JasperReports Server User Guide

Release 4.7

http://www.jaspersoft.com

This is version 0812-JSP47-17 of the *JasperReports Server User Guide*.

Table of Contents

CHAPTER 1 INTRODUCTION TO JASPERREPORTS SERVER

JasperReports Server builds on JasperReports as a comprehensive family of Business Intelligence (BI) products, providing robust static and interactive reporting, report server, and data analysis capabilities. These capabilities are available as either stand-alone products, or as part of an integrated end-to-end BI suite utilizing common metadata and provide shared services, such as security, a repository, and scheduling. The server exposes comprehensive public interfaces enabling seamless integration with other applications and the capability to easily add custom functionality.

The heart of the Jaspersoft BI Suite is the server, which provides the ability to:

- Easily create new reports based on views designed in an intuitive, web-based, drag and drop Ad Hoc Editor.
- Efficiently and securely manage many reports.
- Interact with reports, including sorting, changing formatting, entering parameters, and drilling on data.
- Schedule reports for distribution through email and storage in the repository.
- Arrange reports and web content to create appealing, data-rich Jaspersoft Dashboards that quickly convey business trends.

For business intelligence users, Jaspersoft offers Jaspersoft OLAP, which runs on the server.

While the Ad Hoc Editor lets users create simple reports, more complex reports can be created outside of the server. You can either use iReport Designer or manually write JRXML code to create a report that can be run in the server. Jaspersoft recommends that you use iReport unless you have a thorough understanding of the JasperReports file structure. See **Chapter 5, “Adding Reports Directly to the Repository,” on page 93** and section **7.1, “Plug-in Requirements,” on page 170**.

Jaspersoft provides several other sources of information to help extend your knowledge of JasperReports Server:

- Our Ultimate Guides document advanced features and configuration. They also include best practice recommendations and numerous examples. The guides are available as downloadable PDFs. Community project users can purchase individual guides or bundled documentation packs from the Jaspersoft online store. Commercial customers can download them freely from the support portal.
- Our Online Learning Portal lets you learn at your own pace, and covers topics for developers, system administrators, business users, and data integration users. The Portal is available online from Professional Services section of our website.
- Our free samples, which are installed with JasperReports, iReport, and JasperReports Server, are documented online. For more information about the samples, see section **1.9, “Mastering Report Design,” on page 19**.

JasperReports Server is a component of both a community project and commercial offerings. Each integrates the standard features such as security, scheduling, a web services interface, and much more for running and sharing reports. Commercial editions provide additional features, including Ad Hoc charts, flash charts, dashboards, Domains, auditing, and a multi-organization architecture for hosting large BI deployments.

This chapter contains the following sections:

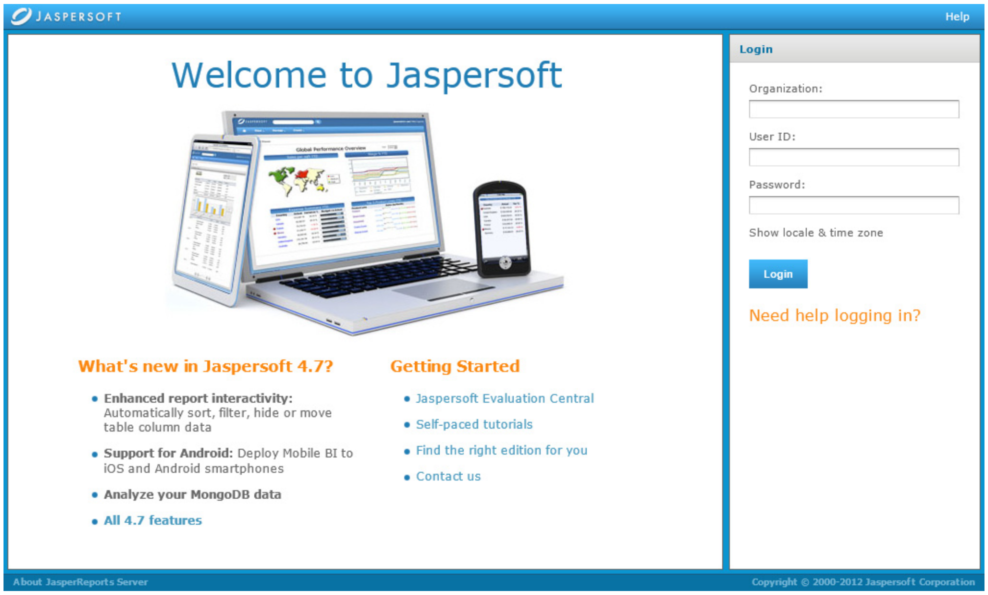
1.1 Logging In

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don’t see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

To protect the data that you can access through the server, all users are required to log in with a password.

To login to the server:

1. Enter `http://<hostname>:8080/jasperserver-pro` in a web browser, where `<hostname>` is the name of the computer that hosts JasperReports Server. The Login page appears:



Welcome to Jaspersoft

What's new in Jaspersoft 4.7?

- **Enhanced report interactivity:** Automatically sort, filter, hide or move table column data
- **Support for Android:** Deploy Mobile BI to iOS and Android smartphones
- **Analyze your MongoDB data**
- All 4.7 features

Getting Started

- Jaspersoft Evaluation Central
- Self-paced tutorials
- Find the right edition for you
- Contact us

Figure 1-1 Jaspersoft Login Page

2. Before logging in, review the information on the login page. There are links to the online help and additional resources.
3. To log in, enter your user ID and password.

If you installed an evaluation server with the sample data, you can log in with the sample user IDs and passwords. For more information, click **Need help logging in?**

The default administrator login credentials are superuser/superuser and jasperadmin/jasperadmin.

For security reasons, administrators should always change the default passwords immediately after installing JasperReports Server, as described in the *JasperReports Server Administrator Guide*.

4. If the Organization field appears in the Login panel, enter the ID or alias of your organization. If you don’t know it, contact your administrator. For more information, see section **1.1.1, “Logging into a Server with Multiple Organizations,” on page 11**.
5. If you want to use a different locale and time zone than the server uses, click **Show locale & time zone**.

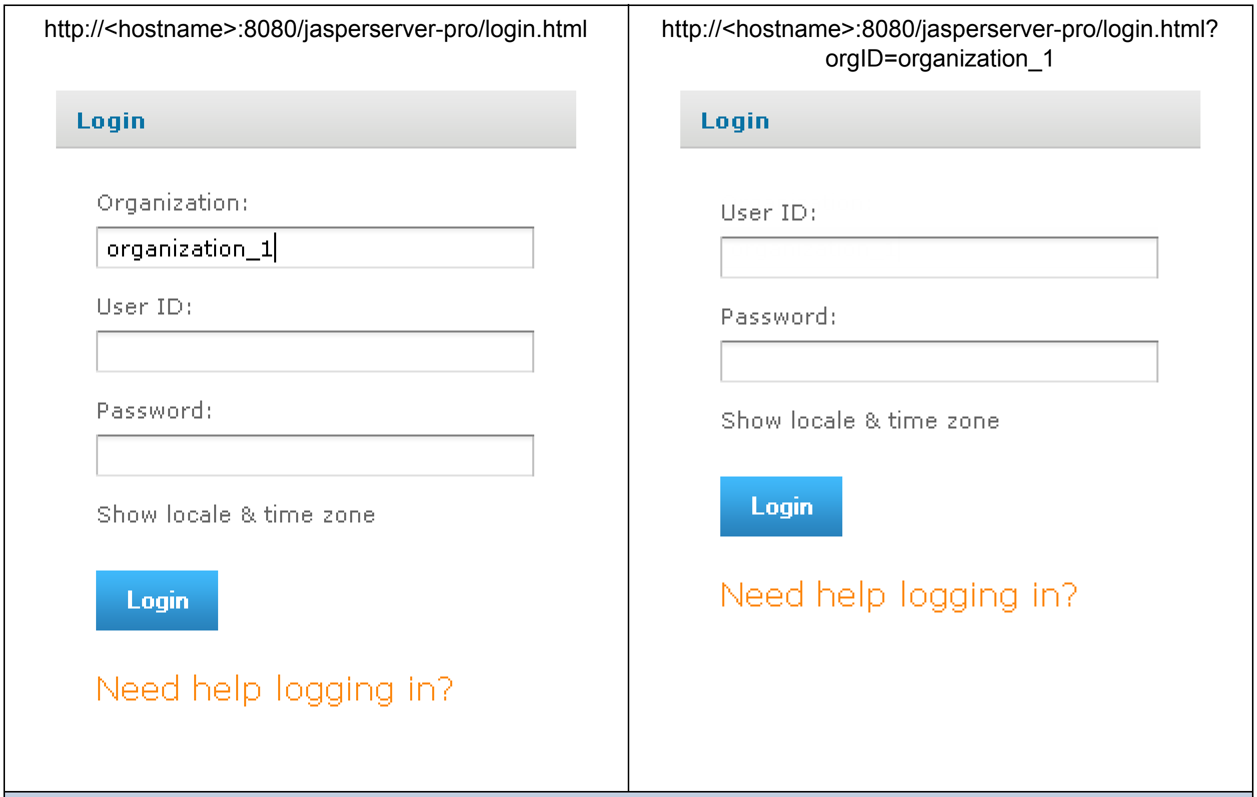
   The Locale and Time Zone fields appear in the Login panel. Select your locale and time zone from the drop-down menus.
6. Click **Login**.

   If you entered a valid user ID and password, the server displays the Getting Started page, as shown in **Figure 1-3**.

1.1.1 Logging into a Server with Multiple Organizations

If the administrator has configured your server to use the multi-tenancy feature, it supports multiple organizations. Each organization has its own private area for storing files and resources. The default Login dialog for a multi-tenant server has an additional field: **Organization**. The left side of **Figure 1-2** shows this field. Enter the ID or alias of your organization. For example, enter the ID of the default organization: `organization_1`.

You don’t have to enter the organization ID each time you log in. The first time you log in, include the organization ID in your login URL, as shown on the right side of **Figure 1-2**. Bookmark the URL and use it for subsequent log ins. The **Organization** field does not appear in the dialog when you specify it in the URL.



http://<hostname>:8080/jasperserver-pro/login.html

Organization: organization_1

http://<hostname>:8080/jasperserver-pro/login.html?orgID=organization_1

Figure 1-2 Login Methods for Multiple Organizations

The superuser account does not specify an organization because it is the system-wide administrator. If the **Organization** field appears in the Login dialog when you log in as superuser, leave it blank. If you try to log in as superuser with an orgID in the URL, the server returns an error.

1.2 The Getting Started Page

From the Getting Started page, you quickly access the most frequently used features of the server

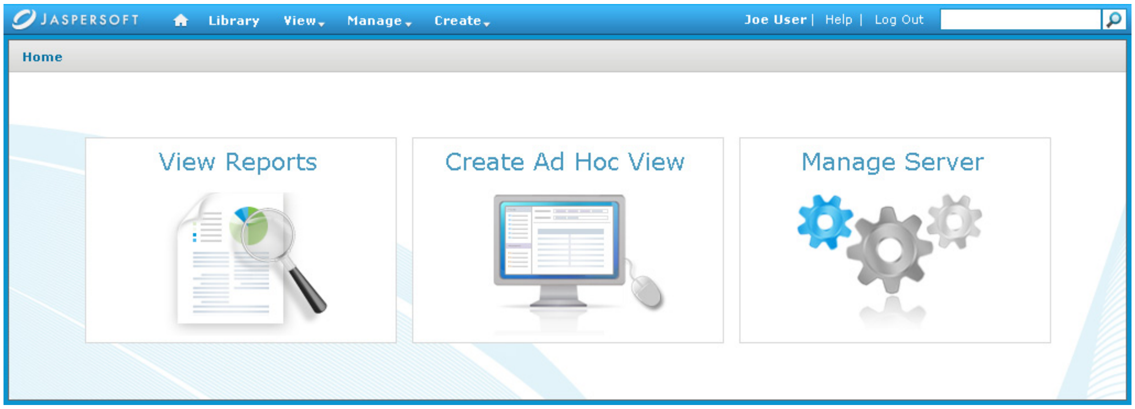


Figure 1-3 Getting Started Page

The Getting Started page for standard users can have three icons that link to the basic functions of the server:

- **View Reports** – Displays a list of the reports that you can view and run.
- **Create Ad Hoc View**– Launches the Data Chooser wizard followed by the Ad Hoc Editor for designing Ad Hoc views – the basis for creating reports on the server – interactively.
- **Manage Server** – Opens the Server Settings page. This option is often only available to administrators.

⌂ and the Library, View, Manage, and Create menus offer these options:

Menu	Description
⌂	Returns to the Getting Started page.
Library	Displays a pared-down repository page that contains the Ad Hoc views, reports, and dashboards the currently logged-in user has rights to
View	• **Search Results** – Displays the repository of resources filtered by criteria selected in the Filters panel. Same as clicking **View Your Reports** on the Getting Started page. • **Repository** – Displays the repository of files and folders containing resources, such as reports, report output, data sources, and images. • **Messages** – Lists system messages, such as an error in a scheduled report. • **UI Samples** – Presents galleries of UI components that you redesign using Themes. Available only to administrators.
Manage	• **Organizations** – Opens the Manage Organizations page. • **Users** – Opens the Manage Users page. • **Roles** – Opens the Manage Roles page. • **Server Settings** – Opens the Server Settings | Log Settings page.
Create	• **Ad Hoc View** – Launches the Ad Hoc Editor for designing views interactively. Same as clicking **Create Ad Hoc View** on the Getting Started page. • **Dashboard** – Launches the Dashboard Designer for laying out multiple reports with input controls, labels, and images. • **Domain** – Launches the Domain Designer for setting up a Domain.

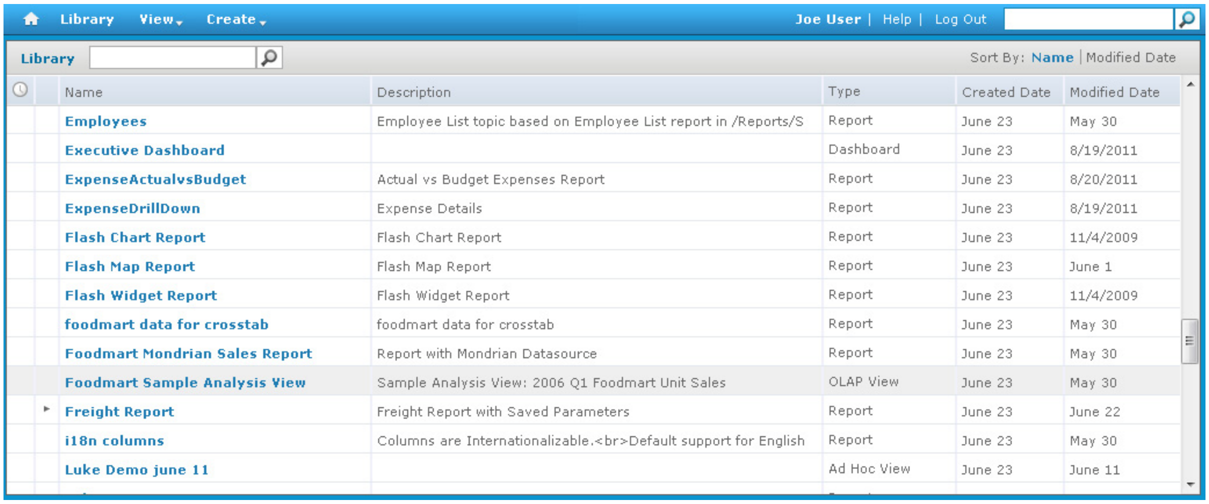
If you log in as an administrator, the Home page has additional options and menu items for managing users, roles, organizations, and settings, such as repository folder names. Administrator functions are documented in the *JasperReports*

Server Administrator Guide. The links to the **Online Help**, **Log Out**, and a search field appear on all JasperReports Server pages. For more information about searching, see section 1.5.2, "Filtering Search Results," on page 15.

1.3 The Library Page

The Library page offers a more focused view of the repository objects. It contains only the Ad Hoc views, reports, and Dashboards that the currently logged-in user has rights to view and work with.

Click **Library** to view your Library list.



Name	Description	Type	Created Date	Modified Date
Employees	Employee List topic based on Employee List report in /Reports/S	Report	June 23	May 30
Executive Dashboard		Dashboard	June 23	8/19/2011
ExpenseActualvsBudget	Actual vs Budget Expenses Report	Report	June 23	8/20/2011
ExpenseDrillDown	Expense Details	Report	June 23	8/19/2011
Flash Chart Report	Flash Chart Report	Report	June 23	11/4/2009
Flash Map Report	Flash Map Report	Report	June 23	June 1
Flash Widget Report	Flash Widget Report	Report	June 23	11/4/2009
foodmart data for crosstab	foodmart data for crosstab	Report	June 23	May 30
Foodmart Mondrian Sales Report	Report with Mondrian Datasource	Report	June 23	May 30
Foodmart Sample Analysis View	Sample Analysis View: 2006 Q1 Foodmart Unit Sales	OLAP View	June 23	May 30
Freight Report	Freight Report with Saved Parameters	Report	June 23	June 22
i18n columns	Columns are Internationalizable. Default support for English	Report	June 23	May 30
Luke Demo june 11		Ad Hoc View	June 23	June 11

Figure 1-4 Library Panel

From the Library page, you can:

- Run and schedule reports
- Open Ad Hoc views and generate reports from them
- Run and edit dashboards
- Run OLAP views

All of these functions are available by right-clicking the item you want to work with and selecting an action from the context menu.

1.3.1 Created vs. Modified Dates

The Library table has two columns that refer to when the repository items were created or last updated.

- The **Created Date** column displays when resource was created.
- The **Modified Date** column displays when the resource was last modified.

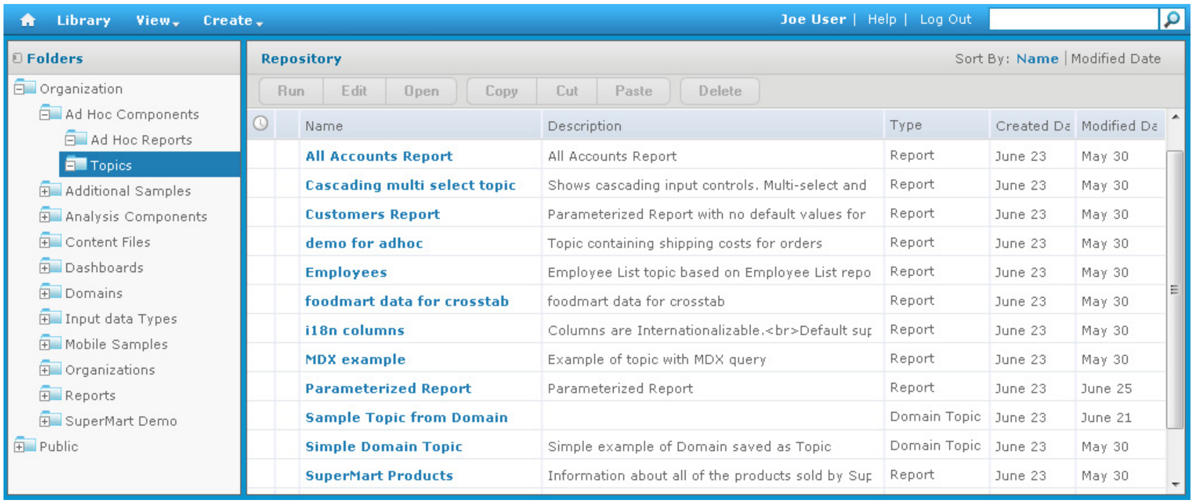
Generally, the created date will be earlier than the modified date. In some situations, however, the created date may be after the modified date. This can happen in two situations:

- When an existing report (A) is modified, then subsequently copied into a new report (B). In the Library list, report B's created date is the day it was created, but its modified date reflects the last time report A was changed.
- An existing report is exported from one system and imported into another. In the Library list, the reports created date is the date it was imported into the new system, and the modified date is the date it was last modified in the original system.

1.4 Browsing the Repository

The repository is the server's internal storage for reports, analysis views, and related files. The repository is organized as a structure of folders containing resources, much like a file system. However, unlike a file system, the repository is stored as a private database that only JasperReports Server can access directly.

To browse the repository, select **View > Repository**. From the repository page, you access the reports, themes, and other files stored on the server. You can browse the repository contents that you have permission to view by expanding icons in **Folders**. Click a folder name to view its contents. Figure 1-5 shows the Repository page.



Name	Description	Type	Created Da	Modified Da
All Accounts Report	All Accounts Report	Report	June 23	May 30
Cascading multi select topic	Shows cascading input controls. Multi-select and	Report	June 23	May 30
Customers Report	Parameterized Report with no default values for	Report	June 23	May 30
demo for adhoc	Topic containing shipping costs for orders	Report	June 23	May 30
Employees	Employee List topic based on Employee List repo	Report	June 23	May 30
foodmart data for crosstab	foodmart data for crosstab	Report	June 23	May 30
i18n columns	Columns are Internationalizable. Default sup	Report	June 23	May 30
MDX example	Example of topic with MDX query	Report	June 23	May 30
Parameterized Report	Parameterized Report	Report	June 23	June 25
Sample Topic from Domain		Domain Topic	June 23	June 21
Simple Domain Topic	Simple example of Domain saved as Topic	Domain Topic	June 23	May 30
SuperMart Products	Information about all of the products sold by Sup	Report	June 23	May 30

Figure 1-5 Repository Folders Panel

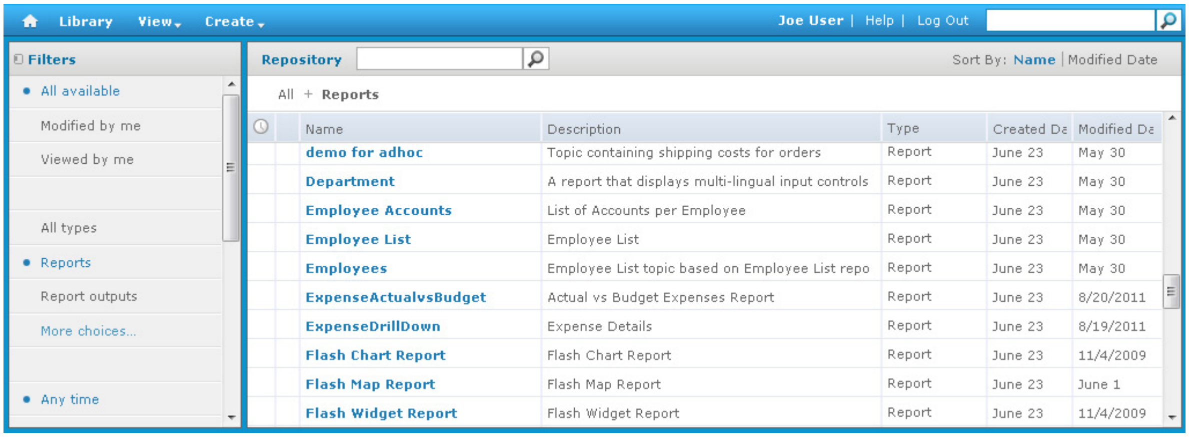
1.5 Searching the Repository

You can search the entire repository, subject to permissions, or narrow the search using filters. **Filters** restrict a search by name, who changed the resource, type of resource, date of the resource, and schedule.

1.5.1 Searching the Entire Repository

To search the repository, select **View > Search Results**. The search results page appears. Instead of only viewing resources by folder, use intuitive search criteria, such as who modified the resource and when, to find pinpoint resources.

On the search results page, use either the **Filters** panel or **Search** field to find resources. The search results page displays results of searches and filters.



- ● All available
- Modified by me
- Viewed by me
- All types
- ● Reports
- Report outputs
- More choices...
- ● Any time

Name	Description	Type	Created Da	Modified Da
demo for adhoc	Topic containing shipping costs for orders	Report	June 23	May 30
Department	A report that displays multi-lingual input controls	Report	June 23	May 30
Employee Accounts	List of Accounts per Employee	Report	June 23	May 30
Employee List	Employee List	Report	June 23	May 30
Employees	Employee List topic based on Employee List repo	Report	June 23	May 30
ExpenseActualvsBudget	Actual vs Budget Expenses Report	Report	June 23	8/20/2011
ExpenseDrillDown	Expense Details	Report	June 23	8/19/2011
Flash Chart Report	Flash Chart Report	Report	June 23	11/4/2009
Flash Map Report	Flash Map Report	Report	June 23	June 1
Flash Widget Report	Flash Widget Report	Report	June 23	11/4/2009

Figure 1-6 Search Results Page

To search all resources in the repository:

1. Select one of these filters: **All available**, **Modified by me**, or **Viewed by me.**
2. Click the ✖ icon in the search field to clear the search term if there is one.
3. Select **All types**, as shown in Figure 1-6.
4. Click 🔍.

   The search results appear, listing files that your user account has permission to view. Click a resource in the list to view it or right-click a resource to see what functions are available from the context menu.

The server remembers your settings on the Search Results page, making the most commonly needed resources remain visible when you return to the page.

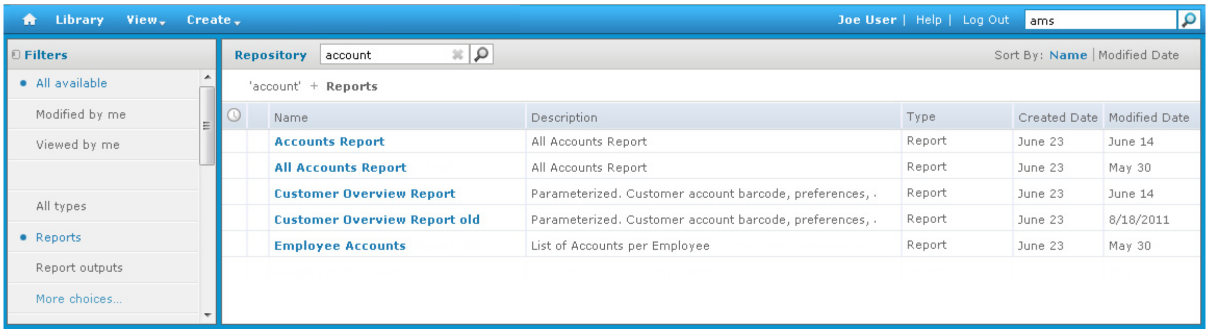
1.5.2 Filtering Search Results

If you enter a search term and click 🔍 at the top of any server page, the server doesn't use filters. The search uses these default settings:

- Include subfolders
- Start at the top-most folder visible to the user
- Search for reports, report outputs, OLAP views, or other resources
- Sort alphabetically by name

If you click **View > Search Results** and click 🔍 on the search results page, the server uses the filters you set in the **Filters** panel.

Figure 1-7 shows the results of a search for the term “account” using the filters All available and All types.



Name	Description	Type	Created Date	Modified Date
Accounts Report	All Accounts Report	Report	June 23	June 14
All Accounts Report	All Accounts Report	Report	June 23	May 30
Customer Overview Report	Parameterized. Customer account barcode, preferences, .	Report	June 23	June 14
Customer Overview Report old	Parameterized. Customer account barcode, preferences, .	Report	June 23	8/18/2011
Employee Accounts	List of Accounts per Employee	Report	June 23	May 30

Figure 1-7 Search Field and Search Results

The search term you enter in the search field isn’t cleared automatically. To clear the search term, click the ✖ icon in the search field.

You refine a search using filters. For example, filters can help you find your most recently viewed reports. You can set each filter independently of the others. You can set the following types of filters:

- User
- Resource
- Access time
- Scheduled report

The user filter has the following settings:

Filter Setting	Description
All Available (default)	All resources.
Modified by me	Selects only resources that were last modified by the user who’s logged in.
Viewed by me	Selects only resources that were run and viewed by the user who’s logged in. This filter not only applies to visualization types, but also to resources that are included in reports such as images.

The resource type filter has the following settings:

Filter Setting	Description
All types (default)	All resources.
Reports	Displays only reports, both JRXML reports and Ad Hoc reports.
Report outputs	Displays only the output from reports that were scheduled or run in the background. Report output can be any of the supported export types, such as HTML and PDF.
Dashboards	Displays only dashboards.
OLAP views	Displays only analysis views (if you implement Jaspersoft OLAP).
Domains	Displays only Domains.
Data sources	Displays only data sources.

The access time filter has the following settings. All times are relative to the user's effective time zone:

Filter Setting	Description
Any time (default)	All resources.
Today	Resources viewed or modified since the previous midnight.
Yesterday	Resources viewed or modified during the previous day ending at midnight.
Past week	Resources viewed or modified during the past 7 days, including today.
Past month	Resources viewed or modified during the past 30 days, including today.

The scheduled report filter has the following settings:

Filter Setting	Description
Any schedule (default)	All resources.
Scheduled	Only reports that have scheduled jobs.
Scheduled by me	Only reports that have jobs scheduled by the currently logged in user.
Not scheduled	Only reports that don't have scheduled jobs and all other resource types.

Remember these do's and don'ts when searching for resources:

- Do use word fragments.
- Do search for the display name or part of the display name of a resource.
- Do search for words or fragments in the description of a resource.
- Do use multiple words.
- Don't search for folder names.
- Don't enter quotes around terms or symbols between terms.
- Don't worry about using upper- or lower-case letters in search terms.

1.6 Using Repository Resources

After finding a resource in the repository, naturally you want to do something with it. Options are:

- Click the name of a report to run and view it.
- Right-click the name of a resource to access other operations on the context menu, for example **Edit** or **Open in Designer**. Items appear on the context menu according to the permissions granted to the user.
- Click anywhere in the row except the resource name to select a resource. Ctrl-click anywhere in the rows to select multiple resources. Use the context menu or buttons above the results list: **Run**, **Edit**, **Open**, **Copy**, **Cut** (move), or **Delete**. If the button is unavailable, the resource doesn't support the operation or you don't have permission to do this operation. For example, the Open button is available when you select a dashboard or an Ad Hoc report if you have permission to write to it.

  You might also need permission to access the folder or dependent file, such as an image, of a resource. For example, to schedule a report, you need to have read/write/delete permission on the folder where server saves the report output. For more information about permissions, see the *JasperReports Server Administrator Guide*.

There are two icons that may appear in the **Repository** panel:

- ▸ indicates that the report has saved options for its input controls. Click the ▸ icon to list the saved options. For more information, see section 3.7, "Running a Report with Input Controls or Filters," on page 43.
- 🕓 indicates that the report is scheduled to run or is running in the background. Click this icon to view the list of jobs scheduled for the report. For more information, see section 3.8, "Scheduling Reports," on page 47.

1.7 Moving Folders

If you have read permission on folders and resources, you can copy and cut them from one folder and paste them to another if you have write permission on the destination folder. The server pastes all contents of the folder that you copy or cut into the new location.

You can drag-and-drop the objects instead of using the paste menu item. Move folders one at a time. You can move other resources in batches.

Relocated objects inherit permissions from the destination folder, losing the permissions in place prior to the move. To change permissions on an object, set the permissions explicitly.

To move folders and resources by cutting and pasting:

1. Log into the server as a user who has these permissions:
   - Read permission on the folder or resource to move
   - Write permission on the destination folder

   For example, log in as joeuser (use the password, joeuser).
2. Click **View > Repository**.
3. In the **Folders** panel, right-click **Reports > Samples**, and select **Add Folder**.
4. In the **Add Folder** dialog, enter a name, such as Financial Reports, and click **Add**.

   The Financial Reports folder appears as a subfolder of Samples and inherits Joe User's default permissions (read-write-delete) on the parent folder.

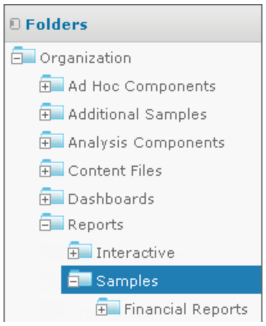


Figure 1-8 New Financial Reports Folder

5. The Financial Reports folder deserves a more prominent location. Move it up one level:

   a. In **Folders**, right-click Financial Reports, and select **Cut**.

   b. Right-click **Reports**, and select **Paste**.

   The Financial Reports folder now appears in **Reports** at the same level as **Samples**.

   You can relocate a folder, subject to permissions, anywhere in the repository with one exception: The server doesn't support copying and pasting a folder to the same location. If the Paste command is disabled when you right-click a destination folder, you don't have write permission on the folder.

1.8 Sorting the Repository List

To change the order of the list of reports and other resources, use the **Sort By** controls:

- Click **Name** to sort alphabetically (A at the top). This is the default sort order.
- Click **Modified Date** to sort by the latest modified time and date (most recent at the top).

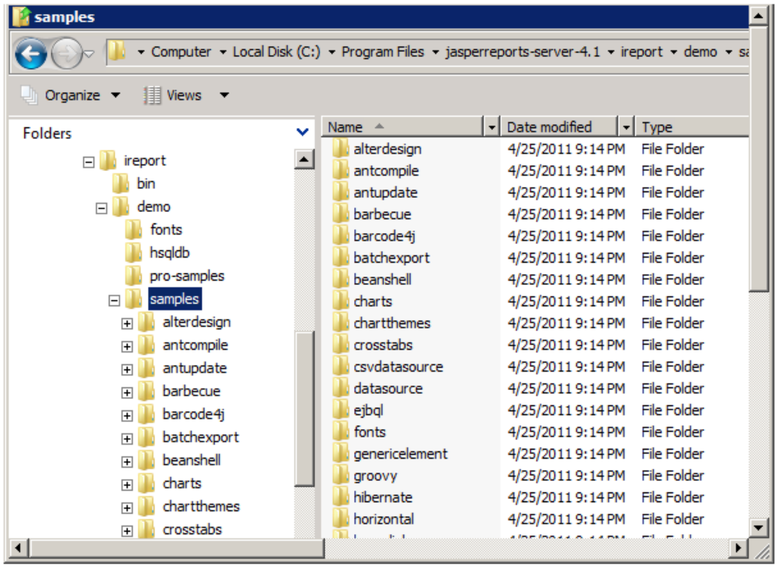
1.9 Mastering Report Design

JasperReports open source library drives the reporting engine of the server. The default server installation includes iReport and an extensive set of free JasperReports samples. To master report design or to learn about a specific aspect of it, such as charting, take advantage of these samples.

1.9.1 Locating JasperReports Samples

Figure 1-9 shows the location of these samples in <js-install>\ireport\demo\samples after installing the server.

<js-install> is the root directory where JasperReports Server is installed.



Name	Date modified	Type
alterdesign	4/25/2011 9:14 PM	File Folder
antcompile	4/25/2011 9:14 PM	File Folder
antupdate	4/25/2011 9:14 PM	File Folder
barbecue	4/25/2011 9:14 PM	File Folder
barcode4j	4/25/2011 9:14 PM	File Folder
batchexport	4/25/2011 9:14 PM	File Folder
beanshell	4/25/2011 9:14 PM	File Folder
charts	4/25/2011 9:14 PM	File Folder
chartthemes	4/25/2011 9:14 PM	File Folder
crosstabs	4/25/2011 9:14 PM	File Folder
csvdatasource	4/25/2011 9:14 PM	File Folder
datasource	4/25/2011 9:14 PM	File Folder
ejbql	4/25/2011 9:14 PM	File Folder
fonts	4/25/2011 9:14 PM	File Folder
genericelement	4/25/2011 9:14 PM	File Folder
groovy	4/25/2011 9:14 PM	File Folder
hibernate	4/25/2011 9:14 PM	File Folder
horizontal	4/25/2011 9:14 PM	File Folder

Figure 1-9 JasperReports Samples Installed with JasperReports Server

The installers for the standalone version of iReport and JasperReports also install the samples.

1.9.2 Learning about the Samples

The samples are documented online:

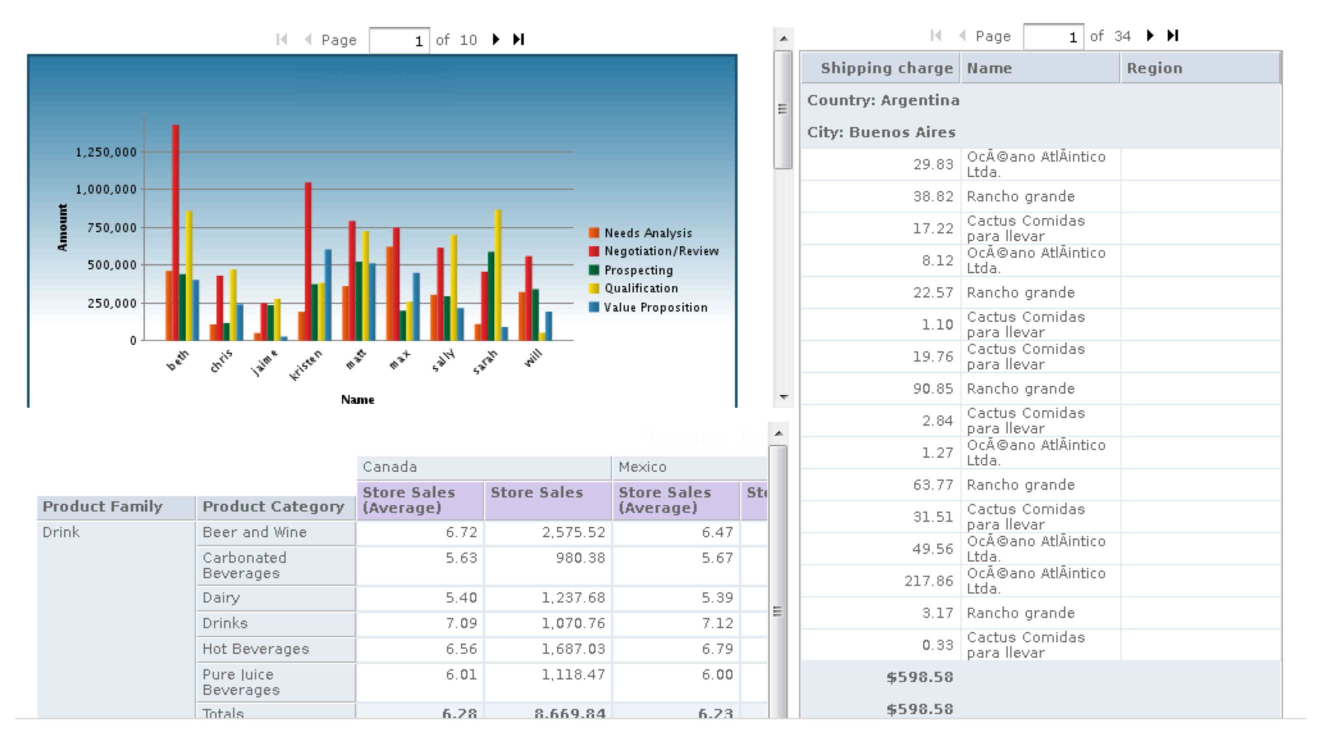
- JasperReports Samples Overview
- JasperReports Samples Reference

Click the Docs link on our community website to find more documentation about iReport and JasperReports Server.

Chapter 2 Working with Jaspersoft Dashboards

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don’t see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

A Jaspersoft Dashboard displays several reports in a single, integrated view. A dashboard can include other dashboards, input controls for choosing the data displayed in one or more frames, and custom frames that point to URLs for other content. By combining different types of related content, you can create appealing, data-rich dashboards that quickly convey trends.



		Canada		Mexico	
Product Family	Product Category	Store Sales (Average)	Store Sales	Store Sales (Average)	St
Drink	Beer and Wine	6.72	2,575.52	6.47	
	Carbonated Beverages	5.63	980.38	5.67	
	Dairy	5.40	1,237.68	5.39	
	Drinks	7.09	1,070.76	7.12	
	Hot Beverages	6.56	1,687.03	6.79	
	Pure Juice Beverages	6.01	1,118.47	6.00	
	Totals	6.28	8,669.84	6.23	

Shipping charge	Name	Region
Country: Argentina		
City: Buenos Aires		
29.83	OcÃ©ano AtlÃintico Ltda.	
38.82	Rancho grande	
17.22	Cactus Comidas para llevar	
8.12	OcÃ©ano AtlÃintico Ltda.	
22.57	Rancho grande	
1.10	Cactus Comidas para llevar	
19.76	Cactus Comidas para llevar	
90.85	Rancho grande	
2.84	Cactus Comidas para llevar	
1.27	OcÃ©ano AtlÃintico Ltda.	
63.77	Rancho grande	
31.51	Cactus Comidas para llevar	
49.56	OcÃ©ano AtlÃintico Ltda.	
217.86	OcÃ©ano AtlÃintico Ltda.	
3.17	Rancho grande	
0.33	Cactus Comidas para llevar	
$598.58		
$598.58		

Figure 2-1 Dashboard with a Table, Chart, and Crosstab

This chapter contains the following sections:

- **Viewing a Dashboard**

- Creating a Dashboard
- Editing a Dashboard
- Tips for Designing Dashboards

2.1 Viewing a Dashboard

You can view a dashboard if you have the proper permissions. By default, you can save dashboards in the /Dashboards folder.

To view a dashboard:

1. Log in as user, `demo`, using the password, `demo`.

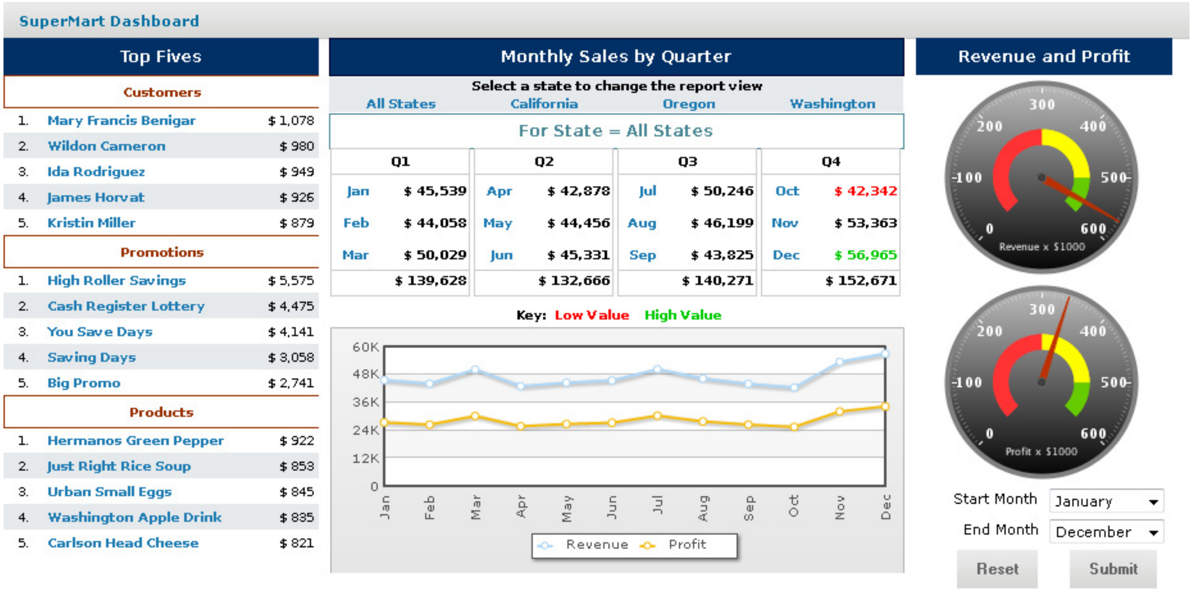
   Passwords are case-sensitive. You must use lowercase `d` when you type `demo`.

2. In the search field, enter `supermart` and click 🔍 .

   The search results are displayed.

3. Click the name **SuperMart Dashboard** in the list of results. Alternatively, right-click the name and select **Run** from the context menu.

   JasperReports Server displays the dashboard, which includes three reports:



SuperMart Dashboard

Top Fives

Customers		
1.	Mary Francis Benigar	$ 1,078
2.	Wildon Cameron	$ 980
3.	Ida Rodriguez	$ 949
4.	James Horvat	$ 926
5.	Kristin Miller	$ 879

Promotions		
1.	High Roller Savings	$ 5,575
2.	Cash Register Lottery	$ 4,475
3.	You Save Days	$ 4,141
4.	Saving Days	$ 3,058
5.	Big Promo	$ 2,741

Products		
1.	Hermanos Green Pepper	$ 922
2.	Just Right Rice Soup	$ 853
3.	Urban Small Eggs	$ 845
4.	Washington Apple Drink	$ 835
5.	Carlson Head Cheese	$ 821

Monthly Sales by Quarter

Select a state to change the report view

All States California Oregon Washington

For State = All States

Q1		Q2		Q3		Q4	
Jan	$ 45,539	Apr	$ 42,878	Jul	$ 50,246	Oct	$ 42,342
Feb	$ 44,058	May	$ 44,456	Aug	$ 46,199	Nov	$ 53,363
Mar	$ 50,029	Jun	$ 45,331	Sep	$ 43,825	Dec	$ 56,965
	$ 139,628		$ 132,666		$ 140,271		$ 152,671

Key: Low Value High Value

Revenue and Profit

Start Month: January

End Month: December

Figure 2-2 SuperMart Dashboard Example

4. When you hover your cursor over each report, controls appear for that individual report: ⟳ ➡ Click **Refresh** to refresh the report content, and click **Open in a new window** to open the report in a new window.
5. Select new values from the **Start Month** and **End Month** drop-downs and click **Submit** to change the data displayed.

   All three reports update to display data for the months you indicate.
6. Click **Reset** to set the input controls to the last values saved and return the dashboard to its initial view.
7. When done, click **View > Repository** to go back to the repository page.

Keep these points in mind when viewing a dashboard that has input controls:

- An input control may appear as a text field, a drop-down, a check box, a multi-select list box, or a calendar icon.

- If one of the frames in a dashboard does not refer to an input control, that frame does not update when you change that input control's value. Only reports that refer to the input control reflect the change.

If a dashboard includes a **Print View** button, click it to display the dashboard without JasperReports Server's header and footer; depending on your web browser, this also opens your browser's Print window.

2.2 Creating a Dashboard

As a user, you can create a dashboard, though your permissions to access the repository may limit the content you can add and the location where you can save the dashboard.

This section includes:

- **Dashboard Overview**
- **Creating a Simple Dashboard**
- **Adding Controls to a Dashboard**
- **Localizing Controls**
- **Adding a Custom URL to a Dashboard**
- **Refining a Dashboard's Layout**
- **About Screen Sizes**

2.2.1 Dashboard Overview

A dashboard can include the following content:

- Reports in the repository.
- Special content:
  - **Custom URL**. Any URL-addressable web content. The dashboard can point to web content and include it in a frame in a web page. For example, you might include a frame that points to the logo on your corporate website; when that logo changes, the dashboard automatically updates to reflect the branding change. A complex example is described in **"Adding a Custom URL to a Dashboard" on page 27**.
  - **Free Text**. A free-form text entry field. Resizing this type of item changes the size of the font in the label. Use free text items to add titles and instructional text to the dashboard.
  - **Single Controls** and **Multiple Controls**. If a report you include on the dashboard is designed to use input controls or filters, you can add that capability to the dashboard. The server maps input controls to one or more frames. For example, if multiple reports include the same parameter, the server automatically maps the corresponding control to each of those reports when you add the input control to the dashboard. Controls can also be manually mapped to custom URL frames.

    Multiple controls are those used by more than one report. Single controls are those used by a single report.

  - **Dashboard Controls**:
    - **Submit**. Applies the values in the dashboard input controls to the reports that refer to each input control. The server refreshes these reports to display the new set of data. If the dashboard doesn't include a **Submit** button, changes to input control values are reflected immediately.
    - **Reset**. Resets the values of the input controls to the last value selected when the dashboard was saved.
    - **Print View**. Displays the dashboard without buttons or the server's header and footer, and (depending on the browser) opens the browser's Print window.
    - **Text Label**. Identifies an input control. When you add an input control to the dashboard, the server automatically adds a text label for it. Resizing this type of item only changes the size of the label itself; the font size in the label is fixed.

2.2.2 Creating a Simple Dashboard

This section describes the creation of a dashboard.

To add a report to a dashboard, you must have permission to view the report.

To create a simple dashboard:

1. Click **Create > Dashboard**.

   The dashboard designer appears, displaying the list of available content and the canvas.

2. In **Available Content**, navigate to the /Reports/Samples folder, right-click the Freight Report.
3. Select **Add to Dashboard**:

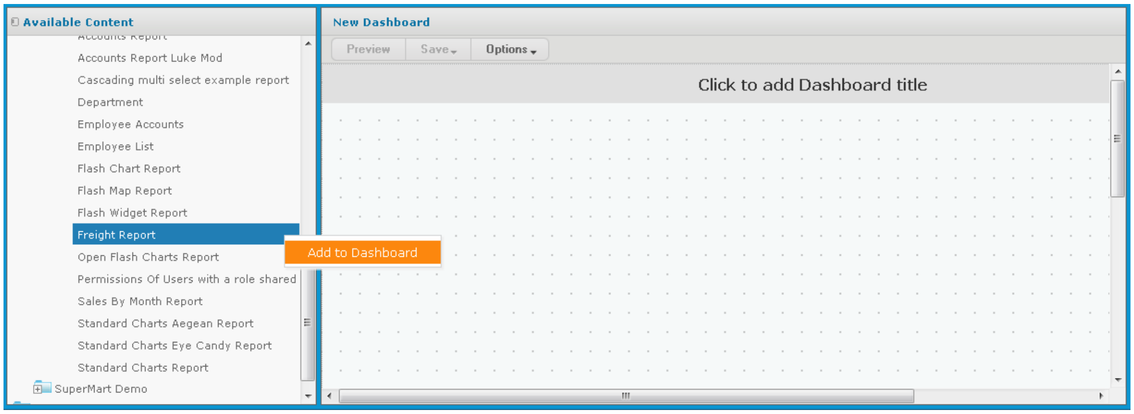


Figure 2-3 List of Available Content in the Dashboard Designer

   The Freight Report appears in a frame in the upper left corner of the canvas.

4. In Available Content, double-click the Accounts Report.

   The Accounts Report appears on the canvas.

5. Right-click the Accounts Report and click **Size to Content**.

   The resized Accounts Report now exceeds the canvas area.

   You can save the dashboard even though its contents exceed the canvas area. In fixed sizing mode, if content exceeds the canvas area, the user may have to scroll to see the entire dashboard. For more information, see section 2.2.7, "About Screen Sizes," on page 29.

6. To ensure that a user with the selected resolution can view the entire dashboard without scrolling, resize the Accounts Report to fit within the canvas area:

   a. Hover the cursor over the handle at the bottom of right-hand edge of the frame containing the Accounts Report.

   b. When the cursor changes to a resizing icon (⤡) click and drag the edge of the frame to resize it.

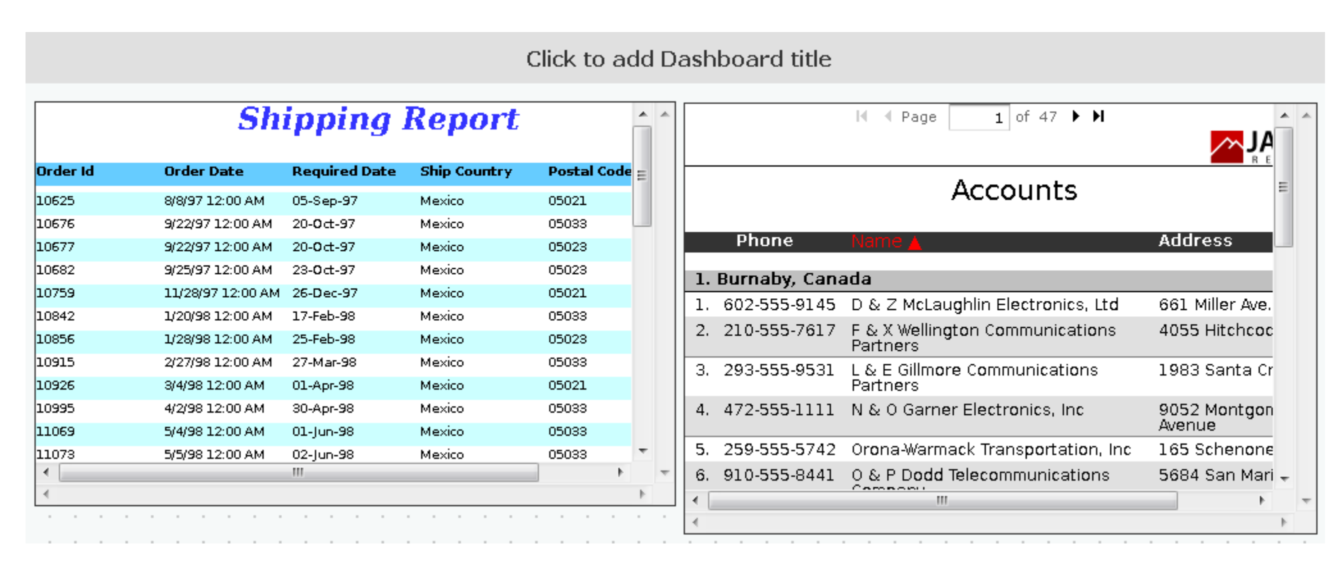
   c. Drag the edge of the frame of the Accounts Report upward until only seven accounts in Burnaby are shown.

   Press the Ctrl key while dragging or resizing items and frames for smoother cursor movement. This disables the default snap-to-grid behavior.

7. Right-click the Accounts Report and click **Show Scroll Bars**.
8. Right-click the Freight Report, and click **Hide Scroll Bars**.

   Use **Hide Scroll Bars** for charts and small crosstabs to size the frame to match its content exactly.

Figure 2-4 shows how the dashboard looks at this point:



Click to add Dashboard title

Shipping Report

Order Id	Order Date	Required Date	Ship Country	Postal Code
10625	8/8/97 12:00 AM	05-Sep-97	Mexico	05021
10676	9/22/97 12:00 AM	20-Oct-97	Mexico	05033
10677	9/22/97 12:00 AM	20-Oct-97	Mexico	05023
10682	9/25/97 12:00 AM	23-Oct-97	Mexico	05023
10759	11/28/97 12:00 AM	26-Dec-97	Mexico	05021
10842	1/20/98 12:00 AM	17-Feb-98	Mexico	05033
10856	1/28/98 12:00 AM	25-Feb-98	Mexico	05023
10915	2/27/98 12:00 AM	27-Mar-98	Mexico	05033
10926	3/4/98 12:00 AM	01-Apr-98	Mexico	05021
10995	4/2/98 12:00 AM	30-Apr-98	Mexico	05033
11069	5/4/98 12:00 AM	01-Jun-98	Mexico	05033
11073	5/5/98 12:00 AM	02-Jun-98	Mexico	05033

Accounts

	Phone	Name ▲	Address
1. Burnaby, Canada			
1.	602-555-9145	D & Z McLaughlin Electronics, Ltd	661 Miller Ave.
2.	210-555-7617	F & X Wellington Communications Partners	4055 Hitchcoc
3.	293-555-9531	L & E Gillmore Communications Partners	1983 Santa Cr
4.	472-555-1111	N & O Garner Electronics, Inc	9052 Montgon Avenue
5.	259-555-5742	Orona-Warmack Transportation, Inc	165 Schenone
6.	910-555-8441	O & P Dodd Telecommunications	5684 San Mari

Figure 2-4 A Simple Dashboard with Sample Reports

9. Click **Preview**.

   The end user view of the dashboard appears in a new tab or a new window, depending on the browser configuration.

10. Close the preview window or tab to return to the designer, and click **Save Dashboard**.

    You are prompted for the name and location for saving the dashboard.

11. Change the default name, New Dashboard to `Freight Dashboard` and locate a folder, such as the /Dashboards folder.

2.2.3 Adding Controls to a Dashboard

The Freight Report was designed to be run with input controls. When you add a report that has input controls to a dashboard, the controls don't appear on the dashboard until you explicitly add them, one-by-one. When the report runs, dashboard users provide input using the control. Data based on the user input appears in the dashboard. For example, using the input control, you select Mexico. The report on the dashboard shows orders from Mexican companies.

To add controls to the dashboard:

1. If the Freight Dashboard created in section 2.2.2, "Creating a Simple Dashboard," is not open, locate the /Dashboards folder in the repository. Right-click the dashboard name and select **Open in Designer** from the context menu.

   The **Open in Designer** submenu opens a dashboard or an Ad Hoc report for editing in the Dashboard Designer or Ad Hoc Editor, respectively.

   The Freight Dashboard appears in the designer, as shown in Figure 2-4, and the input controls for the report appear in the Special Content folder.

2. In the **Available Content** list, open the **Special Content > Single Report Controls** folder.

   The three input controls associated with the Freight Report appear.

3. Right-click Country and select **Add to Dashboard**.

   The Country input control and its label appear above the Freight Report on the canvas.

   If you want to place the input control in a location other than above the report, drag it from the Available Content list to the desired location. You can delete, reposition, and resize the input control or its label independently.

4. Select a new value from the Country input control.

   The data displayed in the Freight Report changes, but not in the Account report. The Account report does not refer to an input control named Country.
5. Add the **OrderID** and **RequestDate** controls to the dashboard. In the **Available Content** list, right-click RequestDate, and select **Add to Dashboard**. Right-click OrderID, and select **Add to Dashboard**.
6. Ctrl-click to select the input controls and their labels.

   You can use a selection rectangle or Ctrl-click to select multiple frames and items on the canvas.

7. Drag the controls below the Freight Report.
8. Draw a selection rectangle to select the OrderID input control and its label, and drag them directly beneath the Country input control.
9. Draw a selection rectangle to select the RequestDate input control and its label, and drag them directly beneath the OrderID input control.
10. Click the **OrderID** label, and change it to `Order`.Change the **RequestDate** label to `Date`.
11. In the **Available Content** list, navigate to **Special Content > Dashboard Controls**, and drag the **Submit** and **Reset** buttons underneath the input controls on the canvas.

    By default, a dashboard automatically updates when you change the values in its input controls. When the dashboard includes the **Submit** button, the server doesn't update the dashboard until you click the Submit button.

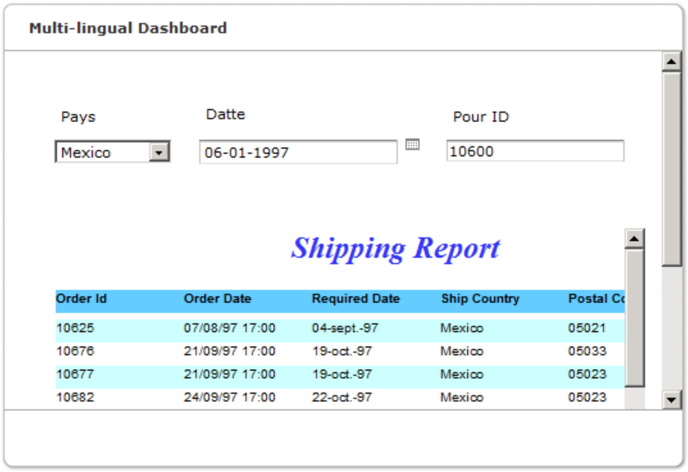
12. Click **Save**.

    The dashboard is saved to the repository.

2.2.4 Localizing Controls

You can design dashboard controls to accommodate different languages. First, use the $R syntax to define prompts and static lists of values. Next, attach resource bundles to the report that contain translations of the prompts and lists of values. Finally, add the report to the dashboard. For more information about how to localize input controls, see section 5.6, "Localizing Reports," on page 120.

Figure 2-5 shows an example of a dashboard that contains localized controls for the Freight Report. The Dashboard Viewer prompts for input in French when the user logs in using the French locale setting.



Multi-lingual Dashboard

Pays: Mexico

Datte: 06-01-1997

Pour ID: 10600

Shipping Report

Order Id	Order Date	Required Date	Ship Country	Postal Cc
10625	07/08/97 17:00	04-sept.-97	Mexico	05021
10676	21/09/97 17:00	19-oct.-97	Mexico	05033
10677	21/09/97 17:00	19-oct.-97	Mexico	05023
10682	24/09/97 17:00	22-oct.-97	Mexico	05023

Figure 2-5 Multi-lingual Input Controls on a Dashboard

2.2.5 Adding a Custom URL to a Dashboard

You can create a frame that displays URL-addressable content. Such mashups can help you leverage data from many sources in a single, integrated view. By default, the server assumes that you want to use the HTTP protocol for custom URL frames. However, you can specify that it use the FILE protocol by entering `file://` at the beginning of the value in the URL. In this case, the server uses the FILE protocol, and looks for the file you specify in the server's WEB-INF directory. This is helpful for including images.

To add a custom URL:

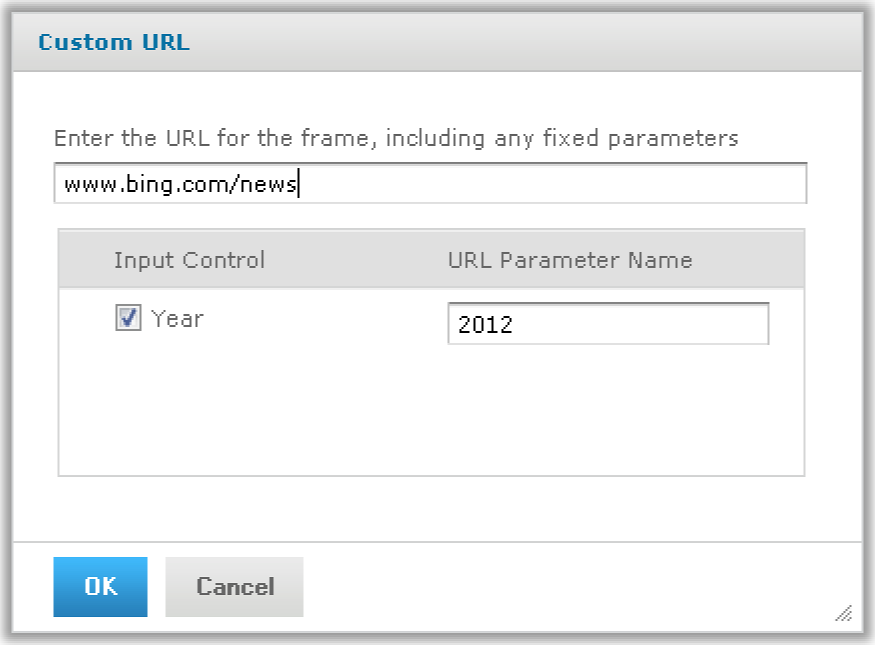
1. If the dashboard you saved in section 2.2.3 isn't open, locate the Freight Dashboard, typically in the /Dashboards folder, right-click Freight Dashboard, and select **Open in Designer** from the context menu.

   The Freight Dashboard appears in the designer, as shown in Figure 2-4.

2. In the **Available Content** list, double-click **Special Content > Custom URL**.

   The Custom URL dialog box appears.

3. Enter the URL of the web page you want the frame to display. For example, enter `www.bing.com/news`:



Custom URL

Enter the URL for the frame, including any fixed parameters

www.bing.com/news

Input Control	URL Parameter Name
☑ Year	2012

Figure 2-6 Custom URL Frame Definition

4. Click the check box next to **Country** to select that input control, and in the **URL Parameter Name** field, replace the default text (`Country`) with the letter `q`. This URL Parameter Name field is case-sensitive.

   The server maps the Country input control to Bing's `q` (query) parameter.

   The OrderID and RequestDate input controls also appear in the Custom URL dialog box. If www.bing.com/news accepted a parameter that was compatible with these input controls, you could check their check boxes to associate the URL with these input controls, as well.

The Custom URL dialog box uses the iframe HTML tag to define an inline frame that can contain a document. If you experience a problem using the Custom URL, check the following possible causes:

- Browser security settings disable support for iframes.
- The target web site blocks access to its web page from an iframe.

5. Click **OK** to close the custom URL dialog box.
6. Select a new value from the Country input control, click **Submit**.

The server passes the Country value to www.bing.com/news, displaying the news related to the selected country. The news displayed in the custom URL frame changes.

7. Resize the custom URL frame so that only the first article's synopsis appears.
8. Drag the custom URL frame to the left to align its left edge with the right edge of the input controls. Use the arrow keys to move selected content one grid space at a time. Press the Ctrl key to move the selected content a single pixel at a time.
9. Click the custom URL frame, and click **Auto-refresh Interval** on the context menu.

   The menu expands to display options for how frequently the server should refresh the frame's content. Smaller values make the server update the frame more often. By default, a frame is never automatically refreshed (that is, its **Auto-refresh Interval** is set to **Manual Only**).
10. Click **5 Minutes** beneath the **Auto-refresh Interval** on the context menu.

    Auto-refresh affects only the end user view of the dashboard. In the designer, the frame is never auto-refreshed.
11. Click **Save**.

    The dashboard is saved to the repository.

2.2.6 Refining a Dashboard's Layout

After completing the layout, refine the look and feel of the dashboard.

To refine the dashboard's layout:

1. If it isn't open, locate the Freight Dashboard saved in section 2.2.5, typically in the /Dashboards folder.
2. Right-click the dashboard name, select **Open in Designer** from the context menu, and click **Preview**.

   The end user's view of the dashboard appears. If the dashboard is already open in the browser, the server updates that page rather than opening a new window or tab.
3. In the **Country** field, select a new value.

   The Freight Report and custom URL frames do not update because the dashboard includes the **Submit** button.
4. Return to the dashboard designer and, on the canvas, hover the cursor over the **Submit** button. Click the hover border when it appears.
5. From the context menu, click **Delete Item**.

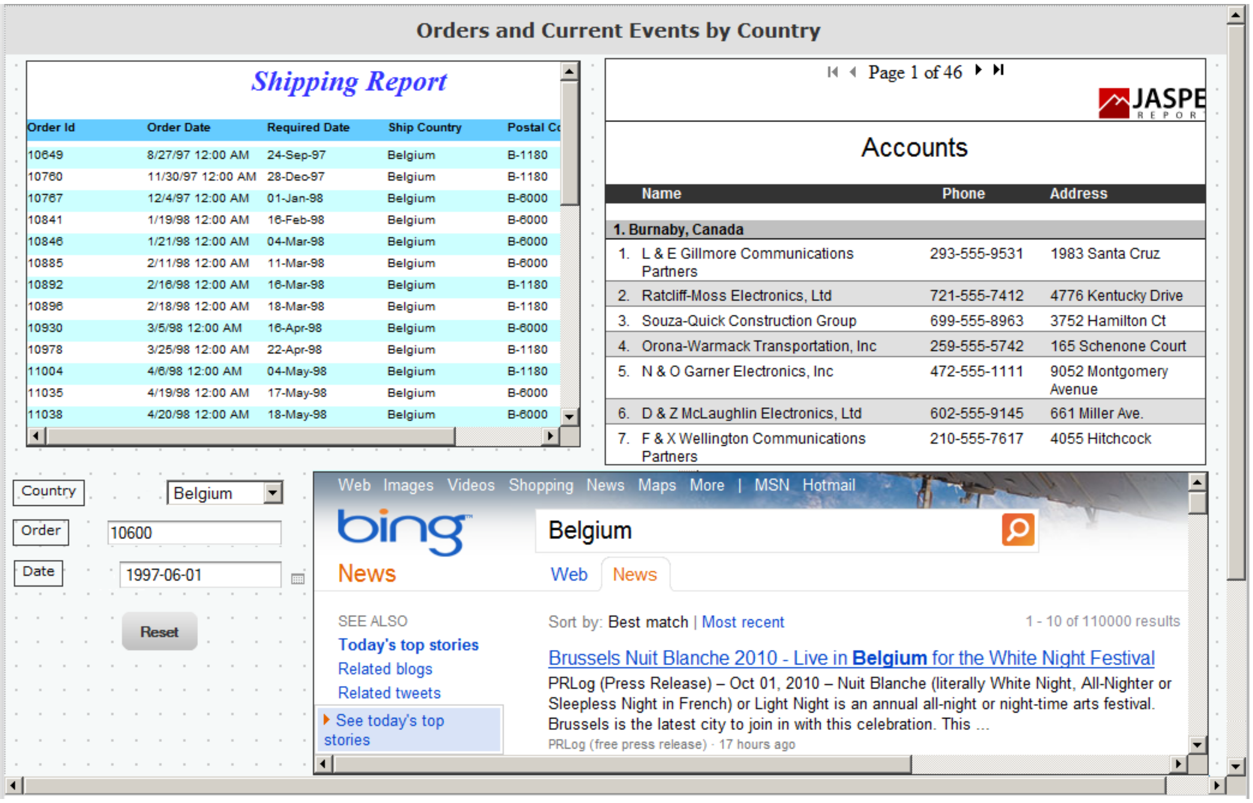
   The **Submit** button disappears.
6. Reposition the **Reset** button to center it in the available space, then click **Click to add dashboard title**.

   The title becomes editable.
7. Enter `Orders and Current Events by Country`.
8. Click **Preview**.

   The end user view of the dashboard appears.

9. Change the value in the Country input control.

   The dashboard reflects the change immediately:



Orders and Current Events by Country

Shipping Report

Order Id	Order Date	Required Date	Ship Country	Postal Cc
10649	8/27/97 12:00 AM	24-Sep-97	Belgium	B-1180
10760	11/30/97 12:00 AM	28-Dec-97	Belgium	B-1180
10767	12/4/97 12:00 AM	01-Jan-98	Belgium	B-6000
10841	1/19/98 12:00 AM	16-Feb-98	Belgium	B-6000
10846	1/21/98 12:00 AM	04-Mar-98	Belgium	B-6000
10885	2/11/98 12:00 AM	11-Mar-98	Belgium	B-6000
10892	2/16/98 12:00 AM	16-Mar-98	Belgium	B-1180
10896	2/18/98 12:00 AM	18-Mar-98	Belgium	B-1180
10930	3/5/98 12:00 AM	16-Apr-98	Belgium	B-6000
10978	3/25/98 12:00 AM	22-Apr-98	Belgium	B-1180
11004	4/6/98 12:00 AM	04-May-98	Belgium	B-1180
11035	4/19/98 12:00 AM	17-May-98	Belgium	B-6000
11038	4/20/98 12:00 AM	18-May-98	Belgium	B-6000

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Accounts

	Name	Phone	Address
1. Burnaby, Canada			
1.	L & E Gillmore Communications Partners	293-555-9531	1983 Santa Cruz
2.	Ratcliff-Moss Electronics, Ltd	721-555-7412	4776 Kentucky Drive
3.	Souza-Quick Construction Group	699-555-8963	3752 Hamilton Ct
4.	Orona-Warmack Transportation, Inc	259-555-5742	165 Schenone Court
5.	N & O Garner Electronics, Inc	472-555-1111	9052 Montgomery Avenue
6.	D & Z McLaughlin Electronics, Ltd	602-555-9145	661 Miller Ave.
7.	F & X Wellington Communications Partners	210-555-7617	4055 Hitchcock

Country: Belgium

Order: 10600

Date: 1997-06-01

Belgium

Sort by: Best match | Most recent

1 - 10 of 110000 results

Brussels Nuit Blanche 2010 - Live in **Belgium** for the White Night Festival

PRLog (Press Release) – Oct 01, 2010 – Nuit Blanche (literally White Night, All-Nighter or Sleepless Night in French) or Light Night is an annual all-night or night-time arts festival. Brussels is the latest city to join in with this celebration. This ...

PRLog (free press release) · 17 hours ago

Figure 2-7 Dashboard with Sample Reports and Special Content

10. Return to the dashboard designer and click **Save**.

    The dashboard is saved to the repository.

2.2.7 About Screen Sizes

When you create a dashboard, you can set the size of the canvas to match a particular screen resolution. For example, end users' laptops display a screen resolution of 800 by 600 pixels, so you set the size of the canvas to 800 by 600 pixels to emulate the user environment.

If you design for a screen size as large or larger than your own, try hiding the Available Content pane, or using a larger monitor to minimize horizontal scrolling.

By default, the dashboard designer supports five standard screen resolutions, which are available by clicking **Options > Guide**. When a dashboard uses fixed sizing, its frames do not resize automatically when the window size changes.

In addition to fixed screen resolutions, dashboards support proportional sizing. When a dashboard uses proportional sizing, its frames resize relative to the size of the browser window. Frames do not resize automatically in the designer; proportional sizing is only evident in the end user's view of the dashboard, or when you select a new screen size in the designer.

If a dashboard that uses proportional sizing is larger than the specified screen size, when the dashboard is viewed, Jaspersoft resizes the frames to fit in the window. No scrolling is required. This may result in a change to the shape of the frames.

Jaspersoft recommends that you design dashboards using fixed sizing mode, then switch to proportional sizing before you save.

In proportional sizing, note that:

- You can resize free text items to a smaller size, but you can't make them larger.
- The grid turns red when any content hangs over the edge of the canvas.

2.3 Editing a Dashboard

You can edit a dashboard if you have the proper permissions.

To edit a dashboard:

1. Select **View > Repository** and search or browse for the Dashboard you want to modify.

   By default, the repository includes the /Dashboards folder where you can store dashboards.
2. Right-click the dashboard and select **Open in Designer** from the context menu.

   The designer appears, displaying the dashboard.
3. Edit the dashboard by adding, removing, resizing, or dragging content. Drag an item from the **Available Content** list and drop it on an existing frame to replace the existing content.

   For more information about working with dashboard content, see section **2.2, "Creating a Dashboard," on page 23**.
4. When you are satisfied with the dashboard, click **Save**.
5. To create a new version of the dashboard, select **Save As** from the Dashboard Selector context menu, and specify a new name.

2.4 Tips for Designing Dashboards

Charts and small crosstabs are best suited to dashboards. However, you can design table reports that work well in the dashboard. Such reports tend to be very narrow and are typically used with input controls to limit the number of rows they return.

Keep reports small because dashboards typically contain more than one. In particular, reports shouldn't be too wide, as horizontal room is always at a premium in a dashboard. The server strips margins from an Ad Hoc report when displaying the report on a dashboard.

2.4.1 Input Control Tips

When designing input controls for a dashboard, keep these guidelines in mind:

- If you want a single input control on the dashboard to control the data displayed in multiple reports, the reports themselves need parameters with the same name as the input control. For example, you might have a query-based list of employee names that can be used in both sales reports and human resources report.
- When defining a parameter in a report, give it a meaningful name that can be reused in other reports. Then, when two reports that include this parameter are added to the dashboard, their input controls appear as Special Content in the **Available Content** list. Storing such input controls in the repository encourages reuse in other reports as they are designed and added to the repository.
- Consider the ramifications of designing input controls to use radio buttons. A report's input control that displays as a radio button set appears as drop-down on a dashboard.
- To pass a value to an external URL, the **URL Parameter Name** you give to the input control must match the name of a parameter that the URL can accept. The value of the input control must also be a value the URL can accept. The target URL is likely to have additional requirements and limitations. For example, the name of the parameter may be case-sensitive; in this case, the value you enter in the **URL Parameter Name** field is also case-sensitive. This is the case for Bing's `q` parameter that is referenced in **2.2.5, "Adding a Custom URL to a Dashboard," on page 27**.

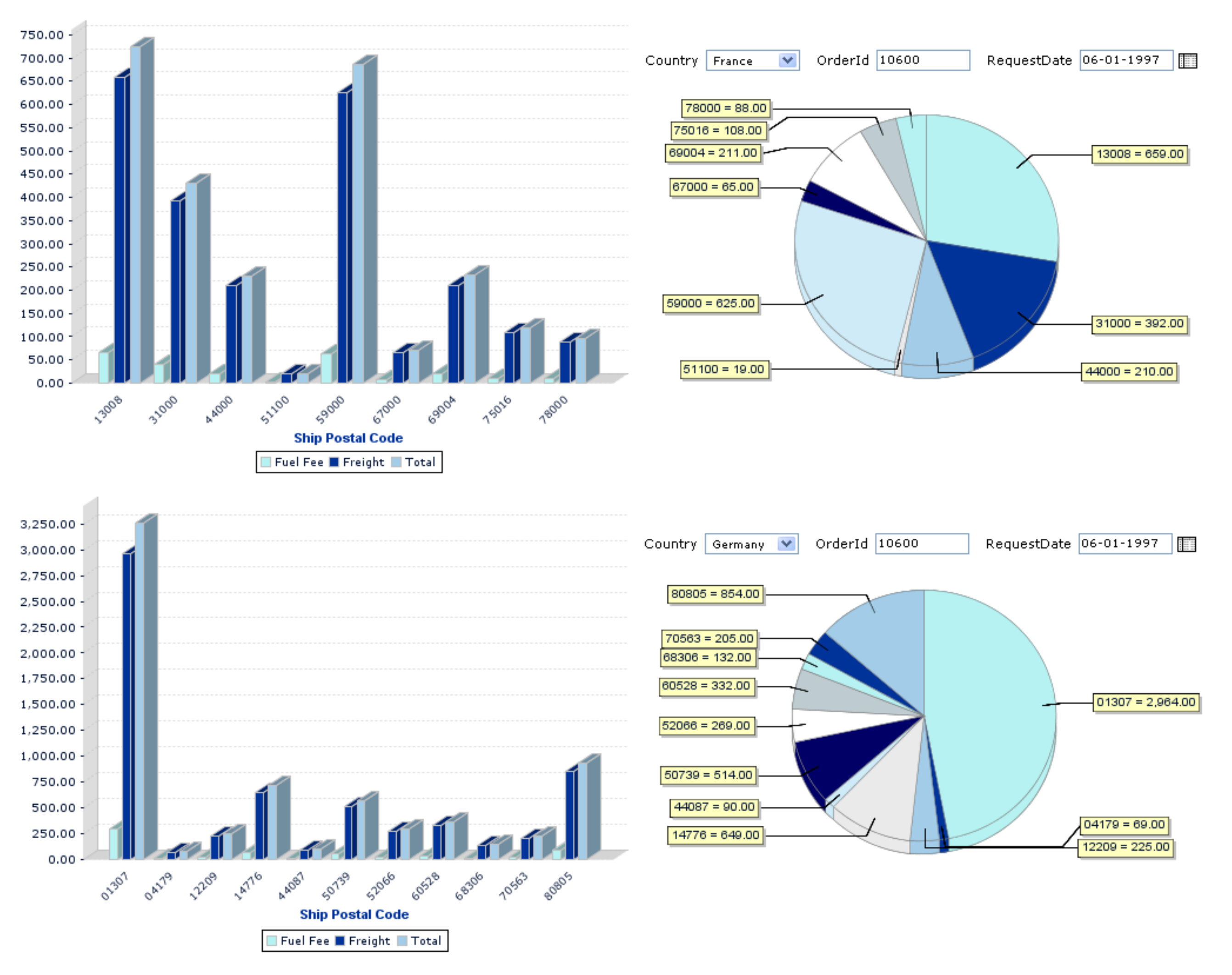
The input control must pass data that the URL can accept. Otherwise, the server may be unable to retrieve the correct data from the external URL.

2.4.2 Miscellaneous Tips

When you create or edit a dashboard, keep these tips in mind:

- Alignment of items:
  - You can use the computer's arrow keys to move selected content one grid space at a time.
  - Press the Ctrl key to move the selected content a single pixel at a time.
- Selection of items:
  - The items on the context menu change depending on your selection. For example, the context menu might include the Delete Item or Delete Frame option, depending on whether you selected a button or a frame.
  - If you select multiple items or frames, the context menu includes only options that apply to all selected items. For example, if you select a frame and a button, the context menu includes only the Delete Items option.
  - When you select multiple frames, the context menu includes several options that can apply to the frames as a group, such as **Hide All Scroll Bars** and **Delete Items**.
  - Select multiple frames to change their sizes all at once. When you drag the edge of one frame, the other frames resize as well.
- Relocated or deleted reports in dashboards:
  - When you delete a report with input controls from the dashboard, the controls are also deleted, but their labels remain. Delete labels manually.
  - If a custom URL frame is mapped to a deleted input control, the server shows the default URL but does not pass the parameter.
  - Keep track of reports used in dashboards to prevent inadvertent deletion. The server deletes a report from a dashboard when you delete it from the repository or move it to a new location.
- Embedded dashboards:
  - A dashboard can include other dashboards, unless this creates a circular dependency. Do not attempt to add a dashboard to itself.
  - Multiple reports in a dashboard that refer to the same input control are controlled by that single input control. If you want users to set the input controls separately for each report, create two dashboards, both of which refer to the input control; then, create a third dashboard that includes the other two.

- Adding the same dashboard twice to a parent dashboard can create a compelling comparison, as shown in **Figure 2-8**:



Country France OrderId 10600 RequestDate 06-01-1997

Country Germany OrderId 10600 RequestDate 06-01-1997

Figure 2-8 A Dashboard Comparing Data from Two Countries

Chapter 3 Running Reports and the Report Viewer

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don't see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

JasperReports Server makes it easy to run reports. When you run a report, it opens in the interactive report viewer. With the viewer, you can personalize and refine the displayed report data. If the report has input controls, you run the report with one set of data and then another. Using the report scheduler, you can run reports repeatedly and unattended during off hours or at other times.

This chapter contains the following sections:

The tutorials in this chapter and throughout this guide assume you've installed the sample data provided with the server.

3.1 Overview of The Report Viewer

The report viewer allows you to view a report, export content to various output formats, and apply formatting, sorting, and filters to control how the data is displayed.

This section describes the functions available in the report viewer. You can find more detailed information about using this functionality throughout this chapter.

To open a report in the report viewer:

1. Locate your report in the library or repository.
2. Click the report name, or right-click the report name and select **Run**. In the repository, you can also click the report row and select **Run** from the tool bar.

   The report opens in the report viewer.

3.1.1 The Report Viewer Tool bar

The report viewer tool bar contains a number of controls for working with your report. These controls are described in **Table 3-1**.

Table 3-1 Report Viewer Tool Bar Icons

Icon	Name	Description
⟳	Refresh report with latest data	Click this icon to refresh the report data against the data source.
◀◀	First	Click this icon to jump to the first page of the report.
◀	Previous	Click this icon to go to the previous page in the report
Page 1 of 2	Current Page	Pagination controls. Displays the page of the report currently displayed.
▶	Next	Click this icon to go to the next page in the report.
▶▶	Last	Click this icon to jump to the last page of the report.
Back	Back	Exits the report viewer and takes you to the previous screen.
💾	Save	Place the cursor over this icon to open a menu of save options.
⇨	Export	Click this icon to export the View into one of the available formats.
↶	Undo	Click this icon to undo the most recent action.
↷	Redo	Click this icon to redo the most recently undone action.
↺	Undo All	Click this icon to revert the report to its state when you last saved.
☰	Input Controls	Click this icon to see the input controls applied to this report. For more information, refer to section **3.7.1, "Simple Input Controls," on page 44**.

3.1.2 Column Menu

Reports that contain table components are enabled for user interactivity. Table components are defined in iReport, Jaspersoft Studio, or tables from Ad Hoc views. When a table is enabled for interactivity, then column formatting, filtering, and sorting is managed from a menu displayed by clicking on the column you want to apply changes to. These menu icons are described in **Table 3-4**.

Table 3-2 Column Formatting Icons

Icon	Name	Description
▥▾	Formatting/Show column/Hide column	Select **Formatting** to open the Format Column box. Select **Show column** or **Hide column** to show or hide the column.
▤	Column filters	Click to open the Filter column box.
⬆	Sort ascending	Click to sort fields on the selected column in ascending order.
⬇	Sort descending	Click to sort fields on the selected column in ascending order.
▼	Column size	Click and drag this icon to make columns wider or narrower.

3.1.3 Data Snapshots

Some reports have an optional Data Snapshot feature enabled. A Data Snapshot is a cached copy of the data included in a specific report. Data Snapshots allow you to access a report's data (including input control settings) without having to retrieve it from the data source, which in some cases can save a significant amount of time.

When a report is opened in the report viewer, data is retrieved from the Data Snapshot. If the Snapshot does not exist, then a live query is made to the data source. A Snapshot is created when a report is saved from the viewer, or via the scheduler. The report viewer UI displays a date and time stamp that indicates when the report data was last refreshed with live source data.

The system administrator can enable or disable the Data Snapshot feature.

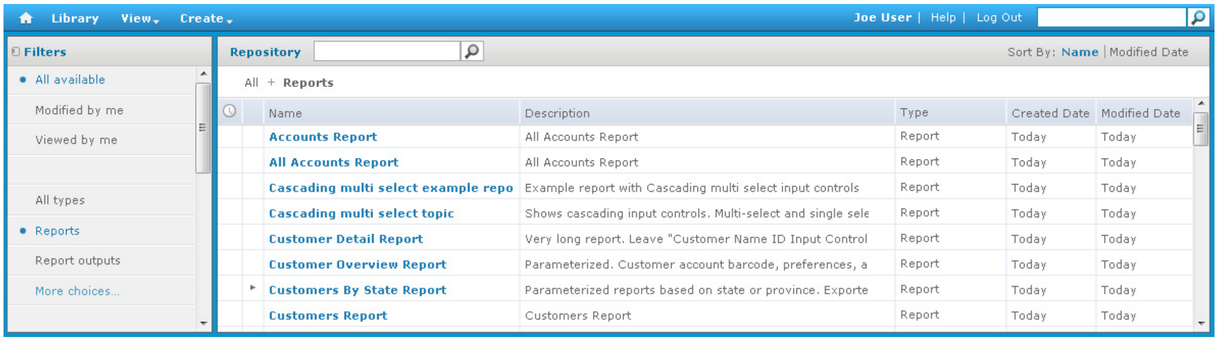
3.2 Running a Simple Report

This section describes how to run a tabular report that lists account data.

To run a report:

1. Log into the server as an administrator, such as jasperadmin.
2. On the Home page, click **View Reports**.

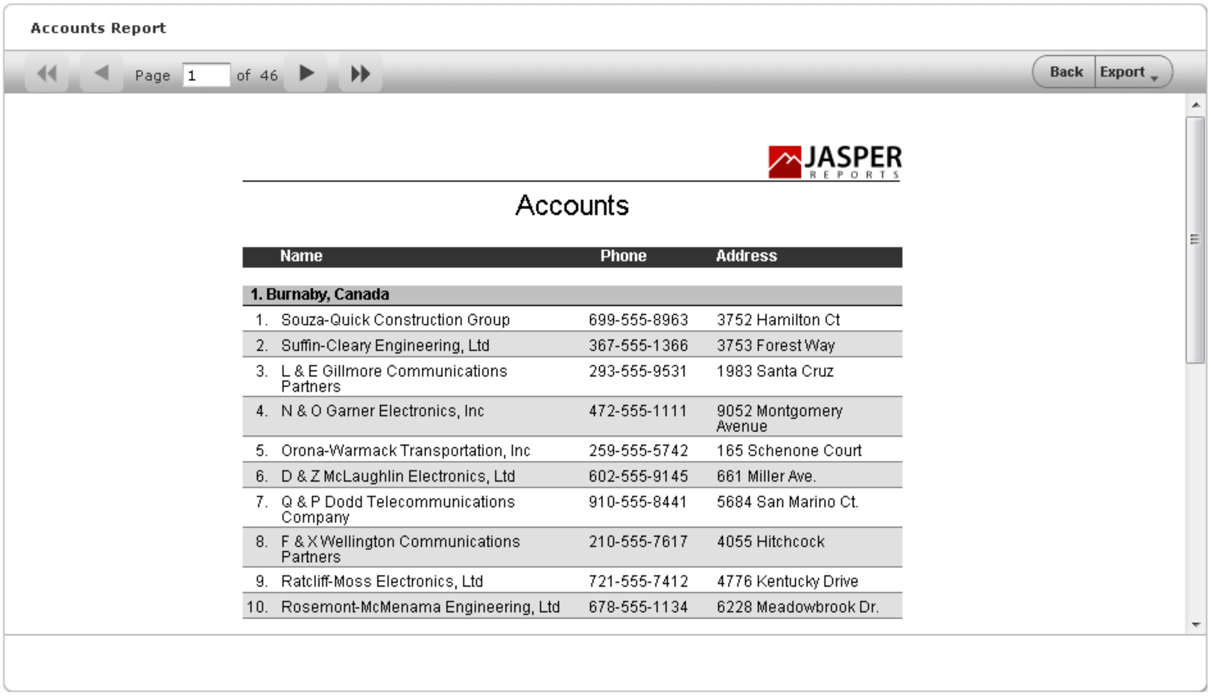
   The search results appear, listing your own files and other files that your user account has permission to view. If you log in as jasperadmin, the Accounts Report appears in the search results.



Name	Description	Type	Created Date	Modified Date
Accounts Report	All Accounts Report	Report	Today	Today
All Accounts Report	All Accounts Report	Report	Today	Today
Cascading multi select example repo	Example report with Cascading multi select input controls	Report	Today	Today
Cascading multi select topic	Shows cascading input controls. Multi-select and single sele	Report	Today	Today
Customer Detail Report	Very long report. Leave "Customer Name ID Input Control	Report	Today	Today
Customer Overview Report	Parameterized. Customer account barcode, preferences, a	Report	Today	Today
Customers By State Report	Parameterized reports based on state or province. Exporte	Report	Today	Today
Customers Report	Customers Report	Report	Today	Today

Figure 3-1 Search Results Listing

3. To run a report, click the name of a report in the repository. For example, click **Accounts Report**. The report appears, as shown in **Figure 3-2**.



Accounts

	Name	Phone	Address
1. Burnaby, Canada			
1.	Souza-Quick Construction Group	699-555-8963	3752 Hamilton Ct
2.	Suffin-Cleary Engineering, Ltd	367-555-1366	3753 Forest Way
3.	L & E Gillmore Communications Partners	293-555-9531	1983 Santa Cruz
4.	N & O Garner Electronics, Inc	472-555-1111	9052 Montgomery Avenue
5.	Orona-Warmack Transportation, Inc	259-555-5742	165 Schenone Court
6.	D & Z McLaughlin Electronics, Ltd	602-555-9145	661 Miller Ave.
7.	Q & P Dodd Telecommunications Company	910-555-8441	5684 San Marino Ct.
8.	F & X Wellington Communications Partners	210-555-7617	4055 Hitchcock
9.	Ratcliff-Moss Electronics, Ltd	721-555-7412	4776 Kentucky Drive
10.	Rosemont-McMenama Engineering, Ltd	678-555-1134	6228 Meadowbrook Dr.

Figure 3-2 Output of the Accounts Report

3.3 Getting New Perspectives on Data

The report shown in **Figure 3-2** was created in iReport using the Table Component. As this type of report runs, you can interact with it in the report viewer to visualize the data in different ways. Column formatting allows you to highlight certain columns and fields, and filtering and sorting report output on-the-fly can provide timely views of the data that answer your questions. For example, suppose you're running the Accounts Report and want to know how many accounts have offices nearby. Highlighting the phone number column with red text and filtering it to show only accounts in your area code would reveal this data.

3.3.1 Column Formatting

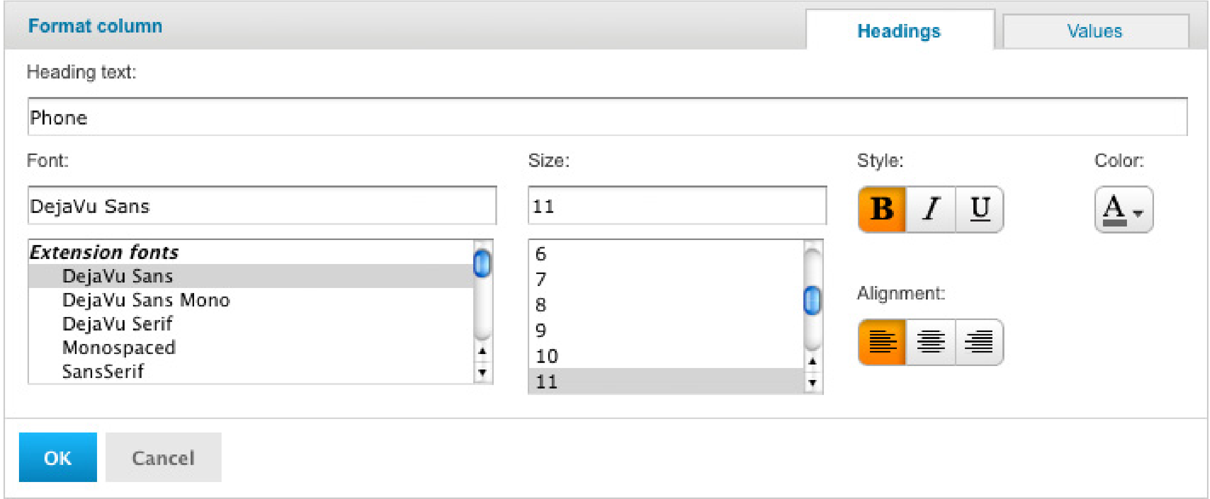
You can customize the basic formatting of column headings and fields. Formatting options include:

- Text (headings only)
- Font type, size, and style
- Font color
- Text alignment

To customize your column formatting:

1. Run your report, so it opens in the report viewer.
2. Click the header or field of the column you want to format.
3. Move your mouse over ▦ and click **Formatting...**

   The Format column dialog appears, as shown in **Figure 3-3**.



Format column

Heading text: Phone

Font: DejaVu Sans

Size: 11

Figure 3-3 Format Column Dialog

4. To format a column's heading, click the **Headings** tab, and change the following options if needed:
   - **Heading text** – Type new heading text to replace the current text.
   - **Font** – Scroll through the menu to select a font.
   - **Size** – Scroll through the menu to select a font size.
   - **Style** – Click to select Bold, Italic, or Underlined text.
   - **Color** – Click to open a color picker, then click to select the text color.
   - **Alignment** – Click to select Left, Center, or Right alignment.
5. To format the text in a column's fields, click the **Values** tab, and change the following options if needed:
   - **Font** – Scroll through the menu to select a font.
   - **Size** – Scroll through the menu to select a font size.

- **Style** – Click to select Bold, Italic, or Underlined text.
- **Color** – Click to open a color picker, then click to select the text color.
- **Alignment** – Click to select Left, Center, or Right alignment.

6. Click **OK**.

3.3.2 Filtering Report Output

If the report output contains more information than you want, interactively filter it to display just what you need. You conditionally filter report output by first selecting the column to use as a basis for filtering. Next, you enter a filter condition, then a value for comparison. The server compares each field of the column to the value that meets the condition. Table 3-3 lists the conditions you can select for each type of column: numeric, date, and text.

Table 3-3 Interactive Filtering Conditions

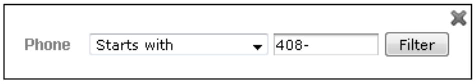
Numeric	Date	Text
Equals	Equals	Equals
Does not equal	Is not equal to	Is not equal to
Greater than	Is between	Contains
Greater than or equal to	Is not between	Does not contain
Less than	Is on or before	Starts with
Less than or equal to	Is before	Does not start with
Is between	Is on or after	Ends with
Is not between	Is after	Does not end with

To interactively filter report data:

1. As you run the type of report shown in Figure 3-2, click the column you want to use for filtering the report. Continuing with the example in section 3.2, click the **Phone** column in the Accounts report.
2. Click the .

   The **Filter column** dialog appears, as shown in Figure 3-4. By default, **Show all rows** is selected.
3. To build your filter, click the radio button to select **Show only rows where**.

   the comparison operator drop-down and value entry box become active.
4. Select a comparison operator from the drop-down. For example, select **Starts with** to compare phone numbers starting with certain numbers.
5. Enter a value for comparison with the data in the column. For example, enter the area code: `408-`

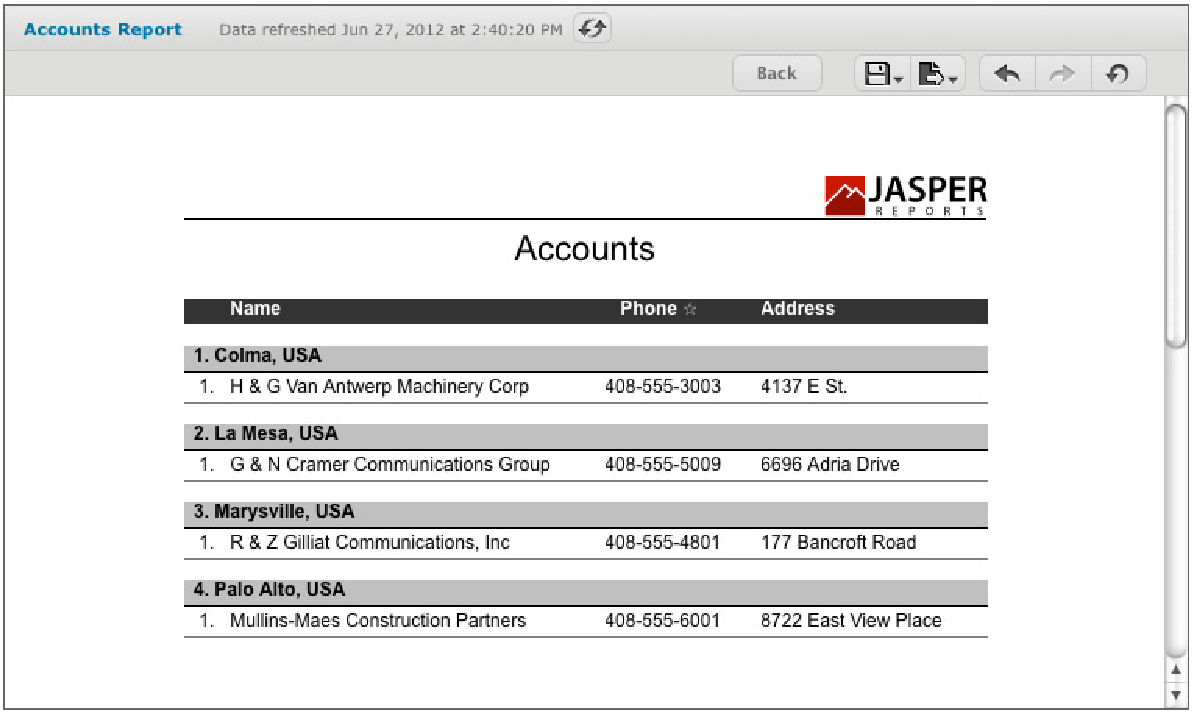


Phone Starts with 408-

Figure 3-4 Filter Column Dialog

6. Click **OK**.

   The view of the report changes to show the filtered output. For example, now the Accounts Report only shows accounts in the 408 area code.



Accounts

Name	Phone ☆	Address
1. Colma, USA		
1. H & G Van Antwerp Machinery Corp	408-555-3003	4137 E St.
2. La Mesa, USA		
1. G & N Cramer Communications Group	408-555-5009	6696 Adria Drive
3. Marysville, USA		
1. R & Z Gilliat Communications, Inc	408-555-4801	177 Bancroft Road
4. Palo Alto, USA		
1. Mullins-Maes Construction Partners	408-555-6001	8722 East View Place

Figure 3-5 Filtered Report Shows Only Accounts in Area Code 408

   A small star icon appears in the heading of the filtered column, to the right of the heading text.

7. To clear the filter indicator and once again display all the accounts, reopen the Filter column dialog and select **Show all rows**, then click **OK**.

3.3.3 Sorting a Report

You can also sort data in report output interactively. For example, you can sort the data alphabetically in ascending or descending order within each city listed in the Accounts Report.

To interactively sort report output:

1. As you run the type of report shown in Figure 3-2, click the column you want to use for sorting the report. For example, click the **Name** column in the Accounts report.
2. Click ⬆ (sort ascending) or ⬇ (sort descending). The report refreshes, and data appears sorted by the selected column in the selected order. In this example, for instance, if you select ⬆, the grouped rows of data are sorted alphabetically in ascending order within each group. Row 1 of the Burnaby, Canada group is now D & Z McLaughlin Electronics, Ltd and row 1 of the Cliffside, Canada group is Abbott-Liff Electronics Holdings.

   The heading text in the column used to sort report data appears red, and the up or down arrow icon in the column header indicates that report output now appears in ascending or descending order, respectively.

   To change the sort order of the groups themselves, you have to modify the report query.

3.3.4 Moving, Resizing, and Hiding Columns

Columns are easily moved, resized, and hidden in your report.

- To move a column, click the column you want to move, then drag the column left or right into the new position. The ▼ indicates where the column is placed.
- To resize a column, click the column you want to resize, then drag the ▼ until the column is the size you want.
- To hide a column, click the column you want to hide, then move your mouse over the ▦▾ and select **Hide column.**

3.4 Navigating the Report

If your report has multiple pages, you can use the pagination controls to move through the report quickly.

To navigate the published report:

- Use ◀ at the top of the report viewer to navigate to the previous page.
- Use ▶ to navigate to the next page.
- Use ▶▶ to go to the end of the report.
- Use ◀◀ to go to the beginning of the report.
- If you know the number of the page you want to view, enter the page number in the Current Page indicator box.

3.5 Exporting the Report

To export the report:

1. To view and save the report in other formats, click the **Export** button.
2. Select an export format from the drop-down. Table 3-4 lists the export options.

Table 3-4 Export File Types

Option	Format Name	Usage
PDF	Adobe Acrobat	To prevent horizontal truncation of an Ad Hoc report when exported, set the Actual Size option in the Ad Hoc Editor.
Excel (Paginated)	XLS	Not recommended for exporting most tables or crosstabs. Repeats headers and footers on each page.
Excel	XLS	Ignores page size and produces spreadsheet-like output.
CSV	Comma Separated Values	Characters outside the Latin 1 character set can cause the Excel spreadsheet to look unacceptable. Try saving the file and importing it using Excel's Import functionality.
DOCX	Word	Do not export reports having more than 63 columns. In Microsoft Word, you cannot create tables having more than 63 columns.
RTF	Rich Text Format	Creates a large output file and, therefore, takes longer to export than PDF, for example.
Flash	Flash Viewer	Exports the report to the Flash viewer. Does not output an SWF file.

Table 3-4 Export File Types

Option	Format Name	Usage
ODT	OpenDocument Text	For best results, minimize the number of rows and columns and make sure they don't overlap.
ODS	OpenDocument Spreadsheet	Same as ODT.
XLSX (Paginated)	Microsoft Open XML Format Spreadsheet	Not recommended for exporting most tables or crosstabs. Repeats headers and footers on each page.
XLSX	Microsoft Open XML Format Spreadsheet	Ignores page size and produces spreadsheet-like output.

3. With the exception of Flash exports, save the report in the export file format, for example PDF, or open the report in the application. View Flash output in the Flash viewer.

3.6 Running a Flash Chart

The JasperReports Server commercial editions support Flash charting, and include the Maps Pro, Charts Pro, and Widgets Pro component libraries. Using the libraries, you can create visually appealing, animated, and interactive reports:

- Maps Pro – Color-coded maps covering all countries and regions of the globe.
- Charts Pro – Standard and stacked charts with animation and interactivity.
- Widgets Pro – Non-standard charts such as gauges, funnels, spark lines, and Gantt charts.

These components are based on Fusion libraries and generate Flash output that is embedded in the HTML and PDF output. When a report containing a Maps, Charts, or Widgets Pro element is exported in a format other than HTML or PDF, the space used by the element remains blank.

To view a Maps, Charts, and Widgets Pro element in the server, install Flash Player. You might need to install plug-ins or enable Flash on the browser. To view Flash elements in PDF output, use a Flash-enabled PDF viewer such as Adobe Reader.

Flash charts are created in iReport Designer Professional as JRXML reports and uploaded to the repository as a report unit. JasperReports Server cannot create Flash charts. The sample data installed with the server includes several simple examples of Flash charts.

To find and run a Flash chart example:

1. From any page in the server, type **flash** into the search field and press Enter or click 🔎 .

   The search results include Flash Chart Report, Flash Map Report, Flash Widget Report, and the Open Flash Charts Report, an experimental report that uses a different Flash library from the Charts Pro, Maps Pro, and Widgets Pro components, which are fully supported by Jaspersoft.

2. Click a Flash report other than the Open Flash Charts Report. For example, open the Flash Map Report:

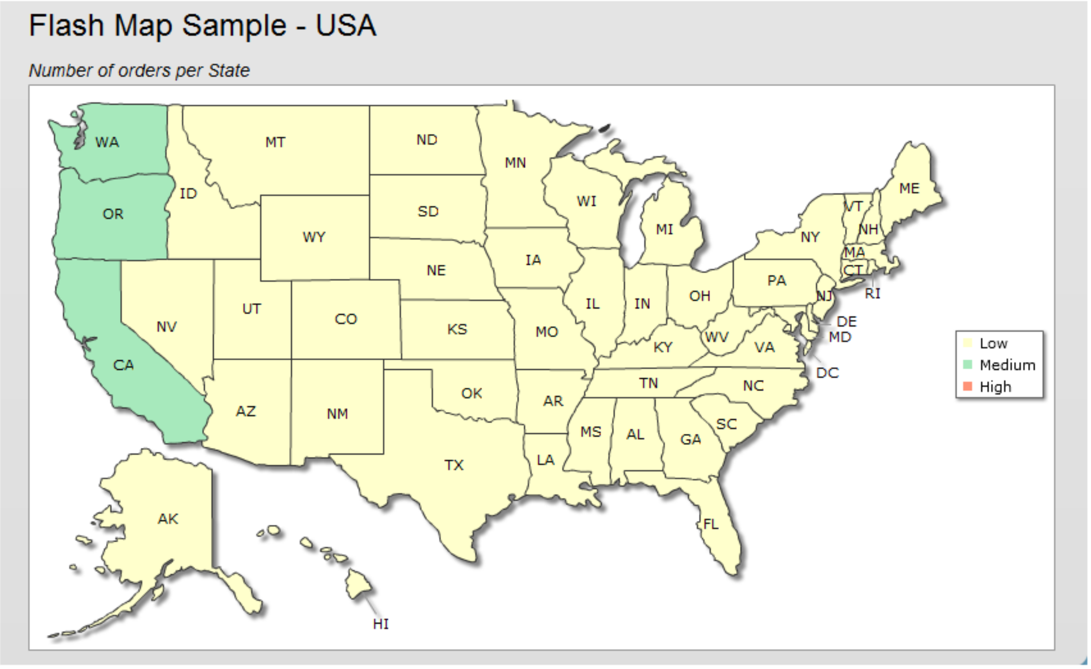


Figure 3-6 Output of the Sample Flash Map Report

The color-shaded states correspond to value ranges defined by the legend.

Flash reports launch in the report viewer, as do other types of reports. However, Flash charts can be animated as they are drawn, giving them greater visual appeal. Flash charts are also interactive.

3. To interact with the map, mouse-over any of the states on the map to see the full state name and, when data exists, the value for that state:

4. Next, search for Flash reports again. This time, select the Flash Widget Report.

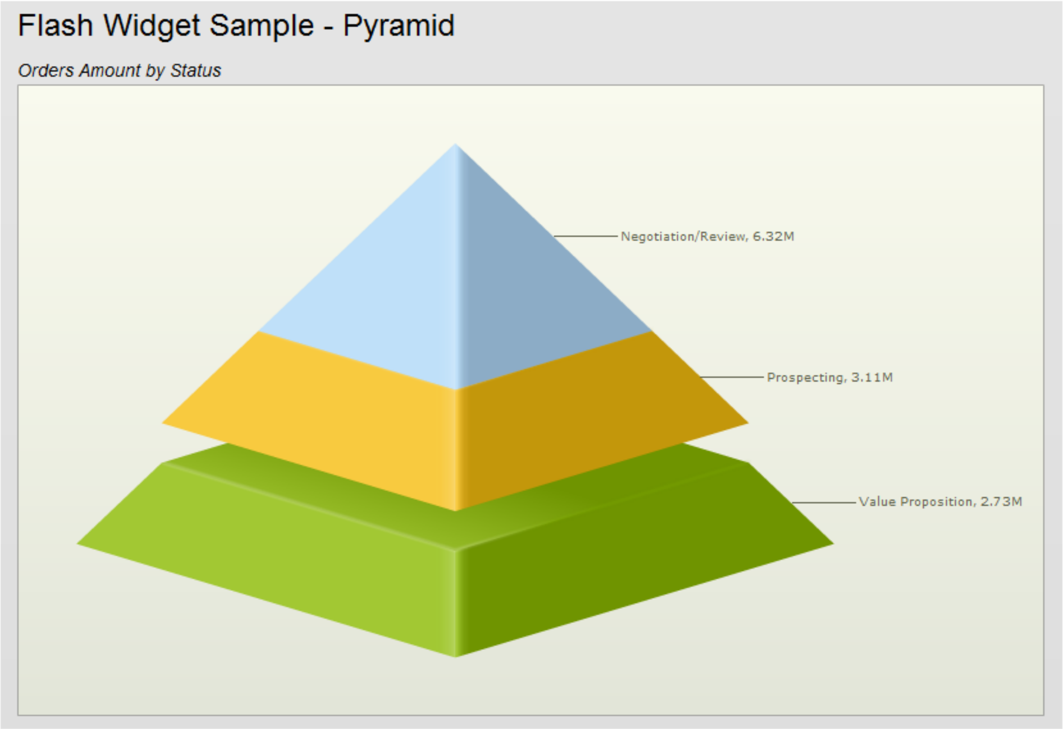


Figure 3-7 Output of the Sample Flash Widget Report

5. To edit the pyramid widget, click a segment to separate it from the others.

   These simple examples with arbitrary data show how Maps, Charts, or Widgets Pro components can present several layers of information in compelling ways.

Flash reports include the following features:

- Text, including labels in maps, charts, or widgets, that can be localized because the report is written in JRXML. For more information about uploading resource bundles for Maps, Charts, or Widgets Pro components, see the *iReport Ultimate Guide*.
- Chart elements, map regions, and widget segments can link to reports that provide details. Depending on the security settings in the Flash Player, you may need to enable links.

For information about creating Flash charts, see the *iReport Ultimate Guide*. To upload JRXML reports, see **Chapter 5, "Adding Reports Directly to the Repository," on page 93**.

3.7 Running a Report with Input Controls or Filters

The server filters the data in the report output when you run a report with an input control. The perfect input control limits the data to what you want to see—and nothing more. When you run a report based on a Domain Topic that defines a filter, the server can render the filter as an input control.

If your system administrator has enabled the Data Snapshot feature (described in section **3.1.3, "Data Snapshots," on page 35**), it is important to note that the default input controls - that is, the input controls as defined when the original iReport- or Ad Hoc view-based report is run - will overwrite any changes made to them the next time you run a report. For instance, suppose you run a report, update the input controls, then save the report. At a later date, you run a report from the iReport or Ad Hoc view source again. That new report will replace the report you ran earlier, and your input control changes will be lost.

To avoid this, save your updated reports with a different name than the default. That way, when subsequent reports are run from the same source, they will not overwrite your report (unless they are given an identical name when saved).

3.7.1 Simple Input Controls

The Freight Report example has three input controls:

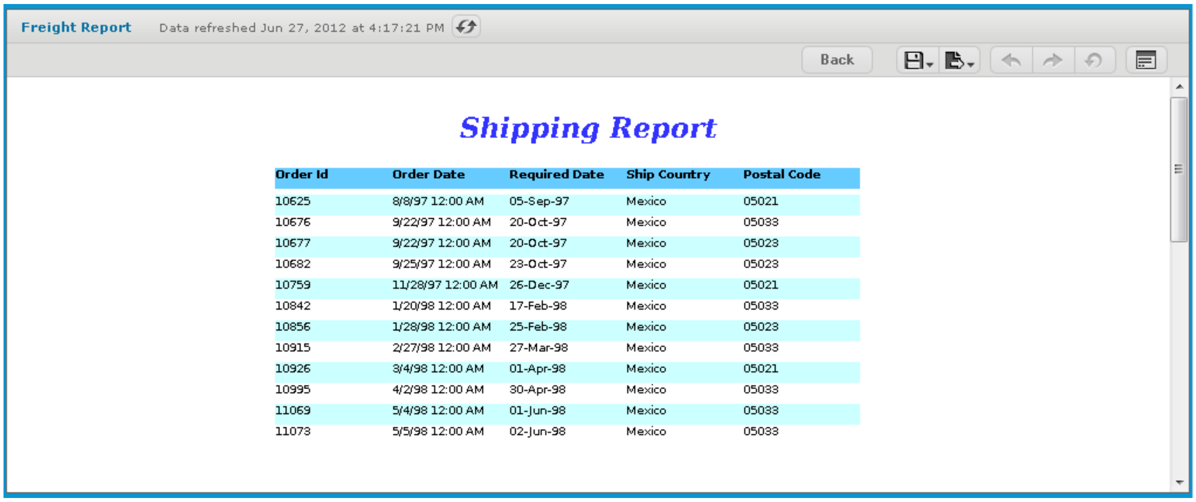
- Country
- Request Date
- Order ID

Using input controls, you run the report with one set of data and then another. When saved, an instance of the report with alternate input controls is called a **Report Version**, and is labeled as such in the repository.

To run a report with simple input controls:

1. In the search field, enter `freight` and click 🔍.
2. In the list of search results, click the name, **Freight Report**.

   The report shows data about orders numbered 10600 and above, shipped to Mexico after June 1, 1997.



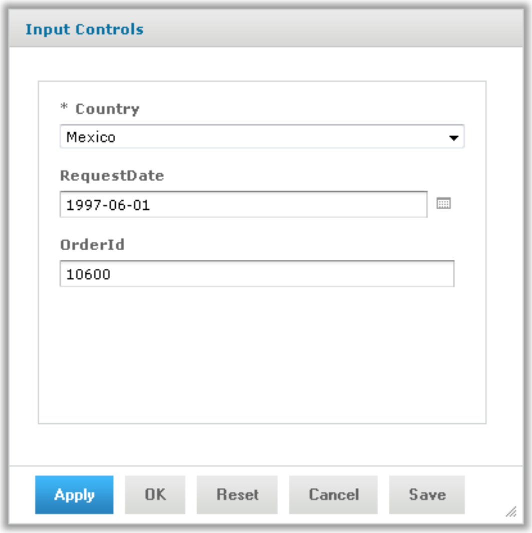
Shipping Report

Order Id	Order Date	Required Date	Ship Country	Postal Code
10625	8/8/97 12:00 AM	05-Sep-97	Mexico	05021
10676	9/22/97 12:00 AM	20-Oct-97	Mexico	05033
10677	9/22/97 12:00 AM	20-Oct-97	Mexico	05023
10682	9/25/97 12:00 AM	23-Oct-97	Mexico	05023
10759	11/28/97 12:00 AM	26-Dec-97	Mexico	05021
10842	1/20/98 12:00 AM	17-Feb-98	Mexico	05033
10856	1/28/98 12:00 AM	25-Feb-98	Mexico	05023
10915	2/27/98 12:00 AM	27-Mar-98	Mexico	05033
10926	3/4/98 12:00 AM	01-Apr-98	Mexico	05021
10995	4/2/98 12:00 AM	30-Apr-98	Mexico	05033
11069	5/4/98 12:00 AM	01-Jun-98	Mexico	05033
11073	5/5/98 12:00 AM	02-Jun-98	Mexico	05033

Figure 3-8 Freight Report Showing Mexican Data

3. To run the report with other input option values, click ☰ .

The Input Controls dialog appears:



* Country

Mexico

RequestDate

1997-06-01

OrderId

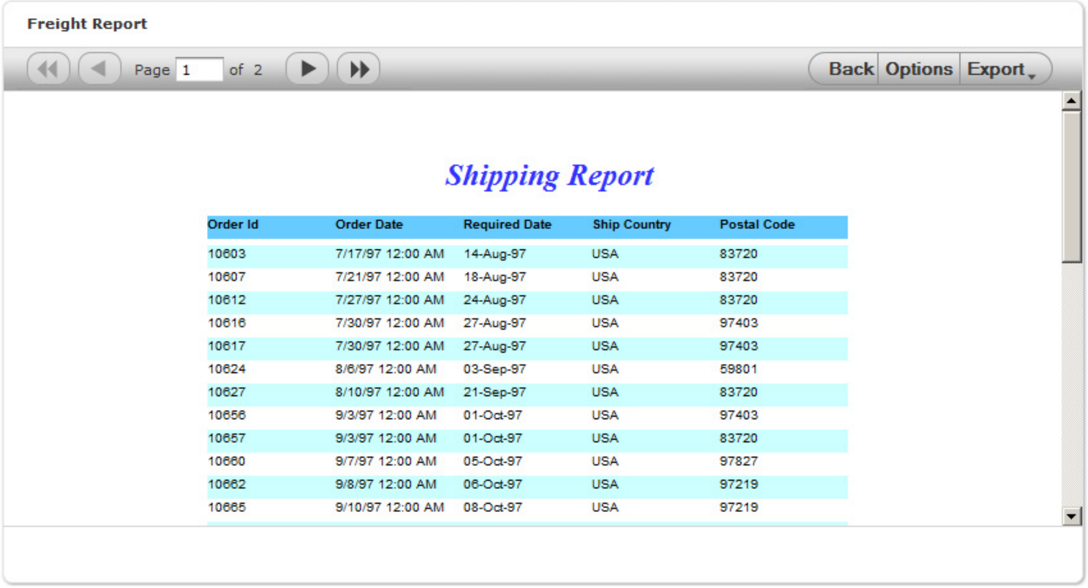
10600

Figure 3-9 Default Input Controls

4. Select USA in the Country field, and click **OK**.

The **Apply** button refreshes the report with the new data, but keeps the Input Controls dialog open.

The report shows data for the USA instead of Mexico:



Shipping Report

Order Id	Order Date	Required Date	Ship Country	Postal Code
10603	7/17/97 12:00 AM	14-Aug-97	USA	83720
10607	7/21/97 12:00 AM	18-Aug-97	USA	83720
10612	7/27/97 12:00 AM	24-Aug-97	USA	83720
10616	7/30/97 12:00 AM	27-Aug-97	USA	97403
10617	7/30/97 12:00 AM	27-Aug-97	USA	97403
10624	8/6/97 12:00 AM	03-Sep-97	USA	59801
10627	8/10/97 12:00 AM	21-Sep-97	USA	83720
10656	9/3/97 12:00 AM	01-Oct-97	USA	97403
10657	9/3/97 12:00 AM	01-Oct-97	USA	83720
10660	9/7/97 12:00 AM	05-Oct-97	USA	97827
10662	9/8/97 12:00 AM	06-Oct-97	USA	97219
10665	9/10/97 12:00 AM	08-Oct-97	USA	97219

Figure 3-10 Freight Report Showing USA Data

5. Click ▤ to display Input Controls again. Click **Save**.

   You are prompted to name the new set of values.
6. Enter `USA` as the new name.
7. To save the set of input options, click **Save**.

The Input Controls dialog box reappears.

A drop-down list showing USA as a set of saved values appears in the Input Controls **Used saved values** menu.

The **Reset** button in Input Controls restores the default input values, set during the report design.

8. In Input Controls, click **OK**.

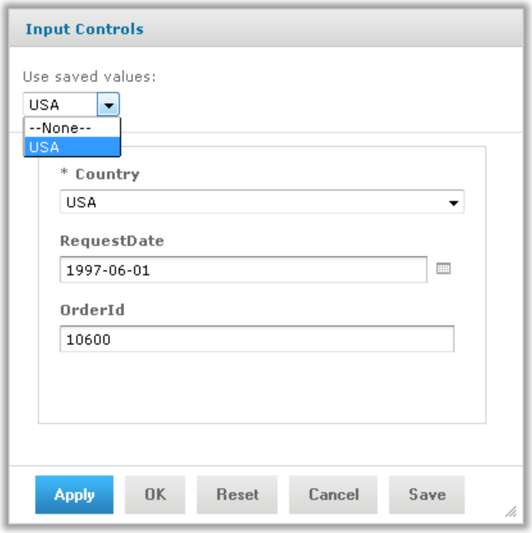


Figure 3-11 Input Controls With a List of Saved Values

9. In the report viewer, click the **Back** button to display the search results page.
10. In search results, click the ▸ icon next to Freight Report to display the link to the saved, USA version of the report:

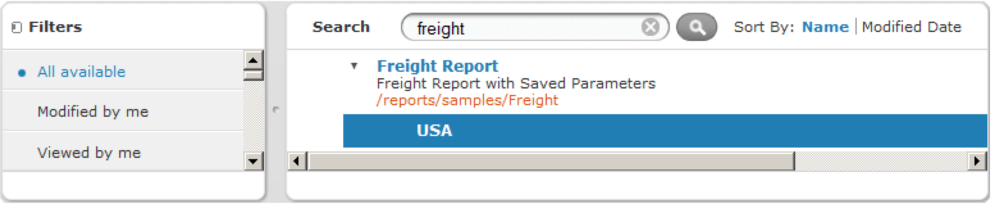


Figure 3-12 The New Version of the Report in the Search Results

You can click the name of the saved version, for example USA, to run the report using the saved input control values,

11. Add a description to the saved version of the report:
    a. In the search results page, right-click the saved version, USA, and select **Properties** from the context menu.
    b. In the Properties dialog box, enter a description for the saved version of the report:
12. Click **Submit**.

    The new description appears below the report when you refresh the display.

3.7.2 Cascading Input Controls

Cascading input controls in a report reduce a large number of choices to a manageable number. A single value chosen for a cascading input control determines which other values appear as choices for input. For example, the choice of a country determines which states or regions are listed as choices. For more information, see section **5.3.3, "Selecting a Data Source for Running the Complex Report," on page 116**.

To run a report with cascading input controls:

1. In the **Search** field at the top of any JasperReports Server page, enter `cascading` and click 🔍 .

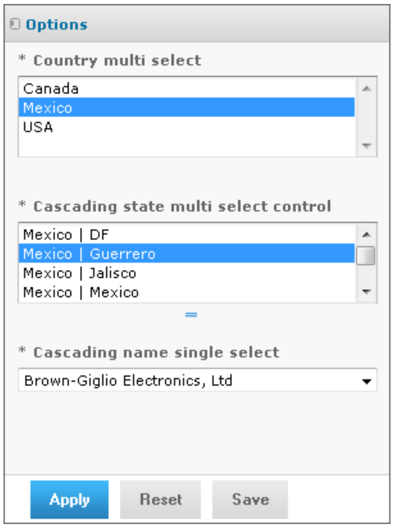
   The search results are displayed in the repository.
2. In the search results, click the name Cascading multi select example report.

   The report runs, and appears with the **Options** panel open on the left side of the report viewer
3. In the Options panel's **Country multi select** drop-down, select a different country, for example Mexico.

   The other drop-downs in the Input Controls dialog box are automatically updated with Mexican data.

   Cascading input controls are implemented as queries that access the database to retrieve the new values. The server displays an activity monitor while the query is running, and in the case of long queries, you can click Cancel and select different values.
4. In the **Cascading state multi select control** drop-down, select a different state, for example Guerrero.

   The **Cascading name single select** drop-down is updated to list accounts in Guerrero.



Options

* Country multi select

- Canada
- Mexico
- USA

* Cascading state multi select control

- Mexico | DF
- Mexico | Guerrero
- Mexico | Jalisco
- Mexico | Mexico

* Cascading name single select

Brown-Giglio Electronics, Ltd

Figure 3-13 Cascading Input Controls

The report design defines country and state input controls as multi-select; users can Ctrl-click to select multiple values in such lists.

5. Click **Apply** to run the report with the chosen values.

   The report creates a list of all account names in the chosen states. The report lists the account name chosen in the **Cascading name single select** input control at the top.

As with simple input controls, you can save these Options settings as a new Report Version. To do this, click **Save** to open the Save Values dialog. Name the new version, then click **Save**.

3.8 Scheduling Reports

Using the report scheduler wizard, you set up a job, report parameters, and output options:

- Set up a job – A job name, when to run the job, and how often
- Report parameters – If the report was designed with input controls, which parameters the job will use

- Output options – Where to store the output, in which formats, the locale, and email options for sending the output as an attachment

Jobs that you schedule run the reports in the background so you can use the server while the report runs.

The permissions of the user who schedules a job determine the data that the report exposes. For example, Gloria only has access to inventory data from the Southeast US region. A report that she schedules only shows data from that region, even when the report is viewed by users in other regions. Other users schedule the report themselves to see the data for their own regions.

Sensitive data could be exposed to unauthorized users if you schedule a job as an administrative user with no data restrictions because the report will contain all requested data in the data source. Any user who receives the report can view all the data regardless of the user's access restrictions.

3.8.1 Setting Up a Job

To set up a job:

1. On the Home page, click **View Reports**; or from any page, click **View > Repository**.
2. Use the search field or browse the list of reports to find the report you want to schedule.

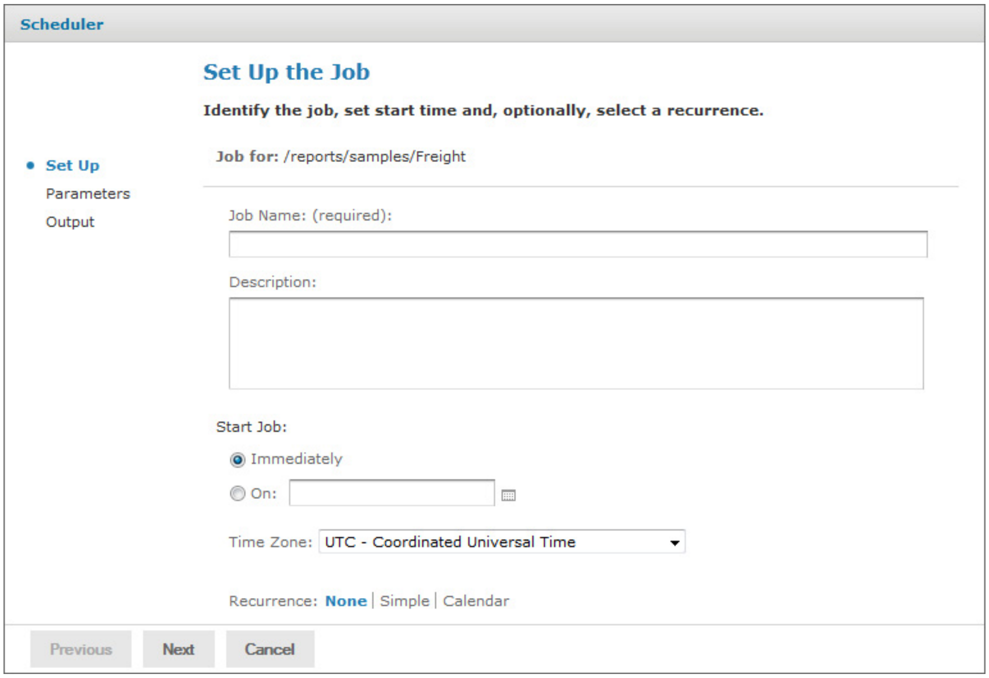
   If the report already has a schedule that you want to add, modify, or delete, click 🕒 beside the report name.

3. Right-click the report and select **Schedule...** from the context menu.

   The Scheduled Jobs page appears, as shown in **Figure 3-17**.
4. Click **Schedule Job**.

   The Set Up the Job page of the Scheduler wizard appears.
5. In the **Job Name** field, enter a name for the job, for example, Weekly Report. The description is optional.
6. Set these schedule attributes:
   - **Start**: Immediately or in the future. Click 📅 to select a future start date and time. If you don't specify recurrence, the start date and time determines when the report runs. If you specify recurrence, you may still want to delay the first report date, for example a weekday report that you want to start next week.
   - **Time Zone**: Specify the time zone for the schedule. The default time zone is the time zone of the server, the time zone you entered at log in. If you're in a different time zone, set this field accordingly.
   - **Recurrence**: Choose one of the following settings:
     - **None**: Run the report once.
     - **Simple**: Schedule the job to recur at an hourly, daily, or weekly interval.
     - **Calendar**: Schedule the job to recur on days of the week or days of the month.

Figure 3-14 shows a job set to run immediately, no recurrence:



Scheduler

Set Up the Job

Identify the job, set start time and, optionally, select a recurrence.

Job for: /reports/samples/Freight

Job Name: (required):

Description:

Start Job:

● Immediately

○ On:

Time Zone: UTC - Coordinated Universal Time

Recurrence: **None** | Simple | Calendar

Figure 3-14 Set Up the Job Page

7. Schedule the job to start at a specific time:
   a. In Start Job, select **On**.
   b. Click ▦ .

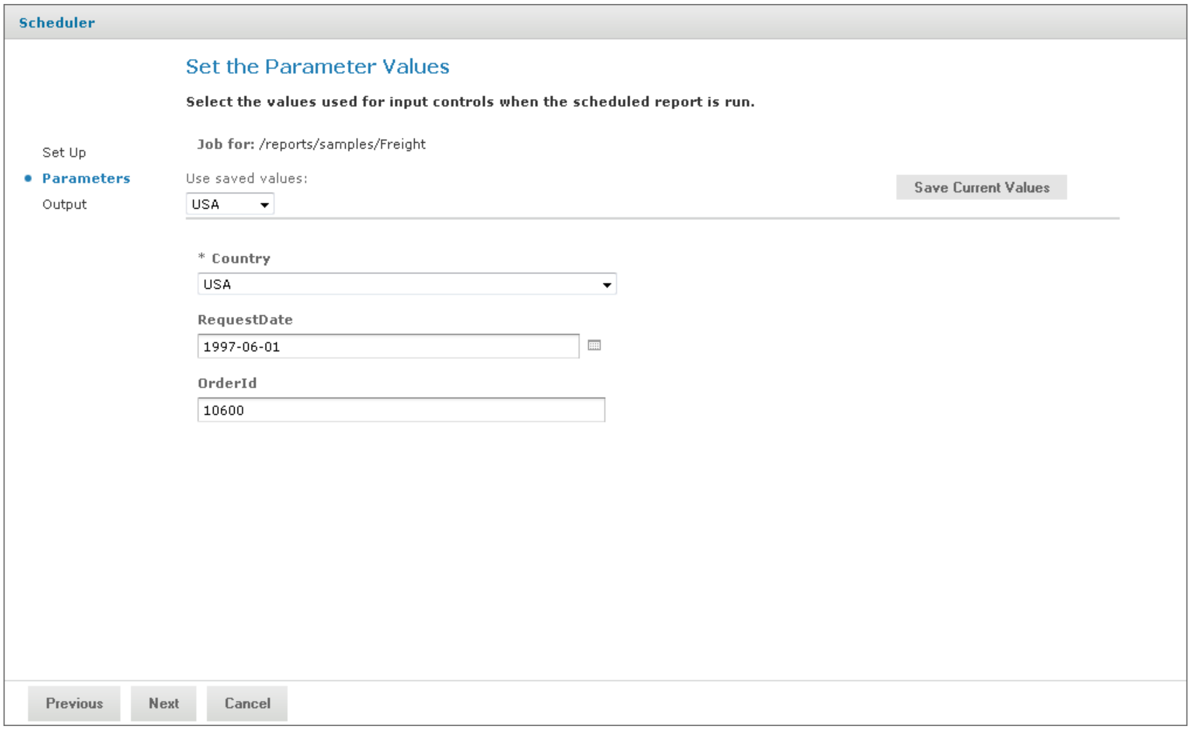
      The calendar appears.
   c. Click a date.
   d. To set the time for the job to run, at the bottom of the calendar, repeatedly click the hours and minutes. To close the calendar, click a blank spot on the Scheduler page.

      The selected date for starting the job appears in the calendar field.
   e. In Recurrence, accept the default setting, None to run the report only once.

If you select Simple or Calendar Recurrence, additional controls appear on the page. For details, see section 3.8.6, "Running a Job Repeatedly," on page 53.

8. Click **Next**.

If the report you are scheduling has input controls that prompt for user input, the Set the Parameter Values page appears:



Scheduler

Set the Parameter Values

Select the values used for input controls when the scheduled report is run.

Job for: /reports/samples/Freight

Use saved values: USA

* Country: USA

RequestDate: 1997-06-01

OrderId: 10600

Figure 3-15 Set the Parameter Values Page for Scheduling a Report

Saved values, if there are any, appear in a drop-down list at the top of the page, as shown in Figure 3-15. In the **Use saved values** drop-down, you can set the input controls defined for the report you're scheduling. You can set the input values for the scheduled report, and click **Save Current Values** to save the input value as a named set of values.

For more information about using saved values and saving input values, see section 3.7, "Running a Report with Input Controls or Filters," on page 43.

9. Choose a set of saved values, or set the input controls. This example uses the saved values for `USA`.
10. Click **Next**.

    The Output Settings page, shown in Figure 3-16, appears.
11. Set output options, as described in the next section, and click Submit to schedule the job.

3.8.2 Setting Output Options

On the Output Details page, you can change these settings:

- **Base Output File Name** – The name of the file as it appears in the repository.
- **Output Description** – The optional description of the file that appears to users who view the repository.
- **Output Format** – The available output formats. Select one, or accept the default format, PDF. When you select more than one, each format is stored as a separate file in the repository and attached as a separate file to the email notification.
- **Output Locale** – The locale settings for generating the report.

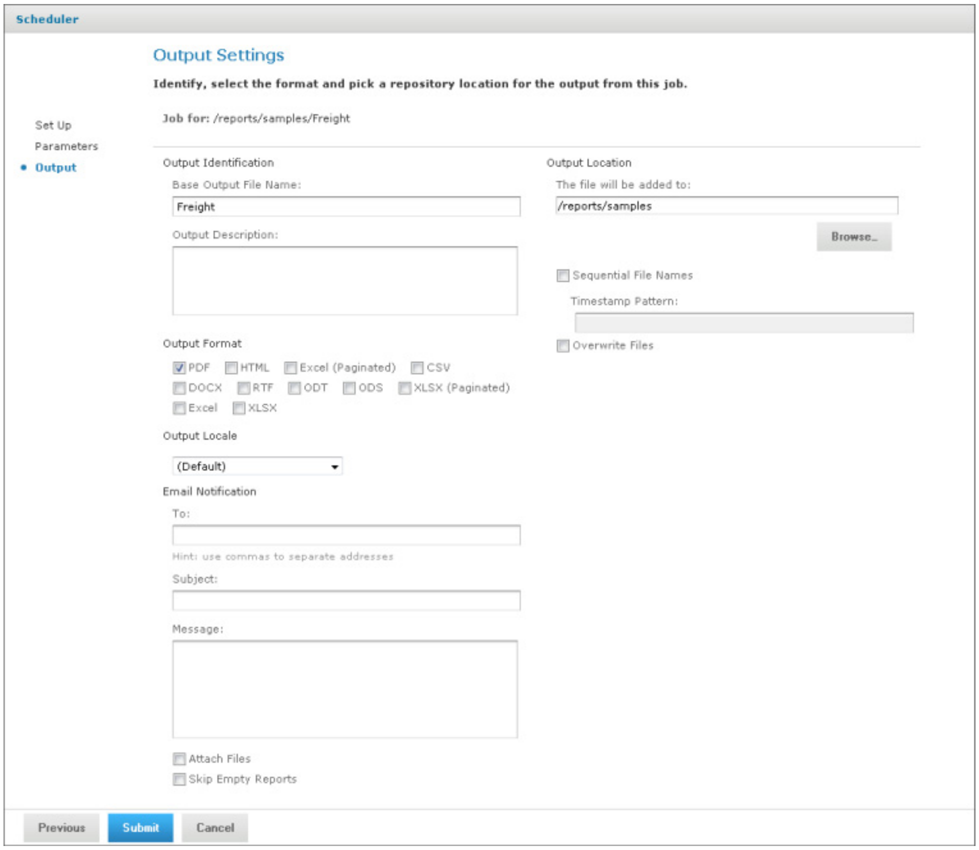
  The report must support locales, for example a report based on a Domain with language bundles (see section 8.3, "Security and Locale Information for a Domain," on page 202).
- **To** – One or more email addresses separated by commas for sending email notification.

  By default, the mail server is not configured by the JasperReports Server installer. To send email notifications, the administrator must configure the mail server, as described in the *JasperReports Server Installation Guide*.
- **Subject** – The subject line of the notification email.

- **Message** – Content of the notification email.
- **Attach Files** – A check box option that, if checked, sends the output of the report with the email notification.

Be careful when sending reports containing sensitive data by email.

- **Skip Empty Reports** – A check box option that, if checked, prevents the server from attaching empty report output files to email notification when report execution fails.
- **Output Location** – The folder for saving the report output. This field is required and you must have write permission to the folder.
- **Sequential File Names** – Appends a timestamp to the names of files created by the job. Useful for the output of recurring jobs or for time-sensitive reports where the output must be dated. When the timestamp is used, the output filename is `<basename>-<timestamp>.<extension>`.
- **Timestamp Pattern** – An optional pattern for the timestamp, based on the `java.text.SimpleDateFormat`. Valid patterns for report output files can only contain letters, numbers, dashes, underscores, and periods. The default pattern is `yyyyMMddHHmm`, for example `200906150601`.
  - For more information about the valid patterns for this field, refer to: http://download.oracle.com/javase/6/docs/api/java/text/SimpleDateFormat.html
- **Overwrite Files** – A check box option that, if checked, overwrites old output files with newer ones of the same name. Useful when you do not have sequential filenames, or you specify a timestamp pattern that may lead to identical filenames.



Output Settings

Identify, select the format and pick a repository location for the output from this job.

Job for: /reports/samples/Freight

Output Identification

Base Output File Name: Freight

Output Description:

Output Format

☑ PDF ☐ HTML ☐ Excel (Paginated) ☐ CSV
☐ DOCX ☐ RTF ☐ ODT ☐ ODS ☐ XLSX (Paginated)
☐ Excel ☐ XLSX

Output Locale

(Default)

Email Notification

To:

Hint: use commas to separate addresses

Subject:

Message:

☐ Attach Files
☐ Skip Empty Reports

Output Location

The file will be added to: /reports/samples

☐ Sequential File Names

Timestamp Pattern:

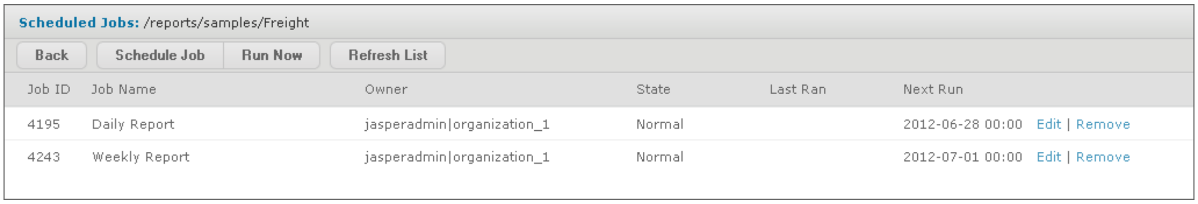
☐ Overwrite Files

Figure 3-16 Output Page for Scheduling a Report

When you click **Submit**, the job appears in the list of scheduled jobs.

3.8.3 Viewing the List of Scheduled Jobs

Scheduled jobs appear in the repository with a 🕓 icon beside the report name. To view the list of scheduled jobs for a report, locate a report in the repository, right-click the report, and select **Schedule** from the context menu. The Scheduled Jobs page appears for the report.



Scheduled Jobs: /reports/samples/Freight

Job ID	Job Name	Owner	State	Last Ran	Next Run	
4195	Daily Report	jasperadmin|organization_1	Normal		2012-06-28 00:00	Edit | Remove
4243	Weekly Report	jasperadmin|organization_1	Normal		2012-07-01 00:00	Edit | Remove

Figure 3-17 The Scheduled Jobs Page for the Freight Report

Typical users only see the jobs that they have defined themselves; administrators see the jobs defined by all users. In **Figure 3-17**, Joe User has scheduled two jobs for the Employees Report.

The Scheduled Jobs page shows the internal ID number of the job, the user (owner) who created the job, and the state of the job. Job states are:

- **Normal** – The job is scheduled.
- **Running** – The server is generating the report output.
- **Complete** – The server has finished running the job and placed output to the repository.
- **Error** – The scheduler encountered an error while scheduling or triggering the job. This doesn’t include cases where the job is successfully triggered, but an error occurs while it runs.

The Scheduled Jobs page includes two controls:

- **Edit** – Changes the schedule.
- **Remove** – Cancels the scheduled job.

  When the server receives a request to delete a job that is running, the server completes running the job before deleting it.

Buttons on the Scheduled Jobs page include:

Button	Description
Back	Returns to the list of reports.
Schedule Job	Opens the Job Details page to define a new job.
Run Now	Runs the report in the background, allowing you to continue working in the server. See section **3.8.7, “Running a Job in the Background,” on page 55**.
Refresh List	Refreshes the list of jobs, for example to see if a job has finished running.

3.8.4 Changing Job Schedules

When the start date for a job has passed, start a new job rather than changing the start date.

To edit a scheduled job:

1. Open the Scheduled Jobs page for the report, as described in section **3.8.1, “Setting Up a Job,” on page 48**.
2. Click **Edit** in the row of the job you want to change.
3. Make the changes on the Job Details, Schedule, Parameters, and Output pages.
4. Click **Save**. The update occurs immediately.

3.8.5 Stopping a Job from Running

To stop a job from running, delete it.

To delete a scheduled job:

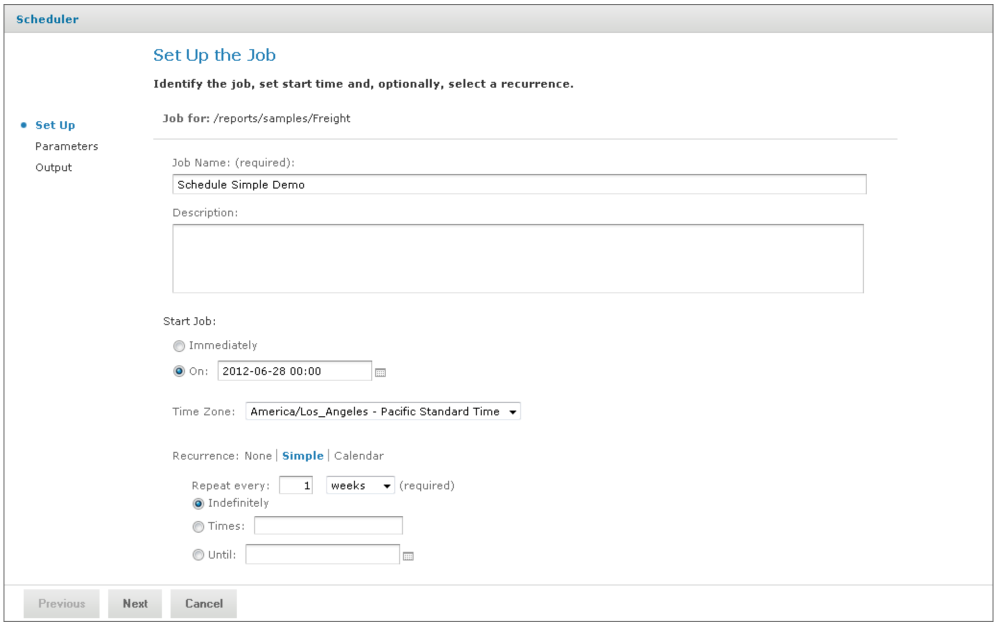
1. Open the Scheduled Jobs page for the report, as described in section 3.8.1, “Setting Up a Job,” on page 48.
2. In the row of the job you want to delete, click **Remove**.

3.8.6 Running a Job Repeatedly

To run reports automatically on a regular basis, select simple or calendar recurrence on the Set Up the Job page:

- **Simple** recurrence repeatedly runs the job at an hourly, daily, or weekly interval, and is quick to set up.
- **Calendar** recurrence involves more settings: time of day, days of the week, or days of the month, and months of the year.

Figure 3-18 shows an example of how to set simple recurrence.



Scheduler

Set Up the Job

Identify the job, set start time and, optionally, select a recurrence.

Job for: /reports/samples/Freight

Job Name: (required): Schedule Simple Demo

Description:

Start Job:

○ Immediately

● On: 2012-06-28 00:00

Time Zone: America/Los_Angeles - Pacific Standard Time

Recurrence: None | **Simple** | Calendar

Repeat every: 1 weeks (required)

● Indefinitely

○ Times:

○ Until:

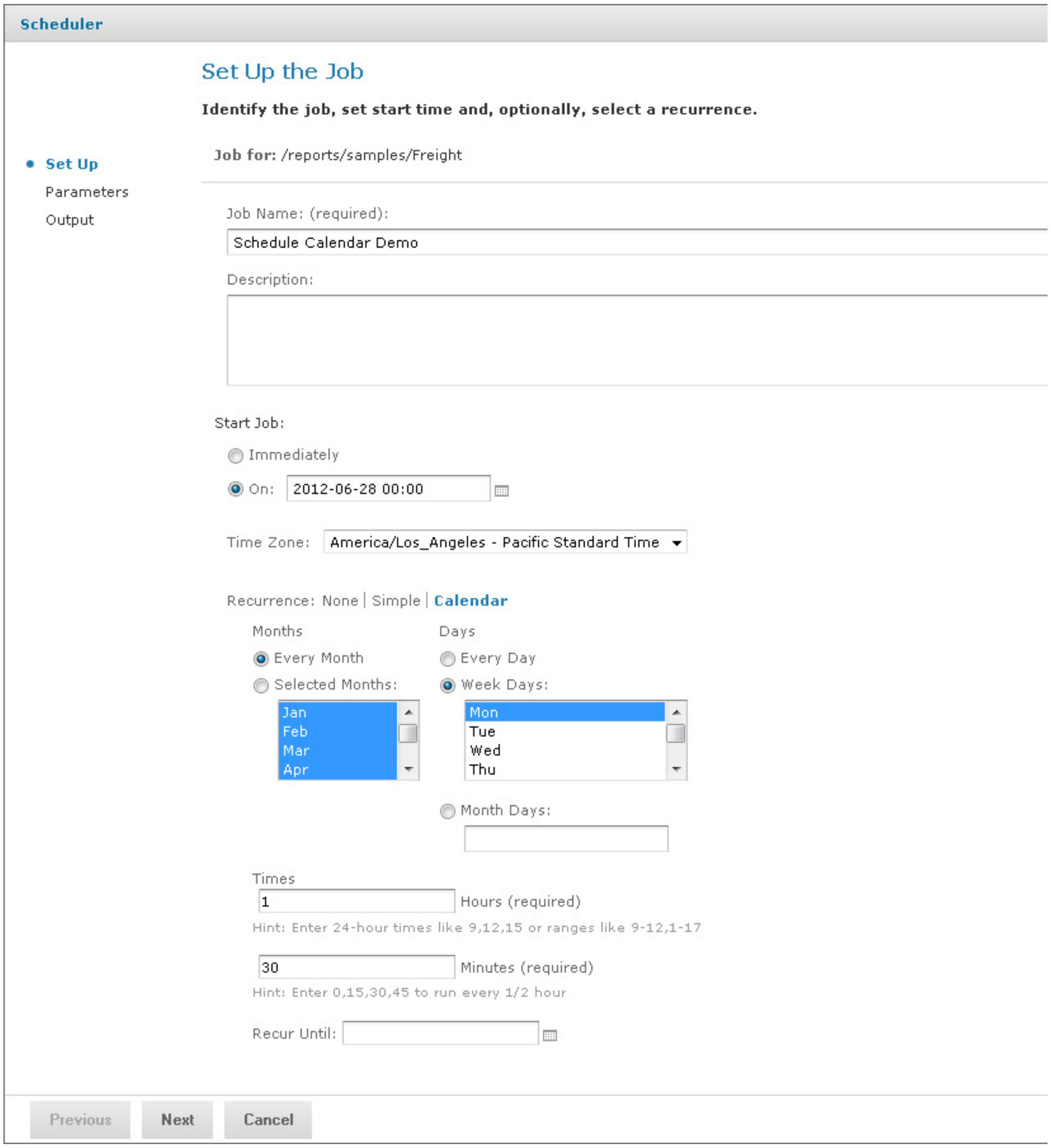
Figure 3-18 Simple Recurrence Settings

Simple recurrence options are:

- **Repeat every** – The interval between jobs, in minutes, hours, days, or weeks.
- **Indefinitely** – Runs until you delete the job.
- **Times** – Runs the specified number of times.
- **Until** – Runs until a calendar date is reached. Click the calendar icon, ▦ , to select the date.

If your server recognizes Daylight Savings Time (DST), jobs scheduled using simple recurrence may seem to occur one hour later (when DST ends) or one hour earlier (when DST begins). If you want jobs to recur at the same time of day and respect DST adjustments, use calendar recurrence.

Figure 3-19 shows an example of calendar recurrence settings.



Scheduler

Set Up the Job

Identify the job, set start time and, optionally, select a recurrence.

Job for: /reports/samples/Freight

Job Name: (required): Schedule Calendar Demo

Description:

Start Job:

○ Immediately

● On: 2012-06-28 00:00

Time Zone: America/Los_Angeles - Pacific Standard Time

Recurrence: None | Simple | **Calendar**

Months

● Every Month

○ Selected Months: Jan, Feb, Mar, Apr

Days

○ Every Day

● Week Days: Mon, Tue, Wed, Thu

○ Month Days:

Times

1 Hours (required)

Hint: Enter 24-hour times like 9,12,15 or ranges like 9-12,1-17

30 Minutes (required)

Hint: Enter 0,15,30,45 to run every 1/2 hour

Recur Until:

Figure 3-19 Calendar Recurrence Settings

Calendar recurrence options are:

- **Months** – The months during which the report runs.
- **Days** – The days when the report runs:
  - Every Day
  - Week Days
  - Month Days – Enter dates or date ranges separated by commas, for example: `1, 15`.
- **Times** – The time of day in minutes and hours when the job should run. The hours use 24-hour format.

  You can also enter multiple minutes or hours, and ranges, separated by commas. For example, entering `0, 15, 30, 45` for the minutes, and `9-17` for the hours, runs the report every 15 minutes from 9:00 a.m. to 5:45 p.m. Enter an asterisk (`*`) to run the job every minute or every hour.
- **Recur Until** – Calendar recurrence runs until a calendar date is reached. Click ▦ to select the date.

3.8.7 Running a Job in the Background

Running a job in the background generates a report, potentially long-running, without affecting performance. You can keep working in the server as the job runs. When the job completes, you can export the report directly to any format and save it in the repository. You can share a report with others by sending the generated report by email.

Running a job in the background is equivalent to scheduling the report to run immediately without recurrence.

To run a job in the background:

1. On the Home page, click **View Your Reports**; or from any page, click **View > Reports**.
2. Use the search field or **Filters** to find the report you want to run.
3. Right-click the report and select **Run in Background** from the context menu.

If the report you're running has input controls or filters that prompt for user input, a page appears for setting parameter values, as shown in Figure 3-15.

4. Choose a set of saved values, or set the fields one at a time.
5. Click **Next**.

   The Output page appears as shown in Figure 3-16, "Output Page for Scheduling a Report," on page 51.
6. Enter the information as described in step in 3.8.2, "Setting Output Options," on page 51.
7. Click **Save**.

   The report begins to run immediately.

3.8.8 Adding a Date/Time Stamp to Scheduled Output

When you add a parameter named `_ScheduledTime` to a JRXML report design in iReport Designer, and then schedule the report to run in the server, the output includes a date/time stamp showing when the report ran. The following procedure describes how to set up and use this parameter:

To display the date/time that the report ran:

1. Launch iReport, and open an existing report.
2. In the Report Inspector, right-click Parameters, and select Add Parameter.
3. Rename the parameter `_ScheduledTime`.

   The new parameter appears in the report inspector:

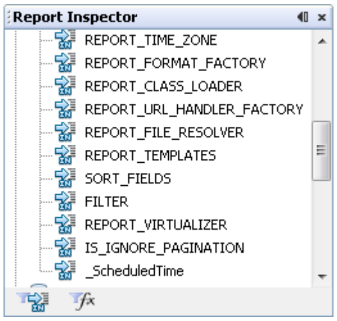
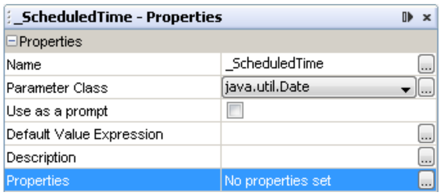


Figure 3-20 _ScheduledTime Parameter in the Report Inspector

4. Set the following parameter properties:
   - Parameter Class = java.util.Date
   - Use as a prompt = unchecked



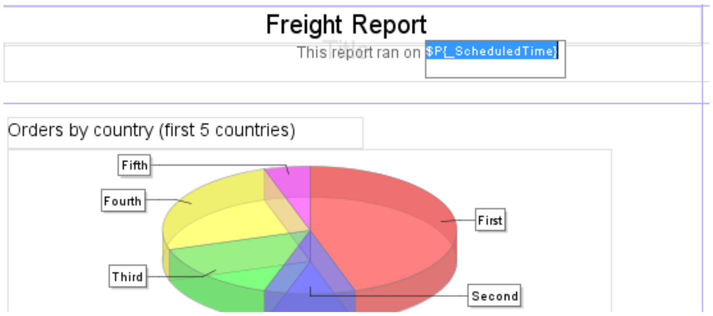
_ScheduledTime - Properties

Properties

Name	_ScheduledTime
Parameter Class	java.util.Date
Use as a prompt	□
Default Value Expression	
Description	
Properties	No properties set

Figure 3-21 _ScheduledTime Parameter Properties

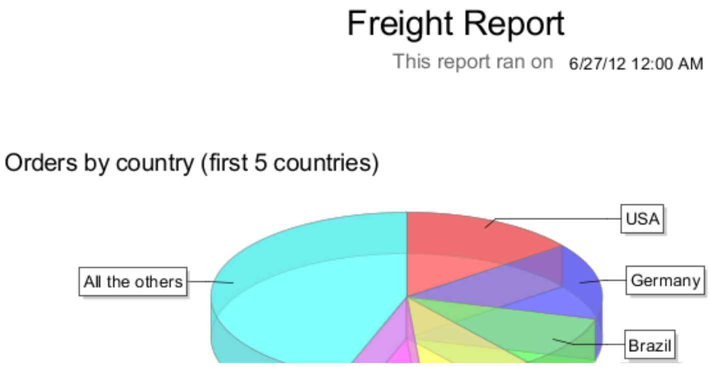
5. Drag the **_ScheduledTime** element from the Report Inspector to a valid location, such as the header, in the Designer:



Freight Report
This report ran on $P{_ScheduledTime}
Orders by country (first 5 countries)
Fifth
Fourth
Third
First
Second

Figure 3-22 Report Design Includes the _ScheduledTime Parameter Element

6. Now you can set other properties, such as the text color of the date/time stamp. In Properties, check **Blank when Null** to prevent the word null from appearing on the report when it runs unscheduled.
7. Compile the report, and add it to the server as a report unit. For more information about how to add the report unit to the server, see section **5.2, “Adding a Simple Report Unit to the Server,” on page 94**.
8. In the server, schedule the report to run immediately.
9. Open the output file:



Freight Report
This report ran on 6/27/12 12:00 AM
Orders by country (first 5 countries)
USA
All the others
Germany
Brazil

Figure 3-23 Output Showing the Scheduled Time the Report Actually Ran

The date and time the report actually ran appears in the output.

3.9 Event Messages

When an event occurs (for example, a scheduled report returns errors), JasperReports Server sends the owner of the report a notification message. You can browse these messages to troubleshoot report scheduling problems in the server. For example, you can determine that a report fails because its data source configuration uses incorrect credentials.

A common cause of the error message indicating that the report failed to execute is an incorrectly configured mail server. The mail server must be manually configured after installation in order for users to send email notifications.

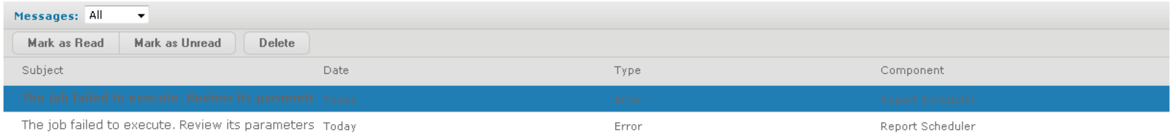
The Messages page displays the list of events logged for the current user.

To open the Messages page:

1. On any page, click **View > Messages**. The Messages page appears.
2. To view a message, click its name.

   The message opens in the Event Details page.
3. To activate the buttons on the Messages page, click in a blank area of the message row that you want to manage.

   The buttons appear.
4. To activate the buttons on the Messages page, click in a blank area of the message row that you want to manage. The buttons appear.



Subject	Date	Type	Component
The job failed to execute. Review its paramete	Today	Error	Report Scheduler
The job failed to execute. Review its parameters	Today	Error	Report Scheduler

Figure 3-24 Message Management Buttons

5. Use the buttons on the Messages page to manage the list of messages.

CHAPTER 4 WORKING WITH THE AD HOC EDITOR

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don't see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

The Ad Hoc Editor is the interactive designer where you create and edit an Ad Hoc view, which is where you define the data used in your reports. Here, you can explore and analyze data from your Topic, Domain, or OLAP data source.

This chapter discusses the Ad Hoc Editor and Ad Hoc views, and includes the following sections:

- **Overview of the Ad Hoc Editor**
- **Working with Tables**
- **Working with Charts**
- **Working with Standard Crosstabs**
- **Working with OLAP Connection-based Crosstabs**
- **Creating Custom Fields**
- **Using Filters and Input Controls**
- **Creating a View from a Domain**
- **Creating Topics**

After you create an Ad Hoc view, you - and other users with the proper permissions - can run the report, then further refine the displayed information and personalize the look of the report in the report viewer. For more information on that process, see **Chapter 3, "Running Reports and the Report Viewer," on page 33**.

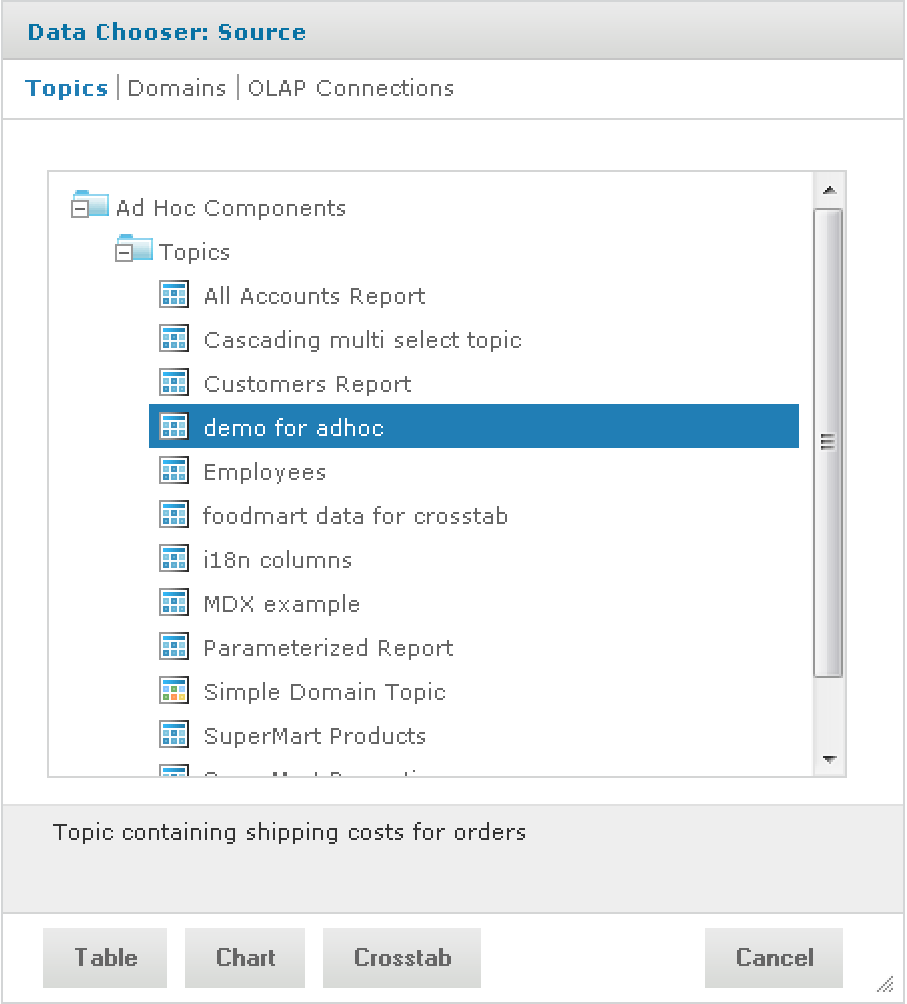
4.1 Overview of the Ad Hoc Editor

The editor supports the creation of views for various types of reports: tables, crosstabs, and charts. You intuitively interact with the editor to create these views by simply dragging and dropping elements. You can add and summarize fields, define groups, label the report, and format data for each field. You can also use the editor to explore and analyze data interactively.

To open the Ad Hoc Editor:

1. Click **Create > Ad Hoc View**. This opens the **Data Chooser** wizard.

2. In the Data Chooser: Source dialog, select a data source type (from **Topics**, **Domains**, or **OLAP Connections**), then choose your data source and click a report type (**Table**, **Chart**, or **Crosstab**). Select the report type you are likely to want as your end result, although you can change your report type later on while working with your view.



- Ad Hoc Components
  - Topics
    - All Accounts Report
    - Cascading multi select topic
    - Customers Report
    - demo for adhoc
    - Employees
    - foodmart data for crosstab
    - i18n columns
    - MDX example
    - Parameterized Report
    - Simple Domain Topic
    - SuperMart Products

Topic containing shipping costs for orders

Figure 4-1 List of Topics in the Ad Hoc Source Dialog

The Ad Hoc Editor contains the following panels:

- **Data Selection,** which contains the fields, dimensions, and measures available in the source Domain, Topic, or OLAP connection.
- **Ad Hoc View**, the main view design panel.
- **Filters**, which defines a subset of data to retrieve from the data source.

We'll discuss how to use these panels to create an Ad Hoc view later in this section.

4.1.1 Ad Hoc Sources: Topics, Domains, and OLAP Connections

The following repository objects provide a prepared connection to a data source for Ad Hoc view creation:

- Topics, JRMXL files created externally and uploaded to JasperReports Server as a basis for Ad Hoc reports.
- Domains, virtual views of a data source that present the data in business terms, allow for localization, and provide data-level security.
- OLAP Connections, multi-dimensional views of data that allow users to analyze a large number of aggregate data levels.

You can also open and edit an existing Ad Hoc view to create a new Ad Hoc view.

4.1.1.1 Topics

Generally, an administrator or iReport user creates a Topic as a JRXML file. The JRXML topic is then associated with a data source in the server. A Topic can also be created from a Domain in the server. Both types of topics appear in the Data Chooser wizard when you create an Ad Hoc view.

Using a Topic as your source generates an empty view, which allows you to begin adding data to your view right away, without choosing, pre-filtering, or changing display names of the data (all of which are required steps when creating a Domain-based report).

To begin designing a Topic-based view:

1. Launch the Ad Hoc Editor by clicking **Create > Ad Hoc View.**
2. In the Data Chooser, select the **Topics** option at the top of the dialog window.
3. Expand the Topics folder and select a topic.
4. Select the type of report you intend to create: table, chart, or crosstab. For an overview of report types, see section **4.1.2, "Ad Hoc Report Types," on page 63**.

You can now begin working on your view in the Ad Hoc Editor.

4.1.1.2 Domains

Administrators create Domains that typically filter the data, create input controls, and manage the list of available fields and measures. A Domain specifies tables in the database, join clauses, calculated fields, display names, and default properties, all of which define items and sets of items for creating Ad Hoc views.

To begin designing a Domain-based view:

1. Launch the Ad Hoc Editor by clicking **Create > Ad Hoc View.**
2. In the Data Chooser, select the **Domains** option at the top of the dialog window.
3. Expand the Domains folder and select a domain.
4. Click **Choose Data...**, and click the options on the left of the window to perform the following tasks:
   - Click **Fields** to select fields of data to use in the view.
   - Click **Pre-filters** to create filters to limit the data available in the Ad Hoc Editor.
   - Click **Display** to change the fields' display names.
   - Click **Save as Topic** to save the customized topic for later use.
5. Select the type of report you want to create: table, chart, or crosstab. For an overview of report types, see section **4.1.2, "Ad Hoc Report Types," on page 63**.

You can now begin working on your view in the Ad Hoc Editor.

4.1.1.3 OLAP Connections

Administrators create OLAP client connections that expose transactional data and define how the data can be seen as a multidimensional cube. An OLAP connection can expose multiple cubes in a single OLAP connection.

With OLAP connections, you can only create views for crosstab-type reports.

To begin designing an OLAP connection-based view:

1. Launch the Ad Hoc Editor by clicking **Create > Ad Hoc View.**
2. In the Data Chooser, select the **OLAP Connections** option at the top of the dialog window.
3. Expand the **Analysis Components | Analysis Connections** folder and select a connection.
4. Select **Crosstab** as the type of report you want to create.

You can now begin working on your view in the Ad Hoc Editor.

For more information about OLAP-based report functionality, refer to the following sections:

- **4.5, “Working with OLAP Connection-based Crosstabs,” on page 77**
- **4.9, “Creating Topics,” on page 89**

4.1.2 Ad Hoc Report Types

The Ad Hoc Editor allows you to create views you can use to generate the most frequently-used report types:

- **Tables**, which are used to view values in the database and to summarize the values in columns.
- **Charts**, which compare one or more measures across multiple sets of related fields.
- **Crosstabs**, which summarize data across multiple dimensions.

This section provides an overview of each report type. The design and content tasks for working with each type of report is discussed in more detail in the following sections:

- For more information on table reports, see section **4.2, "Working with Tables," on page 67**.
- For more information on chart reports, see section **4.3, "Working with Charts," on page 71**.
- For more information on crosstab reports, see section **4.4, "Working with Standard Crosstabs," on page 75**.

4.1.2.1 Tables

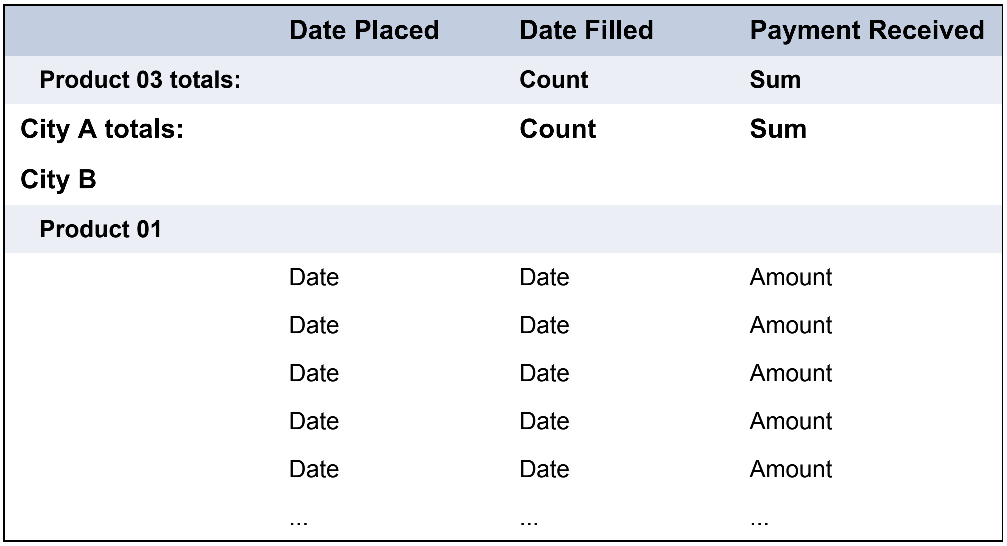
The architecture of a table report consists of columns, rows, and groups.

Columns in a table correspond to the columns in the data source. They are included in the report by adding fields or measures. to the table in the Ad Hoc view.

Rows correspond to rows in the database. The information in each row depends on what columns are included in the table.

Using groups, rows can be grouped by identical values in any field with intermediate summaries for each grouped value. For example, a table report of product orders might contain columns to show the dates and amounts of each order, and its rows might be grouped by city and product:

	Date Placed	Date Filled	Payment Received
City A			
Product 01			
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
Product 01 totals:		**Count**	**Sum**
Product 02			
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
Product 02 totals:		**Count**	**Sum**
Product 03			
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount

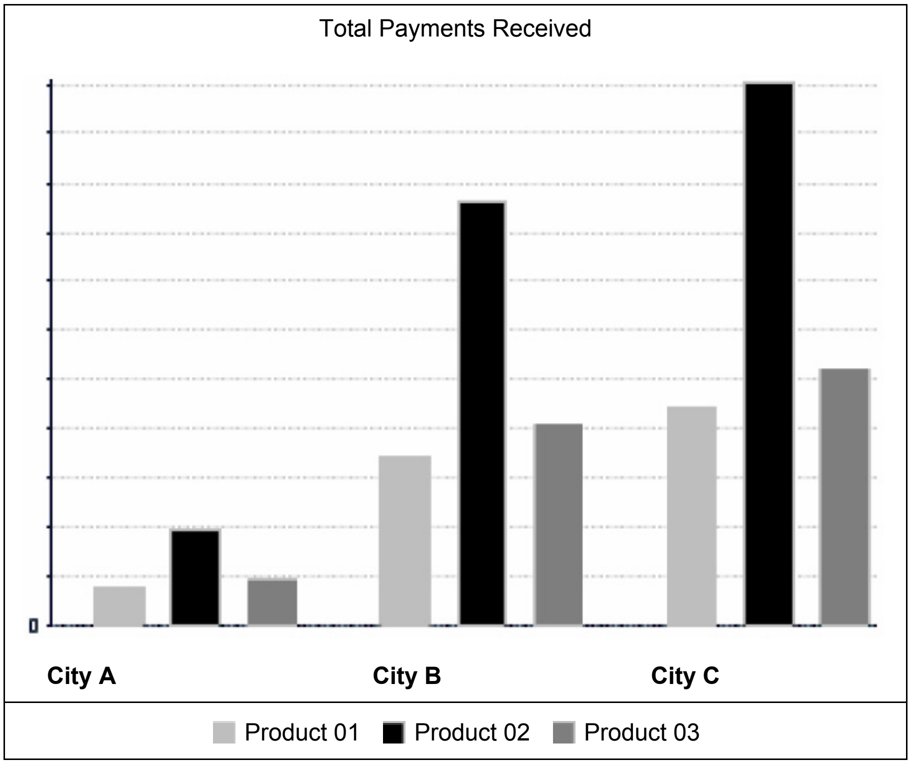


	Date Placed	Date Filled	Payment Received
Product 03 totals:		**Count**	**Sum**
City A totals:		**Count**	**Sum**
City B			
Product 01			
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	Date	Date	Amount
	...	...	...

For more information on working with tables, see section **4.2, "Working with Tables," on page 67**.

4.1.2.2 Charts

Charts summarize data graphically. Types of charts include bar chart, line chart, and pie chart, among others. With the exception of time series and scatter charts, each type of chart compares summarized values for a group. For example, the **Chart** tab might show the data in a bar chart that compared the sum of Payments Received for each of the products in each of the cities:



For more information on working with charts, see section **4.3, "Working with Charts," on page 71**.

4.1.2.3 Crosstabs

Crosstabs are more compact representations than tables; they show only computed values, rather than individual database values. Columns and rows specify the dimensions for grouping; cells contain the summarized measurements. For instance, the example above could be displayed in a crosstab with columns grouped by sales manager and year:

		Tom			**Harriet**			**Manager Totals**
		2007	**2008**	**Year Totals**	**2007**	**2008**	**Year Totals**	
City A	**Product 01**	Payment Received	Payment Received	**Payment Received**	Payment Received	Payment Received	**Payment Received**	**Payment Received**
	Product 02	Payment Received	Payment Received	**Payment Received**	Payment Received	Payment Received	**Payment Received**	**Payment Received**
	Product 03	Payment Received	Payment Received	**Payment Received**	Payment Received	Payment Received	**Payment Received**	**Payment Received**
	Product Totals	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**
City B	**Product 01**	Payment Received	Payment Received	**Payment Received**	Payment Received	Payment Received	**Payment Received**	**Payment Received**
	...	...	...	**...**	...	...	**...**	**...**
City Totals		**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**	**Payment Received**

For more information on working with crosstabs, see section **4.4, "Working with Standard Crosstabs," on page 75**.

OLAP connection-based crosstabs behave differently than those created from Topics or Domains. See section **4.9, "Creating Topics," on page 89**.

4.1.3 The Data Selection Panel

The Data Selection panel contains a list of available fields in the chosen Topic or Domain. If you are using a Domain, fields may appear in nested sets. Use the arrow beside the set name to expand or collapse a set of fields.

Available fields may be divided into two sections in the panel, **Fields** and **Measures**.

To hide this panel, click the icon in the top left corner; this is helpful when arranging content in a large Ad Hoc view. Click the same icon on the minimized panel to expand it.

For more information on working with fields, see sections **4.2.1, "Using Fields in Tables," on page 67**, **4.3.2, "Using Fields and Measures in Charts," on page 73**, and **4.4.1, "Using Fields in Crosstabs," on page 75**.

4.1.4 The Ad Hoc View Panel

The Ad Hoc View panel includes **Sample Data** | **Full Data** options for displaying a subset (sample) of data, or all (full) data in the report. Using the sample data can make the design process quicker by loading less data. The full data set shows you a more realistic view of the final report as it appears to your users. Use the subset for initial design; use the full set for refining layout elements such as column width.

By default, the editor displays only a smaller, sample set of the data in the table. Click **Full Data** to view the full set of data.

Depending on its configuration, JasperReports Server may load a Topic, Domain, or OLAP connection's entire result set into memory when you edit or run the report. If the data policies and other options that control JasperReports Server's memory are disabled, ensure that each Topic, Domain, or OLAP connection returns a manageable amount of data, given the environment's load capacity. Alternately, you can change the server's configuration.

The Ad Hoc View panel also includes **Table, Chart,** and **Crosstab** options for resetting the report type. You can change the report type in the Ad Hoc Editor during the design or when you reopen the design for editing.

To change the report type:

- Near the top of the Ad Hoc View panel, select the report type you wish to display.

The data is displayed in the new report type.

The tool bar at the top of the panel provides access to many functions of the Ad Hoc Editor. **Table 4-1** describes the tool bar.

Table 4-1 Ad Hoc Editor Tool Bar Icons

Icon	Name	Description
👁	Presentation Mode	Click this icon to hide the editor interface and view only the report. This mode provides a subset of the editor's full feature set.
💾	Save	Place the cursor over this icon to open a menu of save options.
📤	Export	Click this icon to export the view into one of the available formats.
↶	Undo	Click this icon to undo the most recent action.
↷	Redo	Click this icon to redo the most recently undone action.
⟲	Undo All	Click this icon to revert the report to its state when you last saved.
⇄	Switch Group	Click this icon to change the way groups are displayed. For more information, refer to section **4.8, "Creating a View from a Domain," on page 86**.
↑	Sort	When working with tables, click this icon to view the current sorting and to select fields for sorting data. For more information, refer to section **4.2.1.6, "Sorting Tables," on page 69**
☰	Input Controls	Click this icon to see the input controls applied to this view. For more information, refer to section **4.7.2, "Using Input Controls," on page 84**.
☑	Page Options	Place the cursor over this icon to open a menu of page-level options. You can: • Change whether to display the Layout Band. • Change whether to display the title area. • In tables, you can also hide or show the detail rows when the data is summarized. This option is available only if the table includes grouped columns.

Directly beneath the tool bar is the Layout Band. Here, there are two fields. These fields have different labels and functions, depending on the type of view you are creating:

- For tables, these fields are **Columns** and **Groups**.
- For charts, these fields are **Measures** and **Group**.
- For crosstabs, these fields are **Columns** and **Rows**.

You can drag and drop fields and measures into these boxes to populate your view.

4.1.5 The Filters Panel

The Filters panel displays any filters defined for the view. You can set the filter values and see the resulting change in the Ad Hoc View panel. To hide the Filters panel, click the icon in the top left corner of the panel. Click the same icon on the minimized panel to expand it again.

For more information on working with filters, see section **4.7, "Using Filters and Input Controls," on page 80**.

Ad Hoc views are created and edited in the Ad Hoc Editor, and are saved to the repository. In addition to creating reports, views can be used as data sources to create new views based on the data included in them, rather than on an original data source.

4.1.6 Saving an Ad Hoc View, Previewing and Creating a Report

After you create a compelling table, chart, or crosstab, you can save the view in the repository for future use.

To save an Ad Hoc view:

1. Hover your mouse over 💾▾ .
2. Select **Save Ad Hoc View** or **Save Ad Hoc View As**.
3. Name the view as needed, and click

The view is saved in the repository.

You can also save an Ad Hoc view as a report. Typically, a report is created when you want to:

- See data in the interactive report viewer.
- Perform additional formatting of the table data.
- Embed the data content into a dashboard.

Create a report from the view by selecting **Save Ad Hoc View and Create Report**; you can also create and run a report directly from the repository. For more information, see section **3.2, "Running a Simple Report," on page 36**. When you run the report, it is displayed as a JasperReport.

4.1.6.1 Dependent Reports

When you create a report from an Ad Hoc view, the report is considered "dependent" on that view.

When you save an Ad Hoc view its dependent reports are not updated. For example, if you open an Ad Hoc view in the Editor and add a column to it, that column will not show up in previous reports created from that view. In such a case, you may want to save the updated view with a different filename to avoid confusion.

4.2 Working with Tables

The following sections explain how to populate, edit, and format your view for a table-type report.

4.2.1 Using Fields in Tables

Insert data into your table by adding fields. All available fields are listed in the **Data Selection** panel, on the left side of the Ad Hoc Editor.

The available fields are divided into two sections in the panel:

- Fields, which can be added to the table as columns or groups.
- Measures, which are specialized fields that contain data values.

To add fields and measures as columns to a table:

1. In the **Data Selection panel**, click to select the field or measure you want to add to the table. Use Ctrl-click to select multiple items.
2. Drag the selected item into the **Columns** box in the Layout Band.

   The field is added to the view as a column in the table.

To remove a field or measure from a table:

- In the Layout Band, click the **x** next to the field or measure's name.

4.2.1.1 Groups

Groups allow you to create detailed data rows. For example, if you have a table that lists the names of suppliers for a restaurant, and you group the suppliers by the City field, the suppliers' names are rearranged so that all suppliers located in

Baltimore are together under a “Baltimore” header row, and all suppliers located in Bethesda are together under a “Bethesda” header row.

Only fields can be applied to a table as a group; measures cannot.

Data is grouped in the table according to the order they have defined. You can change the order by dragging the groups into position if needed.

To create a group:

1. In the **Data Selection** panel, click to select the field you want to add to the table as a group.
2. Drag the field to the **Groups** box in the Layout Band.

   The Ad Hoc view refreshes and displays the data grouped under a new header row.

You can also add a group to the table by right-clicking a field and selecting **Add as Group**.

To remove a group:

- In the Layout Band, click the **x** next to the field’s name in the **Groups** box.

To move a the grouping order up or down in a table:

- In the Layout Band, drag the name of the group you want to move into its new position.

4.2.1.2 Summaries

You can display summary data for any column in your table.Summary data may be in the form of various functions, such as:

- Sum
- Count
- Distinct Count
- Average.

For example, in a table with a list of stores, grouped by City and Country, you can display the number of stores in each City, and in each Country, using this function.

By default, the summary function for each field is defined by the data source, OLAP, or domain definition.

To add a summary to a table:

- In the table, right-click the column you want to calculate a summary for, and select **Add Summary**.

  The summary information is added to the group header, or is added to the bottom of a column if no groups are included in the table.

To remove a summary from a table:

- In the table, right-click the column with the summary you want to remove, and select **Remove Summary**.

  The summary information is removed from the table.

4.2.1.3 Column and Header Labels

You can edit a column or header label directly in the Ad Hoc Editor.

To edit a column or header label:

1. On the Ad Hoc view panel, right-click the column or group header you want to rename.
2. Select **Edit Label** from the context menu.

   The Edit Label window opens.
3. In the text entry box, delete the existing name and enter the new name.
4. Click **Submit**.

If space is at a premium, you can remove labels from the report. When you delete a label, it is displayed in the editor, but does not appear when you run the report.

To delete a column or header label:

1. On the Ad Hoc view, right-click the column or header label you want to remove.
2. Select **Delete Label** from the context menu.

To re-apply a label:

1. Right-click the column or header label you want to replace.
2. Select **Add Label** from the context menu.

   The Edit Label window opens.
3. Enter the label name, if needed.
4. Click **Submit**.

4.2.1.4 Managing Column Size and Spacing

You can change the size of, and spaces between, columns to manage the appearance of your table, to use space more efficiently.

To resize a column:

1. In the Ad Hoc View panel, click to select the column you want to resize.
2. Move the cursor to the right edge of the column.
3. When the cursor changes to the resize icon (↔), click and drag the column edge right or left until the column is the needed size.

Spacers can be added to a table to arrange columns farther apart, or add margins to a table.

To change the spacing between columns:

1. In the **Data Selection** panel, in the Measures section, click **Spacer**.
2. Drag the spacer into the **Columns** box in the Layout Band between names of the two columns you want to move apart.

   A spacer column, labeled ◆ , appears in the table.
3. Repeat this action to add space between each of the columns.
4. To remove a spacer, right-click the spacer column and select **Remove from Table**.

To use spacers to create table margins:

1. In the **Data Selection** panel, click to select **Spacer**.
2. Drag the spacer into the **Columns** box in the Layout Band.
3. Repeat as needed until the margins are as wide as needed.
4. Repeat the steps above, adding the spacer to the right edge of the table.

4.2.1.5 Reordering Columns

You can move columns to the right or left to reorder data in your table.

To reorder a column:

1. In the Ad Hoc View panel, right-click the column you want to move.
2. Select **Move Right** or **Move Left** from the context menu.

4.2.1.6 Sorting Tables

In the Ad Hoc Editor, you can sort the rows of a table by one or more fields.

To sort a table:

1. Click ↑≡.

   The Sort window appears. If the table is already sorted, the window shows the fields that are used.
2. To add a field to sort on, double-click the field in **Available Fields**.

   The Available Fields panel now lists only fields that are not already in Sort On.
3. Select one or more fields to sort by. You can also use Ctrl-click to select multiple fields.
4. Click ▶.
5. To arrange the sorting precedence of the fields, select each field in the Sort window and click **Move to top**, **Move up**, **Move down**, or **Move to bottom**: ⤒, ▲, ▼, and ⤓.
6. To remove a field, select it and click ◀.
7. Click **OK**.

   The table updates to display the rows sorted by the selected fields.

When sorting a table:

- You can right-click a field in **Data Selection** and select **Use for Sorting** from the context menu. In this case, the table is sorted by a field that isn't in the table; you may want to note the sorting fields in the title.
- If a column is already being used and you want to stop using it or change the sorting, right-click the column and select **Change Sorting** from the context menu.

4.2.1.7 Adding a Title

1. Above the table, click the text **Click to add a title**.
2. Enter the new table title in the text entry box.

4.2.1.8 Changing the Data Format

You can change the formatting for columns containing numeric data, such as dates and monetary amounts.

To change the data format for a column:

1. In the Ad Hoc view, right-click the column for which you want to change the data format.
2. Select **Change Data Format** from the context menu.
3. Select the format you want to use. These options vary, depending on the type of numeric data contained in the column.

   The data in the column now appears in the new format.

4.2.1.9 Changing the Data Source

You may need to select a new data source for your table. This is a simple task, but you should keep in mind that **all report data and formatting are lost when you select a new Topic, Domain, or OLAP connection**. Any changes to the report are also lost if you navigate to another page using the browser navigation buttons, the main menu, or the **Search** field. To preserve changes, accept the current Topic or click **Cancel**.

To change the table's data source:

1. At the top of the **Data Selection** panel, click ☰▾ and select **Change Source.**
2. Select a different Topic, Domain, or OLAP connection.
3. Click **Table** to apply the new data source.

Click **Cancel** to return to the editor without changing the Topic.

4.2.1.10 Showing and Hiding Detail Rows

You can simplify or expand the information in your table by hiding or showing detail rows.

To hide detail rows in a table:

1. Place the cursor over ☑▾.
2. Select **Hide Detail Rows** to show only the summarized totals for each group.

   The Ad Hoc Editor applies a summary to each field depending on its datatype.

To show detail rows in a table:

1. Place the cursor over ☑▾.
2. Select **Show Detail Rows** to display the detailed information for each group.

   The Ad Hoc Editor displays the complete information in each row.

4.3 Working with Charts

The following sections explain how to populate, edit, and format your view for a chart-type report.

Charts are graphical representations of data. Many tasks related to working with charts are identical (or very similar) to those for table reports. For any tasks not discussed in this section, see the information in section **4.2, “Working with Tables,” on page 67**.

4.3.1 Chart Types

Charts have different layout and format options from tables and crosstabs.

There are a number of chart types to choose from to best represent your information. These types are broken into two categories:

- Summarized charts, which show data grouped and summarized.
- Unsummarized charts, which show each data point individually, and don’t support grouping. Unsummarized charts can only be run or saved if the fields selected for the X and Y axes are appropriate.

The Ad Hoc Editor can create both summarized and unsummarized charts.

Summarized chart types include:

- Bar, which compares values displayed as bars.
- Pie, which compares values displayed as slices of a circular graph.
- Line, which compares values displayed as points connected by lines.
- Area, which compares values displayed as shaded areas.

Unsummarized chart types include:

- Scatter, which compares values expressed as pairs that determine the position of a point on the chart. For scatter charts, both fields must be numeric.

> A scatter chart uses Cartesian coordinates to display values as points whose locations are determined by two variables you select. One variable determines the horizontal position and the other determines the vertical position. The chart plots paired values against one another.

- Time Series, which compares values based on times or dates associated with the data. Use a date field as the group. For time series charts, one field must be a date or date/time, and the other must be numeric.

> Time series charts plot the data against the passage of time. They can help you understand the nature and underlying context of the data, identify trends, or forecast future results. In a time series chart, the horizontal axis must represent a date or time field, such as Purchase Date. If you add a field to the horizontal axis that has a datatype other than a date/time, the Ad Hoc Editor renders the chart as best it can, but the result is likely to be meaningless.

Because these charts are unsummarized, the Change Summary Function option is not available for them.

By default, the Ad Hoc Editor creates a bar chart. You can select a different type of chart at any time.

To select a new chart type:

1. In the Ad Hoc View panel, right-click the chart.
2. Select **Change Chart Type.**
3. Select the type of chart you want to apply to your report.

You can right-click the chart to open a context menu that provides these formatting categories:

- **Change Chart Type**
- **Display Options**
- **Legends and Labels**
- **Remove Group**
- **Change Summary Function**
- **Change Data Format**
- **Add/Remove Measure**

The options available in the Display Options category vary depending on the type of chart you are working with. The following table describes the options for each chart type:

Table 4-2 Ad Hoc Display Options

Type	Context Menu Options
All Chart Types	◆ **Remove Gradient** or **Apply Gradient.** Whether the background color should be graded or solid. When the gradient is removed, the background is filled with a solid color. ◆ **Remove Background** or **Fill Background**. Whether the background should be filled. Note that the gradient doesn't appear when you run the report.
Bar	◆ **Flat Bars** or **3D Bars.** Whether to use a flat, two dimensional appearance, or a three dimensional (3D) appearance. ◆ **Stacked** or **Simple Series**. Whether multiple measures of each group are depicted as individual bars or as portions of a single bar. Note that a series chart displays multiple measures for each group value. ◆ **Horizontal Bars** or **Vertical Bars.** Whether the bars are parallel to the width or height of the chart.
Pie Chart	When creating a pie chart, you can indicate whether to use a two-dimensional **Flat Pie**, or the default three-dimensional **3D Pie.**
Line Chart	When creating a line chart, you can indicate whether to display markers at each data point and lines that join them. Select **Hide Lines** or **Show Lines**, and **Hide Points** or **Show Points**, to remove or display those indicators from the chart.
Area Chart	When creating an area chart, you can indicate whether the groups should be displayed as transparent overlays or as solid areas. Select **Stacked Series** to display the groups as solid areas arranged vertically, one on top of another; select **Simple Series** to display groups as transparent overlays. As compared to line charts, area charts emphasize quantities rather than trends.

Type	Context Menu Options
Scatter	When creating a scatter chart, you can indicate whether to display markers at each data point and lines that join them. Select **Hide Lines** or **Show Lines**, and **Hide Points** or **Show Points**, to remove or display those indicators from the chart.
Time Series	When creating a time series chart, you can indicate whether to display markers at each data point and lines that join them. Select **Hide Lines** or **Show Lines**, and **Hide Points** or **Show Points**, to remove or display those indicators from the chart.

4.3.2 Using Fields and Measures in Charts

Data is added to your chart as a group or as a measure. All available fields are listed in the Data Selection panel, as either standard fields or measures.

- Standard fields can be added to the chart as a measure or a group.
- Measures contain summarized values; therefore, they cannot be added to the chart as a group.

Before any fields are added to the chart, the Ad Hoc Editor displays a placeholder with the legend displaying a single entry: No Data. As you add groups and measures, the placeholder changes to reflect the data in the chart. For example, when you add a group to a pie chart, the pie displays the correct number of pie slices; when you add a measure to a bar chart, the Y-axis units and values show the range of values in the measure you selected.

4.3.2.1 Chart Measures

Chart measures are typically numeric fields that determine the length of bars, size of pie slices, location of points (in line charts), and height of areas.

The Ad Hoc Editor displays only the first measure when you change to a pie chart because pie charts can show only a single measure. Any additional measures are displayed when you change back to a bar or other chart type.

To add a field to a chart as a measure:

1. In the Data Selection panel, click to select the field or measure you want to add to the chart as a measure. Use Ctrl-click to select multiple items.
2. Drag the selected item into the **Measures** box in the Layout Band.

   The field is added to the chart.

To remove a measure field from a chart:

- In the Layout Band, click the x next to the field or measure's name.

If the chart displays multiple measures, the context menu lists them under the **Measures** menu item. The measures are listed in the order they appear within the groups. On the chart context menu, click **Measures > [Measure Name] > Remove Measure** (where **[Measure Name]** is the name of the measure you want to remove).

The **Measures** menu also allows you to change the summary function and data format. It is available from the chart context menu as well as from the legend.

4.3.2.2 Chart Groups

Similar to the table's grouping option (described in section **4.2.1.1, "Groups," on page 67**), a chart's group field determines how data is categorized. For example, in a bar chart, the category field determines how the bars are grouped; in a pie chart it determines what each slice represents.

Measures cannot be used as groups.

Time series and scatter charts don't support grouping; instead, each data point is mapped individually. The data aren't summarized.

To add a field to a chart as a group:

1. In the Data Selection panel, click to select the field you want to add to the chart as a group. Use Ctrl-click to select multiple items.
2. Drag the selected item into the **Groups** box in the Layout Band.

   The field is added to the chart.
3. To replace a group already added to the chart, right-click a new field and select **Replace Group**, or simply drag the new field into the **Groups** box in the Layout Band.

To remove a group field from a chart:

- In the Layout Band, click the x next to the field's name.

4.3.2.3 Legends and Labels

You can rename the measures displayed in the chart by right-clicking the measure's label in the legend and selecting **Edit Legend Label** from the menu that appears. The text you enter replaces the field's name.

If you change the measure's summary function, the label updates to reflect the change. If you change the summary function back, the last name entered for that measure with that summary function appears.

You can hide legends and labels to give the chart more space, or you can show them to make the chart easier to understand.

To show or hide legends and labels:

1. Right-click the chart and select **Legends and Labels**.
2. Specify whether to hide or show the legend, the group title (which identifies the name of the group field), or measure titles (which identifies the measures).

When working with a chart that displays two measures with very different ranges of values, the chart may be difficult to read or understand. To make the ranges of values more similar, create a custom field that multiplies or divides one of the measures. Consider the case where you are comparing the number of items sold (values ranging from 0-50) and the total sales revenue for each product (values ranging from 0-50,000), you could create a custom field that divided the revenue measure by 1000. Adding this measure in place of the actual revenue measure yields a chart in which the two measures are depicted in closer scale. The new chart is both easier to read and more appealing. Jaspersoft recommends that you note such changes in the legend label or title.

To add a field in a specific position in a chart:

1. Click to select the field you want to add to the chart.
2. Drag and drop the field onto the chart legend, in the desired location. The new measure appears in the correct location in the chart

4.3.2.4 Resizing a Chart

By default, the page is set to **Actual Size**, which resizes the page to fit the chart's dimensions.

You can increase a chart's size to improve its legibility or decrease its size if it's intended for use in a Jaspersoft dashboard or JSR-168 compliant portal, such as Liferay. When you place the cursor over the right-hand or bottom edge of the chart, the resize arrow appears; click and drag the edge of the chart to increase or decrease its size.

For more information about portal integration, refer to the *JasperReports Server Administrator Guide*.

4.4 Working with Standard Crosstabs

This section describes crosstabs based on Topics and Domains. For information about crosstabs based on OLAP connections, refer to **4.5, “Working with OLAP Connection-based Crosstabs,” on page 77** and **4.9, “Creating Topics,” on page 89**.

Crosstabs have different data, layout, and format options than tables or charts.

If you selected Crosstab when you created a view, as described in section **4.1.2, “Ad Hoc Report Types,” on page 63**, the following sections explain tasks specific to your crosstab development.

4.4.1 Using Fields in Crosstabs

Fields can be added to crosstabs as row groups or column groups. Measures can be added to crosstab rows or columns as well, but all measures must be included in a crosstab as either a row or a column -- that is, you can add one or more measures to the crosstab as columns, or add one or more measures to the crosstab as rows, but you cannot have one measure as a column and another as a row in the same crosstab.

4.4.1.1 Crosstab Rows and Columns

When creating a view for a crosstab-type report, keep in mind that row and column groups are arranged in hierarchies. Drag the group headings to rearrange the hierarchy; you can also right-click a heading and select a **Move** option from the context menu or press the cursor keys. Rearranging the groups may change the preview data in the editor.

To add a field or measure to a crosstab group:

1. In the **Data Selection** panel, click to select the field you want to add to the crosstab as a group. Use Ctrl-click to select multiple items.
2. Drag the selected item into the **Columns** or **Rows** box in the Layout Band.

4.4.1.2 Crosstab Measures

Measure labels are displayed in the crosstab based on their status as a row or column:

- Measures included as rows appear in the crosstab below the **Measures** heading.
- Measures included as columns appear in the crosstab to the right of the **Measures** heading.

Right-click a measure to perform any of the following tasks:

You can right-click a measure in the crosstab to open a context menu that provides these options:

- **Change Summary Function**
- **Change Data Format**
- **Remove From Crosstab**
- **Create Filter**
- **Move Up** or **Move Down**

Measures are arranged in cells. You can add any number of measures. All the measures appear together in every cell. To rearrange the measures, drag them in the measure label area.

4.4.1.3 Pivoting

You can pivot a crosstab in two ways:

- Pivot the entire crosstab by clicking ↻. The row and column groups switch places. For more information, see section **4.8, “Creating a View from a Domain,” on page 86**.
- Pivot a single group:
    - To pivot a single row group, right-click it and select **Switch To Column Group**.
    - To pivot a single column group, right-click it and select **Switch To Row Group**.

4.4.1.4 Slicing

The slice feature lets you keep or exclude group members in a crosstab. To slice, right-click a group member and select:

- **Keep Only** to remove all groups except the selected one from the crosstab.
- **Exclude** to remove this group from the crosstab.

Use Ctrl-click and Shift-click to select multiple groups to keep or exclude.

You can select multiple row groups or multiple column groups; you can't slice by both row groups and column groups at once. Compare slice to drill-through, drill to details, and filtering.

For more information about filtering, see section **4.7, "Using Filters and Input Controls," on page 80**.

4.4.1.5 Summarizing

All row and column groups are summarized automatically:

- To turn off a group summary, right-click any heading in the group and select **Delete Row Summary** or **Delete Column Summary** from the context menu. To reapply the summary, right-click the heading and select **Add Row Summary** or **Add Column Summary.**

  The Delete Summary option is available only for the outermost group on either axis (that is, either the outermost row group or the outermost column group)

- To select the summary function and data format for a measure, right-click the measure label and select from the context menu. Note that you can't change the summary function on custom fields that calculate percents (Percent of Total, Percent of Column Group Parent, and Percent of Row Group Parent).
- The summary functions for numeric fields are Sum, Average, Maximum, Minimum, Distinct Count, and Count All. Distinct Count is the number of different items in the row or column; Count All is the total number of items. For instance, if there are 3 widgets of type A and 3 widgets of type B, Distinct Count is 2 and Count All is 6.

4.4.1.6 Collapsing and Expanding Members

By default, the editor displays each row and column group of a crosstab in a collapsed state. This means that you can see the totals for the group, but not the measures for its individual members. To see measures for a group's members, right-click the group label and select **Expand Members**.

When a group's members are expanded, select **Collapse Members** from the same menu to hide the measures. Collapsing an outer group also collapses its inner groups. The **Expand Members** and **Collapse Members** options are only available for outermost groups, or for inner groups nested in an expanded outer group.

When you collapse a group, its summary is automatically displayed; this prevents invalid crosstab layouts in which there is nothing to display for some totals if the summary has been deleted previously.

4.4.1.7 Sorting

By default, the rows and columns of a crosstab are sorted in alphabetical order of the group names. Click the sorting icon beside any measure to cycle through the sort options:

- A Alphabetical order (A to Z) of the column and row group labels; this is the default sort order.
- # Numeric ascending order (smallest to greatest) of the column and row group summary values.
- # Numeric descending order (greatest to smallest) of the column and row group summary values.

When the crosstab includes more than one row group or more than one column group, the inner groups are also sorted according to your selection. Only one measure can be used for sorting at any one time; changing the sort order for another measure resets all others to the default.

4.4.1.8 Resizing and Layout

Many of the layout and formatting options that are set manually in tables are set automatically in crosstabs. In particular, row and column sizes are fixed and no spacer is available.

4.4.1.9 Drilling Through Data

Drill-through functionality is available for crosstab data. A drill-through table displays the supporting details for the selected roll-up value.

To view the drill-through table for a value in your crosstab:

- Click hyperlinked data to display additional columns from that specific fact data.

By default, the drill-through table opens in its own window or tab, depending on your browser settings.

4.5 Working with OLAP Connection-based Crosstabs

An OLAP connection is a definition for retrieving OLAP data for use in Ad Hoc views and reports. An OLAP connection is either a direct Java connection (Mondrian connection) or an XML-based API connection (XML/A connection). You must create OLAP client connections in order to use this functionality, which may be restricted by your license. For more information on creating OLAP client connections, as well as other administrative tasks regarding OLAP, refer to the *Jaspersoft OLAP User Guide*.

The Ad Hoc Editor displays a more focused tool bar when your Ad Hoc view is based on an OLAP connection. It contains a subset of the options available in the standard tool bar, including Presentation Mode, Save, Run the Report, Undo, Redo, Undo All, Switch Group, and Display Options. For a description of these options, see **Table 4-1, “Ad Hoc Editor Tool Bar Icons,” on page 66**.

4.5.1 Dimensions and Measures

When you create a view that will generate a report based on an OLAP connection, the cube metadata defined in the connection’s OLAP schema is automatically applied to your data: the dimensions and measures in the cube are shown in the Data Selection panel.

Dimensions and measures describe your data in terms of these organizing principles and facts:

- **Dimension**: A categorization of the data in a cube. For example, a cube that stores data about sales figures might include dimensions such as time, product, region, and customer’s industry. A dimension is a hierarchical series of relationships in which each level has a parent and may also have children. Note that a level is a particular location within the dimension, whereas a member is a specific data element at a particular level. For example, if the dimension is Geography, then one of its levels might be Country; at the Country level, USA might be a member.

  Some dimensions include a special level at the top of the hierarchy that includes every level in the dimension. This All member is used to display the summarized data across the dimension. The All member of dimensions is a common feature in many OLAP solutions.
- **Measure**: A field that displays the facts that constitute the quantitative data in a cube. For example, a cube that stores data about sales figures might include measures such as unit sales, store sales revenue, and store sales cost.

The items in the **Dimensions** section of the Data Selection panel may appear in a multi-level tree structure. You can add the entire dimension tree, or any sub-trees, to your crosstab by dragging the top-level name into the Layout Band. Individual items can be added to the crosstab in the same manner.

Items in the Measures section are organized into a single-level list. Any calculated measures are indicated with a calculation icon # .

When working with OLAP connections, the Layout Band at the top of the Ad Hoc View panel allows you to drag and drop dimensions and measures into the crosstab. As you add columns and rows, the crosstab automatically builds on the panel. In the **Columns** and **Rows** fields, each item in your crosstab is represented as a token; drag tokens left and right to change their position on an axis or drag them between the fields to pivot them.

You can’t drag and drop items directly onto the Ad Hoc View panel. Instead, drag them to the **Columns** or **Rows** text boxes in the Layout Band, or right-click a dimension or measure and use the context menu to add them to the crosstab.

The cube metadata applied to your view provides structure to your crosstab: you can add a dimension with any number of levels, but it must follow the hierarchy defined in the cube. For example, if a dimension's levels are Country, State, and City, you can place any one of them in the crosstab, but if you add two or more, their order (defined in the OLAP schema) is enforced. For example:

Possible	Impossible
Country, State, City	State, Country, City
Country, City	City, Country
State, City	City, State
Country, State	State, Country

In addition, you can't mix members from different dimensions. For example, consider a crosstab that includes both a Geography dimension (Country, State, and City) and a Time dimension (Year, Quarter, and Month): you can't insert the Year level between the Country and State levels. The levels of each dimension are always kept together.

All measures in the crosstab must be either rows or columns. You can't have measures on both axes at the same time. To move measures between dimensions, right-click and select **Switch To Column Group** or **Switch To Row Group**. All the measures move to the other axis.

4.5.2 Drilling Through Data

Drill-through functionality is available for crosstab data. A drill-through table displays the supporting details for the selected roll-up value.

To view the drill-through table for a value in your crosstab:

1. Click hyperlinked data to display additional columns related to that information.
2. Use the page controls to navigate the table.

The drill-through table opens in its own window or tab, depending on your browser settings.

4.6 Creating Custom Fields

You can create new fields in an Ad Hoc view by applying mathematical formulas to a view's existing numeric fields. For example, consider a view that includes both a Cost and a Revenue field. You could calculate the profit for each record by creating a custom field that subtracts the Cost field from the Revenue field. Create a custom field by selecting an existing field in the Measures section of the Data Selection panel of a table-type view; the **Create Custom Field** menu item appears on the context menu when you right-click a numeric field.

The Ad Hoc Editor supports three types of functions:

- Basic functions include addition, subtraction, multiplication, and division. You can use these functions with a constant (such as multiplying the cost by two to calculate a standard 50% markup), or you can use them with multiple fields. Select multiple fields using Ctrl-click; the columns' borders change color to indicate that multiple fields are selected; right-click to open the context menu and create a custom field.
- Advanced functions include round, rank, percent of total, percent of row group, and percent of column group. These functions don't take constants, nor do they support multiple fields.
- Date functions can calculate the difference between two dates in a number of intervals, such as years, weeks, days, and seconds.

A custom field can include only a single function. To use more than one function, create two custom fields, with one building on the other. In this case, pay special attention to the order in which you create the custom fields, as this may affect the results; for example, rounding then multiplying is different from multiplying then rounding.

Because custom fields can build upon one another, you can create complex calculations. For example, you can divide the Profit custom field in the previous example by the Revenue field to express each record's margin as a percent. When a custom field is the basis of another field, you can't delete it until you delete the one that builds on it.

When working with multiple fields:

- You can only select basic functions and date differences.
- You can multiply or add any number of fields, but ordered functions (subtract and divide) and date functions can only be used with two fields at a time.
- For ordered operations, the order in which you select fields matters. For example, to calculate profit in the example above, click Revenue first, then Ctrl-click Cost. When you right-click, select **Create Custom Field** and choose subtraction, the Ad Hoc Editor assumes you are subtracting the Cost field from the Revenue field. You can always change the order of fields by clicking **Swap**.

To create a custom field based on one field:

1. In the **Measures** section of the Data Selection panel, right-click a numeric field and select **Create Custom Field** from the context menu.
2. Depending on the type of function you want to create, select options in **Basic Functions** or **Advanced Functions.**
3. In **Basic Functions**, you can add, subtract, multiply, or divide the field values by a constant, which you enter as a number in the selected field; this number is the constant to use in the formula.
4. If you selected a basic function, click **Swap** to put the constant before the field in the formula; this is only useful in conjunction with ordered operations.
5. Click **Create Field**.

   The custom field appears in the list of available measures.

To create a custom field based on multiple numeric fields:

1. In the **Measures** section of the Data Selection panel, Ctrl-click two or more numeric fields, right-click one of the selected fields, and select **Create Custom Field** from the context menu.
2. Select from the following options:
   - If you selected just two fields, choose **+, -, ***, or **/**.
   - If you selected more than two fields, choose **Add All** or **Multiply All**.
3. Click **Swap** from the context menu to change the order of the fields in the formula; this is only useful in conjunction with ordered functions.
4. Click **Create Field**.

   The custom field appears in the list of available measures.

To create a custom field based on two date fields:

1. In the **Data Selection** panel, Ctrl-click two date fields.
2. Right-click, and select **Create Custom Field** from the context menu.
3. Select one of the **Date Difference** intervals.

   You can compare dates only when exactly two date fields are selected.
4. Click **Create Field**.

   The custom field appears in the list of available measures.

Keep the following in mind when creating custom fields:

- To edit an existing custom field, right-click it and select **Edit Formula** from the context menu. You can then choose a different function, or enter a different value (if you are editing a basic function).
- When you create a custom field based on a field on the panel, the new field appears in the panel; when you create a custom field from a field in **Data Selection**, it appears at the bottom of the list.
- The percent of group functions are unique among the custom functions in that they calculate values based on the grouping defined in the report. Thus, the following limitations apply:
  - The percent of column group functions are meaningless in charts and tables. In these contexts, these functions always return 100.

  - Custom fields using the special percent functions cannot be used as a group, as a filter, nor as the basis for other custom fields.
  - The summary function for custom fields using the percent functions is always Sum; this cannot be modified. Furthermore, the percentage is always calculated on the sum of the original field, regardless of the summary function applied to the field in the table or crosstab, if any.
- The Round function uses the standard method of rounding (arithmetic rounding), in which decimal values greater than 0.5 are rounded to the next largest whole number, and values less than 0.5 are rounded down.
- A custom field's label is determined by the fields, constants, and functions it includes; for example, the default label for the Profit field in the example above is Store Sales - Store Cost. Right-click the column and select **Edit Label** to enter a more compelling name.
- By default, the Ad Hoc Editor supports only two decimal places. If the custom fields return data that are significant to the third decimal place, you can add new masking options by editing configuration files. For more information, refer to the *JasperReports Server Administrator Guide*.
- You can't delete a custom field that is used in the **Ad Hoc View** panel. First, remove the custom field from the Ad Hoc View panel and then delete it from the **Data Selection** panel.

4.7 Using Filters and Input Controls

JRXML Topics, Domains, and OLAP connections use different mechanisms for screening the data they return:

- JRXML Topics can contain Parameterized queries. The parameters can be mapped to input controls that allow users to select the data they want to include.
- Domains (and Domain Topics) can be filtered by selecting fields in the Domain and specifying comparison values. The filters can be configured for users to select the data to include.
- Within the Domain design, filters based on conditions can also be defined; these filters are not displayed in the report viewer when the report runs.
- OLAP connections rely on XML schemas to filter the data in an underlying transactional database. Input controls are never generated directly from the OLAP schema.

You can define filters in the Ad Hoc Editor regardless of whether you are working with data from a Domain, Topic, or OLAP connection. Such filters can be helpful in improving the report's initial performance by reducing the amount of data the report returns by default. For more information, see section **4.7.3, "Input Controls and Filters Availability," on page 85**. To prevent users from seeing the full dataset, you can also use input controls in a JRXML Topic or filters defined in the Domain design, which can be hidden from end users.

If you want to return different data to different users of the same report, define data-level security based on a user roles and profile attributes. This is available for reports based on a Domain, Domain Topic, or OLAP client connection. For more information, refer to the *Jaspersoft OLAP User Guide*. For more information, refer to section **8.4, "The Domain Security File," on page 204** and to the *Jaspersoft OLAP User Guide*.

Input controls and filters interact seamlessly. For example, you can create filters in an Ad Hoc view that gets data from a JRXML Topic that includes input controls.

The server refreshes the editor against both the filters and the input controls. Because some combinations of input controls and filters don't return data, this can result in an empty report.

If the result set is empty, check for an incompatible combination of filters and input controls, such as a standard filter (set to Mexico against a Country field) and a **Keep Only** filter (set to Canada against a Country field), or an incorrectly-defined advanced filter expression (data must meet all criteria in multiple filters, rather than meeting criteria in a subset of those filters). See section **4.7.1.1, "Advanced Filtering," on page 81** for information on advanced filter expressions.

In rare cases, filters can conflict with report parameters, and you'll need to rename the field causing the conflict by editing the JRXML file. Refer to the *iReport Ultimate Guide* for more information about editing JRXML files.

For more information about:

- JRXML Topics and input controls, see section **5.3.2, "Adding Input Controls," on page 106**.

- Domain Topic filters, see section **4.9.2, “Creating Topics from Domains,” on page 91**.
- Localizing input control prompts and lists of values, see section **5.6, “Localizing Reports,” on page 120**.

4.7.1 Using Filters

Filters can be defined at three levels:

- In the Domain Designer.
- When creating a view from a Domain (in the Data Chooser).
- In the Ad Hoc Editor (even when the view is based on a JRXML Topic or OLAP connection).

In this section, we discuss how to define filters in the Ad Hoc Editor. For information on defining filters in the Domain Designer, see section **6.4.6, “Pre-filters Tab,” on page 156**. For information on defining filters in the Data Chooser, see section **4.8.1.2, “The Pre-filters Page,” on page 87**.

In addition, you can control how and what filters are applied to a field or fields by using advanced expressions. For more information, see section **4.7.1.1, “Advanced Filtering,” on page 81**.

To create a filter in the Ad Hoc Editor:

1. Right-click a field in the **Data Selection** panel and select **Create Filter**.

   A new filter appears in the Filters panel. If the Filters panel was hidden, it appears when you create a new filter.

> If the results are empty and you don’t understand why, check for an incompatible combination of filters and input controls. Click ▤ to compare input controls with the filters in the Filters panel.

2. Use the fields in the filter to change its value. Depending on the datatype of the field you selected, the filter maybe multi-select, single-select, or text input.
3. Click ▤▾ and select **Minimize All Filters** or **Maximize All Filters** to toggle expansion of the items in the filter.
4. Click ▤▾ and select **Remove All Filters** to remove the filters.
5. Click ▼ to hide the filter’s details. Click ▶ to display them again.
6. Click the **Select All** check box (if it appears in the Filters panel) to select all values currently available in the dataset. The **Select All** check box does not appear in the Filters panel for numbers and dates.

   Note that the **Select All** check box doesn’t guarantee that all values are selected every time the report runs. Instead, the check box is a shortcut to help you quickly select all the values currently available in the dataset. To ensure that all values appear in the report whenever it is edited or run, remove the filter entirely. On the panel, you can also create a filter from the right-click context menu of a column in a table. On the **Chart** tab, you must right-click the field in the **Data Selection** panel.

When you change a filter, the server uses the new value to determine the data to display. If you change only the operator in a filter, you must deselect the value in that filter, then reselect it to apply the updated filter.

For filters with multiple values, you do not need to reselect all values. After changing the operator, use Ctrl-click to deselect just one of the values, then Ctrl-click to reselect that value.

> When you right-click a group member in a crosstab and select **Keep Only** or **Exclude**, you create complex filters. When you create a filter against an inner group, the filter that appears may be created as a complex filter; a complex filter can’t be edited but it can be removed. Complex filters also appear in the Ad Hoc Editor if a Data Chooser wizard filter was created and locked.

4.7.1.1 Advanced Filtering

When you create multiple filters, they are, by default, connected with an implicit AND operator; that is, the data displayed in your table, chart, or crosstab is what remains after all your filters are applied.

However, with the advanced filter functionality, you can exercise greater control over the displayed data by applying an advanced expression that includes more complex, nested AND, OR, and NOT operators, as well as by applying multiple filters to a single field.

Advanced filters are not available for Ad Hoc reports created from OLAP connections.

Advanced filters are useful in a number of situations, including:

- **When using the AND operator isn't sufficient**. Consider an international company that wants to view data for stores located on the Pacific Rim; they may create an advanced expression with the following criteria:
  - Country is USA

    AND
  - State is California OR Washington OR Oregon OR Hawaii OR Alaska.

    OR
  - Country is Japan OR Indonesia

  Using the AND operator for all of these criteria returns an empty view, as no store is located in all of those areas.
- **When you need to eliminate some results in a field.** For example, if your food and beverage distribution company wants to view sales for all drinks except for high-price items, you might include the following criteria in an advanced expression:
  - Product Group is Beverages

    NOT
  - Price is greater than 39.99

  This filter displays all items in the Beverage Product Group, but filters out those with prices over $39.99

These are only two scenarios where advanced filters can hone your results and make your report more precise. There are, of course, many other situations where they can be applied.

In this section, we take you through these tasks:

- Creating an advanced expression
- Editing an advanced expression
- Removing an advanced expression
- Applying multiple filters to a single field

Advanced filters are applied to reports, but filter details don't appear on report previews, or on the report itself.

To create and apply an advanced filter:

1. Create two or more filters for your data, as described in section **4.7.1, "Using Filters," above.** These can be standard field-based filters, or **Keep Only** and **Exclude** filters.

   Note that, as you create the filters for use in an advanced expression, you may find that the data in your view disappears, since most (if not all) of the data won't meet all of the filter criteria. When you create your advanced expression and change some of the ANDs to ORs and NOTs, data reappears in the panel.
2. At the top of the Filters panel, click ☰▾ in the upper right-corner and select **Show Expression** to display the **Filter Expression, for** pane. The **Filter Expression, for** pane is empty by default.
3. In the **Filter Expression, for** pane, click the **Edit** button. The **Edit Advanced Filters** dialog appears.
4. In the Edit Advanced Filters dialog, use the filter preview window to locate the filters, and note the letter designations they have been given.

Filter letter designations are case sensitive, and must be CAPITALIZED.

5. Enter a filter expression using the letter designations, and including the following operators:

- **AND** narrows your results and includes only fields that meet the criteria of both filters before and after the operator.
- **OR** broadens your results and includes fields that meet the criteria of either filter before or after the operator.
- **NOT** excludes results that match the criteria.
- **Parentheses** combines multiple filters into a single item in the expression.

6. Check your expression by clicking the **Validate** button. If your expression works with the available filters, you receive a green “Success” validation message; an incorrect expression receives a red invalid message with a brief description of the problem.
7. When your expression is validated successfully, click **Submit**. Your report is updated to reflect the newly-applied filter criteria.

After creating an advanced filter, you may want to add another filter to the expression, or remove one already included in the expression.

If the simple filter you wish to delete is part of an advanced filter, you must first remove it from the advanced filter expression; otherwise, deleting the filter deletes the advanced filter expression.

To add a new filter to an existing advanced expression:

1. If necessary, create the new filter in the **Filter** panel.
2. In the **Filter Expression, for** pane, click **Edit** to open the Edit Advanced Filters dialog.
3. In the Edit Advanced Filters dialog, add the new filter to the expression. Any unused filters appear in the filter preview window highlighted in gray.
4. Click **Validate** to check the integrity of the new expression.
5. When your expression is validated successfully, click **Submit**.

To remove a filter from an advanced expression:

1. In the **Filter Expression, for** pane, click **Edit** to open the Edit Advanced Filters dialog.
2. In the Edit Advanced Filters dialog, remove the unwanted filter from the expression, and adjust the expression as needed.
3. Click **Validate** to check the integrity of the new expression.
4. When your expression is validated successfully, click **Submit**.

When working with advanced expressions, you may decide to delete an expression and create a new one.

To remove an advanced expression from a report:

1. In the **Filter Expression, for** pane, click **Edit** to open the Edit Advanced Filters dialog.
2. Clear the expression from the **Filter Expression** text box.
3. Click **Submit**. The expression is removed, leaving the remaining filters intact.

When you refine your advanced expression, you may also want to delete unused filters from the Filters panel.

- If the filter you want to remove isn’t part of the advanced filter, hover your mouse over ≣▾ in the filter’s title bar and select **Remove Filter**.
- If you want to remove all existing filters, including the advanced expression, hover your mouse over ≣▾ in the upper right corner of the Filters panhandle select **Remove All Filters**.

You can apply multiple simple filters to a single field, if needed, to further refine your advanced filter results. For example, a user may want to view the data in the Shipping Cost field, but only when it meets certain criteria combinations:

- When shipping costs to French cities with postal codes that begin with the number 5 are under five Euros
- When shipping costs to German cities with postal codes that begin with the number 1 are under five Euros

You can recreate the scenario below using the **demo for adhoc** topic.

In the following example a user has a table including the following columns:

- Country

- Postal Code
- Shipping Charge

To analyze the specific shipping costs described above, the user creates the following (simple) filters - including two filters each for the Country and Postal code fields:

- A. Country *equals* France
- B. Postal code *starts with* 5
- C. Country *equals* Germany
- D. Postal code *starts with* 1
- E. Shipping Charge *is less than* 5

Then, to display only the information she needs, she creates the following advanced expression:

- ((A and B) or (C and D)) and E

This translates to:

- ((FRANCE and POSTAL CODES THAT START WITH 5) or (GERMANY and POSTAL CODES THAT START WITH 1)) and SHIPPING CHARGES LESS THAN 5 EUROS.

4.7.2 Using Input Controls

In the Ad Hoc Editor, you can display the input controls defined in the Topic as visible to users. You can accept the controls' default values or enter other values. The Ad Hoc Editor indicates that the view has input controls by displaying ▤ as active on the tool bar. Click this icon to select new values or to save values as the new defaults for this report. The following procedure steps through these tasks.

To add an input control to the report using a filter:

1. Create a new filter, or use an existing one in the Filters panel.
2. In Filters, click ▤▾ beside the new filter, and select **Show Operator**.

   The filter's operator appears in a drop-down.
3. Select an operator from the drop-down and enter the in the text box below the drop-down.

   The filter appears as an input control when the view is used to run the report.
4. Place your cursor over 💾▾ , select **Save Ad Hoc View as....**
5. Name the report, select a location, and click **Save**.
6. On the tool bar, click ▤ .

   Only the input controls defined in the topic appear here. Again, if no input controls were defined in the topic, the button appears inactive. You can create a report and open it in the report viewer to see a filter listed as an input control.

To edit the values for a view's input controls:

1. On the tool bar, click ▤ .

   A window listing the input controls defined in the Topic appears.

   > The Parameterized Report Topic already includes three input controls, created when the report was uploaded: Country, RequestDate, and OrderId.

2. Select new values. For example, select USA from the **Country** drop-down.
3. To change default values of input controls, select the check box, **Set these values as defaults when saving your view**.

   The selected values become the default values when you save the view.
4. Click **OK**.

   The report design on the Ad Hoc view shows USA data.

4.7.3 Input Controls and Filters Availability

Input controls and filters can appear in the Editor and when a report runs:

- Input controls can be set to be visible or invisible when you edit a report:
  - Input controls set to **Always prompt** are displayed in the editor and always appear before the report is run.
  - Input controls that aren't set to **Always prompt** are always hidden in the editor and hidden when the report is run.
- Filters defined in the Domain design are always hidden in the editor and when the report is run.
- Filters created in the Data Chooser wizard can be locked or unlocked:
  - Filters that are unlocked display filter information in the editor and are available from the **Options** button when the report is run.
  - Filters that are locked display input controls in the editor when you click 👁 to see the view in display mode but are not available from the **Options** button when the report is run. Users can remove the filter while in the editor, allowing them to see all the data unfiltered when the report is run.
  - You can't change whether the filter is displayed after the report is created.
- Filters defined in the editor are always available in the Filters panel of the editor and from the **Options** button when the report is run.

When setting up input controls for a huge report that takes a long time to run, consider setting the report to **Always prompt**. Before a report is run, the report viewer prompts you to provide the input options, preventing the report from running using the default input options.

Filters that are unlocked are available. When input controls or filters don't appear in the report viewer, click the **Options** button to view them. You can learn more about how filters and input controls interact in the editor by walking through the data exploration tutorial with the Filters panel open.

To set an input control to always prompt:

1. Locate a Topic, such as the Parameterized Report Topic, in the repository and click **Edit**.
2. On the Controls & Resources page of the JasperReport wizard, under Input Control Options, select **Always prompt**:

To determine whether an input control is visible:

1. Locate a Topic, such as the Parameterized Report Topic, in the repository and click **Edit**.
2. On the Controls & Resources page, click the name of an input control, such as Country.
3. On the Locate Input Control page, click **Next**.

   At the bottom of the Create Input Control page, if the **Visible** check box is selected, the input control appears on the report when it runs. For more information, see section **5.3.2, "Adding Input Controls," on page 106**.

   If you don't provide a default value for the input control, users are prompted to select a value when they create a report based on the Topic.

To lock a filter:

1. Click **Create > Ad Hoc View**.
2. In the Data Chooser wizard, click **Domains** to create a new report based on a Domain.
3. Click **Choose Data**.
4. In **Fields**, move tables and fields from **Source** to **Selected Fields**.
5. Click **Pre-filters**.
6. Double-click a field in the **Fields** panel.
7. In the Filters panel, define a filter as described in section **4.8.1.2, "The Pre-filters Page," on page 87**.
8. Check the **Locked** check box, and click **OK**.
9. Click **Table** to open the Ad Hoc Editor.

   In the Filters panel, the name of the filter and a note about the lock appears under the heading **Locked**.

4.8 Creating a View from a Domain

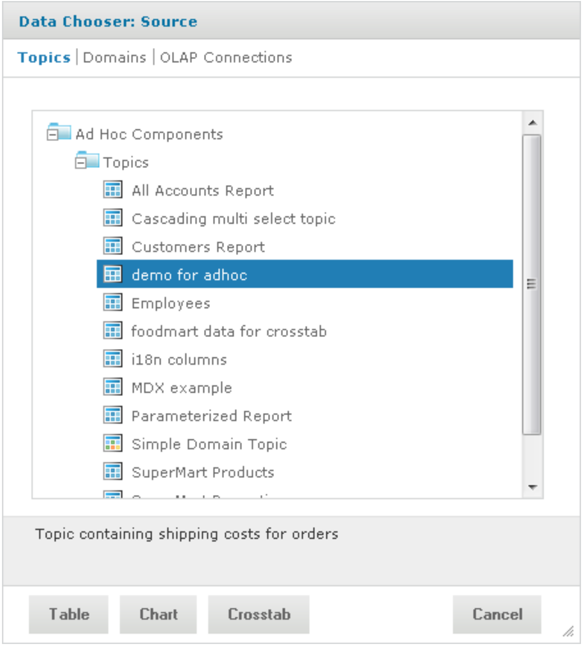
Like Topics and OLAP connections, administrators and data analysts create Domains for reuse to simplify access to data during report design. Domains give report makers more flexibility than Topics in choosing fields from the database and allow filtering of the data before it is included in a view and the subsequent report.

A report based on a Domain can prompt the user for input that determines what data is presented. For example, if a Domain includes all sales data for a company, the report can present detailed information grouped by postal code and prompt the user to select the geographic area, such as a US state. The report displays only the pertinent information.

For a more complete description of how to create Domains, see section 6.2, "Example of Creating a Domain," on page 142.

To begin creating create a basic report from a Domain:

1. On the Home page, click **Create > Ad Hoc View**. The Data Chooser wizard opens.
2. Click **Domains**. The list of the available domains appears.



Data Chooser: Source

Ad Hoc Components
Topics
All Accounts Report
Cascading multi select topic
Customers Report
demo for adhoc
Employees
foodmart data for crosstab
i18n columns
MDX example
Parameterized Report
Simple Domain Topic
SuperMart Products

Topic containing shipping costs for orders

Figure 4-2 Simple Domain Selected in the Ad Hoc Sources Dialog

A description of the selected Domain appears at the bottom of the Domains tab.

3. Select the domain you want to use.
4. Click **Choose Data**. The Data Chooser opens to the Select Fields page.

   You are now ready to configure your data using the Data Chooser Wizard.

4.8.1 Using the Data Chooser Wizard

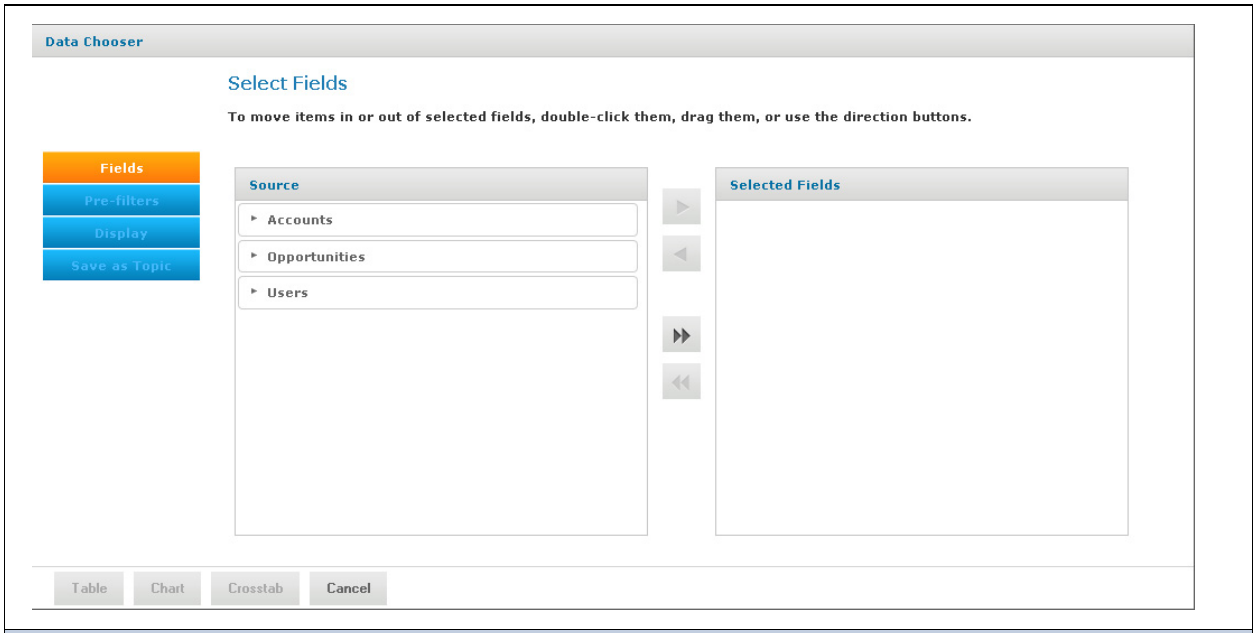
To design a Domain Topic or a view based on a domain, use the Data Chooser wizard. To open the Data Chooser wizard, click **Create > Ad Hoc View.** Select Domains, click a Domain, and click **Choose Data** to access the following pages of the Data Chooser wizard:

- The Select Fields Page – Choose the fields to make available in the Ad Hoc Editor.
- The Pre-filters Page – Define a filter on any field, with the option of prompting for user input, or to compare fields.
- The Display Page – Change the order and names of fields that appear in the Ad Hoc Editor.
- The Save as Topic Page – Save the settings as a Domain Topic.

You must first select some fields on the Select Fields page, but the other three pages are optional and can be completed in any order. Click **Table, Chart,** or **Crosstab** at any time to begin designing a report based on the chosen data.

4.8.1.1 The Select Fields Page

Use this page to choose fields and sets of fields to use in the report or make available in the Domain Topic:



To move items in or out of selected fields, double-click them, drag them, or use the direction buttons.

Figure 4-3 The Select Fields Page of the Data Chooser Wizard

- The Source panel displays the sets of fields in the Domain. Use ▼ and ▶ to close or expand each set.
- The Selected Fields panel shows the items you selected. You can move a field or set back and forth between the panels by dragging, double-clicking, or selecting the item and clicking an arrow button, such as ▶ .
- If you move an individual field out of a set, it appears in a set of the same name, for example Accounts, as shown in Figure 4-3. If you do not want sets, use the settings on the Display page.
- Some Domains define sets that are not joined. When you select a field from such a set, the unjoined sets aren’t available.

4.8.1.2 The Pre-filters Page

You can pre-filter data in the Data Chooser wizard before clicking **Table**, **Chart**, or **Crosstab** to launch the Ad Hoc Editor or before clicking **Save as Topic** to create a Domain Topic. Pre-filtering data limits the data choices available in a Domain Topic or the fields that ultimately appear in the Ad Hoc view. You also can define a filter on a field that does not appear in the final report. The filter is still applied and only data that satisfies all defined filters appear in the final report. For example, you can filter data to select a single country, in which case it doesn’t make sense for the Country field to appear as a row, column, or group. You also can design reports that prompt users for input of data to use as a filter.

The Pre-filters page provides powerful functionality for designing reports within the server.

To define a filter:

1. In the Data Chooser wizard, click **Pre-filters**.
2. Expand the options in the **Fields** panel.
3. Double-click to select a field in the **Fields** panel.

   Choices appear for filtering the selected field:
4. Choose a comparison operator.

   Text fields have both substring comparison operators such as “starts with” or “contains” and whole string matching such as “equals” or “is one of.” When you select a whole string matching operator, a list appears showing all existing values for the chosen field retrieved in real-time from the database.

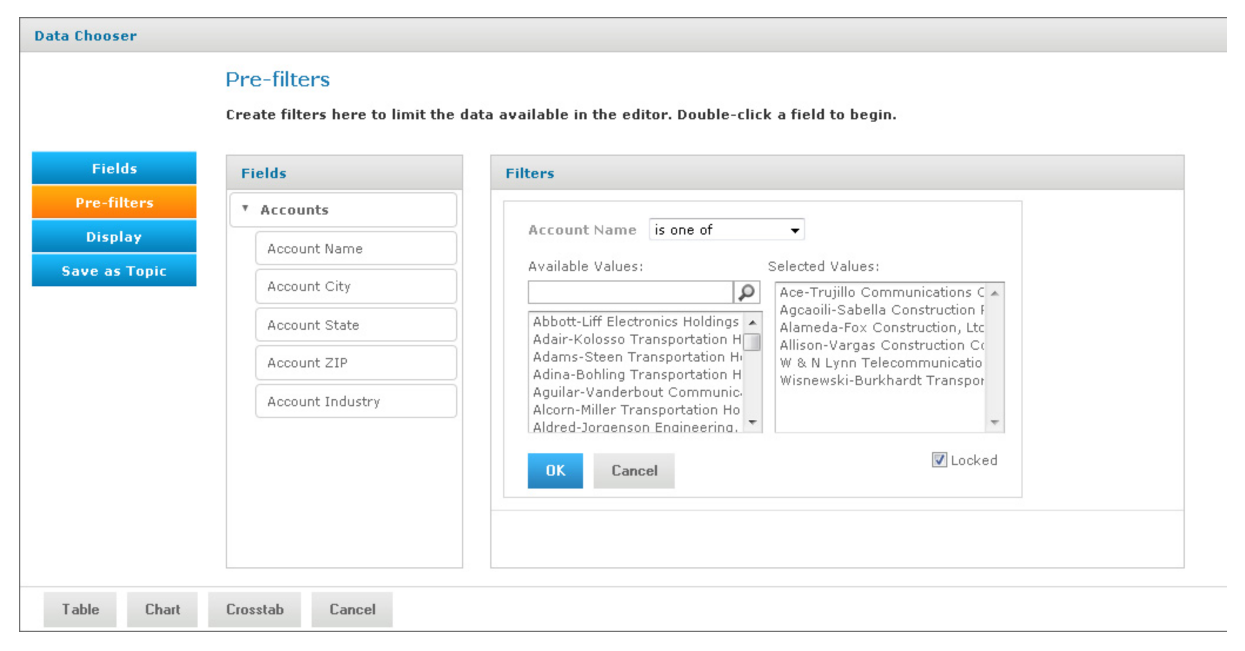
   In the Filters panel, a drop-down containing the account names appears from which you can select multiple values.

5. Click each value for comparison in Available Values to move it to Selected Values.

> If there are more than 50 values to display in Available Values, click 🔍 to search for the value. The maximum number of items that can be displayed in Available Values is configurable. For details, see the *JasperReports Server Administrator Guide*.

The account names appear in Selected Values.

6. To limit the report design to the four account names in Selected Values, check the **Locked** check box:



Data Chooser

Pre-filters

Create filters here to limit the data available in the editor. Double-click a field to begin.

Fields

- Accounts
  - Account Name
  - Account City
  - Account State
  - Account ZIP
  - Account Industry

Filters

Account Name: is one of

Available Values:

Abbott-Liff Electronics Holdings
Adair-Kolosso Transportation H
Adams-Steen Transportation H
Adina-Bohling Transportation H
Aguilar-Vanderbout Communic
Alcorn-Miller Transportation Ho
Aldred-Jorgenson Engineering,

Selected Values:

Ace-Trujillo Communications C
Agcaoili-Sabella Construction I
Alameda-Fox Construction, Ltd
Allison-Vargas Construction C
W & N Lynn Telecommunicatio
Wisnewski-Burkhardt Transpor

☑ Locked

Figure 4-4 Condition Editor in the Filters Panel on the Pre-filters Page

By default, the **Locked** check box is unchecked, making the filter available to end-users when they run the report. On the report page, users can click the **Options** button to enter a comparison value for this condition; when the user clicks **Apply** or **OK**, the report preview refreshes with data that match the condition. The condition is available as a prompt even if the filtered field does not appear in the report. For example, the final report might present data for a single country, but the country is chosen by the user. Once defined, filter prompts can be modified in the Ad Hoc Editor, as explained in section **4.7.2, "Using Input Controls," on page 84**.

Note that when the **Locked** check box is checked, the filter is not available to end-users when they run the report. The condition can only be removed from the view, if needed, but not edited.

7. Click **OK** to define the filter.

   The **Filters** panel shows the filters you have defined.

8. In the **Filters** panel, click **Change** to modify the condition. Click **OK** to save the changes. After selecting a row, you can also click **Remove** to delete it from the list.

> Data rows must match all conditions. In other words, the overall filter applied to the data is the logical AND of all conditions you have defined.

4.8.1.3 The Display Page

Use the Display page to change the default label and order of the fields as they should appear in the list of fields in the Ad Hoc Editor. You can always change the field labels and ordering in the Ad Hoc Editor, but setting them here makes them available in a Domain Topic. The page includes these options:

- To change the order of fields, click once anywhere in a field's row and use the **Move to top**, **Move up**, **Move down**, or **Move to bottom** buttons:

  ⤒ , ▲ , ▼ , and ⤓

  Fields may be moved only within their set, but sets as a whole may be also be moved.
- By default, the field name becomes the display label for the row, column, or measure that you create from the given field. To change the default display label of a field or set, double-click anywhere in the row and type the new label in the text box.
- Sets and the fields they contain appear in the list of fields in the Ad Hoc Editor. Sets are not used in views, but can be used to add all their fields at once, expediting view creation.
- If you don't want to use sets in the Ad Hoc Editor, select **Flat List** at the top of the Data Selection panel. You can now relabel the fields and reorder them.

4.8.1.4 The Save as Topic Page

On the Save as Topic page, you can enter a name and a description to save the Data Chooser settings as a Domain Topic. Thereafter, you can create different views from the Domain Topic, using its fields, filters, and display label settings. You can also edit the Domain Topic to change the settings.

- After you enter a name for the Domain Topic, save it by clicking **Table**, **Chart**, **or Crosstab** from any page in the wizard. The Ad Hoc Editor opens in table, chart, or crosstab mode, respectively, ready to use the fields, filters, and display label settings.
- By default, Domain Topics are saved in the standard Topics folder. This corresponds to the **Ad Hoc Components > Topics** location in the repository; JRXML Topics and Domain Topics in this folder appear on the **Topics** tab when you start a report. Do not modify this folder name.
- The description text appears with the Domain Topic in the repository and at the bottom of the **Topics** tab on the Ad Hoc Source dialog. Enter an informative description that helps users understand the nature and purpose of this Domain Topic.

4.9 Creating Topics

When a user clicks **Create > Ad Hoc View** on the Home page, the list of Topics on the **Topics** tab is populated from the Ad Hoc Components/Topics folder in the repository. There are two types of Topics:

- JRXML-based Topics – Created by administrators using iReport and uploaded as JRXML files to the proper location in the repository. Topics are typically of this type.
- Domain Topics – Created from a Domain by administrators using JasperReports Server.

Either type of Topic is an empty report associated with a data source in the server, and is then built on in the Ad Hoc Editor.

4.9.1 Creating and Uploading a Topic

JRXML-based topics are the most common type of topic. You can upload previously-created JRXML topics via the repository.

To upload a JRXML-based Topic:

1. Log into the server as administrator and select **View > Repository**.

> While any user with sufficient repository permissions can upload a Topic to the server, this example requires an administrator login to access the JServer Jdbc data source.

2. Locate the folder where Topics are stored. The location of the Topics folder depends on your system configuration; by default, Topics are in the **Ad Hoc Components > Topics** folder.
3. Right-click the Topics folder and select **Add Resource > JasperReport** from the context menu.

   Add Resource appears on the context menu only if your login account has write privilege to the folder.

   After selecting **Add Resource > JasperReport**, the Set Up the Report page of the JasperReport wizard appears.
4. In the Set Up the Report page, give the Topic a name, a Resource ID, and an optional description, then click **Next**.
   - The **Name** field is the visible name of the file in the repository, such as `Example Topic`.
   - The **Resource ID** field is the internal ID of the object, such as `Example_Topic`. The server does not accept spaces in an internal ID.
   - The **Description** field, such as `Topic uploaded for User Guide example`, helps users understand the purpose of the file.
5. In the **Locate the JRXML File** section, select **Upload a Local File**, and click **Browse** to locate the file and upload the Topic from the file system. In this example, the file is <js-install>/samples/adhoc/topics/adhoc_sample.jrxml.

   To locate adhoc_sample.jrxml, you need access to the server host file system.
6. Click **Data Source**.

   Because this is a simple Topic without parameters, there are no controls and resources associated with it. If the Topic has a Parameterized query, you can create input controls for it. See section **5.3.3, "Selecting a Data Source for Running the Complex Report," on page 116**. Such input controls can appear in the Ad Hoc Editor and when the report is run.
7. Click **Select data source from repository** and **Browse** to locate the data source named **Data Sources/JServer Jdbc data source**.

   Topics must be associated with the data source that they were designed for.
8. Click **Next**.
9. In Locate Query, click **Submit**.

   Topics usually do not need a query or customization, but you can define them.

When you select **Create > Ad Hoc View**, the Example Topic appears on the Topics tab of the Data Chooser wizard. If you select the Example Topic, you can create a report using the columns available in the data source selected in **step 7**.

When you create a JRXML file for use as a Topic, you can specify the name to display for each field that the Topic returns. To do so, define a field property named `adhoc.display` for each field declared in the JRXML. The `adhoc.display` field property must have the following syntax:

```
<property name="adhoc.display" value="Any Name"/>
```

For example, this JRXML code declares a StoreState field that is displayed in reports as Store State:

```
<field name="StoreState" class="java.lang.String">
  <property name="adhoc.display" value="Store State"/>
</field>
```

Topics also support the $R expressions for field names; for more information, see section **5.6, "Localizing Reports," on page 120**.

For fields in a non-domain topic the following properties may be of interest:

- `dimensionOrMeasure`: marks a field as a field or a measure
- `defaultAgg`: which aggregation should be used for this measure (avg, etc)
- `semantic.item.desc`: A description for the field
- `DefaultMask`: set a measure as a $, date etc

4.9.2 Creating Topics from Domains

In some circumstances, it is important to create a Topic based on the Domain and data settings you chose. In other circumstances, creating a Topic isn't necessary. The main consideration is how reports based on the Domain-based view are used. The following table explains the choices:

If you want to ...	Then do this	Explanation
Create a single-use report from the Domain with your settings.	Click **Table**, **Chart**, or **Crosstab** after defining your settings in the Data Chooser wizard, then format the view and create your report.	Your field selections appear in the Ad Hoc Editor and you can create views from them, but the settings themselves are not saved.
Run a report repeatedly as is or with prompting for new input, or make very similar reports in the Ad Hoc Editor.	Click **Table**, **Chart**, or **Crosstab** after defining your settings in the Data Chooser wizard, then format and save the view in the Ad Hoc Editor.	After you save a view, users can create reports to be run from it repeatedly and be prompted for input each time if you defined unlocked filters.
Reuse your field, filter, and display settings on this Domain to create new views with different formatting.	After saving your settings as a Domain Topic on the Save as Topic page of the Data Chooser wizard, start a new view and choose your Domain Topic from the **Domains** tab.	Domain Topics are saved in JRXML format in the repository. They appear on the **Topics** tab when you start a view.
Be able to modify one or more of the settings you made in the Data Chooser wizard.	After saving your settings as a Domain Topic on the Save as Topic page of the Data Chooser wizard, find your Domain Topic in the repository and open it in the Domain Designer.	Domain Topics can be edited as described in section **4.9.2.3, "Editing a Domain Topic," on page 92**. After you save your changes, you can create views based on the modified Domain Topic.
Create views from the same repository data source but with different Domain settings, such as derived fields and different joins to make new fields available in a report.	Edit the Domain and save it with a new name. Then start a new view and choose your data from the new Domain.	Domains provide advanced functionality such as table joins and derived fields based directly on a data source. Domains usually require administrator permissions to create and modify.

4.9.2.1 Access Permissions in Domain Topics

If other users create reports from your Domain Topic-based view, and the Domain is configured for security, it is important to consider everyone's access permissions. You might not have access to all of the fields in the Domain nor to all the data in those fields. There may be fields that can be seen only by other users, and in the fields that you can see, there may be data that is hidden from you. When you save the Domain as a Topic, only the fields that you selected appear in the Domain Topic. When you create a view from the Topic, only the data that you can access in those fields appears. When others create views from the Topic, they see only fields that they have permission to access. These rules also apply to the reports generated from these views.

For example, in a Domain, user Tomas can access fields B-C and data rows 1-3; Anita can access fields C-E and data rows 2-5. Tomas uses the Data Chooser wizard and saves a Domain Topic based on the Domain. When Tomas and Anita create reports from the same view, they see different combinations of fields and the data in them.

	Fields	Data
Tomas's report from his Domain Topic	B C	1 2 3
Anita's report from the same Domain Topic	C	2 3 4 5

Even though Anita has permission to see more fields, they are not available to her because Tomas did not have access to them when he created the Domain Topic. However, Anita does have permission to see more data than Tomas, so when she creates a view, or opens or runs the report based on that view, she can see more rows than Tomas can when he views the report. See section **8.4, "The Domain Security File," on page 204** for a technical explanation of data security for Domains. See the note in section **6.5, "Editing a Domain," on page 162** about the impact of editing a Domain or Domain Topic.

4.9.2.2 Saving Domain Settings as a Domain Topic

To save settings in the Data Chooser wizard as a Domain Topic:

1. While making selections in the Data Chooser wizard, navigate to the **Save Topic** page.
2. Enter a Topic name and description.

   Do not change the location folder. Using the default /adhoc/topics folder makes the saved Domain Topic available on the **Topics** tab when you select **Create > Ad Hoc View**.
3. If your data selections, filter definitions, and display settings are complete, click **Table**, **Chart**, or **Crosstab**.

   If settings are incomplete, navigate to the other pages to finish, then click **Table**, **Chart**, or **Crosstab**

   The new Topic appears in the **Ad Hoc Components > Topics** folder.

   Because a Domain Topic is a type of report, it appears when the Search page is filtered to show reports:

4.9.2.3 Editing a Domain Topic

You can modify a Domain Topic you created using the Data Chooser wizard.

To edit the settings in a Domain Topic:

1. Select **View > Repository** and search (or browse) for the Domain Topic you want to modify.

   Domain Topics are usually kept in the **Ad Hoc Components > Topics** folder.
2. Right-click the Domain Topic and select **Open in Designer** from the context menu.

   The Domain Topic opens in the Data Chooser wizard.
3. Follow the guidelines in section **4.8.1, "Using the Data Chooser Wizard," on page 86** to edit the Domain Topic as needed.
4. To save changes to the selected Domain Topic, click **Table**, **Chart**, **or Crosstab** on any page.

   Use caution when editing Domain Topics that may have been used to create other views. Users who relied on the Domain Topic might receive unexpected data or errors. It is safer to save changes as a new Domain Topic.

To save changes as a new Domain Topic, navigate to the Save as Topic page and enter identifying information for the new Topic, then click **Table**, **Chart**, **or Crosstab**.

CHAPTER 5 ADDING REPORTS DIRECTLY TO THE REPOSITORY

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don't see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

Using the Ad Hoc Editor, you can create reports within JasperReports Server from pre-defined Topics and Domains. You can also create reports outside of JasperReports Server and add them to the repository. To add a report to the repository, you need to have a valid JRXML file. To create and validate this file, you can use iReport Designer. Jaspersoft recommends iReport for most users because its graphical user interface simplifies the job. You can also use a text editor to create the file containing JRXML code if you have a thorough understanding of the JasperReports file structure.

You can add a report to the server's repository in two ways:

- From within the server

  Add a JRXML file and any other resources the report needs as a report unit. A wizard guides you through each step.
- From iReport Designer

  Design the report in iReport, and use the JasperReports Server Plug-in to add the JRXML and resources to the repository.

This chapter includes examples of adding a report to the repository using the server's wizard and the plug-in. The chapter contains the following sections:

5.1 Overview of a Report Unit

In the server, a report unit is the collection of elements for retrieving data and formatting output. **Figure 5-1 on page 94** shows these elements:

- The data source and query that retrieves data for the report.
- The main JRXML that determines the layout and is the core of the report unit.
- The main JRXML defines other elements in one of the following ways:

  - Creating definitions internally
  - Referring to existing elements in the repository using the `repo:` syntax
- The input controls and other resources.

For more information about the report unit, refer to the *JasperReports Server Ultimate Guide*.

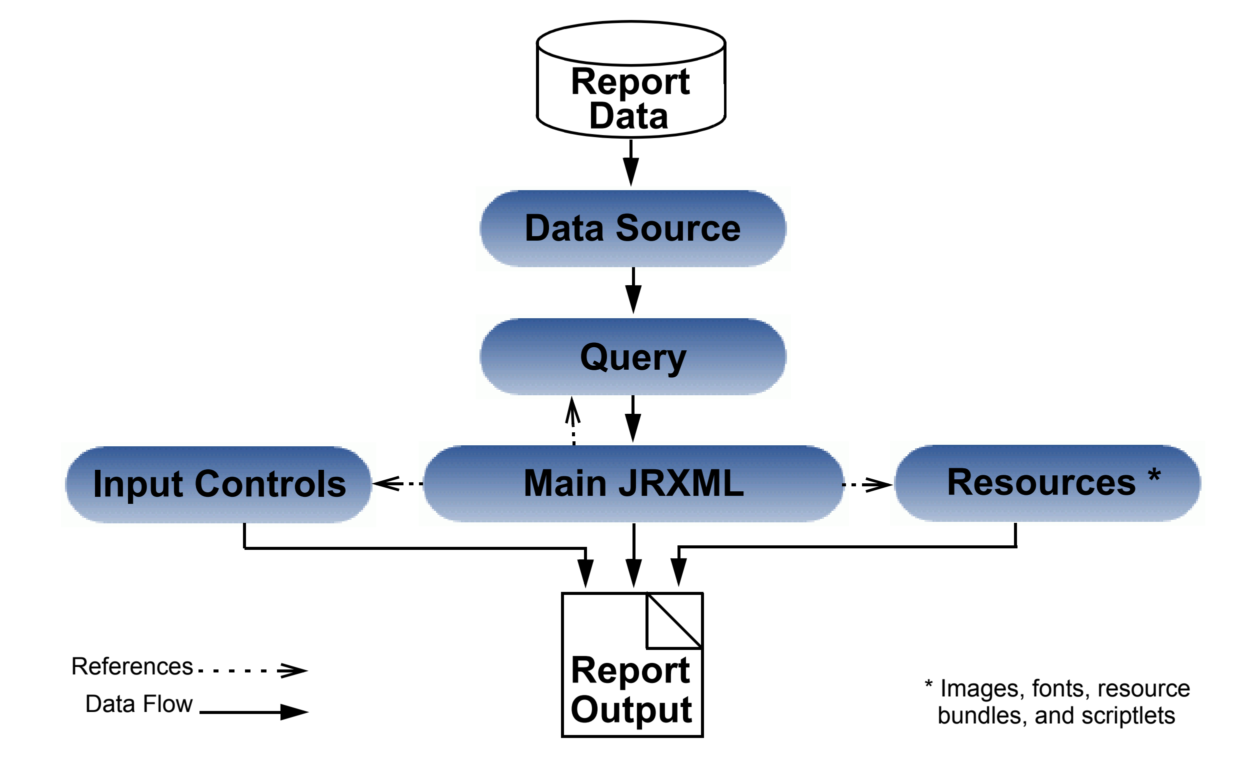


Figure 5-1 Elements of a Report Unit

5.2 Adding a Simple Report Unit to the Server

This section presents an example of uploading a JRXML to the server. The report only has two image resources. The example defines a custom query for the report unit.

To add the simple report unit to the server, you need access to the following sample data installed with the server:

- <js-install>/samples/reports/AllAccounts.jrxml
- <js-install>/samples/images/logo.jpg files

5.2.1 Uploading the Main JRXML

If you want to validate the JRXML before uploading it, use iReport. The server doesn't validate the JRXML when you upload it.

This procedure shows you how to set up a name for the report in the repository and upload the main JRXML file that references all other elements.

To upload the main JRXML for the simple report example:

1. Log into the server as administrator and select **View > Repository**.

> If you log in as a user, you can upload a report unit to the server, but this example requires an administrator login to access the image resources.

2. Locate the folder where you want to add the report.

   For example, go to **Organization > Reports > Samples**.

3. Right-click the Samples folder and select **Add Resource > JasperReport** from the context menu.

   Add Resource only appears on the context menu if your user account has write permission to the folder.

   The Set Up the Report page of the JasperReport wizard appears.

4. In **Naming**, enter the name and description of the new report, and accept the Resource ID generated as you type the name:

   - Name

     Display name of the report: `New Simple Report`

   - Resource ID

     Permanent designation of the report object in the repository: `New_Simple_Report`

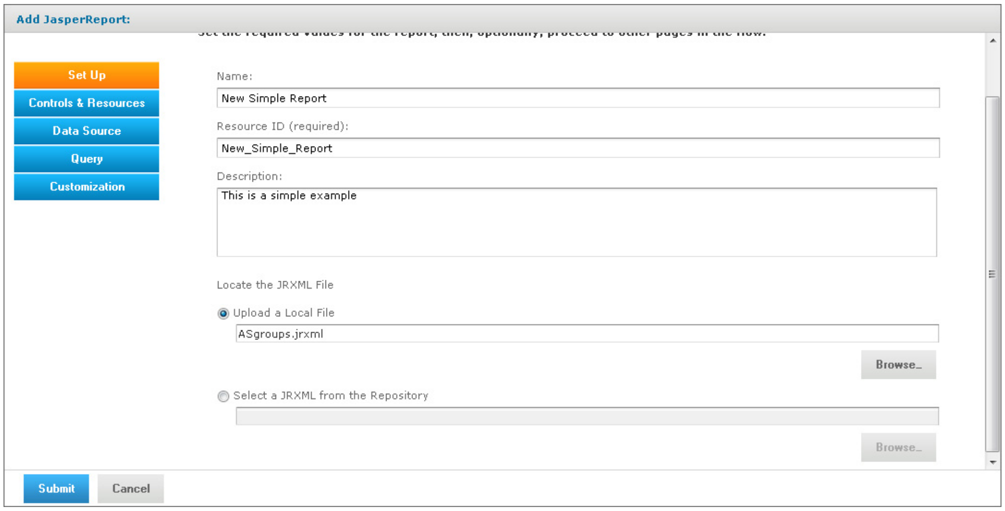
   - Description

     Optional description displayed in the repository: `This is a simple example`

5. Select **Upload a Local File** and **Browse** to <js-install>samples/reports/AllAccounts.jrxml.

   You can upload a new JRXML or select a JRXML from the repository.

   Figure 5-2 shows the Set Up the Report page.



Add JasperReport:

Set the required values for the report, then, optionally, proceed to other pages in the flow.

Name: New Simple Report

Resource ID (required): New_Simple_Report

Description: This is a simple example

Locate the JRXML File

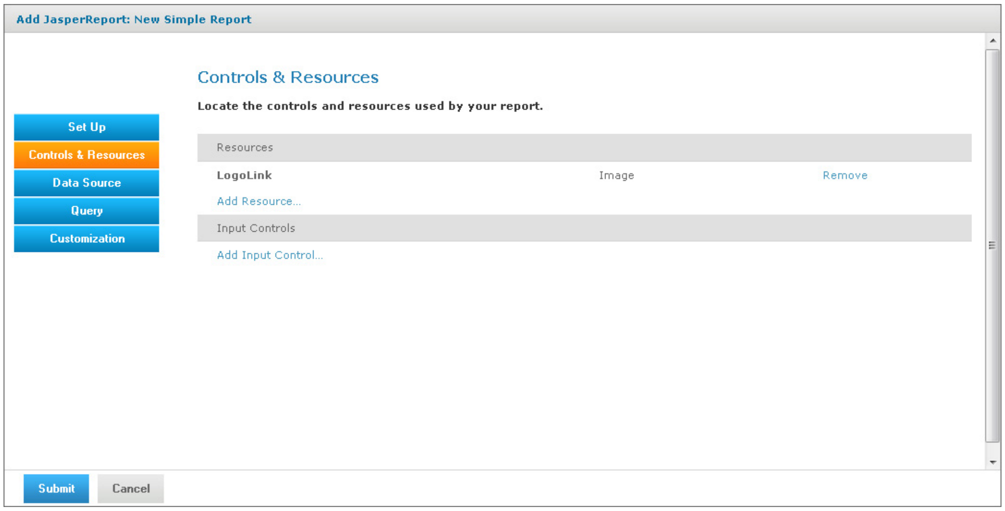
● Upload a Local File: ASgroups.jrxml

○ Select a JRXML from the Repository

Figure 5-2 Required Set Up Values

6. Click **Controls & Resources**.

   The server uploads the main JRXML file. The Controls & Resources page reappears with a message to locate suggested resources.


Add JasperReport: New Simple Report

Controls & Resources

Locate the controls and resources used by your report.

Resources

LogoLink	Image	Remove

Add Resource...

Input Controls

Add Input Control...

Figure 5-3 Suggested Resources in the Resources List

The suggested resources are missing resources that the server needs to validate and run the report. In this example, suggested resources are the hyperlinked names of images:

- Logolink
- AllAccounts_Res2

Next, upload the suggested file resources.

5.2.2 Uploading Suggested File Resources

A JRXML file doesn't embed resources, such as images. When the server uploads the JRXML, it tries to detect and list missing resources, as shown in Figure 5-3. You need to take one of the following actions:

- Upload resources that the report needs.
- Select a resource from the repository to the report.

If the Controls & Resources page doesn't list any suggested file resources, perhaps the report doesn't reference any. Often, the server can't detect all of the referenced resources, as discussed in section 5.3.1, "Uploading Undetected File Resources," on page 104.

To upload suggested file resources for the simple report example:

1. Click **Add Now** in the same row as the suggested resource. For example, click **Add Now** for LogoLink.

   The Locate File Resource page appears.

2. Choose **Select a resource from the Repository**, and **Browse** to an image file. For example, **Browse** to Images/JR Logo.

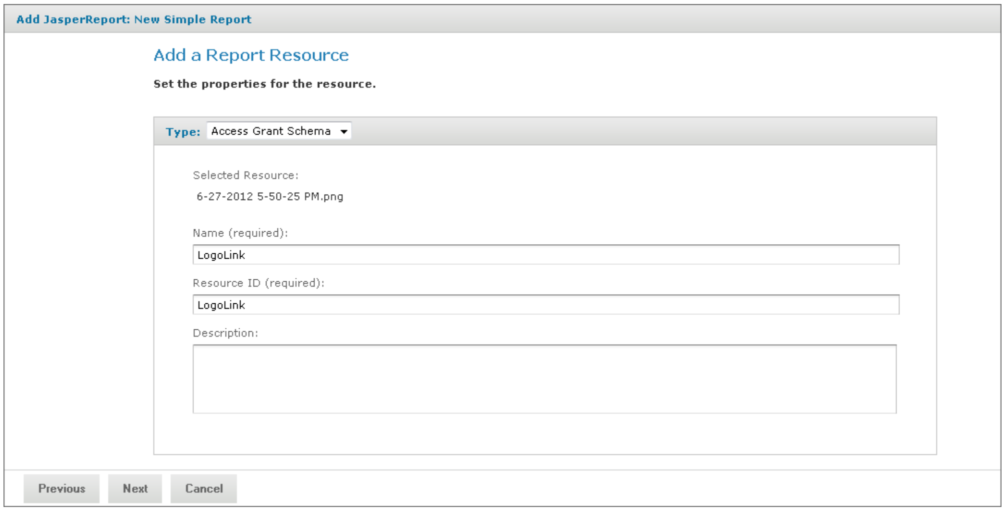
   Any image file works.

3. Click **Select**.

   The path to the image appears in the wizard.

4. Click **Next**.

   The Add a Report Resource page appears:



Add JasperReport: New Simple Report

Add a Report Resource

Set the properties for the resource.

Type: Access Grant Schema

Selected Resource:
6-27-2012 5-50-25 PM.png

Name (required): LogoLink

Resource ID (required): LogoLink

Description:

Figure 5-4 Properties of a Resource

The properties include the LogoLink name, resource ID, and description. These properties don't redefine the properties of the JRLogo file in the repository.

5. Click **Next** to accept the default naming of the file resource.

   The Controls & Resources page appears again, showing that the LogoLink resource was added.
6. On Controls and Resources, click **Add Now** in the AllAccounts_Res2 row.

   The Locate File Resource page appears again.
7. Select **Upload a Local File**, and **Browse** to <js-install>/samples/images/logo.jpg.
8. Open logo.jpg, and click **Next**.

   The server uploads the file.

   The Add a Report Resource page appears, showing the properties of the file resource.

The properties include the AllAccounts_Res2 name, resource ID, and description.

9. Click **Next** to accept the default naming of the file resource.

   The Controls & Resources page reappears, showing the addition of both resources referenced in the main JRXML.
10. Click **Data Source** and define a data source as described in the next section.

5.2.2.1 Referencing Styles

You can apply a style to your report by referencing a property sheet, created in iReport, that contains information on a style.

To do this, you will need to edit the Styles.jrxml file and change the <templates> statement.

To reference styles from an external property sheet:

1. Locate and open the Styles.jrxml file.
2. In the JRXML file, declare `<template>"repo:styles"</template>` (do not include the .jrtx extension).
3. Save the JRXML file.
4. Log into the sever as an administrator, and select **View > Repository**.
5. Expand the **Organization > Reports** folder.

6. Right-click the Samples folder and select **Add Resource > JasperReport** to open the Add JasperReport wizard.
7. On the Set Up page, enter the required information.
8. Select **Upload a Local File** and click **Browse...**
9. Locate `Styles.jrxml`, and click **Open**.
10. Click **Submit**.
11. Copy the base_styles.jrtx file from the directory:

    `<jrs-install>\ireport\demo\samples\templates\reports`

    and place into the `C:\` directory.
12. Edit the `styles.jrtx` file and add `C:\\ before base_styles.jrtx`.
13. Back on the server, select **View > Repository,** then expand the **Organization** folder**.**
14. Right-click **Images**, and select **Add Resource > File > Style Template.**
15. Under Path to File,click **Browse..**. then locate the style.jrtx file.
16. Enter a Name (Styles) and click **Submit**.
17. In the repository, open the Reports > Styles folder, then right click on Styles report and select **Edit.**
18. Click **Control & Resources**, then click the **Add Resource...** link.
19. Select **Select a resource from the Repository** radio button, **Browse...**
20. Locate **Organization > Images > Styles**, and click **Select**.
21. Click **Next** button
22. On the Add a Report Resource screen, enter **Name: Styles**, then click **Next**.
23. Click **Submit**

5.2.3 Defining the Data Source

Data sources belong to the report engine, JasperReports Server, and are not defined in the main JRXML. The JRXML does not retain any data source defined in iReport when you add the JRXML to the server. You need to define a data source in the server that the report unit can use. From the Data Source page, select a data source in the repository or create a new data source on-the-fly. The data source can be different from the database configured for JasperReports Server if the application server can find its driver. For example, in a default installation of JasperReports Server, Tomcat looks for data source drivers in <js-install>/apache-tomcat/lib. Put a copy of the driver in this location.

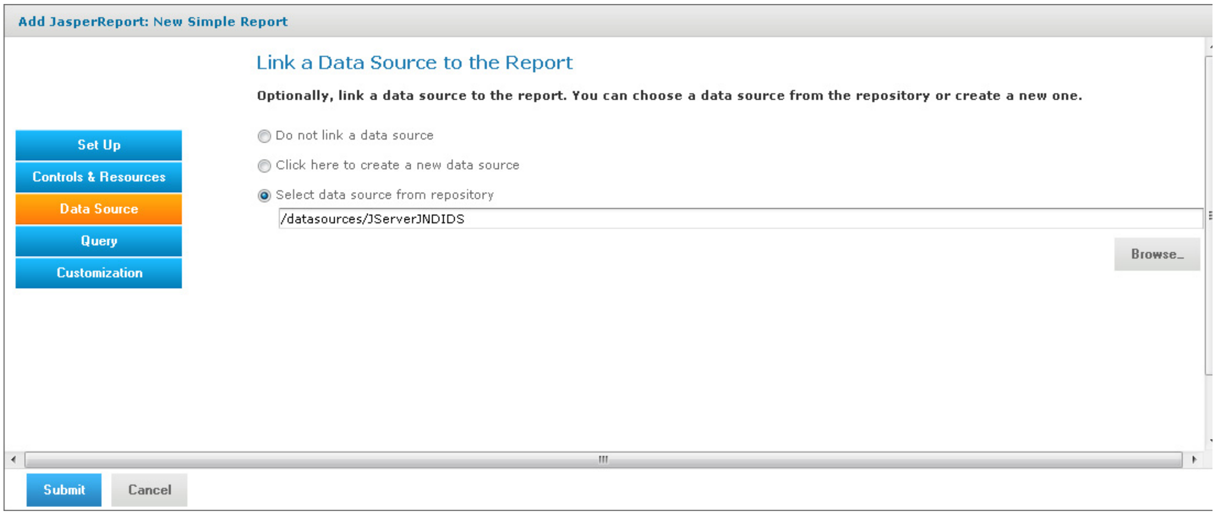
To define the data source for the simple report example:

1. In the JasperReport wizard, click Data Source.

   The Link a Data Source to the Report page presents these choices:

   - Do not link a data source – Select or define the data source at a later time. You see an error if you run the report in this state.
   - Click here to create a new data source – Define a new data source that is only available to your report.
   - Select data source from repository – Select an existing data source from the repository.

2. Choose **Select data source from the Repository** and **Browse** to /Data Sources/JServer JNDI Data Source. Click Select. The path to the data source appears.



Add JasperReport: New Simple Report

Link a Data Source to the Report

Optionally, link a data source to the report. You can choose a data source from the repository or create a new one.

○ Do not link a data source

○ Click here to create a new data source

● Select data source from repository

/datasources/JServerJNDIDS

Figure 5-5 Data Source Page

3. Click **Query** to define the Query as described in the next section.

5.2.4 Defining the Query

The query in the report unit determines the data that the server retrieves from a data source. You can use an existing query or define a new one. You can create multiple reports that look the same but contain different data by defining different queries for the same JRXML file. The simple report example defines a custom query that displays accounts from a single country.

To define a custom query for the simple report example:

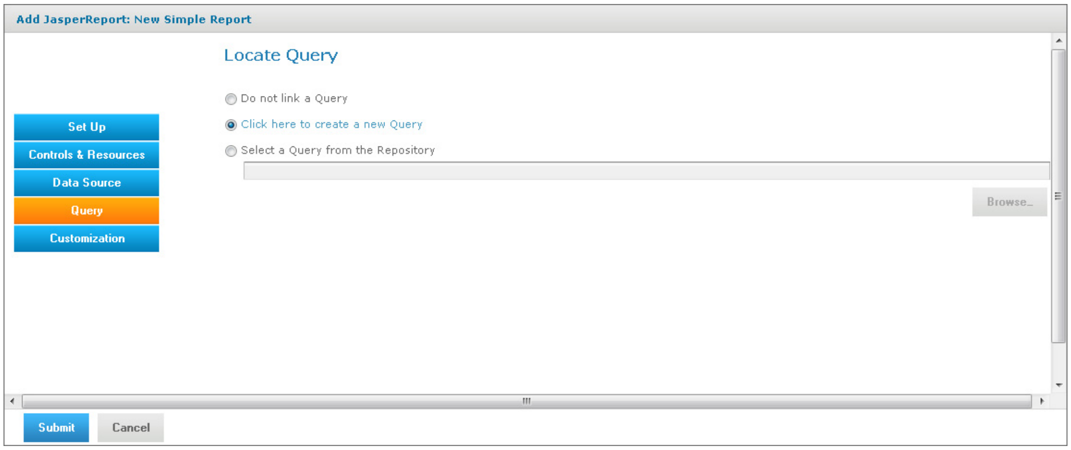
1. In the JasperReport wizard, click Query.

   The Locate Query page presents these choices:

   - Do not link a Query – Uses the query, if there is one, defined within the main JRXML. If the main JRXML doesn’t have a query, you can’t run the report.
   - Click here to create a new Query – Guides you through defining a new query, only available to your report.
   - Select a Query from the Repository – Selects an existing query from the repository.

   The AllAccounts.jrxml file uploaded in section 5.2.1, “Uploading the Main JRXML,” on page 94 already contains a query. This example overrides the existing query by defining a new one.

2. On the Query page, select the **Click here to create a new Query** option:



Add JasperReport: New Simple Report

Locate Query

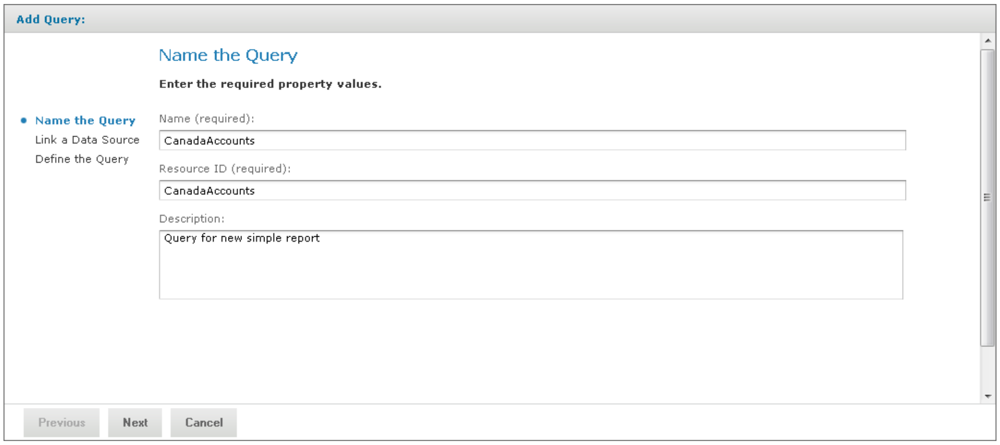
○ Do not link a Query
● Click here to create a new Query
○ Select a Query from the Repository

Figure 5-6 Query Page

3. Click the link, **Click here to create a new Query**.

   The Name the Query page appears where you can enter the name, resource ID, and description of the query. This query and its properties are visible only within the report unit.

4. In this example, the query must retrieve only Canadian accounts. Enter the following values:
   - Name – `CanadaAccounts`
   - Resource ID – `CanadaAccounts`
   - Description – `Query for New Simple Report in User Guide`



Add Query:

Name the Query

Enter the required property values.

Name (required): CanadaAccounts

Resource ID (required): CanadaAccounts

Description: Query for new simple report

Figure 5-7 Name the Query Page

5. Click **Next**.

   The Link a Data Source to the Query page appears.

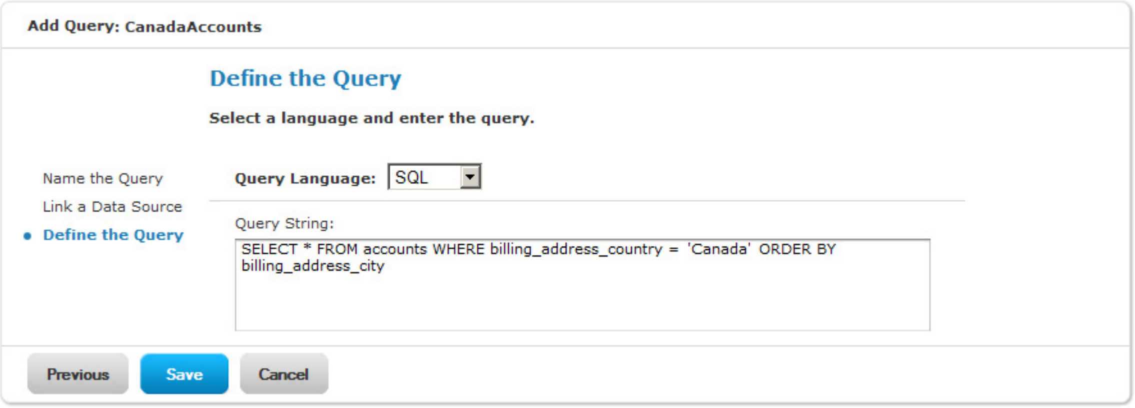
   The Link a Data Source to the Query page appears. You can select a query from the repository, define a new one, or select not to link a data source.

6. Select **Do not link a data source** to use the data source you selected in section **, "You can apply a style to your report by referencing a property sheet, created in iReport, that contains information on a style.," on page 97**.

7. Click **Next**. The Define the Query page appears.

8. Select **SQL** in the Query Language drop-down and enter the following Query String to retrieve only Canadian accounts:

```
SELECT * FROM accounts WHERE billing_address_country = 'Canada' ORDER BY
billing_address_city
```



Add Query: CanadaAccounts

Define the Query

Select a language and enter the query.

- Name the Query
- Link a Data Source
- • Define the Query

Query Language: SQL

Query String:

```
SELECT * FROM accounts WHERE billing_address_country = 'Canada' ORDER BY
billing_address_city
```

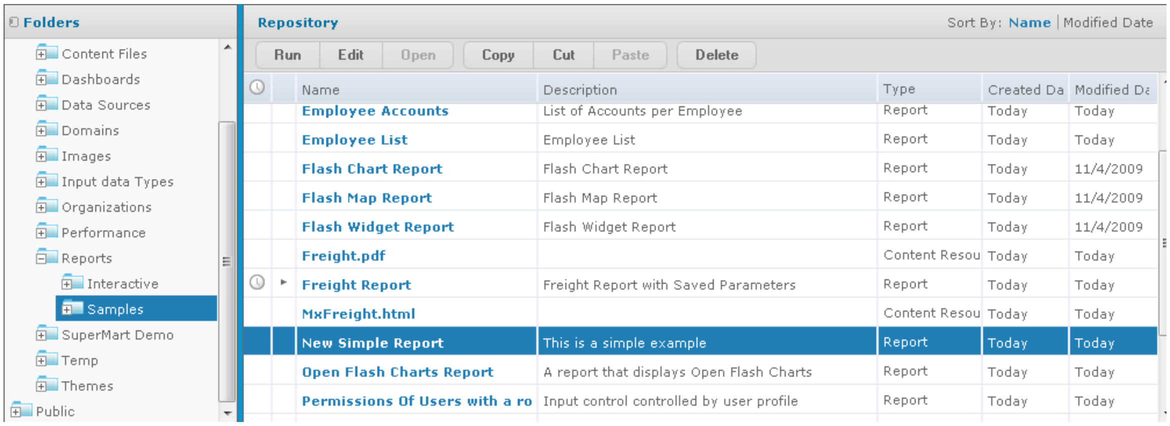
Figure 5-8 Definition of a Query

9. Click **Save** to save the query. The Customization page appears. No customization is required.

10. Click **Submit** to submit the new report unit to the repository.

5.2.5 Saving the New Report Unit

To submit a new report unit to the repository, click **Submit** on any page of the JasperReport wizard, from the Set Up page to the Customization page. You don't have to set options on pages, such as Customization, you do not need. When you click **Submit**, the server validates the report unit. After clicking **Submit**, a message appears at the top of the repository page, indicating that the report was successfully saved. The report appears in the repository with the description you entered on the Set Up page. To run the report and view the output, click its name, New Simple Report.



Folders

- Content Files
- Dashboards
- Data Sources
- Domains
- Images
- Input data Types
- Organizations
- Performance
- Reports
  - Interactive
  - Samples
- SuperMart Demo
- Temp
- Themes
- Public

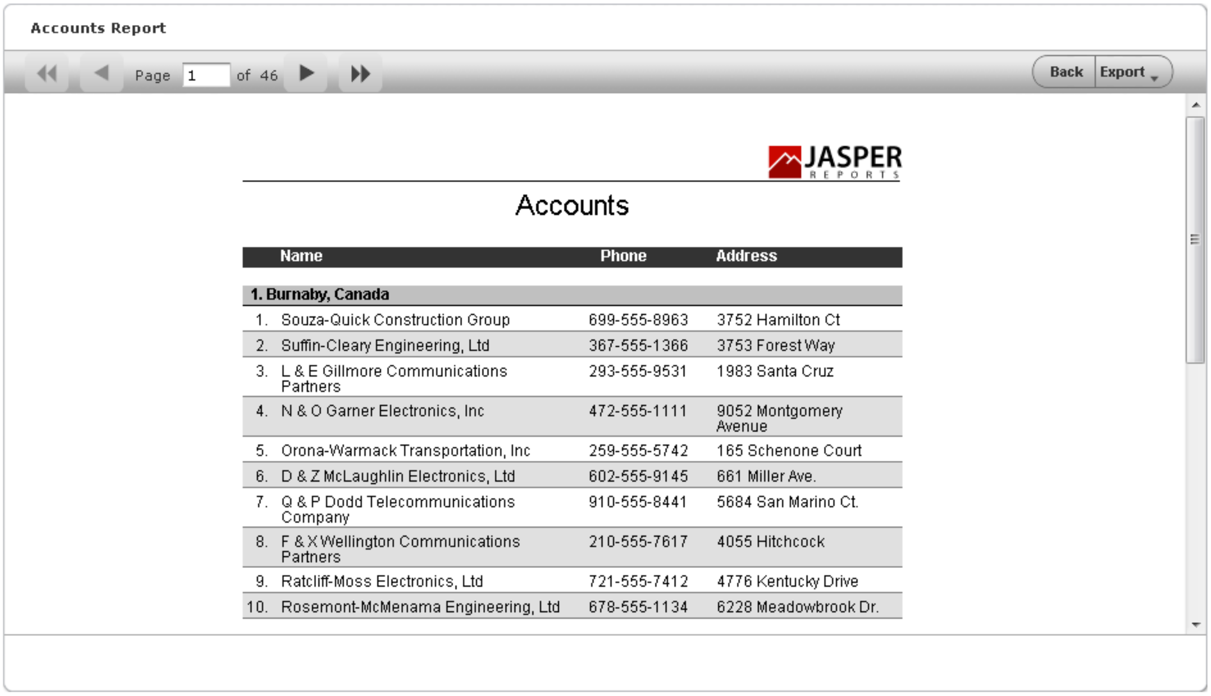
Repository

Sort By: Name | Modified Date

Name	Description	Type	Created Da	Modified Da
Employee Accounts	List of Accounts per Employee	Report	Today	Today
Employee List	Employee List	Report	Today	Today
Flash Chart Report	Flash Chart Report	Report	Today	11/4/2009
Flash Map Report	Flash Map Report	Report	Today	11/4/2009
Flash Widget Report	Flash Widget Report	Report	Today	11/4/2009
Freight.pdf		Content Resou	Today	Today
Freight Report	Freight Report with Saved Parameters	Report	Today	Today
MxFreight.html		Content Resou	Today	Today
New Simple Report	This is a simple example	Report	Today	Today
Open Flash Charts Report	A report that displays Open Flash Charts	Report	Today	Today
Permissions Of Users with a ro	Input control controlled by user profile	Report	Today	Today

Figure 5-9 New Simple Report Added to the Repository

Figure 5-10 on page 102 shows the output, only Canadian accounts.



Accounts

	Name	Phone	Address
1. Burnaby, Canada			
1.	Souza-Quick Construction Group	699-555-8963	3752 Hamilton Ct
2.	Suffin-Cleary Engineering, Ltd	367-555-1366	3753 Forest Way
3.	L & E Gillmore Communications Partners	293-555-9531	1983 Santa Cruz
4.	N & O Garner Electronics, Inc	472-555-1111	9052 Montgomery Avenue
5.	Orona-Warmack Transportation, Inc	259-555-5742	165 Schenone Court
6.	D & Z McLaughlin Electronics, Ltd	602-555-9145	661 Miller Ave.
7.	Q & P Dodd Telecommunications Company	910-555-8441	5684 San Marino Ct.
8.	F & X Wellington Communications Partners	210-555-7617	4055 Hitchcock
9.	Ratcliff-Moss Electronics, Ltd	721-555-7412	4776 Kentucky Drive
10.	Rosemont-McMenama Engineering, Ltd	678-555-1134	6228 Meadowbrook Dr.

Figure 5-10 Output of the New Simple Report

In the report viewer, click to go to the end of the report. The logo images that you added as file resources appear.

5.3 Adding a Complex Report Unit to the Server

This section includes an example of how to add a report unit with all these resources:

- SalesByMonth.jrxml file – the main JRXML
- SalesByMonthDetail.jrxml file – a subreport
- sales.properties – an English resource bundle file
- scriptlet.jar – a scriptlet class JAR file
- JR Logo – an image in the repository
- JServer JNDI data source – a data source file in the repository

These resources are part of the sample data installed with the server. To complete this example and run the report without server errors, you need access to these resources.

The example also guides you through defining every type of input control:

- Text
- Check box
- Drop-down
- Date
- Query

If you're not interested in creating all types of input controls, but want to work through part of the example, delete parameters for the input controls you don't create before you run the report. For more information, see **"To remove unwanted parameters from the sample report design:" on page 132**.

The complex report you create in this example is almost exactly like the SalesByMonth report in the **Reports > Samples** folder of the repository.

To upload the main JRXML and suggested resource files for the complex report unit:

1. Log into JasperReports Server as administrator and select **View > Repository**.

   If you log in as a user, you can upload a report unit to the server, but this example requires an administrator login to access the image resources.

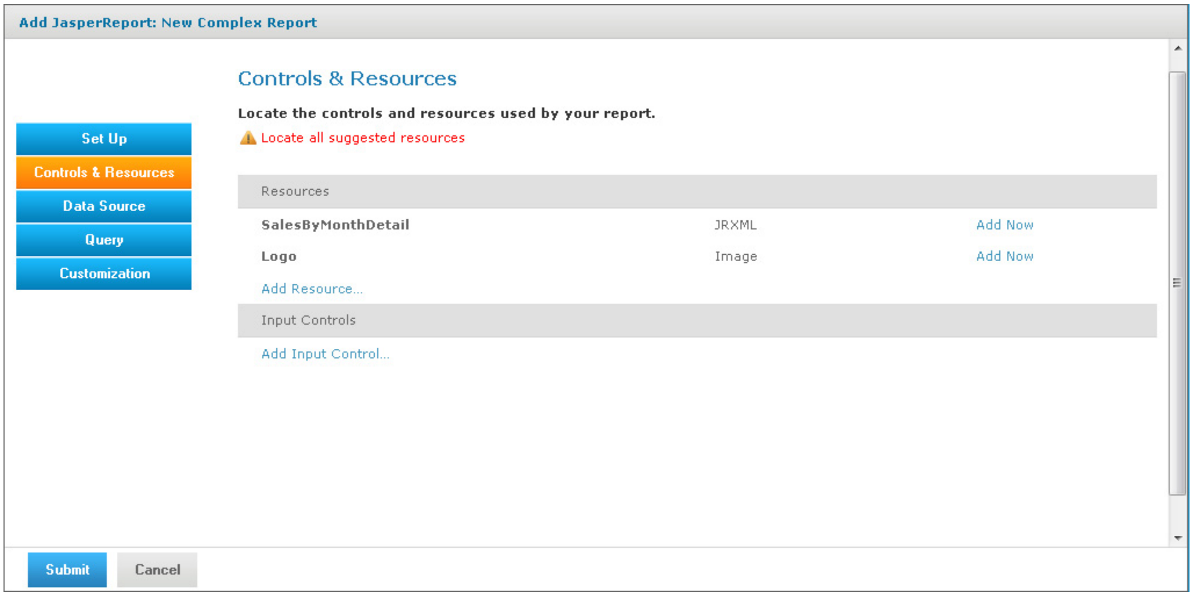
2. Navigate to a folder to add the report. For example, navigate to **Organization > Reports > Samples**.
3. Right-click the Samples folder and select **Add Resource > JasperReport** from the context menu.

   Add Resource only appears on the menu if your user account has write privilege to the folder.

   The Set Up the Report page appears.
4. On the Set Up the Report page, enter these properties:
   - Name – `New Complex Report`
   - Resource ID – `New_Complex_Report`
   - Description – `This is a complex report`
5. Select **Upload a Local File**.
6. Click **Browse** to locate the file <js-install>/samples/reports/SalesByMonth.jrxml.
7. Click **Controls & Resources**.

   On the Controls & Resources page, the list of suggested resources appears:
   - A sub-report (the SalesByMonthDetail.jrxml file)
   - A logo image

   Figure 5-11 shows the list of suggested resources.



Add JasperReport: New Complex Report

Controls & Resources

Locate the controls and resources used by your report.

⚠ Locate all suggested resources

Resources		
SalesByMonthDetail	JRXML	Add Now
Logo	Image	Add Now
Add Resource...		

Input Controls

Add Input Control...

Figure 5-11 Suggested Resources for the Complex Report

8. On the Controls & Resources page, upload the sub-report:

   a. Click **Add Now** in the same row as SalesByMonthDetail.

      The Locate File Resource page appears.

   b. Select **Upload a Local File**.

   c. Click **Browse** and locate the file <js-install>/samples/reports/SalesByMonthDetail.jrxml. Select SalesByMonthDetail.jrxml.

The path to SalesByMonthDetail.jrxml appears in the **Upload a Local File** field.

d. On the Locate File Resource page, click **Next**.

e. On the Add a Report Resource page, click **Next** to accept the default report resource name and resource ID.

9. On the Controls & Resources page, upload the logo image resource:

a. In the same row as Logo, click **Add Now**.

The Locate File Resource page appears.

b. On the Locate File Resource page, click **Select a resource from the Repository.**

c. Click **Browse** to locate the file /Images/JR Logo and select JR Logo.

d. Click **Next**.

The Add a Report Resource page appears.

e. On the Add a Report Resource page, click **Next** to accept the default name, resource ID, and description: Logo.

The second suggested resource is added.

5.3.1 Uploading Undetected File Resources

The JasperReport wizard can't detect every type of resource referenced in the main JRXML. You need to know the names of these resources and add them to the report; otherwise, the server can't validate the report. This document provides you with the names of these resources, but if you wanted to discover these names, use the JasperReports Server Plug-in to open the JRXML in iReport and examine its parameters and properties. For more information about the JasperReports Server Plug-in, see **Chapter 7, "Accessing Reports and Domains from iReport," on page 169**.

These are the undetected resources in the SalesByMonth.jrxml:

- A scriptlet JAR – The scriptlet writes the message, "I'm a scriptlet in a jar," to the last page of the report output.
- An English language resource bundle.
- The optional Romanian language resource bundle.

  If you're interested in working with a multi-lingual report, add the Romanian resource bundle. The Romanian resource bundle is part of the sample data installed with the server.

On the Controls & Resources page, upload the undetected resources to the server using exactly the same name for the resource ID as iReport uses.

To upload the undetected file resources for the complex report example:

1. Add and upload the scriptlet JAR file:

a. On the Controls & Resources page, click **Add Resource**.

b. On the Locate File Resource page, select **Upload a Local File**, and click **Browse** to locate the <js-install>/samples/jars/scriptlet.jar file. Select scriptlet.jar.

The path to the file appears in the **Upload a Local file** field.

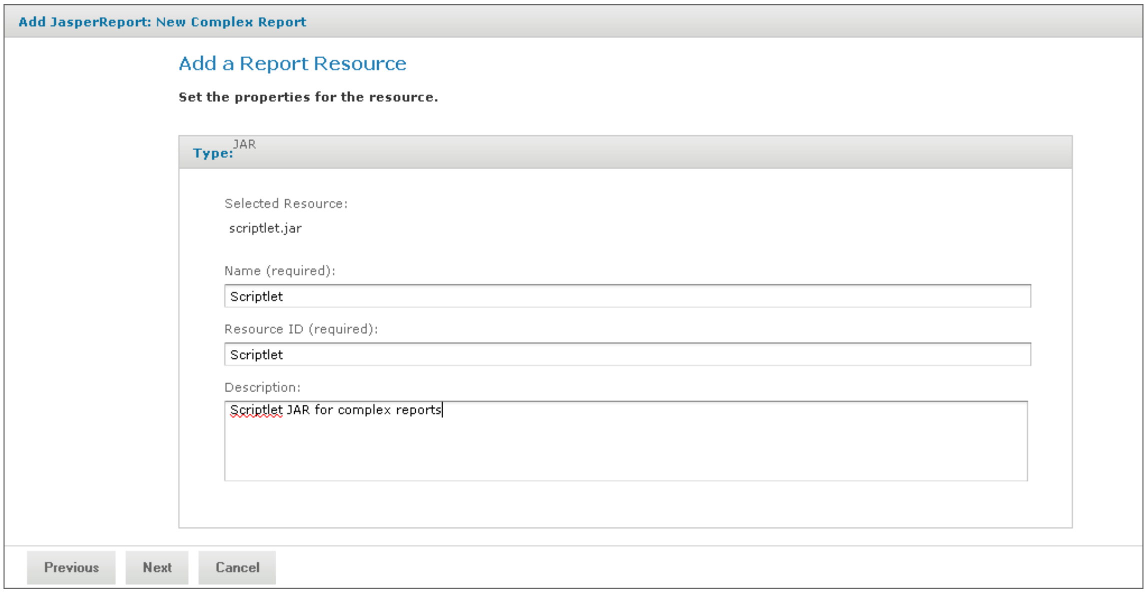
c. Click **Next**.

The Add a Report Resource page appears. **Figure 5-12 on page 105** shows that the file name scriptlet.jar appears, indicating that the server successfully loaded and automatically detected the JAR.

d. Enter the following information; the Resource ID is referenced in the main JRXML file, so do not change it:

- Name – `Scriptlet`
- Resource ID– `Scriptlet`
- Description – `Scriptlet JAR for complex report`

Figure 5-12 on page 105 shows these values entered on the Add a Report Resource page.



Add JasperReport: New Complex Report

Add a Report Resource

Set the properties for the resource.

Type: JAR

Selected Resource:
scriptlet.jar

Name (required): Scriptlet

Resource ID (required): Scriptlet

Description: Scriptlet JAR for complex reports

Figure 5-12 Scriptlet JAR Resource Properties

2. Click **Next**.
3. Add and upload the English resource bundle:
   a. On the **Controls & Resources** page, click **Add Resource** again.

      The Locate File Resource page appears.

   b. Select **Upload a Local File**, click **Browse** to locate the file <js-install>/samples/resource_bundles/sales.properties. Select the file.

      The path to the resource bundle appears in the **Upload a Local file** field.

   c. In Locate File Resource, click **Next**.

      The **Add a Report Resource** page indicates that the file was successfully loaded and automatically detected as a resource bundle.

   d. Enter the following information:
      - Name – `sales.properties`
      - Resource ID – `sales.properties`
      - Description – `Default English resource bundle`

      Enter the Resource ID field exactly as shown.

4. Click **Next**.
5. Add and upload the Romanian Resource bundle:
   a. On the Controls & Resources page, click **Add Resource** again.
   b. Select **Upload a Local File** and click **Browse** to locate this file:

      <js-install>/samples/resource_bundles/sales_ro.properties

   c. In Locate File Resource, click **Next**.

      The Add a Report Resource page shows that uploading the file was successful. The server recognized the type (resource bundle) and name (sales_ro.properties) of the selected resource.

   d. Enter the following information:
      - Name – `sales_ro.properties`

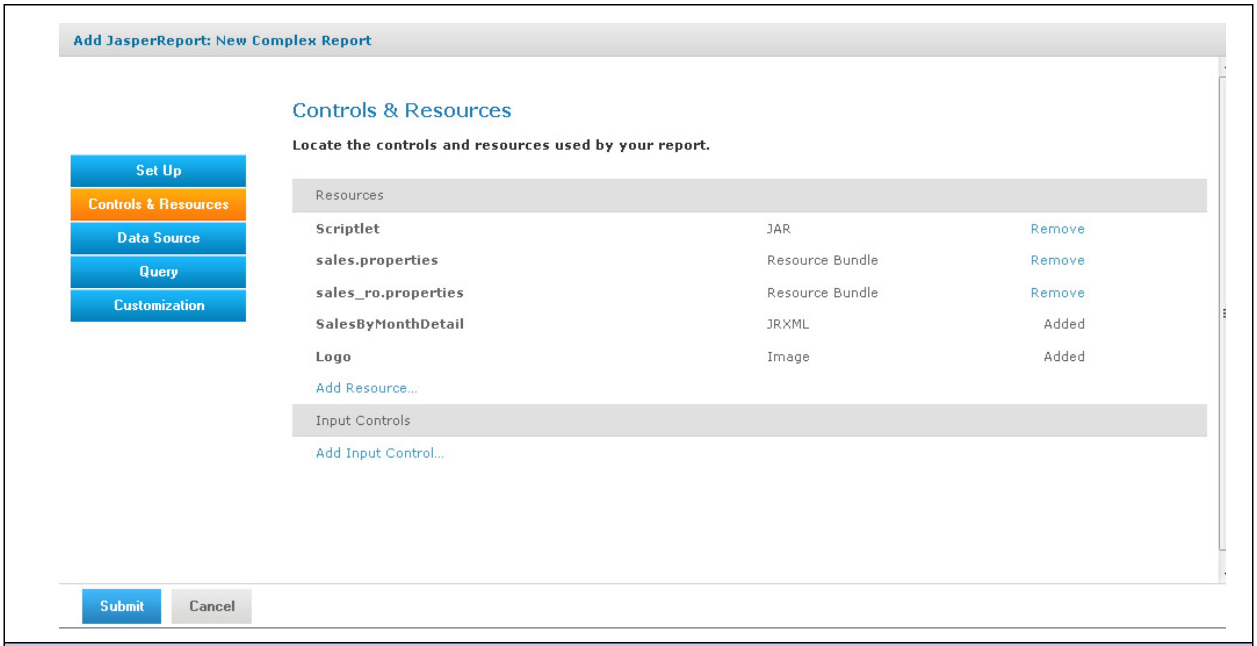
- Resource ID – `sales_ro.properties`

  Enter the Resource ID field exactly as shown.

- Description – `Romanian resource bundle`

e. Click **Next**.

Controls & Resources lists all the files:



Add JasperReport: New Complex Report

Controls & Resources

Locate the controls and resources used by your report.

Resources		
Scriptlet	JAR	Remove
sales.properties	Resource Bundle	Remove
sales_ro.properties	Resource Bundle	Remove
SalesByMonthDetail	JRXML	Added
Logo	Image	Added

Add Resource...

Input Controls

Add Input Control...

Figure 5-13 List of Detected and Undetected File Resources

If you want to upload a different file for a named resource, click its resource ID in the **Resources** list and locate the new file or repository object. You can also change the name and description of the resource, but not its resource ID. If there’s a mistake in a resource ID:

- Locate the ID in the list of resources on the Controls & Resources page, and click **Remove**.
- Re-add the resource, entering the correct resource ID.

5.3.2 Adding Input Controls

Input controls are graphical widgets the server displays with the report. Input controls perform the following functions:

- Prompt the user for input
- Validate the format of the input
- Pass the input to the report

Based on the input, the server modifies the WHERE filter clauses in SQL parametrized queries.

Input controls correspond to the parameters defined in JRXML reports, such as `$P{name}`. The server maps the value that the user enters for the input control to the parameter of the same name. If you define an input control in the JasperReport and the server can’t find a parameter by the same name in the JRXML, the input control doesn’t function when the report runs.

The JRXML can define a default value for the input control. To prevent users from changing the default, you can make the input control read-only or invisible.

When you create an input control, you define, or use a predefined, datatype, for user entries. Datatypes define the expected input (numbers, text, date, or date/time) and can include range restrictions that the server enforces. The server uses the datatype to classify and validate the data.

To define a datatype, set properties on the Set the Datatype Kind and Properties page. Properties differ for other datatypes that appear on the Set the Datatype Kind and Properties page.

Type	The classification of the data, which can be `Text`, `Number`, `Date`, or `Date-Time`.
Name	The name of the datatype.
Resource ID	The unique ID of the datatype that you cannot edit.
Description	Any additional information you want to provide about the datatype.
Pattern	A regular expression that restricts the possible values of the field. Appears when the Text type.
Minimum value	The lowest permitted value for the field.
Maximum value	The highest permitted value for the field.
Minimum Is Strict	If checked, the maximum value itself is not permitted; only values less than the maximum value are permitted.
Maximum Is Strict	If checked, the minimum value itself is not permitted; only values greater than the minimum value are permitted.

You choose one of these widget types for the input control:

- Boolean – A check box widget for entering a yes/no value.
- Single value – A text, number, date, or date/time widget. Input can be constrained to a minimum value, maximum value, or both. Text input can also be constrained by a matching pattern. A text box widget for entering a value, or a calendar for entering date and date/time.
- Multiple values – One of the following widgets that present a static list of values, or a dynamic list of values returned by a separate query, to the user.
  - Drop-down list to select a single value
  - Radio buttons to select a single value
  - Multi-select list to select multiple values
  - Check boxes to select multiple values

  After determining the list of values to be presented to the user, choose the widget.

The query in the SalesByMonth.jrxml file has several input control parameters, one for each different type of input control. These procedures show you how to add each type to the report unit.

5.3.2.1 Adding a Text Input Control

The simplest input control is a text box. In this example, the datatype for the input value is a number; the server verifies that the user enters a number into the text box.

To add a text input control to the complex report example:

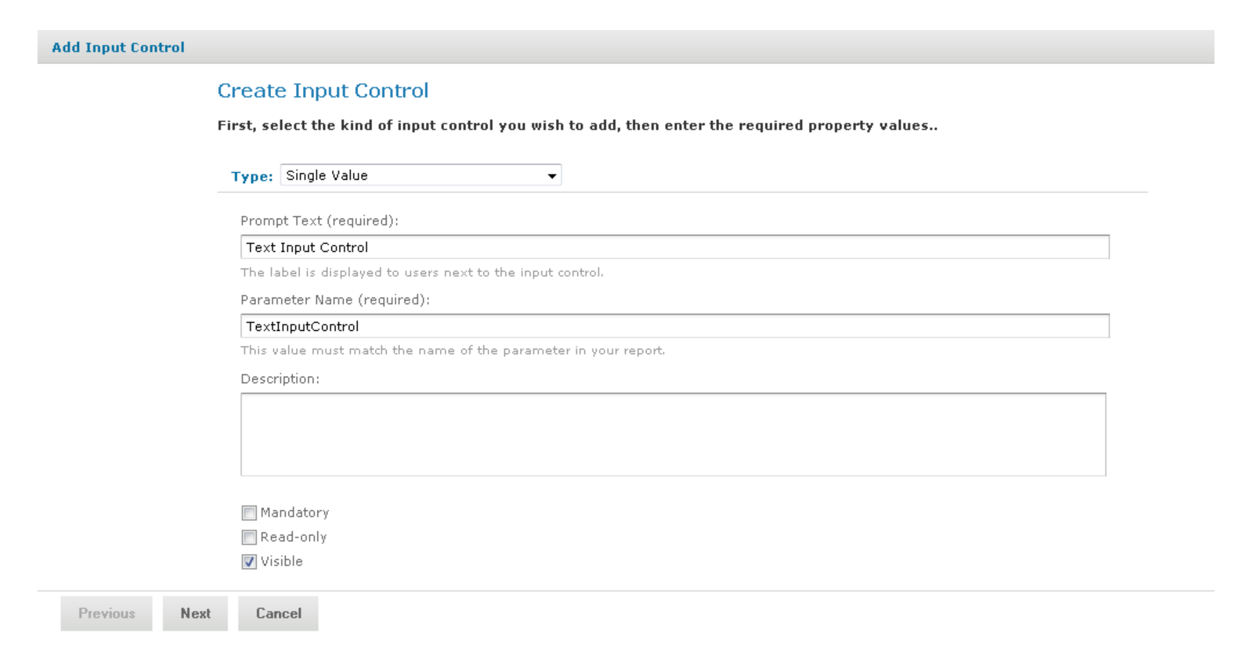
1. After completing steps in **"Uploading Undetected File Resources" on page 104**, click **Controls & Resources** in the JasperReport wizard.
2. On the Controls & Resources page, click **Add Input Control**.

   The Locate Input Control page appears.
3. Select **Define an Input Control in the next step**.
4. Click **Next**.
5. On the Create Input Control page, accept the default type of input from the **Type** drop-down: **Single Value**.
6. Enter the other properties for the input control:

   The name is referenced in the main JRXML file, so enter it exactly as shown.

   - Prompt Text – The label that the user sees next to the widget for this input: `Text Input Control`

- Parameter Name – The name of the parameter in the report that receives the user value: `TextInput`
- Description – An optional description that appears only within the report wizard: leave blank in this example.
- Mandatory, Read-only, Visible – A setting that affects how the input control is displayed: check only **Visible**.



Add Input Control

Create Input Control

First, select the kind of input control you wish to add, then enter the required property values..

Type: Single Value

Prompt Text (required): Text Input Control

The label is displayed to users next to the input control.

Parameter Name (required): TextInputControl

This value must match the name of the parameter in your report.

Description:

□ Mandatory
□ Read-only
☑ Visible

Figure 5-14 Properties of the Text Input Control

To reuse an input control, add it to the repository independent of any report using **Add Resource > Input Control**. Before using the input control in a report, check that the parameter name in the JRXML matches the name in the Create Input Control page; otherwise, the server can't run the report.

7. Click **Next**.
8. In Locate Datatypes, select **Define a DataType in the next step**, and click **Next**:

Instead of defining a datatype, you can use one in the repository if its type and range are compatible with your input control.

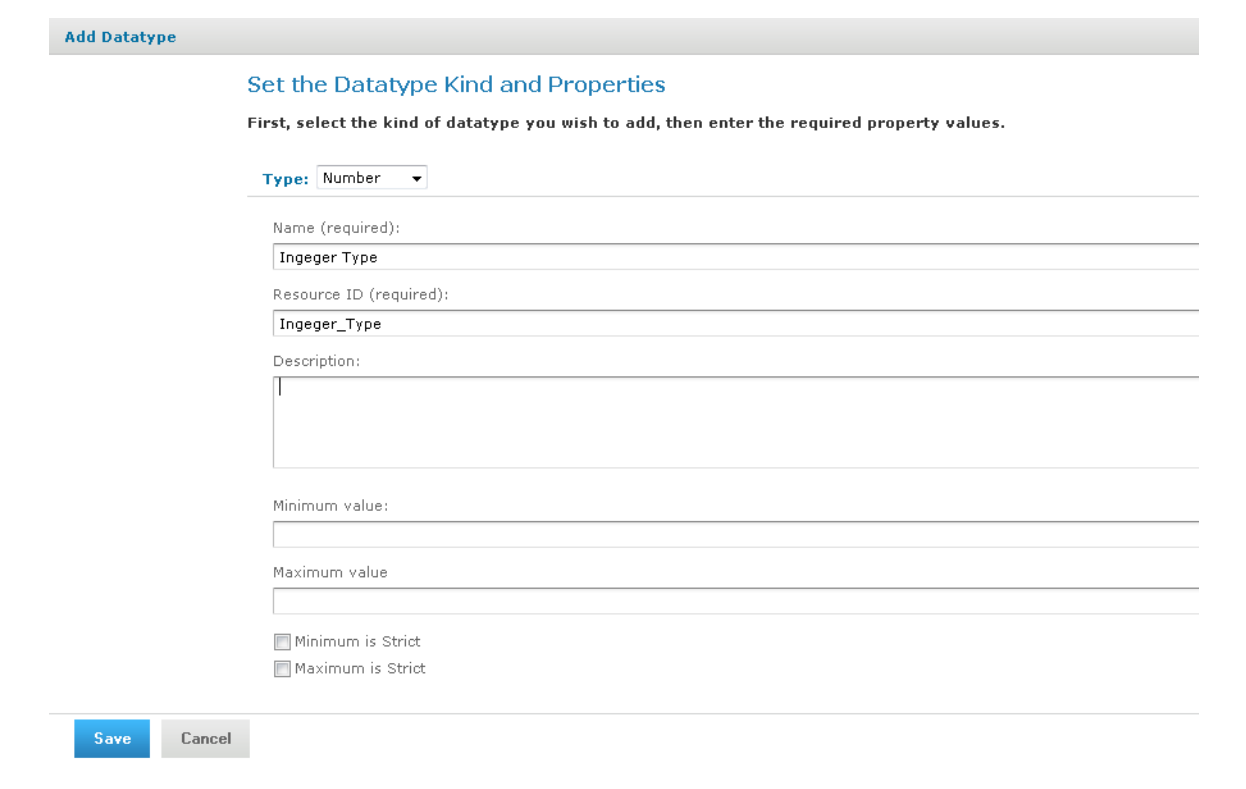
9. In Set the Datatype Kind and Properties, enter the properties for the datatype:

   a. In Type, select the format of the data that the user may enter. Select **Number** from the drop-down.

      The number format allows users to enter integers and decimals.

   b. Enter a name – `Integer Type`
   c. Enter a resource ID – `Integer_Type`

The name and resource ID are required, but only visible when defining the input control.



Add Datatype

Set the Datatype Kind and Properties

First, select the kind of datatype you wish to add, then enter the required property values.

Type: Number

Name (required): Ingeger Type

Resource ID (required): Ingeger_Type

Description:

Minimum value:

Maximum value

□ Minimum is Strict

□ Maximum is Strict

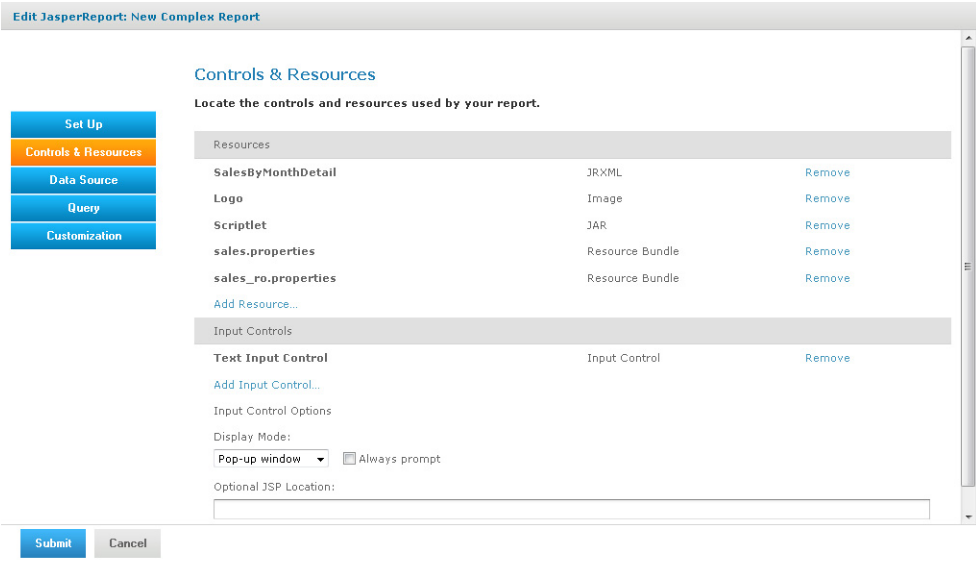
Figure 5-15 Integer Datatype Properties

d. Leave these properties blank in this example:

- Description – An optional description that appears only within the report wizard.
- Minimum value – The lower bound of the value the user may enter.
- Maximum value – The upper bound of the value the user may enter.
- Minimum is strict – Means the minimum value itself is not allowed.
- Maximum is strict – Means the maximum value itself is not allowed.

10. Click **Save**.

The Controls & Resources page now lists the Text Input Control.



Controls & Resources

Locate the controls and resources used by your report.

Resources		
SalesByMonthDetail	JRXML	Remove
Logo	Image	Remove
Scriptlet	JAR	Remove
sales.properties	Resource Bundle	Remove
sales_ro.properties	Resource Bundle	Remove

Add Resource...

Input Controls		
Text Input Control	Input Control	Remove

Add Input Control...

Input Control Options

Display Mode: Pop-up window ☐ Always prompt

Optional JSP Location:

Figure 5-16 Text Input Control in Input Controls List

5.3.2.2 Adding a Simple Check Box Input Control

A check box input control accepts true/false (boolean) input from the user.

To add a simple check box input control to the complex report example:

1. Continuing with the previous example, on the Controls & Resources page, click **Add Input Control**.
2. On the Locate Input Control page, click **Define an Input Control in the next step**.
3. Click **Next**.
4. On the Create Input Control page, select the type of input from the **Type** drop-down: **Boolean**.
5. Enter the other properties for the input control.
    - Prompt Text – `Check Box Input Control`
    - Parameter Name – `CheckboxInput`

    Enter the parameter name exactly as shown because the main JRXML file references this name.

    - Description – Leave blank in this example.
    - Mandatory, Read-only, Visible – Check only visible.
6. Click **Submit**.

    The Controls & Resources page appears with the new check box input control.

5.3.2.3 Adding a Drop-Down Input Control

The drop-down input control, also called a list input control, gives the user a pre-determined list of choices. As a report designer, you make these decisions about a drop-down input control:

- To present a single-select or multi-select list to the user
- To present a single choice as a drop-down list or a set of radio buttons
- To present a multi-select control as a multi-select list or a set of check boxes

Radio buttons and check boxes usually work well for five or fewer choices. This example shows how to create an input control that presents three choices in a drop-down list. A list of values defines these choices. You can create a new list of values, dedicated to this input control, or you can use a list of values in the repository.

To add a drop-down input control to the complex report example:

1. Continuing with the previous example, on the Controls & Resources page, click **Add Input Control**.
2. On the Locate Input Control page, click **Define an Input Control in the next step**.
3. Click **Next**.
4. On the Create Input Control page, select the type of input from the **Type** drop-down: **Single-select List of Values**.
5. Enter the other properties for the input control:
   - Prompt Text – `List Input Control`
   - Parameter Name – `ListInput`

     Enter the parameter name exactly as shown because the main JRXML file references this name.

   - Description – Leave blank in this example.
   - Mandatory, Read-only, Visible – Check only visible.
6. Click **Next**.
7. On the Locate List of Values page, select **Define a list of values in the next step**.

   Instead of defining a list of values, you can use one in the repository if its values are compatible with the parameter defined in the JRXML report.

8. Click **Next**.
9. On the Add List of Values page, enter a name, resource ID, and optional description for the list of values. These properties aren’t visible outside of the input control. Enter these values:
   - Name – `list type`
   - Resource ID – `list_type`
   - Description – Leave blank in this example.
10. In the **Name Value** panel, enter names and values to present as choices to the user:
    - Enter unique names.

      The server requires unique names to distinguish which item the user chose.

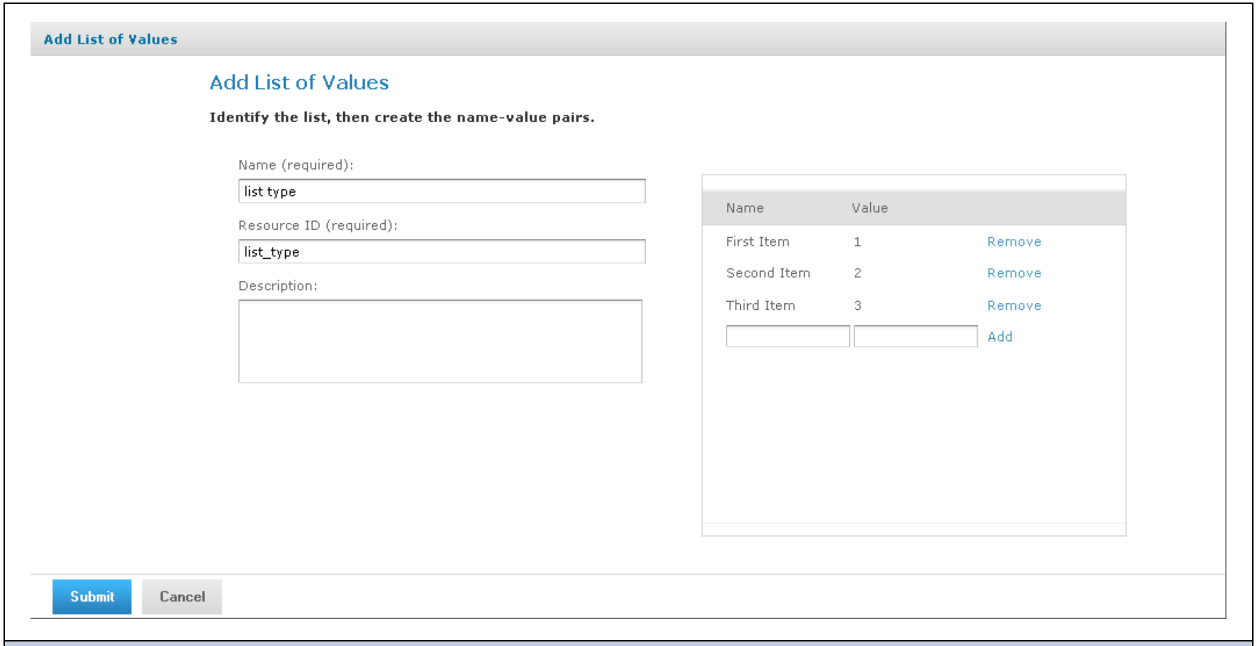
    - Enter values of the type that match the parameter definition in the JRXML report.

    After entering a name and value, click **Add**. If you make a mistake, click **Remove**.

    For this example, enter:

    - Name `First Item` with value `1`.
    - Name `Second Item` with value `2`.

- Name `Third Item` with value `3`.



Add List of Values

Add List of Values

Identify the list, then create the name-value pairs.

Name (required): list type

Resource ID (required): list_type

Description:

Name	Value	
First Item	1	Remove
Second Item	2	Remove
Third Item	3	Remove
		Add

Figure 5-17 Definition of the List of Values

11. Click **Submit**.

    The Controls & Resources page appears with the new List Input control.

5.3.2.4 Adding a Date Input Control

This example of adding a date input control uses a datatype that already exists in the sample data in the repository.

To add a date input control to the complex report example:

1. On the Controls & Resources page, click **Add Input Control**.
2. On the Locate Input Control page, select **Define an Input Control in the next step**, then click **Next**.
3. On the Create Input Control page, select the type of input from the **Type** drop-down: **Single-Value**
4. Enter the other properties for the input control:
   - Prompt Text – `Date Input Control`
   - Parameter Name – `DateInput`

     Enter the parameter name exactly as shown because the main JRXML file references this name.

   - Description – Leave blank in this example.
   - Mandatory, Read-only, Visible – Check only the visible setting.
5. Click **Next**.
6. On the Locate Datatypes page, select **Select a Datatype from the Repository**.
7. Click **Browse**.
8. In Select Resource from Repository, expand Input Data Types, and select the **Date Datatype**.
9. Click **Select**.

   The Locate DataTypes page shows the location of this datatype in the repository, /datatypes/DateDatatype.
10. Click **Next**.

The Controls & Resources page appears with the new Date Input Control.

5.3.2.5 Adding a Query-Based Input Control

A query-based input control presents a dynamically-created list of choices to the user. The server performs a query whose results are used to create the list of choices. You must perform the following tasks:

- Configure the query.
- Designate how to display the results in the input control.
- Specify the value to pass as the corresponding parameter.

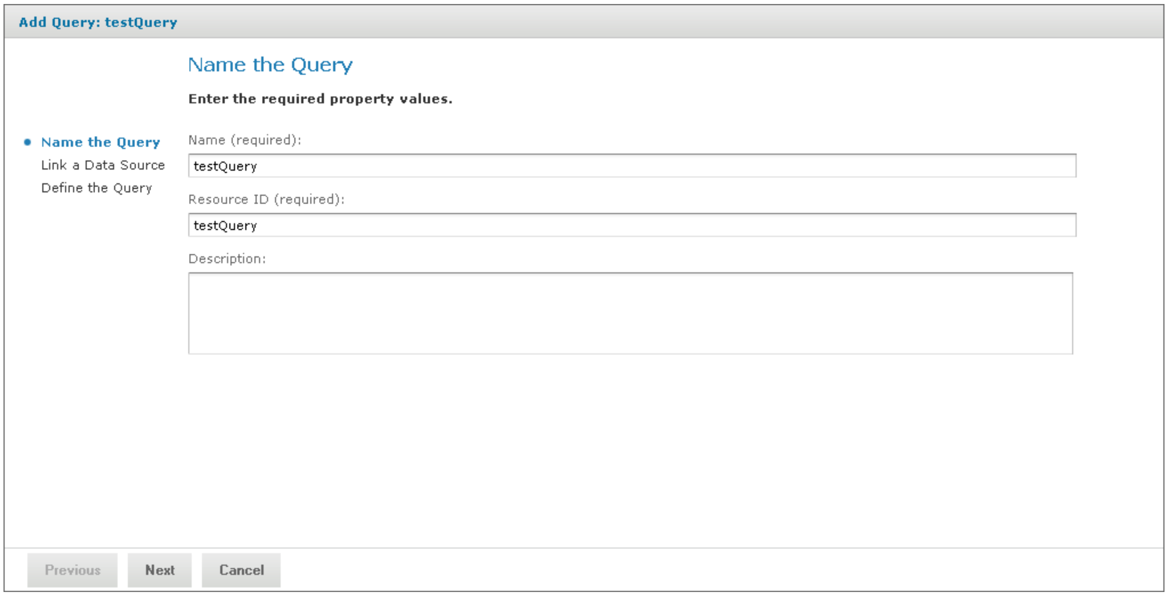
To add a query-based input control to the complex report example:

1. On the Controls & Resources page, click **Add Input Control**.
2. On the Locate Input Control page, select **Define an Input Control in the next step**.
3. Click **Next**.
4. On the Create Input Control page, select the type of input from the **Type** drop-down: **Single-select Query**.
5. Enter the naming properties for the input control:
   - Prompt Text – `Query Input Control`
   - Parameter Name – `QueryInput`

     Enter the parameter name exactly as shown because the main JRXML file references this name.

   - Description – Leave blank in this example.
   - Mandatory, Read-only, Visible – Use the default settings in this example.
6. Click **Next**.

   The Locate Query page appears. Options are:
   - To locate a reusable query in the repository
   - To define a new query dedicated to this input control
7. For this example, select **Define a Query in the next step.**
8. Click **Next**.
9. On the Name the Query page, enter naming properties for the new query. For this example, enter `testQuery` in both the Name and Resource ID fields.



Add Query: testQuery

Name the Query

Enter the required property values.

Name (required): testQuery

Resource ID (required): testQuery

Description:

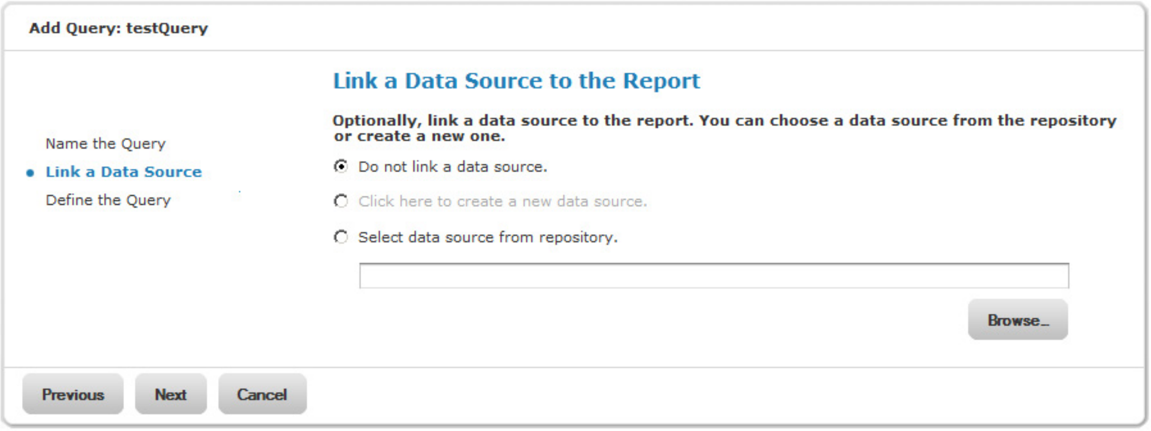
Figure 5-18 Properties of the Query for the Query Input Control

10. Click **Next**.

The Link a Data Source to the Report page appears. Options are:

- To use the same data source for the input control as you use for the report
- To define a new data source, dedicated to this input control
- To select a reusable data source from the repository

11. For this example, select **Do not link a data source** to use the same data source for the input control as you use for the report. You will select the data source for the report in **5.3.3, "Selecting a Data Source for Running the Complex Report," on page 116**.



Add Query: testQuery

Link a Data Source to the Report

Optionally, link a data source to the report. You can choose a data source from the repository or create a new one.

● Do not link a data source.

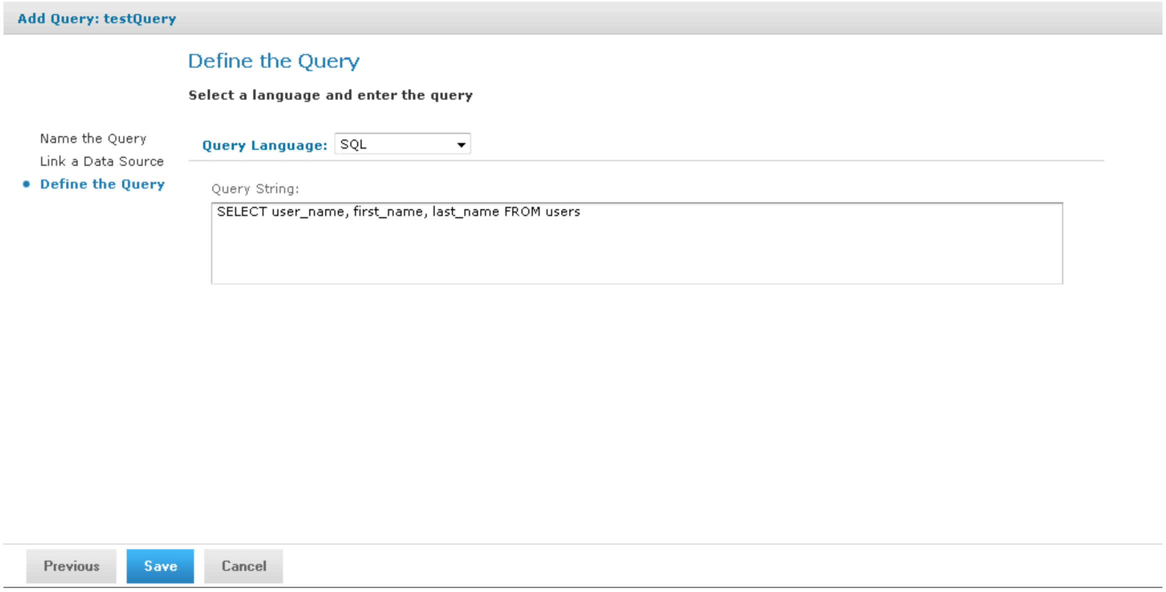
○ Click here to create a new data source.

○ Select data source from repository.

Figure 5-19 Data Source Link for the Query Input Control

12. Click **Next**.
13. On the Define the Query page, select **SQL** from the Query Language drop-down.
14. Enter this Query String to retrieve the labels and values to be displayed for this input control:

```
SELECT user_name, first_name, last_name FROM users
```



Add Query: testQuery

Define the Query

Select a language and enter the query

Query Language: SQL

Query String:

```
SELECT user_name, first_name, last_name FROM users
```

Figure 5-20 Query String Definition

15. Click **Save**.
16. For each row in the results of the query, the server presents a single value, such as Sarah Smith, in the input type widget (drop-down, radio buttons, multi-choice, check boxes). On the Query Information page, name the database columns to

comprise the input value presented to the user. The column names must match those in the `SELECT` clause of the query string exactly:

a. In the Value Column, enter the `user_name`.

b. In the Visible Column, enter `first_name`.

c. Click **Add**.

d. In the Visible Column, enter `last_name`.

e. Click **Add**.

For each visible column that you want to display as a choice, enter the name, then click **Add**. If you make a mistake, click **Remove**.

17. Click **Submit**.

The Controls & Resources page displays all the resources, including the new input controls. **Figure 5-21 on page 116** shows these resources.

Next, set the input control options, described in the next section.

5.3.2.6 Setting the Input Control Options

In this procedure, you set the display mode in **Input Control Options** at the bottom of the Controls & Resources page. These options only appear after you add an input control to the report. **Figure 5-21 on page 116** shows these options.

To configure the appearance of the input controls for the complex report example:

1. Select **Pop-up window.**

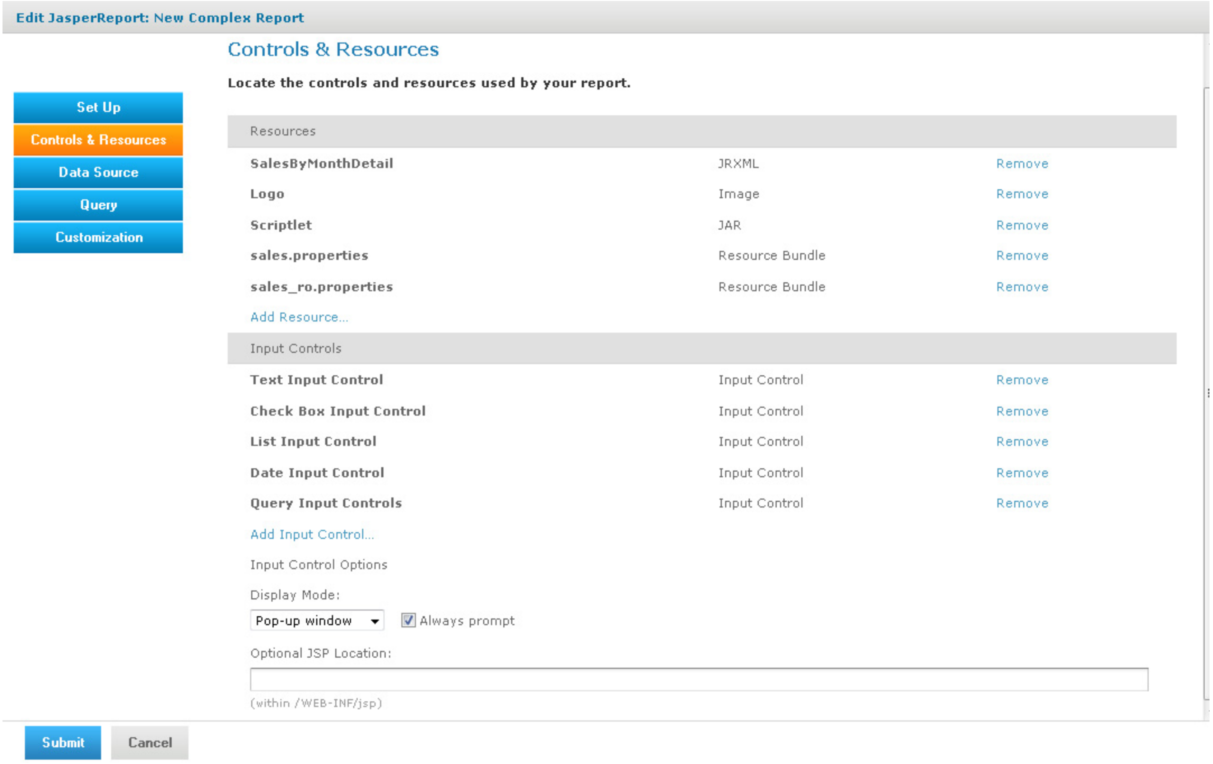
You can also select **Separate page** to display the input controls in a separate browser window, **Top of page** to display them above the report, or **In page** to display them on the side of the report.

2. Check **Always prompt** when you want the server to display the Input Controls dialog to prompt the user when the report runs.

The definition of input controls in this example specified Visible and not Mandatory. When input controls aren’t mandatory and Always prompt isn’t checked on the Controls & Resources page, the user must click the Options button in the report viewer to change input controls; otherwise, the report runs with default input controls

3. Leave **Optional JSP Location** blank for this example.

   You can use the Optional JSP Location option to specify the path to a JSP file that affects the appearance of the input controls.



Edit JasperReport: New Complex Report

Controls & Resources

Locate the controls and resources used by your report.

Resources		
SalesByMonthDetail	JRXML	Remove
Logo	Image	Remove
Scriptlet	JAR	Remove
sales.properties	Resource Bundle	Remove
sales_ro.properties	Resource Bundle	Remove
Add Resource...		

Input Controls		
Text Input Control	Input Control	Remove
Check Box Input Control	Input Control	Remove
List Input Control	Input Control	Remove
Date Input Control	Input Control	Remove
Query Input Controls	Input Control	Remove
Add Input Control...		

Input Control Options

Display Mode:

Pop-up window ☑ Always prompt

Optional JSP Location:

(within /WEB-INF/jsp)

Figure 5-21 Input Controls and Resources

Select the data source to finish the complex report example.

5.3.3 Selecting a Data Source for Running the Complex Report

You select a data source to retrieve data for the report and the query input control; otherwise, the report and the list of users in the query input control will be blank.

To select a data source and run the complex report:

1. On the Controls & Resources page of the JasperReport wizard, select **Data Source**.
2. On the Locate Data Source page, choose **Select data source from repository**.
3. Click **Browse,** and choose **Organization > Data Sources > JServerJNDI Data Source**. Click the **Select** button.
4. On Link a Data Source to the Report, click **Submit**.
5. On the Locate Query Page, click **Submit** again to save the complex report.

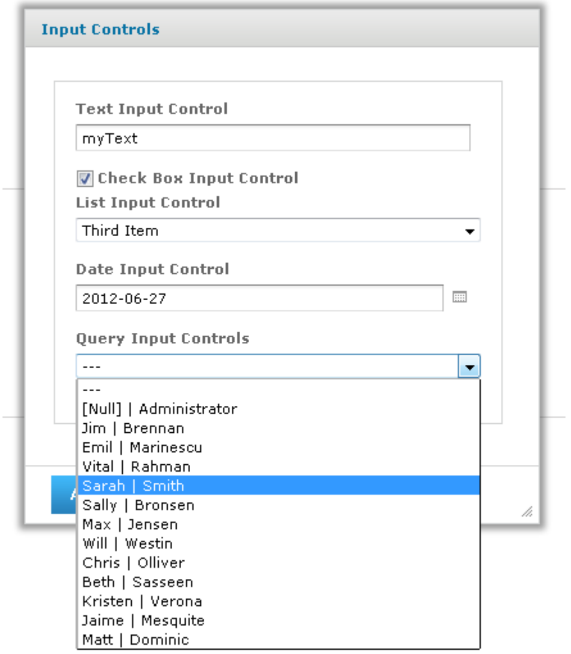
   Skip the Query and Customization pages of the JasperReport wizard to use the default settings on those pages.

   The server validates the report and a message appears indicating that the report was added to the repository. The New Complex Report appears in the repository.
6. In the Repository, click the name New Complex Report to run and view the report.

   Input controls appear.
7. Enter these input values, as shown in **Figure 5-22**:
   a. Text Input Control: `myText`
   b. Check Box Input Control: Check the checkbox.
   c. List Input Control: Select **Third Item**.

d. Date Input Control: Click ▦ , select December 31, 2010.

e. Query Input Control: Select **Sarah Smith** from the drop-down.



Input Controls

Text Input Control

myText

☑ Check Box Input Control

List Input Control

Third Item

Date Input Control

2012-06-27

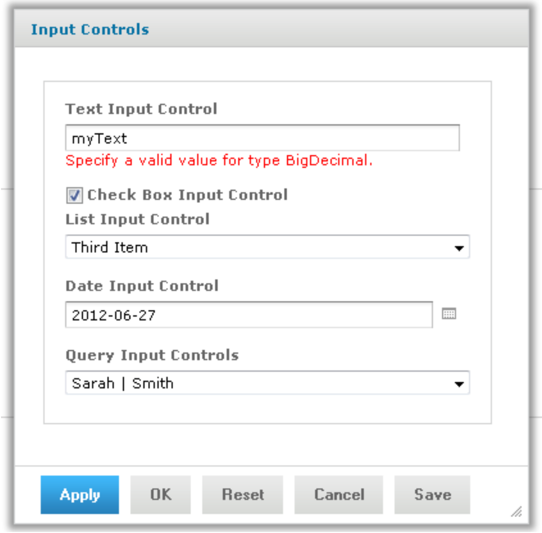
Query Input Controls

[Null] | Administrator
Jim | Brennan
Emil | Marinescu
Vital | Rahman
Sarah | Smith
Sally | Bronsen
Max | Jensen
Will | Westin
Chris | Olliver
Beth | Sasseen
Kristen | Verona
Jaime | Mesquite
Matt | Dominic

Figure 5-22 Input Controls Dialog for the New Complex Report

8. Click **OK** or **Apply** to run the report with the selected input, including the incorrect non-numerical input for the Text Input Control.

   The server enforces the proper format defined for each input control. You defined the Text Input Control as a numeric type, so it accepts only valid numbers, as indicated by the message to specify a valid float number, as shown in Figure 5-23.



Input Controls

Text Input Control

myText

Specify a valid value for type BigDecimal.

☑ Check Box Input Control

List Input Control

Third Item

Date Input Control

2012-06-27

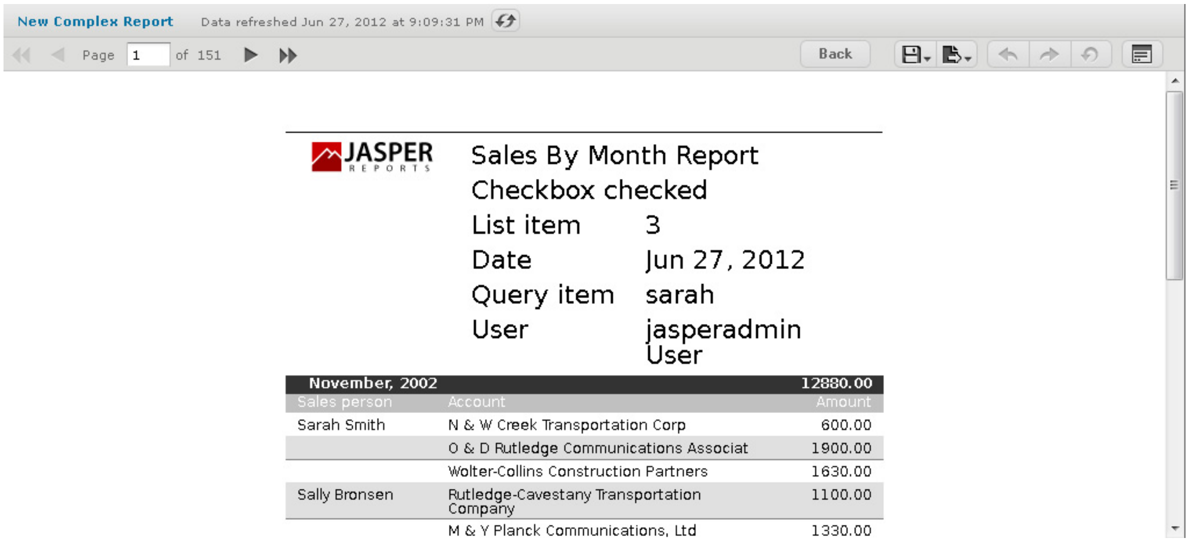
Query Input Controls

Sarah | Smith

Figure 5-23 Invalid Input Message

9. In Text Input Control, enter 3 and click **OK** or **Apply** again.

The sample report includes a header that displays the value of each parameter received from the input controls. Values and labels for the input controls appear in the language specified by the active resource bundle, in this case English.



Sales By Month Report
Checkbox checked

List item	3
Date	Jun 27, 2012
Query item	sarah
User	jasperadmin User

November, 2002		12880.00
Sales person	Account	Amount
Sarah Smith	N & W Creek Transportation Corp	600.00
	O & D Rutledge Communications Associat	1900.00
	Wolter-Collins Construction Partners	1630.00
Sally Bronsen	Rutledge-Cavestany Transportation Company	1100.00
	M & Y Planck Communications, Ltd	1330.00

Figure 5-24 Output Controlled by Input

In the report viewer, you can open the Input Controls dialog at any time by clicking the **Options** button. Click **OK** to run the report using the chosen values and close the Input Controls dialog; click **Apply** to run the report using the chosen values, but keep the Input Controls open for choosing other values and re-running the report.

If you get an error when you run the report, open it for editing as described in **5.5, "Editing JRXML Report Units," on page 119**. Review your settings. If you can't find the problem, edit the SalesByMonth sample report (in the repository at /reports/samples) and compare its settings to your report.

To see the message written by the scriptlet JAR on the last page of the report, click ⏩ in the report viewer.

5.4 Adding Cascading Input Controls to a Report

JRXML-based reports can include input controls that have dynamic values. The values depend on a user's selection in other input controls. For example, a report has input controls for country, state, and city. The options in the State input control depend on the value selected in the Country input control. When the user selects a state, the list of values includes only those in the selected state. These cascading input controls use queries to determine the values to display in each input control field.

To use input controls as parameters for a query that populates another input control, you use a special syntax to reference a parameter name in the input control's query. The syntax is identical to the `$P{parameterName}` syntax used in queries for JasperReports. For more information about defining the input control's query, see section **5.3.2.5, "Adding a Query-Based Input Control," on page 113**.

For example, a report returns data identified by country and city. It includes input controls called COUNTRY and CITY. This query used by the CITY input control retrieves city names from a table called `accounts` based on the value selected by the COUNTRY input control:

```
select city from accounts where country = $P{COUNTRY}
```

When the user selects a country from the COUNTRY input control, the value selected is used by the query of the CITY input control; the CITY input control is refreshed to show the result. Note that there are other ways to use a parameter in a query.

For an example of a report that has cascading input controls, see section **3.7.2, "Cascading Input Controls," on page 46**.

5.5 Editing JRXML Report Units

After you add a report unit to the repository, you can edit any of its elements, including file resources and input controls. This example modifies the display text of the ambiguous Text Input Control.

To edit the complex report example:

1. Log into the server as an administrator and select **View > Repository**.

   If you log in as a user, you can edit a report that you created. This example requires an administrator login because an administrator created the complex report.

2. Search or browse the repository to locate the report. In this example, go to **Organization > Reports > Samples**.
3. Right-click the New Complex Report and select **Edit** from the context menu.

   The JasperReport wizard opens the report unit.
4. Navigate to the page of the wizard for making the change; in this example, click **Controls & Resources**.
5. Make changes to an input control prompt and the display mode of the input controls, for example:
   a. Click the name of the **TextInput** control.

      The Locate Input Control page shows that this input control is locally defined.

   b. Click **Next**.

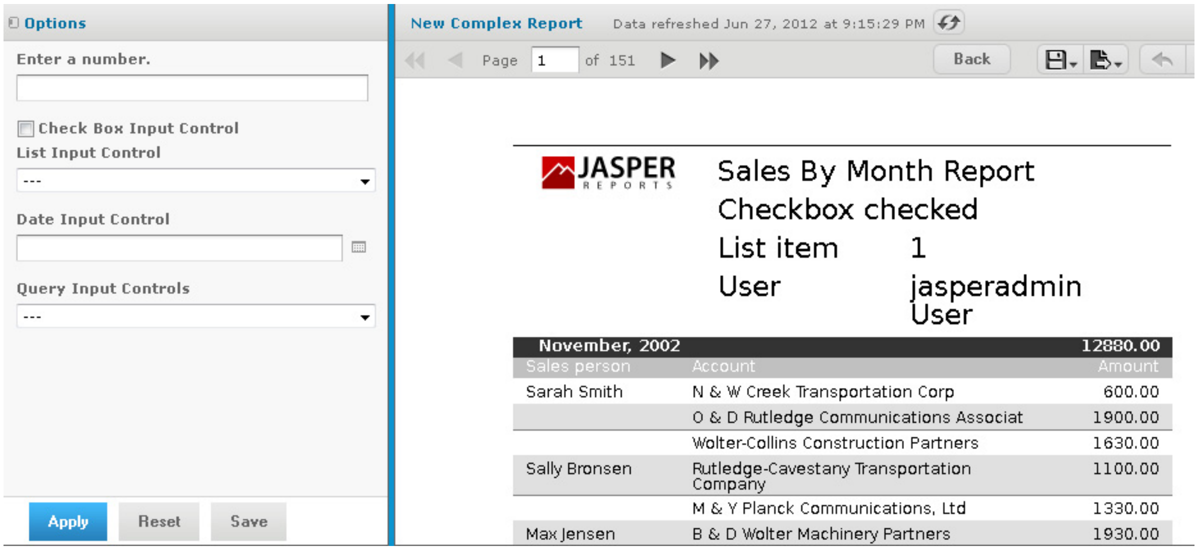
      The Create Input Control page appears.

   c. Change the contents of the Prompt Text field to `Enter a number`. Click **Next**.

      The Locate Datatypes page appears. You can select a different datatype from the repository. For this example, accept the existing datatype setting.

   d. In Locate Datatypes, click **Next**.
   e. In Set the Datatype Kind and Properties, click **Save** to accept the datatype property settings.
6. On the Controls & Resources page:
   a. Change the Display Mode to **In Page**.
   b. Clear the **Always prompt** check box.
   c. Click **Submit**.
7. Run the New Complex Report again.

   Instead of appearing in a pop-up before the report; the input controls appear in the Options panel of the report. Figure 5-25 shows the new prompt, **Enter a number**, for the text input control. Because none of the input controls in this example are required, the report can display with blank input controls. Enter values and click **Apply** to modify the report output according to your input.



Sales By Month Report
Checkbox checked

List item	1
User	jasperadmin User

November, 2002		12880.00
Sales person	Account	Amount
Sarah Smith	N & W Creek Transportation Corp	600.00
	O & D Rutledge Communications Associat	1900.00
	Wolter-Collins Construction Partners	1630.00
Sally Bronsen	Rutledge-Cavestany Transportation Company	1100.00
	M & Y Planck Communications, Ltd	1330.00
Max Jensen	B & D Wolter Machinery Partners	1930.00

Figure 5-25 Output of the Modified Report

5.6 Localizing Reports

You can adapt reports to global audiences by localizing input controls and field names:

- Input controls – The server supports multi-lingual prompts and static lists of values in reports.
- Field names – The server supports multi-lingual field names in reports.

A `$R` expression that you write in the report design triggers linguistic changes in the report output for different locales. Each `$R` expression refers to a name-value pair (your translations) in a resource bundle. A resource bundle file is a text file that has a `.properties` extension. You create a resource bundle in iReport or a text editor. You set the base name of the resource bundle in the header of the JRXML file:

```
<jasperReport name="StoreSales" pageWidth="595" pageHeight="842" columnWidth="515"
leftMargin="40" rightMargin="40" topMargin="50" bottomMargin="50"
resourceBundle="simpleTable">
```

For example, `simpleTable` is the base name of the resource bundle file for this report. If you prefer using a graphical user interface to coding in XML, use iReport Designer to set the base name of the resource bundle, as explained on **page 122**.

5.6.1 Running a Localized Report

In this procedure, you run the Romanian version of the complex report that you added in section **5.3.1, "Uploading Undetected File Resources," on page 104**.

To run the Romanian version of the complex report:

1. Choose the Romanian locale on the login page of the server, and login as an administrator.
2. Click **View > Repository**, and navigate to **Organization > Reports > Samples**.
3. Click the name of the complex report, New Complex Report.

   The Input Controls dialog appears.
4. Enter input control values:
   a. Text Input Control: `3`
   b. Check Box Input Control: Check the check box.

c. List Input Control: Select **Third Item**.

d. Date Input Control: Click ▦ , and select March 31, 2010.

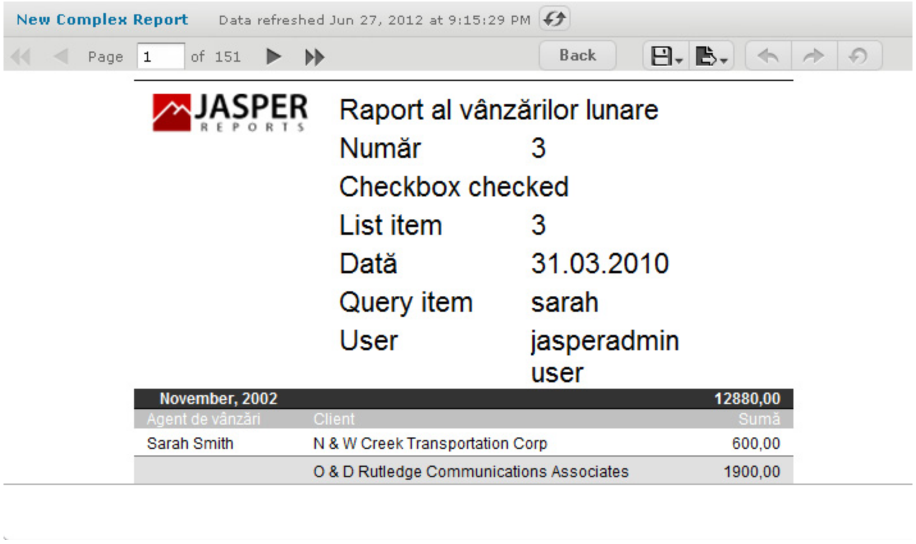
e. Query Input Control: Select **Sarah Smith** from the drop-down.

f. Click **OK**.

The fields in the title band and column names (sales person, sales account, and sales amount), shown in **Figure 5-26**, appear in the language set by the Romanian resource bundle sales_ro.properties:

```
title=Raport al v\u00E2nz\u0103rilor lunare
sales.person=Agent de v\u00E2nz\u0103ri
sales.account=Client
sales.amount=Sum\u0103
param.number=Num\u0103r
param.date=Dat\u0103
```

The currency and dates in the report output header map to Romanian locale settings.



Raport al vânzărilor lunare

Număr 3

Checkbox checked

List item 3

Dată 31.03.2010

Query item sarah

User jasperadmin user

November, 2002		12880,00
Agent de vânzări	Client	Sumă
Sarah Smith	N & W Creek Transportation Corp	600,00
	O & D Rutledge Communications Associates	1900,00

Figure 5-26 A Report Localized for the Romanian Locale

By default, the web interface elements appear in US English when you choose an unsupported locale, such as the Romanian locale. If you choose a supported language, the web interface elements appear in that language. Supported languages are Chinese (Simplified), French, German, Japanese, and Spanish. You can customize the server to support additional languages; you can translate the web interface into a different language, server property names, and messages in another language. For some locales, you may also need to change the default locale and time zone. For more information about localizing the server, see the *JasperReports Server Administrator Guide*.

5.6.2 Adding Multi-lingual Prompts to Input Controls

This section describes how to create an Ad Hoc report that prompts for input multiple languages. The tasks are:

- Set the base name of the resource bundles in the JRXML Topic.
- Create resource bundles that contain translations for the prompts.
- Create an Ad Hoc report based on the JRXML Topic.
- Edit an input control to make prompts multi-lingual.
- Upload the resource bundles.
- Run the report and use the localized input control.

The order of these tasks is important: Set the base name of the resource bundle in the JRXML Topic first, then create the Ad Hoc report. If you open the JRXML Topic after creating an Ad Hoc report, iReport removes grouping or sorting of data if there is any.

To set the base name of the resource bundles in the JRXML Topic:

1. Start iReport. In iReport, click **Window > JasperReports Server Repository**.

   The Repository Navigator appears.
2. In the Repository Navigator, set up a connection to the server as described in section **7.2, "Connecting to the Server from iReport," on page 170**.
3. Navigate to **Ad Hoc Components > Topics** and right-click the JRXML topic for this report: **Parametrized Report**.
4. Select **Copy**.
5. Navigate to the **Reports** folder, right-click, and select **Paste**. The Parametrized Report topic appears in Reports.
6. To open the topic in the Designer tab, expand the Parametrized Report folder and double-click its main JRXML: **ParametersJRXML_label**. The Shipping Report appears in the Designer tab.
7. Click **Window > Report Inspector**.
8. In the Report Inspector, right-click the root node: **ParamMany**.

   In the main JRXML, ParamMany is the report name.
9. From the context menu, choose **Properties.**

   Figure 5-27 shows the ParamMany root node and Properties context menu.

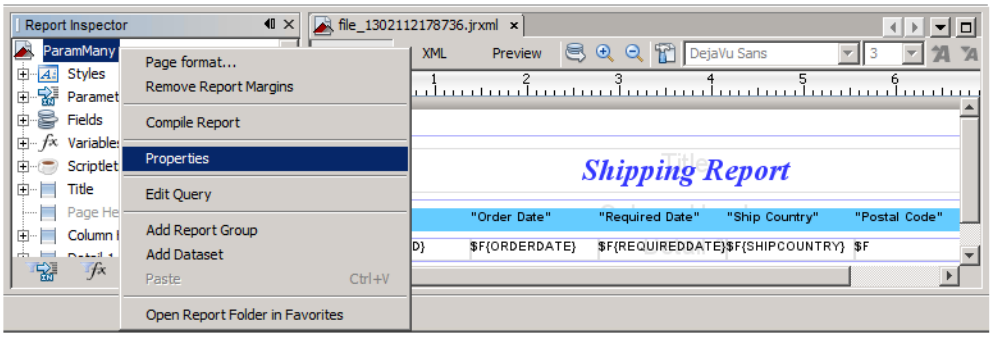
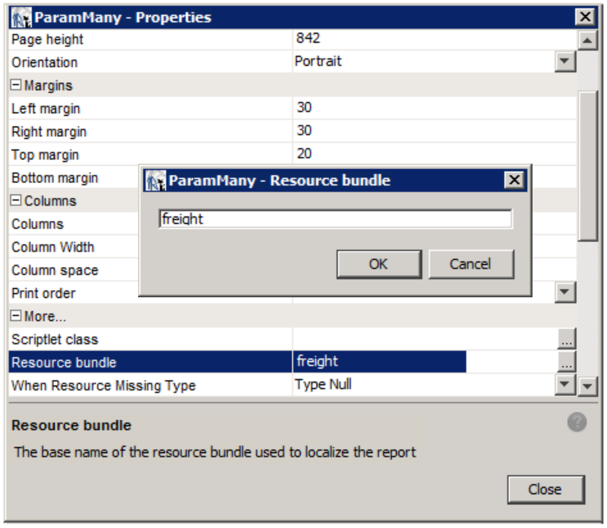


Figure 5-27 Selecting Properties of the ParamMany report

The ParamMany Properties dialog appears.

10. In the ParamMany Properties dialog, set the base name of the resource bundle to freight:
    a. Scroll down to the **Resource bundle** property.
    b. Click ....
    c. Enter `freight`.

Figure 5-28 shows the properties of the ParamMany report.



Page height	842
Orientation	Portrait
⊟ Margins	
Left margin	30
Right margin	30
Top margin	20
Bottom margin	
⊟ Columns	
Columns	
Column Width	
Column space	
Print order	
⊟ More...	
Scriptlet class	
Resource bundle	freight
When Resource Missing Type	Type Null

freight

Resource bundle

The base name of the resource bundle used to localize the report

Figure 5-28 Setting the Base Name of the Resource Bundle

11. Click **OK** to close the **ParamMany - Resource bundle** dialog.
12. Click **Close** to close the **ParamMany - Properties** dialog.
13. Click **File > Save** to save the resource bundle name to the JRXML.
14. In the Repository Navigator, right-click **ParametersJRXML_label**. and choose **Replace with Current Document**.

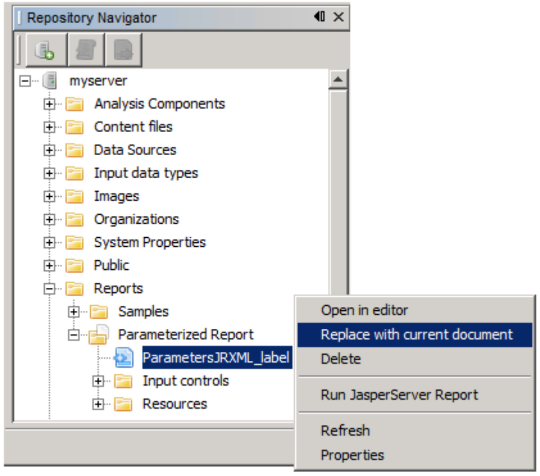


Figure 5-29 Saving the Current Document in iReport to the Repository

The modified JRXML with a base resource bundle name overwrites the Parametrized Report Topic in the repository.

To create resource bundles that contain translations for prompts:

1. In a text editor, create a new file for English translations, and enter these name-value pairs in the file:

```
BundleCountry = Country
BundleDate = Date
BundleOrder= Order
```

2. Save the file as `freight.properties`.

The file name of the default (English) resource bundle consists of the base name of the resource bundle and the properties extension.

3. In a text editor, create a new file for French translations, and enter these name-value pairs in the file:

```
BundleCountry = Pays
BundleDate = Datte
BundleOrder = Pour ID
```

4. Save the file as `freight_fr.properties`.

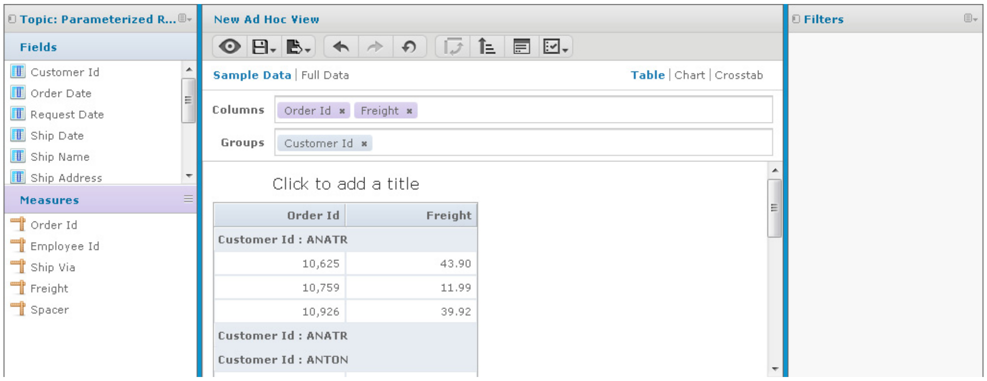
The file name of a localized resource bundle follows this Java naming convention:

<default_file_name>_<locale>.properties

- <default_file_name> is the base name of the resource bundle
- <locale> is a Java-compliant locale identifier

To create an Ad Hoc View based on the JRXML Topic:

1. Log into the server as administrator, and choose **Create > Ad Hoc View**.
2. In the Data Chooser wizard, navigate to **Ad Hoc Components > Topics**, on the Topics tab, choose **Parametrized Report**.
3. Click **Table.** The Parametrized Report topic (a blank report) opens in the Ad Hoc Editor.
4. In the **Measures** list, double-click these fields:
   - Order ID
   - Freight
5. Right-click the **Customer Id** field and select **Add as Group**.
6. Click **Click to add a title**, and enter **Multi-lingual Input Prompts View.**



Columns: Order Id, Freight

Groups: Customer Id

Click to add a title

Order Id	Freight
Customer Id : ANATR	
10,625	43.90
10,759	11.99
10,926	39.92
Customer Id : ANATR	
Customer Id : ANTON	

Figure 5-30 Creating an Ad Hoc View

7. Click 💾, select **Save Ad Hoc view As and Create Report**. In the Save As dialog, select the **Ad Hoc Reports** folder, and enter:

   Data View Name: `Multi-lingual Input Prompts View`

   Data View Description: `A report that prompts for input in French and English.`

   Report Name: `Multi-lingual Input Prompts View Report`
8. Click **Save**.

To edit an input control to make prompts multi-lingual:

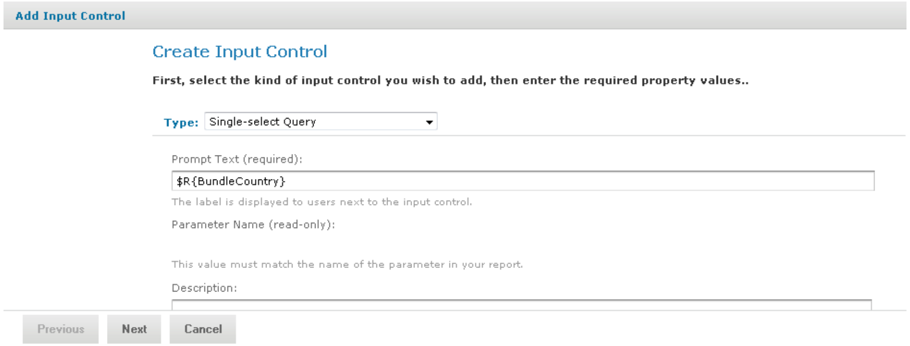
1. In the server, click **View > Repository.**
2. Locate the Multi-lingual Input Prompts View Report, right-click it, and choose **Edit**.

The JasperReport wizard appears.

3. Click **Controls & Resources**. The Controls & Resources page lists these input controls:
    - Country
    - RequestDate
    - OrderID
4. Click the **Country** input control.
5. On the Locate Input Control page, click **Next** to define an input control in the next step.
6. On the Create Input Control page, change the prompt text from `Country` to this expression:

    `$R{BundleCountry}`

    Figure 5-31 shows this expression entered in the prompt text field.



Add Input Control

Create Input Control

First, select the kind of input control you wish to add, then enter the required property values..

Type: Single-select Query

Prompt Text (required):

$R{BundleCountry}

The label is displayed to users next to the input control.

Parameter Name (read-only):

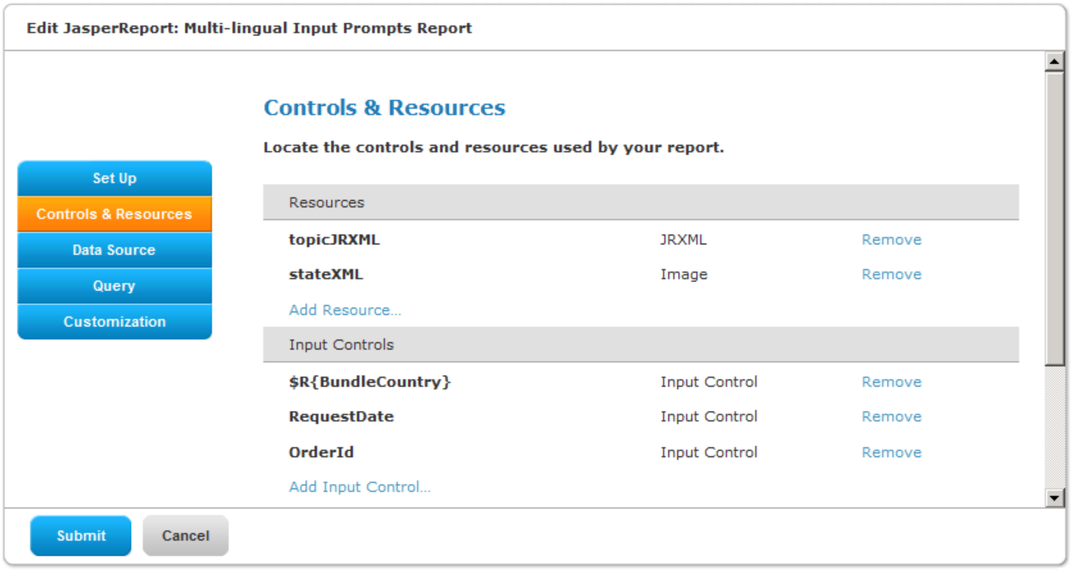
This value must match the name of the parameter in your report.

Description:

Figure 5-31 Entering a $R Expression in the Prompt Text Field

7. Click **Next**.
8. Accept the default settings on subsequent pages by clicking **Next** and **Save:**
    a. On the Locate Query page, click **Next**.
    b. On the Name the Query page, click **Next**.
    c. On the Link a Data Source to the Query page, click **Next**.
    d. On the Define the Query page, click **Save**.
9. On the Set Parameter Values page, click **Submit**.

The Controls & Resources page now shows the `$R{BundleCountry}` expression instead of Country at the top of the list of input controls:



Edit JasperReport: Multi-lingual Input Prompts Report

Controls & Resources

Locate the controls and resources used by your report.

Resources		
topicJRXML	JRXML	Remove
stateXML	Image	Remove
Add Resource...		

Input Controls		
$R{BundleCountry}	Input Control	Remove
RequestDate	Input Control	Remove
OrderId	Input Control	Remove
Add Input Control...		

Figure 5-32 Input Controls Include One Multi-lingual Input Control

10. Change the prompt text of the other input controls in a similar manner:

    a. Repeat step 4 through step 6 to change the RequestDate and OrderID input controls to these expressions:

       RequestDate: `$R{BundleDate}`

       OrderID: `$R{BundleOrder}`

    b. Accept the default settings on subsequent pages of the JasperReport wizard by clicking **Next** and **Save**.

       The Controls & Resources page now shows the `$R` expressions for all three input controls.

To upload the resource bundles:

1. On the **Controls & Resources** page, click **Add Resource**.

   The Locate File Resource page appears.

2. On the Locate File Resource page, select **Upload a Local File.**
3. Click **Browse**, locate the freight.properties file, select the file, and click **Open**.
4. On the Locate File Resource page, click **Next**.

   On the Add a Report Resource page, freight.properties appears as the Selected Resource, indicating that the server automatically detected it as a resource bundle.

5. On the Add a Report Resource page, enter these properties:

   - Name – `freight.properties`
   - Resource ID – `freight.properties`

     Enter the Resource ID field exactly as shown.

   - Description – `Default English resource bundle`

6. Click **Next**. The list of resources on the Controls & Resources page now includes the resource bundle freight.properties.
7. On Controls & Resources, click **Add Resource** again, but this time, upload the French resource bundle:

   a. On the Controls & Resources page, click **Add Resource** again.

   b. Select **Upload a Local File**, click **Browse**, locate the freight_fr.properties file you created, select it, and click **Open**.

   c. In Locate File Resource, click **Next**. The **Add a Report Resource** page appears:

d. Enter the following information:
   - Name – `freight_fr.properties`
   - Resource ID – `freight_fr.properties`
   - Description – `French resource bundle`

8. Click **Next**.

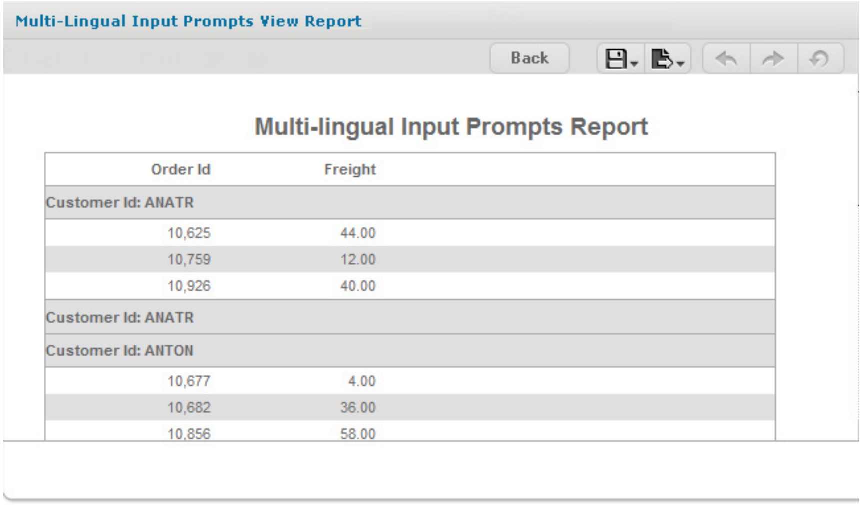
   The Controls & Resources page shows the English and French resource bundles in the resources list.

9. Click **Submit**.

To run the report and use the localized input control:

1. Click **Log Out**.
2. On the Login page, click **Show locale & time zone**.
3. Select the **en_US-English (United States)** locale, and log into the server as an administrator.
4. Run the Multi-lingual Input Prompts Report.

   The report appears in the report viewer:



Multi-lingual Input Prompts Report

Order Id	Freight
Customer Id: ANATR	
10,625	44.00
10,759	12.00
10,926	40.00
Customer Id: ANATR	
Customer Id: ANTON	
10,677	4.00
10,682	36.00
10,856	58.00

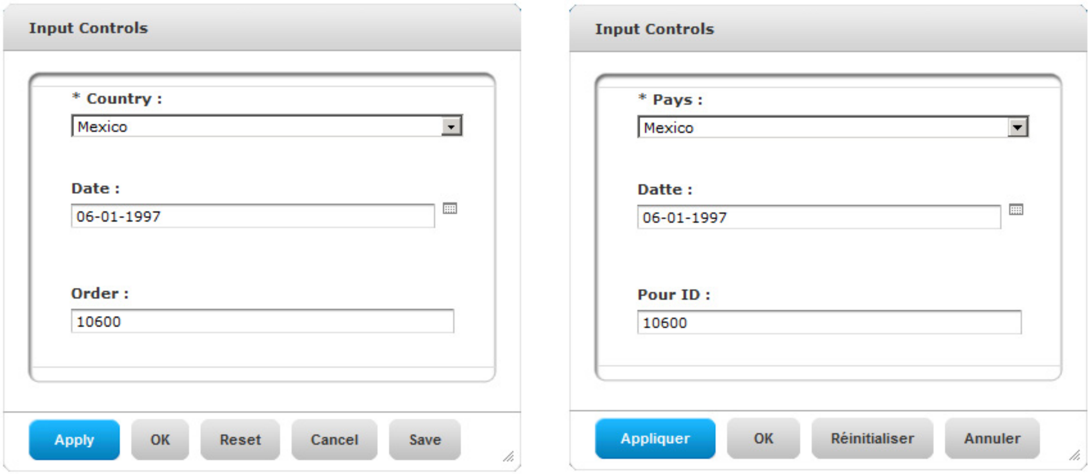
Figure 5-33 Viewing the Report in English

5. Click **Options**.

   The input controls appear with English prompts.

6. Click **Log Out**.
7. On the Login page, click **Show locale & time zone**.
8. Select the **fr - French** locale, and log in as administrator.
9. Run the report again and click Options.

Figure 5-34 shows the input controls that with English and French prompts.



Input Controls

* Country : Mexico

Date : 06-01-1997

Order : 10600

Input Controls

* Pays : Mexico

Datte : 06-01-1997

Pour ID : 10600

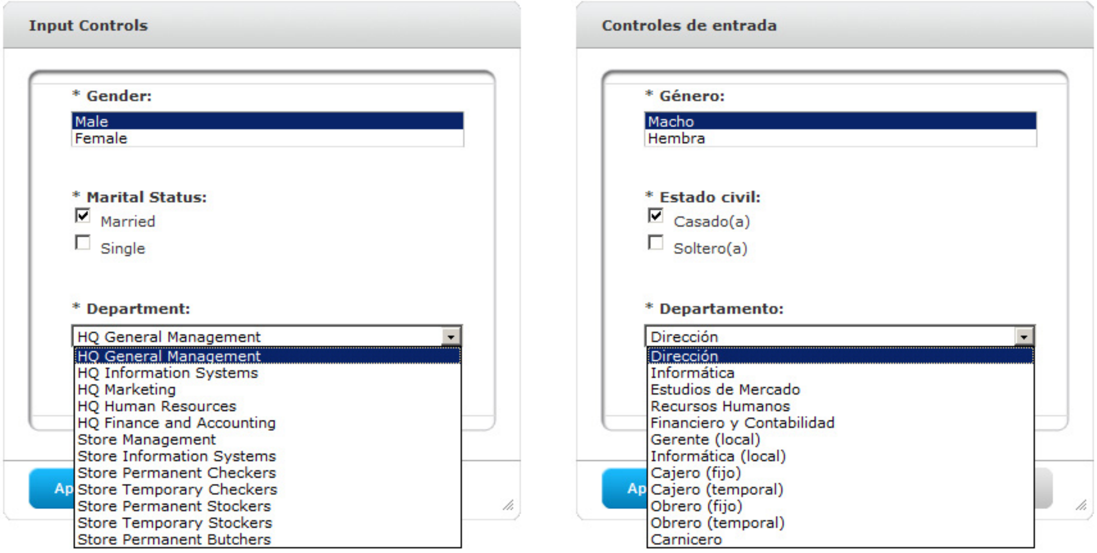
Figure 5-34 Input Control Prompts in English and French

5.6.3 Adding a Multi-Lingual Static List to an Input Control

The server provides linguistic support for the list of values that an input control can present to users. The input controls that can present a list of values are:

- Single-select list of values
- Single-select list of values (radio)
- Multi-select list of values
- Multi-select list of values (check box)

Figure 5-35 shows an example of the multi-lingual Department Report in the Reports/Samples folder (if you installed sample reports during installation). The prompts and the multi-select list of values appear in English or Spanish, depending on the locale you select on the login page.



Input Controls

* Gender:
Male
Female

* Marital Status:
☑ Married
☐ Single

* Department: HQ General Management
HQ General Management
HQ Information Systems
HQ Marketing
HQ Human Resources
HQ Finance and Accounting
Store Management
Store Information Systems
Store Permanent Checkers
Store Temporary Checkers
Store Permanent Stockers
Store Temporary Stockers
Store Permanent Butchers

Controles de entrada

* Género:
Macho
Hembra

* Estado civil:
☑ Casado(a)
☐ Soltero(a)

* Departamento: Dirección
Dirección
Informática
Estudios de Mercado
Recursos Humanos
Financiero y Contabilidad
Gerente (local)
Informática (local)
Cajero (fijo)
Cajero (temporal)
Obrero (fijo)
Obrero (temporal)
Carnicero

Figure 5-35 A Multi-select List of Values in English and Spanish

The next example shows how to localize an input control that presents a single-select list of values. These tasks are explained step-by-step:

- Add a multi-lingual static list of values to a list input control.
- Create a new resource bundle for the French translations.
- Upload the French resource bundle.
- Create a new resource bundle for the English translations.
- Replace the existing English resource bundle with the new one.
- Remove unwanted parameters from the sample report design.
- Run the report that uses a multi-lingual list of values in an input control.

You edit a sample report to localize the list input control. To the list input control, you add a multi-lingual list of values for the US English and French locales.

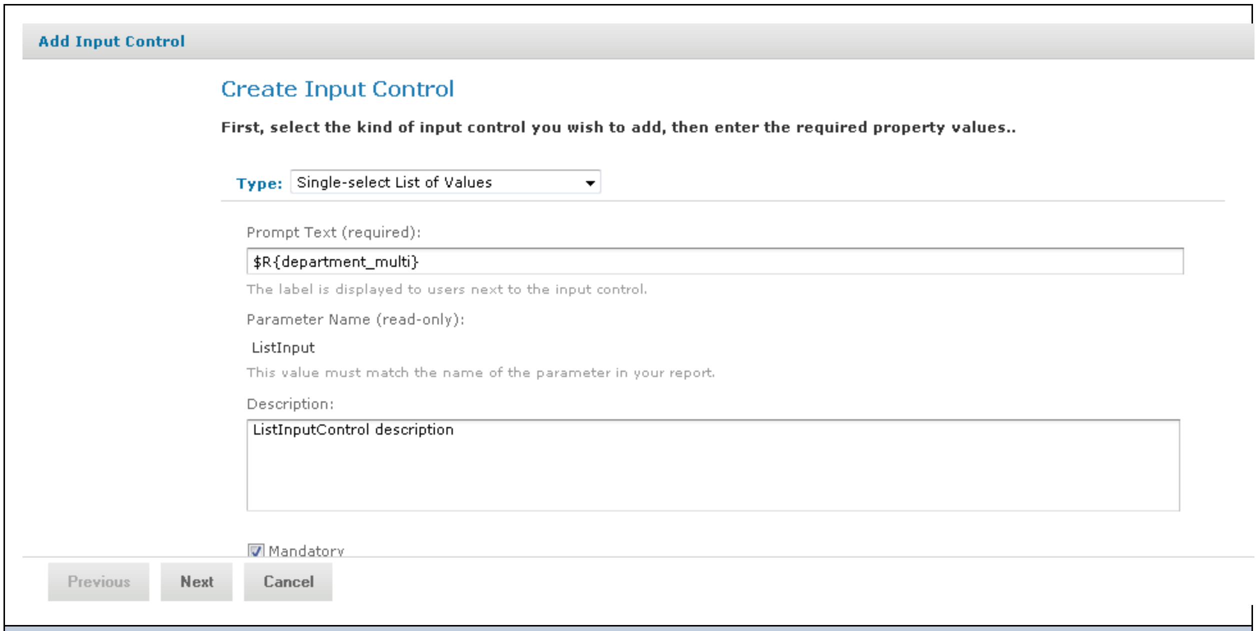
To add a multi-lingual static list of values to a list input control:

1. Log into the server as administrator and add a folder to the repository named Temp.
2. Locate the Sales By Month report in the **Reports > Samples** folder of the repository. Select it and click **Copy**.
3. Navigate to the **Temp** folder and choose **Paste**. The Sales By Month Report appears in the Temp folder.
4. Select the Sales By Month Report and click **Edit**.

   The JasperReport wizard appears.
5. Click **Controls & Resources**.

   The report has five input controls, including a List Input Control, two resource bundles, and other resources, as shown in Figure 5-21 on page 116.
6. Click the **List Input Control** to edit it.
7. In Locate Input Control, click **Next**.
8. On the Create Input Control page, change the prompt text from List Input Control to `$R{department_multi}`.

   Figure 5-36 shows the `$R` expression in the **Prompt Text** field.



Add Input Control

Create Input Control

First, select the kind of input control you wish to add, then enter the required property values..

Type: Single-select List of Values

Prompt Text (required):

$R{department_multi}

The label is displayed to users next to the input control.

Parameter Name (read-only):

ListInput

This value must match the name of the parameter in your report.

Description:

ListInputControl description

☑ Mandatory

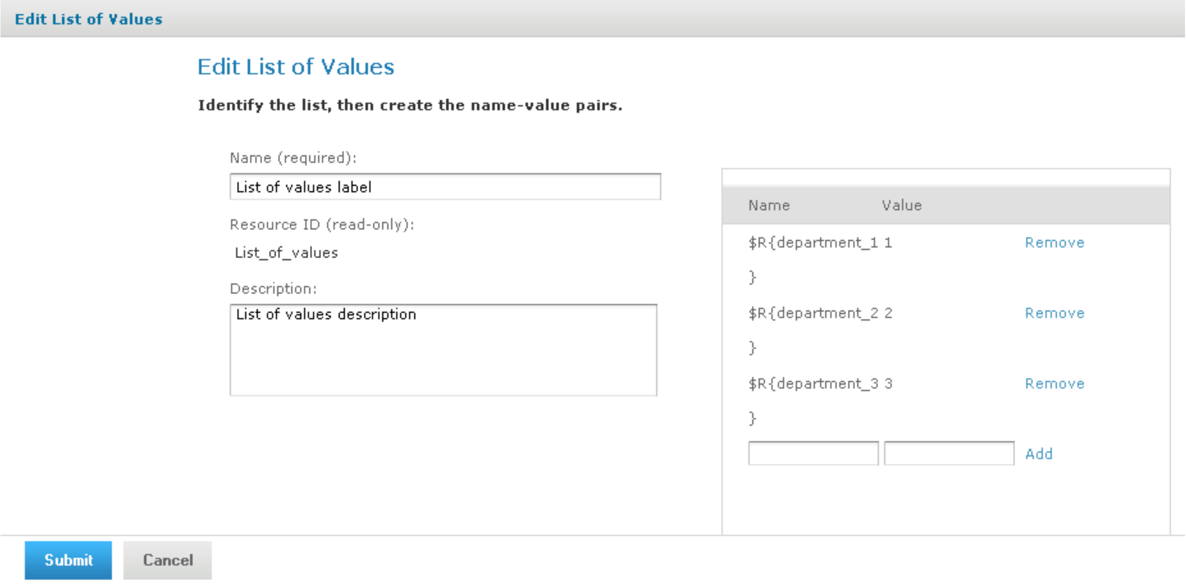
Figure 5-36 A $R Expression in the Prompt Text Field

9. Click **Next**.
10. On the Locate List of Values page, click **Next**. The Edit List of Values page appears.
11. On the Edit List of Values page, click **Remove** to remove each existing name-value pair.

12. Add these name-value pairs:

Name	Value
`$R{department_1}`	1
`$R{department_2}`	2
`$R{department_3}`	3

Figure 5-37 shows the edited list of values containing the `$R` expressions in the name fields.



Edit List of Values

Edit List of Values

Identify the list, then create the name-value pairs.

Name (required): List of values label

Resource ID (read-only): List_of_values

Description: List of values description

Name	Value
$R{department_1 }	1
$R{department_2 }	2
$R{department_3 }	3

Figure 5-37 The Revised List of Values Containing $R Expressions

13. Click **Submit**.

    The Controls & Resources page shows the change to the input control prompt. The expression `$R{department_multi}` replaces List Input Control in the list of input controls.

14. Click **Submit** again to save your work.

To create a new resource bundle for the French translations:

1. In a text editor, create a new file for French translations, and enter these name-value pairs for the input control:

```
department_multi=Choisir le service
department_1 = Travail # 1
department_2 = Travail # 2
department_3 = Travail # 3
```

2. At the bottom of the file, enter these field and property translations to localize the report:

```
title=Rapport de ventes mensuelles
sales.person=Commercial
sales.account=Compte
sales.amount=Montant
param.list=Liste Détaillée
```

Use the Unicode escape sequence if you cannot enter é: \u00e9

3. Save the file as `sales_fr.properties` to your hard drive.

To upload the French resource bundle:

1. Assuming you are still logged into the server, select the Sales By Month report, and click **Edit**.
2. On the Controls & Resources page, click **Add Resource**.
3. Select **Upload a Local File**, click **Browse**, and locate the sales_fr.properties file on your hard drive. Select the file, and click **Open**.
4. In Locate File Resource, click **Next**.

   On the Add a Report Resource page, sales_fr.properties appears as the Selected Resource, indicating that the server automatically detected it as a resource bundle.
5. On the Add a Report Resource page, enter this information:
   - Name – `sales_fr.properties`
   - Resource ID – `sales_fr.properties`

   Enter the Resource ID field exactly as shown.
6. Click **Next**.

   The Controls & Resources page appears.

To create a new resource bundle for the English translations:

1. In a text editor, create a new file for English translations, and enter these input control name-value pairs in the file:

```
department_multi=Select Department
department_1=Work #1
department_2=Work #2
department_3=Work #3
```

2. At the bottom of the file, enter these field and property translations to localize the report:

```
title=Sales By Month Report
sales.person=Sales person
sales.account=Account
sales.amount=Amount
param.list=List item
```

3. Save the file as `sales.properties` to your hard drive.

To replace the old English resource bundle in the repository with the new one:

1. Assuming you are still logged into the server and editing the Sales By Month report, remove the old sales.properties resource bundle:
   a. On the Controls & Resources page, select sales.properties.
   b. Click **Remove**.
2. Click **Add Resource**.
3. On the Locate File Resource page, select **Upload a Local File**, click **Browse**, and locate the new sales.properties file that you created in the previous procedure. Click **Open**.
4. Click **Next**.

   On the Add a Report Resource page, sales.properties appears as the Selected Resource, indicating that the server automatically detected it as a resource bundle.
5. On the Add a Report Resource page, enter this information:
   - Name – `sales.properties`

- Resource ID – `sales.properties`

  Enter the Resource ID field exactly as shown.

6. Click **Next**.
7. On Controls & Resources, click **Submit**.

   At this point, the report does not run because the sales.properties file does not contain name-value pairs for all parameters that the JRXML defines. In the next procedure, you remove these parameters from the report.

To remove unwanted parameters from the sample report design:

This procedure assumes you finished procedures in section **5.6.2, "Adding Multi-lingual Prompts to Input Controls," on page 121** and are still connected to the server from iReport using the JasperReports Server Plug-in. In this procedure, you remove elements in the title band that lists parameter names and settings in the report output header.

1. In the Repository Navigator, expand the Temp and Sales By Month Report folders, then double-click Sales By Month Jasper Report.

   The JRXML report appears in the Designer tab.
2. Ctrl-click to select all elements in the title band except `$R{title}`, `$R{param.list}`, and `$P{ListInput}`.

   Figure 5-38 shows the selected elements in the title band.

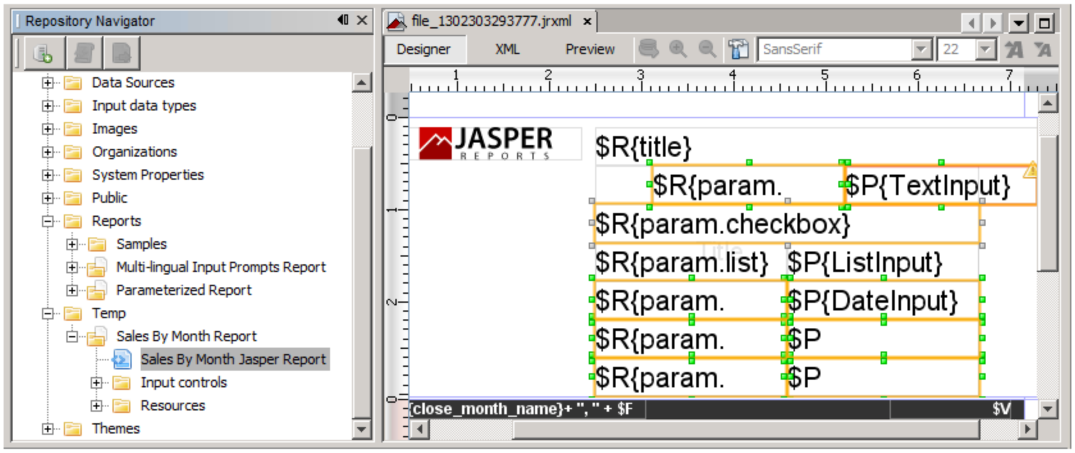


Figure 5-38 Selecting Elements to Remove from the Title Band

3. Right-click an empty area in the Designer tab, and choose Delete. If you have empty elements after the last step, delete them.

Figure 5-39 shows the remaining elements.

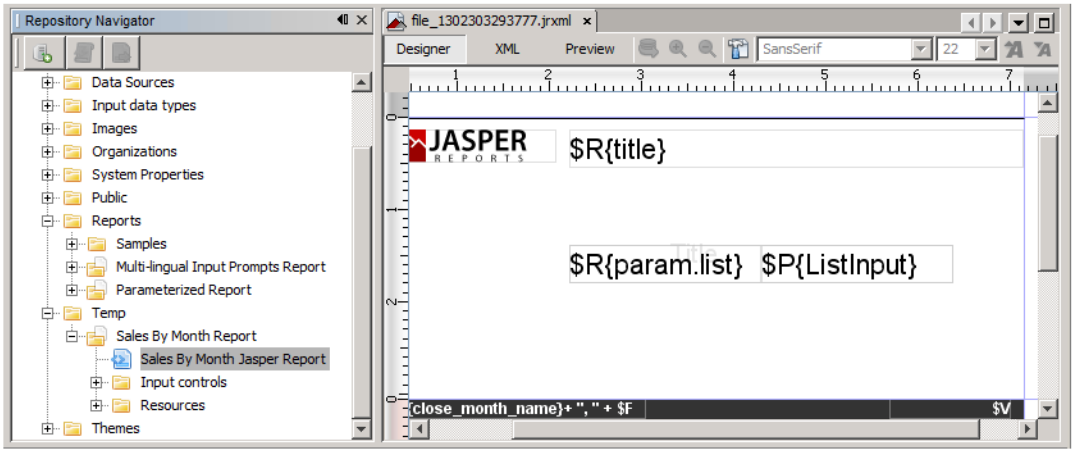


Figure 5-39 Elements Remaining in the Title Band

There's too much white space in the title band.

4. To remove excess white space:

   a. Drag a selection box around the `$R{param.list}` and `$P{ListInput}` elements.

   b. Press the **Arrow** key on the keyboard to move the elements upward.

   c. Drag the bottom margin of the title band upward to reduce its height.

5. Remove the actual parameters from the report:

   a. Choose **Window > Report** Inspector.

   b. In the Report Inspector, expand Parameters, scroll to the bottom of the parameter list, and Ctrl-click to select these parameters:

      - TextInput
      - CheckboxInput
      - DateInput
      - QueryInput
      - LoggedInUser

   c. Right-click the selected parameters and select **Delete**.

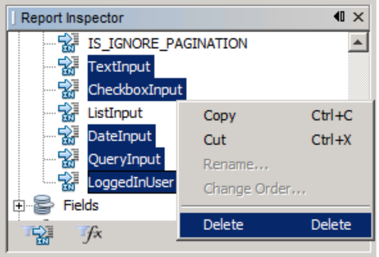


Figure 5-40 Deleting Unwanted Parameters From the JRXML

6. Click **Yes** to confirm that you want to delete the items.
7. From iReport, remove the input control resources from the report unit in the repository.

a. In the Repository Navigator, expand Input Controls in the report unit Sales By Month Report.

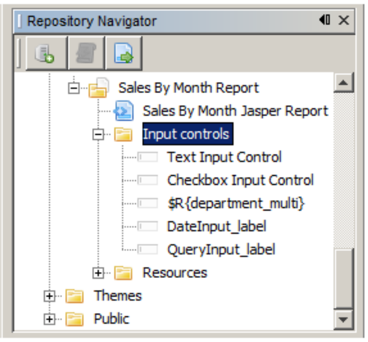


Figure 5-41 Expanding the Input Controls Folder

b. Ctrl-click to select these input control resources:

- Text Input Control
- Checkbox Input Control
- DateInput_label
- QueryInput_label

c. Right-click the selected resources and click **Delete**

Answer **Yes** to each prompt to confirm the deletion of the resource.

8. Right-click the Sales By Month Jasper Report JRXML, and choose **Replace with Current Document**.

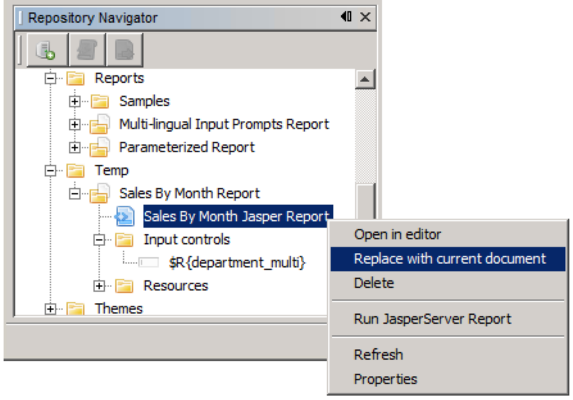
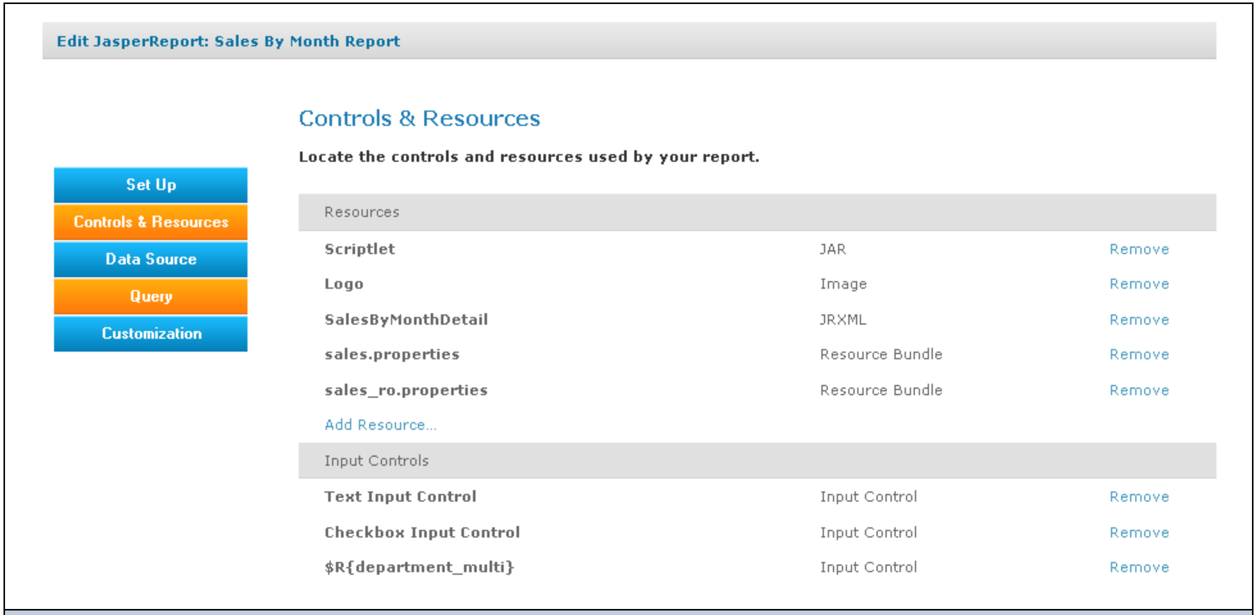


Figure 5-42 Saving the Modified JRXML to the Repository from iReport

9. Click **Yes** when asked if you want to save the file before sending its content to the server.

10. Click **View > Repository**, navigate to the Temp folder, and select the Sales By Month Report. Click **Edit.**

Figure 5-43 shows the JasperReport wizard on the server. Only one input control remains in the report.



Edit JasperReport: Sales By Month Report

Controls & Resources

Locate the controls and resources used by your report.

Resources		
Scriptlet	JAR	Remove
Logo	Image	Remove
SalesByMonthDetail	JRXML	Remove
sales.properties	Resource Bundle	Remove
sales_ro.properties	Resource Bundle	Remove
Add Resource...		

Input Controls		
Text Input Control	Input Control	Remove
Checkbox Input Control	Input Control	Remove
$R{department_multi}	Input Control	Remove

Figure 5-43 Controls & Resources Listing Only One Input Control

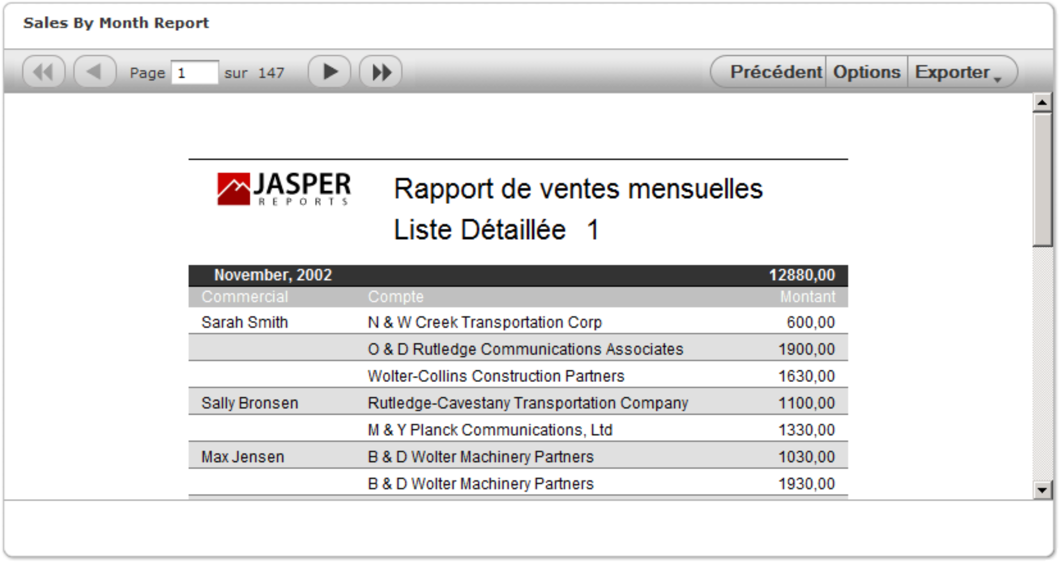
To run the report that uses a multi-lingual list of values:

1. Click LogOut. On the server login page, click **Show locale & time zone**, select the **en_US-English (United States)** locale, and log into the server as an administrator.
2. Navigate to the Temp folder of the repository, and click the name of the Sales By Month Report to run the report.

   The report viewer presents the report using English field and property names in the report.
3. Click **Options**, and select the drop-down.

   The prompt and list of values appear in English, as shown in Figure 5-45 on page 136.
4. Logout, on the server login page, click **Show locale & time zone**, select the **fr_French** locale, and log into the server as an administrator.
5. Navigate to the **Temp** folder of the repository, and click the name of the Sales By Month Report to run the report.

   Figure 5-44 shows the report output: the French report title, field, and property names defined in the resource bundle. The server formats the currency using a comma instead of a decimal point to separate Euro cents from dollars. Translation packs and resource bundles installed with the server for the French locale are used to format currency and dates and to translate web interface components.



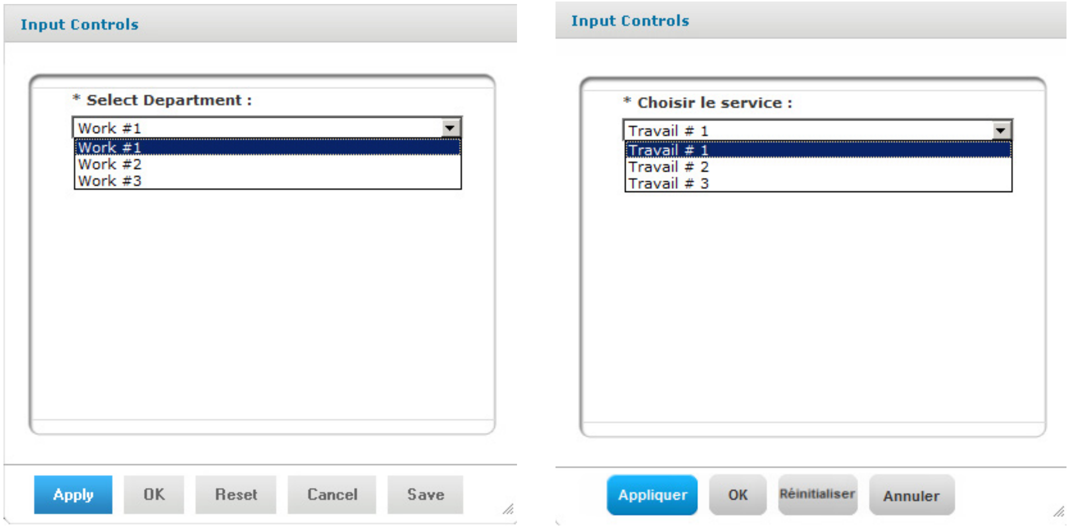
Rapport de ventes mensuelles

Liste Détaillée 1

November, 2002		12880,00
Commercial	Compte	Montant
Sarah Smith	N & W Creek Transportation Corp	600,00
	O & D Rutledge Communications Associates	1900,00
	Wolter-Collins Construction Partners	1630,00
Sally Bronsen	Rutledge-Cavestany Transportation Company	1100,00
	M & Y Planck Communications, Ltd	1330,00
Max Jensen	B & D Wolter Machinery Partners	1030,00
	B & D Wolter Machinery Partners	1930,00

Figure 5-44 Viewing Report Output for the French Locale

6. Click **Options**, and select the drop-down. The input control prompt and static list of values appears in French. Figure 5-45 shows the input control prompt and static list of values in English and in French.



* Select Department :

Work #1
Work #1
Work #2
Work #3

* Choisir le service :

Travail # 1
Travail # 1
Travail # 2
Travail # 3

Figure 5-45 A List of Values in English and French

5.6.4 Reusing Resource Bundles

The location of a resource bundle determines its capability for being reused and conditions under which the server uses it. To resolve a $R expression in a report, the server scans resource bundles at two levels in the order described in this table.

Order	Level	Description
1	Report/ Repository	A report-level bundle declares the resource bundle base name in the header of its JRXML file. The Romanian resource bundle is a report-level bundle. A repository-level bundle is independent of any specific report and can be linked to multiple reports, as described in section **8.5, "Locale Bundles," on page 211**).
2	Server	A server-wide bundle typically contains server messages and labels of user interface components, as described in the *JasperReports Server Administrator Guide*. This bundle typically resides in the WEB-INF/bundles directory of the server.

First, the server searches the report/repository level and stops scanning resource bundles if it finds a resolution to the $R expression. If the server does not find a resolution, it scans the server level for the resource ID of the field and uses this ID.

5.6.5 Using Default Fonts in JasperReports Server

By default, the server uses three fonts you can use in reports:

- DejaVu Sans
- DejaVu Serif
- DejaVu Sans Mono

Using the DejaVu fonts shipped with the server ensures availability of fonts in all environments; the PDF is pixel-perfect every time.

The DejaVu fonts replace the Java logical fonts used in previous versions of the server:

- SansSerif
- Serif
- Monospaced

SansSerif, Serif, Monospaced can still be used, but are deprecated because these Java logical fonts map to different TTF files in different environments, and run the risk of text being cut when exported to PDF due to font metric mismatches. Also, these Java logical fonts aren't recognized by some browsers, resulting in font substitutions. For example, Firefox in a Windows environment renders the SansSerif logical font as Serif.

When using the DejaVu fonts coming from JasperReports font extensions, you don't need to set any other font attributes (such as the `pdfXXX` attributes) in the JRXML or specify font mapping. The font extension file that makes these fonts available sets font attributes and mapping.

For more information about DejaVu, refer to its SourceForge project at:

http://dejavu-fonts.org/wiki/index.php?title=Main_Page.

When you upload a TrueType font to the repository, the file name must include the correct extension (.TTF).

Chapter 6 Creating Domains

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don’t see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

A Domain is a metadata layer that provides a business view of the data accessed through a data source. A Domain presents the data in business terms appropriate to your audience, and can limit the access to data based on the security permissions of the person running the report. A Domain defined in JasperReports Server can be used to create reports, Ad Hoc reports, and Domain Topics.

This chapter covers the process of creating a Domain and defining its contents. For instructions about creating Domain Topics and reports based on Domains in the Ad Hoc Editor, see section **4.8, “Creating a View from a Domain,” on page 86**. Domains defined in the server can be accessed through iReport Designer as well, as described in section **7.7, “Using the Domain Plug-in,” on page 179**.

This chapter contains the following sections:

- **Introduction to Domains**
- **Example of Creating a Domain**
- **Using the Add New Domain Page**
- **Using the Domain Designer**
- **Editing a Domain**

6.1 Introduction to Domains

Production databases typically contain data in tables that are optimized for storage and retrieval. Columns with data relevant to users need to be joined across several tables, filtered by business needs, secured against unauthorized access, and labeled using user-friendly names. In relational databases, a view can perform some of these functions. In the server, a Domain performs all these functions and more, such as the localization of report text and permissions based on data values.

A Domain is a virtual view, created and stored in the server without modifying the data source. Through a Domain, users see columns that have been joined, filtered, and labeled for their business needs. Security policies limit the data values users can access through a Domain. Administrators define Domains, and users create reports based on Domains using either the Ad Hoc Editor or iReport.

Typically, database administrators or business analysts create Domains for end users who understand the structure of the raw data in the database. In the default server installation, those who create Domains must have organization admin privileges.

Domains, like Topics, are used in the Ad Hoc Editor as a basis for designing reports. Users can save a report based on a Domain for others to run, and can also save the settings in a Domain Topic so others can design similar reports.

Using a Domain instead of a Topic has the following advantages:

- Domains can be created directly through the server user interface.
- Domain creators can write SQL queries, joins, filter expressions, and security files to specify exactly what data can be accessed, as well as labels and locale bundles to specify how the data appears.
- When designing a report based on a Domain, the server can optimize database access to allow editing of reports that access huge datasets.
- A Domain design typically includes data filtering, but users who create reports using the Domain can filter data even further. Users can select a subset of columns to appear in the Ad Hoc Editor and give them custom labels. Users can filter the data for each column.
- Users who create reports can design prompts for input from report readers to filter data that appears in the document.

For more information, see section **4.8, "Creating a View from a Domain," on page 86** and section **4.9.2, "Creating Topics from Domains," on page 91**.

6.1.1 Domain Use Cases

Typically, you base the decision to use Domains, Domain Topics, or saved reports on the complexity of the data and your business needs. Consider the following use cases:

- Case 1 – Domains and Domain Topics can be designed to give users great freedom in designing reports plus the security features that prevent unauthorized access to data.
- Case 2 – Administrators can create very targeted Domains and Domain Topics, then use repository access permissions to make sure users cannot modify them.

In the first case, a Domain could contain dozens of tables in several unjoined sets, perform very little filtering but define a strong data-level security policy. Users of the Domain might see only a single set of tables according to their security permissions. They could then perform their own filtering, relabel columns for their own needs, and save their settings as a Domain Topic for future reuse in Ad Hoc reports. In this case, there might be only one Domain within the organization but many Domain Topics that users have created for specific needs.

In the second case, Domains can be used to perform complex joins, have formulae for calculating new columns, filter data, and select a small set of columns for specific users or specific types of reports. Perhaps reports also need to be internationalized, so the administrator creates the corresponding locale bundles. In this scenario, there might be many specific Domains, and each would have corresponding locale bundles and a single Domain Topic. Users would have a wide variety of Domain Topics to choose from, each for a specific purpose, but no opportunity to access the Domains to perform their own filtering.

The preceding examples illustrate two extreme cases, but there are many scenarios that combine some degree of both. The number of users in your production environment and their level of proficiency also determine your general use cases. A small number of users who understand their database might be given administrator privileges to define complex Domains as an extension of the Ad Hoc report design process. On the other hand, with large numbers of users or with users who have limited database skills, administrators want to create Domains that help the users meet their business goals.

The table in section **4.9.2, "Creating Topics from Domains," on page 91** describes individual use cases for Domains, Domain Topics, and reports based on Domains.

6.1.2 Terminology

This chapter refers to both columns and fields. Conventionally, database tables are composed of columns, and the columns divide each row or record into fields. Some Domain operations refer to columns, others to fields, however the two terms refer to the same concept from different perspectives. For example, a calculated field refers to a field that is computed from the other field values in the same row or record. But the effect of a calculated field in every row is to create a new calculated column. Similarly, operations such as joins and filters operate on designated field values in a row, but they are defined by the columns that determine the fields involved.

Within a Domain, columns are called items. Because an item may originate from derived tables or calculated fields, it may not correspond to a single column in the database.

Measures are columns or fields that display numeric values or aggregate values in reports. Measures are the quantitative values of a record, such as an amount, as opposed to qualitative values such as name or location. Having a field designated as a measure determines where the item can be placed in the report. For example, measures appear summarized in the center of crosstabs, whereas only non-measures, simply called fields, can be used as row and column groups of the crosstab. In Domains, all items based on numeric fields are designated as measures by default, but you can set them manually as well. By marking items as measures, Domains help report creators find and use the data they need in the Ad Hoc Editor.

6.1.3 Components of a Domain

A Domain is saved as an object in the repository. Like other repository objects, it has a name, optional description, and folder location specified at creation time. A Domain references the following components:

- A JDBC or JNDI data source whose tables and columns are presented through the Domain. Data sources are selected from previously defined data sources in the repository.
- The Domain design that specifies tables and columns in data source, queries for derived tables, joins between tables, calculated fields, and labels to display the columns.
- Optional locale bundles consisting of localized property files that present labels and descriptions in other languages.
- Optional security file that defines row and column-level access privileges based on users or roles.

The Domain design is either created using the Domain Designer or uploaded from an external XML file. Locale bundles and security files are uploaded from external files. The following sections describe the various dialogs for selecting, creating, or uploading the components of a Domain.

6.1.4 Sample Domains

The following sample Domains are provided in **Organization > Domains** in the default installation:

- Simple Domain – Demonstrates basic features of Domains
  - Based on the SugarCRM JNDI sample data source
  - Includes a design file that you can export, as described in section **8.1, “The Domain Design File,” on page 185**
  - Used to create Simple Domain Topic in the **Organization > Ad Hoc Components > Topics** folder, as described in section **4.9.2, “Creating Topics from Domains,” on page 91**
  - Shows how a report creator can see the items in a Domain through a Domain Topic
- SuperMart Domain – Demonstrates advanced features of Domains
  - Based on the Foodmart sample data source
  - Represents a complex Domain with many tables and joins
  - Includes a design file that you can export, as described in section **8.1, “The Domain Design File,” on page 185**
  - Includes the Domain security file and locale bundles that you can download and inspect, as described in section **8.1, “The Domain Design File,” on page 185**

You can use the samples to practice designing and using Domains and to see complex reports based on Domains:

6.1.5 Overview of Creating a Domain

In practice, you should plan Domain features before you begin the creation process. Decide on the data source and define it in the server repository. Know the elements of your design: tables and columns to choose, joins to perform, filters to define, sets you need, and item properties to expose to users. Determine whether the users of the Domain need localized resources, such as translated labels and local formats. Finally, determine a security policy for the data retrieved through the Domain.

To launch the Domain Designer:

1. As an administrative user, select **Add Resource > Domain** in the repository to open the Add New Domain page of the Domain Designer.

2. Enter a name and optional description for the Domain.
3. Under Data Source, browse to locate a data source.
4. Optionally define localization bundles or data-level security on the Add New Domain page of the Domain Designer.
5. Click Create with Domain Designer to launch the Domain Designer.

The next section includes a detailed example of creating a Domain.

6.2 Example of Creating a Domain

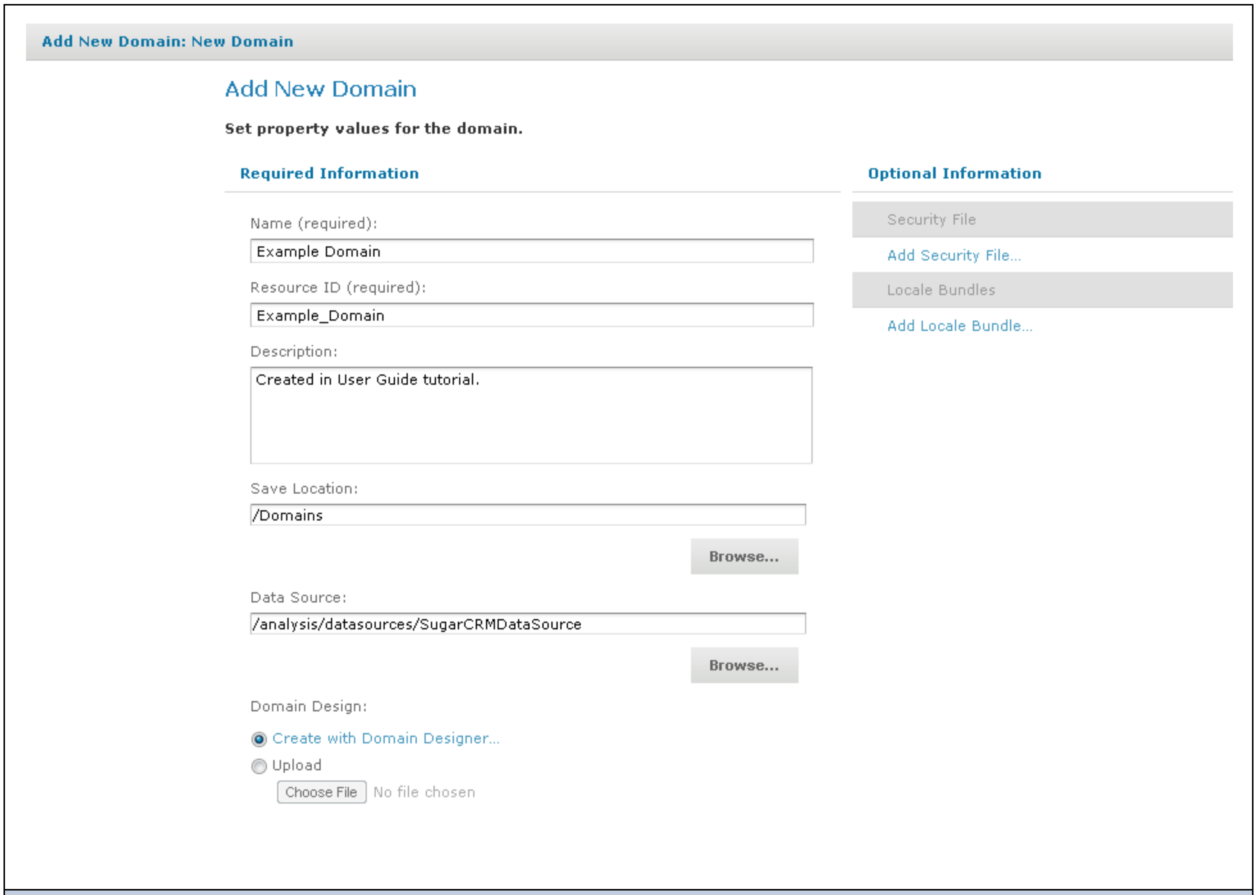
The following example shows how to create a Domain. For complete information about all of the options and settings available for designing reports, see section **6.3, "Using the Add New Domain Page," on page 150** and section **6.4, "Using the Domain Designer," on page 151**.

To create a sample Domain:

1. Log in to JasperReports Server as an administrator and select **Create > Domain.**

   Alternatively, you can select **View > Repository**, then right-click a folder, such as /Domains, and select **Add Resource > Domain** from the context menu.

   The Add New Domain page appears:



Add New Domain: New Domain

Add New Domain

Set property values for the domain.

Required Information

Name (required): Example Domain

Resource ID (required): Example_Domain

Description: Created in User Guide tutorial.

Save Location: /Domains

Data Source: /analysis/datasources/SugarCRMDataSource

Domain Design:

● Create with Domain Designer...

○ Upload

No file chosen

Optional Information

Figure 6-1 Add New Domain Page

2. In Name, enter a name for the Domain and an optional description. In this example:
   - Name – `Example Domain`
   - Description – `Created in User Guide tutorial`
3. In Resource ID, accept the automatically entered ID or enter an ID. No space characters are allowed.

4. In Save Location, click **Browse**, and browse to the Domains folder.
5. Under Data Source, click **Browse**. The Select Data Source dialog box appears.
6. Select **Analysis Components > Analysis Data Sources > SugarCRM Data Source**, and then click **Select**:

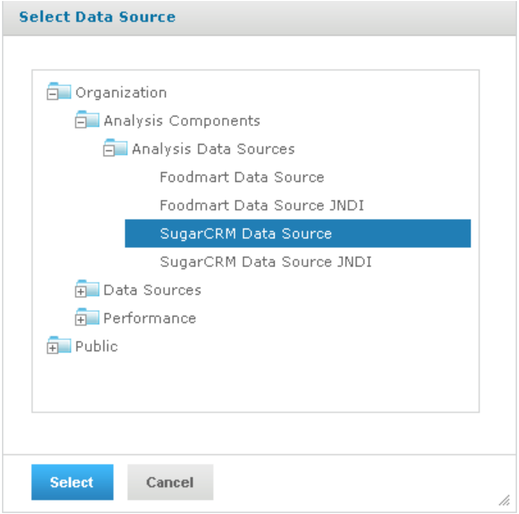


Figure 6-2 Select a Data Source for a New Domain

The path to the data source appears on the Add New Domain page.

7. Under Domain Design, click **Create with Domain Designer**.
8. For data sources that allow schemas (subdivisions of a database), you are prompted to select a schema. The PostgreSQL database that is bundled in the evaluation version supports schemas, so you must select the public schema, as shown in the following figure:

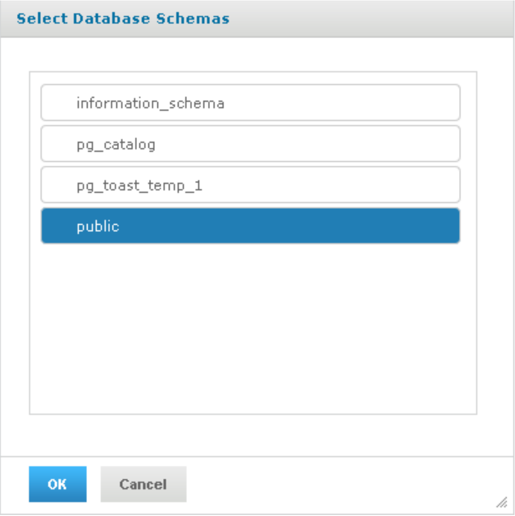


Figure 6-3 Select a Data Source for a New Domain

9. Click **OK** in the Select Database Schemas dialog if necessary.

   The Domain Designer appears. The **Tables** tab shows the database tables in the data source. You can expand each table to see its individual columns.

In databases that support schemas (subdivisions of a database), tables names are prefixes by <schemaName>_ to distinguish tables that may have the same name in separate schemas. This procedure is based on the sample data in a PostgreSQL database, and therefore it uses table names with the public_ prefix.

10. Double-click the following tables in **Data Source** to add them to **Selected Tables**:

    `public_accounts`, `public_accounts_opportunities`,
    `public_cases`, `public_opportunities`, `public_users`

    Because this example uses the Sugar CRM data source, ignore the check box **Inspect new tables and automatically generate joins**.

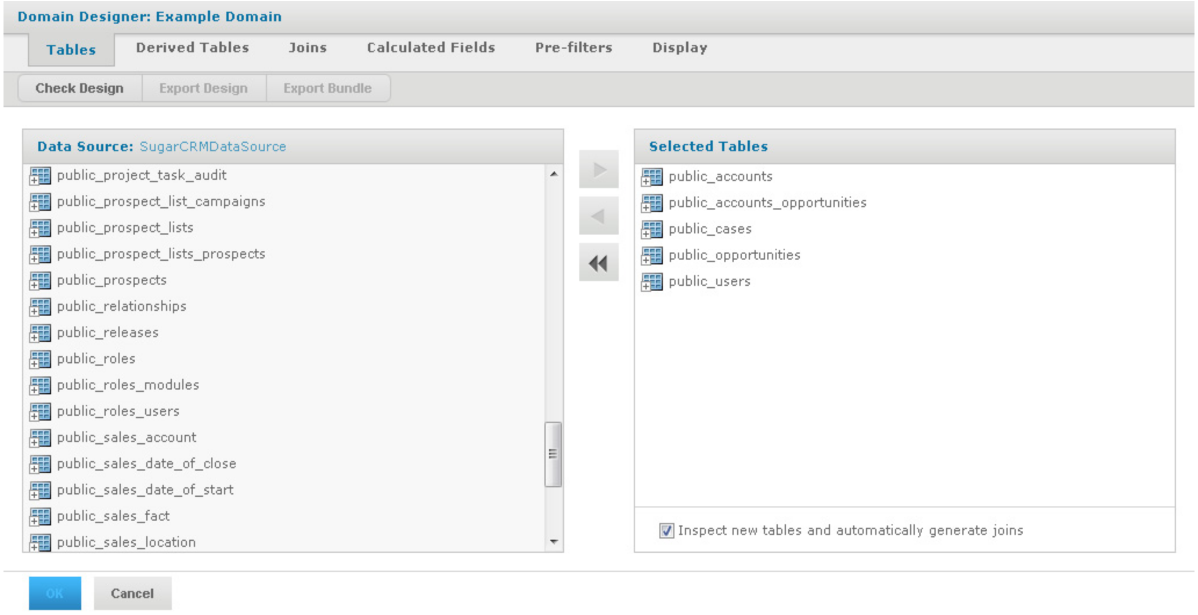


Figure 6-4 Tables Tab of the Domain Designer

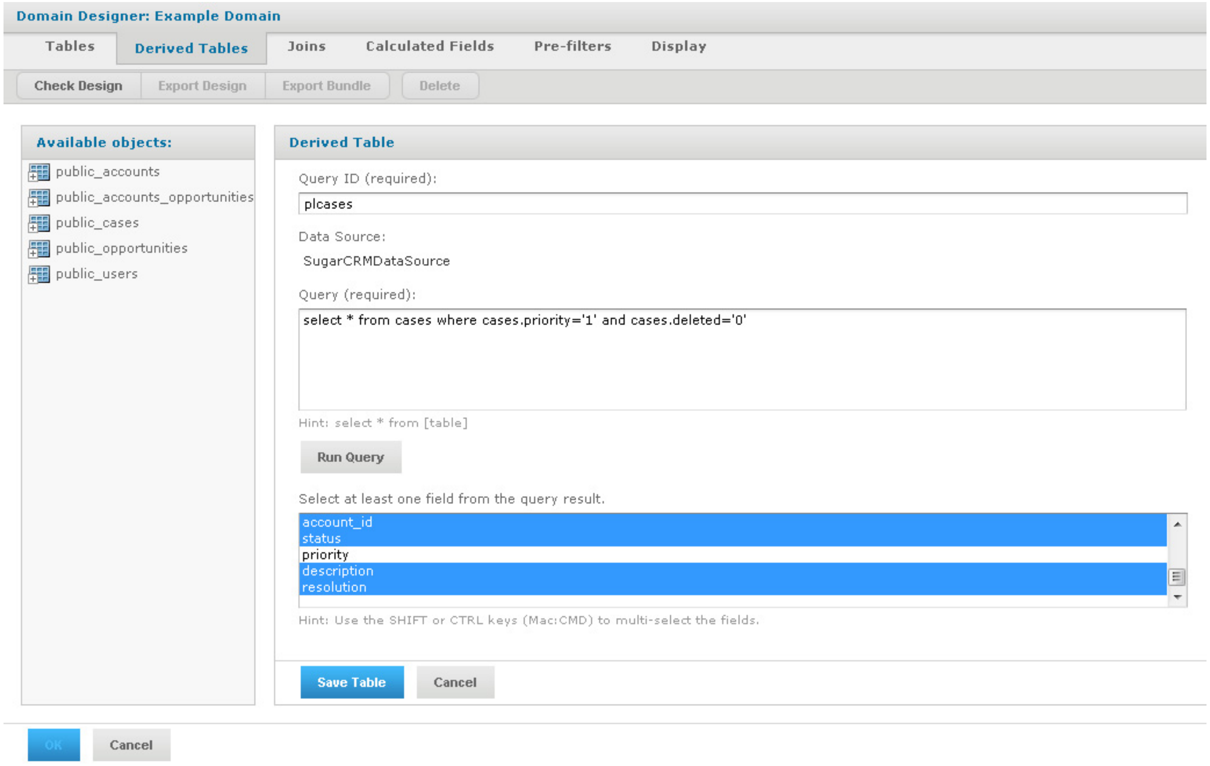
11. Click the **Derived Tables** tab. A derived table is defined by a query and a selection of the columns in the result.
12. Create a derived table:
    a. Enter a meaningful name in the **Query ID** field, in this example: `p1cases`.
    b. Type the following query:

    ```
    select * from cases where cases.priority='1' and cases.deleted='0'
    ```

    c. Click **Run Query**.
    d. Using Ctrl-click, select the following fields from the query result:

    ```
    account_id            date_entered        name
    assigned_user_id      description         resolution
    case_number           id                  status
    ```

    The Derived Tables tab appears as shown in the following figure:



Query ID (required):
plcases

Data Source:
SugarCRMDataSource

Query (required):
select * from cases where cases.priority='1' and cases.deleted='0'

Hint: select * from [table]

Select at least one field from the query result.

account_id
status
priority
description
resolution

Hint: Use the SHIFT or CTRL keys (Mac:CMD) to multi-select the fields.

Figure 6-5 Derived Tables Tab of the Domain Designer

e. Click **Save Table**. The new derived table, p1cases, appears in the list of available objects.

13. Click the **Joins** tab. The tables selected on the Tables tab and defined on the Derived Tables tab appear in **Left Table** and **Right Table**.

14. In the left table, select the `users` table and click **Copy** to create the `users1` table. Select the same `users` table, click **Change ID**, and rename the `users` table to `users2`.

    Now, there are two table aliases for the users table to avoid circular joins:

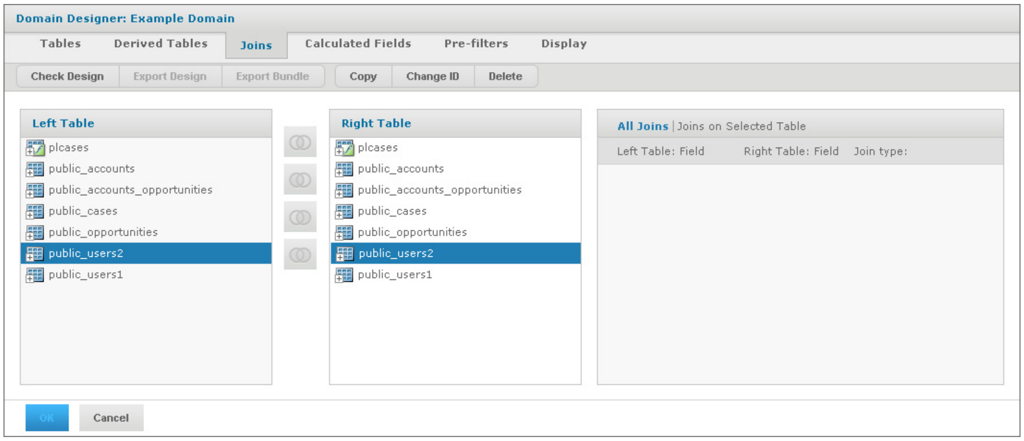


Figure 6-6 Joins Tab of the Domain Designer

15. To specify a join, expand the tables to see column names, select a column in the left table and a column in the right table, then click a join icon. For this example, specify the following joins:

Left Table and Column	Right Table and Column	Join Type
public_accounts: id	public_accounts_opportunities: account_id	Inner
public_accounts_opportunities: opportunity_id	public_opportunities: id	Inner
public_opportunities: assigned_user_id	public_users1: id	Inner
public_accounts: id	P1cases: account_id	Left Outer
public_users2: id	P1cases: assigned_user_id	Right Outer

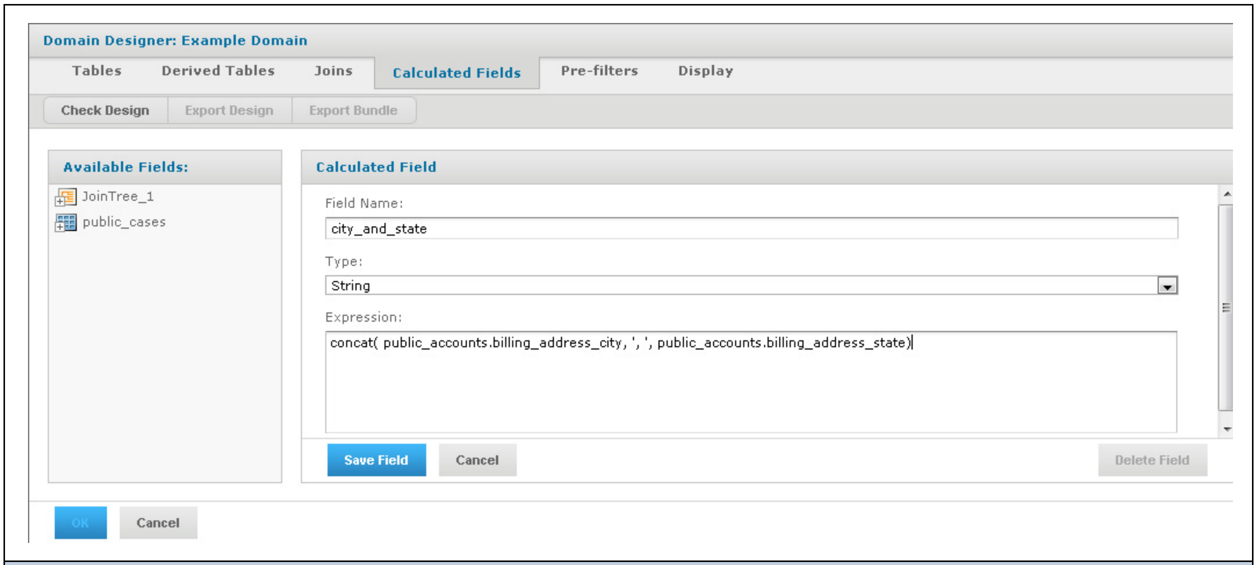
Each row returned by an inner join contains data from all tables involved in the join. Outer joins return rows that satisfy the join condition plus rows from either the left or right table for which no corresponding rows exist in the other table. In this example, the result of the left outer join includes accounts without P1 cases. The result of the right outer join includes P1 cases without assigned users.

16. Click the **Calculated Fields** tab.

The Available Fields panel shows join trees, which are the joined tables resulting from any joins you defined, and any unjoined tables, such as the `cases` table in this example. The `cases` table was used only to help create the `p1cases` derived table, but itself was not joined to the other tables, as shown in **Figure 6-7**.

17. Enter the following details for a calculated field that creates unambiguous city names:
    - Field Name – `city_and_state`
    - Type – `String`
    - Expression – `concat( public_accounts.billing_address_city, ', ', public_accounts.billing_address_state)`

When entering the expression, you can expand the join tree and double-click column names to insert them instead of typing them.



Field Name: city_and_state

Type: String

Expression: concat(public_accounts.billing_address_city, ', ', public_accounts.billing_address_state)

Figure 6-7 Calculated Fields Tab of the Domain Designer

18. Click **Save Field** to validate the expression and add the calculated field to **Available Fields**.
19. Click the **Pre-filters** tab.

    The Fields and Filters panels appear.
20. Define two filters as follows:

    a. In Fields, expand the join tree and the `opportunities` table.

    b. Double-click the `opportunity_type` column to create a filter condition.

    c. Use **Equals** as the comparison operator, and select **Existing Business** from the drop-down.

    d. Click **OK** to create the filter.

    e. Create another filter by expanding the `p1cases` table and double-clicking the `status` column.

    If you select the wrong column, click **Cancel**.

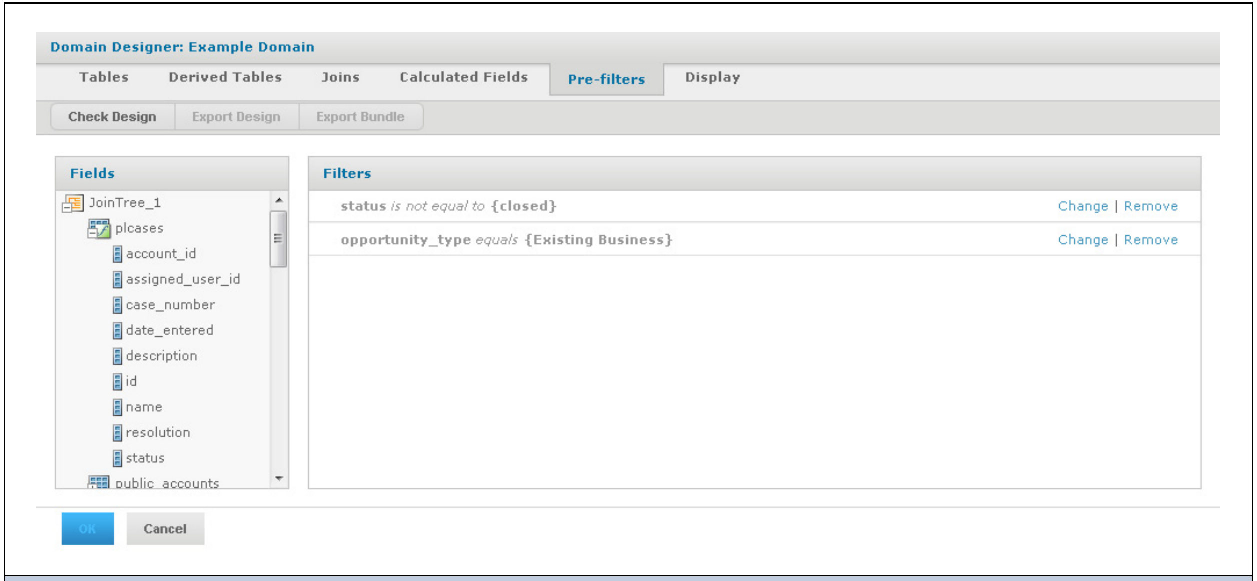
    f. Choose the `is not equal to` comparison operator.

    g. Enter the value `closed` in the search field, but do not click the search icon.

    When the selection list in the Filters pane does not contain the value you want to use, type it in the search field.

    h. Click **OK** to save the filter.

The filters you defined appear in the Filters panel:

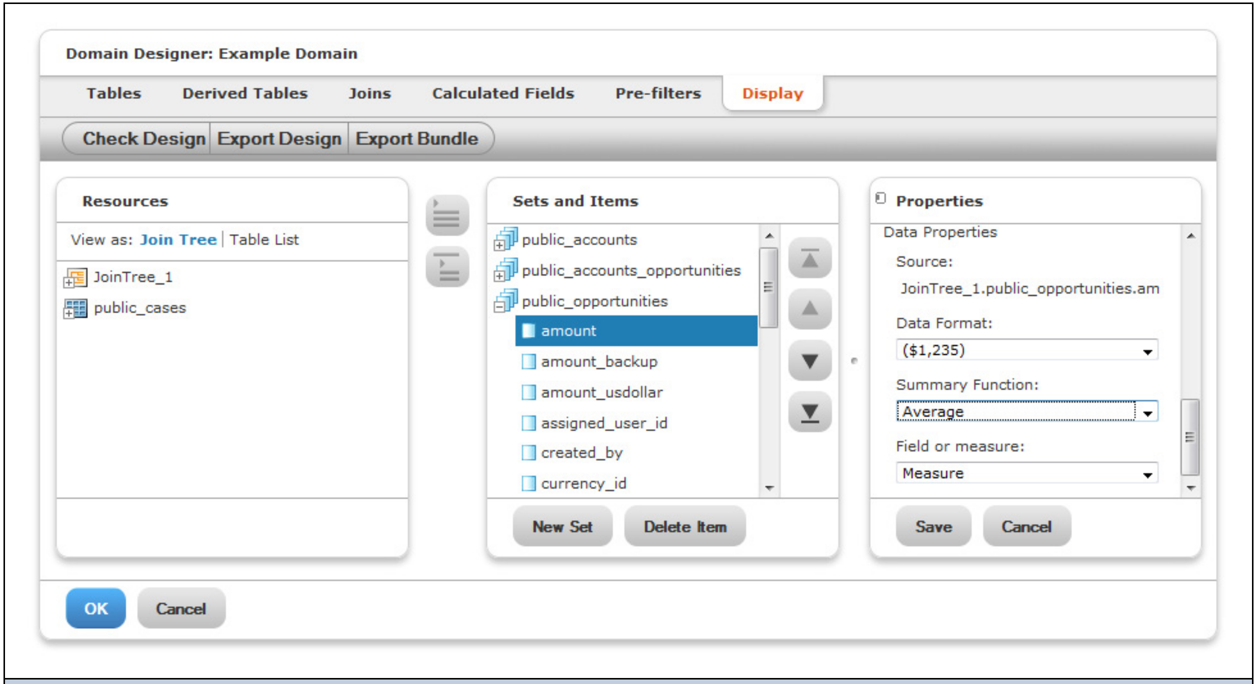


status *is not equal to* {closed}

opportunity_type *equals* {Existing Business}

Figure 6-8 Pre-filters Tab of the Domain Designer

21. Click the **Display** tab. On this tab, you define how you want your fields to appear to users.



Source:
JoinTree_1.public_opportunities.am

Data Format:
($1,235)

Summary Function:
Average

Field or measure:
Measure

Figure 6-9 Display Tab of the Domain Designer

22. Create a hierarchy of sets and items from the tables and columns in JoinTree_1:

    a. Select JoinTree_1.

    b. Click ≡ to add all of the JoinTree_1 tables and columns to **Sets and Items**.

23. In the Properties panel, rename the sets and items to give them descriptions specified in the following table.

The properties in the following table are meant to be realistic but do not represent an actual business case.

(Set ID) Set Label Set Description	Item ID	Item Label	Item Description
(accounts) Account Customer account information	name1	Customer	Name of customer
	account_type	Type	Account type
	industry	Industry	Primary industry
	annual_revenue	Revenue Size	Estimated annual revenue
	employees	Employee Size	Estimated number of employees
	city_and_state	City, State	City and state of headquarters
(users1) Account Rep Primary account representative	first_name	First Name	Given name
	last_name	Last Name	Surname or family name
(opportunities) Opportunity Sales opportunity	date_entered2	Date	Date opportunity opened
	amount	Amount	Anticipated amount of the contract
	probability	Probability	Estimated chance of winning the contract
	description2	Description	Description of the opportunity
	lead_source	Source	Lead source
	sales_stage	Stage	Sales stage
(p1cases) P1 Case High priority support cases	case_number	Case	Case number
	date_entered	Date	Date case opened
	name	Summary	Name or summary of the case
	description	Description	Detailed description of the case
	resolution	Resolution	Description of the case resolution
	status	Status	Current status of the case
(users2) Case Rep Support case representative or engineer	first_name1	First Name	Given name
	last_name1	Last Name	Surname or family name

24. Set the data format and summary properties for the following items:

   - Opportunity, Date: data format of Jun 28, 2012
   - Opportunity, Amount: data format of ($1,235) and summary of average
   - P1 Case, Date: data format of Jun 28, 2012

   When used in reports, these items will have the data formats and summary functions defined here as defaults.

   You can also set the Field or Measure setting on any item. By default, numeric fields are selected to be measures, but you may need to change this setting occasionally. For example, a numeric value that you use as an identifier should be set to Field, and a textual ID that you want to use for counting should be set to Measure (and the summary function set to Count or Count Distinct).

25. Click **OK** to finish creating this Domain.

   The Add New Domain page appears again.

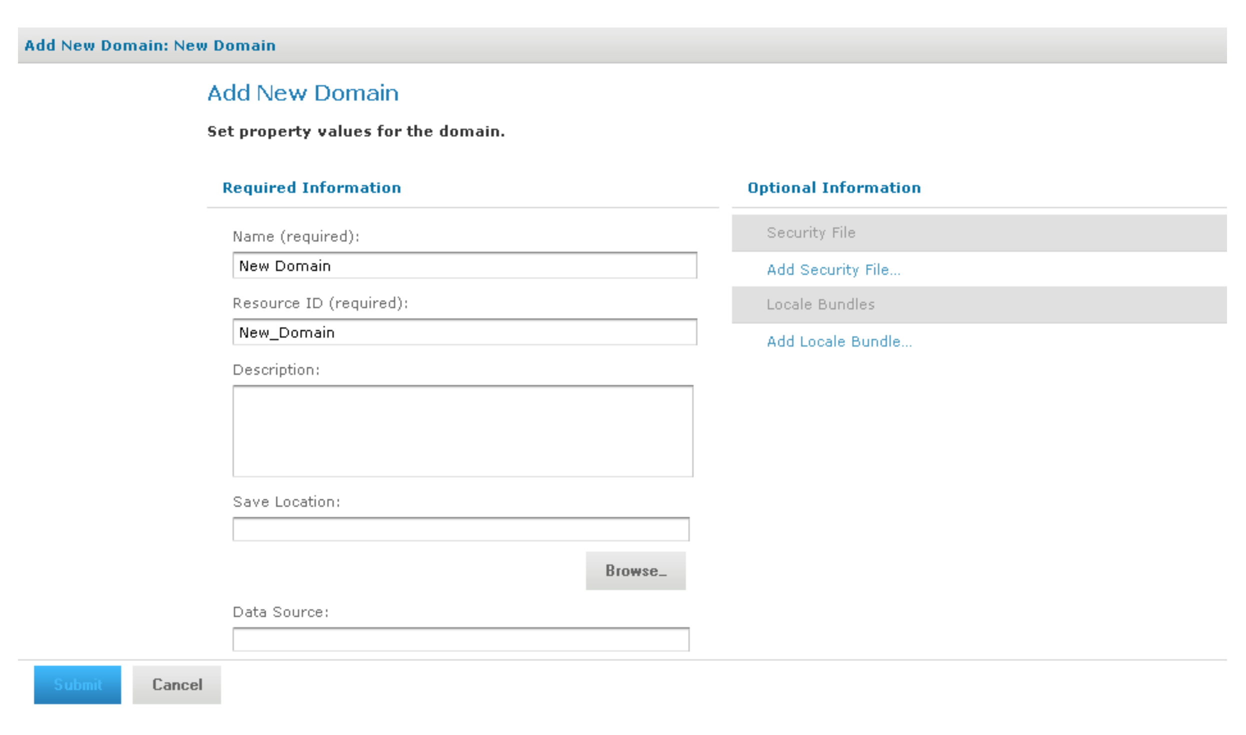
Under Domain Schema, you can click Edit with Domain Designer to launch the Domain Designer again to edit it.

26. Click **Submit** in the Add New Domain page.

    The new Domain is validated and stored in the location you specified in **step 4**. The new Domain appears in search results when you search the repository for it.

6.3 Using the Add New Domain Page

The Add New Domain page appears when you click **Create > Domain** or when you right-click a repository folder and choose **Add Resource > Domain**. From the Add New Domain page, you set up basic properties of the Domain, such as its name and data source, and then launch the Domain Designer.



Add New Domain: New Domain

Add New Domain

Set property values for the domain.

Required Information

Name (required): New Domain

Resource ID (required): New_Domain

Description:

Save Location:

Data Source:

Optional Information

Security File

Add Security File...

Locale Bundles

Add Locale Bundle...

Figure 6-10 Add New Domain Page

On the Add New Domain page, you specify the following components of the Domain:

- Name – Specify the name for the Domain that users will see in the repository.
- Resource ID – Accept the automatically entered resource ID or enter a new one. No spaces allowed.
- Description – Specify the description that appears in the repository and in the Ad Hoc Editor when users create a report using the Domain. Optional, but recommended.
- Save Location – Browse to the repository folder where you want to save the Domain.

> The server locates Domains by their repository object type, not by their location. The default location is the last folder selected in the repository.

- Data Source – Browse the repository to choose a data source from the list of data sources in your organization.
  - Use only data sources that are in the repository and for which the user has at least read permission.
  - Domains must use either JDBC or JNDI data sources.
  - You can use the sample JDBC and JNDI data sources in **Organization > Data Sources** and **Organization > Analysis Components > Analysis Data Sources** if you installed the sample data.
- Domain Design – Create the design using the Domain Designer console or upload a schema outside the repository.

Upload a schema if you have a data source, such as an Oracle RDBMS, that supports schemas. Browse to locate a schema from the available schemas in the data source. All the tables in the schemas you choose appear in the Data Source panel on the Tables tab. For more information, see section **8.1, "The Domain Design File," on page 185**.

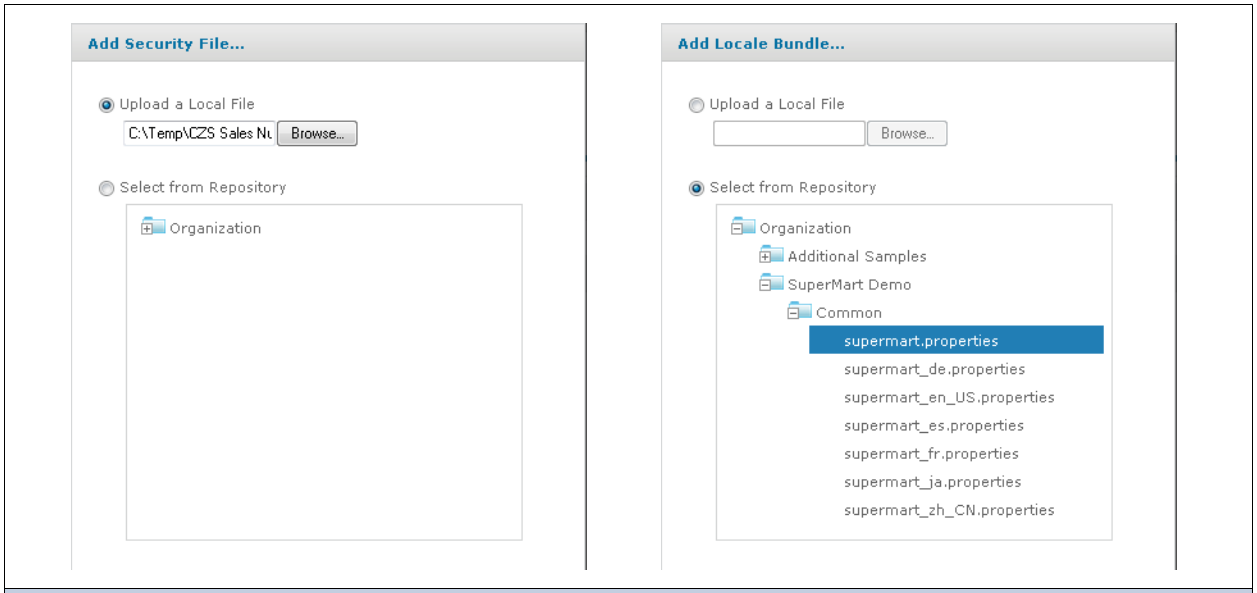
- Optional Information – Specify a security file and one or more locale bundles.

Before you can submit and save a Domain to the repository, you must specify a display name, resource ID, save location, data source, and Domain design.

- The **Cancel** button exits the Add New Domain page. For new Domains, no Domain is created; when modifying an existing Domain, it remains unchanged.
- The **Submit** button validates and saves the Domain components. For more information, see section **6.4, "Using the Domain Designer," on page 151**. The location for Domains in the sample data is the **Organization > Domains** folder, but you may use any location.

6.3.1 Add Security File and Add Locale Bundle Options

The **Add New Domain** page includes options to upload security and locale bundle files for the Domain. You can add, replace, or remove any previously uploaded files for the Domain:



Add Security File...

● Upload a Local File
C:\Temp\CZS Sales Nu Browse...
○ Select from Repository
Organization

Add Locale Bundle...

○ Upload a Local File
Browse...
● Select from Repository
Organization
Additional Samples
SuperMart Demo
Common
supermart.properties
supermart_de.properties
supermart_en_US.properties
supermart_es.properties
supermart_fr.properties
supermart_ja.properties
supermart_zh_CN.properties

Figure 6-11 Resources Page of the Add New Domain Dialog

Adding security and local bundle files is documented in section **8.3, "Security and Locale Information for a Domain," on page 202**.

6.4 Using the Domain Designer

You use the Domain Designer to define all the components of a Domain. From the bottom of the Add New Domain or Edit Domain pages, click **Create in Domain Designer** or **Edit in Domain Designer**, respectively to open the Domain Designer console. Along the top of the Domain Designer console are tabs for configuring various aspects of the design:

- Tables tab – Select all tables whose columns you want to use in the Domain, either directly or indirectly.
- Derived Tables tab – Enter queries whose results appear as derived tables available in the Domain.
- Joins tab – Define inner and outer joins between all the tables and derived tables.
- Calculated Fields tab – Enter expressions whose results appear as calculated fields.
- Pre-filters tab – Specify conditions on field values to limit the data accessed through the Domain.
- Display tab – Organize the visual aspects of the Domain and change the display properties of tables, columns, sets, and items exposed to Domain users.

From the Tables tab, you can navigate to any other tab. To navigate between tabs, click the tab name at the top of the Domain Designer. Before you can save the design, you must choose which sets and items to expose to users of the Domain. The **OK** button on the console validates the design and saves it in the location you specified earlier. For more information, see section **6.4.10, "Domain Validation," on page 161**. After saving a Domain, you can modify it using the Domain Designer.

The **Cancel** button on the console exits the Domain Designer without saving any of the design settings. For new Domains, no design is saved; when modifying an existing design, it remains unchanged.

6.4.1 Tables Tab

The Tables tab contains two panels:

- Data Source – Shows the tables and columns in the data source or schema you chose in the Add New Domain page.
- Selected Tables – Shows all tables and columns that you use to design the Domain. Initially, this panel is blank.

Typically, you move the following tables from Data Source to Selected Tables:

- Tables that need to be joined
- Tables that you want to reference in the Domain design, even if their columns do not appear directly in the Domain.

  For example, select the tables containing columns that you want to use in a derived table or calculated field.

An understanding of the logical design of tables in the data source is critical to selecting which tables need to be joined.

To select tables for use in designing the Domain, first expand the table icons beside the table names to inspect the columns of a table. Double-click or drag a table name in the **Data Source** panel to move it to the **Selected Tables** panel. Alternatively, use ▶ or ◀ to move a table from one panel to the other.

On the Tables tab, you can select only entire tables for the Domain. On the Display tab, you can make column-level selections.

To remove a table, double-click or drag it out of Selected Tables. You can also click ◀◀ to clear Selected Tables.

The **Inspect new tables and automatically generate joins** check box at the bottom of Selected Tables creates joins only if the database has been configured with referential constraints (foreign keys). Otherwise, selecting it has no effect.

If applicable, the generated joins appear on the Join tab.

The Tables tab does not detect changes to the database tables and columns in real-time. To update a Domain after making changes to the database structure, click **OK** to close the Domain Designer, then launch it again.

Keep the following points in mind regarding Domain updates:

- New tables and columns appear in the Data Source panel; new columns appear under their table name.
- To add a new column to the Domain, move its table to Selected Tables.

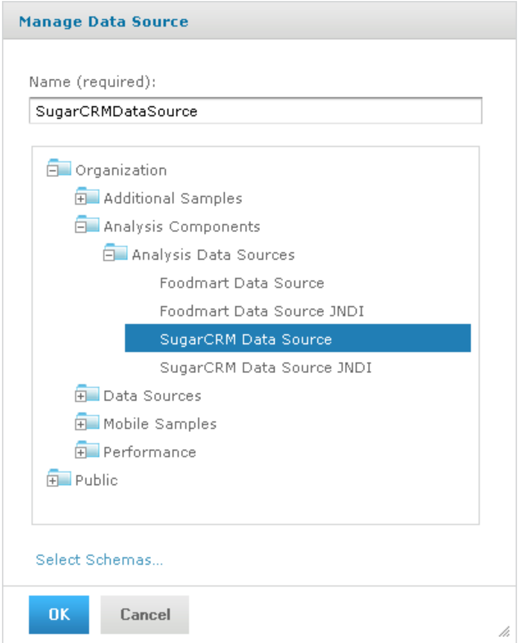
  The Tables tab works only with entire tables.
- From Selected Tables, respond affirmatively to the prompt to remove tables and columns deleted from the database.

  The Domain Designer removes those columns or tables from the Tables tab.

If you had selected the dropped columns for display, you must manually remove them from the Display tab, otherwise the Domain issues a validation error. For information about removing columns that were displayed through the Domain, see section **6.5.1, "Maintaining Referential Integrity," on page 163**.

6.4.2 Manage Data Source Dialog Box

The name of the data source that you choose for the Domain appears at the top of the **Data Source** panel on the Tables tab. Click the name of the data source to make changes to it. The **Manage Data Source** dialog box appears:



Name (required): SugarCRMDataSource

Figure 6-12 Manage Data Source Dialog Box of the Tables Tab

As shown in this figure, the default name for a data source is the display name of its repository object. You can edit the name by typing a new one. Usually, this is not necessary because Domain users do not see the name of the data source. However, if you select a new data source for the Domain, the name in the design does not change automatically. In this situation, you typically change the name in the design to match the new data source.

If the database changes servers, you need to create a new data source object and use it to replace the previous one in the Domain. To change the data source, select a new one, and click **OK** to apply the changes.

When you change the data source, previous settings in the Domain Designer that do not conform to the new data source are lost without prompting.

If the database supports schemas, such as PostgreSQL or Oracle RDBMS, click **Select Schemas** at the bottom of the Manage Data Source dialog box to choose among available schemas in the data source. The tables in the schemas that you choose appear in the Data Sources panel.

The Data Source panel shows columns that have a supported type listed on page 190. If the data source has special datatypes such as CLOB or NVARCHAR2, or if you access synonyms on an Oracle database, you need to configure the server to recognize them. See the configuration chapter in the *JasperReports Server Administrator Guide*.

6.4.3 Derived Tables Tab

You create a derived table in a Domain by first building a custom query using the objects you selected on the Tables tab. Because Domains are based on JDBC and JNDI data sources, you write the query in SQL. You run the query, and then select columns from the query result for use in the Domain design.

The clauses in a query determine the structure and contents of the table returned by the query. For example, the WHERE clause may contain conditions that determine the rows of the derived table.

To define a derived table:

1. Type a name for the table in the **Query ID** field.
2. Enter a valid SQL query in **Query**. The query may refer to any table or column in **Available objects**. Only queries that begin with the `select` statement are allowed. Do *not* include a closing semi-colon (`;`).

   Expand the tables in **Available objects**. Double-click column names to add them to the query.

3. When the query is complete, click **Run Query** to test it and choose the list of columns in the result.
4. By default, all columns in the result are selected. Use Ctrl-click to change the selection. If you want only a few columns out of many, it is easier to specify the column names in the `SELECT` clause of the query.
5. Click **Save Table** to add the derived table to **Available objects**. A distinctive icon, identifies it as a derived table.

6.4.4 Joins Tab

Joins create associations between tables so that their rows may be presented together in the same report. Multiple joins associate columns across many tables to create powerful data visualizations when used in reports. The number of tables and joins in the Domain depends on your business needs, as described in section **6.1.1, "Domain Use Cases," on page 140**. The server supports the four most common join types, all based on equality between values in each column.

To join tables for the Domain, use the Joins tab. On the Joins tab, the list of selected and derived tables is duplicated in the **Left Table** and **Right Table** panels. Expand tables in both panels, select a column in each table having the same logical meaning and compatible formats, then click a join icon:

Join Inner – The result contains only rows where the values in the chosen columns are equal. In the support case example in section **6.2, "Example of Creating a Domain," on page 142**, the result of an inner join contains only support cases that have been assigned to a support engineer.

Join Left Outer – The result contains all the rows of the **Left Table**, paired with a row of the **Right Table** when the values in the chosen columns are equal or contain blanks. If the support cases are in the Left Table of the example, the result of a left outer join contains all support cases even if they do not have an assigned engineer.

Join Right Outer – The result contains all the rows of the Right Table, paired with a row of the Left Table when the values in the chosen columns are equal or contain blanks. If the users are in the Right Table of the example, the result of a right outer join contains all the users and the support cases assigned to each engineer, if there are any. In this example, a user might also appear several times if different support cases refer to the same support engineer user ID.

Full Outer Join – The result contains all rows from both tables, paired when the joined columns are equal, and filled with blanks otherwise.

The new join appears in **All Joins | Joins on Selected Table** panel.

In order to create a join between two tables, each table must have a column with the same meaning. For example, a table with data for support cases has a column for the assigned engineer user ID that can be joined with the table of user data that has a user ID column.

In some cases, you may need to duplicate a table in order to join it several times without creating a circular join, or in order to join it to itself. You can also duplicate a table so it may be joined with different tables for different uses. Click the following icons above the Right Table to make a copy, change the name, or delete a table:

- **Copy** – Copies the selected table and gives it a name with sequential numbering. The copy appears in both Left Table and Right Table.

- **Change ID** – Changes the name of the selected table. The new name becomes the ID of the table throughout the Domain, and is updated everywhere it appears in the Domain Designer.
- **Delete** – Removes the table from both lists. If the deleted table was the only instance of a table, removing it on the Joins tab also removes it from the list of selected tables on the Tables tab.

You use the **All Joins | Joins on Selected Table** panel to see the defined joins, to remove a join, and to change the join type:

- **All Joins** – Lists all joins defined for the Domain.
- **Joins on Selected Table** – Lists only joins defined on the table you select, simplifying the view you have of many joins.
- **Join Type** – Changes the type of join.
- **Remove** – Removes the selected join definition from the list of joins and from the Domain design.

After creating joins, one or more join trees appear on the **Calculated**, **Pre-Filters** and **Display** tabs. For example, if you join tables A and B, B and C, then join tables D and E, the result is two join trees. Columns of table A and table C may appear in the same report because their tables belong to the same join tree. Tables A and D are said to be unjoined; their columns may not be compared or appear in the same report. Tables that are not joined appear individually along with the join trees.

6.4.5 Calculated Fields Tab

You create a calculated field for the Domain by writing an expression that computes a value based on the data in another column or columns. In order for the value to be coherent, all columns that appear in the expression for a calculated field must be from the same join tree.

To create a calculated field:

1. Select the Calculated Fields tab to begin defining a new calculated field.
2. In **Field Name**, enter a short name for the calculated field. This name becomes the ID of the field in the Domain.

   Later you can give the field a more meaningful label and full description.

3. In **Type**, select a datatype for the calculated field. The expression you write must return a value of this type.

   Generally, this datatype matches the datatype of the columns in the expression. Therefore, you need to be familiar with the datatypes of columns in the data source.

4. Enter an expression to compute the value of the calculated field.

   Write expressions using the Domain Expression Language, fully described in section **8.2, “The DomEL Syntax,” on page 198**.

   To insert a reference to the value of another column:

   a. Expand the join-tree to find its table and double-click the column name.

      The column name appears in the expression at the cursor, qualified by its table name.

      Calculated fields may be used to compute other calculated fields.

   b. Double-click the calculated field name to insert a reference to it into an expression.

      Do not insert a column reference from unjoined trees because the Domain Designer does not validate expressions as they are written.

5. Click **Save Field** to save the new calculated field. To clear the calculated field editor without saving, click **Cancel**.

After saving the calculated field, the Domain Designer validates the expression and warns you of any errors at this time. If there are errors, use the indications of the error message to help correct the expression. After validation, a calculated field appears in the table or join tree whose columns are used in the expression.

Calculated fields have a distinctive icon, , for easy recognition in **Available Fields**.

An expression that does not use any columns has a constant value. For example, you might create an integer field named Count that has the value 1 and later has a default summary function to count all occurrences. Constant fields are independent of join trees and automatically appear in a set called Constants.

To view, edit, or delete the definition of a calculated field:

1. Cancel any input in the calculated field editor, then click the name of the field in Available Fields.
2. Modify its name, its type, or its expression.
3. Click **OK** to save the new definition, or click Cancel if you just viewed the field definition.

   Click **Delete Field** to remove the calculated field from the Domain design.

6.4.6 Pre-filters Tab

A filter on one or more columns reduces data that is not needed or wanted in reports based on the Domain. For example, financial reports for the current fiscal year may need data from the previous fiscal year for comparison, but nothing earlier. It is always good practice to filter out irrelevant data to reduce the size of query results and processing time within the server.

Also, reports based directly on the Domain can define their own filters. Putting often-used filters in the Domain design avoids the need for each user to define filters independently and also reduces the chance for errors.

You can define a filter on a column that you do not plan to expose in the Domain. The filter remains active and only data that satisfies all defined filters appears to report users. For example, you can filter data to select a single country, in which case it doesn’t make sense for the column to appear in a report. However, you should clearly document such data restrictions in the description of the Domain, so that users understand what data is accessible through the Domain.

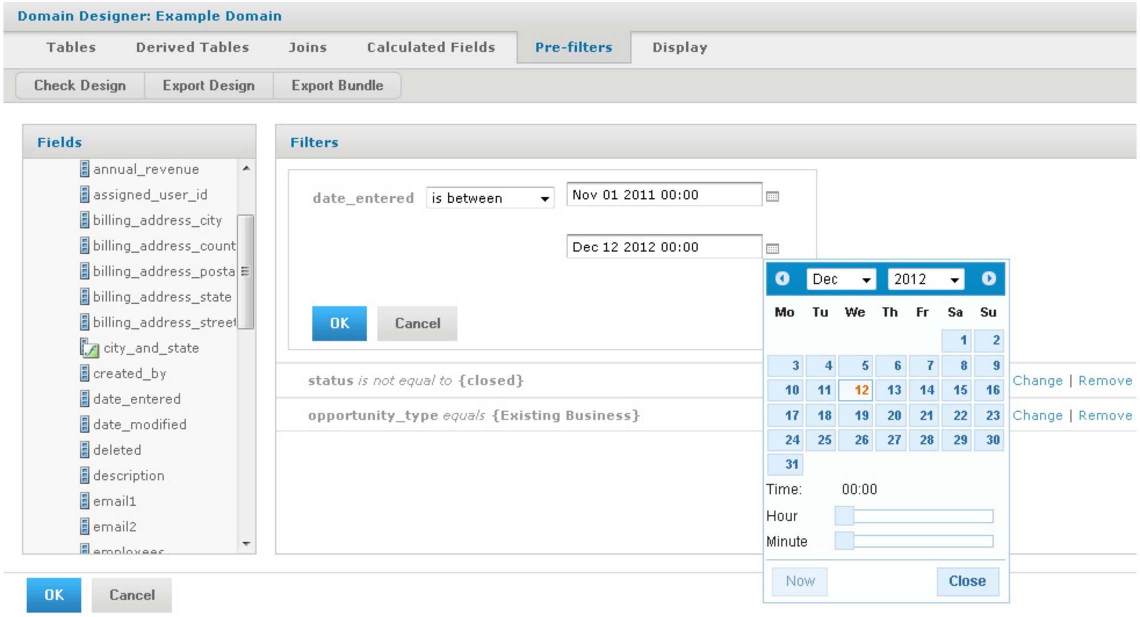
To define a filter:

1. Double-click a column in **Fields**.

   Alternatively, you can drag a column to the Filters panel. The column appears in the **Filters** panel with a list of conditional operators you can apply to that column.
2. Choose the comparison operator and filter value from the drop-down.

   In the Filters panel, the choice of comparison operators depends on the datatype of the column. For example, string types offer a choice of string search operators and date types offer time comparison operators. The filter value depends on the datatype and the comparison operator.

For example, if you select a date column with the `is between` operator, the Filters panel displays two calendar icons for specifying a date range:



date_entered is between Nov 01 2011 00:00 – Dec 12 2012 00:00

status *is not equal to* {closed}

opportunity_type *equals* {Existing Business}

Figure 6-13 Filters Panel of the Domain Designer

Text columns have both substring comparison operators such as `starts with` or `contains` and whole string matching such as `equals` or `is one of`. When you select a whole string matching operator, the panel displays a list of all existing values for the chosen column, retrieved in real-time from the database. If there are more than 50 values to display, use the search controls to the left and click 🔍 to narrow the list of available values. For multiple value matching, double-click the available values to select them. You may perform multiple searches and select values from each list of results.

> To define a filter that compares two columns of the same datatype, Ctrl-click to select the second column, and drag the columns to the Filters panel. This action is possible only when two columns of the same type are selected.

3. Click **OK** to define the filter. To clear the condition editor without saving a filter, click **Cancel**.

   Filters shows all the filters you have defined. The overall filter applied to the data is the logical AND of all conditions you defined.

In Filters, click **Change** to modify a filter you defined. Click **OK** to save the changes. After selecting a row, you can click the **Remove** button to remove it from the list.

6.4.7 Display Tab

On the Display tab, you specify which columns and calculated fields to expose through the Domain and how they appear. Typically, you select only columns that are useful in building or filtering reports, and omit other columns for simplicity. You also can modify display properties, such as the label and description of tables and sets and items for each specified column. Using meaningful labels and descriptions to help users of the Domain.

The Display tab contains three panels:

- **Resources** – Lists tables or join trees, depending on the view you choose.
- **Sets and Items** – Lists resources that appear to report creators who use the Domain.
- **Properties** – Displays and modifies properties of selected sets and item.

In the **Resources** panel you can view resources as either a **Join Tree** or a **Table List**:

- Join Tree – Displays joined, unjoined, and calculated tables for this Domain. Joined tables appear as join trees.

- Table List – Displays the selected and calculated tables for this Domain.

In the Table List view, you can use the **Delete Table** button to remove the selected table from the **Resources** panel and from the Domain design. The table no longer appears on the Joins tab, and any joins to the table are deleted. Use carefully.

To specify which columns and calculated fields are exposed to users of the Domain, you move resources from the **Resources** panel to the **Sets and Items** panel:

- Set – A group of items independent of the tables in which the columns originate.
- Item – A column or calculated field, along with its display properties, that you want to appear in the Domain.

All items in a set correspond to columns in a join tree. Sets and items appear to report creators who use the Domain. Sets are optional. You can create a list of items outside of any sets. If you want to display only a few of the columns from the join tree, first create a new set in Sets and Items. Next, add items from the join tree in Resources.

To move a resource to Sets and Items, you can drag it from Resources and drop it in Sets and Items, or you can use one of the following buttons:

☰ **Add to Sets** – Select a resource in Resources and click this icon to add it to Sets and Items. Tables are added as sets, and columns are added as items outside of any set.

☰ **Add to Selected Set** – Select a destination set in Sets and Items, select a resource in Resources, and click this icon. Tables are added to Sets and Items as subsets, and columns are added as items within the destination set. You can also expand sets in Sets and Items and drag tables and columns from Resources to the destination set.

To create new sets or delete items, use the **New Set** and **Delete** buttons:

New Set – Creates a new set or subset in Sets and Items. If a set is not selected, clicking New Set creates a top-level set; otherwise, clicking New Set creates a subset.

Delete – Removes the selected set or item from Sets and Items. You can also double-click the object or drag and drop it in a blank area of Resources. Items removed from Sets and Items automatically reappear in Resources.

To move most of the tables and columns in Resources to Sets and Items:

1. Double-click the join tree name in Resources, or drag-and-drop it from Resources to Sets and Items. All tables are created as sets, and the columns are created as items within the sets.
2. Remove any unwanted sets or items individually from Sets and Items using the **Delete Item** button.

To change the order of items within a set in Sets and Items:

1. Select the item.
2. Reposition the item using one of the following buttons:

   ⤒ Move the selected set or item to the top.

   ▲ Move the selected set or item up.

   ▼ Move the selected set or down.

   ⤓ Move the selected set or item to the bottom.

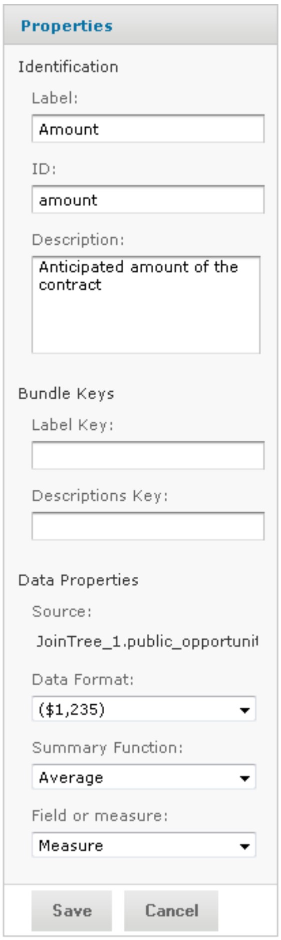
You can also use these buttons to reposition sets within Sets and Items.

To move items and subsets into other sets:

1. In Sets and Items, select the item or subset you want to move.
2. Click **Delete Item**.
3. In Sets and Items, select the destination set.
4. In Resources, select the item or subset deleted from Sets and Items.
5. Click ☰ to add the item or subset from Resources to the destination set.

Subsets always appear after the items in a set.

6.4.8 The Properties Panel



Properties

Identification

Label: Amount

ID: amount

Description: Anticipated amount of the contract

Bundle Keys

Label Key:

Descriptions Key:

Data Properties

Source: JoinTree_1.public_opportunit

Data Format: ($1,235)

Summary Function: Average

Field or measure: Measure

Figure 6-14 Table of Properties on the Display Tab of the Domain Designer

In the Properties panel on the Display tab, you can view, edit, and save properties of a set or item. You select an item in the Sets and Items panel, and click the **Edit** button. For example, open the Simple Domain example in the repository for editing in the Domain Designer. On the Display tab, select the Opportunities: Amount item, then click the **Edit** button in Properties. Set the Data Format and Summary Function, as shown in the previous figure. Click the **Save** button. The property settings determine how sets and items appear to users of the Domain.

The following table shows the properties and possible actions you can perform on the, depending on what you select in the other panels. For example, if you select the ID of a table in the Resources panel, you can view and edit the ID.

Panel	Selection	Properties	Possible actions
Resources (Table List view)	Table	◆ ID of the table ◆ Name of the data source ◆ Name of the table in the data source	◆ View and edit ◆ View only ◆ View only
Resources (Table List view)	Field (column)	◆ ID of the field ◆ Name of the data source ◆ Name of the field’s table in the data source ◆ Java datatype of the field	◆ View only ◆ View only ◆ View only ◆ View only

Panel	Selection	Properties	Possible actions
Resources (Join Tree view)	Table, field, or join tree	None	None
Sets and Items	Set	- Label of the set - ID of the set - Description of the set - Internationalization keys for the set	- View and edit - View and edit - View and edit - View and edit
Sets and Item	Item	- Label of the item - ID of the item - Description of the item - Internationalization keys for the item - Source, table.field - Data format - Default summary function - Field or measure	- View and edit - View and edit - View and edit - View and edit - View only - View and edit - View and edit - View and edit

Labels and descriptions are visible to users of the Domain. Descriptions of sets and items appear as tooltips in the Ad Hoc Editor and help report creators understand their purpose. The internationalization keys are the property names of internationalized strings in locale bundles. Selecting an item in Sets and Items displays the internationalization keys, if there are any, for the item under **Bundle Keys**.

After defining the list of sets, subsets and items, refine the way the Domain appears to users by renaming and providing descriptions for sets, subsets, and items. Click **Edit** in the Properties panel to modify properties. The following table describes each of the properties in detail:

Property	Appears On	Description
ID	Table, Field Set, Item	An identifier used within the Domain. Default table and field IDs are based on the names in the data source, but you may change the ID of a table as long as it remains unique. Set and item IDs are a separate namespace in which each ID must be unique, although based on table and field IDs by default. The ID property value must be alphanumeric and not start with a digit. When editing a Domain that has been used to create Topics and reports, you should not change any IDs. For more information, see section **6.5.1, "Maintaining Referential Integrity," on page 163**.
Data Source	Table, Field	Alias of the data source for the selected field or table.
Source Table	Table, Field	Name of the selected table, or of the field's table, in the data source. Does not change when the ID property of a table is modified.
Datatype	Field	Java datatype of the selected field.
Label	Set, Item	User-friendly name displayed in the Data Chooser and the Ad Hoc Editor.
Description	Set, Item	User-friendly description displayed as tooltip on the label in the Ad Hoc Editor. The description helps the report creator understand the data represented by this set or item.
Label Key Description Key	Set, Item	Internationalization keys for the label and description properties; locale bundles associate this key with the localized text for the label or description. Keys may only use characters from the ISO Latin-1 set, digits, and underscores (_).
Source	Item	References the Domain names of the table and field associated with this item; the syntax is `Domain_jointree.Domain_table.datasource_field`.

Property	Appears On	Description
Data Format	Item	Default numerical format (such as number of decimal places) for the item when used in a report.
Summary Function	Item	Default summary function for the item when used in a report. Numerical items have functions, such as sum or average. Other items have either a function to count distinct values or to count all values.
Field or Measure	Item	Designates whether the item is a qualitative value (field) or quantitative value (measure). By default, all numeric types are assumed to be measures, and all non-numeric items are plain fields. Use this setting to override the default. For more information, see section **6.1.2, “Terminology,” on page 140**.

From the **Export** menu you can choose to export the design or locale bundle for the Domain, as described in the next section.

6.4.9 Designer Tool Bar

The tool bar buttons operate on the Domain design in its current state, regardless of which tab is selected.

- **Check Design** – Validates the Domain as described in the next section.
- **Export Design** – Exports the XML design for the Domain. Use this menu item if you want to edit the XML in an external editor, for example to duplicate settings with copy-paste or to enter a complex formula. Exporting the XML design from the Domain Designer avoids having to write it from scratch. For more information, see section **8.1, “The Domain Design File,” on page 185**.
- **Export Bundle** – Generates the internationalization keys and saves them to a Java properties file that serves as a template for the locale bundles. Use this menu item to create a template for the locale bundles after you have defined the sets and items on the Display tab. You can select a check box to automatically generate keys based on the set and item IDs. This option is visible only after you define localized sets or items. For more information, see section **8.5, “Locale Bundles,” on page 211**.

  You can save time editing the properties for a large number of sets and items by using the exported XML file instead of using the properties table on the Display tab. For more information about saving and uploading XML, see section **8.1, “The Domain Design File,” on page 185**.

  Before exporting a bundle, make sure the set and item IDs are finalized because they are used to generate the keys. The generated keys are added to the Domain design and appear in the table of properties. For more information about the internationalization keys, see section **8.5, “Locale Bundles,” on page 211**.

6.4.10 Domain Validation

The validation of a Domain ensures that all of its components are consistent. The Domain Designer checks the syntax of files when they are uploaded, but overall consistency must be checked when saving a new or edited Domain.

When you click **Check Design**, the Domain Designer performs the following validation.

1. Verifies that the tables and columns of the Domain design exist in the data source.

> In special cases where you need to create a design before the data source is available, this step can be omitted by setting a parameter in the server configuration file. See the *JasperReports Server Administrator Guide*.

2. Verifies that all items in each defined set originate in the same join tree.
3. Verifies that all items reference existing columns.
4. Verifies that derived tables have valid SQL queries.
5. If a security file has been uploaded, verifies that all items and sets in the security file exist in the Domain design.

If validation fails, the Domain Designer remains open and a message appears to help you correct the error. Make the necessary changes to the settings and save again. If the settings are in the uploaded files, edit the files and upload them again.

Validation is important because the Domain design may include derived table queries and calculated field expressions entered by the user.

Validation occurs at the following times:

- When opening the Domain Designer. This check detects any inconsistencies in Domain designs from uploaded files.
- When navigating from tab to tab under certain circumstances. This check detects problems on the tab where they occur.
- When changing the data source.
- When exporting the Domain design file.
- When clicking **Check Design** in the Domain Designer.
- When clicking OK to exit the Domain Designer.

Unless you click Check Design, no message appears when validation succeeds. When validation fails, however, a message appears to help you correct the error.

6.5 Editing a Domain

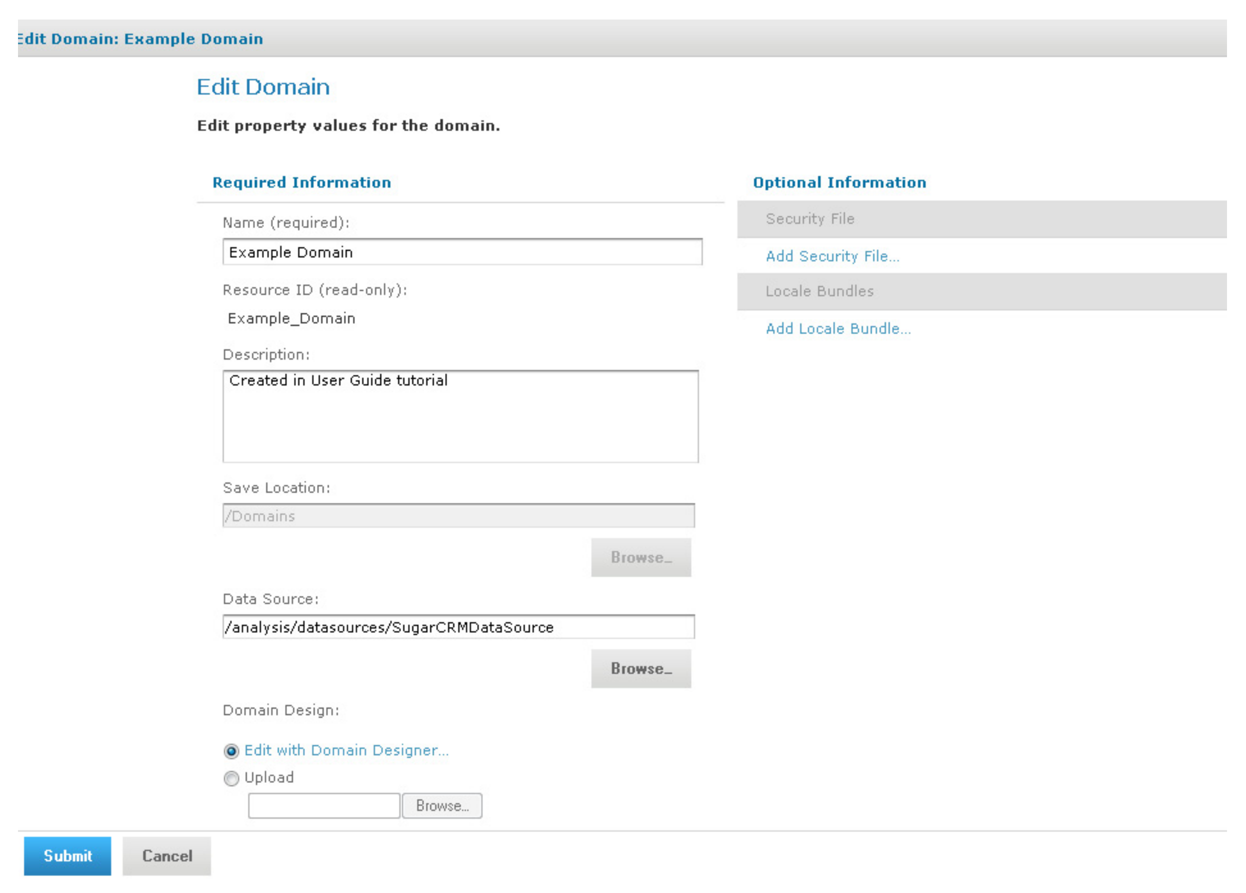
You can edit a Domain by changing, adding to, and deleting its components.

> Use extreme caution when editing Domains that might have been used for reports and Domain Topics. A Domain specifies the data source for the Domain Topics and reports that are based on the Domain. These Domain Topics and reports might fail if you edit the underlying Domain; if you delete the underlying Domain, dependent reports fail.
>
> Before you edit a Domain, see section **6.5.1, "Maintaining Referential Integrity," on page 163**.

To edit a Domain:

1. Log in to the server as an administrator and select **View > Search Results**.
2. Locate the Domain.
   a. Choose **View > Search Results**.
   b. In the Filters panel, under Types, click **More choices**.
   c. Click Domains.
3. Right-click an existing Domain and select **Edit** from the context-menu.

   The Edit Domain page appears. This page is similar to the Add New Domain page documented in section **6.3, "Using the Add New Domain Page," on page 150**.



Edit Domain

Edit property values for the domain.

Required Information

Name (required): Example Domain

Resource ID (read-only): Example_Domain

Description: Created in User Guide tutorial

Save Location: /Domains

Data Source: /analysis/datasources/SugarCRMDataSource

Domain Design:

● Edit with Domain Designer...

○ Upload

Optional Information

Figure 6-15 Edit Domain Page

4. In Name, change the display name of the Domain.
5. In Description, change the description of the Domain.
6. In Data Source, browse to locate a new data source for the Domain.

Changing the data source only makes sense in certain cases, for example if your data source definition changes slightly but the underlying database does not change. If you change to a data source with a different database, the definitions in the Domain design are no longer be valid and you are not able to save the Domain.

7. In Domain Design, click **Edit with Domain Designer**. For instructions, see section **6.4, "Using the Domain Designer," on page 151**. Alternatively, select the **Upload** option, and browse to locate a schema. You can import the XML file of the Domain design after exporting it and make modifications in an external editor. See also "**Maintaining Referential Integrity**" below if you need to remove items in the Domain.
8. To add or replace the security file or locale bundles for the Domain, click **Add Security File** or **Add Locale Bundle** in Optional Information. The Resources page is further documented in section **8.1, "The Domain Design File," on page 185**.
9. When done, click **Submit** to update the Domain. To close the Domain Designer without modifying the Domain stored in the repository, click **Cancel**.

After modifying a Domain, you must clear the Ad Hoc cache of all queries based on the Domain. This removes any data that was based on the old instance of the Domain and avoids inconsistencies in new reports. For instructions, see the *JasperReports Server Administrator Guide*.

6.5.1 Maintaining Referential Integrity

When editing an existing Domain, the user is responsible for maintaining the referential integrity between the items in the Domain and any Domain Topics or reports that have been created from the Domain. Referential integrity means that at the time a Domain Topic or report is opened or run, all the items that the Domain references are still defined in the Domain. If you modify a Domain by removing sets or items, you must be sure that no Domain Topics or reports are based on those sets or items. Even if the underlying tables and columns still exist in the database, the sets and items referenced in the Domain must still exist in the Domain.

Domain items are identified by their IDs and the IDs of the sets in which they are located. Changing the ID of an item or moving it to a different set also makes it unavailable to any Topics and reports that referenced the ID. To change the name of an item or set, edit its label property, not its ID (see section **6.4.8, "The Properties Panel," on page 159**). Moving an item is considered the same as deleting it from its current location so it can be added elsewhere.

Any report that references a deleted item no longer runs, nor can you open it in the Ad Hoc Editor again. A Domain Topic that references a deleted item causes errors when used in the Ad Hoc Editor. You can, however, open a Domain Topic for editing and remove references to deleted items. That action, however, allows only new reports to use the Domain Topic, and does not fix the broken reports based on the items deleted from the Domain Topic.

The granularity of referential integrity is at the individual set and item level. This means that changes to sets and items that are not used in a given report or Topic do not affect the report or Topic. For example, if you delete an item used by Topic A but not Topic B, then Topic A fails and reports based on Topic A that included the item fail. But Topic B and its reports are unaffected, as are any reports based on Topic A that did not include the deleted item.

6.5.2 Fixing Referential Integrity Problems

Generally, to maintain referential integrity, avoid deleting items from a Domain that reports need to use. Sometimes, removing an item or set from a Domain is unavoidable. For example, you included an item erroneously that exposes confidential data to unauthorized users, or the underlying database changes, making the item invalid.

In a typical scenario, an administrator or data analyst creates a Domain and many end-users create Topics and reports based on it. When deleting Domain items in such a situation, tell users beforehand to modify reports to prevent reports from using the item. Inevitably, a user fails to modify a report as requested, and needs to fix the broken report. The server provides a mechanism to simplify fixing the report. The user can replace the deleted item with a placeholder, open the report, and edit it, even after the original item has been removed.

The following procedure assumes a user created a report based on a Domain. The Domain is similar to the one described in section **6.2, "Example of Creating a Domain," on page 142**. The Domain exposes the `accounts_opportunities` table that contains no useful columns and is necessary only to join the `accounts` and `opportunities` tables. Unfortunately, some users were confused by the additional items exposed by the Domain, and used the `date_modified` item in their reports. You want to delete the accounts_opportunities table from Sets and Items, so it is no longer exposed to users.

To fix referential integrity problems:

1. Locate the problematic Domain in the repository, right-click, and choose **Edit**. The Edit Domain page appears.
2. On the Edit Domain page, click **Edit with Domain Designer.**

3. In the Domain Designer, click the **Display** tab, and select the public`_accounts_opportunities` set in **Sets and Items**:

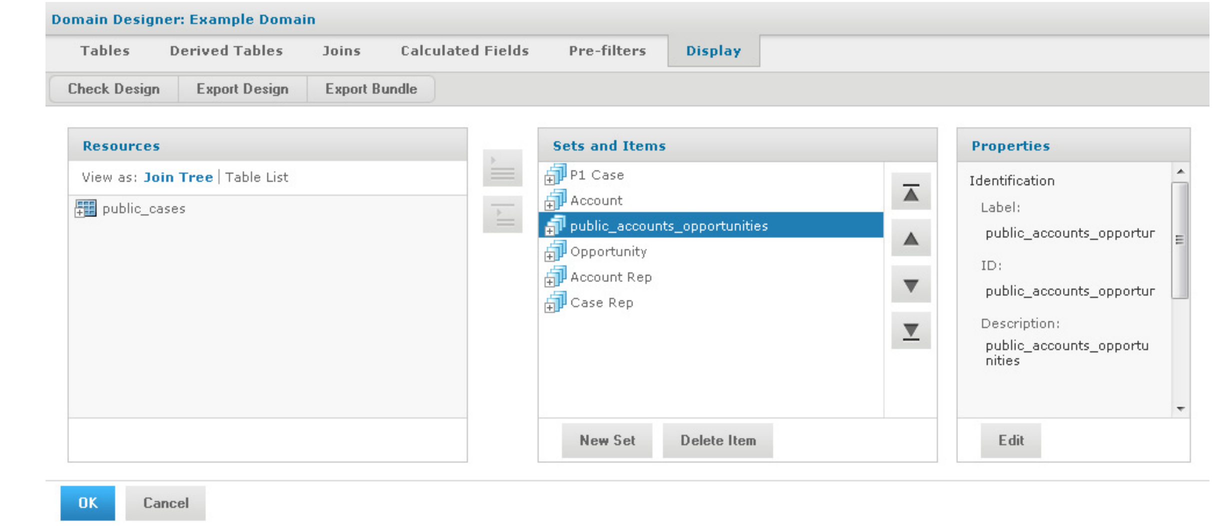
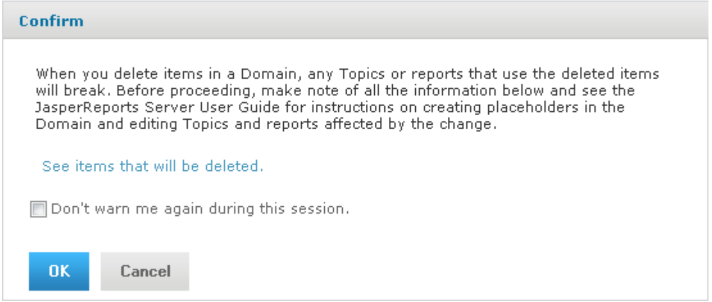


Figure 6-16 Deletion of Items in Use in Reports from a Domain

4. Click **Delete Item**. The **Confirm** dialog box appears, indicating that the item is in use and that a potential referential integrity problem exists. The message includes a link, **See items that will be deleted**, to the **Detail** dialog box, containing the items you are deleting from the Domain. Figure 6-17 shows the Confirm dialog box.



Confirm

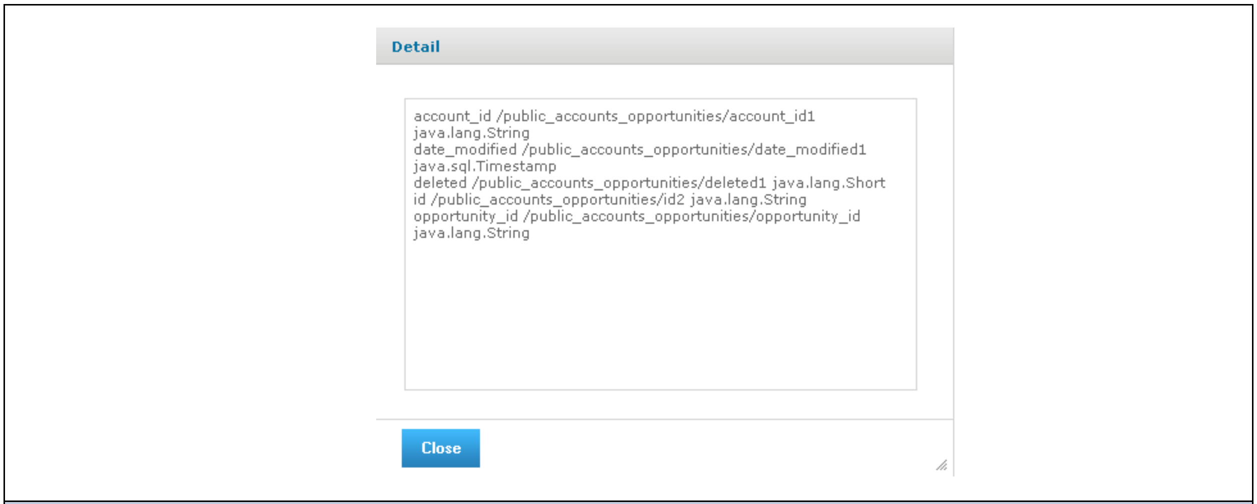
When you delete items in a Domain, any Topics or reports that use the deleted items will break. Before proceeding, make note of all the information below and see the JasperReports Server User Guide for instructions on creating placeholders in the Domain and editing Topics and reports affected by the change.

See items that will be deleted.

☐ Don't warn me again during this session.

Figure 6-17 Indication of Referential Integrity Problem

5. Click **See items to be deleted**. For each deleted item, the Detail window lists the item label, the set and items IDs as a path, and the datatype of the item:



```
account_id /public_accounts_opportunities/account_id1
java.lang.String
date_modified /public_accounts_opportunities/date_modified1
java.sql.Timestamp
deleted /public_accounts_opportunities/deleted1 java.lang.Short
id /public_accounts_opportunities/id2 java.lang.String
opportunity_id /public_accounts_opportunities/opportunity_id
java.lang.String
```

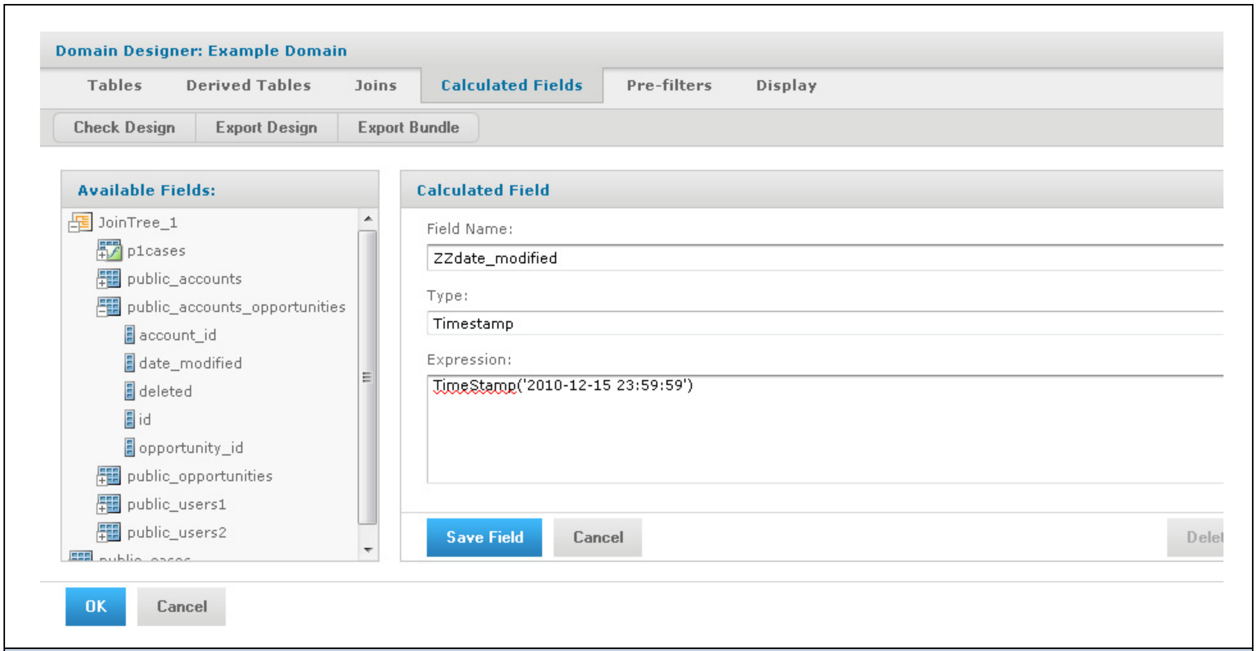
Figure 6-18 List of Items to Be Deleted

The `date_modified` item has the ID `date_modified1`, is in the `accounts_opportunities` set, and is of the type `java.sql.Timestamp`.

6. Close the Detail dialog box and click OK in the Confirm dialog box.
7. Click the **Calculated Fields** tab.

Because a calculated field is a custom column of a user-selected type, it can serve as a placeholder. The value of the custom column is irrelevant, but it needs to be recognized as a placeholder when it appears in a report.

8. Enter a field name, type, and an expression that returns a constant value of the same type as the deleted item, as shown in Figure 6-19, and click **Save Field**.



Field Name: ZZdate_modified

Type: Timestamp

Expression: TimeStamp('2010-12-15 23:59:59')

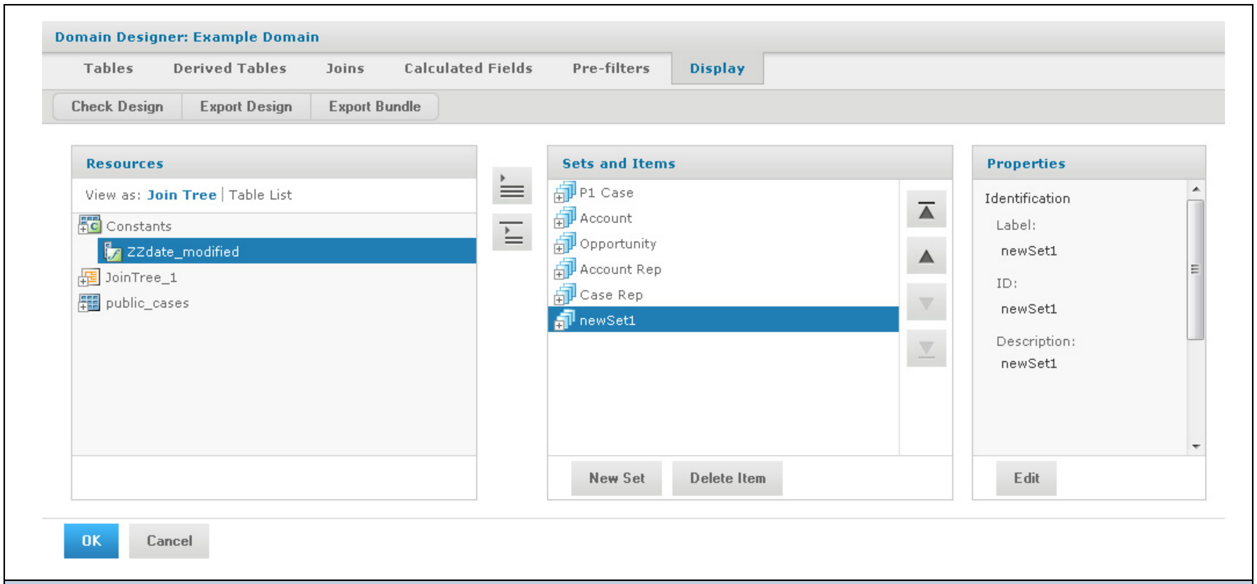
Figure 6-19 Creation of Calculated Field as Placeholder for a Deleted Item

The ZZ prefix in Name distinguishes the placeholder from other columns in the Domain. The value in Type must match the datatype of the deleted item, in this case a timestamp. For information about calculated field datatypes, see section **8.2.1, “Datatypes,” on page 198**.

9. Click the **Display** tab.

A placeholder item must be located in placeholder set to mimic the structure of the deleted item, and generally, in exactly the same path of nested sets as the original item. You deleted the accounts_opportunities set, so you need to create a set for the placeholder item.

10. In Sets and Items, click **New Set** to create the placeholder set.
11. In Resources, expand the list of Constants and select `ZZdate_modified`:



Label:
newSet1
ID:
newSet1
Description:
newSet1

Figure 6-20 Calculated Field Set Up as a Placeholder

12. Click to add the ZZdate_modified to the new set.
13. In Sets and Items, select the placeholder set, newSet1.
14. In Properties, click **Edit** and change these properties:

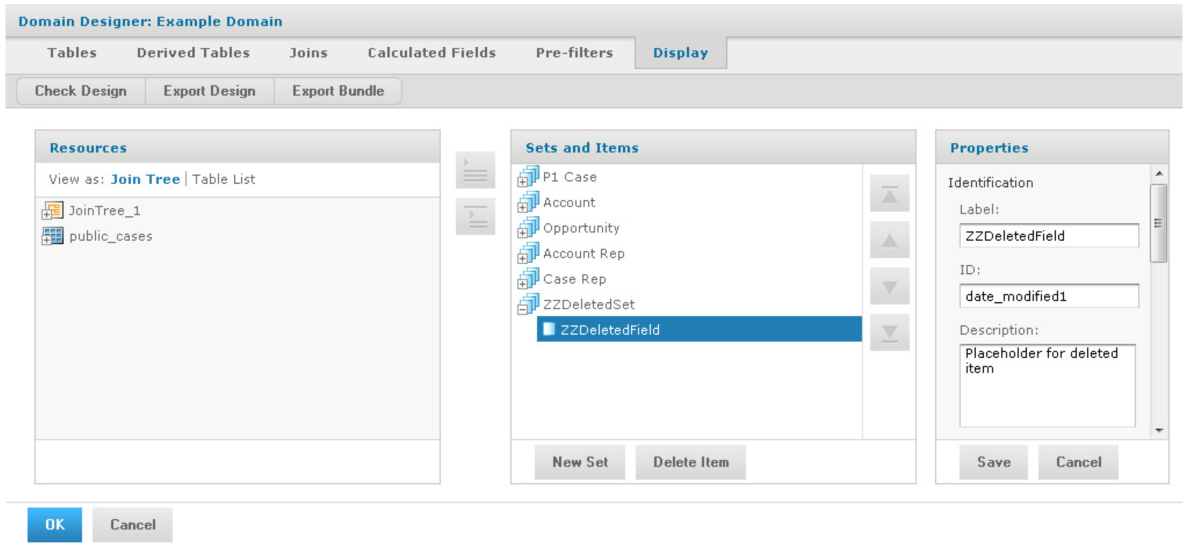
Property	New Value
ID	`accounts_opportunities`
Label	`ZZDeletedSet`
Description	`Placeholder for deleted set`

15. In Sets and Items, select ZZdate_modified.
16. In Properties, click **Edit** and change these properties:

Property	New Value
ID	`date_modified1`
Label	`ZZDeletedField`
Description	`Placeholder for deleted item`

Distinguishing the placeholders from real items by using the ZZDeletedSet and ZZDeletedField labels discourages their use in building new Ad Hoc reports. The IDs, although invisible to users, must be identical to those of the deleted item and set, so the server can open and run the report.

Figure 6-21 shows the modified properties for the placeholder item.



Label: ZZDeletedField

ID: date_modified1

Description: Placeholder for deleted item

Figure 6-21 Modification of ID Properties to Match the Deleted Item

17. Click **OK** in the Domain Designer and then **Submit** on the Edit Domain page.

Alternatively, you can edit the XML design file of a Domain to fix referential integrity problems. Conceptually, the modifications are the same as described in this procedure, but the order is slightly different.

To fix referential integrity problems in the XML design file of a Domain:

1. Instead of deleting the item, first create the constant calculated field. You can do this in the Domain Designer even before exporting the design file. You must be familiar with the design file syntax to create the calculated field with the correct type and expression, as described in section 8.1.3, "Structure of the Design File," on page 187.
2. Next, locate the item definition and change its `resourceID` so that it references the newly created calculated field. This removes the reference to the unwanted column, and replaces it with an item that references the placeholder field.
3. Update the other properties of the item and its enclosing set, using the values shown in Figure 6-21. For more information, see section 8.1.3.6, "Representing Sets and Items in XML," on page 194.
4. Save the design file and upload it, as described in section 8.1.4, "Uploading a Design File to a Domain," on page 197.

Chapter 7 Accessing Reports and Domains from iReport

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don’t see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

iReport Designer includes JasperReports Server and Domain plug-ins. Using the JasperReports Server Plug-in, you move reports between iReport and JasperReports Server. The server plug-in uses web services to interact with the server. Some tasks you can perform using the server plug-in are:

- Browse the repository on the server from iReport.
- Add reports and subreports to the repository from iReport.
- Drag and drop images and other resources from the repository to the iReport Designer tab.
- Add and delete folders and resources on the server from iReport. Resources include images, fonts, JRXML files, JAR files, datatypes, and input controls.
- Modify resource properties on the server from iReport.
- Link input controls to reports on the server.
- Import and export data sources (JDBC, JNDI, and JavaBean).
- Download, edit, and upload JRXML files.
- Connect to multiple servers to facilitate access both test and production environments.

Using the Domain Plug-in, you can create a report in iReport based on a Domain in JasperReports Server.

This chapter contains the following sections:

- **Plug-in Requirements**
- **Connecting to the Server from iReport**
- **Creating a Report Unit in the Repository from iReport**
- **Managing Resources in the Repository from iReport**
- **Editing a Report in the Repository from iReport**
- **Running a Report from iReport**
- **Using the Domain Plug-in**
- **Creating and Uploading Chart Themes to the Server**

7.1 Plug-in Requirements

The JasperReports Server Plug-in and the Domain Plug-in require:

- Java Sun JDK 6 or higher
- iReport Designer 4.0 or higher – You can install iReport when you install the server.
- JasperReports Server 4.0 or higher with enabled web services – Web services are enabled by default.

7.2 Connecting to the Server from iReport

This procedure shows you how to connect to JasperReports Server directly from iReport.

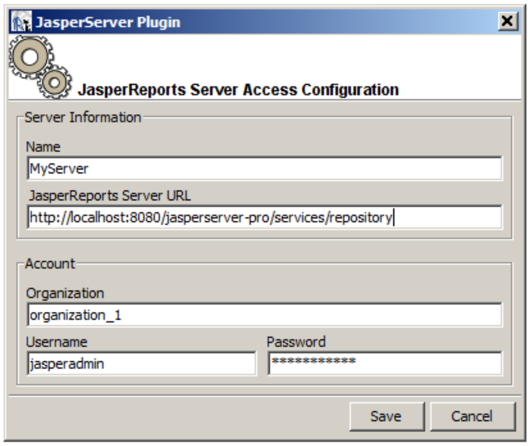
To access the server repository within iReport:

1. Start iReport:
   - In Windows, click **Start > All Programs > JasperReports Server 4.2 > Start iReport Designer**; or
   - In Linux, change to the iReport home directory and enter `./iReport.sh` at the command prompt.
2. Click **Window > JasperReports Server Repository**.

   The Repository Navigator tool bar appears.
3. On initial startup of iReport, no servers are configured. To add a server, click in the Repository Navigator tool bar.

   The JasperReports Server Access Configuration dialog appears.
4. Enter configuration information to access your server instance. All fields are required:
   - Name – An identifier for this server instance that will appear in the Repository Navigator.
   - JasperReports Server URL – Full URL to the repository web service; check that the default URL is jasperserver-pro. You need to change `hostname` to the name of your server:

     `http://hostname:8080/jasperserver-pro/services/repository`
   - Organization – If there is more than one organization in the server instance, you must specify the ID or the alias of the user's organization, for example `organization_1`. In the default installation with a single organization, you can leave this field blank.
   - Username – ID of the user accessing the server from iReport.
   - Password – The password of the user.



Server Information

Name: MyServer

JasperReports Server URL: http://localhost:8080/jasperserver-pro/services/repository

Account

Organization: organization_1

Username: jasperadmin

Password: ************

Figure 7-1 Configuration to Access the Server from iReport

5. Click **Save**, then expand the repository tree in the Repository Navigator.

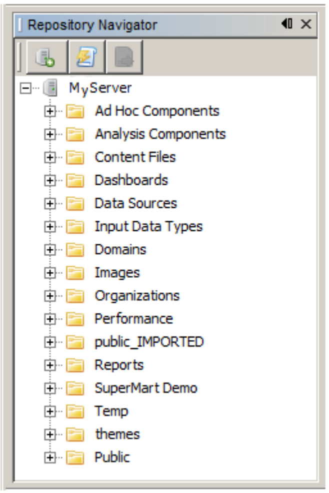


Figure 7-2 Server Repository as Seen from iReport

The visibility and access to resources in the Repository Navigator depend on the organization and permissions of the user.

You can add multiple servers to the Repository Navigator. Servers configured for iReport 3.1 versions of the plug-in and later are compatible with the iReport 4.0.0 or later version of the plug-in. You may experience problems if you connect to incompatible servers.

7.3 Creating a Report Unit in the Repository from iReport

To add a new report unit, you need a JRXML file, which you can create in iReport beforehand. A report unit has a main JRXML file, a data source, input controls (zero or more), and resources (zero or more).

To create a report unit in the repository:

1. In the Repository Navigator, shown in Figure 7-2, right-click a parent folder for the new report and click **Add > JasperServer Report**. For example, add the report unit to the Reports folder.

   The ReportUnit Wizard appears.
2. In the Naming step, enter an ID, for example, `report_unit_example`. No spaces allowed.
3. In the **Name** field, enter a meaningful name. For example, enter `Report Unit Example`. This name will appear in the repository on the server, and consequently, in the Repository Navigator.
4. In the **Description** field, briefly describe the report unit. The description will appear in the repository on the server and help users find the report they need.
5. Click **Next**.
6. In the Main JRXML step, locate the main JRXML file in the repository or on your hard drive. You can also specify a report that you have open in iReport.

   For example, assume you have a report file named report1.jrxml on your hard drive that you already opened the report in iReport. Select **Locally Defined**, then click the **Get source from current opened report** button.
7. Click **Next**.
8. In the Locate Data Source step, select one of the following options:
   - From the repository
   - Locally Defined
   - Don’t use any data source

   For this example, select **Locally Defined.**

9. Click the **Edit local datasource** button.

   The Data Source dialog appears.

10. In the Data Source dialog:

    a. On the **General** tab, enter a unique ID. No spaces allowed. For example, enter `MyFoodmartDS`.

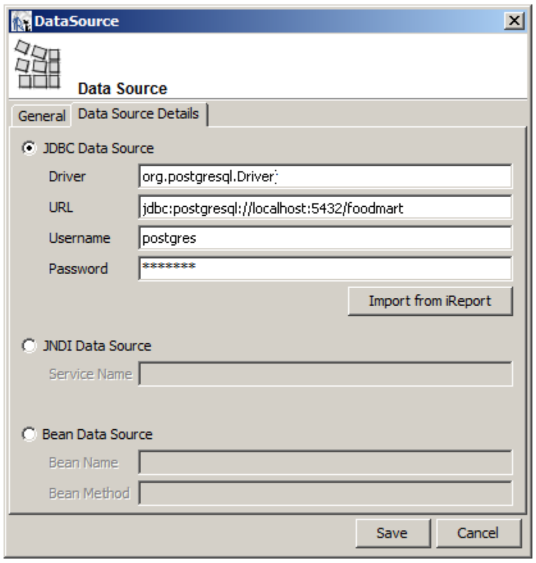
    b. In **Name**, enter a meaningful name. This name will appear in the repository on the server. For example, enter `FoodmartDS`.

    c. On the Data Source Details tab, select a data source type, for example **JDBC Data Source**, and fill in the required details:

    - Driver – `org.postgresql.Driver`
    - URL – `jdbc:postgresql://localhost:5432/foodmart`
    - User name (for the database) – `postgres`
    - Password (for the database)

    If you defined the JDBC data source in the currently opened report, you can click the **Import from iReport** button to help provide these details. Select the data source from the drop-down that you specified during report design. Fill in the port number for the database (5432 for example), and click OK

    Figure 7-3 shows typical details for a JDBC data source.



DataSource

Data Source

General | Data Source Details

● JDBC Data Source

Driver: org.postgresql.Driver

URL: jdbc:postgresql://localhost:5432/foodmart

Username: postgres

Password: ********

○ JNDI Data Source

Service Name:

○ Bean Data Source

Bean Name:

Bean Method:

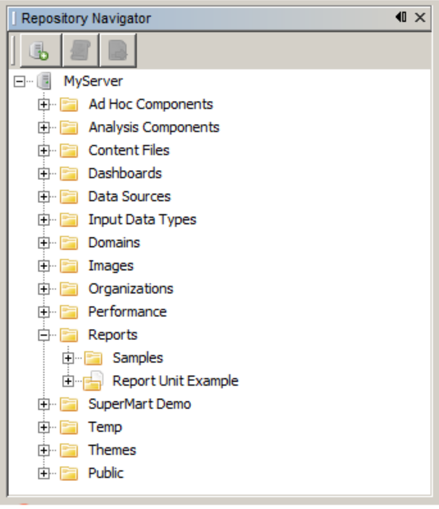
Figure 7-3 Data Source Details

    d. Click **Save**.

11. In the ReportUnit wizard, click **Finish**.

If the report unit doesn't appear in the Repository Navigator, right-click the server name (MyServer in Figure 7-4) and select **Refresh** from the context menu.

12. In the Repository Navigator, expand the Reports folder. The report unit, Report Unit Example, appears:



- MyServer
  - Ad Hoc Components
  - Analysis Components
  - Content Files
  - Dashboards
  - Data Sources
  - Input Data Types
  - Domains
  - Images
  - Organizations
  - Performance
  - Reports
    - Samples
    - Report Unit Example
  - SuperMart Demo
  - Temp
  - Themes
  - Public

Figure 7-4 The New Report Unit in the Repository Navigator

7.3.1 Adding an Image and Subreport to the Report Unit

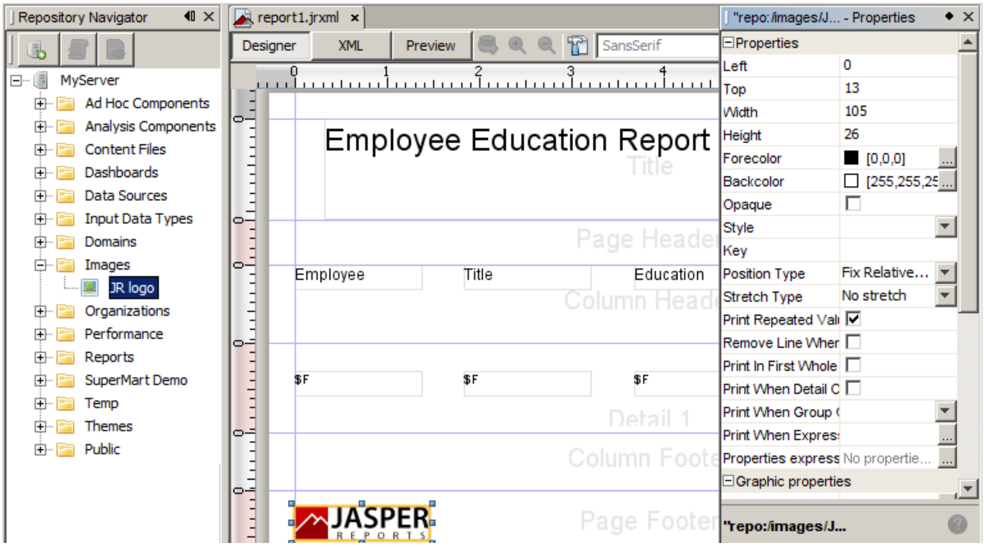
A subreport is a JasperReport that's embedded within another report: the master report. As the Master report executes, each time the server encounters a subreport element it executes the subreport. The server embeds the subreport content into the output of the Master report. Subreports can process records from a query different from the Master report's query.

To add an image from the repository to a report unit:

1. Continuing the previous example, expand the Images folder in the Repository Navigator, select the JR Logo image.
2. Drag the image to the Designer. Drop the image in the page footer band of the open report, report1.jrxml.

   The plug-in adds the image element to the report, setting an expression in `repo:` syntax, which refers to the location of the image in the repository.

   Figure 7-5 shows the selected image file in the Repository Navigator, the image element in the page footer band of the report, and the location expression at the top and bottom of the properties list.



- MyServer
  - Ad Hoc Components
  - Analysis Components
  - Content Files
  - Dashboards
  - Data Sources
  - Input Data Types
  - Domains
  - Images
    - JR logo
  - Organizations
  - Performance
  - Reports
  - SuperMart Demo
  - Temp
  - Themes
  - Public

Properties	
Left	0
Top	13
Width	105
Height	26
Forecolor	■ [0,0,0]
Backcolor	□ [255,255,25
Opaque	□
Style	
Key	
Position Type	Fix Relative...
Stretch Type	No stretch
Print Repeated Valı	☑
Remove Line Wher	□
Print In First Whole	□
Print When Detail C	□
Print When Group (	
Print When Expres:	
Properties express	No propertie...
Graphic properties	

"repo:/images/J...

Figure 7-5 A Repository Image Added to a Report

To add a subreport to a report unit:

1. In iReport, assuming report1.jrxml is still open from the previous procedures, perform these steps:
    a. From the palette, drag a **Subreport** element to the detail band of the report in the Designer.

       The Subreport wizard appears.

    b. On the Subreport page of the wizard, select one of these options:
        - Create a new report
        - Use an existing report
        - Just create a subreport element

       For this example, assume you have a pre-existing and compiled JRXML file named subreport.jrxml. Select **Use an existing report**.

    c. Browse to the jrxml version of the report, subreport.jrxml.
    d. Select the .jrxml file. Click **Open**, then **Next**.

       The Connection expression page of the Subreport wizard appears, offering these options:
        - Use the same connection as the master report

          Fills the master report when the subreport is JDBC-based. The JDBC connection is passed to the subreport for execution.
        - Use another connection

          Sets up a different JDBC connection.
        - Use a JRDatasource expression

          Uses a JRDataSource object to fill the subreport. You will need to write an expression capable of returning a JRDataSource object.
        - Use an empty data source

          Sets the data source expression to `new JREmptyDataSource()`. This expression creates a special data source that provides a single record with all the field values set to null. Useful for displaying static content in a subreport.
        - Don't use any connection or data source

          Used for displaying static content in a report.

    e. Select the first option, **Use the same connection used to fill the master report**. Click **Next**.

       The Parameters page of the subreport wizard appears.

       If the report has parameters, you select the Expression drop-down next to the name of the parameter, the scroll and select the field that contains the parameter.

    f. In this example, there are no parameters. On the Parameters page, click **Next**.

       The Subreport expression page of the wizard appears.

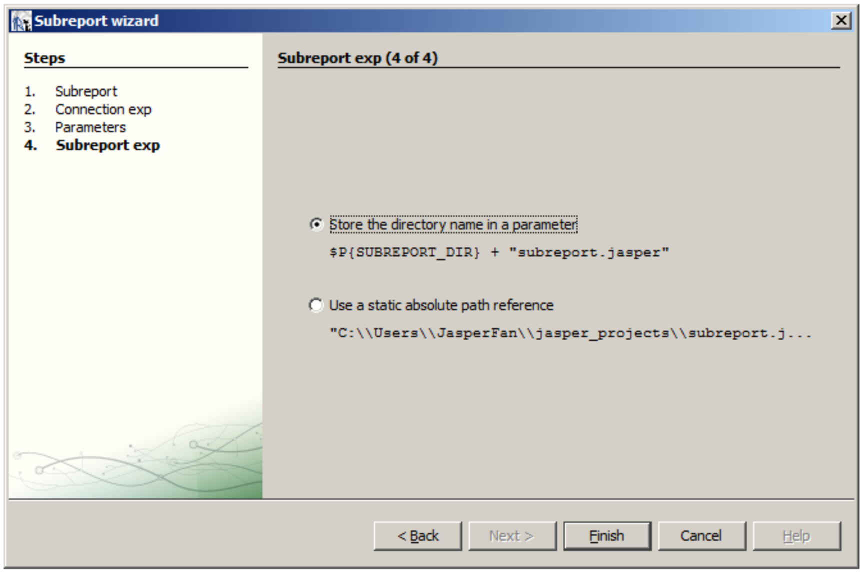
    g. On Subreport expression page of the wizard, select one of these options:
        - **Store the directory name in a parameter**

          If you're creating reports to run or preview in iReport, choose this option.
        - **Use a static absolute path reference**

          If you're creating reports to run or preview in iReport, choose this option.

       Figure 7-6 shows the Subreport expression page.

For this example, choose the **Store the directory name in a parameter** option, then click **Finish**.



● Store the directory name in a parameter

```
$P{SUBREPORT_DIR} + "subreport.jasper"
```

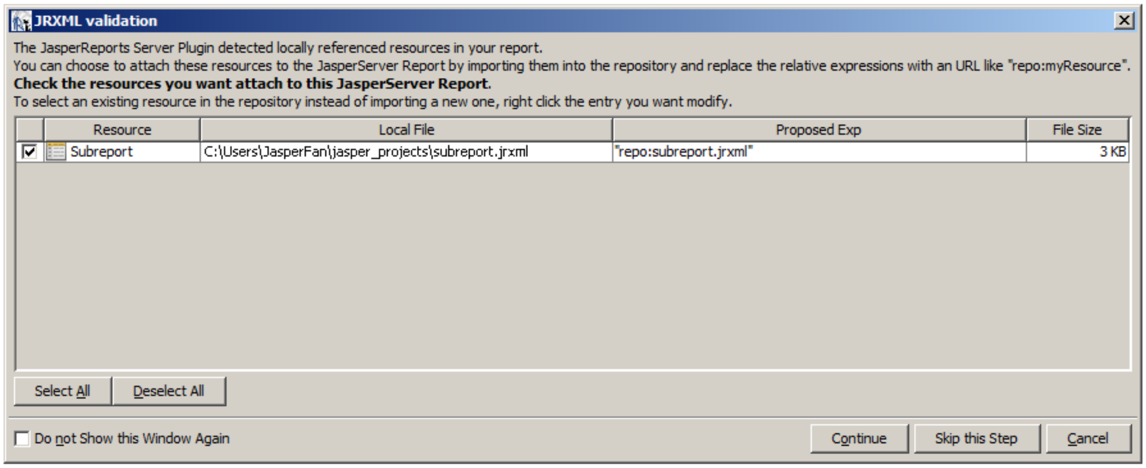
○ Use a static absolute path reference

```
"C:\\Users\\JasperFan\\jasper_projects\\subreport.j...
```

Figure 7-6 A Subreport Expression

2. Stretch the subreport element until it’s wide enough to fill the band.
3. Select the subreport in the master report’s Report Inspector and edit the size of the subreport:
   a. In the properties panel, edit the print margins. Set the Left and Top properties to zero because a subreport is meant to be a portion of a page, not an entire document.
   b. Set the Height property to a very small value, such as 1 pixel. When the subreport element is filled with subreport data, it dynamically expands in height, so you can set its height to a very small value to leave room in the band for other elements.
4. In iReport, click **File > Save** to save changes to the report.
5. Synchronize the changes you made in iReport to the Report Unit Example on the server by replacing its Main JRXMLwith the JRXML you just altered in iReport:
   a. In the Repository Navigator, expand the Report Unit Example folder.
   b. Right-click the Main JRXML, and select **Replace with current document**.

   The JRXML validation dialog appears. Figure 7-7 shows the JRXML validation dialog.



The JasperReports Server Plugin detected locally referenced resources in your report.
You can choose to attach these resources to the JasperServer Report by importing them into the repository and replace the relative expressions with an URL like "repo:myResource".
Check the resources you want attach to this JasperServer Report.
To select an existing resource in the repository instead of importing a new one, right click the entry you want modify.

	Resource	Local File	Proposed Exp	File Size
☑	Subreport	C:\Users\JasperFan\jasper_projects\subreport.jrxml	"repo:subreport.jrxml"	3 KB

□ Do not Show this Window Again

Figure 7-7 JRXML Validation

The server detects that the report unit includes a subreport, and the subreport needs a different expression. In iReport, subreports need this expression:

```
$P{SUBREPORT_DIR} + reportName.jasper
```

In the server, subreports need this expression:

```
repo : reportName expression
```

c. If the Subreport resource is not selected, click the checkbox to select it, then click continue to upload the subreport and the proposed expression to the repository.

> When you upload a report to the server that uses the `repo:` syntax to refer to resources in the repository, the server prompts you to locate the resources for JRXML validation. For more information, refer to the *JasperReports Server Ultimate Guide*.

A message confirms that the JRXML was updated.

d. Click OK.

In the Repository Navigator, the subreport jrxml appears in the Resources folder of the Report Unit Example.

6. To run the report from iReport:

a. Right-click the Report Unit Example folder in the Repository Navigator.

> You cannot run a subreport alone on the server; you must run the entire report unit.

b. Select **Run JasperServer Report** from the context menu.

7. To run the report in the server, first you need to link a data source to the report:

a. Log into the server.

b. Click **View > Repository**. Select the report unit in the repository.

c. Click **Edit**.

d. On the **Set Up** page, upload report1.jrxml.

e. On the Data Source page, link a data source to the report. For example, select the following data source from the repository:

/Analysis Components/Analysis Data Sources/FoodmartDataSourceJNDI

7.4 Managing Resources in the Repository from iReport

While creating reports that you intend to store in the repository, you also need to create and manage the resources associated with them, such as images, JARs, JRXML files, property files for localized reports, input controls, datatypes, lists of values, style templates (JRTX), and data sources. If you’re maintaining existing reports, you may need to access, modify, and save changes to existing resources. You can also modify the location, name, or description of the repository folders.

To add, modify, or delete resources to the repository from iReport:

1. If the **Repository Navigator** is not open, click **Window > JasperReports Server Repository**.
2. To add a resource to the repository, right-click a folder, select **Add**, and then select the type of object you want to add.

> If you choose to add any item other than a JasperReport, a dialog for entering the location and other information about the object appears. If you choose to add a JasperReport, a wizard guides you through the process.

3. To change the location of a resource in the repository, locate the object, then drag-and-drop it to the new location.

Or, perform the following steps:

a. Right-click the object and select **Copy** or **Cut**. Or use the keyboard shortcuts: Ctrl-C and Ctrl-X, respectively.

b. Locate the destination, right-click, and select **Paste**, or use the keyboard shortcut Ctrl-V.

When cutting the object, it is not removed from its original location until pasted in the new location.

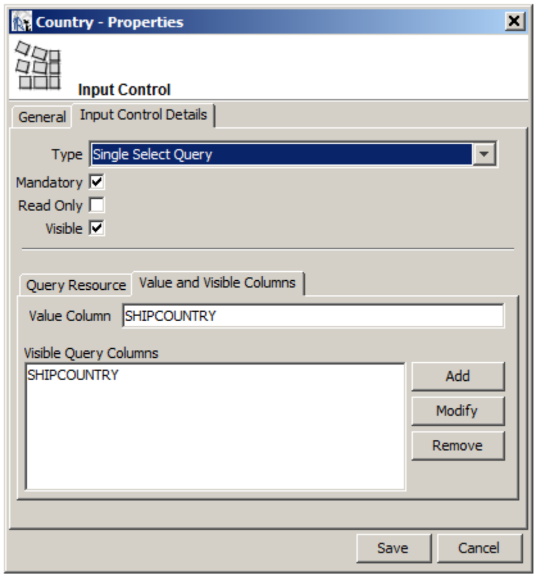
4. To delete a resource from the repository, locate the object, right-click it, and select **Delete**. You must confirm your action to prevent accidental deletions.
5. To modify a resource, find its folder in the Repository Navigator, then right-click the resource and select **Properties**.

   In the **Properties** dialog appears. The number of tabs in the dialog depends on the type of resource:
6. On the **General** tab, view the object's repository ID, name, and description.

   If you are logged in as an administrator, you can modify property values and save them back to the Repository.

   Tabs other than **General**, if there are any, contain controls that are specific to each type of resource. File-based resources have a **Resource** tab.
7. On the **Resource** tab, check **Replace the resource with this file**, browse to another image on your hard drive, and click **Save** to replace the image on the server with the image on your hard drive.
8. Click **Export File**, and then **Save** to download a resource descriptor to your hard drive.

   For example, in the Repository Navigator, you can replace a resource on one server with a resource on another: Connect to both servers using the plug-in, export an image from server 1, open image properties on server 2, browse to the file you exported from server 1.
9. Change an input control from the **Input Control Details** tab:



Type: Single Select Query

Mandatory ☑

Read Only ☐

Visible ☑

Value Column: SHIPCOUNTRY

Visible Query Columns: SHIPCOUNTRY

Figure 7-8 Properties of an Input Control Resource

10. Click **Save** in the Properties dialog box to make the changes effective in the repository.

7.5 Editing a Report in the Repository from iReport

In the Repository Navigator, the 📂 icon means a report unit, and 📄 means a JRXML file. When you work with a JRXML file in the Repository from iReport, iReport operates on a copy of the file. You need to upload the JRXML file to put it back into the repository when finished.

To edit a JRXML file in the Repository from iReport:

1. In the **Repository Navigator**, right-click the JRXML file in the report unit and select **Open in Editor**.

   The JRXML from the repository is stored locally in the <USER_HOME>/.ireport/jstmp directory. This directory is never automatically cleared.

The JRXML appears in the Designer window.

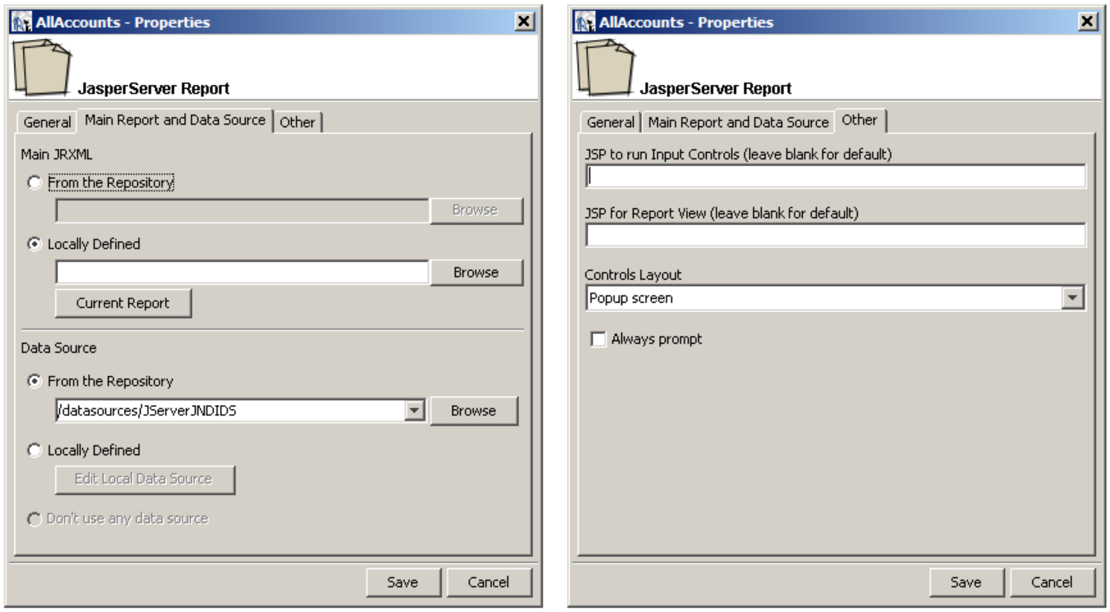
2. Edit the file, either in the Designer or in the XML editor. For information about adding images or subreports to the JRXML file, see section 7.3, "Creating a Report Unit in the Repository from iReport," on page 171.
3. To save the file and upload it to the repository, right-click the file in the repository tree and click **Replace with Current JRXML**.

   A message confirms the operation's success.

To edit a Report Unit in the Repository from iReport:

1. In the Repository Navigator, right-click the report unit and select **Properties**.
2. On the **General** tab, change the repository name and description.
3. On the **Main Report and Data Source** tab, you can change the JRXML file for the report, either by selecting one from the repository, or uploading one through iReport. Click **Current Report** to use the JRXML currently being edited in iReport. Similarly, you can select the data source from the repository or from iReport. See Figure 7-9 on page 178.
4. On the **Other** tab, you can set display properties for any input controls.
5. On the JSP fields you can modify the appearance of the controls.

   The Controls Layout determines where they appear.



Main JRXML

○ From the Repository

● Locally Defined

Data Source

● From the Repository

/datasources/JServerJNDIDS

○ Locally Defined

○ Don't use any data source

JSP to run Input Controls (leave blank for default)

JSP for Report View (leave blank for default)

Controls Layout

Popup screen

□ Always prompt

Figure 7-9 Properties of a Report Unit in iReport

6. Click **Save** to make the changes effective in the repository.

7.6 Running a Report from iReport

To run a report on the server using all the export options set in iReport:

1. Right-click a report in the repository tree and click **Run JasperServer Report**.
2. If the report has input controls, the Report Parameters dialog prompts you for values:

   The report is displayed in the report viewer. If the report does not appear, look for errors or messages in Report Problems at the bottom of the iReport console.

7.7 Using the Domain Plug-in

A Domain is a virtual view of a data source that represents the data in business terms appropriate to your audience. A Domain restricts access to data that is inappropriate for your audience. For more information about Domains, see **Chapter 6, "Creating Domains," on page 139**.

The Domain plug-in enables iReport users to generate reports from Domains.

To open the Domains Window:

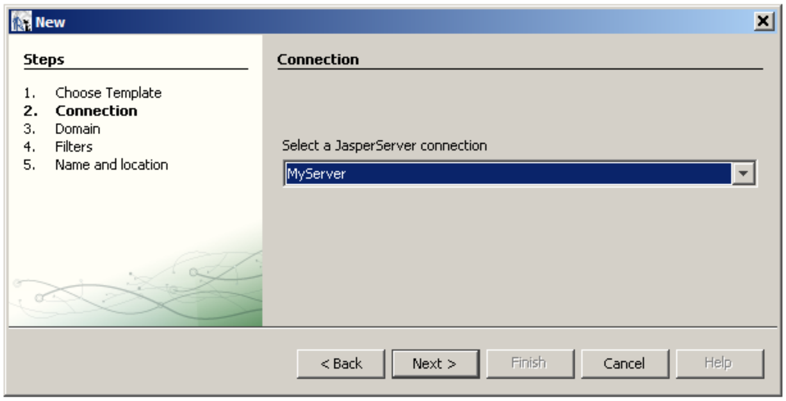
1. Connect to the server from iReport as described in section **7.2, "Connecting to the Server from iReport," on page 170**.
2. Click **Window > Domains**.

   The Domains Window appears on the left-hand side of the screen.

To create a report in iReport based on a Domain in the server:

3. To start a report based on a Domain, in iReport, click **File > New**.
4. In the New file window, click **Domain Report**.
5. Accept the default, **Blank A4**, for the report size, and click **Finish**.

   The Domain Report wizard opens to the Connection step:



New

Steps

1. Choose Template
2. **Connection**
3. Domain
4. Filters
5. Name and location

Connection

Select a JasperServer connection

MyServer

Figure 7-10 Connection Step in the iReport Domain Report Wizard

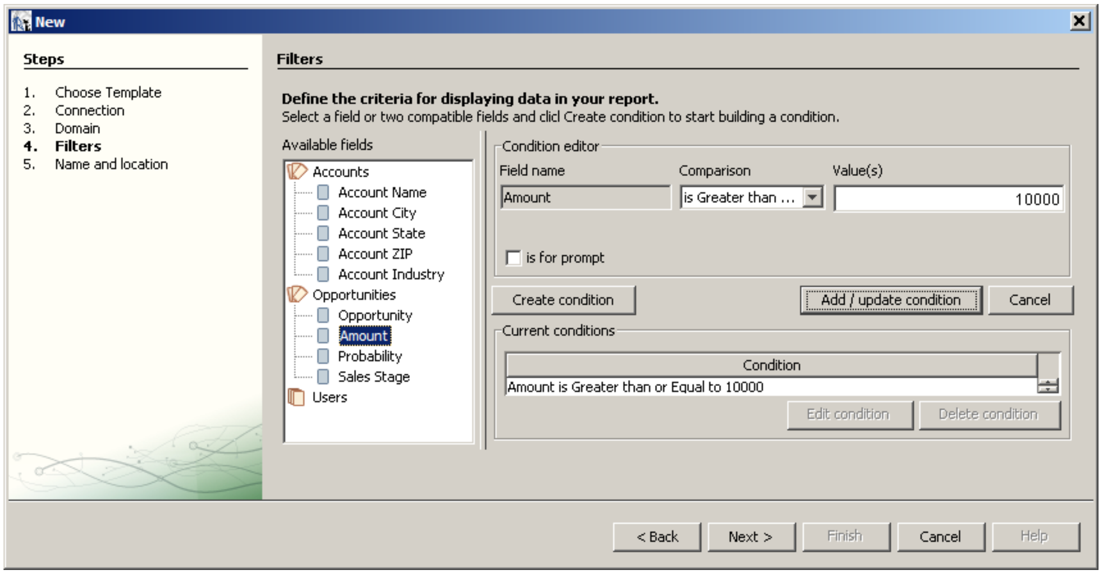
6. Select a connection to a JasperReports Server, then click **Next**.

   The Domain step displays a selector containing all the Domains within the repository visible to the user defined in the connection.

   If the user's organization includes a sub-organization, the list includes any Domains in the sub-organization as well.

7. Select a Domain. For example, accept the default Domain, Simple_Domain, and click **Next**. The Filters step displays the Domain's items, which may correspond to fields and calculated fields in the Domain.
8. Define any necessary filter conditions to apply to the fields of the Domain. For example, expand Opportunities, double-click Amount. In the **Condition editor**, select **is Greater than or equal to**. Enter the value 10000, as shown in **Figure 7-11**, and click **Add/Update condition**. Even if that field is not included in the report, the filter is active and is applied to the rows of data that appear.

   Filters limit the data the report returns, and you may select any field to prompt the user with an input control. This page is similar to the Filters page in the Data Chooser wizard within the server. For more information, see section **4.8.1.2, "The Pre-filters Page," on page 87**.



New

Steps

1. Choose Template
2. Connection
3. Domain
4. **Filters**
5. Name and location

Filters

Define the criteria for displaying data in your report.
Select a field or two compatible fields and clicl Create condition to start building a condition.

Condition editor

Field name: Amount
Comparison: is Greater than ...
Value(s): 10000
☐ is for prompt

Current conditions

Condition
Amount is Greater than or Equal to 10000

Figure 7-11 Filters Step in the iReport Domain Report Wizard

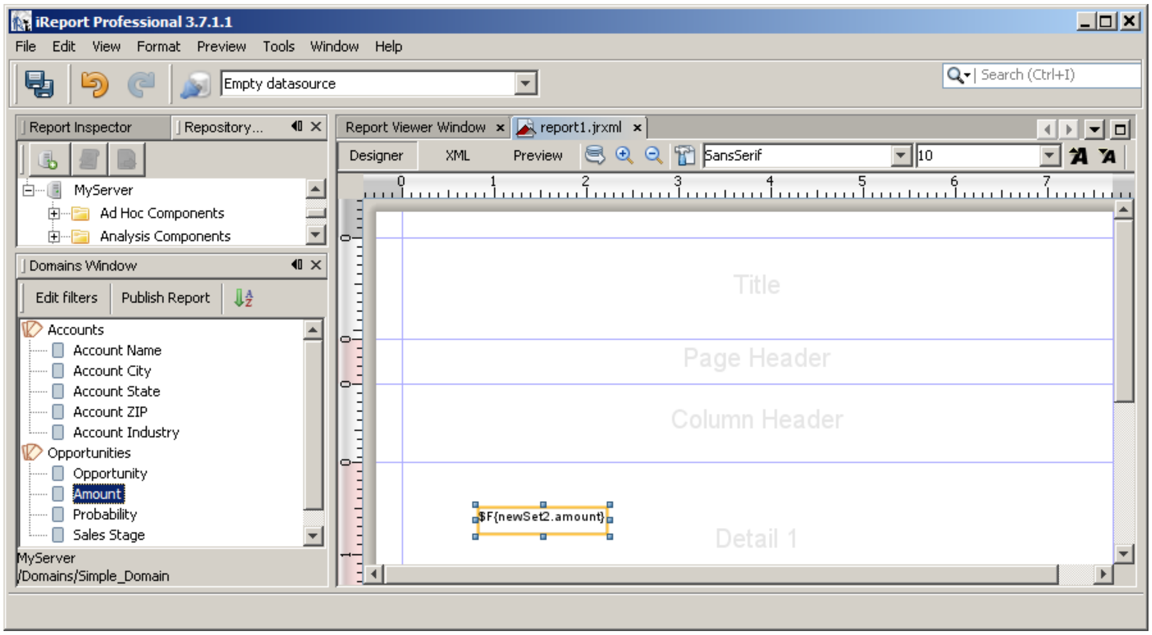
9. Click **Next**. In the Name and Location step, enter a name and a location on the hard drive to save the report.

   The Name and Location step determines the file name of the report in iReport, not in the JasperReports Server repository. Perform step 12 to step 14 to publish the report in the repository.

10. Click **Finish**.

    The report document appears in design area. The Domain Window now shows the sets and items in the Domain.

11. Drag items from the Domains Window to the detail area of the JRXML in the designer to add them to the report, as shown in Figure 7-12. Edit the report to format its data and its look and feel.



iReport Professional 3.7.1.1

Empty datasource

$F{newSet2.amount}

MyServer
/Domains/Simple_Domain

Figure 7-12 Using a Domain on the Server from iReport

If you want to change the filters on the Domain data, click **Edit Filters** in the Domains Window. Filters are defined as queryFilterString elements in the XML of the report. Click **XML** next to **Designer** to view the XML.

For the simple filter shown in **step 8**, the following XML is generated:

```
<queryString language="domain">
  <![CDATA[<query>
            <queryFields>
              <queryField id="newSet2.amount"/>
            </queryFields>
            <queryFilterString>newSet2.amount &gt;= 10000</queryFilterString>
          </query>]]>
</queryString>
```

The `query` has two elements: `queryFields` and `queryFilterString`:

- Field IDs in both elements are specified as `set_ID.field_ID`.
- The filter uses the Domain Expression Language described in section **8.2, "The DomEL Syntax," on page 198**.

12. When you are satisfied with the report, save the report, then click **Publish Report** in the Domain window.

    You are prompted for a name, label, and description of the new report unit.

13. Enter a name (object ID), label (display name), and an optional description for the report in the repository, then click **Next**.

    You are prompted for a location for the report unit.

14. Select a valid repository location and click **Finish**.
15. If the report doesn't appear in the repository tree, right-click the server name and click **Refresh**.
16. With the report published to the server, you can test it by clicking in the repository navigator window.

    The report output appears in the report viewer Window.

You cannot run a Domain report until it has been published to the server.

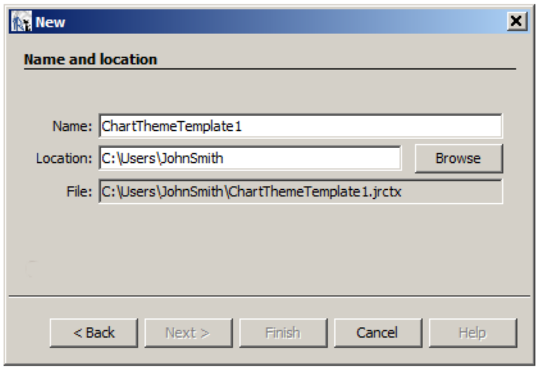
7.8 Creating and Uploading Chart Themes to the Server

Using iReport, you can create new chart themes that give a custom look to any chart. You can easily set the fonts, colors, line widths, and other settings that determine the appearance of charts. You can then import the chart theme for use in reports generated in the server, either on a report-by-report basis or as a global setting for all charts that do not provide their own theme. After creating the chart theme, you can upload it to the server using the JasperReports Server Plug-in.

To create a new chart theme in iReport:

1. Select **File > New > Chart Theme** and click **Finish**.

   The new file dialog box opens with a default file name. Chart themes use the .jrctx file extension.



Name: ChartThemeTemplate1

Location: C:\Users\JohnSmith

File: C:\Users\JohnSmith\ChartThemeTemplate1.jrctx

Figure 7-13 New Chart Theme in iReport

2. Enter a name and location and click **Finish**.

   Alternatively, open an existing chart theme file with the .jrctx extension.

   The chart theme editor appears in the Designer window.

3. Maximize and pin, if necessary, the following windows, which you use together to work with the chart theme:

   - **Template Inspector** on the left – Select a category of properties.
   - **Properties** on the right – View and change properties.

   If the windows are not open, select **Window > Template Inspector** and **Window > Properties**.

   These windows are shown in **Figure 7-14 on page 183**.

   The available options are based on the JFreeChart library used to generate charts. iReport supports only the most common options provided by JFreeCharts.

   iReport supports only the most common options provided by JFreeCharts.

4. Select each category in the template inspector and review the available options, which appear in the properties window to the right.

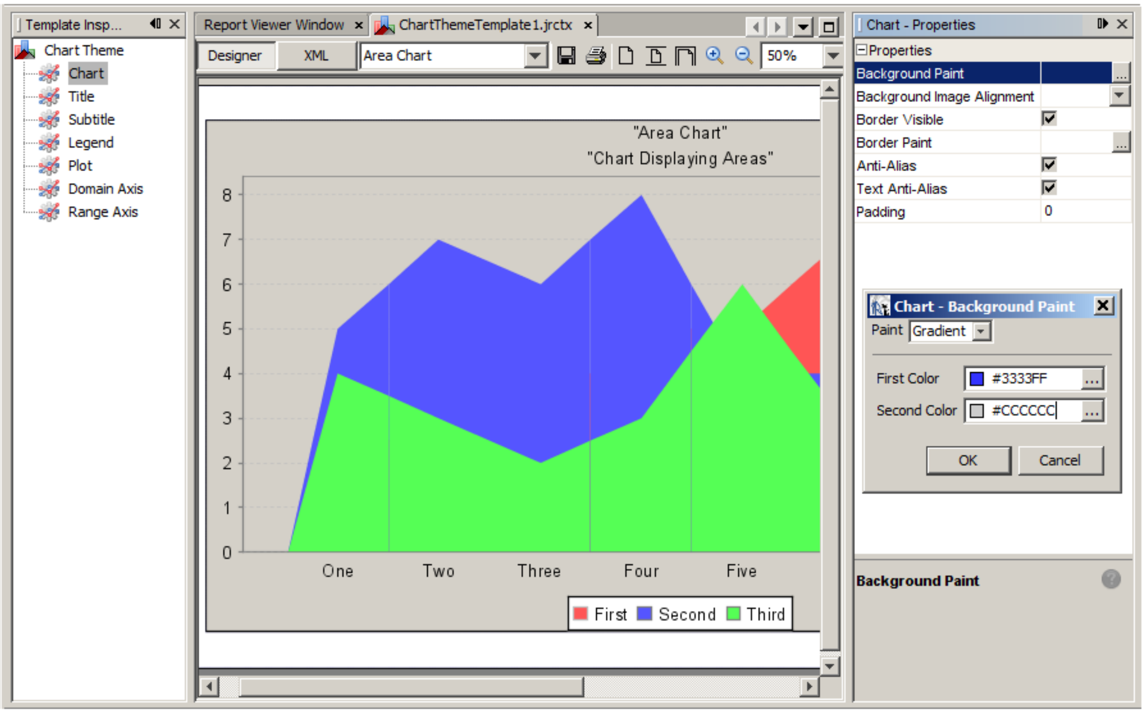
5. Select a property to change its value.

   Depending on the nature of the property, you might type text, select a color, check or clear a check box, or select a value from a drop-down. As you update the chart theme, the Designer shows your changes. For example, change the Series Color property in the Plot category to set the color of the data series in the chart.

6. Select different chart types from the drop-down.

   Testing the theme with different chart types is critical if you are creating a theme for use with many reports, such as a corporate chart theme.

7. To view the XML that defines the chart theme's appearance, click the **XML** tab.



Properties

Background Paint	
Background Image Alignment	
Border Visible	☑
Border Paint	
Anti-Alias	☑
Text Anti-Alias	☑
Padding	0

Chart - Background Paint

Paint: Gradient

First Color: #3333FF

Second Color: #CCCCCC

Figure 7-14 Chart Theme Editor in iReport

8. When you are satisfied with the chart theme, click **File > Save** to save the chart theme.

   This saves the report to your local hard drive.

9. In the template inspector, right-click **Chart Theme**, and click **Export as Jar** from the context menu.

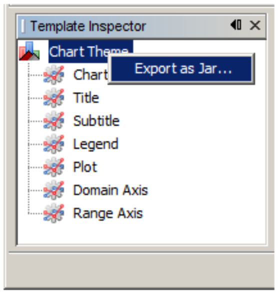


Figure 7-15 Exporting a Chart Theme

10. Enter the name of the theme and the name of the JAR file when prompted to identify the chart theme.

    The chart theme name is the text that appears in the **Chart Theme** drop-down in iReport's properties list. If you don't want this theme to be available in iReport for some reason, clear the check box.

11. Leave the box checked if you want the JAR to be placed on iReport's classpath.

12. Click **Export**.

    The chart theme is exported. The theme can be used at the report or server level in JasperReports Server. For more information, refer to the *JasperReports Server Administrator Guide*.

In iReport, you can upload the chart theme to the server using the JasperReports Server plug-in; right-click the folder in the repository where the theme should reside, and select **Add > JAR Archive**.

Chapter 8 Advanced Domain Features

This section describes functionality that can be restricted by the software license for JasperReports Server. If you don’t see some of the options described in this section, your license may prohibit you from using them. To find out what you're licensed to use, or to upgrade your license, contact Jaspersoft.

The security file and locale bundle are optional information in a Domain. When included, these options provide data access permissions and localized strings for reports based on a Domain. The data security and localized strings are defined in external files that Domain creators must upload to the Domain. Security and locale options take effect in the Ad Hoc Editor when creating the report and in the final output when running the report.

The Domain design can be exported to an XML file and edited outside of JasperReports Server. This gives Domain creators an alternative to using JasperReports Server to modify the design and simplifies sharing of Domains between systems. This chapter documents the syntax for the security file and locale bundle and discusses the important considerations in writing or modifying file contents. The discussion begins with the Domain design file because the security file and locale bundles rely on certain values it contains.

For a definition of the terms column, field, and item as used in Domains, see section **6.1.2, “Terminology,” on page 140**.

This chapter contains the following sections:

- **The Domain Design File**
- **The DomEL Syntax**
- **Security and Locale Information for a Domain**
- **The Domain Security File**
- **Locale Bundles**
- **Internationalized Databases**

8.1 The Domain Design File

The design of a Domain specifies the selection of tables in the data source, any derived tables, joins, calculated fields, and filters, as well as how those elements appear to users. In JasperReports Server, the Domain design can be created interactively through the Domain Designer, however there is also an XML file format for exporting and uploading the settings. The text file containing a Domain design represented in XML is called a design file.

The XML in a design file is a hierarchy of elements and attributes on those elements that specifies all the settings in the Domain. The elements and attributes are defined by an XML schema provided in an XSD file. In addition, there are constraints on a Domain design that are not expressed in the XML schema. A design file can be modified or written from scratch in an editor and uploaded to the server, as long as it conforms to the XML schema and the design constraints.

XML is not the native format of the Domain design. The XML file is only a representation from which the design can be inferred. A design has additional constraints that are not mapped in the XML format.

There are several common use cases for working with design files:

- Completing the elements of a new design. Use the Domain Designer to define as much of the design as possible, then export the design file and add your handwritten code to the exported file. For example, you can enter the SQL query for a derived table or complex expressions for a calculated field.
- Working with very large Domains. The Domain Designer makes it easy to select all tables and columns and expose them as sets and items, but editing the labels and descriptions of dozens of items is faster when they appear in a single design file.
- Making repetitive changes to an existing Domain design. If the database changes or you want to move a design file to a different system, you may need to edit each table or item in the design in the same way. Using search-and-replace on an external editor does this quickly.
- Creating locale bundles and security files as described in the other sections of this chapter. These optional files refer to elements of the Domain design, and it is often more convenient to copy-paste them between external files.
- Creating a Domain design from scratch. It is possible to write a valid XML file that meets the constraints of JasperReports Server and defines a Domain design. However, due to the complexity of creating a valid design file, it is much easier to begin with a basic design file exported from the Domain Designer or to modify an existing design file.

After editing, a design file can be uploaded, validated, and used to define the design of a new or existing Domain. When you open the design in the Domain Designer again, the modifications appear and are editable in the Designer. For example, a description you added in the XML design file appears in the Properties table of the Display Tab, and you are be able to edit it again the Designer. Other elements of the XML file appear on some or all of the Designer tabs.

8.1.1 Exporting the Design File from a Domain

The design file of a Domain can be exported from the Domain Designer dialog and saved as an XML file. The file contains the current state of the Domain in the Domain Designer.

To export a Domain's design file:

1. Log in to the server as an administrator and browse or search for the Domain you want to export.
2. Right-click the Domain and select **Edit** from the context-menu.

   The Edit Domain page of the Domain Designer appears.
3. In Domain Design, click **Edit with Domain Designer**.

   The Domain Designer opens to the Tables tab. The tabs of the designer show the design settings for this Domain that you can export to XML.
4. Click **Export Design**.
5. If your data source supports schemas (subdivisions of a database), you are prompted to include the schema name in the table name. Select **Yes** if you intend to use this Domain design file with the same data source and schema. Select **No** if you intend to re-use this Domain design with other data sources or other schemas.
6. The browser usually gives you the choice of viewing or saving the file. To save the design file, select a location and give it a name. Be sure to keep the .xml suffix.

   The server validates the design before exporting the XML file. If errors are found, you can cancel the export. For more information, see section **6.4.10, "Domain Validation," on page 161**.

8.1.2 Working With a Design File

The relationship between item definitions, column definitions, and actual database columns is the essence of the Domain itself and must be maintained when editing the design file. In order to be usable when uploaded to a Domain, a design file must meet the following conditions:

- It must be well-formed XML.

  This means that all syntax, spelling, and punctuation is correct so that the file contains a hierarchy of elements, attributes, and content.
- It must be valid with regards to the XML schema.

  The XML schema defines element and attribute names that are allowed and how they are nested to create a hierarchical structure. This ensures that the elements and attributes are the same ones with the same meaning used by JasperReports Server. The XML schema of a Domain design is given in the XSD file is located in:

  <install-dir>/samples/domain-xsd/schema_1_0.xsd
- The design file must be internally consistent and define all the necessary elements of a Domain design.

  These are constraints that cannot be expressed in the XSD file because they are outside the scope of an XML schema.
- The tables and columns in the design must be consistent with their external definition in the data source of the Domain.

  The design must references valid table and column names in the data source; in particular, table names for a design based on an Oracle RDBMS must include the schema name. The data source also defines the datatype of a column, and the design must use that column accordingly. As a result, a design file is specific to a given data source and most likely fails when used in a Domain with a different data source.

In addition, the more complex elements of a design file have further constraints:

- SQL queries for a derived table must be valid with respect to the JDBC driver for the data source. Also, the tables and columns in the query must exist in the data source, and the columns in the results must match those declared in the design.
- Expressions for filters and calculated fields must be valid programmatic expressions in a local format called Domain Expression Language (DomEL). This format is documented in section **8.2, "The DomEL Syntax," on page 198**.

The design of a Domain is stored internally in the repository. The XML is only a representation from which the design can be inferred, and it may have some validity errors that cannot be detected. As a result, the Domain resource and the XML may not remain totally synchronized through several cycles of exporting to XML, editing, and uploading. For example, the Domain Designer sometimes renames the result of a join (JoinTree_1), which affects the security file.

However, the Domain Designer also has limitations and cannot create some valid designs. For example, in a design file, you may select the columns of a table whereas you can only select whole tables on the Tables tab. Furthermore, the Domain Designer cannot read some valid designs, in which case you must not open the uploaded design file in the Domain Designer. These rare cases are documented in the following sections.

As with any XML file, a design file is plain text and can be edited in any text editor. The server exports well-formatted XML, and if you want to make only a few changes or simple additions, a text editor is sufficient. For editing the content of the design file, a specialized XML editor ensures that the design file is well-formed, so you don't introduce other errors. If you want to make structural changes or write a design file from scratch, use an XML editor that understands the XML schema in the schema_1_0.xsd file. By loading both the XML and XSD files, this type of XML editor lets you insert elements and attributes only in the places they are allowed to ensure that the design file is valid.

However, no editor can enforce the internal and external constraints on a design file. The following section explains all of the possible elements and attributes of an XML design file and the various constraints you must maintain on each of them.

8.1.3 Structure of the Design File

This section explains each of the XML elements and attributes in a design file and how they relate to the settings in the Domain Designer. The sample XML code is taken from the example Domain created in section **6.2, "Example of Creating a Domain," on page 142**, although some elements have been added to show structures that did not appear in the example.

Because certain XML elements correspond to objects in the Domain design, this section refers to XML elements that *contain* Domain objects such as sets. This is a short-hand description that means the XML elements contain other XML elements that represent the Domain objects.

The top-level container elements of a design file are:

- `schema` (no relationship to the database schema)
- `itemGroups`
- `items`
- `resources`

The following schema representation shows the top-level structure of the design file:

```
<schema xmlns="http://www.jaspersoft.com/2007/SL/XMLSchema" version="1.0"
        schemaLocation="schema_1_0.xsd">
  <itemGroups>...
  </itemGroups>
  <items>...
  </items>

  <resources>...
  </resources>
</schema>
```

- `schema` – The outer-most container element of a design file.

  When exported from the Domain Designer, the `schema` element includes the `xmlns` and `version` attributes.

  - The `xmlns` attribute specifies an XML namespace for all element names.

    This string must be unique to Jaspersoft, but it does not correspond to a valid URL. For more information, see http://www.w3.org/TR/REC-xml-names.
  - The `version` attribute gives the version of the XSD used to create this design file.
  - The `schemaLocation` attribute is often added by XML editors to locate the XSD file.
- `itemGroups` – Contains all the sets and items within sets in the Domain.

  Along with `items`, this element corresponds to all the sets and items defined on the Display tab of the Domain Designer. Therefore, `itemGroups` and `items` define what users see when they create a report based on this Domain. The sets and items defined under `itemGroups` and `items` must be internally consistent with the tables and columns under `resources`.
- `items` – Contains all the items that are not within sets.

  These correspond to the items at the root level of the Display tab. When all items are contained in sets, this element is absent.
- `resources` – Contains all the definitions in the design:
  - columns
  - tables
  - derived tables
  - joins
  - calculated fields
  - filters

  These definitions in the design correspond to the first five tabs of the Domain Designer:

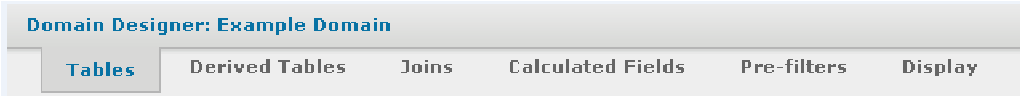


Figure 8-1 Domain Designer Tabs

  Because the elements under `resources` refer to database objects, they must be externally consistent with the data source intended for this Domain.

Even though the `itemGroups` appear first in the design file, this section documents the `resources` first so that design elements are presented in the same order as the tabs of the Domain Designer.

The `resources` element contains the `jdbcTable` and `jdbcQuery` elements to represent database tables and derived tables, respectively. Join trees are represented as a `jdbcTable` element with additional contents to define the joins.

```
<resources>
  <jdbcTable datasourceId="SugarCRMDataSource" tableName="accounts" id="accounts">
    ...
  </jdbcTable>
  <jdbcTable datasourceId="SugarCRMDataSource" tableName="accounts_opportunities"
             id="accounts_opportunities">
    ...
  </jdbcTable>
  <jdbcTable datasourceId="SugarCRMDataSource" tableName="opportunities"
             id="opportunities">
      ...
    <filterString>opportunity_type == 'Existing Business'</filterString>
  </jdbcTable>
  <jdbcQuery datasourceId="SugarCRMDataSource" id="p1cases">
    <fieldList>
      <field id="account_id" type="java.lang.String"/>
      <field id="assigned_user_id" type="java.lang.String"/>
      <field id="case_number" type="java.lang.Integer"/>
      <field id="date_entered" type="java.sql.Timestamp"/>
      <field id="description" type="java.lang.String"/>
      <field id="id" type="java.lang.String"/>
      <field id="name" type="java.lang.String"/>
      <field id="resolution" type="java.lang.String"/>
      <field id="status" type="java.lang.String"/>
    </fieldList>
    <filterString>status != 'closed'</filterString>
    <query>select * from cases where cases.priority=1 and cases.deleted=false</query>
  </jdbcQuery>

  <jdbcTable datasourceId="SugarCRMDataSource" tableName="users" id="users1">
    ...
  </jdbcTable>
  <jdbcTable datasourceId="SugarCRMDataSource" tableName="users" id="users2">
    ...
  </jdbcTable>
  <jdbcTable datasourceId="SugarCRMDataSource" tableName="accounts" id="JoinTree_1">
    ...
  </jdbcTable>
</resources>
```

8.1.3.1 Representing Tables in XML

In the Domain Designer, you can select only entire tables, not individual columns. In the XML design file, however, you can specify any subset of columns that you need.

- `jdbcTable` – Represents a table or a copy of a table in the data source. A Domain design must reference all the tables that it needs to access. The `jdbcTable` element is also used to describe join trees, but this case is documented separately on page 192. All three attributes of `jdbcTable` are required:
  - `datasourceId` – Alias that identifies the data source. When created in the Domain Designer, this is the data source alias defined in section **6.4.3, “Derived Tables Tab,” on page 153**. When creating a design file, this alias may be any name you choose, but it must be identical for all tables and derived tables. When uploading the file, the `datasourceId` automatically becomes the alias associated with the data source defined for the Domain.

  - tableName – Literal name of the table in the data source. For PostgreSQL and Oracle-based data sources, the table name includes the schema name in the form schema_name.table_name, if you opted to include schema names when exporting the design.
  - id – Table ID that is used to reference the table in the Domain design. If you copy a table in order to join it multiple times, each has the same datasourceId and tableName but must be given a different id.
- fieldList – A container for field elements. Required on jdbcTable elements because it would not make sense to have a table without columns in the Domain design. You must reference all the columns that you use in the Domain.
- field – Represents a column of a table in the data source. All the columns that you want to reference in the Domain defined with this element. Both attributes of field are required:
  - id – Literal name of the column in the data source. As in the JDBC model that the data source is based on, the id must be unique within the jdbcTable, but not necessarily within the Domain.
  - type – The Java type of the column, as determined from the data source by the JDBC driver. The type is one of the following:

    java.lang.Boolean
    java.lang.Byte
    java.lang.Character
    java.lang.Double
    java.lang.Float
    java.lang.Integer
    java.lang.Long
    java.lang.Short
    java.lang.String
    java.math.BigDecimal
    java.sql.Date
    java.sql.Time
    java.sql.Timestamp
    java.util.Date

Unless you know the name and type of every column in the data source, it is often easier to select and export tables from the Domain Designer. The Domain Designer accesses the data source to find the names of all tables and columns, as well as their types. You may then export the XML design file with this information and refine your design.

If you have proprietary types in your database, the server may not be able to map its Java type from the JDBC driver. You can configure the mapping for proprietary types, as described in the *JasperReports Server Administrator Guide*.

Alternatively, you can override any mapping by specifying the type attribute for any given field in the XML design file. The server uses this Java type for the field, regardless of its mapping. If your proprietary type cannot be cast in the specified type, the server raises an exception.

8.1.3.2 Representing Derived Tables in XML

Derived tables are similar in structure to tables, but they use the jdbcQuery element which contains the query element:

- jdbcQuery – Represents a derived table that is the result of an SQL query.

  Both attributes of jdbcQuery are required:
  - datasourceId – Alias that identifies the data source for the Domain. The alias designates the data source to be queried. In the design file, this alias must be identical for all tables and derived tables.
  - id – Table ID that is used to reference the derived table in the Domain design. Any reference to the id of a jdbcTable may also reference the id of a derived table.
- fieldList – A required container for the field elements.

  When the derived table is created in the Domain Designer, the set of columns corresponds to the selection of columns in the query result on the Derived Tables tab.
- field – Represents a column in the results of the query.

  Only the columns represented by a field element are available for reference by other elements. The columns of a derived table must be among those returned by the query.
  - id – Literal name of the column in the query result. If the query gives an alias to the column in a SELECT AS statement, the id is the same as the alias. The id must be unique within the query results, but not necessarily within the Domain.
  - type – The Java type of the column, as determined from the data source by the JDBC driver.
- query – The SQL query sent to the database server.

  Any valid SQL can be used, as long as the columns in the result match the id and type of all field elements of the derived table given in the fieldList. If you add a derived table in the Domain Designer, it runs the query and generates columns based on the result set. You could then export the design file containing the generated column list. The syntax for a valid SQL query does *not* include a closing semi-colon (;).

The following sample query selects some columns, including a field calculated in the SQL, from the result of a join with sorted results. In this case, only `exp_date`, `store_id`, `amount`, `currency`, `conv`, and `as_dollars` can be exposed as columns of this derived table.

```
<query>
  select e.exp_date, e.store_id, e.amount, c.currency, c.conversion_ratio conv,
    amount * c.conversion_ratio as_dollars
  from expense_fact e join currency c
    on (e.currency_id = c.currency_id and date(e.exp_date) = c.date)
  order by e.exp_date
</query>
```

A derived table provides an alternative way to create joins and calculated fields. Here are some things to keep in mind when deciding how to implement the Domain:

- Unlike joins defined in the Domain, joins within a derived table are not restricted to equality comparisons when uploaded to the Domain Designer. For more information, see section **8.1.3.3, "Representing Joins in XML," on page 191**.
- Unlike calculated fields in DomEL, calculated fields within derived tables may use any function call recognized by the RDBMS. See section **8.2, "The DomEL Syntax," on page 198** for restrictions on function calls in calculated fields.
- The Domain mechanism applies filters, aggregation, and joins to derived tables by wrapping the SQL in a nested query, which may be less efficient on some databases than the equivalent query generated for a non-derived table.

8.1.3.3 Representing Joins in XML

A join is represented in the design file as a special `jdbcTable` element. It contains the `joinInfo` and `joinedDataSetList` elements to define the actual joins. It also contains a list of columns that are exposed through the Domain, each with a prefix on the field `id` attribute to identify its originating table. The Domain Designer automatically exposes all columns of all tables in a join, but in the design file you only need to specify those you want to reference elsewhere in the Domain.

```
<jdbcTable datasourceId="SugarCRMDataSource" id="JoinTree_1" tableName="accounts">
  <fieldList>
    <field id="accounts_opportunities.account_id" type="java.lang.String"/>
    ...
  </fieldList>
  <joinInfo alias="accounts" referenceId="accounts"/>
  <joinedDataSetList>
    <joinedDataSetRef>
      <joinString>join accounts_opportunities accounts_opportunities on
        (accounts.id == accounts_opportunities.account_id)</joinString>
    </joinedDataSetRef>
    <joinedDataSetRef><joinString>join opportunities opportunities on
        (accounts_opportunities.opportunity_id == opportunities.id)</joinString>
    </joinedDataSetRef>
    <joinedDataSetRef><joinString>join users1 users1 on
        (opportunities.assigned_user_id == users1.id)</joinString>
    </joinedDataSetRef>
    <joinedDataSetRef><joinString>left outer join p1cases p1cases on
        (accounts.id == p1cases.account_id)</joinString>
    </joinedDataSetRef>
    <joinedDataSetRef><joinString>right outer join users2 users2 on
        (users2.id == p1cases.assigned_user_id)</joinString>
    </joinedDataSetRef>
  </joinedDataSetList>
</jdbcTable>
```

- jdbcTable – Represents the results of one or more joins between tables. If not all tables are joined together, there is one jdbcTable representing each join tree and containing only the join expressions for that tree. To define the join, the attributes and elements have a different meaning than for a regular table.
  - datasourceId – Alias that identifies the data source for the Domain. The alias designates the data source where the join is performed. In the design file, this alias must be identical to that for all tables and derived tables.
  - id – ID that is used to reference the join results in the Domain design. In the Domain Designer, each join tree is automatically given the ID JoinTree_n, where n is a sequential number. In the design file, you can give the join any name, as long as it is unique among all other tables and derived tables.
  - tableName – Literal name of the first table in the join. This table name is combined with those in the joinInfo and joinedDataSetList to define the join expressions. For an Oracle RDBMS, the table name includes the schema name in the form schema_name.table_name.
- fieldList – A required container for the field elements in the join tree.
- field – Represents a column in the join tree. The table of each column is identified by a prefix on the id attribute. When created in the Domain Designer, the design file includes every column in every table of the join. When you create your own design file, only the columns you want to reference are needed. Both attributes of field are required:
  - id – Field ID composed of the ID of the table in the design and the literal name of the column in the data source. The syntax is table_ID.field_name.
  - type – The Java type of the column, identical to the type in its table definition.
- joinInfo – Gives the table ID and alias for the table given by the tablename attribute. The table ID and alias are used as the first table in the join definition. This element and its two attributes are required even if they are identical.
  - alias – Alternative name within the join expression for the table identified in referenceId. By default, the alias is the same as the referenceID, but you may supply a true alias in handwritten design files. If you use a distinct alias, you must be careful to use the alias throughout the joinString element that defines the join.
  - referenceId – Table id of the table within the design whose data source name is given in tableName.
- joinedDataSetList – Container for the list of join statements.
- joinedDataSetRef – Container for the join statement.
- joinString – A string expressing an SQL join statement in the following format:

  join_type join table_ID table_alias on join_expression

  Where:
  - join_type – One of right outer, left outer, or full outer. Inner join is the default if no join type is specified.
  - table_ID – The ID of a table within the design.
  - table_alias – Alternative name to use for the table_ID within the join expression. By default, the alias is the same as the table_ID, but you may supply a true alias in handwritten design files.
  - join_expression – Expression that compares the columns on which the join is made, in the form

```
left_table_alias.field_name == right_table_alias.field_name
```

> Join expressions are actually written in the DomEL syntax to allow more complex expressions, such as boolean operators and other comparisons. See section 8.2, "The DomEL Syntax," on page 198.
>
> However, join expressions other than equality between field values are not supported in the Domain Designer. You can upload a design file with such joins, but they are overwritten with equi-joins if you open the design in the Domain Designer. Join expressions with several boolean clauses are not supported in the Domain Design either. You can sometimes replace them with filters on tables in the join.

The order of joinedDataSetRef elements is important. The first one must contain a join expression between the table_alias it defines and the alias in the joinInfo element. The subsequent ones may only reference the table_alias they define and ones that appear in joinString elements before them.

8.1.3.4 Representing Calculated Fields in XML

Calculated fields are defined as regular columns in a field element with an additional attribute. Calculated fields that rely only on columns of the same table appear in jdbcTable for that table, as well as in the join tree. Calculated fields that rely on columns from different tables that are joined appear only in the join tree.

The following example shows the XML for a calculated expression in the `accounts` table. Because it references only the columns of `accounts`, it appears in that table and in the join tree.

```
<jdbcTable datasourceId="SugarCRMDataSource" id="accounts" tableName="accounts">
  <fieldList>
    ...
    <field dataSetExpression="concat( billing_address_city, ', ',
           billing_address_state )" id="city_and_state" type="java.lang.String"/>
    ...
  </fieldlist>
</jdbcTable>
...
<jdbcTable datasourceId="SugarCRMDataSource" id="JoinTree_1" tableName="anything">
  <fieldList>
    ...
    <field dataSetExpression="concat( accounts.billing_address_city, ', ',
           accounts.billing_address_state )" id="accounts.city_and_state"
           type="java.lang.String"/>
    ...
  </fieldlist>
</jdbcTable>
```

The attributes of the `field` element have a different meaning when defining a calculated field:

- `dataSetExpression` – Expression which calculates a value based on other columns. The syntax for the expression, including how to reference columns, is documented in section **8.2, "The DomEL Syntax," on page 198**.
- `id` – User-defined name of the calculated field. The format of the `id` is dependent on how the calculated field appears in the design file:

1. If the expression references columns in the same table:
   a. The field appears in the table and the `id` is a simple column name.
   b. The field also appears in a join tree that uses the table, the `id` has the form `table_ID.field_name`.
2. When the expression references columns in different tables, the field appears only in the join tree of those tables, and the `id` has the form `jointree_ID.field_name`.
3. When the expression computes a constant value. The field appears in a table named `Constant`, and the `id` is a simple column name. Constant fields are further explained below.

- `type` – The Java type of the value calculated by the expression, for example `java.lang.String`. This type must be compatible with the result of the DomEL expression and among the JDBC-compatible types listed on **page 190**.

A special case of a calculated field occurs when the expression does not reference any column names. The calculated field always has the same value and is said to be a constant. In the Domain Designer, constant fields are automatically grouped in a table named `Constant` and may be used in other calculated fields, filters, or even as an item. Because constant fields are not dependent on any column values, they may be used in any join tree and exposed to the user along with the items from any join tree. When editing a design file, you must treat constant calculated fields in the same way.

8.1.3.5 Representing Filters in XML

Filters are defined as optional `filterString` elements inside of `jdbcTable` and `jdbcQuery` elements. They impose a condition on any results that are returned for that table, query, or join tree, thereby limiting the number of rows returned when accessing the data source. Whereas other settings mainly determine which columns are available for use in a report. A filter determines which rows are available when running the report.

- `filterString` – Expression which evaluates to true or false when applied to each row of values in the data source. The expression refers to columns using their `id` attribute. Thus, a filter on a table or derived table refers to the simple column name, but a filter on a join tree refers to the `table_ID.field_name`. The full syntax for the expression is documented in section **8.2, "The DomEL Syntax," on page 198**.

Filters defined in the Domain Designer are limited to conditions on one column or comparisons of two columns, with more complex filters created by the conjunction (logical AND) of several conditions. Other filter expressions are not supported. You can upload a design file with more complex filters, but they are overwritten or cause errors if you open the design in the Domain Designer.

For example, the following filters are defined in the example Domain on **page 148**:

```
<jdbcTable datasourceId="SugarCRMDataSource" id="opportunities"
           tableName="opportunities">
  <fieldList>
    ...
    <field id="opportunity_type" type="java.lang.String"/>
  </fieldList>
  <filterString>opportunity_type == 'Existing Business'</filterString>
</jdbcTable>
<jdbcQuery datasourceId="SugarCRMDataSource" id="p1cases">
  <fieldList>
    ...
    <field id="status" type="java.lang.String"/>
  </fieldList>
  <filterString>status != 'closed'</filterString>
  <query>...</query>
</jdbcQuery>
```

8.1.3.6 Representing Sets and Items in XML

Now that all the table and field IDs have been defined, look at the definitions of sets and items that are exposed through `itemGroups` and `items` elements at the top of the Domain design file. The `itemGroups` and `items` elements are equivalent to the selection of sets and items on the Display tab of the Domain Designer. They create a hierarchy of sets, subsets and items and hold attributes that define all the properties available on sets and items. For a description of each possible property, see section **6.4.8, "The Properties Panel," on page 159**. The following example shows two levels of sets, with items inside each level as well as at the root, outside of any set.

```
<itemGroups>
  <itemGroup label="outerset" ... >
    <itemGroups>
      <itemGroup label="innerset" ... >
        <items>
          <item label="innersetitem1" ... />
          <item label="innersetitem2" ... />
        </items>
      </itemGroup>
    </itemGroups>

    <items>
      <item label="outersetitem1" ... />
      <item label="outersetitem2" ... />
    </items>
  </itemGroup>
</itemGroups>
<items>
  <item label="outsideitem1" ... />
  <item label="outsideitem2" ... />
</items>
```

- `itemGroups` – A container for `itemGroup` elements.
- `itemGroup` – Represents a set. The `itemGroup` element may contain an `itemGroups` element, an `items` element, or both, representing its subsets and items, respectively. The attributes of `itemGroup` are the properties of the set it represents:
  - `id` – The unique identifier of the set among all set and item IDs. This attribute is required.
  - `label` – The set's name, visible to users of the Domain. If the label is missing, the Ad Hoc Editor displays the `id`.
  - `description` – The optional description of the set, visible to users as a tooltip on the set name in the Ad Hoc Editor.
  - `labelId` – The internationalization key for the label in the Domain's locale bundles.
  - `descriptionId` – The internationalization key for the description in the Domain's locale bundles.
  - `resourceId` – A reference to the table on which the set is based. This attribute is required, but it has no meaning on a set and is not significant in the design.

  When an internationalization key is defined for the label or description, the label or description is replaced with the value given by the key in the local bundle corresponding to the user's locale. See section **8.5, "Locale Bundles," on page 211**.
- `items` – A container for `item` elements.
- `item` – Represents an item. The attributes of `item` are the properties of the item it represents:
  - `id` – The unique identifier of the item among all set and item IDs. This attribute is required.
  - `label` – The item's name, visible to users. If the label is missing, the Ad Hoc Editor displays the `id`.
  - `description` – The optional description of the item, visible as a tooltip on the item name in the Ad Hoc Editor.
  - `labelId` – The internationalization key for the label in the Domain's locale bundles.
  - `descriptionId` – The internationalization key for the description in the Domain's locale bundles.
  - `resourceId` – A reference to the column on which the item is based. This attribute is required because it defines the connection between what the user sees and the corresponding data in the data source. The `resourceId` has the form `table_ID.field_ID`. When the item refers to a column in a join tree, the `resourceID` corresponds to `jointree_ID.table_ID.field_name` because the field ID in a join tree includes the table ID.
  - `dimensionOrMeasure` – Corresponds to the **Field or measure** setting in the user interface. Its possible values are `Dimension` (equivalent to field) or `Measure`. By default, all numeric fields are treated as measures in the Ad Hoc Editor. This attribute is optional and necessary only when overriding the default behavior, for example to make a numeric item explicitly not a measure. See section **6.1.2, "Terminology," on page 140**.
  - `defaultMask` – A representation of the default data format to use when this item is included in a report. The possible values depend on the `type` attribute of the column referenced by the `resourceId`. See the table below.
  - `defaultAgg` – The name of the default summary function (also called aggregation) to use when this item is included in a report. The possible values for the `defaultAgg` depend on the `type` attribute of the column referenced by the `resourceId`. The following table gives the possible data formats and summary functions based on the column type. The appearance columns show the equivalent setting in the properties table of the Display tab:

Field Type	Default Data Formats		Default Summary Functions	
	Attribute Value	**Appearance**	**Attribute Value**	**Appearance**

Integer	`#,##0`
	`0`
	`$#,##0;($#,##0)`
	`#,##0;(#,##0)`
		-1,234
		-1234
		($1,234)
		(1234)
			`Highest`
			`Lowest`
			`Average`
			`Sum`
			`DistinctCount`
			`Count`
				Maximum
				Minimum
				Average
				Sum
				Distinct Count
				Count All

Double	`#,##0.00`
	`0`
	`$#,##0.00;($#,##0.00)`
	`$#,##0;($#,##0)`
		-1,234.56
		-1234
		($1,234.56)
		($1,234)		

Date	`short,hide`
	`medium,hide`
	`long,hide`
	`medium,medium`
		3/31/09
		Mar 31, 2009
		March 31, 2009
		Mar 31, 2009 23:59:59
			`DistinctCount`
			`Count`
				Distinct Count
				Count All

All others	*Not allowed*			

The following example shows the use of the itemGroup and item elements to represent the sets and items from section **6.2, “Example of Creating a Domain,” on page 142**. The design file was exported from the Domain Designer.

```
<itemGroups>
  ...
  <itemGroup id="users1" label="Account Rep" description="Primary account
             representative" labelId="" descriptionId="" resourceId="JoinTree_1">
    <items>
      <item id="first_name" label="First Name" description="Given name"
            labelId="" descriptionId="" resourceId="JoinTree_1.users1.first_name"/>
      <item id="last_name" label="Last Name" description="Surname or family name"
            labelId="" descriptionId="" resourceId="JoinTree_1.users1.last_name"/>
    </items>
  </itemGroup>
  <itemGroup id="opportunities" label="Opportunity" description="Sales opportunity"
             labelId="" descriptionId="" resourceId="JoinTree_1">
    <items>
      <item id="date_entered1" label="Date" description="Date opportunity opened"
            labelId="" descriptionId="" defaultMask="short,hide"
            resourceId="JoinTree_1.opportunities.date_entered"/>
      <item id="amount" label="Amount" description="Estimated contract Amount"
            labelId="" descriptionId="" defaultMask="$#,##0;($#,##0)"
            defaultAgg="Average" resourceId="JoinTree_1.opportunities.amount"/>
      <item id="probability" label="Probability" description="Chance of closing the
            contract" labelId="" descriptionId=""
            resourceId="JoinTree_1.opportunities.probability"/>
      <item id="description1" label="Description" description="Description of
            opportunity" labelId="" descriptionId=""
            resourceId="JoinTree_1.opportunities.description"/>
      <item id="lead_source" label="Lead Source" description="Lead Source" labelId=""
            descriptionId="" resourceId="JoinTree_1.opportunities.lead_source"/>
      <item id="sales_stage" label="Sales Stage" description="Sales Stage" labelId=""
            descriptionId="" resourceId="JoinTree_1.opportunities.sales_stage"/>
    </items>
  </itemGroup>
  <itemGroup id="p1cases" label="P1 Case" description="High priority (P1) support
             case" labelId="" descriptionId="" resourceId="JoinTree_1">
    <items>
      <item id="case_number" label="Case" description="Case number" labelId=""
            descriptionId="" resourceId="JoinTree_1.p1cases.case_number"/>
      <item id="date_entered2" label="Date" description="Date case opened" labelId=""
            descriptionId="" resourceId="JoinTree_1.p1cases.date_entered"/>
      <item id="name2" label="Summary" description="Name or summary of case"
            labelId="" descriptionId="" resourceId="JoinTree_1.p1cases.name"/>
      <item id="description2" label="Description" description="Detailed description
            of the case" labelId="" descriptionId=""
            resourceId="JoinTree_1.p1cases.description"/>
      <item id="resolution" label="Resolution" description="Description of the case
            resolution" labelId="" descriptionId=""
            resourceId="JoinTree_1.p1cases.resolution"/>
      <item id="status" label="Status" description="Current case status" labelId=""
            descriptionId="" resourceId="JoinTree_1.p1cases.status"/>
    </items>
  </itemGroup>
  ...
</itemGroups>
```

Labels and descriptions may contain any characters, but the ID property value of both `itemGroup` and `item` elements must be alphanumeric and not start with a digit.

8.1.4 Uploading a Design File to a Domain

After you have modified an XML design file, you can upload it through the Add New Domain page. Alternatively, you can create a new Domain based on a modified file or even on a design file created from scratch.

To upload an XML design file:

1. Log in to the server as an administrator and select **View > Search Results**.
2. Locate the Domain.
   a. Choose **View > Search Results**.
   b. In the Filters panel, under Types, click **More choices**.
   c. Click Domains.
3. To update an existing Domain, right-click the Domain and select **Edit** from the context-menu.

   To create a new Domain, select **Create > Domain** from the main menu.

   The Domain appears in the Data and Design page of the Edit Domain or Add New Domain dialog. If you are creating a new Domain, you must select a data source before you can proceed.
4. Select **Upload** under the Domain Schema, then click **Browse** to find the XML design file. In the File Upload window, click Open.

   The design file overwrites any existing design without prompting. If you make a mistake or upload the wrong file, click **Cancel** on the Data and Design page and start over.

   The server validates the uploaded XML file. If there are syntax or semantic errors, the current design is not replaced. You can make changes to the XML file and upload it again until there are no errors.
5. If you used only supported features in the design file, verify the uploaded Domain design by selecting **Edit in Domain Designer**. Make sure the settings you made in the XML file appear as expected on the various tabs of the Domain Designer. If there are any errors or inconsistencies, you should make changes to the XML file, upload it again, and verify it again. The results of editing a design in the Domain Designer based on inconsistent XML file are unpredictable. If you cannot resolve the error or inconsistencies, you should click **Cancel** on the Data and Design page so that the uploaded design is not saved.

   After the design appears correctly in the Domain Designer, you may make further modifications on any of the tabs.

   If you intentionally use syntax in the design file that Domain Designer does not support, do **not** launch the Domain Designer after uploading the file. The Domain Designer can have unpredictable results with some XML designs it does not support.
6. Click **OK**, then click **Submit** to update the Domain in the repository.
7. If you modified an existing Domain, you must clear the Ad Hoc cache of all queries based on the Domain. This removes any data that was based on the old instance of the Domain and avoid inconsistencies in new reports. For instructions, see the *JasperReports Server Administrator Guide*.

8.2 The DomEL Syntax

Various components of a Domain need to compute values based on some expression involving constants, field values, and environment variables. The Domain Expression Language (DomEL) was created to fill this need. Currently, the following features in XML design files are expressed in DomEL:

- The `on` and `where` clauses of derived tables
- The `on` clause of join statements
- Calculated fields
- Filter expressions in Domains and Domain topics (equivalent to `where` clauses)
- The `testProfileAttribute` function
- Row-level security (see section **8.4, "The Domain Security File," on page 204**)

A DomEL expression is a shorthand way of writing a complex query. When processing a report based on a Domain, the server interprets DomEL expressions to generate parts of the SQL expression that perform the desired query. Depending on the data policy, either the augmented SQL is passed to the data source, or the server performs a simpler query and applies the DomEL expressions to the full dataset in memory.

8.2.1 Datatypes

The following simple datatypes may be declared as constants, used in expressions, and returned as values:

Simple Type	Description	Example of Constant
boolean	Expressions such as comparison operators return boolean values, but `true` and `false` constants are undefined and cannot be used.	none
integer	Whole numbers.	`123` or `-123`
decimal	Floating point numbers. Decimal separator must be a period (`.`); other separators such as comma (`,`) are not supported.	`123.45` or `-123.45`
string	Character string entered with single quotes (`'`); double quotes (`"`) are not supported.	'hello world'
date	ANSI standard date.	`d'2009-03-31'` or `Date('2009-03-31')`
timestamp	ANSI standard date and time.	`ts'2009-03-31` 23:59:59`'` or TimeStamp('2009-03-31 23:59:59')

The following composite datatypes may be declared as constants and used with the `in` *set* or `in` *range* operator. The values in these composite types are not necessarily constant, they could be determined by field values:

Composite Type	Description	Example

set	Contains any number of any simple type above.	`(1, 2, 3)`
		`('apples','oranges')`

range	Inclusive range applicable to numbers and dates, including fields that are number or date types.	`(0:12)` or `(0.0:12.34)`
		`(d'2009-01-01':d'2009-12-31')`
		`(limit_min:limit_max)`

8.2.2 Field References

DomEL expressions are stored in the Domain design and interpreted when the server prepares to run a query to retrieve data from the data source. Therefore, all references to field values in an expression are based on the IDs given in the Domain design. Field references have the following format, depending on where the expression appears:

Appears In	Field Reference	Explanation
Derived table	`table_ID.field_name`	The SQL query that defines a derived table can refer to any previously defined table or derived table in the Domain. Therefore, you must include the table ID.
Join expression	`table_alias.field_name`	Within a join expression, tables are given alias names that must be used. Even though join expressions may appear in separate `joinedDatasetRef` elements, the alias declared in each one can be used in any subsequent one.
Calculated field on a table or derived table	`field_name`	Calculated fields can only appear on a table if they refer exclusively to fields of the table, in which case no table ID is needed. However, the table ID is not forbidden, and the Domain Designer sometimes includes it.
Calculated field on a join tree.	`table_ID.field_name`	Calculated fields declared in join trees refer to fields prefixed with their table ID.
Filter on a table or derived table	`field_name`	Filters that are evaluated within the table or derived table do not need the table ID.
Filter on a join tree	`table_ID.field_name`	Filters that refer to fields in separate tables of the join tree need to use the table ID on each field name.

8.2.3 Operators and Functions

DomEL provides the following operators, listed in order of precedence. Operators higher in this list are evaluated before operators lower in the list:

Operator	Syntax	Description
multiply, divide	`i * j / k`	Arithmetic operators for numeric types only. Parentheses for grouping are not supported.
add, subtract	`i + j - k`	
equal	`i == j`	Comparison operators for string, numeric, and date types.
not equal	`i != j`	
less than	`i < j`	Comparison operators for numeric and date types only.
less than or equal	`i <= j`	
greater than	`i > j`	
greater than or equal	`i >= j`	
in *set*	`i in ('apples','oranges')`	Sets can be of any type.
in *range*	`i in (j:k)`	Ranges must be numeric or date types.
not	`not ( i )`	Boolean operators. Parentheses are required for not and may be used for grouping.
and	`i and j and k`	
or	`i or j or k`	

DomEL also defines the following operations as functions:

Function	Syntax	Description
startsWith	`startsWith(i, 'prefix')`	Comparison operators for strings. To test string equality, use `i in ('string')`.
endsWith	`endsWith(j, 'suffix')`	
contains	`contains(k, 'substring')`	
concat	`concat(i, ' and ', j, ...)`	Returns the string of all parameters concatenated.
testProfileAttribute*	`testProfileAttribute (table_ID.field_name, 'profileAttribute')`	`table_ID.field_name` is the table name and field name of the field you're comparing to a profile attribute. This argument can also be an expression, such as a concatenation of fields. It cannot be a constant or a groovy call. `profileAttribute` is the name of the user profile attribute.

* Profile attributes are available in all editions of JasperReports Server, but the `testProfileAttribute` function is available only in JasperReports Server Professional and Enterprise editions. Contact Jaspersoft to obtain the software.

8.2.4 Profile Attributes

A profile attribute is a name-value pair inserted in a user object, such as a user or role. It is ordinarily used to extend the object's standard access grants, but it has other uses, as well. It can be added to objects by database tools or custom code.

For example, this Groovy expression tests users for the Cities access grant in the `store_city` field in the `store` table:

```
<filterExpression>store.store_city in
(groovy('authentication.getPrincipal().getAttributes().find{ it.attrName == "Cities"
}.attrValue.split(",").collect {"''" + it + "''"
}.join(",").replaceFirst("^''","").replaceFirst("''\$","")'))</filterExpression>
```

Using profile attributes enables you to obtain similar results with simpler expressions. The example below uses a principal expression to find all users with the `Cities` profile attribute, then it uses a filter expression to grant access only to the users among them whose `Cities` profile attribute is `San Francisco`:

```
<resourceAccessGrant id="Jointree_1_row_access_grant_2">
  <principalExpression><![CDATA[authentication.getPrincipal().getAttributes().any{
  it.getAttrName() in ['Cities'] && it.getAttrValue() in ['San Francisco'] }]]></
  principalExpression>
  <filterExpression>store.store_city in ('San Francisco')</filterExpression>
</resourceAccessGrant>
```

The next example tests the same profile attribute, `Cities`. However, instead of granting access only to users with a specific profile attribute, you use variable substitution in the filter expression to grant access to all users according to their `Cities` attribute. A user with the `San Francisco` profile attribute gets access to that city, a user with the `Denver` profile attribute gets access to that city, and so on:

```
<resourceAccessGrant id="Jointree_1_row_access_grant_4">
  <principalExpression><![CDATA[authentication.getPrincipal().getAttributes().any{
  it.getAttrName() in ['Cities'] }]]></principalExpression>
  <filterExpression>store.store_city in
  (groovy('authentication.getPrincipal().getAttributes().find{ it.attrName ==
  "Cities" }.attrValue'))</filterExpression>
</resourceAccessGrant>
```

Finally, testProfileAttribute is a function for taking advantage of the profile attributes feature. An extension of the DomEL language, testProfileAttribute examines an object for a given profile attribute and permits access to the related data when the attribute is present.

Using the testProfileAttribute function, you can write simpler expressions than you can using Groovy. For instance, this filter expression tests users for the Cities profile attribute. Compare it to the expression in the previous example:

```
<filterExpression>testProfileAttribute(store.store_city, 'Cities')</filterExpression>
```

For more information about profile attributes, variable substitution, and testProfileAttribute, see the *JasperReports Server Ultimate Guide* and *Jaspersoft OLAP Ultimate Guide.*

8.2.5 SQL Functions

You may use SQL functions in a DomEL expression, but only in limited circumstances:

- The functions must be supported by the database. See the vendor documentation for available functions and their syntax.
- The functions must follow the convention of comma-separated parameters. For example, you can use TRIM(person.name), but not TRIM('Jr' FROM person.name)
- The type of the return values must be appropriate, either within the expression or for the type of the calculated field.
- The SQL context must be appropriate for the functions. For example, you cannot use aggregation functions such as COUNT in a calculated field because there is no GROUP BY clause.

Except for the comma-separated parameter pattern, the DomEL validation cannot enforce these criteria. You must ensure that any SQL functions meet these criteria, otherwise the expression causes errors when using the Domain to create a report.

8.2.6 Complex Expressions

Complex expressions are written by grouping any of the operators or functions above. Parentheses () may be used for grouping boolean operators, but arithmetic expressions that rely on parentheses are not supported. To compute complex arithmetic expressions, you may need to define several expressions as separate calculated fields, and then reference them in a simpler expression in another calculated field.

The following examples show complex expressions suitable for filters. This first one selects only stores in Western states of the US:

```
s1.store_country in ('USA') and s1.store_state in ('WA', 'OR', 'CA', 'NV')
```

The following filter expression uses a date range:

```
s1.first_opened_date in ( Date( '2000-01-01' ) : Date( '2004-12-31' )) and not( s1.closed )
```

As shown in these examples, field values are often compared to constant values such as 'USA'. Therefore, the author of the design file must ensure that values used in a DomEL expression exist in the data source. Otherwise, a wrong value might go undetected and impact the quality of data in reports based on the Domain. The Domain Designer determines values for comparison by accessing the data source, so if you export a design file, you can use the values it has found. Another way to reduce errors and also support future data changes is to use more general expressions such as:

```
s1.store_country in ('US', 'USA', 'United States')
```

8.2.7 Return Value

DomEL expressions are used in different contexts for different purposes. The expected return type depends on where the expression appears:

Appears In	Expected Return Type	Explanation
Derived Table	SQL query with boolean expressions	A derived table is defined by an SQL expression that contains DomEL expressions. The join on clause may contain boolean comparisons and the where clause may contain filters, both of which are described below.

Appears In	Expected Return Type	Explanation
Join expression	boolean	Within a join expression, the `on` clause contains a comparison of fields from each table that has a boolean result. The `on` clause may also contain other DomEL expressions logically associated with `and` or `or` to create a complex join condition (see warning on **page 191**).
Calculated field	any type	The expression must evaluate to a type that is compatible with the SQL type declared in the Domain Designer or in the design file. For example, if the declared type is `java.lang.Float`, the expression must compute a decimal value.
Filter	boolean	Filters must be true or false overall. When there are several conditions, they must be logically associated with `and` or `or` (currently, only `and` is supported in the Domain Designer).

8.3 Security and Locale Information for a Domain

You can include security and locale information by uploading the following files:

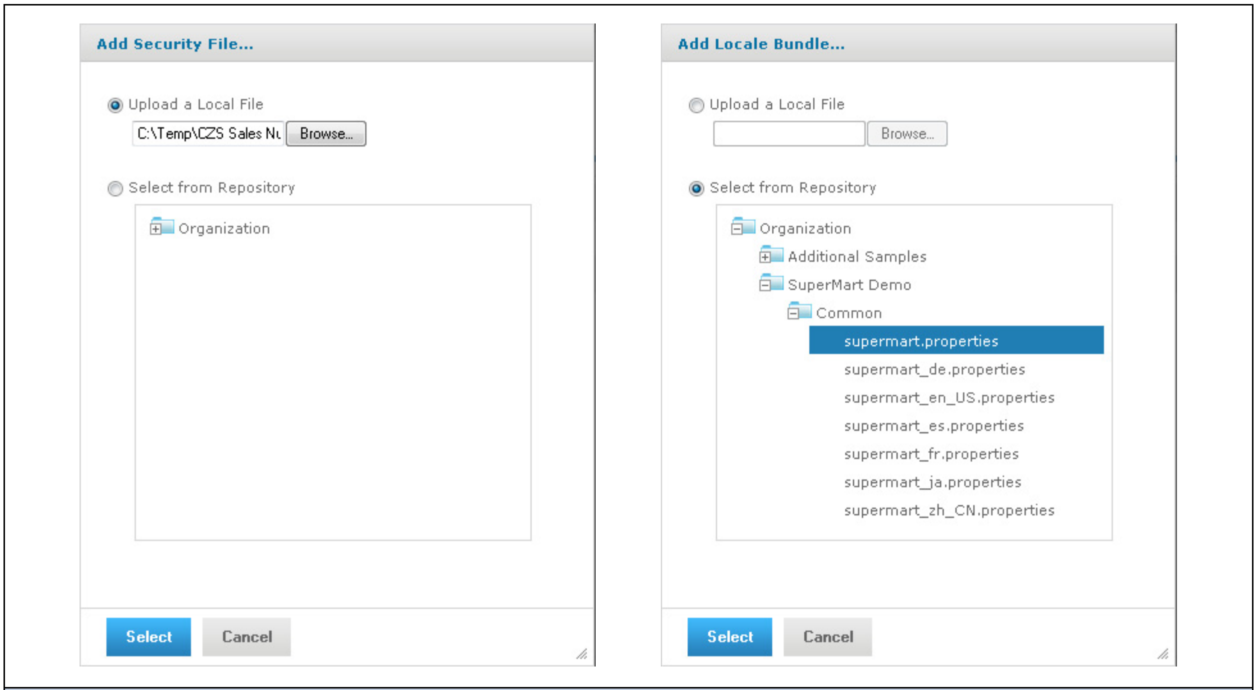
- A single security file. Defines row and column-level access to data selected by the Domain.
- Any number of locale bundles. Provides internationalized labels for the sets and items of the Domain design.

You upload and manage these files using the Edit Domain or Add New Domain pages of the Domain Designer. This section describes how to upload and replace Domain resources. For more information about the syntax of resource files, see section **8.4, "The Domain Security File," on page 204** and section **8.5, "Locale Bundles," on page 211**.

To upload and replace a security file and locale bundles for a Domain:

1. Log in to the server as an administrator and select **View > Search Results**.
2. Locate the Domain. Typically, you set the Domain filter in **Filters > All Types > More Choices > Domains**.
3. Right-click an existing Domain and select **Edit** from the context-menu.

   The Domain appears in the Edit Domain page of the Domain Designer.
4. Click **Add Security File** or **Add Locale Bundle** to upload a security file or locale bundle to the Domain. The respective Add Security File or Add Locale Bundle dialog box appears:



Add Security File...

● Upload a Local File

C:\Temp\CZS Sales Nu

○ Select from Repository

Organization

Add Locale Bundle...

○ Upload a Local File

● Select from Repository

- Organization
  - Additional Samples
  - SuperMart Demo
    - Common
      - supermart.properties
      - supermart_de.properties
      - supermart_en_US.properties
      - supermart_es.properties
      - supermart_fr.properties
      - supermart_ja.properties
      - supermart_zh_CN.properties

Figure 8-2 Add Security File and Add Locale Bundle Dialog Boxes

There can be only one security file but any number of locale bundles. When a security file exists, the **Add Security File** text is disabled. See step 8 to replace an existing security file.

5. You can upload resources from local files or from objects in the repository. Select **Upload a Local File** or **Select from Repository** and then **Browse** to select a file or repository object.

   When browsing the repository, you see only XML files or locale bundle objects. To upload a security file, select an XML file created explicitly as a security file. When selected, the XML file in the repository is referenced by the Domain, unlike a local file that is uploaded directly into the Domain.

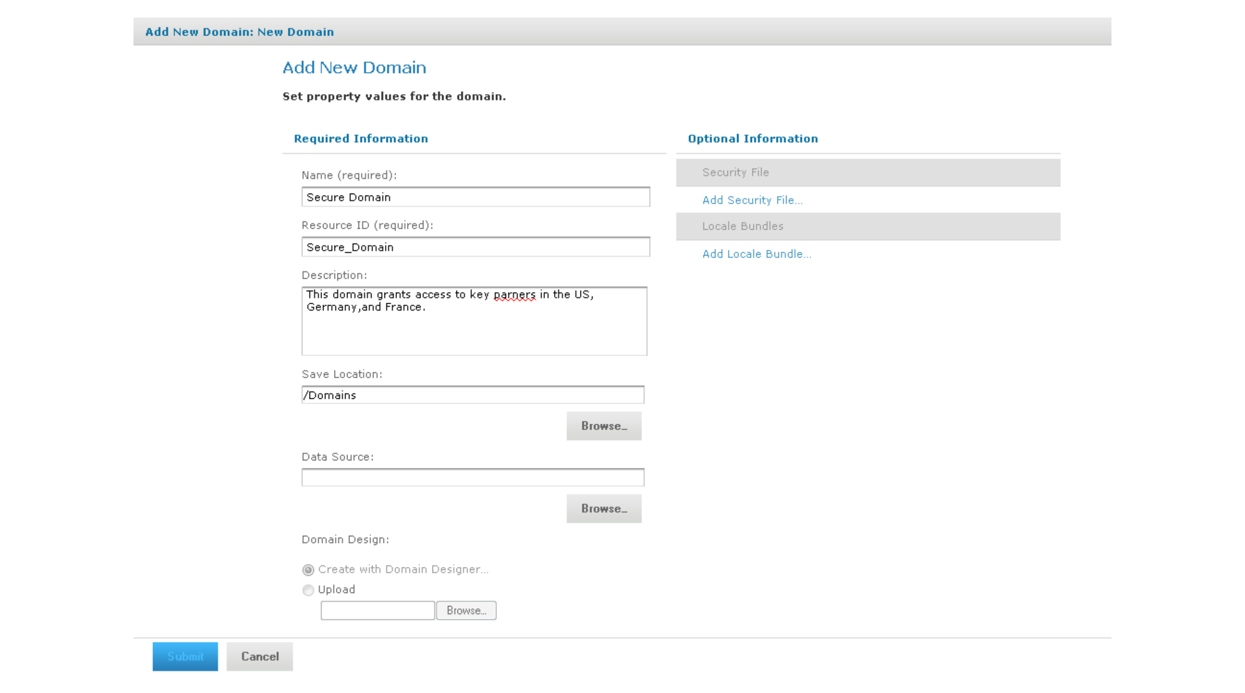
   The repository manager warns you if you attempt to delete a security or locale bundle file that is referenced by a Domain, but it does not warn you if you replace these files with a different file. When you store these files in the repository, ensure that any updates to the files are compatible with the Domains that reference them.

6. Click **Select** to upload the file and add it to the list of current resources.

   The server validates the file to make sure it matches the format of a security file or locale bundle. If the file type is not recognized or there is a syntax error, the file is not added to the list of resources and you must select another file or click **Cancel**.

7. Repeat step 4 through step 6 to upload one security file and any number of locale bundles.

   Optional Information in the Edit Domain page lists the referenced files.



Add New Domain: New Domain

Add New Domain

Set property values for the domain.

Required Information

Name (required): Secure Domain

Resource ID (required): Secure_Domain

Description: This domain grants access to key parners in the US, Germany,and France.

Save Location: /Domains

Browse...

Data Source:

Browse...

Domain Design:

● Create with Domain Designer...

○ Upload

Browse...

Optional Information

Security File

Add Security File...

Locale Bundles

Add Locale Bundle...

Submit

Cancel

Figure 8-3 List of Security and Locale Files in the Edit Domain Page

8. To edit or delete the uploaded resources, click **Change** or **Remove**, respectively. To download the security file or a locale bundle file, click the name of the referenced file in the list.

   For example, you add an item to the Domain after creating the locale bundles, and you need to add its label and description keys to each bundle. Download each of the locale bundles in the Domain, edit each file to add the new keys, then upload each file to replace the corresponding locale bundle. You might also want to define access permissions for the new item by downloading, modifying, and uploading the security file as well.

9. If you modified an existing Domain, you must clear the Ad Hoc cache of all queries based on the Domain. This removes any data that was based on the old instance of the Domain and avoids inconsistencies in new reports. For instructions, see the *JasperReports Server Administrator Guide*.

8.4 The Domain Security File

The security file defines permissions to control access to Domain data on the basis of user names and roles existing in the server. When creating or running a report based on a Domain, the user name and roles are checked against the permissions in the security file. Permissions can be set separately on the data's columns and rows.

Security on columns is defined by permissions on the sets and items of the Domain, corresponding to columns in the data source. For example, only certain users might be able to see sensitive employee information such as a Social Security Number. Security on rows is defined by permissions on the data values, for example a manager might only be allowed to see the salary column of employees whose manager field equals the manager's employee number.

The IDs of tables, columns, sets and items that appear in the design are referenced by the security file. In Domains, columns display the items in the Domain; rows display the values of each item. Column security is defined on `itemGroupId` and `itemId`; row security is defined on `resourceId`.

A user can only see results where he has both column- and row-level access. For instance, in a certain Domain, user David has access to columns A-F and rows 1-6. Tomas has access to columns B-C and rows 1-3. Anita has access to columns C-E and rows 2-5. When the users run reports from the Domain, they get different results. David sees data in cells where columns A-F and rows 1-6 intersect. Tomas sees data only where columns B-C and rows 1-3 intersect. Anita sees data only where columns C-E and rows 2-5 intersect.

	Item A	Item B	Item C	Item D	Item E	Item F
1	David	David Tomas	David Tomas	David	David	David
2	David	David Tomas	David Tomas Anita	David	David	David
3	David	David Tomas	David Tomas Anita	David Anita	David Anita	David
4	David	David	David Anita	David Anita	David Anita	David
5	David	David	David Anita	David Anita	David Anita	David
6	David	David	David	David	David	David

For a given query on the data source, the security definition finds the access grants and determines his access rights, determined first for item groups and items, then for resources. When the query is passed to the data source and the report is run, the grants are applied as filters on the report's columns and rows. Security that is defined on the physical layer applies to all content in the presentation layer. Security that is defined on a join applies only to the presentation layer content that is specific to the join.

When a user is designing a report in the Ad Hoc Editor, he sees only the columns to which he has access. When the report runs, portions to which the user has no access are blank.

Access grants take a `principalExpression` that evaluates the principal in authentication objects created in the Acegi security framework (http://www.jasperforge.org). The standard expression is

```
<principalExpression>authentication.getPrincipal().getRoles().any{ it.getRoleName() in
['ANY_SUPPORTED_ROLE'] }
</principalExpression>
```

The expression gets the current authentication object and determines the access privileges of the principal in the object. Then, from the server, it gets the user and roles associated with the object. Finally, it evaluates the roles for the specified role. The access grants are applied to the role.

The expression evaluates to

```
<principalExpression>authentication.principal.roles.roleName in ('ANY_SUPPORTED_ROLE')
</principalExpression>
```

While the standard principal expression tests for a given role, an expression can test for any object in the principal. For example, this expression tests for attribute A:

```
<principalExpression>authentication.getPrincipal().getAttributes().any{ it.getAttributeA()
in ['ANY_SUPPORTED_ROLE'] }
</principalExpression>
```

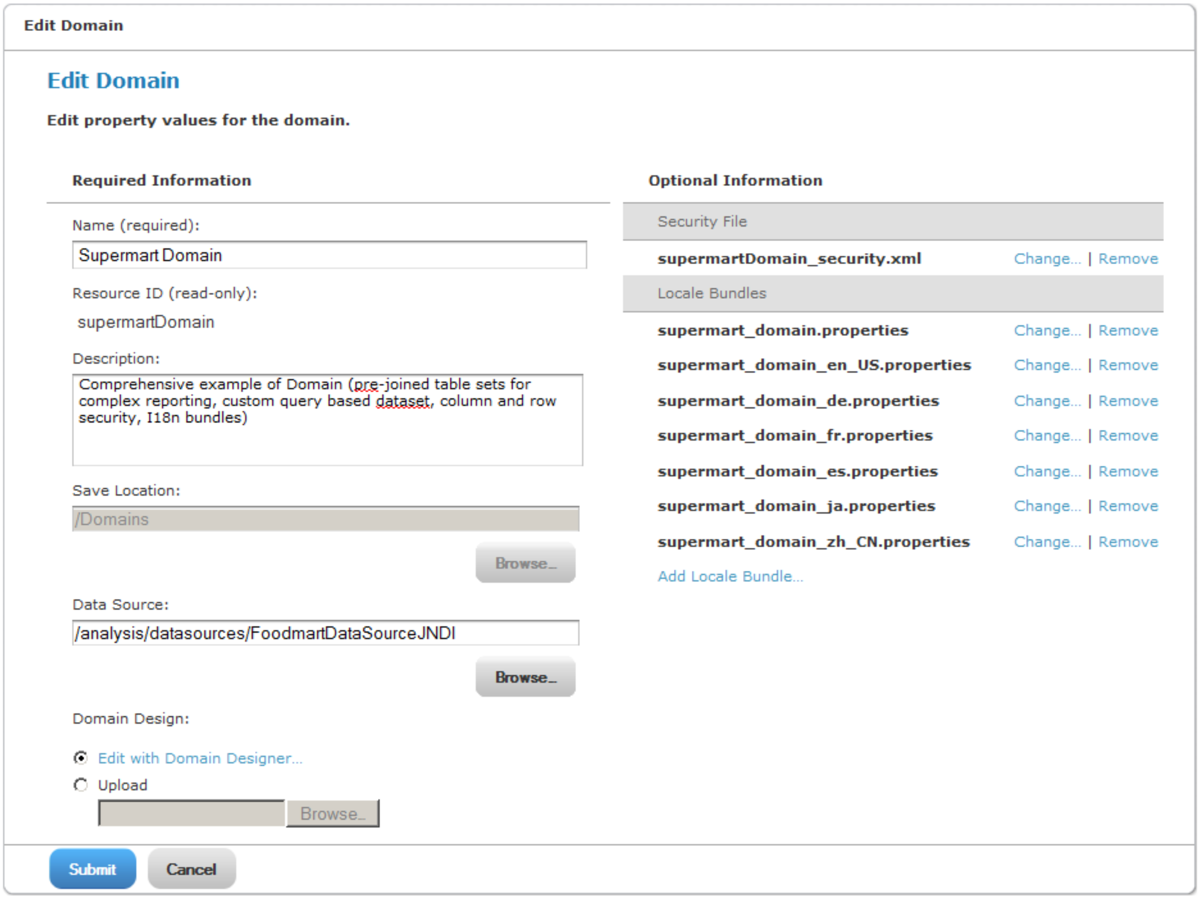
The scripting language for `principalExpression` is Groovy.

For more information about Groovy, go to http://groovy.codehaus.org.

All access grants for a Domain are defined in a single security file that is attached to the Domain as a resource, as described in section **8.3, "Security and Locale Information for a Domain," on page 202**. The default access is `granted`.

When creating a security file, be sure to use the IDs of items and groups as they are defined in the Domain design file exported from the Domain Designer. For more information, see section **8.1.2, "Working With a Design File," on page 186**.

If you modify the Domain, you should also export the design file and update the security file with any IDs that have changed. Update the security file using the **Change** function on the Edit Domain page of the Domain Designer.



Edit Domain

Edit Domain

Edit property values for the domain.

Required Information

Name (required): Supermart Domain

Resource ID (read-only): supermartDomain

Description: Comprehensive example of Domain (pre-joined table sets for complex reporting, custom query based dataset, column and row security, I18n bundles)

Save Location: /Domains

Data Source: /analysis/datasources/FoodmartDataSourceJNDI

Domain Design:

● Edit with Domain Designer...

○ Upload

Optional Information

Security File

supermartDomain_security.xml Change... | Remove

Locale Bundles

supermart_domain.properties Change... | Remove

supermart_domain_en_US.properties Change... | Remove

supermart_domain_de.properties Change... | Remove

supermart_domain_fr.properties Change... | Remove

supermart_domain_es.properties Change... | Remove

supermart_domain_ja.properties Change... | Remove

supermart_domain_zh_CN.properties Change... | Remove

Add Locale Bundle...

Figure 8-4 Changing a Security File in the Domain Designer

A typical security file has the following structure:

```
<securityDefinition xmlns="http://www.jaspersoft.com/2007/SL/XMLSchema"
                    version="1.0" itemGroupDefaultAccess="granted">
  <resourceAccessGrants>    <!-- Begin row-level security -->
    <resourceAccessGrantList id="expense_join_resource_access_grant" label="aLabel"
                             resourceId="expense_join">
      <resourceAccessGrants>
        <resourceAccessGrant id="expense_join_ROLE_SUPERMART_MANAGER_store_row_grant">
          <principalExpression>
            authentication.getPrincipal().getRoles().any{ it.getRoleName() in
            ['ROLE_SUPERMART_MANAGER'] }
          </principalExpression>
          <filterExpression>s.store_country in ('USA') and s.store_state in ('CA')
          </filterExpression>
        </resourceAccessGrant>
        ...
      </resourceAccessGrants>
    </resourceAccessGrantList>
    ...
  </resourceAccessGrants>

  <itemGroupAccessGrants>    <!-- Begin column-level security -->
    <itemGroupAccessGrantList id="expense_join_item_group_access_grant_group"
              label="aLabel" itemGroupId="expense_join" defaultAccess="denied">
      <itemGroupAccessGrants>
        <itemGroupAccessGrant id="expense_join_super_user_item_group_grant"
                              access="granted">
          <principalExpression>
            authentication.getPrincipal().getRoles().any{ it.getRoleName() in
            ['ROLE_ADMINISTRATOR'] }
          </principalExpression>
        </itemGroupAccessGrant>
        ...
      </itemGroupAccessGrants>
    </itemGroupAccessGrantList>
    ...
  </itemGroupAccessGrants>
</securityDefinition>
```

8.4.1 Row-Level Security

Row-level security is specified in resourceAccessGrants. For each dataset from which data is returned by a query in the design file, a resourceAccessGrantList specifies the rows to which a user has access. Each grant is defined in a resourceAccessGrant that contains a principalExpression and a filterExpression.

A resourceAccessGrant must be defined for a joined resource if any query in the security definition has at least one item from the resource, even if that query does not include the related dataset.

Row-level security applies whenever access to a secured resource is requested, even if the request is indirect. For instance, a column in the Region table might be joined to a column in the Sales table. User Tomas has access to Region but not Sales. Tomas's report uses columns from Region but he cannot see them because he does not have access to Sales.

Row-level security is defined as follows:

```
<resourceAccessGrants>    <!-- Begin row-level security -->
  <resourceAccessGrantList id="expense_join_resource_access_grant" label="aLabel"
                           resourceId="expense_join">
    <resourceAccessGrants>
      <resourceAccessGrant id="expense_join_ROLE_SUPERMART_MANAGER_store_row_grant">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_SUPERMART_MANAGER'] }</principalExpression>
        <filterExpression>s.store_country in ('USA') and s.store_state in ('CA')
        </filterExpression>
      </resourceAccessGrant>
      <resourceAccessGrant id="account_ROLE_SUPERMART_MANAGER_account_row_grant"
                           orMultipleExpressions="true">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_SUPERMART_MANAGER'] }</principalExpression>
        <filterExpression>s.store_number == 0</filterExpression>
      </resourceAccessGrant>
      <resourceAccessGrant id="account_ROLE_SUPERMART_MANAGER_account_row_grant2"
                           orMultipleExpressions="true">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName()
          in ['ROLE_SUPERMART_MANAGER'] }</principalExpression>
        <filterExpression>s.store_number == 24</filterExpression>
      </resourceAccessGrant>
    </resourceAccessGrants>
  </resourceAccessGrantList>

  <resourceAccessGrantList id="account_resource_access_grant" label="aLabel"
                           resourceId="account">
    <resourceAccessGrants>
      <resourceAccessGrant id="account_resource_super_user_row_grant">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_ADMINISTRATOR'] }</principalExpression>
      </resourceAccessGrant>
      <resourceAccessGrant id="account_ROLE_SUPERMART_MANAGER_row_grant">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_SUPERMART_MANAGER'] }</principalExpression>
        <filterExpression>account_type == 'Expense'</filterExpression>
      </resourceAccessGrant>
    </resourceAccessGrants>
  </resourceAccessGrantList>
</resourceAccessGrants>
```

Elements of `resourceAccessGrants` are:

- `resourceAccessGrantList`. List of grants for one dataset in the Domain.
  - `resourceAccessGrant`. Grant in the dataset for a specific case, such as a user or role.
    - `principalExpression`. Evaluation of the authentication object and user to determine the role to be granted access.

- filterExpression. Filter on the dataset; determines the rows to which access is granted. Filters are applied to resource IDs. See the section **8.2, “The DomEL Syntax,” on page 198** for examples of valid filter expressions. For an alternative to writing filter expressions in Groovy, see the testProfileAttribute function in section **8.2.3, “Operators and Functions,” on page 199**.

8.4.2 Column-Level Security

Column-level security is specified in itemGroupAccessGrants. An itemGroupAccessGrantList defines default access to one item group. Within the group, access is granted by user role in itemGroupAccessGrants. Access to items within an item group can be specified by itemAccessGrants.

Column-level security passes from parent object to child object unless specified otherwise:

- If access is unspecified for an object, the access of the parent object applies. If the unspecified object is an item in an item group, the item group’s access applies.
- If the unspecified object is an item in an item group that is nested in another item group, the access of the nearest parent item group applies to the item.

  If the nearest parent group’s access is also unspecified, that group takes its access from its parent group and passes it to the item. In this case (specified item group > unspecified item group > unspecified item), access for the item cannot be specified in an item-level grant.
- If access is specified for an item group but there is no item group principal expression matching the current user, the user has the item group’s default access, not the item group’s specified access.

  If a matching item group principal expression does exist, the user’s access to items depends on access specifications, if there are any. Access to other items depends on the item group’s specified access.

  If multiple item group principal expressions match the user (such as one expression for the user and one for his role), their access grants are combined, or ANDed, in a simple series. As a result, one denied statement overrides multiple granted statements.

Column-level security is defined as follows:

```
<itemGroupAccessGrants>    <!-- Begin column-level security -->
  <itemGroupAccessGrantList id="expense_join_item_group_access_grant_group" label="aLabel"
                            itemGroupId="expense_join" defaultAccess="denied">
    <itemGroupAccessGrants>
      <itemGroupAccessGrant id="expense_join_super_user_item_group_grant" access="granted">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_ADMINISTRATOR'] }</principalExpression>
      </itemGroupAccessGrant>
      <itemGroupAccessGrant id="ROLE_SUPERMART_MANAGER_item_group_access_grant"
                            access="granted">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_SUPERMART_MANAGER'] }</principalExpression>
        <itemAccessGrantList id="expense_join_ROLE_SUPERMART_MANAGER_item_grant"
                             defaultAccess="denied">
          <itemAccessGrants>
            <itemAccessGrant id="itemAccessGrant1" itemId="ej_expense_fact_exp_date"
                             access="granted" />
          </itemAccessGrants>
        </itemAccessGrantList>
      </itemGroupAccessGrant>
    </itemGroupAccessGrants>
  </itemGroupAccessGrantList>
  <itemGroupAccessGrantList id="expense_join_store_item_group_access_grant_group"
                    label="aLabel" itemGroupId="expense_join_store" defaultAccess="denied">
    <itemGroupAccessGrants>
      <itemGroupAccessGrant id="expense_join_store_super_user_item_group_grant"
                            access="granted">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_ADMINISTRATOR'] }</principalExpression>
      </itemGroupAccessGrant>
      <itemGroupAccessGrant id="ROLE_SUPERMART_MANAGER_store_item_group_access_grant"
                            access="granted">
        <principalExpression>
          authentication.getPrincipal().getRoles().any{ it.getRoleName() in
          ['ROLE_SUPERMART_MANAGER'] }</principalExpression>
        <itemAccessGrantList id="expense_join_ROLE_SUPERMART_MANAGER_store_item_grant"
                             defaultAccess="denied">
          <itemAccessGrants>
            <itemAccessGrant id="itemAccessGrant3" itemId="ej_store_store_type"
                             access="granted" />
            <itemAccessGrant id="itemAccessGrant4" itemId="ej_store_region_id"
                             access="granted" />
            <itemAccessGrant id="itemAccessGrant5" itemId="ej_store_store_name"
                             access="granted" />
            <itemAccessGrant id="itemAccessGrant6" itemId="ej_store_store_number"
                             access="granted" />
            <itemAccessGrant id="itemAccessGrant7" itemId="ej_expense_fact_exp_date"
                             access="granted" />
            <itemAccessGrant id="itemAccessGrant8" itemId="ej_expense_fact_amount"
                             access="granted"  />
          </itemAccessGrants>
        </itemAccessGrantList>
      </itemGroupAccessGrant>
    </itemGroupAccessGrants>
  </itemGroupAccessGrantList>
</itemGroupAccessGrants>
```

Elements of `itemGroupAccessGrants` are:

- `itemGroupAccessGrantList`. List of access grants to one item group. Specifies default access to the item group and all items in the group. If you want to restrict access to items outside of any group or set, create an `itemGroupAccessGrantList` for them where the id of the group is `""`.
  - `itemGroupAccessGrant`. Specifies access to the item group for one user role.
    - `principalExpression`. Evaluation of the authentication object and user to determine the role to be granted or denied access.
      - `itemAccessGrantList`. List of access grants to items in the item group. Specifies default access to the items. Overrides default in `itemGroupAccessGrantList`.
        - `itemAccessGrant`. Specifies access to one item.

In the above example, the progression of column access grants is:

- Deny access to everyone.
- For each item group:
  - Grant group access to administrator roles.
  - Grant group access to additional roles.

- For each additional role, deny access to specific items or, alternatively, deny access to all group items, then grant access to specific items.

Access is denied to everyone initially. Otherwise, all users would have complete access. Next, access to each item group is granted for administrator roles.

Next, access is defined for the SuperMart manager role. First, access is granted to each item group even though the access may be limited eventually. If access is not granted at the group level, the SuperMart manager has no access at all. Then, access to all items in the group is denied, followed by grants to specific items.

An alternative way to restrict access is to simply deny it on specific items. However, this method is not as secure as denying access to all items then granting access to some. The latter requires the programmer to specifically identify each item to which the role has access, which is more secure.

By default, all grants for a given role are ANDed. The ANDed series can be modified by an OR expression (`orMultipleExpressions="true"`). For instance, the following grants are implemented as `A and B and C`:

```
<resourceAccessGrant id="A">
<resourceAccessGrant id="B">
<resourceAccessGrant id="C">;
```

while these grants are implemented as `(A or B) and C`:

```
<resourceAccessGrant id="A">
<resourceAccessGrant id="B" orMultipleExpressions="true">
<resourceAccessGrant id="C">
```

The OR expression can be applied in grants for items and item groups as well as resources.

8.5 Locale Bundles

A locale bundle is a set of properties files used in localizing software. The files contain other-language versions of the labels and messages that are displayed to users. The locale bundles associated with a Domain provide localized text when creating and running reports based on Domains. When a user's operating environment specifies a locale, the server looks for the corresponding locale bundle and uses the labels and messages it contains. The localized text appears in the Ad Hoc designer and in the report viewer. The server interface is already internationalized, and Domains make reports internationalizable so that users can create and view reports in their language.

A locale bundle for a Domain consists of a single file containing all the internationalization keys for the sets and items in the Domain. Each key is associated with the text for the label or description in the language of the target locale. The name of the file includes the target locale, so the server automatically associates it with the user's locale when needed.

Language	Locale	Filename	Sample Contents

English	default	ExampleDomain.properties	`ACCOUNTS.NAME.LABEL=Customer`
			`ACCOUNTS.NAME.DESCR=Name of Customer`

French	fr	ExampleDomain_fr.properties	`ACCOUNTS.NAME.LABEL=Client`
			`ACCOUNTS.NAME.DESCR=Nom du client`

When a Domain with locale bundles is used to create or run a report, the server resolves each label to display as follows:

- The server looks for a bundle corresponding to the current locale and for the key corresponding to the label. If both exist, the server displays the text associated with the key; if the bundle or key does not exist, then
- The server looks for the same key in a default bundle among the resources. If these exist, it displays the text associated with the key in the default bundle; if the default bundle or key does not exist, then
- It displays the text of the `label` property defined in the Domain design; if no label is defined, then
- It displays the value of the `id` property.

Descriptions are localized in the same manner, except they are left blank if there is no locale bundle, default bundle, or `description` property defined.

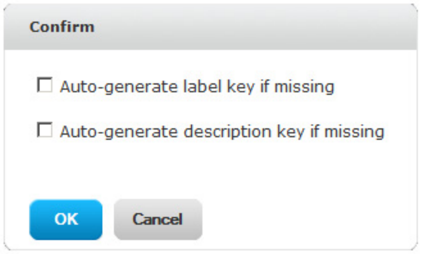
There are several strategies for managing the locale bundles. Based on the search algorithm above and your localization needs, you could have one of the following scenarios:

- You do not have any localization needs at the time you create the Domain. You give all labels and descriptions a clear and complete text within the design, and you leave the key names undefined. As your enterprise grows, users in another country need to create reports based on the Domain. To create localized text for those users, edit the Domain design to define the internationalization keys, then create the locale bundle. You can create locale bundles incrementally each time you have users who need a new language. Users in your home country who do not specify a locale still see the labels and description in the original Domain design.
- You want to create the Domain tailored to a multilingual environment where reports need to be localized for each user's specified locale. In this case, you do not specify any labels or descriptions in the Domain design, only the internationalization keys. Then you create a default locale bundle that gives the clear and complete text of every label and description in your preferred language. In this way, all user-visible text for the Domain is in the standard format of a locale bundle, and you can use specialized software or translation services to create all the locale bundles you need. In case a label or description is not translated, users see the text of the default locale bundle.

8.5.1 Defining the Internationalization Keys

In the Domain Designer, the name of the internationalization keys are defined by the Label Key and Description Key properties on each set and item on the **Display** tab. By default, these properties are blank. You may name the keys in any way you want, as long as each key is unique among all keys within the Domain. However, because keys are used in a Java properties file, they may only use characters from the ISO Latin-1 set, digits, and underscores (_).

To automate this process, use **Export Bundle** on the Display tab of the Domain Designer. The Confirm dialog box appears.



Confirm

□ Auto-generate label key if missing

□ Auto-generate description key if missing

Figure 8-5 Confirm Export Bundle Options Dialog Box

Exporting a bundle performs two tasks:

- Optionally generates all the key names
- Outputs a locale bundle stub

You have the option of generating only the label keys, only the description keys, both, or neither. When you click **OK**, the generated key names are added to all the blank `Label Key` and `Description Key` properties; any keys that already exist are not be modified. In order to guarantee uniqueness, the generated key names have the following format:

```
<setID>.LABEL
<setID>.DESCR
<setID>.<itemID>.LABEL
<setID>.<itemID>.DESCR
```

The locale bundle stub is a Java properties file in the proper format containing all the defined keys, ready for translation. The locale bundle stub is further explained in the next section.

In the design schema, the name of the keys are given by the `labelId` and `descriptionId` attributes on each `itemGroup` and `item` element. If these attributes are missing or defined with an empty value (`""`), the keys are not defined. To define the keys, give these attributes a value that is unique among all the keys. Again, keys may only use characters from the ISO Latin-1 set, digits, and underscores (_).

If you have many sets and items, it may be easier to upload the design file in a Domain and open it in the Domain Designer. You can then generate the keys automatically, export the bundle as explained above, and export the XML design file that now contains the generated keys.

If the design file does not load properly in the Domain Designer, you are not be able to use the exported design file. In this case, do not overwrite the design file, but save the exported file to another name and attempt to merge in the generated keys.

8.5.2 Creating Locale Bundle Files

A locale bundle for a Domain is a Java properties file where each property name is a unique internationalization key from one of the labels or descriptions in the design. The value of each property is the text for the label or description in the target language. The name of the file identifies the locale in the form <any_name>_<locale>.properties, where <locale> is any Java-compliant locale identifier, for example `fr` or `fr_CA`. If the _<locale> part of the file name is omitted, the file designates the strings for the default locale.

Usually, the set of keys is identical in the properties file of each locale bundle, but this is not necessary. The text for a given key in a given locale is determined by the algorithm given in section **8.5, "Locale Bundles," on page 211**.

Often, it is simplest to create the properties files from the stub exported by the Domain Designer. Whether you have created the design in the Domain Designer or in an external file uploaded to the Domain Designer, use **Export Bundle** in the menu bar to export a blank properties file. Optionally, you may generate any missing keys, as described in the previous section.

The following example shows part of the properties file output for the Domain created in section **6.2, "Example of Creating a Domain," on page 142**. All of the internationalization keys were generated automatically as well. As the example shows, sets and items in the bundle stub appear in the same order as on the Display tab of the Domain Designer:

```
ACCOUNTS.LABEL=
ACCOUNTS.DESCR=
ACCOUNTS.NAME.LABEL=
ACCOUNTS.NAME.DESCR=
ACCOUNTS.ACCOUNT_TYPE.LABEL=
ACCOUNTS.ACCOUNT_TYPE.DESCR=
ACCOUNTS.INDUSTRY.LABEL=
ACCOUNTS.INDUSTRY.DESCR=
...
ACCOUNTS.CITY_AND_STATE.LABEL=
ACCOUNTS.CITY_AND_STATE.DESCR=
USERS1.LABEL=
USERS1.DESCR=
USERS1.FIRST_NAME.LABEL=
USERS1.FIRST_NAME.DESCR=
USERS1.LAST_NAME.LABEL=
USERS1.LAST_NAME.DESCR=
...
```

The syntax for the properties file is the same as for Java properties files. Generally, everything after the = symbol is part of the translated text. Java properties files use the ISO-8859-1 (Latin-1) encoding that supports most, but not all, accented characters. For accented characters that are not in ISO-8859-1, or any other international characters, use Unicode escape sequences. For example, the œ character has the Unicode escape sequence `\u0153`.

The following example shows the French translation for the properties file above, including accented characters.

The single straight quote (') sometimes causes issues when processed in Domain properties files. To avoid this issue, use the right single quote (’) by its Unicode sequence \u2019, as shown in the following example.

```
ACCOUNTS.LABEL=Comptes
ACCOUNTS.DESCR=Détails des comptes clients.
ACCOUNTS.NAME.LABEL=Client
ACCOUNTS.NAME.DESCR=Nom du client
ACCOUNTS.ACCOUNT_TYPE.LABEL=Type
ACCOUNTS.ACCOUNT_TYPE.DESCR=Type du compte client.
ACCOUNTS.INDUSTRY.LABEL=Industrie
ACCOUNTS.INDUSTRY.DESCR=Industrie d\u2019activité primaire.
...
ACCOUNTS.CITY_AND_STATE.LABEL=Localité
ACCOUNTS.CITY_AND_STATE.DESCR=Ville et région ou état du client.
USERS1.LABEL=Responsable
USERS1.DESCR=Responsable du compte client.
USERS1.FIRST_NAME.LABEL=Prénom
USERS1.FIRST_NAME.DESCR=Prénom usuel.
USERS1.LAST_NAME.LABEL=Nom
USERS1.LAST_NAME.DESCR=Nom de famille.
...
```

After creating the properties file for the first locale, you can simply copy the file and change the `_<locale>` designator to begin translation of another locale bundle. A best practice is to save a blank properties file or the default locale bundle as a template for future translations. Also, if you change the Domain design, you can export the locale bundle again and compare it to the template to find all new keys.

You can create and edit the properties file in any text editor. Certain editors provide features for editing properties files. There are also translation products that manage all of the resource bundles together, allowing you to translate in parallel and find missing keys and missing translations.

Regardless of how you edit properties files, when all translations are finished, you need to upload them as locale bundles to the Domain. See the procedure in section **8.3, "Security and Locale Information for a Domain," on page 202** for instructions about uploading locale bundles. Also, if you change a Domain design and need to modify the properties files, follow that same procedure to download, modify, and upload each locale bundle.

For additional information about locales and locale bundles in JasperReports Server, see the Localization chapter in the *JasperReports Server Administrator Guide*.

8.6 Internationalized Databases

In addition to locale bundles, JasperReports Server supports international characters in the database schema, for example in the table and column names. The server supports UTF-8 (8-bit Unicode Transformation Format) character encoding as described in the Localization chapter in the *JasperReports Server Administrator Guide*.

If your database is properly configured and the appropriate fonts are available to your browser, the Domain Designer displays the international characters on the various tabs where table and column names appear. This means that your data architects can work in their native language within the Domain Designer.

As with all values from your reporting database, table and column names are not localizable. They can only be displayed in the Domain Designer as they appear in the database. You can, however, have localized labels for these table and column names, so that they appear in the Ad Hoc designer according to the users' locale.

All UTF-8 characters are allowed in IDs except the following symbols that will cause errors: `().,"=!+-></:[]*|?$`. This limitation applies to table IDs in the database as well as user created IDs in design files and in the Domain Designer. In addition, the straight single quote (`'`, Unicode 0027) can appear in database table IDs but not in user-created IDs. In general, the best practice is to use alphabet characters, not punctuation or arithmetic symbols when creating Domains.

Glossary

Ad Hoc Editor

The interactive data explorer in JasperReports Server Professional and Enterprise editions. Starting from a predefined collection of fields, the Ad Hoc Editor lets you drag and drop fields, dimensions, and measures to explore data and create tables, charts, and crosstabs. These Ad Hoc views can be saved as reports.

Ad Hoc Report

In previous versions of JasperReports Server, a report created through the Ad Hoc Editor. Such reports could be added to dashboards and be scheduled, but when edited in iReport, lost their grouping and sorting. In the current version, the Ad Hoc Editor is used to explore views which in turn can be saved as reports. Such reports can be edited in iReport and Jaspersoft Studio without loss, and can be scheduled and added to dashboards.

Ad Hoc View

A view of data that is based on a Domain, Topic, or OLAP client connection. An Ad Hoc view can be a table, chart, or crosstab and is the entry point to analysis operations such as slice and dice, drill down, and drill through. Compare **OLAP View**. You can save an Ad Hoc view as a report in order to edit it in the interactive viewer, schedule it, or add it to a dashboard.

Analysis View

See **OLAP View**.

Audit Archiving

To prevent audit logs from growing too large to be easily accessed, the installer configures JasperReports Server to move current audit logs to an archive after a certain number of days, and to delete logs in the archive after a certain age. The archive is another table in the JasperReports Server's repository database.

Audit Domains

A Domain that accesses audit data in the repository and lets administrators create Ad Hoc reports of server activity. There is one Domain for current audit logs and one for archived logs.

Audit Logging

When auditing is enabled, audit logging is the active recording of who used JasperReports Server to do what when. The system installer can configure what activities to log, the amount of detail gathered, and when to archive the data. Audit logs are stored in the same private database that JasperReports Server uses to store the repository, but the data is only accessible through the audit Domains.

Auditing

A feature of JasperReports Server Enterprise edition that records all server activity and allows administrators to view the data.

Calculated Field

In a Domain, a field whose value is calculated from a user-written formula that may include any number of fields, operators, and constants. A calculated field is defined in the Domain Designer, and it becomes one of the items to which the Domain’s security file and locale bundles can apply.

CRM

Customer Relationship Management. The practice of managing every facet of a company’s interactions with its clientele. CRM applications help businesses track and support their customers.

CrossJoin

An MDX function that combines two or more dimensions into a single axis (column or row).

Cube

The basis of most OLAP applications, a cube is a data structure that contains three or more dimensions that categorize the cube’s quantitative data. When you navigate the data displayed in an OLAP view, you are exploring a cube.

Custom Field

In the Ad Hoc Editor, a field that is created through menu items as a simple function of one or two available fields, including other custom fields. When a custom field becomes too complex or needs to be used in many reports, it is best to define it as a calculated field in a Domain.

Dashboard

A collection of reports, input controls, graphics, labels, and web content displayed in a single, integrated view. Dashboards often present a high level view of your data, but input controls can parameterize the data to display. For example, you can narrow down the data to a specific date range. Embedded web content, such as other web-based applications or maps, make dashboards more interactive and functional.

Derived Table

In a Domain, a derived table is defined by an additional query whose result becomes another set of items available in the Domain. For example, with a JDBC data source, you can write an SQL query that includes complex functions for selecting data. You can use the items in a derived table for other operations on the Domain, such as joining tables, defining a calculated field, or filtering. The items in a derived table can also be referenced in the Domain’s security file and locale bundles.

Data Policy

In JasperReports Server, a setting that determines how the server processes and caches data used by Ad Hoc reports. Select your data policies by clicking **Manage > Ad Hoc Settings**.

Data Source

Defines the connection properties that JasperReports Server needs to access data. The server transmits queries to data sources and obtains datasets in return for use in filling reports and previewing Ad Hoc reports. JasperReports Server supports JDBC, JNDI, and Bean data sources; custom data sources can be defined as well.

Dataset

A collection of data arranged in columns and rows. Datasets are equivalent to relational results sets and the `JRDataSource` type in the JasperReports Library.

Datatype

In JasperReports Server, a datatype is used to characterize a value entered through an input control. A datatype must be of type text, number, date, or date-time. It can include constraints on the value of the input, for example maximum and minimum values. As such, a datatype in JasperReports Server is more structured than a datatype in most programming languages.

Denormalize

A process for creating table joins that speeds up data retrieval at the cost of having duplicate row values between some columns.

Dice

An OLAP operation to select columns.

Dimension

A categorization of the data in a cube. For example, a cube that stores data about sales figures might include dimensions such as time, product, region, and customer's industry.

Domain

A virtual view of a data source that presents the data in business terms, allows for localization, and provides data-level security. A Domain is not a view of the database in relational terms, but it implements the same functionality within JasperReports Server. The design of a Domain specifies tables in the database, join clauses, calculated fields, display names, and default properties, all of which define items and sets of items for creating Ad Hoc reports.

Domain Topic

A Topic that is created from a Domain by the Data Chooser. A Domain Topic is based on the data source and items in a Domain, but it allows further filtering, user input, and selection of items. Unlike a JRXML-based Topic, a Domain Topic can be edited in JasperReports Server by users with the appropriate permissions.

Drill

To click on an element of an OLAP view to change the data that is displayed:

- Drill down. An OLAP operation that exposes more detailed information down the hierarchy levels by delving deeper into the hierarchy and updating the contents of the navigation table.
- Drill through. An OLAP operation that displays detailed transactional data for a given aggregate measure. Click a fact to open a new table beneath the main navigation table; the new table displays the low-level data that constitutes the data that was clicked.
- Drill up. An OLAP operation for returning the parent hierarchy level to view to summary information.

Eclipse

An open source Integrated Development Environment (IDE) for Java and other programming languages, such as C/C++.

ETL

Extract, Transform, Load. A process that retrieves data from transactional systems, and filters and aggregates the data to create a multidimensional database. Generally, ETL prepares the database that your reports will access. The Jaspersoft ETL product lets you define and schedule ETL processes.

Fact

The specific value or aggregate value of a measure for a particular member of a dimension. Facts are typically numeric.

Field

A field is equivalent to a column in the relational database model. Fields originate in the structure of the data source, but you may define calculated fields in a Domain or custom fields in the Ad Hoc Editor. Any type of field, along with its display name and default formatting properties, is called an item and may be used in the Ad Hoc Editor.

Frame

A dashboard element that displays reports or custom URLs. Frames can be mapped to input controls if their content can accept parameters.

Group

In a report, a group is a set of data rows that have an identical value in a designated field.

- In a table, the value appears in a header and footer around the rows of the group, while the other fields appear as columns.
- In a chart, the field chosen to define the group becomes the independent variable on the X axis, while the other fields of each group are used to compute the dependent value on the Y axis.

Hierarchy Level

In an OLAP cube, a member of a dimension containing a group of members.

Input Control

A button, check box, drop-down list, text field, or calendar icon that allows users to enter a value when running a report or viewing a dashboard that accepts input parameters. For JRXML reports, input controls and their associated datatypes must be defined as repository objects and explicitly associated with the report. For Domain-based reports that prompt for filter values, the input controls are defined internally. When either type of report is used in a dashboard, its input controls are available to be added as special content.

iReport Designer

An open source tool for graphically designing reports that leverage all features of the JasperReports Library. The Jaspersoft iReport Designer lets you drag and drop fields, charts, and sub-reports onto a canvas, and also define parameters or expressions for each object to create pixel-perfect reports. You can generate the JRXML of the report directly in iReport, or upload it to JasperReports Server. iReport is implemented in NetBeans.

Item

When designing a Domain or creating a Topic based on a Domain, an item is the representation of a database field or a calculated field along with its display name and formatting properties defined in the Domain. Items can be grouped in sets and are available for use in the creation of Ad Hoc reports.

JasperReport

A combination of a report template and data that produces a complex document for viewing, printing, or archiving information. In the server, a JasperReport references other resources in the repository:

- The report template (in the form of a JRXML file)
- Information about the data source that supplies data for the report
- Any additional resources, such as images, fonts, and resource bundles referenced by the report template.

The collection of all the resources that are referenced in a JasperReport is sometimes called a report unit. End users usually see and interact with a JasperReport as a single resource in the repository, but report creators must define all of the components in the report unit.

JasperReports Library

An embeddable, open source, Java API for generating a report, filling it with current data, drawing charts and tables, and exporting to any standard format (HTML, PDF, Excel, CSV, and others). JasperReports processes reports defined in JRXML, an open XML format that allows the report to contain expressions and logic to control report output based on run-time data.

JasperReports Server

A commercial open source, server-based application that calls the JasperReports library to generate and share reports securely. JasperReports Server authenticates users and lets them upload, run, view, schedule, and send reports from a web browser. Commercial versions provide metadata layers, interactive report and dashboard creation, and enterprise features such as organizations and auditing.

Jaspersoft ETL

A graphical tool for designing and implementing your data extraction, transforming, and loading (ETL) tasks. It provides hundreds of data source connectors to extract data from many relational and non-relational systems. Then, it schedules and performs data aggregation and integration into data marts or data warehouses that you use for reporting.

Jaspersoft OLAP

A relational OLAP server integrated into JasperReports Server that performs data analysis with MDX queries. The product includes query builders and visualization clients that help users explore and make sense of multidimensional data. Jaspersoft OLAP also supports XML/A connections to remote servers.

Jaspersoft Studio

An open source tool for graphically designing reports that leverage all features of the JasperReports Library. Jaspersoft Studio lets you drag and drop fields, charts, and sub-reports onto a canvas, and also define parameters or expressions for each object to create pixel-perfect reports. You can generate the JRXML of the report directly in JasperSoft Studio, or upload it to JasperReports Server. Jaspersoft Studio is implemented in Eclipse.

JavaBean

A reusable Java component that can be dropped into an application container to provide standard functionality.

JDBC

Java Database Connectivity. A standard interface that Java applications use to access databases.

JNDI

Java Naming and Directory Interface. A standard interface that Java applications use to access naming and directory services.

Join Tree

In Domains, a collection of joined tables from the actual data source. A join is the relational operation that associates the rows of one table with the rows of another table based on a common value in given field of each table. Only the fields in a same join tree or calculated from the fields in a same join tree may appear together in a report.

JPivot

An open source graphical user interface for OLAP operations. For more information, visit http://jpivot.sourceforge.net/.

JRXML

An XML file format for saving and sharing reports created for the JasperReports Library and the applications that use it, such as iReport Designer and JasperReports Server. JRXML is an open format that uses the XML standard to define precisely all the structure and configuration of a report.

MDX

Multidimensional Expression Language. A language for querying multidimensional objects, such as OLAP (On Line Analytical Processing) cubes, and returning cube data for analytical processing. An MDX query is the query that determines the data displayed in an OLAP view.

Measure

Depending on the context:

- In a report, a formula that calculates the values displayed in a table's columns, a crosstab's data values, or a chart's dependent variable (such as the slices in a pie).
- In an OLAP view, a formula that calculates the facts that constitute the quantitative data in a cube.

Mondrian

A Java-based, open source multidimensional database application.

Mondrian Connection

An OLAP client connection that consists of an OLAP schema and a data source. OLAP client connections populate OLAP views.

Mondrian Schema Editor

An open source Eclipse plug-in for creating Mondrian OLAP schemas.

Mondrian XML/A Source

A server-side XML/A source definition of a remote client-side XML/A connection used to populate an OLAP view using the XML/A standard.

MySQL

An open source relational database management system. For information, visit http://www.mysql.com/.

Navigation Table

The main table in an OLAP view that displays measures and dimensions as columns and rows.

ODBO Connect

Jaspersoft ODBO Connect enables Microsoft Excel 2003 and 2007 Pivot Tables to work with Jaspersoft OLAP and other OLAP servers that support the XML/A protocol. After setting up the Jaspersoft ODBO data source, business analysts can use Excel Pivot Tables as a front-end for OLAP analysis.

OLAP

On Line Analytical Processing. Provides multidimensional views of data that help users analyze current and past performance and model future scenarios.

OLAP Client Connection

A definition for retrieving data to populate an OLAP view. An OLAP client connection is either a direct Java connection (Mondrian connection) or an XML-based API connection (XML/A connection).

OLAP Schema

A metadata definition of a multidimensional database. In Jaspersoft OLAP, schemas are stored in the repository as XML file resources.

OLAP View

Also called an analysis view. A view of multidimensional data that is based on an OLAP client connection and an MDX query. Unlike Ad Hoc views, you can directly edit an OLAP view's MDX query to change the data and the way they are displayed. An OLAP view is the entry point for advanced analysis users who want to write their own queries. Compare **Ad Hoc View**.

Organization

A set of users that share folders and resources in the repository. An organization has its own user accounts, roles, and root folder in the repository to securely isolate it from other organizations that may be hosted on the same instance of JasperReports Server.

Organization Admin

Also called the organization administrator. A user in an organization with the privileges to manage the organization's user accounts and roles, repository permissions, and repository content. An organization admin can also create suborganizations and mange all of their accounts, roles, and repository objects. The default organization admin in each organization is the `jasperadmin` account.

Outlier

A fact that seems incongruous when compared to other member's facts. For example, a very low sales figure or a very high number of helpdesk tickets. Such outliers may indicate a problem (or an important achievement) in your business. The analysis features of Jaspersoft OLAP excel at revealing outliers.

Parameter

Named values that are passed to the engine at report-filling time to control the data returned or the appearance and formatting of the report. A report parameter is defined by its name and type. In JasperReports Server, parameters can be mapped to input controls that users can interact with.

Pivot

To rotate a crosstab such that its row groups become column groups and its column groups become rows. In the Ad Hoc Editor, pivot a crosstab by clicking ↻.

Pivot Table

A table with two physical dimensions (for example, X and Y axis) for organizing information containing more than two logical dimensions (for example, PRODUCT, CUSTOMER, TIME, and LOCATION), such that each physical dimension is capable of representing one or more logical dimensions, where the values described by the dimensions are aggregated using a function such as SUM. Pivot tables are used in Jaspersoft OLAP.

Properties

Settings associated with an object. The settings determine certain features of the object, such as its color and label. Properties are normally editable. In Java, properties can be set in files listing objects and their settings.

Report

In casual usage, *report* may refer to:

- A JasperReport. See **JasperReport**.
- The main JRXML in a JasperReport.
- The file generated when a JasperReport is scheduled. Such files are also called content resources or output files.
- The file generated when a JasperReport is run and then exported.
- In previous JasperReoprts Server versions, a report created in the Ad Hoc Editor. See **Ad Hoc Report**.

Repository

The tree structure of folders that contain all saved reports, dashboards, OLAP views, and resources. Users access the repository through the JasperReports Server web interface or through iReport. Applications can access the repository through the web service API. Administrators use the import and export utilities to back up the repository contents.

Resource

In JasperReports Server, anything residing in the repository, such as an image, file, font, data source, Topic, Domain, report element, saved report, report output, dashboard, or OLAP view. Resources also include the folders in the repository. Administrators set user and role-based access permissions on repository resources to establish a security policy.

Role

A security feature of JasperReports Server. Administrators create named roles, assign them to user accounts, and then set access permissions to repository objects based on those roles. Certain roles also determine what functionality and menu options are displayed to users in the JasperReports Server interface.

Schema

A logical model that determines how data is stored. For example, the schema in a relational database is a description of the relationships between tables, views, and indexes. In Jaspersoft OLAP, an OLAP schema is the logical model of the data that appears in an OLAP view; they are uploaded to the repository as resources. For Domains, schemas are represented in XML design files.

Schema Workbench

A graphical tool for easily designing OLAP schemas, data security schemas, and MDX queries. The resulting cube and query definitions can then be used in Jaspersoft OLAP to perform simple but powerful analysis of large quantities of multi-dimensional data stored in standard RDBMS systems.

Set

In Domains and Domain Topics, a named collection of items grouped together for ease of use in the Ad Hoc Editor. A set can be based on the fields in a table or entirely defined by the Domain creator, but all items in a set must originate in the same join tree. The order of items in a set is preserved.

Slice

An OLAP operation for filtering data rows.

SQL

Structured Query Language. A standard language used to access and manipulate data and schemas in a relational database.

System Admin

Also called the system administrator. A user who has unlimited access to manage all organizations, users, roles, repository permissions, and repository objects across the entire JasperReports Server instance. The system admin can create root-level organizations and manage all server settings. The default system admin is the `superuser` account.

Topic

A JRXML file created externally and uploaded to JasperReports Server as a basis for Ad Hoc reports. Topics are created by business analysts to specify a data source and a list of fields with which business users can create reports in the Ad Hoc Editor. Topics are stored in the Ad Hoc Components folder of the repository and displayed when a user launches the Ad Hoc Editor.

Transactional Data

Data that describe measurable aspects of an event, such as a retail transaction, relevant to your business. Transactional data are often stored in relational databases, with one row for each event and a table column or field for each measure.

User

Depending on the context:

- A person who interacts with JasperReports Server through the web interface. There are generally three categories of users: administrators who install and configure JasperReports Server, database experts or business analysts who create data sources and Domains, and business users who create and view reports and dashboards.
- A user account that has an ID and password to enforce authentication. Both people and API calls accessing the server must provide the ID and password of a valid user account. Roles are assigned to user accounts to determine access to objects in the repository.

View

Several meanings pertain to JasperReports Server:

- An Ad Hoc view. See **Ad Hoc View**.
- An OLAP view. See **OLAP View**.
- A database view. See http://en.wikipedia.org/wiki/View_%28database%29.

WCF

Web Component Framework. A low-level GUI component of JPivot. For more information, see http://jpivot.sourceforge.net/wcf/index.html.

Web Services

A SOAP (Simple Object Access Protocol) API that enables applications to access certain features of JasperReports Server. The features include repository, scheduling and user administration tasks.

XML

eXtensible Markup language. A standard for defining, transferring, and interpreting data for use across any number of XML-enabled applications.

XML/A

XML for Analysis. An XML standard that uses Simple Object Access protocol (SOAP) to access remote data sources. For more information, see http://www.xmla.org/

XML/A Connection

A type of OLAP client connection that consists of Simple Object Access Protocol (SOAP) definitions used to access data on a remote server. OLAP client connections populate OLAP views.

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