TM880

APROL reporting

PERFECTION IN AUTOMATION
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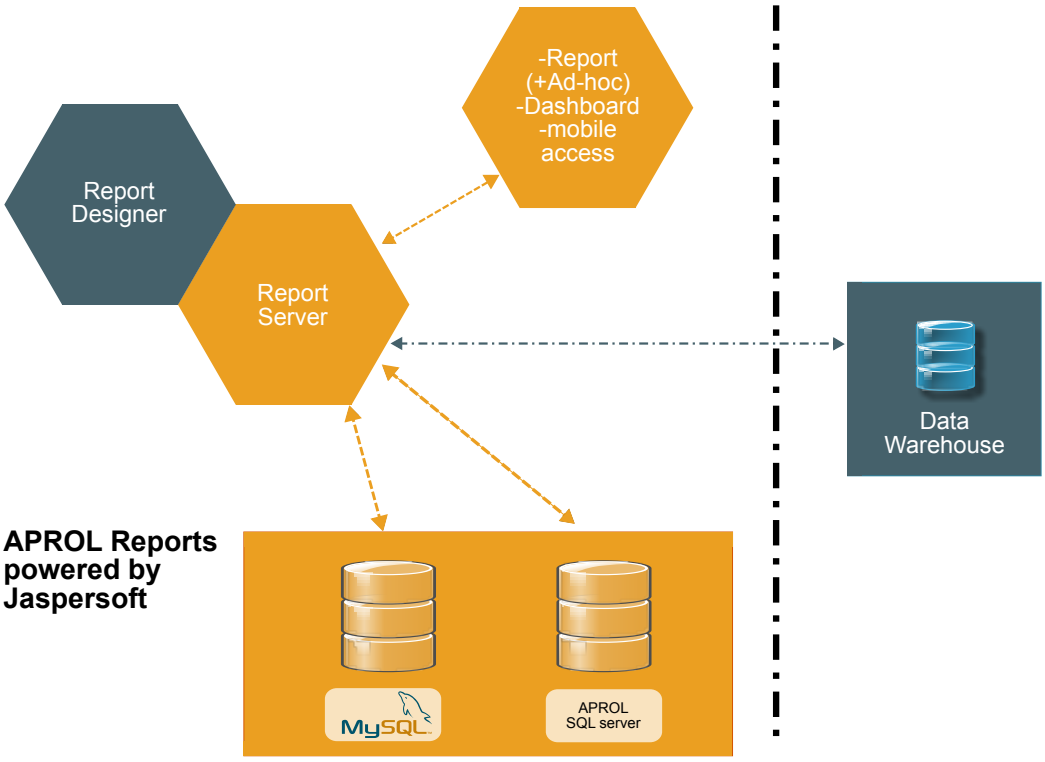
Requirements	
Training modules	TM880 – APROL Reporting
Software	APROL
Hardware	1 control computer, 1 controller

Table of contents

1 Introduction

Users can create their own reports and call up interactive dashboards using the integrated business intelligence tool from Jaspersoft.



1.1 Objectives

In this training module, you will learn about the usage of the reporting tools in APROL.

- You learn how to create customer-specific APROL SQL tables with PDA blocks.
- You will get an overview of the AprolSqlServer system structure.
- You will get to know the "Jaspersoft Studio" report designer and the different editor views.
- You will learn the basic elements of a Jaspersoft report.
- You will learn how reports are time controlled and output in different formats.
- You will get an overview of the JasperReport server's ad-hock analyses.

1.2 Icons and safety guidelines

The safety notices in this manual are organized as follows:

Danger: Disregarding these safety guidelines and notices can result in severe injury, death or substantial damage to equipment.

Warning: Disregarding these safety guidelines and notices can result in severe injury or substantial damage to equipment.

Caution: Disregarding the safety regulations and guidelines can result in injury or damage to material. Important information for preventing errors.

Additional notices and information in this manual are organized as follows:

Note: Important notices and additional information

Help: References to additional document sources are provided here. (help system, data sheets, user's manuals)

Example: Indicates an example to further illustrate a topic.

Result: A brief summary of the results of an exercise.

Organization of safety notices in external manuals

This manual contains references to other manuals. How safety notices are organized in external manuals is listed in the respective manual.

Task: Tasks and exercises

Sections marked with an orange stripe on the left side contain information about exercises as well as the associated actions to be taken. Exercises are intended to provide a deeper understanding of learned information.

2 PDA connection

The variables of any B&R controller can be adopted in the APROL system by using the PDA connection.

2.1 Composition of the controller variables

The necessary variables can be selected online or offline in the ControllerManager.

Online configuration

A connection must be established to the controller via host name or IP address if the online configuration is carried out. A new connection can be established in the ControllerManager via the **<connection> / <edit connection>** menu.

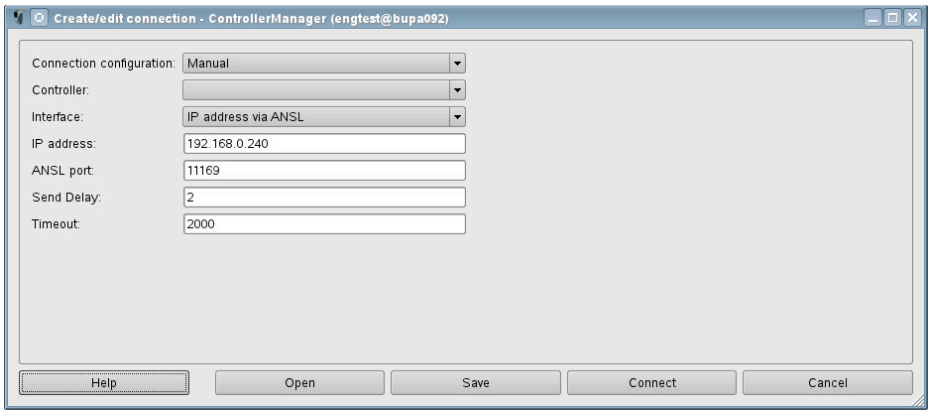


Figure 1: Establishing a connection to a controller

The PDA configuration can then be started by a right click on the connected controller.

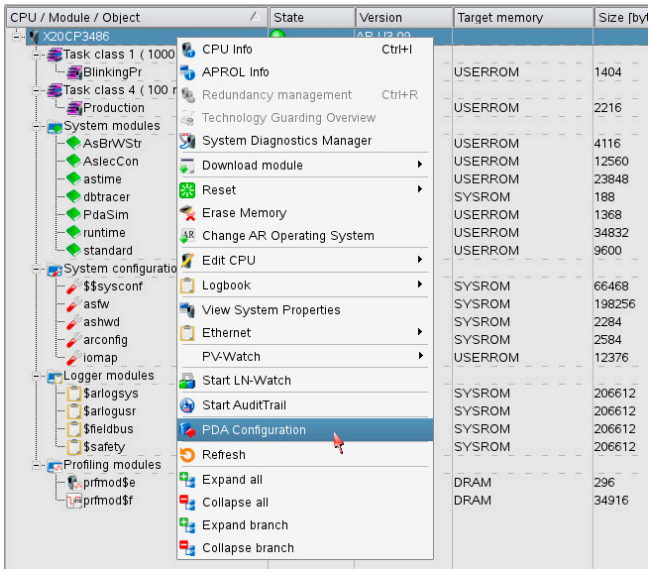


Figure 2: Online PDA Configuration

Offline Configuration

An offline PDA configuration can be started if no connection is established in the ControllerManager. A directory and the corresponding tasks are necessary for this composition.

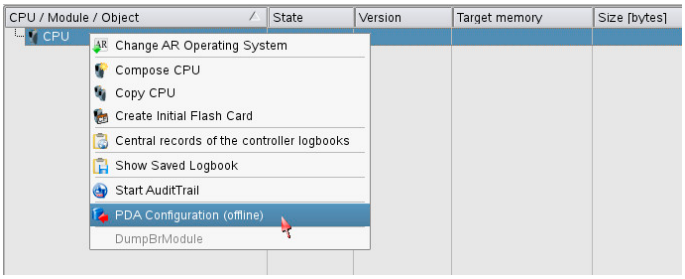


Figure 3: Offline PDA Configuration

2.2 Selection of the controller variables

The required variables (global and local) can be selected in the PDA dialog.

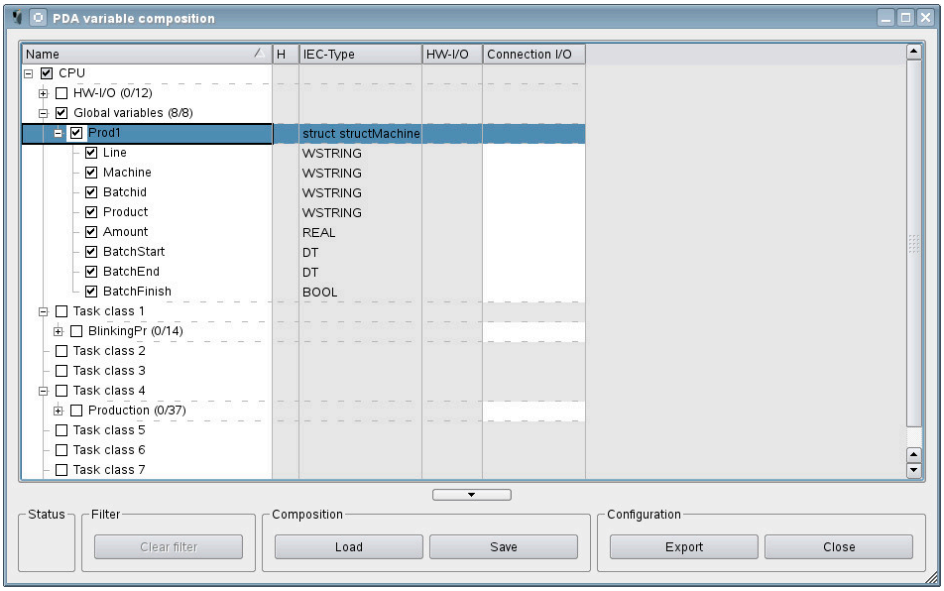


Figure 4: Variable composition

The associated variables are also selected together with the hardware I/O selection.

Automatic creation of gateway variables

Connection names are required in order to be able to import the variables into the APROL system. They can be created automatically by using the **<create generic connection I/O names>** function.

The following rules are applied during the creation:

- The task and variable names of local variables are combined (TASKNAME_VARNAME)
- Full stops (.) are substituted with underscores.
- Square brackets ([and]) are substituted with underscores.

Figure 5: Generic creation of variable names

The configuration can be exported by using the **<Export>** button.

2.3 Import of the variables in the CaeManager

The export files can be imported into the CaeManager, in the runtime system / APROL connections.

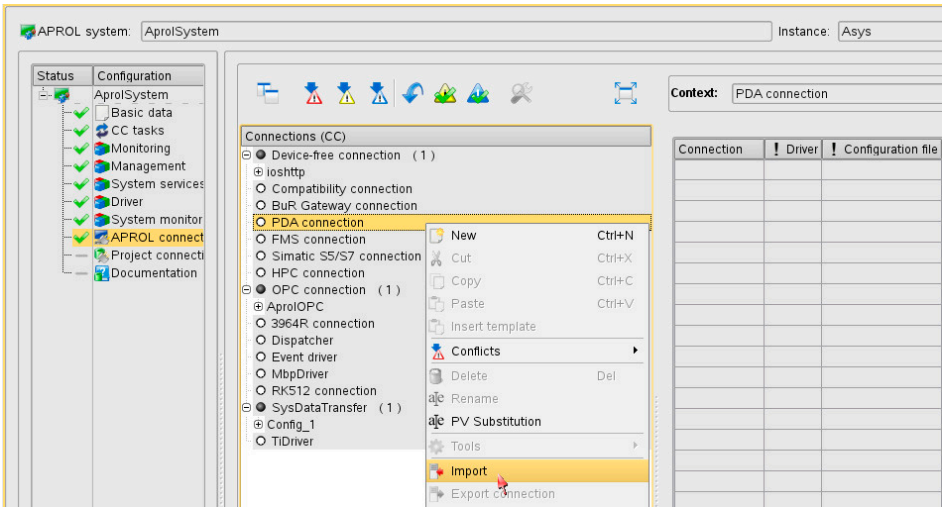


Figure 6: APROL connections

The name of the PDA connection is shown in the import dialog. The PDA connection list can be imported by using the **<Import>** button.

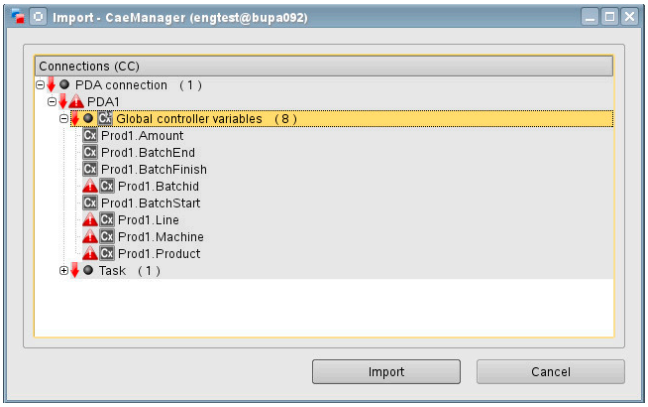
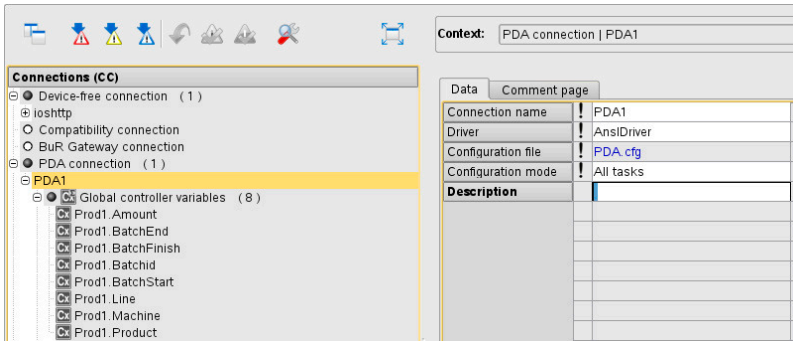


Figure 7: Importing a PDA connection

A red triangle in front of a variable shows that no connection variable was assigned or that the length of a string was not defined.

The corresponding driver must be configured for each PDA connection.



2.4 Driver configuration

An AnslDriver or InaDriver must be configured, so that the APROL system can establish a connection to the respective controller. The settings are made in the runtime system / driver.

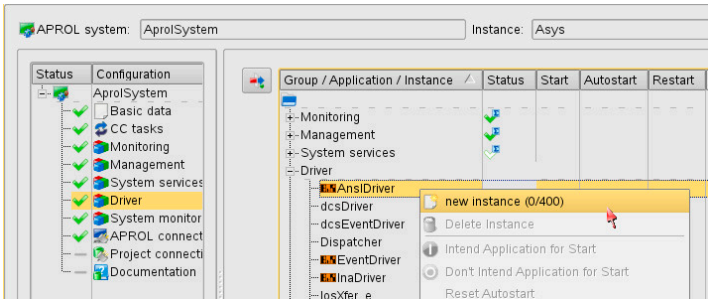


Figure 8: Creating a new AnslDriver instance

The AnslDriver can be used as of a controller AR-OS A3.09. The InaDriver must be used for an older AR-OS.

The options driverName, ipPrimary and pda must be set in the newly created AnslDriver instance. These 3 options will be required as soon as the "Configure manually" menu item is selected.

The following options must be set in the AnslDriver configuration.

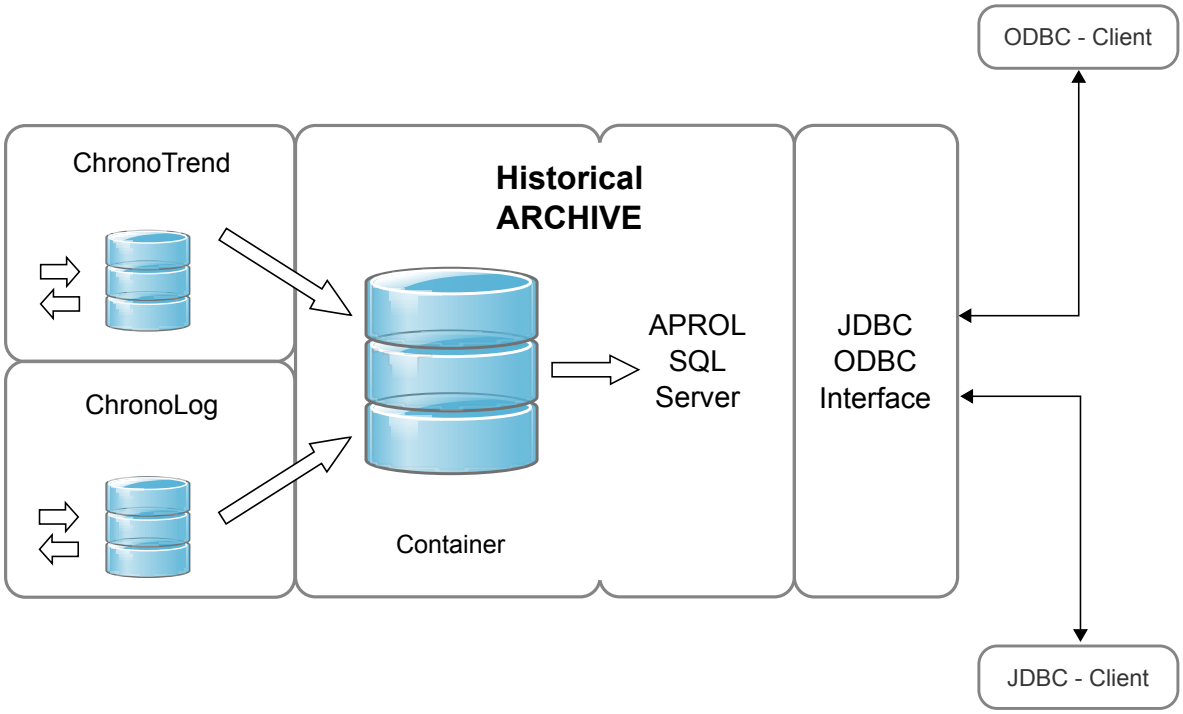
- pda: Name of the PDA connection (selectable via drop-down list).
- ipPrimary: IP address of the controller.
- driverName: Name of the driver.

	Application	Prio	Category	Option	Value	Used
1	AnslDriver_001	2	Mode	-cpuLoggerUpdateCycleTime	60	X
2	AnslDriver_001	1	Configuration	-ctrlInstance		-
3	AnslDriver_001	1	Configuration	-driverName	pda1	X
4	AnslDriver_001	1	Mode	-eventMode		X
5	AnslDriver_001	1	Configuration	-gw		-
6	AnslDriver_001	1	Connectivity	-ipPrimary	192.168.0.240	X
7	AnslDriver_001	1	Controller redundancy	-isRedu		-
8	AnslDriver_001	2	Mode	-logBooks	$arlogsys, $fieldbus, $safety, $arlogconn	X
9	AnslDriver_001	1	Configuration	-pda	PDA1	X
10	AnslDriver_001	2	CC redundancy	-slaveConnect		-

Figure 9: Configuration of the AnslDriver

3 AprolSqlServer

The historical data of an APROL system can be accessed with the help of ODBC/JDBC and the query language SQL-92. The 'AprolSqlServer' receives your queries and applies them to the ChronoLog database.



3.1 Authentication and authorization

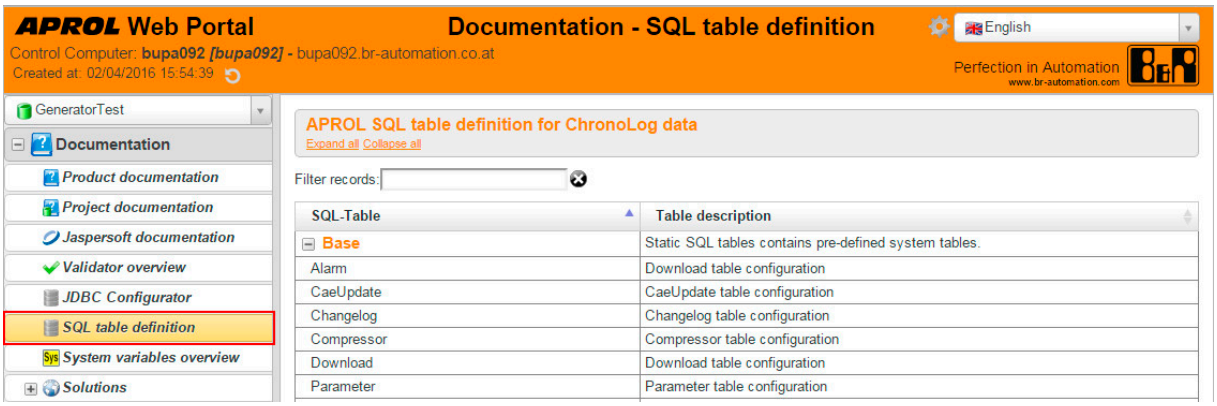
A user name and password is required to connect to the AprolSqlServer. Operators need the right 'AprolSqlServer: Read' to access historical data.

Furthermore, it is possible to create an operator who only has the right to read SQL data. He/she should be used for the reporting tools.

A pre-configured SQL operator is supplied; SqlSystemOperator (password: .SqlSystemOperator). The SqlSystemOperator account should be deactivated, because of security reasons.

3.2 System tables

The system tables are stored in the "base" schema. This schema is automatically activated as being standard and must therefore not be added explicitly when executing a query. A list of the pre-defined tables and their columns is listed in the APROL web portal.



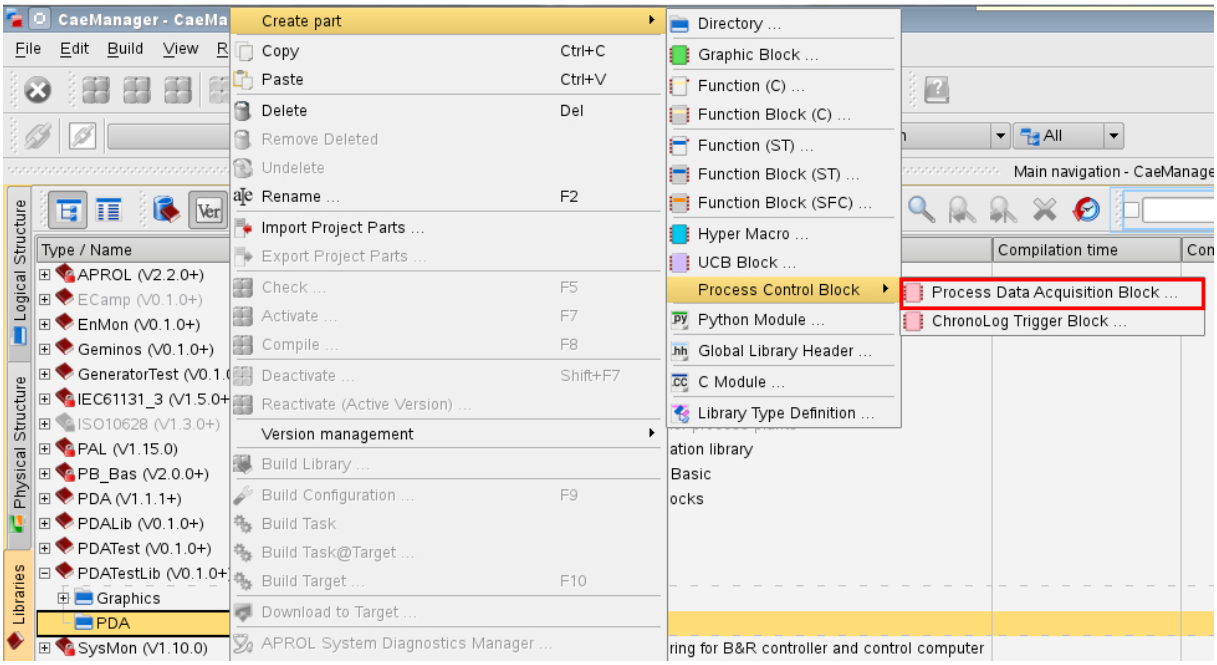
3.3 Dynamic tables

In addition to the APROL system tables, customer-specific tables can be created. Table schemas are defined with the help of PDA (Process Data Acquisition) blocks. The table names must be introduced to the pda schema when the PDA tables are queried.

Example: `SELECT * FROM pda."table name"`

3.3.1 Creation of PDA blocks

PDA blocks are created in a CAE library. Library and block name specify the identifiers which will be used in the SQL tables.



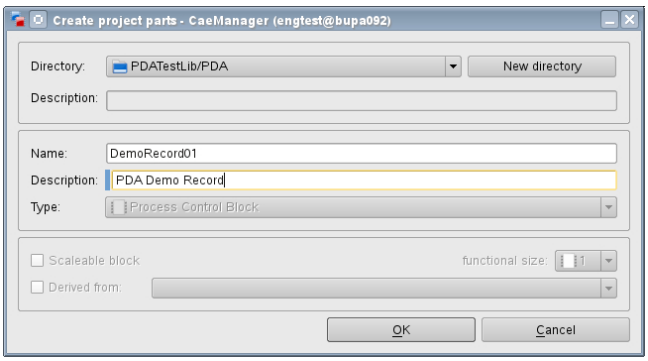


Figure 10: Creating a new block

A PDA block has 4 mandatory pins:

Pin	Description
Trigger	A positive edge on this input triggers a database record.
ts	Timestamp of the entry If this input is not provided for, the timestamp of the trigger event will be used.
rec_rate	Assignment of the target container.
equp_id	Customer-specific part of the identifier. Is not allowed to be empty!

Further pins can be created with a right click -> Create pin.

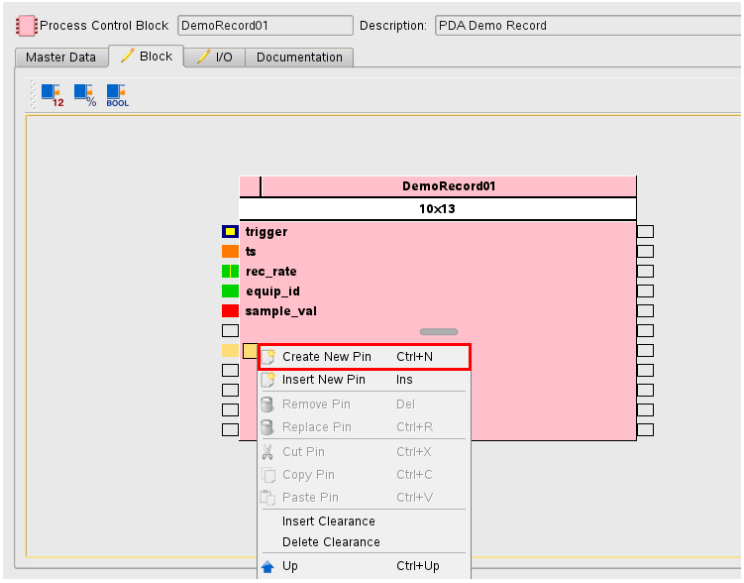


Figure 11: Creating block pins

The "sample_val" pin will be created automatically and creates a database record upon each trigger. It should therefore be deleted or renamed.

Creating a new PDA block

1) Create a new PDA block "Production" in the PDA library.

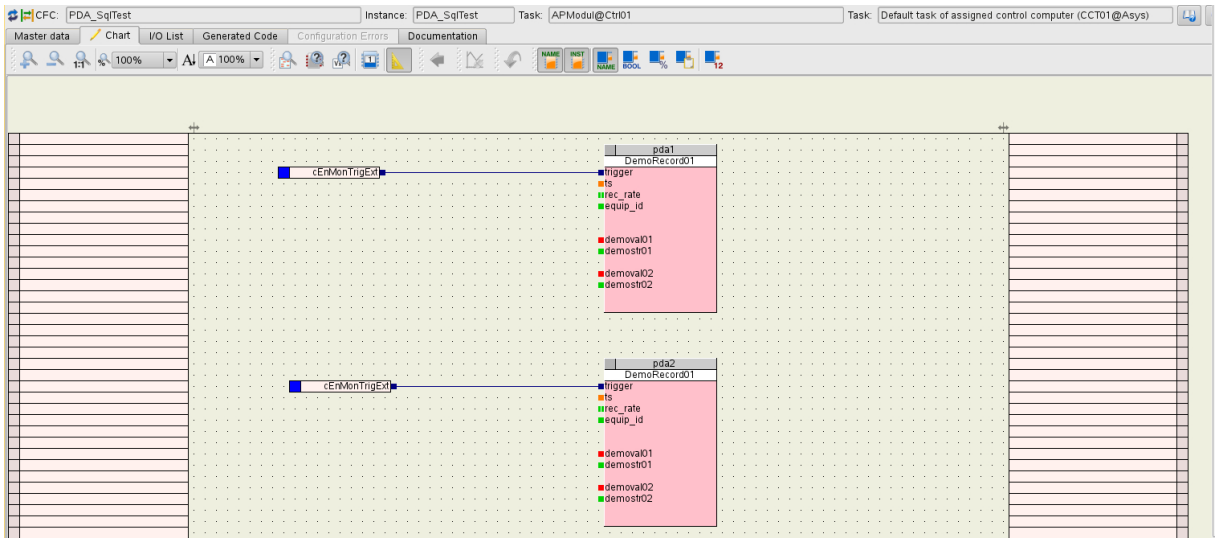
2) Create the following pins:

Pin name	Data type	Description
line	LSTRING	Production line
machine	LSTRING	Machine
product	LSTRING	Produced product
batchid	LSTRING	Unique batch ID
batchstart	DT	Start time of the batch
batchend	DT	End of the batch
amount	REAL	Amount produced

3) Compilation of the created block

3.3.2 Use of PDA blocks

Many instances of a PDA block can be placed in a CFC. The "trigger" pin must be connected, the project part can otherwise not be compiled.



PDA schema

A new table is created in the "pda" schema after the build and the project part has been downloaded.

3.4 Access to historical data

The necessary JDBC and ODBC drivers are installed per default on an APROL system. An installer is available for Windows and can be found on the APROL DVD.

Chapter D1.8 APROL-SQL / Installation of the JDBC and ODBC remote driver in Windows

3.4.1 ODBC access

AprolSQLQueryTool

The "AprolSqlQueryTool" executes queries via ODBC. The tool is suitable for tests to check if an SQL statement delivers the desired result. It is started via the KDE menu ->Diagnosis->AprolSqlQueryTool.

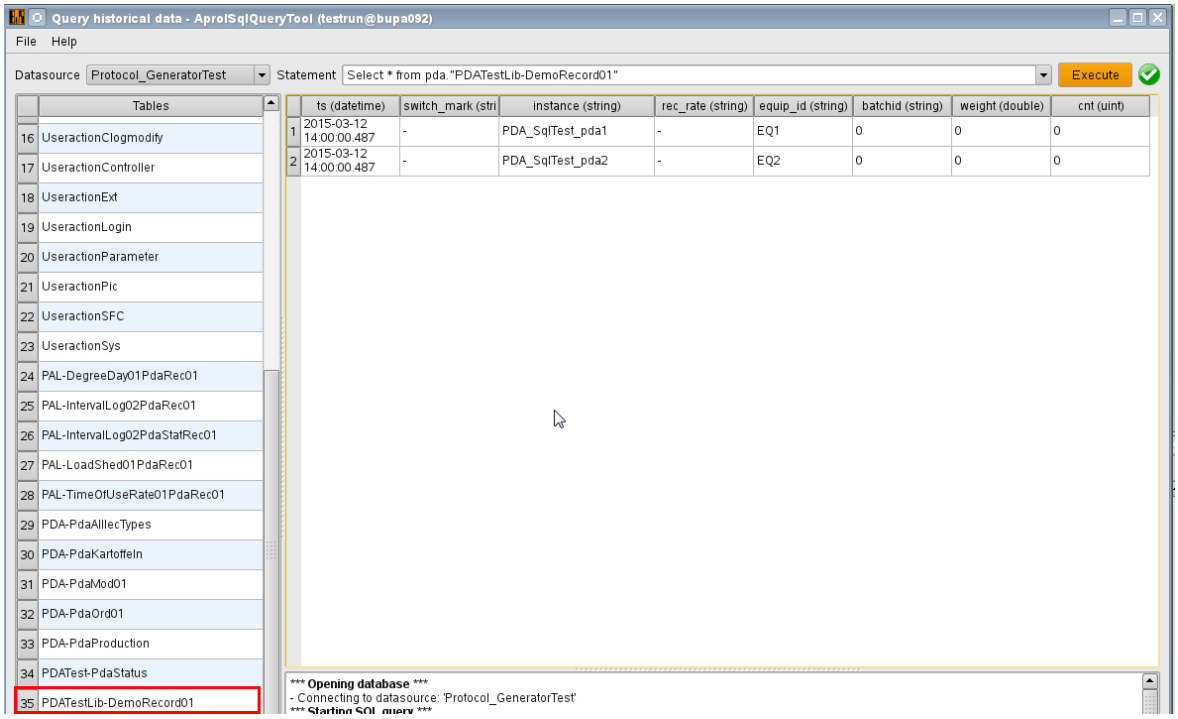


Figure 12: Example query in the AprolSqlQueryTool

All of the available SQL tables are listed in this application. An SQL query can be entered in the "Statement" field.

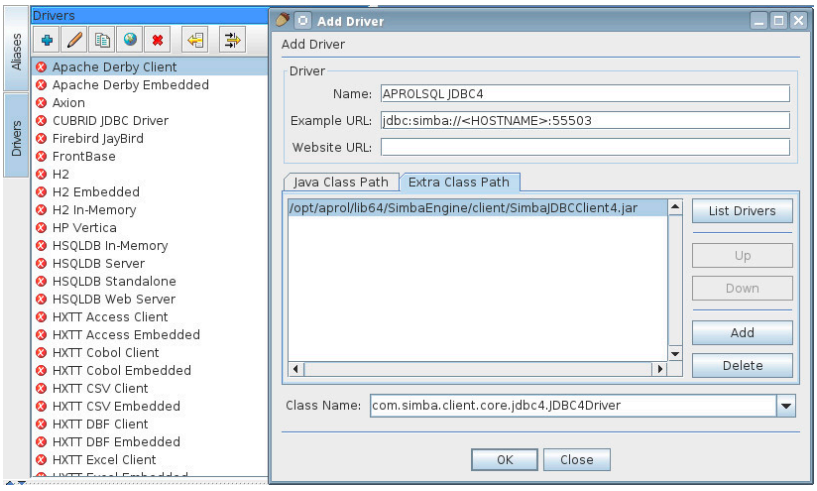
The most simple select query is `SELECT *FROM "table name"`. This delivers all data records in the table.

3.4.2 JDBC access

A URL and JDBC client are required for a JDBC connection. The JDBC URL can be generated with the **<APROL SQL JDBC Configurator>**. The "Squirrel SQL Client" tool can be used as a JDBC client.

Driver configuration

A new driver can be created for the AprolSqlServer in the "Driver" tab. The path to the drier must be specified in the **<Extra Class Path>** tab. The <Class Name> field is filled out automatically when **<List Drivers>** is pressed.



Alias configuration

A connection to the AprolSqlServer can then be established in the Alias tab. The JDBC URL which is necessary for this is created automatically by the APROL SQL JDBC Configurator.

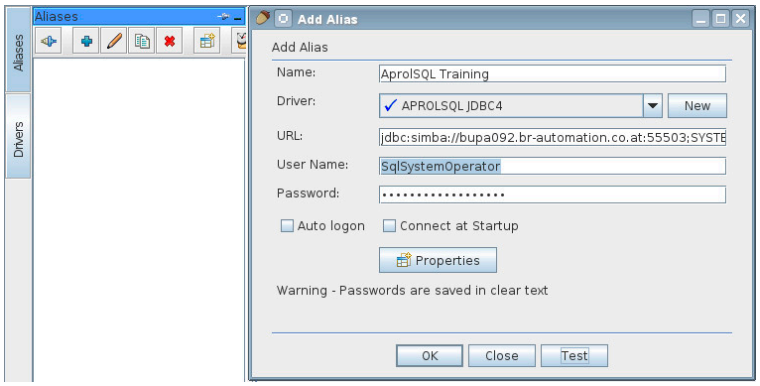


Figure 13: New JDBC Connection

3.5 APROL-SQL example queries

List all entries in the alarm table:

```
SELECT * FROM Alarm
```

List the first ten entries in the alarm table

```
SELECT * FROM Alarm LIMIT  10
```

Query the columns pv, priority and project

```
SELECT pv,priority,project FROM Alarm LIMIT  10
```

Query the alarm table with a filter on the column ts:

```
SELECT * FROM Alarm
WHERE ts BETWEEN '2016-03-01 00:00:00' AND '2016-03-02 00:00:00'
```

Query the alarm table with a filter on the column pv:

```
SELECT * FROM Alarm WHERE ts IN('pv1', 'pv2', ...)
```

List all of the different values in the "group" column:

```
SELECT "group" FROM Alarm GROUP BY "group"
```

Sum of the alarm duration per alarm group:

```
SELECT "group",SUM(duration) as "dur" FROM Alarm GROUP BY "group"
```

Sort results in ascending order:

```
SELECT "group",SUM(duration) as "dur" FROM Alarm
GROUP BY "group" ORDER BY "dur" DESC
```

4 Jaspersoft Studio

4.1 General information about Jaspersoft Studio

Opening Jaspersoft Studio

Jaspersoft Studio is started via the KDE menu ->Reports-> Jaspersoft BI -> **Jaspersoft Studio Professional** .

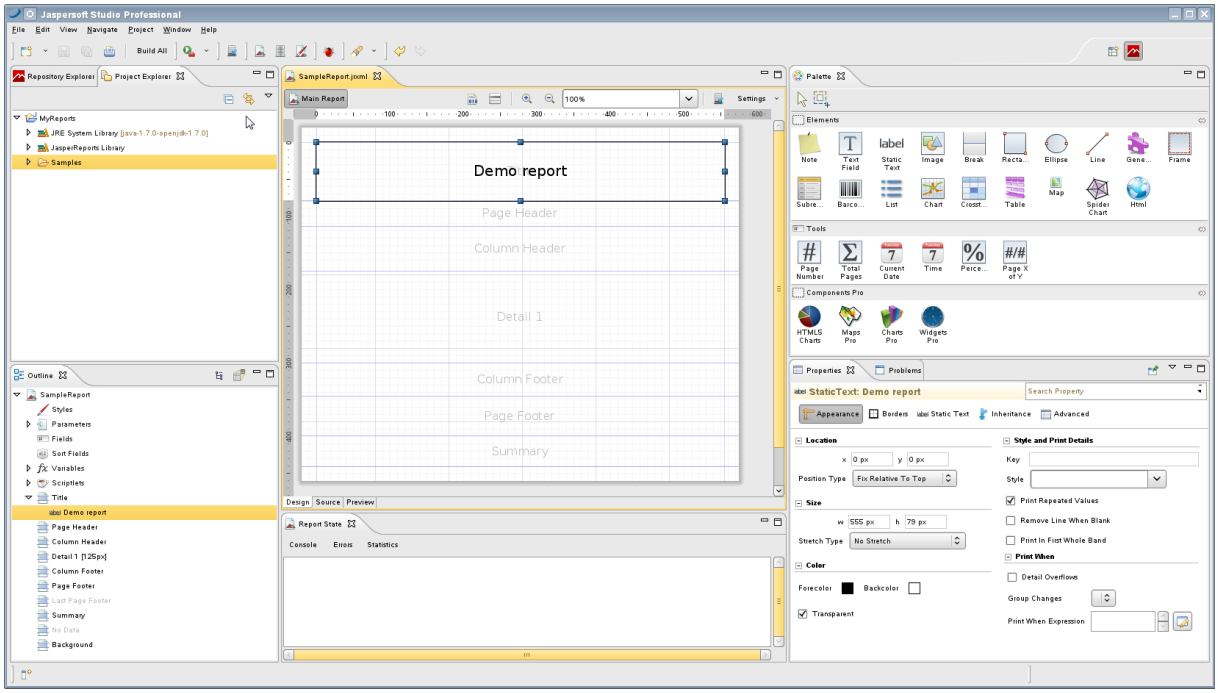


Figure 14: Jaspersoft Studio

Report Editor

The editor window is divided into three tabs:

- Design: graphical Report Editor
- Source: XML source code of the report
- Preview: Preview of a report supporting different output formats.

Editor Views

Apart from the report editor, Jaspersoft Studio offers many supported views:

- Repository Explorer: List of all data adapters and JasperReport server connections
- Project Explorer: Local JasperReports projects
- Outline: Structure of the open JasperReports
- Palette: Selection of the elements
- Properties: Properties of the selected element.

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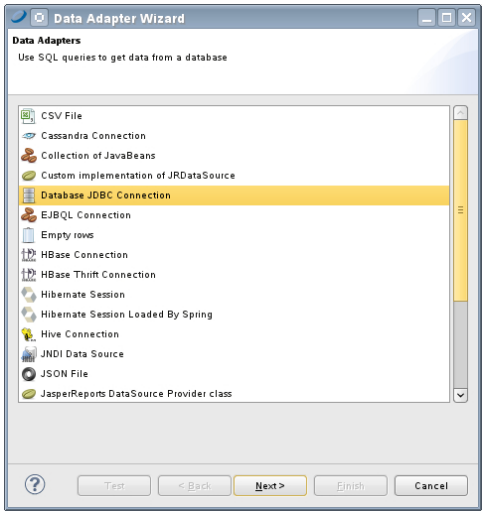
4.2 Connection to the AprolSqlServer



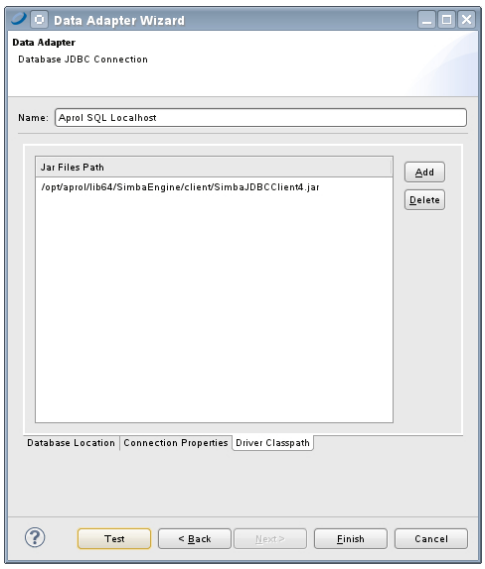
Step 1: Type of the data source

A new data adapter can be created in the repository view. The **"Database JDBC Connection"** type is required to connect to an AprolSqlServer.

Step 2: JDBC properties

The JDBC parameters (Driver, URL, User name and Password) are needed to establish a connection to the SQL server.

> The JDBC URL can be generated in the APROL web portal. "Access to historical data" on page 15



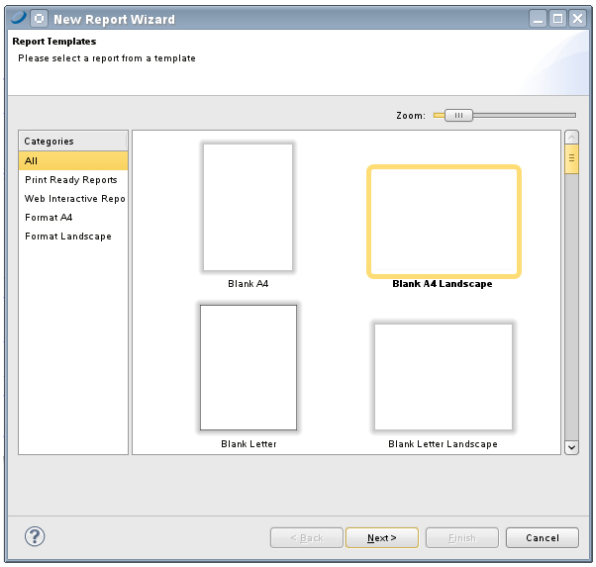
Step 3: Database driver

The database driver path is entered in the last step. In the case of the AprolSqlServer, this is **/opt/aprol/lib64/SimbaEngine/client/SimbaJDBCClient4.jar**.

4.3 Creating reports

4.3.1 Wizard

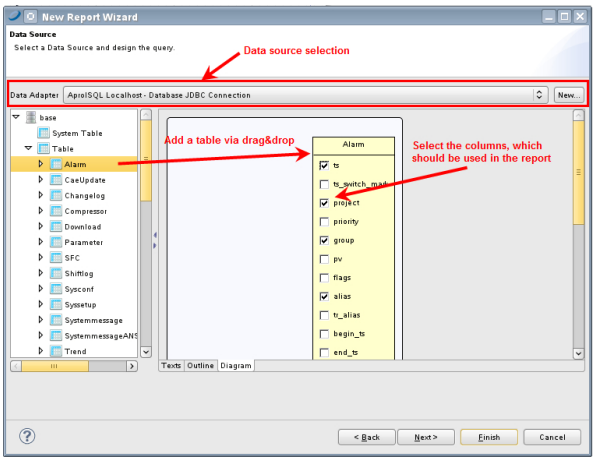
A report can be created in a few steps by using the wizard. The report wizard starts automatically when a new report is created (File->New->Jasper Report).



Step 1: Template selection

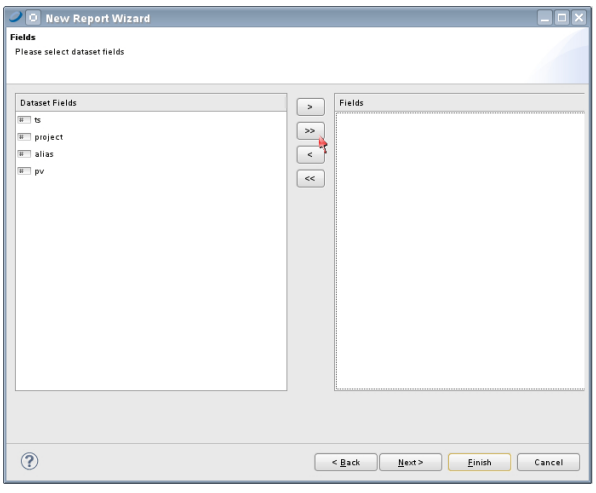
A report format is chosen in the first selection. A style can also be selected.

It is also possible to create your own report templates.



Step 2: SQL Designer

In the next step, a query can be created with the built-in SQL designer.



Step 3: Selection of the SQL columns

Columns which should be used in the report must be added to "Fields". The report wizard is closed and a new report is created with **<Finish>**.

4.3.2 structure

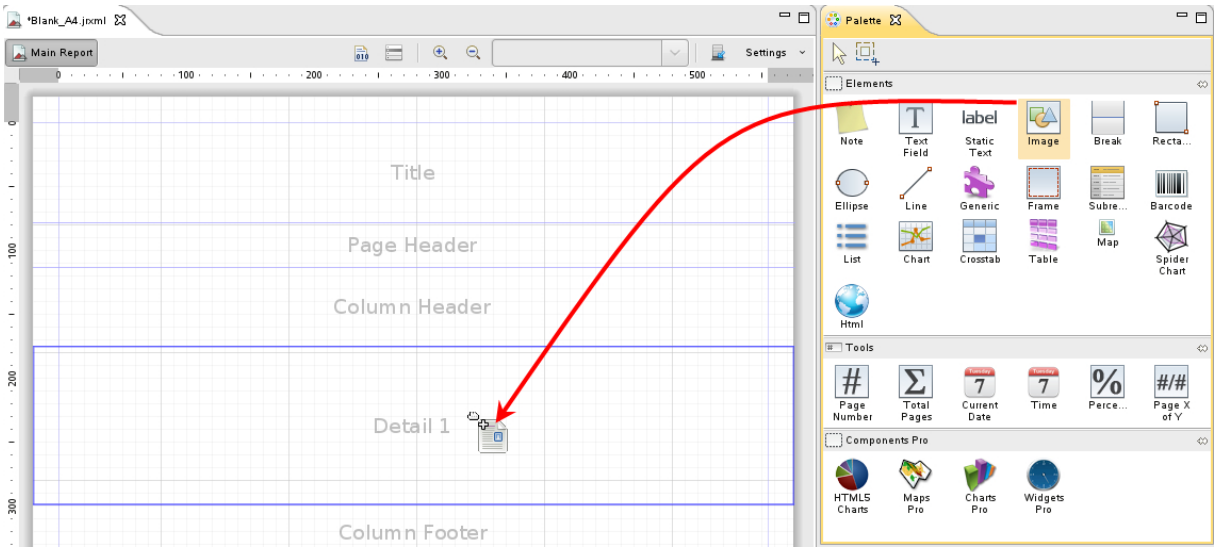
A report is divided in different bands which possess different properties. An overview of the layout is shown in the "**Outline**" tab.

Volume	Description
Title	Is printed once at the beginning of a report.
Page Header	Is printed at the beginning of each page.
Column Header	Is printed at the beginning of each column.
Detail	A detail band is printed for each SQL line.
Column Footer	Is printed at the end of each column.
Page Footer	Is printed at the end of page.
Summary	The summary band is output at the end of a report.

Table 1: List of the report bands

4.3.3 Elements

Report elements can be placed via drag & drop from the palette in the report editor. The band in which an element is stored plays a great role, because the properties of a band influence the output.



Placing fields directly

Fields, parameters and variables can be positioned directly in the report from the "Outline View". This action is the same as using a "Text field" and then configuring the expression.

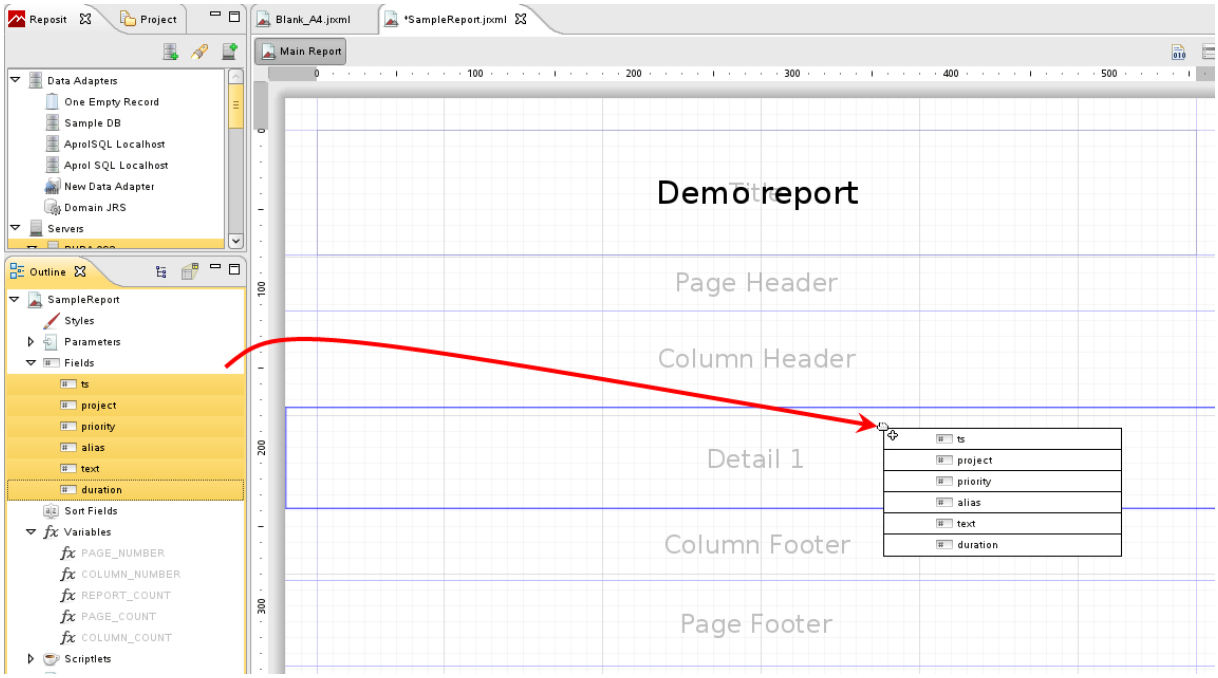


Figure 15: Placing of variables

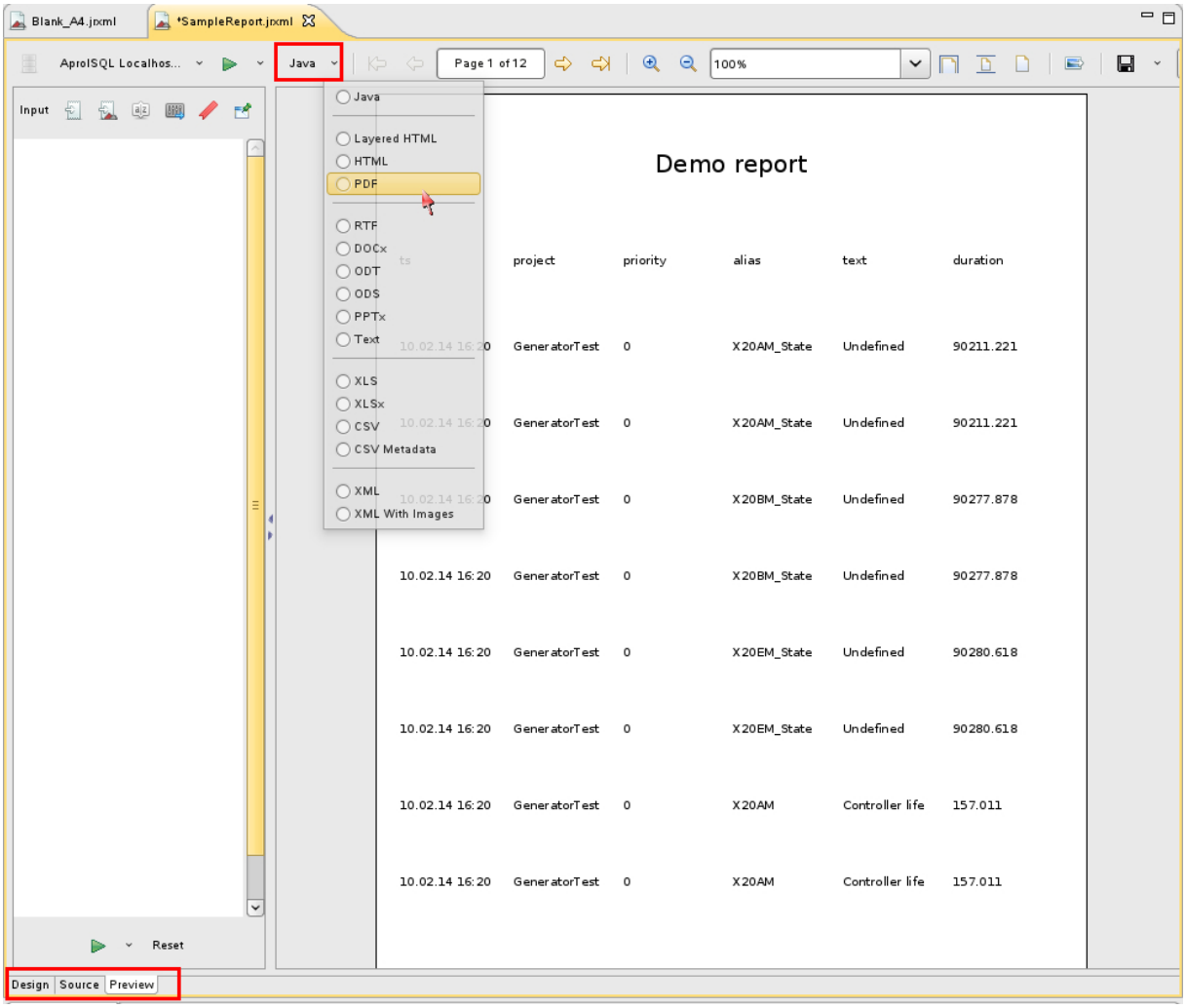
Element properties

Each placed element possesses different properties (background color, frames, font size). The properties can be changed in the "Properties" window.

Styles can be created and assigned to the elements in order to apply properties simply to several elements at once.

4.3.4 Preview

You can switch between the Design and Preview in the Report Designer. You can switch between the different export formats in the preview.



Creating a simple report

1) Create a new report using the wizard
2) Query the PDA table using the SQL Designer
3) Creating a table report in the Reports Designer

4.3.5 Styles

Styles are an accumulation of attributes which can be assigned to visual elements. They can be used to change the properties of several text fields comfortably. the It must be noted that the Style attributes are always overwritten with the "directly assigned" properties in the element.

Styles are normally created in the Outline View of a report. It is also possible to create a "Style Template File" to make it globally available.

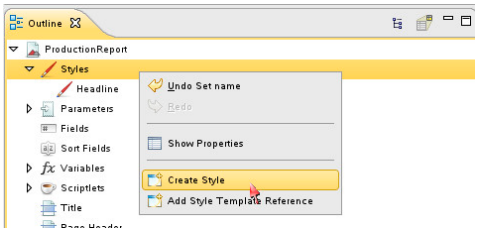


Figure 16: Creating a style

A style is assigned in the properties of an element. Several elements may be selected during the assignment.

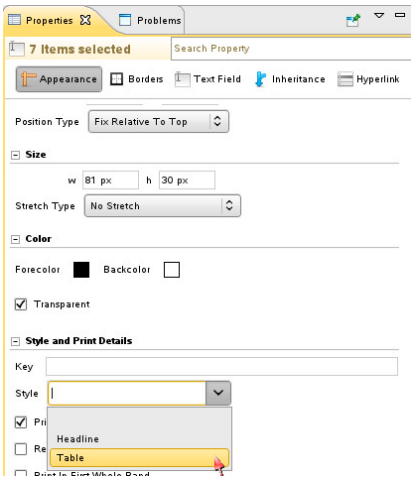


Figure 17: Assigning a style

Conditional Styles

A style may contain several conditions which will change attributes if they are fulfilled. In this way, the background color of a table line can be changed based on a value.

4.3.6 Parameter

Parameters are normally transferred from the report server to reports. They are used to provide a report with additional arguments. A report's SQL query can be constructed dynamically by using the parameters.

Parameters in the SQL queries

Parameters can be used directly in SQL queries in order to define filters.

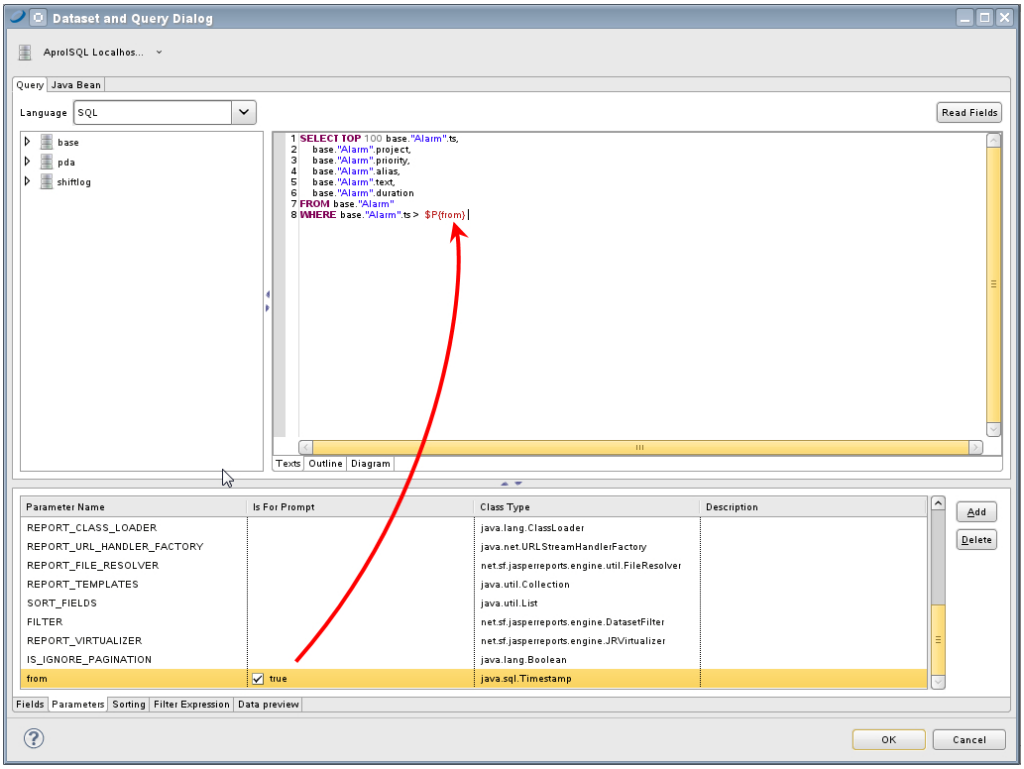


Figure 18: Parameters in the SQL editor

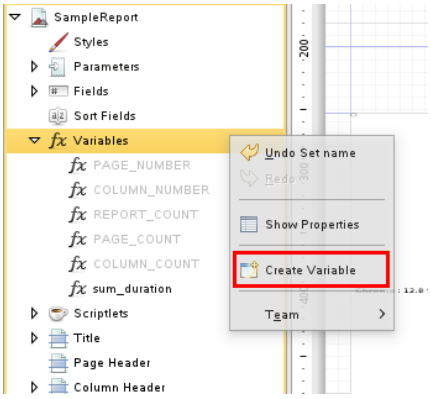
A parameter is now demanded before the next execution of the report. The value entered by the user is entered in the SQL query.

Creating parameters for filtering

1) Creating the parameters from Ts and tillTS for the date filtering
2) Extending the SQL query with a WHERE clause
3) Show date range in the report

4.3.7 Variables

The variables are values which are calculated in the report. This may be the sum of a database column, for example.



Creating one variable

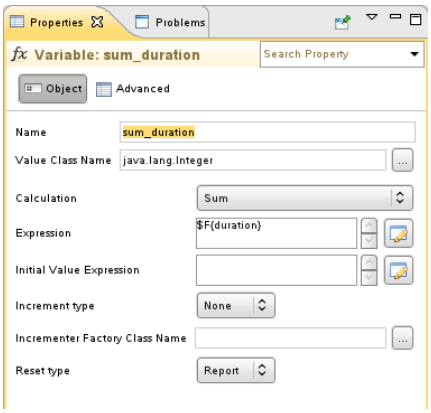
Variables are created in the "Outline View".

Figure 19: Creating one variable

Variable properties

The properties of a variable are defined in the Properties window.

Name	Description
Name	Name of the variable
Value Class Name	Data type of the variable.
Calculation	Function which will be applied to the expression. If no calculation is defined, the value corresponds to the expression's variable.
Expression	Basic value for calculating the variable.



Example

The sum of all of the column's values is generated here. This variable increases by the value of the duration column when the detail band is output. Variables can also be placed directly from the Outline View into the report in the same way as database fields.

Figure 20: Variable properties

Calculation of the entire amount produced

1) Creating a new variable production sum
2) Enter the java.lang.Double data type as the value class
3) Select the type sum for calculations
4) Input the corresponding field in the expression

4.3.8 Charts

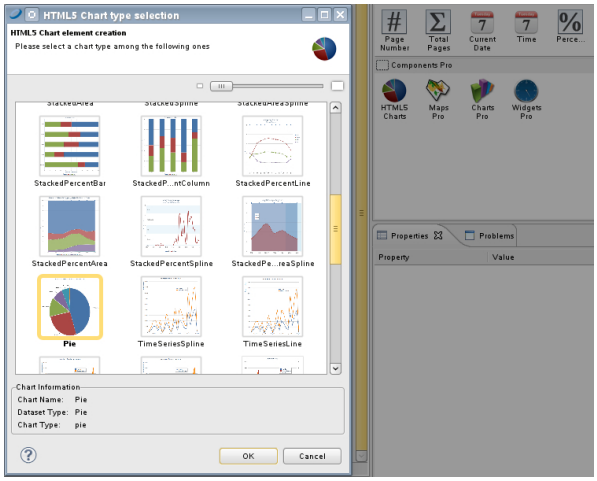


Diagram selection

An HTML5 diagram is also placed via drag and drop in the respective band. The diagram type is specified in a selection dialog.

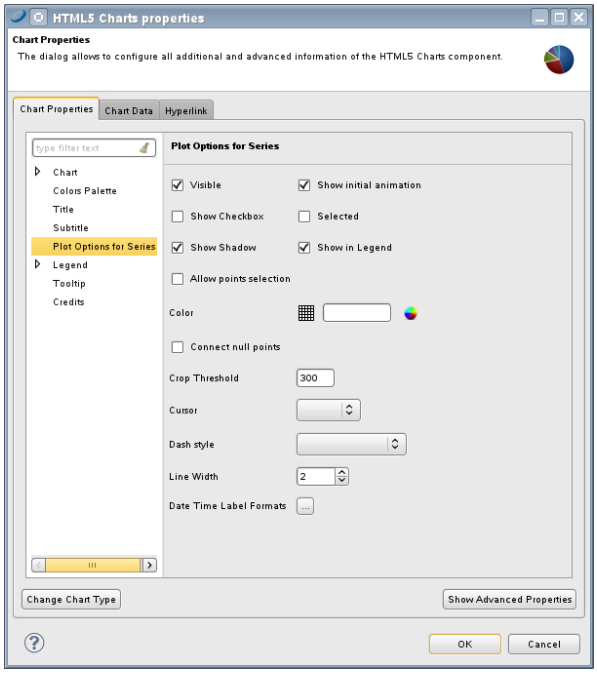


Chart Properties

The properties dialog is opened by double-clicking on the diagram. The appearance of the diagram is configured in this window.

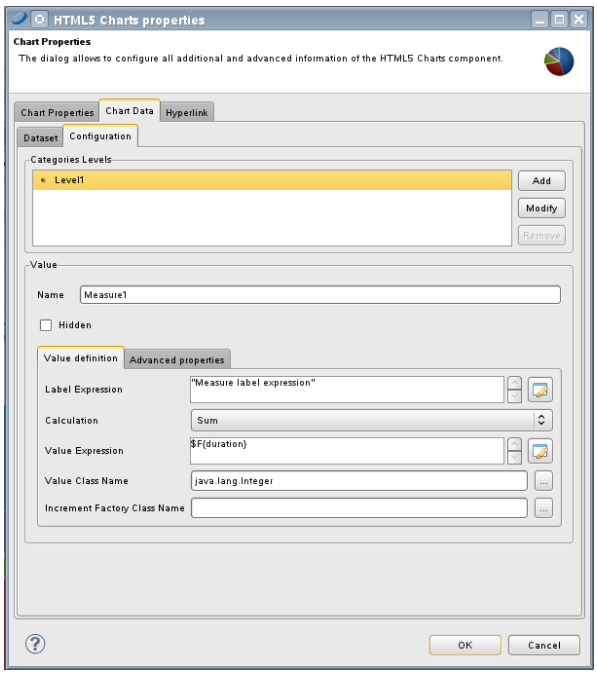


Diagram data

The values are assigned in the second tab. A category (key) and corresponding value must be given for pie charts.

Display of the products in a pie chart

1) Inserting an HTML5 diagram from the palette.
2) Select the field for the product in the category expression
3) Select sum for the calculation
4) Enter the field for the amount in the value expression

4.3.9 Sub datasets

Several sub datasets can be created in addition to the standard report (main dataset). These sub datasets contain other SQL queries and therefore other data than the main dataset.

The following components can be in a sub dataset:

- Diagram
- Table
- Crosstab
- List

Create sub dataset

A sub dataset can be created in the report outline. A wizard appears (similar to the report wizard) to define the query of the sub dataset.

A sub dataset has its own parameters and cannot access the main dataset's parameters directly. Parameter transfers and return values can be used for communication between main and sub datasets.

4.3.10 Table

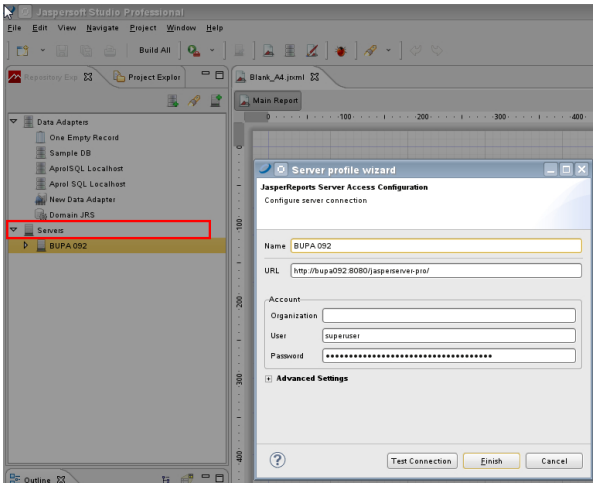
This widget can be used to create a table with predefined styles. Adding a table to the report starts the report wizard. A new dataset can also be created there of an existing one can be used.

A table can only be used on a sub dataset.

4.3.11 Cross-classified table

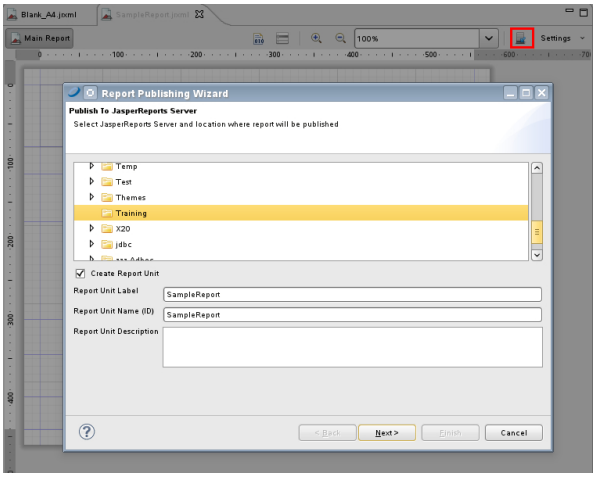
A simple cross-classified table, divided in columns, rows, and measurements, can be created with this widget. The configuration takes place with a wizard which starts as soon as a "Crosstab" is added to the report.

4.4 Connection to the report server



Establishing a connection

A connection to the report server can be created in the "Repository view". Host name/IP address, and login data are required for this.

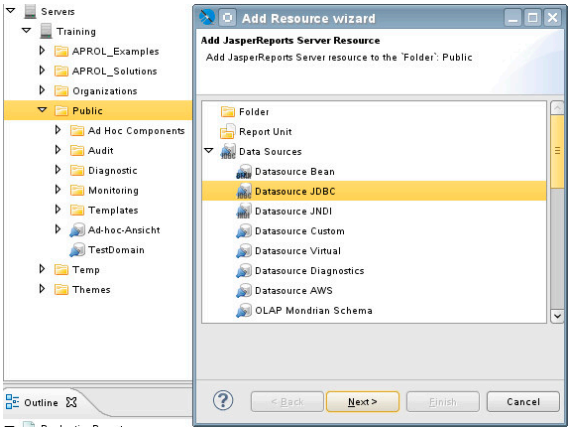


Publicizing the report

Reports can be loaded directly from the report designer to the report server. Both the report and the necessary resources (graphics, styles, etc.) are loaded to the server. A path of the server repository must be specified during publication.

4.4.1 Uploading a data source

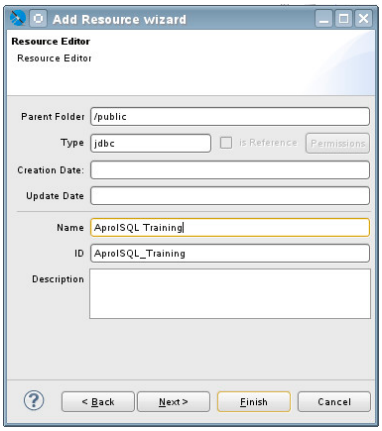
A data source configured in Jaspersoft Studio can be transferred simply to the JasperReport server. The advantage of this is that the driver configuration does not have to be repeated. The following steps are necessary for this:



New resources on the report server

Clicking **<New>** in the Repository creates a new JDBC data source in the corresponding directory.

Figure 21: Creating a new resource



Alias assignment

A name is appointed to the data source in the second step. The data source is saved under this name in the server. Several reports could refer to this data source in the course of events.

Figure 22: Assigning an alias

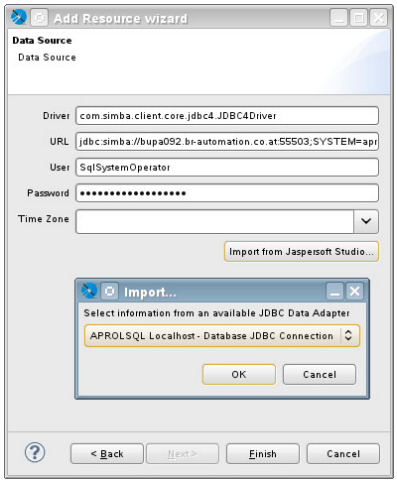


Figure 23: Import of the configuration

Importing the Jaspersoft Studio Configuration

The JDBC parameters can be assigned manually. The parameters are adopted in a data source configured in Jaspersoft Studio using the **<Import From Jaspersoft Studio>** button.

5 JasperReport server

5.1 Configuration

The installation/configuration of the JasperReport server is done with the **AprolConfigJasperReportsServer --configure** command. This command must be executed on each APROL logging server.

Licensing

A valid license is required for the use of the JasperReport server. Licensing can be done via the **<License>** button in the "APROL Info Licenses" dialog.

The JasperReport server can be opened directly from the APROL web portal after it has been configured and licensed successfully.

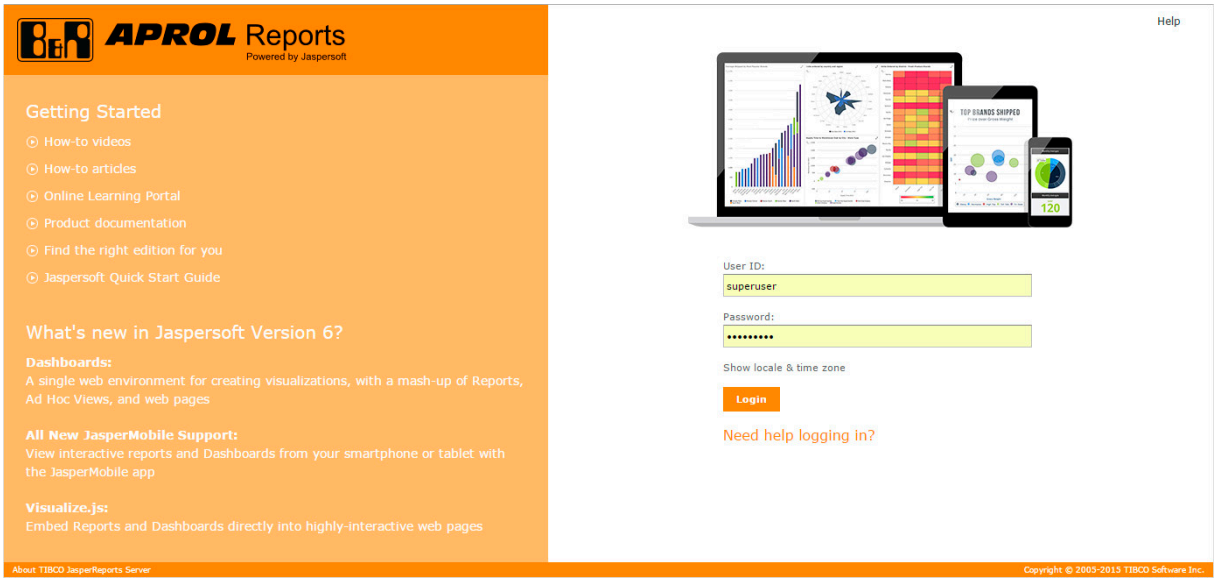


Figure 24: JasperReport server login page

5.2 User Management

Standard user

The JasperReport server has its own user management. Several users are preset during the installation:

User Name	Password	Role
superuser	superuser	System administrator
jasperadmin	jasperadmin	Administrator of an Organization
JasperAprolReportUser	.aprolreportuser	User for opening APROL example reports
joeuser	joeuser	User for opening Jaspersoft example reports

Creating/editing users

Administrators can create new users and edit the rights of existing ones. The menu can be opened via Management -> Users. You can login immediately as the user in order to test the rights. This option is only available to administrators.

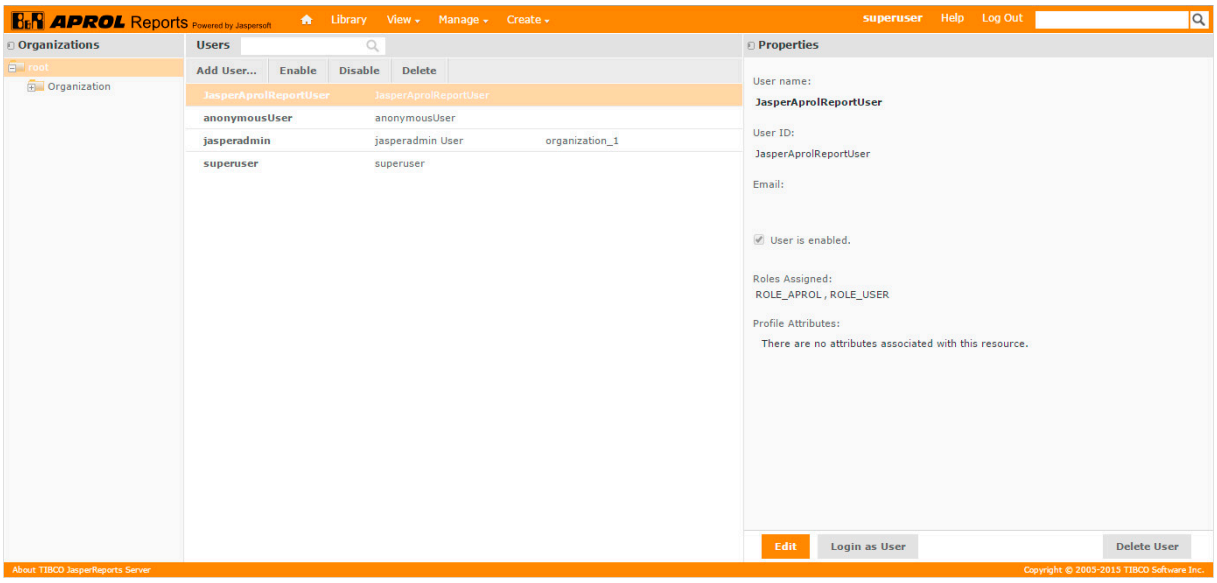
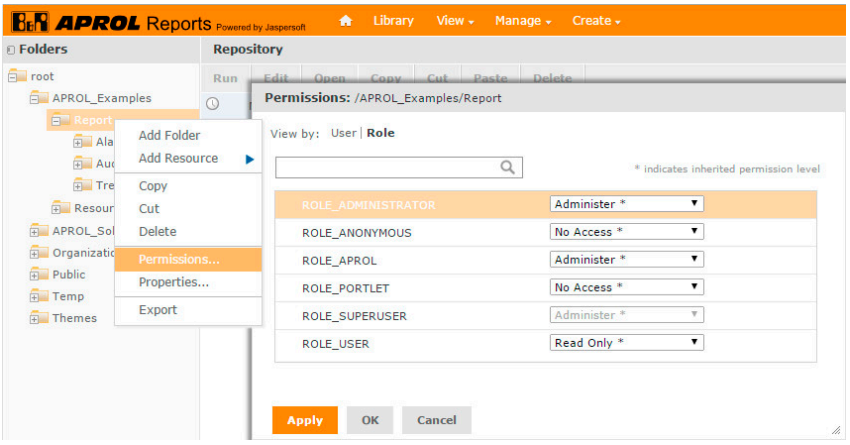


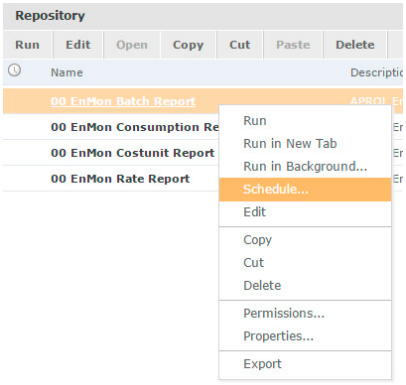
Figure 25: JasperReport server user management

Rights assignment

The rights can be assigned to directories or individual reports. The rights dialog is opened with a right click on a resource.



5.3 Report Scheduler



Schedule

Reports can also be triggered by the server at a certain time, for example, to create monthly reports automatically. Several "Time plans" can be created per report. A new time plan can be created or an existing one edited by right clicking a report and selecting the "Planned jobs" menu item.

Figure 26: Context menu of a report

New jobs can be created or existing ones edited in this menu. A normal user only sees the jobs which they have created.

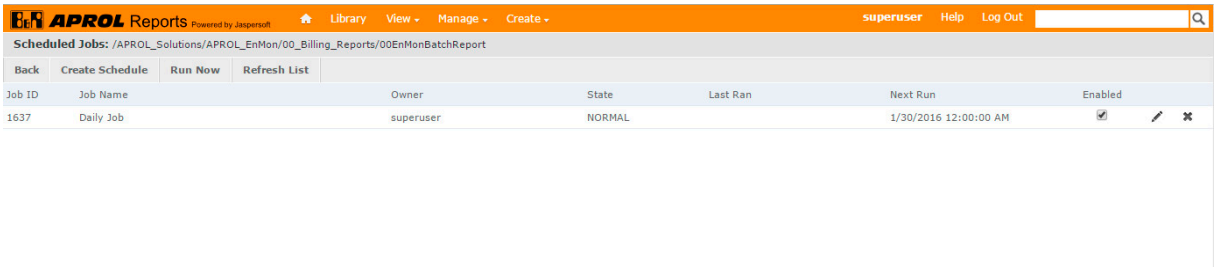
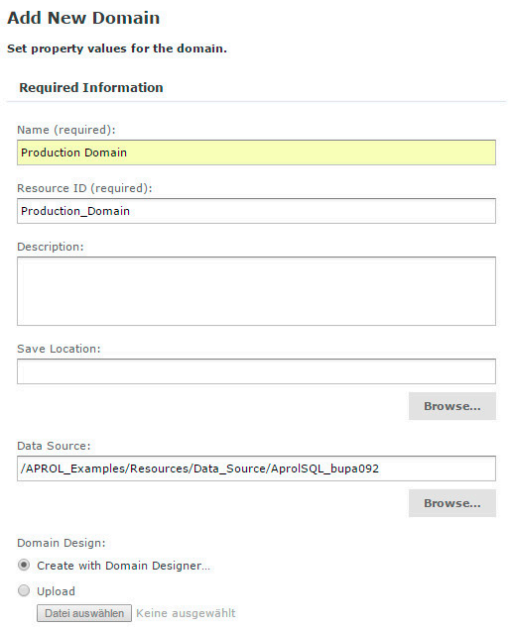


Figure 27: Planned Jobs

An external SMTP server must be configured to send mails.

5.4 Domains

A domain is a metadata layer between a database and the data which is displayed. They are used to allow a simple configuration when creating ad-hoc analyses and dashboards



Creating a new domain

In addition to the name, the data source of the domain and a repository path must be specified when creating a domain. As soon as the data source is defined, the domain designer can be used for the visual configuration of the metadata layer.

Figure 28: Creating a new domain

Domain Designer

The domain designer is divided into 5 tabs. The selection of the database table which is to be used in the **<Tables>** tab is enough for a simple domain and the columns to be used in the **<View>** tab.

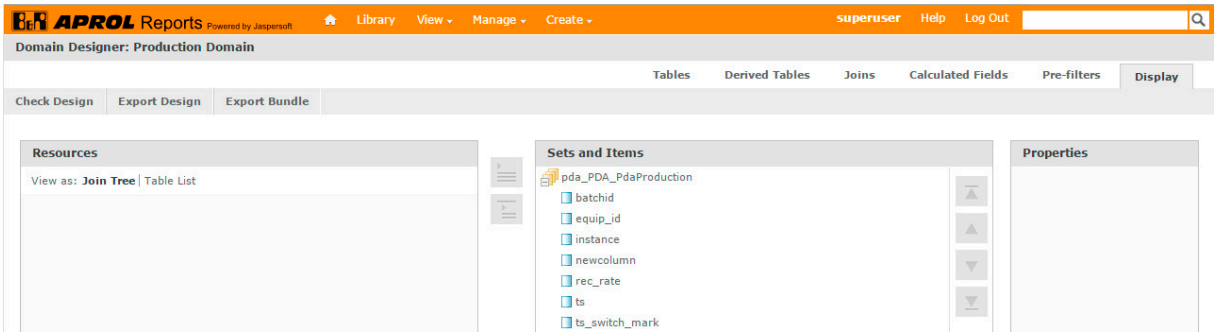
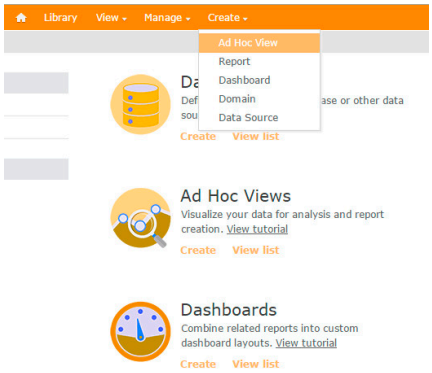


Figure 29: Elements of a domain

5.5 Ad-hoc views

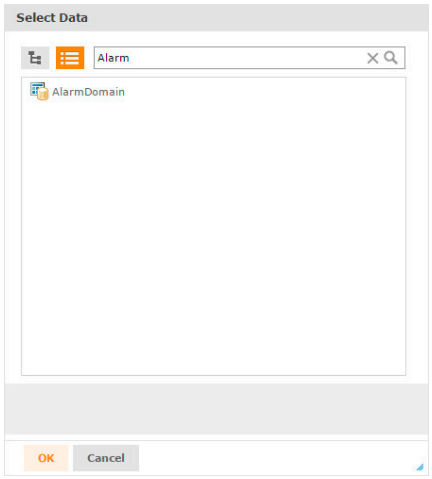
Ad-hoc views can be created on the basis of domains or themes (prepared SQL queries) on the report server. Jaspersoft Studio is not needed for the creation. The configuration is solely carried out in the web browser.

5.5.1 Creating an ad-hoc view



A new ad-hoc view can be created using the menu bar of the report server (Create -> Ad-hoc View).

Figure 30: Creating a new ad-hoc view



A domain must be selected in order to create an ad-hoc view. This contains all of the available database fields.

Figure 31: Selection of the domain

There are 4 option dialogs available:

- Fields: Selection of the database fields for the ad-hoc analysis.
- Pre-filter: Predefined filter at the start of the analysis.
- Display: Specification of alias names for the database columns.
- Save as theme: Saving the configuration for later use.

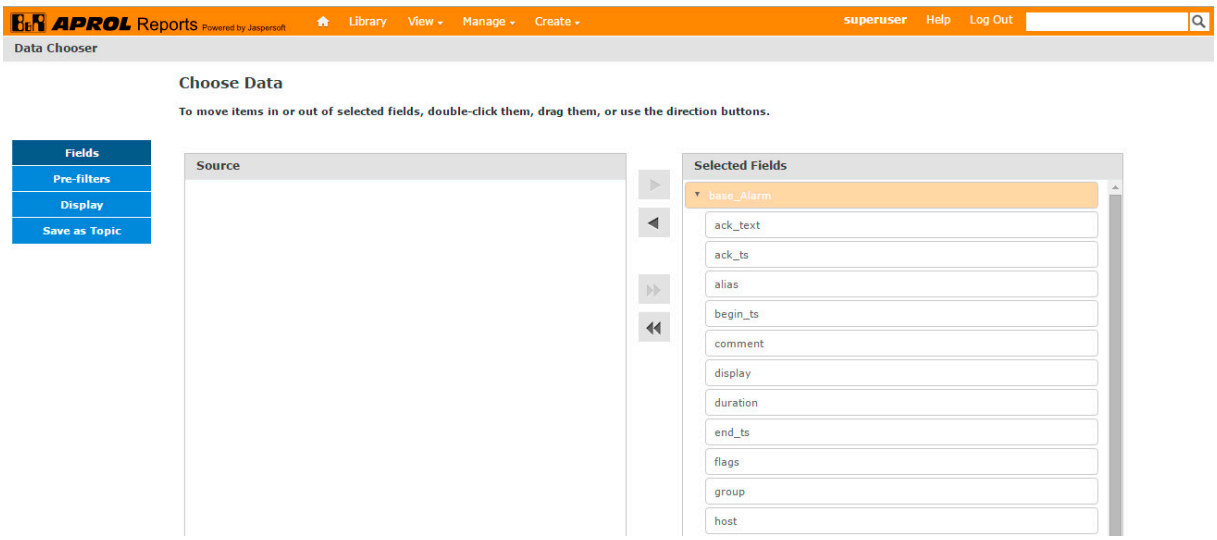


Figure 32: Data selection for the ad-hoc analysis

The selection is confirmed using the "OK" button and the ad-hoc editor is then started.

5.5.2 Basic information about the ad-hoc editor

Database columns are divided into fields and dimensions in the editor:

- Field: Standard field used to group dimensions.
- Dimension: numerical value which is summarized.

Both fields and dimensions can be placed as lines and columns in the editor per double-click or drag-and-drop. But, all dimensions must be in the same group.

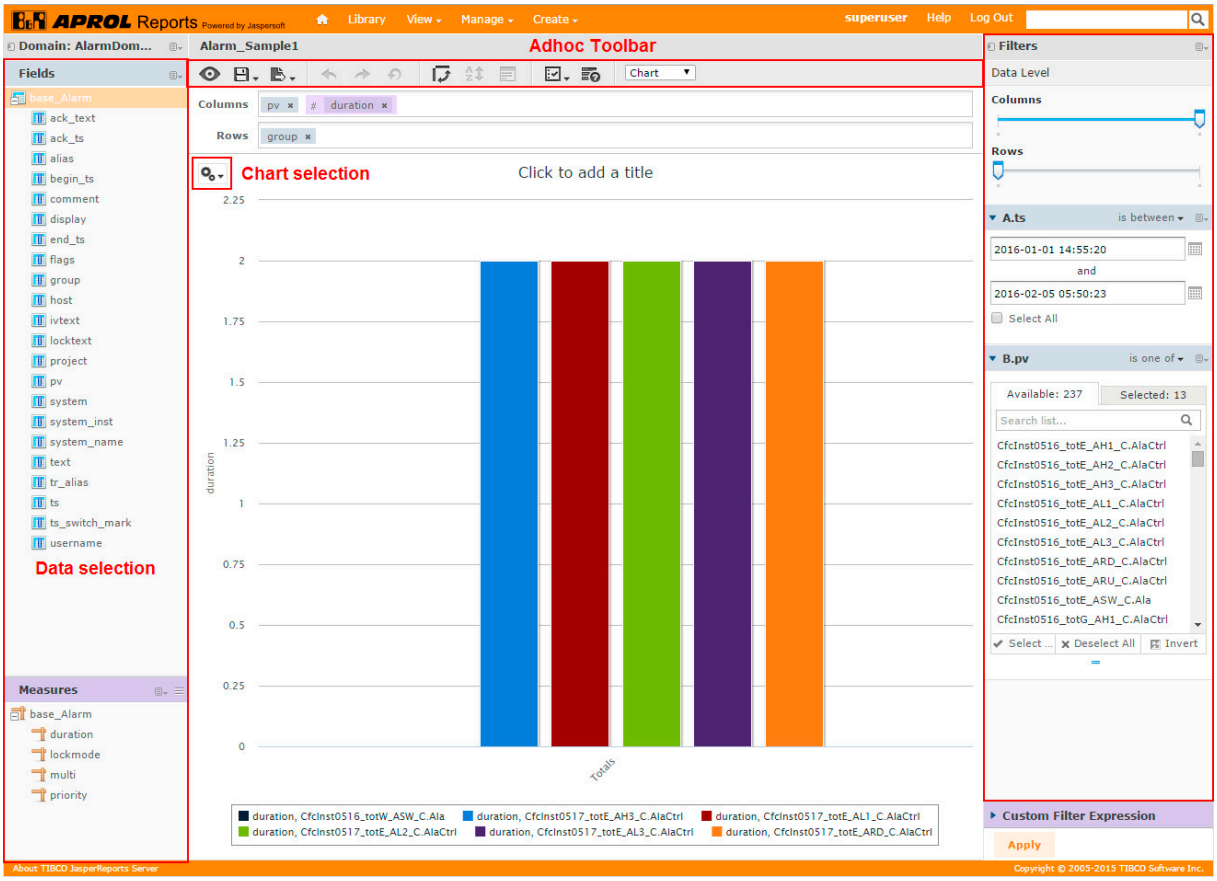


Figure 33: Ad-hoc editor

Summary calculation

Each dimension is summarized according to filter, data level, and constellation of the rows and columns. There are different types of calculation available for the summary. The type can be selected by right clicking a placed dimension.

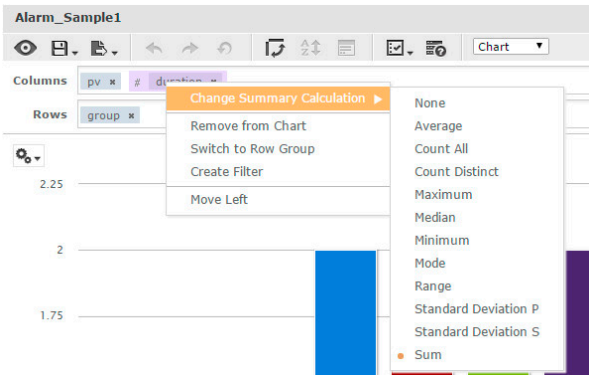


Figure 34: Changing the summary calculation

Filter

Each field and dimension can be filtered in the editor. A new filter is created with a right click -> "Create Filter" on the respective item. Different filter types are available.

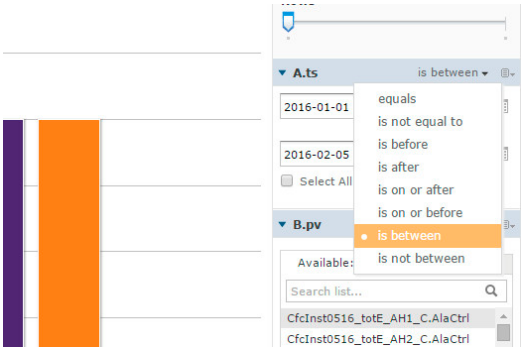


Figure 35: Selection of the filter type

The available filter types depend on the data type of the field.

Save ad-hoc view

Ad-hoc compositions can be saved using the toolbar or exported directly in the desired output format.

Configuration of a new ad-hoc analysis

1) Configuration of a new domain with the PDA table
2) Creation of an ad-hoc analysis with the domain
3) Create diagrams and cross-classified tables for the amount produced

5.6 Dashboards

A dashboard is created like an ad-hoc view, based on domains and in JasperReport server. Dashboards are composed of several "Dashlets". A dashlet can be either a simple report or an ad-hoc view which was created in the dashboard designer. There is a toolbar in the dashboard designer for creating dashlets.

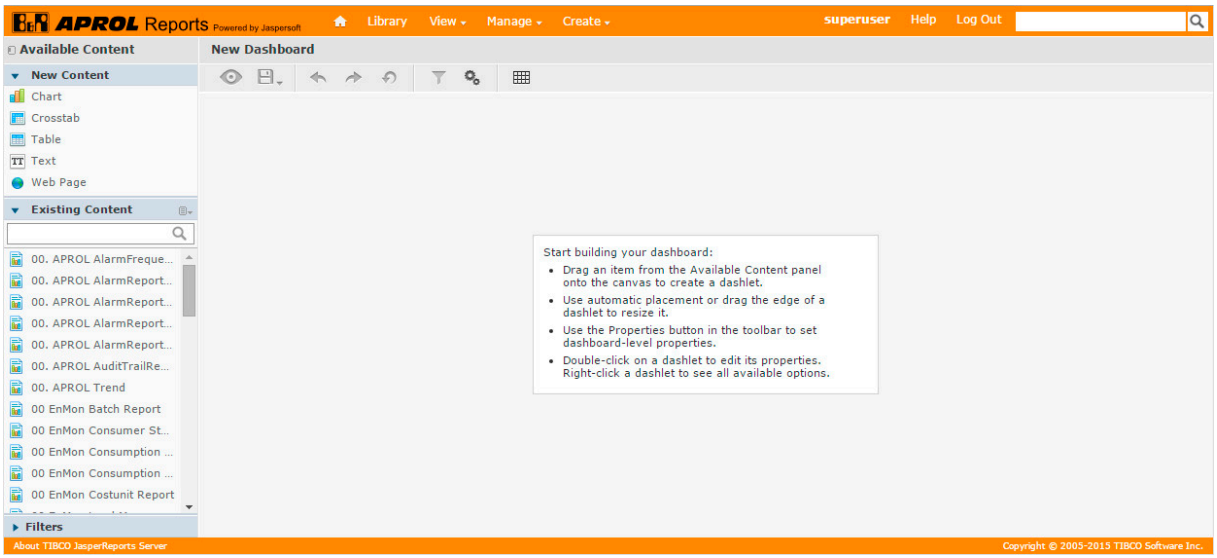


Figure 36: Dashboard Designer

An automatic update interval can be defined in the properties of a dashlet. Hyperlinks can also be defined for individual components.

Filter Manager

Filter can be set to make the dashboard interactive. The filter manager defines which dashlet has an effect on the respective filter.

5.7 HTTP Interface

Reports can also be opened directly. For this purpose, only the corresponding URL must be sent to the server. The server delivers a report or a predefined export as an answer. This direct call is suitable for embedding a report in the DisplayCenter.

Schema for the URL:

- **Basic URL:**https:<HOST NAME>:8443/jasperserver-pro/flow.html?_flowId=viewReportFlow
- **Report:** &reportUnit=/Directory1/Subdirectory/ReportId
- **Login Data:** &j_username=<user name>&j_password=<password>
- **Additional parameters:** &paramName=value&paramName2=value

The composed URL to be called is then:

https:<SERVER ID>:8443/jasperserver-pro/flow.html?_flowId=viewReportFlow&reportUnit=/Directory1/Subdirectory/ReportId&j_username=<user name>&j_password=<password>&paramName=value&paramName2=value

Built-in parameters

There are some predefined parameters which can be given to the server.

Parameter	Description	Example
j_username	JasperReportServer user name	j_username=superuser
j_password	JasperReportServer password	j_password=superuser
viewAsDashboardFrame	Deactivates the user interface of the JasperReport server.	viewAsDashboardFrame=true
decorate	Fades out the theme of the JasperReport server.	decorate=no
output	Alternative output format (HTML per default)	output=pdf

Table 2: List of the most common built-in parameters

6 Summary

The AprolSqlServer offers a comfortable interface for querying the historical data of an APROL project.

Simple user-specific reports can be created using the Jaspersoft Studio. The JasperReport server provides a report viewer which is easy to use. Reports in a modern web interface can be displayed and also exported in the desired format.

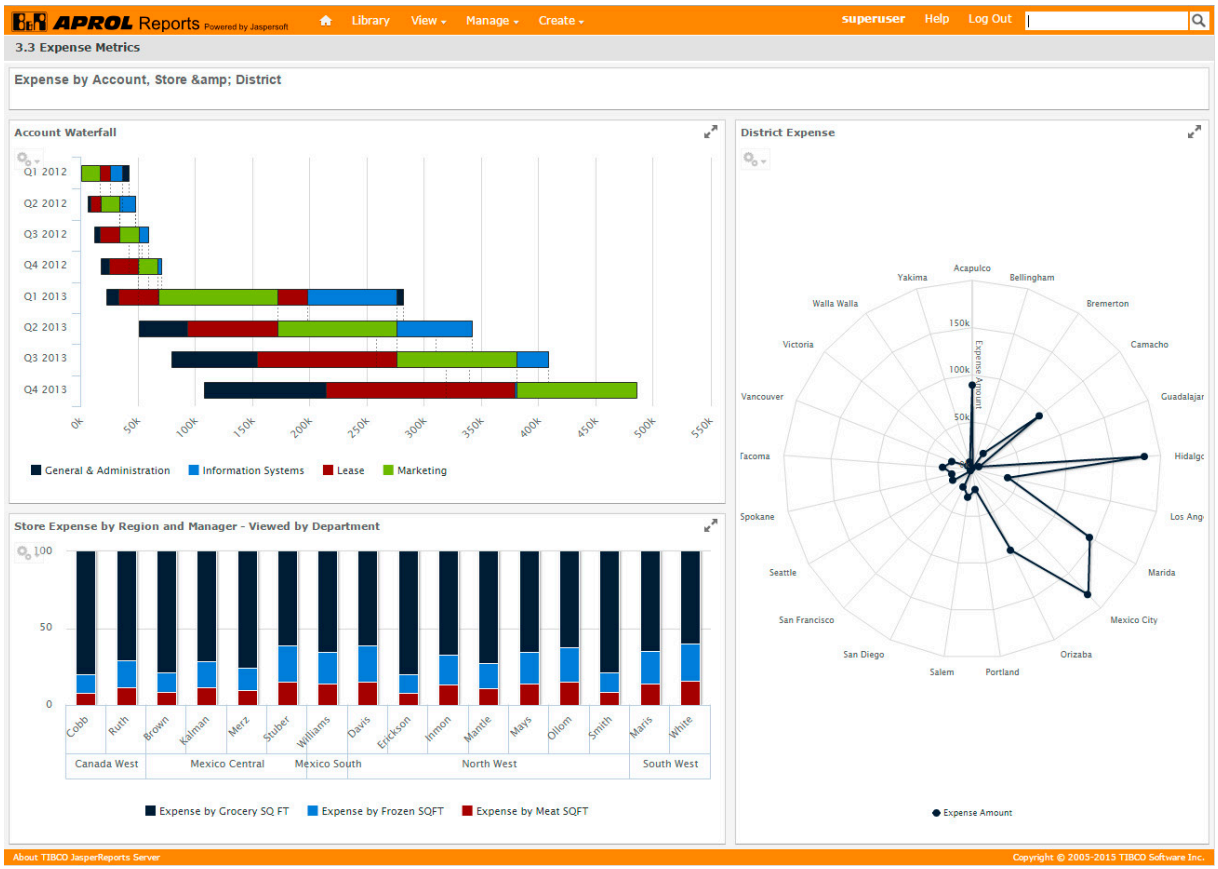


Figure 37: Example Dashboard

Data can be analyzed directly in the browser by using dashboards and ad-hoc views, and the results saved on the server.

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* SEM210 - Basics is a prerequisite for this seminar.
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