Developing Reports

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Preface

In This Section

Using this Manual

Welcome to Developing Reports.

This manual covers using the Query, Reporting, and Analysis Engine (QRA) to easily and quickly build reports based on data stored in the CBU.

Before You Get Started

You should be familiar with the following:

- Your application architecture
- The CBU
- Designing or working with databases and data warehouses
- SQL

Who Should Read this Manual

This manual is for developers and project managers who are responsible for developing the user interface.

However, there are other topics covered in this manual that may interest other members of the project development team.

- Administrators

  You will find information about the different components that make up the user interface. You can learn the location of the different files which make up the user interface.

- Developers

  This manual is about building user interfaces for your solution. You learn how to write JSPs that use the Presentation Manager JavaServer Page framework. You also learn how to group and program sets of JSPs. These sets, called channels, allow users to access the same solution by using different devices and protocols.

  You also learn how to use the framework to create new workflows, customize menus, and manage personalization information to create interactive and customizable user interfaces.

- Project Architect

  You can use the information in this manual to learn about channels and how they work. You can lean about the components and the flexibility of you solution when it is based on channels built on a common framework.

- Project Manager

  You will find information about channels and the Presentation Manager JavaServer Page framework important when developing user interfaces. You may also be interested in reading about personalization data, menus and workflows as their characteristics may influence how you go about developing the user interfaces of your solution.

How this Manual is Organized

This manual contains the following chapters:

- **Overview of Developing Reports**

  This chapter covers the basics of the Query,Reporting, and Analysis (QRA) Engine.

  It contains information about:

  - The QRA
  - How the QRA works with the Web Channel
  - Developing Reports

- **Defining Reports**

  This chapter covers creating the report definition file.

  It contains information about:

  - Creating the file
  - Declaring the file

- **Creating Data Providers**

  This chapter covers creating and developing data providers. These components of your report are responsible for extracting the data for reports.

  It contains information about:

  - Creating the Data Provider in the report definition file
  - Writing the SQL to obtain the data
  - Specifying the Mapping of returned data

- **Creating Data Provider Prompts**

  This chapter covers creating and developing Prompts.

  It contains information about:

  - Creating Prompts
  - Creating Prompt Blocks

- **Creating Tabular Data Transformers**

  This chapter covers creating and developing Tabular Data Transformers. These components of your report are responsible for formatting the data obtained from Data Providers in tables.

  It contains information about:

  - Creating the Data Transformer in the report definition file
  - Creating Master Detail tables
  - Creating Aggregates
  - Specifying Display Formats
  - Creating Filters
  - Creating Prompt Blocks
  - Specifying sorts

- **Creating Matrix Data Transformers**

  This chapter covers creating and developing Matrix Data Transformers.

  It contains information about:

  - Differences between Tabular and Matrix Data Transformers
  - Working with dimensions
  - Working with measures

- **Creating Charts**

  This chapter covers creating charts in your transformers.

  It contains information about:

  - Creating the chart in the Transformer
  - Specifying the Styles
  - Specifying the Data Set
  - Specifying the Axes

- **Working with Reports**

  This chapter covers working with reports.

  It contains information about:

  - Specifying the layout of elements
  - Localizing

  - Customizing
  - Reloading reports

- **Chart Style Reference**

  This appendix is a Chart Style reference. It covers the different styles of the various charts.

  It contains information about:

  - General Chart Properties
  - Specific properties for each type of chart

What Typographical Changes and Symbols Mean

This manual uses the following conventions:

TYPEFACE	MEANING	EXAMPLE
Italics	Manuals, topics or other important items	Refer to *Developing Connectors*.
Small Capitals	Software and Component names	Your application uses a database called the CID.
Fixed Width	File names, commands, paths, and on screen commands	Go to `//home/my file`

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Finding the Information You Need

The product suite comes with comprehensive documentation set that covers all aspects of building solutions based on the edocs Telco Service & Analytics Manager. You should always read the release bulletin for late-breaking information.

Getting Started

If you are new to the edocs Telco Solutions, you should start by reading *Introducing Telco Service & Analytics Manager Applications*. This manual contains an overview of the various components along with the applications and their features. It introduces various concepts and components you must be familiar with before moving on to more specific documentation. Once you have finished, you can read the manual which covers different aspects of working with the application. At the beginning of each manual, you will find an introductory chapter which covers concepts and tasks.

Designing Your Solution

While reading *Introducing Telco Service & Analytics Manager Applications*, you should think about how the different components can address your solution's needs.

You can refer to *Developing Telco Service Manager (TSM)* for information about extending the object model, application security, and other design issues. The *CID Reference Guide* also gives you the information about how the information in your solution is managed and stored.

You can refer to *Developing Telco Analytics Manager (TAM)* for information about customizing the database, synchronizing data with TSM, loading data from external invoice files, and other design issues. The *CBU Reference Guide* also gives you the information about how the information in your solution is managed and stored. You should also read the section on integrating TAM with TSM in *Developing Telco Analytics Manager (TAM)*.

You can also read the introduction of *Developing Connectors* for information about integrating your solution.

Installing Telco Service & Analytics Manager Applications

You should start by reading the Release Bulletin. For detailed installation and configuring information, refer to *Installing Telco Service & Analytics Manager Applications*. This manual covers installing applications on one or more computers. It also contains the information you need to configure the different components you install.

You might also refer to *Developing Telco Service & Analytics Manager Applications* and *Developing Connectors* as these manuals contain information on customizing applications and working with other software.

If you are upgrading, be sure to read *Migrating Telco Service & Analytics Manager Applications*.

Building Your Solution

If you are designing and programming your solution, you have several different sources of information. If you are programming the user interface of the solution, you should read *Developing User Interfaces*. You also refer to the *BLM Specification* and *JSPF specification* for detailed information about programming the user interface. For configuring the various components, you refer to *Installing Telco Service & Analytics Manager Applications* and sections in other documents which deal with the component to configure.

If you are designing and programming TAM, you have several different sources of information. If you are programming the user interface of the solution, you should read *Developing Reports*. You also refer to the *QRA API Specification* and the *QRA Configuration File Reference Documentation* for detailed information about the different components you can use to build reports. For configuring the various components, you refer to *Installing Telco Service & Analytics Manager Applications* and sections in other documents which deal with the component to configure.

If you are working with the business logic of your solution, you should read *Developing Telco Service Manager (TSM)*. You can also refer to the *BLM Reference Guide* for more information about the design and structure of the BLM object model. For information about how this information is stored, you should refer to the *CID Reference Guide* along with the *CID Reference* documentation for your database. In order to develop your application, you most likely will need to install and run the Loopback Connector. This component mimics back-end applications for development purposes. For information about installing and running this component, refer to *Using the Loopback Connector*.

If you are working on the data warehouse side of TAM, you should read *Developing Telco Analytics Manager (TAM)*. For more information about the design and structure of the CBU, you should refer to the *CBU Reference Guide* along with the *CBU Reference* documentation for your database. You should also read *Developing Telco Analytics Manager (TAM)* for information about synchronizing data between the TAM and *Telco Service Manager (TSM)*. In this manual, you will also find information about loading data in both the CBU and the CID.

For more information about integrating your application, you should read *Building Connectors* to learn how Telco Service & Analytics Manager applications work with different software.

Integrating Your Solution

If you are involved in configuring your solution to work with Operation Support Software (OSS), you should read *Building Connectors*. This manual helps you understand the integration architecture and shows you how to build connectors to connect to today's market-leading OSS software. You can also read *Using the Loopback Connector* for information about a connector built for development purposes. Other manuals you can refer to for information about configuring your application include *Introducing Telco Service & Analytics Manager Applications, Developing Telco Analytics Manager (TAM),* and *Developing Telco Service Manager (TSM)*.

Managing Telco Service & Analytics Manager Applications

If you are responsible for managing Telco Service & Analytics Manager applications, you should read the *Installing Telco Service & Analytics Manager Applications* for information about configuring various components and information about working with different application servers. *Administrating Telco Service & Analytics Manager Applications* covers what you need to know about managing your solution at runtime. For information about OSS systems, you should read *Building Connectors*.

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Contents

CHAPTER 1

Overview of Developing Reports

In This Section

About the QRA

The Query, Reporting and Analysis Engine (QRA) provide a secure, standard approach to retrieving analysis data from the Communications Billing and Usage (CBU) database.

Data Providers are data source components. Data Providers separate reports from the physical data repository, guaranteeing secure access, and allowing new reports to be designed and used without the need to understand the technical definition of the relevant CBU schema. For Report Processors within the Personalization Manager, Data Providers are effectively the source of analysis data.

Any number of Data Providers can be defined through XML Report Definition schemas. Each Data Provider retrieves specific fields of analysis data from the CBU, constrained by any filters (Prompts) specified within the Data Provider definition, and also by the security restrictions of the user requesting the report. This ensures that regardless of the scope of a particular report, the user cannot gain access to information unless they have the security rights to view it. If the user's security rights are changed, they are updated through Notifications.

Data Providers can be used to query any RDBMS schema under one of supported RDBMS.

Data Transformers are used to structure the report allowing to filter, sort, drill, show alerter, design chart, design tabular, design matrix, and so on. Data Providers are used as a source of Data Transformers allowing new reports to be designed and used without the need to understand the technical definition of the relevant CBU schema.

The QRA also comes with a set of JSPs which serve as the default HTML renderer. These JSPs handle transforming the extracted and formatted information into HTML. They are designed to handle almost all of you needs with little or no modification.

About the QRA and the MyWeb Channel

A report HTML viewer comes with the QRA. This report viewer or HTML renderer is a set off JSPs used to create and manage reports. This HTML viewer is used in several page flows and allows the end user of your application to interact with reports. A chart engine is also installed with the the Web channel.

The MyWeb Channels comes with:

1. A set of sample reports.
2. HTML renderer JSPs. The following JSPs are used when building and managing reports. They are located in `<home_dir>/channels/MyWeb`:
   - `report_list.jsp` to list the reports
   - `report_save.jsp` to save reports
   - `report_confirm.jsp` to confirm reports
   - `report_submit_confirm.jsp` to confirm the processing of the report
   - `report_view.jsp` to display the report
   - `form_handler/listReports.inc` form handler to set the report code prefix for each list of reports.
   - `helpers/report_helper.inc` the report helper jsp which includes all the rendering method to produce the report HTML

The HTML renderer supports the following types of reports:

- Simple report
- Master/detail report
- Data+chart report
- Data+Multi chart report
- Master/Summary/Detail report
- Dashboard report
- Tabbed report

The HTML renderer allows the user to:

- Select a report
- Refresh data providers filling prompts
- Filters data processed by data transformers
- Sorts data transformers
- Drill down to another report through hyperlinks
- Navigate through the pages of a data transformers
- View each block of a tabbed report via the tabbed transformer bar
- View each hidden charts of a data transformer via the chart navigation bar
- Get a printer friendly view of the report
- Save the report as personal for future consultation

Overview of Developing Reports

Creating a Report involves:

1. Creating the Report Definition file

   This XML file contains all the information your application needs to create a report.

2. Creating Data Providers

   In the Report Definition file, you declare a Data Provider. A Data Provider is the component which is responsible for connecting to a database and retrieving information.

3. Creating Prompts

   In the declaration of the Data Provider, you create interactive prompts. Interactive prompts allow users to select the information they want to see in their reports.

4. Creating Data Transformers

   In the Report Definition file, you declare one or more Data Transformer for each Data Provider. A Data Transformer is responsible for formatting the data for display. Once you obtain information from a specific Data Provider, you usually need to reformat it to fit your reports. You can also create prompts in a data transformer to allow users to select the information they want to see.

- Creating Charts

  Charts is one of the ways you can format data obtained by Data Providers. Specified as part of your Data Transformer, charts can be a fundamental part of your reports.

- Configuring Report Processing

  When users create reports, sometimes the complexity or the amount of data to be accessed can take a while to process and display. The Report Processor is responsible for processing such reports in the background while users continue to use the application.

  You can fully customize how your application handles these reports by setting thresholds which can trigger automatic background processing or prompt the user to either wait for the report to finish or come back later to view the report when it is finished. Your users can also access pages to manage the reports they have submitted for processing.

- Configuring and Customizing the Reports

  After completing the development of the report components, you can specify some of the more general aspects of your report.

CHAPTER 2

Defining Reports

In This Section

About Defining Reports

The QRA uses XML files to define reports. These files are referred to as Report Definition files and they contain all the information your TAM needs to access information and build reports.

Report Definition files are located in `<home_dir>/channels/WEB-INF/classes/nmycfg/qra`.

These files are based on the `report.xsd` Report Definition Schema.

Defining Reports involves:

- Creating the Report Definition file
- Declaring the Report Definition file in the list of available reports

One way of becoming familiar with the QRA is to try all of the sample reports and open the report definition files to see what is in them. You can then copy and modify the Report Definition file to try out your own reports.

Your XML editor can also use the Report Definition Schema to validate your Report Definition files.

The schema documentation is also on the CD-ROM. To view the documentation, open `Documentation.html` and go to the *TAM* section.

The QRA API documentation can also be viewed from this page.

Creating the Report Definition File

You can create a Report Definition file from scratch or you can create a copy of one of the existing report definition files in `<home_dir>/WEB-INF/classes/nmycfg/qra`.

The file name must be unique and cannot contain any spaces.

You can define one or several reports in the same XML definition file.

After you create your Report Definition file, you:

- Declare the Report
- Create the elements

To create a Report Definition File

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Do one of the following:
   - Copy and rename an existing Report Definition file
   - Use your XML editor to create a new file based on the the `report.xsd` Report Definition Schema

Declaring Your Report

The QRA has a properties file which lists the available reports. The reports declared in this file are loaded in memory when your application starts.

The `reportelements.properties` configuration file lists the reports. This file is located in `<home_dir>/channels/WEB-INF/classes/nmycfg/qra`.

The syntax of the declaration is:

```
nmycfg.qra.Report_Name.xml
```

where:

- `nmycfg.qra` is the java pathname
- `Report_Name.xml` is the Report Definition file

An example of a report properties file:

```
# ===========================================================================
# Copyright (c) 1999-2003 Netonomy, Inc. All Rights Reserved.
# ---------------------------------------------------------------------------
# Public configuration file. Use this file to configure your application.
# ---------------------------------------------------------------------------

nmycfg.qra.GlobalPrompts.xml
nmycfg.qra.ContractDetailedCalls.xml
nmycfg.qra.ContractInvoiceOverview.xml
nmycfg.qra.InvoiceOverview.xml
nmycfg.qra.TotalFeePerCostCenter.xml
nmycfg.qra.MostExpensiveCalls.xml
nmycfg.qra.CallAnalysisDashboard.xml
nmycfg.qra.TotalCostPerTariff.xml
nmycfg.qra.CostCenterAnalysisDashboard.xml

# ==================================================================
```

You can group reports in directories. You just need to make sure that the name of the report definition file is entered correctly.

For instance, you could have

```
nmycfg.qra.invoices.<report1_name>.xml
```

...

```
nmycfg.qra.costcenter.<report1_name>.xml
```

...

To declare the Report Definition file

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Open the `reportelements.properties` configuration file.
3. Enter the name of the Report Definition file. Use the syntax:
   `nmycfg.qra.myreportname.xml`

CHAPTER 3

Creating Data Providers

A Data Provider is the component which obtains data for reports. The data provider is responsible for:

- Accessing the database
- Specifying the query
- Setting the maximum number of rows returned
- Setting the timeout
- Specifying the SQL statement

A report element contains one or more Data Providers.

In This Section

About Creating Data Providers

Data Providers are key components of the QRA. Data Providers separate reports from the physical data repository, guaranteeing secure access, and allowing new reports to be designed and used without the need to understand the technical definition of the relevant schema. For Report Processors, Data Providers are the source of analysis data.

The Data Provider does the following:

- Accesses the database
- Executes the query
- Makes the data available to the data transformer

Creating Data Providers involves:

- Setting the data source
- Creating the Data Provider in the report definition file
- Specifying the data source
- Setting the maximum number of rows returned
- Setting the query timeout
- Specifying the SQL statement

A report element file contains one or more Data Providers.

For more information about the structure and syntax of the XML, refer to the *QRA Configuration File Reference Documentation*.

Example of a Data Provider

The following report definition has an SQL Statement with 2 prompts and where the first SQL prompt is mapped to the prompt USER_LOGIN and the second SQL prompt is mapped to prompt PCCKEY

The root tag of the Data Provider. It specifies: - Code - maximum number of rows returned - timeout	<TabularDataProvider code="TotalFeePerCostCenter" maxRows="1000" timeout="100">
The tag for the data source	<DalQuery instanceName="cbu_database">
The SQL Statement	<![CDATA[SELECT cc_lnk.RANK_FROM_PARENT rank, child.COST_CENTER_PATH path, child.COST_CENTER_NAME name, count(distinct contract.CONTRACT_UIDN), count(budr.BUDR_FEE) count, sum(budr.BUDR_FEE) fee FROM NMY_USER_DIM usr, NMY_FUNCT_SCOPE_LNK fs_lnk, NMY_ACTOR_LNK a_lnk, ...
A Prompt	WHERE (usr.USER_LOGIN = ?)
The SQL Statement (continued)	AND (fs_lnk.USER_KEY = usr.USER_KEY) AND (fs_lnk.FUNCT_CODE = 'USAGE') AND (fs_lnk.ACTOR_KEY = a_lnk.PARENT_ACTOR_KEY) AND (actor.ACTOR_KEY = fs_lnk.ACTOR_KEY) AND (actor.ACTOR_TYPE = 'L') AND (a_lnk.CHILD_ACTOR_KEY = acl.ACTOR_KEY) AND (acl.CONTRACT_KEY = contract.CONTRACT_KEY)
Another Prompt	AND (cc_lnk.PARENT_CC_KEY = ?)

The SQL Statement (continued)	AND (cc_lnk.CHILD_CC_KEY = child.COST_CENTER_KEY) AND (ccc.COST_CENTER_KEY = cc_lnk.CHILD_CC_KEY) AND (ccc.CONTRACT_KEY = contract.CONTRACT_KEY) AND (contract.CONTRACT_KEY = budr.CONTRACT_KEY) AND (budr.START_DATE_KEY = d.DATE_KEY) GROUP BY RANK_FROM_PARENT, COST_CENTER_PATH, COST_CENTER_NAME ORDER BY RANK_FROM_PARENT ASC]]></DalQuery>
The column mapping of returned data	<Columns> <Column code="RANK_FROM_PARENT" name="rank" type="java.lang.Long"/> <Column code="COST_CENTER_PATH" name="Cost Center" type="java.lang.String"/> <Column code="COST_CENTER_NAME" name="name" type="java.lang.String"/> <Column code="N_CONTRACTS" name="#Contracts" type="java.lang.Long"/> <Column code="N_CALLS" name="#Calls" type="java.lang.Long"/> <Column code="S_FEE" name="Total Fee" type="java.lang.Double"/> </Columns>
The prompt bindings (in the order they appear in the SQL)	<PromptBindings> <PromptBinding prompt="USER_LOGIN"/> <PromptBinding prompt="PCCKEY"/> </PromptBindings>
The end tag of the root tag.	</TabularDataProvider>

Creating the DataProvider Element

Creating the DataProvider element involves:

- Creating the element
- Specifying the code
- Specifying the maximum number of rows to return
- Specifying the timeout

To create the DataProvider Element

1 Create a Data Provider element. Use the syntax:

```
<TabularDataProvider code="your_code_name" maxRows="XXXX"
timeout="XXXX">
```

2 Enter the values of the following attributes:

ATTRIBUTE	DESCRIPTION
code	The code of the Data Provider The code must be unique to the report element. If you more than one data provider in the element, you must use numeric values
maxRows	The maximum number of rows to return
timeout	The query timeout (in milliseconds)

Example of a `<TabularDataProvider>` element:

```
<TabularDataProvider code="CONTRACT_DETAILED_CALLS" maxRows="1000" timeout="100">
```

To set the maximum number of rows to retrieve

1 Open the Report Definition file.

2 Find the `<TabularDataProvider>` element corresponding to the Data Provider to modify.

3 Set the `maxRows` attribute to the maximum number of rows to return.

Setting the Timeout

1 Open the Report Definition file.

2. Find the `<TabularDataProvider>` element corresponding to the Data Provider to modify.
3. Set the `timeout` attribute to the amount of time to wait for a query.

Specifying the Data Source of the Data Provider

You need to specify the data source for the DataProvider.

When you specify the data source, the DataProvider knows where to execute the SQL script it uses to retrieve data.

By default, the following data sources are available:

INSTANCE NAMES	JDBC DATA SOURCES
route_database	cidDatasource
cbu_database	cbuDatasource

If you need to access a database which is not among the default data sources, you need to create and configure new datasource with a new instance name.

Specifying the data source involves:

- Creating a new datasource if required
- Setting the Data Provider to use the data source

To set the data source

1. Open the Report Definition file.
2. Find the `<TabularDataProvider>` element corresponding to the Data Provider to modify.
3. Create a `<DalQuery>` element
4. Set the `instanceName` attribute of the `<DalQuery>` element to data source to use.

Example of a `DalQuery` element set to use the CBU.

```
<TabularDataProvider code="ContractInvoiceOverview" maxRows="1000" timeout="100">
         <DalQuery instanceName="cbu_database">
         …
</TabularDataProvider>
```

To specify a new data source

1. Go to `<home_dir>/channels/WEB-INF/classes/nmycfg/dal/instances`.
2. Open `instances.properties` and add the name of your new data source. Use the syntax:

```
new_database=nmycfg.dal.instances.new_instance
```

Example of the data source declaration in instances.properties:

```
route_database=nmycfg.dal.instances.instance_route
cbu_database=nmycfg.dal.instances.cbu_instance
new_database=nmycfg.dal.instances.new_instance
```

1 Create a new file called `new_instance.properties` by duplicating the `cbu_instance.properties` file.

2 Change the values of the `instance_id` and `source_name`.

- Open all the instance definition files and find the highest `instance_id` value used and increment it by one. Then set `instance_id` to this value.
- Set the `source_name` to `jdbc/newDatasource`.

  Example of the contents of the `new_instance.properties` file:

  ```
  instance_id=2
  dal_driver=com.netonomy.dal.drivers.impl.sql.jndi.JNDIDatasourceInstance
  source_name=jdbc/newDatasource
  login=
  password=
  native_driver=
  max_string_size=1900
  queries_file=
  debug_driver=false
  jndi_initial_context_factory=
  jndi_provider_url=
  ```

1 Define the `newDatasource` data source in your application server

For more information about defining data sources, refer to your product documentation.

2 Set the data source of the DataProvider to `newDatasource`

Example of the DataProvider set to use the new data source:

```
<TabularDataProvider code="ContractInvoiceOverview" maxRows="1000" timeout="100">
        <DalQuery instanceName="new_database">
        …
</TabularDataProvider>
```

Writing the SQL Statement

About Writing SQL Statements for Reports

You should use your SQL tool to create and test your SQL statement. This way you can take advantage of your tool's editing and testing features. When your SQL statement is ready, you place a copy of it in the report definition file.

You then edit the SQL Statement to program the prompts. A prompt is simply a place in the SQL statement where some kind of input is required to filter the results. The prompts in your SQL are associated with a PromptBinding which points to a DataProvider Prompt you build for user input.

You also need to define the mapping of the columns your SQL Statements return.

Writing SQL Statements involves:

- Copying your SQL statement in your report definition file
- Editing the prompts:
    - Enter simple prompts
    - Enter multiple value prompts
    - Enter prompts for values which are ignored if NULL
- Mapping the columns returned by the SQL
- Specifying the DataProvider Prompt for each prompt

For more information about the structure of the CBU, refer to the *CBU Reference Guide* and the *CBU Reference Documentation* corresponding to your database.

Entering the SQL Statement

To write a simple query, you should use your SQL designer tool. After you have written and tested your SQL statement, copy it in the report definition file.

The SQL statements are in the `<DalQuery>` tags enclosed by `<![CDATA[` and `]]>`.

The format of SQL statements is:

```
    <DalQuery instanceName="instance_name">

         <![CDATA[

            Your SQL

            ...

            ]]>

     </DalQuery>
```

For editing and comprehension, your SQL statement can be several lines.

Example of a simple query:

```
<DalQuery instanceName="cbu_database">
<![CDATA[
SELECT DISTINCT BILL_ACCT_BIZ, BILL_ACCT_NAME
FROM NMY_BILL_ACCT_DIM
ORDER BY BILL_ACCT_NAME ASC
]]>
</DalQuery>
```

Refer to the CBU section to help you build your SQL Statement.

Setting the Prompts in the SQL Statement

When working with prompts in your SQL Statement, you may need to modify the SQL in order to take advantage of the pre processing of the SQL Statement.

This pre processing replaces the prompt values in the SQL with the values entered by users or set by the . The SQL can then be executed to retrieve information.

Setting the prompts involves:

- Setting simple prompts
- Setting multiple value prompts
- Setting prompts which can be ignored if null

Set the SQL Statement with prompts

If your SQL statement has prompts for user interaction, you need to make sure they are declared using the QRA clause `"?"` for every prompt.

An example of using the `"?"` in a prompt:

```
 ...
WHERE
  ( usr.USER_LOGIN =  ? )
  AND  ( fs_lnk.USER_KEY = usr.USER_KEY )
...
```

Set the SQL Statement with multiple valued prompt

If your prompt requires more than one value, you use the QRA clause `[IN (?)]`. When the SQL Statement is processed by the DAL, this clause is replaced and filled with the user values.

An example of using the QRA clause for multi-value prompts:

```
<DalQuery instanceName="cbu_database">
<![CDATA[
SELECT DISTINCT BILL_ACCT_BIZ, BILL_ACCT_NAME
FROM NMY_BILL_ACCT_DIM
WHERE BILL_ACCT_BIZ [(IN (?)]
ORDER BY BILL_ACCT_NAME ASC
]]>
</DalQuery>
```

If you activate the log and set it to the maximum debug level, the trace of the example is:

Data source	<DEBUG_INFO> <CONNECTION instance="nmycfg.dal.instances.cbu_instance"/>

Query definition before preprocessing	<STATEMENT name="*** DIRECT QUERY ***">
	<PREQUERY> SELECT DISTINCT BILL_ACCT_BIZ, BILL_ACCT_NAME
	FROM NMY_BILL_ACCT_DIM
	WHERE BILL_ACCT_BIZ [(IN (?)]
	ORDER BY BILL_ACCT_NAME ASC</PREQUERY>

Bindable parameter values	<PARAMETERS> <param i="0" bindable="true" value="{'3', '4', }"/> </PARAMETERS>

Executed query	<QUERY>
	SELECT DISTINCT BILL_ACCT_BIZ, BILL_ACCT_NAME
	FROM NMY_BILL_ACCT_DIM
	WHERE BILL_ACCT_BIZ in (:1,:2)
	ORDER BY BILL_ACCT_NAME ASC</QUERY>

Closing	</STATEMENT> </DEBUG_INFO>

Set the SQL Statement with Prompts which can be ignored

You can also use QRA clauses ignore optional prompts when the user does not enter any information.

The `IGNORE IF NULL` clause along with the operator is for prompts where the user has a choice and does not enter any information. For instance, when the user does not enter a value for an Input prompt or does not select a value for a choice prompt.

The syntax of QRA `IGNORE IF NULL` clauses is:

```
ColumnName QRAClause
```

These prompts can be used in SQL where clauses.

The QRA Clauses you can use are:

QRA CLAUSE	DESCRIPTION
[=? OR IGNORE IF NULL]	To use when the column must be equal to a prompted value which can be null
[!=? OR IGNORE IF NULL]	To use when the column must be different from a prompted value which can be null
[>=? OR IGNORE IF NULL]	To use when the column must be greater than or equal to a prompted value which can be null
[<=? OR IGNORE IF NULL]	To use when the column must be less than or equal to a prompted value which can be null
[>? OR IGNORE IF NULL]	To use when the column must be greater than to a prompted value which can be null
[<? OR IGNORE IF NULL]	To use when the column must be less than a prompted value which can be null
[NOT IN (?) OR IGNORE IF NULL]	To use when the column must not be equal to any of several prompted values which can be null
[IN (?) OR IGNORE IF NULL]	To use when the column must be equal to one of several prompted values which can be null
[LIKE [? OR IGNOREALL IF NULL]]	To use when the column must be like a prompted value which can be null Note: This clause is IGNOREALL

For example, an `IN` operator along with the `IGNORE IF NULL` clause:

```
<DalQuery instanceName="cbu_database">
<![CDATA[
SELECT DISTINCT BILL_ACCT_BIZ, BILL_ACCT_NAME
FROM NMY_BILL_ACCT_DIM
WHERE BILL_ACCT_BIZ [IN (?) OR IGNORE IF NULL]
ORDER BY BILL_ACCT_NAME ASC
]]>
</DalQuery>
```

Specify the Mapping of Returned Columns

In the Data Provider, you must declare the type of each column of `SELECT` statements in your SQL Statement.

The syntax for declaring the mapping of returned columns to their type is:

```
<Column code="RETURNED_COLUMN" type="java_type"/>
```

where:

- `RETURNED_COLUMN` is the code name of the column
- `java_type` is the corresponding column type

The available java types are:

TYPE	DESCRIPTION
java.lang.Boolean	Use this type to map any Boolean SQL column type
java.lang.Double	Use this type to map any Double or Float SQL column type
java.lang.Long	Use this type to map any Integer or Long SQL column type
java.lang.String	Use this type to map any VARCHAR, TEXT or similar SQL column type
java.sql.Date	Use this type to map any Date SQL column type
java.sql.Time	Use this type to map any Time SQL column type
java.sql.TimeStamp	Use this type to map any DateTime or Timestamp SQL column type

An example of declaring the column mapping:

The Data Provider root tag	<TabularDataProvider code="CONTRACT_DETAILED_CALLS" maxRows="1000" timeout="100">

The SQL Statement with SELECT	<DalQuery instanceName="cbu_database"><![CDATA[SELECT
	  NMY_SERVICE_DIM.SERVICE_NAME,
	  NMY_UDR_TYPE_DIM.UDR_TYPE_NAME,
	  NMY_DATE_DIM.DAY_DATE,
	  NMY_TIME_DIM.TIME_OF_DAY,
	  NMY_BUDR_FACT.DEST_NUMBER,
	  NMY_DEST_ZONE_DIM.DEST_ZONE_NAME,
	  NMY_BUDR_FACT.BUDR_VOLUME,
	  NMY_BUDR_FACT.BUDR_FEE,
	  NMY_UDR_TARIFF_DIM.UDR_TARIFF_NAME
	FROM
	  NMY_SERVICE_DIM, NMY_UDR_TYPE_DIM, NMY_DATE_DIM, NMY_TIME_DIM, NMY_BUDR_FACT,
	  NMY_DEST_ZONE_DIM, NMY_UDR_TARIFF_DIM, NMY_FUNCT_SCOPE_LNK, NMY_CONTRACT_DIM,
	  NMY_BILL_PERIOD_DIM, NMY_USER_DIM, NMY_ACTOR_LNK, NMY_CONTRACT_ACL
	WHERE
	…
	]]></DalQuery>

The column mapping	`<Columns>`
	`  <Column code="SERVICE_NAME" type="java.lang.String"/>`
	`  <Column code="UDR_TYPE_NAME"  type="java.lang.String"/>`
	`  <Column code="DAY_DATE" type="java.sql.Date"/>`
	`  <Column code="TIME_OF_DAY" type="java.sql.Time"/>`
	`  <Column code="DEST_NUMBER" type="java.lang.String"/>`
	`  <Column code="DEST_ZONE_NAME" type="java.lang.String"/>`
	`  <Column code="BUDR_VOLUME" type="java.lang.Long"/>`
	`  <Column code="BUDR_FEE" type="java.lang.Double"/>`
	`  <Column code="UDR_TARIFF_NAME" type="java.lang.String"/>`
	` </Columns>`
	`</TabularDataProvider>`

In order to avoid truncating the contents of returned columns, you must make sure that the mapping you declare corresponds to the information in the column. For example, if the column of the RDBMS is a float and you map it to “Long” the digits are ignored and the value is truncated and not rounded off.

Specifying the DataProvider Prompt

For each prompt, you must declare a PromptBinding in the same order they appear in the SQL Statement. These bindings refer to a specified Data Provider Prompt.

The syntax is:

```
<PromptBinding prompt="PROMPT_CODE"/>
```

where:

- `PROMPT_CODE` is the code of the Data Provider Prompt.

An example of a prompt and its binding. The simple `usr.USER_LOGIN` "?" prompt is:

```
 ...
WHERE
  ( usr.USER_LOGIN =  ? )
  AND  ( fs_lnk.USER_KEY = usr.USER_KEY )
...
```

The PromptBinding declaration for `usr.USER_LOGIN` and the prompt `USER_LOGIN` is :

```
<PromptBindings>
          <PromptBinding prompt="USER_LOGIN"/>
          ...
</PromptBindings>
```

CHAPTER 4

Creating Data Provider Prompts

In This Section

About Creating Data Provider Prompts

The Data Provider Prompt gives your users the power to interact with the system and select the data they want see.

A prompt basically sets the value in the SQL statement in the Data Provider. There are several ways of setting such information. The different types of prompts include:

- System Prompts

  The values of these prompts are set by the system or set by the application workflow.
- Interactive Prompts

  The values of these prompts are determined by direct user interaction, like selecting named from a list or selecting check boxes.

The format of a prompt is:

```
<Prompt code="CODE_NAME" name="name" type="type">

    ...

</Prompt>
```

where

- `CODE_NAME` the unique code name of the prompt
- `name` the name of the prompt
- `type` the type of prompt from the list of java data types.

Each prompt in your Data Provider SQL Statement must have an associated prompt. This means that your report definition file can contain one or more Data Provider Prompt.

When the application starts, it loads all of the reports declared in the `reportelements.properties` file. Because all of the reports are loaded in memory, the code of each prompt must be unique.

Because they are all loaded at startup, you can create a report definition file which contains a set of global prompts which can be used by all of the reports. By default, these global Data Provider Prompts are in `GlobalPrompts.xml`.

Specifying System Prompts

You use System Prompts to set values automatically in your your data provider without any user interaction. You can also specify if the prompt value should be displayed or not.

System prompts can be divided into two different categories:

- Internal prompts

  This prompt has a value set by the `report_helper.jsp`. This JSP sets the value taking into account the context of the application. For instance, the value can be specified by:

  - USER_LOGIN
  - ADMINISTERED_ORGANIZATION
  - ADMINISTERED_LEVEL

- Implicit prompts

  This prompt has a value set by the calling page.

To specify the System Prompt, use the syntax:

```
<Prompt code="CODE_NAME" name="name" type="type"
isHidden="true/false">

     <SystemPrompt/>

</Prompt>
```

where

- `CODE_NAME the unique code name of the prompt`
- `name the name of the prompt`
- `type the type of prompt from the list of java data types.`
- `isHidden` determines if the value is shown to the end user

The available java types are:

TYPE	DESCRIPTION
java.lang.Boolean	Use this type to map any Boolean SQL column type
java.lang.Double	Use this type to map any Double or Float SQL column type
java.lang.Long	Use this type to map any Integer or Long SQL column type
java.lang.String	Use this type to map any VARCHAR, TEXT or similar SQL column type
java.sql.Date	Use this type to map any Date SQL column type
java.sql.Time	Use this type to map any Time SQL column type
java.sql.TimeStamp	Use this type to map any DateTime or Timestamp SQL column type

System Prompts must be used only by data providers. Do not use System Prompts in Tabular Data Transformers.

Specifying Interactive Prompts

Interactive prompts are prompts which obtain their values through user interaction.

They can be divided into two different categories:

- Input prompts

  This prompt gets its value directly from user input. Input prompts are text fields.

- Choice prompts

  This prompt has a specific set of values that the user is asked to choose. Choice prompts include list boxes, radio buttons, check boxes, and drop down lists.

These prompts may have default values. These default values can be set in the Data Provider Prompt itself or by using the context in which you call the report.

Input Prompts

You use an input prompt to get a particular value directly from the user.

This prompt is displayed as a text box and has no default value.

You can:

- Set a static default value
- Set a dynamic default value
- Specify the width of the text box

This example shows the declaration of a prompt which sets the value for a date and where the input text box is set to a width of 15 characters.

The start tag of the prompt element	`<Prompt code="FROM" type="java.sql.Date">`

The default value element
The default value is set to 2002-01-01
	`<DefaultValue>`
	`<Value>2002-01-01</Value>`
	`</DefaultValue>`

The input textbox with a specified width of 15 characters	`<InputPrompt>`
	`<PromptFormat>`
	`<TextBox width="15"/>`
	`</PromptFormat>`
	`</InputPrompt>`

End tag of the root element	`</Prompt>`

With Static Default Value

If the `<Value>` element of the `<DefaultValue>` element is empty (`<Value/>`), the default value is an empty string. If you do not declare a default value using the `<DefaultValue>` element, the default value of the prompt is NULL.

With a Dynamic Default Value

If you enter an <Expression> or <Script> element under the <DefaultValue> element, the default value is calculated when the report is loaded.

The following example shows you how to declare a dynamic default value.

The example assumes that the CurrentDate definition exists.

The start tag of the prompt element	`<Prompt code="FROM" type="java.sql.Date">`

The dynamic default value element	`<DefaultValue>`
	`<Expression><![CDATA[$D{CurrentDate}]]></Expression>`
	`</DefaultValue>`

The input textbox with a specified width of 15 characters	`<InputPrompt>`
	`<PromptFormat>`
	`<TextBox width="15"/>`
	`</PromptFormat>`
	`</InputPrompt>`

End tag of the root element	`</Prompt>`

Specifying the Width

Specify the width of the text box by using the width attribute of the <TextBox> element.

Choice Prompts

You use a choice prompt to give the user a choice among different values.

You can set the default value of this prompt by using the `defaultValue` attribute.

The possible values are:

- `first`
- `last`

This example shows the declaration of a Choice prompt which sets the default value as the last value on the list of possible values.

The start tag of the prompt element	`<Prompt code="PROMPT_CODE" type="java.lang.String">`

The choice prompt and the defaultValue
The default value is the last value
	`<ChoicePrompt defaultValue=”last”>`
	`...`
	`</ChoicePrompt>`

End tag of the prompt element	`</Prompt>`

There are different ways to obtain the list of possible values of a Choice Prompt:

- Specify the list in the `<ChoicePrompt>` element
- Specify a data provider in the `<ChoicePrompt>` element to obtain the list dynamically
- Specify a report provider in the `<ChoicePrompt>` element to obtain the list dynamically

With Explicit List of Values

In the <ChoicePrompt> element, you can specify the list of possible values. You can use this type of list for values which are common to all of your users and which do not change.

To specify a value, you use:

- The `<ExplicitValues>` element to create the list
- More than one `<ChoiceItem>` elements to specify a possible value

This example shows Choice Prompt with three possible values with the default value being the last value on the list:

The start tag of the prompt element	`<Prompt code="PROMPT_CODE" type="java.lang.String">`
The choice prompt element and the defaultValue	`<ChoicePrompt defaultValue=”last”>`

The possible values with their display value and value	`<ExplicitValues>`
	`<ChoiceItem displayValue="value1Label">`
	`<Value>value1</Value>`
	`</ChoiceItem>`
	`<ChoiceItem displayValue="value2Label">`
	`<Value>value2</Value>`
	`</ChoiceItem>`
	`<ChoiceItem displayValue="value3Label">`
	`<Value>value3</Value>`
	`</ChoiceItem>`
	`</ExplicitValues>`

End tag of the choice prompt element	`</ChoicePrompt>`
End tag of the prompt element	`</Prompt>`

With Dynamic List of Values

If the values of your Choice Prompt change frequently or if the values depend on the user, you can fill the list of options dynamically by using a Data provider.

This data provider can be either:

- local data provider

  A local data provider is one that is written in the Choice Prompt itself
- Report data provider

  A report declared for the report but not contained in the Choice Prompt which uses it

Because this list is dynamic, the `<ChoicePrompt>` element does not have a `defaultValue` attribute.

You use the `<DynamicValues>` elements to display the elements. This element has the following attributes:

- `displayColumn`

  This is the column used for display values.
- `valueColumn`

  This is the column used to get the return value of the selected value

These columns must exist in the data provider.

This example shows a ChoicePrompt with dynamic values:

```
<Prompt code="PROMP_CODE" type="java.lang.String">
          <ChoicePrompt>
          <DynamicValues displayColumn="BILL_PERIOD_NAME" valueColumn="BILL_PERIOD_KEY" >
                    …
```

In the <ChoicePrompt> element, you can specify the list of possible values. You can use this type of list for values which are common to all of your users and which do not change.

To specify a value, you use:

- The `<ExplicitValues>` element to create the list
- More than one `<ChoiceItem>` elements to specify a possible value

This example shows Choice Prompt with three possible values with the default value being the last value on the list:

The start tag of the prompt element	`<Prompt code="PROMP_CODE" type="java.lang.String">`
The choice prompt element	`<ChoicePrompt>`

A dynamic value	`<DynamicValues displayColumn="BILL_PERIOD_NAME" valueColumn="BILL_PERIOD_KEY" >`
	`...`

End tag of the choice prompt element	`</ChoicePrompt>`
End tag of the prompt element	`</Prompt>`

Example of DynamicValues Based on a Prompt Provider

This example shows a Choice Prompt with Dynamic Values obtained using a local prompt provider.

The start tag of the prompt element	`<Prompt code="BILL_PERIOD_KEY"  type="java.lang.Long">`
The choice prompt element	`<ChoicePrompt>`

A dynamic value	`<DynamicValues displayColumn="BILL_PERIOD_NAME" valueColumn="BILL_PERIOD_KEY"`
	`>`

The Data Provider	<TabularDataProvider code="BILL_PERIOD" maxRows="1000" timeout="100">
The SQL Statement	<DalQuery instanceName="cbu_database"><![CDATA[SELECT DISTINCT NMY_BILL_PERIOD_DIM.BILL_PERIOD_KEY, NMY_BILL_PERIOD_DIM.BILL_PERIOD_NAME, NMY_BILL_PERIOD_DIM.BILL_PERIOD_START FROM NMY_BILL_PERIOD_DIM, NMY_USER_DIM, NMY_BILL_ACCT_ACL, NMY_FUNCT_SCOPE_LNK, NMY_ACTOR_LNK, NMY_BILL_ACCT_DIM, NMY_MAIN_INVOICE_FACT WHERE (NMY_BILL_ACCT_DIM.BILL_ACCT_KEY=NMY_BILL_ACCT_ACL.BILL_ACCT_KEY) AND (NMY_MAIN_INVOICE_FACT.BILL_ACCT_KEY=NMY_BILL_ACCT_DIM.BILL_ACCT_KEY) AND (NMY_MAIN_INVOICE_FACT.BILL_PERIOD_KEY=NMY_BILL_PERIOD_DIM.BILL_PERIOD_KEY) AND (NMY_BILL_ACCT_ACL.ACTOR_KEY=NMY_ACTOR_LNK.CHILD_ACTOR_KEY) AND (NMY_FUNCT_SCOPE_LNK.ACTOR_KEY=NMY_ACTOR_LNK.PARENT_ACTOR_KEY) AND (NMY_USER_DIM.USER_KEY=NMY_FUNCT_SCOPE_LNK.USER_KEY) AND (NMY_USER_DIM.USER_LOGIN = ?) ORDER BY NMY_BILL_PERIOD_DIM.BILL_PERIOD_START ASC]]></DalQuery>
The Column Binding	<Columns> <Column code="BILL_PERIOD_KEY" type="java.lang.Long"/> <Column code="BILL_PERIOD_NAME" type="java.lang.String"/> <Column code="BILL_PERIOD_START" type="java.lang.String"/> </Columns>
The Prompt Bindings	<PromptBindings> <PromptBinding prompt="USER_LOGIN"/> </PromptBindings>
End tags	</TabularDataProvider> </DynamicValues> </ChoicePrompt> </Prompt>

Example of DynamicValues Based on a Report Provider

This example shows a Choice Prompt with Dynamic list of values obtained using a report provider.

You reference another data provider of the report where the prompt is used.

You use the `<TabularDataProviderRef>` element and the `provider` attribute to specify the report provider.

You can also change the way the column is sorted by the report you call. This is useful if the default sort does not apply to the dynamic values.

In this example, the `displayColumn="DEST_ZONE_NAME"` and `valueColumn="DEST_ZONE_KEY"` attributes refer to the columns defined in the CONTRACT_DETAILED_CALLS data provider defined in the current report. This example also shows this prompt changing the column sort.

The start tag of the prompt element	`<Prompt code=" DEST_ZONE_KEY " type="java.lang.Long">`
The choice prompt element	`<ChoicePrompt>`
A dynamic value	`<DynamicValues displayColumn="DEST_ZONE_NAME" valueColumn="DEST_ZONE_KEY">`
The Reference to the Data Provider	`<TabularDataProviderRef provider="CONTRACT_DETAILED_CALLS">`

The override of the default sort of the referenced data provider	`<ColumnSorts>` `<ColumnSort column="DEST_ZONE_NAME" order="ascending"/>`
	`</ColumnSorts>`

End tags	`</TabularDataProviderRef>`
	`</DynamicValues>`
	`</ChoicePrompt>`
	`</Prompt>`

Formatting the Choice Prompt

You can set the format of the way your Choice Prompt is displayed.

You can choose from one of the following:

- Dropdown List
- Check Box
- List Box
- Radio Button

For an example of the different formats, refer to D*efault HTML Rendering* in this section.

An example of a List Box with 7 visible lines:

The Prompt declaration element	`<Prompt code="PROMPT_CODE" type="java.lang.String">`
The choice prompt element	`<ChoicePrompt>`

The PromptFormat element and the format declaration	`<PromptFormat>`
	`<ListBox visibleRowCount="7"/>`
	`</PromptFormat>`
	`...`

End tags	`</ChoicePrompt>`
	`</Prompt>`

A list box has the `visibleRowCount` attribute which specifies the number of rows visible. To create a drop down list box, set this attribute to "1"

The other choice prompts do not have any attributes.

Cascaded Prompts

In some cases, you may want the user to rill in the values in a list.

For example, you may want to allow users to first select a bill period then an invoice then a sub invoice to view a specific contract invoice report .

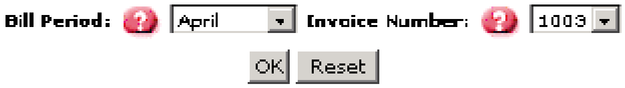
In the sample, reports there are the following interactive prompts:

- BILL_PERIOD
- MAIN_INVOICE

MAIN_INVOICE depends on the value selected in the BILL_PERIOD prompt

The report's Contract_Invoice_Details Data Provider depends on the selected values in the selected prompts.

The interactive prompt is displayed as follows:



The method for creating this prompt is as follows:

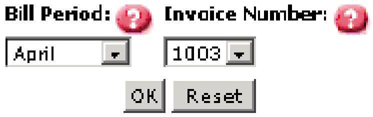
1. Define the interactive prompts:
   - BILL_PERIOD
   - MAIN_INVOICE
2. Define the SYSTEM_BILL_PERIOD system prompt
3. Define that the SYSTEM_BILL_PERIOD prompt refreshes the MAIN_INVOICE prompt

   To do so, define a property on Prompt Block. Use the syntax:

   ```
   <Property
   key="CASCADED_PROMPT_SYSTEM_BILL_PERIOD_KEY">BILL_PERIOD_KEY<
   /Property>
   ```

You can specify that the label is displayed on top of the interactive prompt.

You use the ON_TOP property of the PromptBlock. When set, all of the prompts of the prompt block have the label on top.



You can specify that the current prompt values are automatically used to refresh the report when selected by the user.

You use the `SUBMIT_ON_SELECT` of the PromptBlock. When set, when a user selects a prompt, the select is done without the user clicking the Submit button.

Prompt Constraints

You can also specify the constraints on the values a user can enter in interactive prompts.

You use the `<Constraints>` element to specify the constraint.

The start tag of the prompt element	`<Prompt code= »FROM » name="From date" type="java.sql.Date">`
	`<DefaultValue>`
	`<Value>2002-01-02</Value>`
	`</DefaultValue>`
	`<InputPrompt>`
	`<PromptFormat>`
	`<TextBox width="15"/>`
	`</PromptFormat>`

The constraint definition	`<Constraints>`
	`<Constraint code="FROM_NOT_BEFORE_CONSTRAINT">`
	`<Expression><![CDATA[ ( $VALUE.getTime() - new java.sql.Date(2001-1900,12,1).getTime() ) > 0]]></Expression>`
	`</Constraint>`
	`</Constraints>`

End tags	`</InputPrompt>`
	`</Prompt>`

You can use other prompt values when comparing values in the definition of the constraint.

Creating Data Provider PromptBlocks

A Prompt Block is a set of prompts for Data Providers with more than one prompt.

The Prompt Block specifies the order in which the prompts are displayed.

You use the `<ProvidersPromptBlock>` element to group the data provider prompts together and define their display order.

The format of the element:

```
<ProvidersPromptBlock code="CODE_NAME" name="name">
```

where

- `CODE_NAME` the unique code name of the Data Provider
- `name` the name of the Data Provider

The prompts are processed in the order they occur in the Prompt Block.

The start tag of the Report element	`<Report code="CONTRACT_DETAILED_CALLS">`
	`<ProvidersPromptBlock code="QRY_PROMPT_BLOCK" name="Query  Prompt Block">`
	`<PromptBlockElement prompt="CONTRACT_BIZ"/>`
	`<PromptBlockElement prompt="BILL_PERIOD_BIZ"/>`
	`<PromptBlockElement prompt="USER_LOGIN"/>`
	`</ProvidersPromptBlock>`
	…
	`</Report>`

The ProvidersPromptBlock element	`<ProvidersPromptBlock code="QRY_PROMPT_BLOCK" name="Query Prompt Block">`

The PromptBlockElement elements listing the prompts in the order they will be processed	`<PromptBlockElement prompt="CONTRACT_BIZ"/>`
	`<PromptBlockElement prompt="BILL_PERIOD_BIZ"/>`
	`<PromptBlockElement prompt="USER_LOGIN"/>`

End tags	`</ProvidersPromptBlock>`
	…
	`</Report>`

Prompt Block Rendering

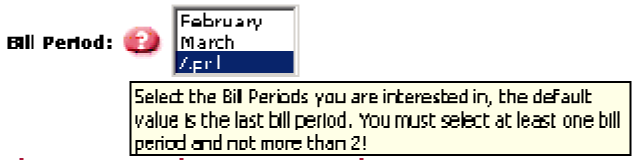
Interactive Prompt Blocks

The default display of prompts include:

- localized prompt name
- Helper icon with localized prompt description
- Input element

The file name of the ❓ icon displayed after the prompt name is `qmark_out.gif`.

When user moves the mouse over the icon, a ballon help opens and displays the prompt description.

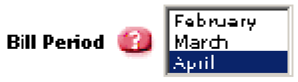


Select the Bill Periods you are interested in, the default value is the last bill period. You must select at least one bill period and not more than 2!

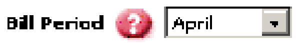
The interactive prompt blocks also display warning and error message for unexpected input

---

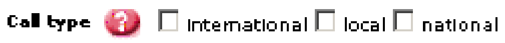
List prompt with three lines visible



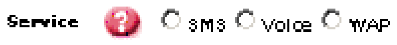
Drop Down List prompt



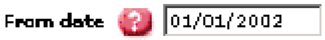
List of Check Box prompt



List of Radio Button prompts

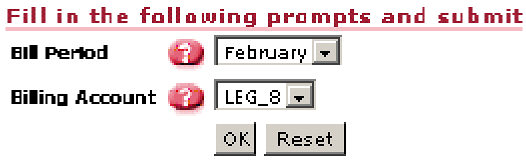


Input prompt



From date ? 01/01/2002

Several prompts



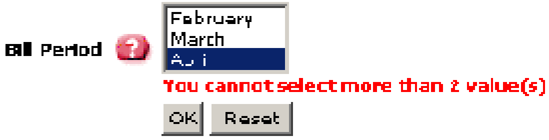
Fill in the following prompts and submit

Bill Period ? February ▾

Billing Account ? LEG_8 ▾

OK Reset

Display error message

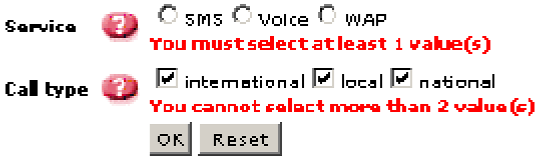


Bill Period ? February
March
April

You cannot select more than 2 value(s)

OK Reset

Display more than one error



Service ? ○ SMS ○ Voice ○ WAP

You must select at least 1 value(s)

Call type ? ☑ international ☑ local ☑ national

You cannot select more than 2 value(s)

OK Reset

Prompt Value Blocks

The prompt values block display the value of the prompt.

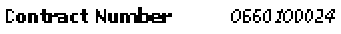
The values of these prompts are the values selected or entered by the user in interactive prompts. For example, on one page the user enters the contract number. On the following page with other prompts, the report displays the number entered by the user as display only text.

These prompt value blocks display the value of:

These prompt value blocks display the value of:

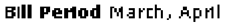
- Interactive prompts values
- Non interactive prompts values
- Visible system prompts values

Mono valued prompts



Contract Number 0660100024

Multi valued prompts



Bill Period March, April

CHAPTER 5

Creating Tabular Data Transformers

In This Section

About Tabular Data Transformers

For each data provider, your report requires one or more Data Transformers.

The Data Transformer is the part of your report which handles formatting, sorting, and displaying the data you obtain from Data Providers. The data obtained by the data provider is referred to as a data block. This block of information has the following components:

- Header
- Data
- Footer

When creating a Data Transformer, you must specify:

- The Data Transformer code
- The code of the Data Provider
- The list of columns of the detail block
- The display of the detail block

The format of a transformer is:

```
<TabularDataTransformer code="CODE_NAME"
provider="PROVIDER_NAME">

    ...

</<TabularDataTransformer>
```

where

- `CODE_NAME` the unique code name of the Data Transformer
- `provider` the name of the Data Provider

Creating the TabularDataTransformer Element

Creating the `TabularDataTransformer` element involves:

- Creating the element
- Specifying the code
- Specifying the Data Provider
- Specifying the element attributes
- Specifying the columns to display

To create the TabularDataTransformer Element

1 Create a TabularDataTransformer element. Use the syntax:

```
<TabularDataTransformer code="your_code_name"
provider="provider_name" ishidden="true"
maxRowsPerPage="number"/>
```

2 Enter the values of the following attributes:

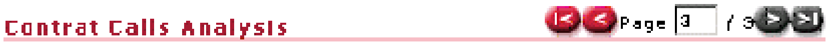
ATTRIBUTE	DESCRIPTION
code	The code of the TabularData Transformer The code must be unique to the report element.
provider	The code of the associated data provider This attribute is mandatory and only existing data providers can be declared.
ishidden	boolean Specifies if the data provider is hidden by default
maxRowsPerPage	Specifies the maximum number of rows before inserting a page break

Example of a `<TabularDataTransformer>` element:

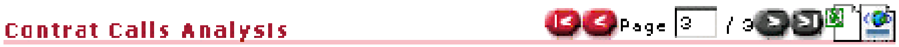
```
<TabularDataTransformer code="NumberOfCallsAndTotalFeesTabularAnalysis" provider="TotalFeePerCostCenter"
isHidden="true" maxRowsPerPage=20>
```

The default rendering of the `TabularDataTransformer` is:

When you specify a page break, the page navigation block is displayed:



When the `EXPORT_AS_CSV` and `EXPORT_AS_XML` properties are defined for transformer, the corresponding icons are displayed:



Defining the Number of Rows per Page

Sometimes the results returned by the Data Provider may be too large to display on a single page or you may want to limit the number of rows displayed. By default, the data transformer displays all the rows returned by the data provider.

You use the attributes of the `<TabularDataTransformer>` element to specify the maximum number of rows per page.

The format of the element:

```
<TabularDataTransformer code="CODE_NAME" provider="provider"
maxRowsPerPage="number"/>
```

where

- `CODE_NAME` the unique code name of the Data Transformer
- `provider` the name of the Data Provider
- `number` is the maximum number of rows per page

In this example, the maximum number of rows is 10.

```
<<Report code=”CONTRACT_DETAILED_CALLS” name=”Contract Detailed Calls”>
        …
<TabularDataTransformer code="CONTRACT_DETAILED_CALLS" provider="CONTRACT_DETAILED_CALLS" maxRowsPerPage="10"/>
</Report>
```

Page Navigation Block

When the Data Provider returns results that exceed the maximum number of rows specified in the Data Transformer `maxRowsPerPage` attribute, the HTML renderer displays page navigation blocks.

The navigation block never appears in the following:

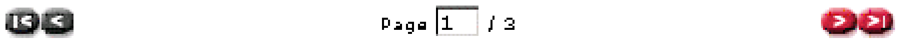
- reports only having a single page

- printer friendly pages

- printer friendly versions with the `DO_NOT_PRETTY_PRINT_ALL_PAGES` property

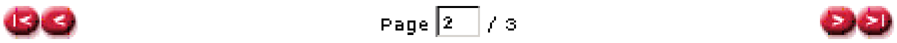
First Page Navigation Block

When the first page of a transformer is displayed only the next page and last page buttons appears.



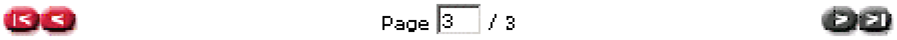
Intermediate Page Navigation Block

When the display page is not the first or the last one of a transformer then all the buttons appear.



Last Page Navigation Block

When the last page of a transformer is displayed only the first page and preceding page buttons appear.



Page 3 / 3

File Names:

nav_first.gif

nav_first_disabled.gif

nav_last.gif

nav_last_disabled.gif

nav_next.gif

nav_next_disabled.gif

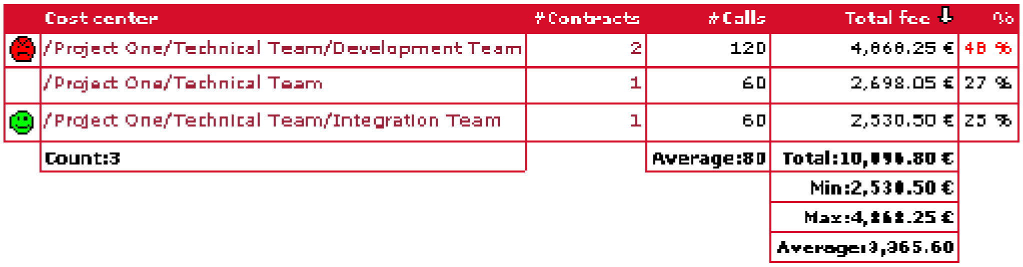
nav_prev.gif

nav_prev_disabled.gif

Defining the Layout

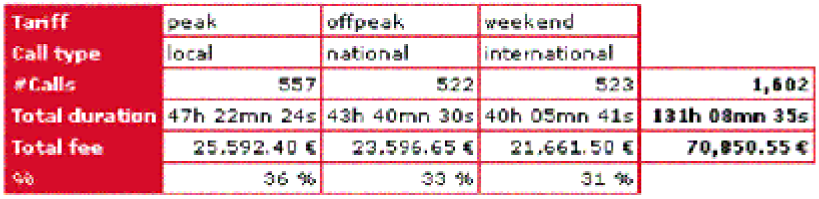
You can specify the layout of the information in your Tabular Data Transformer.

By default, the data is arranged vertically:



	Cost center	# Contracts	# Calls	Total fee ⇩	%
☹	/Project One/Technical Team/Development Team	2	120	4,868.25 €	48 %
	/Project One/Technical Team	1	60	2,698.05 €	27 %
☺	/Project One/Technical Team/Integration Team	1	60	2,530.50 €	25 %
	Count:3		Average:80	Total:10,096.80 €	
				Min:2,530.50 €	
				Max:4,868.25 €	
				Average:3,365.60	

You can arrange the layout horizontally by setting the `isHorizontal` attribute to `"true"`.



Tariff	peak	offpeak	weekend	
Call type	local	national	international	
# Calls	557	522	523	1,602
Total duration	47h 22mn 24s	43h 40mn 30s	40h 05mn 41s	131h 08mn 35s
Total fee	25.592.40 €	23.596.65 €	21.661.50 €	70,850.55 €
%	36 %	33 %	31 %	

Creating the Detail Element

Once you specify the DataTransformer element, you create the detail subelement which contains the information from the Data Provider to display.

Creating the detail element involves:

- Creating the detail element
- Specifying the columns
- Specifying the display format of the information in the column

Specifying the Columns

By default, the Data Transformer works with all of the columns declared in its associated Data Provider. However, you may need to change the order of the column or you do not want to display all of the columns returned by the Data Provider.

You use the `<Column>` element to specify the columns and their position. Use the syntax:

```
<Columns>

     <Column code="COLUMN_CODE"/>

     ...

<Columns>
```

where:

- COLUMN_CODE is the code of the column

The start tag of the Report element	<Report code=”CONTRACT_DETAILED_CALLS” name=”Contract Detailed Calls”> ...

The Data Transformer element	`<TabularDataTransformer code="CONTRACT_DETAILED_CALLS"`
	`provider="CONTRACT_DETAILED_CALLS">`

The Columns element and the declaration of the column to display in the order they are declared	`<detail>`
	`<Columns>`
	`<Column code="SERVICE_NAME"/>`
	`<Column code="UDR_TYPE_NAME"/>`
	`<Column code="DAY_DATE"/>`
	`<Column code="TIME_OF_DAY"/>`
	`<Column code="DEST_NUMBER"/>`
	`<Column code="DEST_ZONE_NAME"/>`
	`<Column code="BUDR_VOLUME"/>`
	`<Column code="BUDR_FEE"/>`
	`<Column code="UDR_TARIFF_NAME"/>`
	`</Columns>`
	`</detail>`

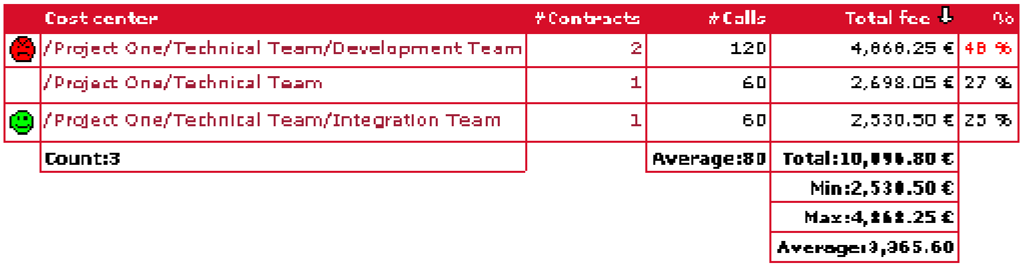
end tags	`.…`
	`</Report>`

When retrieving a column for calculations but not for display, you must set the `isHidden` column attribute to `true`.

Specifying Display Formats

Display formats are specified for Data and Footer values and cells.

Combining all the possibilities you can design a Data Transformer to display information like this:

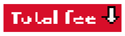


	Cost center	#Contracts	#Calls	Total fee ⇩	%
☹	/Project One/Technical Team/Development Team	2	120	4,868.25 €	48 %
	/Project One/Technical Team	1	60	2,698.05 €	27 %
☺	/Project One/Technical Team/Integration Team	1	60	2,530.50 €	25 %
	Count:3		Average:80	Total:10,[illegible].80 €	
				Min:2,53[illegible].50 €	
				Max:4,[illegible].25 €	
				Average:3,365.60	

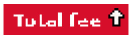
The header is a one line row which displays the column header. If it exists, the localized name is used.

If you can sort the information in the column, the column header is a hyperlink. When a sort is defined on a column then the order of the sort is displayed on the right side of the column name.

For descending sorts:


Total fee ⇩

For ascending sorts:


Total fee ⇧

The `nmy_vtab_H` style is for the column name.

Data

The data is the set of information displayed as rows.

The format of the data is specified for each column.

If declared, the format and pattern are retrieved and applied.

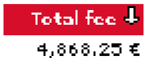
The `nmy_vtab_D` style is for the cell displaying the value

Value Format

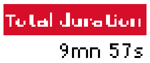
The expression defines the format of the value dynamically.

The format can be defined several ways:

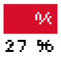
- Applying a defined format to the value: `$F{EuroFormat}($VALUE)`.

  
  Total fee ⇩
  4,868.25 €

- Applying a definition to the value: `$D{DurationFormat}($VALUE)`.

  
  Total Duration
  9mn 57s

- Applying an expression to the value: `$F{PercentFormat}($VALUE * 100 / $A{SUM_S_FEE})`

  
  %
  27 %

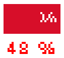
Value Style

The expression defines the style to be applied to the value, the cell or the row dynamically.

The style can be defined several ways:

- You can highlight the value: `$VALUE * 100 / $A{SUM_S_FEE}>30 ? "nmy_textHighValue" : ""`.

  The `nmy_textHighValue` style exists in the default CSS.



%

48 %

Row Style

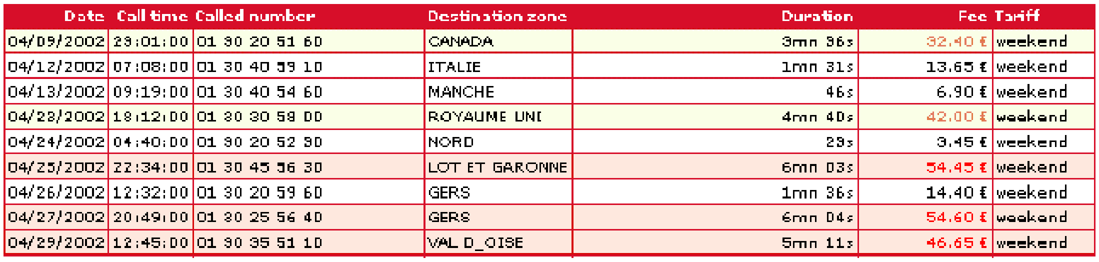
When defined on the first column of a detail block it is applied on the row.

The expression defines the style to the row dynamically.

You can highlight the row depending on the value of a column:

```
<Script><![CDATA[
String strTmp ="";
if ( ($C{BUDR_FEE} < ($A{MAX2_BUDR_FEE}+$A{AVG2_BUDR_FEE})/2) && ($C{BUDR_FEE} >= $A{AVG2_BUDR_FEE}) ) {
          strTmp = "nmy_cellMediumValue";
}
if ($C{BUDR_FEE} >= ($A{MAX2_BUDR_FEE}+$A{AVG2_BUDR_FEE})/2) {
          strTmp = "nmy_cellHighValue";
}
return strTmp;
]]></Script>
```

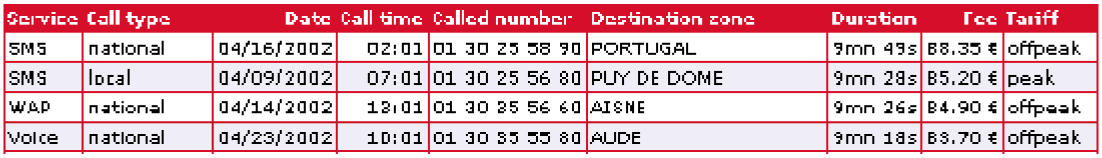
The `nmy_textHighValue` style exists in the default CSS.



Date	Call time	Called number	Destination zone		Duration	Fee	Tariff
04/09/2002	23:01:00	01 30 20 51 60	CANADA		3mn 36s	32.40 €	weekend
04/12/2002	07:08:00	01 30 40 59 10	ITALIE		1mn 31s	13.65 €	weekend
04/13/2002	09:19:00	01 30 40 54 60	MANCHE		46s	6.90 €	weekend
04/23/2002	18:12:00	01 30 30 58 00	ROYAUME UNI		4mn 40s	42.00 €	weekend
04/24/2002	04:40:00	01 30 20 52 30	NORD		23s	3.45 €	weekend
04/25/2002	22:34:00	01 30 45 56 30	LOT ET GARONNE		6mn 03s	54.45 €	weekend
04/26/2002	12:32:00	01 30 20 59 60	GERS		1mn 36s	14.40 €	weekend
04/27/2002	20:49:00	01 30 25 56 40	GERS		6mn 04s	54.60 €	weekend
04/29/2002	12:45:00	01 30 35 51 10	VAL D_OISE		5mn 11s	46.65 €	weekend

You can also alternate style row per row: `($ROW%2==0) ? "nmy_alt1" : "nmy_alt2"`.

The `nmy_alt1` and `nmy_alt2` styles exist in the default CSS.

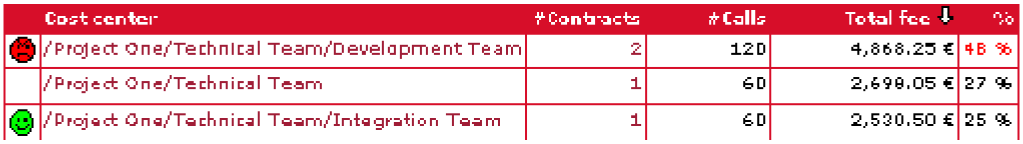


Service	Call type	Date	Call time	Called number	Destination zone	Duration	Fee	Tariff
SMS	national	04/16/2002	02:01	01 30 25 58 90	PORTUGAL	9mn 49s	88.35 €	offpeak
SMS	local	04/09/2002	07:01	01 30 25 56 80	PUY DE DOME	9mn 28s	85.20 €	peak
WAP	national	04/14/2002	13:01	01 30 35 56 60	AISNE	9mn 26s	84.90 €	offpeak
Voice	national	04/23/2002	10:01	01 30 35 55 80	AUDE	9mn 18s	83.70 €	offpeak

Value Image

The expression defines which image to call depending on a column value dynamically:

```
<Script><![CDATA[
String strTmp="level_space.gif";
if ( $VALUE > ($A{AVG_S_FEE} + ($A{MAX_S_FEE} - $A{AVG_S_FEE})*4/5) ) strTmp = "smile_angry.gif";
if ( $VALUE < ($A{AVG_S_FEE} - ($A{AVG_S_FEE} - $A{MIN_S_FEE})*9/10) ) strTmp = "smile_happy.gif";
return strTmp;
]]></Script>
```



	Cost center	# Contracts	# Calls	Total fee ⇩	%
☹	/Project One/Technical Team/Development Team	2	120	4,868.25 €	48 %
	/Project One/Technical Team	1	60	2,698.05 €	27 %
☺	/Project One/Technical Team/Integration Team	1	60	2,530.50 €	25 %

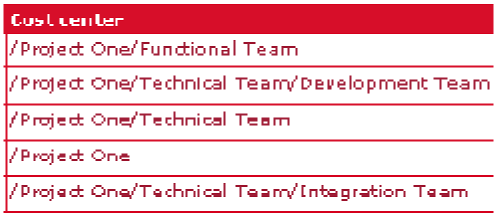
The `smile_angry.gif`, `smile_happy.gif` and `level_space.gif` images exist in the directory of the application images.

Value Report Links

The expression defines the hyperlink on the value to display dynamically:

```
$D{ExternalLinkReport2Prompts}("STD_CCS_CostCenterAnalysisDashboard", "BILL_PERIOD_KEY", ""+$P{BILL_PERIOD_KEY}
,"PCCKEY", $C{COST_CENTER_KEY} )
```

The ExternalLinkReport2Prompts definition is defined in the `GlobalDefinitions.xml` file that comes with QRA. This method requires defining which report you want to go to and which parameters and their values.



Cost center
/Project One/Functional Team
/Project One/Technical Team/Development Team
/Project One/Technical Team
/Project One
/Project One/Technical Team/Integration Team

Footer

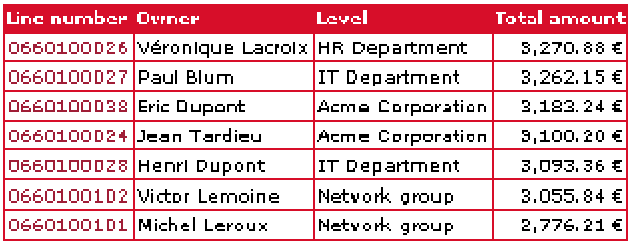
The footer is the multi row section which displays the defined aggregates. In the same column where an aggregate have been defined in the footer zone an aggregate is displayed.

When they are several aggregates defined for the same column, they are displayed one under the other.

The style `nmy_vtab_A` is for the aggregate value.

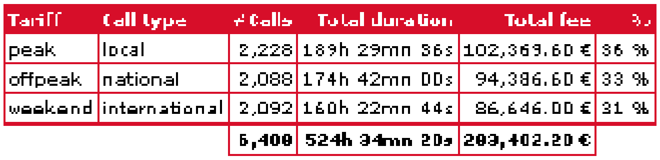
When the `isHidden` attribute is set on an aggregate, then the HTML renderer does not display the aggregate.

No aggregates



Line number	Owner	Level	Total amount
0660100026	Véronique Lacroix	HR Department	3,270.88 €
0660100027	Paul Blum	IT Department	3,262.15 €
0660100038	Eric Dupont	Acme Corporation	3,183.24 €
0660100024	Jean Tardieu	Acme Corporation	3,100.20 €
0660100028	Henri Dupont	IT Department	3,093.36 €
0660100102	Victor Lemoine	Network group	3.055.84 €
0660100101	Michel Leroux	Network group	2,776.21 €

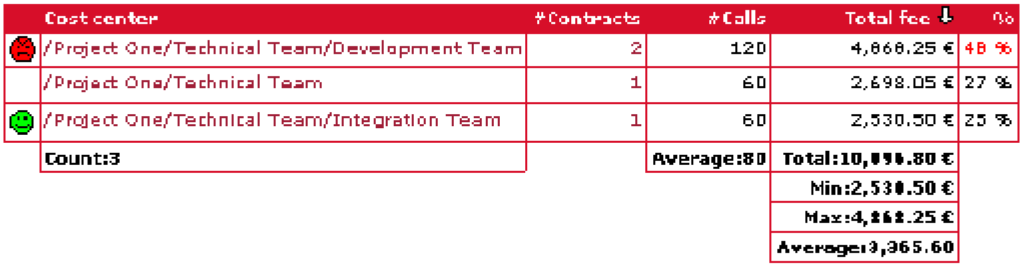
An aggregate per column but not all columns



Tariff	Call type	# Calls	Total duration	Total fee	%
peak	local	2,228	189h 29mn 36s	102,369.60 €	36 %
offpeak	national	2,088	174h 42mn 00s	94,386.60 €	33 %
weekend	international	2,092	160h 22mn 44s	86,646.00 €	31 %
		6,400	524h 34mn 20s	283,402.20 €	

Heterogeneous number of aggregate per column

Total fee column has 4 defined aggregates, #Calls column has 1 defined aggregate and #Contracts has no defined aggregate.



	Cost center	#Contracts	#Calls	Total fee ⇩	%
☹	/Project One/Technical Team/Development Team	2	120	4,868.25 €	48 %
	/Project One/Technical Team	1	60	2,698.05 €	27 %
☺	/Project One/Technical Team/Integration Team	1	60	2,530.50 €	25 %
	Count:3		Average:80	Total:10,[illegible].80 €	
				Min:2,53[illegible].50 €	
				Max:4,[illegible].25 €	
				Average:3,365.60	

Creating Master Detail Columns

Creating a Master Detail block element involves:

- Creating the Master element
- Specifying the columns to display
- Specifying the display order
- Specifying the aggregation if any

To specify the master column

In order to group data of a particular column, you use the `<master>` element.

You use the attributes of the `<master>` element to determine the parent column and if you want a page break before each new master.

The format of the element:

```
<Master keyColumnCode="COLUMN_CODE" pageBreak="true">
```

where

- `COLUMN_CODE` is the column code of the master column
- `pageBreak` specifies if a page break occurs before the next master

In this example, the report:

- A master column is `SERVICE_NAME` (`keyColumnCode="SERVICE_NAME"`)
- A page break occurs each time the master value changes (`pageBreak="true"`)
- that the column value to display is the same as the column value to group (`<Column code="SERVICE_NAME"/>`)

The Data Provider root tag	`<TabularDataTransformer code="CONTRACT_DETAILED_CALLS" name="Contract Detailed Calls" provider="CONTRACT_DETAILED_CALLS" maxRowsPerPage="10">`
Master declaration root element	`<Masters>`

The SERVICE_NAME Master element and column declaration	`<Master keyColumnCode="SERVICE_NAME" pageBreak="true">`
	`<Columns>`
	`<Column code="SERVICE_NAME"/>`
	`</Columns>`
	`</Master>`

End tags	`</Masters>`
	`</TabularDataTransformer>`

To specify the columns to display

In the master detail, you can group data for display in order to help you improve the display of information.

For example, if you want to group events by month, you can specify the month as the master and also display the year.

In this example, the report:

- A master column is MONTH_NAME
- The column values to display are YEAR and MONTH_NAME

Master declaration root element	`<Masters>`

The MONTH_NAME master element and column declarations	`<Master keyColumnCode="MONTH_NAME" pageBreak="true">`
	`<Columns>`
	`<Column code="YEAR"/>`
	`<Column code="MONTH_NAME"/>`
	`</Columns>`
	`</Master>`

End tag	`</Masters>`

By default, the master column is not sorted. And the data are displayed as they are retrieved from the data provider. You must specify the default sort, otherwise the master and its details may not be in order.

To specify the default order

You can sort the display of your master column.

In the Master element, you specify the sorts using the <ColumnSort> element.

The format of the element:

```
<ColumnSort column="COLUMN_CODE" order="sort_order"/>
```

where

- COLUMN_CODE the code name of the column
- sort_order the order of the sort

  Possible values:

  ascending

  descending

In the example, the `MONTH_NAME` is used to group the data.

A default sort is applied on the `DATE` column (`<ColumnSort column="DATE" order="ascending"/>`)

When the report is executed, the data transformer data is grouped by Month ordered by Date

Master declaration root element	`<Masters>`

The MONTH_NAME Master element and column declarations	`<Master keyColumnCode="MONTH_NAME">`
	`<Columns>`
	`<Column code="YEAR"/>`
	`<Column code="MONTH_NAME"/>`
	`</Columns>`

Sorts declaration root element and column sort declaration to sort on DATE in ascending order	`<Sorts>`
	`<ColumnSorts>`
	`<ColumnSort column="DATE" order="ascending"/>`
	`</ColumnSorts>`
	`</Sorts>`

End tags	`</Master>`
	`</Masters>`

You can also define interactive sorts.

To specify the aggregation

You can also use column aggregation feature to display aggregation on the detail below a master column.

This example

Master declaration root element	`<Masters>`

The Service Name Master element and column declaration	`   <Master keyColumnCode="SERVICE_NAME">`
	`     <Columns>`
	`          <Column code="SERVICE_NAME"/>`
	`     </Columns>`

The Aggregation declaration element and the column declaration to display the sum of the values found in the BUDR_FEE column	`     <Aggregations>`
	`          <Aggregation code="SUM1_BUDR_FEE">`
	`                    <ColumnOperation column="BUDR_FEE" operation="sum"/>`
	`          </Aggregation>`

The Aggregation declaration element and the column declaration to display the maximum value found in the BUDR_FEE column	`          <Aggregation code="MAX1_BUDR_FEE">`
	`                    <ColumnOperation column="BUDR_FEE" operation="max"/>`
	`          </Aggregation>`

End tags	`    </Aggregations>`
	` </Master>`
	`</Masters>`

To specify more than one master detail group

A report can also have several master-detail groups.

The order of the display is determined by the order of its declaration.

This example produces a report which looks like:

```
Service Name: Value1
   Call type: Value1
         Detail
   Call type: Value2
         Detail
Service Name: Value2
   Call type: Value1
         Detail
   Call type: Value4
         Detail
```

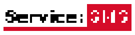
Master declaration root element	<Masters>

The SERVICE_NAME Master element and column declaration	<Master keyColumnCode="SERVICE_NAME"> <Columns> <Column code="SERVICE_NAME"/> </Columns> </Master>
The UDR_TYPE_NAME Master element and column declaration	<Master keyColumnCode="UDR_TYPE_NAME"> <Columns> <Column code="UDR_TYPE_NAME"/> </Columns> </Master>
End tag	</Masters>

Master Value Block

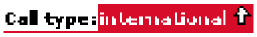
The HTML Render displays the Master Value blocks as follows:

Standard Block:



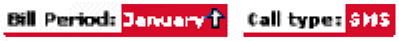
Service: SMS

Sortable Column:



Call type: international

One that one value to display for the master value:



Bill Period: January

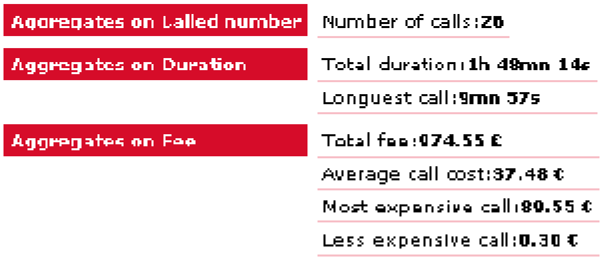
Call type: SMS

The `nmy_master_H` style is for the column name cell.

The `nmy_master_D` style is for the value cell.

Master Aggregates Block

Master Aggregate Blocks are displayed as follows:



Aggregates on Called number	Number of calls:**26**
Aggregates on Duration	Total duration:**1h 48mn 14s**
	Longuest call:**9mn 57s**
Aggregates on Fee	Total fee:**974.55 €**
	Average call cost:**37.48 €**
	Most expensive call:**80.55 €**
	Less expensive call:**0.30 €**

Creating Aggregations

You can define several aggregations on each column. An aggregate is always associated with a column and has a code for localization.

Creating Aggregations involves:

- Specifying the column
- Specifying the operator

About Aggregations

You can define several aggregations on each column. An aggregate is always associated with a column and has a code for localization.

Creating Aggregations involves:

- Specifying the column
- Specifying the operator

The format of a aggregation is:

```
<Aggregation code="CODE_NAME">

    <ColumnOperation column="COLUMN_CODE"
operation="operation">...

</Aggregation>
```

where

- `CODE_NAME` the unique code name of the aggregation
- `COLUMN_CODE` the column code
- `operation` is the operation to preform

The report processor displays aggregate values for each column. If a column has more than one aggregate, the aggregates are displayed one line at a time.

If specified, the localized aggregate’s name is displayed to the left of the aggregate value.

To create an aggregation

1 Create a Aggregations root tag after the `<detail>` element. Use the syntax:

```
<Aggregations>
```

2 Under this tag, create a Aggregation tag. Use the syntax:

```
<Aggregation code=code>
```

3 Enter the values of the following attributes:

ATTRIBUTE	DESCRIPTION
code	The code of the aggregate The code must be unique to the report element.

To specify the column operation

1 Under the Aggregation tag, enter a `<ColumnOperation>` element. Use the syntax:

```
<ColumnOperation column="COLUMN_CODE"
operation="operation_to_perform"/>
```

2 Enter the values of the following attributes:

ATTRIBUTE	DESCRIPTION
COLUMN_CODE	The code of the column.
operation	The operation to perform on all data in the column: `sum` returns the sum `average` returns the average `count` returns the count `min` returns the smallest value `max` returns the largest value

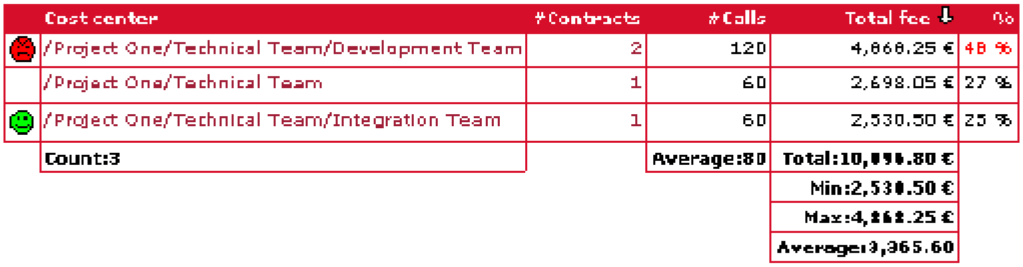
Example of Aggregations

The Data Provider root tag	<TabularDataTransformer code="TotalFeePerCostCenter" provider="TotalFeePerCostCenter" maxRowsPerPage="10">
The detail element and its column declarations	<Detail> <Columns> <Column code="RANK_FROM_PARENT" isHidden="true"/> <Column code="COST_CENTER_PATH"/> <Column code="N_CONTRACTS"/> <Column code="N_CALLS"/> <Column code="S_FEE"/> </Columns> </Detail>
The aggregation declaration root element and the the aggregation declarations	<Aggregations> <Aggregation code="COUNT_COST_CENTER_PATH"> <ColumnOperation column="COST_CENTER_PATH" operation="count"/> </Aggregation> <Aggregation code="AVG_N_CALLS"> <ColumnOperation column="N_CALLS" operation="average"/> </Aggregation> <Aggregation code="SUM_S_FEE"> <ColumnOperation column="S_FEE" operation="sum"/> </Aggregation> <Aggregation code="MIN_S_FEE"> <ColumnOperation column="S_FEE" operation="min"/> </Aggregation> <Aggregation code="MAX_S_FEE"> <ColumnOperation column="S_FEE" operation="max"/> </Aggregation> </Aggregations>
End tag	… </TabularDataTransformer>

Specifying Display Formats

Display formats are specified for Data and Footer values and cells.

Combining all the possibilities you can design a Data Transformer to display information like this:



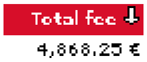
	Cost center	#Contracts	#Calls	Total fee ⇩	%
☹	/Project One/Technical Team/Development Team	2	120	4,868.25 €	48 %
	/Project One/Technical Team	1	60	2,698.05 €	27 %
☺	/Project One/Technical Team/Integration Team	1	60	2,530.50 €	25 %
	Count:3		Average:80	Total:10,[illegible].80 €	
				Min:2,53[illegible].50 €	
				Max:4,[illegible].25 €	
				Average:3,365.60	

Value Format

The expression defines the format of the value dynamically.

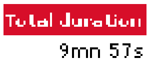
The format can be defined several ways:

- Applying a defined format to the value: `$F{EuroFormat}($VALUE)`.



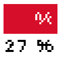
Total fee ⇩
4,868.25 €

- Applying a definition to the value: `$D{DurationFormat}($VALUE)`.



Total duration
9mn 57s

- Applying an expression to the value: `$F{PercentFormat}($VALUE * 100 / $A{SUM_S_FEE})`



%
27 %

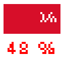
Value Style

The expression defines the style to be applied to the value, the cell or the row dynamically.

The style can be defined several ways:

- You can highlight the value: `$VALUE * 100 / $A{SUM_S_FEE}>30 ? "nmy_textHighValue" : ""`.

  The `nmy_textHighValue` style exists in the default CSS.

  %

  48 %

Row Style

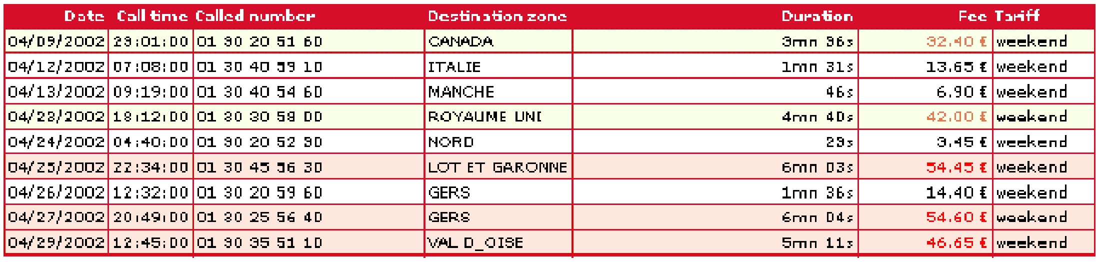
When defined on the first column of a detail block it is applied on the row.

The expression defines the style to the row dynamically.

You can highlight the row depending on the value of a column:

```
<Script><![CDATA[

String strTmp ="";

if ( ($C{BUDR_FEE} < ($A{MAX2_BUDR_FEE}+$A{AVG2_BUDR_FEE})/2) && ($C{BUDR_FEE} >= $A{AVG2_BUDR_FEE}) ) {

          strTmp = "nmy_cellMediumValue";

}

if ($C{BUDR_FEE} >= ($A{MAX2_BUDR_FEE}+$A{AVG2_BUDR_FEE})/2) {

          strTmp = "nmy_cellHighValue";

}

return strTmp;

]]></Script>
```

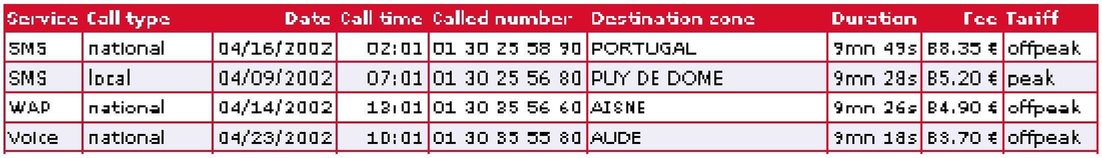
The `nmy_textHighValue` style exists in the default CSS.



Date	Call time	Called number	Destination zone	Duration	Fee	Tariff
04/09/2002	23:01:00	01 30 20 51 60	CANADA	3mn 36s	32.40 €	weekend
04/12/2002	07:08:00	01 30 40 59 10	ITALIE	1mn 31s	13.65 €	weekend
04/13/2002	09:19:00	01 30 40 54 60	MANCHE	46s	6.90 €	weekend
04/23/2002	18:12:00	01 30 30 58 00	ROYAUME UNI	4mn 40s	42.00 €	weekend
04/24/2002	04:40:00	01 30 20 52 30	NORD	23s	3.45 €	weekend
04/25/2002	22:34:00	01 30 45 56 30	LOT ET GARONNE	6mn 03s	54.45 €	weekend
04/26/2002	12:32:00	01 30 20 59 60	GERS	1mn 36s	14.40 €	weekend
04/27/2002	20:49:00	01 30 25 56 40	GERS	6mn 04s	54.60 €	weekend
04/29/2002	12:45:00	01 30 35 51 10	VAL D_OISE	5mn 11s	46.65 €	weekend

You can also alternate style row per row: `($ROW%2==0) ? "nmy_alt1" : "nmy_alt2"`.

The `nmy_alt1` and `nmy_alt2` styles exist in the default CSS.

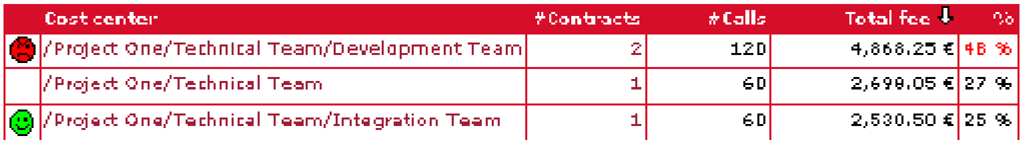


Service	Call type	Date	Call time	Called number	Destination zone	Duration	Fee	Tariff
SMS	national	04/16/2002	02:01	01 30 25 58 90	PORTUGAL	9mn 49s	88.35 €	offpeak
SMS	local	04/09/2002	07:01	01 30 25 56 80	PUY DE DOME	9mn 28s	85.20 €	peak
WAP	national	04/14/2002	13:01	01 30 35 56 60	AISNE	9mn 26s	84.90 €	offpeak
Voice	national	04/23/2002	10:01	01 30 35 55 80	AUDE	9mn 18s	83.70 €	offpeak

Value Image

The expression defines which image to call depending on a column value dynamically:

```
<Script><![CDATA[

String strTmp="level_space.gif";

if ( $VALUE > ($A{AVG_S_FEE} + ($A{MAX_S_FEE} - $A{AVG_S_FEE})*4/5) ) strTmp = "smile_angry.gif";

if ( $VALUE < ($A{AVG_S_FEE} - ($A{AVG_S_FEE} - $A{MIN_S_FEE})*9/10) ) strTmp = "smile_happy.gif";

return strTmp;

]]></Script>
```



	Cost center	# Contracts	# Calls	Total fee ⇩	%
☹	/Project One/Technical Team/Development Team	2	120	4,868.25 €	48 %
	/Project One/Technical Team	1	60	2,698.05 €	27 %
☺	/Project One/Technical Team/Integration Team	1	60	2,530.50 €	25 %

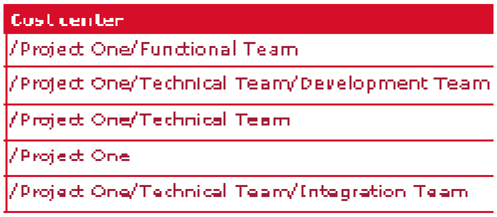
The `smile_angry.gif`, `smile_happy.gif` and `level_space.gif` images exist in the directory of the application images.

Value Report Links

The expression defines the hyperlink on the value to display dynamically:

```
$D{ExternalLinkReport2Prompts}("STD_CCS_CostCenterAnalysisDashboard", "BILL_PERIOD_KEY", ""+$P{BILL_PERIOD_KEY}
,"PCCKEY", $C{COST_CENTER_KEY} )
```

The ExternalLinkReport2Prompts definition is defined in the `GlobalDefinitions.xml` file that comes with QRA. This method requires defining which report you want to go to and which parameters and their values.



Costcenter
/Project One/Functional Team
/Project One/Technical Team/Development Team
/Project One/Technical Team
/Project One
/Project One/Technical Team/Integration Team

Creating Filters

Your Data Transformer can also be used to filter the information returned by the Data Provider.

A filter does just that, it filters the data returned by the Data Provider.

The types of filters are:

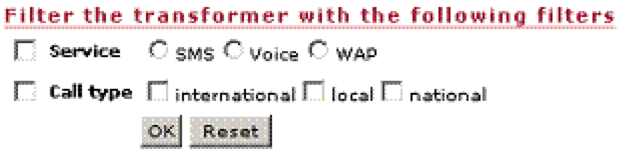
- Explicit filters

  You use an explicit filter when you want to specify how to filter the data coming from the Data Provider. There is no user interaction in determining the values of the filter and it is applied when accessing the Data Provider.

- Interactive filters

  The values of these filters are specified by the user.

You can use these filters along with a prompt block to create forms like this:



Filter the transformer with the following filters

□ Service ○ SMS ○ Voice ○ WAP

□ Call type □ international □ local □ national

You use the `<Filter>` element to define the column and the operator for your filter

- For Explicit filters, you use the `<ExplicitValue>` elements to specify the values.
- For Interactive filters, you use the `<PromptedValue>` elements to specify the values.

The format of the element:

```
<Filter column="COLUMN_CODE" operator="operator">

   <PromptedValue prompt="PROMPT_NAME">
```

or

```
   <ExplicitValue prompt="PROMPT_NAME">
```

...

```
</Filter>
```

where

- `COLUMN_CODE` the code name of the column
- `operator` the operator to use
- `PROMPT_NAME` is the prompt

You can create filters:

- With only one value to be selected
- With several values to be selected

The examples are interactive filters. For Explicit filters, use the `<ExplicitValue>` elements.

To specify a single value filter

1. Set the following attributes of the prompt specified by the `<PromptedValue>` element:
   - `maxOccurs="1"`
   - `minOccurs="1"`
2. You can use the following operators in the `<Filter>` element:
   - `"equal"`
   - `"not equal"`
   - `"greater than"`
   - `"less than"`
3. You can use one of the following formats in the Prompt declaration:
   - Drop Down List
   - List Box mono selection
   - Radio button

To specify a multiple value filter

1. Set the following attributes of the prompt specified by the `<PromptedValue>` element:
   - `maxOccurs` to a value greater than "1"
2. You can use the following operators in the `<Filter>` element:
   - `"In list"`

- `"Not in list"`

3 You can use one of the following formats in the Prompt declaration:

- Check box
- List Box multi selection

Example of a Filter

This example shows a filter in a Data Transformer:

The Report root element	`<Report code="CONTRACT_DETAILED_CALLS" name="Contract Detailed Calls">` ...

The Data Transformer element	<TabularDataTransformer code="CONTRACT_DETAILED_CALLS" name="Contract Detailed Calls" provider="CONTRACT_DETAILED_CALLS" maxRowsPerPage="10">
The PromptBlock element and PromptBlockElement declarations	<PromptBlock code="CONTRACT_DETAILED_CALLS" name="Transformer prompt block"> <PromptBlockElement prompt="SERVICE_NAME"/> <PromptBlockElement prompt="UDR_TYPE_NAME"/> </PromptBlock>>
The Filter declaration element and Filter declarations	<Filters> <Filter column="SERVICE_NAME" operator="equal"> <PromptedValue prompt="SERVICE_NAME"/> </Filter> <Filter column="UDR_TYPE_NAME" operator="equal"> <PromptedValue prompt="UDR_TYPE_NAME"/> </Filter> </Filters>
End tags	… </TabularDataTransformer> </Report>
The Prompt element for a Choice prompt	<Prompt code="UDR_TYPE_NAME" name="UDR_TYPE_NAME" type="java.lang.String" maxOccurs="1" minOccurs="0"> <ChoicePrompt> <PromptFormat> <CheckBox/> </PromptFormat> <DynamicValues displayColumn="UDR_TYPE_NAME" valueColumn="UDR_TYPE_NAME"> <TabularDataProviderRef provider="CONTRACT_DETAILED_CALLS"> <ColumnSorts> <ColumnSort column="UDR_TYPE_NAME" order="ascending"/> </ColumnSorts> </TabularDataProviderRef> </DynamicValues> </ChoicePrompt> </Prompt>
The PromptFormat element and checkbox declaration	<PromptFormat> <CheckBox/> </PromptFormat>
The dynamic values of the Choice prompt	<DynamicValues displayColumn="UDR_TYPE_NAME" valueColumn="UDR_TYPE_NAME"> <TabularDataProviderRef provider="CONTRACT_DETAILED_CALLS">
The column sorts	<ColumnSorts> <ColumnSort column="UDR_TYPE_NAME" order="ascending"/> </ColumnSorts>
End tags	</ChoicePrompt> </Prompt>
Declaration of the Choice prompt	<Prompt code="SERVICE_NAME" name="SERVICE_NAME" type="java.lang.String"> <ChoicePrompt>
The format	<PromptFormat> <RadioButton/> </PromptFormat>

The dynamic values of the Choice prompt	`<DynamicValues displayColumn="SERVICE_NAME" valueColumn="SERVICE_NAME">`
	`<TabularDataProviderRef provider="CONTRACT_DETAILED_CALLS">`

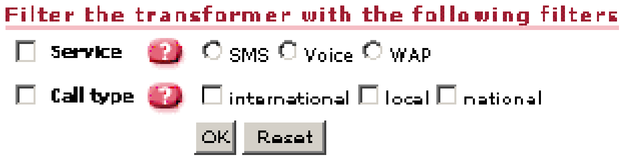
The column sorts	`<ColumnSorts>`
	`<ColumnSort column="SERVICE_NAME" order="ascending"/>`
	`</ColumnSorts>`

End tags	`</TabularDataProviderRef>`
	`</DynamicValues>`
	`</ChoicePrompt>`
	`</Prompt>`

Filter Block

It has the same comportment as the prompt block

Except that all the filters are optional and should be available for activation.

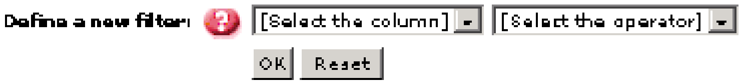

Filter the transformer with the following filters
☐ Service
○ SMS ○ Voice ○ WAP
☐ Call type
☐ international ☐ local ☐ national
OK
Reset

Custom Filters

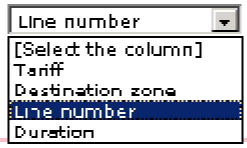
Your users can also filter the displayed data. You use a custom filter block to give your users the possibility to do this..

You must specify the allowed combination of filter (column + operator + operand) of your filter block.

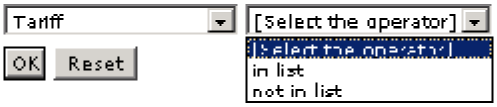
The first time a user accesses a report with a custom filter block, the rendering is as follows:



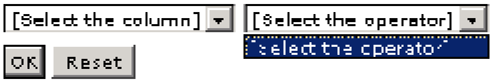
The list of columns displayed is the list of columns having at least one declared filter.



The list of operators is the operators of filters defined for the the selected column.

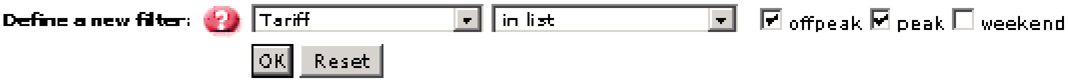


When no column is selected the operator drop down list is empty.



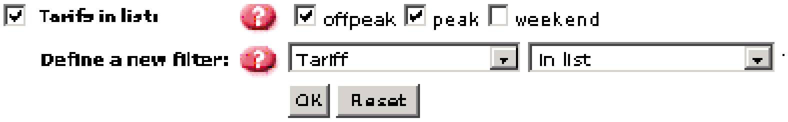
The user can select a column then an operator, so the corresponding operand control appears.

For a Check Box prompt, the rendering is as follows:



Define a new filter: Tariff in list ☑ offpeak ☑ peak ☐ weekend

When the user submits the transformer, the block is filtered and the the rendering is as follows:

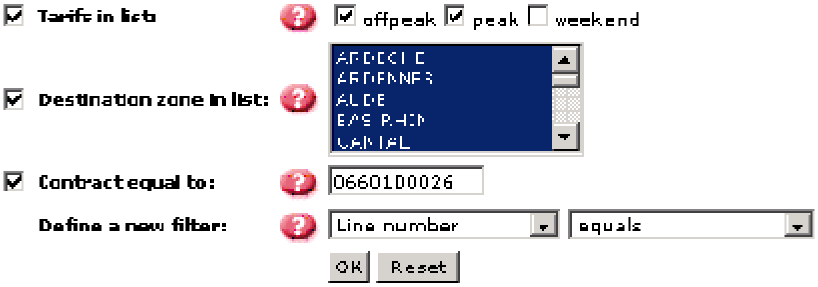


☑ Tarifs in list: ☑ offpeak ☑ peak ☐ weekend

Define a new filter: Tariff in list

Users can define several filters of information this way.

Here is an example where the user has defined 3 filters:



☑ Tarifs in list: ☑ offpeak ☑ peak ☐ weekend

☑ Destination zone in list: ARDECHE ARDENNES AUDE BAS RHIN CANTAL

☑ Contract equal to: 0660100026

Define a new filter: Line number equals

To define custom filter you must declare the following property for each filter:

```
<Filter code="UDR_TARIFF_NAME_IN_LIST" column="UDR_TARIFF_NAME"
operator="in_list">

     <Properties>

          <Property key="GROUP">true</Property>

     </Properties>

     <PromptedValue prompt="UDR_TARIFF_NAME_IN_LIST"/>

</Filter>
```

Creating PromptBlocks

A Prompt Block is a set of prompts for Data Providers with more than one prompt.

The Prompt Block specifies the order in which the prompts are displayed.

You use the `<ProvidersPromptBlock>` element to group the data provider prompts together and define their display order.

The format of the element:

```
<ProvidersPromptBlock code="CODE_NAME" name="name">
```

where

- `CODE_NAME` the unique code name of the Data Transformer
- `name` the name of the Data Provider

You can define only one PromptBlock per Data Transformer.

This example shows the order in two Prompt Block elements:

```
<PromptBlock code="CONTRACT_DETAILED_CALLS">

          <PromptBlockElement prompt="SERVICE_NAME"/>

          <PromptBlockElement prompt="UDR_TYPE_NAME"/>

</PromptBlock>
```

Specifying Sorts

Most of the time, the column sorting is done with the Data Provider. The specified sort is usually appropriate for most reports. However, you can also use a Data Transformer to sort columns.

You can also use the sort feature to have two or more Tabular Data Transformers with different sorts using data from the same Data Provider.

Specifying the Default Column Sort

You use the `<ColumnSort>` element to specify the name of the column and the order of the sort.

The format of the element:

```
<ColumnSort column="COLUMN_CODE" order="sort_order"/>
```

where

- `COLUMN_CODE` the code name of the column
- `sort_order` the order of the sort

  Possible values:

  `ascending`

  `descending`

This example shows how to sort the `BUDR_VOLUME` column declared in either the data provider or in the data transformer.

The Data Transformer element	`<TabularDataTransformer code="CONTRACT_DETAILED_CALLS" name="Contract Detailed Calls" provider="CONTRACT_DETAILED_CALLS" maxRowsPerPage="10">`

The Columns declaration element and column declarations	`<Columns>`
	`<Column code="SERVICE_NAME"/>`
	`...`
	`</Columns>`

The Sorts declaration element and Column sort declarations	`<Sorts>`
	`…`
	`<ColumnSorts>`
	`<ColumnSort column="BUDR_VOLUME" order="ascending"/>`
	`</ColumnSorts>`
	`</Sorts>`

End tags	`</ProvidersPromptBlock>`
	`…`
	`</Report>`

Specifying Interactive Sorting

Your Tabular Data Transformer can define columns with interactive sorting.

Specifying Basic Interactive Sorting

You use the `<SortableColumns>` element to define the maximum number of column sorts and the `<SortableColumn>` element to specify the columns that can be sorted.

The format of the element:

```
<SortableColumns maxColumnSorts="number">
```

where

- `number` the maximum number of column sorts

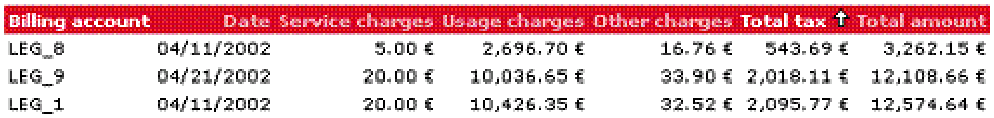
In this example, the columns used in the data transformer come from the data provider.

The Data Transformer element	<TabularDataTransformer code="ContractInvoiceOverview" name="Contract Detailed Calls" provider="ContractInvoiceOverview"> …

The Sorts declaration element and the SortableColumn declarations	<Sorts>
	   <SortableColumns maxColumnSorts="1">
	         <SortableColumn column="CONTRACT_NAME"/>
	         <SortableColumn column="MEMBER_NAME"/>
	         <SortableColumn column="LEVEL_NAME"/>
	         <SortableColumn column="SERVICE_CHARGES"/>
	         <SortableColumn column="USAGE_CHARGES"/>
	         <SortableColumn column="OTHER_CHARGES"/>
	         <SortableColumn column="TOTAL_TAX"/>
	         <SortableColumn column="TOTAL_AMOUNT"/>
	   </SortableColumns>
	…

End tags	</Sorts> … </TabularDataTransformer>

The HTML produced by the report:



Billing account	Date	Service charges	Usage charges	Other charges	Total tax ↑	Total amount
LEG_8	04/11/2002	5.00 €	2,696.70 €	16.76 €	543.69 €	3,262.15 €
LEG_9	04/21/2002	20.00 €	10,036.65 €	33.90 €	2,018.11 €	12,108.66 €
LEG_1	04/11/2002	20.00 €	10,426.35 €	32.52 €	2,095.77 €	12,574.64 €

An arrow is displayed on the right of the column header to inform the user about the sort.

Specifying Multiple Column Sorts

In order to create complex sorts of information, you can define two or more Tabular Data Transformers to use data from the same Data Provider. This allows you to create complex sorting features for your report.

Multiple sorts are specified in the `maxColumnSorts` attribute of the `<SortableColumns>`

In this example, the `maxColumnSorts` is set to 2. This means that the information supports sorts on 2 columns.

The columns used in the data transformer come from the data provider.

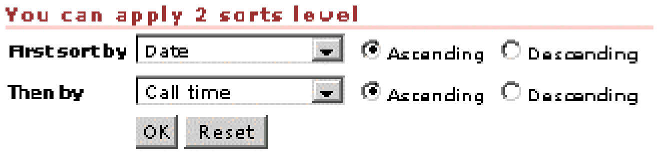
Each Data Transformer has the following:

The Data Transformer element	`<TabularDataTransformer code="CONTRACT_DETAILED_CALLS" name="Contract Detailed Calls" provider="CONTRACT_DETAILED_CALLS" maxRowsPerPage="10">` …

The Sorts declaration element and the SortableColumn declarations	`<Sorts>`
	`<SortableColumns maxColumnSorts="2">`
	`<SortableColumn column="DEST_ZONE_NAME"/>`
	`<SortableColumn column="SERVICE_NAME"/>`
	`<SortableColumn column="UDR_TYPE_NAME"/>`
	`<SortableColumn column="DAY_DATE"/>`
	`<SortableColumn column="TIME_OF_DAY"/>`
	`<SortableColumn column="BUDR_VOLUME"/>`
	`<SortableColumn column="BUDR_FEE"/>`
	`</SortableColumns>`
	…
	`</Sorts>`

End tags	`</TabularDataTransformer>`

The HTML produced by the `report_helper.jsp` prompts the user to enter the sorts to apply:



You can apply 2 sorts level

First sort by: Date ● Ascending ○ Descending

Then by: Call time ● Ascending ○ Descending

Sort Block

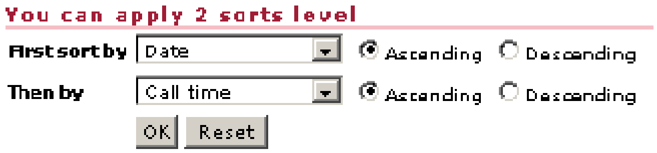
The sort block appears when the attribute on element <SortableColumns maxColumnSorts=”NSORTS”> is set to a value NSORTS greater than or equal to 1.

It displays NSORTS rows.

Each rows display a drop down list which contains the list of sortable column.

For the selected one the user can precise the sort.

When first accessing a transformer the default sorts are applied and are selected in the sort block.



You can apply 2 sorts level

First sort by Date ● Ascending ○ Descending

Then by Call time ● Ascending ○ Descending

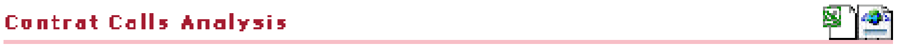
Exporting Data

You can use the Export As feature to allow your users to export the data in TabularDataTransformer or MatrixDataTransformer. They can export the data in the following formats:

- XML
- CSV

When available, the Transformer title zone displays a clickable button corresponding to the available formats.

An example of a transformer title zone with XML and CSV exports available:



Contrat Calls Analysis

Exporting as XML

To allow you users to download the data as XML, you specify the `EXPORT_AS_XML` as a property of your transformer.

When specified, the following button appears on the title zone:

When clicked, the server generates an XML file corresponding to the data displayed in the transformer.

This button is always displayed on the right corner of the transformer title zone. If the CSV download is also available to users, the CSV button is to the left of the XML button.

Example of an XML Export

Typical sample of generation is:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<transformer name="Contrat Calls Analysis">
          <row>
                    <cell>Service</cell>
                    <cell>Call type</cell>
                    <cell>Date</cell>
                    <cell>Call time</cell>
                    <cell>Called number</cell>
                    <cell>Destination zone</cell>
                    <cell>Duration</cell>
                    <cell>Fee</cell>
                    <cell>Tariff</cell>
          </row>
          <row>
                    <cell>SMS</cell>
                    <cell>international</cell>
                    <cell>2002-04-09</cell>
                    <cell>23:01:00</cell>
                    <cell>01 30 20 51 60</cell>
                    <cell>CANADA</cell>
                    <cell>216</cell>
                    <cell>32.4</cell>
                    <cell>weekend</cell>
          </row>
          <row>
                    <cell>SMS</cell>
                    <cell>international</cell>
                    <cell>2002-04-12</cell>
                    <cell>07:08:00</cell>
                    <cell>01 30 40 59 10</cell>
                    <cell>ITALIE</cell>
                    <cell>91</cell>
                    <cell>13.65</cell>
                    <cell>weekend</cell>
          </row>
</transformer>
```

Exporting as CSV

To allow you users to download the data as CSV, you specify the `EXPORT_AS_CSV` as a property of your TabularDataTransformer or MatrixDataTransformer.

When specified, the following button appears on the title zone:

When clicked, the server generates a CSV file corresponding to the data displayed in the transformer.

This button is always displayed to the left of the Download as XML button when both are available.

Example of a CSV Export

```
Service;Call type;Date;Call time;Called number;Destination zone;Duration;Fee;Tariff

SMS;local;2002-04-04;10:35:00;01 30 40 58 50;SEINE;85;12.75;peak

SMS;local;2002-04-06;11:35:00;01 30 10 50 20;TARN;2;0.3;peak

SMS;local;2002-04-11;02:27:00;01 30 25 59 70;YVELINES;597;89.55;peak

SMS;local;2002-04-12;16:31:00;01 30 15 59 30;CORREZE;193;28.95;peak

SMS;local;2002-04-22;23:26:00;01 30 10 55 20;JAPON;452;67.8;peak

SMS;local;2002-04-23;08:31:00;01 30 45 50 20;ESPAGNE;302;45.3;peak

Voice;international;2002-04-01;22:47:00;01 30 35 50 20;VAR;302;45.3;weekend

Voice;international;2002-04-21;09:19:00;01 30 05 51 60;CANTAL;516;77.4;weekend

Voice;international;2002-04-26;05:51:00;01 30 25 54 10;HAUTS DE SEINE;541;81.15;weekend

Voice;international;2002-04-28;10:25:00;01 30 30 51 60;HAUTS DE SEINE;16;2.4;weekend

Voice;local;2002-04-07;14:23:00;01 30 00 57 90;YVELINES;279;41.85;peak

Voice;local;2002-04-10;07:58:00;01 30 25 50 00;COTE D'OR;100;15.0;peak

Voice;local;2002-04-11;01:39:00;01 30 20 53 00;MOSELLE;230;34.5;peak

Voice;local;2002-04-13;21:26:00;01 30 10 59 90;CORREZE;499;74.85;peak

Voice;local;2002-04-14;22:08:00;01 30 40 53 70;BELFORT;37;5.55;peak

Voice;local;2002-04-27;04:29:00;01 30 00 56 60;BELFORT;66;9.9;peak

Voice;national;2002-04-05;20:12:00;01 30 45 51 80;VENDEE;318;47.7;offpeak

Voice;national;2002-04-05;04:27:00;01 30 15 50 60;DEUX SEVRES;106;15.9;offpeak

Voice;national;2002-04-06;12:02:00;01 30 35 55 40;HAUTE SAONE;154;23.1;offpeak

Voice;national;2002-04-08;06:05:00;01 30 35 59 80;HERAULT;198;29.7;offpeak

Voice;national;2002-04-15;02:22:00;01 30 35 53 10;CORSE DU SUD;331;49.65;offpeak

WAP;local;2002-04-03;16:17:00;01 30 15 54 40;OISE;144;21.6;peak

WAP;local;2002-04-04;02:48:00;01 30 40 54 10;RHONE;441;66.15;peak

WAP;local;2002-04-10;09:53:00;01 30 35 53 70;RHONE;537;80.55;peak

WAP;local;2002-04-16;01:54:00;01 30 35 54 70;MOSELLE;147;22.5;peak

WAP;local;2002-04-16;15:57:00;01 30 40 59 80;JURA;98;14.7;peak

WAP;national;2002-04-02;23:02:00;01 30 35 55 30;ORNE;553;82.95;offpeak

WAP;national;2002-04-19;17:11:00;01 30 00 51 00;ORNE;410;61.5;offpeak

WAP;national;2002-04-19;22:15:00;01 30 20 52 10;BAS RHIN;421;63.15;offpeak

WAP;national;2002-04-24;22:53:00;01 30 10 56 70;LOT;267;40.5;offpeak

WAP;national;2002-04-28;08:03:00;01 30 25 51 70;VAL DE MARNE;317;47.55;offpeak

WAP;national;2002-04-30;12:40:00;01 30 35 52 10;CORSE DU SUD;121;18.15;offpeak
```

CHAPTER 6

Creating Matrix Data Transformers

In This Section

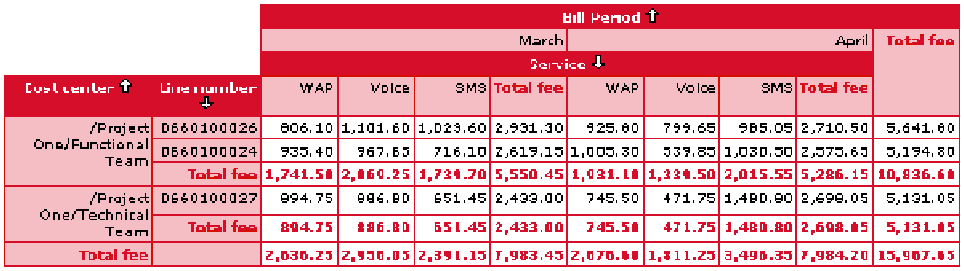
About Matrix Data Transformers

A Matrix Data Transformer is based on a TabularDataProvider and has:

- A prompt block used for interactive filters on dimension values
- Charts
- Sorts on dimension values
- Formats and expressions on dimension values and measures

The matrix block presents the information in a 2 dimension matrix.

- The row dimensions area
- The column dimensions area
- The measures area



		Bill Period ⇧								
		March				April				Total fee
		Service ⇩								
Cost center ⇧	Line number ⇩	WAP	Voice	SMS	Total fee	WAP	Voice	SMS	Total fee	
/Project One/Functional Team	0660100026	806.10	1,101.60	1,023.60	2,931.30	925.80	799.65	985.05	2,710.50	5,641.80
	0660100024	935.40	967.65	716.10	2,619.15	1,005.30	539.85	1,030.50	2,575.65	5,194.80
	Total fee	1,741.50	2,069.25	1,739.70	5,550.45	1,931.10	1,339.50	2,015.55	5,286.15	10,836.60
/Project One/Technical Team	0660100027	894.75	886.80	651.45	2,433.00	745.50	471.75	1,480.80	2,698.05	5,131.05
	Total fee	894.75	886.80	651.45	2,433.00	745.50	471.75	1,480.80	2,698.05	5,131.05
Total fee		2,636.25	2,956.05	2,391.15	7,983.45	2,676.60	1,811.25	3,496.35	7,984.20	15,967.65

Differences Between Matrix and Tabular Data Transformers

- Format expressions

  Only values to format can be changed when using expressions to manage format.

- Sorts

  Dimensions must always be sorted so that they can be crossed.

  By default, a dimension break has an ascending sort on its key column.

  You can specify if the dimension is sortable and which column break to use in the Transformer.

- Pagination

  Matrix Data Transformers do not support multiple pages.

- Custom Filters

  Are not available for Matrix Data Transformers.

Working with Dimensions

A dimension is a tabular structure.

The tabular structure columns are grouped together using breaks in order to create an hierarchy

Each break has a key column defining the value to use to compute breaks.

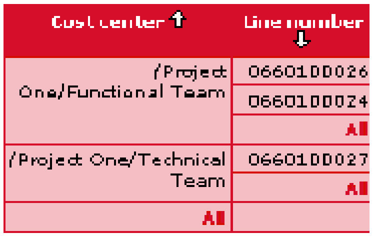
Break values are considered as distinct dimension value and have their own lines in the tabular structure. On these lines all columns of breaks with a higher depth than current break value are set to null.

Child values of a dimension break value are only present if associated measures exist for the parent value.

Examples of Row Dimensions Areas

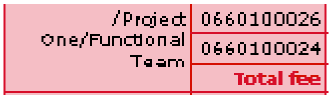
If a column row dimension is defined as sortable then the column value has an hyperlink on it. And if the sortable column has a default sort defined on it then the sort icons is display in the right direction.

When a sort is changed by user interaction then the sort icon reflects the user choice.



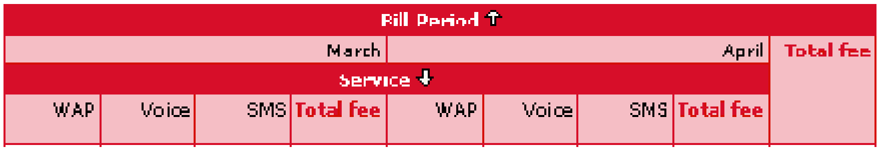
Cost center ⇧	Line number ⇩
/Project One/Functional Team	0660100026
	0660100024
	All
/Project One/Technical Team	0660100027
	All
All	

A break is automatically done on the parent row dimension when several values are found:



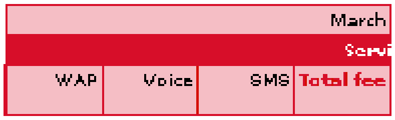
/Project One/Functional Team	0660100026
	0660100024
	Total fee

Column Dimension Area



Bill Period ⇧								
March				April				Total fee
Service ⇩								
WAP	Voice	SMS	Total fee	WAP	Voice	SMS	Total fee	

A break is automatically done on the parent column dimension when several values are found:



March			
Servi			
WAP	Voice	SMS	Total fee

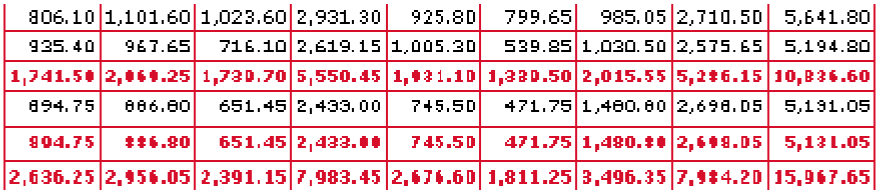
Working with Measures

A measure is a provider column and an aggregation operation.

The aggregation operations are the same as available on TabularDataTransformer:

OPERATIO N	SUPPORTED INPUT TYPES	OUTPUT TYPES	DESCRIPTION
Min	Double Long Timestamp Date Time	Double Long Timestamp Date Time	null considered lesser than any non null value and equal to null
Max	Double Long Timestamp Date Time	Double Long Timestamp Date Time	null considered lesser than any non null value and equal to null
Sum	Double Long	Double Long	returns null if any of the values to aggregate is null
Average	Double Long	Double Long	returns null if any of the values to aggregate is null
Count	Any type	Long	returns number of aggregated PROVIDER lines independent of specified column, null values are counted it is NOT a count distinct it does NOT count matrix cells

Examples of Measure Areas

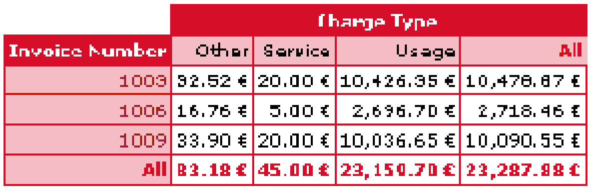


806.10	1,101.60	1,023.60	2,931.30	925.80	799.65	985.05	2,710.50	5,641.80
935.40	967.65	716.10	2,619.15	1,005.30	539.85	1,030.50	2,575.65	5,194.80
1,741.50	2,069.25	1,739.70	5,550.45	1,931.10	1,339.50	2,015.55	5,286.15	10,836.60
894.75	886.80	651.45	2,433.00	745.50	471.75	1,480.80	2,698.05	5,131.05
894.75	886.80	651.45	2,433.00	745.50	471.75	1,480.80	2,698.05	5,131.05
2,636.25	2,956.05	2,391.15	7,983.45	2,676.60	1,811.25	3,496.35	7,984.20	15,967.65

Examples

This example is a MatrixDataTransformer with the following:

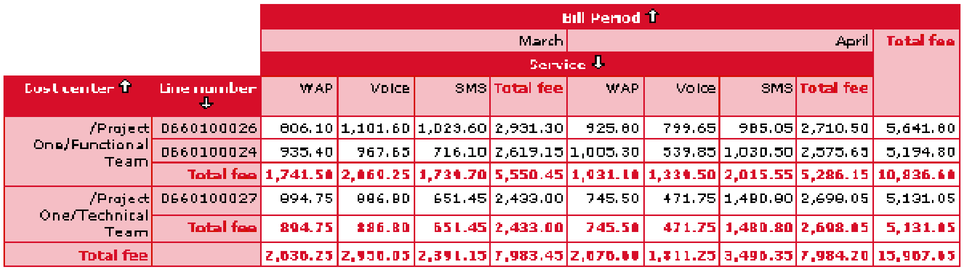
- 1 row dimension
- 1 column dimension
- 1 measure



	Charge Type			
Invoice Number	Other	Service	Usage	All
1003	32.52 €	20.00 €	10,426.35 €	10,478.87 €
1006	16.76 €	5.00 €	2,696.70 €	2,718.46 €
1009	33.90 €	20.00 €	10,036.65 €	10,090.55 €
All	83.18 €	45.00 €	23,159.70 €	23,287.88 €

This example is a MatrixDataTransformer with the following:

- 2 row dimensions
- 2 column dimensions
- 1 measure



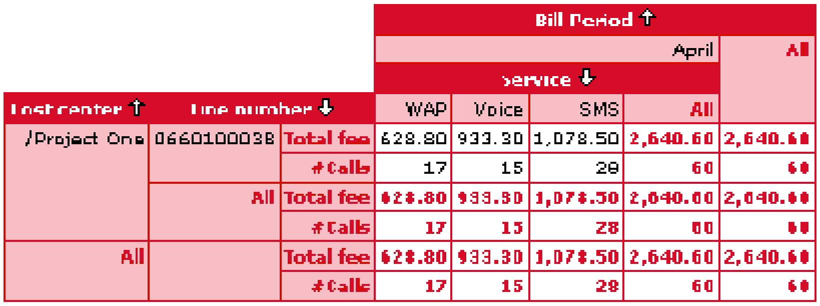
		Bill Period ⇧								
		March				April				Total fee
		Service ⇩								
Cost center ⇧	Line number ⇩	WAP	Voice	SMS	Total fee	WAP	Voice	SMS	Total fee	
/Project One/Functional Team	0660100026	806.10	1,101.60	1,023.60	2,931.30	925.80	799.65	985.05	2,710.50	5,641.80
	0660100024	935.40	967.65	716.10	2,619.15	1,005.30	539.85	1,030.50	2,575.65	5,194.80
	Total fee	1,741.50	2,069.25	1,739.70	5,550.45	1,931.10	1,339.50	2,015.55	5,286.15	10,836.60
/Project One/Technical Team	0660100027	894.75	886.80	651.45	2,433.00	745.50	471.75	1,480.80	2,698.05	5,131.05
	Total fee	894.75	886.80	651.45	2,433.00	745.50	471.75	1,480.80	2,698.05	5,131.05
Total fee		2,636.25	2,956.05	2,391.15	7,983.45	2,676.60	1,811.25	3,496.35	7,984.20	15,967.65

This example is a MatrixDataTransformer with the following:

- 2 row dimensions
- 2 column dimensions
- 2 measures

When there is more than one measure defined then the measure headers are display and repeated for each column value.

By default when there are 2 measures the display of measure is in line



			Bill Period ⇧				
			April				All
			Service ⇩				
Cost center ⇧	Line number ⇩		WAP	Voice	SMS	All	
/Project One	0660100038	Total fee	628.80	933.30	1,078.50	2,640.60	2,640.60
		# Calls	17	15	28	60	60
	All	Total fee	628.80	933.30	1,078.50	2,640.60	2,640.60
		# Calls	17	15	28	60	60
All		Total fee	628.80	933.30	1,078.50	2,640.60	2,640.60
		# Calls	17	15	28	60	60

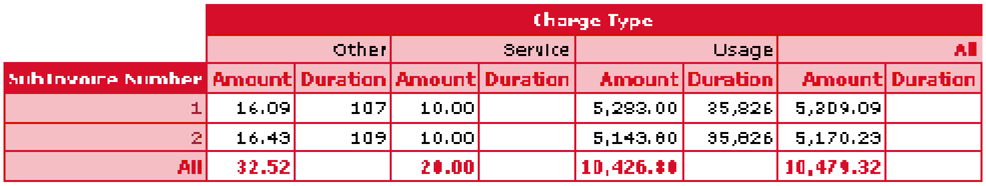
To display each measure in the column, define the property `MEASURE_IN_COLUMN` and set it to `"true"`.

This example is a MatrixDataTransformer with the following:

- 1 row dimension
- 1 column dimension
- 2 measures

When there is more than one measure defined then the measure headers are display and repeated for each column value.

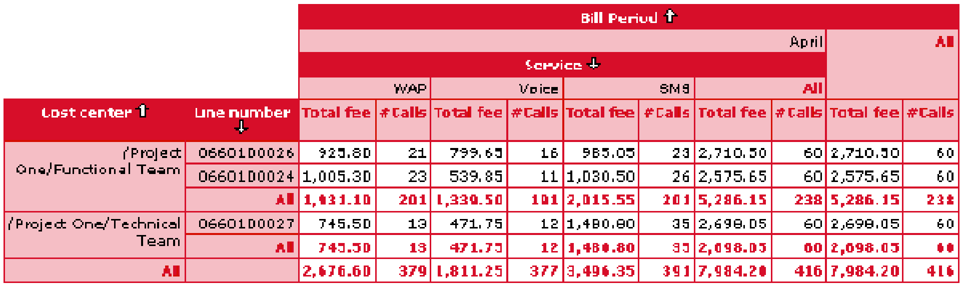
In this sample Amount and Duration are repeated for each Charge Type value.



	Charge Type							
	Other		Service		Usage		All	
SubInvoice Number	Amount	Duration	Amount	Duration	Amount	Duration	Amount	Duration
1	16.09	107	10.00		5,283.00	85,826	5,309.09	
2	16.43	109	10.00		5,143.80	85,826	5,170.23	
All	32.52		20.00		10,426.80		10,479.32	

This example is a MatrixDataTransformer with the following:

- 2 row dimensions
- 2 column dimensions
- 2 measures



		Bill Period ↑									
		April								All	
		Service ↓									
		WAP		Voice		SMS		All			
Cost center ↑	Line number ↓	Total fee	#Calls	Total fee	#Calls	Total fee	#Calls	Total fee	#Calls	Total fee	#Calls
/Project One/Functional Team	0660100026	925.80	21	799.65	16	985.05	23	2,710.50	60	2,710.50	60
	0660100024	1,005.30	23	539.85	11	1,030.50	26	2,575.65	60	2,575.65	60
	All	1,931.10	201	1,339.50	101	2,015.55	201	5,286.15	238	5,286.15	238
/Project One/Technical Team	0660100027	745.50	13	471.75	12	1,480.80	35	2,698.05	60	2,698.05	60
	All	745.50	13	471.75	12	1,480.80	35	2,698.05	60	2,698.05	60
All		2,676.60	379	1,811.25	377	3,496.35	391	7,984.20	416	7,984.20	416

CHAPTER 7

Creating Charts

In This Section

About Creating Charts

The chart is a visual representation of the data which is retrieved sorted and filtered in the Tabular or Matrix Data Transformer. The Chart Engine is responsible for generating these charts. It is based on the KavaChart java library.

You can create charts for the following:

- Detail when there is no master
- Detail of a master detail
- Summary of a master

On UNIX systems, charts may not be displayed correctly and an exception may occur when the X11 environment settings are not set correctly. If the settings are not correct, you find errors about this problem in the logs.

If this happens, set the DISPLAY environment variable to a valid X11 server. If you are using a Java platform 1.4 or higher, you can also set the java mode to `headless`.

Creating a chart involves:

- Creating the Chart element
- Specifying the type of chart
- Specifying the size
- Specifying the titles
- Specifying the type of graphic file
- Specifying the tooltips

Creating the Chart Element

Creating the chart element involves:

- Creating the detail element
- Specifying the type of chart

To create the chart element

1 Create a Chart element. Use the syntax:

```
<Chart code="CODE_NAME" type=”chartType”>
```

2 Enter the values of the following attributes:

ATTRIBUTE	DESCRIPTION
code	The code of the Chart Transformer The code must be unique to the report element.
type	The type of chart. Can be one of the following: • area • bar • barArea • barLine • column • labelLine • line • pie • speedo • stackBar • stackColumn • twinAxisBarArea • twinAxisBarLine • twinAxisLine • twinAxisStackBarLine

To specify the size of the chart

In the `<chart>` element, enter the following attributes:

- `height` to specify the height in pixels
- `width` to specify the width in pixels

Specifying the Titles of the Chart

In the `<chart>` element, enter the following attributes:

- `title` to specify the title of the chart
- `subtitle` to specify the subtitle of the chart

To specify the image file format

In the `<chart>` element, enter the following attributes:

- `codec` to specify the type of image file to create
- `contentType` to specify the content type of the image file

  You can enter one of the following codec/content type:

ENCODER NAME	CONTENT TYPE	DESCRIPTION
j_png	image/png	PNG lossless compression.
jpeg	image/jpeg	JDK native lossy jpeg encoder
j_jpeg	image/jpeg	JIMI java lossy jpeg encoder (slower than jpeg, but may be useful in case of video hardware dependency problems)

You can set a default file format in the Chart properties file. This attribute overrides the default format.

Specifying the Chart Styles

The Chart engine applies the styles defined for a chart. You can specify the default and chart specific styles for the following elements:

- Title
- Series properties
- Chart Background
- Plot area (size, colors, fonts, …)
- Axis
- Legend (position, formatting …)
- Tooltip

The styles of a chart are declared in the `styles.properties` file. The property files are located in `<home_dir>channels/WEB-INF/classes/nmycfg/qra/chart`.

In this file you specify:

- Default styles for all charts
- Default styles per chart type
- Specific styles

The Chart engine uses the same order when applying the styles to your chart.

In order to become familiar with chart styles and how they work, we suggest modifying the default styles in the samples.

For the list of Chart engine styles, refer to the Chart Style Reference Appendix in this manual.

To set the styles of a chart

In the `<chart>` element, enter the following attributes:

- style to specify the Specific styles declared in `styles.properties`

  The specified styles override the default styles

  The styles must be separated by a space

Example of a `<chart>` element with a style attribute specifying the following styles:

- `noLegend`
- `textLabelsOn`

  <Chart code="CHARTPIE" name="pie" type="pie" codec="jpeg" height="250" width="300" style="noLegend textLabelsOn">

Specifying the Chart Data Set

Depending on the chart type, you may need to use several Datasets. For instance, you may need more than one dataset when you compare several columns returning the same type of data.

You must specify a dataset title for each data set.

On a chart type which supports several Y Axes, you can declare the dataset using the second axis called YAux. In order to use this second axis, you set the useAuxAxis attribute to "true"

Example of a Chart Data Set

Dataset tag

```
<Datasets>
```

Fee Data Set

```
  <Dataset title="Fee">
     <DoubleSeries code="yValues">
          <Column code="S_FEE"/>
     </DoubleSeries>
     <StringSeries code="Labels">
          <Column code="S_FEE"/>
     </StringSeries>
     <StringSeries code="Links">
          <Column code="COST_CENTER_PATH" formatCode="link"/>
     </StringSeries>
  </Dataset>
```

Number of calls Dataset

```
  <Dataset title="#Calls" useAuxAxis="true">
     <DoubleSeries code="yValues">
          <Column code="N_CALLS"/>
     </DoubleSeries>
     <StringSeries code="Labels">
          <Column code="N_CALLS"/>
     </StringSeries>
     <StringSeries code="Links">
          <Column code="COST_CENTER_PATH" formatCode="link"/>
     </StringSeries>
  </Dataset>
```

Closing tag

```
</Datasets>
```

To define the Y values

You define the column code which is used to retrieve the values. Use the syntax:

```
<DoubleSeries code="yValues">

      <Column code="COLUMN_CODE"/>

</DoubleSeries>
```

To define the labels for each Y value

You define the column code which is used to retrieve the labels of the values. Use the syntax:

```
<StringSeries code="yValues">

      <Column code="COLUMN_CODE"/>

</StringSeries>
```

To define hyperlinks for each Y value

You define the column code which is used to retrieve the labels of the values.

You specify the `formatCode` attribute as a link and specify the column which has been defined in the data transformer to generate hyperlinks for each data of the chart.

```
<StringSeries code="Links">

      <Column code="COLUMN_CODE" formatCode="link"/>

</StringSeries>
```

Specifying the Axes

To define the title of the X axis

You can define the label by defining which column of the data transformer provides the labels. Use the syntax:

```
<XAxis title="Title of the X Axis">

     <Labels>

          <Column code="COLUMN_NAME"/>

     </Labels>

</XAxis>
```

To define the title of the Y axis

You can define the title of the Y axis by setting the `title` attribute. Use the syntax:

```
<YAxis title="My Y Axis Title"/>
```

To define the title of the YAux axis

You can define the title of the YAux axis by setting the title attribute.

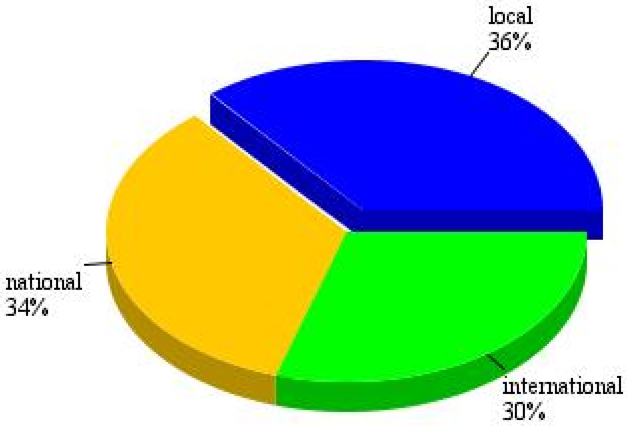
YAux can be declared when the chart supports 2 vertical Y axes. Use the format:

```
<AuxAxis title="My Title"/>
```

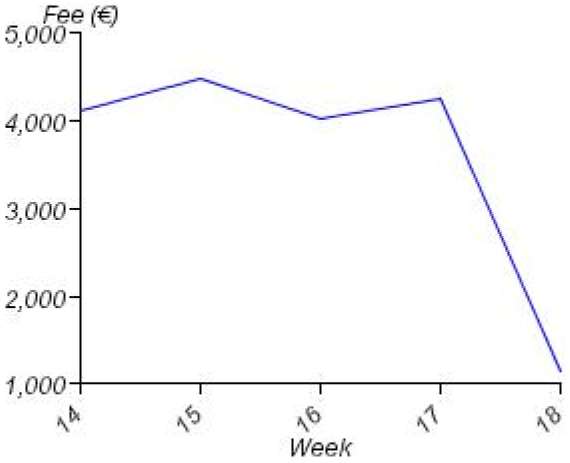
Sample Charts

Here are some example of the different charts you can create using the Chart engine and the HTML renderer.

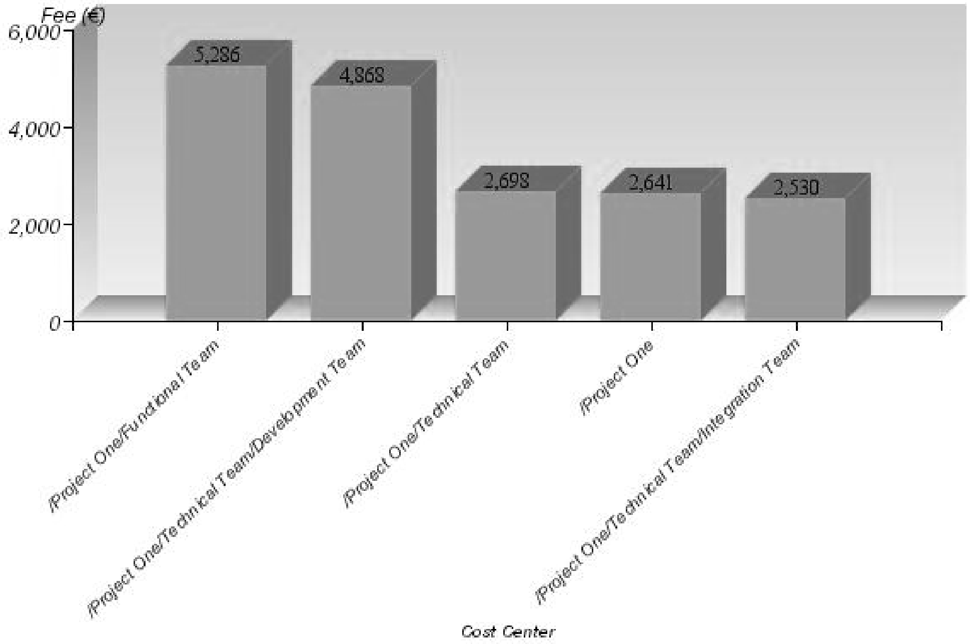
Pie Chart



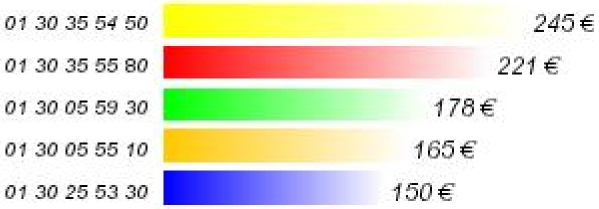
Line



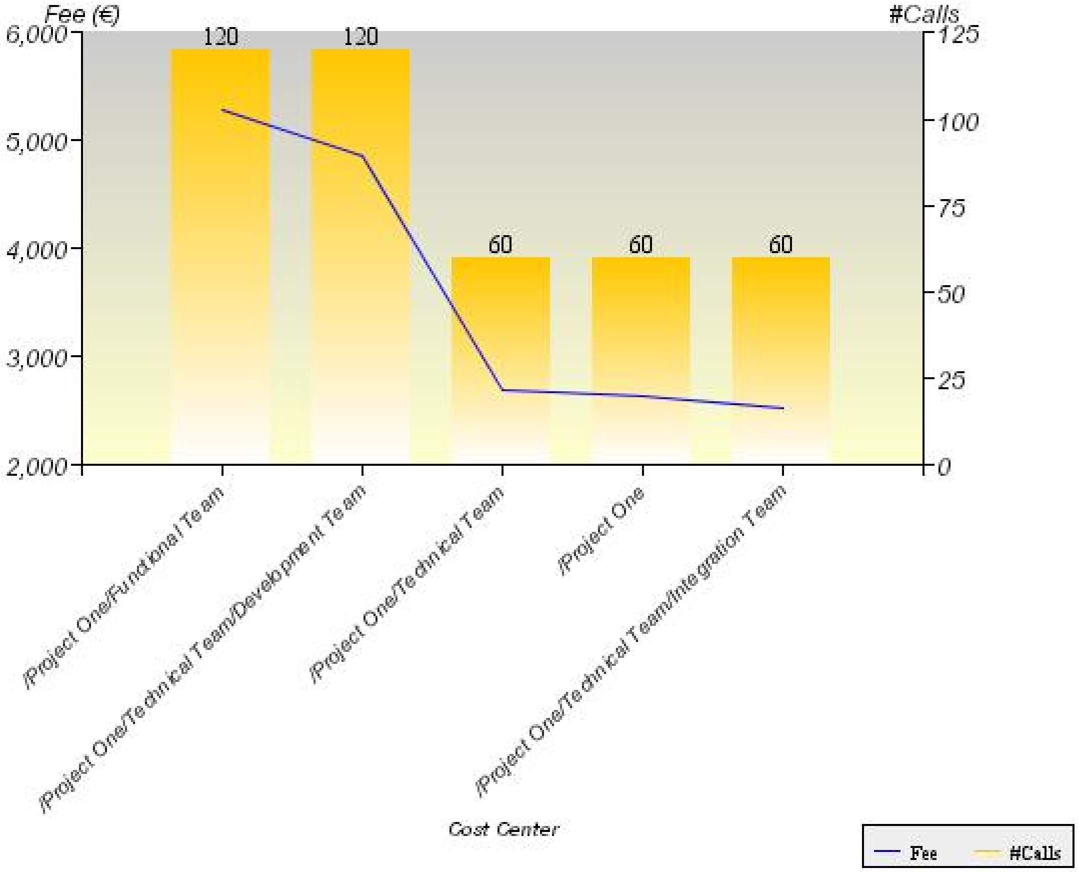
Vertical Bar Chart



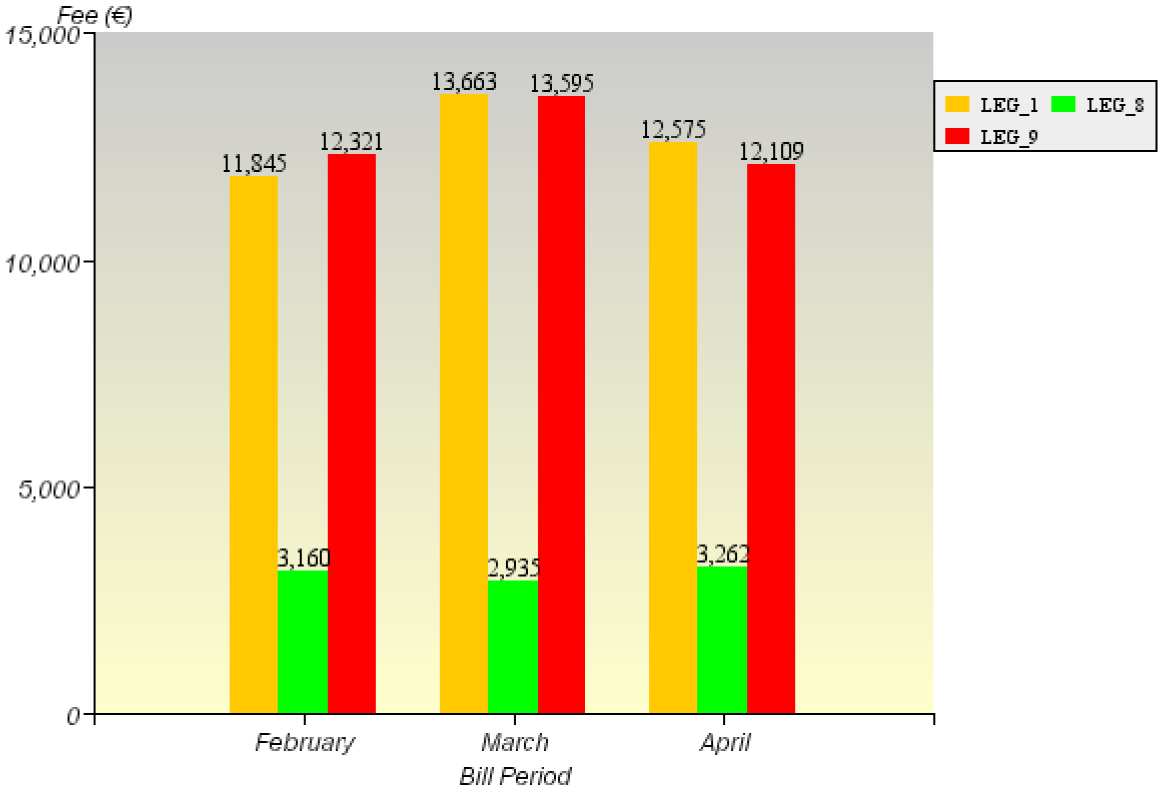
Horizontal Bar Chart



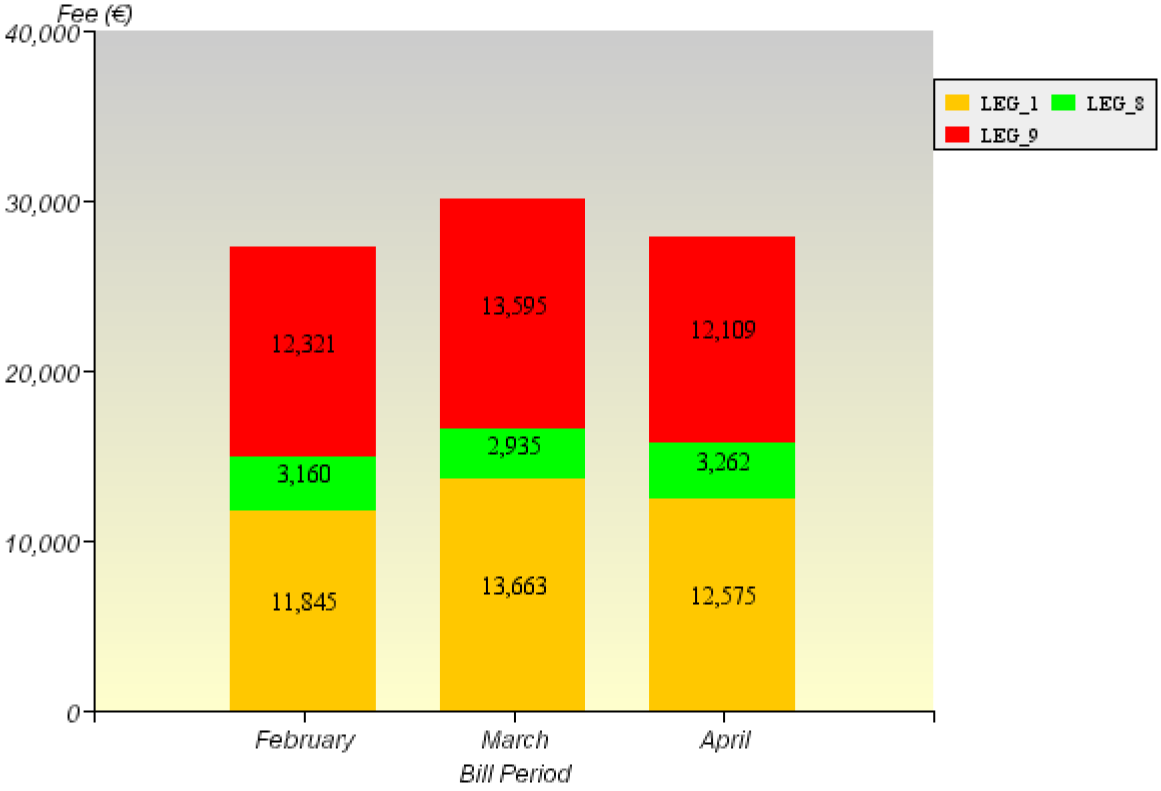
Combined Bar and Line Chart



2 Dimension Column



Vertical Column Bar Chart



Stacked Horizontal Bar Chart

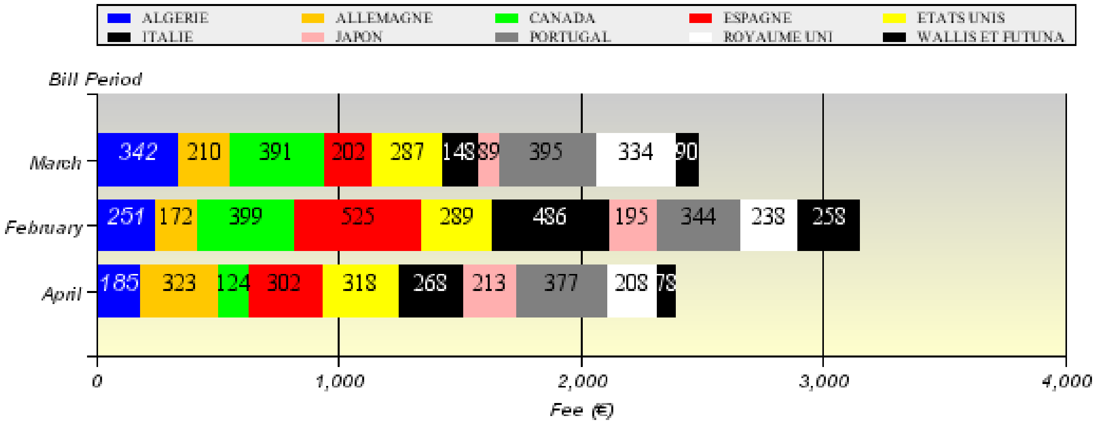
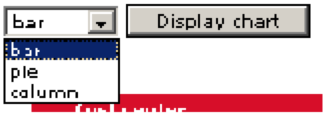


Chart Navigation Block

The block allows the user to view the hidden defined chart attached to a transformer.



CHAPTER 8

Working with Reports

In This Section

About Working with Reports

Once you have completed creating your Data Accessors and Data Transformers, you can focus on making the report meet your user's needs.

Working with reports involves:

- Specifying the display format
- Localizing the display
- Customizing the report renderer
- Reloading the report definition file
- Saving reports
- Specifying the execution mode

Specifying the Layout

Once you have created your and declared the report definition file, you now need to decide what your report will look like.

Here are some examples of reports you can create using the QRA.

These examples are divided into the following categories:

- MonoTransformer reports

  These reports display data from a single data transformer. They may have more than one way of displaying data, but the source of the data remains a single data transformer. For instance, for a given transformer, the report may display the data as a pie chart and a table.

- MultiTransformer reports

  These reports display data from more than one data transformer. By using different data transformers, the reports can present a dashboard of information to give users a more complete and exhaustive view of their account. The `report_view.jsp` uses the `NB_TRANSFORMER_PER_LINE` property declared in the report definition file to determine the number of transformers displayed per line.

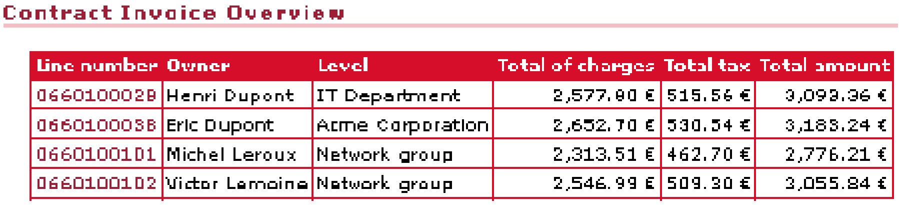
Along with these categories, there is a utility report for displaying printer-friendly reports.

MonoTransformer Report Templates

Simple Report

This report displays only one vertical tabular block based on one transformer.

An example of this template:



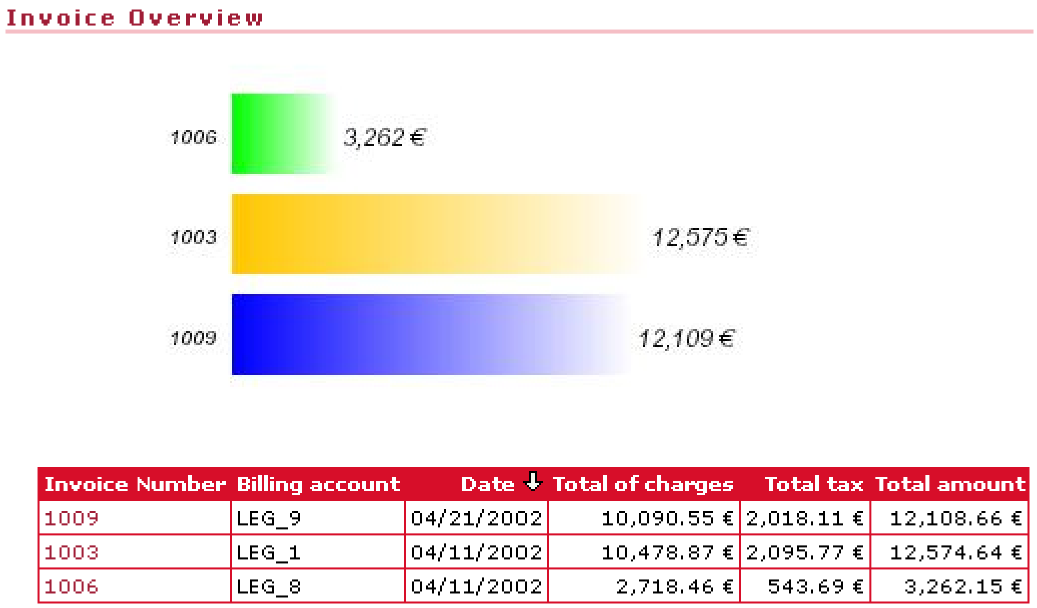
Contract Invoice Overview

Line number	Owner	Level	Total of charges	Total tax	Total amount
0660100028	Henri Dupont	IT Department	2,577.80 €	515.56 €	3,093.36 €
0660100038	Eric Dupont	Acme Corporation	2,652.70 €	530.54 €	3,183.24 €
0660100101	Michel Leroux	Network group	2,313.51 €	462.70 €	2,776.21 €
0660100102	Victor Lemoine	Network group	2,546.99 €	509.30 €	3,055.84 €

Chart and Data Reports

This report displays a vertical tabular block and the chart based on the same transformer.

An example of this template:



Invoice Overview

Invoice Number	Billing account	Date ⇩	Total of charges	Total tax	Total amount
1009	LEG_9	04/21/2002	10,090.55 €	2,018.11 €	12,108.66 €
1003	LEG_1	04/11/2002	10,478.87 €	2,095.77 €	12,574.64 €
1006	LEG_8	04/11/2002	2,718.46 €	543.69 €	3,262.15 €

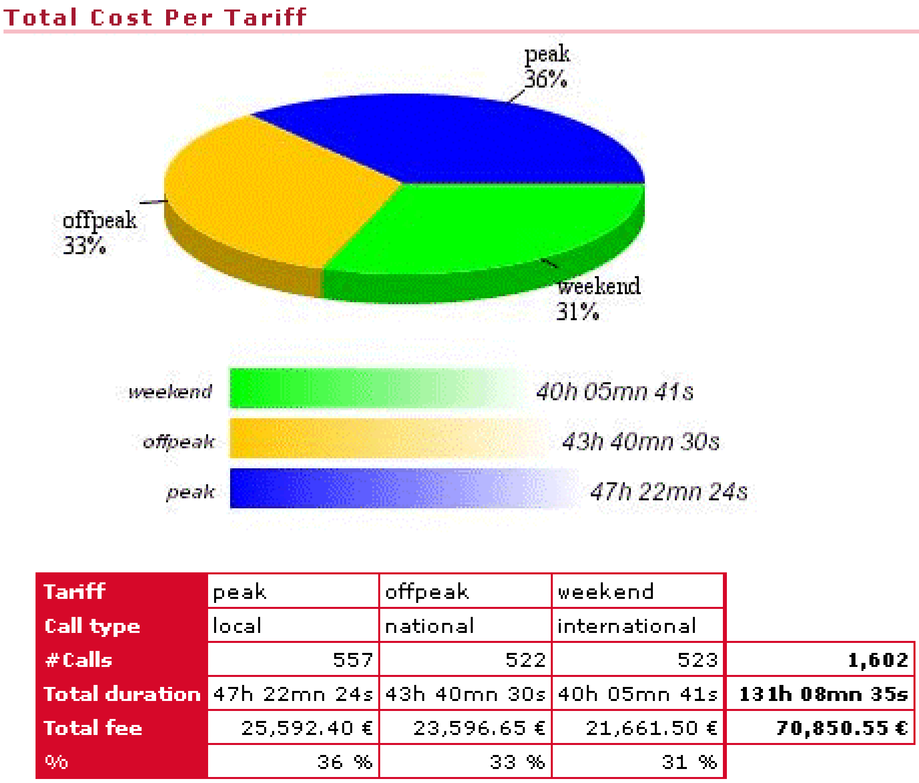
MultiChart Reports

These reports have several charts and the detail of the same transformer.

Display MultiCharts

When all charts are declared with the attribute `isHidden=false`, the chart navigation bar is not shown and all the charts are displayed.

The charts are displayed before the detail block.

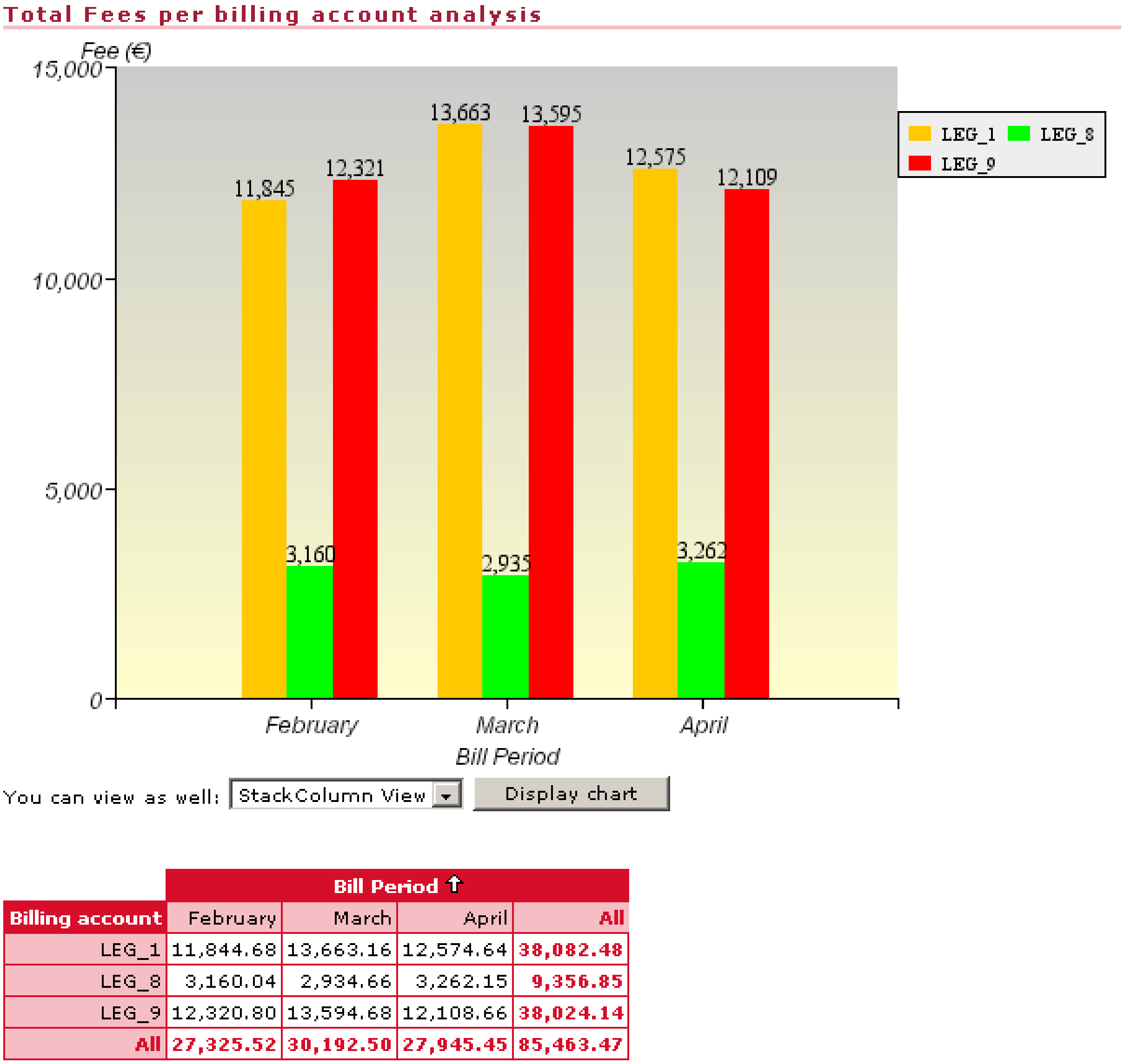


Total Cost Per Tariff

Tariff	peak	offpeak	weekend	
Call type	local	national	international	
#Calls	557	522	523	**1,602**
Total duration	47h 22mn 24s	43h 40mn 30s	40h 05mn 41s	**131h 08mn 35s**
Total fee	25,592.40 €	23,596.65 €	21,661.50 €	**70,850.55 €**
%	36 %	33 %	31 %	

Interactive Multicharts

When at least one chart is declared as hidden (attribute `isHidden=true)` the visible charts are displayed and a chart navigation bar is displayed underneath the chart to let the user select the hidden charts.



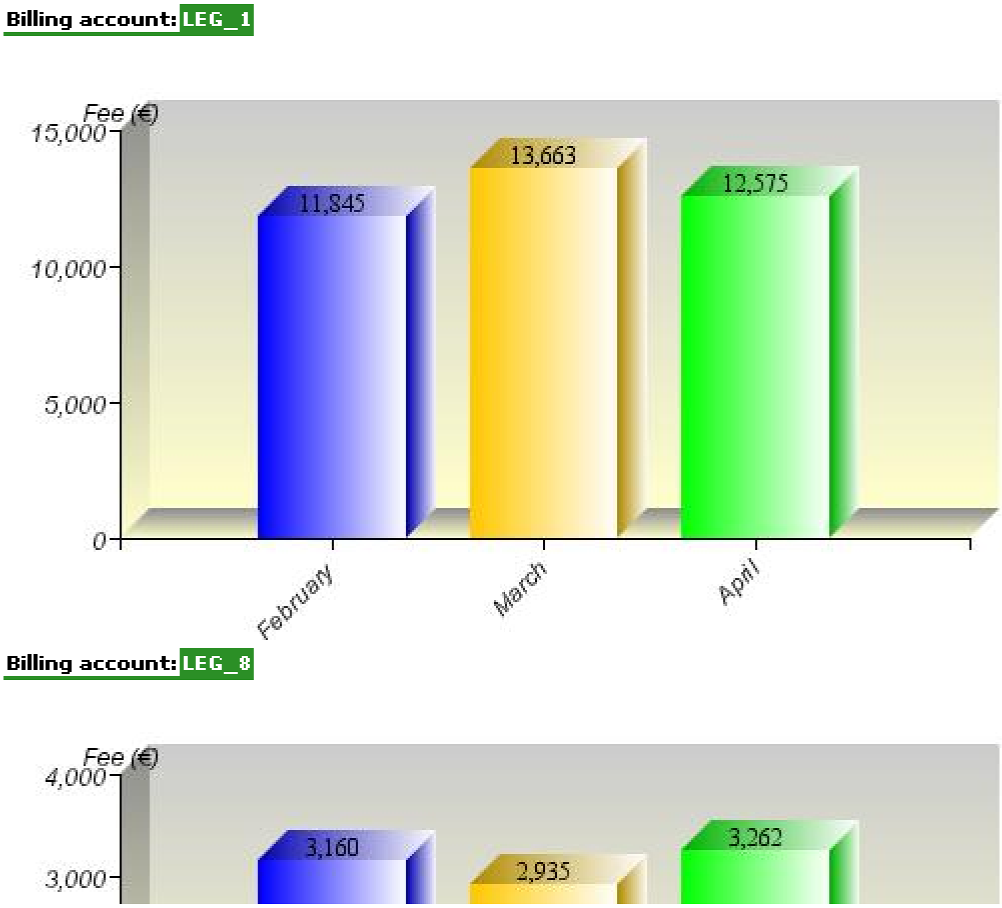
Total Fees per billing account analysis

You can view as well: StackColumn View

	Bill Period ↑			
Billing account	February	March	April	All
LEG_1	11,844.68	13,663.16	12,574.64	38,082.48
LEG_8	3,160.04	2,934.66	3,262.15	9,356.85
LEG_9	12,320.80	13,594.68	12,108.66	38,024.14
All	27,325.52	30,192.50	27,945.45	85,463.47

Master/Detail Reports

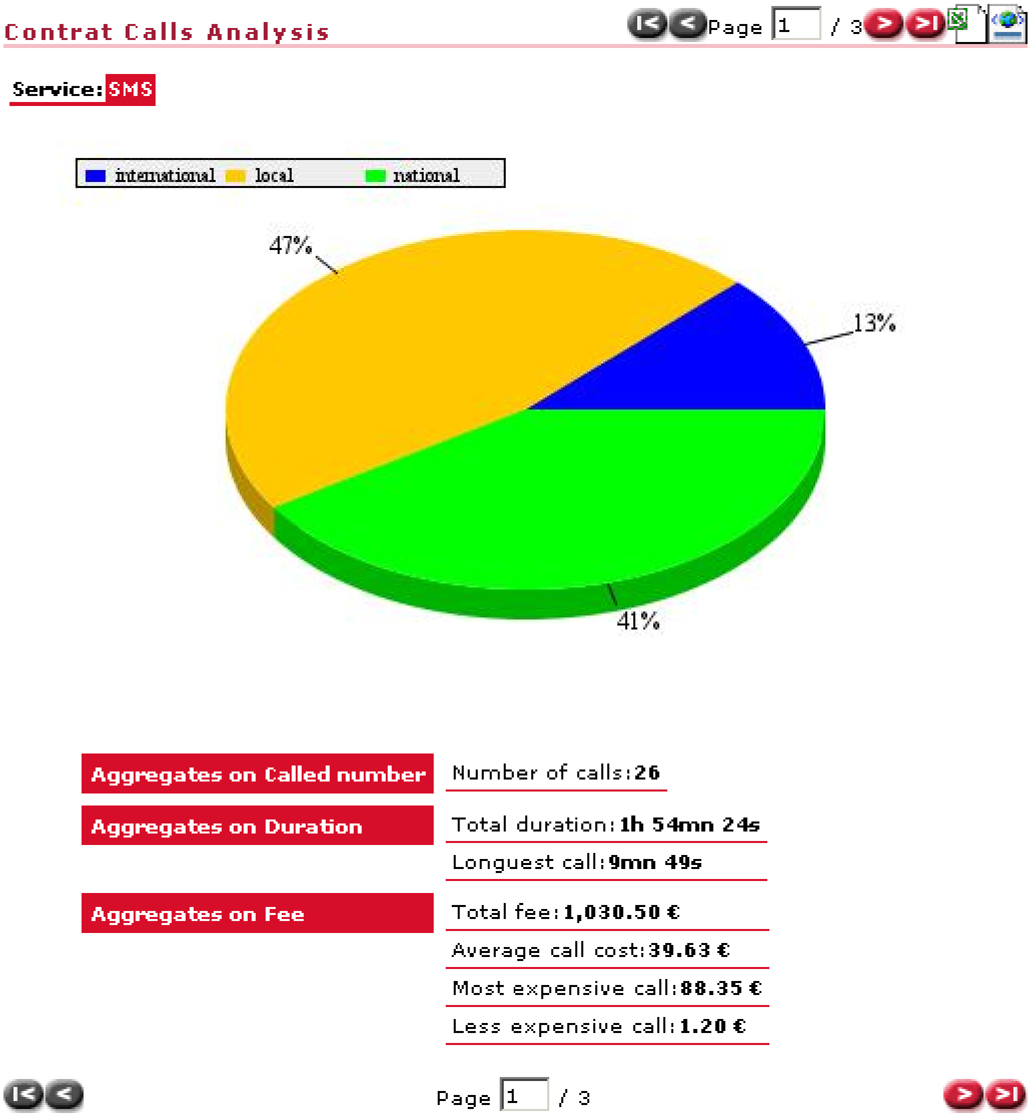
This report is a master/detail(chart) report



Billing account: LEG_1

Billing account: LEG_8

Summary and Master/Detail Report



Contrat Calls Analysis

Service: SMS

Aggregates on Called number	Number of calls: **26**
Aggregates on Duration	Total duration: **1h 54mn 24s**
	Longuest call: **9mn 49s**
Aggregates on Fee	Total fee: **1,030.50 €**
	Average call cost: **39.63 €**
	Most expensive call: **88.35 €**
	Less expensive call: **1.20 €**

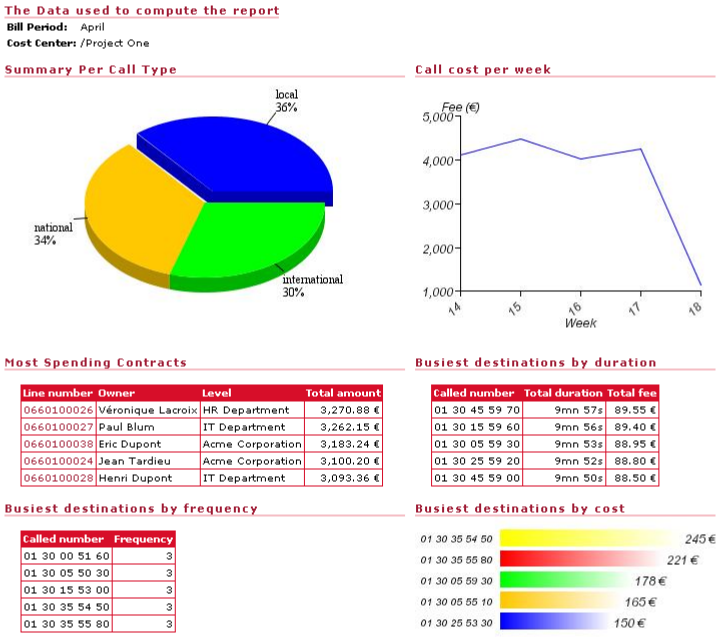
MultiTransformer Report Templates

Dashboard Reports

This is an example of a report with:

- 6 transformers
- `NB_TRANSFORMER_PER_LINE=2`

If no `NB_TRANSFORMER_PER_LINE` is specified, the HTML Renderer displays 2 transformers per line.



The Data used to compute the report

Bill Period: April

Cost Center: /Project One

Summary Per Call Type

Call cost per week

Most Spending Contracts

Line number	Owner	Level	Total amount
0660100026	Véronique Lacroix	HR Department	3,270.88 €
0660100027	Paul Blum	IT Department	3,262.15 €
0660100038	Eric Dupont	Acme Corporation	3,183.24 €
0660100024	Jean Tardieu	Acme Corporation	3,100.20 €
0660100028	Henri Dupont	IT Department	3,093.36 €

Busiest destinations by duration

Called number	Total duration	Total fee
01 30 45 59 70	9mn 57s	89.55 €
01 30 15 59 60	9mn 56s	89.40 €
01 30 05 59 30	9mn 53s	88.95 €
01 30 25 59 20	9mn 52s	88.80 €
01 30 45 59 00	9mn 50s	88.50 €

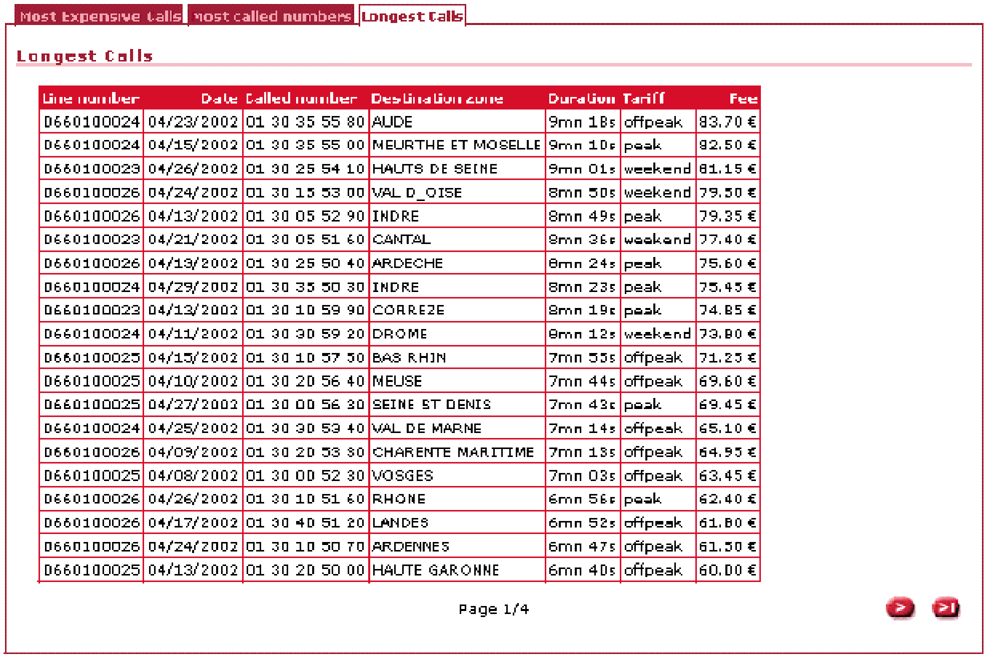
Busiest destinations by frequency

Called number	Frequency
01 30 00 51 60	3
01 30 05 50 30	3
01 30 15 53 00	3
01 30 35 54 50	3
01 30 35 55 80	3

Busiest destinations by cost

Tabbed Reports

A tabbed Report has a Transformer index block used to select the transformer to display.



Longest Calls

Line number	Date	Called number	Destination zone	Duration	Tariff	Fee
0660100024	04/23/2002	01 30 35 55 80	AUDE	9mn 18s	offpeak	83.70 €
0660100024	04/15/2002	01 30 35 55 00	MEURTHE ET MOSELLE	9mn 10s	peak	82.50 €
0660100023	04/26/2002	01 30 25 54 10	HAUTS DE SEINE	9mn 01s	weekend	81.15 €
0660100026	04/24/2002	01 30 15 53 00	VAL D_OISE	8mn 50s	weekend	79.50 €
0660100026	04/13/2002	01 30 05 52 90	INDRE	8mn 49s	peak	79.35 €
0660100023	04/21/2002	01 30 05 51 60	CANTAL	8mn 36s	weekend	77.40 €
0660100026	04/13/2002	01 30 25 50 40	ARDECHE	8mn 24s	peak	75.60 €
0660100024	04/29/2002	01 30 35 50 30	INDRE	8mn 23s	peak	75.45 €
0660100023	04/13/2002	01 30 10 59 90	CORREZE	8mn 19s	peak	74.85 €
0660100024	04/11/2002	01 30 30 59 20	DROME	8mn 12s	weekend	73.80 €
0660100025	04/15/2002	01 30 10 57 50	BAS RHIN	7mn 55s	offpeak	71.25 €
0660100025	04/10/2002	01 30 20 56 40	MEUSE	7mn 44s	offpeak	69.60 €
0660100025	04/27/2002	01 30 00 56 30	SEINE ST DENIS	7mn 43s	peak	69.45 €
0660100024	04/25/2002	01 30 30 53 40	VAL DE MARNE	7mn 14s	offpeak	65.10 €
0660100026	04/09/2002	01 30 20 53 30	CHARENTE MARITIME	7mn 13s	offpeak	64.95 €
0660100025	04/08/2002	01 30 00 52 30	VOSGES	7mn 03s	offpeak	63.45 €
0660100026	04/26/2002	01 30 10 51 60	RHONE	6mn 56s	peak	62.40 €
0660100026	04/17/2002	01 30 40 51 20	LANDES	6mn 52s	offpeak	61.80 €
0660100026	04/24/2002	01 30 10 50 70	ARDENNES	6mn 47s	offpeak	61.50 €
0660100025	04/13/2002	01 30 20 50 00	HAUTE GARONNE	6mn 40s	offpeak	60.00 €

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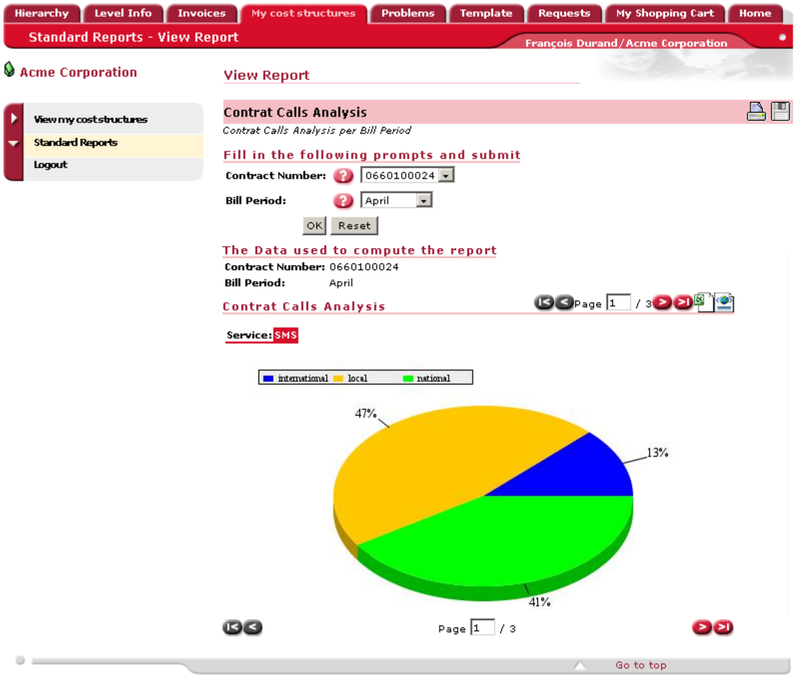
Printer Friendly

The default report view lets the user interact with the report via prompts, filters, sorts, pages, hyperlinks.

At any time, the user may click on a link for a printer-friendly version of the report. This is a link represented by a printer as seen in the example.This removes the interactive items (menus, title, header, footer) from the report and presents a version that is ready to print.

You can limit the printer friendly printout to the current page by using the `DO_NOT_PRETTY_PRINT_ALL_PAGES` property.

Normal View



Contrat Calls Analysis

Contrat Calls Analysis per Bill Period

Fill in the following prompts and submit

Contract Number: 0660100024

Bill Period: April

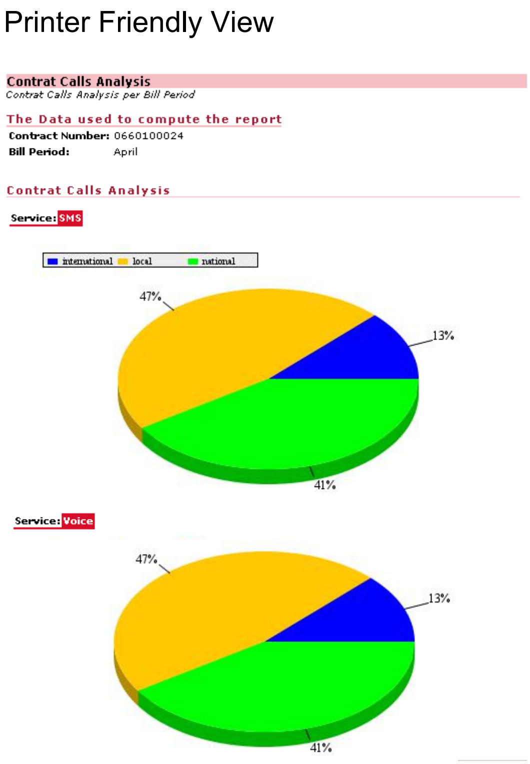
The Data used to compute the report

Contract Number: 0660100024

Bill Period: April

Contrat Calls Analysis

Service: SMS



Printer Friendly View

Contrat Calls Analysis

Contrat Calls Analysis per Bill Period

The Data used to compute the report

Contract Number: 0660100024

Bill Period: April

Contrat Calls Analysis

Service: SMS

Service: Voice

Localizing Reports

The reports use the `name` and `description` attribute of the element for display values.

If your report has to be in more than one language, you localize the value of the these attributes.

To localize reports

To localize the `name` and `description` attributes:

1. Use the PLS to localize strings
2. Use the special methods in the `report_helper.jsp`
   - `localizeReportElementName`
   - `localizeReportElementDesc`

In order to retrieve the localized name and localized description of a report element, the strings to localize must be declared in the channel configuration file using the following syntax:

REPORT ELEMENT	STRINGS TO DEFINE IN MYWEB.XML
Report	QRA.REPORT.<report code>.NAME QRA.REPORT.<report code>.DESCRIPTION
Prompt	QRA.PROMPT.<prompt code>.NAME QRA.PROMPT.<prompt code>. DESCRIPTION
TabularDataProvider	QRA.PROVIDER.<provider code>.NAME QRA.PROVIDER.<provider code>. DESCRIPTION
TabularDataTransformer MatrixDataTransformer	QRA.TRANSFORMER.<transformer code>.NAME QRA.TRANSFORMER.<transformer code>. DESCRIPTION
PromptBlock	QRA.PROMPTBLOCK.<promptblock code>.NAME QRA.PROMPTBLOCK.<promptblock code>. DESCRIPTION
ColumnDescriptor FieldDescriptor	QRA.COLUMN.<column code>.NAME QRA.COLUMN.<column code>. DESCRIPTION
Aggregation	QRA.AGGREGATION.<column code>.NAME QRA.AGGREGATION.<column code>. DESCRIPTION

Customizing Reports

You can enhance and customize the standard reports.

Enhancing your reports involves:

- Customizing the `report_view.jsp` used to display the reports
- Adding properties to report elements

Customizing the Report View JSP

`The report_view.jsp` is the jsp which handles the display of the data transformer and prompt blocks.

This JSP can be modified to meet you needs or can be used as a template to help you get started with writing your own reports.

You can modify this file by doing the following:

- Change formatting
- Change position of elements
- Add your company visual identity
- Generate and display charts

You can also add additional properties to report elements

Adding Properties to Report Elements

You can add your own properties to any report element. You can use this to customize your reports to fit your application's requirements.

An example is in the `CONTRACT_DETAILED_CALLS` report. The `CONTRACT_DETAILED_CALLS` Data Transformer has an additional property called `ALTERNATE_ROWS`.

The Data Transformer alternates the color of the rows when the `ALTERNATE_ROWS` property exists and is set.

```
<TabularDataTransformer code="CONTRACT_DETAILED_CALLS" provider="CONTRACT_DETAILED_CALLS" maxRowsPerPage="10">

          <Properties>

                    <Property key="ALTERNATE_ROWS">true</Property>

          </Properties>
```

To access and use a property, you use the following method:

```
getProperty("ALTERNATE_ROWS")
```

For example you can retrieve the value of the property implementing the following code:

```
…

TabularDataTransformer transformer ;

…

System.out.println("Value of the Alternate Rows Property on element Transformer: " +
transformer.getProperty("ALTERNATE_ROWS"));

…
```

Reloading Reports

When the application starts, the report configuration file is loaded into memory. Once this file is loaded, changes made to this file are not taken into account. This presents a problem because when you develop an pplication, you often have to modify the contents of this file.

In order to keep you from having to stop and restart your application server every time you modify this file, you can use a special JSP. The `framework_reloadqra.jsp` JSP reloads the Report configuration file. This file is located in `<home_dir>/channels/MyWeb/fwk`.

The `framework_reloadqra.jsp` implements the `ReportingMgr.reloadConfiguration()` method to reload the report configuration.

This JSP is for development purposes only and should not be used in production environments.

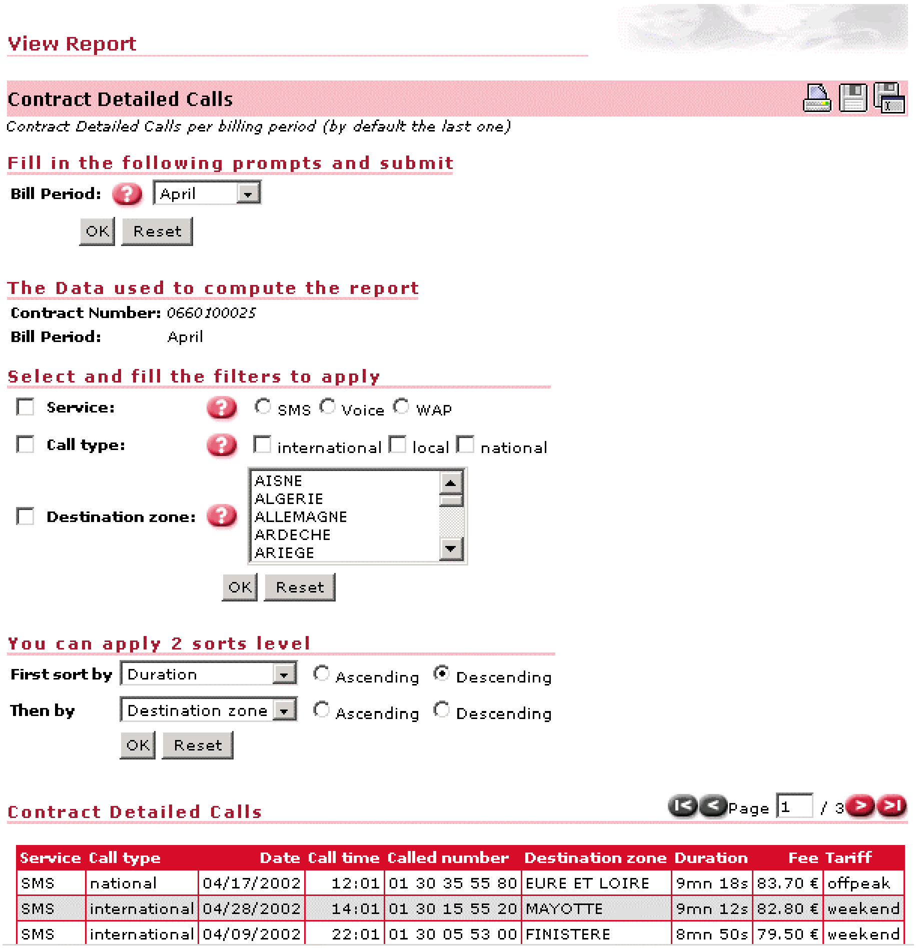
Saving Reports

When viewing a report, the title bar of the report displays buttons corresponding to the actions that the user can carry out.

The user's role determines which buttons are displayed on the title bar.

An example of a title bar displaying the following options:

- Print
- Save report
- Save report for current administrated user



View Report

Contract Detailed Calls

Contract Detailed Calls per billing period (by default the last one)

Fill in the following prompts and submit

Bill Period: April

The Data used to compute the report

Contract Number: *0660100025*
Bill Period: April

Select and fill the filters to apply

□ **Service:** ○ SMS ○ Voice ○ WAP

□ **Call type:** □ international □ local □ national

□ **Destination zone:** AISNE, ALGERIE, ALLEMAGNE, ARDECHE, ARIEGE

You can apply 2 sorts level

First sort by Duration ○ Ascending ● Descending

Then by Destination zone ○ Ascending ○ Descending

Contract Detailed Calls

Service	Call type	Date	Call time	Called number	Destination zone	Duration	Fee	Tariff
SMS	national	04/17/2002	12:01	01 30 35 55 80	EURE ET LOIRE	9mn 18s	83.70 €	offpeak
SMS	international	04/28/2002	14:01	01 30 15 55 20	MAYOTTE	9mn 12s	82.80 €	weekend
SMS	international	04/09/2002	22:01	01 30 05 53 00	FINISTERE	8mn 50s	79.50 €	weekend

For more information about saving reports, refer to *Working with the Report Manager* in *Developing Analytic Applications.*

Saving Reports

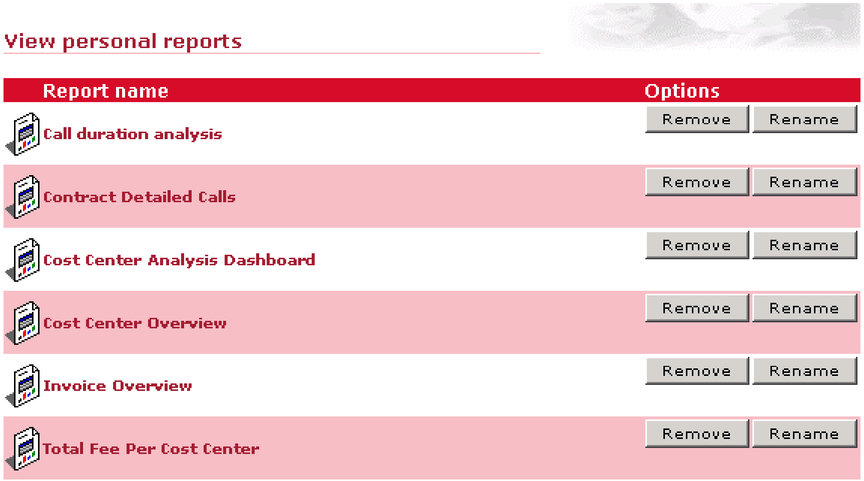
Depending on the displayed options, saving a report involves selection one of the following buttons:

- 💾 Save the report. The report is saved in the current user's personal folder on the server.
- 💾 Save the report for another user. The report is saved in the current administrated user's personal folder on the server.

When the user selects the Save Report button, a dialog box appears prompting the user to enter a name for the report. If the report already exists a confirmation dialog box appears.

Viewing Saved Reports

To view saved reports, the user chooses the *Personal reports* menu item. When selected, a page appears displaying a list of saved reports.



View personal reports

Report name	Options
Call duration analysis	Remove Rename
Contract Detailed Calls	Remove Rename
Cost Center Analysis Dashboard	Remove Rename
Cost Center Overview	Remove Rename
Invoice Overview	Remove Rename
Total Fee Per Cost Center	Remove Rename

The user can do the following:

- View the report
- Rename the report
- Delete the report

Specifying Execution Mode

Reports can be processed immediately or in background. In the report definition file, you can:

- Force the execution mode
- Configure the report cost estimate policy
- Configure the submitted report naming policy in case of background execution

At the application level you can also configure:

- The maximum time allowed to execute any report immediately
- The notification policy parameters to advise user that new reports submitted to background execution are available for viewing.

About Execution Modes

When users create reports, sometimes the complexity or the amount of data to be accessed can take a while to process and display. The Report Processor is responsible for processing such reports in the background while users continue to use the application.

These settings tell the report processor to do the following:

- Process the report immediately

  The report is processed and the results returned as soon as they are generated by the report.
- Send the report to the report processor for processing

  The report is sent to the report processor to be processed. When finished, the report processor notifies the user when the results are ready.
- Determine the execution mode

  The report processor estimates the cost of running the report against specified thresholds.

  Depending on the estimate, the report processor does the following:

  - If the cost of executing the report is less than the first threshold, the report is executed immediately.
  - If the cost of executing the report is between the first and second threshold, the report processor prompts the user. The user then selects the execution mode.
  - If the cost of executing the report is greater than the second threshold, the report processor executes the report in the background.

Specifying the execution more involves:

- Specifying the automatic execution mode
- Specifying the conditional execution mode
- Configuring the default name of submitted report
- Specifying the maximum amount of time for reports
- Configuring user notification

Using Automatic Execution Modes

You can configure a report to have an automatic execution mode. The automatic execution modes include:

- Synchronous mode where the report is always executed immediately
- Asynchronous mode where the report is always sent to the report processor

You use the `EXECUTION_MODE` property of a report to determine how the report is processed.

Specifying the automatic execution mode involves:

- Adding the `EXECUTION_MODE` property to the report
- Specifying the property

If the `EXECUTION_MODE` property is empty or not declared, the report processor checks to see if the conditional mode is declared. If there is no conditional execution mode specified, the report processor processes the report in synchronous mode.

To specify the automatic execution mode

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Open the report Report Definition file to modify.
3. Under the `<Report>` element, add a `<Properties>` element after the `<Description>` element. Use the syntax:

```
<Properties>
     <Property key="EXECUTION_MODE"></Property>
</Properties>
```

4. Enter one of the following values for the property element:
   - `SYNCHRONOUS` to execute the report immediately
   - `ASYNCHRONOUS` to send the report to the report processor for background processing
5. Save your changes.

Using the Conditional Execution Mode

You can configure a report to have a conditional execution mode. If a report has a conditional execution mode, the report processor estimates the cost of running the report against specified thresholds.

You can configure:

- dynamic expression to calculate the estimated processing cost. This calculation is based on functional criteria such as the number of contracts involved in the execution of the report data providers.
- Two thresholds T1 and T2 to determine the execution mode depending on the previous calculation. The general policy is:

  If the estimate processing cost is greater or equal to T2 then the report is automatically sent to background execution

  If the estimate processing cost is lesser than T2 and greater or equal to T1, the user can chose the execution mode

  If the estimate processing cost is lesser than T1, than the report is executed immediately

Specifying the conditional execution mode involves:

- Programming the estimated processing cost expression to test the report
- Configuring the thresholds which determine how the report is executed

Configuring the Report Cost Estimate Policy

The execution mode of a report can depend on the estimated processing cost of the report. For instance, you can use the number of contracts in the report to determine how your reports are executed.

You can configure:

- A dynamic expression to calculate the estimate processing cost. This calculation is based on functional criteria like the number of contracts involved in the execution of the report data providers.
- Two thresholds used to determine the execution mode.

  In this document, these thresholds are referred to as the T1 (the minimum cost threshold) and T2 (the maximum cost threshold). Thresholds are less than and greater than values.
  Using the result of the dynamic expression, you use these thresholds to determine the execution mode of the report.

  The general policy is:

  - If the estimate processing cost is greater or equal to T2, the report is sent to the report processor for processing
  - If the estimate processing cost is lesser than T2 and greater than or equal to T1, the user can chose the execution mode
  - If the estimate processing cost is lesser than T1, the report is executed immediately

You can modify the default policy by defining by only specific thresholds:

- If only T1 is defined and if the estimate processing cost is greater than or equal to T1, the user can chose the execution mode.
- If only T2 is defined and if the estimate processing cost is lesser than T2, the user can chose the execution mode.
- If T1 is equal to T2 and if the estimate processing cost is greater than or equal to T2, the report is sent to background processing
- If either T1 and T2 or the estimate processing cost is not defined, there is no estimate processing cost calculation and the report is processed immediately.

Configuring the report cost estimate policy involves:

- Configuring the dynamic expression to calculate the cost
- Configuring the thresholds

To program the cost estimate

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Open the report Report Definition file to modify.
3. Under the `<Report>` element, add an `ESTIMATED_PROCESSING_COST` dynamic property. A dynamic property is a property to which you can assign an expression or script. Use the syntax:

   ```
   <DynamicProperties>
        <DynamicProperty key="property_name"
   type="java.lang.Long">
   </DynamicProperties>
   ```

4. Implement the expression or the script to calculate the estimate processing cost.

   Available variable for the estimate processing cost expression are:

   - `$Report` to browse the report
   - `$P{Prompt_code}` to get prompt value
   - `$D{Definition_code}` (Param1, Param2) to refer to a definition

You can call a query in a definition. The return value is always the first column of the first row selected by the query. The query must always return at least one row.

The declaration of a query in a definition is similar to the declaration of a query in a data provider. For more information, refer to *Creating Data Providers* in this manual.

For more information about the exact syntax to use, refer to the *QRA Configuration File Reference Documentation* online documentation.

Example of Programming the Cost Estimate

This example shows a trend report analyzing the grouping of BUDR by hour for all contracts the user has the right to view. The cost calculated in this example is the number of contracts that the user has the permission to access and number of selected bill periods.

Report root element	`Example:// specification of the estimated_processing_cost in the report definition`
	`// Definition of the report`
	`<Report code="STD_INV_TotalCallsPerBillPeriodByHour" name="Total Calls Per Bill Period By Hour">`
	`   <Description>Total calls per hour for s selected bill period</Description>`
	`...`

Declaration of the DynamicProperty	`<DynamicProperties>`
	`         <DynamicProperty key="ESTIMATED_PROCESSING_COST" type="java.lang.Long">`

The expression calculating the value of the DynamicProperty	`// the call to the definition of the query  this query uses the user login as a parameter and multiplies the result by the number of selected bill periods`
	`// you can refer to the VisibleContractsCost definition in the globaldefinition.xml file`
	`<Expression>$D{VisibleContractsCost}($P{USER_LOGIN}) * $P{MULTIPLE_BILL_PERIOD_KEY_CONTRACT_INVOICE}.length</Expression>`

Closing tags	`         </DynamicProperty>`
	`...`
	`</DynamicProperties>`
	`...`

To configure the conditional processing thresholds

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Open the report Report Definition file to modify.
3. Under the `<Properties>` element, add the following elements:
   - `MIN_COST_LIMIT` for the T1 minimum threshold. `MAX_COST_LIMIT` for the T2 maximum threshold

Use the syntax:

```
<Properties>
  <Property key="element_name"></Property>
</Properties>
```

The `<Properties>` must be declared before the `<DynamicProperties>` element.

4 Set the value of each property to a long value.

Example Of Setting Thresholds

The cost estimate is calculated using the expression:

```
($P{USER_LOGIN}) *
$P{MULTIPLE_BILL_PERIOD_KEY_CONTRACT_INVOICE}.length
```

Your report has the following thresholds:

- `MIN_COST_LIMIT` is less than 9
- `MAX_COST_LIMIT` is greater than 15

The settings are for demonstration purposes only and they should vary depending on your implementation of this feature

The report configuration file

Report root element	`ReportElements xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="report.xsd">`
	`<Report code="STD_INV_TotalCallsPerBillPeriodByHour" name="Total Calls Per Bill Period By Hour">`
	`   <Description>Total calls per hour for s selected bill period</Description>`

Declaration of the threshold	`  <Properties>`
	`    <Property key="MIN_COST_LIMIT">9</Property>`
	`    <Property key="MAX_COST_LIMIT">15</Property>`
	`  </Properties>`

Declaration of the DynamicProperty	`  <DynamicProperties>`
	`    <DynamicProperty key="ESTIMATED_PROCESSING_COST" type="java.lang.Long">`

Declaration of the DynamicProperty	`        <Expression>$D{VisibleContractsCost}($P{USER_LOGIN}) * $P{MULTIPLE_BILL_PERIOD_KEY_CONTRACT_INVOICE}.length</Expression>`

Closing tags	`        </DynamicProperty>`
	`...`
	`</DynamicProperties>`
	...

Configuring Default Report Names

When a report is posted to background processing, the application proposes the name of the submitted report to help the user retrieving and viewing the report when processed.

By default, the proposed name is the localized report name but you can define in the report configuration file your own naming convention. For example, you can decide that the submitted report name will be the report name followed by a significant prompt value.

Configuring the naming policy involves:

- Adding the `TITLE_MASK` property to the report
- Setting the value of property with a string and format patterns {0}, {1}, {2}, and so on
- Calculate the value of each format pattern using dynamic dynamic properties
- Localizing the report names

To specify the default report name

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Open the report Report Definition file to modify.
3. Under the `<Properties>` element, add the `TITLE_MASK` element. Use the syntax:

   ```
   <Properties>
     <Property key="TITLE_MASK">the title of your
     report</Property>
   </Properties>
   ```

4. Save your changes

Example of Declaring the Report Name

The report configuration file

Report root element	ReportElements xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="report.xsd"> <Report code="STD_INV_TotalCallsPerBillPeriodByHour" name="Total Calls Per Bill Period By Hour"> <Description>Total calls per hour for s selected bill period</Description>
Declaration of the threshold	<Properties> <Property key="MIN_COST_LIMIT">9</Property> <Property key="MAX_COST_LIMIT">15</Property>
Declaration of the title	<Property key="TITLE_MASK">Total Calls by hour for bill period(s)</Property> </Properties>
Declaration of the DynamicProperty	<DynamicProperties> <DynamicProperty key="ESTIMATED_PROCESSING_COST" type="java.lang.Long">
Declaration of the DynamicProperty	<Expression>$D{VisibleContractsCost}($P{USER_LOGIN}) * $P{MULTIPLE_BILL_PERIOD_KEY_CONTRACT_INVOICE}.length</Expression>
Closing tags	</DynamicProperty> ... </DynamicProperties> ...

To use format patterns in the report name

1. Go to `<home_dir>/WEB-INF/classes/nmycfg/qra`.
2. Open the report Report Definition file to modify.
3. Under the `<Properties>` element, find the `TITLE_MASK` element.
4. Enter the number of format patterns you need.
5. Under the `<Report>` element, for each format pattern, create a dynamic property.

Use the syntax:

```
<DynamicProperties>
     <DynamicProperty key="TITLE_Px" type="java.lang.String">
</DynamicProperties>
```

where

`TITLE_Px` corresponds to the format pattern you use. For example, for the format pattern {2}, the key is `TITLE_P2`.

6 For each format pattern, create an expression to specify the value of the format pattern.

Example Of Using Format Patterns

Report root element	`ReportElements xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="report.xsd">`
	`<Report code="STD_INV_TotalCallsPerBillPeriodByHour" name="Total Calls Per Bill Period By Hour">`
	`<Description>Total calls per hour for s selected bill period</Description>`

Declaration of the threshold	`<Properties>`
	`<Property key="MIN_COST_LIMIT">9</Property>`
	`<Property key="MAX_COST_LIMIT">15</Property>`

Declaration of the title with a {0} format pattern	`<Property key="TITLE_MASK">Total Calls by hour for bill period(s) {0}</Property>`
	`</Properties>`

Declaration of the DynamicProperty	`<DynamicProperties>`
	`<DynamicProperty key="ESTIMATED_PROCESSING_COST" type="java.lang.Long">`

The expression calculating the value of the DynamicProperty	`<Expression>$D{VisibleContractsCost}($P{USER_LOGIN}) * $P{MULTIPLE_BILL_PERIOD_KEY_CONTRACT_INVOICE}.length</Expression>`
Declaration of the DynamicProperty for the format pattern {0}	`<DynamicProperty key="TITLE_P0" type="java.lang.String">`
The expression calculating the value of the {0} format pattern	`<Expression>$D{DisplayChoicePrompt}($REPORT,"MULTIPLE_BILL_PERIOD_KEY_CONTRACT_INVOICE")</Expression>`

Closing tags	`</DynamicProperty>`
	`...`
	`</DynamicProperties>`
	...

DisplayChoicePrompt is a facility to get the display of the selected values of a choice prompt parameter. This definition is declared in GlobalDefinitions.xml.

To localize the default report name

By default, the name calculated with the `REPORT_TITLE_MASK` property is not localized.

Localizing it is similar to any report element localization with the following convention. The name of the localized string in each localization file uses the syntax:

```
QRA.REPORT.<REPORTCODE>.TITLE_MASK
```

where

`<REPORTCODE>` is the code of the report

Setting the Maximum Report Time

You can set the maximum amount of time that is allowed for a report to be processed asynchronously. By using this setting, you can improve the useability and quality of service of your application by limiting the time a user waits for the result of their report.

No matter what the cause (system overloaded), once this limit is exceeded, an timeout occurs. You can use this timeout to inform your users that the report has taken too long to process then prompt them to submit the report for background processing.

Setting the maximum report time involves:

- Setting the report time property

To set the maximum report time

1. Open your application in the PLS.
2. Set the value of the application property `REPORT_PROCESSING_TIMEOUT` to one of the following:
   - Zero if there is no maximum report time
   - to the maximum number of seconds

Configuring Report Notifications

By using the report notification feature, your application can regularly check the number of processed reports than have not been read and inform the user. For instance, your application might display an icon when the user has unread reports waiting for them.

Configuring report notification involves:

- Activating report notifications

To configure report notification

1. Open your application in the PLS.
2. Set the value of the application property `IS_UNREADREPORTS_CHECK_ENABLED` to true (if the property is not defined, create it)
3. Set the value of the application property `UNREADREPORT_CHECK_DELAY` to the number of seconds between two checks (if the property is not defined, create it)

If you do not enter a value for either of these properties, the check unread processed reports feature is not activated.

APPENDIX A

Chart Style Reference

In This Section

General Properties

Generated Image Properties

PARAMETER	VALUE TYPE	EFFECT
imageType	String	Output image type. This defaults to native JPEG generation. Other supported imageTypes include j_jpeg (a java jpeg generator), j_png (a java PNG generator, recommended), and j_bmp (a java .BMP file generator).
height	String	pixel height of generated image
width	String	pixel width of generated image
toolTips	true/false	create a client-side MAP for tool-tip dwell labels
dwellUseLabelString	true/false	Tells the servlet whether to use each datapoint's label as a part of the popup dwell labels.
dwellUseXValue	true/false	Tells the servlet whether to use each datapoint's X value as a part of the popup dwell labels.
dwellUseYValue	true/false	Tells the servlet whether to use each datapoint's Y value as a part of the popup dwell labels.
dwellXString	String	A text string containing the characters "XX" to add descriptive text to the dwell label X value. Example: "Category XX"
dwellYString	String	A text string containing the characters "XX" to add descriptive text to the dwell label Y value. Example: "Unit Sales: $XX"
dwellLabelPrecision	Integer	Number of digits of precision for dwell label values. For example, if precision is "2", labels will look like this: 123.45 or 123,45.
dwellUseLabelString	true/false	When set to true, use each datapoint's label as a part of the popup dwell labels.
dwellUseXValue	true/false	When set to true, use each datapoint's X value as a part of the popup dwell labels.

General Chart Properties

The following parameters are shared by all the supported chart types and are related to general charting features. This table and those that follow use these conventions for describing the kind of argument each parameter requires.

PARAMETER	VALUE TYPE	EFFECT
titleString	String	Chart Title (default none)
titleFont	font	Font name, size, & style for chart title (default TimesRoman, plain, 12 pt)
titleColor	color	color of text in Title (default black)
subTitleString	String	Chart Sub-Title (default none)
subTitleFont	font	Font name, size, & style for chart title (default TimesRoman, plain, 12 pt)
subTitleColor	color	color of text in Title (default black)
labelsOn	anything	determines whether bar, line, pie, etc., labels will be visible
labelAngle	integer	the number of degrees to rotate datum labels
labelPrecision	integer	the number of digits of precision for datum labels
labelFormat	integer	deprecated - by default, servlets and applets will use the default locale to determine how numbers should be formatted. You can override this with labelFormat for compatibility with older releases of KavaChart
legendOn	anything	make the legend visible
legendOff	anything	make the legend invisible (default)
legendColor	color	sets the background color of a legend
legendVertical	anything	legend icons in vertical list (default)
legendHorizontal	anything	legend icons in horizontal list
legendLabelFont	font	Font name, size, & style for legend (default TimesRoman, plain, 12 pt)
legendLabelColor	color	color of text in legend (default black)
legendllX	double	X location of lower left legend corner (default 0.2)
legendllY	double	Y location of lower left legend corner (default 0.2)
iconWidth	double	width of legend icon (default 0.07)

iconHeight	double	height of legend icon (default 0.05)
iconGap	double	gap between icon and next legend entry (default 0.01)
plotAreaTop	double	top of the plotting area
plotAreaBottom	double	bottom of the plotting area
plotAreaRight	double	right side of the plotting area
plotAreaLeft	double	left side of the plotting area
plotAreaColor	color	color of plotting area background (default white)
backgroundColor	color	color of chart background (default white)
3D	anything	turns on 3D effects for this chart (default 2D)
2D	anything	turns on 2D effects for this chart (default 2D)
XDepth	integer	number of pixels of offset in X direction for 3D effect (default 15)
YDepth	integer	number of pixels of offset in y direction for 3D effect (default 15)
delimiter	String	the separator character for list parameters. Default is comma (e.g. "123.432.123").
defaultFont	Font	A new default font for your charts. This parameter overrides the default font setting for KavaChart graphs. This parameter sets a new default for all KavaChart graphics running within the Java Virtual Machine in the current session, so you should use it cautiously. Its primary value is for settings that wish to start with consistent font usage for all charts.
backgroundImage	URL or file name	Charts can replace the solid background color with a GIF or JPEG image for added effect.
outlineColor	Color	Color to use for outlining bars, plotareas, etc. (Default none). Using this param automatically enables outlining for most objects
outlineDataRepresentation	true|false	If outlineColor is set to some color, you can selectively turn the outlining off for the DataRepresentation (Bars, Pie, Area, etc.) by setting this property to "false". Default is "true".
outlinePlotarea	true|false	If outlineColor is set to some color, you can selectively turn the outlining off for the Plotarea (the region bounded by the x and y axes) by setting this property to "false". Default is "true".
outlineBackground	true|false	If outlineColor is set to some color, you can selectively turn the outlining off for the Background (the total chart image area) by setting this property to "false". Default is "true".

outlineLegend	true|false	If outlineColor is set to some color, you can selectively turn the outlining off for the chart Legend by setting this property to "false". Default is "true".

Axis Properties

The following tables contain parameters for adjusting axes. Line, area, bar, and their derivatives use these parameters. Axis parameters consist of a set of parameters and an option list. The option list is contained in a separate table.

If you're modifying an X Axis (usually on the top or bottom of a chart), use xAxisParameterName instead of yAxisParameterName. X Axes are on the left and right for Horizontal Bar Type charts. Speedo charts have a single Axis, which is a Y Axis.

If you're modifying an Auxiliary Y Axis (charts that have left and right axes, for example), use auxAxisParameterName instead of yAxisParameterName.

AXIS PARAMETER	VALUE TYPE	EFFECT
yAxisTitle	string	Axis title
yAxisTitleFont	font	Axis title font
yAxisTitleColor	color	Axis title color
yAxisLabelFont	font	use this font for axis labels
yAxisLabelColor	color	axis labels in this color (default black)
xAxisLabels	list	A comma separated list of user-defined labels for this Axis. This is only effective for certain types of chart (BarChart derivatives, LabelLineChart, Area charts) that use a LabelAxis. By default, LabelAxis is only used for X axes, although you can change this by making a minor modification to the applets.
yAxisLabelAngle	integer	label rotation in degrees (default 0). Note: rotations of 0 and 90 degrees will be the most readable
yAxisLabelFormat	0:default, 1:Comma, 2:European	(default 0) Note: by default, charts will automatically localize formats based on the Java Virtual Machine running the chart.
yAxisLabelPrecision	integer	Number of digits past the decimal point to display
yAxisLineColor	color	axis line color (default black)
yAxisTickColor	color	axis tick mark color (default black)
yAxisGridColor	color	axis grid line color (default black)
yAxisColor	color	sets axis grids, ticks, lines and labels to the same color
yAxisTickLength	integer	number of pixels long for axis tick marks

yAxisMinTickLength	integer	number of pixels long for axis minor tick marks
yAxisStart	double	starting value on axis. By default, axes automatically determine a starting and ending value. By setting this value, you can give the axis a default minimum value. If the Axis is set to noAutoScale, this value will be used directly. Otherwise, this value may be adjusted slightly to yield better looking labels. For example, if you set yAxisStart to 0.01, the chart may decide to round the value down to 0.0 to create even axis increments.
yAxisEnd	double	ending value on axis. By default, axes automatically determine a starting and ending value. By setting this value, you can give the axis a default maximum value. If the Axis is set to noAutoScale, this value will be used directly. Otherwise, this value may be adjusted slightly to yield better looking labels. For example, if you set yAxisStart to 9.99, the chart may decide to round the value up to 10.0 to create even axis increments.
yAxisLabelCount	integer	how many labels on an axis set to noAutoScale
yAxisTickCount	integer	how many tick marks on an axis set to noAutoScale
yAxisMinTickCount	integer	how many minor tick marks on an axis set to noAutoScale
yAxisGridCount	integer	how many grid lines on an axis set to noAutoScale

The following lists include various options for adjusting the look of an X or Y axis. Use these parameters in a list, like this: param name=xAxisOptions value="gridOff, tickOff, lineOn". If you're modifying an auxiliary Y axis (such as in a chart that has left and right axes), use auxAxisOptions.

AXIS OPTIONS (YAXISOPTIONS, XAXISOPTIONS OR AUXAXISOPTIONS)	VALUE TYPE	EFFECT
autoScale	true|false	automatically create axis scale (default)
noAutoScale	true|false	axis scale defined in applet parameters
rotateTitle	true|false	"true" if vertical axis title should be parallel with axis
logScaling	true|false	"true" if axis should use log scaling
lineOn	true|false	axis line is visible (default)
lineOff	true|false	axis line is invisible
tickOn	true|false	major tick marks are visible (default)

tickOff	true|false	major tick marks are invisible
minTickOn	true|false	minor tick marks are visible
minTickOff	true|false	minor tick marks are invisible (default)
labelsOn	true|false	axis labels are visible (default)
labelsOff	true|false	axis labels are invisible
gridOn	true|false	grid lines are visible
gridOff	true|false	grid lines are invisible (default)
rightAxis	true|false	this axis goes on the right
topAxis	true|false	this axis goes on the top
bottomAxis	true|false	this axis goes on the bottom
leftAxis	true|false	this axis goes on the left (default)

Dataset Properties

Datasets can vary a great deal from chart to chart. Some kinds of charts only use Y values, others use both X and Y values. Some charts use a color to represent an entire dataset (bar charts, line graphs), and some use a color for each data value (pie charts, individual bar charts). In general, every chart must define a list of numbers for Y data.

DATASET PARAMETERS	VALUE TYPE	EFFECT
dataset0Color	color	color to use for this dataset (default varies)
dataset0Colors	list of colors	colors to use for pie slices or bars (default varies)
dataset0Image	URL (or filename)	image to use for this dataset's markers (default none). Use this property to define line markers for scatter plots.
dataset0LineWidth	integer	pixel width of plot line
dataset0LabelFont	font	font to use for this dataset's labels (default TimesRoman 12pt)
dataset0LabelColor	color	color to use for this dataset's labels (default black)
dataset0Color	color	color to use for this dataset (default varies)
dataset0Colors	list of colors	colors to use for pie slices or bars (default varies)
dataset0Image	URL (or filename)	image to use for this dataset's markers (default none). Use this property to define line markers for scatter plots.
dataset0LineWidth	integer	pixel width of plot line
dataset0LabelFont	font	font to use for this dataset's labels (default TimesRoman 12pt)
dataset0LabelColor	color	color to use for this dataset's labels (default black)

Specific Chart Properties

line and labelLine Chart Properties

Line charts can use any general parameters. Line charts have variable line width (adjustable by dataset), image markers, and labels that can be toggled on or off. You can also toggle lines on or off to create a scatter plot.

LabelLineApp takes user-defined labels along the X axis.

Line Chart parameters include:

PARAMETERS	VALUE TYPE	EFFECT
plotLinesOn	anything	plot lines should display (default)
plotLinesOff	anything	Create a scatter plot by making plot lines invisible

bar, column, stackBar, stackColumn Chart Properties

Bar charts can use any general parameters. Bar charts have variable bar width, an adjustable baseline, and labels that can be toggled on or off.

stackBarApp and stackColumnApp stack data series rather than clustering them.

Bar Chart parameters include:

PARAMETERS	VALUE TYPE	EFFECT
barBaseline	double	bars ascend or descend from this value
barClusterWidth	double	This determines how wide each bar should be. If the value is 1.0, bar 1 will touch bar 2. If the value is 0.5, each bar will take 50% of the available space. If you have more than one data series defined, this value describes the total width of a cluster of bars.

pie Chart Properties

Pie charts can use any general parameters. Pie charts can toggle percentage, value, and textual labels. They can also set a beginning angle value, and can set an exploded slice for emphasis.

Pie slice colors are defined using dataset0Colors.

Pie Chart parameters include:

PARAMETERS	VALUE TYPE	EFFECT
explodeSlice	integer	slice number to explode
textLabelsOn	anything	make string labels visible
textLabelsOff	anything	make string labels invisible (default)
valueLabelsOn	anything	make numeric labels visible
valueLabelsOff	anything	make numeric labels invisible (default)
percentLabelsOn	anything	make percentage labels visible (default)
percentLabelsOff	anything	make percentage labels invisible
labelPosition	integer	0: at center of slice, 1: at edge of slice, 2: outside edge of slice with pointer
startDegrees	integer	degrees counterclockwise from 3 o'clock for first slice
xLoc	double	x Location for center of pie (between 0 & 1, default 0.5)
yLoc	double	y Location for center of pie (between 0 & 1, default 0.5)
pieWidth	double	% of window for pie diameter (default .6 = 60%)
pieHeight	double	% of window for pie diameter (default .6 = 60%)
pointerLengths	list	a values to redefine the pointer lengths for external labels. By default, this value is 0.2.
lineColor	Color	redefines the color used for pie slice pointers

speedo Chart Properties

Speedo charts can use any general parameters. Speedo charts have adjustable axis locations and styles, as well as adjustable needle styles. This applet can be particularly useful in conjunction with an image background to superimpose a dial and needle on a scanned image of a physical

This chart draws only the first value of dataset 0.

Speedo Chart parameters include:

PARAMETERS	VALUE TYPE	EFFECT
needleStyle	integer	Kind of needle (default 1) 0 = arrow, 1 = line, 2 = thick arrow, 3 = swept arc
speedoPosition	integer	0 (default) is a mostly complete circle, 1 - 4 are semi circles in various positions, 5-8 are quarter circles in various positions
labelsInside	anything	labels on the inside of the speedo
labelsOutside	anything	labels on the outside of the speedo

barArea Chart Properties

BarArea combination charts can use any general parameters. BarArea charts have variable bar width, and labels that can be toggled on or off. If you don't include a parameter to define X axis labels, this chart will use Datum labels (param dataset0Labels) beneath each bar. If Datum labels aren't defined, this chart will display each bar's Y value beneath it. Data series can be assigned to either Bar or Area style charting. Bars draw over areas, and may be stacked or clustered. Areas are always stacked.

BarArea Chart parameters include:

PARAMETERS	VALUE TYPE	EFFECT
datasetNType	Bar|Area	dataset N will be either Bar or Area, based on this value.
stackedBar	true|false	If "true", bars will be stacked, one series upon another.
barBaseline	double	bars ascend or descend from this value
clusterWidth	double	This determines how wide each bar should be. If the value is 1.0, bar 1 will touch bar 2. If the value is 0.5, each bar will take 50% of the available space. If you have more than one data series defined, this value describes the total width of a cluster of bars.
barLabelsOn	true|false	determines whether labels will be drawn above each bar
barLabelAngle	integer	degrees to rotate bar labels

barLine Chart Properties

BarLine combination charts can use any general parameters. BarLine charts have variable bar width, and labels that can be toggled on or off. If you don't include a parameter to define X axis labels, this chart will use Datum labels (param dataset0Labels) beneath each bar. If Datum labels aren't defined, this chart will display each bar's Y value beneath it. Data series can be assigned to either Bar or Line style charting. Lines draw over bars, and bars may be stacked or clustered.

BarLine Chart parameters include:

PARAMETERS	VALUE TYPE	EFFECT
datasetNType	Bar|Line	dataset N will be either Bar or Line, based on this value.
stackedBar	true|false	If "true", bars will be stacked, one series upon another.
barBaseline	double	bars ascend or descend from this value
clusterWidth	double	This determines how wide each bar should be. If the value is 1.0, bar 1 will touch bar 2. If the value is 0.5, each bar will take 50% of the available space. If you have more than one data series defined, this value describes the total width of a cluster of bars.
barLabelsOn	true|false	determines whether labels will be drawn above each bar
barLabelAngle	integer	degrees to rotate bar labels

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