

Oracle® Business Intelligence Publisher

User's Guide

Release 10.1.3.2

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Oracle Business Intelligence Publisher User's Guide, Release 10.1.3.2

Part No. B40017-01

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- Did you understand the context of the procedures?
- Did you find any errors in the information?
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- Do you need different information or graphics? If so, where, and in what format?
- Are the examples correct? Do you need more examples?

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Preface

Intended Audience

Welcome to Release 10.1.3.2 of the *Oracle Business Intelligence Publisher User's Guide*.

This guide is intended for users who will use Oracle Business Intelligence Publisher Enterprise to perform one or all of the following:

- View and Schedule reports
- Design report layouts
- Develop report queries and data models
- Translate reports
- Perform administrative tasks including: setting up users, setting up data sources, and configuring runtime behaviors

For users who will be developing report queries and data models, knowledge of SQL or your data source is assumed.

For users who will be designing report layouts, some experience with Microsoft Word is assumed. If you are designing advanced report layouts, you may benefit by using an XSL reference.

See Related Information Sources on page xv for more Oracle product information.

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Related Information Sources

To download free release notes, installation documentation, white papers, or other collateral, please visit the Oracle Technology Network (OTN). You must register online before using OTN; registration is free and can be done at

<http://www.oracle.com/technology/membership/>

If you already have a username and password for OTN, then you can go directly to the documentation section of the OTN Web site at

<http://www.oracle.com/technology/documentation/>

Information specifically related to BI Publisher can be found at:

<http://www.oracle.com/technology/products/applications/publishing/index.html>

Part 1

Viewing and Scheduling Reports

Getting Started

Accessing Business Intelligence Publisher Enterprise

Logging in with credentials:

1. Navigate to the URL provided by your system administrator.



The screenshot shows the Oracle BI Publisher Enterprise login interface. At the top, the text "ORACLE BI Publisher Enterprise" is displayed. Below this is a navigation bar with several small images. The main content area features a globe on the left and a login form on the right. The login form includes a "Username" field with the text "operations", a "Password" field with masked characters, and a "Please contact administrator for your username/password." message. There are "Sign In" and "Guest" buttons, an "Accessibility Mode" checkbox, and a language dropdown menu set to "English". A copyright notice "Copyright 2005 Oracle. All Rights Reserved." is visible at the bottom right of the page.

2. Select the language you prefer for the user interface.
3. Enter your credentials to log in to BI Publisher.
4. Select **Accessibility Mode** if you wish to render the Reports home page in an accessible tree structure.
5. Select **Sign In**.

To view reports, see *Viewing and Scheduling Reports*, page 2-1.

To set user preferences, see *Setting Preferences*, page 1-2.

Logging in as Guest:

If your site has enabled a Guest user option, a **Guest** button will display on the log in page.

A Guest user does not require credentials and has privileges only to view reports available in the Guest folder.

1. Select the language you prefer for the user interface.
2. Select **Guest**.

To view reports, see *Viewing and Scheduling Reports*, page 2-1.

Setting Preferences

Use the **Preferences** page to set the following:

- UI Language
- Report Locale
- SVG support in HTML
- Report Timezone
- Password

Access the **Preferences** page by selecting the **Preferences** link from any page within the BI Publisher Enterprise application.

Set UI Language

The UI language is the language that your user interface displays in. The language that you selected at login will be selected as the default. Choose from the languages that are available for your installation.

Set Report Locale

A locale is a language and territory combination (for example, English (United States) or French (Canada)). BI Publisher uses the report locale selection to determine the following:

- The template translation to apply
- The number formatting and date formatting to apply to the report data

Note that a particular report must have an available template translation for the selected locale. If not, BI Publisher will apply a locale fallback logic to select the template. For more information, see *Locale Selection Logic*, page 7-7.

The appropriate number and date formatting will be applied independently of the template translation.

Set Report Timezone

Select the timezone to apply to your reports. Reports run by this user will display the time according to the timezone preference selected here. You can override this setting for a particular report from the *Schedule Report*, page 2-5 page. Note that the time displayed on the user interface and reflected in report processing times is governed by the BI Publisher server timezone.

Enable SVG for HTML

You can choose to have graphics in your HTML reports displayed using scalable vector graphics (SVG) technology. Your browser may require a plug-in to enable SVG. If so, you will be prompted to download this plug-in the first time you attempt to view an HTML graphic with SVG enabled. If you do not wish to use the SVG plug-in, select No.

Set Your Password

To change your password, select the **Account** tab of the Preferences page. Enter your current password then your new password as prompted.

Viewing and Scheduling Reports

Viewing a Report

The Reports home page offers different functionality depending on your user permissions.

To view a report

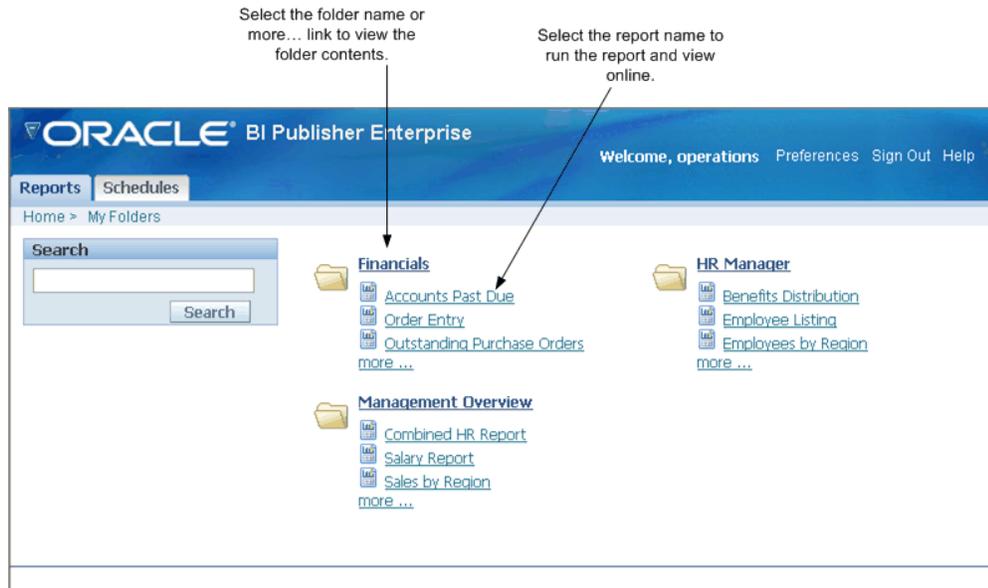
1. Navigate to the report.

The **Reports** home page displays two main reports folders.

- **Shared Folders** contains the reports and folders you have been granted access to based on your role
- **My Folders** contains the reports and folders your administrator has assigned to you and the reports you have created (if you have the BI Publisher Developer or Administrator role).

Each folder displays the first three items (reports or folders) contained in the folder. To see additional items contained in a folder, either select the folder name, or select the **more** link.

Viewing a Report

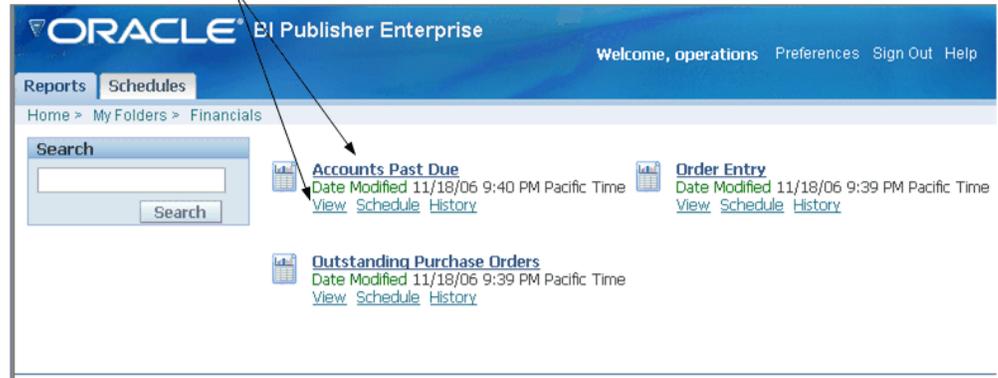


2. From the Reports home page, select the report name; or, from the Folder view, select the **View** link for the report. This will run the report using the default options and display it in your browser.

Note: Some reports may not allow online execution. For these reports, the **View** link will not display. Select **Schedule** to schedule a report run. See Scheduling a Report, page 2-5.

Folder View

From the Folder view, select the report name or the View link to run the report and view online.



Depending on the report definition and your user permissions, you may be presented with the following options:

- **Change parameter values** - if the report includes parameters, these are presented on the **View** page. To display the report with new parameter values, enter the values and select **View**.

Select a different template

Choose new parameters

Select a different output type

ORACLE BI Publisher Enterprise

Welcome, operations Preferences Sign Out Help

Reports Schedules

Home > Shared Folders > Executive > Employee Salary Report View Schedule History

Department: All Manager: All

Customer:

Template: Simple html View Export Send Schedule

Vision Systems Confidential

My Salary Report

| Name | Job Title | Manager | Department | Salary |
|------------------|-------------------------------|------------------|------------|-----------|
| Neena Kochhar | Administration Vice President | Steven King | Executive | 17,000.00 |
| Lex De Haan | Administration Vice President | Steven King | Executive | 17,000.00 |
| Alexander Hunold | Programmer | Lex De Haan | IT | 9,000.00 |
| Bruce Ernst | Programmer | Alexander Hunold | IT | 6,000.00 |
| David Austin | Programmer | Alexander Hunold | IT | 4,800.00 |
| Valli Pataballa | Programmer | Alexander Hunold | IT | 4,800.00 |
| Diana Lorentz | Programmer | Alexander Hunold | IT | 4,200.00 |
| Nancy Greenberg | Finance Manager | Neena Kochhar | Finance | 12,000.00 |
| Daniel Faviet | Accountant | Nancy Greenberg | Finance | 9,000.00 |

- **Change the report template** - if multiple templates are available they will be displayed in the **Template** list. Select a new template, then select **View**.
- **Change the output type** - if multiple output types are available, select the desired output type (example: html, pdf, rtf, excel, or data) from the list and select **View**. The output will be rendered in your browser.
- **Export the report** - select the **Export** button to export the report to the default application for its output type (for example: Adobe Acrobat for pdf output or Microsoft Excel for excel output).
- **Send the report** - select the **Send** button to invoke the **Destination** dialog. Select the delivery method (Email, Printer, Fax, FTP or Web Folder) and enter the appropriate information for your choice.

Note: To Send a report to the Printer or Fax, you must first change the output type to PDF and select **View**. Then select **Send**.

Access to the following functions must be granted by the System Administrator and may not be available to all users:

- **Schedule a report** - see Scheduling a Report, page 2-5.
- **Invoke Analyzer** - see Using the Online Analyzer, page 2-11.
- **Invoke Excel Analyzer** - see Using the BI Publisher Analyzer for Excel, page 2-14.

Scheduling a Report

To schedule a report:

1. Select the name of the folder that contains the report to access the Folder view; or, select the report name to View the report.
2. Select the **Schedule** link.
3. On the **Schedule Report** page, enter the following:
 - **Report Parameters** (if applicable) - if the report definition includes parameters, select the desired values for this submission.
 - **Template** - select the layout template to apply to the report. You can apply one template per job submission.
 - **Format** - select the output format.
 - **Job Name** - enter a name for your report run.
 - **Report Formatting Locale** - Select the language-territory combination for the report. This field defaults to the **Report Locale** defined in the user **Preferences** (see Setting Preferences, page 1-2).

Note: A report must have an available template translation for the selected locale. If not, BI Publisher will apply a locale fallback logic to select the template. For more information, see Locale Selection Logic, page 7-7.

The appropriate number and date formatting will be applied independently of the template translation.

- **Report Formatting Time Zone** - select the time zone that you want use for the published report. The time zone defaults to the time zone of the BI Publisher server.
- **Report Formatting Calendar** - select the calendar to apply to the date.

- **Public** - select this check box to make this job available to all users with access to the report. Users with access can view the report from the **History** page.
- **Save data for Republish** - select this check box if you want the XML data from the report run saved.
- **Save Output** - select this check box if you want the report output saved. You must select this option if you want to view your report from the **History** page.
- **Use Unicode (UTF8)**

Schedule Report Page

ORACLE® BI Publisher Enterprise

Welcome, operations Preferences Sign Out Help

Reports Schedules

Schedule Report

Cancel Submit

Report Parameters

Department: All
 Manager: All
 Customer:
 Template: Simple
 Format: html

Job Properties

* Job Name: Employee Salary Report
 Report Formatting Locale: English (United States)
 Report Formatting Time Zone: [GMT-8] Pacific Standard Time
 Report Formatting Calendar: Gregorian

Public
 Save Data for Republish
 Save Output
 Use Unicode (UTF8)

Notification

Email Addresses
Separate multiple email addresses with commas.

Notify When Report completed
 Report completed with warnings
 Report failed

Time

Set the date/time based on the server's timezone.
This page was rendered at 11/19/06 7:52 PM Pacific Time

Run Immediately
 Run Once
 Run Daily/Weekly
 Run Monthly

Delivery

Destination

Email
 Printer
 Fax
 FTP
 Web Folder

4. If you wish to receive notification by e-mail, enter a comma-separated list of addresses to send the notification to and select the notification criteria.
5. Enter the **Time** criteria.
 - If you select **Run Once**, select the **Run Date** and **Run Time**.
 - If you select **Run Daily/Weekly** select the days of the week, the **Run Time**, **Active Start Date** to begin the recurring job and the **Active End Date** to end the recurring schedule.
 - If you select **Run Monthly**, select the month, the day of the month to run the report, the **Run Time**, the **Active Start Date** to begin running the report and the **Active End Date**. To select multiple days of the month to run the report, enter each day separated by a comma (example: 1,15,28).
6. Select the **Destination** mode and enter the appropriate fields for your selection. To deliver via multiple channels, select the **Add Destination** button and continue adding destinations as needed.

If you do not wish to choose any of these destinations, leave this region blank. Select the **Save output** check box in the **Job Properties** region to view the output from the **History** page. See Viewing Report History, page 2-10.

 - Email - enter multiple e-mail addresses separated by a comma. Enter any **Body**

text that you want to include with the report.

- **Printer** - Select the **Printer Group** and the **Printer**, enter the **Number of copies**, and select Single sided or Double sided (the printer must support duplex printing for this option to take effect), the optionally select the printer **Tray** from which to print the report, and the **Pages** to print if you do not wish to print the entire report.
 - **Fax** - select the **Fax server** to deliver the report and enter the **Fax number** to which to send the report.
 - **FTP**
 - **FTP Server** - select the server to deliver the report.
 - **Username** - enter a valid username for the server.
 - **Password** - enter a valid password.
 - **Remote Filename** - enter the full path to the file on the remote server. (Example: /home/user/myreport.pdf)
 - **Use Secure FTP** - select the check box to use secure FTP.
 - **Web Folder**
 - **Web Folder Server** - select the server to deliver the report.
 - **Username** - enter a valid username for the server.
 - **Password** - enter a valid password.
 - **Remote Filename** - enter the full path to the file on the remote server. (Example: /public/myreport.pdf)
7. Select **Submit**. This will invoke the Schedules page where you can monitor your report. See Managing Your Scheduled Reports, page 2-9.

Scheduling a Report to Be Burst

If your report has been enabled for bursting, the Schedule Report page will include a **Burst Report** option under the **Job Properties** region. Once you select this option, the Template and Format parameters and the Delivery options for the report run are disabled because these parameters are defined in the delivery dataset defined for the report. See Enabling a Report for Bursting, page 3-41 for more information on bursting set up.

ORACLE BI Publisher Enterprise

Welcome, admin Preferences Sign Out Help

Reports Schedules Admin

Schedule Report Cancel Submit

Report Parameters

Customer: All Order #: All

Output format and layout template definition should be defined in the bursting configuration if you burst the report.

Job Properties

* Job Name: Invoice Batch Burst

Report Formatting Locale: English (United States)

Report Formatting Time Zone: [GMT-8] Pacific Standard Time

Report Formatting Calendar: Gregorian

Burst Report
 Public
 Save Data for Republish
 Save Output
 Use Unicode (UTF8)

Managing Your Scheduled Reports

The **Schedules** tab displays information about scheduled reports and the **History** of reports that have already run.

Schedules Page

ORACLE BI Publisher Enterprise

Welcome, operations Preferences Sign Out Help

Reports Schedules

History Schedules

Report Schedules

Page Refreshed Sunday, November 19, 2006 8:09 PM Pacific Time

View By: My Schedule Go

Select Jobs: Suspend Resume Delete

[Select All](#) | [Select None](#)

| Select | Job Name | Status | Username | Time | Recurring | Scope |
|--------------------------|---------------------------------|-----------|------------|--|-------------------------------------|---------|
| <input type="checkbox"/> | Sales Dashboard | Scheduled | operations | Run at 21:00 on Monday Tuesday Wednesday Thursday Friday | <input checked="" type="checkbox"/> | Private |

Navigate to this page by selecting the **Schedules** tab, and then the Schedules subtab.

- View current schedules for your private, shared, and public reports
- Monitor the status of a submitted report

- Delete a scheduled report
- Suspend/Resume a scheduled report
- View the submission details

Viewing Report History and Saved Output

The **History** page displays information about scheduled reports and reports that have already run.

The screenshot shows the Oracle BI Publisher Enterprise interface. The top navigation bar includes 'Reports' and 'Schedules' tabs, with 'History' selected. Below the navigation, there's a 'History of Scheduled Reports' section. It includes a 'Page Refreshed' timestamp and a 'View By' dropdown set to 'My History'. A table titled 'Select Histories:' contains two rows of report history. Each row has a 'Select' checkbox, a 'Job Name' (Employee Salary Report), a 'Status' (Success), a 'Username' (operations), a 'Scope' (Private), a 'Start Processing Time', an 'End Processing Time', and three action icons: Data XML, Document, and Republish.

| Select | Job Name | Status | Username | Scope | Start Processing Time | End Processing Time | Data XML | Document | Republish |
|--------------------------|--|---------|------------|---------|-----------------------|---------------------|----------|----------|-----------|
| <input type="checkbox"/> | Employee Salary Report | Success | operations | Private | 11/19/06 7:58 PM | 11/19/06 7:58 PM | | | |
| <input type="checkbox"/> | Employee Salary Report | Success | operations | Private | 11/18/06 9:22 PM | 11/18/06 9:22 PM | | | |

Navigate to this page by selecting the Schedules tab then the **History** subtab. Use this page to:

- View the status of private, shared, and public submitted reports
- View start and end processing times
- Download or view the XML data produced from the report (if you selected **Save Data** for the report)
- Download or view the report document (if you selected **Save output**)
- View report submission details
- Republish the report data using other formats or templates (if you selected **Save Data** for the report)

You can sort the table of reports by Job Name, Status, Username, Scope, Start Time, or End Time by selecting the column heading.

Using the Online Analyzer

Note: Your system administrator must assign you access to this feature.

The online Analyzer allows you to create a pivot table of your data. Use the interface to analyze your report data by dragging and dropping data items into the crosstab structure. Then quickly rearrange data as desired by dragging items to different row, column or summary positions.

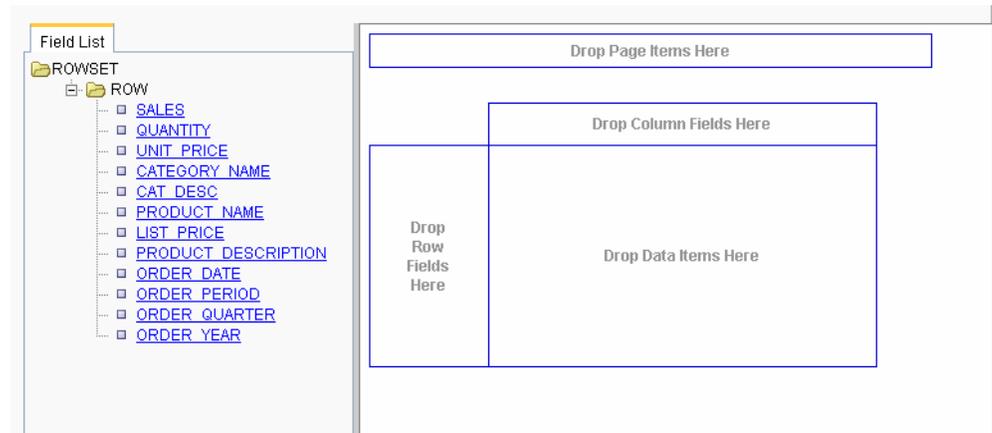
You can filter the data displayed in your pivot table by defining page-level data items. Drag and drop the desired field to the Page item area and then choose from the values that immediately populate the list.

After selecting all the data items for the table, choose whether to view the Sum, Average, or Count of the data items.

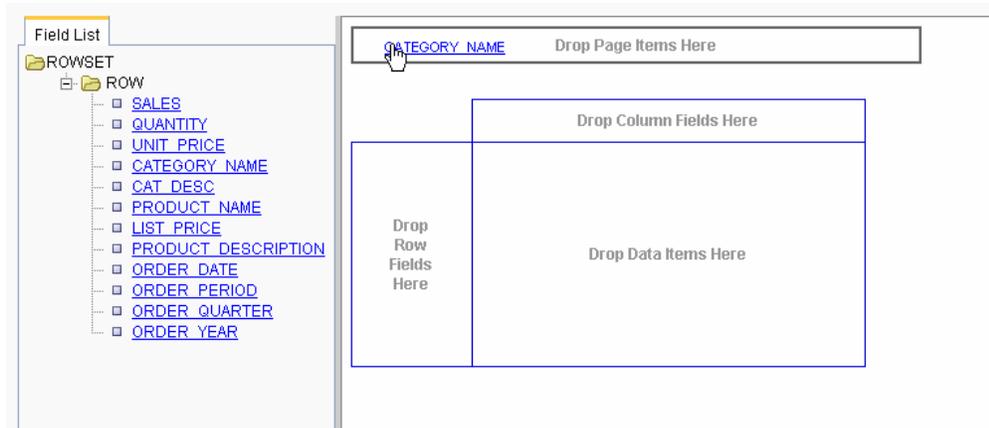
The following example displays the usage of the Analyzer with a simple Sales Analysis report:

1. Select the **Analyzer** button from the View Report page.

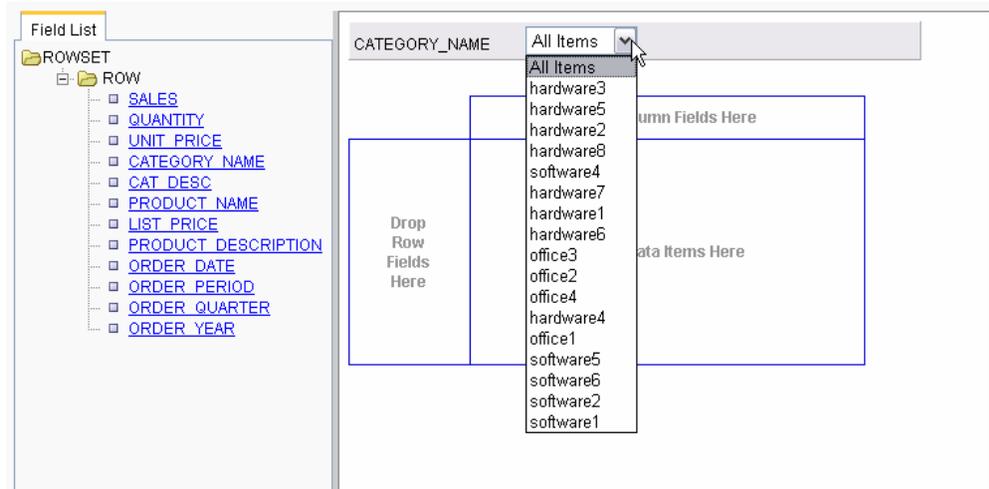
The Analyzer interface displays the list of data fields on a pane and an empty crosstab structure on the adjacent pane, as shown in the following figure.



2. To filter by CATEGORY_NAME, drag the item to the Page Items region, as shown in the following figure:



Now you can choose a value from the CATEGORY_NAME list to filter the page data:



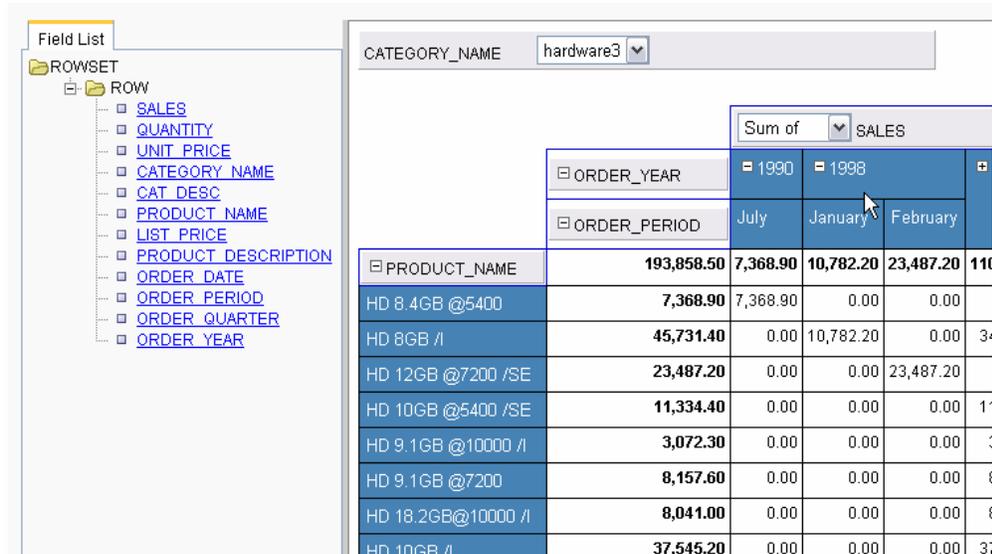
3. To view product sales by year, drag PRODUCT_NAME into the Row Field area, and drop ORDER_YEAR into the Column Field area. Drop the SALES data into the table body area, as shown in the following figure:

| | | Sum of SALES | | | | |
|--------------------|--|--------------|----------|-----------|------------|-----------|
| | | 1990 | 1998 | 1999 | 2000 | |
| ORDER_YEAR | | 1990 | 1998 | 1999 | 2000 | |
| PRODUCT_NAME | | 193,858.50 | 7,368.90 | 34,269.40 | 110,240.20 | 41,980.00 |
| HD 8.4GB @5400 | | 7,368.90 | 7,368.90 | 0.00 | 0.00 | 0.00 |
| HD 8GB /I | | 45,731.40 | 0.00 | 10,782.20 | 34,949.20 | 0.00 |
| HD 12GB @7200 /SE | | 23,487.20 | 0.00 | 23,487.20 | 0.00 | 0.00 |
| HD 10GB @5400 /SE | | 11,334.40 | 0.00 | 0.00 | 11,334.40 | 0.00 |
| HD 9.1GB @10000 /I | | 3,072.30 | 0.00 | 0.00 | 3,072.30 | 0.00 |
| HD 9.1GB @7200 | | 8,157.60 | 0.00 | 0.00 | 8,157.60 | 0.00 |
| HD 18.2GB@10000 /I | | 8,041.00 | 0.00 | 0.00 | 8,041.00 | 0.00 |
| HD 10GB /I | | 37,545.20 | 0.00 | 0.00 | 37,545.20 | 0.00 |
| HD 10GB /R | | 2,271.50 | 0.00 | 0.00 | 2,271.50 | 0.00 |

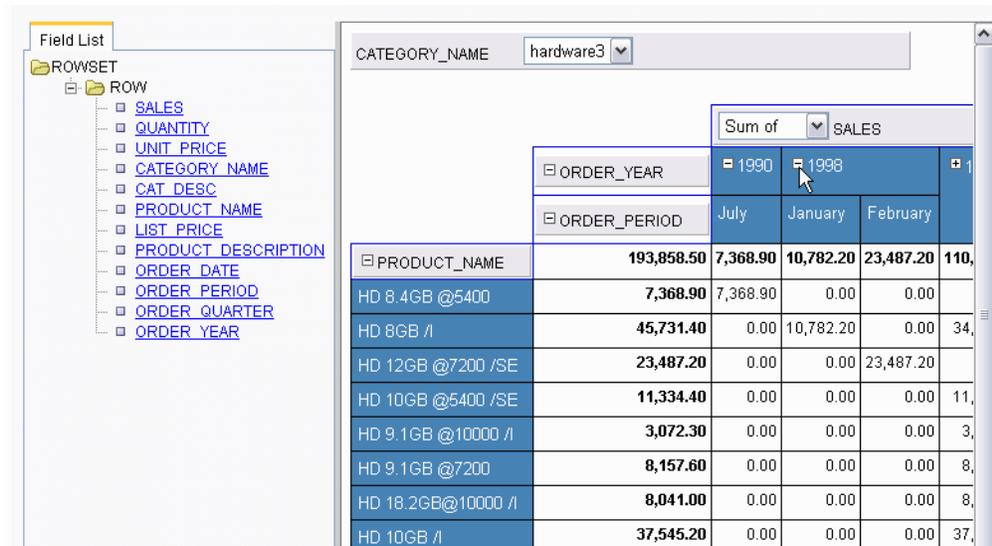
You can now see the calculated sales totals as a sum of the data items.

| | | Sum of SALES | | | | |
|--------------------|--------------|--------------|----------|-----------|------------|-----------|
| | | 1990 | 1998 | 1999 | 2000 | |
| ORDER_YEAR | ORDER_PERIOD | 1990 | 1998 | 1999 | 2000 | |
| PRODUCT_NAME | | 193,858.50 | 7,368.90 | 34,269.40 | 110,240.20 | 41,980.00 |
| HD 8.4GB @5400 | | 7,368.90 | 7,368.90 | 0.00 | 0.00 | 0.00 |
| HD 8GB /I | | 45,731.40 | 0.00 | 10,782.20 | 34,949.20 | 0.00 |
| HD 12GB @7200 /SE | | 23,487.20 | 0.00 | 23,487.20 | 0.00 | 0.00 |
| HD 10GB @5400 /SE | | 11,334.40 | 0.00 | 0.00 | 11,334.40 | 0.00 |
| HD 9.1GB @10000 /I | | 3,072.30 | 0.00 | 0.00 | 3,072.30 | 0.00 |
| HD 9.1GB @7200 | | 8,157.60 | 0.00 | 0.00 | 8,157.60 | 0.00 |
| HD 18.2GB@10000 /I | | 8,041.00 | 0.00 | 0.00 | 8,041.00 | 0.00 |

4. Add the dimension of ORDER_PERIOD to the table by dragging the data item over the ORDER_YEAR. Now you can click the ORDER_YEAR to open it up to display each ORDER_PERIOD total. Click again to close the item and view only the ORDER_YEAR total.



The final figure shows how you can arrange the same data differently in the interface to perform a new analysis.



Using the BI Publisher Analyzer for Excel

Note: Your system administrator must assign you access to this feature.

Prerequisites

- Microsoft .NET Framework 2.0

If not installed on your computer, you will be prompted to download it the first

time you use the Analyzer for Excel.

- Microsoft Excel 2000 or later

Features

The Analyzer for Excel enables you to:

- Export the results of the report query to an Excel spreadsheet.
- Log in to BI Publisher Enterprise from Excel to refresh your data, apply new parameters, and apply a template to the report data.
- Create Excel templates and upload them to the BI Publisher server
- Access and run your reports from an Excel session.

Launching the Excel Analyzer

1. Select the **Excel Analyzer** button from the View report page. You will be prompted to Save or Open the report .xls file.
2. When you open the file, select Enable Macros from the Excel dialog.

Note: You must enable macros to use the Analyzer for Excel.

The report data will render in your Excel application window and the Oracle BI Publisher menu will appear on your Excel menu bar. Note that the data are the results of the report query with no template and default filtering applied.

You can now manipulate the data as you wish in Excel.

If the report has parameters, the parameter names will appear at the top of the sheet, but you must log in to apply new parameter values. See Using the Oracle BI Publisher Menu, page 2-15.

Using the Oracle BI Publisher Menu

You must log in to enable all the menu commands.

Login – allows you to log in to the BI Publisher server.

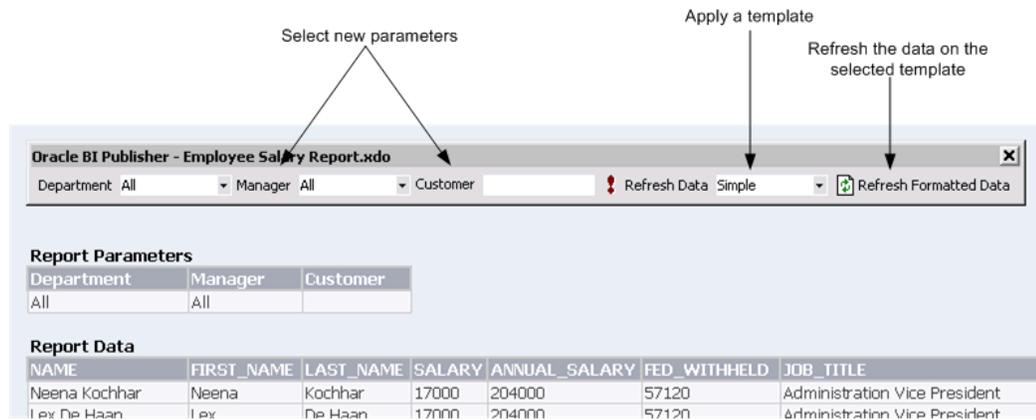
Note: If you do not have Microsoft .NET Framework 2.0 installed on your computer, you will be prompted to download it. Select the URL and follow the instructions on the Microsoft Web site to download and install .NET. If you do not wish to install .NET, click OK to close the

message window.

If this is the first time you have used the Analyzer for Excel, or if you do not have the latest version of Analyzer for Excel, you will be prompted to install the latest version.

Show Report Parameters – displays the updateable parameters and available templates for the report in a toolbar.

Analyzer for Excel Toolbar



To update the data, select a new parameter value then select **Refresh Data** to refresh the data in the current sheet.

To apply a template, select the template, then select **Refresh Formatted Data**. This will download the report as HTML into a new worksheet. Select the new worksheet to see the data with the new template applied.

Note: The template you select must have HTML as an available output.

To change the parameters from this worksheet, select the new values, then select **Refresh Data**, then select **Refresh Formatted Data**.

Update Excel Template

If you used the Open Template dialog to download a template from the BI Publisher server, use this option to upload the updated layout back to the server.

Add as New Excel Template -

If you used the Open Template dialog to download a template or to open a report from the BI Publisher server, use this option to upload the layout to the server. Also use this option to upload modifications to an existing template under a different name.

Note that if you created any charts on a separate worksheet the charts cannot be scheduled and viewed within BI Publisher Enterprise. Only charts that you create on the same worksheet that is downloaded by the Excel Analyzer can be updated and

viewed within the BI Publisher application.

View Report Online

Launches the View report page.

Browse for Reports Online

This dialog enables you to select reports from the BI Publisher Report Server or the Oracle BI Answers server. You can either load the report data to create a new template, or download an existing template to update it or to use as a starting point for a new template.

When you use the Open Template dialog to initiate the template building process, you can then use the Update Excel Template options from the Oracle BI Publisher Menu to upload the template directly to the appropriate report in the BI Publisher server.

From the Oracle BI Publisher menu, select Open Template.

Workspace

The default workspace is the Oracle BI Publisher server; you can also select Oracle BI to connect to the Answers server. Browse the directory structure of the workspace to select the desired report. Select a folder to display its contents in the Reports pane.

Reports Pane

The Reports pane lists the reports in the selected directory. Select a report to display the available templates in the Layout Templates pane.

Open Report

Loads the XML data of the selected report to the Template Builder.

Open Layout Template Downloads and opens the selected template in the Template Builder and loads the XML data.

To start a new template, select <New> from the list of templates then select Open Layout Template; or double-click <New>.

Use the Report Browser's Up icon to move up the directory structure.

Use the View As menu to view the folder contents as Large Icons, Small Icons, List or Details.

Preferences - select your locale and proxy settings if required.

Logging in Through Excel

Once you have installed the Analyzer for Excel, you can log in to the BI Publisher Enterprise server any time from Excel, you do not have to log in to BI Publisher first.

Once you have Excel open, simply select Log in from the Oracle BI Publisher menu. The BI Publisher Enterprise log in screen will prompt you to enter your credentials and to select (or enter) the Report Server URL.

Part 2

Creating Reports and Layouts

Creating a New Report

Process Overview

Note: You must be assigned the BI Publisher Developer role or BI Publisher Administrator role to create or edit reports.

Creating a new report consists of the following steps:

1. Create the report entry in the desired folder on the Reports page.
2. Open the Report Editor.
3. Specify the general properties for the report.
4. Define the Data Model.

Your report data may come from a SQL query, an HTTP feed, a Web service, an Oracle BI Answers request, a file, or BI Publisher's data template.

5. Define the parameters that you want users to pass to the query, and define lists of values for users to select parameter values.
6. Test your data model.
7. Design the layout template.
 - If you are designing an RTF template, load the data to the Template Builder for Word. Use the Template Builder in conjunction with the instructions in *Creating an RTF Template*, page 5-1 to build your report layout.
 - If you are designing a PDF template, follow the instructions in *Creating a PDF Template*, page 8-1 to build your report layout.

- If you are using a predesigned PDF form (such as a government form) follow the instructions under Mapping Data to PDF Form Fields.
8. Upload your templates to the Report Editor.
 9. (Optional) Enable bursting.
 10. (Optional) Add translations for your reports. See Translating Reports, page 7-1.

Create the Report Entry and Specify General Properties

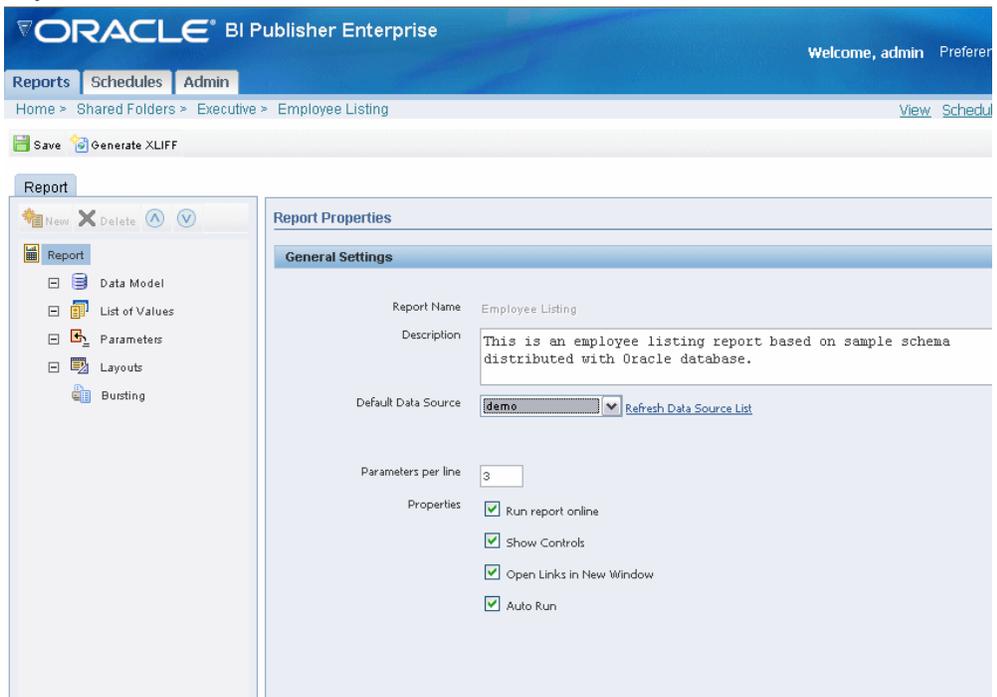
Note: You must be assigned the BI Publisher Developer role or BI Publisher Administrator Role to create or upload reports.

1. Navigate to the folder in which you want the new report to reside.
To create a new folder for this report, select the **Create a new folder** link.
2. Select the **Create a new report** link from the Folder and Report Tasks menu. This will invoke a text box for you to enter the name of your new report.



3. Enter the name for your new report and select **Create**. This creates the listing for your report within the current folder.
4. Select the **Edit** link for the new report entry. This invokes the Report Editor.

Report Editor



5. Enter the **Report Properties**:

- Description - the description will display beneath the report name within the report folder.
- Default Data Source - select the data source from the list of values. You may define multiple data sources for your report when you define the Data Model. The Default Data Source you select here will be presented as the default for each new data set you define. Select **Refresh Data Source List** to see any new data sources added since your session was initiated.
- Parameters per line - enter the number of parameters that you want to display before creating a second parameter line for the report. The parameter line is displayed in the online report View page and the Schedule page.
- Run report online - select this box to enable this report in the online viewer. If not selected, users will be able to Schedule the report only.
- Show controls - select this box so that all users can see the control region of the report. Control region consists of the Template list, Output list, and Parameter lists.
- Open Links in New Window? - select this box to open any links contained in

the report in a new browser window.

- Auto Run - select this box to automatically run the report when the user selects the report or the View link for the report within the report folder. When Auto Run is not turned on, selecting the report or the View link for the report displays the online Viewer and parameters for the report only. The user must select the View button from the online Viewer to run the report.
6. Select the **Save** icon to save your report definition.

Defining the Data Model

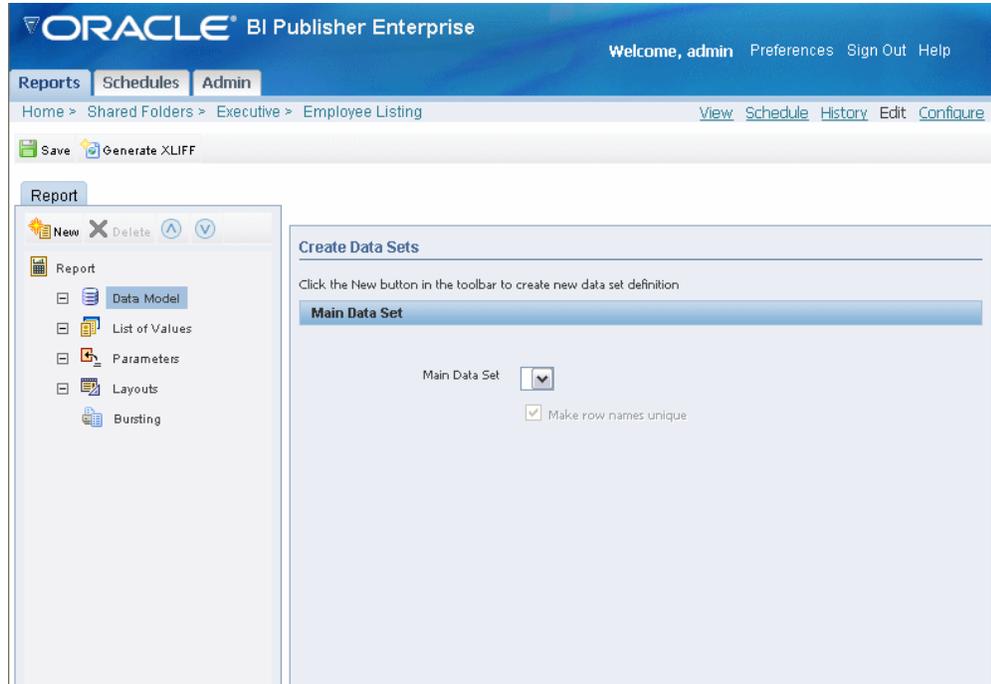
BI Publisher requires XML data to publish reports. The XML data can come from any of the following sources:

- SQL query
- HTTP (XML feed)
- Web service
- Data Template
- Oracle BI Answers request
- File

You can define multiple data sets for one report and each data set can have a different data source and source type. When you define multiple SQL queries, you can concatenate the resulting data sets.

To Define the Data Model:

1. Select Data Model.



This will display the **Main Data Set** list. This list will be empty until you define a data set. To define a data set, select **New**.

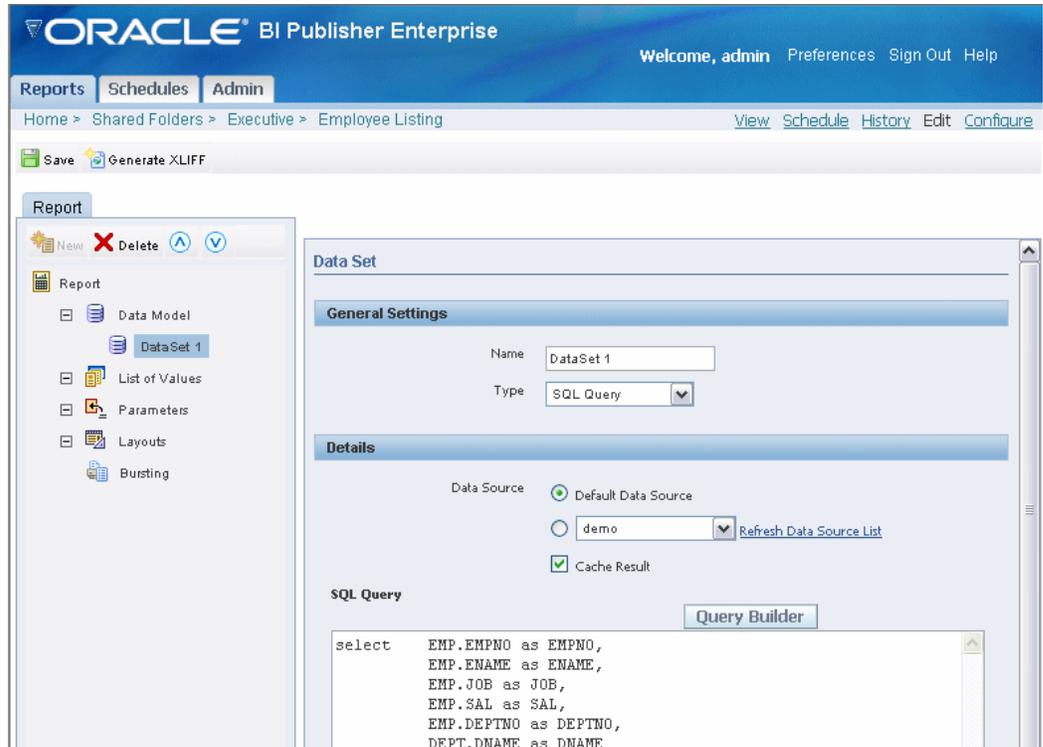
- Enter a **Name** and **Type** for the data set. The **Type** can be:
 - SQL Query
 - HTTP (XML Feed)
 - Web Service
 - Data Template
 - Oracle BI Answers
 - File

Important: If your data set is a Web Service or HTTP (XML Feed) you must define any parameters before you define the data set.

2. After you have defined your data sets, select **Data Model**. The data sets that you have defined will now populate the list for **Main Data Set**. Select the data set that will be used to generate the report.

Note: If you are defining multiple data sets from SQL queries, you can combine them into a single data set by selecting Concatenated SQL Data Source. It is strongly recommended that you select **Make row names unique** if you are concatenating datasets.

Defining a SQL Query Data Set Type



1. Select the **Data Source** for this data set. Select the **Default Data Source** (defined in the Report Properties) or select a new data source from the list.
2. Select the **Cache Result** box if you wish to cache the results of the query for your session.

By caching the results of the query, multiple templates can be applied to these results without requerying the data. This will enhance online performance. However, if the data is updated during the session, the user cannot view the new data via the View report page until the cache is cleared.

Note: You can control the cache expiration time and the cache size through the configuration settings. See Setting Server Configuration Options, page 11-8 for more information.

3. Enter the SQL query or select **Query Builder**. See Using the Query Builder, page 3-8 for information on the Query Builder utility.

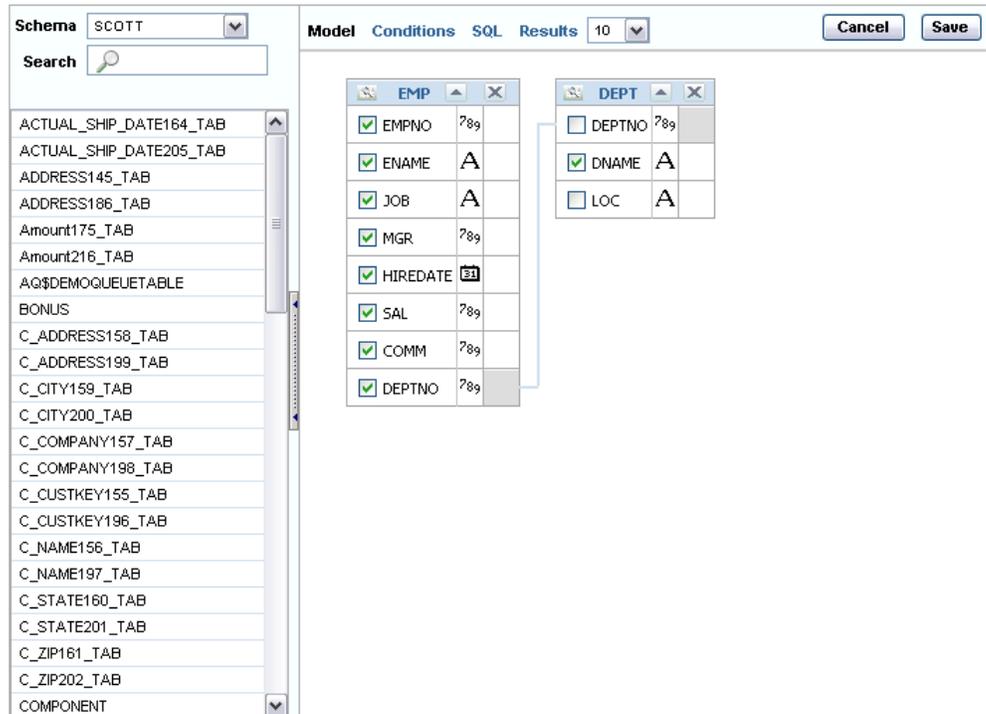
Using the Query Builder

About Query Builder

Use the Query Builder to build SQL queries without coding. The Query Builder enables you to search and filter database objects, select objects and columns, create relationships between objects, and view formatted query results with minimal SQL knowledge.

The Query Builder page is divided into three sections:

- Object Selection pane contains a list objects from which you can build queries. Only objects in the current schema display.
- Design pane displays selected objects from the Object Selection pane.
- Output pane allows you to create conditions, view the generated SQL, or view query results.



Understanding the Query Builder Process

To build a query, perform the following steps:

- Select objects from the Object Selection pane.
- Add objects to the Design pane and select columns.
- Optional: Establish relationships between objects.
- Optional: Create query conditions.
- Execute the query and view results.

Using the Object Selection Pane

In the Object Selection pane you can select a schema and search and filter objects.

To hide the Object Selection pane, select the control bar located between it and the Design pane. Select it again to unhide it.

Selecting a Schema

The Schema list contains all the available schemas in the data source. Note that you may not have access to all that are listed.

Searching and Filtering Objects

Use the Search field to enter a search string. Note that if more than 100 tables are

present in the data source, you must use the Search feature to locate and select the desired objects.

Selecting Objects

The Object Selection pane lists the tables, views, and materialized views from the selected schema (for Oracle databases, synonyms are also listed). Select the object from the list and it displays on the Design pane. Use the Design pane to identify how the selected objects will be used in the query.

Supported Column Types

Columns of all types display as objects in the Design pane. Note the following column restrictions:

- Each can select no more than 60 columns for each query.
- Only the following column types are selectable:
 - VARCHAR2, CHAR
 - NUMBER
 - DATE, TIMESTAMP
 - BLOB

Note: The BLOB must be XML or an image. When you execute the query in the Query Builder, the BLOB will not display in the Results pane, however, the query will be constructed correctly when saved to the Report Editor.

- XMLType

Note: When you execute the query in the Query Builder, the XMLType will display as null. When you save the query to the Report Builder, you must add the function (such as getClobval()) to extract the XML from the type.

Adding an Object to the Design Pane

1. Select an object.

The selected object displays in the Design pane. An icon representing the datatype displays next to each column name.

2. Select the check box for each column to include in your query.

When you select a column, it appears on the **Conditions** tab. Note that the **Show** check box on the **Conditions** tab controls whether a column is included in query results. By default, this check box is selected.

To select the first twenty columns, click the small icon in the upper left corner of the object and then select **Check All**.

3. To execute the query and view results, select **Results**.

Tip: You can also execute a query using the key strokes CTRL + ENTER.

Resizing the Design and Results Pane

As you select objects, you can resize the Design and Results panes by selecting and dragging the gray horizontal rule dividing the page.

Removing or Hiding Objects in the Design Pane

To remove an object, select the **Remove** icon in the upper right corner of the object.

To temporarily hide the columns within an object, click the **Show/Hide Columns** icon.

Specifying Query Conditions

Conditions enable you to filter and identify the data you want to work with. As you select columns within an object, you can specify conditions on the Conditions tab. You can use these attributes to modify the column alias, apply column conditions, sort columns, or apply functions.

When you select a column to include in your query, it appears as a separate row in the Output pane. The following table describes the attributes available on the **Conditions** tab:

| Condition Attribute | Description |
|---------------------|---|
| Up and Down Arrows | Controls the display order of the columns in the resulting query. |
| Column | Displays the column name. |
| Alias | Specify an optional column alias. An alias is an alternative column name. Aliases are used to make a column name more descriptive, to shorten the column name, or prevent possible ambiguous references. |
| Condition | The condition modifies the query's WHERE clause. When specifying a column condition, you must include the appropriate operator and operand. All standard SQL conditions are supported. For example: >=10 ='VA' IN (SELECT dept_no FROM dept) BETWEEN SYSDATE AND SYSDATE + 15 |

| Condition Attribute | Description |
|---------------------|--|
| Sort Type | Select ASC (Ascending) or DESC (Descending). |
| Sort Order | Enter a number (1, 2, 3, and so on) to specify the order in which selected columns should display. |
| Show | Select this check box to include the column in your query results. You do not need to select Show if you need to add a column to the query for filtering only. For example, suppose you wish to create following query: <pre>SELECT ename FROM emp WHERE deptno = 10</pre> To create this query in Query Builder: <ol style="list-style-type: none"> 1. From the Object list, select EMP. 2. In the Design Pane, select <code>ename</code> and <code>deptno</code>. 3. For the <code>deptno</code> column, in Condition enter <code>=10</code> and uncheck the Show check box. |
| Function | Available argument functions include: <ol style="list-style-type: none"> 1. Number columns - COUNT, COUNT DISTINCT, AVG, MAXIMUM, . MINIMUM, SUM 2. VARCHAR2, CHAR columns - COUNT, COUNT DISTINCT, INITCAP, LENGTH, LOWER, LTRIM, RTRIM, TRIM, UPPER 3. DATE, TIMESTAMP columns- COUNT, COUNT DISTINCT |
| Group By | Specify columns to be used for grouping when an aggregate function is used. Only applicable for columns included in output. |
| Delete | Deselect the column, excluding it from the query. |

As you select columns and define conditions, Query Builder writes the SQL for you.

To view the underlying SQL, click the **SQL** tab

Creating Relationships Between Objects

You can create relationships between objects by creating a join. A join identifies a relationship between two or more tables, views, or materialized views.

About Join Conditions

When you write a join query, you specify a condition that conveys a relationship between two objects. This condition is called a join condition. A join condition determines how the rows from one object will combine with the rows from another object.

Query Builder supports inner, outer, left, and right joins. An inner join (also called a simple join) returns the rows that satisfy the join condition. An outer join extends the result of a simple join. An outer join returns all rows that satisfy the join condition and returns some or all of those rows from one table for which no rows from the other satisfy the join condition.

Note: See *Oracle Database SQL Reference* for information about join conditions.

Joining Objects Manually

Create a join manually by selecting the Join column in the Design pane.

1. From the Object Selection pane, select the objects you want to join.
2. Identify the columns you want to join.

You create a join by selecting the Join column adjacent to the column name. The Join column displays to the right of the datatype. When your cursor is in the appropriate position, the following help tip displays:

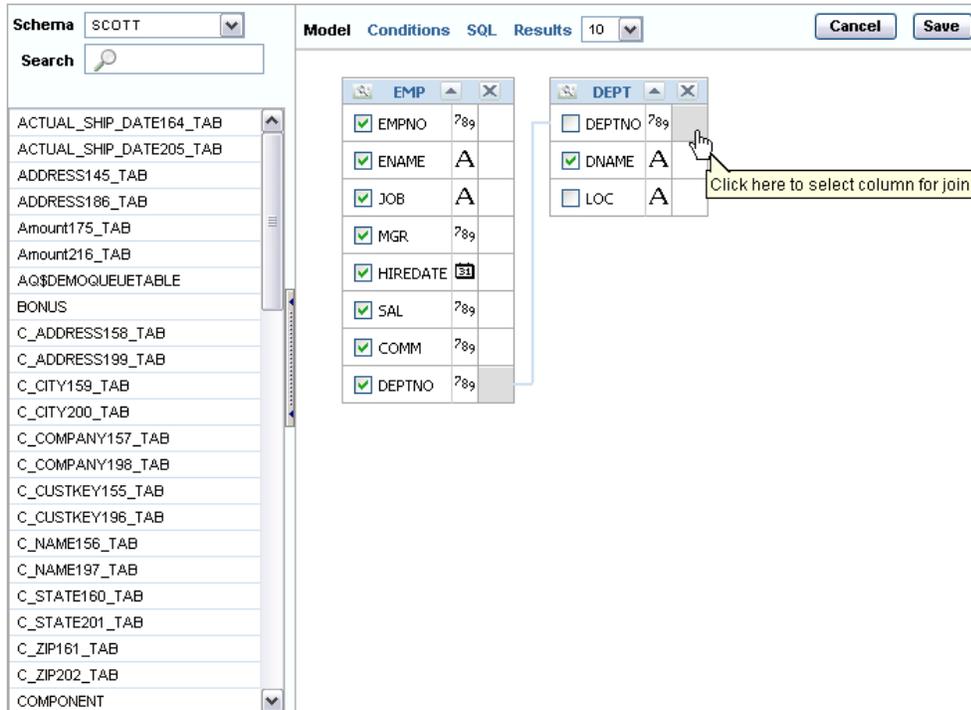
Click here to select column for join

3. Select the appropriate Join column for the first object.

When selected, the Join column is darkened. To deselect a Join column, simply select it again or press ESC.

4. Select the appropriate Join column for the second object.

When joined, line connects the two columns. An example is shown in the following figure:



5. Select the columns to be included in your query. You can view the SQL statement resulting from the join by positioning the cursor over the join line.
6. Click **Results** to execute the query.

Saving a Query

Once you have built the query and executed it, select the Save button to return to the Report Editor. The query will appear in the SQL Query box.

Editing a Saved Query

Once you have saved the query from the Query Builder to the Report Editor, simply select **Query Builder** again to edit the query. The Query Builder will parse the query and present it for modification in the Query Builder interface.

Defining an HTTP Data Set Type

Using the HTTP data source type you can create reports from RSS feeds over the Web.

Note that if you want to include parameters for an HTTP (XML feed), you must define the parameters first, so that they are available for selection when setting up the data source. See *Adding Lists of Values and Parameters*, page 3-22.

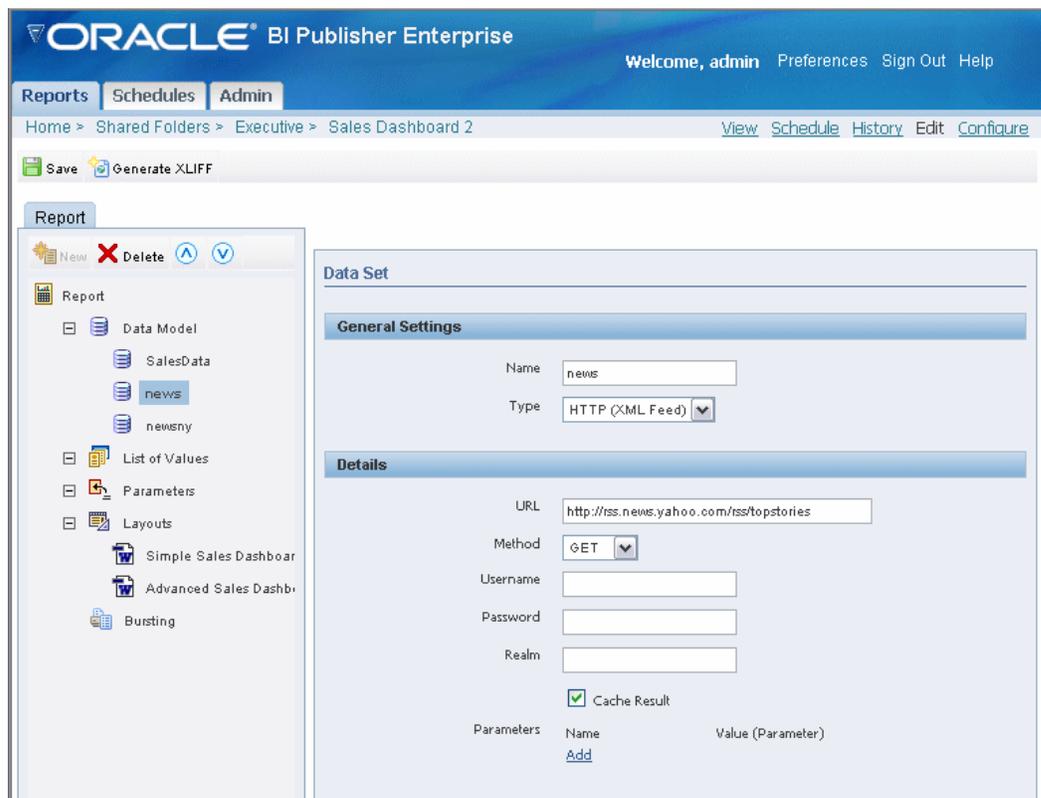
- Enter the URL for the XML feed.
- Select the Method: Get or Post.

- Enter the Username, Password, and Realm for the URL, if required.
- Select the **Cache Result** box if you wish to cache the results of the query for your session.

By caching the results of the query, multiple templates can be applied to these results without requerying the data. This will enhance online performance. However, if the data is updated during the session, the user cannot view the new data via the View report page until the cache is cleared.

Note: You can control the cache expiration time and the cache size through the configuration settings. See Setting Server Configuration Options, page 11-8 for more information.

- To add a parameter, select the Add link. Enter the Name and select the Value. The Value list is populated by the parameter Identifiers defined in the Parameters section. See Adding Parameters and Lists of Values, page 3-22.



Defining a Web Service Data Set Type

BI Publisher supports document/literal Web service data sources that return XML as a

string.

Tip: If the WSDL URL is outside of your company firewall remember to start the server up with the proxy parameters.

Note that if you want to include parameters for the Web service method, you must define the parameters first, so that they are available for selection when setting up the data source. See Adding Parameters and Lists of Values, page 3-22.

Multiple parameters are supported. Ensure the method name is correct and the order of the parameters matches the order in the method. If you want to call a method in your Web service that accepts two parameters, you must map two parameters defined in the report to those two. Note that only parameters of simple type are supported, for example, string and integer.

- Enter the WSDL URL and the Web Service Method.

Important: Only document/literal Web services are supported.

- To specify a parameter, select the Add link. Select the parameter from the list.

Note: The parameters must already be set up in the Parameters section of the report definition See Adding Parameters and Lists of Values, page 3-22.

Web Service Example

This example shows how to add a Web service to BI Publisher as a data source. The Web service returns stock quote information. The Web service will pass one parameter: the quote symbol for a stock.

The WSDL URL is:

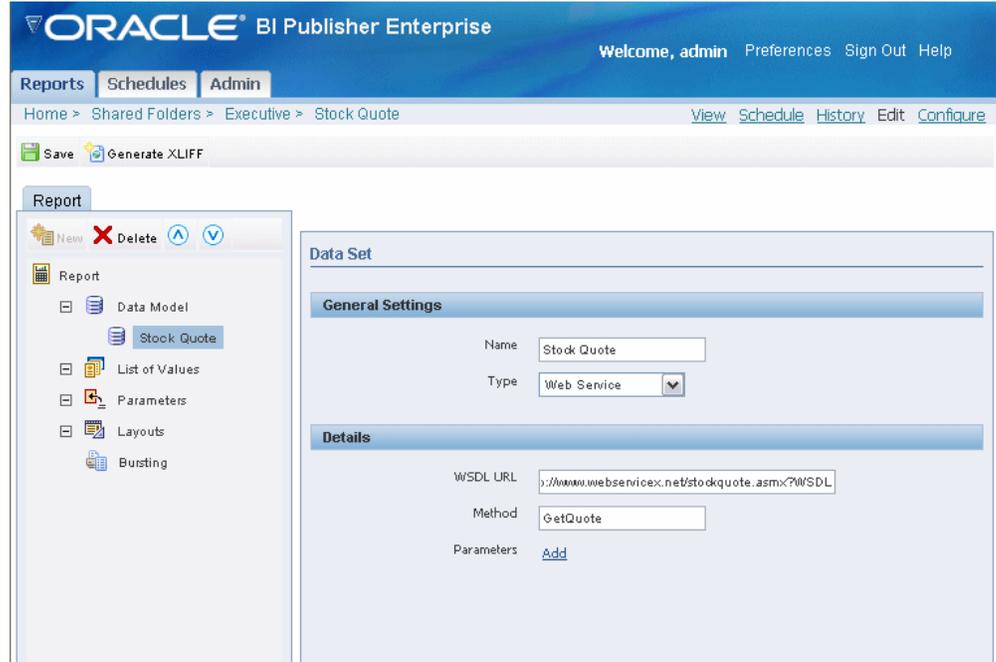
```
http://www.websvcicex.net/stockquote.asmx?WSDL
```

If you are not already familiar with the available methods and parameters in the Web service that you want to call, you can open the URL in a browser to view them. This Web service includes a method called GetQuote. It takes one parameter, which is the stock quote symbol.

To add the Web service as a data source:

1. Enter the Data Set information:
 - Enter a **Name** for the Data Set and select Web Service as the **Type**.
 - Enter the **WSDL URL**:
`http://www.websvcicex.net/stockquote.asmx?WSDL`

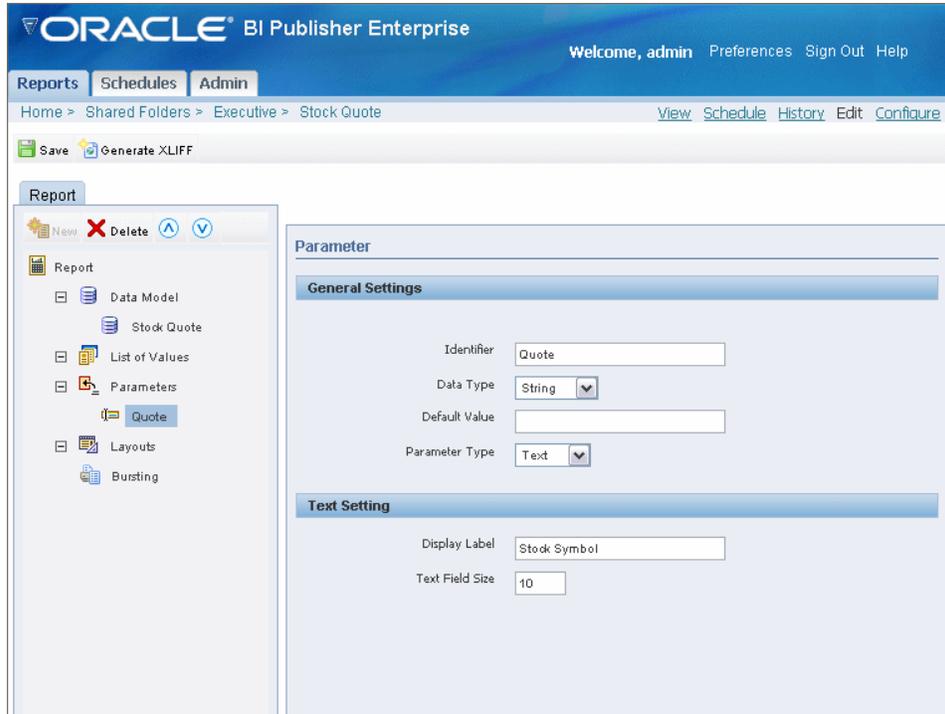
- Enter the **Method**: GetQuote



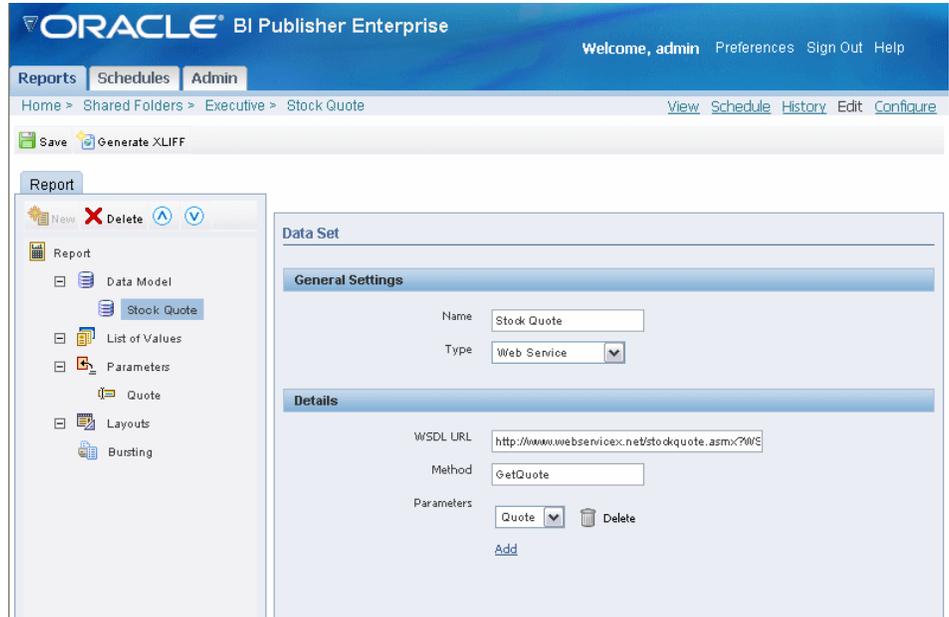
2. Define the parameter to make it available to the Web service data set.

Select **Parameters** on the **Report** definition pane and click **New** to create a new parameter. Enter the following:

- **Identifier** - enter an internal identifier for the parameter.
- **Data Type** - String
- **Default Value** - if desired, enter a default for the parameter.
- **Parameter Type** - Text
- **Display label** - enter the label you want displayed for your parameter.
- **Text Field Size** - enter the size for the text entry field in characters.



3. Return to your Web service data set and add the parameter.
 - In the Details section under Parameters, Select **Add**. The Quote parameter you specified is now available from the list.



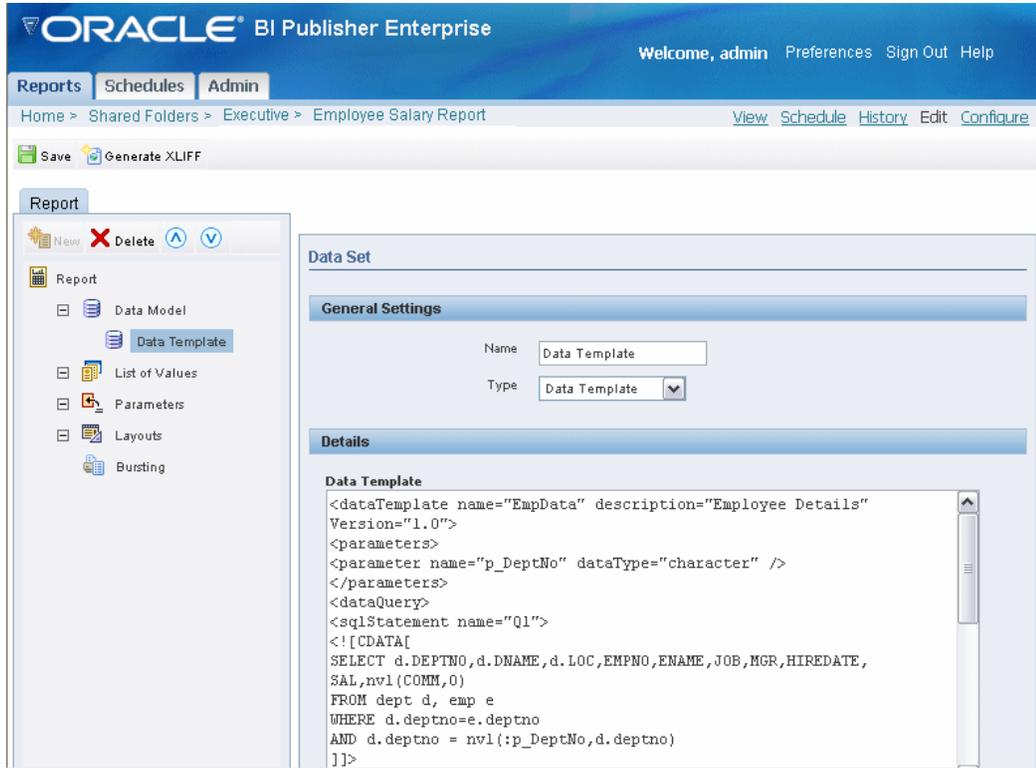
4. To view the results XML, select **View**. Enter a valid value for your Stock Quote parameter and select **View** again.

Defining a Data Template Data Set Type

Use the BI Publisher data template to create more complex SQL queries. See Building a Data Template, page 4-1 for features and usage. Please note that lexical parameters are only supported when executing a query against an Oracle E-Business Suite instance.

Enter the data template code directly in the **Data Template** text box, or copy and paste the data template from another text source.

Important: If copying the data template, the entry in the text box must begin with the <dataTemplate> element. Do not include the XML declaration.



Defining an Oracle BI Answers Request Data Set Type

If you have enabled integration with Oracle Business Intelligence Presentation Services, then you can access the BI catalog to select an Oracle BI Answers request as a data source. Oracle BI Answers is an ad hoc query building tool included in the Oracle Business Intelligence Enterprise Edition. For more information on building Oracle BI Answers see the *Oracle Business Intelligence Answers, Delivers, and Interactive Dashboards User Guide*.

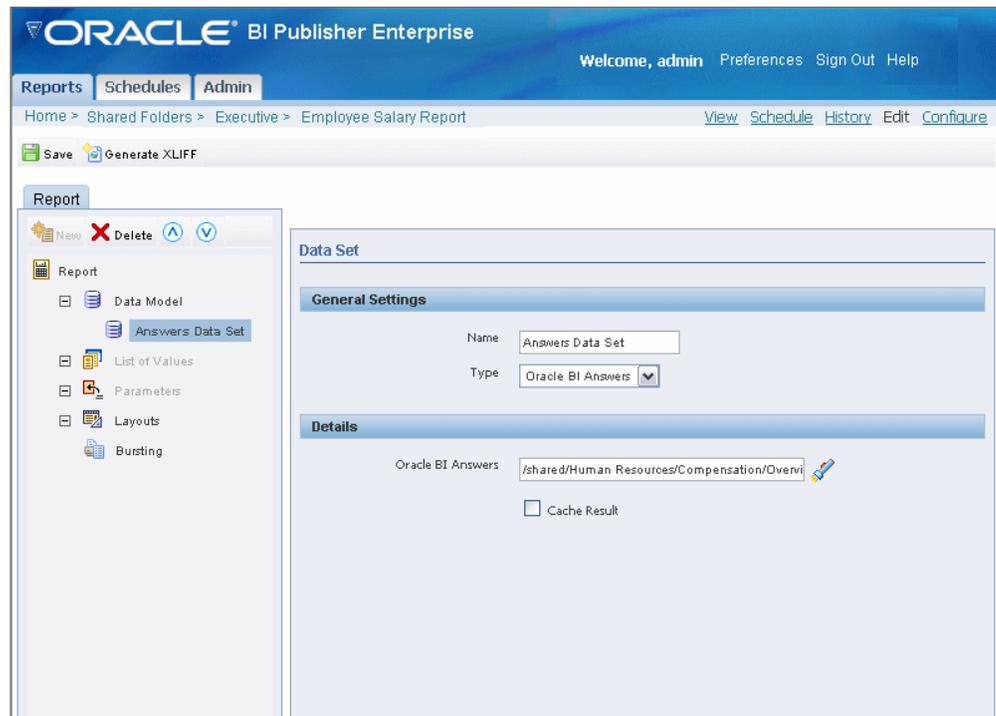
1. Choose Oracle BI Answers as the data set **Type**.

Note: BI Publisher does not support lists of values and parameters for the Oracle BI Answers request data set type.

2. Select the browse icon to connect to the Oracle BI Answers catalog. This action displays the folders you have access to on the Oracle BI Presentation Services server.

Note: You must set up integration with Oracle BI Presentation Services to enable Oracle BI Answers as a data set Type. See

3. Select the Answers request you wish to use as the data set for your report.



4. Select the **Cache Result** box if you wish to cache the results of the query for your session.

By caching the results of the query, multiple templates can be applied to these results without requerying the data. This will enhance online performance. However, if the data is updated during the session, the user cannot view the new data via the View report page until the cache is cleared.

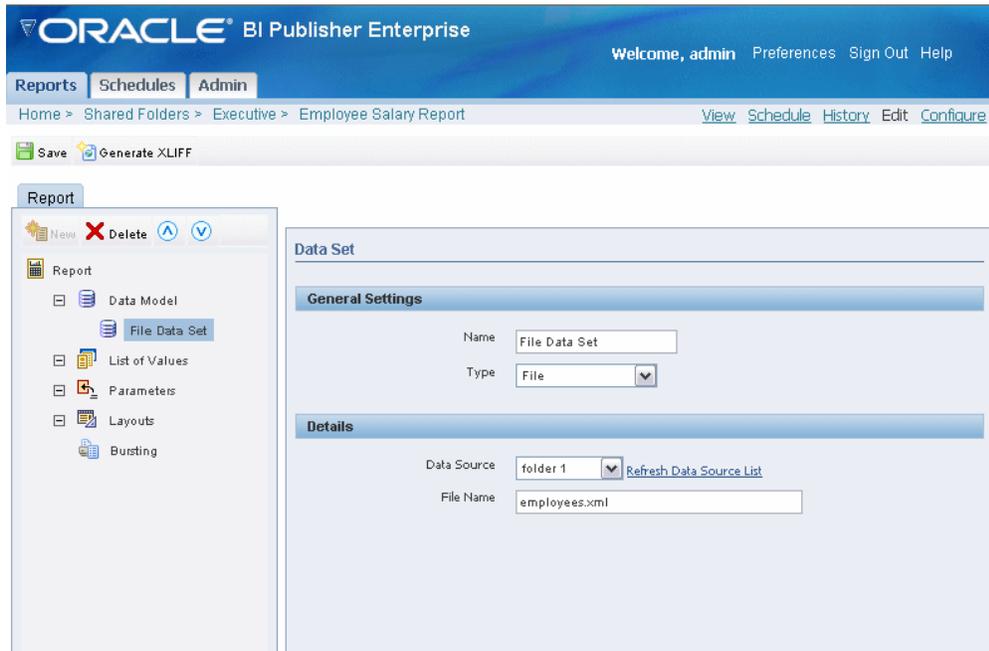
Note: You can control the cache expiration time and the cache size through the configuration settings. See Setting Server Configuration Options, page 11-8 for more information.

Defining a File as a Data Set Type

When you set up data sources (see Setting Up Data Sources, page 11-2) you can define a file directory as a data source. You can then place xml documents in the file directory to access directly as data sources for your reports.

1. Choose File as the data set **Type**.
2. Choose the appropriate file directory as the Data Source.

3. Enter the **File Name** of the XML document to use as the report data set. If the file resides in a subdirectory, include the path.



Adding Parameters and Lists of Values

Add parameters to your report definition to enable your users to interact with the report and specify the data of interest from the data set; or specify hidden parameters to control the data returned to a user from a data set.

Note: Parameters are not supported for Oracle BI Answers request data set type.

BI Publisher supports the following parameter types:

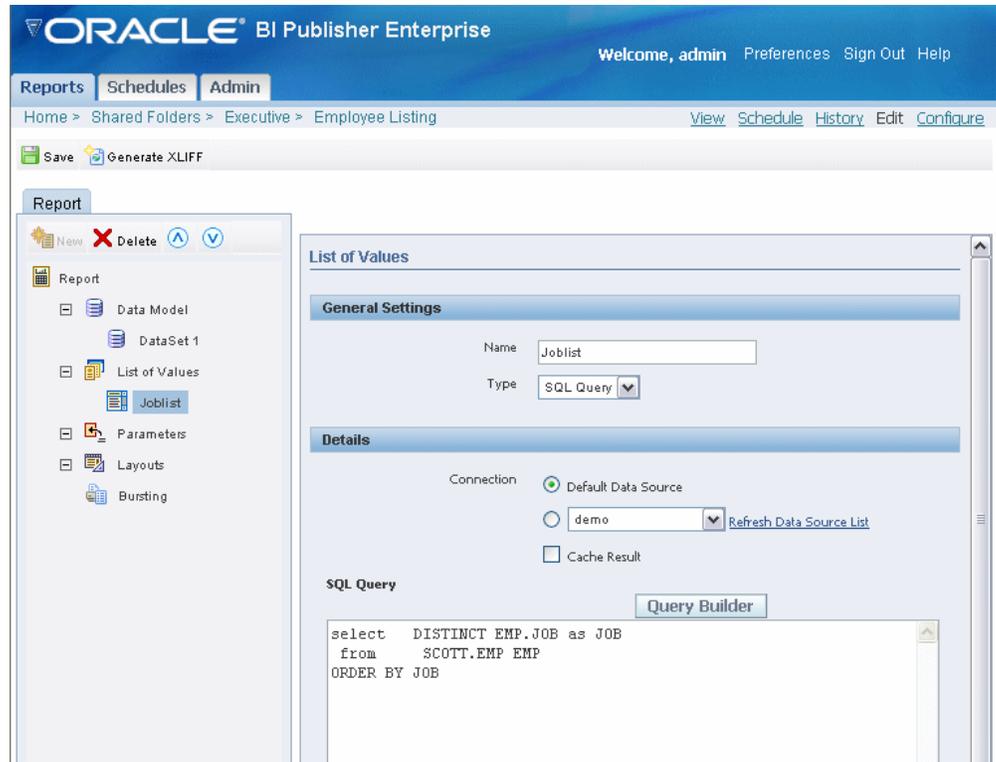
- **Text** - allows the user to enter a text entry to pass as the parameter.
- **Menu** - allows the user to pass parameters by making selections from a list of values. This option supports multiple selections, a "Select All" option, and partial page refresh for cascading parameters. Define the properties for the list of values in the report definition. A list of values can contain fixed data that you specify or the list can be created via a SQL query executed against any of the defined data sources.

To add a parameter as a menu, define the list of values first. Then define the parameter and associate it to the list of values. See *Adding a List of Values*, page 3-23.

- **Date**
- **Hidden** - enables you to pass the default value always, without allowing the user to see or change it.

Adding a List of Values:

- Select List of Values and then select the New icon in the toolbar. This will create a **New List of Values** entry.
- Enter a Name for the list and select a Type: SQL Query or Fixed Data.



If you select SQL Query:

- Select a Connection from the data source list.
- Select **Cache Result** if you want the results of the query cached for the report session.
- Enter the SQL query or use the Query Builder. See Using the Query Builder, page 3-8 for information on the Query Builder utility.

If you select Fixed Data:

- Select the **Add** link to add the Label and Value pairs for the LOV.

Adding Parameters

Select **Parameters** and then select the **New** icon to define parameters for the report.

The screenshot shows the Oracle BI Publisher Enterprise interface. The top navigation bar includes 'Reports', 'Schedules', and 'Admin'. The breadcrumb trail is 'Home > Shared Folders > Executive > Employee Listing'. The main content area is titled 'Parameter' and is divided into two sections: 'General Settings' and 'Menu Setting'. In the 'General Settings' section, the 'Identifier' is 'Joblist', the 'Data Type' is 'String', the 'Default Value' is '*', and the 'Parameter Type' is 'Menu'. In the 'Menu Setting' section, the 'Display Label' is 'Choose Job Title', the 'List of Values' is 'Joblist', and the 'Options' section has 'Multiple Selection' unchecked, 'Can select all' checked, and 'Refresh other parameters on change' checked. A left-hand pane shows a tree view of report components, with 'Parameters' and 'Joblist' selected.

- Enter a name **Identifier** and the **Data Type** (String, Integer, Boolean, Date, or Float).
- Enter a **Default Value** for the parameter, if desired. Enter * to pass All as the default.

Note: Using * passes a null, so you must handle the null in your data source. A method to handle the null would be the standard Oracle NVL command, for example:

```
where customer_id = nvl(:cstid, customer_id)
```

where cstid is a value passed from the LOV and when the user selects All it will pass a null value.

If your data source is the Oracle BI Server, use the following macro to handle the null:

```
{ $ if ${sYear}='*' $ }
{ $ elsif ${sYear}='2000' $ }
where Year = :sYear
{ $ else $ }
where Year = :sYear
{ $ endif $ }
```

where Year is a value passed from the LOV and when the user selects All it will pass a null value.

Note that the test operator must be either "=" or "!=".

- Select the **Parameter Type**:
 - **Text** - this type allows the user to enter a text entry to pass as the parameter. Enter the Display Label for the parameter and the Text Field Size in characters.
 - **Menu** - this type presents an LOV. Enter the Display Label and select from the LOVs you defined in the previous step. You may also enable the following options:
 - **Multiple Selection** - allows the user to select multiple entries from the list.
 - **Can select all** - inserts an "All" option in the list.
 - **Refresh other parameters on change** - performs a partial page refresh to refresh any other parameters whose values are dependent on the value of this one.
 - **Date** - passes a date parameter. If you select a Parameter Type of Date, the Data Type automatically defaults to Date. Enter the following:
 - Display Label and Text Field Size in characters.
 - Date Format String
 - Date From and Date To
 - **Hidden** - select this option to pass the default value always, without allowing the user to see or change it.

Adding Layouts to the Report Definition

BI Publisher offers several options for designing templates for your reports. Templates can be in any of the following formats:

- Rich Text Format (RTF)

RTF is the most common template type. Use Microsoft Word to design the template. Most Microsoft Word formatting features are supported. BI Publisher provides a plugin utility for Microsoft Word that automates template design and enables you to connect to BI Publisher to access data and upload templates directly from your Word session.

- Portable Document Format (PDF)

PDF templates are used primarily for using predefined forms as templates for your reports. For example, you can download forms from government Web sites and load them to BI Publisher as report templates. You can also design your own PDF templates using Adobe Acrobat Professional. BI Publisher provides a mapping tool to enable you to map fields from your data source to the form fields in the PDF template.

- Microsoft Excel (XLS)

Use BI Publisher's Analyzer for Excel to download your report data to an Excel spreadsheet. Create a layout for the data in Excel and then upload the spreadsheet back to BI Publisher to use as a template. See *Using the BI Publisher Analyzer for Excel*, page 2-14.

- XSL Stylesheet

You can define a template in XSL formatting language. Specify whether your template is for FO, HTML, XML, or Text transformation. To add your template, follow the steps in *Adding a Layout - General Steps*, page 3-27.

- eText

These are specialized RTF templates used for constructing EDI or EFT transactions. See *Creating an eText Template*, page 9-1. To add your template, follow the steps in *Adding a Layout - General Steps*, page 3-27.

To add a layout to your report definition, select **Layouts** to specify the layout template for the report. Defining layouts consists of two steps: Upload a template file, and then assign the template file to a Layout definition. If you are connected to BI Publisher through the Template Builder or Excel Analyzer, you can upload the layout file in one step.

Note: To build a template for your report, you must have sample data. Once you have defined your query, you can select the View link to generate XML. Select the Export button and save the file to your local directory. If you are building an RTF template or Excel template you can load this data directly to the Template Builder for Word or Excel using BI Publisher's desktop tools described in the following sections.

For information on creating template layout files, see *Creating an RTF Template*, page 5-1 or *Creating a PDF Template*, page 8-1.

Adding a Layout - General Steps

To add a layout to your report definition, select **Layouts** to specify the layout template for the report. Defining layouts consists of two steps: Upload a template file, and then assign the template file to a Layout definition. If you are connected to BI Publisher through the Template Builder or Excel Analyzer, you can upload the layout file in one step.

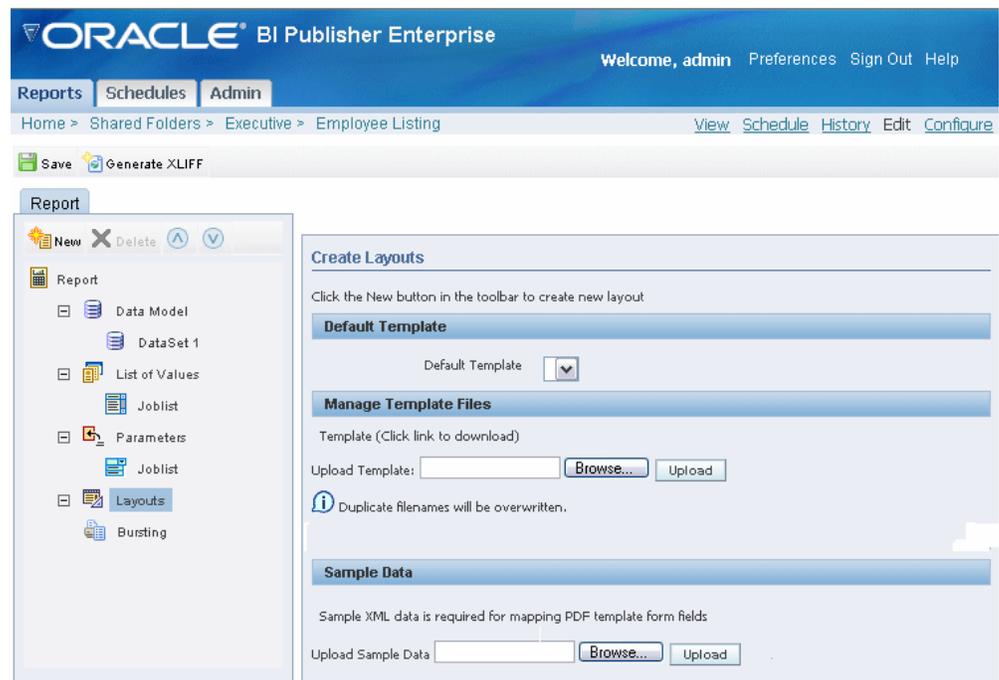
See *Creating an RTF Template Using the Template Builder for Word*, page 3-29.

The general guidelines for uploading and defining the layout for any template type are as follows:

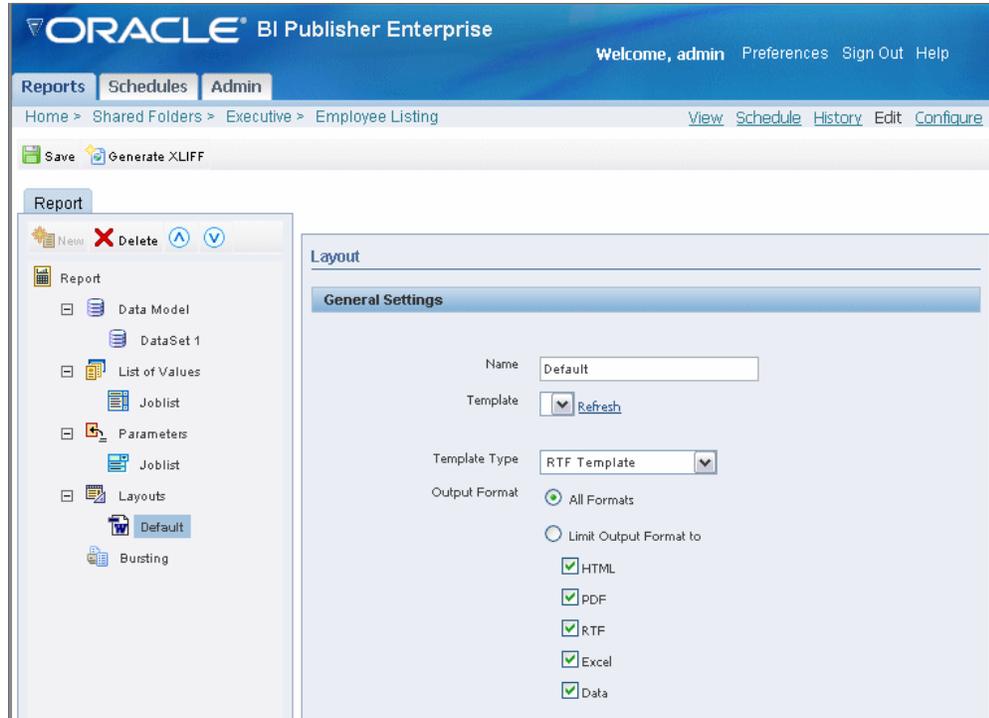
1. Upload your layout template file.

From the BI Publisher Report Editor. Select **Layouts**.

Use the **Browse** button to locate it in your local file system, then select **Upload**. The template will now appear in the **Manage Template Files** region. You can upload as many templates as you want to make available to this report.



2. Select the **New** icon to create the definition for the new template.



- Enter a **Name** for the layout definition. This name will appear in the Template list on the View report page.
- Select the **Template** file from the list of uploaded templates to correspond to this layout definition.
- Select the appropriate template type you are uploading: RTF, PDF, Excel, XSL, or eText.
- Select the **Output Format** types to allow for this layout.

If the template type is RTF, you can either select **All Formats** or limit the allowed formats by selecting only those desired.

All other template types have specific output formats. For these, **All Formats** is automatically selected. The allowed output type for each of the other template types is the same as the template type (example: PDF Templates allow PDF output only).

Note: You can also manage the output types allowed through the Runtime Configuration properties. However, the setting on the report definition will override the configuration. See Setting Runtime Properties, page 11-13.

3. Select Save. The Layout will now appear as an available template when you run the report.
4. Select a Default Template. The Default Template will be used by default by the online viewer and the scheduler unless the user selects another.

Creating an RTF Template Using the Template Builder for Word

Prerequisites:

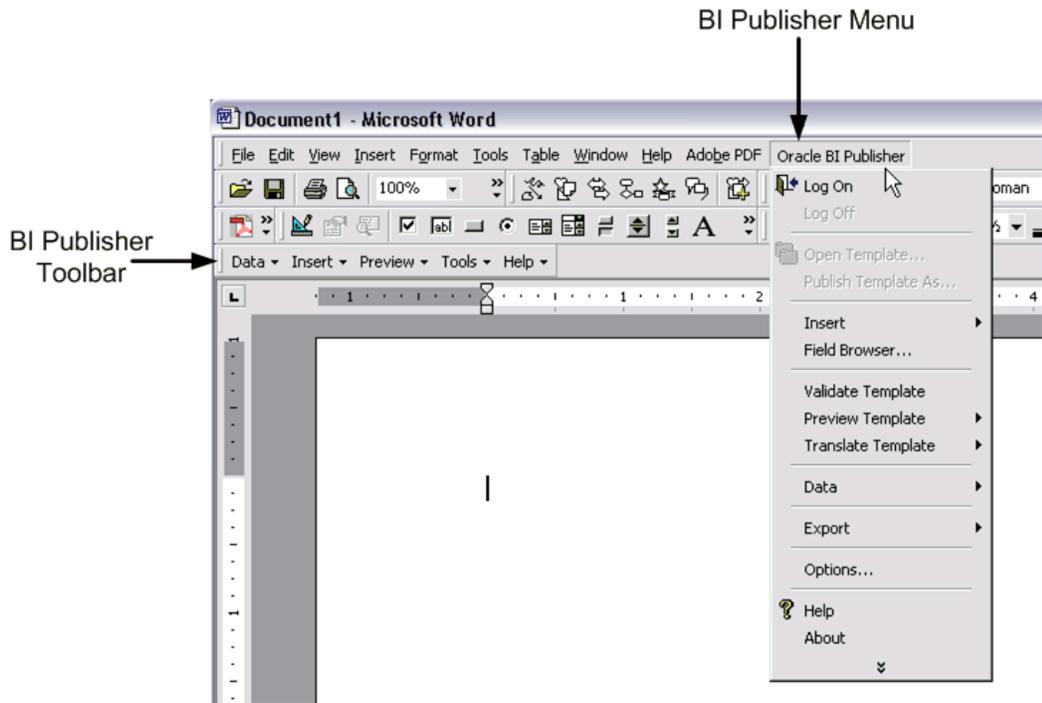
- Your report data model has been created and runs successfully.
- Microsoft Word version 2000 or later and Microsoft Windows version 2000 or later are installed on your client.
- The Template Builder has been downloaded and installed on your client.

The Template Builder can be downloaded from the BI Publisher **Folder and Report Tasks** region.



Features of the Template Builder

When you open Microsoft Word after installing the Template Builder you will notice the Oracle BI Publisher menu and the BI Publisher toolbar.



The toolbar and the menu provide two methods of performing many of the same functions, including:

- Insert data fields into your RTF templates
- Insert tables, forms, charts, and crosstabs
- Preview your template in multiple outputs
- Browse and update the content of form fields
- Validate your template
- Perform calculations on fields within the template
- Connect to the Oracle BI Publisher server or the Oracle BI server to retrieve data to build your template
- Publish your template to the Oracle BI Publisher server
- Extract boilerplate text into an XLIFF translation file and test translations

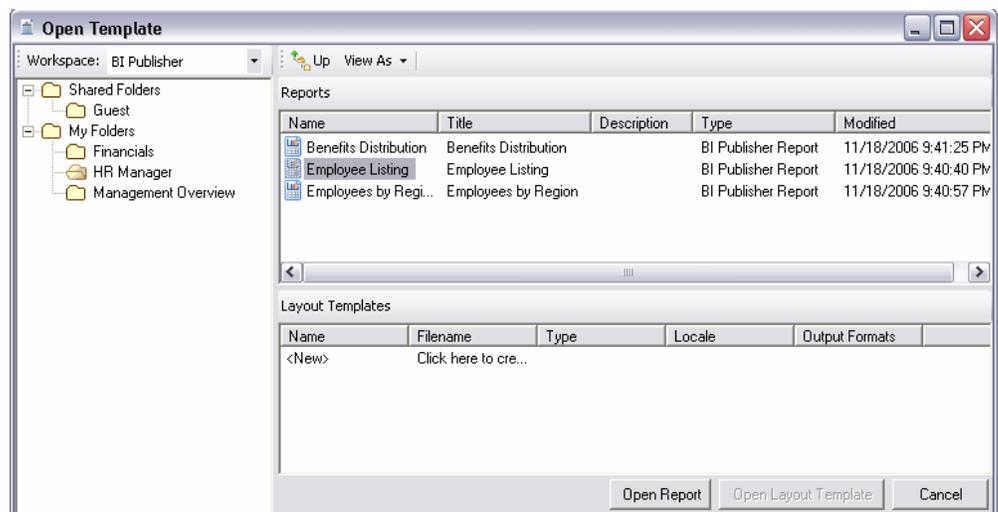
Building and Uploading Your Template

You can build and upload your template via a direct connection with the BI Publisher server, or you can build and upload your template in disconnected mode.

Connected Mode

1. Open Microsoft Word.
2. From the Oracle BI Publisher menu, select **Log On**.
3. Enter your BI Publisher credentials and the URL for the BI Publisher server.
(Contact your system administrator if you do not know the URL.)
4. The Open Template dialog presents the same folder structure as your BI Publisher Reports home page. Select the report for which you want to build a template.
5. Select **Open Report** to load the data to the Template Builder; or double-click <New> in the Layout Templates pane.

Note that any existing templates will be listed in the **Layout Templates** pane.



6. Follow the guidelines in the Template Builder online help (from the Oracle BI Publisher menu) to insert data fields and design your template using features such as tables, charts, graphics, and crosstabs. Use Microsoft Word to apply formatting to fonts and other objects in your template.

For more advanced template options, use the guidelines in *Creating an RTF Template*, page 5-1.

7. To upload your template to the BI Publisher server and add it to your report definition, select **Publish Template As** from the Oracle BI Publisher menu.
If you have not saved your template, you will be prompted to save it in Rich Text Format.
8. Enter a name for your template in the **Upload as New** dialog. Note that this is the name that appears under Layouts in the Report Editor. This is also the template name that will be displayed whenever the user is presented an option for selecting a

template for this report (for example, in the View Report page).

9. (Optional) Limit the output formats for this template.

From the BI Publisher Enterprise interface, open the report in the Report Editor. Under Layouts, select your uploaded template. If you wish to limit the output formats for this report, select only the formats you want to make available.

Disconnected Mode

From the Report Editor:

1. Generate a sample data file.

From the Report Editor or from the Reports page, select **View**. If no layouts are defined for your report, then the output type will default to xml, otherwise, choose **data** for the output type. Select **Export**. Save the results as an XML file to a local directory.

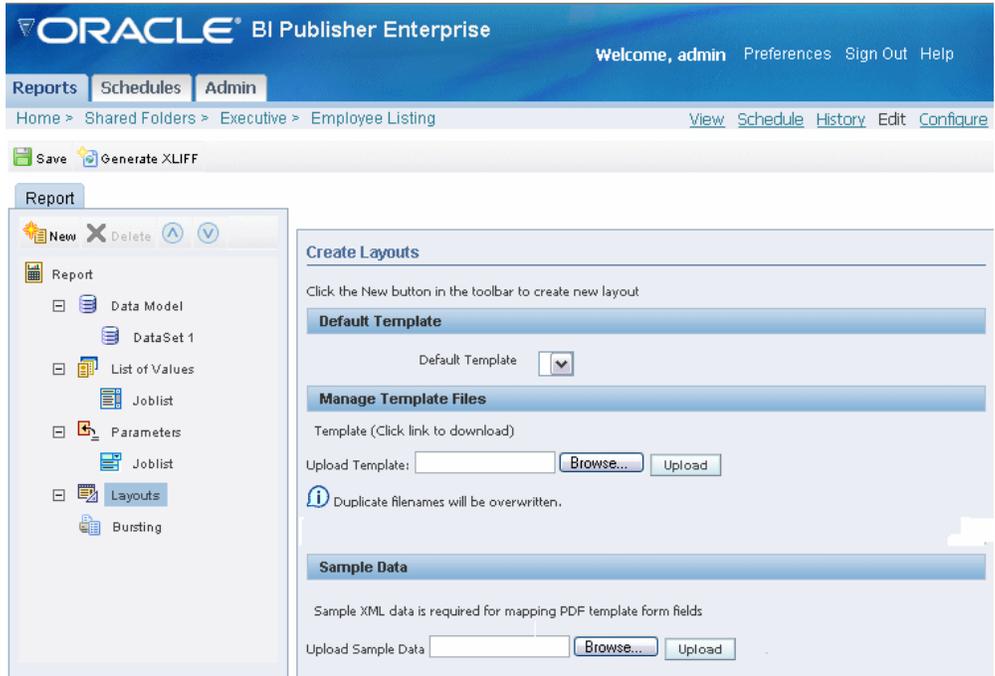
2. Open Microsoft Word with the Template Builder installed.
3. From the Oracle BI Publisher menu select **Data** and then select **Load Sample XML Data**. Locate your sample data file in your local directory and select **Open**. A pop up message will indicate your data has loaded successfully.
4. Follow the guidelines in the Template Builder online help (from the Oracle BI Publisher menu) to insert data fields and design your template using features such as tables, charts, graphics, and crosstabs. Use Microsoft Word to apply formatting to fonts and other objects in your template.

For more advanced template options, use the guidelines in Creating an RTF Template, page 5-1.

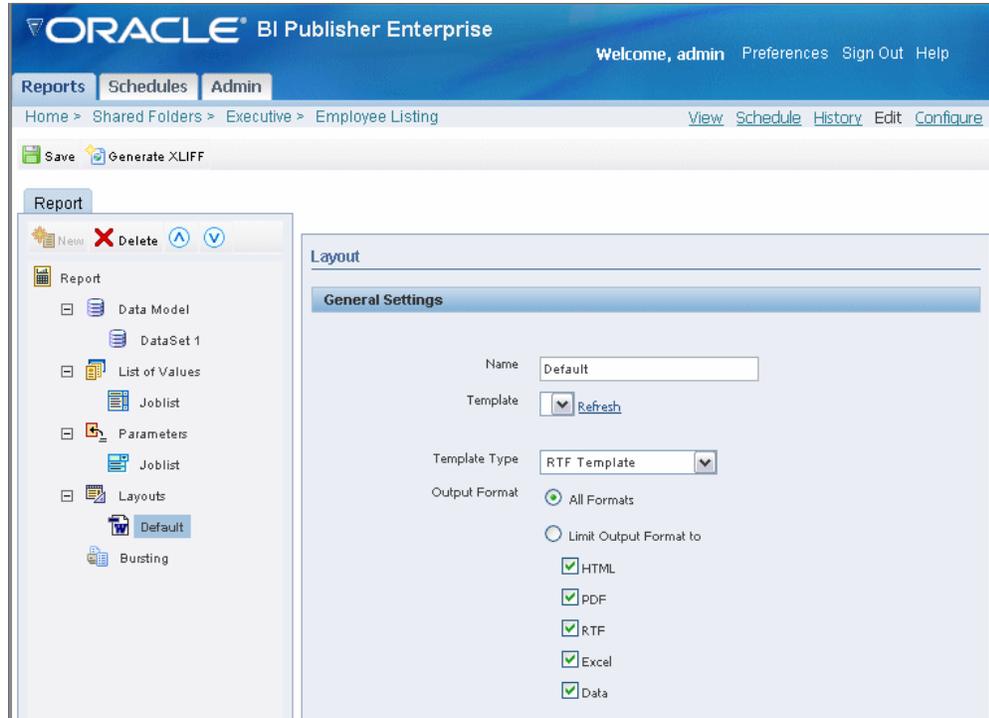
5. Upload your layout template file.

Return to your report definition in the BI Publisher Report Editor. Select **Layouts**.

Use the **Browse** button to locate it in your local file system, then select **Upload**. The template will now appear in the **Manage Template Files** region. You can upload as many templates as you want to make available to this report.



6. Select the **New** icon to create the definition for the new template.



- Enter a **Name** for the layout definition. This name will appear in the Template list on the View report page.
- Select the **Template** file from the list of uploaded templates to correspond to this layout definition.
- Select the appropriate template type: RTF or PDF.
- Select the **Output Format** types to allow for this layout.

If the template type is RTF, you can either select **All Formats** or limit the allowed formats by selecting only those desired.

If the template type is PDF, **All Formats** is automatically selected. The only allowed output type for a PDF template is PDF.

Note: You can also manage the output types through the Runtime Configuration Properties. However, the setting on the report definition will override the configuration setting. For more information, see Setting Runtime Properties, page 11-13.

Adding a PDF Template to Your Report

Typically, the source for a PDF template is a predefined form from a third party, such as

the government. If form fields have already been defined in the PDF, then you have two options for associating the XML data to the PDF form fields:

- Map the data fields to the form fields in the PDF, using BI Publisher's PDF mapping tool
- Name the fields from your data source to match the names of the form fields.

If you are creating a report to be used exclusively for the preparation of a PDF form, then consider naming the fields in your data according to the form field names in the PDF. If the field names match, no mapping is required.

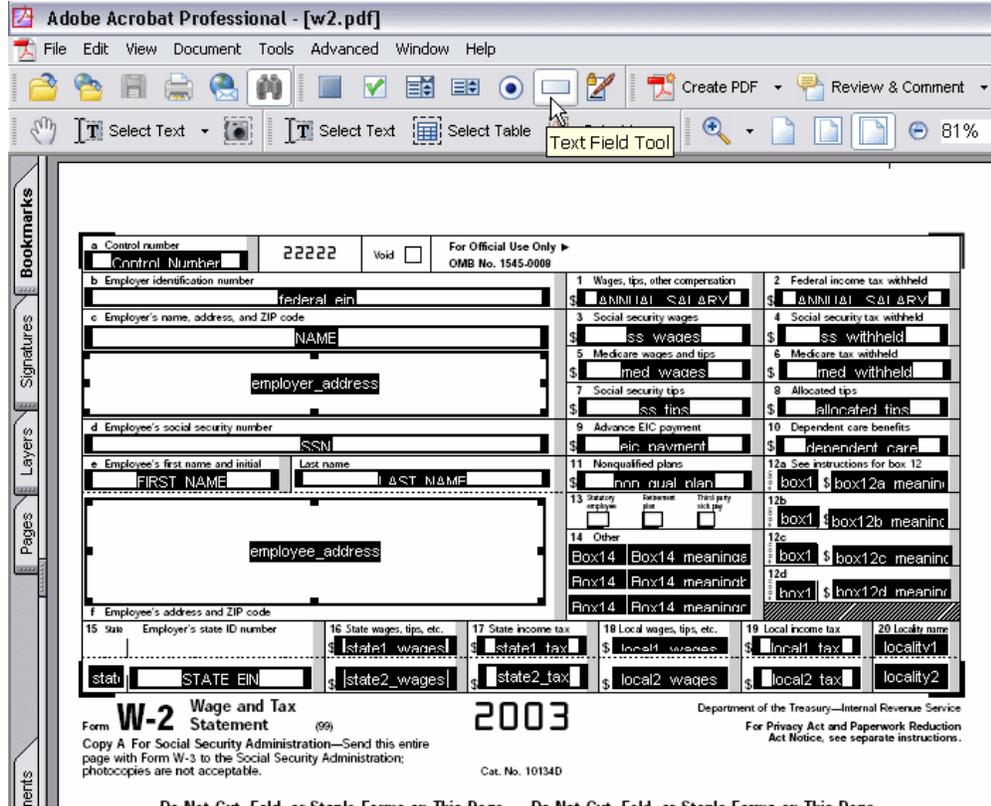
If the predefined PDF does not have form fields defined, or if you wish to design your own PDF template, then you must use Adobe Acrobat Professional to insert the form fields. You can then either name the fields according to the data source (no mapping will be required) or use BI Publisher's PDF mapping tool. For information on designing a PDF template and inserting form fields, see *Creating a PDF Template*, page 8-1.

Determining If a PDF Has Form Fields Defined

If you have the full version of Adobe Acrobat 5.0 or later:

1. Open the file in Adobe Acrobat.
2. Select the Text Field Tool (Adobe Acrobat Professional 6.0 users) or the Form Tool (Adobe Acrobat 5.0 users). This will highlight text fields that have already been defined. If no fields are highlighted then you must add the fields to the PDF. See *Adding Markup to the Template Layout*, page 8-3 for instructions on inserting PDF form fields.

The following figure shows a sample PDF form opened in Adobe Acrobat Professional 6.0. The **Text Field Tool** has been selected to display all the available form fields.



If you do not have the full version of Adobe Acrobat 5.0 or later:

1. Follow the instructions in Adding a Predefined PDF Form as a Template, page 3-36.
2. If no highlighted fields display for mapping, or you cannot select a field, then you must add them before you can use BI Publisher's mapping tool. Adding form fields requires Adobe Acrobat 5.0 or later, or Adobe Acrobat Professional 6.0 or later. For more information, see Creating a PDF Template, page 8-1.

Adding a Predefined PDF Form as a Template

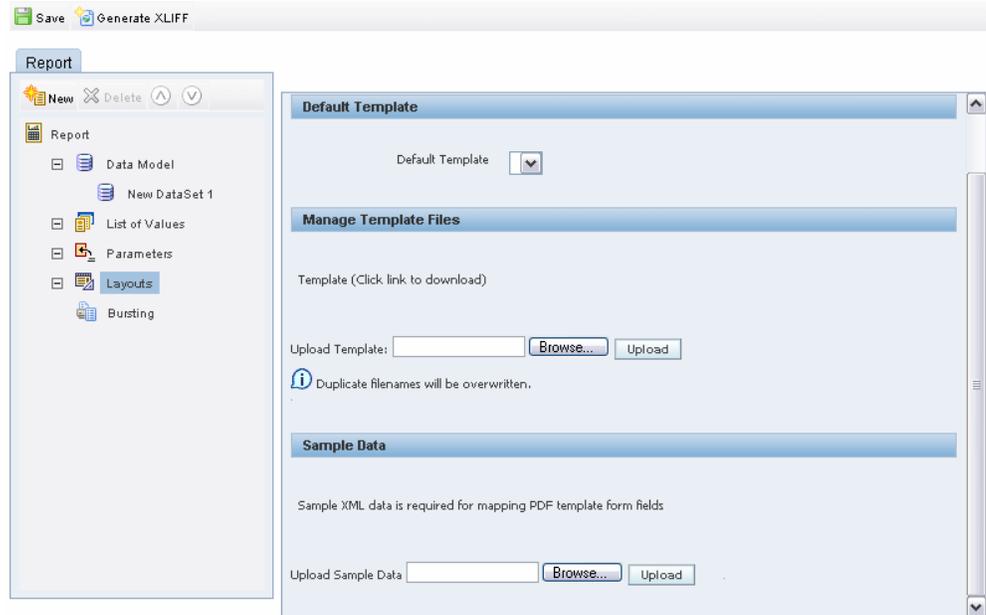
Prerequisites:

- A report data model defined in BI Publisher.
- A PDF document with form fields defined.
- Adobe Acrobat Reader installed as a Web browser plugin. Recommended version is Adobe Acrobat Reader 7.0 or later. (You can use Acrobat Reader 6 if English is the only language required for your site.)

1. From the Report Editor, select **Layouts**.

2. Upload the PDF template file.

From the **Manage Template Files** region, select **Browse** to locate the PDF file, and then select **Upload**.



3. Generate a sample data file.

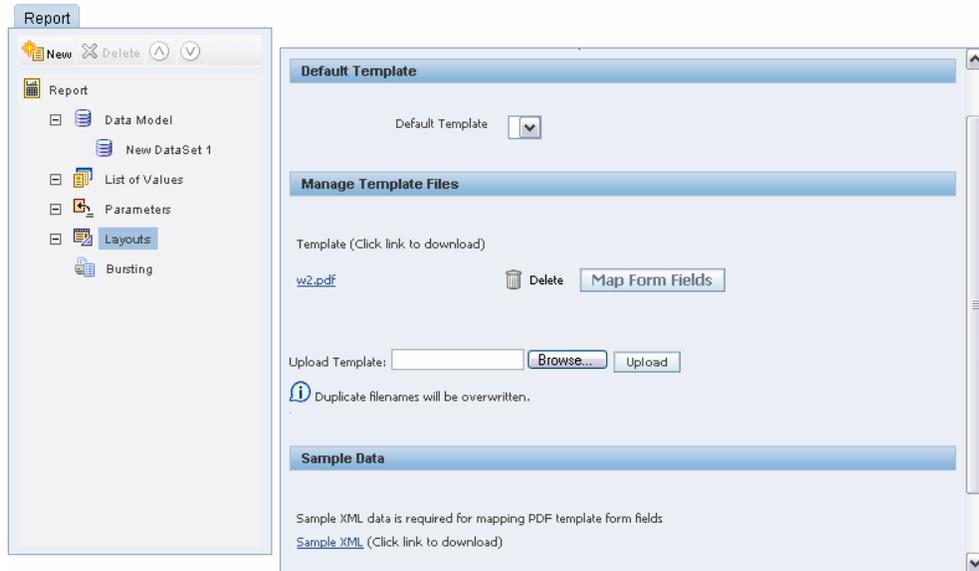
From the Report Editor or from the Reports page, select **View**. If no layouts are defined for your report, then the output type will default to xml, otherwise, choose **data** for the output type. Select **Export**. Save the results as an XML file to a local directory.

4. Upload the sample data file.

From the Report Editor, **Layouts** pane, in the **Sample Data** region, browse for and upload your sample data file.

5. Map the PDF form fields.

Once you have uploaded your template and sample data, the **Map Form Fields** button will become enabled.



6. Select Map Form Fields.

The BI Publisher mapping tool will launch in a separate browser window.

Note that as you mouse over the fields, the name of the field in the PDF form will display.

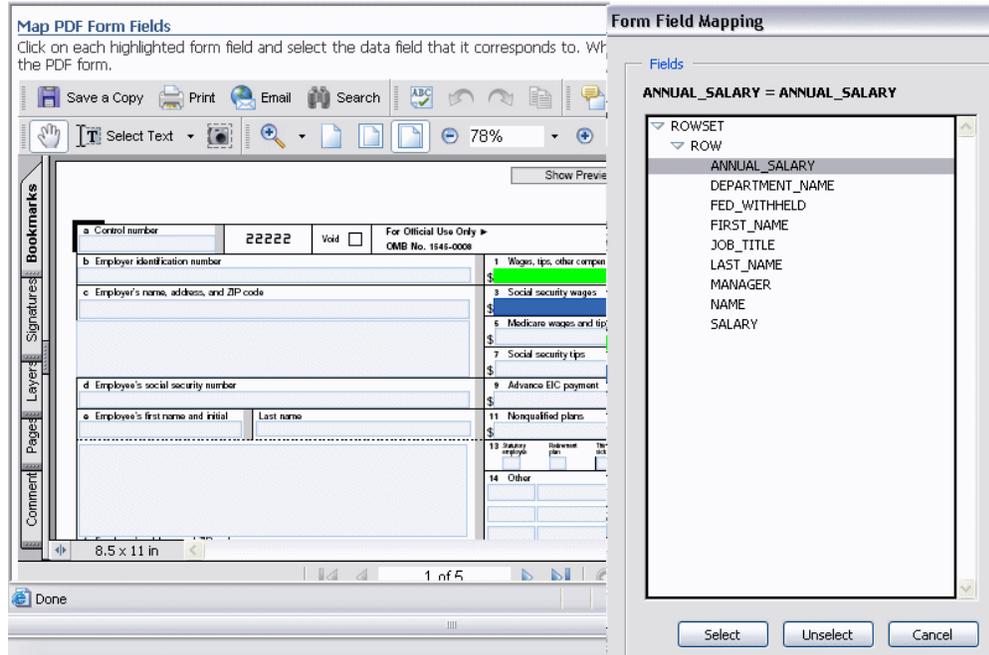
Map PDF Form Fields

Click on each highlighted form field and select the data field that it corresponds to. When finished, use the Submit button in the PDF form.

The screenshot shows a PDF form mapping interface. The toolbar at the top includes buttons for 'Save a Copy', 'Print', 'Email', 'Search', 'Review & Comment', and 'Sign'. Below the toolbar is a 'Select Text' tool and a zoom level of 78%. The main area displays a tax form with several fields highlighted in blue. The form includes sections for 'Control number' (2222), 'Employer identification number', 'Employer's name, address, and ZIP code', 'Employee's social security number', and 'Employee's first name and initial'. The right side of the form contains a grid of boxes for tax withholdings and payments, such as 'Wages, tips, other compensation', 'Federal income tax withheld', 'Social security wages', 'Social security tax withheld', 'Medicare wages and tips', 'Medicare tax withheld', 'Social security tips', 'Allocated tips', 'Advance EIC payment', 'Dependent care benefits', 'Nonqualified plans', and 'Other'. A 'Show Preview' button and a 'Submit' button are located at the top right of the form area. A vertical sidebar on the left contains 'Bookmarks', 'Signatures', 'Layers', 'Pages', and 'Comments'.

7. Click in the field on the PDF form that you want to map data to.

A second window will launch, displaying the field names from the sample data that you loaded. Note that the form field selected is shown at the top of the dialog. If the field is already mapped, the dialog will display the name of the data field that it is currently mapped to. In the figure below, ANNUAL_SALARY is the name of the selected form field. It is shown as being mapped to ANNUAL_SALARY in the data (ANNUAL_SALARY = ANNUAL_SALARY).



8. Select the field from the Form Field Mapping dialog and then click **Select**. This will complete the mapping for the field.
9. Repeat the selection process for each field that you want to map from the PDF template.
10. To see a preview of your template with the sample data mapped to the fields, select **Show Preview**.
11. When you have mapped all fields, select **Submit** to save your mapping file.
Note that the PDF mapping file is saved in the report definition as a .map file.
12. Select the **New** icon to create the definition for the new template.
 - Enter a **Name** for the layout definition. This name will appear in the Template list on the View report page.
 - Select the **Template** file from the list of uploaded templates to correspond to this layout definition.
 - Select the appropriate template type: PDF.
 - The **Output Format** for PDF templates defaults to **All Formats** and does not allow update. PDF output is the only allowed output type for PDF templates.

Enabling Bursting

Using BI Publisher's bursting feature you can split a single report based on a key in the report data and deliver the report based on a second key in the report data. Driven by the delivery key, you can apply a different template, output format, delivery method, and locale to each split segment of your report. Example implementations include:

- Invoice generation and delivery based on customer-specific layouts and delivery preference
- Financial reporting to generate a master report of all cost centers, bursting out individual cost center reports to the appropriate manager
- Generation of payslips to all employees based on one extract and delivered via e-mail

Enabling a Report for Bursting

Prerequisite: A report defined in BI Publisher. The report data must contain an element by which the report will be split and an element by which the report will be delivered.

Enabling a report for bursting consists of the following steps:

- Open the report in Edit mode.
- Select **Bursting** under the report definition.
- Select the **Enable Bursting** check box.
- Select the **Split By** and **Deliver By** elements.

The **Split By** element is the data element from the report file that you wish to split the report by. For example, to split a batch of invoices by each invoice, you may use an element called CUSTOMER_NAME.

The **Deliver By** element is the data element from the report file by which to determine the delivery method. In the invoice example, it is likely that each invoice will have delivery criteria determined by customer, therefore the Deliver By element may be CUSTOMER_ID.

- Select the data source for the delivery XML.

The delivery XML can be sourced from the same data source as the main data set, or it can be generated from a different data source.

- Enter the SQL query to build the delivery XML. See Defining the Delivery Data Set, page 3-42 for details.

Defining the Delivery Data Set

Based on the SQL query that you provide on the Bursting criteria page of the Report Editor, BI Publisher will build the delivery XML data set. The delivery XML data set contains the information to deliver your burst report appropriately to each recipient. The delivery data in this XML document is used as a mapping table for each Deliver By element. The structure of the delivery XML is as follows:

```
<ROWSET>
  <ROW>
    <KEY></KEY>
    <TEMPLATE></TEMPLATE>
    <TEMPLATE_FORMAT></TEMPLATE_FORMAT>
    <LOCALE></LOCALE>
    <OUTPUT_FORMAT></OUTPUT_FORMAT>
    <DEL_CHANNEL></DEL_CHANNEL>
    <PARAMETER1></PARAMETER1>
    <PARAMETER2></PARAMETER2>
    <PARAMETER3></PARAMETER3>
    <PARAMETER4></PARAMETER4>
    <PARAMETER5></PARAMETER5>
    <PARAMETER6></PARAMETER6>
    <PARAMETER7></PARAMETER7>
    <PARAMETER8></PARAMETER8>
    <PARAMETER9></PARAMETER9>
    <PARAMETER10></PARAMETER10>
  </ROW>
</ROWSET>
```

where

- KEY is the Delivery key and must match the **Deliver By** element. The bursting engine uses the key to link delivery criteria to a specific section of the burst data.
- TEMPLATE - is the name of the Layout template to apply. Note that the value is the Layout name (for example, "Invoice"), not the template file name (for example, invoice.rtf).
- TEMPLATE_FORMAT - is the format of the layout template. Valid values are:
 - RTF
 - PDF
 - ETEXT
 - XSL_FO
- LOCALE - is the template locale, for example, "en-US".
- OUTPUT_FORMAT - is the output format. Valid values are: for example: pdf, html, excel.

- HTML
- PDF
- RTF
- EXCEL
- DEL_CHANNEL - is the delivery method. Valid values are:
 - EMAIL
 - FAX
 - FILE
 - FTP
 - PRINT
 - WEBDAV
- Delivery parameters by channel. The delivery parameters by channel are defined in the following table:

Parameter Mapping

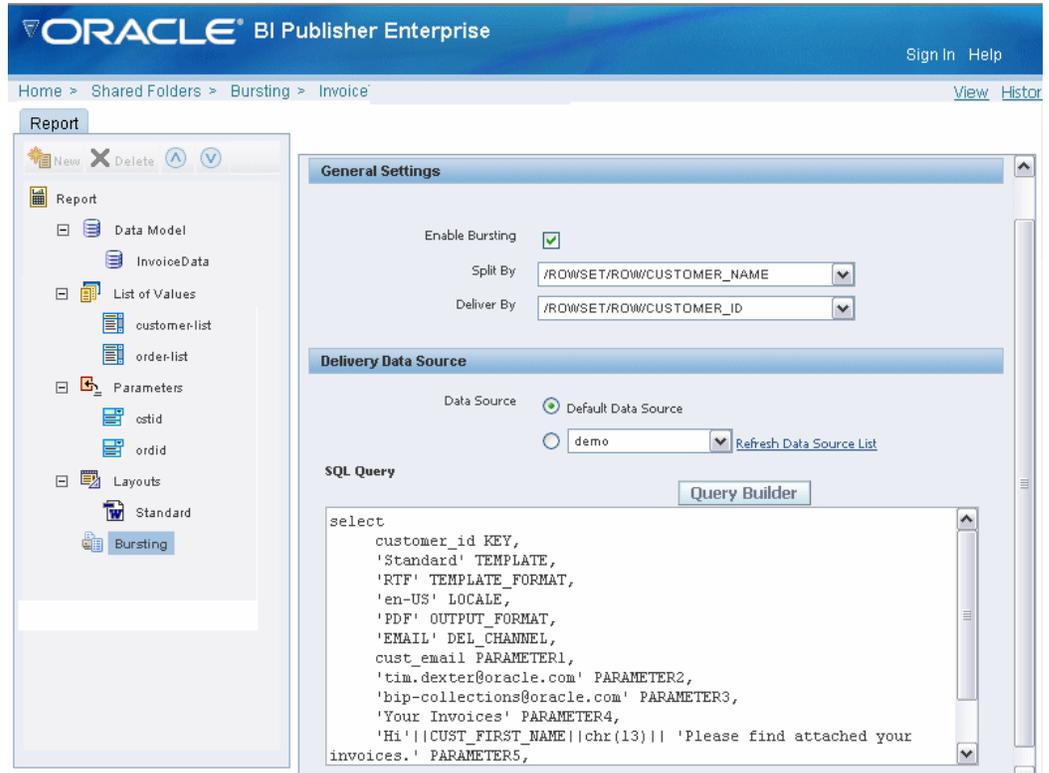
| Channel | Parameter 1 | Parameter 2 | Parameter 3 | Parameter 4 | Parameter 5 | Parameter 6 | Parameter 7 |
|---------|---------------|-------------|-------------|-------------|--------------|---|-------------|
| Email | Email address | cc | From | Subject | Message Body | Attachment (true/false) | Reply-To |
| | | | | | | Note that if your output format is pdf, you must set this parameter to "true" to attach the pdf to the email. | |

| Channel | Parameter 1 | Parameter 2 | Parameter 3 | Parameter 4 | Parameter 5 | Parameter 6 | Parameter 7 |
|---------|-----------------|-------------|------------------|------------------|------------------|-------------|-------------|
| Printer | Printer Group | Printer | Number of copies | Sides | Tray | | |
| Fax | Fax server Name | Fax Number | | | | | |
| WEBDAV | Server Name | Username | Password | Remote Directory | Remote File Name | | |
| File | Directory | File Name | | | | | |
| FTP | Server Name | Username | Password | Remote Directory | Remote File Name | | |

Bursting Example

Example

The following example shows bursting enabled for a report based on the Split By key CUSTOMER_NAME and the Deliver By key CUSTOMER_ID.



The report will be burst and delivered via e-mail. The template, template format, locale, output format, delivery channel, and customer e-mail address are all specified in elements from the delivery data source and will be returned by the query. The SQL to generate the delivery XML for this example is as follows:

```
select distinct
CUSTOMER_ID KEY,
CST_TEMPLATE TEMPLATE,
TMPL_TYPE TEMPLATE_FORMAT,
CST_LOCALE LOCALE,
CST_FORMAT OUTPUT_FORMAT,
CST_DEL_CHAN DEL_CHANNEL,
CST_EMAIL PARAMETER1,
'accounts.receivable@oracle.com' PARAMETER2,
'bip-collections@oracle.com' PARAMETER3,
'Your Invoices' PARAMETER4,
'Hi'||CUST_FIRST_NAME||chr(13)|| 'Please find attached your
invoices.' PARAMETER5,
'true' PARAMETER6,
'donotreply@nowhere.com' PARAMETER7
from customers
```

For information on running the report, see *Scheduling a Report to Be Burst*, page 2-8.

Accessing Reports via a URL

This section describes how to call a BI Publisher report via a URL from another application, for example from a portal or from an Application Express application.

Security Considerations

In the BI Publisher security model, reports are placed in folders and those folders are then secured to a role and a role assigned to a user. For a user to successfully access the report, you must ensure that the user is credentialed within BI Publisher to see it. There are two options for this:

- Use the Guest folder

Enable the Guest folder via the Security Configuration tab of the Security Center page (for more information see *Allowing Guest Access*, page 10-2). Any report in this folder is open to all users to see and run. Use this option if the report does not contain sensitive data.

- Use SSO

If both the calling application and BI Publisher are configured as partner applications in an SSO server, you can call any report via a URL and as long as the user has rights to see or run the report, then BI Publisher will render it without the need for the user to log in. For more information on setting up security options, see *Defining a Security Model*, page 10-1.

Building the URL

The basic URL for a report is as follows:

```
http://<server:port>/xmlpserver/<ReportDirectory>/<ReportName>.xdo
```

where

`server:port` - is the name of the server and port number where BI Publisher is running

`xmlpserver` - is a required string (the name of the application)

`ReportDirectory` - is the folder path to the report

Important: On the BI Publisher server, a report resides in a folder named for the report. For example, assume you have a report called Salary Report. On your BI Publisher desktop it is located in a folder of reports called Executive. Within Executive, it is located in a folder called Private. The path to this report would therefore be

Executive/Private/Salary+Report

Note that you must replace a space in the folder or report name with the + character.

`ReportName.xdo` - is the name of the report with the `.xdo` extension.

This will render the complete report inside the BI Publisher page with all the report

controls. The default template, output and parameters will be used to render the report.
For example:

```
http://xdopf.us.oracle.com:9999/xmlpserver/Executive/Salary+Report/Salary+Report.xdo
```

```
server:port - xdopf.us.oracle.com:9999
```

```
xmlpserver
```

```
ReportDirectory - Executive/Salary+Report
```

```
ReportName.xdo - Salary+Report.xdo
```

Specifying Parameters in the URL

If you want to specify parameters for your output report, such as the template, the output format, and any parameters defined for the report, you can add name/value pairs to the URL. The easiest way to generate the URL is to use the Export function from the BI Publisher View Report page. The URL generated will look similar to the basic URL described above, but the name/value pairs will be added.

For example:

```
http://xdopf.us.oracle.com:9999/xmlpserver/Executive/Employee+Salary+Report/Employee+Salary+Report.xdo?_xpf=&_xpt=1&_xdo=%2FExecutive%2FEmployee+Salary+Report%2FEmployee+Salary+Report.xdo&dept=10&_xt=Standard&_xf=html
```

The URL components through the report name are described in the previous section.

The URL after the report name consists of:

```
?_xpf=&_xpt=1&_xdo=%2FExecutive%2FEmployee+Salary+Report%2FEmployee+Salary+Report.xdo&dept=10=&_xt=Standard&_xf=html
```

Note the following standard URL syntax:

? - denotes the first parameter

& - denotes each additional parameter

The BI Publisher parameters are as follows:

_xpf - required string for internal use

_xpt - defines whether to render the report in the full BI Publisher window (as above), or to render just the report document. Valid values are

- 0 - uses the BI Publisher window
- 1 - renders just the document

_xdo - (optional) provides the path to the current report

dept - this is a parameter specific to the report as defined in the report definition. In this case the department for the data. Notice it takes the department ID. The parameter definition is to show the user the department name and then pass the ID to the query. You can have multiple parameters and their values in the URL.

`_xt` - this controls the template to be used. This is the template name, not the template file name. In this case, the template name is "Standard".

`_xf` - this controls the format of the output to be generated. Valid values are same as for the report: pdf, html, excel, rtf, or data.

Building a Data Template

Introduction

The BI Publisher data engine enables you to rapidly generate any kind of XML data structure against any database in a scalable, efficient manner. The data template is the method by which you communicate your request for data to the data engine. It is an XML document whose elements collectively define how the data engine will process the template to generate the XML.

The data engine supports the following functionality:

- Single and multiple data queries
- Query links
- Parameters
- Aggregate functions (SUM, AVG, MIN, MAX, COUNT)
- Event triggers
- Multiple data groups

The XML output generated by the data engine supports the following:

- Unicode for XML Output

Unicode is a global character set that allows multilingual text to be displayed in a single application. This enables you to develop a single multilingual application and deploy it worldwide.

- Canonical format

The data engine generates date elements using the canonical ISO date format: YYYY-MM-DDTHH24:MI:SS.FF3TZH:TZM for a mapped date element, and

#####.## for number elements in the data template XML output.

The Data Template Definition

The data template is an XML document that consists of four basic sections: define parameters, define triggers, define data query, define data structure. This structure is shown in the following graphic:



As shown in the sample figure, the data template consists of a `<parameters>` section in which parameters are declared in child `<parameter>` elements; a `<dataQuery>` section in which the SQL queries are defined in child `<sqlStatement>` elements; and a `<dataStructure>` section in which the output XML structure is defined.

The table below lists the elements that make up the XML data template. Each element is described in detail in the following sections. Required elements are noted.

| Element | Attributes/Description |
|-------------------------|--|
| dataTemplate (Required) | Attributes: <ul style="list-style-type: none"> • name (Required) • description • version (Required) • defaultPackage - the PL/SQL package name to resolve any lexical references, group filters, or data triggers defined in the template. • dataSourceRef - (Required) the default data source reference for the entire data template. |
| properties | Consists of one or more <property> elements to support the XML output and Data Engine specific properties. |
| property | Attributes: <ul style="list-style-type: none"> • name (Required) - the property name. • value - valid values for this property. |
| parameters | Consists of one or more <parameter> elements. |
| parameter | Attributes: <ul style="list-style-type: none"> • name (Required) - the parameter name that will be referenced in the template. • dataType - valid values are: "character", "date", "number" • defaultValue - value to use for the parameter if none supplied from the data • include_in_output - whether this parameter should appear in the XML output or not. The valid values are "true" and "false". |
| lexicals | (Supported for queries against the Oracle E-Business Suite only). Consists of one or more lexical elements to support flexfields. |

| Element | Attributes/Description |
|-------------------------|--|
| lexical | <p>There are four types of key flexfield-related lexicals as follows:</p> <ul style="list-style-type: none"> • oracle.apps.fnd.flex.kff.segments_metadata • oracle.apps.fnd.flex.kff.select • oracle.apps.fnd.flex.kff.where • oracle.apps.fnd.flex.kff.order_by |
| dataQuery (Required) | Consists of one or more <sqlstatement> or <xml>elements. |
| sqlstatement (Required) | <p>Attributes:</p> <ul style="list-style-type: none"> • name (Required) - the unique query identifier. Note that this name identifier will be the same across the data template. Enter the query inside the CDATA section. |
| xml | <p>Attributes:</p> <ul style="list-style-type: none"> • name (Required) - the unique query identifier. • expressionPath – Xpath expression |
| url | <p>Attributes:</p> <ul style="list-style-type: none"> • method – either GET or POST • realm - authentication name • username- valid username • password - valid password |

| Element | Attributes/Description |
|---------------|---|
| link | <p>Attributes:</p> <ul style="list-style-type: none"> • parentQuery - specify the parent query name. • parentColumn - specify the parent column name. • childQuery - specify the child query name. • childColumn - specify the child column name. • condition - the SQL operator that defines the relationship between the parent column and the child column. The following values for condition are supported: =, <, <=, >, >= |
| dataTrigger | <p>Attributes:</p> <ul style="list-style-type: none"> • name (Required) - the event name to fire this trigger • source (Required) - the PL/SQL <package name>.<function name> |
| dataStructure | <p>(Required for multiple queries) Defines the structure of the output XML. Consists of <group> and <element>elements to specify the structure. This section is optional for single queries; if not specified, the data engine will generate flat XML.</p> |
| group | <p>Consists of one or more <element> elements and sub <group> elements.</p> <p>Attributes:</p> <ul style="list-style-type: none"> • name (Required) - the XML tag name to be assigned to the group. • source (Required) - the unique query identifier for the corresponding sqlstatement from which the group's elements will be derived. • groupFilter - the filter to apply to the output data group set. Define the filter as: <package name>.<function name>. <p>Note: Applying a filter has performance impact. Do not use this functionality unless necessary. When possible, filter data using a WHERE clause in your query.</p> |

| Element | Attributes/Description |
|--------------------|---|
| element (Required) | Attributes: <ul style="list-style-type: none"> name - the tag name to assign to the element in the XML data output. value (Required) - the column name for the SQL statement. Note that for aggregations in which the column name is in another group, the value must be defined as <code><group name>.<column/alias name></code>. function - supported functions are: SUM(), COUNT(), AVG(), MIN(), MAX() |

Constructing the Data Template

You can use any text or XML editor to write a data template.

Data Template Declaration

The `<dataTemplate>` element is the root element. It has a set of related attributes expressed within the `<dataTemplate>` tag.

| Attribute Name | Description |
|----------------|--|
| name | (Required) Enter the data template name. |
| description | (Optional) Enter a description of this data template. |
| version | (Required) Enter a version number for this data template. |
| defaultPackage | This attribute is required if your data template contains lexical references or any other calls to PL/SQL. |
| dataSourceRef | (Required) The default data source reference for the entire data template. |

Properties Section

Use the `<properties>` section to set properties to affect the XML output and data engine execution.

Example:

```

<properties>
  <property name="include_parameters" value="false" />
  <property name="include_null_Element" value="false" />
  <property name="include_rowsettag" value="false" />
  <property name="scalable_mode" value="on" />
</properties>

```

The following table shows the supported properties:

| Property Name | Description |
|----------------------|---|
| include_parameters | <p>Indicates whether to include parameters in the output.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> • True (default) • False |
| include_null_Element | <p>Indicates whether to remove or keep the null elements in the output.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> • True (default) • False |
| xml_tag_case | <p>Allows you to set the case for the output XML element names.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> • upper (default) • lower • as_are (The case will follow the definition in the dataStructure section.) |
| db_fetch_size | <p>Sets the number of rows fetched at a time through the jdbc connection. The default value is 500.</p> |

| Property Name | Description |
|-------------------|--|
| scalable_mode | <p>Sets the data engine to execute in scalable mode. This is required when processing a large volume of data.</p> <p>Valid values:</p> <ul style="list-style-type: none"> • on • off (default) |
| include_rowsettag | <p>Allows you to include or exclude the Rowset Tag from the output.</p> <p>Valid values:</p> <ul style="list-style-type: none"> • true (default) • false |
| debug_mode | <p>Turns debug mode on or off.</p> <p>Valid values:</p> <ul style="list-style-type: none"> • on • off (default) |

Parameters Section

A parameter is a variable whose value can be set at runtime. Parameters are especially useful for modifying `SELECT` statements and setting PL/SQL variables at runtime. The Parameters section of the data template is optional.

How to Define Parameters

The `<parameter>` element is placed between the open and close `<parameters>` tags. The `<parameter>` element has a set of related attributes. These are expressed within the `<parameter>` tag. For example, the `name`, `dataType`, and `defaultValue` attributes are expressed as follows:

```
<parameters>
  <parameter name="dept" dataType="number" defaultValue="10"/>
</parameters>
```

| Attribute Name | Description |
|-------------------|---|
| name | Required. A keyword, unique within a given Data Template, that identifies the parameter. |
| dataType | Optional. Specify the parameter data type as "character", "date", or "number". Default value is "character". For the "date" dataType, the following three formats (based on the canonical ISO date format) are supported: <ul style="list-style-type: none"> • YYYY-MM-DD (example: 1997-10-24) • YYYY-MM-DD HH24:MI:SS (example: 1997-10-24 12:00:00) • YYYY-MM-DDTHH24:MI:SS.FF3TZH:TZM |
| defaultValue | Optional. This value will be used for the parameter if no other value is supplied from the data at runtime. |
| include_in_output | Optional. Whether this parameter should appear in XML output or not. The valid values are "true" and "false". |

How to Pass Parameters

To pass parameters, (for example, to restrict the query), use bind variables in your query. For example:

Query:

```
SELECT * FROM EMP
WHERE deptno=:department
```

At runtime, the value of `department` is passed to the query:

```
SELECT * FROM EMP
WHERE deptno=10
```

Data Query Section

The `<dataQuery>` section of the data template is required.

Supported Column Types

The following column types are selectable:

- VARCHAR2, CHAR

- NUMBER
- DATE, TIMESTAMP
- BLOB/BFILE (conditionally supported)

BLOB image retrieval is supported in the following two cases:

- Using the SetSQL API (see SQL to XML Processor, page 4-28)
- In the data template when no Structure section is defined. The returned data must be flat XML.

The BLOB/BFILE must be an image. Images are retrieved into your results XML as base64 encoding. You can retrieve any image type that is supported in the RTF template (jpg, gif, or png). You must use specific syntax to render the retrieved image in your template. See Rendering an Image Retrieved from BLOB Data, page 5-17.

- CLOB (conditionally supported)

The CLOB must contain text or XML. Data cannot be escaped inside the CLOB column.

- XMLType (conditionally supported)

XMLType can be supported if it is converted to a CLOB using the `getClobVal()` method.

- REF CURSOR (conditionally supported)

A REF CURSOR is supported inside the SQL statement when only one results set is returned.

How to Define SQL Queries

The `<sqlStatement>` element is placed between the open and close `dataQuery` tags. The `<sqlStatement>` element has a related attribute, `name`. It is expressed within the `<sqlStatement>` tag. The query is entered in the CDATA section. For example:

```
<dataQuery>
  <sqlStatement name="Q1">
    <![CDATA[SELECT DEPTNO,DNAME,LOC from dept]]>
  </sqlStatement>
</dataQuery>
```

| Attribute Name | Description |
|----------------|--|
| name | A unique identifying name for the query. Note that this name will be referred to throughout the data template. |

If your column names are not unique, you must use aliases in your SELECT statements to ensure the uniqueness of your column names. If you do not use an alias, then the default column name is used. This becomes important when you specify the XML output in the dataStructure section. To specify an output XML element from your query you declare a `value` attribute for the element tag that corresponds to the source column.

Tip: Performing operations in SQL is faster than performing them in the data template or PL/SQL. It is recommended that you use SQL for the following operations:

- Use a WHERE clause instead of a group filter to exclude records.
- Perform calculations directly in your query rather than in the template.

How to Define an XML Data Source

Place the `<xml>` element between the open and close `dataQuery` tags. The `<xml>` element has the related attributes: `name`, which is a unique identifier; and `expressionPath`, which can be used to link the SQL query and the XML data. Linking the SQL query and XML data enables you to leverage capabilities such as aggregation and summarization.

Example:

```
<xml name="empxml" expressionPath="//ROW[DEPTNO=$DEPTNO]">
<url method="GET" realm="" username=""
password="">file:///d:/dttest/employee.xml</url>
</xml>
```

Lexical References

You can use lexical references to replace the clauses appearing after SELECT, FROM, WHERE, GROUP BY, ORDER BY, or HAVING. Use a lexical reference when you want the parameter to replace multiple values at runtime.

Create a lexical reference using the following syntax:

```
&parametername
```

Define the lexical parameters as follows:

- Before creating your query, define a parameter in the PL/SQL default package for each lexical reference in the query. The data engine uses these values to replace the lexical parameters.
- Create your query containing lexical references.

For example:

```
Package employee
AS
  where_clause varchar2(1000);
  .....

Package body employee
AS
  .....
where_clause := 'where deptno=10';
.....
```

Data template definition:

```
<dataQuery>
  <sqlstatement name="Q1">
    <![CDATA[SELECT ENAME, SAL FROM EMP &where_clause]]>
  </sqlstatement>
</dataQuery>
```

How to Define a Data Link Between Queries

If you have multiple queries, you must link them to create the appropriate data output. In the data template, there are two methods for linking queries: using bind variables or using the `<link>` element to define the link between queries.

Tip: To maximize performance when building data queries in the data template:

BI Publisher tests have shown that using bind variables is more efficient than using the link tag.

The following example shows a query link using a bind variable:

```
<dataQuery>
  <sqlstatement name="Q1">
    <![CDATA[SELECT EMPNO, ENAME, JOB from EMP
      WHERE DEPTNO = :DEPTNO]]>
  </sqlstatement>
</dataQuery>
```

The `<link>` element has a set of attributes. Use these attributes to specify the required link information. You can specify any number of links. For example:

```
<link name="DEPTEMP_LINK" parentQuery="Q1" parentColumn="DEPTNO"
  childQuery="Q_2" childColumn="DEPARTMENTNO"/>
```

| Attribute Name | Description |
|----------------|--|
| name | Required. Enter a unique name for the link. |
| parentQuery | Specify the parent query name. This must be the name that you assigned to the corresponding <code><sqlstatement></code> element. See <i>How to Define Queries</i> , page 4-10. |
| parentColumn | Specify the parent column name. |
| childQuery | Specify the child query name. This must be the name that you assigned to the corresponding <code><sqlstatement></code> element. See <i>How to Define Queries</i> , page 4-10. |
| childColumn | Specify the child column name. |

Using Data Triggers

Data triggers execute PL/SQL functions at specific times during the execution and generation of XML output. Using the conditional processing capabilities of PL/SQL for these triggers, you can do things such as perform initialization tasks and access the database.

Data triggers are optional, and you can have as many `<dataTrigger>` elements as necessary.

The `<dataTrigger>` element has a set of related attributes. These are expressed within the `<dataTrigger>` tag. For example, the name and source attributes are expressed as follows:

```
<dataTrigger name="beforeReport" source="employee.beforeReport()" />
<dataTrigger name="beforeReport"
source="employee.beforeReport(:Parameter)" />
```

| Attribute Name | Description |
|----------------|---|
| name | The event name to fire this trigger. |
| source | The PL/SQL <code><package name>.<function name></code> where the executable code resides. |

The location of the trigger indicate at what point the trigger fires:

- Place a `beforeReport` trigger anywhere in your data template before the `<dataStructure>` section.. A `beforeReport` trigger fires before the `dataQuery` is

executed.

- Place an afterReport trigger after the <dataStructure> section. An afterReport trigger fires after you exit and after XML output has been generated.

Data Structure Section

In the data structure section you define what the XML output will be and how it will be structured. The complete group hierarchy is available for output. You can specify all the columns within each group and break the order of those columns; you can use summaries, and placeholders to further customize within the groups. The dataStructure section is required for multiple queries and optional for single queries. If omitted for a single query, the data engine will generate flat XML.

Defining a Group Hierarchy

In the data template, the <group>element is placed between open and close <dataStructure> tags. Each <group>has a set of related elements. You can define a group hierarchy and name the element tags for the XML output.

Creating Break Groups

Use a break group to produce subtotals or add placeholder columns. A break group suppresses duplicate values in sequential records. You should set an Order By clause in the SQL query to suppress duplicate values.

Assign a name to the group, and declare the source query, then specify the elements you want included in that group. When you specify the element, you assign it a name that will be used as the XML output tag name, and you declare the source column as the value. If you do not assign a name, the value (or source column name) will be used as the tag name.

For example:

```
<dataStructure>
  <group name="G_DEPT" source="Q1" ">
    <element name="DEPT_NUMBER" value="DEPTNO" />
    <element name="DEPT_NAME" value="DNAME"/>
  <group name="G_EMP" source="Q2">
    <element name="EMPLOYEE_NUMBER" value="EMPNO" />
    <element name="NAME" value="ENAME"/>
    <element name="JOB" value="JOB" />
  </group>
</group>
</dataStructure>
```

The following table lists the attributes for the <group>element tag:

| Attribute Name | Description |
|----------------|---|
| name | Specify any unique name for the group. This name will be used as the output XML tag name for the group. |
| source | The name of the query that provides the source data for the group. The <code>source</code> must come from the <code>name</code> attribute of the <code><sqlStatement></code> element. |

The following table lists the attributes for the `<element>` element tag:

| Attribute Name | Description |
|----------------|---|
| name | Specify any name for the element. This name will be used as the output XML tag name for the element. The name is optional. If you do not specify a name, the source column name will be used as the XML tag name. |
| value | The name of the column that provides the source data for the element (from your query). |

Applying Group Filters

It is strongly recommended that you use a WHERE clause instead of a group filter to exclude records from your extract. Filters enable you to conditionally remove records selected by your queries, however, this approach impacts performance. Groups can have user-created filters, using PL/SQL.

The PL/SQL function must return a boolean value (TRUE or FALSE). Depending on whether the function returns TRUE or FALSE, the current record is included or excluded from the XML data output.

For example, a sample PL/SQL function might be:

```
function G_EMPFilter return boolean is
begin
  if sal < 1000 then
    return (FALSE);
  else
    return (TRUE);
  end if;
end;
```

An example of the group filter in your data template definition would be:

```

<group name="G_DEPT" source="Q1"
groupFilter="empdata.G_EMPFilter(:DEPTSAL)">
  <element name="DEPT_NUMBER" value="DEPTNO" />
  <element name="DEPT_NAME" value="DNAME"/>
  <element name="DEPTSAL" value="G_EMP.SALARY" function="SUM()"/>

```

Creating a Summary Column

A summary column performs a computation on another column's data. Using the `function` attribute of the `<element>` tag, you can create the following summaries: sum, average, count, minimum, and maximum.

To create a summary column, you must define the following three attributes in the element tag:

| Attribute | Description |
|-----------|---|
| name | The XML tag name to be used in the XML data output. |
| source | The name of the column that contains the data on which the summary calculation is to be performed. The source column remains unchanged. |
| function | The aggregation function to be performed. The type tells the XDO data engine how to compute the summary column values. Valid values are: SUM(), AVG(), COUNT(), MAX(), and MIN(). |

The break group determines when to reset the value of the summary column. For example:

```

<group name="G_DEPT" source="Q1">
  <element name="DEPT_NUMBER" value="DEPTNO" />
  <element name="DEPTSAL" value="G_EMP.SALARY" function="SUM()"/>
  <group name="G_EMP" source="Q2">
    <element name="EMPLOYEE_NUMBER" value="EMPNO" />
    <element name="NAME" value="ENAME"/>
    <element name="JOB" value="JOB" />
    <element name="SALARY" value="SAL"/>
  </group>
</group>

```

Flexfield Support

Note: This section applies to data templates written to query the Oracle Applications database.

Flexfields are defined in the data template using lexical parameters.

How to define a flexfield

1. Define the SELECT statement to use for the report data.
2. Within the SELECT statement, define each flexfield as a lexical. Use the &LEXICAL_TAG to embed flexfield related lexicals into the SELECT statement.
3. Define the flexfield-related lexicals using XML tags in the data template.

Example

```
<dataTemplate ...
  <parameters ...
  </parameters>

  <lexicals ...
    <lexical type="oracle.apps.fnd.flex.kff..."
      name="<Name of the lexical>"
      comment="<comment>"
    />
    <lexical type="oracle.apps.fnd.flex.kff..."
      name="<Name of the lexical>"
      comment="<comment>"
    />
  </lexicals>

  <dataQuery>
    <sqlStatement ...

      SELECT &FLEX_SELECT flex_select_alias
      FROM some_table st, code_combination_table cct
      WHERE st.some_column = 'some_condition'
      AND &FLEX_WHERE
      ORDER BY st.some_column, &FLEX_ORDER_BY
    </sqlStatement>
  </dataQuery>
</dataStructure .../>

</dataTemplate>
```

Flexfield Lexicals

There are four types of KFF-related lexicals. These are:

- oracle.apps.fnd.flex.kff.segments_metadata
- oracle.apps.fnd.flex.select
- oracle.apps.fnd.flex.kff.where
- oracle.apps.fnd.flex.kff.order_by

Following are descriptions of each type of KFF lexical:

oracle.apps.fnd.flex.kff.segments_metadata

Use this type of lexical to retrieve flexfield-related metadata. Using this lexical, you are not required to write PL/SQL code to retrieve this metadata. Instead, define a dummy SELECT statement, then use this lexical to get the metadata.

The XML syntax for this lexical is as follows:

```
<lexicals>
  <lexical
    type="oracle.apps.fnd.flex.kff.segments_metadata"
    name="Name of the lexical"
    comment="Comment"
    application_short_name="Application Short Name of the KFF"
    id_flex_code="Internal code of the KFF"
    id_flex_num="Internal number of the KFF structure"
    segments="For which segment(s) is this metadata requested?"
    show_parent_segments="Should the parent segments be listed?"
    metadata_type="Type of metadata requested"/>
</lexicals>
```

The following table lists the attributes for the segments_metadata lexical:

| Attribute | Description |
|------------------------|--|
| application_short_name | (Required) The application short name of the key flexfield. For example: SQLGL. |
| id_flex_code | (Required) the internal code of the key flexfield. For example: GL# |
| id_flex_num | (Required) Internal number of the key flexfield structure. For example: 101 |
| segments | (Optional) Identifies for which segments this data is requested. Default value is "ALL". See the <i>Oracle Applications Developer's Guide</i> for syntax. |
| show_parent_segments | (Optional) Valid values are "Y" and "N". Default value is "Y". If a dependent segment is displayed, the parent segment is automatically displayed, even if it is not specified as displayed in the segments attribute. |
| metadata_type | (Required) Identifies what type of metadata is requested. Valid values are: above_prompt - above prompt of segment(s) left_prompt - left prompt of segment(s) |

Example

This example shows how to request the `above_prompt` of the GL Balancing Segment, and the `left_prompt` of the GL Account Segment.

```
SELECT &FLEX_GL_BALANCING_ABPROMPT alias_gl_balancing_aprompt,  
&FLEX_GL_ACCOUNT_LPROMPT alias_gl_account_lprompt  
FROM dual
```

```
<lexicals>  
  <lexical type="oracle.apps.fnd.flex.kff.segments_metadata"  
    name="FLEX_GL_BALANCING_ABPROMPT"  
    comment="Comment"  
    application_short_name="SQLGL"  
    id_flex_code="GL#"  
    id_flex_num=":P_ID_FLEX_NM"  
    segments="GL_BALANCING"  
    metadata_type="ABOVE_PROMPT"/>  
  <lexical type="oracle.apps.fnd.flex.kff.segments_metadata"  
    name="FLEX_GL_ACCOUNT+LPROMPT"  
    comment="Comment"  
    application_short_name="SQLGL"  
    id_flex_code="GL#"  
    id_flex_num=":P_ID_FLEX_NUM"  
    segments="GL_ACCOUNT"  
    metadata_type="LEFT_PROMPT"/>  
</lexicals>
```

oracle.apps.fnd.flex.kff.select

This type of lexical is used in the `SELECT` section of the statement. It is used to retrieve and process key flexfield (kff) code combination related data based on the lexical definition.

The syntax is as follows:

```
<lexicals>  
  <lexical  
    type="oracle.apps.fnd.flex.kff.select"  
    name="Name of the lexical"  
    comment="Comment"  
    application_short_name="Application Short Name of the KFF"  
    id_flex_code="Internal code of the KFF"  
    id_flex_num="Internal number of the KFF structure"  
    multiple_id_flex_num="Are multiple structures allowed?"  
    code_combination_table_alias="Code Combination Table Alias"  
    segments="Segments for which this data is requested"  
    show_parent_segments="Should the parent segments be listed?"  
    output_type="output type"/>  
</lexicals>
```

The following table lists the attributes for this lexical:

| Attribute | Description |
|-------------------------------------|---|
| <code>application_short_name</code> | (Required) The application short name of the key flexfield. For example: SQLGL. |

| Attribute | Description |
|------------------------------|---|
| id_flex_code | (Required) the internal code of the key flexfield. For example: GL# |
| id_flex_num | (Conditionally required) Internal number of the key flexfield structure. For example: 101. Required if MULTIPLE_ID_FLEX_NUM is "N". |
| multiple_id_flex_num | (Optional) Indicates whether this lexical supports multiple structures or not. Valid values are "Y" and "N". Default is "N". If set to "Y", then flex will assume all structures are potentially used for data reporting and it will use <code><code_combination_table_alias>.<set_defining_column_name></code> to retrieve the structure number. |
| code_combination_table_alias | (Optional) Segment column names will be prepended with this alias. |
| segments | (Optional) Identifies for which segments this data is requested. Default value is "ALL". See the <i>Oracle Applications Developer's Guide</i> for syntax. |
| show_parent_segments | (Optional) Valid values are "Y" and "N". Default value is "Y". If a dependent segment is displayed, the parent segment is automatically displayed, even if it is not specified as displayed in the <code>segments</code> attribute. |
| output_type | (Required) Indicates what kind of output should be used as the reported value. Valid values are: value - segment value as it is displayed to user. padded_value - padded segment value as it is displayed to user. Number type values are padded from the left. String type values are padded on the right. |
| description | Segment value's description up to the description size defined in the segment definition. |
| full_description | Segment value's description (full size). |

| Attribute | Description |
|-----------|--|
| security | Returns Y if the current combination is secured against the current user, N otherwise. |

Example

This example shows how to report concatenated values, concatenated descriptions, the value of the GL Balancing Segment, and the full description of the GL Balancing Segment for a single structure:

```

SELECT &FLEX_VALUE_ALL alias_value_all,
       &FLEX_DESCR_ALL alias_descr_all,
       &FLEX_GL_BALANCING alias_gl_balancing,
       &FLEX_GL_BALANCING_FULL_DESCR alias_gl_balancing_full_descr,
       ...
FROM   gl_code_combinations gcc,
       some_other_gl_table sogt
WHERE  gcc.chart_of_accounts_id = :p_id_flex_num
       and sogt.code_combination_id = gcc.code_combination_id
       and <more conditions on sogt>

```

```

<lexicals>
  <lexical
    type="oracle.apps.fnd.flex.kff.select"
    name="FLEX_VALUE_ALL"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    multiple_id_flex_num="N"
    code_combination_table_alias="gcc"
    segments="ALL"
    show_parent_segments="Y"
    output_type="VALUE"/>
  <lexical
    type="oracle.apps.fnd.flex.kff.select"
    name="FLEX_DESCR_ALL"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    multiple_id_flex_num="N"
    code_combination_table_alias="gcc"
    segments="ALL"
    show_parent_segments="Y"
    output_type="DESCRIPTION"/>
  <lexical
    type="oracle.apps.fnd.flex.kff.select"
    name="FLEX_GL_BALANCING"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    multiple_id_flex_num="N"
    code_combination_table_alias="gcc"
    segments="GL_BALANCING"
    show_parent_segments="N"
    output_type="VALUE"/>
  <lexical
    type="oracle.apps.fnd.flex.kff.select"
    name="FLEX_GL_BALANCING_FULL_DESCR"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    multiple_id_flex_num="N"
    code_combination_table_alias="gcc"
    segments="GL_BALANCING"
    show_parent_segments="N"
    output_type="FULL_DESCRIPTION"/>

```

```
</lexicals>
```

oracle.apps.fnd.flex.kff.where

This type of lexical is used in the WHERE section of the statement. It is used to modify the WHERE clause such that the SELECT statement can filter based on key flexfield segment data.

The syntax for this lexical is as follows:

```
<lexicals>
  <lexical
    type="oracle.apps.fnd.flex.kff.where"
    name="Name of the lexical"
    comment="Comment"
    application_short_name="Application Short Name of the KFF"
    id_flex_code="Internal code of the KFF"
    id_flex_num="Internal number of the KFF structure"
    code_combination_table_alias="Code Combination Table Alias"
    segments="Segments for which this data is requested"
    operator="The boolean operator to be used in the condition"
    operand1="Values to be used on the right side of the operator"
    operand2="High value for the BETWEEN operator"/>
</lexicals>
```

The attributes for this lexical are listed in the following table:

| Attribute | Description |
|------------------------------|---|
| application_short_name | (Required) The application short name of the key flexfield. For example: SQLGL. |
| id_flex_code | (Required) the internal code of the key flexfield. For example: GL# |
| id_flex_num | (Conditionally required) Internal number of the key flexfield structure. For example: 101. Required if MULTIPLE_ID_FLEX_NUM is "N". |
| code_combination_table_alias | (Optional) Segment column names will be prepended with this alias. |
| segments | (Optional) Identifies for which segments this data is requested. Default value is "ALL". See the <i>Oracle Applications Developer's Guide</i> for syntax. |
| operator | (Required) Valid values are: =, <, >, <=, >=, !=, <>, , BETWEEN, LIKE |
| operand1 | (Required) Values to be used on the right side of the conditional operator. |

| Attribute | Description |
|------------------|--|
| operand2 | (Optional) High value for the BETWEEN operator. |
| full_description | Segment value's description (full size). |
| security | Returns Y if the current combination is secured against the current user, N otherwise. |

Example

This example shows a filter based on the GL Account segment and the GL Balancing Segment:

```
SELECT <some columns>
  FROM gl_code_combinations gcc,
       some_other_gl_table sogt
 WHERE gcc.chart_of_accounts_id = :p_id_flex_num
       and sogt.code_combination_id = gcc.code_combination_id
       and &FLEX_WHERE_GL_ACCOUNT
       and &FLEX_WHERE_GL_BALANCING
       and <more conditions on sogt>
```

```
<lexicals>
  <lexical
    type="oracle.apps.fnd.flex.kff.where"
    name="FLEX_WHERE_GL_ACCOUNT"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    code_combination_table_alias="gcc"
    segments="GL_ACCOUNT"
    operator="="
    operand1=":P_GL_ACCOUNT"/>
  <lexical
    type="oracle.apps.fnd.flex.kff.where"
    name="FLEX_WHERE_GL_BALANCING"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    code_combination_table_alias="gcc"
    segments="GL_BALANCING"
    operator="BETWEEN"
    operand1=":P_GL_BALANCING_LOW"
    operand2=":P_GL_BALANCING_HIGH"/>
</lexicals>
```

oracle.apps.fnd.flex.kff.order_by

This type of lexical is used in the ORDER BY section of the statement. It returns a list of column expressions so that the resulting output can be sorted by the flex segment values.

The syntax for this lexical is as follows:

```

<lexicals>
  <lexical
    type="oracle.apps.fnd.flex.kff.order_by"
    name="Name of the lexical"
    comment="Comment"
    application_short_name="Application Short Name of the KFF"
    id_flex_code="Internal code of the KFF"
    id_flex_num="Internal number of the KFF structure"
    multiple_id_flex_num="Are multiple structures allowed?"
    code_combination_table_alias="Code Combination Table Alias"
    segments="Segment(s) for which data is requested"
    show_parent_segments="List parent segments?"/>
</lexicals>

```

The attributes for this lexical are listed in the following table:

| Attribute | Description |
|------------------------------|---|
| application_short_name | (Required) The application short name of the key flexfield. For example: SQLGL. |
| id_flex_code | (Required) the internal code of the key flexfield. For example: GL# |
| id_flex_num | (Conditionally required) Internal number of the key flexfield structure. For example: 101. Required if MULTIPLE_ID_FLEX_NUM is "N". |
| multiple_id_flex_num | (Optional) Indicates whether this lexical supports multiple structures or not. Valid values are "Y" and "N". Default is "N". If set to "Y", then flex will assume all structures are potentially used for data reporting and it will use <code><code_combination_table_alias>.<set_defining_column_name></code> to retrieve the structure number. |
| code_combination_table_alias | (Optional) Segment column names will be prepended with this alias. |
| segments | (Optional) Identifies for which segments this data is requested. Default value is "ALL". See the <i>Oracle Applications Developer's Guide</i> for syntax. |
| show_parent_segments | (Optional) Valid values are "Y" and "N". Default value is "Y". If a dependent segment is displayed, the parent segment is automatically displayed, even if it is not specified as displayed in the <code>segments</code> attribute. |

Example

The following example shows results sorted based on GL Account segment and GL Balancing segment for a single structure KFF.

```
SELECT <some columns>
  FROM gl_code_combinations gcc,
       some_other_gl_table sogt
 WHERE gcc.chart_of_accounts_id = :p_id_flex_num
       and sogt.code_combination_id = gcc.code_combination_id
       and <more conditions on sogt>
 ORDER BY <some order by columns>,
         &FLEX_ORDER_BY_GL_ACCOUNT,
         &FLEX_ORDER_BY_GL_BALANCING

<lexicals>
  <lexical
    type="oracle.apps.fnd.flex.kff.order_by"
    name="FLEX_ORDER_BY_GL_ACCOUNT"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    code_combination_table_alias="gcc"
    segments="GL_ACCOUNT"
    show_parent_segments="Y"/>
  <lexical
    type="oracle.apps.fnd.flex.kff.order_by"
    name="FLEX_ORDER_BY_GL_BALANCING"
    comment="Comment"
    application_short_name="SQLGL"
    id_flex_code="GL#"
    id_flex_num=":P_ID_FLEX_NUM"
    code_combination_table_alias="gcc"
    segments="GL_BALANCING"
    show_parent_segments="N"/>
</lexicals>
```

Using the Data Engine Java API

This section describes how to utilize BI Publisher's data engine outside of the BI Publisher Enterprise user interface through the Java APIs. Use the descriptions in this section in conjunction with the Javadocs included with your installation files.

Calling a Data Template from the Java API

The following classes comprise the data engine utility Java API:

- oracle.apps.xdo.oa.util.DataTemplate (OA wrapper API)
- oracle.apps.xdo.dataengine.DataProcessor (Core wrapper API)

The DataProcessor class is the main class to use to execute a data template with the BI Publisher Data Engine. To use this API, you will need to instantiate this class and set parameter values for the data template, connection and output destination. Once the parameters are set, you can start processing by calling `processData()` method.

Example

This example provides a sample data template file, then shows an annotated Java code sample of how to call it.

The sample data template is called `EmpDataTemplate.xml` and is stored as `/home/EmpDataTemplate.xml`:

```
<?xml version="1.0" encoding="WINDOWS-1252" ?>
  <dataTemplate name="EmpData" description="Employee Details"
Version="1.0">
  <parameters>
    <parameter name="p_DeptNo" dataType="character" />
  </parameters>
  <dataQuery>
    <sqlStatement name="Q1">
      <![CDATA[
        SELECT d.DEPTNO,d.DNAME,d.LOC,EMPNO,ENAME, JOB,MGR, HIREDATE,
          SAL,nvl(COMM,0)
        FROM dept d, emp e
        WHERE d.deptno=e.deptno
        AND d.deptno = nvl(:p_DeptNo,d.deptno)
      ]]>
    </sqlStatement>
  </dataQuery>
  <dataStructure>
    <group name="G_DEPT" source="Q1">
      <element name="DEPT_NUMBER" value="DEPTNO" />
      <element name="DEPT_NAME" value="DNAME" />
      <element name="DEPTSAL" value="G_EMP.SALARY"
        function="SUM()" />
      <element name="LOCATION" value="LOC" />
      <group name="G_EMP" source="Q1">
        <element name="EMPLOYEE_NUMBER" value="EMPNO" />
        <element name="NAME" value="ENAME" />
        <element name="JOB" value="JOB" />
        <element name="MANAGER" value="MGR" />
        <element name="HIREDATE" value="HIREDATE" />
        <element name="SALARY" value="SAL" />
      </group>
    </group>
  </dataStructure>
</dataTemplate>
```

The following code sample is an annotated snippet of the Java code used to process the data template by the data engine:

```

{
try {

    //Initialization - instantiate the DataProcessor class//
    DataProcessor dataProcessor = new DataProcessor();

    //Set Data Template to be executed
    dataProcessor.setDataTemplate("/home/EmpDataTemplate.xml");

    //Get Parameters - this method will return an array of the
    //parameters in the data template
    ArrayList parameters = dataProcessor.getParameters();
    // Now we have the arraylist we need to iterate over
    // the parameters and assign values to them
    Iterator it = parameters.iterator();

    while (it.hasNext())
    {
        Parameter p = (Parameter) it.next();
        if (p.getName().equals("p_DeptNo"))
        // Here we assign the value '10' to the p_DeptNo parameter.
        // This could have been entered from a report submission
        // screen or passed in from another process.
            p.setValue(new "10");
    }
    // The parameter values now need to be assigned
    // to the data template; there are two methods
    // available to do this: 1. Use the setParameters
    // method to assign the 'parameters' object to the template:
    dataProcessor.setParameters(parameters);

    // 2. or you can assign parameter values using a hashtable.

    Hashtable parameters = new Hashtable();
    parameters.put("p_DeptNo","10");
    dataProcessor.setParameters(parameters);

    // Now set the jdbc connection to the database that you
    // wish to execute the template against.
    // This sample assumes you have already created
    // the connection object 'jdbcConnection'
    dataProcessor.setConnection(jdbcConnection);
    // Specify the output directory and file for the data file
    dataProcessor.setOutput("/home/EmpDetails.xml")
    // Process the data template
    dataProcessor.processData();
    } catch (Exception e)
    {
    }
}

```

SQL to XML Processor

The data engine not only supports data generation from data templates, but it can also return data by simply passing it a SQL statement. This functionality is similar to the native database support for generating XML with the added advantage that you can retrieve huge amounts of data in a hierarchical format without sacrificing performance and memory consumption. Your SQL statement can also contain parameters that can be given values prior to final processing.

The processor will generate XML in a ROWSET/ROW format. The tag names can be overridden using the `setRowsetTag` and `setRowsTag` methods.

The following annotated code sample shows how to use the `setSQL` method to pass a SQL statement to the data engine and set the element names for the generated data:

Example

```
//Initialization - instantiate the DataProcessor class
DataProcessor dataProcessor = new DataProcessor();
// Set the SQL to be executed
dataProcessor.setSQL( "select invoicenum, invoiceval
                      from invoice_table where
                      supplierid = :SupplID");
//Setup the SupplID value to be used
Hashtable parameters = new Hashtable();
parameters.put("SupplID ", "2000");
//Set the parameters
dataProcessor.setParameters(parameters);
//Set the db connection
dataProcessor.setConnection(jdbcConnection);
//Specify the output file name and location
dataProcessor.setOutput("/home/InvoiceDetails.xml")
//Specify the root element tag name for the generated output
dataProcessor.setRowsetTag("INVOICES");
//Specify the row element tag name for the generated output
dataProcessor.setRowsetTag("INVOICE");
//Execute the SQL
dataProcessor.processData();
```

Other Useful Methods

The data engine has several very useful functions that can be used to generate objects or files that can be used with the other BI Publisher APIs:

writeDefaultLayout – once the `DataTemplate` has been instantiated you can call this method to generate a default RTF template that can be used with the `RTFProcessor` to create an XSL template to be used with the `FOProcessor`. Alternatively, the default RTF can be loaded into Microsoft Word for further formatting. This method can generate either a String or Stream output.

writeXMLSchema - once the `DataTemplate` has been instantiated you can call this method to generate an XML schema representation of your data template. This is very useful if you are working with PDF templates and need to create mapping from the PDF document to your XML data.

setScalableModeOn – if you know you are going to return a large dataset or have a long running query you can specify that the data engine enter scalable mode. This will cause it to use the disk rather than use memory to generate the output.

setMaxRows – this allows you to specify a fixed number of rows to be returned by the engine. This is especially useful when you want to generate some sample data to build a layout template against.

Sample Data Templates

This section contains two sample data templates:

- Employee Listing
- General Ledger Journals Listing

The sample files are annotated to provide a better description of the components of the data template. To see more data template samples, see the BI Publisher page on Oracle Technology Network (OTN)

[<http://www.oracle.com/technology/products/applications/publishing/index.html>].

From here you can copy and paste the samples to get you started on your own data templates.

Employee Listing Data Template

This template extracts employee data and department details. It has a single parameter, Department Number, that has to be populated at runtime. The data is extracted using two joined queries that use the bind variable method to join the parent (Q1) query with the child (Q2) query. It also uses the event trigger functionality using a PL/SQL package "employee" to set the where clause on the Q1 query and to provide a group filter on the G_DEPT group.

The sample data template will generate the following XML:

```

<?xml version="1.0" encoding="UTF-8"?>
<dataTemplateName>
  <LIST_G_DEPT>
    <G_DEPT>
      <DEPT_NUMBER>10</DEPT_NUMBER>
      <DEPT_NAME>ACCOUNTING</DEPT_NAME>
      <LOCATION>NEW YORK</LOCATION>
      <LIST_G_EMP>
        <G_EMP>
          <EMPLOYEE_NUMBER>7782</EMPLOYEE_NUMBER>
          <NAME>CLARK</NAME>
          <JOB>MANAGER</JOB>
          <MANAGER>7839</MANAGER>
          <HIREDATE>1981-06-09T00:00:00.000-07:00</HIREDATE>
          <SALARY>2450</SALARY>
        </G_EMP>
        <G_EMP>
          <EMPLOYEE_NUMBER>7839</EMPLOYEE_NUMBER>
          <NAME>KING</NAME>
          <JOB>PRESIDENT</JOB>
          <MANAGER/>
          <HIREDATE>1981-11-17T00:00:00.000-08:00</HIREDATE>
          <SALARY>5000</SALARY>
        </G_EMP>
        ...
      </LIST_G_EMP>
      <DEPTSAL>12750</DEPTSAL>
    </G_DEPT>
    <G_DEPT>
      <DEPT_NUMBER>20</DEPT_NUMBER>
      <DEPT_NAME>RESEARCH</DEPT_NAME>
      <LOCATION>DALLAS</LOCATION>
      <LIST_G_EMP>
        <G_EMP>
          <EMPLOYEE_NUMBER>7369</EMPLOYEE_NUMBER>
          <NAME>SMITH</NAME>
          <JOB>CLERK</JOB>
          ...
        </G_EMP>
      </LIST_G_EMP>
      <DEPTSAL>10875</DEPTSAL>
    </G_DEPT>
  </LIST_G_DEPT>
</dataTemplateName>

```

Following is the data template used to extract this data.

```

<?xml version="1.0" encoding="WINDOWS-1252" ?>- The template is named,
an optional description
- can be provided and the default package, if any, is identified:
<dataTemplate name="Employee Listing" description="List of
Employees" dataSourceRef="ORCL_DB1" defaultPackage="employee"
version="1.0">
  <parameters>- Defines a single parameter for the Department Number
- with default of 20:
    <parameter name="p_DEPTNO" dataType="character"
      defaultValue="20"/>
  </parameters>
  <dataQuery>
    <sqlStatement name="Q1">- This extracts the department
information based on a
- where clause from a pl/sql package:
      <![CDATA[SELECT DEPTNO,DNAME,LOC from dept
        where &pwhereclause
        order by deptno]]>
    </sqlStatement>
    <sqlStatement name="Q2">- This second query extracts the employee
data and joins to
- the parent query using a bind variable, :DEPTNO
      <![CDATA[SELECT EMPNO,ENAME,JOB,MGR,HIREDATE,SAL,nvl
        (COMM,0) COMM
        from EMP
        WHERE DEPTNO = :DEPTNO ]]>
    </sqlStatement>
  </dataQuery>- A call is made to a before fetch trigger to set the

- where clause variable in the department query, &pwhereclause:

  <dataTrigger name="beforeReport"
    source="employee.beforeReportTrigger"/>
  <dataStructure>- The following section specifies the XML
hierarchy
- for the returning data:
    <group name="G_DEPT" source="Q1"
      groupFilter="employee.G_DEPTFilter(:DEPT_NUMBER)">- There is a
group filter placed on the DEPT group.
- This is returned from the employee.G_DEPTFilter plsql package.
- It passes the DEPT_NUMBER value ("name" attribute) rather
- than the DEPTNO value ("value" attribute)

      <element name="DEPT_NUMBER" value="DEPTNO" />
      <element name="DEPT_NAME" value="DNAME"/>- This creates a
summary total at the department level based
- on the salaries at the employee level for each department:

      <element name="DEPTSAL" value="G_EMP.SALARY"
        function="SUM()"/>
    </group>
    <element name="LOCATION" value="LOC" />
    <group name="G_EMP" source="Q2">
      <element name="EMPLOYEE_NUMBER" value="EMPNO" />
      <element name="NAME" value="ENAME"/>
      <element name="JOB" value="JOB" />
      <element name="MANAGER" value="MGR"/>
      <element name="HIREDATE" value="HIREDATE"/>
      <element name="SALARY" value="SAL"/>
    </group>
  </dataStructure>

```

</dataTemplate>

The PL/SQL Package:

```
- This is the package specification, it declares the global
- variables and functions contained therein
function BeforeReportTrigger return boolean;
p_DEPTNO NUMBER;
pwhereclause varchar2(3200);
function G_DEPTFilter(deptno number) return boolean;
END;

/
- This is the package body, it contains the code for the
- functions/procedures

create or replace package body employee as

- this is the event trigger called from the data template
- prior to the data fetch. It sets the where clause
- for the department query (Q1) based on the incoming
- data template parameter
FUNCTION BeforeReportTrigger return boolean is
begin
  IF (p_DEPTNO=10) THEN
    pwhereclause := 'DEPTNO =10';
  elsif (p_DEPTNO=20) THEN
    pwhereclause:='DEPTNO =20';
  elsif (p_DEPTNO=30) THEN
    pwhereclause:='DEPTNO =30';
  elsif (p_DEPTNO=40) THEN
    pwhereclause:='DEPTNO =20';
  else
    pwhereclause:='1=1';
  end if;
end;
RETURN(TRUE);
- This function specifies a group filter on the Q1 group.
- If the department number is 30 then the data is not returned.
FUNCTION G_DEPTFilter(deptno number) return boolean is
BEGIN
  if deptno = 30 then
    return (FALSE);
  end if;

  RETURN (TRUE);
end;
END;
/
```

General Ledger Journals Data Template Example

This data template extracts GL journals data from the E-Business Suite General Ledger schema. It is based on an existing Oracle Report that has been converted to a data template format. It follows the same format as the Employee data template but has some added functionality.

```

<?xml version="1.0" encoding="UTF-8" ?>
<dataTemplate name="GLRGNJ" dataSourceRef="ORA_EBS"
  defaultPackage="GLRGNJ" version="1.0">
  <parameters>- Parameter declaration, these will be populated at
runtime.
    <parameter name="P_CONC_REQUEST_ID" dataType = "number"
      defaultValue="0"></parameter>
    <parameter name="P_JE_SOURCE_NAME" dataType="character">
</parameter>
    <parameter name="P_SET_OF_BOOKS_ID" dataType="character"
      defaultValue="1"></parameter>
    <parameter name="P_PERIOD_NAME" dataType="character">Dec-97
</parameter>
    <parameter name="P_BATCH_NAME" dataType="character"></parameter>
    <parameter name="P_POSTING_STATUS" dataType="character"
      defaultValue="P"></parameter>
    <parameter name="P_CURRENCY_CODE" dataType="character"
      defaultValue="USD"></parameter>
    <parameter name="P_START_DATE" dataType = "date"></parameter>
    <parameter name="P_END_DATE" dataType = "date"></parameter>
    <parameter name="P_PAGESIZE" dataType = "number"
      defaultValue="180"></parameter>
    <parameter name="P_KIND" dataType = "character"
      defaultValue="L"></parameter>
  </parameters>
  <lexicals>- Flexfield lexical declaration, this specifies the setup
required
- for these flexfield functions.
- The first will return the full accounting flexfield with
- the appropriate delimiter e.g. 01-110-6140-0000-000
<lexical type ="oracle.apps.fnd.flex.kff.select"
  name ="FLEXDATA_DSP"
  application_short_name="SQLGL"
  id_flex_code="GL#"
  id_flex_num=":STRUCT_NUM"
  multiple_id_flex_num="N"
  code_combination_table_alias="CC"
  segments="ALL"
  show_parent_segments="Y"
  output_type="VALUE" />- The second will return 'Y' if the current
combination is
- secured against the current user, 'N' otherwise
<lexical type ="oracle.apps.fnd.flex.kff.select"
  name ="FLEXDATA_SECURE"
  application_short_name="SQLGL"
  id_flex_code="GL#"
  id_flex_num=":STRUCT_NUM"
  multiple_id_flex_num="N"
  code_combination_table_alias="CC"
  segments="ALL"
  show_parent_segments="Y"
  output_type="SECURITY" />
</lexicals>
<dataQuery>
<sqlStatement name="Q_MAIN">
<![CDATA[
SELECT
S.user_je_source_name           Source,
B.name                          Batch_Name,
B.default_effective_date       Batch_Eff_date,
B.posted_date                   Batch_Posted_Date,

```

```

B.je_batch_id          Batch_Id,
B.running_total_accounted_dr  B_TOT_DR,
B.running_total_accounted_cr  B_TOT_CR,
D.je_header_id        Header_id,
D.name                Header_Name,
C.user_je_category_name  Category,
D.running_total_accounted_dr  H_TOT_DR,
D.running_total_accounted_cr  H_TOT_CR,
J.je_line_num         Je_Line_Num,
decode(nvl(CC.code_combination_id, -1), -1, 'A', null)
FLEXDATA_H,
J.effective_date      Line_Effective_Date,
J.description         Line_Description,
J.accounted_dr        Line_Acc_Dr,
J.accounted_cr        Line_Acc_Cr,
D.currency_code       Currency_Code,
D.external_reference  Header_Reference,
&POSTING_STATUS_SELECT Recerence1_4,
nvl(J.stat_amount,0)  Line_Stat_Amount,
GLL.description       Batch_Type,
B.actual_flag         Actual_Flag,
GLL2.meaning          Journal_Type,
SOB.consolidation_sob_flag  Cons_Sob_Flag,
&FLEXDATA_DSP FLEXDATA_DSP,
&FLEXDATA_SECURE FLEXDATA_SECURE
FROM gl_lookups GLL, gl_je_sources S, gl_je_categories C,
gl_je_lines J, gl_code_combinations CC, gl_je_headers D,
gl_je_batches B, gl_lookups GLL2, gl_sets_of_books SOB
WHERE GLL.lookup_code = B.actual_flag
AND GLL.lookup_type = 'BATCH_TYPE'
AND GLL2.lookup_type = 'AB_JOURNAL_TYPE'
AND GLL2.lookup_code = B.average_journal_flag
AND SOB.set_of_books_id = :P_SET_OF_BOOKS_ID
AND S.je_source_name = D.je_source
AND C.je_category_name = D.je_category
AND J.code_combination_id = CC.code_combination_id(+)
AND J.je_header_id = D.je_header_id
AND &CURRENCY_WHERE
AND D.je_source = NVL(:P_JE_SOURCE_NAME, D.je_source)
AND D.je_batch_id = B.je_batch_id
AND &POSTING_STATUS_WHERE
AND B.name = NVL(:P_BATCH_NAME, B.name)
AND &PERIOD_WHERE
AND B.set_of_books_id = :P_SET_OF_BOOKS_ID
ORDER BY S.user_je_source_name,
B.actual_flag,
B.name,
B.default_effective_date,
D.name,
J.je_line_num
]]>
</sqlStatement>
</dataQuery>- The original report had an AfterParameter
- and Before report triggers
<dataTrigger name="afterParameterFormTrigger"
source="GLRGNJ.afterpform"/>
<dataTrigger name="beforeReportTrigger"
source="GLRGNJ.beforereport"/>
<dataStructure>- A very complex XML hierarchy can be built with summary
- columns referring to lower level elements
<group name="G_SOURCE" dataType="varchar2" source="Q_MAIN">

```

```

<element name="Source" dataType="varchar2" value="Source"/>
  <element name="SOU_SUM_ACC_DR" function="sum" dataType="number"
    value="G_BATCHES.B_TOTAL_DR"/>
  <element name="SOU_SUM_ACC_CR" function="sum" dataType="number"
    value="G_BATCHES.B_TOTAL_CR"/>
  <element name="SOU_SUM_STAT_AMT" function="sum"
    dataType="number" value="G_BATCHES.B_TOT_STAT_AMT"/>
  <group name="G_BATCHES" dataType="varchar2" source="Q_MAIN">
    <element name="Actual_Flag" dataType="varchar2"
      value="Actual_Flag"/>
    <element name="Batch_Id" dataType="number" value="Batch_Id"/>
    <element name="Batch_Name" dataType="varchar2"
      value="Batch_Name"/>
    <element name="Batch_Eff_date" dataType="date"
      value="Batch_Eff_date"/>
    <element name="Journal_Type" dataType="varchar2"
      value="Journal_Type"/>
    <element name="Cons_Sob_Flag" dataType="varchar2"
      value="Cons_Sob_Flag"/>
    <element name="Batch_Type" dataType="varchar2"
      value="Batch_Type"/>
    <element name="Batch_Posted_Date" dataType="date"
      value="Batch_Posted_Date"/>
    <element name="B_TOT_DR" dataType="number" value="B_TOT_DR"/>
    <element name="B_TOTAL_DR" function="sum" dataType="number"
      value="G_HEADERS.H_Total_Dr"/>
    <element name="B_TOT_CR" dataType="number" value="B_TOT_CR"/>
    <element name="B_TOTAL_CR" function="sum" dataType="number"
      value="G_HEADERS.H_Total_Cr"/>
    <element name="B_TOT_STAT_AMT" function="sum" dataType="number"
      value="G_HEADERS.H_TOT_STAT_AMT"/>
    <element name="B_TOTAL_STAT" function="sum" dataType="number"
      value="G_HEADERS.H_Total_Stat"/>
    <group name="G_HEADERS" dataType="varchar2" source="Q_MAIN">
      <element name="Header_id" dataType="number"
        value="Header_id"/>
      <element name="Header_Name" dataType="varchar2"
        value="Header_Name"/>
      <element name="Category" dataType="varchar2"
        value="Category"/>
      <element name="Header_Reference" dataType="varchar2"
        value="Header_Reference"/>
      <element name="Currency_Code" dataType="varchar2"
        value="Currency_Code"/>
      <element name="H_TOT_DR" dataType="number" value="H_TOT_DR"/>
      <element name="H_Total_Dr" function="sum" dataType="number"
        value="G_LINES.Line_Acc_Dr"/>
      <element name="H_TOT_CR" dataType="number" value="H_TOT_CR"/>
      <element name="H_Total_Cr" function="sum" dataType="number"
        value="G_LINES.Line_Acc_Cr"/>
      <element name="H_TOT_STAT_AMT" function="sum"
        dataType="number"
        value="G_LINES.Line_Stat_Amount"/>
      <element name="H_Total_Stat" function="sum" dataType="number"
        value="G_LINES.Line_Stat_Amount"/>
    </group>
  </group>
  <group name="G_LINES" dataType="varchar2" source="Q_MAIN"
    groupFilter="GLRGNJ.g_linesgroupfilter(:G_LINES.FLEXDATA_SECURE)">
    <element name="Je_Line_Num" dataType="number"
      value="Je_Line_Num"/>
    <element name="FLEXDATA_H" dataType="varchar2"
      value="FLEXDATA_H"/>
  </group>

```

```

<element name="FLEXDATA_DSP" dataType="varchar2"
  value="FLEXDATA_DSP"/>
  <element name="Line_Description" dataType="varchar2"
    value="Line_Description"/>
  <element name="Recerence1_4" dataType="varchar2"
    value="Recerence1_4"/>
  <element name="Line_Acc_Dr" dataType="number"
    value="Line_Acc_Dr"/>
  <element name="Line_Acc_Cr" dataType="number"
    value="Line_Acc_Cr"/>
  <element name="Line_Stat_Amount" dataType="number"
    value="Line_Stat_Amount"/>
  <element name="Line_Effective_Date" dataType="date"
    value="Line_Effective_Date"/>
  <element name="FLEXDATA_SECURE" dataType="varchar2"
    value="FLEXDATA_SECURE"/>
</group>
</group>
</group>
</group>
<element name="R_TOT_DR" function="sum" dataType="number"
  value="G_SOURCE.SOU_SUM_ACC_DR"/>
<element name="R_TOT_CR" function="sum" dataType="number"
  value="G_SOURCE.SOU_SUM_ACC_CR"/>
<element name="R_TOT_STAT_AMT" function="sum" dataType="number"
  value="G_SOURCE.SOU_SUM_STAT_AMT"/>
<element name="JE_SOURCE_DSP" function="first" dataType="number"
  value="G_SOURCE.Source"/>
<element name="REP_BATCH_ID" function="first" dataType="number"
  value="G_BATCHES.Batch_Id"/>
<element name="C_DATEFORMAT" dataType="varchar2"
  value="C_DATEFORMAT"/>
</dataStructure>- There is an after fetch trigger, this can be used to
clean up
- data or update records to report that they have been reported
<dataTrigger name="afterReportTrigger"
  source="GLRGNJ.afterreport"/>
</dataTemplate>

```

Employee XML Datasource Data Template

This data template combines data that exists in a table called "dept" with data from an xml file called "employee.xml". It follows the same format as the Employee data template but the employee data comes from an xml file instead of from the emp table.

```

<?xml version="1.0" encoding="WINDOWS-1252" ?>
<dataTemplate name="Employee Listing" description="List of Employees" v
ersion="1.0">
  <parameters>- Defines a single parameter for the Department Number
    - with default of 20:
    <parameter name="p_DEPTNO" dataType="character"
      defaultValue="20"/>
  </parameters>
  <dataQuery>
    <sqlStatement name="Q1">
      <![CDATA[SELECT DEPTNO,DNAME,LOC from dept
        order by deptno]]>
    </sqlStatement>
    <xml name="empxml" expressionPath="//ROW[DEPTNO=$DEPTNO]">- Defines
name
    - and link to DEPTNO in Q1
    <url method="GET" realm="" username="" password=""
      file:///d:/dttest/employee.xml</url>- Defines url for xml data
    </xml>
  </dataQuery>-
    <dataStructure>- The following section specifies the XML hierarchy-
for the returning data:
    <group name="G_DEPT" source="Q1"
      <element name="DEPT_NUMBER" value="DEPTNO" />
      <element name="DEPT_NAME" value="DNAME"/>
    - This creates a summary total at the department level based
    - on the salaries at the employee level for each department:

      <element name="DEPTSAL" value="G_EMP.SALARY"
        function="SUM()"/>
    <element name="LOCATION" value="LOC" />
    <group name="G_EMP" source="empxml">
      <element name="EMPLOYEE_NUMBER" value="EMPNO" />
      <element name="NAME" value="ENAME"/>
      <element name="JOB" value="JOB" />
      <element name="MANAGER" value="MGR"/>
      <element name="HIREDATE" value="HIREDATE"/>
      <element name="SALARY" value="SAL"/>
    </group>
  </group>
</dataStructure>
</dataTemplate>

```

Creating an RTF Template

Introduction

Rich Text Format (RTF) is a specification used by common word processing applications, such as Microsoft Word. When you save a document, RTF is a file type option that you select.

BI Publisher's RTF Template Parser converts documents saved as the RTF file type to XSL-FO. You can therefore create report designs using many of your standard word processing application's design features and BI Publisher will recognize and maintain the design.

During design time, you add data fields and other markup to your template using BI Publisher's simplified tags for XSL expressions. These tags associate the XML report data to your report layout. If you are familiar with XSL and prefer not to use the simplified tags, BI Publisher also supports the use of pure XSL elements in the template.

In addition to your word processing application's formatting features, BI Publisher supports other advanced reporting features such as conditional formatting, dynamic data columns, running totals, and charts.

If you wish to include code directly in your template, you can include *any* XSL element, many FO elements, and a set of SQL expressions extended by BI Publisher.

Supported Modes

BI Publisher supports two methods for creating RTF templates:

- Basic RTF Method

Use any word processing application that supports RTF version 1.6 writer (or later) to design a template using BI Publisher's simplified syntax.

- Form Field Method

Using Microsoft Word's form field feature allows you to place the syntax in hidden

form fields, rather than directly into the design of your template. BI Publisher supports Microsoft Word 2000 (or later) with Microsoft Windows version 2000 (or later).

Note: If you use XSL or XSL:FO code rather than the simplified syntax, you must use the form field method.

This guide describes how to create RTF templates using both methods.

Prerequisites

Before you design your template, you must:

- Know the business rules that apply to the data from your source report.
- Generate a sample of your source report in XML.
- Be familiar with the formatting features of your word processing application.

Overview

Creating an RTF template file consists of two basic steps:

1. Design your template layout.

Use the formatting features of your word processing application and save the file as RTF.

2. Mark up your template layout.

Insert the BI Publisher simplified tags.

When you design your template layout, you must understand how to associate the XML input file to the layout. This chapter presents a sample template layout with its input XML file to illustrate how to make the proper associations to add the markup tags to the template.

Using the BI Publisher Template Builder

The Template Builder is an extension to Microsoft Word that simplifies the development of RTF templates. It automates many of the manual steps that are covered in this chapter. Use it in conjunction with this manual to increase your productivity.

The Template Builder is tightly integrated with Microsoft Word and allows you to perform the following functions:

- Insert data fields

- Insert data-driven tables
- Insert data-driven forms
- Insert data-driven charts
- Preview your template with sample XML data
- Browse and update the content of form fields
- Extract boilerplate text into an XLIFF translation file and test translations

Manual steps for performing these functions are covered in this chapter. Instructions and tutorials for using the Template Builder are available from the readme and help files delivered with the tool.

Associating the XML Data to the Template Layout

The following is a sample layout for a Payables Invoice Register:

Sample Template Layout



Payables Invoice Register

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Supplier:

| Invoice Num | Invoice Date | GL Date | Curr | Entered Amt | Accounted Amt |
|---------------------|--------------|---------|------|-------------|---------------|
| | | | | | |
| Total for Supplier: | | | | | |

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Note the following:

- The data fields that are defined on the template
For example: Supplier, Invoice Number, and Invoice Date
- The elements of the template that will repeat when the report is run.
For example, all the fields on the template will repeat for each Supplier that is

reported. Each row of the invoice table will repeat for each invoice that is reported.

XML Input File

Following is the XML file that will be used as input to the Payables Invoice Register report template:

Note: To simplify the example, the XML output shown below has been modified from the actual output from the Payables report.

```
<?xml version="1.0" encoding="WINDOWS-1252" ?>
- <VENDOR_REPORT>
- <LIST_G_VENDOR_NAME>
- <G_VENDOR_NAME>
  <VENDOR_NAME>COMPANY A</VENDOR_NAME>
- <LIST_G_INVOICE_NUM>
- <G_INVOICE_NUM>
  <SET_OF_BOOKS_ID>124</SET_OF_BOOKS_ID>
  <GL_DATE>10-NOV-03</GL_DATE>
  <INV_TYPE>Standard</INV_TYPE>
  <INVOICE_NUM>031110</INVOICE_NUM>
  <INVOICE_DATE>10-NOV-03</INVOICE_DATE>
  <INVOICE_CURRENCY_CODE>EUR</INVOICE_CURRENCY_CODE>
  <ENT_AMT>122</ENT_AMT>
  <ACCTD_AMT>122</ACCTD_AMT>
  <VAT_CODE>VAT22%</VAT_CODE>
  </G_INVOICE_NUM>
</LIST_G_INVOICE_NUM>
<ENT_SUM_VENDOR>1000.00</ENT_SUM_VENDOR>
<ACCTD_SUM_VENDOR>1000.00</ACCTD_SUM_VENDOR>
</G_VENDOR_NAME>
</LIST_G_VENDOR_NAME>
<ACCTD_SUM_REP>108763.68</ACCTD_SUM_REP>
<ENT_SUM_REP>122039</ENT_SUM_REP>
</VENDOR_REPORT>
```

XML files are composed of elements. Each tag set is an element. For example `<INVOICE_DATE></INVOICE_DATE>` is the invoice date element. "INVOICE_DATE" is the tag name. The data between the tags is the value of the element. For example, the value of INVOICE_DATE is "10-NOV-03".

The elements of the XML file have a hierarchical structure. Another way of saying this is that the elements have parent-child relationships. In the XML sample, some elements are contained within the tags of another element. The containing element is the parent and the included elements are its children.

Every XML file has only one root element that contains all the other elements. In this example, VENDOR_REPORT is the root element. The elements LIST_G_VENDOR_NAME, ACCTD_SUM_REP, and ENT_SUM_REP are contained between the VENDOR_REPORT tags and are children of VENDOR_REPORT. Each child element can have child elements of its own.

Identifying Placeholders and Groups

Your template content and layout must correspond to the content and hierarchy of the input XML file. Each data field in your template must map to an element in the XML file. Each group of repeating elements in your template must correspond to a parent-child relationship in the XML file.

To map the data fields you define *placeholders*. To designate the repeating elements, you define *groups*.

Note: BI Publisher supports regrouping of data if your report requires grouping that does not follow the hierarchy of your incoming XML data. For information on using this feature, see *Regrouping the XML Data*, page 5-81.

Placeholders

Each data field in your report template must correspond to an element in the XML file. When you mark up your template design, you define placeholders for the XML elements. The placeholder maps the template report field to the XML element. At runtime the placeholder is replaced by the value of the element of the same name in the XML data file.

For example, the "Supplier" field from the sample report layout corresponds to the XML element `VENDOR_NAME`. When you mark up your template, you create a placeholder for `VENDOR_NAME` in the position of the Supplier field. At runtime, this placeholder will be replaced by the value of the element from the XML file (the value in the sample file is **COMPANY A**).

Identifying the Groups of Repeating Elements

The sample report lists suppliers and their invoices. There are fields that repeat for each supplier. One of these fields is the supplier's invoices. There are fields that repeat for each invoice. The report therefore consists of two groups of repeating fields:

- Fields that repeat for each supplier
- Fields that repeat for each invoice

The invoices group is nested inside the suppliers group. This can be represented as follows:

Suppliers

- Supplier Name
- Invoices

- Invoice Num
- Invoice Date
- GL Date
- Currency
- Entered Amount
- Accounted Amount
- Total Entered Amount
- Total Accounted Amount

Compare this structure to the hierarchy of the XML input file. The fields that belong to the Suppliers group shown above are children of the element G_VENDOR_NAME. The fields that belong to the Invoices group are children of the element G_INVOICE_NUM.

By defining a group, you are notifying BI Publisher that *for each* occurrence of an element (parent), you want the included fields (children) displayed. At runtime, BI Publisher will loop through the occurrences of the element and display the fields each time.

Designing the Template Layout

Use your word processing application's formatting features to create the design.

For example:

- Select the size, font, and alignment of text
- Insert bullets and numbering
- Draw borders around paragraphs
- Include a watermark
- Include images (jpg, gif, or png)
- Use table autoformatting features
- Insert a header and footer

For additional information on inserting headers and footers, see *Defining Headers and Footers*, page 5-15.

For a detailed list of supported formatting features in Microsoft Word, see *Supported*

Native Formatting Features, page 5-40. Additional formatting and reporting features are described at the end of this section.

Adding Markup to the Template Layout

BI Publisher converts the formatting that you apply in your word processing application to XSL-FO. You add markup to create the mapping between your layout and the XML file and to include features that cannot be represented directly in your format.

The most basic markup elements are placeholders, to define the XML data elements; and groups, to define the repeating elements.

BI Publisher provides tags to add markup to your template.

Note: For the XSL equivalents of the BI Publisher tags, see XSL Equivalent Syntax, page 6-6.

Creating Placeholders

The placeholder maps the template field to the XML element data field. At runtime the placeholder is replaced by the value of the element of the same name in the XML data file.

Enter placeholders in your document using the following syntax:

```
<?XML element tag name?>
```

Note: The placeholder must match the XML element tag name exactly. It is case sensitive.

There are two ways to insert placeholders in your document:

1. Basic RTF Method: Insert the placeholder syntax directly into your template document.
2. Form Field Method: (Requires Microsoft Word) Insert the placeholder syntax in Microsoft Word's Text Form Field Options window. This method allows you to maintain the appearance of your template.

Basic RTF Method

Enter the placeholder syntax in your document where you want the XML data value to appear.

Enter the element's XML tag name using the syntax:

```
<?XML element tag name?>
```

In the example, the template field "Supplier" maps to the XML element `VENDOR_NAME`. In your document, enter:

```
<?VENDOR_NAME?>
```

The entry in the template is shown in the following figure:

Supplier: <?VENDOR_NAME?>

| Invoice Num | Invoice |
|-------------|---------|
| | |

Total for Supplier:

Form Field Method

Use Microsoft Word's **Text Form Field Options** window to insert the placeholder tags:

1. Enable the **Forms** toolbar in your Microsoft Word application.
2. Position your cursor in the place you want to create a placeholder.
3. Select the **Text Form Field** toolbar icon. This action inserts a form field area in your document.
4. Double-click the form field area to invoke the **Text Form Field Options** dialog box.
5. (Optional) Enter a description of the field in the **Default text** field. The entry in this field will populate the placeholder's position on the template.

For the example, enter "Supplier 1".

6. Select the **Add Help Text** button.
7. In the help text entry field, enter the XML element's tag name using the syntax:

```
<?XML element tag name?>
```

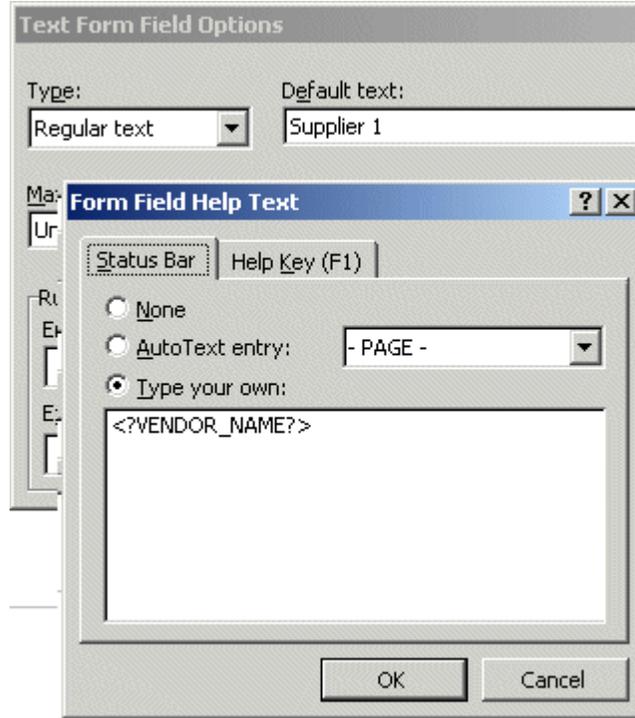
You can enter multiple element tag names in the text entry field.

In the example, the report field "Supplier" maps to the XML element `VENDOR_NAME`. In the **Form Field Help Text** field enter:

```
<?VENDOR_NAME?>
```

The following figure shows the **Text Form Field Options** dialog box and the **Form Field Help Text** dialog box with the appropriate entries for the Supplier field.

Tip: For longer strings of BI Publisher syntax, use the Help Key (F1) tab instead of the Status Bar tab. The text entry field on the Help Key (F1) tab allows more characters.



8. Select **OK** to apply.

The **Default text** is displayed in the form field on your template.

The figure below shows the Supplier field from the template with the added form field markup.

Supplier: Supplier1

| Invoice Num | Inv |
|-------------|-----|
| | |
| Total | |

Complete the Example

The following table shows the entries made to complete the example. The Template Field Name is the display name from the template. The Default Text Entry is the value entered in the Default Text field of the Text Form Field Options dialog box (form field method only). The Placeholder Entry is the XML element tag name entered either in the Form Field Help Text field (form field method) or directly on the template.

| Template Field Name | Default Text Entry (Form Field Method) | Placeholder Entry (XML Tag Name) |
|---------------------------------|--|----------------------------------|
| Invoice Num | 1234566 | <?INVOICE_NUM?> |
| Invoice Date | 1-Jan-2004 | <?INVOICE_DATE?> |
| GL Date | 1-Jan-2004 | <?GL_DATE?> |
| Curr | USD | <?INVOICE_CURRENCY_CODE?> |
| Entered Amt | 1000.00 | <?ENT_AMT?> |
| Accounted Amt | 1000.00 | <?ACCTD_AMT?> |
| (Total of Entered Amt column) | 1000.00 | <?ENT_SUM_VENDOR?> |
| (Total of Accounted Amt column) | 1000.00 | <?ACCTD_SUM_VENDOR?> |

The following figure shows the Payables Invoice Register with the completed form field placeholder markup.

See the Payables Invoice Register with Completed Basic RTF Markup, page 5-12 for the completed basic RTF markup.



Payables Invoice Register

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25th January 2004

Supplier: **Supplier 1**

| Invoice Num | Invoice Date | GL Date | Curr | Entered Amt | Accounted Amt |
|-------------------------------|--------------|------------|------|----------------|----------------|
| 1234566 | 1-Jan-2004 | 1-Jan-2004 | USD | 1000.00 | 1000.00 |
| Total for Supplier: Supplier1 | | | | 1000.00 | 1000.00 |

Company Confidential

Defining Groups

By defining a group, you are notifying BI Publisher that *for each* occurrence of an element, you want the included fields displayed. At runtime, BI Publisher will loop through the occurrences of the element and display the fields each time.

In the example, for each occurrence of G_VENDOR_NAME in the XML file, we want the template to display its child elements VENDOR_NAME (Supplier Name), G_INVOICE_NUM (the Invoices group), Total Entered Amount, and Total Accounted Amount. And, for each occurrence of G_INVOICE_NUM (Invoices group), we want the template to display Invoice Number, Invoice Date, GL Date, Currency, Entered Amount, and Accounted Amount.

To designate a group of repeating fields, insert the grouping tags around the elements to repeat.

Insert the following tag before the first element:

```
<?for-each:XML group element tag name?>
```

Insert the following tag after the final element:

```
<?end for-each?>
```

Grouping scenarios

Note that the group element must be a parent of the repeating elements in the XML

input file.

- If you insert the grouping tags around text or formatting elements, the text and formatting elements between the group tags will be repeated.
- If you insert the tags around a table, the table will be repeated.
- If you insert the tags around text in a table cell, the text in the table cell between the tags will be repeated.
- If you insert the tags around two different table cells, but in the same table row, the single row will be repeated.
- If you insert the tags around two different table rows, the rows between the tags will be repeated (this does not include the row that contains the "end group" tag).

Basic RTF Method

Enter the tags in your document to define the beginning and end of the repeating element group.

To create the Suppliers group in the example, insert the tag

```
<?for-each:G_VENDOR_NAME?>
```

before the Supplier field that you previously created.

Insert `<?end for-each?>` in the document after the summary row.

The following figure shows the Payables Invoice Register with the basic RTF grouping and placeholder markup:

<?for-each:G_VENDOR_NAME?> <?sort:VENDOR_NAME?>

Supplier: <?VENDOR_NAME?>

| Invoice Num | Invoice Date | GL Date | Curr | Entered Amt | Accounted Amt |
|---|----------------------|-------------|--|------------------------|-----------------------------------|
| <?for-each: G_INVOICE_NUM?> <?INVOICE_NUM?> | <?INVOICE_D ATE?> | <?GL_DATE?> | <?INV OICE CUR REN CY_C ODE? > | <?ENT_AMT?> | <?ACCTD_AMT?> <?end for-each?> |
| Total for Supplier: <?VENDOR_NAME?> | | | | <?ENT_SUM_VEND OR?> | <?ACCTD_SUM_V ENDOR?> |

<?end for-each?>

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Form Field Method

1. Insert a form field to designate the beginning of the group.

In the help text field enter:

<?for-each:group element tag name?>

To create the Suppliers group in the example, insert a form field before the Suppliers field that you previously created. In the help text field enter:

<?for-each:G_VENDOR_NAME?>

For the example, enter the Default text "Group: Suppliers" to designate the beginning of the group on the template. The Default text is not required, but can make the template easier to read.

2. Insert a form field after the final placeholder element in the group. In the help text field enter <?end for-each?>.

For the example, enter the Default text "End: Suppliers" after the summary row to designate the end of the group on the template.

The following figure shows the template after the markup to designate the Suppliers group was added.

Group: Suppliers

Supplier: Supplier 1

| Invoice Num | Invoice |
|-------------|---------|
| 1234566 | 1-Jan- |
| | |

End:Suppliers

Complete the Example

The second group in the example is the invoices group. The repeating elements in this group are displayed in the table. For each invoice, the table row should repeat. Create a group within the table to contain these elements.

Note: For each invoice, only the table *row* should repeat, not the entire table. Placing the grouping tags at the beginning and end of the table row will repeat only the row. If you place the tags around the table, then for each new invoice the entire table with headings will be repeated.

To mark up the example, insert the grouping tag `<?for-each:G_INVOICE_NUM?>` in the table cell before the Invoice Num placeholder. Enter the Default text "Group:Invoices" to designate the beginning of the group.

Insert the end tag inside the final table cell of the row after the Accounted Amt placeholder. Enter the Default text "End:Invoices" to designate the end of the group.

The following figure shows the completed example using the form field method:

Group: Suppliers Sort by: Supplier

Supplier: **Supplier 1**

| Invoice Num | Invoice Date | GL Date | Curr | Entered Amt | Accounted Amt |
|--------------------------------------|--------------|------------|------|----------------|----------------|
| Group:Invoices 1234566 | 1-Jan-2004 | 1-Jan-2004 | USD | 1000.00 | 1000.00 |
| | | | | | End:Invoices |
| Total for Supplier: Supplier1 | | | | 1000.00 | 1000.00 |

End:Suppliers

Company Confidential

Defining Headers and Footers

Native Support

BI Publisher supports the use of the native RTF header and footer feature. To create a header or footer, use the your word processing application's header and footer insertion tools. As an alternative, or if you have multiple headers and footers, you can use `start:body` and `end body` tags to distinguish the header and footer regions from the body of your report.

Inserting Placeholders in the Header and Footer

At the time of this writing, Microsoft Word does not support form fields in the header and footer. You must therefore insert the placeholder syntax directly into the template (basic RTF method), or use the `start body/end body` syntax described in the next section.

Multiple or Complex Headers and Footers

If your template requires multiple headers and footers, create them by using BI Publisher tags to define the body area of your report. You may also want to use this method if your header and footer contain complex objects that you wish to place in form fields. When you define the body area, the elements occurring before the beginning of the body area will compose the header. The elements occurring after the body area will compose the footer.

Use the following tags to enclose the body area of your report:

```
<?start:body?>
```

```
<?end body?>
```

Use the tags either directly in the template, or in form fields.

The Payables Invoice Register contains a simple header and footer and therefore does not require the start body/end body tags. However, if you wanted to add another header to the template, define the body area as follows:

1. Insert `<?start:body?>` before the Suppliers group tag:
`<?for-each:G_VENDOR_NAME?>`
2. Insert `<?end body?>` after the Suppliers group closing tag: `<?end for-each?>`

The following figure shows the Payables Invoice Register with the start body/end body tags inserted:

ORACLE
E-Business Suite

Payables Invoice Register

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25th July 2003

`<?start:body?>`

Group: Suppliers Sort by Supplier

Supplier: **Supplier 1**

| Invoice Num | Invoice Date | GL Date | Curr | Entered Amt | Accounted Amt |
|-------------------------------|--------------|------------|------|-------------|---------------|
| Group:Invoices 1234566 | 1-Jan-2004 | 1-Jan-2004 | USD | 1000.00 | 1000.00 |
| | | | | | End:Invoices |
| Total for Supplier: Supplier1 | | | | 1000.00 | 1000.00 |

End:Suppliers
`<?end body?>`

Company Confidential

Different First Page and Different Odd and Even Page Support

If your report requires a different header and footer on the first page of your report; or, if your report requires different headers and footers for odd and even pages, you can define this behavior using Microsoft Word's Page Setup dialog.

1. Select **Page Setup** from the **File** menu.
2. In the **Page Setup** dialog, select the **Layout** tab.
3. In the **Headers and footers** region of the dialog, select the appropriate check box:
Different odd and even
Different first page
4. Insert your headers and footers into your template as desired.

At runtime your generated report will exhibit the defined header and footer behavior.

Inserting Images and Charts

Images

BI Publisher supports several methods for including images in your published document:

Direct Insertion

Insert the jpg, gif, or png image directly in your template.

URL Reference

URL Reference

1. Insert a dummy image in your template.
2. In Microsoft Word's **Format Picture** dialog box select the **Web** tab. Enter the following syntax in the **Alternative text** region to reference the image URL:

```
url: {'http://image location'}
```

For example, enter:

```
url: {'http://www.oracle.com/images/ora_log.gif'}
```

Element Reference from XML File

1. Insert a dummy image in your template.
2. In Microsoft Word's **Format Picture** dialog box select the **Web** tab. Enter the following syntax in the **Alternative text** region to reference the image URL:

```
url: {IMAGE_LOCATION}
```

where IMAGE_LOCATION is an element from your XML file that holds the full URL to the image.

You can also build a URL based on multiple elements at runtime. Just use the `concat` function to build the URL string. For example:

```
url: {concat (SERVER, '/', IMAGE_DIR, '/', IMAGE_FILE) }
```

where SERVER, IMAGE_DIR, and IMAGE_FILE are element names from your XML file that hold the values to construct the URL.

This method can also be used with the OA_MEDIA reference as follows:

```
url: {concat ('${OA_MEDIA}', '/', IMAGE_FILE) }
```

Rendering an Image Retrieved from BLOB Data

If your data source is a Data Template (for information, see Data Templates, page 4-1) and your results XML contains image data that had been stored as a BLOB in the

database, use the following syntax in a form field inserted in your template where you want the image to render at runtime:

```
<fo:instream-foreign-object content type="image/jpg">
<xsl:value-of select="IMAGE_ELEMENT"/>
</fo:instream-foreign-object>
```

where

image/jpg is the MIME type of the image (other options might be: *image/gif* and *image/png*)

and

IMAGE_ELEMENT is the element name of the BLOB in your XML data.

Note that you can specify *height* and *width* attributes for the image to set its size in the published report. BI Publisher will scale the image to fit the box size that you define. For example, to set the size of the example above to three inches by four inches, enter the following:

```
<fo:instream-foreign-object content type="image/jpg" height="3 in"
width="4 in">
<xsl:value-of select="IMAGE_ELEMENT"/>
</fo:instream-foreign-object>
```

Specify in pixels as follows:

```
<fo:instream-foreign-object content type="image/jpg" height="300 px"
width="4 px">
...
```

or in centimeters:

```
<fo:instream-foreign-object content type="image/jpg" height="3 cm"
width="4 cm">
...
```

or as a percentage of the original dimensions:

```
<fo:instream-foreign-object content type="image/jpg" height="300%"
width="300%">
...
```

Chart Support

BI Publisher leverages the graph capabilities of Oracle Business Intelligence Beans (BI Beans) to enable you to define charts and graphs in your RTF templates that will be populated with data at runtime. BI Publisher supports all the graph types and component attributes available from the BI Beans graph DTD.

The BI Beans graph DTD is fully documented in the following technical note available from the Oracle Technology Network [<http://www.oracle.com/technology/index.html>] (OTN): "DTD for Customizing Graphs in Oracle Reports [http://www.oracle.com/technology/products/reports/htdocs/getstart/whitepapers/graphdtd/graph_dtd_technote_2.html]."

The following summarizes the steps to add a chart to your template. These steps will be

discussed in detail in the example that follows:

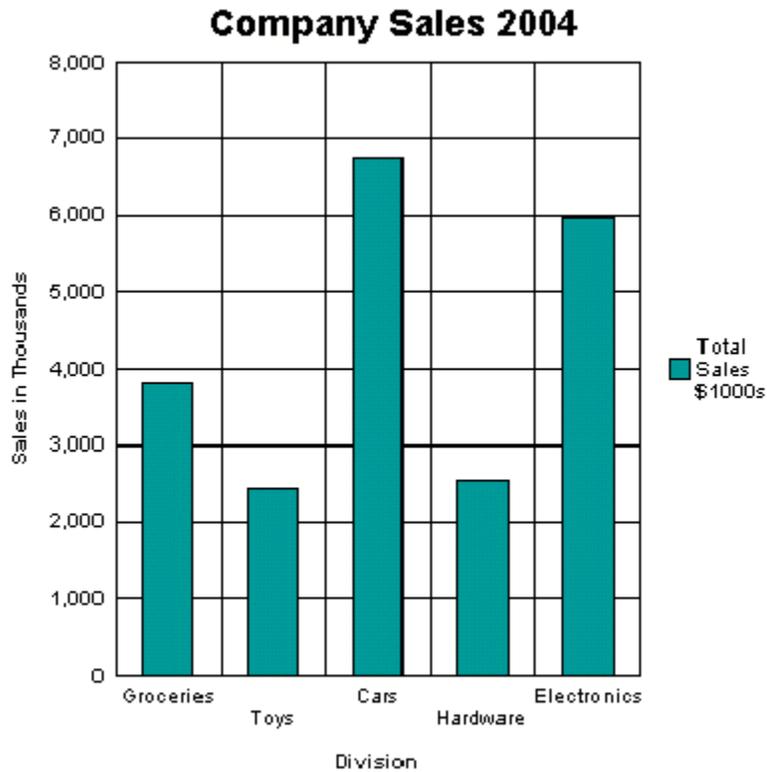
1. Insert a dummy image in your template to define the size and position of your chart.
2. Add the definition for the chart to the Alternative text box of the dummy image. The chart definition requires XSL commands.
3. At runtime BI Publisher calls the BI Beans applications to render the image that is then inserted into the final output document.

Adding a Sample Chart

Following is a piece of XML data showing total sales by company division.

```
<sales year=2004>
  <division>
    <name>Groceries</name>
    <totalsales>3810</totalsales>
    <costofsales>2100</costofsales>
  </division>
  <division>
    <name>Toys</name>
    <totalsales>2432</totalsales>
    <costofsales>1200</costofsales>
  </division>
  <division>
    <name>Cars</name>
    <totalsales>6753</totalsales>
    <costofsales>4100</costofsales>
  </division>
  <division>
    <name>Hardware</name>
    <totalsales>2543</totalsales>
    <costofsales>1400</costofsales>
  </division>
  <division>
    <name>Electronics</name>
    <totalsales>5965</totalsales>
    <costofsales>3560</costofsales>
  </division>
</sales>
```

This example will show how to insert a chart into your template to display it as a vertical bar chart as shown in the following figure:



Note the following attributes of this chart:

- The style is a vertical bar chart.
- The chart displays a background grid.
- The components are colored.
- Sales totals are shown as Y-axis labels.
- Divisions are shown as X-axis labels.
- The chart is titled.
- The chart displays a legend.

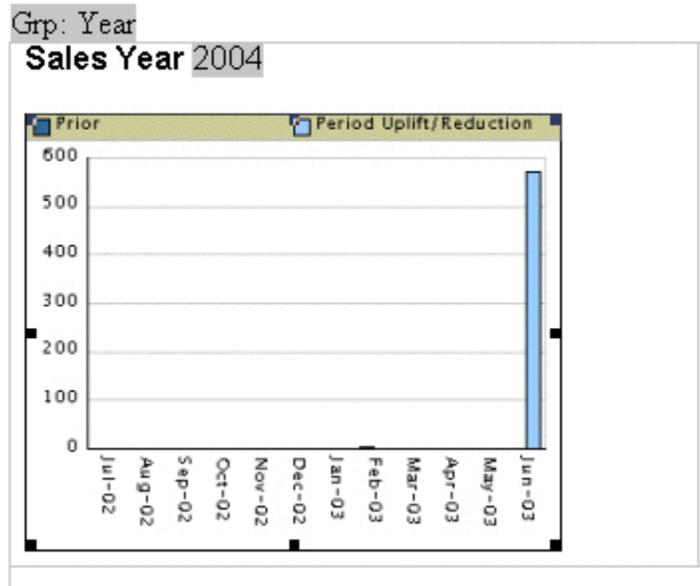
Each of these properties can be customized to suit individual report requirements.

Inserting the Dummy Image

The first step is to add a dummy image to the template in the position you want the chart to appear. The image size will define how big the chart image will be in the final document.

Important: You must insert the dummy image as a "Picture" and not any other kind of object.

The following figure shows an example of a dummy image:

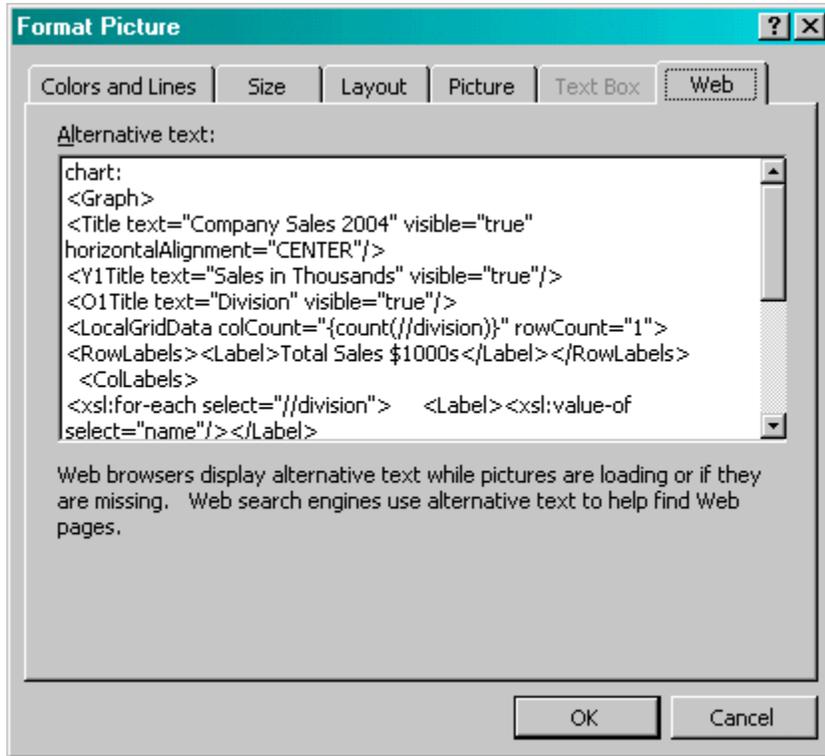


The image can be embedded inside a for-each loop like any other form field if you want the chart to be repeated in the output based on the repeating data. In this example, the chart is defined within the sales year group so that a chart will be generated for each year of data present in the XML file.

Right-click the image to open the **Format Picture** palette and select the **Web** tab. Use the **Alternative text** entry box to enter the code to define the chart characteristics and data definition for the chart.

Adding Code to the Alternative Text Box

The following graphic shows an example of the BI Publisher code in the **Format Picture Alternative text** box:



The content of the **Alternative text** represents the chart that will be rendered in the final document. For this chart, the text is as follows:

```

chart:
<Graph graphType = "BAR_VERT_CLUST">
  <Title text="Company Sales 2004" visible="true"
horizontalAlignment="CENTER"/>
  <Y1Title text="Sales in Thousands" visible="true"/>
  <O1Title text="Division" visible="true"/>
  <LocalGridData colCount="{count(//division)}" rowCount="1">
    <RowLabels>
      <Label>Total Sales $1000s</Label>
    </RowLabels>
    <ColLabels>
      <xsl:for-each select="//division">
        <Label>
          <xsl:value-of select="name"/>
        </Label>
      </xsl:for-each>
    </ColLabels>
    <DataValues>
      <RowData>
        <xsl:for-each select="//division">
          <Cell>
            <xsl:value-of select="totalsales"/>
          </Cell>
        </xsl:for-each>
      </RowData>
    </DataValues>
  </LocalGridData>
</Graph>

```

The first element of your chart text must be the `chart:` element to inform the RTF parser that the following code describes a chart object.

Next is the opening `<Graph>` tag. Note that the whole of the code resides within the tags of the `<Graph>` element. This element has an attribute to define the chart type: `graphType`. If this attribute is not declared, the default chart is a vertical bar chart. BI Beans supports many different chart types. Several more types are presented in this section. For a complete listing, see the BI Beans graph DTD documentation.

The following code section defines the chart type and attributes:

```
<Title text="Company Sales 2004" visible="true"
horizontalAlignment="CENTER"/>
  <Y1Title text="Sales in Thousands" visible="true"/>
  <O1Title text="Division" visible="true"/>
```

All of these values can be declared or you can substitute values from the XML data at runtime. For example, you can retrieve the chart title from an XML tag by using the following syntax:

```
<Title text="{CHARTTITLE}" visible="true" horizontalAlignment="CENTER"/>
```

where "CHARTTITLE" is the XML tag name that contains the chart title. Note that the tag name is enclosed in curly braces.

The next section defines the column and row labels:

```
<LocalGridData colCount="{count(//division)}" rowCount="1">
  <RowLabels>
    <Label>Total Sales $1000s</Label>
  </RowLabels>
  <ColLabels>
    <xsl:for-each select="//division">
      <Label>
        <xsl:value-of select="name"/>
      </Label>
    </xsl:for-each>
  </ColLabels>
```

The `LocalGridData` element has two attributes: `colCount` and `rowCount`. These define the number of columns and rows that will be shown at runtime. In this example, a count function calculates the number of columns to render:

```
colCount="{count(//division)}"
```

The `rowCount` has been hard-coded to 1. This value defines the number of sets of data to be charted. In this case it is 1.

Next the code defines the row and column labels. These can be declared, or a value from the XML data can be substituted at runtime. The row label will be used in the chart legend (that is, "Total Sales \$1000s").

The column labels for this example are derived from the data: Groceries, Toys, Cars, and so on. This is done using a for-each loop:

```

<ColLabels>
  <xsl:for-each select="//division">
    <Label>
      <xsl:value-of select="name"/>
    </Label>
  </xsl:for-each>
</ColLabels>

```

This code loops through the <division> group and inserts the value of the <name> element into the <Label> tag. At runtime, this will generate the following XML:

```

<ColLabels>
  <Label>Groceries</Label>
  <Label>Toys</Label>
  <Label>Cars</Label>
  <Label>Hardware</Label>
  <Label>Electronics</Label>
</ColLabels>

```

The next section defines the actual data values to chart:

```

<DataValues>
  <RowData>
    <xsl:for-each select="//division">
      <Cell>
        <xsl:value-of select="totalsales"/>
      </Cell>
    </xsl:for-each>
  </RowData>
</DataValues>

```

Similar to the labels section, the code loops through the data to build the XML that is passed to the BI Beans rendering engine. This will generate the following XML:

```

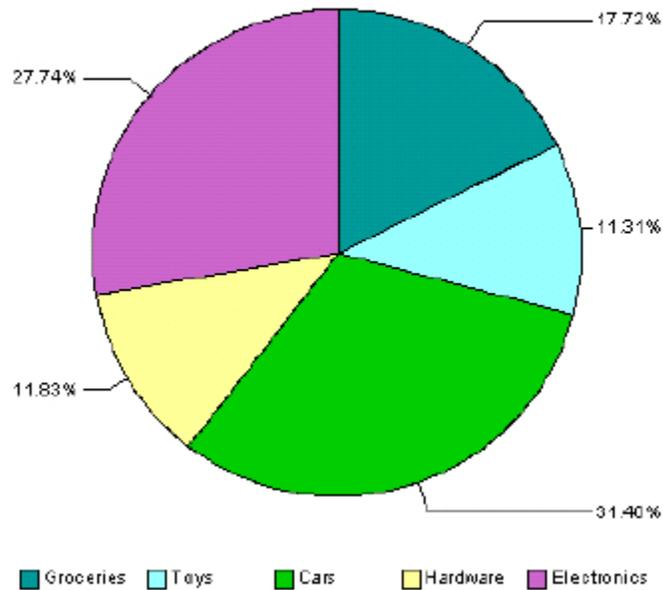
<DataValues>
  <RowData>
    <Cell>3810</Cell>
    <Cell>2432</Cell>
    <Cell>6753</Cell>
    <Cell>2543</Cell>
    <Cell>5965</Cell>
  </RowData>
</DataValues>

```

Additional Chart Samples

You can also display this data in a pie chart as shown in the following figure:

Company Sales 2004



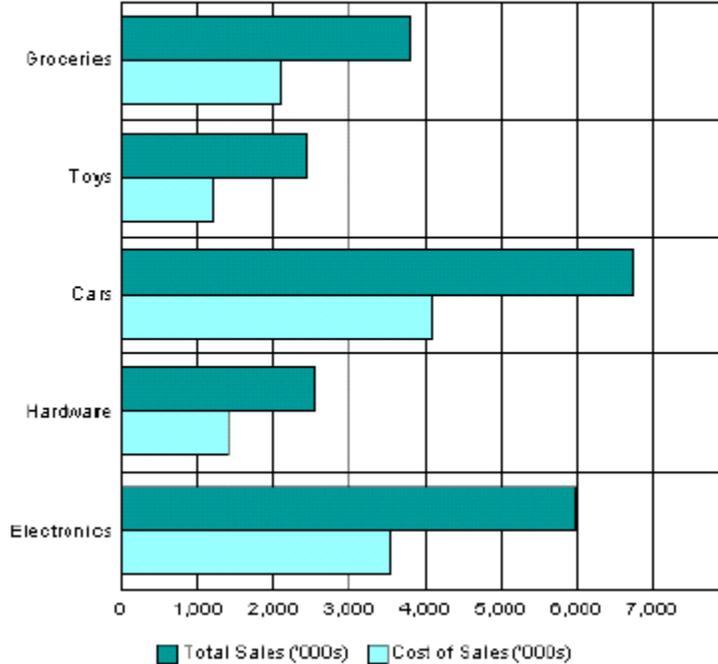
The following is the code added to the template to render this chart at runtime:

```
chart:
<Graph graphType="PIE">
  <Title text="Company Sales 2004" visible="true"
    horizontalAlignment="CENTER"/>
  <LocalGridData rowCount="{count(//division)}" colCount="1">
    <RowLabels>
      <xsl:for-each select="//division">
        <Label>
          <xsl:value-of select="name"/>
        </Label>
      </xsl:for-each>
    </RowLabels>
    <DataValues>
      <xsl:for-each select="//division">
        <RowData>
          <Cell>
            <xsl:value-of select="totalsales"/>
          </Cell>
        </RowData>
      </xsl:for-each>
    </DataValues>
  </LocalGridData>
</Graph>
```

Horizontal Bar Chart Sample

The following example shows total sales and cost of sales charted in a horizontal bar format. This example also adds the data from the cost of sales element (<costofsales>) to the chart:

Company Sales 2004



The following code defines this chart in the template:

```

chart:
<Graph graphType = "BAR_HORIZ_CLUST">
  <Title text="Company Sales 2004" visible="true"
horizontalAlignment="CENTER"/>
  <LocalGridData colCount="{count(//division)}" rowCount="2">
  <RowLabels>
    <Label>Total Sales ('000s)</Label>
    <Label>Cost of Sales ('000s)</Label>
  </RowLabels>
  <ColLabels>
    <xsl:for-each select="//division">
      <Label><xsl:value-of select="name"/></Label>
    </xsl:for-each>
  </ColLabels>
  <DataValues>
  <RowData>
    <xsl:for-each select="//division">
      <Cell><xsl:value-of select="totalsales"/></Cell>
    </xsl:for-each>
  </RowData>
  <RowData>
    <xsl:for-each select="//division">
      <Cell><xsl:value-of select="costofsales"/></Cell>
    </xsl:for-each>
  </RowData>
  </DataValues>
  </LocalGridData>
</Graph>

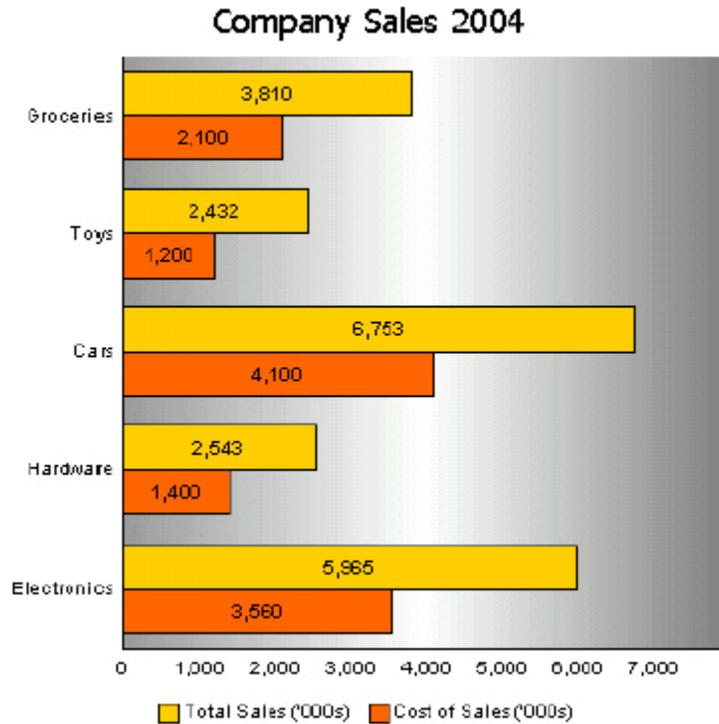
```

To accommodate the second set of data, the `rowCount` attribute for the

LocalGridData element is set to 2. Also note the DataValues section defines two sets of data: one for Total Sales and one for Cost of Sales.

Changing the Appearance of Your Chart

There are many attributes available from the BI Beans graph DTD that you can manipulate to change the look and feel of your chart. For example, the previous chart can be changed to remove the grid, place a graduated background, and change the bar colors and fonts as shown in the following figure:



The code to support this is as follows:

```

chart:
<Graph graphType = "BAR_HORIZ_CLUST">
<SeriesItems>
  <Series id="0" color="#ffcc00"/>
  <Series id="1" color="#ff6600"/>
</SeriesItems>
<O1MajorTick visible="false"/>
<X1MajorTick visible="false"/>
<Y1MajorTick visible="false"/>
<Y2MajorTick visible="false"/>
<MarkerText visible="true" markerTextPlace="MTP_CENTER"/>
<PlotArea borderTransparent="true">
  <SFX fillType="FT_GRADIENT" gradientDirection="GD_LEFT"
    gradientNumPins="300">
    <GradientPinStyle pinIndex="1" position="1"
      gradientPinLeftColor="#999999"
      gradientPinRightColor="#cc6600"/>
  </SFX>
</PlotArea>
<Title text="Company Sales 2004" visible="true">
  <GraphFont name="Tahoma" bold="false"/>
</Title>
. . .
</Graph>

```

The colors for the bars are defined in the `SeriesItems` section. The colors are defined in hexadecimal format as follows:

```

<SeriesItems>
  <Series id="0" color="#ffcc00"/>
  <Series id="1" color="#ff6600"/>
</SeriesItems>

```

The following code hides the chart grid:

```

<O1MajorTick visible="false"/>
  <X1MajorTick visible="false"/>
  <Y1MajorTick visible="false"/>
  <Y2MajorTick visible="false"/>

```

The `MarkerText` tag places the data values on the chart bars:

```

<MarkerText visible="true" markerTextPlace="MTP_CENTER"/>

```

The `PlotArea` section defines the background. The `SFX` element establishes the gradient and the `borderTransparent` attribute hides the plot border:

```

<PlotArea borderTransparent="true">
  <SFX fillType="FT_GRADIENT" gradientDirection="GD_LEFT"
    gradientNumPins="300">
    <GradientPinStyle pinIndex="1" position="1"
      gradientPinLeftColor="#999999"
      gradientPinRightColor="#cc6600"/>
  </SFX>
</PlotArea>

```

The `Title text` tag has also been updated to specify a new font type and size:

```

<Title text="Company Sales 2004" visible="true">
  <GraphFont name="Tahoma" bold="false"/>
</Title>

```

Drawing, Shape, and Clip Art Support

BI Publisher supports Microsoft Word drawing, shape, and clip art features. You can add these objects to your template and they will be rendered in your final PDF output.

The following AutoShape categories are supported:

- Lines - straight, arrowed, connectors, curve, free form, and scribble
- Connectors - straight connectors only are supported. Curved connectors can be achieved by using a curved line and specifying the end styles to the line.
- Basic Shapes - all shapes are supported.
- Block arrows - all arrows are supported.
- Flowchart - all flowchart objects are supported.
- Stars and Banners - all objects are supported.
- Callouts - the "line" callouts are not supported.
- Clip Art - add images to your templates using the Microsoft Clip Art libraries

Freehand Drawing

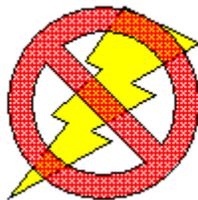
Use the freehand drawing tool in Microsoft Word to create drawings in your template to be rendered in the final PDF output.

Hyperlinks

You can add hyperlinks to your shapes. See Hyperlinks, page 5-53.

Layering

You can layer shapes on top of each other and use the transparency setting in Microsoft Word to allow shapes on lower layers to show through. The following graphic shows an example of layered shapes:



3-D Effects

BI Publisher does not currently support the 3-D option for shapes.

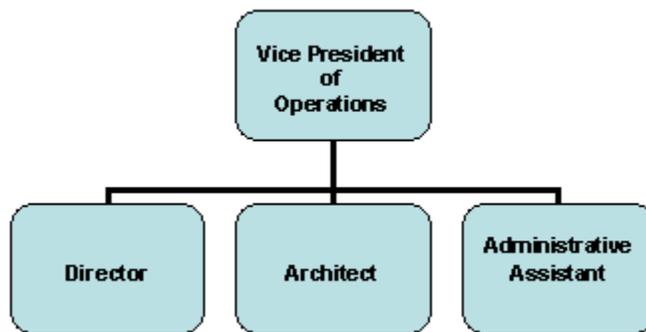
Microsoft Equation

Use the equation editor to generate equations in your output. The following figure shows an example of an equation:

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N \left(x_i - \bar{x} \right)^2}$$

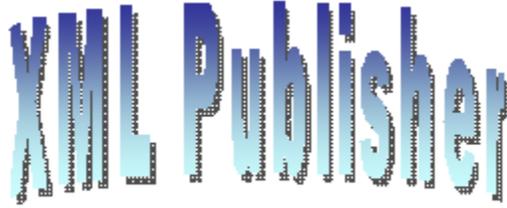
Organization Chart

Use the organization chart functionality in your templates and the chart will be rendered in the output. The following image shows an example of an organization chart:



WordArt

You can use Microsoft Word's WordArt functionality in your templates. The following graphic shows a WordArt example:



Note: Some Microsoft WordArt uses a bitmap operation that currently cannot be converted to SVG. To use the unsupported WordArt in your template, you can take a screenshot of the WordArt then save it as an image (gif, jpeg, or png) and replace the WordArt with the image.

Data Driven Shape Support

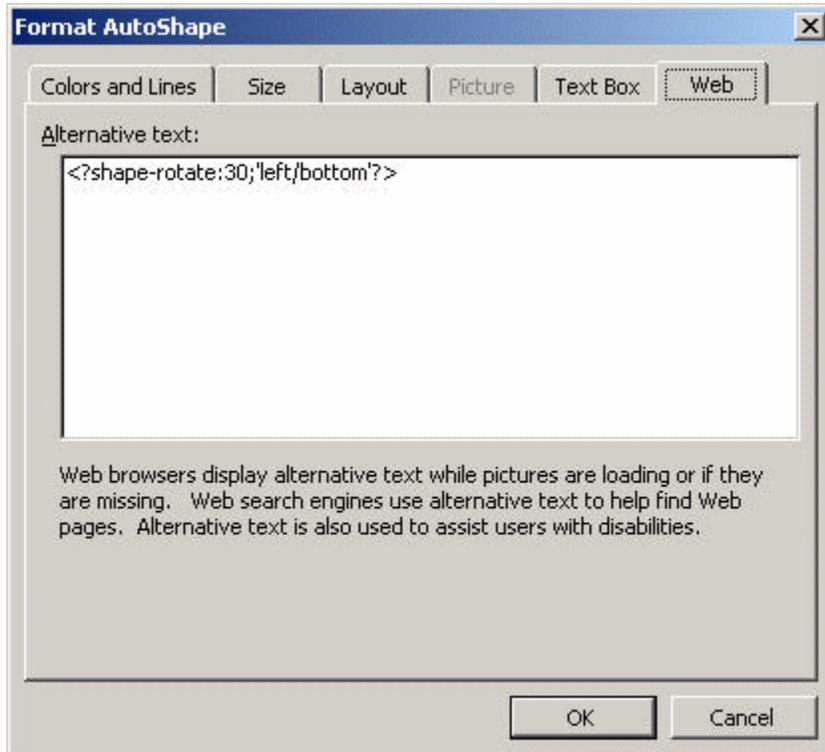
In addition to supporting the static shapes and features in your templates, BI Publisher supports the manipulation of shapes based on incoming data or parameters, as well. The following manipulations are supported:

- Replicate
- Move
- Change size
- Add text
- Skew
- Rotate

These manipulations not only apply to single shapes, but you can use the group feature in Microsoft Word to combine shapes together and manipulate them as a group.

Placement of Commands

Enter manipulation commands for a shape in the Web tab of the shape's properties dialog as shown in the following example figure:



Replicate a Shape

You can replicate a shape based on incoming XML data in the same way you replicate data elements in a for-each loop. To do this, use a `for-each@shape` command in conjunction with a `shape-offset` declaration. For example, to replicate a shape down the page, use the following syntax:

```
<?for-each@shape:SHAPE_GROUP?>
  <?shape-offset-y: (position()-1)*100?>
</end for-each?>
```

where

`for-each@shape` opens the for-each loop for the shape context

`SHAPE_GROUP` is the name of the repeating element from the XML file. For each occurrence of the element `SHAPE_GROUP` a new shape will be created.

`shape-offset-y: -` is the command to offset the shape along the y-axis.

`(position()-1)*100` - sets the offset in pixels per occurrence. The XSL `position()` command returns the record counter in the group (that is 1,2,3,4); one is subtracted from that number and the result is multiplied by 100. Therefore for the first occurrence the offset would be 0: $(1-1) * 100$. The offset for the second occurrence would be 100 pixels: $(2-1) * 100$. And for each subsequent occurrence the offset would be another 100 pixels down the page.

Add Text to a Shape

You can add text to a shape dynamically either from the incoming XML data or from a parameter value. In the property dialog enter the following syntax:

```
<?shape-text:SHAPETEXT?>
```

where SHAPETEXT is the element name in the XML data. At runtime the text will be inserted into the shape.

Add Text Along a Path

You can add text along a line or curve from incoming XML data or a parameter. After drawing the line, in the property dialog enter:

```
<?shape-text-along-path:SHAPETEXT?>
```

where SHAPETEXT is the element from the XML data. At runtime the value of the element SHAPETEXT will be inserted above and along the line.

Moving a Shape

You can move a shape or transpose it along both the x and y-axes based on the XML data. For example to move a shape 200 pixels along the y-axis and 300 along the x-axis, enter the following commands in the property dialog of the shape:

```
<?shape-offset-x:300?>
```

```
<?shape-offset-y:200?>
```

Rotating a Shape

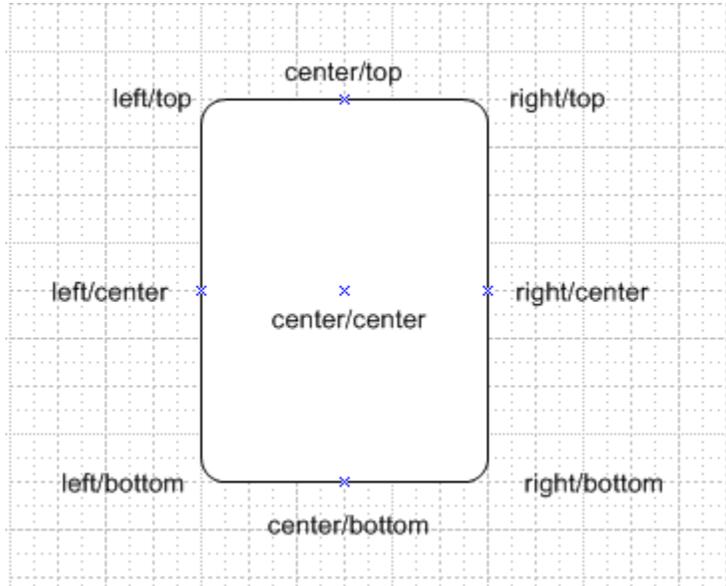
To rotate a shape about a specified axis based on the incoming data, use the following command:

```
<?shape-rotate:ANGLE;'POSITION'?>
```

where

ANGLE is the number of degrees to rotate the shape. If the angle is positive, the rotation is clockwise; if negative, the rotation is counterclockwise.

POSITION is the point about which to carry out the rotation, for example, 'left/top'. Valid values are combinations of left, right, or center with center, top, or bottom. The default is left/top. The following figure shows these valid values:



To rotate this rectangle shape about the bottom right corner, enter the following syntax:

```
<?shape-rotate:60,'right/bottom'??>
```

You can also specify an x,y coordinate within the shape itself about which to rotate.

Skewing a Shape

You can skew a shape along its x or y axis using the following commands:

```
<?shape-skew-x:ANGLE;' POSITION'??>
<?shape-skew-y:ANGLE;' POSITION'??>
```

where

ANGLE is the number of degrees to skew the shape. If the angle is positive, the skew is to the right.

POSITION is the point about which to carry out the rotation, for example, 'left/top'. Valid values are combinations of left, right, or center with center, top, or bottom. See the figure under Rotating a Shape, page 5-33. The default is 'left/top'.

For example, to skew a shape by 30 degrees about the bottom right hand corner, enter the following:

```
<?shape-skew-x:number(.)*30;'right/bottom'??>
```

Changing the Size of a Shape

You can change the size of a shape using the appropriate commands either along a single axis or both axes. To change a shape's size along both axes, use:

```
<?shape-size:RATIO??>
```

where RATIO is the numeric ratio to increase or decrease the size of the shape. Therefore a value of 2 would generate a shape twice the height and width of the

original. A value of 0.5 would generate a shape half the size of the original.

To change a shape's size along the x or y axis, use:

```
<?shape-size-x:RATIO?>  
<?shape-size-y:RATIO?>
```

Changing only the x or y value has the effect of stretching or shrinking the shape along an axis. This can be data driven.

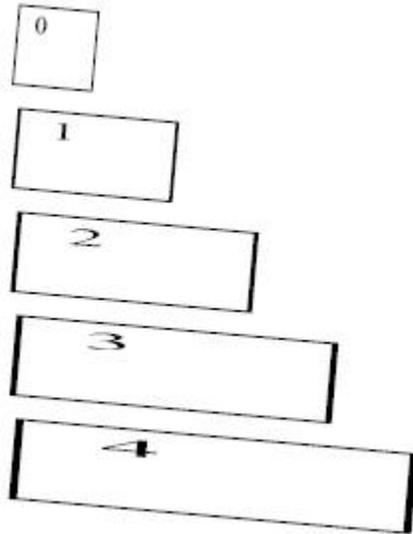
Combining Commands

You can also combine these commands to carry out multiple transformations on a shape at one time. For example, you can replicate a shape and for each replication, rotate it by some angle and change the size at the same time.

The following example shows how to replicate a shape, move it 50 pixels down the page, rotate it by five degrees about the center, stretch it along the x-axis and add the number of the shape as text:

```
<for-each@shape:SHAPE_GROUP?>  
  <?shape-text:position()?>  
  <?shape-offset-y:position()*50?>  
  <?shape-rotate:5;'center/center'?>  
  <?shape-size-x:position()+1?>  
<end for-each?>
```

This would generate the output shown in the following figure:



CD Ratings Example

This example demonstrates how to set up a template that will generate a star-rating based on data from an incoming XML file.

Assume the following incoming XML data:

```

<CATALOG>
  <CD>
    <TITLE>Empire Burlesque</TITLE>
    <ARTIST>Bob Dylan</ARTIST>
    <COUNTRY>USA</COUNTRY>
    <COMPANY>Columbia</COMPANY>
    <PRICE>10.90</PRICE>
    <YEAR>1985</YEAR>
    <USER_RATING>4</USER_RATING>
  </CD>
  <CD>
    <TITLE>Hide Your Heart</TITLE>
    <ARTIST>Bonnie Tylor</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <COMPANY>CBS Records</COMPANY>
    <PRICE>9.90</PRICE>
    <YEAR>1988</YEAR>
    <USER_RATING>3</USER_RATING>
  </CD>
  <CD>
    <TITLE>Still got the blues</TITLE>
    <ARTIST>Gary More</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <COMPANY>Virgin Records</COMPANY>
    <PRICE>10.20</PRICE>
    <YEAR>1990</YEAR>
    <USER_RATING>5</USER_RATING>
  </CD>
  <CD>
    <TITLE>This is US</TITLE>
    <ARTIST>Gary Lee</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <COMPANY>Virgin Records</COMPANY>
    <PRICE>12.20</PRICE>
    <YEAR>1990</YEAR>
    <USER_RATING>2</USER_RATING>
  </CD>
</CATALOG>

```

Notice there is a USER_RATING element for each CD. Using this data element and the shape manipulation commands, we can create a visual representation of the ratings so that the reader can compare them at a glance.

A template to achieve this is shown in the following figure:

| Title | Artist | Rating |
|---------|--------|---|
| F TITLE | ARTIST | E  |

The values for the fields are shown in the following table:

| Field | Form Field Entry |
|--------------|--|
| F | <?for-each:CD?> |
| TITLE | <?TITLE?> |
| ARTIST | <?ARTIST?> |
| E | <?end for-each?> |
| (star shape) | Web Tab Entry: <pre> <?for-each@shape:xdoxslt:foreach_number(\$_XDOCTX,0 ,USER_RATING,1)?> <?shape-offset-x:(position()-1)*25?> <?end for-each?> </pre> |

The form fields hold the simple element values. The only difference with this template is the value for the star shape. The replication command is placed in the Web tab of the Format AutoShape dialog.

In the for-each@shape command we are using a command to create a "for...next loop" construct. We specify 1 as the starting number; the value of USER_RATING as the final number; and 1 as the step value. As the template loops through the CDs, we create an inner loop to repeat a star shape for every USER_RATING value (that is, a value of 4 will generate 4 stars). The output from this template and the XML sample is shown in the following graphic:

| Title | Artist | Rating |
|---------------------|--------------|--------|
| Empire Burlesque | Bob Dylan | ★★★★ |
| Hide Your Heart | Bonnie Tylor | ★★★ |
| Still got the blues | Gary More | ★★★★★ |
| This is US | Gary Lee | ★★ |

Grouped Shape Example

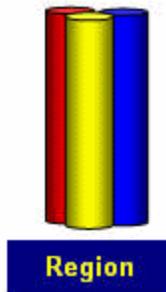
This example shows how to combine shapes into a group and have them react to the incoming data both individually and as a group. Assume the following XML data:

```

<SALES>
  <SALE>
    <REGION>Americas</REGION>
    <SOFTWARE>1200</SOFTWARE>
    <HARDWARE>850</HARDWARE>
    <SERVICES>2000</SERVICES>
  </SALE>
  <SALE>
    <REGION>EMEA</REGION>
    <SOFTWARE>1000</SOFTWARE>
    <HARDWARE>800</HARDWARE>
    <SERVICES>1100</SERVICES>
  </SALE>
  <SALE>
    <REGION>APAC</REGION>
    <SOFTWARE>900</SOFTWARE>
    <HARDWARE>1200</HARDWARE>
    <SERVICES>1500</SERVICES>
  </SALE>
</SALES>

```

You can create a visual representation of this data so that users can very quickly understand the sales data across all regions. Do this by first creating the composite shape in Microsoft Word that you wish to manipulate. The following figure shows a composite shape made up of four components:



The shape consists of three cylinders: red, yellow, and blue. These will represent the data elements software, hardware, and services. The combined object also contains a rectangle that is enabled to receive text from the incoming data.

The following commands are entered into the Web tab:

Red cylinder: `<?shape-size-y:SOFTWARE div 1000;'left/bottom'??>`

Yellow cylinder: `<?shape-size-y:HARDWARE div 1000;'left/bottom'??>`

Blue cylinder: `<?shape-size-y:SERVICES div 1000;'left/bottom'??>`

The shape-size command is used to stretch or shrink the cylinder based on the values of the elements SOFTWARE, HARDWARE, and SERVICES. The value is divided by 1000 to set the stretch or shrink factor. For example, if the value is 2000, divide that by 1000 to get a factor of 2. The shape will generate as twice its current height.

The text-enabled rectangle contains the following command in its Web tab:

`<?shape-text:REGION??>`

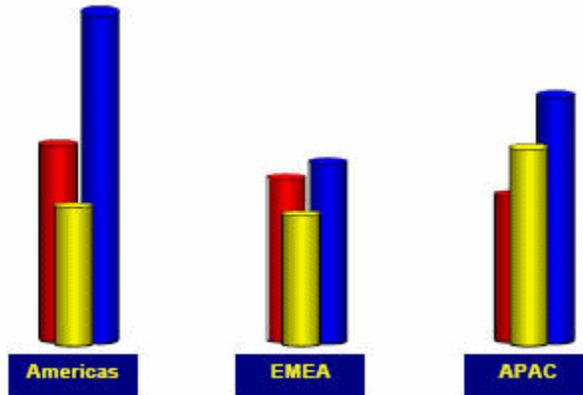
At runtime the value of the REGION element will appear in the rectangle.

All of these shapes were then grouped together and in the Web tab for the grouped object, the following syntax is added:

```
<?for-each@shape:SALE?>  
<?shape-offset-x:(position()-1)*110?>  
<?end for-each?>
```

In this set of commands, the `for-each@shape` loops over the SALE group. The `shape-offset` command moves the next shape in the loop to the right by a specific number of pixels. The expression `(position()-1)` sets the position of the object. The `position()` function returns a record counter while in the loop, so for the first shape, the offset would be $1-1*100$, or 0, which would place the first rendering of the object in the position defined in the template. Subsequent occurrences would be rendered at a 100 pixel offset along the x-axis (to the right).

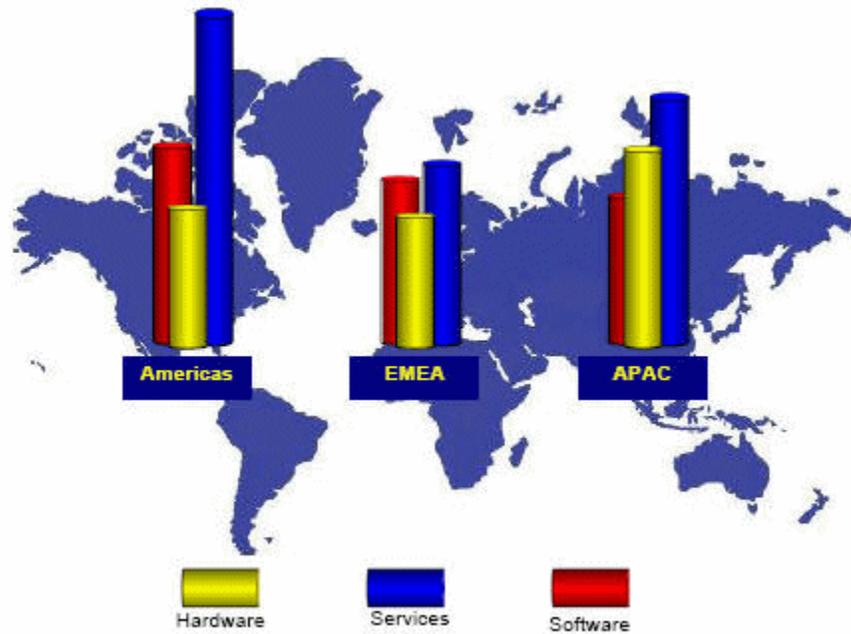
At runtime three sets of shapes will be rendered across the page as shown in the following figure:



To make an even more visually representative report, these shapes can be superimposed onto a world map. Just use the "Order" dialog in Microsoft Word to layer the map behind the grouped shapes.

Microsoft Word 2000 Users: After you add the background map and overlay the shape group, use the Grouping dialog to make the entire composition one group.

Microsoft Word 2002/3 Users: These versions of Word have an option under Tools > Options, General tab to "Automatically generate drawing canvas when inserting autoshapes". Using this option removes the need to do the final grouping of the map and shapes. We can now generate a visually appealing output for our report as seen in the following figure:



Supported Native Formatting Features

In addition to the features already listed, BI Publisher supports the following features of Microsoft Word.

General Features

- Large blocks of text
- Page breaks

To insert a page break, insert a Ctrl-Enter keystroke just before the closing tag of a group. For example if you want the template to start a new page for every Supplier in the Payables Invoice Register:

1. Place the cursor just before the Supplier group's closing `<?end for-each?>` tag.
2. Press Ctrl-Enter to insert a page break.

At runtime each Supplier will start on a new page.

Using this Microsoft Word native feature will cause a single blank page to print at the end of your report output. To avoid this single blank page, use BI Publisher's page break alias. See Special Features: Page Breaks, page 5-48.

- Page numbering

Insert page numbers into your final report by using the page numbering methods of your word processing application. For example, if you are using Microsoft Word:

1. From the **Insert** menu, select **Page Numbers...**
2. Select the **Position**, **Alignment**, and **Format** as desired.

At runtime the page numbers will be displayed as selected.

- Hidden text

You can format text as "hidden" in Microsoft Word and the hidden text will be maintained in RTF output reports.

Alignment

Use your word processor's alignment features to align text, graphics, objects, and tables.

Note: Bidirectional languages are handled automatically using your word processing application's left/right alignment controls.

Tables

Supported table features include:

- Nested Tables
- Cell Alignment

You can align any object in your template using your word processing application's alignment tools. This alignment will be reflected in the final report output.

- Row spanning and column spanning

You can span both columns and rows in your template as follows:

1. Select the cells you wish to merge.
2. From the **Table** menu, select **Merge Cells**.
3. Align the data within the merged cell as you would normally.

At runtime the cells will appear merged.

- Table Autoformatting

BI Publisher recognizes the table autoformats available in Microsoft Word.

1. Select the table you wish to format.
2. From the **Table** menu, select **Autoformat**.
3. Select the desired table format.

At runtime, the table will be formatted using your selection.

- Cell patterns and colors

You can highlight cells or rows of a table with a pattern or color.

1. Select the cell(s) or table.
2. From the **Table** menu, select **Table Properties**.
3. From the **Table** tab, select the **Borders and Shading...** button.
4. Add borders and shading as desired.

- Repeating table headers

If your data is displayed in a table, and you expect the table to extend across multiple pages, you can define the header rows that you want to repeat at the start of each page.

1. Select the row(s) you wish to repeat on each page.
2. From the **Table** menu, select **Heading Rows Repeat**.

- Prevent rows from breaking across pages.

If you want to ensure that data within a row of a table is kept together on a page, you can set this as an option using Microsoft Word's **Table Properties**.

1. Select the row(s) that you want to ensure do not break across a page.
2. From the **Table** menu, select **Table Properties**.
3. From the **Row** tab, deselect the check box "Allow row to break across pages".

- Fixed-width columns

To set the widths of your table columns:

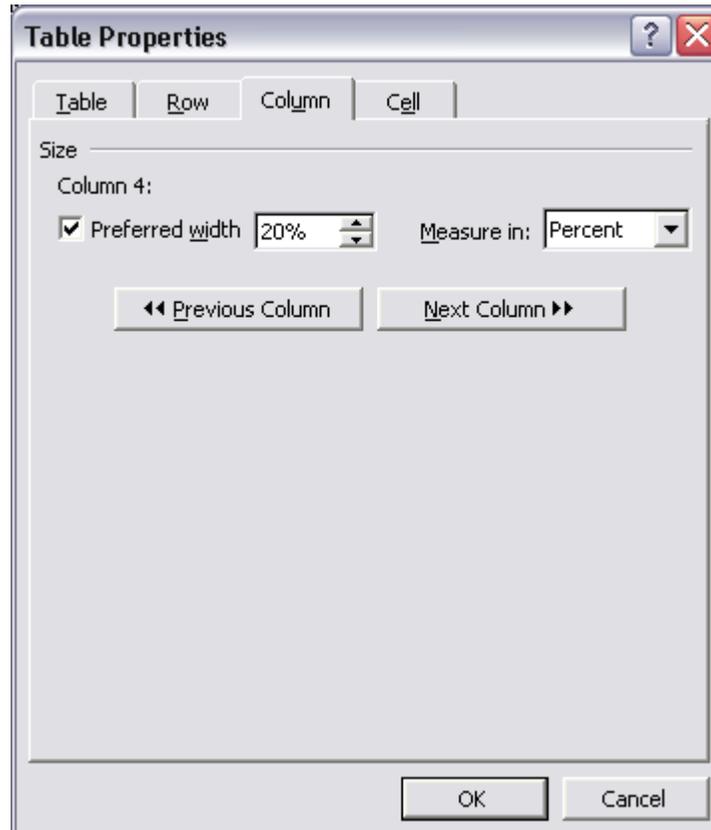
1. Select a column and then select **Table >Table Properties**.
2. In the **Table Properties** dialog, select the **Column** tab.
3. Enable the **Preferred width** checkbox and then enter the width as a **Percent** or

in **Inches**.

4. Select the **Next Column** button to set the width of the next column.

Note that the total width of the columns must add up to the total width of the table.

The following figure shows the **Table Properties** dialog:

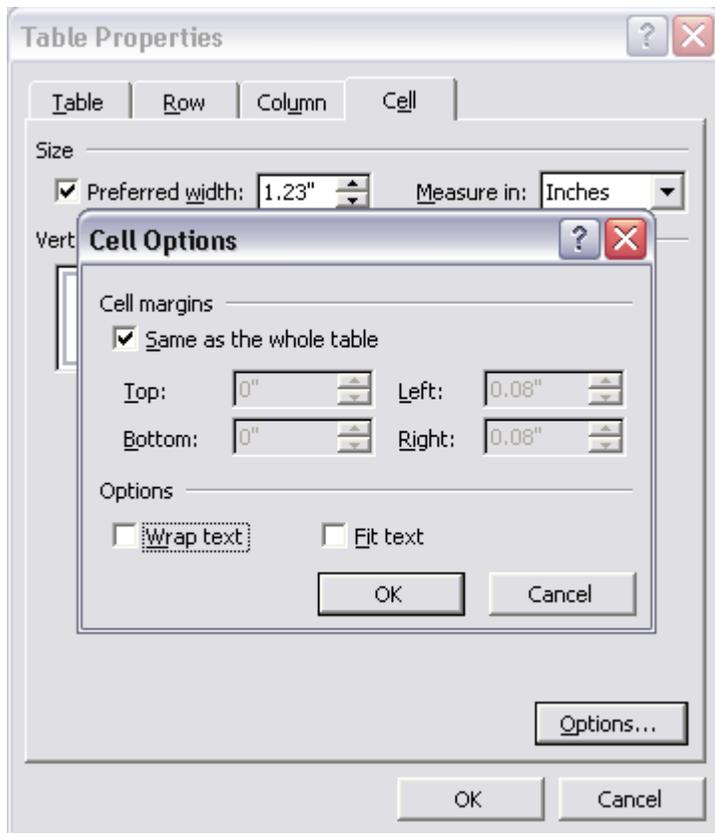


- Text truncation

By default, if the text within a table cell will not fit within the cell, the text will be wrapped. To truncate the text instead, use the table properties dialog.

1. Place your cursor in the cell in which you want the text truncated.
2. Right-click your mouse and select **Table Properties...** from the menu, or navigate to **Table >Table Properties...**
3. From the **Table Properties** dialog, select the **Cell** tab, then select **Options...**
4. Deselect the **Wrap Text** check box.

The following figure shows the Cell Options dialog.



An example of truncation is shown in the following graphic:

| Wrap Text checked | Wrap Text unchecked |
|--|---------------------|
| The quick brown fox jumped over the lazy river. | The quick brown fox |

Date Fields

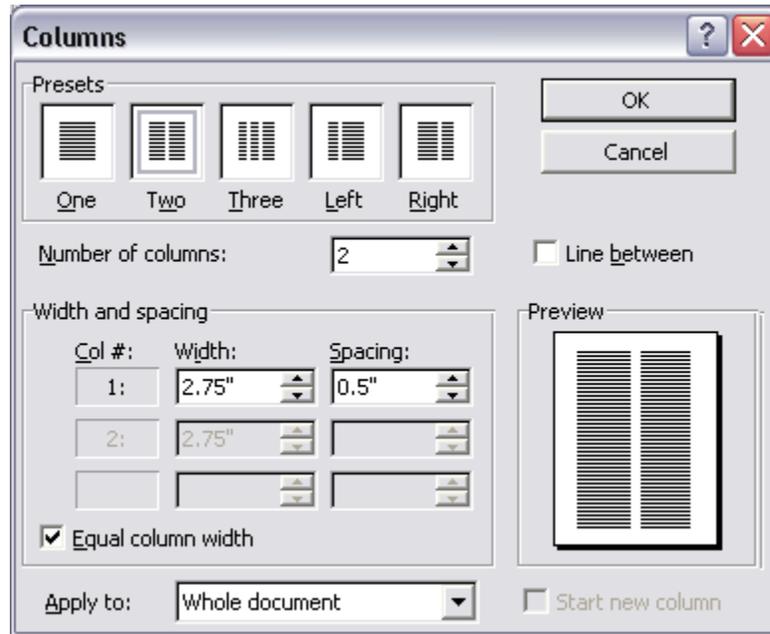
Insert dates using the date feature of your word processing application. Note that this date will correspond to the publishing date, not the request run date.

Multicolumn Page Support

BI Publisher supports Microsoft Word's Columns function to enable you to publish your output in multiple columns on a page.

Select **Format > Columns** to display the **Columns** dialog box to define the number of

columns for your template. The following graphic shows the Columns dialog:



Multicolumn Page Example: Labels

To generate address labels in a two-column format:

1. Divide your page into two columns using the Columns command.
2. Define the repeatable group in the first column. Note that you define the repeatable group only in the first column, as shown in the following figure:



F

| | |
|----------|-----------------|
| Name | CUSTOMER_NAME |
| Number | CUSTOMER_NUMBER |
| City | CITY |
| State | STATE |
| Zip Code | ZIP_CODE |

E

Tip: To prevent the address block from breaking across pages or columns, embed the label block inside a single-celled table. Then specify in the Table Properties that the row should not break across pages. See Prevent rows from breaking across pages, page 5-42.

This template will produce the following multicolumn output:

| | | | |
|----------|--------------------|----------|----------|
| Name | Nuts and Bolts Ltd | Name | Big Co |
| Number | 1220 | Number | 1221 |
| City | Espoo | City | Helsinki |
| State | FI | State | FI |
| Zip Code | | Zip Code | |
| | | | |
| Name | My Company | Name | Small Co |
| Number | 1220 | Number | 1221 |
| City | Espoo | City | Helsinki |
| State | FI | State | FI |
| Zip Code | | Zip Code | |

Background and Watermark Support

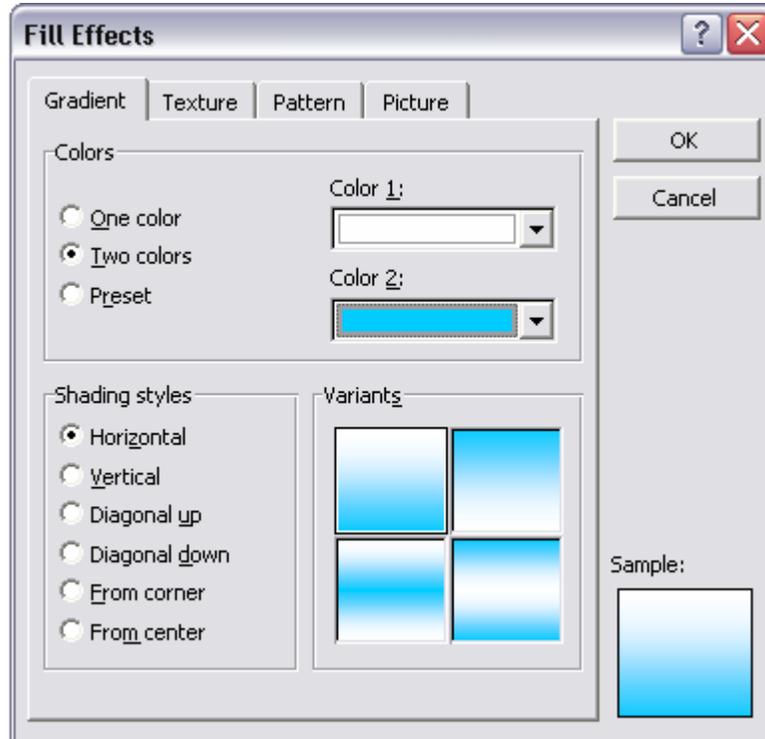
BI Publisher supports the "Background" feature in Microsoft Word. You can specify a single, graduated color or an image background for your template to be displayed in the PDF output. Note that this feature is supported for PDF output only.

To add a background to your template, use the Format > Background menu option.

Add a Background Using Microsoft Word 2000

From the Background pop up menu, you can:

- Select a single color background from the color palette
- Select Fill Effects to open the Fill Effects dialog. The Fill Effects dialog is shown in the following figure:



From this dialog select one of the following supported options:

- Gradient - this can be either one or two colors
- Texture - choose one of the textures provided, or load your own
- Pattern - select a pattern and background/foreground colors
- Picture - load a picture to use as a background image

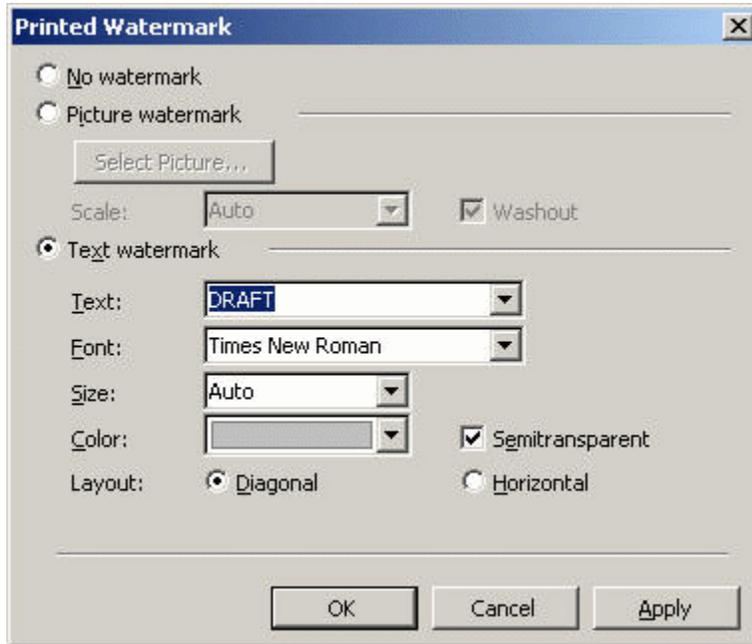
Add a Text or Image Watermark Using Microsoft Word 2002 or later

These versions of Microsoft Word allow you to add either a text or image watermark.

Use the Format > Background > Printed Watermark dialog to select either:

- Picture Watermark - load an image and define how it should be scaled on the document
- Text Watermark - use the predefined text options or enter your own, then specify the font, size and how the text should be rendered.

The following figure shows the Printed Watermark dialog completed to display a text watermark:



Template Features

Page Breaks

To create a page break after the occurrence of a specific element use the "split-by-page-break" alias. This will cause the report output to insert a hard page break between every instance of a specific element.

To insert a page break between each occurrence of a group, insert the "split-by-page-break" form field within the group immediately before the `<?end for-each?>` tag that closes the group. In the Help Text of this form field enter the syntax:

```
<?split-by-page-break:??>
```

Example

For the following XML, assume you want to create a page break for each new supplier:

```

<SUPPLIER>
  <NAME>My Supplier</NAME>
  <INVOICES>
    <INVOICE>
      <INVNUM>10001-1</INVNUM>
      <INVDATE>1-Jan-2005</INVDATE>
      <INVAMT>100</INVOICEAMT>
    </INVOICE>
    <INVOICE>
      <INVNUM>10001-2</INVNUM>
      <INVDATE>10-Jan-2005</INVDATE>
      <INVAMT>200</INVOICEAMT>
    </INVOICE>
  </INVOICES>
</SUPPLIER>
<SUPPLIER>
  <NAME>My Second Supplier</NAME>
  <INVOICES>
    <INVOICE>
      <INVNUM>10001-1</INVNUM>
      <INVDATE>11-Jan-2005</INVDATE>
      <INVAMT>150</INVOICEAMT>
    </INVOICE>
  ...

```

In the template sample shown in the following figure, the field called PageBreak contains the split-by-page-break syntax:

FE

Supplier: Supplier 1

| Invoice Number | Invoice Date | Amount | Running Total |
|----------------|--------------|--------|---------------|
| FE10001-1 | 1-Jan-2005 | 100.00 | 100.00EFE |

PageBreak EFE

Place the PageBreak field with the `<?split-by-page-break:?>` syntax immediately before the `<?end for-each?>` field. The PageBreak field sits inside the end of the SUPPLIER loop. This will ensure a page break is inserted before the occurrence of each new supplier. This method avoids the ejection of an extra page at the end of the group when using the native Microsoft Word page break after the group.

Initial Page Number

Some reports require that the initial page number be set at a specified number. For example, monthly reports may be required to continue numbering from month to month. BI Publisher allows you to set the page number in the template to support this requirement.

Use the following syntax in your template to set the initial page number:

```
<?initial-page-number:pagenumber?>
```

where *pagenumber* is the XML element or parameter that holds the numeric value.

Example 1 - Set page number from XML data element

If your XML data contains an element to carry the initial page number, for example:

```
<REPORT>
  <PAGESTART>200<\PAGESTART>
  . . . .
</REPORT>
```

Enter the following in your template:

```
<?initial-page-number:PAGESTART?>
```

Your initial page number will be the value of the PAGESTART element, which in this case is 200.

Example 2 - Set page number by passing a parameter value

If you define a parameter called PAGESTART, you can pass the initial value by calling the parameter.

Enter the following in your template:

```
<?initial-page-number:$PAGESTART?>
```

Note: You must first declare the parameter in your template. See *Defining Parameters in Your Template*, page 5-88.

Last Page Only Content

BI Publisher supports the Microsoft Word functionality to specify a different page layout for the first page, odd pages, and even pages. To implement these options, simply select **Page Setup** from the **File** menu, then select the **Layout** tab. BI Publisher will recognize the settings you make in this dialog.

However, Microsoft Word does not provide settings for a different last page only. This is useful for documents such as checks, invoices, or purchase orders on which you may want the content such as the check or the summary in a specific place only on the last page.

BI Publisher provides this ability. To utilize this feature, you must:

1. Create a section break in your template to ensure the content of the final page is separated from the rest of the report.
2. Insert the following syntax on the final page:

```
<?start@last-page:body?>
<?end body?>
```

Any content on the page that occurs above or below these two tags will appear only on the last page of the report. Also, note that because this command explicitly specifies the content of the final page, any desired headers or footers previously defined for the report must be reinserted on the last page.

Example

This example uses the last page only feature for a report that generates an invoice listing with a summary to appear at the bottom of the last page.

Assume the following XML:

```
<?xml version="1.0" encoding="WINDOWS-1252"?>
<INVOICELIST>
  <VENDOR>
    <VENDOR_NAME>Nuts and Bolts Limited</VENDOR_NAME>
    <ADDRESS>1 El Camino Real, Redwood City, CA 94065</ADDRESS>
    <INVOICE>
      <INV_TYPE>Standard</INV_TYPE>
      <INVOICE_NUM>981110</INVOICE_NUM>
      <INVOICE_DATE>10-NOV-04</INVOICE_DATE>
      <INVOICE_CURRENCY_CODE>EUR</INVOICE_CURRENCY_CODE>
      <ENT_AMT>122</ENT_AMT>
      <ACCTD_AMT>122</ACCTD_AMT>
      <VAT_CODE>VAT22%</VAT_CODE>
    </INVOICE>
    <INVOICE>
      <INV_TYPE>Standard</INV_TYPE>
      <INVOICE_NUM>100000</INVOICE_NUM>
      <INVOICE_DATE>28-MAY-04</INVOICE_DATE>
      <INVOICE_CURRENCY_CODE>FIM</INVOICE_CURRENCY_CODE>
      <ENT_AMT>122</ENT_AMT>
      <ACCTD_AMT>20.33</ACCTD_AMT>
      <VAT_CODE>VAT22%</VAT_CODE>
    </INVOICE>
  </VENDOR>
  <VENDOR>
    ...
  <INVOICE>
    ...
  </INVOICE>
</VENDOR>
<SUMMARY>
  <SUM_ENT_AMT>61435</SUM_ENT_AMT>
  <SUM_ACCTD_AMT>58264.68</SUM_ACCTD_AMT>
  <TAX_CODE>EU22%</TAX_CODE>
</SUMMARY>
</INVOICELIST>
```

The report should show each VENDOR and their INVOICE data with a SUMMARY section that appears only on the last page, placed at the bottom of the page. The template for this is shown in the following figure:

Template Page One

F

Vendor: **VENDOR_NAME**

Address: **ADDRESS**

| Invoice Type | Invoice Num | Invoice Date | Invoice Currency | Entered Amount | Accounted Amount |
|--------------|-------------|--------------|------------------|----------------|------------------|
| F Invoice | 120000 | 01-Jan-2006 | USD | 100 | 100 E |

E

<<insert section break>

Insert a Microsoft Word section break (type: next page) on the first page of the template. For the final page, insert new line characters to position the summary table at the bottom of the page. The summary table is shown in the following figure:

Last Page Only Layout

Last Page Placeholder

Tax Summary

| Tax Code | Entered Amount | Accounted Amount |
|------------|----------------|------------------|
| F VAT 18.5 | 100 | 100 E |

In this example:

- The F and E components contain the for-each grouping statements.
- The grayed report fields are placeholders for the XML elements.
- The "Last Page Placeholder" field contains the syntax:

```
<?start@last-page:body?><?end body?>
```

to declare the last page layout. Any content above or below this statement will appear on the last page only. The content above the statement is regarded as the header and the content below the statement is regarded as the footer.

If your reports contains headers and footers that you want to carry over onto the last page, you must reinsert them on the last page. For more information about headers and footers see Defining Headers and Footers, page 5-15.

You must insert a section break (type: next page) into the document to specify the last page layout. This example is available in the samples folder of the Oracle BI Publisher Template Builder for Word installation.

It is important to note that if the report is only one page in length, the first page layout will be used. If your report requires that a single page report should default to the last page layout (such as in a check printing implementation) then you can use the following alternate syntax for the "Last Page Placeholder" on the last page:

```
<?start@last-page-first:body?><?end body?>
```

Substituting this syntax will result in the last page layout for reports that are only one page long.

End on Even or End on Odd Page

If your report has different odd and even page layouts, you may want to force your report to end specifically on an odd or even page. For example, you may include the terms and conditions of a purchase order in the footer of your report using the different odd/even footer functionality (see Different First Page and Different Odd and Even Page Support, page 5-16) and you want to ensure that the terms and conditions are printed on the final page.

Or, you may have binding requirements to have your report end on an even page, without specific layout.

To end on an even page with layout:

Insert the following syntax in a form field in your template:

```
<?section:force-page-count;'end-on-even-layout'??>
```

To end on an odd page layout:

```
<?section:force-page-count;'end-on-odd-layout'??>
```

If you do not have layout requirements for the final page, but would like a blank page ejected to force the page count to the preferred odd or even, use the following syntax:

```
<?section:force-page-count;'end-on-even'??>
```

or

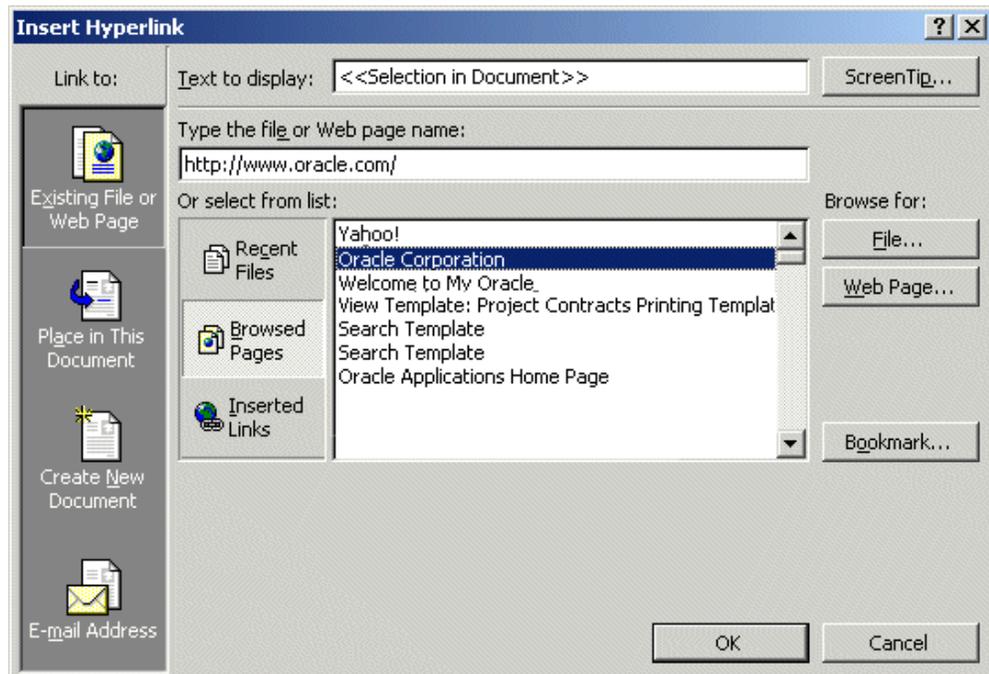
```
<?section:force-page-count;'end-on-odd'??>
```

Hyperlinks

BI Publisher supports several different types of hyperlinks. The hyperlinks can be fixed or dynamic and can link to either internal or external destinations. Hyperlinks can also be added to shapes.

- To insert static hyperlinks to either text or a shape, use your word processing application's insert hyperlink feature:
 1. Select the text or shape.
 2. Use the right-mouse menu to select **Hyperlink**; or, select **Hyperlink** from the **Insert** menu.
 3. Enter the URL using any of the methods provided on the **Insert Hyperlink** dialog box.

The following screenshot shows the insertion of a static hyperlink using Microsoft Word's **Insert Hyperlink** dialog box.



- If your input XML data includes an element that contains a hyperlink or part of one, you can create dynamic hyperlinks at runtime. In the **Type the file or Web page name** field of the **Insert Hyperlink** dialog box, enter the following syntax:

```
{URL_LINK}
```

where URL_LINK is the incoming data element name.

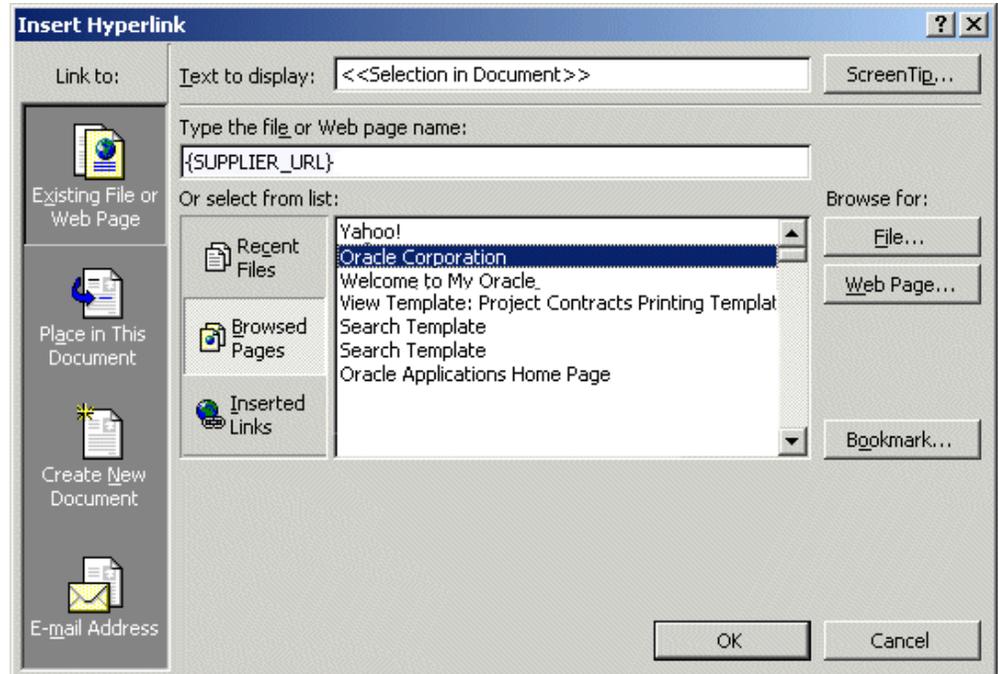
If you have a fixed URL that you want to add elements from your XML data file to construct the URL, enter the following syntax:

```
http://www.oracle.com?product={PRODUCT_NAME}
```

where PRODUCT_NAME is the incoming data element name.

In both these cases, at runtime the dynamic URL will be constructed.

The following figure shows the insertion of a dynamic hyperlink using Microsoft Word's **Insert Hyperlink** dialog box. The data element SUPPLIER_URL from the incoming XML file will contain the hyperlink that will be inserted into the report at runtime.



- You can also pass parameters at runtime to construct a dynamic URL.

Enter the parameter and element names surrounded by braces to build up the URL as follows:

```
{$SERVER_URL}{REPORT}/cstid={CUSTOMER_ID}
```

where SERVER_URL and REPORT are parameters passed to the template at runtime (note the \$ sign) and CUSTOMER_ID is an XML data element. This link may render as:

```
http://myserver.domain:8888/CustomerReport/cstid=1234
```

Inserting Internal Links

Insert internal links into your template using Microsoft Word's Bookmark feature.

1. Position your cursor in the desired destination in your document.
2. Select **Insert >Bookmark...**
3. In the **Bookmark** dialog, enter a name for this bookmark, and select **Add**.
4. Select the text or shape in your document that you want to link back to the

Bookmark target.

5. Use the right-mouse menu to select **Hyperlink**; or select **Hyperlink** from the **Insert** menu.
6. On the **Insert Hyperlink** dialog, select **Bookmark**.
7. Choose the bookmark you created from the list.

At runtime, the link will be maintained in your generated report.

Table of Contents

BI Publisher supports the table of contents generation feature of the RTF specification. Follow your word processing application's procedures for inserting a table of contents.

BI Publisher also provides the ability to create dynamic section headings in your document from the XML data. You can then incorporate these into a table of contents.

To create dynamic headings:

1. Enter a placeholder for the heading in the body of the document, and format it as a "Heading", using your word processing application's style feature. You cannot use form fields for this functionality.

For example, you want your report to display a heading for each company reported. The XML data element tag name is <COMPANY_NAME>. In your template, enter <?COMPANY_NAME?> where you want the heading to appear. Now format the text as a Heading.

2. Create a table of contents using your word processing application's table of contents feature.

At runtime the TOC placeholders and heading text will be substituted.

Generating Bookmarks in PDF Output

If you have defined a table of contents in your RTF template, you can use your table of contents definition to generate links in the Bookmarks tab in the navigation pane of your output PDF. The bookmarks can be either static or dynamically generated.

For information on creating the table of contents, see Table of Contents, page 5-56.

- To create links for a static table of contents:

Enter the syntax:

```
<?copy-to-bookmark:??>
```

directly above your table of contents and

```
<?end copy-to-bookmark:??>
```

directly below the table of contents.

- To create links for a dynamic table of contents:

Enter the syntax:

```
<?convert-to-bookmark:??>
```

directly above the table of contents and

```
<?end convert-to-bookmark:??>
```

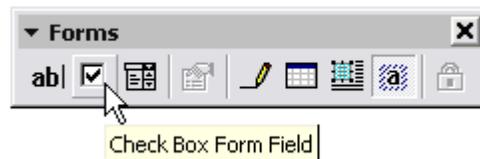
directly below the table of contents.

Check Boxes

You can include a check box in your template that you can define to display as checked or unchecked based on a value from the incoming data.

To define a check box in your template:

1. Position the cursor in your template where you want the check box to display, and select the Check Box Form Field from the Forms tool bar (shown in the following figure).

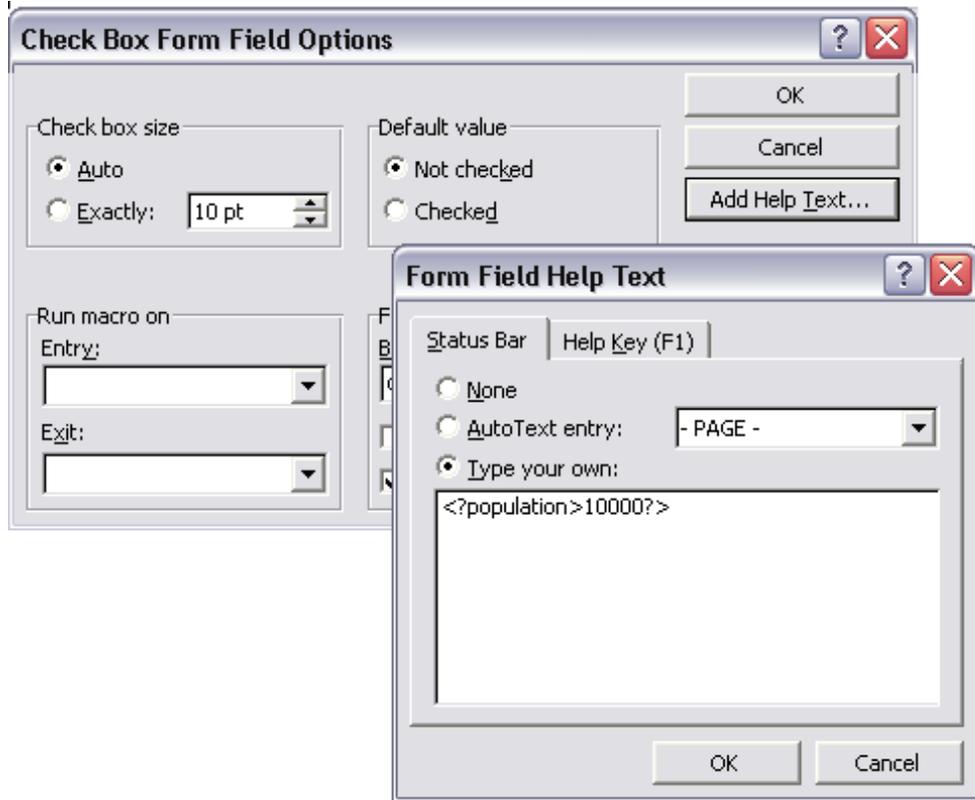


2. Right-click the field to open the **Check Box Form Field Options** dialog.
3. Specify the **Default value** as either Checked or Not Checked.
4. In the Form Field Help Text dialog, enter the criteria for how the box should behave. This must be a boolean expression (that is, one that returns a true or false result).

For example, suppose your XML data contains an element called `<population>`. You want the check box to appear checked if the value of `<population>` is greater than 10,000. Enter the following in the help text field:

```
<?population>10000?>
```

This is displayed in the following figure:



Note that you do not have to construct an "if" statement. The expression is treated as an "if" statement.

See the next section for a sample template using a check box.

Drop Down Lists

BI Publisher allows you to use the drop-down form field to create a cross-reference in your template from your XML data to some other value that you define in the drop-down form field.

For example, suppose you have the following XML:

```

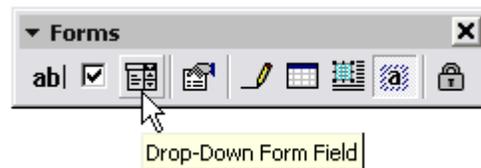
<countries>
  <country>
    <name>Chad</name>
    <population>7360000</population>
    <continentIndex>5</continentIndex>
  </country>
  <country>
    <name>China</name>
    <population>1265530000</population>
    <continentIndex>1</continentIndex>
  </country>
  <country>
    <name>Chile</name>
    <population>14677000</population>
    <continentIndex>3</continentIndex>
  </country>
  . . .
</countries>

```

Notice that each `<country>` entry has a `<continentindex>` entry, which is a numeric value to represent the continent. Using the drop-down form field, you can create an index in your template that will cross-reference the `<continentindex>` value to the actual continent name. You can then display the name in your published report.

To create the index for the continent example:

1. Position the cursor in your template where you want the value from the drop-down list to display, and select the Drop-Down Form Field from the Forms tool bar (shown in the following figure).



2. Right-click the field to display the **Drop-Down Form Field Options** dialog.
3. Add each value to the **Drop-down item** field and the click **Add** to add it to the **Items in drop-down list** group. The values will be indexed starting from one for the first, and so on. For example, the list of continents will be stored as follows:

| Index | Value |
|-------|---------------|
| 1 | Asia |
| 2 | North America |

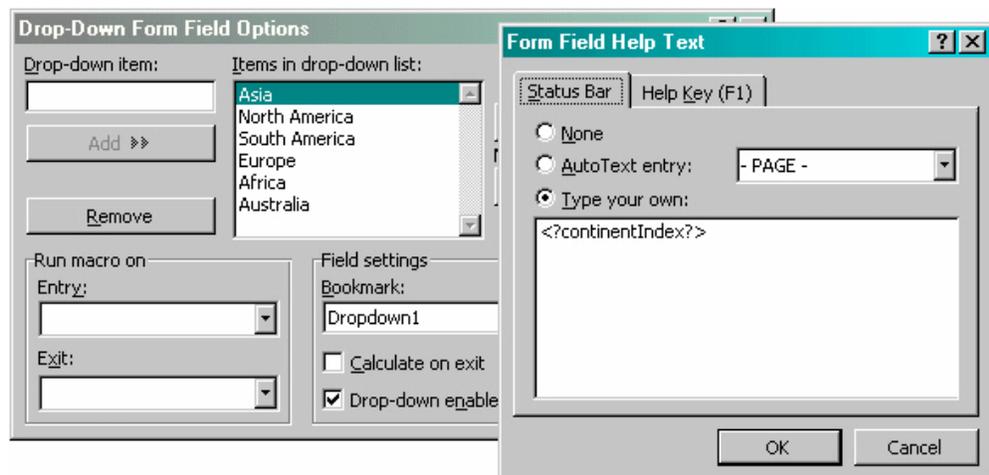
| Index | Value |
|-------|---------------|
| 3 | South America |
| 4 | Europe |
| 5 | Africa |
| 6 | Australia |

- Now use the Help Text box to enter the XML element name that will hold the index for the drop-down field values.

For this example, enter

```
<?continentIndex?>
```

The following figure shows the **Drop-Down Form Field Options** dialogs for this example:



Using the check box and drop-down list features, you can create a report to display population data with check boxes to demonstrate figures that reach a certain limit. An example is shown in the following figure:

| Country | Population | more than 10M? | Continent |
|---------------|---------------|-------------------------------------|---------------|
| Chad | 7,360,000 | <input type="checkbox"/> | Africa |
| China | 1,265,530,000 | <input checked="" type="checkbox"/> | Asia |
| Chile | 14,677,000 | <input checked="" type="checkbox"/> | South America |
| Sweden | 8,887,000 | <input type="checkbox"/> | Europe |
| United States | 270,312,000 | <input checked="" type="checkbox"/> | North America |
| New Zealand | 3,625,000 | <input type="checkbox"/> | Australia |

The template to create this report is shown in the next figure:

| Country | Population | more than 10M? | Continent |
|----------|------------|--------------------------|-----------|
| FE China | 1,000,000 | <input type="checkbox"/> | Asia EFE |

where the fields have the following values:

| Field | Form Field Entry | Description |
|-------------|------------------------|--|
| FE | <?for-each:country?> | Begins the <code>country</code> repeating group. |
| China | <?name?> | Placeholder for the <code>name</code> element. |
| 1,000,000 | <?population?> | Placeholder for the <code>population</code> element. |
| (check box) | <?population>1000000?> | Establishes the condition for the check box. If the value for the <code>population</code> element is greater than 1,000,000, the check box will display as checked. |
| Asia | <?continentIndex?> | The drop-down form field for the <code>continentIndex</code> element. See the preceding description for its contents. At runtime, the value of the XML element is replaced with the value it is cross-referenced to in the drop-down form field. |
| EFE | <?end for-each?> | Ends the <code>country</code> group. |

Conditional Formatting

Conditional formatting occurs when a formatting element appears only when a certain condition is met. BI Publisher supports the usage of simple "if" statements, as well as more complex "choose" expressions.

The conditional formatting that you specify can be XSL or XSL:FO code, or you can specify actual RTF objects such as a table or data. For example, you can specify that if reported numbers reach a certain threshold, they will display shaded in red. Or, you

can use this feature to hide table columns or rows depending on the incoming XML data.

If Statements

Use an if statement to define a simple condition; for example, if a data field is a specific value.

1. Insert the following syntax to designate the beginning of the conditional area.

```
<?if:condition?>
```

2. Insert the following syntax at the end of the conditional area: `<?end if?>`.

For example, to set up the Payables Invoice Register to display invoices only when the Supplier name is "Company A", insert the syntax `<?if:VENDOR_NAME='COMPANY A'?>` before the Supplier field on the template.

Enter the `<?end if?>` tag after the invoices table.

This example is displayed in the figure below. Note that you can insert the syntax in form fields, or directly into the template.

```
Group: Suppliers
<?if:VENDOR_NAME='Company A'?>
Supplier: Supplier 1

| Invoice Num            | Invoice Date |
|------------------------|--------------|
| Group:Invoices 1234566 | 1-Jan-2004   |


<?end if?>
End:Suppliers
```

If Statements in Boilerplate Text

Assume you want to incorporate an "if" statement into the following free-form text:

The program was (not) successful.

You only want the "not" to display if the value of an XML tag called `<SUCCESS>` equals "N".

To achieve this requirement, you must use the BI Publisher context command to place

the if statement into the inline sequence rather than into the block (the default placement).

Note: For more information on context commands, see *Using Context Commands*, page 5-121.

For example, if you construct the code as follows:

```
The program was <?if:SUCCESS='N'?>not<?end if?> successful.
```

The following undesirable result will occur:

```
The program was  
not  
successful.
```

because BI Publisher applies the instructions to the block by default. To specify that the if statement should be inserted into the inline sequence, enter the following:

```
The program was <?if@inlines:SUCCESS='N'?>not<?end if?>  
successful.
```

This construction will result in the following display:

```
The program was successful.
```

If SUCCESS does not equal 'N';

or

```
The program was not successful.
```

If SUCCESS equals 'N'.

If-then-Else Statements

BI Publisher supports the common programming construct "if-then-else". This is extremely useful when you need to test a condition and conditionally show a result. For example:

```
IF X=0 THEN  
  Y=2  
ELSE  
  Y=3  
END IF
```

You can also nest these statements as follows:

```
IF X=0 THEN  
  Y=2  
ELSE  
  IF X=1 THEN  
    Y=10  
  ELSE Y=100  
END IF
```

Use the following syntax to construct an if-then-else statement in your RTF template:

```
<?xdofx:if element_condition then result1 else result2 end if?>
```

For example, the following statement tests the AMOUNT element value. If the value is greater than 1000, show the word "Higher"; if it is less than 1000, show the word "Lower"; if it is equal to 1000, show "Equal":

```
<?xdofx:if AMOUNT > 1000 then 'Higher'  
  else  
    if AMOUNT < 1000 then 'Lower'  
      else  
        'Equal'  
      end if?  
    end if?>
```

Choose Statements

Use the `choose`, `when`, and `otherwise` elements to express multiple conditional tests. If certain conditions are met in the incoming XML data then specific sections of the template will be rendered. This is a very powerful feature of the RTF template. In regular XSL programming, if a condition is met in the `choose` command then further XSL code is executed. In the template, however, you can actually use visual widgets in the conditional flow (in the following example, a table).

Use the following syntax for these elements:

```
<?choose:??>  
<?when:expression?>  
<?otherwise?>
```

"Choose" Conditional Formatting Example

This example shows a `choose` expression in which the display of a row of data depends on the value of the fields `EXEMPT_FLAG` and `POSTED_FLAG`. When the `EXEMPT_FLAG` equals "^", the row of data will render light gray. When `POSTED_FLAG` equals "*" the row of data will render shaded dark gray. Otherwise, the row of data will render with no shading.

In the following figure, the form field default text is displayed. The form field help text entries are shown in the table following the example.

| | | | | | |
|-----------------------|--|--|--------------|--|-------------------------------------|
| Column Legend: | <table border="1"> <tr> <td style="background-color: #cccccc;"></td> <td>'Not Posted'</td> </tr> <tr> <td style="background-color: #808080;"></td> <td>'Reduces Available Exemption Limit'</td> </tr> </table> | | 'Not Posted' | | 'Reduces Available Exemption Limit' |
| | 'Not Posted' | | | | |
| | 'Reduces Available Exemption Limit' | | | | |

| | Tax Code | Taxable Recoverable | Taxable Non-Recoverable | Recoverable Tax | Tax Non-Recoverable | Total |
|--|-----------------------|---------------------|-------------------------|-----------------|---------------------|-------|
| | <Grp:VAT | | | | | |
| | <Choose | | | | | |
| | <When EXEMPT_FLAG='^' | | | | | |
| | VAT 15% | 1000 | 1000 | 1000 | 1000 | 1000 |
| | End When> | | | | | |
| | <When POSTED_FLAG='*' | | | | | |
| | VAT 15% | 1000 | 1000 | 1000 | 1000 | 1000 |
| | End When> | | | | | |
| | Otherwise | | | | | |
| | VAT 15% | 1000 | 1000 | 1000 | 1000 | 1000 |
| | End Otherwise>] | | | | | |
| | End Choose> | | | | | |
| | End VAT> | | | | | |

| Default Text Entry in Example Form Field | Help Text Entry in Form Field |
|--|-------------------------------|
| <Grp:VAT | <?for-each:VAT?> |
| <Choose | <?choose?> |
| <When EXEMPT_FLAG='^' | <?When EXEMPT_FLAG='^'?> |
| End When> | <?end When?> |
| <When EXEMPT_FLAG='^' | <?When EXEMPT_FLAG='^'?> |
| End When> | <?end When?> |

Column Formatting

You can conditionally show and hide columns of data in your document output. The following example demonstrates how to set up a table so that a column is only displayed based on the value of an element attribute.

This example will show a report of a price list, represented by the following XML:

```

<items type="PUBLIC"> <! - can be marked 'PRIVATE' - >
  <item>
    <name>Plasma TV</name>
    <quantity>10</quantity>
    <price>4000</price>
  </item>
  <item>
    <name>DVD Player</name>
    <quantity>3</quantity>
    <price>300</price>
  </item>
  <item>
    <name>VCR</name>
    <quantity>20</quantity>
    <price>200</price>
  </item>
  <item>
    <name>Receiver</name>
    <quantity>22</quantity>
    <price>350</price>
  </item>
</items>

```

Notice the `type` attribute associated with the `items` element. In this XML it is marked as "PUBLIC" meaning the list is a public list rather than a "PRIVATE" list. For the "public" version of the list we do not want to show the quantity column in the output, but we want to develop only one template for both versions based on the list type.

The following figure is a simple template that will conditionally show or hide the quantity column:

| Name | IF Quantity end-if | Price |
|-------------------|--------------------|-----------------|
| grp:ItemPlasma TV | 20 | 1,000.00end grp |

The following table shows the entries made in the template for the example:

| Default Text | Form Field Entry | Description |
|--------------|-------------------|--|
| grp:Item | <?for-each:item?> | Holds the opening for-each loop for the <code>item</code> element. |
| Plasma TV | <?name?> | The placeholder for the <code>name</code> element from the XML file. |

| Default Text | Form Field Entry | Description |
|--------------|--|---|
| IF | <?if@column:/items/@type="PRIVATE"?> | The opening of the if statement to test for the attribute value "PRIVATE". Note that this syntax uses an XPath expression to navigate back to the "items" level of the XML to test the attribute. For more information about using XPath in your templates, see XPath Overview, page 5-118. |
| Quantity | N/A | Boilerplate heading |
| end-if | <?end if?> | Ends the if statement. |
| 20 | <?if@column:/items/@type="PRIVATE"?><?quantity?><?end if?> | The placeholder for the quantity element surrounded by the "if" statement. |
| 1,000.00 | <?price?> | The placeholder for the price element. |
| end grp | <?end for-each?> | Closing tag of the for-each loop. |

The conditional column syntax is the "if" statement syntax with the addition of the @column clause. It is the @column clause that instructs BI Publisher to hide or show the column based on the outcome of the if statement.

If you did not include the @column the data would not display in your report as a result of the if statement, but the column still would because you had drawn it in your template.

Note: The @column clause is an example of a context command. For more information, see Using Context Commands, page 5-121.

The example will render the output shown in the following figure:

| Name | Price |
|------------|----------|
| Plasma TV | 4,000.00 |
| DVD Player | 300.00 |
| VCR | 200.00 |
| Receiver | 350.00 |

If the same XML data contained the type attribute set to "PRIVATE" the following output would be rendered from the same template:

| Name | Quantity | Price |
|------------|----------|----------|
| Plasma TV | 10 | 4,000.00 |
| DVD Player | 3 | 300.00 |
| VCR | 20 | 200.00 |
| Receiver | 22 | 350.00 |

Row Formatting

BI Publisher allows you to specify formatting conditions as the row-level of a table. Examples of row-level formatting are:

- Highlighting a row when the data meets a certain threshold.
- Alternating background colors of rows to ease readability of reports.
- Showing only rows that meet a specific condition.

Conditionally Displaying a Row

To display only rows that meet a certain condition, insert the `<?if:condition?>` `<?end if?>` tags at the beginning and end of the row, within the for-each tags for the group. This is demonstrated in the following sample template.

| Industry | Year | Month | Sales |
|--|-------------------|--------------------|------------------------------------|
| <code>for-each SALE if big INDUSTRY</code> | <code>YEAR</code> | <code>MONTH</code> | <code>SALES end if end SALE</code> |

Note the following fields from the sample figure:

| Default Text Entry | Form Field Help Text | Description |
|--------------------|---|--|
| for-each SALE | <code><?for-each:SALE?></code> | Opens the for-each loop to repeat the data belonging to the SALE group. |
| if big | <code><?if:SALES>5000?></code> | If statement to display the row only if the element SALES has a value greater than 5000. |
| INDUSTRY | <code><?INDUSTRY?></code> | Data field |
| YEAR | <code><?YEAR?></code> | Data field |

| Default Text Entry | Form Field Help Text | Description |
|--------------------|----------------------|--------------------------|
| MONTH | <?MONTH?> | Data field |
| SALES end if | <?end if?> | Closes the if statement. |
| end SALE | <?end for-each?> | Closes the SALE loop. |

Conditionally Highlighting a Row

This example demonstrates how to set a background color on every other row. The template to create this effect is shown in the following figure:

| Industry | Year | Month | Sales |
|--------------------------------|------|-------|----------------|
| for-each SALE format; INDUSTRY | YEAR | MONTH | SALES end SALE |

The following table shows values of the form fields in the template:

| Default Text Entry | Form Field Help Text | Description |
|--------------------|---|--|
| for-each SALE | <?for-each:SALE?> | Defines the opening of the for-each loop for the SALE group. |
| format; | <?if@row:position() mod 2=0?> <xsl:attribute name="background-color" xdofo:ctx="incontext">lightgray</xsl:attribute><?end if?> | For each alternate row, the background color attribute is set to gray for the row. |
| INDUSTRY | <?INDUSTRY?> | Data field |
| YEAR | <?YEAR?> | Data field |
| MONTH | <?MONTH?> | Data field |
| SALES | <?SALES?> | Data field |
| end SALE | <?end for-each?> | Closes the SALE for-each loop. |

In the preceding example, note the "format;" field. It contains an if statement with a "row" context (@row). This sets the context of the if statement to apply to the current row. If the condition is true, then the <xsl:attribute> for the background color of the row will be set to light gray. This will result in the following output:

| Industry | Year | Month | Sales |
|------------|------|-------|---------|
| Oil | 2000 | Jan | 100,000 |
| Automotive | 2000 | Jan | 200,000 |
| Groceries | 2000 | Jan | 50,000 |

Note: For more information about context commands, see Using Context Commands, page 5-121.

Cell Highlighting

The following example demonstrates how to conditionally highlight a cell based on a value in the XML file.

For this example we will use the following XML:

```
<accounts>
  <account>
    <number>1-100-3333</number>
    <debit>100</debit>
    <credit>300</credit>
  </account>
  <account>
    <number>1-101-3533</number>
    <debit>220</debit>
    <credit>30</credit>
  </account>
  <account>
    <number>1-130-3343</number>
    <debit>240</debit>
    <credit>1100</credit>
  </account>
  <account>
    <number>1-153-3033</number>
    <debit>3000</debit>
    <credit>300</credit>
  </account>
</accounts>
```

The template lists the accounts and their credit and debit values. In the final report we want to highlight in red any cell whose value is greater than 1000. The template for this is shown in the following figure:

| Account | Debit | Credit |
|----------------------|-----------|--------------|
| FE:Account1-232-4444 | CH1100.00 | CH2100.00EFE |

The field definitions for the template are shown in the following table:

| Default Text Entry | Form Field Entry | Description |
|--------------------|--|--|
| FE:Account | <?for-each:account?> | Opens the for each-loop for the element <code>account</code> . |
| 1-232-4444 | <?number?> | The placeholder for the <code>number</code> element from the XML file. |
| CH1 | <?if:debit>1000?><xsl:attribute xdofo:ctx="block" name="background-color">red</xsl:attribute><?end if?> | This field holds the code to highlight the cell red if the debit amount is greater than 1000. |
| 100.00 | <?debit?> | The placeholder for the <code>debit</code> element. |
| CH2 | <?if:credit>1000?><xsl:attribute xdofo:ctx="block" name="background-color">red</xsl:attribute><?end if?> | This field holds the code to highlight the cell red if the credit amount is greater than 1000. |
| 100.00 | <?credit?> | The placeholder for the <code>credit</code> element. |
| EFE | <?end for-each?> | Closes the for-each loop. |

The code to highlight the debit column as shown in the table is:

```
<?if:debit>1000?>
  <xsl:attribute
    xdofo:ctx="block" name="background-color">red
  </xsl:attribute>
<?end if?>
```

The "if" statement is testing if the debit value is greater than 1000. If it is, then the next lines are invoked. Notice that the example embeds native XSL code inside the "if" statement.

The "attribute" element allows you to modify properties in the XSL.

The `xdofo:ctx` component is an BI Publisher feature that allows you to adjust XSL attributes at any level in the template. In this case, the background color attribute is changed to red.

To change the color attribute, you can use either the standard HTML names (for example, red, white, green) or you can use the hexadecimal color definition (for example, #FFFFFF).

The output from this template is displayed in the following figure:

| Account | Debit | Credit |
|------------|---------|---------|
| 1-100-3333 | 100.00 | 300.00 |
| 1-101-3533 | 220.00 | 30.00 |
| 1-130-3343 | 240.00 | 1100.00 |
| 1-153-3033 | 3000.00 | 300.00 |

Page-Level Calculations

Displaying Page Totals

BI Publisher allows you to display calculated page totals in your report. Because the page is not created until publishing time, the totaling function must be executed by the formatting engine.

Note: Page totaling is performed in the PDF-formatting layer. Therefore this feature is not available for other outputs types: HTML, RTF, Excel.

Note: Note that this page totaling function will only work if your source XML has raw numeric values. The numbers must not be preformatted.

Because the page total field does not exist in the XML input data, you must define a variable to hold the value. When you define the variable, you associate it with the element from the XML file that is to be totaled for the page. Once you define total fields, you can also perform additional functions on the data in those fields.

To declare the variable that is to hold your page total, insert the following syntax immediately following the placeholder for the element that is to be totaled:

```
<?add-page-total:TotalFieldName;'element'??>
```

where

`TotalFieldName` is the name you assign to your total (to reference later) and

`'element'` is the XML element field to be totaled.

You can add this syntax to as many fields as you want to total.

Then when you want to display the total field, enter the following syntax:

```
<?show-page-total:TotalFieldName;'Oracle-number-format'??>
```

where

`TotalFieldName` is the name you assigned to give the page total field above and

`Oracle-number-format` is the format you wish to use to for the display, using the Oracle format mask (for example: C9G999D00). For the list of Oracle format mask

symbols, see Using the Oracle Format Mask, page 5-110.

The following example shows how to set up page total fields in a template to display total credits and debits that have displayed on the page, and then calculate the net of the two fields.

This example uses the following XML:

```
<balance_sheet>
  <transaction>
    <debit>100</debit>
    <credit>90</credit>
  </transaction>
  <transaction>
    <debit>110</debit>
    <credit>80</credit>
  </transaction>
  ...
</balance_sheet>
```

The following figure shows the table to insert in the template to hold the values:

| Debit | Credit |
|-----------|---------------|
| FE 100.00 | 90.00 Net EFE |

The following table shows the form field entries made in the template for the example table:

| Default Text Entry | Form Field Help Text Entry | Description |
|--------------------|---|--|
| FE | <?for-each:transaction?> | This field defines the opening "for-each" loop for the transaction group. |
| 100.00 | <?debit?><?add-page-total:dt;'debit'?'> | This field is the placeholder for the debit element from the XML file. Because we want to total this field by page, the page total declaration syntax is added. The field defined to hold the total for the debit element is dt. |
| 90.00 | <?credit?><?add-page-total:ct;'credit'?'> | This field is the placeholder for the credit element from the XML file. Because we want to total this field by page, the page total declaration syntax is added. The field defined to hold the total for the credit element is ct. |

| Default Text Entry | Form Field Help Text Entry | Description |
|--------------------|---|--|
| Net | <add-page-total:net;'debit - credit'??> | Creates a net page total by subtracting the credit values from the debit values. |
| EFE | <?end for-each?> | Closes the for-each loop. |

Note that on the field defined as "net" we are actually carrying out a calculation on the values of the `credit` and `debit` elements.

Now that you have declared the page total fields, you can insert a field in your template where you want the page totals to appear. Reference the calculated fields using the names you supplied (in the example, `ct` and `dt`). The syntax to display the page totals is as follows:

For example, to display the debit page total, enter the following:

```
<?show-page-total:dt;'C9G990D00';'(C9G990D00)'??>
```

Therefore to complete the example, place the following at the bottom of the template page, or in the footer:

```
Page Total Debit: <?show-page-total:dt;'C9G990D00';'(C9G990D00)'??>
```

```
Page Total Credit: <?show-page-total:ct;'C9G990D00';'(C9G990D00)'??>
```

```
Page Total Balance: <?show-page-total:net;'C9G990D00';'(C9G990D00)'??>
```

The output for this report is shown in the following graphic:

| | | Page 1 |
|--|--------------|---------------------------|
| | Debit | Credit |
| | 100.00 | 90.00 |
| | 110.00 | 80.00 |
| | 120.00 | 70.00 |
| | 130.00 | 60.00 |
| | 140.00 | 50.00 |
| | 150.00 | 40.00 |
| | | Page Total Debit:750.00 |
| | | Page Total Credit:390.00 |
| | | Page Total Balance:360.00 |

Brought Forward/Carried Forward Totals

Many reports require that a page total be maintained throughout the report output and be displayed at the beginning and end of each page. These totals are known as "brought

forward/carried forward" totals.

Note: The totaling for the brought forward and carried forward fields is performed in the PDF-formatting layer. Therefore this feature is not available for other outputs types: HTML, RTF, Excel.

An example is displayed in the following figure:

| Page 1 | | | Page 2 Brought Forward: 300 | | | Page 3 Brought Forward: 600 | | |
|----------------------|----------|--------|--------------------------------|----------|--------|--------------------------------|----------|--------|
| Inv | Date | Amount | Inv | Date | Amount | Inv | Date | Amount |
| 1001 | 1-Jan-05 | 100 | 1004 | 1-Jan-05 | 100 | 1007 | 1-Jan-05 | 100 |
| 1002 | 1-Jan-05 | 100 | 1005 | 1-Jan-05 | 100 | 1008 | 1-Jan-05 | 100 |
| 1003 | 1-Jan-05 | 100 | 1006 | 1-Jan-05 | 100 | 1009 | 1-Jan-05 | 100 |
| Carried Forward: 300 | | | Carried Forward: 600 | | | | | |

At the end of the first page, the page total for the Amount element is displayed as the Carried Forward total. At the top of the second page, this value is displayed as the Brought Forward total from the previous page. At the bottom of the second page, the brought forward value plus the total for that page is calculated and displayed as the new Carried Forward value, and this continues throughout the report.

This functionality is an extension of the Page Totals, page 5-72 feature. The following example walks through the syntax and setup required to display the brought forward and carried forward totals in your published report.

Assume you have the following XML:

```
<?xml version="1.0" encoding="WINDOWS-1252"?>
<INVOICES>
  <INVOICE>
    <INVNUM>10001-1</INVNUM>
    <INVDATE>1-Jan-2005</INVDATE>
    <INVAMT>100</INVOICEAMT>
  </INVOICE>
  <INVOICE>
    <INVNUM>10001-2</INVNUM>
    <INVDATE>10-Jan-2005</INVDATE>
    <INVAMT>200</INVOICEAMT>
  </INVOICE>
  <INVOICE>
    <INVNUM>10001-1</INVNUM>
    <INVDATE>11-Jan-2005</INVDATE>
    <INVAMT>150</INVOICEAMT>
  </INVOICE>
  .
  .
  .
</INVOICES>
```

The following sample template creates the invoice table and declares a placeholder that will hold your page total:

Init PTs

| Invoice | Date | Amount |
|-----------|-------------|--------------------|
| FE 132342 | 10-May-2005 | 1,000.00 InvAmt EG |

End PTs

The fields in the template have the following values:

| Field | Form Field Help Text Entry | Description |
|------------|----------------------------------|---|
| Init PTs | <?init-page-total: InvAmt?> | Declares "InvAmt" as the placeholder that will hold the page total. |
| FE | <?for-each:INVOICE?> | Begins the INVOICE group. |
| 10001-1 | <?INVNUM?> | Placeholder for the Invoice Number tag. |
| 1-Jan-2005 | <?INVDATE?> | Placeholder for the Invoice Date tag. |
| 100.00 | <?INVAMT?> | Placeholder for the Invoice Amount tag. |
| InvAmt | <?add-page-total:InvAmt;INVAMT?> | Assigns the "InvAmt" page total object to the INVAMT element in the data. |
| EFE | <?end for-each?> | Closes the INVOICE group. |
| End PTs | <?end-page-total:InvAmt?> | Closes the "InvAmt" page total. |

To display the brought forward total at the top of each page (except the first), use the following syntax:

```
<xdofo:inline-total
  display-condition="exceptfirst"
  name="InvAmt">
  Brought Forward:
<xdofo:show-brought-forward
  name="InvAmt"
  format="99G999G999D00"/>
</xdofo:inline-total>
```

The following table describes the elements comprising the brought forward syntax:

| Code Element | Description and Usage |
|-----------------------------------|---|
| <code>inline-total</code> | <p>This element has two properties:</p> <ul style="list-style-type: none"> • <code>name</code> - name of the variable you declared for the field. • <code>display-condition</code> - sets the display condition. This is an optional property that takes one of the following values: <ul style="list-style-type: none"> • <code>first</code> - the contents appear only on the first page • <code>last</code> - the contents appear only on the last page • <code>exceptfirst</code> - contents appear on all pages except first • <code>exceptlast</code> - contents appear on all pages except last • <code>everytime</code> - (default) contents appear on every page <p>In this example, <code>display-condition</code> is set to "exceptfirst" to prevent the value from appearing on the first page where the value would be zero.</p> |
| Brought Forward: | <p>This string is optional and will display as the field name on the report.</p> |
| <code>show-brought-forward</code> | <p>Shows the value on the page. It has the following two properties:</p> <ul style="list-style-type: none"> • <code>name</code> - the name of the field to show. In this case, "InvAmt". This property is mandatory. • <code>format</code> - the Oracle number format to apply to the value at runtime. This property is optional, but if you want to supply a format mask, you must use the Oracle format mask. For more information, see <i>Using the Oracle Format Mask</i>, page 5-110 . |

Insert the brought forward object at the top of the template where you want the brought forward total to display. If you place it in the body of the template, you can insert the syntax in a form field.

If you want the brought forward total to display in the header, you must insert the full code string into the header because Microsoft Word does not support form fields in the header or footer regions. However, you can alternatively use the start body/end body syntax which allows you to define what the body area of the report will be. BI Publisher will recognize any content above the defined body area as header content, and any content below as the footer. This allows you to use form fields. See *Multiple or Complex*

Headers and Footers, page 5-15 for details.

Place the carried forward object at the bottom of your template where you want the total to display. The carried forward object for our example is as follows:

```
<xdofo:inline-total
  display-condition="exceptlast"
  name="InvAmt">
  Carried Forward:
<xdofo:show-carry-forward
  name="InvAmt"
  format="99G999G999D00"/>
</xdofo:inline-total>
```

Note the following differences with the brought-forward object:

- The `display-condition` is set to `exceptlast` so that the carried forward total will display on every page except the last page.
- The display string is "Carried Forward".
- The `show-carry-forward` element is used to show the carried forward value. It has the same properties as `brought-carried-forward`, described above.

You are not limited to a single value in your template, you can create multiple brought forward/carried forward objects in your template pointing to various numeric elements in your data.

Running Totals

Example

The variable functionality (see Using Variables, page 5-87) can be used to add a running total to your invoice listing report. This example assumes the following XML structure:

```
<?xml version="1.0" encoding="WINDOWS-1252"?>
<INVOICES>
  <INVOICE>
    <INVNUM>10001-1</INVNUM>
    <INVDATE>1-Jan-2005</INVDATE>
    <INVAMT>100</INVOICEAMT>
  </INVOICE>
  <INVOICE>
    <INVNUM>10001-2</INVNUM>
    <INVDATE>10-Jan-2005</INVDATE>
    <INVAMT>200</INVOICEAMT>
  </INVOICE>
  <INVOICE>
    <INVNUM>10001-1</INVNUM>
    <INVDATE>11-Jan-2005</INVDATE>
    <INVAMT>150</INVOICEAMT>
  </INVOICE>
</INVOICES>
```

Using this XML, we want to create the report that contains running totals as shown in the following figure:

| Invoice Number | Invoice Date | Amount | Running Total |
|----------------|--------------|--------|---------------|
| 1000-1 | 1-Jan-2005 | 100.00 | 100.00 |
| 1000-2 | 10-Jan-2005 | 200.00 | 300.00 |
| 1000-3 | 11-Jan-2005 | 150.00 | 450.00 |

To create the Running Total field, define a variable to track the total and initialize it to 0. The template is shown in the following figure:

| RTotalVar | | | |
|----------------|--------------|--------|---------------|
| Invoice Number | Invoice Date | Amount | Running Total |
| FE10001-1 | 1-Jan-2005 | 100.00 | 100.00EFE |

The values for the form fields in the template are shown in the following table:

| Form Field | Syntax | Description |
|------------|--|---|
| RtotalVar | <?xdoxslt:set_variable(\$_XDO CTX, 'RTotalVar', 0)?> | Declares the "RTotalVar" variable and initializes it to 0. |
| FE | <?for-each:INVOICE?> | Starts the Invoice group. |
| 10001-1 | <?INVNUM?> | Invoice Number tag |
| 1-Jan-2005 | <?INVDATA?> | Invoice Date tag |
| 100.00 | <?xdoxslt:set_variable(\$_XDO CTX, 'RTotalVar', xdoxslt:get_variable(\$_XDOC TX, 'RTotalVar') + INVAMT)?> xdoxslt:get_variable(\$_XDOC TX, 'RTotalVar')?> | Sets the value of RTotalVar to the current value plus the new Invoice Amount. Retrieves the RTotalVar value for display. |
| EFE | <?end for-each?> | Ends the INVOICE group. |

Data Handling

Sorting

You can sort a group by any element within the group. Insert the following syntax within the group tags:

```
<?sort:element name?>
```

For example, to sort the Payables Invoice Register (shown at the beginning of this chapter) by Supplier (VENDOR_NAME), enter the following after the

```
<?for-each:G_VENDOR_NAME?> tag:
```

```
<?sort:VENDOR_NAME?>
```

To sort a group by multiple fields, just insert the sort syntax after the primary sort field. To sort by Supplier and then by Invoice Number, enter the following

```
<?sort:VENDOR_NAME?> <?sort:INVOICE_NUM?>
```

Checking for Nulls

Within your XML data there are three possible scenarios for the value of an element:

- The element is present in the XML data, and it has a value
- The element is present in the XML data, but it does not have a value
- The element is not present in the XML data, and therefore there is no value

In your report layout, you may want to specify a different behavior depending on the presence of the element and its value. The following examples show how to check for each of these conditions using an "if" statement. The syntax can also be used in other conditional formatting constructs.

- To define behavior when the element is present and the value is not null, use the following:

```
<?if:element_name!=""?>desired behavior <?end if?>
```

- To define behavior when the element is present, but is null, use the following:

```
<?if:element_name and element_name=""?>desired behavior <?end if?>
```

- To define behavior when the element is not present, use the following:

```
<?if:not(element_name)?>desired behavior <?end if?>
```

Regrouping the XML Data

The RTF template supports the XSL 2.0 for-each-group standard that allows you to regroup XML data into hierarchies that are not present in the original data. With this feature, your template does not have to follow the hierarchy of the source XML file. You are therefore no longer limited by the structure of your data source.

XML Sample

To demonstrate the for-each-group standard, the following XML data sample of a CD catalog listing will be regrouped in a template:

```
<CATALOG>
  <CD>
    <TITLE>Empire Burlesque</TITLE>
    <ARTIST>Bob Dylan</ARTIST>
    <COUNTRY>USA</COUNTRY>
    <COMPANY>Columbia</COMPANY>
    <PRICE>10.90</PRICE>
    <YEAR>1985</YEAR>
  </CD>
  <CD>
    <TITLE>Hide Your Heart</TITLE>
    <ARTIST>Bonnie Tylor</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <COMPANY>CBS Records</COMPANY>
    <PRICE>9.90</PRICE>
    <YEAR>1988</YEAR>
  </CD>
  <CD>
    <TITLE>Still got the blues</TITLE>
    <ARTIST>Gary More</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <COMPANY>Virgin Records</COMPANY>
    <PRICE>10.20</PRICE>
    <YEAR>1990</YEAR>
  </CD>
  <CD>
    <TITLE>This is US</TITLE>
    <ARTIST>Gary Lee</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <COMPANY>Virgin Records</COMPANY>
    <PRICE>12.20</PRICE>
    <YEAR>1990</YEAR>
  </CD>
```

Using the regrouping syntax, you can create a report of this data that groups the CDs by country and then by year. You are not limited by the data structure presented.

Regrouping Syntax

To regroup the data, use the following syntax:

```
<?for-each-group: BASE-GROUP; GROUPING-ELEMENT?>
```

For example, to regroup the CD listing by COUNTRY, enter the following in your template:

```
<?for-each-group:CD;COUNTRY?>
```

The elements that were at the same hierarchy level as COUNTRY are now children of COUNTRY. You can then refer to the elements of the group to display the values desired.

To establish nested groupings within the already defined group, use the following syntax:

```
<?for-each:current-group(); GROUPING-ELEMENT?>
```

For example, after declaring the CD grouping by COUNTRY, you can then further group by YEAR within COUNTRY as follows:

```
<?for-each:current-group();YEAR?>
```

At runtime, BI Publisher will loop through the occurrences of the new groupings, displaying the fields that you defined in your template.

Note: This syntax is a simplification of the XSL for-each-group syntax. If you choose not to use the simplified syntax above, you can use the XSL syntax as shown below. The XSL syntax can only be used within a form field of the template.

```
<xsl:for-each-group
  select=expression
  group-by="string expression"
  group-adjacent="string expression"
  group-starting-with=pattern>
  <!--Content: (xsl:sort*, content-constructor) -->
</xsl:for-each-group>
```

Template Example

The following figure shows a template that displays the CDs by Country, then Year, and lists the details for each CD:

| Title | Artist | Price |
|--------------------|----------|-------|
| Group:DetailsMy CD | John Doe | 1.00 |

The following table shows the BI Publisher syntax entries made in the form fields of the preceding template:

| Default Text Entry | Form Field Help Text Entry | Description |
|--------------------|--|---|
| Group by Country | <code><?for-each-group:CD;COUNTRY?></code> | The <code><?for-each-group:CD;COUNTRY?></code> tag declares the new group. It regroups the existing CD group by the COUNTRY element. |
| USA | <code><?COUNTRY?></code> | Placeholder to display the data value of the COUNTRY tag. |
| Group by Year | <code><?for-each-group:current-group();YEAR?></code> | The <code><?for-each-group:current-group();YEAR?></code> tag regroups the current group (that is, COUNTRY), by the YEAR element. |
| 2000 | <code><?YEAR?></code> | Placeholder to display the data value of the YEAR tag. |
| Group: Details | <code><?for-each:current-group()?></code> | Once the data is grouped by COUNTRY and then by YEAR, the <code><?for-each:current-group()?></code> command is used to loop through the elements of the current group (that is, YEAR) and render the data values (TITLE, ARTIST, and PRICE) in the table. |
| My CD | <code><?TITLE?></code> | Placeholder to display the data value of the TITLE tag. |
| John Doe | <code><?ARTIST?></code> | Placeholder to display the data value of the ARTIST tag. |
| 1.00 | <code><?PRICE?></code> | Placeholder to display the data value of the PRICE tag. |
| End Group | <code><?end for-each?></code> | Closes out the <code><?for-each:current-group()?></code> tag. |

| Default Text Entry | Form Field Help Text Entry | Description |
|----------------------|----------------------------|---|
| End Group by Year | <?end for-each-group?> | Closes out the <?for-each-group:current-group();YEAR?> tag. |
| End Group by Country | <?end for-each-group?> | Closes out the <?for-each-group:CD;COUNTRY?> tag. |

This template produces the following output when merged with the XML file:

| Country:USA | | |
|---------------------|--------------|-------|
| Year:1985 | | |
| Title | Artist | Price |
| Empire Burlesque | Bob Dylan | 10.90 |
| Country:UK | | |
| Year:1988 | | |
| Title | Artist | Price |
| Hide your heart | Bonnie Tylor | 9.90 |
| Year:1990 | | |
| Title | Artist | Price |
| Still got the blues | Gary More | 10.20 |
| This is US | Gary Lee | 12.20 |

Regrouping by an Expression

Regrouping by an expression allows you to apply a function or command to a data element, and then group the data by the returned result.

To use this feature, state the expression within the regrouping syntax as follows:

```
<?for-each:BASE-GROUP;GROUPING-EXPRESSION?>
```

Example

To demonstrate this feature, an XML data sample that simply contains average

temperatures per month will be used as input to a template that calculates the number of months having an average temperature within a certain range.

The following XML sample is composed of <temp> groups. Each <temp> group contains a <month> element and a <degree> element, which contains the average temperature for that month:

```
<temps>
  <temp>
    <month>Jan</month>
    <degree>11</degree>
  </temp>
  <temp>
    <month>Feb</month>
    <degree>14</degree>
  </temp>
  <temp>
    <month>Mar</month>
    <degree>16</degree>
  </temp>
  <temp>
    <month>Apr</month>
    <degree>20</degree>
  </temp>
  <temp>
    <month>May</month>
    <degree>31</degree>
  </temp>
  <temp>
    <month>Jun</month>
    <degree>34</degree>
  </temp>
  <temp>
    <month>Jul</month>
    <degree>39</degree>
  </temp>
  <temp>
    <month>Aug</month>
    <degree>38</degree>
  </temp>
  <temp>
    <month>Sep</month>
    <degree>24</degree>
  </temp>
  <temp>
    <month>Oct</month>
    <degree>28</degree>
  </temp>
  <temp>
    <month>Nov</month>
    <degree>18</degree>
  </temp>
  <temp>
    <month>Dec</month>
    <degree>8</degree>
  </temp>
</temps>
```

You want to display this data in a format showing temperature ranges and a count of the months that have an average temperature to satisfy those ranges, as follows:

Annual Temperature Summary

| Range | Number of Months |
|--------------|------------------|
| 0 F to 10 F | 1 Month(s) |
| 10 F to 20 F | 4 Month(s) |
| 20 F to 30 F | 3 Month(s) |
| 30 F to 40 F | 4 Month(s) |

Using the for-each-group command you can apply an expression to the `<degree>` element that will enable you to group the temperatures by increments of 10 degrees. You can then display a count of the members of each grouping, which will be the number of months having an average temperature that falls within each range.

The template to create the above report is shown in the following figure:

Annual Temperature Summary

| Range | Number of Months |
|-----------------|---------------------------|
| Group by TmpRng | Months Month(s)End TmpRng |
| Range | |

The following table shows the form field entries made in the template:

| Default Text Entry | Form Field Help Text Entry |
|--------------------|---|
| Group by TmpRng | <pre><?for-each-group:temp;floor(degree div 10?)> <?sort:floor(degree div 10)?></pre> |
| Range | <pre><?concat(floor(degree div 10)*10,' F to ',floor(degree div 10)*10+10, F')?></pre> |
| Months | <pre><?count(current-group())?></pre> |
| End TmpRng | <pre><?end for-each-group?></pre> |

Note the following about the form field tags:

- The `<?for-each-group:temp;floor(degree div 10)?>` is the regrouping tag. It specifies that for the existing `<temp>` group, the elements are to be regrouped by the expression, `floor(degree div 10)`. The `floor` function is an XSL function that returns the highest integer that is not greater than the argument

(for example, 1.2 returns 1, 0.8 returns 0).

In this case, it returns the value of the <degree> element, which is then divided by 10. This will generate the following values from the XML data: 1, 1, 1, 2, 3, 3, 3, 3, 2, 2, 1, and 0.

These are sorted, so that when processed, the following four groups will be created: 0, 1, 2, and 3.

- The `<?concat(floor(degree div 10)*10,'F to ', floor(degree div 10)*10+10, 'F'?)>` displays the temperature ranges in the row header in increments of 10. The expression concatenates the value of the current group times 10 with the value of the current group times 10 plus 10.

Therefore, for the first group, 0, the row heading displays 0 to (0 +10), or "0 F to 10 F".

- The `<?count(current-group())?>` uses the count function to count the members of the current group (the number of temperatures that satisfy the range).
- The `<?end for-each-group?>` tag closes out the grouping.

Using Variables

Updateable variables differ from standard XSL variables `<xsl:variable>` in that they are updateable during the template application to the XML data. This allows you to create many new features in your templates that require updateable variables.

The variables use a "set and get" approach for assigning, updating, and retrieving values.

Use the following syntax to declare/set a variable value:

```
<?xdoxslt:set_variable($_XDOCTX, 'variable name', value)?>
```

Use the following syntax to retrieve a variable value:

```
<?xdoxslt:get_variable($_XDOCTX, 'variable name')?>
```

You can use this method to perform calculations. For example:

```
<?xdoxslt:set_variable($_XDOCTX, 'x', xdoxslt:get_variable($_XDOCTX, 'x' + 1)?>
```

This sets the value of variable 'x' to its original value plus 1, much like using "x = x + 1".

The `$_XDOCTX` specifies the global document context for the variables. In a multi-threaded environment there may be many transformations occurring at the same time, therefore the variable must be assigned to a single transformation.

See the section on Running Totals, page 5-78 for an example of the usage of updateable variables.

Defining Parameters

You can pass runtime parameter values into your template. These can then be referenced throughout the template to support many functions. For example, you can filter data in the template, use a value in a conditional formatting block, or pass property values (such as security settings) into the final document.

Note: For BI Publisher Enterprise users, all name-value parameter pairs are passed to the template. You must register the parameters that you wish to utilize in your template using the syntax described below.

Using a parameter in a template

1. Declare the parameter in the template.

Use the following syntax to declare the parameter:

```
<?param@begin:parameter_name;parameter_value?>
```

where

parameter_name is the name of the parameter

parameter_value is the default value for the parameter (the *parameter_value* is optional)

param@begin: is a required string to push the parameter declaration to the top of the template at runtime so that it can be referred to globally in the template.

The syntax must be declared in the Help Text field of a form field. The form field can be placed anywhere in the template.

2. Refer to the parameter in the template by prefixing the name with a "\$" character. For example, if you declare the parameter name to be "InvThresh", then reference the value using "\$InvThresh".
3. If you are not using BI Publisher Enterprise, but only the core libraries:

At runtime, pass the parameter to the BI Publisher engine programmatically.

Prior to calling the FOPProcessor API create a Properties class and assign a property to it for the parameter value as follows:

```
Properties prop = new Properties();  
prop.put("xslt.InvThresh", "1000");
```

Example: Passing an invoice threshold parameter

This example illustrates how to declare a parameter in your template that will filter your data based on the value of the parameter.

The following XML sample lists invoice data:

```

<INVOICES>
  <INVOICE>
    <INVOICE_NUM>981110</INVOICE_NUM>
    <AMOUNT>1100</AMOUNT>
  </INVOICE>
  <INVOICE>
    <INVOICE_NUM>981111</INVOICE_NUM>
    <AMOUNT>250</AMOUNT>
  </INVOICE>
  <INVOICE>
    <INVOICE_NUM>981112</INVOICE_NUM>
    <AMOUNT>8343</AMOUNT>
  </INVOICE>
  . . .
</INVOICES>

```

The following figure displays a template that accepts a parameter value to limit the invoices displayed in the final document based on the parameter value.

InvThresh Declaration

| Invoice Number | Invoice Amount |
|----------------|-----------------|
| FE IF 13222-2 | \$100.00 EI EFE |

| Field | Form Field Help Text Entry | Description |
|----------------------|----------------------------|--|
| InvThreshDeclaration | <?param@begin:InvThresh?> | Declares the parameter InvThresh. |
| FE | <?for-each:INVOICE?> | Begins the repeating group for the INVOICE element. |
| IF | <?if:AMOUNT>\$InvThresh?> | Tests the value of the AMOUNT element to determine if it is greater than the value of InvThresh. |
| 13222-2 | <?INVOICE_NUM?> | Placeholder for the INVOICE_NUM element. |
| \$100.00 | <?AMOUNT?> | Placeholder for the AMOUNT element. |
| EI | <?end if?> | Closing tag for the if statement. |
| EFE | <?end for-each?> | Closing tag for the for-each loop. |

In this template, only INVOICE elements with an AMOUNT greater than the InvThresh

parameter value will be displayed. If we pass in a parameter value of 1,000, the following output shown in the following figure will result:

| Invoice Number | Invoice Amount |
|----------------|----------------|
| 981110 | 1100 |
| 981112 | 8343 |

Notice the second invoice does not display because its amount was less than the parameter value.

Setting Properties

BI Publisher properties that are available in the BI Publisher Configuration file can alternatively be embedded into the RTF template. The properties set in the template are resolved at runtime by the BI Publisher engine. You can either hard code the values in the template or embed the values in the incoming XML data. Embedding the properties in the template avoids the use of the configuration file.

Note: See BI Publisher Configuration File, page D-1 for more information about the BI Publisher Configuration file and the available properties.

For example, if you use a nonstandard font in your template, rather than specify the font location in the configuration file, you can embed the font property inside the template. If you need to secure the generated PDF output, you can use the BI Publisher PDF security properties and obtain the password value from the incoming XML data.

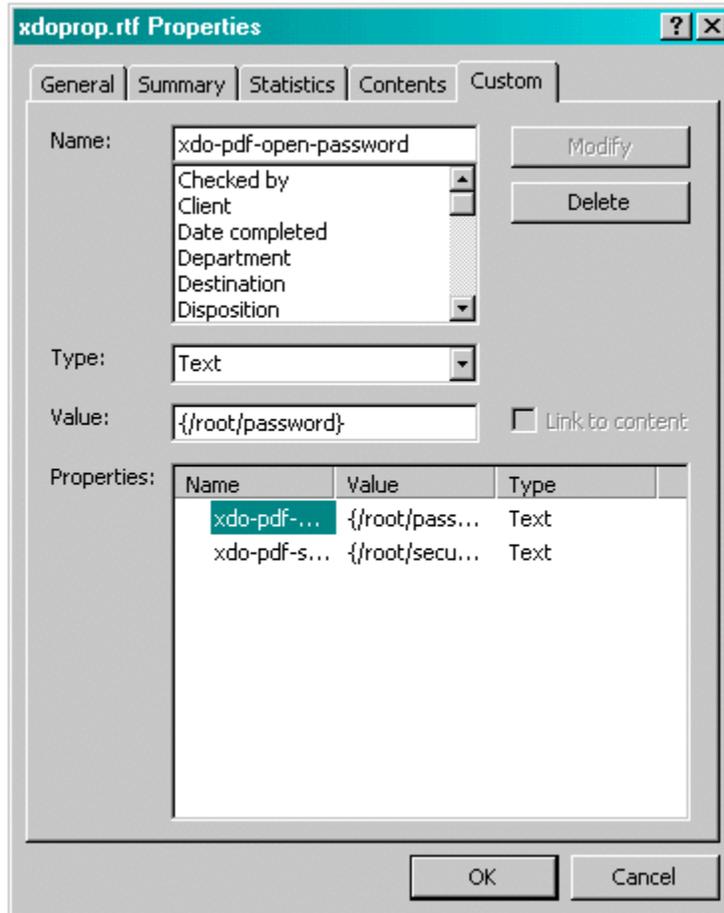
To add an BI Publisher property to a template, use the Microsoft Word **Properties** dialog (available from the **File** menu), and enter the following information:

Name - enter the BI Publisher property name prefixed with "xdo-"

Type - select "Text"

Value - enter the property value. To reference an element from the incoming XML data, enter the path to the XML element enclosed by curly braces. For example:
{/root/password}

The following figure shows the Properties dialog:



Embedding a Font Reference

For this example, suppose you want to use a font in the template called "XMLPScript". This font is not available as a regular font on your server, therefore you must tell BI Publisher where to find the font at runtime. You tell BI Publisher where to find the font by setting the "font" property. Assume the font is located in "/tmp/fonts", then you would enter the following in the Properties dialog:

Name: xdo-font.XMLPScript.normal.normal

Type: Text

Value: truetype./tmp/fonts/XMLPScript.ttf

When the template is applied to the XML data on the server, BI Publisher will look for the font in the /tmp/fonts directory. Note that if the template is deployed in multiple locations, you must ensure that the path is valid for each location.

For more information about setting font properties, see Font Definitions, page D-4.

Securing a PDF Output

For this example, suppose you want to use a password from the XML data to secure the PDF output document. The XML data is as follows:

```
<PO>
  <security>true</security>
  <password>welcome</password>
  <PO_DETAILS>
  ..
</PO>
```

In the Properties dialog set two properties: `pdf-security` to set the security feature as enabled or not, and `pdf-open-password` to set the password. Enter the following in the Properties dialog:

Name: xdo-pdf-security

Type: Text

Value: {/PO/security}

Name: xdo-pdf-open-password

Type: Text

Value: {/PO/password}

Storing the password in the XML data is not recommended if the XML will persist in the system for any length of time. To avoid this potential security risk, you can use a template parameter value that is generated and passed into the template at runtime.

For example, you could set up the following parameters:

- PDFSec - to pass the value for the xdo-pdf-security property
- PDFPWD - to pass the value for the password

You would then enter the following in the Properties dialog:

Name: xdo-pdf-security

Type: Text

Value: {\$PDFSec}

Name: xdo-pdf-open-password

Type: Text

Value: {\$PDFPWD}

For more information about template parameters, see *Defining Parameters in Your Template*, page 5-88.

Advanced Report Layouts

Batch Reports

It is a common requirement to print a batch of documents, such as invoices or purchase orders in a single PDF file. Because these documents are intended for different

customers, each document will require that the page numbering be reset and that page totals are specific to the document. If the header and footer display fields from the data (such as customer name) these will have to be reset as well.

BI Publisher supports this requirement through the use of a context command. This command allows you to define elements of your report to a specific section. When the section changes, these elements are reset.

The following example demonstrates how to reset the header and footer and page numbering within an output file:

The following XML sample is a report that contains multiple invoices:

```
...
<LIST_G_INVOICE>
  <G_INVOICE>
    <BILL_CUST_NAME>Vision, Inc. </BILL_CUST_NAME>
    <TRX_NUMBER>2345678</TRX_NUMBER>
    ...
  </G_INVOICE>
  <G_INVOICE>
    <BILL_CUST_NAME>Oracle, Inc. </BILL_CUST_NAME>
    <TRX_NUMBER>2345685</TRX_NUMBER>
    ...
  </G_INVOICE>
  ...
</LIST_G_INVOICE>
...
```

Each G_INVOICE element contains an invoice for a potentially different customer. To instruct BI Publisher to start a new section for each occurrence of the G_INVOICE element, add the @section command to the opening for-each statement for the group, using the following syntax:

```
<?for-each@section:group name?>
```

where *group_name* is the name of the element for which you want to begin a new section.

For example, the for-each grouping statement for this example will be as follows:

```
<?for-each@section:G_INVOICE?>
```

The closing <?end for-each?> tag is not changed.

The following figure shows a sample template. Note that the G_INVOICE group for-each declaration is still within the body of the report, even though the headers will be reset by the command.

```

Invoice# <?TRX_NUMBER?>

for-each G_INVOICE
INVOICE

BILL_CUST_NAME
BILL_ADDRESS1
BILL_ADDRESS2
BILL_CITY, BILL_STATE BILL_POSTAL_CODE

end G_INVOICE

```

The following table shows the values of the form fields from the example:

| Default Text Entry | Form Field Help Text | Description |
|--------------------|--------------------------------|--|
| for-each G_INVOICE | <?for-each@section:G_INVOICE?> | Begins the G_INVOICE group, and defines the element as a Section. For each occurrence of G_INVOICE, a new section will be started. |
| <?TRX_NUMBER?> | N/A | Microsoft Word does not support form fields in the header, therefore the placeholder syntax for the TRX_NUMBER element is placed directly in the template. |
| end G_INVOICE | <?end for-each?> | Closes the G_INVOICE group. |

Now for each new occurrence of the G_INVOICE element, a new section will begin. The page numbers will restart, and if header or footer information is derived from the data, it will be reset as well.

Cross-Tab Support

The columns of a cross-tab report are data dependent. At design-time you do not know how many columns will be reported, or what the appropriate column headings will be. Moreover, if the columns should break onto a second page, you need to be able to define the row label columns to repeat onto subsequent pages. The following example

shows how to design a simple cross-tab report that supports these features.

This example uses the following XML sample:

```
<ROWSET>
  <RESULTS>
    <INDUSTRY>Motor Vehicle Dealers</INDUSTRY>
    <YEAR>2005</YEAR>
    <QUARTER>Q1</QUARTER>
    <SALES>1000</SALES>
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Motor Vehicle Dealers</INDUSTRY>
    <YEAR>2005</YEAR>
    <QUARTER>Q2</QUARTER>
    <SALES>2000</SALES>
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Motor Vehicle Dealers</INDUSTRY>
    <YEAR>2004</YEAR>
    <QUARTER>Q1</QUARTER>
    <SALES>3000</SALES>
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Motor Vehicle Dealers</INDUSTRY>
    <YEAR>2004</YEAR>
    <QUARTER>Q2</QUARTER>
    <SALES>3000</SALES>
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Motor Vehicle Dealers</INDUSTRY>
    <YEAR>2003</YEAR>
    ...
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Home Furnishings</INDUSTRY>
    ...
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Electronics</INDUSTRY>
    ...
  </RESULTS>
  <RESULTS>
    <INDUSTRY>Food and Beverage</INDUSTRY>
    ...
  </RESULTS>
</ROWSET>
```

From this XML we will generate a report that shows each industry and totals the sales by year as shown in the following figure:

| Industry | 2005 | 2004 | 2003 |
|-----------------------|------|------|------|
| Motor Vehicle Dealers | 3000 | 6000 | 1200 |
| Home Furnishings | 3200 | 7770 | 3300 |
| Electronics | 9000 | 9000 | 4300 |
| Food and Beverage | 1200 | 900 | 5600 |

The template to generate this report is shown in the following figure. The form field entries are shown in the subsequent table.

| | |
|-------------------------------|-------------------------------------|
| Industry header column | for: YEAR end |
| for: INDUSTRY | for: sum(SALES) end end |

The form fields in the template have the following values:

| Default Text Entry | Form Field Help Text | Description |
|--------------------|--|---|
| header column | <?horizontal-break-table:1?> | Defines the first column as a header that should repeat if the table breaks across pages. For more information about this syntax, see Defining Columns to Repeat Across Pages, page 5-98. |
| for: | <?for-each-group@column:RESULTS;YEAR?> | Uses the regrouping syntax (see Regrouping the XML Data, page 5-81) to group the data by YEAR; and the @column context command to create a table column for each group (YEAR). For more information about context commands, see Using the Context Commands, page 5-121. |
| YEAR | <?YEAR?> | Placeholder for the YEAR element. |
| end | <?end for-each-group?> | Closes the for-each-group loop. |
| for: | <?for-each-group:RESULTS;INDUSTRY?> | Begins the group to create a table row for each INDUSTRY. |
| INDUSTRY | <?INDUSTRY?> | Placeholder for the INDUSTRY element. |

| Default Text Entry | Form Field Help Text | Description |
|--------------------|---|---|
| for: | <code><?for-each-group@cell:current-group();YEAR?></code> | Uses the regrouping syntax (see Regrouping the XML Data, page 5-81) to group the data by YEAR; and the <code>@cell</code> context command to create a table cell for each group (YEAR). |
| sum(Sales) | <code><?sum(current-group()//SALES)?></code> | Sums the sales for the current group (YEAR). |
| end | <code><?end for-each-group?></code> | Closes the for-each-group statement. |
| end | <code><?end for-each-group?></code> | Closes the for-each-group statement. |

Note that only the first row uses the `@column` context to determine the number of columns for the table. All remaining rows need to use the `@cell` context to create the table cells for the column. (For more information about context commands, see Using the Context Commands, page 5-121.)

Dynamic Data Columns

The ability to construct dynamic data columns is a very powerful feature of the RTF template. Using this feature you can design a template that will correctly render a table when the number of columns required by the data is variable.

For example, you are designing a template to display columns of test scores within specific ranges. However, you do not know how many ranges will have data to report. You can define a dynamic data column to split into the correct number of columns at runtime.

Use the following tags to accommodate the dynamic formatting required to render the data correctly:

- **Dynamic Column Header**
`<?split-column-header:group element name?>`
 Use this tag to define which group to split for the column headers of a table.
- **Dynamic Column** `<?split-column-data:group element name?>`
 Use this tag to define which group to split for the column data of a table.
- **Dynamic Column Width**
`<?split-column-width:name?>` or
`<?split-column-width:@width?>`

Use one of these tags to define the width of the column when the width is described in the XML data. The width can be described in two ways:

- An XML element stores the value of the width. In this case, use the syntax `<?split-column-width:name?>`, where *name* is the XML element tag name that contains the value for the width.
- If the element defined in the `split-column-header` tag, contains a width attribute, use the syntax `<?split-column-width:@width?>` to use the value of that attribute.
- Dynamic Column Width's unit value (in points) `<?split-column-width-unit:value?>`

Use this tag to define a multiplier for the column width. If your column widths are defined in character cells, then you will need a multiplier value of ~6 to render the columns to the correct width in points. If the multiplier is not defined, the widths of the columns are calculated as a percentage of the total width of the table. This is illustrated in the following table:

| Width Definition | Column 1 (Width = 10) | Column 2 (Width = 12) | Column 3 (Width = 14) |
|---------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Multiplier not present -% width | 10/10+12+14*100 28% | %Width = 33% | %Width =39% |
| Multiplier = 6 - width | 60 pts | 72 pts | 84 pts |

Defining Columns to Repeat Across Pages

If your table columns expand horizontally across more than one page, you can define how many row heading columns you want to repeat on every page. Use the following syntax to specify the number of columns to repeat:

```
<?horizontal-break-table:number?>
```

where *number* is the number of columns (starting from the left) to repeat.

Note that this functionality is supported for PDF output only..

Example of Dynamic Data Columns

A template is required to display test score ranges for school exams. Logically, you want the report to be arranged as shown in the following table:

| Test Score | Test Score Range 1 | Test Score Range 2 | Test Score Range 3 | ... Test Score Range n |
|-------------------|---------------------------|---------------------------|---------------------------|-------------------------------|
| Test Category | # students in Range 1 | # students in Range 2 | # students in Range 3 | # of students in Range n |

but you do not know how many Test Score Ranges will be reported. The number of Test Score Range columns is dynamic, depending on the data.

The following XML data describes these test scores. The number of occurrences of the element `<TestScoreRange>` will determine how many columns are required. In this case there are five columns: 0-20, 21-40, 41-60, 61-80, and 81-100. For each column there is an amount element (`<NumofStudents>`) and a column width attribute (`<TestScore width="15">`).

```
<?xml version="1.0" encoding="utf-8"?>
<TestScoreTable>
  <TestScores>
    <TestCategory>Mathematics</TestCategory>
    <TestScore width="15">
      <TestScoreRange>0-20</TestScoreRange>
      <NumofStudents>30</NumofStudents>
    </TestScore>
    <TestScore width="20">
      <TestScoreRange>21-40</TestScoreRange>
      <NumofStudents>45</NumofStudents>
    </TestScore>
    <TestScore width="15">
      <TestScoreRange>41-60</TestScoreRange>
      <NumofStudents>50</NumofStudents>
    </TestScore>
    <TestScore width="20">
      <TestScoreRange>61-80</TestScoreRange>
      <NumofStudents>102</NumofStudents>
    </TestScore>
    <TestScore width="15">
      <TestScoreRange>81-100</TestScoreRange>
      <NumofStudents>22</NumofStudents>
    </TestScore>
  </TestScores>
</TestScoreTable>
```

Using the dynamic column tags in form fields, set up the table in two columns as shown in the following figure. The first column, "Test Score" is static. The second column, "Column Header and Splitting" is the dynamic column. At runtime this column will split according to the data, and the header for each column will be appropriately populated. The Default Text entry and Form Field Help entry for each field are listed in the table following the figure. (See Form Field Method, page 5-8 for more information on using form fields).

| | |
|--------------------------------|--------------------------------------|
| Test Score | Column Header and Splitting |
| Group:TestScores Test Category | Content and Splitting end:TestScores |

| Default Text Entry | Form Field Help Text Entry |
|-----------------------------|---|
| Group:TestScores | <?for-each:TestScores?> |
| Test Category | <?TestCategory?> |
| Column Header and Splitting | <?split-column-header:TestScore?> <?split-column-width:@width?> <?TestScoreRange?>% |
| Content and Splitting | <?split-column-data:TestScore?> <?NumofStudents?> |
| end:TestScores | <?end for-each?> |

- **Test Score** is the boilerplate column heading.
- Test Category is the placeholder for the <TestCategory> data element, that is, "Mathematics," which will also be the row heading.
- The second column is the one to be split dynamically. The width you specify will be divided by the number of columns of data. In this case, there are 5 data columns.
- The second column will contain the dynamic "range" data. The width of the column will be divided according to the split column width. Because this example does not contain the unit value tag (<?split-column-width-unit:value?>), the column will be split on a percentage basis. Wrapping of the data will occur if required.

Note: If the tag (<?split-column-width-unit:value?>) were present, then the columns would have a specific width in points. If the total column widths were wider than the allotted space on the page, then the table would break onto another page.

The "horizontal-break-table" tag could then be used to specify how many columns to repeat on the subsequent page. For example, a value of "1" would repeat the column "Test Score" on the subsequent page, with the continuation of the columns that did not fit on the first page.

The template will render the output shown in the following figure:

| Test Score | 0-20 | 21-40 | 41-60 | 61-80 | 81-100 |
|-------------|------|-------|-------|-------|--------|
| Mathematics | 30 | 45 | 50 | 102 | 22 |

Number and Formatting

Number Formatting

BI Publisher supports two methods for specifying the number format:

- Microsoft Word's Native number format mask
- Oracle's format-number function

Note: You can also use the native XSL format-number function to format numbers. See: Native XSL Number Formatting, page 5-126.

Use only one of these methods. If the number format mask is specified using both methods, the data will be formatted twice, causing unexpected behavior.

The group separator and the number separator will be set at runtime based on the template locale. This is applicable for both the Oracle format mask and the MS format mask.

Data Source Requirements

To use the Oracle format mask or the Microsoft format mask, the numbers in your data source must be in a raw format, with no formatting applied (for example: 1000.00). If the number has been formatted for European countries (for example: 1.000,00) the format will not work.

Note: The BI Publisher parser requires the Java BigDecimal string representation. This consists of an optional sign ("-") followed by a sequence of zero or more decimal digits (the integer), optionally followed by a fraction, and optionally followed by an exponent. For example: -123456.3455e-3.

Translation Considerations

If you are designing a template to be translatable, using currency in the Microsoft format mask is not recommended unless you want the data reported in the same currency for all translations. Using the MS format mask sets the currency in the template so that it cannot be updated at runtime.

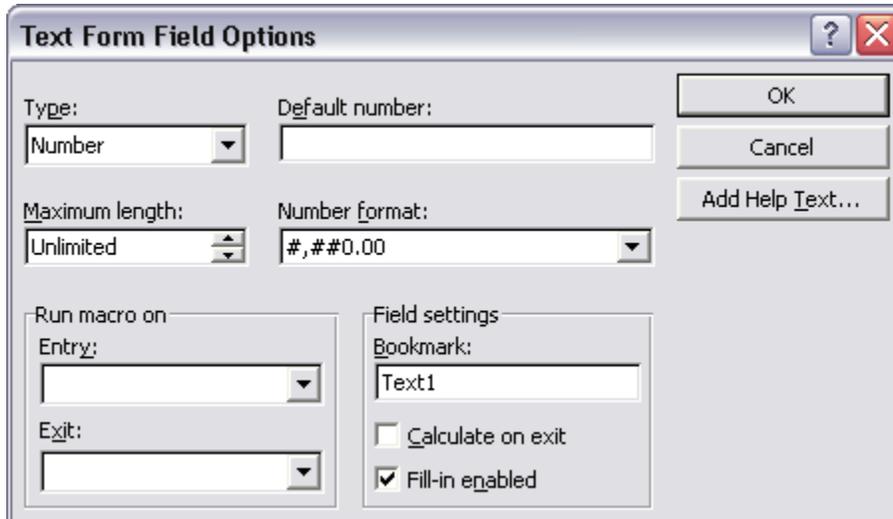
Instead, use the Oracle format mask. For example, L999G999G999D99, where "L" will be

replaced by the currency symbol based on the locale at runtime.

Do not include "%" in the format mask because this will fix the location of the percent sign in the number display, while the desired position could be at the beginning or the end of a number, depending on the locale.

Using the Microsoft Number Format Mask

To format numeric values, use Microsoft Word's field formatting features available from the Text Form Field Options dialog box. The following graphic displays an example:



To apply a number format to a form field:

1. Open the **Form Field Options** dialog box for the placeholder field.
2. Set the **Type** to Number.
3. Select the appropriate **Number format** from the list of options.

Supported Microsoft Format Mask Definitions

The following table lists the supported Microsoft format mask definitions:

| Symbol | Location | Meaning |
|--------|----------|--|
| 0 | Number | <p>Digit. Each explicitly set 0 will appear, if no other number occupies the position.</p> <p>Example:</p> <p>Format mask: 00.0000</p> <p>Data: 1.234</p> <p>Display: 01.2340</p> |
| # | Number | <p>Digit. When set to #, only the incoming data is displayed.</p> <p>Example:</p> <p>Format mask: ##.####</p> <p>Data: 1.234</p> <p>Display: 1.234</p> |
| . | Number | <p>Determines the position of the decimal separator. The decimal separator symbol used will be determined at runtime based on template locale.</p> <p>For example:</p> <p>Format mask: #,##0.00</p> <p>Data: 1234.56</p> <p>Display for English locale: 1,234.56</p> <p>Display for German locale: 1.234,56</p> |
| - | Number | <p>Determines placement of minus sign for negative numbers.</p> |
| , | Number | <p>Determines the placement of the grouping separator. The grouping separator symbol used will be determined at runtime based on template locale.</p> <p>For example:</p> <p>Format mask: #,##0.00</p> <p>Data: 1234.56</p> <p>Display for English locale: 1,234.56</p> <p>Display for German locale: 1.234,56</p> |

| Symbol | Location | Meaning |
|--------|---------------------|--|
| E | Number | Separates mantissa and exponent in a scientific notation. Example: 0.###E+0 plus sign always shown for positive numbers 0.###E-0 plus sign not shown for positive numbers |
| ; | Subpattern boundary | Separates positive and negative subpatterns. See Note below. |
| % | Prefix or Suffix | Multiply by 100 and show as percentage |
| ' | Prefix or Suffix | Used to quote special characters in a prefix or suffix. |

Note: Subpattern boundary: A pattern contains a positive and negative subpattern, for example, "#,##0.00;(#,##0.00)". Each subpattern has a prefix, numeric part, and suffix. The negative subpattern is optional. If absent, the positive subpattern prefixed with the localized minus sign ("- in most locales) is used as the negative subpattern. That is, "0.00" alone is equivalent to "0.00;-0.00". If there is an explicit negative subpattern, it serves only to specify the negative prefix and suffix. The number of digits, minimal digits, and other characteristics are all the same as the positive pattern. That means that "#,##0.0#;(#)" produces precisely the same behavior as "#,##0.0#;(#,##0.0#)".

Using the Oracle Format Mask

To apply the Oracle format mask to a form field:

1. Open the Form Field Options dialog box for the placeholder field.
2. Set the **Type** to "Regular text".
3. In the Form Field Help Text field, enter the mask definition according to the following example:

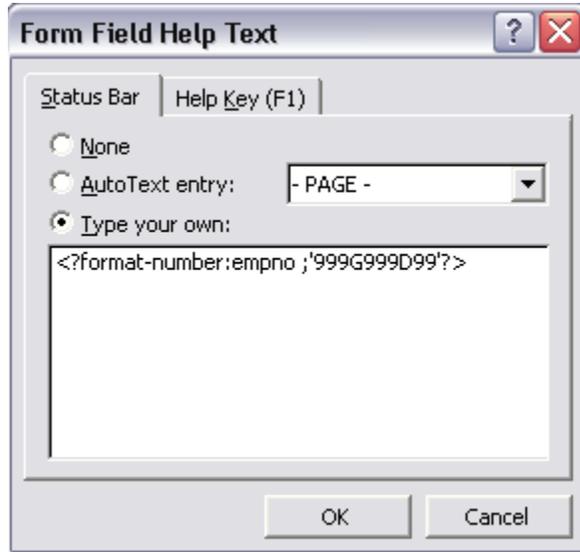
```
<?format-number: fieldname; '999G999D99' ?>
```

where

fieldname is the XML tag name of the data element you are formatting and

999G999D99 is the mask definition.

The following graphic shows an example Form Field Help Text dialog entry for the data element "empno":



The following table lists the supported Oracle number format mask symbols and their definitions:

| Symbol | Meaning |
|--------|---|
| 0 | Digit. Each explicitly set 0 will appear, if no other number occupies the position. Example: Format mask: 00.0000 Data: 1.234 Display: 01.2340 |
| 9 | Digit. Returns value with the specified number of digits with a leading space if positive or a leading minus if negative. Leading zeros are blank, except for a zero value, which returns a zero for the integer part of the fixed-point number. Example: Format mask: 99.9999 Data: 1.234 Display: 1.234 |
| C | Returns the ISO currency symbol in the specified position. |

| Symbol | Meaning |
|-------------------|--|
| D | <p>Determines the placement of the decimal separator. The decimal separator symbol used will be determined at runtime based on template locale.</p> <p>For example:</p> <p>Format mask: 9G999D99</p> <p>Data: 1234.56</p> <p>Display for English locale: 1,234.56</p> <p>Display for German locale: 1.234,56</p> |
| EEEE | Returns a value in scientific notation. |
| G | <p>Determines the placement of the grouping (thousands) separator. The grouping separator symbol used will be determined at runtime based on template locale.</p> <p>For example:</p> <p>Format mask: 9G999D99</p> <p>Data: 1234.56</p> <p>Display for English locale: 1,234.56</p> <p>Display for German locale: 1.234,56</p> |
| L | Returns the local currency symbol in the specified position. |
| MI | Displays negative value with a trailing "-". |
| PR | Displays negative value enclosed by <> |
| PT | Displays negative value enclosed by () |
| S (before number) | Displays positive value with a leading "+" and negative values with a leading "-" |
| S (after number) | Displays positive value with a trailing "+" and negative value with a trailing "-" |

Date Formatting

BI Publisher supports three methods for specifying the date format:

- Specify an explicit date format mask using Microsoft Word's native date format mask.

- Specify an explicit date format mask using Oracle's format-date function.
- Specify an abstract date format mask using Oracle's abstract date format masks. (Recommended for multilingual templates.)

Only one method should be used. If both the Oracle and MS format masks are specified, the data will be formatted twice causing unexpected behavior.

Data Source Requirements

To use the Microsoft format mask or the Oracle format mask, the date from the XML data source must be in canonical format. This format is:

YYYY-MM-DDThh:mm:ss±HH:MM

where

- YYYY is the year
- MM is the month
- DD is the day
- T is the separator between the date and time component
- hh is the hour in 24-hour format
- mm is the minutes
- ss is the seconds
- ±HH:MM is the time zone offset from Universal Time (UTC), or Greenwich Mean Time

An example of this construction is:

2005-01-01T09:30:10-07:00

The data after the "T" is optional, therefore the following date: 2005-01-01 can be formatted using either date formatting option. Note that if you do not include the time zone offset, the time will be formatted to the UTC time.

Translation Considerations

date_format

Using the Microsoft Date Format Mask

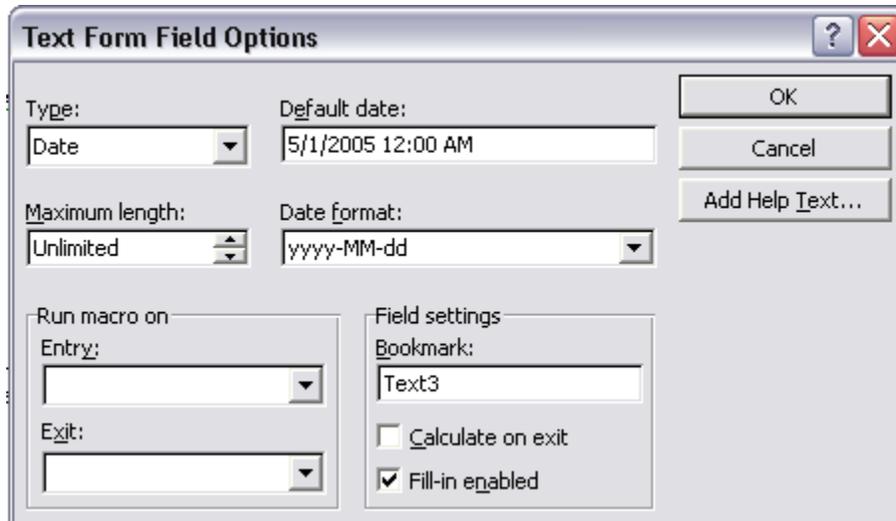
To apply a date format to a form field:

1. Open the **Form Field Options** dialog box for the placeholder field.

2. Set the **Type** to Date, Current Date, or Current Time.
3. Select the appropriate **Date format** from the list of options.

If you do not specify the mask in the **Date format** field, the abstract format mask "MEDIUM" will be used as default. See Oracle Abstract Format Masks, page 5-113 for the description.

The following figure shows the Text Form Field Options dialog box with a date format applied:



The following table lists the supported Microsoft date format mask components:

| Symbol | Meaning |
|--------|---|
| d | The day of the month. Single-digit days will not have a leading zero. |
| dd | The day of the month. Single-digit days will have a leading zero. |
| ddd | The abbreviated name of the day of the week, as defined in AbbreviatedDayNames. |
| dddd | The full name of the day of the week, as defined in DayNames. |
| M | The numeric month. Single-digit months will not have a leading zero. |
| MM | The numeric month. Single-digit months will have a leading zero. |
| MMM | The abbreviated name of the month, as defined in AbbreviatedMonthNames. |

| Symbol | Meaning |
|---------------|---|
| MMMM | The full name of the month, as defined in MonthNames. |
| yy | The year without the century. If the year without the century is less than 10, the year is displayed with a leading zero. |
| yyyy | The year in four digits. |
| gg | The period or era. This pattern is ignored if the date to be formatted does not have an associated period or era string. |
| h | The hour in a 12-hour clock. Single-digit hours will not have a leading zero. |
| hh | The hour in a 12-hour clock. Single-digit hours will have a leading zero. |
| H | The hour in a 24-hour clock. Single-digit hours will not have a leading zero. |
| HH | The hour in a 24-hour clock. Single-digit hours will have a leading zero. |
| m | The minute. Single-digit minutes will not have a leading zero. |
| mm | The minute. Single-digit minutes will have a leading zero. |
| s | The second. Single-digit seconds will not have a leading zero. |
| ss | The second. Single-digit seconds will have a leading zero. |
| f | Displays seconds fractions represented in one digit. |
| ff | Displays seconds fractions represented in two digits. |
| fff | Displays seconds fractions represented in three digits. |
| ffff | Displays seconds fractions represented in four digits. |
| fffff | Displays seconds fractions represented in five digits. |
| ffffff | Displays seconds fractions represented in six digits. |
| fffffff | Displays seconds fractions represented in seven digits. |

| Symbol | Meaning |
|--------|--|
| tt | The AM/PM designator defined in AMDesignator or PMDesignator, if any. |
| z | Displays the time zone offset for the system's current time zone in whole hours only. (This element can be used for formatting only) |
| zz | Displays the time zone offset for the system's current time zone in whole hours only. (This element can be used for formatting only) |
| zzz | Displays the time zone offset for the system's current time zone in hours and minutes. |
| : | The default time separator defined in TimeSeparator. |
| / | The default date separator defined in DateSeparator. |
| ' | Quoted string. Displays the literal value of any string between two ' characters. |
| " | Quoted string. Displays the literal value of any string between two " characters. |

Using the Oracle Format Mask

To apply the Oracle format mask to a date field:

1. Open the **Form Field Options** dialog box for the placeholder field.
2. Set the **Type** to Regular Text.
3. Select the **Add Help Text...** button to open the **Form Field Help Text** dialog.
4. Insert the following syntax to specify the date format mask:

```
<?format-date:date_string;
'ABSTRACT_FORMAT_MASK'; 'TIMEZONE' ?>
```

or

```
<?format-date-and-calendar:date_string;
'ABSTRACT_FORMAT_MASK'; 'CALENDAR_NAME'; 'TIMEZONE' ?>
```

where time zone is optional. The detailed usage of format mask, calendar and time zone is described below.

If no format mask is specified, the abstract format mask "MEDIUM" will be used as default.

Example form field help text entry:

<?format-date:hiredate;'YYYY-MM-DD'??>

The following table lists the supported Oracle format mask components:

| Symbol | Meaning |
|---------------|--|
| - | Punctuation and quoted text are reproduced in the result. |
| / | |
| ' | |
| . | |
| ; | |
| : | |
| "text" | |
| AD | AD indicator with or without periods. |
| A.D. | |
| AM | Meridian indicator with or without periods. |
| A.M. | |
| BC | BC indicator with or without periods. |
| B.C. | |
| CC | Century. For example, 2002 returns 21; 2000 returns 20. |
| DAY | Name of day, padded with blanks to length of 9 characters. |
| D | Day of week (1-7). |
| DD | Day of month (1-31). |
| DDD | Day of year (1-366). |
| DL | Returns a value in the long date format. |
| DS | Returns a value in the short date format. |
| DY | Abbreviated name of day. |

| Symbol | Meaning |
|---------------|--|
| E | Abbreviated era name. |
| EE | Full era name. |
| FF[1..9] | Fractional seconds. Use the numbers 1 to 9 after FF to specify the number of digits in the fractional second portion of the datetime value returned. Example: 'HH:MI:SS.FF3' |
| HH | Hour of day (1-12). |
| HH12 | Hour of day (1-12). |
| HH24 | Hour of day (0-23). |
| MI | Minute (0-59). |
| MM | Month (01-12; JAN = 01). |
| MON | Abbreviated name of month. |
| MONTH | Name of month, padded with blanks to length of 9 characters. |
| PM | Meridian indicator with or without periods. |
| P.M. | |
| RR | Lets you store 20th century dates in the 21st century using only two digits. |
| RRRR | Round year. Accepts either 4-digit or 2-digit input. If 2-digit, provides the same return as RR. If you don't want this functionality, then simply enter the 4-digit year. |
| SS | Seconds (0-59). |
| TZD | Daylight savings information. The TZD value is an abbreviated time zone string with daylight savings information. It must correspond to the region specified in TZR. Example: PST (for Pacific Standard Time) PDT (for Pacific Daylight Time) |

| Symbol | Meaning |
|--------|--|
| TZH | Time zone hour. (See TZM format element.) |
| TZM | Time zone minute. (See TZH format element.) Example: 'HH:MI:SS.FFTZH:TZM' |
| TZR | Time zone region information. The value must be one of the time zone regions supported in the database. Example: PST (Pacific Standard Time) |
| WW | Week of year (1-53) where week 1 starts on the first day of the year and continues to the seventh day of the year. |
| W | Week of month (1-5) where week 1 starts on the first day of the month and ends on the seventh. |
| X | Local radix character. |
| YYYY | 4-digit year. |
| YY | Last 2, or 1 digit(s) of year. |
| Y | |

Default Format Mask

If you do not want to specify a format mask with either the MS method or the Oracle method, you can omit the mask definition and use the default format mask. The default format mask is the MEDIUM abstract format mask from Oracle. (See Oracle Abstract Format Masks, page 5-113 for the definition.)

To use the default option using the Microsoft method, set the **Type** to Date, but leave the **Date format** field blank in the **Text Form Field Options** dialog.

To use the default option using the Oracle method, do not supply a mask definition to the "format-date" function call, for example:

```
<?format-date:hiredate?>
```

Oracle Abstract Format Masks

The abstract date format masks reflect the default implementations of date/time formatting in the I18N library. When you use one of these masks, the output generated will depend on the locale associated with the report.

Specify the abstract mask using the following syntax:

```
<?format-date:fieldname;'MASK'??>
```

where fieldname is the XML element tag and

MASK is the Oracle abstract format mask name

For example:

```
<?format-date:hiredate;'SHORT'??>  
<?format-date:hiredate;'LONG_TIME_TZ'??>
```

The following table lists the abstract format masks and the sample output that would be generated for US locale:

| Mask | Output for US Locale |
|----------------|---------------------------------------|
| SHORT | 2/31/99 |
| MEDIUM | Dec 31, 1999 |
| LONG | Friday, December 31, 1999 |
| SHORT_TIME | 12/31/99 6:15 PM |
| MEDIUM_TIME | Dec 31, 1999 6:15 PM |
| LONG_TIME | Friday, December 31, 1999 6:15 PM |
| SHORT_TIME_TZ | 12/31/99 6:15 PM GMT |
| MEDIUM_TIME_TZ | Dec 31, 1999 6:15 PM GMT |
| LONG_TIME_TZ | Friday, December 31, 1999 6:15 PM GMT |

Calendar and Timezone Support

Calendar Specification

The term "calendar" refers to the calendar date displayed in the published report. The following types are supported:

- GREGORIAN
- ARABIC_HIJRAH

- ENGLISH_HIJRAH
- JAPANESE_IMPERIAL
- THAI_BUDDHA
- ROC_OFFICIAL (Taiwan)

Use one of the following methods to set the calendar type:

- Call the format-date-and-calendar function and declare the calendar type.

For example:

```
<?format-date-and-calendar:hiredate;'LONG_TIME_TZ';'ROC_OFFICIAL';?>
```

The following graphic shows the output generated using this definition with locale set to zh-TW and time zone set to Asia/Taipei:

中華民國88年12月31日 星期五 下午 2:15 台北

- Set the calendar type using the profile option XDO: Calendar Type (XDO_CALENDAR_TYPE).

Note: The calendar type specified in the template will override the calendar type set in the profile option.

Time Zone Specification

There are two ways to specify time zone information:

- Call the format-date or format-date-and-calendar function with the Oracle format.
- Set the user profile option Client Timezone (CLIENT_TIMEZONE_ID) in Oracle Applications.

If no time zone is specified, UTC is used.

In the template, the time zone must be specified as a Java time zone string, for example, America/Los Angeles. The following example shows the syntax to enter in the help text field of your template:

```
<?format-date:hiredate;'LONG_TIME_TZ';'Asia/Shanghai'?>
```

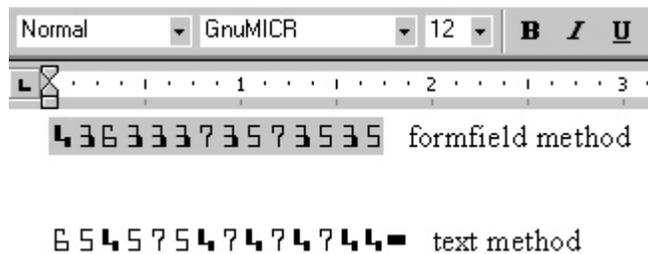
Using External Fonts

BI Publisher enables you to use fonts in your output that are not normally available on the server. To set up a new font for your report output, use the font to design your

template on your client machine, then make it available on the server, and configure BI Publisher to access the font at runtime.

1. Use the font in your template.
 1. Copy the font to your <WINDOWS_HOME>/fonts directory.
 2. Open Microsoft Word and build your template.
 3. Insert the font in your template: Select the text or form field and then select the desired font from the font dialog box (Format > Font) or font drop down list.

The following graphic shows an example of the form field method and the text method:



2. Place the font on the server.

Place the font in a directory accessible to the formatting engine at runtime.

3. Set the BI Publisher "font" property.

You can set the font property for the report in the BI Publisher Font Mappings page, or in the configuration file.

To set the property in the configuration file:

Update the BI Publisher configuration file "fonts" section with the font name and its location on the server. For example, the new entry for a TrueType font is structured as follows:

```
<font family="MyFontName" style="normal" weight="normal">
  <truetype path="\user\fonts\MyFontName.ttf"/>
</font>
```

See BI Publisher Configuration File, page D-1 for more information.

To set the property in the template:

See Setting Runtime Properties, page 11-13.

Now you can run your report and BI Publisher will use the font in the output as designed. For PDF output, the advanced font handling features of BI Publisher embed the external font glyphs directly into the final document. The embedded font only contains the glyphs required for the document and not the complete font definition.

Therefore the document is completely self-contained, eliminating the need to have external fonts installed on the printer.

Advanced Barcode Formatting

BI Publisher offers the ability to execute preprocessing on your data prior to applying a barcode font to the data in the output document. For example, you may need to calculate checksum values or start and end bits for the data before formatting them.

The solution requires that you register a barcode encoding class with BI Publisher that can then be instantiated at runtime to carry out the formatting in the template. This is covered in Advanced Barcode Font Formatting Class Implementation, page A-59.

To enable the formatting feature in your template, you must use two commands in your template. The first command registers the barcode encoding class with BI Publisher. This must be declared somewhere in the template prior to the encoding command. The second is the encoding command to identify the data to be formatted.

Register the Barcode Encoding Class

Use the following syntax in a form field in your template to register the barcode encoding class:

```
<?register-barcode-vendor:java_class_name;barcode_vendor_id?>
```

This command requires a Java class name (this will carry out the encoding) and a barcode vendor ID as defined by the class. This command must be placed in the template before the commands to encode the data in the template. For example:

```
<?register-barcode-vendor:'oracle.apps.xdo.template.rtf.util.barcodeutil.BarcodeUtil';'XMLPBarVendor'?>
```

where

`oracle.apps.xdo.template.rtf.util.barcodeutil.BarcodeUtil` is the Java class and

`XMLPBarVendor` is the vendor ID that is defined by the class.

Encode the Data

To format the data, use the following syntax in a form field in your template:

```
<?format-barcode:data;'barcode_type';'barcode_vendor_id'?>
```

where

`data` is the element from your XML data source to be encoded. For example: `LABEL_ID`

`barcode_type` is the method in the encoding Java class used to format the data (for example: `Code128a`).

`barcode_vendor_id` is the ID defined in the `register-barcode-vendor` field of the first command you used to register the encoding class.

For example:

```
<?format-barcode:LABEL_ID;'Code128a';'XMLPBarVendor'?>
```

At runtime, the `barcode_type` method is called to format the data value and the barcode font will then be applied to the data in the final output.

Advanced Design Options

XPath is an industry standard developed by the World Wide Web Consortium (W3C). It is the method used to navigate through an XML document. XPath is a set of syntax rules for addressing the individual pieces of an XML document. You may not know it, but you have already used XPath; RTF templates use XPath to navigate through the XML data at runtime.

This section contains a brief introduction to XPath principles. For more information, see the W3C Web site: <http://www.w3.org/TR/xpath>

XPath follows the Document Object Model (DOM), which interprets an XML document as a tree of nodes. A node can be one of seven types:

- root
- element
- attribute
- text
- namespace
- processing instruction
- comment

Many of these elements are shown in the following sample XML, which contains a catalog of CDs:

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- My CD Listing -->
<CATALOG>
  <CD cattype=Folk>
    <TITLE>Empire Burlesque</TITLE>
    <ARTIST>Bob Dylan</ARTIST>
    <COUNTRY>USA</COUNTRY>
    <PRICE>10.90</PRICE>
    <YEAR>1985</YEAR>
  </CD>
  <CD cattype=Rock>
    <TITLE>Hide Your Heart</TITLE>
    <ARTIST>Bonnie Tylor</ARTIST>
    <COUNTRY>UK</COUNTRY>
    <PRICE>9.90</PRICE>
    <YEAR>1988</YEAR>
  </CD>
</CATALOG>

```

The root node in this example is CATALOG. CD is an element, and it has an attribute cattype. The sample contains the comment My CD Listing. Text is contained within the XML document elements.

Locating Data

Locate information in an XML document using location-path expressions.

A node is the most common search element you will encounter. Nodes in the example CATALOG XML include CD, TITLE, and ARTIST. Use a path expression to locate nodes within an XML document. For example, the following path returns all CD elements:

```
//CATALOG/CD
```

where

the double slash (//) indicates that all elements in the XML document that match the search criteria are to be returned, regardless of the level within the document.

the slash (/) separates the child nodes. All elements matching the pattern will be returned.

To retrieve the individual TITLE elements, use the following command:

```
/CATALOG/CD/TITLE
```

This example will return the following XML:

```

<CATALOG>
  <CD cattype=Folk>
    <TITLE>Empire Burlesque</TITLE>
  </CD>
  <CD cattype=Rock>
    <TITLE>Hide Your Heart</TITLE>
  </CD>
</CATALOG>

```

Further limit your search by using square brackets. The brackets locate elements with certain child nodes or specified values. For example, the following expression locates all CDs recorded by Bob Dylan:

```
/CATALOG/CD[ARTIST="Bob Dylan"]
```

Or, if each CD element did not have an `PRICE` element, you could use the following expression to return only those CD elements that include a `PRICE` element:

```
/CATALOG/CD[PRICE]
```

Use the bracket notation to leverage the attribute value in your search. Use the `@` symbol to indicate an attribute. For example, the following expression locates all Rock CDs (all CDs with the `catttype` attribute value `Rock`):

```
//CD[@cattype="Rock"]
```

This returns the following data from the sample XML document:

```
<CD cattype=Rock>
  <TITLE>Hide Your Heart</TITLE>
  <ARTIST>Bonnie Tylor</ARTIST>
  <COUNTRY>UK</COUNTRY>
  <PRICE>9.90</PRICE>
  <YEAR>1988</YEAR>
</CD>
```

You can also use brackets to specify the item number to retrieve. For example, the first CD element is read from the XML document using the following XPath expression:

```
/CATALOG/CD[1]
```

The sample returns the first CD element:

```
<CD cattype=Folk>
  <TITLE>Empire Burlesque</TITLE>
  <ARTIST>Bob Dylan</ARTIST>
  <COUNTRY>USA</COUNTRY>
  <PRICE>10.90</PRICE>
  <YEAR>1985</YEAR>
</CD>
```

XPath also supports wildcards to retrieve every element contained within the specified node. For example, to retrieve all the CDs from the sample XML, use the following expression:

```
/CATALOG/*
```

You can combine statements with Boolean operators for more complex searches. The following expression retrieves all Folk and Rock CDs, thus all the elements from the sample:

```
//CD[@cattype="Folk"]||//CD[@cattype="Rock"]
```

The pipe (`|`) is equal to the logical OR operator. In addition, XPath recognizes the logical OR and AND, as well as the equality operators: `<=`, `<`, `>`, `>=`, `==`, and `!=`. For example, we can find all CDs released in 1985 or later using the following expression:

```
/CATALOG/CD[YEAR >=1985]
```

Starting Reference

The first character in an XPath expression determines the point at which it should start in the XML tree. Statements beginning with a forward slash (`/`) are considered absolute. No slash indicates a relative reference. An example of a relative reference is:

CD/*

This statement begins the search at the current reference point. That means if the example occurred within a group of statements the reference point left by the previous statement would be utilized.

As noted earlier, double forward slashes (//) retrieve every matching element regardless of location in the document.

Context and Parent

To select current and parent elements, XPath recognizes the dot notation commonly used to navigate directories. Use a single period (.) to select the current node and use double periods (..) to return the parent of the current node. For example, to retrieve all child nodes of the parent of the current node, use:

```
../*
```

Therefore, to access all CDs from the sample XML, use the following expression:

```
/CATALOG/CD/..
```

You could also access all the CD titles released in 1988 using the following:

```
/CATALOG/CD/TITLE[../YEAR=1988]
```

The .. is used to navigate up the tree of elements to find the YEAR element at the same level as the TITLE, where it is then tested for a match against "1988". You could also use // in this case, but if the element YEAR is used elsewhere in the XML document, you may get erroneous results.

XPath is an extremely powerful standard when combined with RTF templates allowing you to use conditional formatting and filtering in your template.

Namespace Support

If your XML data contains namespaces, you must declare them in the template prior to referencing the namespace in a placeholder. Declare the namespace in the template using either the basic RTF method or in a form field. Enter the following syntax:

```
<?namespace:namespace name= namespace url?>
```

For example:

```
<?namespace:fsg=http://www.oracle.com/fsg/2002-30-20/?>
```

Once declared, you can use the namespace in the placeholder markup, for example:

```
<?fsg:ReportName?>
```

Using the Context Commands

The BI Publisher syntax is simplified XSL instructions. This syntax, along with any native XSL commands you may use in your template, is converted to XSL-FO when you upload the template to the Template Manager. The placement of these instructions within the converted stylesheet determines the behavior of your template.

BI Publisher's RTF processor places these instructions within the XSL-FO stylesheet according to the most common context. However, sometimes you need to define the context of the instructions differently to create a specific behavior. To support this requirement, BI Publisher provides a set of context commands that allow you to define the context (or placement) of the processing instructions. For example, using context commands, you can:

- Specify an if statement in a table to refer to a cell, a row, a column or the whole table.
- Specify a for-each loop to repeat either the current data or the complete section (to create new headers and footers and restart the page numbering)
- Define a variable in the current loop or at the beginning of the document.

You can specify a context for both processing commands using the BI Publisher syntax and those using native XSL.

- To specify a context for a processing command using the simplified BI Publisher syntax, simply add `@context` to the syntax instruction. For example:
 - `<?for-each@section:INVOICE?>` - specifies that the group INVOICE should begin a new section for each occurrence. By adding the section context, you can reset the header and footer and page numbering.
 - `<?if@column:VAT?>` - specifies that the if statement should apply to the VAT column only.
- To specify a context for an XSL command, add the `xdofo:ctx="context"` attribute to your tags to specify the context for the insertion of the instructions. The value of the context determines where your code is placed.

For example:

```
<xsl:for-each xdofo:ctx="section" select ="INVOICE">
<xsl:attribute xdofo:ctx="inblock"
name="background-color">red</xsl:attribute>
```

BI Publisher supports the following context types:

| Context | Description |
|---------|--|
| section | The statement affects the whole section including the header and footer. For example, a <code>for-each@section</code> context command creates a new section for each occurrence - with restarted page numbering and header and footer. See Batch Reports, page 5-92 for an example of this usage. |

| Context | Description |
|----------------|---|
| column | <p>The statement will affect the whole column of a table. This context is typically used to show and hide table columns depending on the data.</p> <p>See Column Formatting, page 5-65 for an example.</p> |
| cell | <p>The statement will affect the cell of a table. This is often used together with @column in cross-tab tables to create a dynamic number of columns.</p> <p>See Cross-Tab Support, page 5-94 for an example.</p> |
| block | <p>The statement will affect multiple complete fo:blocks (RTF paragraphs). This context is typically used for if and for-each statements. It can also be used to apply formatting to a paragraph or a table cell.</p> <p>See Cell Highlighting, page 5-70 for an example.</p> |
| inline | <p>The context will become the single statement inside an fo:inline block. This context is used for variables.</p> |
| incontext | <p>The statement is inserted immediately after the surrounding statement. This is the default for <?sort?> statements that need to follow the surrounding for-each as the first element.</p> |
| inblock | <p>The statement becomes a single statement inside an fo:block (RTF paragraph). This is typically not useful for control statements (such as if and for-each) but is useful for statements that generate text, such as call-template.</p> |
| inlines | <p>The statement will affect multiple complete inline sections. An inline section is text that uses the same formatting, such as a group of words rendered as bold.</p> <p>See If Statements in Boilerplate Text, page 5-62.</p> |
| begin | <p>The statement will be placed at the beginning of the XSL stylesheet. This is required for global variables. See Defining Parameters, page 5-88.</p> |
| end | <p>The statement will be placed at the end of the XSL stylesheet.</p> |

The following table shows the default context for the BI Publisher commands:

| Command | Context |
|----------------|----------------|
| apply-template | inline |

| Command | Context |
|---------------|-----------|
| attribute | inline |
| call-template | inblock |
| choose | block |
| for-each | block |
| if | block |
| import | begin |
| param | begin |
| sort | incontext |
| template | end |
| value-of | inline |
| variable | end |

Using XSL Elements

You can use any XSL element in your template by inserting the XSL syntax into a form field.

If you are using the basic RTF method, you cannot insert XSL syntax directly into your template. BI Publisher has extended the following XSL elements for use in RTF templates.

To use these in a basic-method RTF template, you must use the BI Publisher Tag form of the XSL element. If you are using form fields, use either option.

Apply a Template Rule

Use this element to apply a template rule to the current element's child nodes.

XSL Syntax: `<xsl:apply-templates select="name">`

BI Publisher Tag: `<?apply:name?>`

This function applies to `<xsl:template-match="n">` where *n* is the element name.

Copy the Current Node

Use this element to create a copy of the current node.

XSL Syntax: `<xsl:copy-of select="name">`

BI Publisher Tag: `<?copy-of:name?>`

Call Template

Use this element to call a named template to be inserted into or applied to the current template. For example, use this feature to render a table multiple times.

XSL Syntax: `<xsl:call-template name="name">`

BI Publisher Tag: `<?call-template:name?>`

Template Declaration

Use this element to apply a set of rules when a specified node is matched.

XSL Syntax: `<xsl:template name="name">`

BI Publisher Tag: `<?template:name?>`

Variable Declaration

Use this element to declare a local or global variable.

XSL Syntax: `<xsl:variable name="name">`

BI Publisher Tag: `<?variable:name?>`

Example:

```
<xsl:variable name="color" select="'red'"/>
```

Assigns the value "red" to the "color" variable. The variable can then be referenced in the template.

Import Stylesheet

Use this element to import the contents of one style sheet into another.

Note: An imported style sheet has lower precedence than the importing style sheet.

XSL Syntax: `<xsl:import href="url">`

BI Publisher Tag: `<?import:url?>`

Define the Root Element of the Stylesheet

This and the `<xsl:stylesheet>` element are completely synonymous elements. Both

are used to define the root element of the style sheet.

Note: An included style sheet has the same precedence as the including style sheet.

XSL Syntax: `<xsl:stylesheet xmlns:x="url">`

BI Publisher Tag: `<?namespace:x=url?>`

Note: The namespace must be declared in the template. See Namespace Support, page 5-121.

Native XSL Number Formatting

The native XSL format-number function takes the basic format:

`format-number(number, format, [decimalformat])`

| Parameter | Description |
|---------------|--|
| number | Required. Specifies the number to be formatted. |
| format | Required. Specifies the format pattern. Use the following characters to specify the pattern: <ul style="list-style-type: none">• # (Denotes a digit. Example: ####)• 0 (Denotes leading and following zeros. Example: 0000.00)• . (The position of the decimal point Example: ###.##)• , (The group separator for thousands. Example: ##,###.##)• % (Displays the number as a percentage. Example: ##%)• ; (Pattern separator. The first pattern will be used for positive numbers and the second for negative numbers) |
| decimalformat | Optional. For more information on the decimal format please consult any basic XSLT manual. |

Using FO Elements

You can use the native FO syntax inside the Microsoft Word form fields.

For more information on XSL-FO see the W3C Website at
<http://www.w3.org/2002/08/XSLFOsummary.html>

The full list of FO elements supported by BI Publisher can be found in the Appendix:
Supported XSL-FO Elements, page C-1.

Extended Function Support in RTF Templates

Extended SQL and XSL Functions

BI Publisher has extended a set of SQL and XSL functions for use in RTF templates. The syntax for these extended functions is

```
<?xdofx:expression?>
```

for extended SQL functions or

```
<?xdoxslt:expression?>
```

for extended XSL functions.

Note: You cannot mix xdofx statements with XSL expressions in the same context. For example, assume you had two elements, FIRST_NAME and LAST_NAME that you wanted to concatenate into a 30-character field and right pad the field with the character "x", you could NOT use the following:

INCORRECT:

```
<?xdofx:rpadd(concat(FIRST_NAME, LAST_NAME), 30, 'x')?>
```

because concat is an XSL expression. Instead, you could use the following:

CORRECT:

```
<?xdofx:rpadd(FIRST_NAME || LAST_NAME), 30, 'x')?>
```

The supported functions are shown in the following table:

| SQL Statement or XSL Expression | Usage | Description |
|---------------------------------|------------------------------|---|
| 2+3 | <?xdoxf:2+3?> | Addition |
| 2-3 | <?xdoxf:2-3?> | Subtraction |
| 2*3 | <?xdoxf:2*3?> | Multiplication |
| 2/3 | <?xdoxf:2/3?> | Division |
| 2**3 | <?xdoxf:2**3?> | Exponential |
| 3 2 | <?xdoxf:3 2?> | Concatenation |
| lpad('aaa',10,'.') | <?xdoxf:lpad('aaa',10,'.')?> | <p>The lpad function pads the left side of a string with a specific set of characters. The syntax for the lpad function is:</p> <pre>lpad (string1,padded_length,[pad_string])</pre> <p><i>string1</i> is the string to pad characters to (the left-hand side).</p> <p><i>padded_length</i> is the number of characters to return.</p> <p><i>pad_string</i> is the string that will be padded to the left-hand side of <i>string1</i>.</p> |
| rpad('aaa',10,'.') | <?xdoxf:rpad('aaa',10,'.')?> | <p>The rpad function pads the right side of a string with a specific set of characters.</p> <p>The syntax for the rpad function is:</p> <pre>rpad (string1,padded_length,[pad_string]).</pre> <p><i>string1</i> is the string to pad characters to (the right-hand side).</p> <p><i>padded_length</i> is the number of characters to return.</p> <p><i>pad_string</i> is the string that will be padded to the right-hand side of <i>string1</i>.</p> |

| SQL Statement or XSL Expression | Usage | Description |
|---------------------------------------|---|--|
| decode('xxx','bbb','ccc','xxx','ddd') | <?xdoxf:decode('xxx','bbb','ccc','xxx','ddd')?> | <p>The decode function has the functionality of an IF-THEN-ELSE statement. The syntax for the decode function is:</p> <pre>decode(expression, search, result [,search, result]...[, default])</pre> <p><i>expression</i> is the value to compare.</p> <p><i>search</i> is the value that is compared against expression.</p> <p><i>result</i> is the value returned, if expression is equal to search.</p> <p><i>default</i> is returned if no matches are found.</p> |
| Instr('abcabcabc','a',2) | <?xdoxf:Instr('abcabcabc','a',2)?> | <p>The <i>instr</i> function returns the location of a substring in a string. The syntax for the <i>instr</i> function is:</p> <pre>instr(string1,string2,[start_position],[nth_appearance])</pre> <p><i>string1</i> is the string to search.</p> <p><i>string2</i> is the substring to search for in string1.</p> <p><i>start_position</i> is the position in string1 where the search will start. The first position in the string is 1. If the <i>start_position</i> is negative, the function counts back <i>start_position</i> number of characters from the end of string1 and then searches towards the beginning of string1.</p> <p><i>nth_appearance</i> is the <i>nth</i> appearance of string2.</p> |
| substr('abcdefg',2,3) | <?xdoxf:substr('abcdefg',2,3)?> | <p>The <i>substr</i> function allows you to extract a substring from a string. The syntax for the <i>substr</i> function is:</p> <pre>substr(string, start_position, [length])</pre> <p><i>string</i> is the source string.</p> <p><i>start_position</i> is the position for extraction. The first position in the string is always 1.</p> <p><i>length</i> is the number of characters to extract.</p> |

| SQL Statement or XSL Expression | Usage | Description |
|---------------------------------|---|--|
| replace(name,'John','Jon') | <?xdoxf:replace(name,'John','Jon')?> | <p>The replace function replaces a sequence of characters in a string with another set of characters. The syntax for the replace function is:</p> <pre>replace(string1,string_to_replace,[replacement_string])</pre> <p><i>string1</i> is the string to replace a sequence of characters with another set of characters.</p> <p><i>string_to_replace</i> is the string that will be searched for in <i>string1</i>.</p> <p><i>replacement_string</i> is optional. All occurrences of <i>string_to_replace</i> will be replaced with <i>replacement_string</i> in <i>string1</i>.</p> |
| to_number('12345') | <?xdoxf:to_number('12345')?> | Function to_number converts char, a value of CHAR, VARCHAR2, NCHAR, or NVARCHAR2 datatype containing a number in the format specified by the optional format model <i>fmt</i> , to a value of NUMBER datatype. |
| to_char(12345) | <?xdoxf:to_char('12345')?> | Use the TO_CHAR function to translate a value of NUMBER datatype to VARCHAR2 datatype. |
| to_date | <?xdoxf:to_date (char [, <i>fmt</i> [, 'nlsparam']])> | TO_DATE converts char of CHAR, VARCHAR2, NCHAR, or NVARCHAR2 datatype to a value of DATE datatype. The <i>fmt</i> is a date format specifying the format of <i>char</i> . If you omit <i>fmt</i> , then <i>char</i> must be in the default date format. If <i>fmt</i> is 'J', for Julian, then <i>char</i> must be an integer. |
| sysdate() | <?xdoxf:sysdate()?> | SYSDATE returns the current date and time. The datatype of the returned value is DATE. The function requires no arguments. |
| minimum | <?xdoxslt:minimum(ELEMENT_NAME)?> | Returns the minimum value of the element in the set. |
| maximum | <?xdoxslt:maximum(ELEMENT_NAME)?> | Returns the maximum value of the element in the set. |

| SQL Statement or XSL Expression | Usage | Description |
|---------------------------------|--|--|
| chr | <?xdoxf:chr(<i>n</i>)?> | CHR returns the character having the binary equivalent to <i>n</i> in either the database character set or the national character set. |
| ceil | <?xdoxf:ceil(<i>n</i>)?> | CEIL returns smallest integer greater than or equal to <i>n</i> . |
| floor | <?xdoxf:floor(<i>n</i>)?> | FLOOR returns largest integer equal to or less than <i>n</i> . |
| round | <?xdoxf:round (<i>number</i> [, <i>integer</i>])?> | ROUND returns <i>number</i> rounded to <i>integer</i> places right of the decimal point. If <i>integer</i> is omitted, then <i>number</i> is rounded to 0 places. <i>integer</i> can be negative to round off digits left of the decimal point. <i>integer</i> must be an integer. |
| lower | <?xdoxf:lower (<i>char</i>)?> | LOWER returns <i>char</i> , with all letters lowercase. <i>char</i> can be any of the datatypes CHAR, VARCHAR2, NCHAR, NVARCHAR2, CLOB, or NCLOB. The return value is the same datatype as <i>char</i> . |
| upper | <?xdoxf:upper(<i>char</i>)?> | UPPER returns <i>char</i> , with all letters uppercase. <i>char</i> can be any of the datatypes CHAR, VARCHAR2, NCHAR, NVARCHAR2, CLOB, or NCLOB. The return value is the same datatype as <i>char</i> . |
| length | <?xdoxf:length(<i>char</i>)?> | The "length" function returns the length of <i>char</i> . LENGTH calculates length using characters as defined by the input character set. |
| greatest | <?xdoxf:greatest (<i>expr</i> [, <i>expr</i>]...)?> | GREATEST returns the greatest of the list of <i>exprs</i> . All <i>exprs</i> after the first are implicitly converted to the datatype of the first <i>expr</i> before the comparison. |
| least | <?xdoxf:least (<i>expr</i> [, <i>expr</i>]...)?> | LEAST returns the least of the list of <i>exprs</i> . All <i>exprs</i> after the first are implicitly converted to the datatype of the first <i>expr</i> before the comparison. |

The following table shows supported combination functions:

| SQL Statement | Usage |
|---|--|
| $(2+3/4-6*7)/8$ | <?xdox:(2+3/4-6*7)/8?> |
| lpad(substr('1234567890',5,3),10,'^') | <?xdox:lpad(substr('1234567890',5,3),10,'^')?> |
| decode('a','b','c','d','e','1') instr('321',1,1) | <?xdox:decode('a','b','c','d','e','1') instr('321',1,1)?> |

XSL Equivalents

The following table lists the BI Publisher simplified syntax with the XSL equivalents.

| Supported XSL Elements | Description | BI Publisher Syntax |
|-------------------------------------|--|---------------------|
| <xsl:value-of select="name"> | Placeholder syntax | <?name?> |
| <xsl:apply-templates select="name"> | Applies a template rule to the current element's child nodes. | <?apply:name?> |
| <xsl:copy-of select="name"> | Creates a copy of the current node. | <?copy-of:name?> |
| <xsl:call-template name="name"> | Calls a named template to be inserted into/applied to the current template. | <?call:name?> |
| <xsl:sort select="name"> | Sorts a group of data based on an element in the dataset. | <?sort:name?> |
| <xsl:for-each select="name"> > | Loops through the rows of data of a group, used to generate tabular output. | <?for-each:name?> |
| <xsl:choose> | Used in conjunction with when and otherwise to express multiple conditional tests. | <?choose?> |

| Supported XSL Elements | Description | BI Publisher Syntax |
|---|---|--|
| <code><xsl:when test="exp"></code> | Used in conjunction with <code>choose</code> and <code>otherwise</code> to express multiple conditional tests | <code><?when:expression?></code> |
| <code><xsl:otherwise></code> | Used in conjunction with <code>choose</code> and <code>when</code> to express multiple conditional tests | <code><?otherwise?></code> |
| <code><xsl:if test="exp"></code> | Used for conditional formatting. | <code><?if:expression?></code> |
| <code><xsl:template name="name"></code> | Template declaration | <code><?template:name?></code> |
| <code><xsl:variable name="name"></code> | Local or global variable declaration | <code><?variable:name?></code> |
| <code><xsl:import href="url"></code> | Import the contents of one stylesheet into another | <code><?import:url?></code> |
| <code><xsl:include href="url"></code> | Include one stylesheet in another | <code><?include:url?></code> |
| <code><xsl:stylesheet xmlns:x="url"></code> | Define the root element of a stylesheet | <code><?namespace:x=url?></code> |

Using FO Elements

You can use most FO elements in an RTF template inside the Microsoft Word form fields. The following FO elements have been extended for use with BI Publisher RTF templates. The BI Publisher syntax can be used with either RTF template method.

The full list of FO elements supported by BI Publisher can be found in the Appendix: Supported XSL-FO Elements, page C-1.

| FO Element | BI Publisher Syntax |
|--|--|
| <code><fo:page-number-citation ref-id="id"></code> | <code><?fo:page-number-citation:id?></code> |
| <code><fo:page-number></code> | <code><?fo:page-number?></code> |
| <code><fo:ANY NAME WITHOUT ATTRIBUTE></code> | <code><?fo:ANY NAME WITHOUT ATTRIBUTE?></code> |

Translating Reports

This chapter covers the following topics:

- Template Translations
- Report File Translations

Template Translations

There are two options for adding translated templates to your report definition:

- Create a separate RTF template that is translated (a localized template)
- Generate an XLIFF file from the original template (at runtime the original template is applied for the layout and the XLIFF file is applied for the translation)

Use the first option if the translated template requires a different layout from the original template.

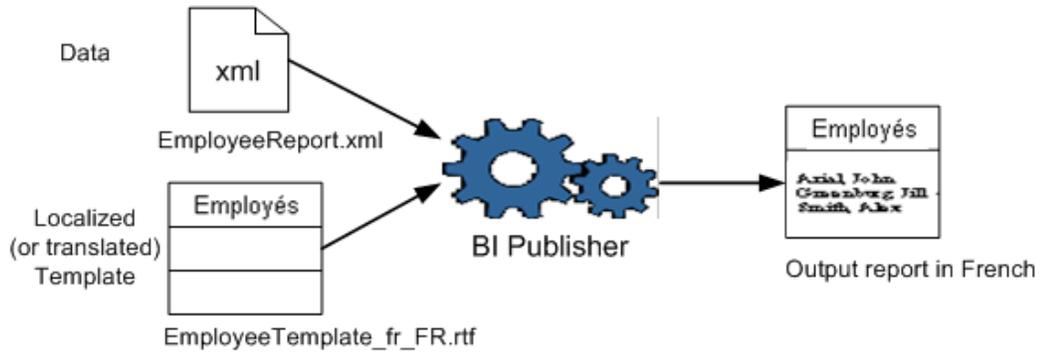
If you only require translation of the text strings of the template layout, use the XLIFF option.

Important: Regardless of which option you choose, you must name your translated templates according to the naming standard for BI Publisher to recognize it at runtime. See Naming Standards for Translated Files, page 7-6.

The following diagrams illustrate the translation concepts

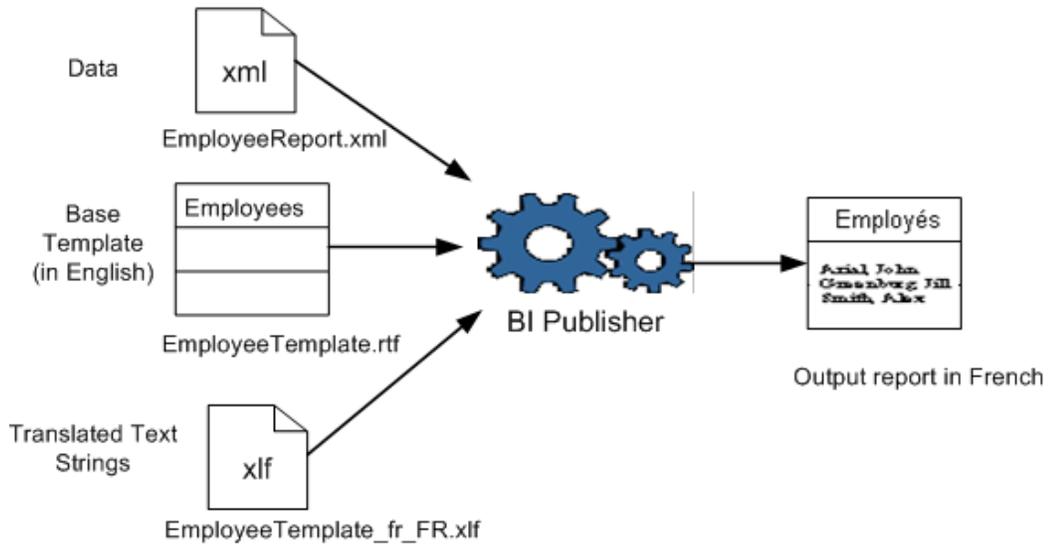
Localized Template Option

Use this option when you want a specific translation to have a different layout.



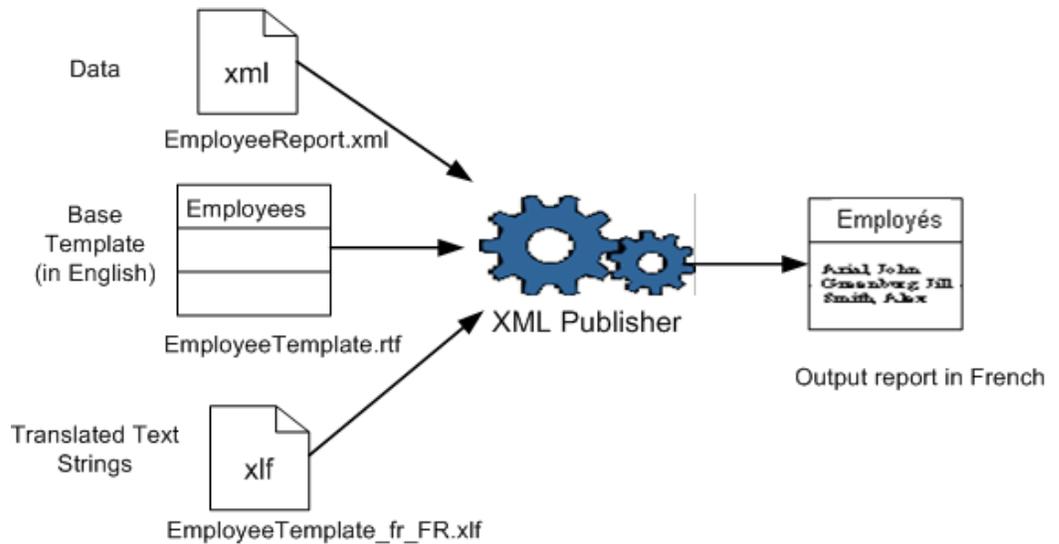
XLIFF File Option

Use this option when you want to use the same layout and apply specific translations.



XLIFF File Option

Use this option when you want to use the same layout and apply specific translations.



Using the XLIFF Option

To generate an XLIFF file from an RTF template:

1. Open your template in Microsoft Word with the Template Builder for Word installed.
2. From the Template Builder menu, select Tools > Translations > Extract Text.
BI Publisher extracts the translatable strings from the template and exports them to an XLIFF (.xlf) file.
3. Save the file to the desired location.

This XLIFF file can then be sent to a translation provider, or using a text editor, you can enter the translation for each string. See Structure of the XLIFF File, page 7-4 for instructions on how to edit the XLIFF file.

Note: XLIFF is the XML Localization Interchange File Format. It is the standard format used by localization providers. For more information about the XLIFF specification, see <http://www.oasis-open.org/committees/xliff/documents/xliff-specification.htm>

A "translatable string" is any text in the template that is intended for display in the published report, such as table headers and field labels. Text supplied at runtime from

the data is not translatable, nor is any text that you supply in the Microsoft Word form fields.

You can translate the template XLIFF file into as many languages as desired and then associate these translations to the original template. See *Uploading Translated Files*, page 7-6.

Structure of the XLIFF File

The XLIFF file generated by BI Publisher has the following structure:

```
<xliff>
  <file>
    <header>
      <body>
        <trans-unit>
          <source>
          <target>
          <note>
```

The following figure shows an excerpt from an untranslated XLIFF file:

```
<?xml version = '1.0' encoding = 'utf-8' ?>
<xliff version="1.0">
  <file source-language="en-US" target-language="en-US" datatype="XDO" original="orpher"
    <header/>
    <body>
      <trans-unit id="d678c24b" maxbytes="4000" maxwidth="90" size-unit="char" translatable="true">
        <source>Italian Purchase VAT Register - [&1]</source>
        <target>Italian Purchase VAT Register - [&1]</target>
        <note>Text located: header/table, token &1:anonymous placeholder(s)</note>
      </trans-unit>
      <trans-unit id="4d3eb24" maxbytes="4000" maxwidth="15" size-unit="char" translatable="true">
        <source>Total</source>
        <target>Total</target>
        <note>Text located: body/table</note>
      </trans-unit>
      <trans-unit id="aeccc17e" maxbytes="4000" maxwidth="37" size-unit="char" translatable="true">
        <source>Non-Recoverable</source>
        <target>Non-Recoverable</target>
        <note>Text located: body/table</note>
      </trans-unit>
      .
      .
    </body>
  </file>
</xliff>
```

source-language and target-language attributes

The `<file>` element includes the attributes `source-language` and `target-language`. The valid value for `source-language` and `target-language` is a combination of the language code and country code as follows:

- the two-letter ISO 639 language code
- the two-letter ISO 3166 country code

Note: For more information on the International Organization for Standardization (ISO) and the code lists, see International Organization for Standardization [<http://www.iso.org/iso/en/ISOOnline.frontpage>].

For example, the value for English-United States is "en-US". This combination is also referred to as a *locale*.

When you edit the exported XLIFF file you must change the `target-language` attribute to the appropriate locale value of your target language. The following table shows examples of source-language and target-language attribute values appropriate for the given translations:

| Translation (Language/Territory) | source-language value | target-language value |
|---|-----------------------|-----------------------|
| From English/US To English/Canada | en-US | en-CA |
| From English/US To Chinese/China | en-US | zh-CN |
| From Japanese/Japan To French/France | ja-JP | fr-FR |

Embedded Data Fields

Some templates contain placeholders for data fields embedded in the text display strings of the report. For example, the title of the sample report is

Italian Purchase VAT Register - (year)

where (year) is a placeholder in the RTF template that will be populated at runtime by data from an XML element. These fields are not translatable, because the value comes from the data at runtime.

To identify embedded data fields, the following token is used in the XLIFF file:

[&#n]

where *n* represents the numbered occurrence of a data field in the template.

For example, in the preceding XLIFF sample, the first translatable string is

```
<source>Italian Purchase VAT Register - [&#1]</source>
```

Warning: Do not edit or delete the embedded data field tokens or you

will affect the merging of the XML data with the template.

<source> and <target> Elements

Each <source> element contains a translatable string from the template in the source language of the template. For example,

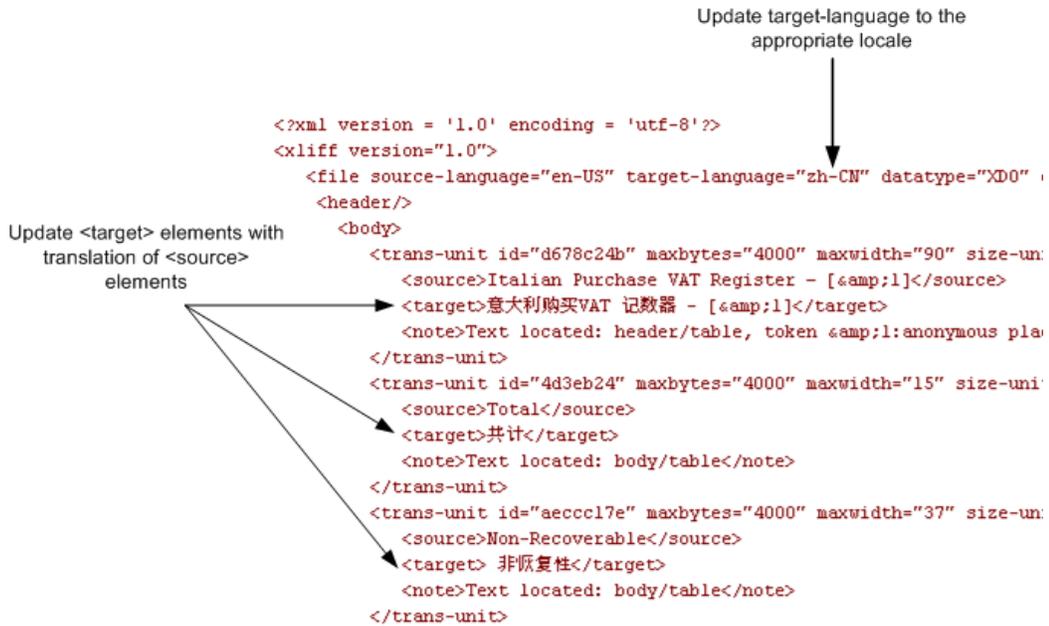
```
<source>Total</source>
```

When you initially export the XLIFF file for translation, the source and target elements are all identical. To create the translation for this template, enter the appropriate translation for each source element string in its corresponding <target> element.

Therefore if you were translating the sample template into German, you would enter the following for the Total string:

```
<source>Total</source>
<target>Gesamtbetrag</target>
```

The following figure shows the sample XLIFF file from the previous figure updated with the Chinese translation:



Naming Standards for Translated Files

Your translated XLIFF and RTF files must be named according to the following standard:

TemplateName_<language code>_<TERRITORY CODE>.xlf or .rtf

or

TemplateName_<language code>.xlf or .rtf

where `TemplateName` is the original template name

language code is the two-letter ISO language code (in lower case)

TERRITORY CODE is the two-letter ISO country code (must be in upper case)

For example, if your original template is named `EmployeeTemplate` and you are uploading a translation for Japanese-Japan, name the file:

`EmployeeTemplate_ja_JP.xlf`

Uploading Translated Files

In the report Editor, select the **Layouts** page to upload the translated XLIFF files. See *Define Layouts*, page 3-25.

Locale Selection Logic

BI Publisher applies a translation based on the user's selected Report Locale. BI Publisher will first try to match an RTF template named for the locale, then an XLIFF file named for the locale. If an exact match on language-territory is not found, BI Publisher will try to match on language only.

For example, if you have a report for which the base template is called `EmployeeTemplate.rtf` and the locale selected is French (France), BI Publisher will select the translation to apply according to the following hierarchy:

`EmployeeTemplate_fr_FR.rtf`

`EmployeeTemplate_fr_FR.xlf`

`EmployeeTemplate_fr.rtf`

`EmployeeTemplate_fr.xlf`

`EmployeeTemplate.rtf`

Note that with the same set of translations, if the locale selected is French (Switzerland), the `EmployeeTemplate_fr.rtf` would be applied. Now if the available translations were limited to the following set:

`EmployeeTemplate_fr_FR.rtf`

`EmployeeTemplate_fr_FR.xlf`

`EmployeeTemplate.rtf`

and the locale selected is French (Switzerland), then the `EmployeeTemplate.rtf` will be applied. Even though there is a language match, BI Publisher will not match the different locales.

Therefore, if you want to ensure that a French language translation is used when French is the selected language, regardless of the selected locale, then you must include either an rtf or xlf file named for the language only (that is, `EmployeeTemplate_fr.rtf` or `EmployeeTemplate_fr.xlf`).

Report File Translations

You can add translated report description files so that your users can view the report description and any parameter labels in the language they selected for their UI preference. Upload translated report description files to the same location as the translated template files. Note that the translated report description files follow a naming standard that is slightly different than the translated template file standard.

For information on setting the UI language preference, see *Setting Preferences*, page 1-2.

To add a report file translation:

1. In the report Editor, select **Generate XLIFF**.
2. Save the .xlf file to a local directory.
3. Send the file to a localization provider, or add the translated text (see *Structure of the XLIFF File*, page 7-4 for information on editing the XLIFF file).
4. Name the translated report file according to the following standard for all languages except Chinese and Portuguese (Brazil):

ReportName_<language_code>.xlf

Where ReportName is the report file name and

language_code is the two-letter ISO language code (in lower case).

Important: Except for the three locales noted below, **do not** include the territory code in the file name.

For Chinese (China), Chinese (Taiwan), and Portuguese (Brazil) you must use the language code and territory code in the translated file name as follows:

ReportName_zh_CN.xlf

ReportName_zh_TW.xlf

ReportName_pt_BR.xlf

5. In the report Editor, select the **Layouts** page to upload the translated XLIFF files. See *Define Layouts*, page 3-25.

Creating a PDF Template

Overview

To create a PDF template, take any existing PDF document and apply the BI Publisher markup. Because the source of the PDF document does not matter, you have multiple design options. For example:

- Design the layout of your template using any application that generates documents that can be converted to PDF
- Scan a paper document to use as a template
- Download a PDF document from a third-party Web site

Note: The steps required to create a template from a third-party PDF depend on whether form fields have been added to the document. For more information, see *Creating a Template from a Predefined PDF Form*, page 8-17.

If you are designing the layout, note that once you have converted to PDF, your layout is treated like a set background. When you mark up the template, you draw fields on top of this background. To edit the layout, you must edit your original document and then convert back to PDF.

For this reason, the PDF template is not recommended for documents that will require frequent updates to the layout. However, it is appropriate for forms that will have a fixed layout, such as invoices or purchase orders.

Supported Modes

BI Publisher supports Adobe Acrobat 5.0 (PDF specification version 1.4). If you are using Adobe Acrobat Professional 6.0 (or later), use the **Reduce File Size Option** (from the **File** menu) to save your file as Adobe Acrobat 5.0 compatible.

For PDF conversion, BI Publisher supports any PDF conversion utility, such as Adobe Acrobat Distiller.

Designing the Layout

To design the layout of your template you can use any desktop application that generates documents that can be converted to PDF. Or, scan in an original paper document to use as the background for the template.

The following is the layout for a sample purchase order. It was designed using Microsoft Word and converted to PDF using Adobe Acrobat Distiller.

|  | | Purchase Order | | | | | |
|---|-------------------------|-----------------------|----------------------|------|--------------|----------------------|-----|
| | | PURCHASE ORDER NO. | REVISION | PAGE | | | |
| VENDOR: | | SHIP TO: | | | | | |
| | | BILL TO: | | | | | |
| CUSTOMER ACCOUNT NO. | VENDOR NO. | DATE OF ORDER/BUYER | REVISED DATE/BUYER | | | | |
| PAYMENT TERMS | | SHIP VIA | JOB | | | | |
| FREIGHT TERMS | | REQUESTOR/DELIVER TO | CONFIRM TO/TELEPHONE | | | | |
| ITEM | PART NUMBER/DESCRIPTION | DELIVERY | QUANTITY | UNIT | UNIT PRICE | EXTENSION | TAX |
| | | | | | | | |
| | | | | | Total | | |
| Oracle E-Business Suite | | | | | | AUTHORIZED SIGNATURE | |

The following is the XML data that will be used as input to this template:

```
<?xml version="1.0"?>
<POXPRPOP2>
  <G_HEADERS>
    <POH_PO_NUM>1190-1</POH_PO_NUM>
    <POH_REVISION_NUM>0</POH_REVISION_NUM>
    <POH_SHIP_ADDRESS_LINE1>3455 108th Avenue</POH_SHIP_ADDRESS_LINE1>
    <POH_SHIP_ADDRESS_LINE2></POH_SHIP_ADDRESS_LINE2>
    <POH_SHIP_ADDRESS_LINE3></POH_SHIP_ADDRESS_LINE3>
    <POH_SHIP_ADR_INFO>Seattle, WA 98101</POH_SHIP_ADR_INFO>
    <POH_SHIP_COUNTRY>United States</POH_SHIP_COUNTRY>
    <POH_VENDOR_NAME>Allied Manufacturing</POH_VENDOR_NAME>
    <POH_VENDOR_ADDRESS_LINE1>1145 Brokaw Road</POH_VENDOR_ADDRESS_LINE1>
    <POH_VENDOR_ADR_INFO>San Jose, CA 95034</POH_VENDOR_ADR_INFO>
    <POH_VENDOR_COUNTRY>United States</POH_VENDOR_COUNTRY>
    <POH_BILL_ADDRESS_LINE1>90 Fifth Avenue</POH_BILL_ADDRESS_LINE1>
    <POH_BILL_ADR_INFO>New York, NY 10022-3422</POH_BILL_ADR_INFO>
    <POH_BILL_COUNTRY>United States</POH_BILL_COUNTRY>
    <POH_BUYER>Smith, J</POH_BUYER>
    <POH_PAYMENT_TERMS>45 Net (terms date + 45)</POH_PAYMENT_TERMS>
    <POH_SHIP_VIA>UPS</POH_SHIP_VIA>
    <POH_FREIGHT_TERMS>Due</POH_FREIGHT_TERMS>
    <POH_CURRENCY_CODE>USD</POH_CURRENCY_CODE>
    <POH_CURRENCY_CONVERSION_RATE></POH_CURRENCY_CONVERSION_RATE>
  <LIST_G_LINES>
    <G_LINES>
      <POL_LINE_NUM>1</POL_LINE_NUM>
      <POL_VENDOR_PRODUCT_NUM></POL_VENDOR_PRODUCT_NUM>
      <POL_ITEM_DESCRIPTION>PCMCIA II Card Holder</POL_ITEM_DESCRIPTION>
      <POL_QUANTITY_TO_PRINT></POL_QUANTITY_TO_PRINT>
      <POL_UNIT_OF_MEASURE>Each</POL_UNIT_OF_MEASURE>
      <POL_PRICE_TO_PRINT>15</POL_PRICE_TO_PRINT>
      <C_FLEX_ITEM>CM16374</C_FLEX_ITEM>
      <C_FLEX_ITEM_DISP>CM16374</C_FLEX_ITEM_DISP>
      <PLL_QUANTITY_ORDERED>7500</PLL_QUANTITY_ORDERED>
      <C_AMOUNT_PLL>112500</C_AMOUNT_PLL>
      <C_AMOUNT_PLL_DISP>112,500.00 </C_AMOUNT_PLL_DISP>
    </G_LINES>
  </LIST_G_LINES>
  <C_AMT_POL_RELEASE_TOTAL_ROUND>312420</C_AMT_POL_RELEASE_TOTAL_ROUND>
</G_HEADERS>
</POXPRPOP2>
```

Adding Markup to the Template Layout

After you have converted your document to PDF, you define form fields that will display the data from the XML input file. These form fields are placeholders for the data.

The process of associating the XML data to the PDF template is the same as the process for the RTF template. See: *Associating the XML Data to the Template Layout: Associating the XML data to the template layout*, page 5-3.

When you draw the form fields in Adobe Acrobat, you are drawing them *on top* of the layout that you designed. There is not a relationship between the design elements on your template and the form fields. You therefore must place the fields exactly where

you want the data to display on the template

Creating a Placeholder

You can define a placeholder as text, a check box, or a radio button, depending on how you want the data presented.

Note: If you are using Adobe Acrobat 5.0, the **Form Tool** is available from the standard toolbar. If you are using Adobe Acrobat 6.0 or later, display the **Forms Toolbar** from the Tools menu by selecting Tools > Advanced Editing > Forms > Show Forms Toolbar.

Naming the Placeholder

The name of the placeholder must match the XML source field name.

Creating a Text Placeholder

To create a text placeholder in your PDF document:

Acrobat 5.0 Users:

1. Select the **Form Tool** from the Acrobat toolbar.
2. Draw a form field box in the position on the template where you want the field to display. Drawing the field opens the **Field Properties** dialog box.
3. In the **Name** field of the **Field Properties** dialog box, enter a name for the field.
4. Select **Text** from the **Type** drop down menu.

You can use the **Field Properties** dialog box to set other attributes for the placeholder. For example, enforce maximum character size, set field data type, data type validation, visibility, and formatting.

5. If the field is not placed exactly where desired, drag the field for exact placement.

Acrobat 6.0 (and later) Users:

1. Select the **Text Field Tool** from the Forms Toolbar.
2. Draw a form field box in the position on the template where you want the field to display. Drawing the field opens the **Text Field Properties** dialog box.
3. On the **General** tab, enter a name for the placeholder in the **Name** field.

You can use the **Text Field Properties** dialog box to set other attributes for the placeholder. For example, enforce maximum character size, set field data type, data

type validation, visibility, and formatting.

4. If the field is not placed exactly where desired, drag the field for exact placement.

Supported Field Properties Options

BI Publisher supports the following options available from the **Field Properties** dialog box. For more information about these options, see the Adobe Acrobat documentation.

- **General**
 - **Read Only**

The setting of this check box in combination with a set of configuration properties control the read-only/updateable state of the field in the output PDF. See Setting Fields as Updateable or Read Only, page 8-16.
- **Appearance**
 - **Border Settings:** color, background, width, and style
 - **Text Settings:** color, font, size
 - **Common Properties:** read only, required, visible/hidden, orientation (in degrees)

(In Acrobat 6.0, these are available from the General tab)
 - **Border Style**
- **Options tab**
 - **Multi-line**
 - **Scrolling Text**
- **Format tab** - Number category options only
- **Calculate tab** - all calculation functions

Creating a Check Box

A check box is used to present options from which more than one can be selected. Each check box represents a different data element. You define the value that will cause the check box to display as "checked."

For example, a form contains a check box listing of automobile options such as Power Steering, Power Windows, Sunroof, and Alloy Wheels. Each of these represents a different element from the XML file. If the XML file contains a value of "Y" for any of these fields, you want the check box to display as checked. All or none of these options

may be selected.

To create a check box field:

Acrobat 5.0 Users:

1. Draw the form field.
2. In the **Field Properties** dialog box, enter a **Name** for the field.
3. Select **Check Box** from the **Type** drop down list.
4. Select the **Options** tab.
5. In the **Export Value** field enter the value that the XML data field should match to enable the "checked" state.

For the example, enter "Y" for each check box field.

Acrobat 6.0 (and later) Users:

1. Select the **Check Box Tool** from the Forms Toolbar.
2. Draw the check box field in the desired position.
3. On the **General** tab of the **Check Box Properties** dialog box, enter a **Name** for the field.
4. Select the **Options** tab.
5. In the **Export Value** field enter the value that the XML data field should match to enable the "checked" state.

For the example, enter "Y" for each check box field.

Creating a Radio Button Group

A radio button group is used to display options from which only one can be selected.

For example, your XML data file contains a field called <SHIPMENT_METHOD>. The possible values for this field are "Standard" or "Overnight". You represent this field in your form with two radio buttons, one labeled "Standard" and one labeled "Overnight". Define both radio button fields as placeholders for the <SHIPMENT_METHOD> data field. For one field, define the "on" state when the value is "Standard". For the other, define the "on" state when the value is "Overnight".

To create a radio button group:

Acrobat 5.0 Users:

1. Draw the form field.

2. On the **Field Properties** dialog box, enter a **Name** for the field. Each radio button you define to represent this value can be named differently, but must be mapped to the same XML data field.
3. Select **Radio Button** from the **Type** drop down list.
4. Select the **Options** tab.
5. In the **Export Value** field enter the value that the XML data field should match to enable the "on" state.

For the example, enter "Standard" for the field labeled "Standard". Enter "Overnight" for the field labeled "Overnight".

Acrobat 6.0 (and later) Users:

1. Select the **Radio Button Tool** from the Forms Toolbar.
2. Draw the form field in the position desired on the template.
3. On the **General** tab of the Radio Button Properties dialog, enter a **Name** for the field. Each radio button you define to represent this value can be named differently, but must be mapped to the same XML data field.
4. Select the **Options** tab.
5. In the **Export Value** field enter the value that the XML data field should match to enable the "on" state.

For the example, enter "Standard" for the field labeled "Standard". Enter "Overnight" for the field labeled "Overnight".

Defining Groups of Repeating Fields

In the PDF template, you explicitly define the area on the page that will contain the repeating fields. For example, on the purchase order template, the repeating fields should display in the block of space between the Item header row and the Total field.

To define the area to contain the group of repeating fields:

1. Insert a form field at the beginning of the area that is to contain the group. (Acrobat 6.0 users select the **Text Field Tool**, then draw the form field.)
2. In the **Name** field of the **Field Properties** window, enter any unique name you choose. This field is not mapped.
3. Acrobat 5.0 users: Select **Text** from the **Type** drop down list.
4. In the **Short Description** field (Acrobat 5.0) or the **Tooltip** field (Acrobat 6.0) of the

Field Properties window, enter the following syntax:

```
<?rep_field="BODY_START"?>
```

5. Define the end of the group area by inserting a form field at the end of the area that is to contain the group.
6. In the **Name** field of the **Field Properties** window, enter any unique name you choose. This field is not mapped. Note that the name you assign to this field must be different from the name you assigned to the "body start" field.
7. Acrobat 5.0 users: Select **Text** from the **Type** drop down list.
8. In the **Short Description** field (Acrobat 5.0) or the **Tooltip** field (Acrobat 6.0) of the **Field Properties** window, enter the following syntax:

```
<?rep_field="BODY_END"?>
```

To define a group of repeating fields:

1. Insert a placeholder for the first element of the group.

Note: The placement of this field in relationship to the BODY_START tag defines the distance between the repeating rows for each occurrence. See Placement of Repeating Fields, page 8-15.

2. For each element in the group, enter the following syntax in the **Short Description** field (Acrobat 5.0) or the **Tooltip** field (Acrobat 6.0):

```
<?rep_field="T1_Gn"?>
```

where n is the row number of the item on the template.

For example, the group in the sample report is laid out in three rows.

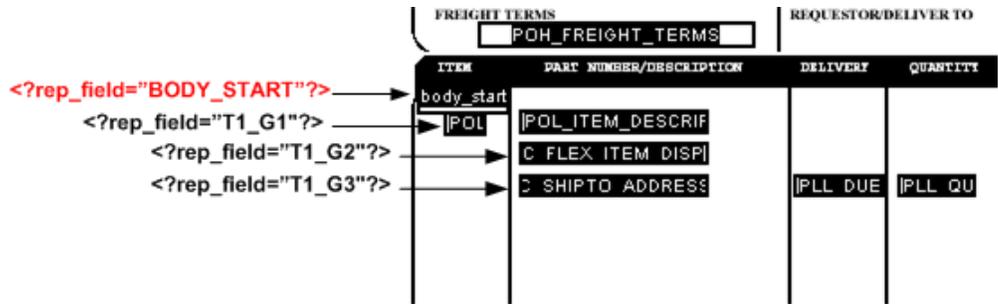
- For the fields belonging to the row that begins with "PO_LINE_NUM" enter

```
<?rep_field="T1_G1"?>
```
- For the fields belonging to the row that begins with "C_FLEX_ITEM_DISP" enter

```
<?rep_field="T1_G2"?>
```
- For the fields belonging to the row that begins with "C_SHIP_TO_ADDRESS" enter

```
<?rep_field="T1_G3"?>
```

The following graphic shows the entries for the **Short Description/Tooltip** field:



- (Optional) Align your fields. To ensure proper alignment of a row of fields, it is recommended that you use Adobe Acrobat's alignment feature.

Adding Page Numbers

This section describes how to add the following page-features to your PDF template:

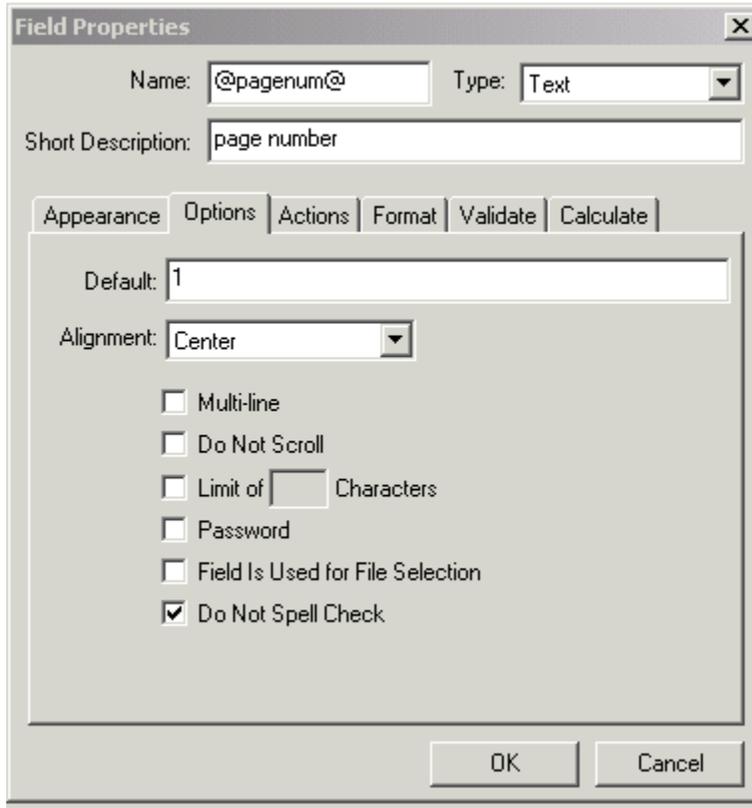
- Page Numbers
- Page Breaks

Adding Page Numbers

To add page numbers, define a field in the template where you want the page number to appear and enter an initial value in that field as follows:

- Decide the position on the template where you want the page number to be displayed.
- Create a placeholder field called @pagenum@ (see Creating a Text Placeholder, page 8-4).
- Enter a starting value for the page number in the **Default** field. If the XML data includes a value for this field, the start value assigned in the template will be overridden. If no start value is assigned, it will default to 1.

The figure below shows the Field Properties dialog for a page number field:



Adding Page Breaks

You can define a page break in your template to occur after a repeatable field. To insert a page break after the occurrence of a specific field, add the following to the syntax in the **Short Description** field of the Field Properties dialog box (use the **Tooltip** field for Acrobat 6.0):

```
page_break="yes"
```

For example:

```
<?rep_field="T1_G3", page_break="yes"?>
```

The following example demonstrates inserting a page break in a template. The XML sample contains salaries of employees by department:

```

<?xml version="1.0"?>
<! - Generated by Oracle Reports version 6.0.8.22.0 - >
<ROOT>
  <LIST_G_DEPTNO>
    <G_DEPTNO>
      <DEPTNO>10</DEPTNO>
      <LIST_G_EMPNO>
        <G_EMPNO>
          <EMPNO>7782</EMPNO>
          <ENAME>CLARK</ENAME>
          <JOB>MANAGER</JOB>
          <SAL>2450</SAL>
        </G_EMPNO>
        <G_EMPNO>
          <EMPNO>7839</EMPNO>
          <ENAME>KING</ENAME>
          <JOB>PRESIDENT</JOB>
          <SAL>5000</SAL>
        </G_EMPNO>
        <G_EMPNO>
          <EMPNO>125</EMPNO>
          <ENAME>KANG</ENAME>
          <JOB>CLERK</JOB>
          <SAL>2000</SAL>
        </G_EMPNO>
        <G_EMPNO>
          <EMPNO>7934</EMPNO>
          <ENAME>MILLER</ENAME>
          <JOB>CLERK</JOB>
          <SAL>1300</SAL>
        </G_EMPNO>
        <G_EMPNO>
          <EMPNO>123</EMPNO>
          <ENAME>MARY</ENAME>
          <JOB>CLERK</JOB>
          <SAL>400</SAL>
        </G_EMPNO>
        <G_EMPNO>
          <EMPNO>124</EMPNO>
          <ENAME>TOM</ENAME>
          <JOB>CLERK</JOB>
          <SAL>3000</SAL>
        </G_EMPNO>
      </LIST_G_EMPNO>
      <SUMSALPERDEPTNO>9150</SUMSALPERDEPTNO>
    </G_DEPTNO>

    <G_DEPTNO>
      <DEPTNO>30</DEPTNO>
      <LIST_G_EMPNO>
        .
        .
        .

      </LIST_G_EMPNO>
      <SUMSALPERDEPTNO>9400</SUMSALPERDEPTNO>
    </G_DEPTNO>
  </LIST_G_DEPTNO>
  <SUMSALPERREPORT>29425</SUMSALPERREPORT>
</ROOT>

```

We want to report the salary information for each employee by department as shown in the following template:

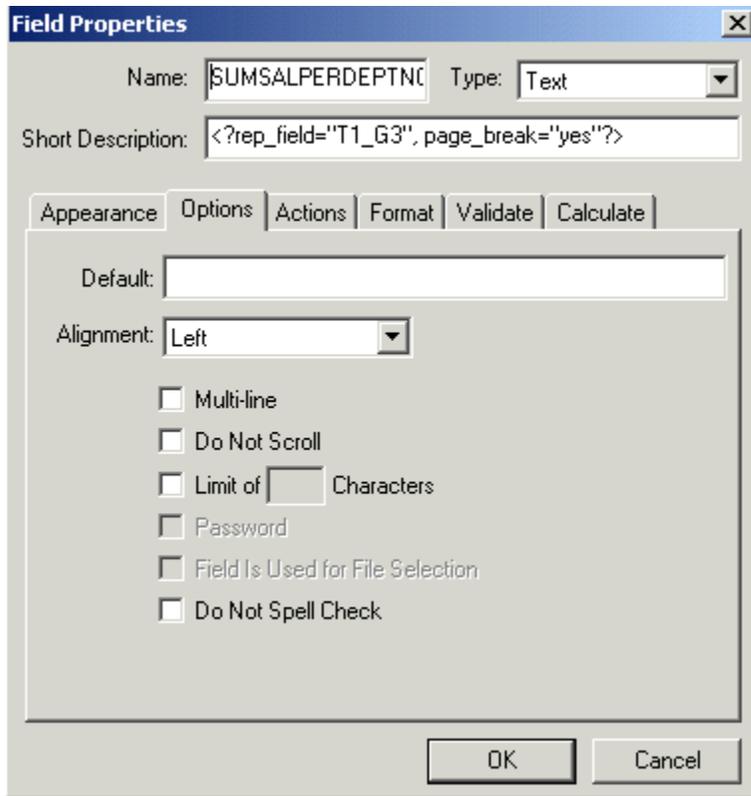
Department Salary Summary

| | | | | | |
|-------------------------|---------------------|--------------------|--------------------|------------------|---------------------------|
| <code>body_start</code> | Dept No. | Emp No | Emp Name | Job | Salary |
| | <code>DEPTNO</code> | <code>EMPNO</code> | <code>ENAME</code> | <code>JOB</code> | <code>SAL</code> |
| | | | | | <code>SUMSALPERDEP</code> |

To insert a page break after each department, insert the page break syntax in the Short Description (or Tooltip field) for the SUMSALPERDEPTNO field as follows:

```
<?rep_field="T1_G3", page_break="yes"?>
```

The Field Properties dialog box for the field is shown in the following figure:



Note that in order for the break to occur, the field must be populated with data from the XML file.

The sample report with data is shown in the following figure:

Department Salary Summary

| Dept No. | Emp No | Emp Name | Job | Salary |
|----------|--------|----------|-----------|--------|
| 10 | 7782 | CLARK | MANAGER | 2450 |
| | 7839 | KING | PRESIDENT | 5000 |
| | 125 | KANG | CLERK | 2000 |
| | 7934 | MILLER | CLERK | 1300 |
| | 123 | MARY | CLERK | 400 |
| | 124 | TOM | CLERK | 3000 |
| | | | | 9150 |

Department Salary Summary

| Dept No. | Emp No | Emp Name | Job | Salary |
|----------|--------|----------|---------|--------|
| 20 | 7369 | SMITH | CLERK | 800 |
| | 7876 | ADAMS | CLERK | 1100 |
| | 7902 | FORD | ANALYST | 3000 |
| | 7788 | SCOTT | ANALYST | 3000 |
| | 7566 | JONES | MANAGER | 2975 |
| | | | | 10875 |

The page breaks after each department.

Performing Calculations

Adobe Acrobat provides a calculation function in the **Field Properties** dialog box. To

create a field to display a calculated total on your report:

1. Create a text field to display the calculated total. Give the field any **Name** you choose.
2. In the **Field Properties** dialog box, select the **Format** tab.
3. Select **Number** from the **Category** list.
4. Select the **Calculate** tab.
5. Select the radio button next to "Value is the *operation* of the following fields:"
6. Select **sum** from the drop down list.
7. Select the **Pick...** button and select the fields that you want totaled.

Completed PDF Template Example

The following figure shows the completed PDF template:



Purchase Order

| | | |
|--------------------|---------|------|
| PURCHASE ORDER NO. | REVISES | PAGE |
| IPOH PO NU | IPOH | |

VENDOR: POH VENDOR NAME

POH VENDOR ADDRESS III

POH VENDOR ADR INFO

POH VENDOR COUNTRY

SHIP TO:

POH SHIP ADDRESS

POH SHIP ADR INFO

POH SHIP COUNTRY

BILL TO:

POH BILL ADDRESS

POH BILL ADR INFO

POH BILL COUNTRY

| | | | | |
|----------------------|------------|---------------------|----------|---|
| CUSTOMER ACCOUNT NO. | VENDOR NO. | DATE OF ORDER/BUYER | | REVEAL DATE/BUYER |
| IPOH CUST | IPOH VE | IPOH CR | IPOH ARI | |
| PAYMENT TERMS | | SHIP VIA | | FOB |
| POH PAYMENT TERMS | | IPOH SHIP V | | <input type="checkbox"/> POH FOB <input type="checkbox"/> |
| FREIGHT TERMS | | REQUEST/DELIVER TO | | CONTACT TEL/TELEPHONE |
| POH FREIGHT TERMS | | | | |

| ITEM | PART NUMBER/DESCRIPTION | DELIVERY | QUANTITY | UNIT | UNIT PRICE | EXTENSION | TAX |
|-----------------|--|----------|----------|------|------------|--------------|------------|
| body_of IPO | IPOL ITEM DES IC FLEX ITEM IC SHIPTO ADR | P11 D | P11 F | POL | IPOL | C AMN | P11 |
| | | | | | | Total | C AMOUNT P |

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Runtime Behavior

Placement of Repeating Fields

As already noted, the placement, spacing, and alignment of fields that you create on the template are independent of the underlying form layout. At runtime, BI Publisher places each repeating row of data according to calculations performed on the placement of the rows of fields that you created, as follows:

First occurrence:

The first row of repeating fields will display exactly where you have placed them on the template.

Second occurrence, single row:

To place the second occurrence of the group, BI Publisher calculates the distance between the BODY_START tag and the first field of the first occurrence. The first field of the second occurrence of the group will be placed this calculated distance below the first occurrence.

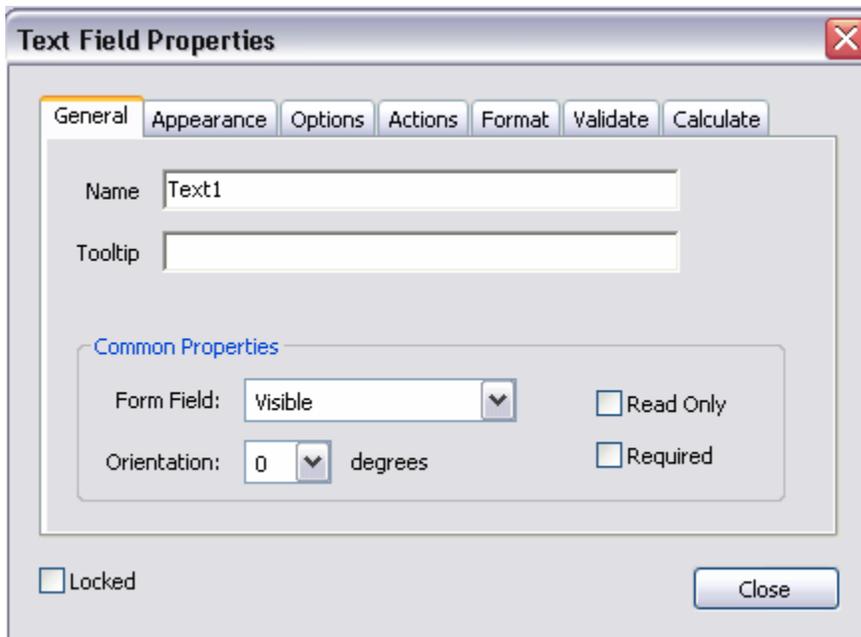
Second occurrence, multiple rows:

If the first group contains multiple rows, the second occurrence of the group will be placed the calculated distance below the last row of the first occurrence.

The distance between the rows within the group will be maintained as defined in the first occurrence.

Setting Fields as Updateable or Read Only

When you define a field in the template you have the option of selecting "Read Only" for the field, as shown in the following sample Text Field Properties dialog:



Regardless of what you choose at design time for the Read Only check box, the default behavior of the PDF processing engine is to set all fields to read-only for the output PDF. You can change this behavior using the following configuration properties in the BI Publisher Configuration File, page D-1:

- all-field-readonly

- all-fields-readonly-asis
- remove-pdf-fields

Note that in the first two options, you are setting a state for the field in the PDF output. The setting of individual fields can still be changed in the output using Adobe Acrobat Professional. Also note that because the fields are maintained, the data is still separate and can be extracted. In the third option, "remove-pdf-fields" the structure is flattened and no field/data separation is maintained.

To make all fields updateable:

Set the "all-field-readonly" property to "false". This sets the Read Only state to "false" for all fields regardless of the individual field settings at design time.

To make all fields read only:

This is the default behavior. No settings are required.

To maintain the Read Only check box selection for each field:

To maintain the setting of the Read Only check box on a field-by-field basis in the output PDF, set the property "all-fields-readonly-asis" to "true". This property will override the settings of "all-field-readonly".

To remove all fields from the output PDF:

Set the property "remove-pdf-fields" to "true".

Overflow Data

When multiple pages are required to accommodate the occurrences of repeating rows of data, each page will display identically except for the defined repeating area, which will display the continuation of the repeating data. For example, if the item rows of the purchase order extend past the area defined on the template, succeeding pages will display all data from the purchase order form with the continuation of the item rows.

Creating a Template from a Predefined PDF Form

There are many PDF forms available online that you may want to use as templates for your report data. For example, government forms that your company is required to submit. You can use these downloaded PDF files as your report templates, supplying the XML data at runtime to fill the report out.

Some of these forms already have form fields defined, some do not. If the form already has fields defined, you can either use BI Publisher's Mapping tool (see Adding a Predefined Form as a Template, page 3-36) or name your data fields to match the form field names (see Using a Predefined Form as a Template by Matching Form Fields, page 8-18). If the form fields are not already defined in the downloaded PDF, you must create them. See Adding Markup to the Template Layout, page 8-3 for instructions on inserting the form field placeholders.

Using a Predefined PDF Form as a Template by Matching the Form Fields

1. Download or import the PDF file to your local system.
2. Open the file in Adobe Acrobat.
3. Select the **Text Field Tool** (Acrobat 6.0 users) or the **Form Tool** (Acrobat 5.0 users). This will highlight text fields that have already been defined.

The following figure shows a sample W-4 PDF form after selecting the **Text Field Tool** to highlight the text fields (in Acrobat 6.0).

The screenshot shows the Adobe Acrobat Professional interface with a W-4 form open. The 'Text Field Tool' is selected in the toolbar, and several text fields on the form are highlighted with a dashed border. The form is titled 'W-4 Employee's Withholding Allowance Certificate' and includes fields for name, address, social security number, and tax status. The highlighted fields are: 'Type or print your first name and middle initial.' (labeled f1-9), 'Last name' (labeled f1-10), 'Home address (number and street or rural route)' (labeled f1-11), 'City or town, state, and ZIP code' (labeled f1-12), 'Total number of allowances you are claiming' (labeled f1-16), 'Additional amount, if any, you want withheld from each paycheck' (labeled f1-17), and 'Employee's signature' (labeled f1-18). The form also includes a section for 'Under penalties of perjury, I declare that I have examined this certificate and to the best of my knowledge and belief, it is true, correct, and complete.'

To map the existing form fields to the data from your incoming XML file, you must rename the fields to match the element names in your XML file.

4. Open the text form field **Properties** dialog by either double-clicking the field, or by selecting the field then selecting **Properties** from the right-mouse menu.
5. In the **Name** field, enter the element name from your input XML file.
6. Repeat for all fields that you want populated by your data file.

Creating an eText Template

This chapter covers the following topics:

- Introduction
- Outbound eText Templates

Introduction

An eText template is an RTF-based template that is used to generate text output for Electronic Funds Transfer (EFT) and Electronic Data Interchange (EDI). At runtime, BI Publisher applies this template to an input XML data file to create an output text file that can be transmitted to a bank or other customer. Because the output is intended for electronic communication, the eText templates must follow very specific format instructions for exact placement of data.

Note: An EFT is an electronic transmission of financial data and payments to banks in a specific fixed-position format flat file (text).

EDI is similar to EFT except it is not only limited to the transmission of payment information to banks. It is often used as a method of exchanging business documents, such as purchase orders and invoices, between companies. EDI data is delimiter-based, and also transmitted as a flat file (text).

Files in these formats are transmitted as flat files, rather than printed on paper. The length of a record is often several hundred characters and therefore difficult to layout on standard size paper.

To accommodate the record length, the EFT and EDI templates are designed using tables. Each record is represented by a table. Each row in a table corresponds to a field in a record. The columns of the table specify the position, length, and value of the field.

These formats can also require special handling of the data from the input XML file. This special handling can be on a global level (for example, character replacement and

sequencing) or on a record level (for example, sorting). Commands to perform these functions are declared in command rows. Global level commands are declared in setup tables.

At runtime, BI Publisher constructs the output file according to the setup commands and layout specifications in the tables.

Prerequisites

This section is intended for users who are familiar with EDI and EFT transactions. The audience for this section, preparers of eText templates, will require both functional and technical knowledge. That is, functional expertise to understand bank and country specific payment format requirements and sufficient technical expertise to understand XML data structure and eText specific coding syntax commands, functions, and operations.

Outbound eText Templates

Structure of eText Templates

There are two types of eText templates: fixed-position based (EFT templates) and delimiter-based (EDI templates). The templates are composed of a series of tables. The tables define layout and setup commands and data field definitions. The required data description columns for the two types of templates vary, but the commands and functions available are the same. A table can contain just commands, or it can contain commands and data fields.

The following graphic shows a sample from an EFT template to display the general structure of command and data rows:

Format Setup:

Hint: Define formatting options...

| | |
|------------------------|----------------------|
| <TEMPLATE TYPE> | FIXED POSITION BASED |
| <OUTPUT CHARACTER SET> | iso-8859-1 |
| <NEW RECORD CHARACTER> | Carriage Return |

Sequences:

Hint: Define sequence generators...

| | |
|------------------------|-----------------|
| <DEFINE SEQUENCE> | PaymentsSeq |
| <RESET AT LEVEL> | PayerInstrument |
| <INCREMENT BASIS> | LEVEL |
| <END DEFINE SEQUENCE > | PaymentsSeq |

} Commands

Format Data Records:

| <LEVEL> | <POSITION> | <LENGTH> | PayerInstrument | <FORMAT> | <PAD> | <DATA> | <COMMENTS> |
|--------------|------------|----------|-----------------|----------|-------|------------------------|--------------------|
| <NEW RECORD> | | | FileHeaderRec | | | | |
| 1 | 1 | 1 | Number | | | 1 | Record Type Code |
| 2 | 2 | 2 | Alpha | R, ^ ^ ^ | | '01' | Priority Code |
| 4 | 1 | 1 | Alpha | R, ^ ^ ^ | | | Immediate Origin |
| 5 | 9 | 9 | Alpha | R, ^ ^ ^ | | BankAccount/BankNumber | Immediate Origin |
| 14 | 1 | 1 | Alpha | R, ^ ^ ^ | | '1' | Mutually Agreed |
| 15 | 9 | 9 | Alpha | R, ^ ^ ^ | | Payer/TaxIdentifier | Immediate Origin |
| 24 | 6 | 6 | Date | | | SYSDATE | File Creation Date |

} Data Elements or Functions

Commands that apply globally, or commands that define program elements for the template, are "setup" commands. These must be specified in the initial table(s) of the template. Examples of setup commands are Template Type and Character Set.

In the data tables you provide the source XML data element name (or static data) and the specific placement and formatting definitions required by the receiving bank or entity. You can also define functions to be performed on the data and conditional statements.

The data tables must always start with a command row that defines the "Level." The Level associates the table to an element from the XML data file, and establishes the hierarchy. The data fields that are then defined in the table for the Level correspond to the child elements of the XML element.

The graphic below illustrates the relationship between the XML data hierarchy and the template Level. The XML element "RequestHeader" is defined as the Level. The data elements defined in the table ("FileID" and "Encryption") are children of the RequestHeader element.

```

?xml version = "1.0" ?>
!DOCTYPE OutBoundPayments:BatchRequest SYSTEM "OutBoundPayments.dtd">
OutBoundPayments:BatchRequest>
  <PaymentsCommon:RequestHeader>
    <PaymentsCommon:Preamble>
      <PaymentsCommon:Version>1.0.11.5.7</PaymentsCommon:Version>
    </PaymentsCommon:Preamble>
    <PaymentsCommon:TrxnParties>
      <PaymentsCommon:RequesterParty>Oracle Germany</PaymentsCommon:RequesterParty>
      <PaymentsCommon:FinancialInstitution>Cit1 Bank</PaymentsCommon:FinancialInstitution>
    </PaymentsCommon:TrxnParties>
    <PaymentsCommon:Encryption>N</PaymentsCommon:Encryption>
    <PaymentsCommon:FileID>10180300001</PaymentsCommon:FileID>
    <PaymentsCommon:BaseRecordCount>94457</PaymentsCommon:BaseRecordCount>
  </PaymentsCommon:RequestHeader>
  <OutBoundPayments:BatchRequest>
    <OutBoundPayment>
      <OutBoundPayment>
      <OutBoundPayment>
      <OutBoundPayment>
      <OutBoundPayment>
      <OutBoundPayment>
      ...

```

| <LEVEL> | | RequestHeader | | | |
|--------------|----------|---------------|--------|---------------------------------|--|
| <POSITION> | <LENGTH> | <FORMAT> | <PAD> | <DATA> | |
| <NEW RECORD> | | FileHeaderRec | | | |
| 1 | 3 | Alpha | | FileID | |
| 4 | 4 | Number | L, '0' | FileID | |
| 8 | 1 | Alpha | R, ' ' | Encryption | |
| 9 | 6 | Date, YYMMDD | | SYSDATE | |
| 15 | 6 | Number | L, '0' | SEQUENCE NUMBER (AllRecordsSeq) | |
| 21 | 129 | Alpha | ' ' | | |

| <LEVEL> | | Batch | | | |
|------------|----------|----------|-------|--------|--|
| <POSITION> | <LENGTH> | <FORMAT> | <PAD> | <DATA> | |

The order of the tables in the template determines the print order of the records. At runtime the system loops through all the instances of the XML element corresponding to a table (Level) and prints the records belonging to the table. The system then moves on to the next table in the template. If tables are nested, the system will generate the nested records of the child tables before moving on to the next parent instance.

Command Rows, Data Rows, and Data Column Header Rows

The following figure shows the placement of Command Rows, Data Rows, and Data Column Header Rows:

Constructing the Data Tables

The data tables contain a combination of command rows and data field rows. Each data table must begin with a Level command row that specifies its XML element. Each record must begin with a New Record command that specifies the start of a new record, and the end of a previous record (if any).

The required columns for the data fields vary depending on the Template Type.

Command Rows

The command rows always have two columns: command name and command parameter. The supported commands are:

- Level
- New record
- Sort ascending
- Sort descending
- Display condition

The usage for each of these commands is described in the following sections.

Level Command

The level command associates a table with an XML element. The parameter for the level command is an XML element. The level will be printed once for each instance the XML element appears in the data input file.

The level commands define the hierarchy of the template. For example, Payment XML data extracts are hierarchical. A batch can have multiple child payments, and a payment can have multiple child invoices. This hierarchy is represented in XML as nested child elements within a parent element. By associating the tables with XML elements through the level command, the tables will also have the same hierarchical structure.

Similar to the closing tag of an XML element, the level command has a companion end-level command. The child tables must be defined between the level and end-level commands of the table defined for the parent element.

An XML element can be associated with only one level. All the records belonging to a level must reside in the table of that level or within a nested table belonging to that level. The end-level command will be specified at the end of the final table.

Following is a sample structure of an EFT file record layout:

- FileHeaderRecordA
 - BatchHeaderRecordA

- BatchHeaderRecordB
 - PaymentRecordA
 - PaymentRecordB
 - InvoiceRecordA
- Batch FooterRecordC
- BatchFooterRecordD
- FileFooterRecordB

Following would be its table layout:

| | |
|-------------------------------------|----------------------|
| <LEVEL> | RequestHeader |
| <NEW RECORD> | FileHeaderRecordA |
| Data rows for the FileHeaderRecordA | |

| | |
|--------------------------------------|--------------------|
| <LEVEL> | Batch |
| <NEW RECORD> | BatchHeaderRecordA |
| Data rows for the BatchHeaderRecordA | |
| <NEW RECORD> | BatchHeaderRecordB |
| Data rows for the BatchHeaderRecordB | |

| | |
|----------------------------------|----------------|
| <LEVEL> | Payment |
| <NEW RECORD> | PaymentRecordA |
| Data rows for the PaymentRecordA | |
| <NEW RECORD> | PaymentRecordB |

Data rows for the PaymentRecordB

<LEVEL> **Invoice**

<NEW RECORD> InvoiceRecordA

Data rows for the InvoiceRecordA

<END LEVEL> **Invoice**

<END LEVEL> **Payment**

<LEVEL> **Batch**

<NEW RECORD> BatchFooterRecordC

Data rows for the BatchFooterRecordC

<NEW RECORD> BatchFooterRecordD

Data rows for the BatchFooterRecordD

<END LEVEL> **Batch**

<LEVEL> **RequestHeader**

<NEW RECORD> FileFooterRecordB

Data rows for the FileFooterRecordB

<END LEVEL> **RequestHeader**

Multiple records for the same level can exist in the same table. However, each table can only have one level defined. In the example above, the BatchHeaderRecordA and BatchHeaderRecordB are both defined in the same table. However, note that the END

LEVEL for the Payment must be defined in its own separate table after the child element Invoice. The Payment END LEVEL cannot reside in the same table as the Invoice Level.

Note that you do not have to use all the levels from the data extract in your template. For example, if an extract contains the levels: RequestHeader > Batch > Payment > Invoice, you can use just the batch and invoice levels. However, the hierarchy of the levels must be maintained.

The table hierarchy determines the order that the records are printed. For each parent XML element, the records of the corresponding parent table are printed in the order they appear in the table. The system loops through the instances of the child XML elements corresponding to the child tables and prints the child records according to their specified order. The system then prints the records of the enclosing (end-level) parent table, if any.

For example, given the EFT template structure above, assume the input data file contains the following:

- Batch1
 - Payment1
 - Invoice1
 - Invoice2
 - Payment2
 - Invoice1
- Batch2
 - Payment1
 - Invoice1
 - Invoice2
 - Invoice3

This will generate the following printed records:

| Record Order | Record Type | Description |
|--------------|-------------------|------------------------------------|
| 1 | FileHeaderRecordA | One header record for the EFT file |

| Record Order | Record Type | Description |
|---------------------|--------------------|-----------------------------------|
| 2 | BatchHeaderRecordA | For Batch1 |
| 3 | BatchHeaderRecordB | For Batch1 |
| 4 | PaymentRecordA | For Batch1, Payment1 |
| 5 | PaymentRecordB | For Batch1, Payment1 |
| 6 | InvoiceRecordA | For Batch1, Payment1, Invoice1 |
| 7 | InvoiceRecordA | For Batch1, Payment1, Invoice2 |
| 8 | PaymentRecordA | For Batch1, Payment2 |
| 9 | PaymentRecordB | For Batch1, Payment2 |
| 10 | InvoiceRecordA | For Batch1, Payment2, Invoice1 |
| 11 | BatchFooterRecordC | For Batch1 |
| 12 | BatchFooterRecordD | For Batch1 |
| 13 | BatchHeaderRecordA | For Batch2 |
| 14 | BatchHeaderRecordB | For Batch2 |
| 15 | PaymentRecordA | For Batch2, Payment1 |
| 16 | PaymentRecordB | For Batch2, Payment1 |
| 17 | InvoiceRecordA | For Batch2, Payment1, Invoice1 |
| 18 | InvoiceRecordA | For Batch2, Payment1, Invoice2 |
| 19 | InvoiceRecordA | For Batch2, Payment1, Invoice3 |

| Record Order | Record Type | Description |
|---------------------|--------------------|------------------------------------|
| 20 | BatchFooterRecordC | For Batch2 |
| 21 | BatchFooterRecordD | For Batch2 |
| 22 | FileFooterRecordB | One footer record for the EFT file |

New Record Command

The new record command signifies the start of a record and the end of the previous one, if any. Every record in a template must start with the new record command. The record continues until the next new record command, or until the end of the table or the end of the level command.

A record is a construct for the organization of the elements belonging to a level. The record name is not associated with the XML input file.

A table can contain multiple records, and therefore multiple new record commands. All the records in a table are at the same hierarchy level. They will be printed in the order in which they are specified in the table.

The new record command can have a name as its parameter. This name becomes the name for the record. The record name is also referred to as the record type. The name can be used in the COUNT function for counting the generated instances of the record. See COUNT, page 9-28 function, for more information.

Consecutive new record commands (or empty records) are not allowed.

Sort Ascending and Sort Descending Commands

Use the sort ascending and sort descending commands to sort the instances of a level. Enter the elements you wish to sort by in a comma-separated list. This is an optional command. When used, it must come right after the (first) level command and it applies to all records of the level, even if the records are specified in multiple tables.

Display Condition Command

The display condition command specifies when the enclosed record or data field group should be displayed. The command parameter is a boolean expression. When it evaluates to true, the record or data field group is displayed. Otherwise the record or data field group is skipped.

The display condition command can be used with either a record or a group of data fields. When used with a record, the display condition command must follow the new record command. When used with a group of data fields, the display condition command must follow a data field row. In this case, the display condition will apply to the rest of the fields through the end of the record.

Consecutive display condition commands are merged as AND conditions. The merged display conditions apply to the same enclosed record or data field group.

Structure of the Data Rows

The output record data fields are represented in the template by table rows. In `FIXED_POSITION_BASED` templates, each row has the following attributes (or columns):

- Position
- Length
- Format
- Pad
- Data
- Comments

The first five columns are required and must appear in the order listed.

For `DELIMITER_BASED` templates, each data row has the following attributes (columns):

- Maximum Length
- Format
- Data
- Tag
- Comments

The first three columns are required and must be declared in the order stated.

In both template types, the Comments column is optional and ignored by the system. You can insert additional information columns if you wish, as all columns after the required ones are ignored.

The usage rules for these columns are as follows:

Position

Specifies the starting position of the field in the record. The unit is in number of characters. This column is only used with `FIXED_POSITION_BASED` templates.

Length/Maximum Length

Specifies the length of the field. The unit is in number of characters. For `FIXED_POSITION_BASED` templates, all the fields are fixed length. If the data is less than the specified length, it is padded. If the data is longer, it is truncated. The truncation always occurs on the right.

For `DELIMITER_BASED` templates, the maximum length of the field is specified. If the

data exceeds the maximum length, it will be truncated. Data is not padded if it is less than the maximum length.

Format Column

Specifies the data type and format setting. There are three accepted data types:

- Alpha
- Number
- Date

Refer to Field Level Key Words, page 9-33 for their usage.

Number Data Type

Numeric data has three optional format settings: Integer, Decimal, or you can define a format mask. Specify the optional settings with the Number data type as follows:

- Number, Integer
- Number, Decimal
- Number, <format mask>

For example:

Number, ###,###.00

The Integer format uses only the whole number portion of a numeric value and discards the decimal. The Decimal format uses only the decimal portion of the numeric value and discards the integer portion.

The following table shows examples of how to set a format mask. When specifying the mask, # represents that a digit is to be displayed when present in the data; 0 represents that the digit placeholder is to be displayed whether data is present or not.

When specifying the format mask, the group separator must always be "," and the decimal separator must always be "." To alter these in the actual output, you must use the Setup Commands NUMBER THOUSANDS SEPARATOR and NUMBER DECIMAL SEPARATOR. See Setup Command Tables, page 9-16 for details on these commands.

The following table shows sample Data, Format Specifier, and Output. The Output assumes the default group and decimal separators.

| Data | Format Specifier | Output |
|-------------|-------------------------|----------------|
| 123456789 | ###,###.00 | 123,456,789.00 |
| 123456789.2 | ###.00 | 123456789.20 |

| Data | Format Specifier | Output |
|-------------|-------------------------|---------------|
| 1234.56789 | ###.000 | 1234.568 |
| 123456789.2 | # | 123456789 |
| 123456789.2 | ### | 123456789.2 |
| 123456789 | ### | 123456789 |

Date Data Type

The Date data type format setting must always be explicitly stated. The format setting follows the SQL date styles, such as MMDDYY.

Mapping EDI Delimiter-Based Data Types to eText Data Types

Some EDI (DELIMITER_BASED) formats use more descriptive data types. These are mapped to the three template data types in the following table:

| ASC X12 Data Type | Format Template Data Type |
|-----------------------------|----------------------------------|
| A - Alphabetic | Alpha |
| AN - Alphanumeric | Alpha |
| B - Binary | Number |
| CD - Composite data element | N/A |
| CH - Character | Alpha |
| DT - Date | Date |
| FS - Fixed-length string | Alpha |
| ID - Identifier | Alpha |
| IV - Incrementing Value | Number |
| Nn - Numeric | Number |
| PW - Password | Alpha |

| ASC X12 Data Type | Format Template Data Type |
|--------------------|---------------------------|
| R - Decimal number | Numer |
| TM - Time | Date |

Now assume you have specified the following setup commands:

| | |
|----------------------------|---|
| NUMBER THOUSANDS SEPARATOR | . |
| NUMBER DECIMAL SEPARATOR | , |

The following table shows the Data, Format Specifier, and Output for this case. Note that the Format Specifier requires the use of the default separators, regardless of the setup command entries.

| Data | Format Specifier | Output |
|-------------|------------------|----------------|
| 123456789 | ###,###.00 | 123.456.789,00 |
| 123456789.2 | ###.00 | 123456789,20 |
| 1234.56789 | ###.000 | 1234,568 |
| 123456789.2 | # | 123456789 |
| 123456789.2 | ### | 123456789,2 |
| 123456789 | ### | 123456789 |

Pad

This applies to FIXED_POSITION_BASED templates only. Specify the padding side (L = left or R = right) and the character. Both numeric and alphanumeric fields can be padded. If this field is not specified, Numeric fields are left-padded with "0"; Alpha fields are right-padded with spaces.

Example usage:

- To pad a field on the left with a "0", enter the following in the Pad column field:
L, '0'

- To pad a field on the right with a space, enter the following the Pad column field:
R, ''

Data

Specifies the XML element from the data extract that is to populate the field. The data column can simply contain the XML tag name, or it can contain expressions and functions. For more information, see Expressions, Control Structure, and Functions, page 9-27.

Tag

Acts as a comment column for DELIMITER_BASED templates. It specifies the reference tag in EDIFACT formats, and the reference IDs in ASC X12.

Comments

Use this column to note any free form comments to the template. Usually this column is used to note the business requirement and usage of the data field.

Setup Command Tables

Setup Command Table

A template always begins with a table that specifies the setup commands. The setup commands define global attributes, such as template type and output character set and program elements, such as sequencing and concatenation.

The setup commands are:

- Template Type
- Output Character Set
- New Record Character
- Invalid Characters
- Replace Characters
- Number Thousands Separator
- Number Decimal Separator
- Define Level
- Define Sequence
- Define Concatenation

Some example setup tables are shown in the following figures:

XDO file name:
XINT-01.rtf

Mapping of Payment Format:
International Payments EFT Format

Format Setup:

Hint: Define formatting options...

| | |
|------------------------|----------------------|
| <TEMPLATE TYPE> | FIXED_POSITION_BASED |
| <OUTPUT CHARACTER SET> | iso-8859-1 |
| <NEW RECORD CHARACTER> | Carriage Return |

| | |
|--------------------------|----|
| <INVALID CHARACTERS> | ¿ |
| <REPLACE CHARACTERS> | |
| A | AO |
| E | EO |
| I | IO |
| O | OO |
| U | UO |
| <END REPLACE CHARACTERS> | |

Format Data Levels:

Hint: Define data levels that are needed in the format which do not exist in data extract...

| | |
|---------------------|--------------------------|
| <DEFINE LEVEL> | PaymentsByPayDatePayee |
| <BASE LEVEL> | Payment |
| <GROUPING CRITERIA> | 'PaymentDate, PayeeName' |
| <END DEFINE LEVEL> | PaymentsByPayDatePayee |

| | |
|----------------|---------------------------------|
| <DEFINE LEVEL> | InvoicesByReportingCatAndAttrib |
| <BASE LEVEL> | Invoice |

| | |
|---------------------|--|
| <GROUPING CRITERIA> | <pre> `InvoiceTrxnReportingCat`, (IF InvoiceTrxnReportingCat = 'V' THEN `InvoiceDEVTransitGoods' END IF), (IF InvoiceTrxnReportingCat = 'V' THEN `InvoiceDEVGoodsIndexNum' END IF), (IF InvoiceTrxnReportingCat = 'V' THEN `InvoiceDEVPassingTrade' END IF) </pre> |
| <END DEFINE LEVEL> | InvoicesByReportingCatAndAttrib |

Sequences :

Hint: Define sequence generators...

| | |
|------------------------|---------------------|
| <DEFINE SEQUENCE> | AllRecordsSeq |
| <RESET AT LEVEL> | PERIODIC_SEQUENCE |
| <INCREMENT BASIS> | RECORD |
| <START AT> | BaseRecordCount + 1 |
| <MAXIMUM> | 999999 |
| <END DEFINE SEQUENCE > | AllRecordsSeq |

| | |
|------------------------|-------------|
| <DEFINE SEQUENCE> | PaymentsSeq |
| <RESET AT LEVEL> | Batch |
| <INCREMENT BASIS> | LEVEL |
| <END DEFINE SEQUENCE > | PaymentsSeq |

Concatenated Records :

Hint: Define fields that are composed of concatenated records...

| | |
|----------------------------|-------------------------|
| <DEFINE CONCATENATION> | ConcatenatedInvoiceInfo |
| <BASE LEVEL> | Invoice |
| <ELEMENT> | InvoiceNum |
| <DELIMITER> | ',' |
| <END DEFINE CONCATENATION> | ConcatenatedInvoiceInfo |

Template Type Command

This command specifies the type of template. There are two types: FIXED_POSITION_BASED and DELIMITER_BASED.

Use the FIXED_POSITION_BASED templates for fixed-length record formats, such as EFTs. In these formats, all fields in a record are a fixed length. If data is shorter than the specified length, it will be padded. If longer, it will be truncated. The system specifies the default behavior for data padding and truncation. Examples of fixed position based formats are EFTs in Europe, and NACHA ACH file in the U.S.

In a DELIMITER_BASED template, data is never padded and only truncated when it has reached a maximum field length. Empty fields are allowed (when the data is null). Designated delimiters are used to separate the data fields. If a field is empty, two delimiters will appear next to each other. Examples of delimited-based templates are EDI formats such as ASC X12 820 and UN EDIFACT formats - PAYMUL, DIRDEB, and CREMUL.

In EDI formats, a record is sometimes referred to as a segment. An EDI segment is treated the same as a record. Start each segment with a new record command and give

it a record name. You should have a data field specifying the segment name as part of the output data immediately following the new record command.

For DELIMITER_BASED templates, you insert the appropriate data field delimiters in separate rows between the data fields. After every data field row, you insert a delimiter row. You can insert a placeholder for an empty field by defining two consecutive delimiter rows.

Empty fields are often used for syntax reasons: you must insert placeholders for empty fields so that the fields that follow can be properly identified.

There are different delimiters to signify data fields, composite data fields, and end of record. Some formats allow you to choose the delimiter characters. In all cases you should use the same delimiter consistently for the same purpose to avoid syntax errors.

In DELIMITER_BASED templates, the <POSITION> and <PAD> columns do not apply. They are omitted from the data tables.

Some DELIMITER_BASED templates have minimum and maximum length specifications. In those cases Oracle Payments validates the length.

Define Level Command

Some formats require specific additional data levels that are not in the data extract. For example, some formats require that payments be grouped by payment date. Using the Define Level command, a payment date group can be defined and referenced as a level in the template, even though it is not in the input extract file.

When you use the Define Level command you declare a base level that exists in the extract. The Define Level command inserts a new level one level higher than the base level of the extract. The new level functions as a grouping of the instances of the base level.

The Define Level command is a setup command, therefore it must be defined in the setup table. It has three subcommands:

- Base Level Command - defines the level (XML element) from the extract that the new level is based on. The Define Level command must always have one and only one base level subcommand.
- Grouping Criteria - defines the XML extract elements that are used to group the instances of the base level to form the instances of the new level. The parameter of the grouping criteria command is a comma-separated list of elements that specify the grouping conditions.

The order of the elements determines the hierarchy of the grouping. The instances of the base level are first divided into groups according to the values of the first criterion, then each of these groups is subdivided into groups according to the second criterion, and so on. Each of the final subgroups will be considered as an instance of the new level.

- Group Sort Ascending or Group Sort Descending - defines the sorting of the group. Insert the <GROUP SORT ASCENDING> or <GROUP SORT DESCENDING>

command row anywhere between the <DEFINE LEVEL> and <END DEFINE LEVEL> commands. The parameter of the sort command is a comma-separated list of elements by which to sort the group.

For example, the following table shows five payments under a batch:

| Payment Instance | PaymentDate (grouping criterion 1) | PayeeName (grouping criterion 2) |
|-------------------------|---|---|
| Payment1 | PaymentDate1 | PayeeName1 |
| Payment2 | PaymentDate2 | PayeeName1 |
| Payment3 | PaymentDate1 | PayeeName2 |
| Payment4 | PaymentDate1 | PayeeName1 |
| Payment5 | PaymentDate1 | PayeeName3 |

In the template, construct the setup table as follows to create a level called "PaymentsByPayDatePayee" from the base level "Payment" grouped according to PaymentDate and Payee Name. Add the Group Sort Ascending command to sort ea:

| | |
|------------------------|------------------------|
| <DEFINE LEVEL> | PaymentsByPayDatePayee |
| <BASE LEVEL> | Payment |
| <GROUPING CRITERIA> | PaymentDate, PayeeName |
| <GROUP SORT ASCENDING> | PaymentDate, PayeeName |
| <END DEFINE LEVEL> | PaymentsByPayDatePayee |

The five payments will generate the following four groups (instances) for the new level:

| Payment Group Instance | Group Criteria | Payments in Group |
|-------------------------------|--------------------------|--------------------------|
| Group1 | PaymentDate1, PayeeName1 | Payment1, Payment4 |
| Group2 | PaymentDate1, PayeeName2 | Payment3 |

| Payment Group Instance | Group Criteria | Payments in Group |
|------------------------|--------------------------|-------------------|
| Group3 | PaymentDate1, PayeeName3 | Payment5 |
| Group4 | PaymentDate2, PayeeName1 | Payment2 |

The order of the new instances is the order that the records will print. When evaluating the multiple grouping criteria to form the instances of the new level, the criteria can be thought of as forming a hierarchy. The first criterion is at the top of the hierarchy, the last criterion is at the bottom of the hierarchy.

Generally there are two kinds of format-specific data grouping scenarios in EFT formats. Some formats print the group records only; others print the groups with the individual element records nested inside groups. Following are two examples for these scenarios based on the five payments and grouping conditions previously illustrated.

Example

First Scenario: Group Records Only

EFT File Structure:

- BatchRec
 - PaymentGroupHeaderRec
 - PaymentGroupFooterRec

| Record Sequence | Record Type | Description |
|-----------------|-----------------------|--|
| 1 | BatchRec | |
| 2 | PaymentGroupHeaderRec | For group 1 (PaymentDate1, PayeeName1) |
| 3 | PaymentGroupFooterRec | For group 1 (PaymentDate1, PayeeName1) |
| 4 | PaymentGroupHeaderRec | For group 2 (PaymentDate1, PayeeName2) |
| 5 | PaymentGroupFooterRec | For group 2 (PaymentDate1, PayeeName2) |
| 6 | PaymentGroupHeaderRec | For group 3 (PaymentDate1, PayeeName3) |
| 7 | PaymentGroupFooterRec | For group 3 (PaymentDate1, PayeeName3) |
| 8 | PaymentGroupHeaderRec | For group 4 (PaymentDate2, PayeeName1) |

| Record Sequence | Record Type | Description |
|-----------------|-----------------------|--|
| 9 | PaymentGroupFooterRec | For group 4 (PaymentDate2, PayeeName1) |

Example

Scenario 2: Group Records and Individual Records

EFT File Structure:

BatchRec

- PaymentGroupHeaderRec
 - PaymentRec
- PaymentGroupFooterRec

Generated output:

| Record Sequence | Record Type | Description |
|-----------------|-----------------------|--|
| 1 | BatchRec | |
| 2 | PaymentGroupHeaderRec | For group 1 (PaymentDate1, PayeeName1) |
| 3 | PaymentRec | For Payment1 |
| 4 | PaymentRec | For Payment4 |
| 5 | PaymentGroupFooterRec | For group 1 (PaymentDate1, PayeeName1) |
| 6 | PaymentGroupHeaderRec | For group 2 (PaymentDate1, PayeeName2) |
| 7 | PaymentRec | For Payment3 |
| 8 | PaymentGroupFooterRec | For group 2 (PaymentDate1, PayeeName2) |
| 9 | PaymentGroupHeaderRec | For group 3 (PaymentDate1, PayeeName3) |
| 10 | PaymentRec | For Payment5 |
| 11 | PaymentGroupFooterRec | For group 3 (PaymentDate1, PayeeName3) |

| Record Sequence | Record Type | Description |
|-----------------|-----------------------|--|
| 12 | PaymentGroupHeaderRec | For group 4 (PaymentDate2, PayeeName1) |
| 13 | PaymentRec | For Payment2 |
| 14 | PaymentGroupFooterRec | For group 4 (PaymentDate2, PayeeName1) |

Once defined with the Define Level command, the new level can be used in the template in the same manner as a level occurring in the extract. However, the records of the new level can only reference the base level fields that are defined in its grouping criteria. They cannot reference other base level fields other than in summary functions.

For example, the PaymentGroupHeaderRec can reference the PaymentDate and PayeeName in its fields. It can also reference thePaymentAmount (a payment level field) in a SUM function. However, it cannot reference other payment level fields, such as PaymentDocName or PaymentDocNum.

The Define Level command must always have one and only one grouping criteria subcommand. The Define Level command has a companion end-define level command. The subcommands must be specified between the define level and end-define level commands. They can be declared in any order.

Define Sequence Command

The define sequence command define a sequence that can be used in conjunction with the SEQUENCE_NUMBER function to index either the generated EFT records or the extract instances (the database records). The EFT records are the physical records defined in the template. The database records are the records from the extract. To avoid confusion, the term "record" will always refer to the EFT record. The database record will be referred to as an extract element instance or level.

The define sequence command has four subcommands: reset at level, increment basis, start at, and maximum:

Reset at Level

The reset at level subcommand defines where the sequence resets its starting number. It is a mandatory subcommand. For example, to number the payments in a batch, define the reset at level as Batch. To continue numbering across batches, define the reset level as RequestHeader.

In some cases the sequence is reset outside the template. For example, a periodic sequence may be defined to reset by date. In these cases, the PERIODIC_SEQUENCE keyword is used for the reset at level. The system saves the last sequence number used for a payment file to the database. Outside events control resetting the sequence in the database. For the next payment file run, the sequence number is extracted from the database for the start at number (see start at subcommand).

Increment Basis

The increment basis subcommand specifies if the sequence should be incremented based on record or extract instances. The allowed parameters for this subcommand are RECORD and LEVEL.

Enter RECORD to increment the sequence for every record.

Enter LEVEL to increment the sequence for every new instance of a level.

Note that for levels with multiple records, if you use the level-based increment all the records in the level will have the same sequence number. The record-based increment will assign each record in the level a new sequence number.

For level-based increments, the sequence number can be used in the fields of one level only. For example, suppose an extract has a hierarchy of batch > payment > invoice and you define the increment basis by level sequence, with reset at the batch level. You can use the sequence in either the payment or invoice level fields, but not both. You cannot have sequential numbering across hierarchical levels.

However, this rule does not apply to increment basis by record sequences. Records can be sequenced across levels.

For both increment basis by level and by record sequences, the level of the sequence is implicit based on where the sequence is defined.

Define Concatenation Command

Use the define concatenation command to concatenate child-level extract elements for use in parent-level fields. For example, use this command to concatenate invoice number and due date for all the invoices belonging to a payment for use in a payment-level field.

The define concatenation command has three subcommands: base level, element, and delimiter.

Base Level Subcommand

The base level subcommand specifies the child level for the operation. For each parent-level instance, the concatenation operation loops through the child-level instances to generate the concatenated string.

Item Subcommand

The item subcommand specifies the operation used to generate each item. An item is a child-level expression that will be concatenated together to generate the concatenation string.

Delimiter Subcommand

The delimiter subcommand specifies the delimiter to separate the concatenated items in the string.

Using the SUBSTR Function

Use the SUBSTR function to break down concatenated strings into smaller strings that can be placed into different fields. For example, the following table shows five invoices in a payment:

| Invoice | InvoiceNum |
|----------------|-------------------|
| 1 | car_parts_inv0001 |
| 2 | car_parts_inv0002 |
| 3 | car_parts_inv0003 |
| 4 | car_parts_inv0004 |
| 5 | car_parts_inv0005 |

Using the following concatenation definition:

| | |
|----------------------------|-------------------------|
| <DEFINE CONCATENATION> | ConcatenatedInvoiceInfo |
| <BASE LEVEL> | Invoice |
| <ELEMENT> | InvoiceNum |
| <DELIMITER> | ; |
| <END DEFINE CONCATENATION> | ConcatenatedInvoiceInfo |

You can reference ConcatenatedInvoiceInfo in a payment level field. The string will be:
 car_parts_inv0001,car_parts_inv0002,car_parts_inv0003,car_parts_inv0004,car_parts_inv0005

If you want to use only the first forty characters of the concatenated invoice info, use either TRUNCATE function or the SUBSTR function as follows:

```
TRUNCATE (ConcatenatedInvoiceInfo, 40)
```

```
SUBSTR (ConctenatedInvoiceInfo, 1, 40)
```

Either of these statements will result in:

```
car_parts_inv0001,car_parts_inv0002,car_
```

To isolate the next forty characters, use the SUBSTR function:

```
SUBSTR (ConcatenatedInvoiceInfo, 41, 40)
```

to get the following string:

```
parts_inv0003,car_parts_inv0004,car_par
```


and implicit record breaks at runtime. Each new record command represents an explicit record break. Each end of table represents an implicit record break. The parameter is a list of constant character names separated by commas.

Some formats contain no record breaks. The generated output is a single line of data. In this case, leave the new record character command parameter field empty.

Number Thousands Separator and Number Decimal Separator

The default thousands (or group) separator is a comma (",") and the default decimal separator is ".". Use the Number Thousands Separator command and the Number Decimal Separator command to specify separators other than the defaults. For example, to define "." as the group separator and "," as the decimal separator, enter the following:

| | |
|----------------------------|---|
| NUMBER THOUSANDS SEPARATOR | . |
| NUMBER DECIMAL SEPARATOR | , |

For more information on formatting numbers, see Format Column, page 9-13.

Expressions, Control Structures, and Functions

This section describes the rules and usage for expressions in the template. It also describes supported control structures and functions.

Expressions

Expressions can be used in the data column for data fields and some command parameters. An expression is a group of XML extract fields, literals, functions, and operators. Expressions can be nested. An expression can also include the "IF" control structure. When an expression is evaluated it will always generate a result. Side effects are not allowed for the evaluation. Based on the evaluation result, expressions are classified into the following three categories:

- **Boolean Expression** - an expression that returns a boolean value, either true or false. This kind expression can be used only in the "IF-THEN-ELSE" control structure and the parameter of the display condition command.
- **Numeric Expression** - an expression that returns a number. This kind of expression can be used in numeric data fields. It can also be used in functions and commands that require numeric parameters.
- **Character Expression** - an expression that returns an alphanumeric string. This kind of expression can be used in string data fields (format type Alpha). They can also be used in functions and command that require string parameters.

Control Structures

The only supported control structure is "IF-THEN-ELSE". It can be used in an expression. The syntax is:

```
IF <boolean_expressionA> THEN
  <numeric or character expression1>
[ELSIF <boolean_expressionB THEN
  <numeric or character expression2>]
...
[ELSE
  <numeric or character expression3>]
END IF
```

Generally the control structure must evaluate to a number or an alphanumeric string. The control structure is considered to a numeric or character expression. The ELSIF and ELSE clauses are optional, and there can be as many ELSIF clauses as necessary. The control structure can be nested.

The IN predicate is supported in the IF-THEN-ELSE control structure. For example:

```
IF PaymentAmount/Currency/Code IN ('USD', 'EUR', 'AON', 'AZM') THEN
    PayeeAccount/FundsCaptureOrder/OrderAmount/Value * 100
ELSIF PaymentAmount/Currency/Code IN ('BHD', 'IQD', 'KWD') THEN
    PayeeAccount/FundsCaptureOrder/OrderAmount/Value * 1000
ELSE
    PayeeAccount/FundsCaptureOrder/OrderAmount/Value
END IF;
```

Functions

Following is the list of supported functions:

- SEQUENCE_NUMBER - is a record element index. It is used in conjunction with the Define Sequence command. It has one parameter, which is the sequence defined by the Define Sequence command. At runtime it will increase its sequence value by one each time it is referenced in a record.
- COUNT - counts the child level extract instances or child level records of a specific type. Declare the COUNT function on a level above the entity to be counted. The function has one argument. If the argument is a level, the function will count all the instances of the (child) level belonging to the current (parent) level instance.

For example, if the level to be counted is Payment and the current level is Batch, then the COUNT will return the total number of payments in the batch. However, if the current level is RequestHeader, the COUNT will return the total number of payments in the file across all batches. If the argument is a record type, the count function will count all the generated records of the (child level) record type belonging to the current level instance.

- INTEGER_PART, DECIMAL_PART - returns the integer or decimal portion of a numeric value. This is used in nested expressions and in commands (display condition and group by). For the final formatting of a numeric field in the data

column, use the Integer/Decimal format.

- IS_NUMERIC - boolean test whether the argument is numeric. Used only with the "IF" control structure.
- TRUNCATE - truncate the first argument - a string to the length of the second argument. If the first argument is shorter than the length specified by the second argument, the first argument is returned unchanged. This is a user-friendly version for a subset of the SQL substr() functionality.
- SUM - sums all the child instance of the XML extract field argument. The field must be a numeric value. The field to be summed must always be at a lower level than the level on which the SUM function was declared.
- MIN, MAX - find the minimum or maximum of all the child instances of the XML extract field argument. The field must be a numeric value. The field to be operated on must always be at a lower level than the level on which the function was declared.
- FORMAT_DATE - Formats a date string to any desirable date format. For example:
FORMAT_DATE("1900-01-01T18:19:20", "YYYY/MM/DD HH24:MI:SS")
will produce the following output:
1900/01/01 18:19:20
- FORMAT_NUMBER - Formats a number to display in desired format. For example:
FORMAT_NUMBER("1234567890.0987654321", "999,999.99")
produces the following output:
1,234,567,890.10
- MESSAGE_LENGTH - returns the length of the message in the EFT message.
- RECORD_LENGTH - returns the length of the record in the EFT message.
- INSTR - returns the numeric position of a named character within a text field.
- SYSDATE, DATE - gets Current Date and Time.
- POSITION - returns the position of a node in the XML document tree structure.
- REPLACE - replaces a string with another string.
- CONVERT_CASE - converts a string or a character to UPPER or LOWER case.
- CHR - gets the character representation of an argument, which is an ASCII value.

- LPAD, RPAD – generates left or right padding for string values.
- AND, OR, NOT – operator functions on elements.
- Other SQL functions include the following. Use the syntax corresponding to the SQL function.
 - TO_DATE
 - LOWER
 - UPPER
 - LENGTH
 - GREATEST
 - LEAST
 - DECODE
 - CEIL
 - ABS
 - FLOOR
 - ROUND
 - CHR
 - TO_CHAR
 - SUBSTR
 - LTRIM
 - RTRIM
 - TRIM
 - IN
 - TRANSLATE

Identifiers, Operators, and Literals

This section lists the reserved key word and phrases and their usage. The supported

operators are defined and the rules for referencing XML extract fields and using literals.

Key Words

There are four categories of key words and key word phrases:

- Command and column header key words
- Command parameter and function parameter key words
- Field-level key words
- Expression key words

Command and Column Header Key Words

The following key words must be used as shown: enclosed in <>s and in all capital letters with a bold font.

- **<LEVEL>**- the first entry of a data table. Associates the table with an XML element and specifies the hierarchy of the table.
- **<END LEVEL>** - declares the end of the current level. Can be used at the end of a table or in a standalone table.
- **<POSITION>** - column header for the first column of data field rows, which specifies the starting position of the data field in a record.
- **<LENGTH>** - column header for the second column of data field rows, which specifies the length of the data field.
- **<FORMAT>** - column header for the third column of data field rows, which specifies the data type and format setting.
- **<PAD>** - column header for the fourth column of data field rows, which specifies the padding style and padding character.
- **<DATA>** - column header for the fifth column of data field rows, which specifies the data source.
- **<COMMENT>** - column header for the sixth column of data field rows, which allows for free form comments.
- **<NEW RECORD>** - specifies a new record.
- **<DISPLAY CONDITION>** - specifies the condition when a record should be printed.
- **<TEMPLATE TYPE>** - specifies the type of the template, either **FIXED_POSITION_BASED** or **DELIMITER_BASED**.

- **<OUTPUT CHARACTER SET>** - specifies the character set to be used when generating the output.
- **<NEW RECORD CHARACTER>** - specifies the character(s) to use to signify the explicit and implicit new records at runtime.
- **<DEFINE LEVEL>** - defines a format-specific level in the template.
- **<BASE LEVEL>** - subcommand for the define level and define concatenation commands.
- **<GROUPING CRITERIA>** - subcommand for the define level command.
- **<END DEFINE LEVEL>** - signifies the end of a level.
- **<DEFINE SEQUENCE>** - defines a record or extract element based sequence for use in the template fields.
- **<RESET AT LEVEL>** - subcommand for the define sequence command.
- **<INCREMENT BASIS>** - subcommand for the define sequence command.
- **<START AT>** - subcommand for the define sequence command.
- **<MAXIMUM>** - subcommand for the define sequence command.
- **<MAXIMUM LENGTH>** - column header for the first column of data field rows, which specifies the maximum length of the data field. For DELIMITER_BASED templates only.
- **<END DEFINE SEQUENCE>** - signifies the end of the sequence command.
- **<DEFINE CONCATENATION>** - defines a concatenation of child level item that can be referenced as a string the parent level fields.
- **<ELEMENT>** - subcommand for the define concatenation command.
- **<DELIMITER>** - subcommand for the define concatenation command.
- **<END DEFINE CONCATENATION>** - signifies the end of the define concatenation command.
- **<SORT ASCENDING>** - format-specific sorting for the instances of a level.
- **<SORT DESCENDING>** - format-specific sorting for the instances of a level.

Command Parameter and Function Parameter Key Words

These key words must be entered in all capital letters, nonbold fonts.

- PERIODIC_SEQUENCE - used in the reset at level subcommand of the define sequence command. It denotes that the sequence number is to be reset outside the template.
- FIXED_POSITION_BASED, DELIMITER_BASED - used in the template type command, specifies the type of template.
- RECORD, LEVEL - used in the increment basis subcommand of the define sequence command. RECORD increments the sequence each time it is used in a new record. LEVEL increments the sequence only for a new instance of the level.

Field-Level Key Words

- Alpha - in the <FORMAT> column, specifies the data type is alphanumeric.
- Number - in the <FORMAT> column, specifies the data type is numeric.
- Integer - in the <FORMAT> column, used with the Number key word. Takes the integer part of the number. This has the same functionality as the INTEGER function, except the INTEGER function is used in expressions, while the Integer key word is used in the <FORMAT> column only.
- Decimal - in the <FORMAT> column, used with the Number key word. Takes the decimal part of the number. This has the same functionality as the DECIMAL function, except the DECIMAL function is used in expressions, while the Decimal key word is used in the <FORMAT> column only.
- Date - in the <FORMAT> column, specifies the data type is date.
- L, R- in the <PAD> column, specifies the side of the padding (Left or Right).

Expression Key Words

Key words and phrases used in expressions must be in capital letters and bold fonts.

- IF THEN ELSE IF THEN ELSE END IF - these key words are always used as a group. They specify the "IF" control structure expressions.
- IS NULL, IS NOT NULL - these phrases are used in the IF control structure. They form part of boolean predicates to test if an expression is NULL or not NULL.

Operators

There are two groups of operators: the boolean test operators and the expression operators. The boolean test operators include: "=", "<>", "<", ">", ">=", and "<=". They can be used only with the IF control structure. The expression operators include: "()", "||", "+", "-", and "*". They can be used in any expression.

| Symbol | Usage |
|--------|---|
| = | Equal to test. Used in the IF control structure only. |
| <> | Not equal to test. Used in the IF control structure only. |
| > | Greater than test. Used in the IF control structure only. |
| < | Less than test. Used in the IF control structure only. |
| >= | Greater than or equal to test. Used in the IF control structure only. |
| <= | Less than or equal to test. Used in the IF control structure only. |
| () | Function argument and expression group delimiter. The expression group inside "()" will always be evaluated first. "()" can be nested. |
| | String concatenation operator. |
| + | Addition operator. Implicit type conversion may be performed if any of the operands are not numbers. |
| - | Subtraction operator. Implicit type conversion may be performed if any of the operands are not numbers. |
| * | Multiplication operator. Implicit type conversion may be performed if any of the operands are not numbers. |
| DIV | Division operand. Implicit type conversion may be performed if any of the operands are not numbers. Note that "/" is not used because it is part of the XPATH syntax. |

| Symbol | Usage |
|--------|--|
| IN | Equal-to-any-member-of test. |
| NOT IN | Negates the IN operator. Not-Equal-to-any-member-of test. |

Reference to XML Extract Fields and XPATH Syntax

XML elements can be used in any expression. At runtime they will be replaced with the corresponding field values. The field names are case-sensitive.

When the XML extract fields are used in the template, they must follow the XPATH syntax. This is required so that the BI Publisher engine can correctly interpret the XML elements.

There is always an extract element considered as the context element during the BI Publisher formatting process. When BI Publisher processes the data rows in a table, the level element of the table is the context element. For example, when BI Publisher processes the data rows in the Payment table, Payment is the context element. The relative XPATH you use to reference the extract elements are specified in terms of the context element.

For example if you need to refer to the PayeeName element in a Payment data table, you will specify the following relative path:

Payee/PayeeInfo/PayeeName

Each layer of the XML element hierarchy is separated by a backslash "/". You use this notation for any nested elements. The relative path for the immediate child element of the level is just the element name itself. For example, you can use TransactionID element name as is in the Payment table.

To reference a parent level element in a child level table, you can use the "../" notation. For example, in the Payment table if you need to reference the BatchName element, you can specify ../BatchName. The "../" will give you Batch as the context; in that context you can use the BatchName element name directly as BatchName is an immediate child of Batch. This notation goes up to any level for the parent elements. For example if you need to reference the RequesterParty element (in the RequestHeader) in a Payment data table, you can specify the following:

../TrxnParties/RequesterParty

You can always use the absolute path to reference any extract element anywhere in the template. The absolute path starts with a backslash "/". For the PayeeName in the Payment table example above, you will have the following absolute path:

/BatchRequest/Batch/Payment/Payee/PayeeInfo/PayeeName

The absolute path syntax provides better performance.

The identifiers defined by the setup commands such as define level, define sequence

and define concatenation are considered to be global. They can be used anywhere in the template. No absolute or relative path is required. The base level and reset at level for the setup commands can also be specified. BI Publisher will be able to find the correct context for them.

If you use relative path syntax, you should specify it relative to the base levels in the following commands:

- The element subcommand of the define concatenation command
- The grouping criteria subcommand of the define level command

The extract field reference in the start at subcommand of the define sequence command should be specified with an absolute path.

The rule to reference an extract element for the level command is the same as the rule for data fields. For example, if you have a Batch level table and a nested Payment level table, you can specify the Payment element name as-is for the Payment table. Because the context for evaluating the Level command of the Payment table is the Batch.

However, if you skip the Payment level and you have an Invoice level table directly under the Batch table, you will need to specify Payment/Invoice as the level element for the Invoice table.

The XPATH syntax required by the template is very similar to UNIX/LINUX directory syntax. The context element is equivalent to the current directory. You can specify a file relative to the current directory or you can use the absolute path which starts with a "/".

Finally, the extract field reference as the result of the grouping criteria sub-command of the define level command must be specified in single quotes. This tells the BI Publisher engine to use the extract fields as the grouping criteria, not their values.

Part 3

Administering BI Publisher

Defining a Security Model

This chapter covers the following topics:

- Security Model Overview
- Understanding BI Publisher's Users and Roles
- Considerations When Deleting a User
- Integrating with LDAP
- Setting Up Oracle Single Sign-On
- Integrating with Oracle E-Business Suite Security
- Integrating with Oracle BI Server Security

Security Model Overview

BI Publisher offers the following security options:

- BI Publisher Security
Use BI Publisher's Users and Roles paradigm to control access to reports and data sources. See *Understanding BI Publisher's Users and Roles*, page 10-2.
- LDAP
Set up the BI Publisher roles in your LDAP server then configure BI Publisher to integrate with it. See *Integrating with LDAP*, page 10-6.
Oracle E-Business Suite
Upload a DBC file to recognize your Oracle E-Business Suite users. See *Integrating with E-Business Suite Security*, page 10-25.
- Oracle BI Server
Set up the BI Publisher roles in your BI Server Administration tool then configure BI Publisher to integrate with it. See *Integrating with Oracle BI Server Security*, page

Defining a Local Superuser

BI Publisher allows you to define an administration Superuser. Using the Superuser credentials you can directly access the BI Publisher server administrative functions without logging in through the defined security model.

Set up this Superuser to ensure access to all administrative functions in case of problems with the current security setup.

1. Select the **Admin** tab.
2. Under **Security Center** select **Security Configuration**.
3. Under **Local Superuser**, select the box and enter the credentials for the Superuser.

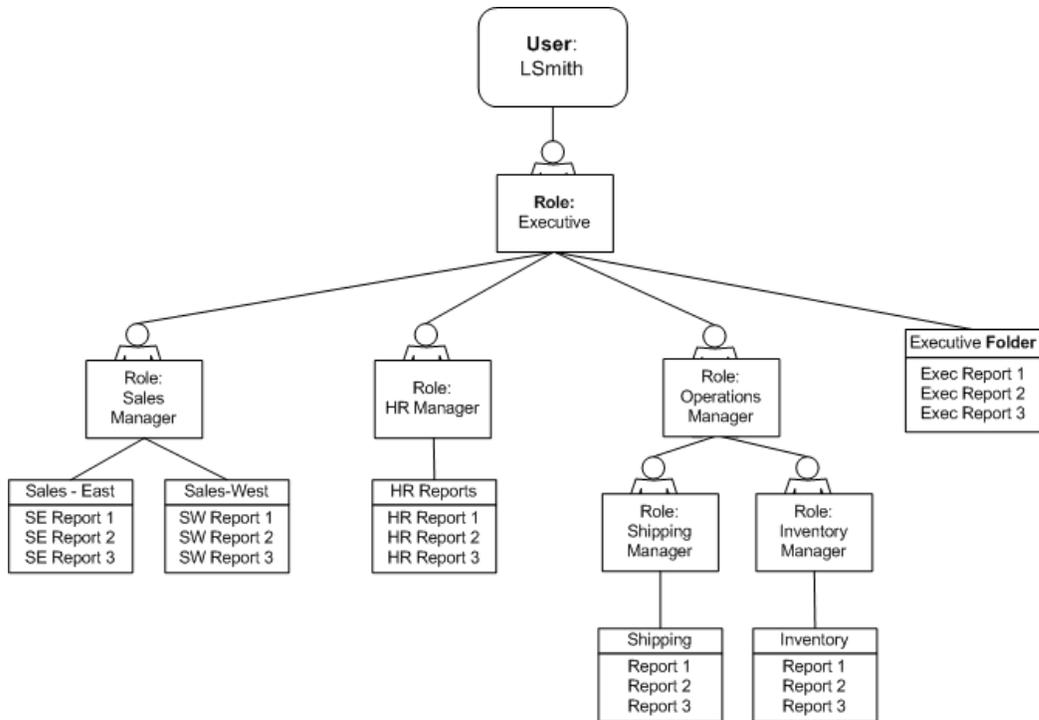
Allowing Guest Access

BI Publisher allows you to set up a public access folder. Any user can access the reports in this folder without entering credentials.

1. Select the **Admin** tab.
2. Under **Security Center** select **Security Configuration**.
3. Under **Guest Access**, select the Allow Guest Access and enter a name for the Guest folder in the system.

Understanding BI Publisher's Users and Roles

A user is granted one or multiple **Roles**. A **Role** defines a user's access to Folders and functions. A role can be assigned one or multiple **Folders** to which access is granted. Reports are contained within the folders. You can create a hierarchy of roles by assigning roles to other roles. In this way the privileges of multiple roles can roll up to higher level roles. The following graphic shows an example of the hierarchy structure of User, Role, and Folder:



Functional Roles

BI Publisher provides five functional roles to grant access to specific tasks within the application. Assign these roles to users based on their need to perform the associated tasks. These roles cannot be updated or deleted.

The following table shows the privileges granted to each functional role:

| Role | Privileges |
|------------------------------|--|
| no roles assigned | View (online reports only) |
| BI Publisher Excel Analyzer | View History Grants access to the Excel Analyzer |
| BI Publisher Online Analyzer | View History Grants access to the Analyzer |

| Role | Privileges |
|--------------------------------|--|
| BI Publisher Scheduler | View Schedule History |
| BI Publisher Template Designer | View History Enables log on from Template Builder |
| BI Publisher Developer | View History Edit Configure Folder and Report Tasks Enables log on from the Template Builder |
| BI Publisher Administrator | View Edit Schedule History Configure Folder and Report Tasks Excel Analyzer Online Analyzer Admin tab and all administration tasks Enables log on from the Template Builder |

Setting Up Users and Roles

There are two options for setting up users and roles:

- Set up users and roles in the BI Publisher Enterprise Security Center
For this option, follow the instructions in this section.

- Integrate BI Publisher Enterprise with an existing LDAP server
For this option, See Integrating with LDAP, page 10-6.

Create a Role:

1. From the **Security Center**, select **Roles and Permissions**; this will invoke the **Security Center** page. Here you can see the list of existing roles and permissions.
2. Select **Create Role**.
3. Enter a **Role Name** and **Description** and select **Apply**.
4. Grant access to data sources for the role. See Setting Up Data Sources, page 11-2.

Add a User:

1. From the **Security Center**, select **Users**. This will invoke the **Security Center Users** page. Here you can see the list of existing users.
2. Select **Create User**.
3. Add the **User Name** and **Password** for the user.

Update a User:

1. From the **Security Center**, select **Users**. This will invoke the **Security Center Users** page. Here you can see the list of existing users.
2. Select the user name. You can update both the user name and the password.

Add a Role to a User:

1. From the **Security Center**, select **Users**. This will invoke the **Security Center Users** page. Here you can see the list of existing users.
2. Select the **Assign Roles** icon for the user.
3. From the **Assign Roles** page, select the role from the **Available Roles** list and then select the **Move** shuttle button to move the role to the **Assigned Roles** list. When done assigning all roles, select **Apply**.

Add a Folder to a Role:

1. From the **Security Center**, select **Roles and Permissions**; this will invoke the **Security Center** page. Here you can see the list of existing roles and permissions.

2. Select the **Add Folders** icon.
3. Select the desired folder from the **Available Folders** list and use the **Move** shuttle button to move it to the **Allowed Folders** list.

Note that the folders are presented as the directory structure is set up in your system. Selecting the top level folder will grant access to all subfolders. Selecting just the subfolder entry will allow access only to the subfolder.

Add a Data Source to a Role

1. From the **Security Center**, select **Roles and Permissions**; this will invoke the **Security Center** page. Here you can see the list of existing roles and permissions.
2. Select the **Add Data Sources** icon for the Role.
3. Move selections from the **Available Data Sources** list to the **Allowed Data Sources** list.

Users with this role will only be allowed to run reports that access data sources on the Allowed Data Sources list.

Add a Role to a Role:

1. From the **Security Center**, select **Roles and Permissions**; this will invoke the **Security Center** page. Here you can see the list of existing roles and permissions.
2. Select the **Add Roles** icon for the Role.
3. Select the desired role from the **Available Roles** list and use the **Move** shuttle button to move it to the **Included Roles**.

Considerations When Deleting a User

When you delete a user in any security model (built-in, LDAP, E-Business Suite, or BI Server), ensure that you delete the user folder from the repository. If you are logged in as an Administrator, the user folders are located on the Reports page under *Users/<username>*. If the individual user folder is not deleted and a new user is created with the same user name, then the new user will have access to the contents of the existing user folder.

Integrating with LDAP

BI Publisher can be integrated with your LDAP server to manage users and report access. Create the users and roles within your LDAP server, then configure the BI Publisher server to access your LDAP server.

In the BI Publisher security center module, assign folders to those roles. When a user logs into the server they will have access to those folders and reports assigned to the LDAP roles.

Integrating the BI Publisher server with Oracle LDAP consists of three main tasks:

1. Set up users and roles
2. Configure BI Publisher to recognize your LDAP server
3. Assign report folders and data sources to roles

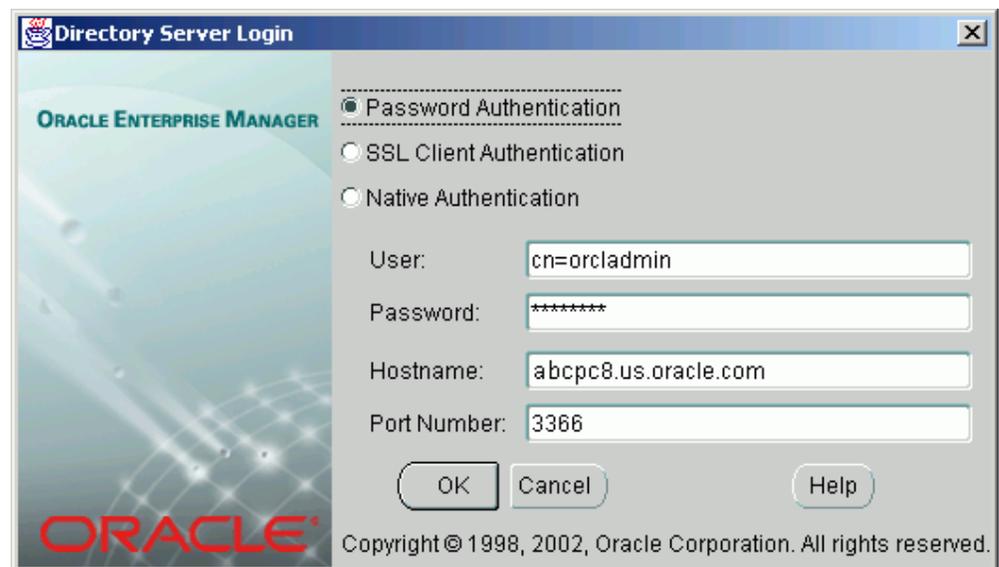
These tasks can be performed through the Oracle Internet Directory (OID) Web UI, or through the client application. Each method is described in detail.

Using the Client Application

Set Up Users and Roles

1. Use the Enterprise Security Manager login to access your LDAP Server.

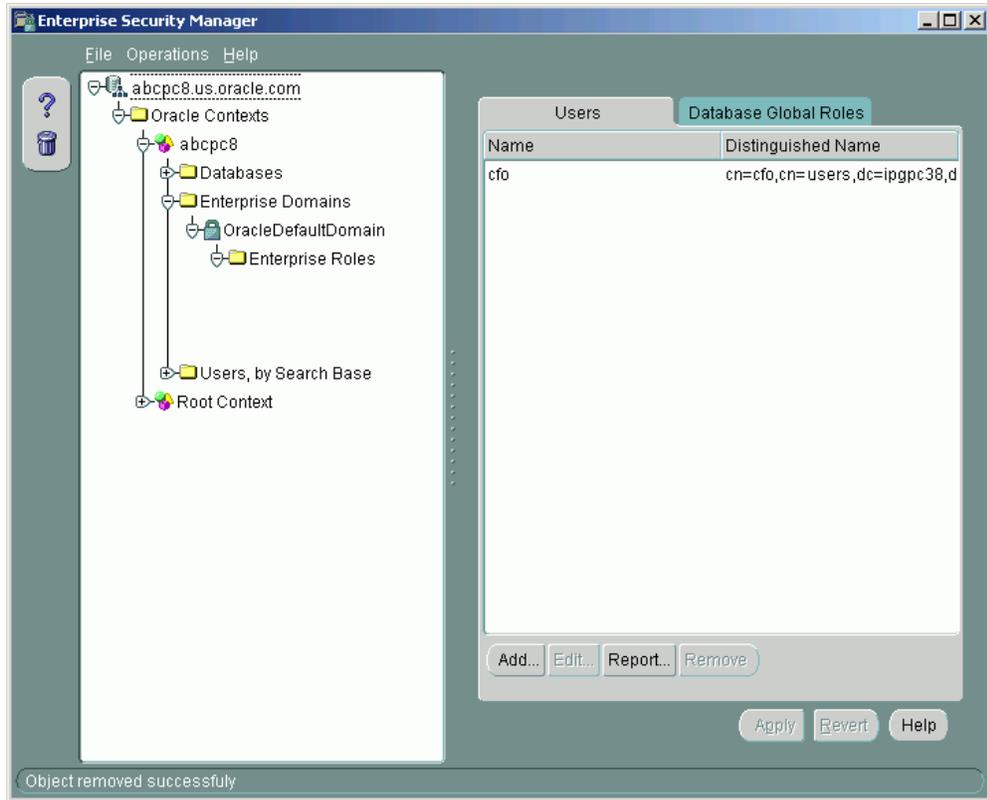
An example Directory Server Login screen is shown in the following figure:



2. Create Roles.

Navigate to the Enterprise Roles node under the OracleDefaultDomain node.

A sample Enterprise Security Manager screen is shown in the following figure:

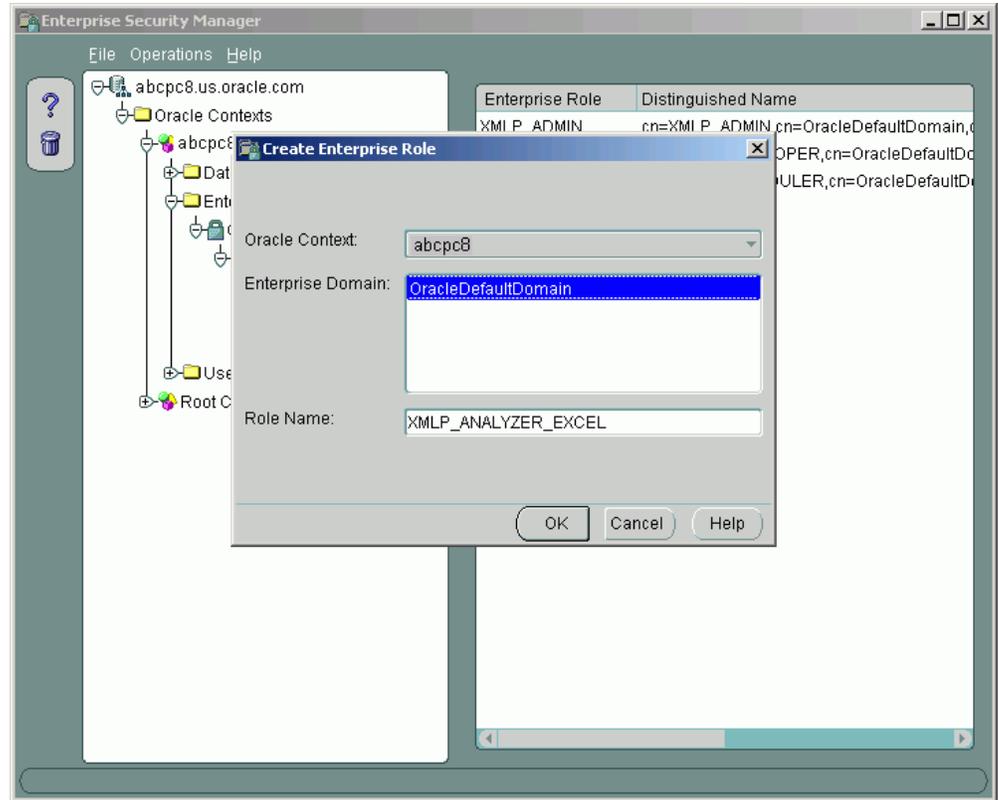


- To create a role, select the **Enterprise Roles** node, then select **Create Enterprise Role** from the **Operations** menu.

You must create the following roles to integrate with BI Publisher: See Understanding Users and Roles, page 10-2 for full descriptions of the required functional roles.

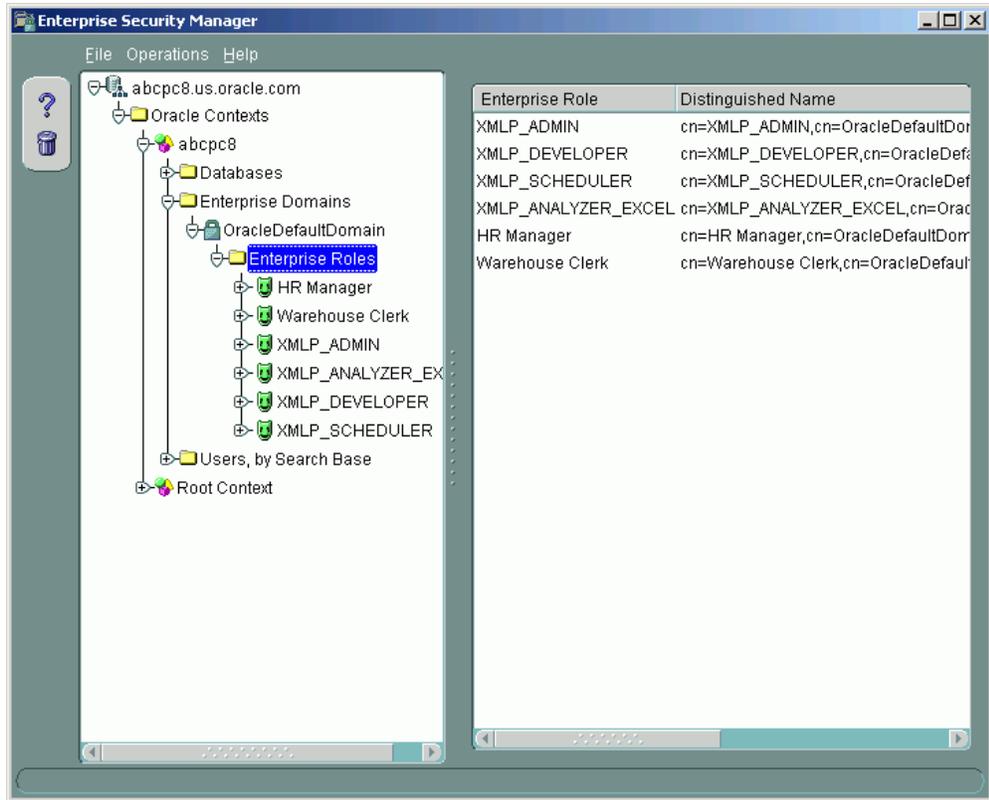
- XMLP_ADMIN – this is the administrator role for the BI Publisher server.
- XMLP_DEVELOPER – allows users to build reports in the system.
- XMLP_SCHEDULER – allows users to schedule reports.
- XMLP_ANALYZER_EXCEL – allows users to use the Excel analysis feature.
- XMLP_ANALYZER_ONLINE – allows users to use the online analysis feature.
- XMLP_TEMPLATE_DESIGNER - allows users to connect to the BI Publisher server from the Template Builder and to upload and download templates.

The following figure shows a sample **Create Enterprise Role** dialog:



4. Create other functional roles as required by your implementation, for example: HR Manager, Warehouse Clerk, or Sales Manager.

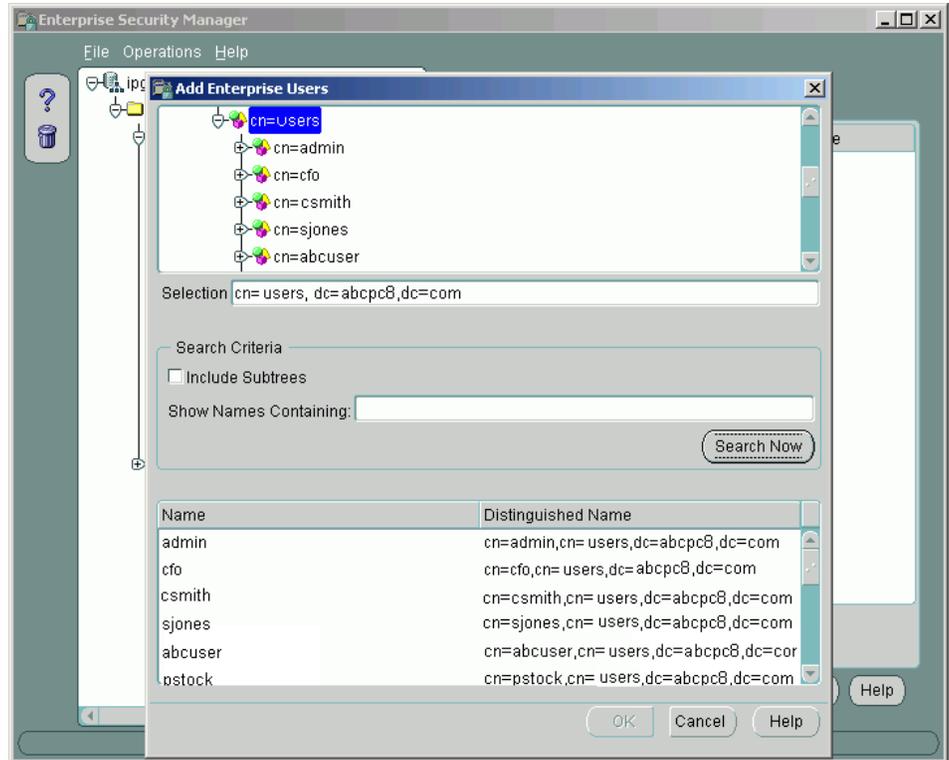
The following figure shows an example Enterprise Security Manager screen with multiple roles defined:



5. Assign roles to users.

- Select the role you wish to add a user to.
- Select **Add**.
- Navigate to the **Users** node and select **Search** to find users.

The following figure shows an example **Add Enterprise Users** dialog:



- Select the user(s) you wish to add to the role and select **OK**.

This action will close the dialog. Select **Apply** on the main form to save your changes.

Now if you expand the Users node under the role, the new users will appear.

Configure the BI Publisher Server to Recognize Your LDAP Server

To configure the BI Publisher server to recognize your LDAP server, update the Security properties in the BI Publisher Admin interface as follows:

1. Navigate to the Security Configuration page: Select the **Admin** tab. Under **Security Center** select **Security Configuration**.
2. Scroll down to the **Security Model** region. Select LDAP for the Security Model.
3. Enter the following:
 - URL
For example: ldap://ldap.server.com:389/
 - Admin Username
For example: orcladmin

- Admin Password:

For example: `welcome`

- Distinguished Name for Users

For example: `cn=users,dc=server,dc=com`

Important: The distinguished name values are case-sensitive and must match the settings in your LDAP server.

- JNDI Context Factory Class

The default value is `com.sun.jndi.ldap.LdapCtxFactory`

- Distinguished Name for Groups

For example: `cn=Groups, dc=us,dc=oracle,dc=com`

The default value is

`cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=example,dc=com`

- Group Search Filter

The default values is `(&(objectclass=groupofuniqueNames)(cn=*))`

- Group Attribute Name

The default value is `cn`

- Group Member Attribute Name

The default value is `uniquemember`

- Group Description Attribute Name

The default value is `description`

Important: You must restart the server for changes to the security model to take effect.

The following figure shows a sample of the LDAP security model entry fields from the Security Configuration page:

The screenshot shows the 'Security Model' configuration window. The 'Security Model' dropdown is set to 'LDAP'. The configuration fields are as follows:

- URL: ldap://hostname:port (Example: ldap://hostname:port)
- Administrator Username: administrator
- Administrator Password: [Redacted]
- Distinguished Name for Users: cn=Users,dc=example,dc=com (Example: cn=Users,dc=example,dc=com)
- Distinguished Name for Groups: cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=example,dc=com (Example: cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=example,dc=com)
- Group Search Filter: (&(objectclass=groupofuniqueNames)(cn=*)) (Default Value: (&(objectclass=groupofuniqueNames)(cn=*))
- Group Attribute Name: cn (Default Value: cn)
- Group Member Attribute Name: uniqueMember (Default Value: uniqueMember)
- Group Description Attribute Name: description (Default Value: description)
- JNDI Context Factory Class: com.sun.jndi.ldap.LdapCtxFactory (Default Value: com.sun.jndi.ldap.LdapCtxFactory)

Assign Folders and Data Sources to Roles

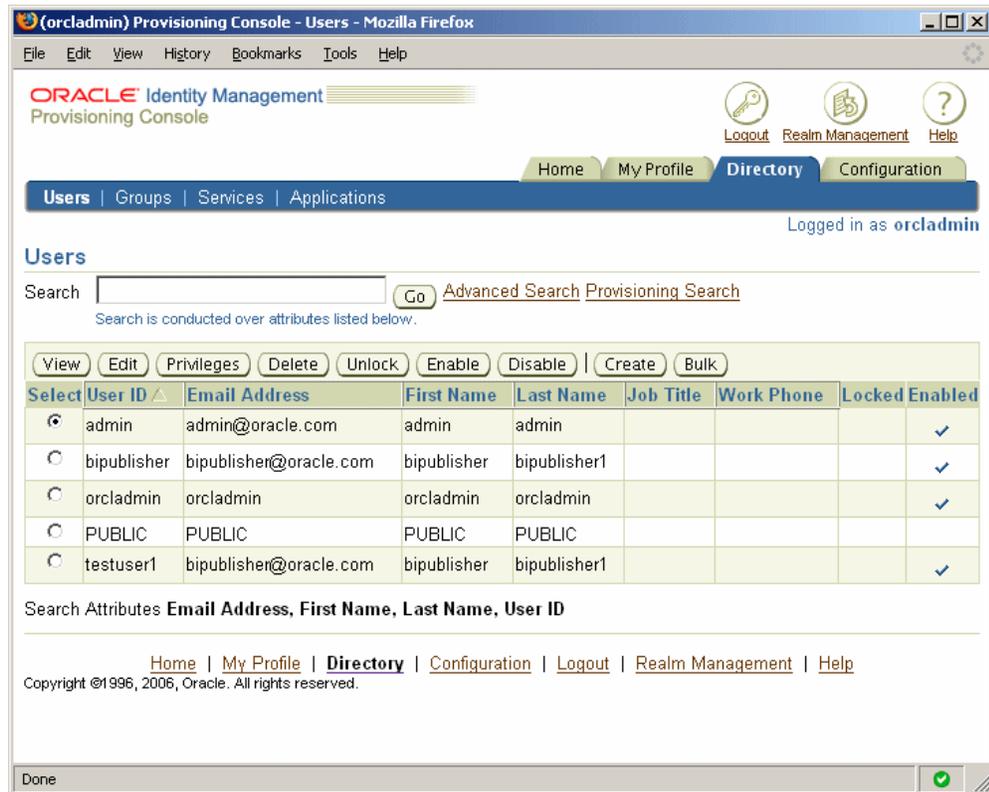
1. Log in with an Administrator role.
2. Navigate to the **Admin** tab. From **Security Center** select **Roles and Permissions**.
You will see the roles you created and assigned in the security manager application. Note the following:
 - The XMLP_X roles are not shown because these are controlled through the LDAP interface.
 - The Users tab is no longer available under the Security Center because users are now managed through your LDAP interface.
 - Roles are not updateable in the BI Publisher interface, with the exceptions of adding folders and adding data sources.
3. Select **Add Folders** to add folders to a particular role using the tree shuttle. Select **Add Data Sources** to add BI Publisher data sources to the role. A role must be assigned access to a data source to run reports from that data source.

Users can now log in using their LDAP username/password and will have access to reports in the folders assigned to their roles set up in LDAP.

Using the OID Web UI

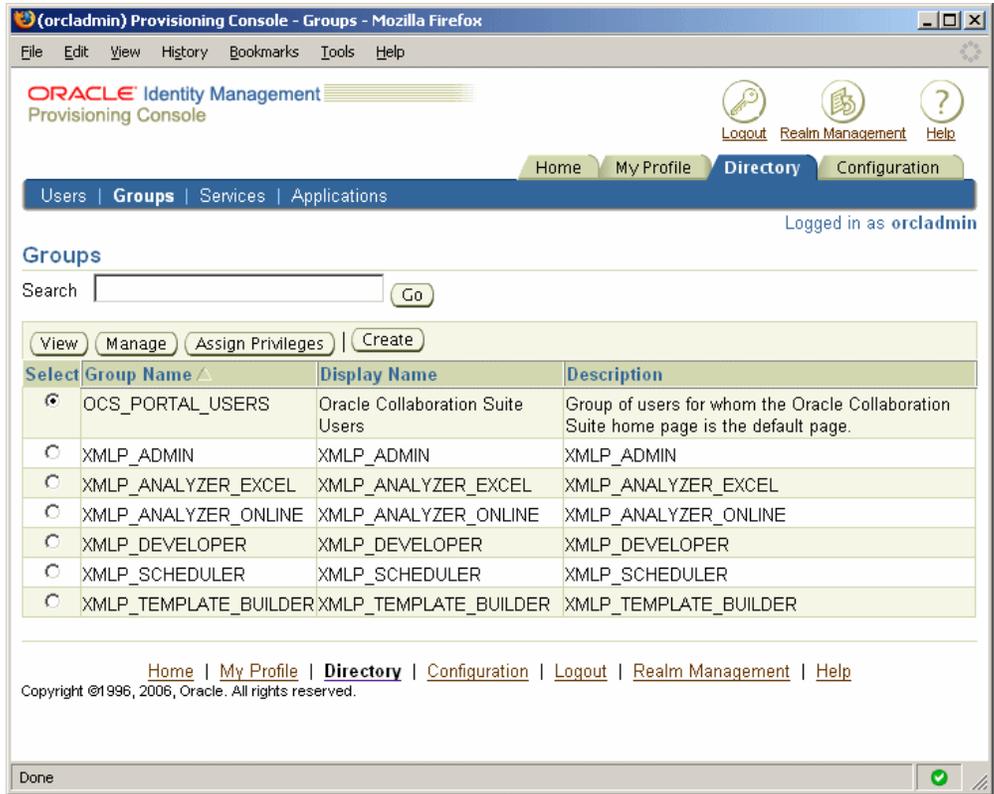
1. Log in to OID. The URL is typically `http://(AS host):(AS port)/oiddas/`
2. Create users for BI Publisher. Select the **Directory** tab, then the **Users** subtab, and

then click the **Create** button.



3. Create the following roles to integrate with BI Publisher: See Understanding Users and Roles, page 10-2 for full descriptions of the required functional roles.
 - XMLP_ADMIN – this is the administrator role for the BI Publisher server.
 - XMLP_DEVELOPER – allows users to build reports in the system.
 - XMLP_SCHEDULER – allows users to schedule reports.
 - XMLP_ANALYZER_EXCEL – allows users to use the Excel analysis feature.
 - XMLP_ANALYZER_ONLINE – allows users to use the online analysis feature.
 - XMLP_TEMPLATE_DESIGNER - allows users to connect to the BI Publisher server from the Template Builder and to upload and download templates.

To create the Group, select the **Groups** subtab, then click **Create**.



- Assign users to the group.
Select each group and click **Manage**, then click **Edit**.

Manage Group > Logged in as **orcladmin**

[Owners](#)
[Members](#)
[Roles Assignment](#)
[Existing Group Memberships](#)
[Edit History](#)

Edit Group

Basic Information

* Name
 * Display Name
 * Description
 Group Visibility Public Private
 Make this group privileged. Enabling this option will allow you to perform the assignment of privileges to this group. Non privileged group cannot be associated with any privilege.

Owners

[Return to Top](#)

Select Owner and ...

| Select Name | Description/Email | Type |
|--|-------------------|------|
| <input checked="" type="radio"/> orcladmin | orcladmin | user |

Members

[Return to Top](#)

Select Member and ...

| Select Name | Description/Email | Type |
|--|------------------------|------|
| <input checked="" type="radio"/> orcladmin | orcladmin | user |
| <input type="radio"/> admin | admin@oracle.com | user |
| <input type="radio"/> testuser1 | bipublisher@oracle.com | user |

- Click the **Add User** button to add users to the Group.

http://ipgpc38.us.oracle.com:7777 - (orcladmin) Provisioning Console - UserSearch - Mozilla...

Search and Select: User

Search

Search for user

Result

| Select | Name | Email Address |
|----------------------------------|-------------|------------------------|
| <input checked="" type="radio"/> | bipublisher | bipublisher@oracle.com |

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Setting Up Oracle Single Sign-On

This section describes how to set up Oracle Single Sign-On with Oracle 10g Application

Server (OracleAS). These guidelines are written based on the Oracle 10g Application Server 10.1.3 release.

Prerequisites

- OracleAS 10g Infrastructure installation (including SSO server)
- The BI Publisher xmlpserver is set up with Oracle Internet Directory (OID) LDAP server.

Note: If you want to set up the BI Publisher server on a different server, that server must also be OracleAS 10g and must be registered in the main OracleAS 10g Infrastructure. This can be done by installing the new OracleAS 10g J2EE and Web Cache. The procedure for this installation is as follows (for AS 10.1.3):

- Run the AS installer
- Choose Oracle Application Server 10g 10.1.3
- Choose J2EE and Web Cache
- Follow the installer instructions. In the OID section, point to the master OracleAS 10g Infrastructure installation on your main server.

Setup Procedure

1. Navigate to the SSO Server home page. Select **SSO Server Administration**. Typically, the URL is: `http://host:port/pls/orasso`.
2. From the SSO Server Administration page, select **Administer Partner Applications**.
3. From the Administer Partner Applications page, select **Add Partner Application**.
4. On the **Create Partner Application** page, under Partner Application Login, enter the following and select **OK**:
 - **Name** : xmlpserver
 - **Home URL** : `http://<xmlpserver host>:<xmlpserver port>/xmlpserver`
 - **Success URL** : `http://<xmlpserver host>:<xmlpserver port>/xmlpserver/login.jsp`
 - **Logout URL** : `http://<xmlpserver host>:<xmlpserver port>/xmlpserver/signout.jsp`

The following figure shows a sample Create Partner Application page:

Create Partner Application [Apply] [OK] [Cancel]

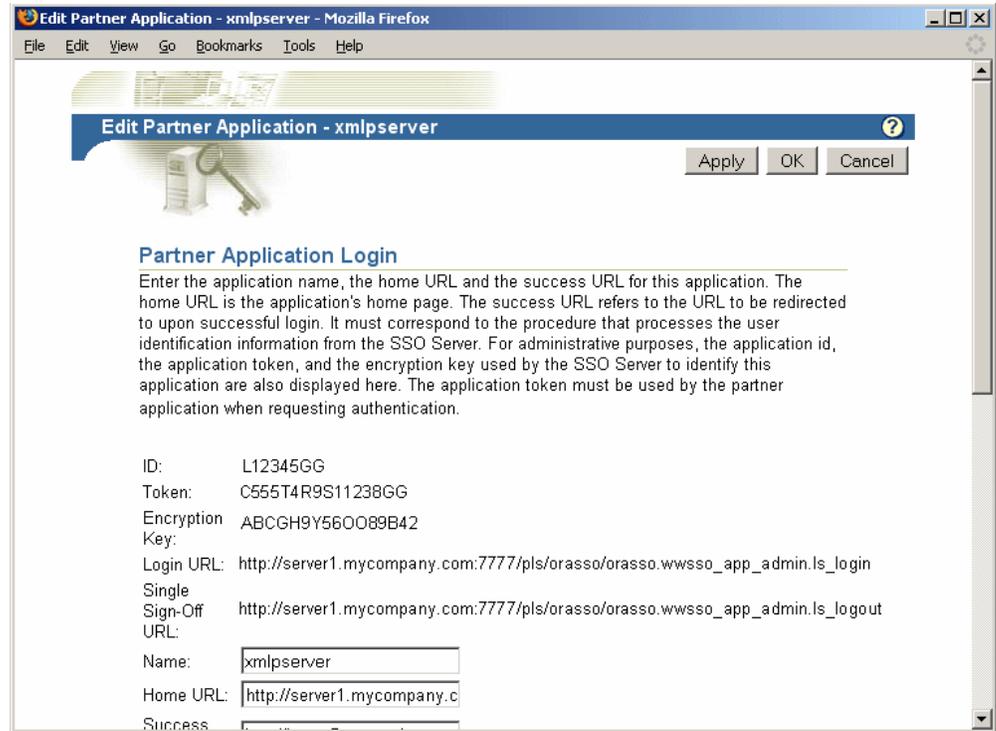
Partner Application Login
 Enter the application name, the home URL and the success URL for this application. The home URL is the application's home page. The success URL refers to the URL to be redirected to upon successful login. It must correspond to the procedure that processes the user identification information from the SSO Server.

Name:
 Home URL:
 Success URL:
 Logout URL:

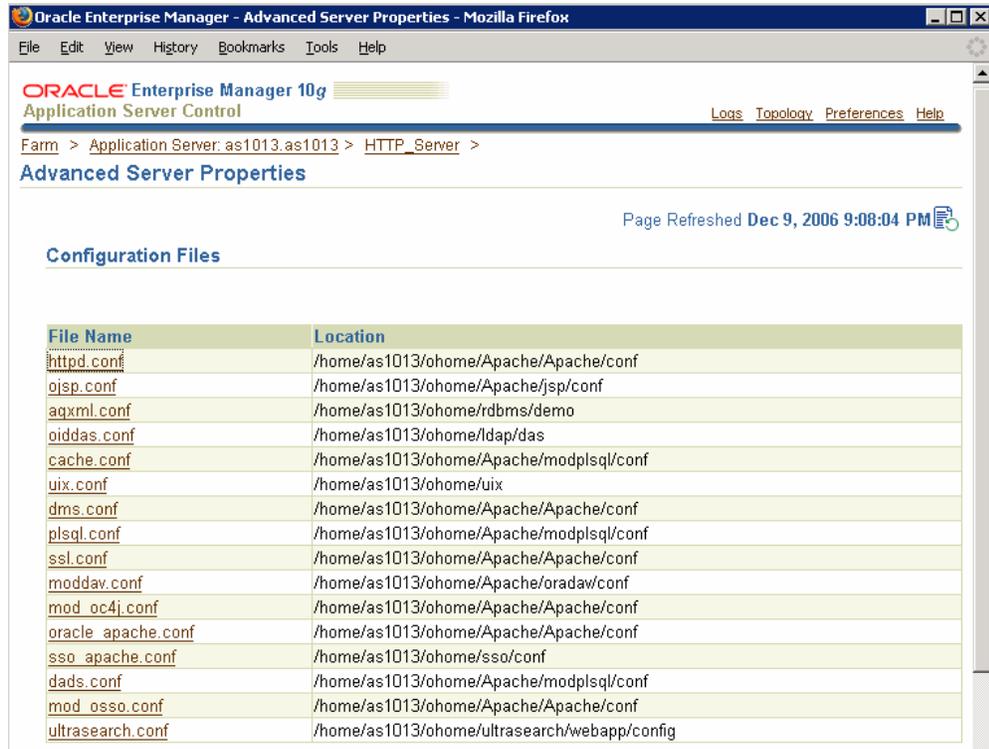
Valid Login Timeframe
 Enter the dates between which logins to the application will be allowed through the SSO Server. A null end date implies an indefinite login timeframe.

Start Date: Use Format DD-MON-YYYY
 End Date: Use Format DD-MON-YYYY

5. If the process was successful, you will see the entry "xmlpserver" on the Administer Partner Applications page. Select the **Edit** icon
6. From the Edit Partner Application page, note the value of **Single Sign-Off URL**.
 The following figure shows a sample Edit Partner Application page:



7. Modify the application server configuration file. Navigate to Application Server Control (ASC). Choose **HTTP Server** and then choose **Advanced Server Properties**. The following figure shows a sample Advanced Server Properties page:



Select `mod_osso.conf` to open the file for editing. To protect the server, add a new "Location" directive as follows:

```
<!-- Protect xmlpserver -->
<Location /xmlpserver>
    require valid-user
    AuthType Basic
</Location>
```

- (Optional) To allow access to the Guest Folder in BI Publisher for users not signed on through SSO, you must make an additional modification to the `mod_osso.conf` file to allow traffic to the Guest folder without checking the SSO token. To do this, add the following directive:

```
<Location /xmlpserver/Guest/>
    require valid-user
    AuthType Basic
    Allow from All
    Satisfy any
</Location>
```

- For integration with Oracle BI Presentation Services, you must disable SSO for Web services between the BI Presentation Services server and the BI Publisher server.

To open up the `xmlpserver` to allow the Web service, enter the following directive in the `mod_osso.conf` file:

```
<Location /xmlpsver/services/>
  require valid-user
    AuthType Basic
    Allow from All
    Satisfy any
</Location>
```

You must make a similar entry to open the BI Presentation Services server. For more information on required configuration for BI Publisher Enterprise and Oracle BI Presentation services, see the *Oracle Business Intelligence Enterprise Edition Deployment Guide*.

A sample `mod_osso.conf` file with the entries discussed in this section is shown below:

```

LoadModule osso_module libexec/mod_osso.so

<IfModule mod_osso.c>
    OssoIpCheck off
    OssoIdleTimeout off
    OssoConfigFile
/home/as1013/ohome/Apache/Apache/conf/osso/osso.conf

    <Location /xmlpserver>
        require valid-user
        AuthType Basic
    </Location>

    <Location /xmlpserver/services>
        require valid-user
        AuthType Basic
        Allow from All
        Satisfy any
    </Location>

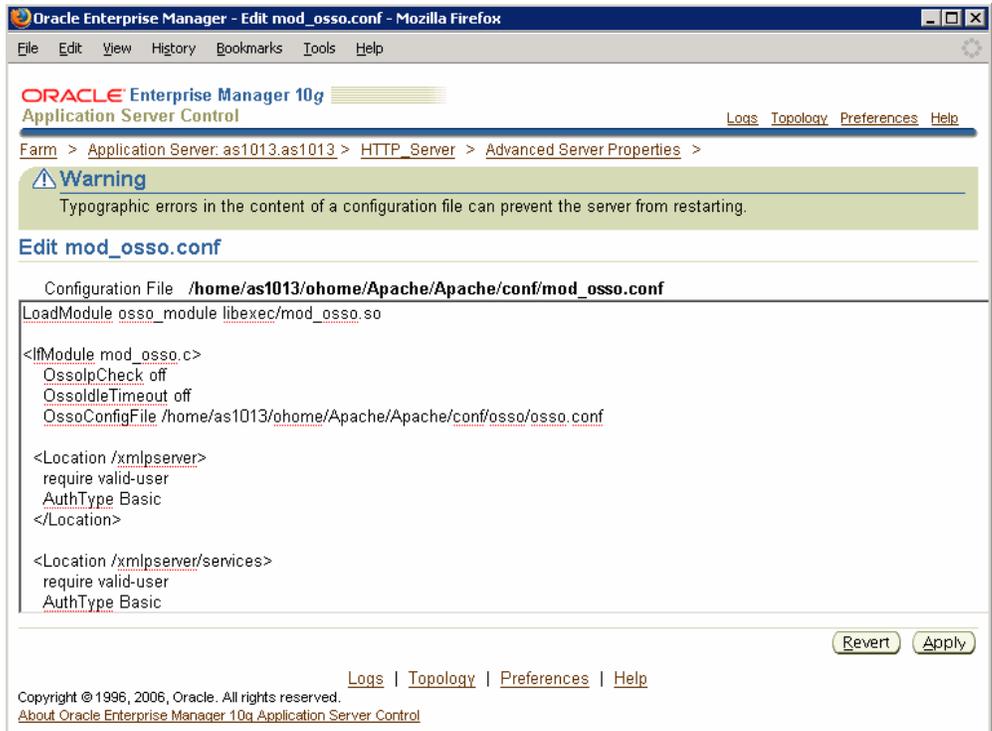
<Location /xmlpserver/Guest/>
    require valid-user
    AuthType Basic
    Allow from All
    Satisfy any
</Location>
#
# Insert Protected Resources: (see Notes below for how to protect
resources)
#

# _____ -
#
# Notes
#
# _____ -
#
# 1. Here's what you need to add to protect a resource,
#    e.g. <ApacheServerRoot>/htdocs/private:
#
#         <Location /private>
#         require valid-user
#         AuthType Basic
#         </Location>
#
</IfModule>

#
# If you would like to have short hostnames redirected to
# fully qualified hostnames to allow clients that need
# authentication via mod_osso to be able to enter short
# hostnames into their browsers uncomment out the following
# lines
#
#PerlModule Apache::ShortHostnameRedirect
#PerlHeaderParserHandler Apache::ShortHostnameRedirect

```

A sample of edit page is shown in the following figure:



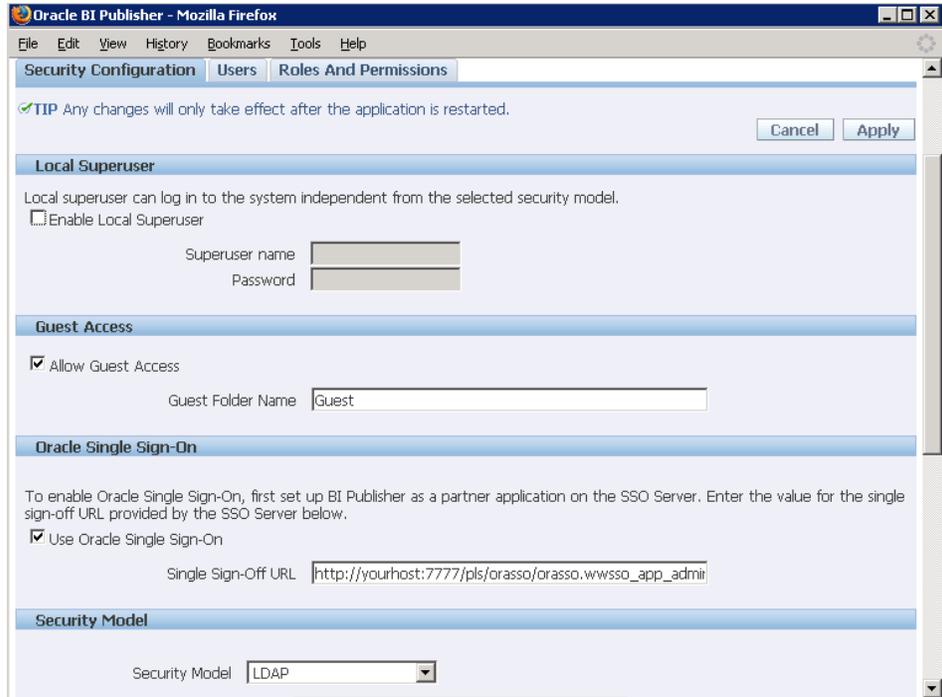
10. Restart the HTTP server.

11. Set up the Single Sign-Off URL on the BI Publisher Security Configuration page.

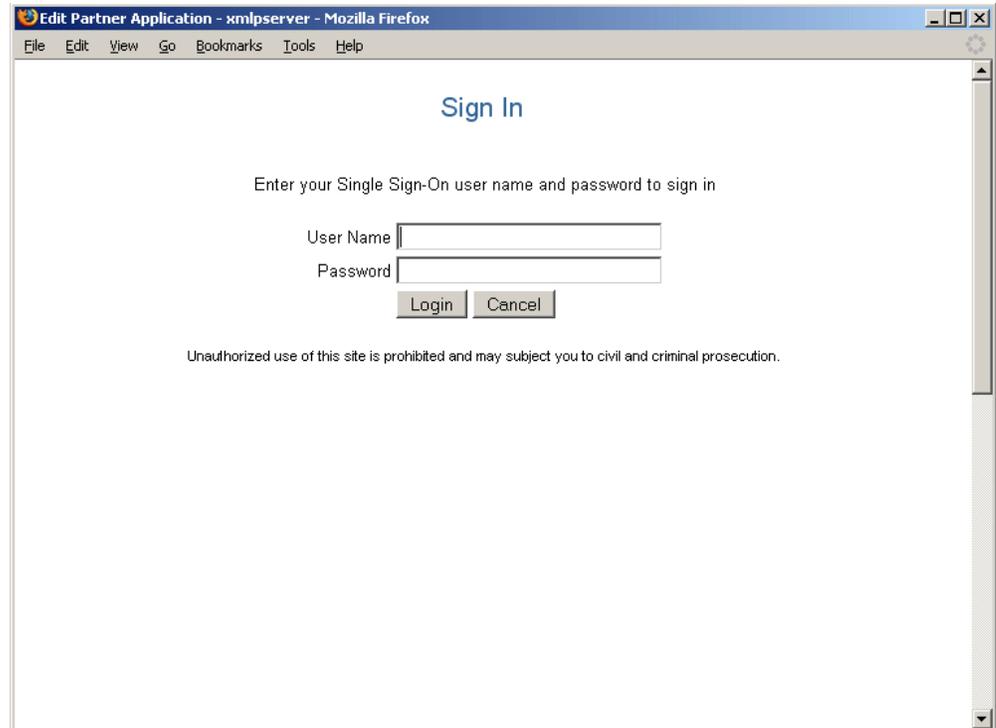
From the Admin tab, select Security Configuration. Enter the following in the Oracle Single Sign-On region:

- Select **Use Oracle Single Sign-On**
- Enter the Single Sign-Off URL with the value you wrote down in the preceding step.

A sample BI Publisher Security Configuration page is shown in the following figure:



12. Restart the application through the Application Server Control page.
13. Enter the URL to access the BI Publisher Enterprise application, and you will be redirected to the SSO login page.
A sample SSO login page is shown in the following figure:



Integrating with Oracle E-Business Suite Security

BI Publisher can leverage your E-Business Suite security to enable your E-Business Suite users to log in to BI Publisher using their E-Business Suite credentials. When you integrate with the E-Business Suite security, your E-Business Suite responsibilities become available as roles in the BI Publisher security center. You can then associate BI Publisher report folders to the imported roles/responsibilities to allow access as you would using the BI Publisher native security. See *Understanding Users and Roles*, page 10-2.

Note: In this release your users will not be able to access or execute reports stored on the E-Business Suite instance.

Setting Up the E-Business Suite Security in BI Publisher

Upload the dbc File

1. In the Oracle E-Business Suite, log in as a System Administrator and create the following responsibilities to correspond to the BI Publisher functional roles:
 - XMLP_ADMIN – this is the administrator role for the BI Publisher server.
 - XMLP_DEVELOPER – allows users to build reports in the system.

- XMLP_SCHEDULER – allows users to schedule reports.
 - XMLP_ANALYZER_EXCEL – allows users to use the Excel analysis feature.
 - XMLP_ANALYZER_ONLINE – allows users to use the online analysis feature.
 - XMLP_TEMPLATE_DESIGNER - allows users to connect to the BI Publisher server from the Template Builder and to upload and download templates.
2. Add the new BI Publisher responsibilities to the appropriate Users.

Note: Ensure to assign at least one user to the XMLP_ADMIN group.
 3. Log in to BI Publisher Enterprise. From the Admin tab, select **Security Configuration**.
 4. In the Security Model section of the page, select Oracle E-Business Suite from the list.
 5. Load your dbc file from the E-Business Suite instance. This is typically located under the \$FND_SECURE directory. If you do not have access to this file, contact your E-Business Suite system administrator. This file specifies how BI Publisher should access the E-Business Suite instance.
 6. It is recommended that you create a local super user for the system to allow you to access the Administrator pages once the changes take effect. Select the **Enable Local Superuser** check box and enter a username and password for the user under the Local Superuser section of the Security Configuration tab.
 7. Restart the BI Publisher server for the security changes to take effect.

Once you restart the system, all your E-Business Suite responsibilities will be visible as roles in the BI Publisher security center. Add folders to the E-Business Suite roles.

Add Folders to the E-Business Suite Roles

1. From the Admin tab select **Roles and Permissions**.
2. All of the responsibilities from your E-Business Suite instance will display as available roles.
3. Find the responsibility (role) that you wish to attach folders to and select **Add Folders**.

Now when EBS users log in using their EBS credentials they will have access to the folders and reports that have been attached to their responsibilities.

Integrating with Oracle BI Server Security

BI Publisher offers integration with Oracle BI Server security so that you can administer the BI Publisher users through the BI Server Administration tool. To accomplish this you must define the BI Publisher functional roles within the Oracle BI Server Administration tool, assign users to these groups, and then specify Oracle BI Security as your security model in the BI Publisher Admin interface.

Note: For information on setting up Oracle BI security, see the *Oracle Business Server Administration Guide*.

1. In the BI Server Administration tool, create the following groups to correspond to the BI Publisher functional roles:
 - XMLP_ADMIN – this is the administrator role for the BI Publisher server.
 - XMLP_DEVELOPER – allows users to build reports in the system.
 - XMLP_SCHEDULER – allows users to schedule reports.
 - XMLP_ANALYZER_EXCEL – allows users to use the Excel analysis feature.
 - XMLP_ANALYZER_ONLINE – allows users to use the online analysis feature.
 - XMLP_TEMPLATE_DESIGNER - allows users to connect to the BI Publisher server from the Template Builder and to upload and download templates.

2. Add the appropriate users to the BI Publisher groups in the BI Server Administration tool.

Note: Ensure to assign at least one user to the XMLP_ADMIN group.

3. In the BI Publisher Enterprise application, log in with Administration privileges. From the Admin tab select **Security Configuration**.

4. In the **Security Model** section of the page, select Oracle BI Server from the list. Provide the following connection information for the BI Server:

- **JDBC Connection String** - example: `jdbc:oraclebi://host:port/`

Note that if your Oracle BI Server is SSL-enabled, you must copy the keystore to the BI Publisher server and provide it in the connection string.

If your Oracle BI servers are set up in a clustered configuration, the connection string must use the appropriate syntax. See Adding the Oracle BI Server as a

JDBC Data Source, page 11-3 for a description of the required syntax.

An example connection string for a clustered, SSL-enabled instance follows:
`jdbc:oraclebi://mycompanyserver.com:9706/PrimaryCCS=BIdb01
;PrimaryCCSPort=9706;ssl=true;sslKeystorefilename=c:\mycom
pany\SSL\OracleBI\sslc\javahost.keystore;sslKeystorepasswo
rd=admin;trustanyserver=true;`

For more information on SSL and on clustered configurations, see the *Oracle Business Intelligence Enterprise Edition Deployment Guide*.

- **Administrator Username and Administrator Password**
 - **Database Driver Class** - example: `oracle.bi.jdbc.AnaJdbcDriver`
5. It is recommended that you create a local super user for the system to allow you to access the Administrator pages once the changes take effect. Select the **Enable Local Superuser** check box and enter a username and password for the user under the Local Superuser section of the Security Configuration tab.
 6. Restart the BI Publisher server for the security changes to take effect.

Add Folders to the Oracle BI Server Roles

1. Log in to BI Publisher as a user with the XMLP_ADMIN role.
2. From the Admin tab select **Roles and Permissions**.
3. All of the groups from your Oracle BI instance will display as available roles.
4. Find the group (role) that you wish to attach folders to and select **Add Folders**.

Using the Admin Functions

This chapter covers the following topics:

- Overview
- Setting Up Data Sources
- Setting Up Integration with Oracle BI Presentation Services
- Setting System Maintenance Options
- Setting Up Delivery Options
- Setting Runtime Properties
- Defining Font Mappings
- Managing Reports and Folders

Overview

Use the Admin interface to set up the following:

- Data Sources
- Security Center Options

Note: For the description of the Security Center options, see *Defining a Security Model*, page 10-1.

- System Maintenance Options, including Server and Scheduler Configuration
- Delivery Options
- Runtime Configuration
- Integration with BI Presentation Services

Setting Up Data Sources

BI Publisher supports three types of data sources:

- JDBC driver database connections
- JNDI datasource connections
- Files

The files data source option enables you to define a directory to which BI Publisher can connect. You can then place XML files in this directory to use as data input to your reports.

When you set up data sources, you can also define security for the data source by selecting which BI Publisher roles can access the data source.

This security mechanism is intended for use with the BI Publisher Developer role to restrict developer use of data sources. For example, suppose you have two datasources: a database containing Financials data and a database containing Human Resources data. The Financials developers should only have access to the Financials data. You can create a role called Financials Developer and assign it the BI Publisher Developer role. You can then assign the Financials Developer to the Financials data source. When the user assigned this role logs in to create reports, he can only see the Financials data source.

By default, BI Publisher Administrators can access all data sources.

If you have not set up the user roles yet, you can assign data sources to a role from the Create Role interface. See Understanding Users and Roles, page 10-2 for more information.

Adding a JDBC Data Source:

1. From the Admin page select **JDBC Connection**. This will display the list of existing JDBC connections.
2. Select the **Add Data Source** button.
3. Enter the following fields for the new connection:
 - **Data Source Name** - enter a display name for the data source.
 - **Connection String** - enter the database connect string.

For an Oracle database the connect string will have the following format:

```
jdbc:oracle:thin@server:port:sid
```

For example:

```
jdbc:oracle:thin@myserver.mycompany.com:1521:prod
```

For a Microsoft SQL Server, the connect string will have the following format:

```
jdbc:sqlserver://server
```

For example:

```
jdbc:sqlserver://myserver.mycompany.com
```

Note that if your Oracle BI Server is SSL-enabled, you must copy the keystore to the BI Publisher server and provide it in the connection string.

- **User Name** - enter the user name required to access the data source on the database.
- **Password** - enter the password associated with the user name for access to the data source on the database.
- **Database Driver Class** - enter the database driver class for the connection.

For example: `oracle.jdbc.driver.OracleDriver` or
`com.microsoft.jdbc.sqlserver.SQLServerDriver`

Important: The JDBC connection library must be placed under [JRE_TOP]/lib. If you are using OC4J, the Oracle driver library will be present with your OC4J install. For other JDBC database libraries you must place them there manually, and restart the server to make them available.

- **Use Proxy Authentication** - select this box to enable Proxy Authentication. This applies to Oracle 10g deployments only. For more information, see *Oracle Database Security Guide 10g*.
4. If you would like to test the connection, select **Test Connection**. If the test is successful, the confirmation message, "Connection established successfully" will display. If connection error occurs, the message "Could not establish connection," will display.
 5. Define security for this data source. Use the shuttle buttons to move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles on the Allowed Roles list will be able to create reports from this the data source.

Adding the Oracle BI Server as a JDBC Data Source:

Note: If you included BI Publisher Enterprise in your Oracle BI Enterprise Edition installation, this data source will be automatically added. You must configure the settings appropriately for your deployment.

To add the Oracle BI Enterprise Edition server as a JDBC data source, follow the guidelines in Adding a JDBC Data Source, page 11-2.

Note that if your Oracle BI Server is SSL-enabled, you must copy the keystore to the BI Publisher server and provide it in the connection string. If your Oracle BI servers are set up in a clustered configuration, the connection string must use the appropriate syntax described in this section.

The entries for Database Driver Class and Connection String must be as follows:

Database Driver Class: `oracle.bi.jdbc.AnaJdbcDriver`

Connection String: The appropriate connection string depends on your specific deployment. For example, if your BI Servers are clustered and/or SSL is enabled, you must construct the URL to include the required properties. For more information on SSL and on clustered configurations, see the *Oracle Business Intelligence Enterprise Edition Deployment Guide*.

The URL for the connection string requires the following format:

```
<URL>:= <Prefix>: [//<Host>:<Port>/][<Property Name>=<Property Value>;]*
```

where

<Prefix>: is the string `jdbc:oraclebi`

<Host>: is the hostname of the analytics server. It can be an IP Address or hostname. The default is `localhost`.

<Port> is the port number that the server is listening on. The default is `9703`.

```
<Property Name>:=  
<Catalog>|<User>|<Password>|<SSL>|<SSLKeyStoreFileName>  
|<SSLKeyStorePassword>|<TrustAnyServer>|<TrustStoreFileName  
>|<TrustStorePassword>|<LogLevel>|<LogFilePath>|<PrimaryCCS>|<PrimaryCCS  
Port>| <SecondaryCCS>|<SecondaryCCSPort>
```

Valid property values are:

<Catalog> - can be any catalog name that is available on the server. If the catalog is not specified, then it will default to the default catalog specified by the server. If the catalog name is not found in the server, it will still use the default catalog and issue a warning during connect.

<User> - specifies the username for the BI Server. The default is "Administrator".

<Password>- specifies the password for the BI Server for the username. The password will be encrypted using 3DES.

<SSL>True|False - default is False. Specifies if the JDBC driver will use SSL or not. If true, the driver will check if `SSLKeyStoreFileName` is readable; if not, it will issue an error message.

<SSLKeyStoreFileName> - the name of the file that store the SSL Keys. This file must exist in the local file system and be readable by the driver.

<SSLKeyStorePassword> - the password to open the file pointed to by `SSLKeyStoreFileName`.

<TrustAnyServer> - True | False - the default is False. If SSL is set to "True" the property specifies whether to check the trust store for the server. If TrustAnyServer is set to "False", the driver will verify that TrustStoreFileName is readable.

<TrustStoreFileName> - if TrustAnyServer is set to false, this property is required to specify the trust store file name.

<TrustStorePassword> - if TrustAnyServer and TrustStoreFileName are specified, this property specifies the password to open up the file specified by TrustStoreFileName.

<LogLevel> - specify the log level. Valid values are

SEVERE | WARNING | INFO | CONFIG | FINE | FINER | FINEST

<LogFilePath> - specifies the file path of the desired logging destination. Default is %TEMP% on windows, \$TMP on UNIX. Driver needs to have write permission on the file. It will create a new entry marked as _0, _1 if the same file name already exists.

<PrimaryCCS> -(For clustered configurations) specifies the primary CCS machine name instead of using the "host" to connect. If this property is specified, the "host" property value is ignored. The jdbc driver will try to connect to the CCS to obtain the load-balanced machine. Default is localhost.

<PrimaryCCSPort> - specifies the primary CCS port number running on the PrimaryCCS machine. Default is 9706.

<SecondaryCCS> - specifies the secondary CCS machine name instead of using the "host" to connect. If this property is specified, then the jdbc driver will try to connect to the CCS to obtain the load-balanced machine. Default is localhost.

<SecondaryCCSPort> - specifies the secondary CCS port number running on the secondary machine. Default is 9706.

Following is an example connection string for a clustered deployment with SSL enabled:

```
jdbc:oraclebi://machine01.domain:9706/PrimaryCCS=machine01;PrimaryCCSPort=9706;SecondaryCCS=machine02;SecondaryCCSPort=9706;user=admin;password=welcome;ssl=true;sslKeystorefilename=c:\mycompany\OracleBI\sslc\javahost.keystore;sslKeystorepassword=welcome;trustanyserver=true;
```

Adding a JNDI Data Source:

1. From the Admin page select **JNDI Connection**. This will display the list of existing JNDI connections.
2. Select the **Add Data Source** button.
3. Enter the following fields for the new connection:
 - **Data Source Name** - enter a display name for the data source.
 - **JNDI Name** - enter the JNDI name of the data source.

- **Use Proxy Authentication** - select this box to enable Proxy Authentication. This applies to Oracle 10g deployments only. For more information, see *Oracle Database Security Guide 10g*.
4. If you would like to test the connection, select **Test Connection**. If the test is successful, the confirmation message, "Connection established successfully" will display. If connection error occurs, the message "Could not establish connection," will display.
 5. Define security for this data source. Use the shuttle buttons to move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles on the Allowed Roles list will be able to create reports from this the data source.

Adding a File Data Source:

1. From the Admin page select **File**. This will display the list of existing file sources.
2. Select the **Add Data Source** button.
3. Enter the following fields for the new data source:
 - **Data Source Name** - enter a display name for the data source.
 - **Path** - enter the full path to the top-level directory on your server.
4. Define security for this data source. Use the shuttle buttons to move roles from the **Available Roles** list to the **Allowed Roles** list. Only users assigned the roles on the Allowed Roles list will be able to create reports from this the data source.

Viewing or Updating a Data Source:

1. From the Admin page select the Data Source type to update.
2. Select the name of the connection to view or update. All fields are updateable.
3. Select **Apply** to apply any changes or **Cancel** to exit the update page.

Setting Up Integration with Oracle BI Presentation Services

By setting up integration with Oracle BI Presentation Services you enable connection to Oracle BI Answers requests as data sources for your reports.

The Oracle BI installer when installing BI Publisher, performs integration with Presentation Services if Presentation Services is also installed with BI Publisher. This means that the Oracle BI installer sets the Presentation Services hostname, port, url values in BI Publisher configuration file `xmlp-server-config.xml`. But the user still needs

to set the Presentation Services username and password in BI Publisher configuration since those are not known at install time.

Note: If you included BI Publisher Enterprise in your Oracle BI Enterprise Edition installation, the Oracle BI installer will set the Presentation Services hostname, port, and url values. However, you must manually enter the Presentation Services username and password here.

1. From the Admin page, under **Integration**, select **Oracle BI Presentation Services**.
2. Enter the following information about your BI Presentation Services server:
 - Server Protocol - select http or https
 - Server Version - select v4
 - Server - enter the server host name. For example: `server01.mycompany.com`
 - Port for the server
 - Administrator Username and Password
 - URL Suffix - default value is: `analytics/saw.dll`

Note: If your deployment is configured for SSO, ensure that this suffix matches the non-SSO application you set up to allow the Web service between the BI Publisher and BI Presentation Services servers. For example: `analyticsSOAP/saw.dll`. For more information, see Setting Up Oracle Single Sign-On, page 10-16.

- Session time out in minutes

Setting System Maintenance Options

Under System Maintenance, you can perform the following administration tasks:

- Set Server Configuration Options
- Set Scheduler Configuration Options
- Refresh Metadata

Setting Server Configuration Options

Use the Server Configuration tab to define

- Your report repository
- General properties for the server
- Caching specifications

Defining Your Report Repository

The report repository can be set up in either the file system or the database.

Defining a File System-Based Repository

1. Under Report Repository, select **File System** as the **Repository Type**.
2. Enter the absolute **Path**.

For example: `/home/bipublisher/repository`

Defining a Database-Based Repository

Important: If you stop and start or restart the database that contains your BI Publisher repository, you must restart you BI Publisher Enterprise server.

1. Under Report Repository, select **XML DB** as the **Repository Type**.
2. Enter the absolute **Path**. For example: `/public/Reports`
3. Select the **Connection Type**: JDBC or JNDI.

Important: Connection type JDBC is **not** recommended for the repository.

- If you select JNDI, enter the JNDI connection pool **Name**
- If you select JDBC (not recommended), enter the following:
 - URL
Example: `jdbc:oracle:thin:@rpts.mycompany.com:1525:ora10g`
 - Username
 - Password

- Database Driver Class

Example: `oracle.jdbc.driver.OracleDriver`

Defining General Properties

- **Debug Level** - Controls the amount of debug information generated by the system. It set to `Exception` (the default setting), only error information is generated. If set to `Debug`, all system output is generated.
- **Report Viewer Height** - sets the size of the report viewing frame in your browser. Enter a value in pixels. The default is 600.
- **Report Scalable Threshold** - sets the threshold at which data is cached on the disk. When the data volume is very large, caching the data will save memory, but will result in slower processing. Enter a value in kilobytes. The default is 10000000 (10 megabytes).
- **Output Formats** - select the formats that you want displayed to the user by default for every RTF template-based report. This server-level setting is overridden by the Output Format types selected in the report definition. See *Adding Layouts to the Report Definition*, page 3-25.

Setting Cache Specifications

Set the following properties to configure the BI Publisher cache:

- **Cache Expiration** - Enter the expiration period for the dataset cache in minutes. The default is 30.

For datasets returned by a SQL query, HTTP, or Oracle BI Answers, you have the option of caching the dataset returned by the query. The returned dataset will remain in cache for the period specified by this property. For more information about setting this property, see *Defining the Data Model*, page 3-5.
- **Cache Size Limit** - Enter the maximum number of datasets to maintain in the cache. The default is 1000.
- **Maximum Cached Reports** - Enter the maximum number of reports to maintain in the cache. The default is 50.

Setting Scheduler Configuration Options

Important: If you stop and start or restart the database that contains your BI Publisher Scheduler tables, you must restart you BI Publisher Enterprise server.

Select the Scheduler Configuration tab and enter the details for your scheduler database:

- Select the **Database Type** to be used for the BI Publisher scheduler from the list of supported databases.
- Enter the database **Connection String**. For example:
`jdbc:oracle:thin:@mydatabase:1525:ora10g`
- Enter the **Username** and **Password** for the database.
- Enter the **Database Driver Class**. For example:
`oracle.jdbc.driver.OracleDriver`

Select **Test Connection** to ensure that BI Publisher can successfully connect to your scheduler database.

Select **Install Schema** to install the BI Publisher scheduler schema to your database.

Important: You must restart the application for changes in the Scheduler settings to take effect.

Scheduler Properties

If you have enabled clustering for your BI Publisher application, you must select **Enable Clustering** for the scheduler.

Refresh Metadata

If you copy reports as files or folders directly to the file system or XML database repository, you must refresh the metadata to make these reports available via the user interface.

Setting Up Delivery Options

Set Delivery Configuration Options:

1. From the Admin page select **Delivery Configuration**.
2. Enter the following properties:
 - **SSL Certificate File** - if SSL is enabled for your installation, you can leave this field empty to use the default certificates built-in with BI Publisher. SSL will work with the default certificate if the server uses the certificate signed by a trusted certificate authority such as Verisign. This field is mandatory only if the user uses the SSL with a self-signed certificate. The self-signed certificate means the certificate is signed by a non-trusted certificate authority (usually the user).

- **Email From Address** - enter the From address that you want to appear on email report deliveries from the BI Publisher server. The default value is `bipublisher-report@oracle.com`.
- **Delivery Notification Email From Address** - enter the From address that you want to appear on notifications delivered from the BI Publisher server. The default value is `bipublisher-notification@oracle.com`.
- **Notification Subject** - enter the subject line you want to appear on the email for each of the following delivery types: Success, Warning, and Failure.

Set Up Print or Fax Server:

Printing is only supported through Internet Printing Protocol (IPP). You must set up CUPS or Windows Print Server for IPP. See Print Server Setup, page 12-1.

1. From the Admin page select **Printer** or **Fax**. Select **Add Server**.
2. Enter the required fields **Server Name** and **URI** for the new server.

Important: You must enter a unique name for each server regardless of the type (printer, fax, email, WebDAV, or FTP).

3. Optionally enter a **Filter**.

A filter enables you to call a conversion utility to convert PDF to Postscript or PDF to TIFF (for fax) for Windows-based print servers. To specify the filter, pass the native OS command string with the 2 placeholders for the input and output filename, {infile} and {outfile}.

This is useful especially if you are trying to call IPP printers directly or IPP printers on Microsoft Internet Information Service (IIS). Unlike CUPS, those print servers do not translate the print file to a format the printer can understand, therefore only limited document formats are supported. With the filter functionality, you can call any of the native OS commands to transform the document to the format that the target printer can understand.

For example, to transform a PDF document to a Postscript format, enter the following PDF to PS command in the **Filter** field:

```
pdftops {infile} {outfile}
```

To call an HP LaserJet printer setup on a Microsoft IIS from Linux, you can set Ghostscript as a filter to transform the PDF document into the format that the HP LaserJet can understand. To do this, enter the following Ghostscript command in the **Filter** field:

```
gs -q -dNOPAUSE -dBATCH -sDEVICE=laserjet -sOutputFile={outfile}
{infile}
```

For fax servers, you can use the filter to transform the file to Tag Image File Format (TIFF).

4. Optionally enter the following fields if appropriate:
 - Security fields: Username and Password, Authentication Type (None, Basic, Digest) and Encryption Type (None, SSL).
 - Proxy Server fields: Host, Port, User Name, Password, Authentication Type (None, Basic, Digest)

Set Up WebDAV Server:

1. From the Admin page select **WebDAV**. This will show the list of servers already added. Select **Add Server**.
2. Enter the **Name** and **Host** for the new server.

Important: You must enter a unique name for each server regardless of the type (printer, fax, email, WebDAV, or FTP).

3. Optionally enter the following fields if appropriate:
 - General fields: Port
 - Security fields: Authentication Type (None, Basic, Digest) and Encryption Type (None, SSL).
 - Proxy Server fields: Host, Port, User Name, Password, Authentication Type (None, Basic, Digest)

Set Up Email or FTP Server:

1. From the Admin page select Email or FTP. This will show the list of servers already added. Select **Add Server**.
2. Enter the **Name** and **Host** for the Email or FTP server.

Important: You must enter a unique name for each server regardless of the type (printer, fax, email, WebDAV, or FTP).

3. Optionally enter the following fields if appropriate:
 - General fields: Port

- Security fields: Username and Password.

Set Up Common Unix Printing System (CUPS) Server:

1. From the Admin page select CUPS. This will show the list of servers already added. Select **Add Server**.
2. Enter the **Server Name** and **Host** and **Port** for the CUPS server.

For more information see Setting Up CUPS, page 12-1.

Setting Runtime Properties

The Runtime Configuration page enables you to set runtime properties at the server level. You can also set properties at the report level. If conflicting values are set for a property at each level, the report level will take precedence.

To set a property at the report level, select the report, and then select the **Configure** link. This will launch the Runtime Configuration page, displaying a column to enable update to the properties for the report and a column that displays the read-only values set for the server.

Note: In versions prior to 10.1.3.2 the Runtime Configuration properties administered through this page were set in a configuration file. This file is still used as a fallback if values are not set through this interface. However, please note that the file is not updated when you update the Runtime Configuration Properties page. For details about the file, see Configuration File Reference, page D-1.

PDF Output Properties

The following properties are available for PDF output:

| Property Name | Internal Name | Default Value | Description |
|---------------------|---------------------|---------------|--|
| Compress PDF output | pdf-compressi on | True | Specify "True" or "False" to control compression of the output PDF file. |

| Property Name | Internal Name | Default Value | Description |
|-----------------------------|-----------------------------|---------------|--|
| Hide PDF viewer's menu bars | pdf-hide-menu bar | False | Specify "True" to hide the viewer application's menu bar when the document is active. The menu bar option is only effective when using the Export button, which displays the output in a standalone Acrobat Reader application outside of the browser. |
| Hide PDF viewer's tool bars | pdf-hide-tool bar | False | Specify "True" to hide the viewer application's toolbar when the document is active. |
| Replace smart quotes | pdf-replace-s martquotes | True | Set to "False" if you do not want curly quotes replaced with straight quotes in your PDF output. |

PDF Security

Use the following properties to control the security settings for your output PDF documents:

| Property Name | Internal Name | Default Value | Description |
|-----------------------------|------------------------------|---------------|---|
| Enable PDF Security | pdf-security | False | If you specify "True," the output PDF file will be encrypted. You must also specify the following properties: <ul style="list-style-type: none"> • Open document password • Modify permissions password • Encryption Level |
| Open document password | pdf-open-passw ord | N/A | This password will be required for opening the document. It will enable users to open the document only. This property is enabled only when "Enable PDF Security" is set to "True". |
| Modify permissions password | pdf-permission s-password | N/A | This password enables users to override the security setting. This property is effective only when "Enable PDF Security" is set to "True". |

| Property Name | Internal Name | Default Value | Description |
|-------------------------------|------------------------------|---------------|--|
| Encryption level | pdf-encryption-level | 0 - low | <p>Specify the encryption level for the output PDF file. The possible values are:</p> <ul style="list-style-type: none"> • 0: Low (40-bit RC4, Acrobat 3.0 or later) • 1: High (128-bit RC4, Acrobat 5.0 or later) <p>This property is effective only when "Enable PDF Security" is set to "True". When Encryption level is set to 0, you can also set the following properties:</p> <ul style="list-style-type: none"> • Disable printing • Disable document modification • Disable context copying, extraction, and accessibility • Disable adding or changing comments and form fields <p>When Encryption level is set to 1, the following properties are available:</p> <ul style="list-style-type: none"> • Enable text access for screen readers • Enable copying of text, images, and other content • Allowed change level • Allowed printing level |
| Disable document modification | pdf-no-changing-the-document | False | Permission available when "Encryption level" is set to 0. When set to "True", the PDF file cannot be edited. |
| Disable printing | pdf-no-printing | False | Permission available when "Encryption level" is set to 0. When set to "True", printing is disabled for the PDF file. |

| Property Name | Internal Name | Default Value | Description |
|--|--------------------------|---------------|---|
| Disable adding or changing comments and form fields | pdf-no-accff | False | Permission available when "Encryption level" is set to 0. When set to "True", the ability to add or change comments and form fields is disabled. |
| Disable context copying, extraction, and accessibility | pdf-no-cceda | False | Permission available when "Encryption level" is set to 0. When set to "True", the context copying, extraction, and accessibility features are disabled. |
| Enable text access for screen readers | pdf-enable-accessibility | True | Permission available when "Encryption level" is set to 1. When set to "True", text access for screen reader devices is enabled. |
| Enable copying of text, images, and other content | pdf-enable-copying | False | Permission available when "Encryption level" is set to 1. When set to "True", copying of text, images, and other content is enabled. |
| Allowed change level | pdf-changes-allowed | 0 | <p>Permission available when "Encryption level" is set to 1. Valid Values are:</p> <ul style="list-style-type: none"> • 0: none • 1: Allows inserting, deleting, and rotating pages • 2: Allows filling in form fields and signing • 3: Allows commenting, filling in form fields, and signing • 4: Allows all changes except extracting pages |

| Property Name | Internal Name | Default Value | Description |
|------------------------|----------------------|---------------|---|
| Allowed printing level | pdf-printing-allowed | 0 | <p>Permission available when "Encryption level" is set to 1. Valid values are:</p> <ul style="list-style-type: none"> • 0: None • 1: Low resolution (150 dpi) • 2: High resolution |

RTF Output

The following properties can be set to govern RTF output files:

| Property Name | Internal Name | Default Value | Description |
|--------------------------------------|--|---------------|---|
| Enable change tracking | rtf-track-changes | False | Set to "True" to enable change tracking in the output RTF document. |
| Protect document for tracked changes | rtf-protect-document-for-tracked-changes | False | Set to "True" to protect the document for tracked changes. |

HTML Output

The following properties can be set to govern HTML output files:

| Property Name | Internal Name | Default Value | Description |
|----------------------|--------------------------|---------------|---|
| Show header | html-show-header | True | Set to "False" to suppress the template header in HTML output. |
| Show footer | html-show-footer | True | Set to "False" to suppress the template footer in HTML output. |
| Replace smart quotes | html-replace-smartquotes | True | Set to "False" if you do not want curly quotes replaced with straight quotes in your HTML output. |

| Property Name | Internal Name | Default Value | Description |
|-----------------------------|---------------------------|---------------|--|
| Character set | html-output-character-set | UTF-8 | Specify the output HTML character set. |
| Make HTML output accessible | make-accessible | False | Specify true if you want to make the HTML output accessible. |
| Base image URI | html-image-base-uri | N/A | Base URI which is inserted into the <code>src</code> attribute of the image tag before the image file name. This works only when the image is embedded in the template. |
| Image file directory | html-image-dir | N/A | Enter the directory for BI Publisher to store the image files that are embedded in the template. |
| Base CSS URI | html-css-base-uri | N/A | Base URI which is inserted into the HTML header to specify where the cascading stylesheets (CSS) for your output HTML documents will reside. You must set this property when <code>make-accessible</code> is true. |
| CSS file directory | html-css-dir | N/A | The CSS directory where BI Publisher stores the css file. You must set this property when <code>make-accessible</code> is true. |

FO Processing Properties

The following properties can be set to govern FO processing:

| Property Name | Internal Name | Default Value | Description |
|---|----------------|---------------|--|
| Use BI Publisher's XSLT processor | xslt-xdoparser | True | Controls BI Publisher's parser usage. If set to False, XSLT will not be parsed. |
| Enable scalable feature of XSLT processor | xslt-scalable | False | Controls the scalable feature of the XDO parser. The property "Use BI Publisher's XSLT processor" must be set to "True" for this property to be effective. |

| Property Name | Internal Name | Default Value | Description |
|---------------------------------------|------------------------------|---------------|---|
| Enable XSLT runtime optimization | xslt-runtime-optimization | True | <p>When set to "True", the overall performance of the FO processor is increased and the size of the temporary FO files generated in the temp directory is significantly decreased. Note that for small reports (for example 1-2 pages) the increase in performance is not as marked.</p> <p>To further enhance performance when you set this property to True, it is recommended that you set the property Extract attribute sets to "False". See RTF Template Properties, page 11-19.</p> |
| Pages cached during processing | system-cache-page-size | 50 | <p>This property is enabled only when you have specified a Temporary Directory (under General properties). During table of contents generation, the FO Processor caches the pages until the number of pages exceeds the value specified for this property. It then writes the pages to a file in the Temporary Directory.</p> |
| Bidi language digit substitution type | digit-substitution | None | <p>Valid values are "None" and "National". When set to "None", Eastern European numbers will be used. When set to "National", Hindi format (Arabic-Indic digits) will be used. This setting is effective only when the locale is Arabic, otherwise it is ignored.</p> |
| Disable variable header support | fo-prevent-variable-header | False | <p>If "True", prevents variable header support. Variable header support automatically extends the size of the header to accommodate the contents.</p> |
| Add prefix to IDs when merging FO | fo-merge-conflict-resolution | False | <p>When merging multiple XSL-FO inputs, the FO Processor automatically adds random prefixes to resolve conflicting IDs. Setting this property to "True" disables this feature.</p> |

RTF Template Properties

The following properties can be set to govern RTF templates:

| Property Name | Internal Name | Default Value | Description |
|------------------------------|----------------------------|--|---|
| Extract attribute sets | rtf-extract-attribute-sets | Auto | <p>The RTF processor will automatically extract attribute sets within the generated XSL-FO. The extracted sets are placed in an extra FO block, which can be referenced. This improves processing performance and reduces file size.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> • Enable - extract attribute sets for all templates and subtemplates • Auto - extract attribute sets for templates, but not subtemplates • Disable - do not extract attribute sets |
| Enable XPath rewriting | rtf-rewrite-path | True | <p>When converting an RTF template to XSL-FO, the RTF processor will automatically rewrite the XML tag names to represent the full XPath notations. Set this property to "False" to disable this feature.</p> |
| Characters used for checkbox | rtf-checkbox-glyph | Default value: Albany WT J;9746;9747/A | <p>The BI Publisher default PDF output font does not include a glyph to represent a checkbox. If your template contains a checkbox, use this property to define a Unicode font for the representation of checkboxes in your PDF output. You must define the Unicode font number for the "checked" state and the Unicode font number for the "unchecked" state using the following syntax: <code>fontname;<unicode font number for true value's glyph >;<unicode font number for false value's glyph></code></p> <p>Example: Albany WT J;9746;9747/A</p> <p>Note that the font that you specify must be made available to BI Publisher at runtime.</p> |

PDF Form Template Properties

The following properties can be set to govern PDF templates:

| Property Name | Default Value | Description |
|---|---------------|--|
| Remove PDF fields from output | False | Specify "true" to remove PDF fields from the output. When PDF fields are removed, data entered in the fields cannot be extracted. For more information, see Setting Fields as Updateable or Read Only, page 8-16. |
| Set all fields as read only in output | true | By default, BI Publisher sets all fields in the output PDF of a PDF template to be read only. If you want to set all fields to be updateable, set this property to "false". For more information, see Setting Fields as Updateable or Read Only, page 8-16. |
| Maintain each field's read only setting | False | Set this property to "true" if you want to maintain the "Read Only" setting of each field as defined in the PDF template. This property overrides the settings of "Set all fields as read only in output." For more information, see Setting Fields as Updateable or Read Only, page 8-16. |

Defining Font Mappings

BI Publisher's Font Mapping feature enables you to map base fonts in RTF or PDF templates to target fonts to be used in the published document. Font Mappings can be specified at the site or report level. Font mapping is performed only for PDF output.

There are two types of font mappings:

- RTF Templates - for mapping fonts from RTF templates and XSL-FO templates to PDF output fonts
- PDF Templates - for mapping fonts from PDF templates to different PDF output fonts.

Making Fonts Available to BI Publisher

BI Publisher provides a set of Type1 fonts and a set of TrueType fonts. You can select any of the fonts in these sets as a target font with no additional setup required. For a list of the predefined fonts see BI Publisher's Predefined Fonts, page 11-22.

The predefined fonts are located in `$JAVA_HOME/jre/lib/fonts`. If you wish to map to another font, you must place the font in this directory to make it available to BI Publisher at runtime. If your environment is clustered, you must place the font on every server.

Setting Font Mapping at the Site Level or Report Level

A font mapping can be defined at the site level or the report level:

- To set a mapping at the site level, select the **Font Mappings** link from the Admin page.
- To set a mapping at the report level, select the **Configuration** link for the report, then select the **Font Mappings** tab. These settings will apply to the selected report only.

The report-level settings will take precedence over the site-level settings.

Creating a Font Mapping

From the **Admin** page, under **Runtime Configuration**, select **Font Mappings**.

To create a Font Mapping

- Under **RTF Templates** or **PDF Templates**, select **Add Font Mapping**.
- Enter the following on the **Add Font Mapping** page:
 - **Base Font** - enter the font family that will be mapped to a new font. Example: Arial
 - Select the **Style**: Normal or Italic (Not applicable to PDF Template font mappings)
 - Select the **Weight**: Normal or Bold (Not applicable to PDF Template font mappings)
 - Select the **Target Font Type**: Type 1 or TrueType
 - Enter the **Target Font**

If you selected TrueType, you can enter a specific numbered font in the collection. Enter the **TrueType Collection (TTC) Number** of the desired font.

For a list of the predefined fonts see BI Publisher's Predefined Fonts, page 11-22

BI Publisher's Predefined Fonts

BI Publisher provides a set of Type1 fonts and a set of TrueType fonts. You can select

any of these fonts as a target font with no additional setup required.

The Type1 fonts are listed in the following table:

Type 1 Fonts

| Number | Font Family | Style | Weight | Font Name |
|---------------|--------------------|--------------|---------------|-----------------------|
| 1 | serif | normal | normal | Time-Roman |
| 1 | serif | normal | bold | Times-Bold |
| 1 | serif | italic | normal | Times-Italic |
| 1 | serif | italic | bold | Times-BoldItalic |
| 2 | sans-serif | normal | normal | Helvetica |
| 2 | sans-serif | normal | bold | Helvetica-Bold |
| 2 | sans-serif | italic | normal | Helvetica-Oblique |
| 2 | sans-serif | italic | bold | Helvetica-BoldOblique |
| 3 | monospace | normal | normal | Courier |
| 3 | monospace | normal | bold | Courier-Bold |
| 3 | monospace | italic | normal | Courier-Oblique |
| 3 | monospace | italic | bold | Courier-BoldOblique |
| 4 | Courier | normal | normal | Courier |
| 4 | Courier | normal | bold | Courier-Bold |
| 4 | Courier | italic | normal | Courier-Oblique |
| 4 | Courier | italic | bold | Courier-BoldOblique |
| 5 | Helvetica | normal | normal | Helvetica |

| Number | Font Family | Style | Weight | Font Name |
|---------------|--------------------|--------------|---------------|-----------------------|
| 5 | Helvetica | normal | bold | Helvetica-Bold |
| 5 | Helvetica | italic | normal | Helvetica-Oblique |
| 5 | Helvetica | italic | bold | Helvetica-BoldOblique |
| 6 | Times | normal | normal | Times |
| 6 | Times | normal | bold | Times-Bold |
| 6 | Times | italic | normal | Times-Italic |
| 6 | Times | italic | bold | Times-BoldItalic |
| 7 | Symbol | normal | normal | Symbol |
| 8 | ZapfDingbats | normal | normal | ZapfDingbats |

The TrueType fonts are listed in the following table. All TrueType fonts will be subsetted and embedded into PDF.

| Number | Font Family Name | Style | Weight | Actual Font | Actual Font Type |
|---------------|-------------------------|--------------|---------------|--------------------|--|
| 1 | Albany WT | normal | normal | ALBANYWT.ttf | TrueType (Latin1 only) |
| 2 | Albany WT J | normal | normal | ALBANWTJ.ttf | TrueType (Japanese flavor) |
| 3 | Albany WT K | normal | normal | ALBANWTK.ttf | TrueType (Korean flavor) |
| 4 | Albany WT SC | normal | normal | ALBANWTS.ttf | TrueType (Simplified Chinese flavor) |

| Number | Font Family Name | Style | Weight | Actual Font | Actual Font Type |
|---------------|-------------------------|--------------|---------------|--------------------|---|
| 5 | Albany WT TC | normal | normal | ALBANWTT.ttf | TrueType (Traditional Chinese flavor) |
| 6 | Andale Duospace WT | normal | normal | ADUO.ttf | TrueType (Latin1 only, Fixed width) |
| 6 | Andale Duospace WT | bold | bold | ADUOB.ttf | TrueType (Latin1 only, Fixed width) |
| 7 | Andale Duospace WT J | normal | normal | ADUOJ.ttf | TrueType (Japanese flavor, Fixed width) |
| 7 | Andale Duospace WT J | bold | bold | ADUOJB.ttf | TrueType (Japanese flavor, Fixed width) |
| 8 | Andale Duospace WT K | normal | normal | ADUOK.ttf | TrueType (Korean flavor, Fixed width) |
| 8 | Andale Duospace WT K | bold | bold | ADUOKB.ttf | TrueType (Korean flavor, Fixed width) |
| 9 | Andale Duospace WT SC | normal | normal | ADUOSC.ttf | TrueType (Simplified Chinese flavor, Fixed width) |
| 9 | Andale Duospace WT SC | bold | bold | ADUOSCB.ttf | TrueType (Simplified Chinese flavor, Fixed width) |
| 10 | Andale Duospace WT TC | normal | normal | ADUOTC.ttf | TrueType (Traditional Chinese flavor, Fixed width) |

| Number | Font Family Name | Style | Weight | Actual Font | Actual Font Type |
|--------|-----------------------|-------|--------|-------------|--|
| 10 | Andale Duospace WT TC | bold | bold | ADUOTCB.ttf | TrueType (Traditional Chinese flavor, Fixed width) |

Managing Reports and Folders

Administration View

If you are assigned the BI Publisher Administrator role your Reports home will display an additional Users folder. This folder will contain all the "My Folders" folders of all the users in your system. Each user "My Folders" folder is named according to the User name. The Administrator can see and update all the user folders.

Folder and Report Tasks

The Folder and Report Tasks menu is available to users assigned the BI Publisher Administrator role or the BI Publisher Developer Role.

Report Tasks

Select the Report Actions icon to expand the menu of available report tasks. Report Tasks include:

- Rename this report
- Copy this report
- Delete this report
- Download this report

Note: The Report Actions menu can be viewed only by the BI Publisher Administrator role and the BI Publisher Developer role.

Select the **Report Actions** icon to expand the list of available **Report Tasks**.

The screenshot displays the Oracle BI Publisher Enterprise web interface. At the top, there is a navigation bar with 'Reports', 'Schedules', and 'Admin' tabs. Below this is a breadcrumb trail: 'Home > Shared Folders > Executive'. A search box is visible on the left. The main content area is divided into two columns. The left column, titled 'Folder and Report Tasks', contains several actions: 'Create a new folder', 'Create a new report', 'Rename this report', 'Copy this report', 'Delete this report', and 'Download this report'. A 'Tip' box below this section states: 'To copy, delete, rename folder or report, please click on folder icon or report icon.' The right column displays two report entries. The first entry is 'Copy of Sales Dashboard 2', which includes a description, a 'Date' field, and a 'Modified' timestamp. A 'Report Actions' icon (a small grid with a red 'X') is highlighted with a mouse cursor, and a tooltip labeled 'Report Actions' is visible. The second entry is 'Employee Salary Report', also with a description, 'Date', and 'Modified' timestamp.

Rename a Report

1. Navigate to the report folder.
2. Select the **Report Actions** icon.
3. Select **Rename this report** from the **Folder and Report Tasks** region.
4. Enter the new name in the text box.

Upload a Report

You can upload a report definition directory as a zip file. The directory must include the report definition file (.xdo file). The zip file must have the same name as the .xdo file contained in the directory. You may also include template files (rtf, pdf, excel, and xsl-fo

files), translation files (.xlf), PDF mapping files (.map files), and sample XML data files (.xml).

1. Navigate to the report folder.
2. Select the **Report Actions** icon.
3. Select **Upload a Report** from the **Folder and Report Tasks** region.
4. Browse to locate the report, then select **Upload**.

Copy a Report

1. Navigate to the report folder.
2. Select the **Report Actions** icon.
3. Select **Copy this report** from the **Folder and Report Tasks** region to copy the report to the clipboard.
4. Navigate to the location you want to copy the report to and select **Paste from clipboard**.

Download a Report

1. Navigate to the report folder.
2. Select the **Report Actions** icon.
3. Select **Download this report** from the **Folder and Report Tasks** region. You will be prompted to save the report definition zip file.

The report definition directory is downloaded to the specified location as a zip file. The report definition directory contains all the files associated with the report, this may include:

- The report definition file (.xdo file)
- All template files (rtf, pdf, and xls files)
- PDF mapping files (.map file)
- Sample data files (xml file)
- Translation files (.xlf files)

Delete a Report

Note: You must be assigned the BI Publisher Developer role or BI Publisher Administration Role to delete reports.

1. Navigate to the report folder.
2. Select the **Report Actions** icon.
3. Select **Delete this report** from the **Folder and Report Tasks** region.

Folder Tasks

Select the Folder Actions icon to expand the menu of available folder tasks. Folder Tasks include:

- Create a new folder
- Rename this folder
- Copy this folder
- Delete this folder

Note: The Report Actions menu can be viewed only by the BI Publisher Administrator role and the BI Publisher Developer role.

Create a New Folder

You can create folders in My Folder, or navigate to the Shared folder in which you want the new folder to reside.

1. From the **Folder and Report Tasks** menu, select **Create a new folder**
2. Enter the Folder Name in the text box that launches, and select **Create**.

Rename a Folder

1. Select the Folder icon to view all **Folder Actions** in the **Folder and Report Tasks** menu.
2. Select **Rename this folder**.
3. Enter the new report name in the text box that launches, and select **Rename**.

Delete a Folder

1. Select the Folder icon to view all **Folder Actions** in the **Folder and Report Tasks** menu.
2. Select **Delete this folder**.
3. Confirm the deletion at the prompt.

Setting Up Print Servers

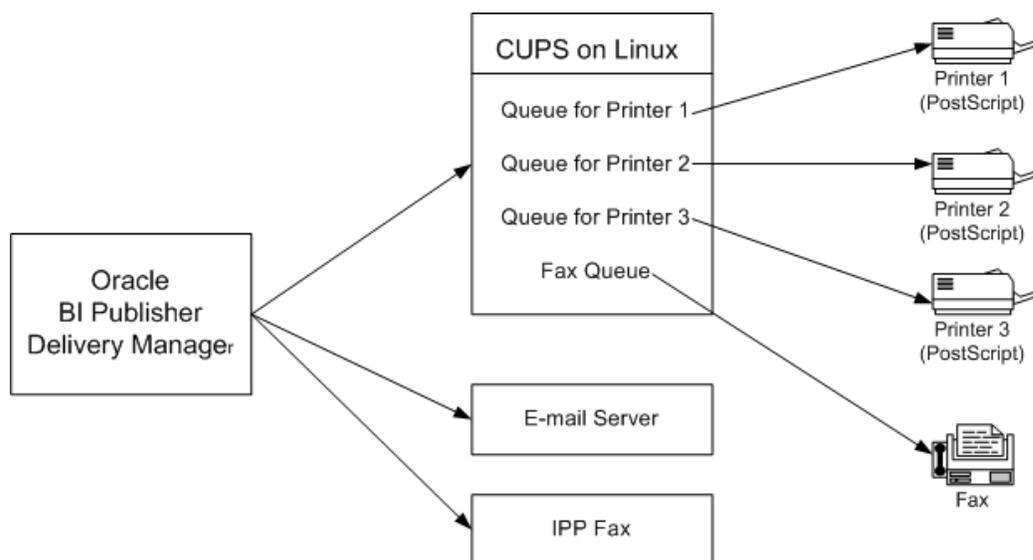
This chapter covers the following topics:

- Setting Up CUPS
- Windows XP Setup

Setting Up CUPS

The delivery manager requires Common UNIX Printing System (CUPS) to print and fax documents. This section describes how to set up CUPS for printing and faxing on RedHat Linux.

The following diagram shows the integration between BI Publisher and CUPS:



The following procedures describe how to add a printer or fax to CUPS and how to test your setup. For more information, see the *CUPS Software Administrators Manual* (<http://www.cups.org/doc-1.1/sam.html>) and the Redhat Advanced Server online help.

Prerequisites

- RedHat Advanced Server 3.0
- Fax Modem connected to the Linux box
- Development Tools for the RedHat Advanced Server installed
- CUPS (Installed by default when installing RedHat AS 3.0)

Setting Up a Printer on CUPS

The RedHat Advanced Server provides a configuration wizard to help you set up your printers. The RedHat process is summarized below:

Using the RedHat Printer Configuration Wizard:

1. Run "redhat-config-printer"

While logged on as the root user, open a terminal and execute "redhat-config-printer". This invokes the **Printer configuration** window.

2. Select the **New** tab to launch the **Add a new print queue** wizard.

3. Follow the wizard prompts to:

- Enter a queue name.
- Select the queue type.

Select "Networked_JetDirect" to set up a network printer. For this selection, you must also enter the following:

- Printer - enter a hostname or IP address.
- Port - enter a port.

If the printer driver is installed in Microsoft Windows, the Printer and Port information is available from the Properties dialog for the printer (Settings > Printers and Faxes > (select printer) > File > Properties).

- Select the printer model.

If your printer supports PostScript, select the following:

- Manufacturer: "Generic"
- Model: "PostScript Printer"

- Review your selections and select "Apply" to create your new print queue.
4. Your new queue now displays in the Printer configuration window.

Test Your Printer on CUPS:

1. Launch a browser on RedHat and enter the following URL:
`http://localhost:631`
2. Select the **Printers** tab. The printer you just created will be listed.
To use your Windows browser to access this page, see Making CUPS Accessible from Other Machines, page 12-5.
3. Select **Print Test Page** to test your printer setup. If the test page does not print, repeat the configuration steps. Ensure that your printer type and model selections are correct.

Installing and Setting Up Fax for CUPS

This section describes how to install efax-0.9 software and configure it for CUPS.

Install the Fax Software:

1. Download efax-0.9 from one of the following locations:
 - <http://www.cce.com/efax/download/>
 - <ftp://ftp.metalab.unc.edu/pub/Linux/apps/serialcomm/fax/efax-0.9.tar.gz>
2. Extract the files to a working directory using the following commands:
 - `gunzip efax-0.9.tar.gz`
 - `tar xvf efax-0.9.tar`
3. Compile and install using the following commands (refer to the Readme for more information):
 - `make`
 - `make install`

Note: You must have `make` and `gcc` installed in your RedHat AS.

4. Test the fax.

Enter the following command:

```
fax send <fax_number><tiff file>
```

For example:

```
fax send 1234567 test.tiff
```

The fax is successful if you get the return code:

```
done, returning 0 (success)
```

5. Download fax4CUPS. It is available from the following site:
 - <http://www.gnu.org/directory/productivity/special/fax4CUPS.html>
6. Install fax4CUPS as follows:
 - Extract the tar file to a temporary directory
 - Change the directory: `cd fax4CUPS-1.23`
 - Open the INSTALL file and follow all steps.
7. Restart CUPS using the following command:

```
/etc/rc.d/init.d/cups restart
```

Setting Up a Fax on CUPS:

1. Launch a browser and go to the following URL: `http://localhost:631/admin`
2. Enter the admin username and password in the dialog that launches.
3. From the **Admin** page, select **Add Printer**.
4. Add a Fax queue as follows:

In the **Add New Printer** region, enter the following fields:

 - Name - enter a meaningful name for the, such as "efaxserver". This will be referred to as "ipp://serverName:631/printers/efaxserver".
 - Location - optional.
 - Description - optional.
5. Select a device for the fax queue.

Select "Faxmodem (efax on /dev/modem)". In some cases, "/dev/ttySxx" will be shown instead.
6. Select a model for the fax queue.

Select "efax". You can also select either "HylaFAX" or "mgetty-fax" if these have been installed.

7. Select the driver for the fax queue.

Select "efax (en)".

8. Verify that the new fax queue appears on the CUPS Admin Web page.

9. Text the fax on CUPS.

Enter the following command to test the fax:

```
/usr/bin/lp -d <printer name> -t <phone#> test.pdf
```

Example:

```
/usr/bin/lp -d efax1 -t 5556231 myfax.pdf
```

Making CUPS Accessible from Other Machines

By default, CUPS does not allow access from other network machines. However, it can be configured to allow access, as follows:

1. Open a CUPS configuration file using the following command:

```
Open /etc/cups/cupsd.conf
```

2. Add a "Listen" instruction.

- Scroll to the bottom of the configuration file where the other Listen instructions are declared.
- Copy "Listen 127.0.0.1:631" and paste it above or below the original.
- Replace "127.0.0.1" with the Linux server's IP address.

3. Configure each printer.

- In the configuration file, locate:

```
<Location /printers/your_printer_queue>
```

- Comment the instruction "Deny From All".

Example:

```
# Deny From All
```

- Change "Allow from 127.0.0.1" to "Allow from All"
 - Repeat for all printer or fax queues that you want to make accessible.
4. Save the configuration file and restart CUPS.

- Use the following command to stop CUPS:
`/etc/rc.d/init.d/cups stop`
- Use the following command to start CUPS:
`/etc/rc.d/init.d/cups start`

5. Test the accessibility from other machines.

Launch a browser from another machine and enter one of the following URLs to ensure that the CUPS web page can be accessed:

- `http://linux_server_name:631`
- `http://linux_ip_address:631`

Windows XP Setup

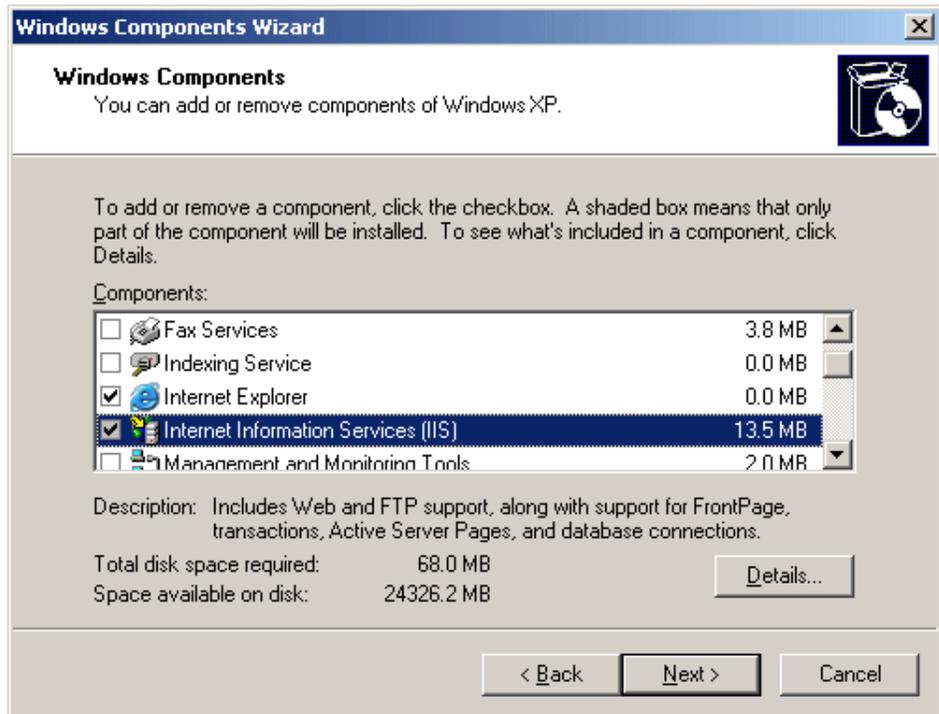
This section describes how to set up Internet Printing Protocol (IPP) on a Windows XP server.

Prerequisite:

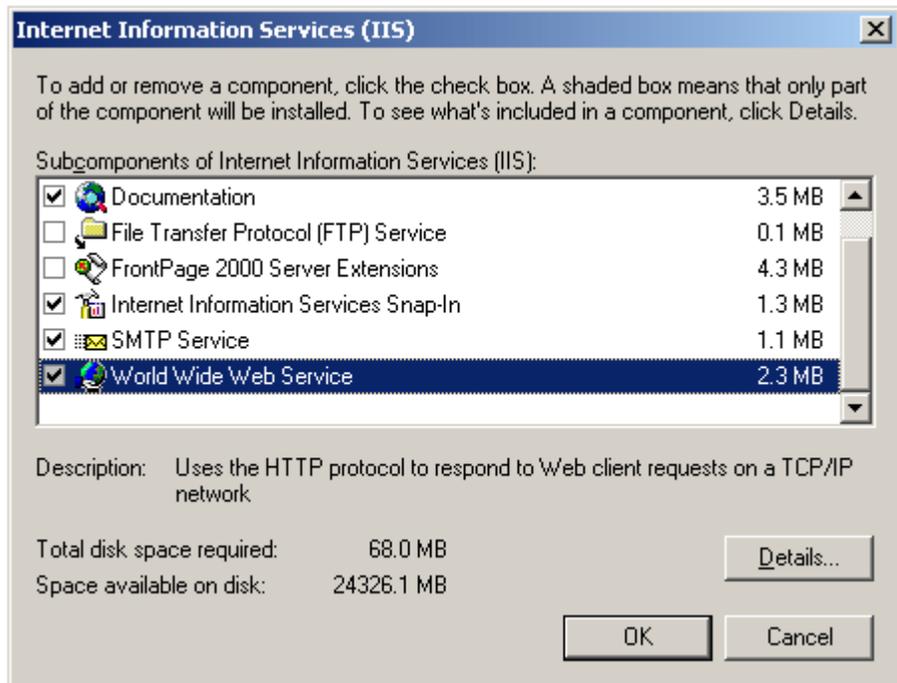
Microsoft Windows XP

Setting Up IPP Printers on Windows XP Professional

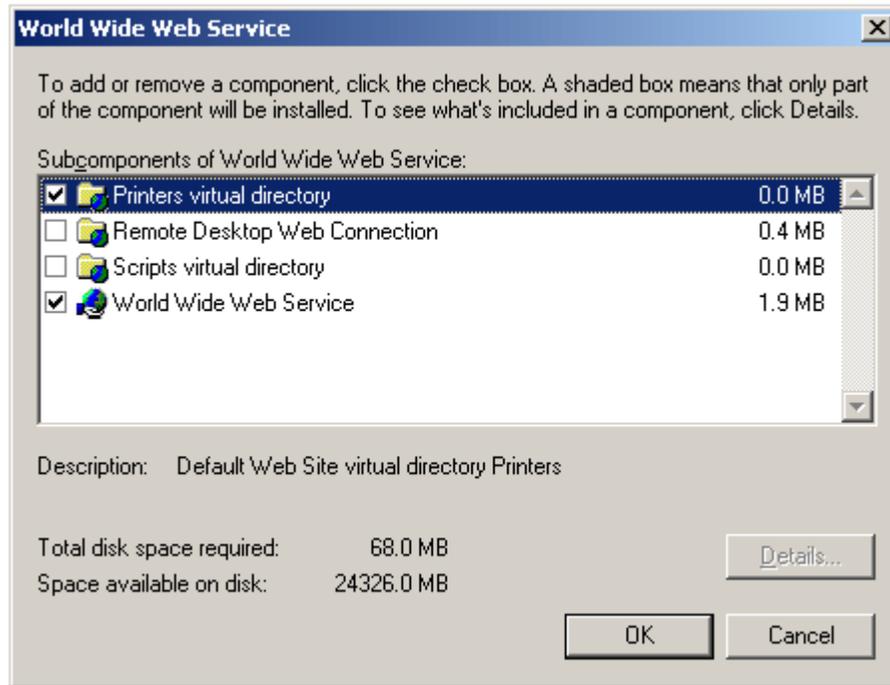
1. Install Internet Information Services (IIS).
 - Open the Control Panel. Select **Add or Remove Programs**, then **Add/Remove Windows Components**.
 - Select the check box for Internet Information Services (IIS) from the list of available Windows Components (shown in the following figure).



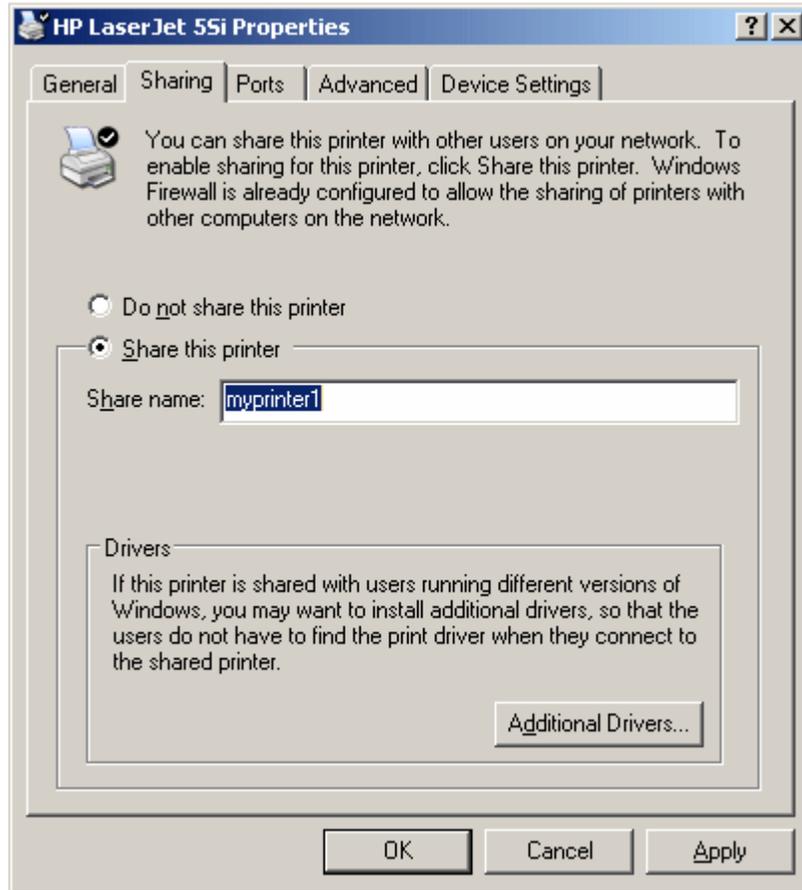
- With IIS highlighted, select **Details**. Ensure that **World Wide Web Service** is selected (shown in the following figure).



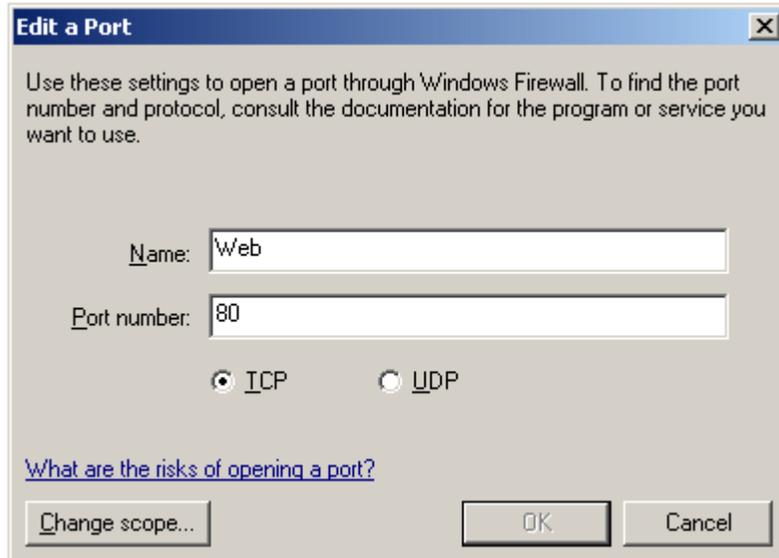
- With **World Wide Web Service** highlighted, select **Details**. Ensure that **Printers virtual directory** is selected (shown in the following figure).



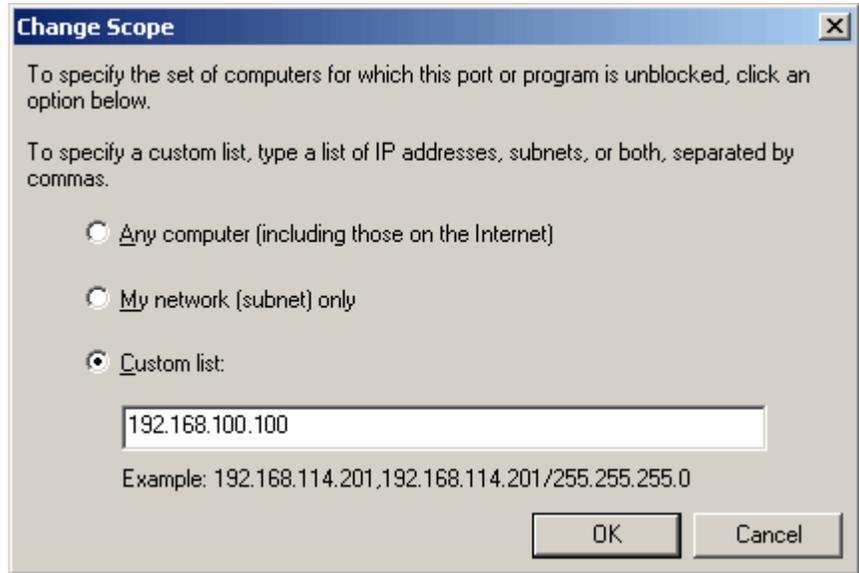
2. Restart Windows XP.
3. Share the printers.
 - From the **Start** menu, select **Settings**, then **Printers and Faxes**.
 - Right-click the printer icon and select **Sharing**.
 - In the printer **Properties** dialog, select **Share this printer** and assign a **Share name** (for example: myprinter1). An example is shown in the following figure.



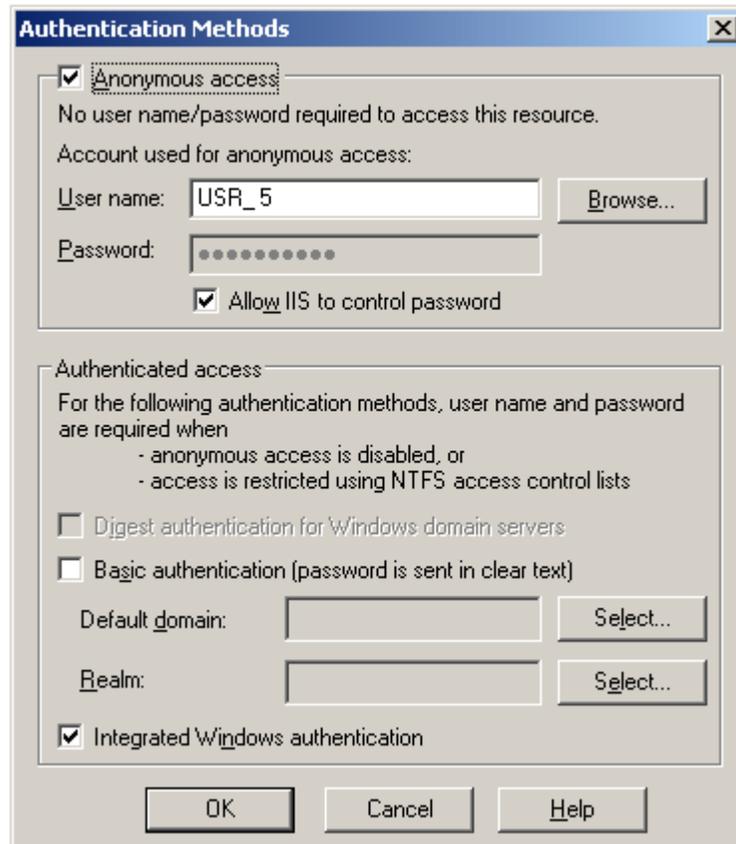
4. Configure the Windows Firewall to open a port to your XMLP Server:
 - From the **Start** menu, select **Settings**, then **Control Panel**.
 - From the **Control Panel**, select **Windows Firewall**.
 - From the **Windows Firewall** dialog, select the **Exceptions** tab.
 - Create an entry in the list of Programs and Services as follows:
 1. Select **Add Port**.
 2. Enter the **Name**: for example, Web
Enter the **Port number**: for example, 80
Select **TCP**.An example is shown in the following figure:



- To allow access from a specific IP address only:
 1. Select your entry, then select **Edit**.
 2. From the **Edit a Program** dialog, select **Change Scope**.
 3. Choose **Custom list**, and enter the IP address of the XMLP Server.
Note that if you use the HTTP proxy server in BI Publisher Server, you must enter the IP address of the proxy server.
An example is shown in the following figure.



5. Change the virtual directory security setting.
 - From the **Control Panel**, select **Administrative Tools**, then **Internet Information Service**.
 - Navigate the Internet Information Service directory hierarchy as follows: Internet Information Services > [your server name] > Web Sites > Default Web Site > Printers. Right-click **Printers** and choose **Properties**.
 - From the **Printers Properties** dialog, select the **Directory Security** tab.
 - In the **Anonymous access and authentication control** region, select **Edit**.
 - In the **Authentication Methods** dialog, select the **Anonymous access** check box. An example is shown in the following figure.



6. Open a browser in a remote machine and enter the following URL: `http://<your server name>/printers`

You will see the list of shared printers.

Using the BI Publisher APIs

This appendix covers the following topics:

- Introduction
- BI Publisher Core APIs
- PDF Form Processing Engine
- RTF Processor Engine
- FO Processor Engine
- PDF Document Merger
- PDF Book Binder Processor
- Document Processor Engine
- Bursting Engine
- BI Publisher Properties
- Advanced Barcode Font Formatting Implementation

Introduction

This chapter is aimed at developers who wish to create programs or applications that interact with BI Publisher through its application programming interface. This information is meant to be used in conjunction with the Javadocs available with your installation files.

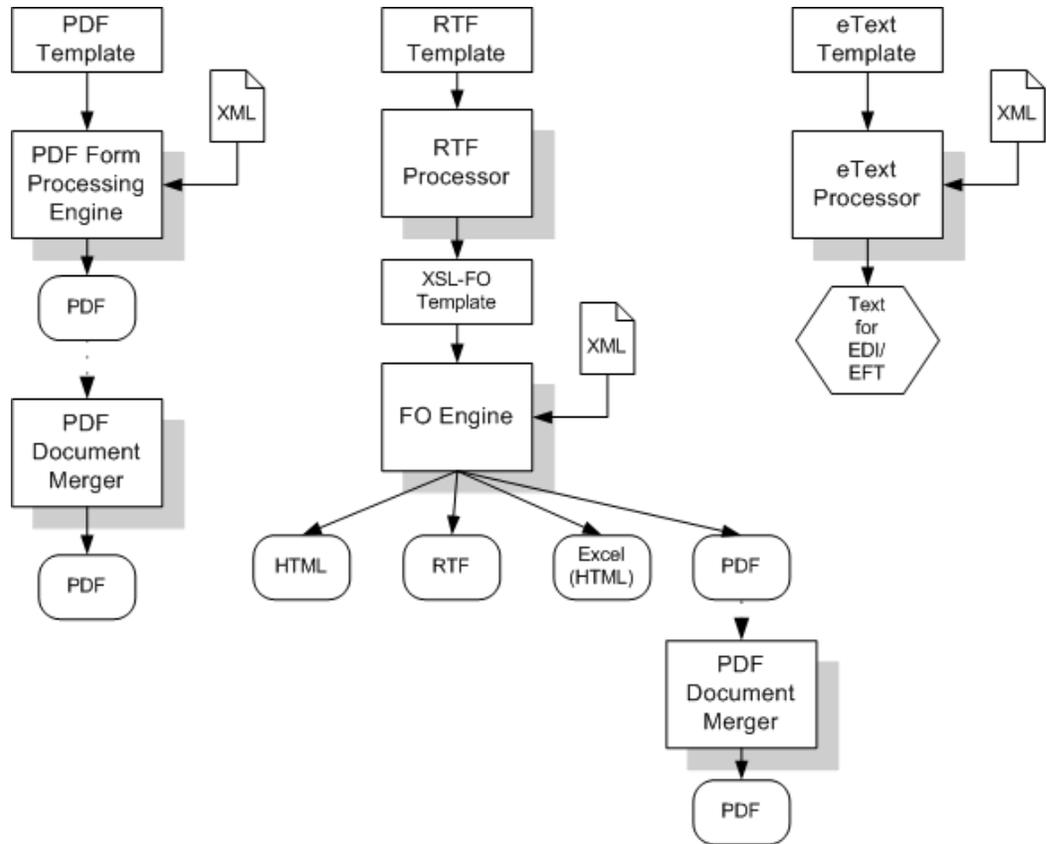
This section assumes the reader is familiar with Java programming, XML, and XSL technologies.

BI Publisher Core APIs

BI Publisher is made up of the following core API components:

- **PDF Form Processing Engine**
Merges a PDF template with XML data (and optional metadata) to produce PDF document output.
- **RTF Processor**
Converts an RTF template to XSL in preparation for input to the FO Engine.
- **FO Engine**
Merges XSL and XML to produce any of the following output formats: Excel (HTML), PDF, RTF, or HTML.
- **PDF Document Merger**
Provides optional postprocessing of PDF files to merge documents, add page numbering, and set watermarks.
- **eText Processor**
Converts RTF eText templates to XSL and merges the XSL with XML to produce text output for EDI and EFT transmissions.
- **Document Processor (XML APIs)**
Provides batch processing functionality to access a single API or multiple APIs by passing a single XML file to specify template names, data sources, languages, output type, output names, and destinations.

The following diagram illustrates the template type and output type options for each core processing engine:



PDF Form Processing Engine

The PDF Form Processing Engine creates a PDF document by merging a PDF template with an XML data file. This can be done using file names, streams, or an XML data string.

As input to the PDF Processing Engine you can optionally include an XML-based Template MetaInfo (.xtn) file. This is a supplemental template to define the placement of overflow data.

The FO Processing Engine also includes utilities to provide information about your PDF template. You can:

- Retrieve a list of field names from a PDF template
- Generate the XFDF data from the PDF template
- Convert XML data into XFDF using XSLT

Merging a PDF Template with XML Data

XML data can be merged with a PDF template to produce a PDF output document in

three ways:

- Using input/output file names
- Using input/output streams
- Using an input XML data string

You can optionally include a metadata XML file to describe the placement of overflow data in your template.

Merging XML Data with a PDF Template Using Input/Output File Names

Input:

- Template file name (String)
- XML file name (String)
- Metadata XML file name (String)

Output:

- PDF file name (String)

Example

```
import oracle.apps.xdo.template.FormProcessor;
.
.
    FormProcessor fProcessor = new FormProcessor();

    fProcessor.setTemplate(args[0]); // Input File (PDF) name
    fProcessor.setData(args[1]);    // Input XML data file name
    fProcessor.setOutput(args[2]);  // Output File (PDF) name
    fProcessor.setMetaInfo(args[3]); // Metadata XML File name You
can omit this setting when you do not use Metadata.

    fProcessor.process();
```

Merging XML Data with a PDF Template Using Input/Output Streams

Input:

- PDF Template (Input Stream)
- XML Data (Input Stream)
- Metadata XML Data (Input Stream)

Output:

- PDF (Output Stream)

Example

```
import java.io.*;
import oracle.apps.xdo.template.FormProcessor;
.
.
.
    FormProcessor fProcessor = new FormProcessor();

    FileInputStream fIs = new FileInputStream(originalFilePath); // Input
File
    FileInputStream fIs2 = new FileInputStream(dataFilePath); // Input
Data
    FileInputStream fIs3 = new FileInputStream(metaData); // Metadata XML
Data
    FileOutputStream fOs = new FileOutputStream(newFilePath); // Output
File

    fProcessor.setTemplate(fIs);
    fProcessor.setData(fIs2); // Input Data
    fProcessor.setOutput(fOs);
    fProcessor.setMetaInfo(fIs3);
    fProcessor.process();

    fIs.close();
    fOs.close();
```

Merging an XML Data String with a PDF Template

Input:

- Template file name (String)
- XML data (String)
- Metadata XML file name (String)

Output:

- PDF file name (String)

Example

```
import oracle.apps.xdo.template.FormProcessor;
.
.
.
FormProcessor fProcessor = new FormProcessor();

fProcessor.setTemplate(originalFilePath); // Input File (PDF) name
fProcessor.setDataString(xmlContents); // Input XML string
fProcessor.setOutput(newFilePath); // Output File (PDF) name
fProcessor.setMetaInfo(metaXml); // Metadata XML File name You
can omit this setting when you do not use Metadata.
fProcessor.process();
```

Retrieving a List of Field Names

Use the `FormProcessor.getFieldNames()` API to retrieve the field names from a PDF template. The API returns the field names into an Enumeration object.

Input:

- PDF Template

Output:

- Enumeration Object

Example

```
import java.util.Enumeration;
import oracle.apps.xdo.template.FormProcessor;
.
.
.
FormProcessor fProcessor = new FormProcessor();
fProcessor.setTemplate(filePath);           // Input File (PDF) name
Enumeration enum = fProcessor.getFieldNames();
while(enum.hasMoreElements()) {
    String formName = (String)enum.nextElement();
    System.out.println("name : " + formName + " , value : " +
fProcessor.getFieldValue(formName));
}
```

Generating XFDF Data

XML Forms Data Format (XFDF) is a format for representing forms data and annotations in a PDF document. XFDF is the XML version of Forms Data Format (FDF), a simplified version of PDF for representing forms data and annotations. Form fields in a PDF document include edit boxes, buttons, and radio buttons.

Use this class to generate XFDF data. When you create an instance of this class, an internal XFDF tree is initialized. Use `append()` methods to append a FIELD element to the XFDF tree by passing a String name-value pair. You can append data as many times as you want.

This class also allows you to append XML data by calling `appendXML()` methods. Note that you must set the appropriate XSL stylesheet by calling `setStyleSheet()` method before calling `appendXML()` methods. You can append XML data as many times as you want.

You can retrieve the internal XFDF document at any time by calling one of the following methods: `toString()`, `toReader()`, `toInputStream()`, or `toXMLDocument()`.

The following is a sample of XFDF data:

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<xfdf xmlns="http://ns.adobe.com/xfdf/" xml:space="preserve">
<fields>
  <field name="TITLE">
    <value>Purchase Order</value>
  </field>
  <field name="SUPPLIER_TITLE">
    <value>Supplie</value>
  </field>
  ...
</fields>
```

The following code example shows how the API can be used:

Example

```
import oracle.apps.xdo.template.FormProcessor;
import oracle.apps.xdo.template.pdf.xfdf.XFDFObject;
.
.
.
FormProcessor fProcessor = new FormProcessor();
fProcessor.setTemplate(filePath); // Input File (PDF) name
XFDFObject xfdfObject = new XFDFObject(fProcessor.getFieldInfo());
System.out.println(xfdfObject.toString());
```

Converting XML Data into XFDF Format Using XSLT

Use an XSL stylesheet to convert standard XML to the XFDF format. Following is an example of the conversion of sample XML data to XFDF:

Assume your starting XML has a ROWSET/ROW format as follows:

```
<ROWSET>
  <ROW num="0">
    <SUPPLIER>Supplier</SUPPLIER>
    <SUPPLIERNUMBER>Supplier Number</SUPPLIERNUMBER>
    <CURRCODE>Currency</CURRCODE>
  </ROW>
  ...
</ROWSET>
```

From this XML you want to generate the following XFDF format:

```
<fields>
  <field name="SUPPLIER1">
    <value>Supplier</value>
  </field>
  <field name="SUPPLIERNUMBER1">
    <value>Supplier Number</value>
  </field>
  <field name="CURRCODE1">
    <value>Currency</value>
  </field>
  ...
</fields>
```

The following XSLT will carry out the transformation:

```

<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
<fields>
<xsl:apply-templates/>
</fields>
</xsl:template>
  <!-- Count how many ROWs(rows) are in the source XML file. -->
  <xsl:variable name="cnt" select="count(//row//ROW)" />
  <!-- Try to match ROW (or row) element.
  <xsl:template match="ROW/*|row/*">
    <field>
      <!-- Set "name" attribute in "field" element. -->
      <xsl:attribute name="name">
        <!-- Set the name of the current element (column name) as a
value of the current name attribute. -->
        <xsl:value-of select="name(.)" />
        <!-- Add the number at the end of the name attribute value
if more than 1 rows found in the source XML file.-->
        <xsl:if test="$cnt > 1">
          <xsl:number count="ROW|row" level="single" format="1"/>
        </xsl:if>
      </xsl:attribute>
      <value>
        <!--Set the text data set in the current column data as a
text of the "value" element. -->
        <xsl:value-of select="." />
      </value>
    </field>
  </xsl:template>
</xsl:stylesheet>

```

You can then use the XFDFObject to convert XML to the XFDF format using an XSLT as follows:

Example

```

import java.io.*;
import oracle.apps.xdo.template.pdf.xfdf.XFDFObject;
.
.
.
XFDFObject xfdfObject = new XFDFObject();

xfdfObject .setStylesheet(new BufferedInputStream(new
FileInputStream(xslPath))); // XSL file name
xfdfObject .appendXML( new File(xmlPath1)); // XML data file name
xfdfObject .appendXML( new File(xmlPath2)); // XML data file name

System.out.print(xfdfObject .toString());

```

RTF Processor Engine

Generating XSL

The RTF processor engine takes an RTF template as input. The processor parses the template and creates an XSL-FO template. This can then be passed along with a data

source (XML file) to the FO Engine to produce PDF, HTML, RTF, or Excel (HTML) output.

Use either input/output file names or input/output streams as shown in the following examples:

Generating XSL with Input/Output File Names

Input:

- RTF file name (String)

Output:

- XSL file name (String)

Example

```
import oracle.apps.xdo.template.FOProcessor;
.
.
.
    public static void main(String[] args)
    {
RTFProcessor rtfProcessor = new RTFProcessor(args[0]); //input template
rtfProcessor.setOutput(args[1]); // output file
rtfProcessor.process();
        System.exit(0);
    }
```

Generating XSL with Input/Output Stream

Input:

- RTF (InputStream)

Output:

- XSL (OutputStream)

Example

```
import oracle.apps.xdo.template.FOProcessor;
.
.
.
    public static void main(String[] args)
    {
        FileInputStream fIs = new FileInputStream(args[0]); //input
template
        FileOutputStream fOs = new FileOutputStream(args[1]); // output

        RTFProcessor rtfProcessor = new RTFProcessor(fIs);
        rtfProcessor.setOutput(fOs);
        rtfProcessor.process();
        // Closes inputStream outputStream
        System.exit(0);
    }
```

FO Processor Engine

Generating Output from an XML File and an XSL File

The FO Processor Engine is BI Publisher's implementation of the W3C XSL-FO standard. It does not represent a complete implementation of every XSL-FO component. For a list of supported XSL-FO elements, see Supported XSL-FO Elements, page C-1.

The FO Processor can generate output in PDF, RTF, HTML, or Excel (HTML) from either of the following two inputs:

- Template (XSL) and Data (XML) combination
- FO object

Both input types can be passed as file names, streams, or in an array. Set the output format by setting the `setOutputFormat` method to one of the following:

- `FORMAT_EXCEL`
- `FORMAT_HTML`
- `FORMAT_PDF`
- `FORMAT_RTF`

An XSL-FO utility is also provided that creates XSL-FO from the following inputs:

- XSL file and XML file
- Two XML files and two XSL files
- Two XSL-FO files (merge)

The FO object output from the XSL-FO utility can then be used as input to the FO processor.

Major Features of the FO Processor

Bidirectional Text

BI Publisher utilizes the Unicode BiDi algorithm for BiDi layout. Based on specific values for the properties `writing-mode`, `direction`, and `unicode bidi`, the FO Processor supports the BiDi layout.

The `writing-mode` property defines how word order is supported in lines and order of lines in text. That is: right-to-left, top-to-bottom or left-to-right, top-to-bottom. The `direction` property determines how a string of text will be written: that is, in a specific direction, such as right-to-left or left-to-right. The `unicode bidi` controls and manages

override behavior.

Font Fallback Mechanism

The FO Processor supports a two-level font fallback mechanism. This mechanism provides control over what default fonts to use when a specified font or glyph is not found. BI Publisher provides appropriate default fallback fonts automatically without requiring any configuration. BI Publisher also supports user-defined configuration files that specify the default fonts to use. For glyph fallback, the default mechanism will only replace the glyph and not the entire string.

Variable Header and Footer

For headers and footers that require more space than what is defined in the template, the FO Processor extends the regions and reduces the body region by the difference between the value of the page header and footer and the value of the body region margin.

Horizontal Table Break

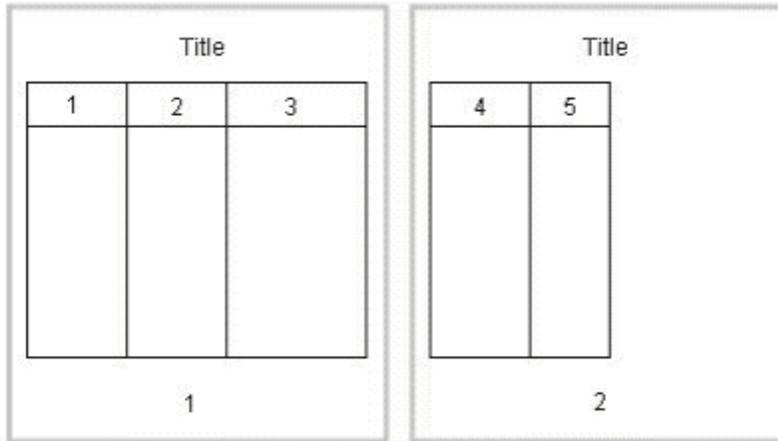
This feature supports a "Z style" of horizontal table break. The horizontal table break is not sensitive to column span, so that if the column-spanned cells exceed the page (or area width), the FO Processor splits it and does not apply any intelligent formatting to the split cell.

The following figure shows a table that is too wide to display on one page:

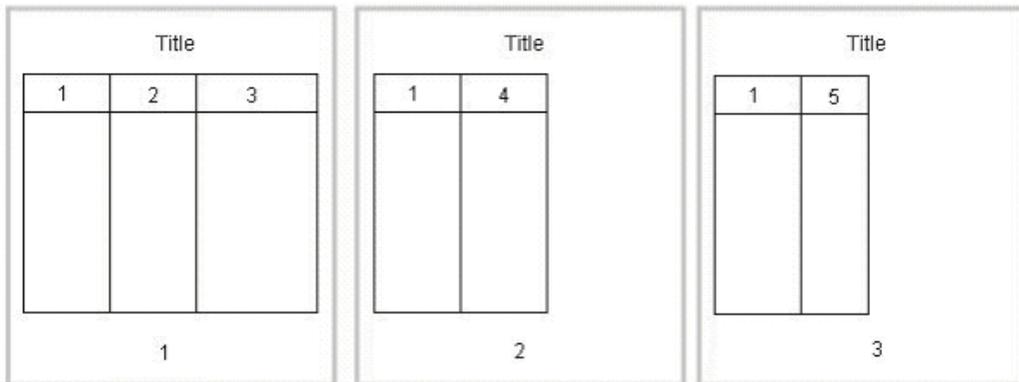
| Title | | | | |
|-------|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| | | | | |

Page Number

The following figure shows one option of how the horizontal table break will handle the wide table. In this example, a horizontal table break is inserted after the third column.



The following figure shows another option. The table breaks after the third column, but includes the first column with each new page.



Generating Output Using File Names

The following example shows how to use the FO Processor to create an output file using file names.

Input:

- XML file name (String)
- XSL file name (String)

Output:

- Output file name (String)

Example

```
import oracle.apps.xdo.template.FOProcessor;
.
.
.
public static void main(String[] args)
{

    FOProcessor processor = new FOProcessor();
    processor.setData(args[0]); // set XML input file
    processor.setTemplate(args[1]); // set XSL input file
    processor.setOutput(args[2]); //set output file
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
    // Start processing
    try
    {
        processor.generate();
    }
    catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }

    System.exit(0);
}
```

Generating Output Using Streams

The processor can also be used with input/output streams as shown in the following example:

Input:

- XML data (InputStream)
- XSL data (InputStream)

Output:

- Output stream (OutputStream)

Example

```
import java.io.InputStream;
import java.io.OutputStream;
import oracle.apps.xdo.template.FOProcessor;
.
.
.
public void runFOProcessor(InputStream xmlInputStream,
                          InputStream xslInputStream,
                          OutputStream pdfOutputStream)
{
    FOProcessor processor = new FOProcessor();
    processor.setData(xmlInputStream);
    processor.setTemplate(xslInputStream);
    processor.setOutput(pdfOutputStream);
    // Set output format (for PDF generation)
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
    // Start processing
    try
    {
        processor.generate();
    }
    catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }

    System.exit(0);
}
```

Generating Output from an Array of XSL Templates and XML Data

An array of data and template combinations can be processed to generate a single output file from the multiple inputs. The number of input data sources must match the number of templates that are to be applied to the data. For example, an input of File1.xml, File2.xml, File3.xml and File1.xsl, File2.xsl, and File3.xsl will produce a single File1_File2_File3.pdf.

Input:

- XML data (Array)
- XSL data (template) (Array)

Output:

- File Name (String)

Example

```
import java.io.InputStream;
import java.io.OutputStream;
import oracle.apps.xdo.template.FOProcessor;
.
.
.
public static void main(String[] args)
{
    String[] xmlInput = {"first.xml", "second.xml", "third.xml"};
    String[] xslInput = {"first.xsl", "second.xsl", "third.xsl"};

    FOProcessor processor = new FOProcessor();
    processor.setData(xmlInput);
    processor.setTemplate(xslInput);

    processor.setOutput("/tmp/output.pdf);           //set (PDF) output
file
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
processor.process();
    // Start processing
    try
    {
        processor.generate();
    }
    catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }
}
```

Using the XSL-FO Utility

Use the XSL-FO Utility to create an XSL-FO output file from input XML and XSL files, or to merge two XSL-FO files. Output from this utility can be used to generate your final output. See [Generating Output from an XSL-FO file](#), page A-18.

Creating XSL-FO from an XML File and an XSL File

Input:

- XML file
- XSL file

Output:

- XSL-FO (InputStream)

Example

```
import oracle.apps.xdo.template.fo.util.FOUtility;
.
.
.
public static void main(String[] args)
{
    InputStream foStream;

    // creates XSL-FO InputStream from XML(arg[0])
    // and XSL(arg[1]) filepath String
    foStream = FOUtility.createFO(args[0], args[1]);
    if (mergedFOStream == null)
    {
        System.out.println("Merge failed.");
        System.exit(1);
    }

    System.exit(0);
}
```

Creating XSL-FO from Two XML Files and Two XSL files

Input:

- XML File 1
- XML File 2
- XSL File 1
- XSL File 2

Output:

- XSL-FO (InputStream)

Example

```
import oracle.apps.xdo.template.fo.util.FOUtility;
.
.
.
public static void main(String[] args)
{
    InputStream firstFOStream, secondFOStream, mergedFOStream;
    InputStream[] input = InputStream[2];

    // creates XSL-FO from arguments
    firstFOStream = FOUtility.createFO(args[0], args[1]);

    // creates another XSL-FO from arguments
    secondFOStream = FOUtility.createFO(args[2], args[3]);

    // set each InputStream into the InputStream Array
    Array.set(input, 0, firstFOStream);
    Array.set(input, 1, secondFOStream);

    // merges two XSL-FOs
    mergedFOStream = FOUtility.mergeFOs(input);

    if (mergedFOStream == null)
    {
        System.out.println("Merge failed.");
        System.exit(1);
    }
    System.exit(0);
}
```

Merging Two XSL-FO Files

Input:

- Two XSL-FO file names (Array)

Output:

- One XSL-FO (InputStream)

Example

```
import oracle.apps.xdo.template.fo.util.FOUtility;
.
.
.
public static void main(String[] args)
{
    InputStream mergedFOStream;

    // creates Array
    String[] input = {args[0], args[1]};

    // merges two FO files
    mergedFOStream = FOUtility.mergeFOs(input);
    if (mergedFOStream == null)
    {
        System.out.println("Merge failed.");
        System.exit(1);
    }
    System.exit(0);
}
```

Generating Output from an FO file

The FO Processor can also be used to process an FO object to generate your final output. An FO object is the result of the application of an XSL-FO stylesheet to XML data. These objects can be generated from a third party application and fed as input to the FO Processor.

The processor is called using a similar method to those already described, but a template is not required as the formatting instructions are contained in the FO.

Generating Output Using File Names

Input:

- FO file name (String)

Output:

- PDF file name (String)

Example

```
import oracle.apps.xdo.template.FOProcessor;
.
.
.
public static void main(String[] args) {

    FOProcessor processor = new FOProcessor();
    processor.setData(args[0]); // set XSL-FO input file
    processor.setTemplate((String)null);
    processor.setOutput(args[2]); //set (PDF) output file
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
    // Start processing
    try
    {
        processor.generate();
    }
    catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }

    System.exit(0);
}
```

Generating Output Using Streams

Input:

- FO data (InputStream)

Output:

- Output (OutputStream)

Example

```
import java.io.InputStream;
import java.io.OutputStream;
import oracle.apps.xdo.template.FOProcessor;
.
.
.
public void runFOProcessor(InputStream xmlfoInputStream,
                          OutputStream pdfOutputStream)
{
    FOProcessor processor = new FOProcessor();
    processor.setData(xmlfoInputStream);
    processor.setTemplate((String)null);

    processor.setOutput(pdfOutputStream);
    // Set output format (for PDF generation)
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
    // Start processing
    try
    {
        processor.generate();
    }
    catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }
}
```

Generating Output with an Array of FO Data

Pass multiple FO inputs as an array to generate a single output file. A template is not required, therefore set the members of the template array to null, as shown in the example.

Input:

- FO data (Array)

Output:

- Output File Name (String)

Example

```
import java.lang.reflect.Array;
import oracle.apps.xdo.template.FOProcessor;
.
.
.
    public static void main(String[] args)
    {

        String[] xmlInput = {"first.fo", "second.fo", "third.fo"};
        String[] xslInput = {null, null, null}; // null needs for xsl-fo
input

        FOProcessor processor = new FOProcessor();
        processor.setData(xmlInput);
        processor.setTemplate(xslInput);

        processor.setOutput("/tmp/output.pdf);           //set (PDF) output
file
        processor.setOutputFormat(FOProcessor.FORMAT_PDF);
processor.process();
        // Start processing
        try
        {
            processor.generate();
        }
        catch (XDOException e)
        {
            e.printStackTrace();
            System.exit(1);
        }
    }
}
```

PDF Document Merger

The PDF Document Merger class provides a set of utilities to manipulate PDF documents. Using these utilities, you can merge documents, add page numbering, set backgrounds, and add watermarks.

Merging PDF Documents

Many business documents are composed of several individual documents that need to be merged into a single final document. The PDFDocMerger class supports the merging of multiple documents to create a single PDF document. This can then be manipulated further to add page numbering, watermarks, or other background images.

Merging with Input/Output File Names

The following code demonstrates how to merge (concatenate) two PDF documents using physical files to generate a single output document.

Input:

- PDF_1 file name (String)
- PDF_2 file name (String)

Output:

- PDF file name (String)

Example

```
import java.io.*;
import oracle.apps.xdo.common.pdf.util.PDFDocMerger;
.
.
.
public static void main(String[] args)
{
    try
    {
        // Last argument is PDF file name for output
        int inputNumbers = args.length - 1;

        // Initialize inputStreams
        FileInputStream[] inputStreams = new
FileInputStream[inputNumbers];
        inputStreams[0] = new FileInputStream(args[0]);
        inputStreams[1] = new FileInputStream(args[1]);

        // Initialize outputStream
        FileOutputStream outputStream = new FileOutputStream(args[2]);

        // Initialize PDFDocMerger
        PDFDocMerger docMerger = new PDFDocMerger(inputStreams,
outputStream);

        // Merge PDF Documents and generates new PDF Document
        docMerger.mergePDFDocs();
        docMerger = null;

        // Closes inputStreams and outputStream
    }
    catch(Exception exc)
    {
        exc.printStackTrace();
    }
}
```

Merging with Input/Output Streams

Input:

- PDF Documents (InputStream Array)

Output:

- PDF Document (OutputStream)

Example

```
import java.io.*;
import oracle.apps.xdo.common.pdf.util.PDFDocMerger;
.
.
.
public boolean mergeDocs(InputStream[] inputStreams, OutputStream
outputStream)
{
    try
    {
        // Initialize PDFDocMerger
        PDFDocMerger docMerger = new PDFDocMerger(inputStreams,
outputStream);

        // Merge PDF Documents and generates new PDF Document
        docMerger.mergePDFDocs();
        docMerger = null;

        return true;
    }
    catch(Exception exc)
    {
        exc.printStackTrace();
        return false;
    }
}
```

Merging with Background to Place Page Numbering

The following code demonstrates how to merge two PDF documents using input streams to generate a single merged output stream.

To add page numbers:

1. Create a background PDF template document that includes a PDF form field in the position that you would like the page number to appear on the final output PDF document.
2. Name the form field @pagenum@.
3. Enter the number in the field from which to start the page numbering. If you do not enter a value in the field, the start page number defaults to 1.

Input:

- PDF Documents (InputStream Array)
- Background PDF Document (InputStream)

Output:

- PDF Document (OutputStream)

Example

```
import java.io.*;
import oracle.apps.xdo.common.pdf.util.PDFDocMerger;
.
.
.
public static boolean mergeDocs(InputStream[] inputStreams, InputStream
backgroundStream, OutputStream outputStream)

{
    try
    {
        // Initialize PDFDocMerger
        PDFDocMerger docMerger = new PDFDocMerger(inputStreams,
outputStream);

        // Set Background
        docMerger.setBackground(backgroundStream);

        // Merge PDF Documents and generates new PDF Document
        docMerger.mergePDFDocs();
        docMerger = null;

        return true;
    }
    catch(Exception exc)
    {
        exc.printStackTrace();
        return false;
    }
}
```

Adding Page Numbers to Merged Documents

The FO Processor supports page numbering natively through the XSL-FO templates, but if you are merging multiple documents you must use this class to number the complete document from beginning to end.

The following code example places page numbers in a specific point on the page, formats the numbers, and sets the start value using the following methods:

- `setPageNumberCoordinates (x, y)` - sets the x and y coordinates for the page number position. The following example sets the coordinates to 300, 20.
- `setPageNumberFontInfo (font name, size)` - sets the font and size for the page number. If you do not call this method, the default "Helvetica", size 8 is used. The following example sets the font to "Courier", size 8.
- `setPageNumberValue (n, n)` - sets the start number and the page on which to begin numbering. If you do not call this method, the default values 1, 1 are used.

Input:

- PDF Documents (InputStream Array)

Output:

- PDF Document (OutputStream)

Example

```
import java.io.*;
import oracle.apps.xdo.common.pdf.util.PDFDocMerger;
.
.
.
    public boolean mergeDocs(InputStream[] inputStreams, OutputStream
outputStream)
    {
        try
        {
            // Initialize PDFDocMerger
            PDFDocMerger docMerger = new PDFDocMerger(inputStreams,
outputStream);

            // Calls several methods to specify Page Number

            // Calling setPageNumberCoordinates() method is necessary to set
Page Numbering
            // Please refer to javadoc for more information
            docMerger.setPageNumberCoordinates(300, 20);

            // If this method is not called, then the default font"(Helvetica,
8)" is used.
            docMerger.setPageNumberFontInfo("Courier", 8);

            // If this method is not called, then the default initial value
"(1, 1)" is used.
            docMerger.setPageNumberValue(1, 1);

            // Merge PDF Documents and generates new PDF Document
            docMerger.mergePDFDocs();
            docMerger = null;

            return true;
        }
        catch(Exception exc)
        {
            exc.printStackTrace();
            return false;
        }
    }
}
```

Setting a Text or Image Watermark

Some documents that are in a draft phase require that a watermark indicating "DRAFT" be displayed throughout the document. Other documents might require a background image on the document. The following code sample shows how to use the PDFDocMerger class to set a watermark.

Setting a Text Watermark

Use the SetTextDefaultWatermark() method to set a text watermark with the following attributes:

- Text angle (in degrees): 55
- Color: light gray (0.9, 0.9, 0.9)
- Font: Helvetica
- Font Size: 100
- The start position is calculated based on the length of the text

Alternatively, use the `SetTextWatermark()` method to set each attribute separately. Use the `SetTextWatermark()` method as follows:

- `SetTextWatermark ("Watermark Text", x, y)` - declare the watermark text, and set the x and y coordinates of the start position. In the following example, the watermark text is "Draft" and the coordinates are 200f, 200f.
- `setTextWatermarkAngle (n)` - sets the angle of the watermark text. If this method is not called, 0 will be used.
- `setTextWatermarkColor (R, G, B)` - sets the RGB color. If this method is not called, light gray (0.9, 0.9, 0.9) will be used.
- `setTextWatermarkFont ("font name", font size)` - sets the font and size. If you do not call this method, Helvetica, 100 will be used.

The following example shows how to set these properties and then call the `PDFDocMerger`.

Input:

- PDF Documents (InputStream)

Output:

- PDF Document (OutputStream)

Example

```
import java.io.*;
import oracle.apps.xdo.common.pdf.util.PDFDocMerger;
.
.
.
    public boolean mergeDocs(InputStream inputStreams, OutputStream
outputStream)
    {
        try
        {
            // Initialize PDFDocMerger
            PDFDocMerger docMerger = new PDFDocMerger(inputStreams,
outputStream);

            // You can use setTextDefaultWatermark() without these detailed
setting
            docMerger.setTextWatermark("DRAFT", 200f, 200f); //set text and
place
            docMerger.setTextWatermarkAngle(80); //set angle
            docMerger.setTextWatermarkColor(1.0f, 0.3f, 0.5f); // set RGB
Color

            // Merge PDF Documents and generates new PDF Document
            docMerger.mergePDFDocs();
            docMerger = null;

            return true;
        }
        catch(Exception exc)
        {
            exc.printStackTrace();
            return false;
        }
    }
}
```

Setting Image Watermark

An image watermark can be set to cover the entire background of a document, or just to cover a specific area (for example, to display a logo). Specify the placement and size of the image using rectangular coordinates as follows:

```
float[ ] rct = {LowerLeft X, LowerLeft Y, UpperRight X,
UpperRight Y}
```

For example:

```
float[ ] rct = {100f, 100f, 200f, 200f}
```

The image will be sized to fit the rectangular area defined.

To use the actual image size, without sizing it, define the LowerLeft X and LowerLeft Y positions to define the placement and specify the UpperRight X and UpperRight Y coordinates as -1f. For example:

```
float[ ] rct = {100f, 100f, -1f, -1f}
```

Input:

- PDF Documents (InputStream)
- Image File (InputStream)

Output:

- PDF Document (OutputStream)

Example

```
import java.io.*;
import oracle.apps.xdo.common.pdf.util.PDFDocMerger;
.
.
.
public boolean mergeDocs(InputStream inputStreams, OutputStream
outputStream, String imagePath)
{
    try
    {
        // Initialize PDFDocMerger
        PDFDocMerger docMerger = new PDFDocMerger(inputStreams,
outputStream);

        FileInputStream wmStream = new FileInputStream(imageFilePath);
        float[] rct = {100f, 100f, -1f, -1f};
        pdfMerger.setImageWatermark(wmStream, rct);

        // Merge PDF Documents and generates new PDF Document
        docMerger.mergePDFDocs();
        docMerger = null;

        // Closes inputStreams
        return true;
    }
    catch(Exception exc)
    {
        exc.printStackTrace();
        return false;
    }
}
```

PDF Book Binder Processor

The PDFBookBinder processor is useful for the merging of multiple PDF documents into a single document consisting of a hierarchy of chapters, sections, and subsections and a table of contents for the document. The processor also generates PDF style "bookmarks"; the outline structure is determined by the chapter and section hierarchy. The processor is extremely powerful allowing you complete control over the combined document.

Usage

The table of contents formatting and style is created through the use of an RTF template created in Microsoft Word. The chapters are passed into the program as separate PDF

files (one chapter, section, or subsection corresponds to one PDF file). Templates may also be specified at the chapter level for insertion of dynamic or static content, page numbering, and placement of hyperlinks within the document.

The templates can be in RTF or PDF format. RTF templates are more flexible by allowing you to leverage BI Publisher's support for dynamic content. PDF templates are much less flexible, making it difficult to achieve desirable effects such as the reflow of text areas when inserting page numbers and other types of dynamic content.

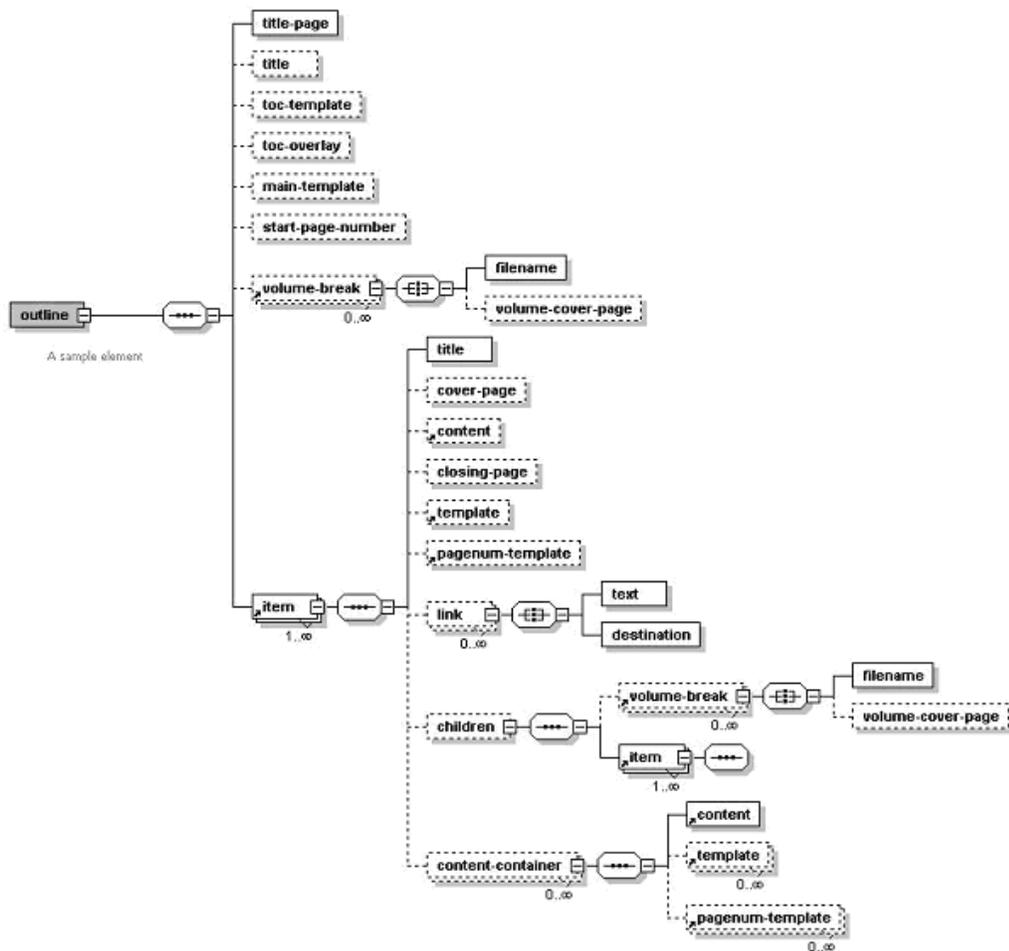
The templates can be rotated (at right angles) or be made transparent. A PDF template can also be specified at the book level, enabling the ability to specify global page numbering, or other content such as backgrounds and watermarks. A title page can also be passed in as a parameter, as well as cover and closing pages for each chapter or section.

XML Control File

The structure of the book's chapters, sections, and subsections is represented as XML and passed in as a command line parameter; or it can also be passed in at the API level. All of the chapter and section files, as well as all the templates files and their respective parameters, are specified inside this XML structure. Therefore, the only two required parameters are an XML file and a PDF output file.

You can also specify volume breaks inside the book structure. Specifying volume breaks will split the content up into separate output files for easier file and printer management.

The structure of the XML control file is represented in the following diagram:



To specify template and content file locations in your XML structure, you can specify a path relative to your local file system or you can specify a URL referring to the template or content location. Secure HTTP protocol is supported, as well as specially recognized BI Publisher protocols, such as:

- "xdo://" - used to specify BI Publisher Template Manager-specific data.
- "fnd://" - used to specify data located in the FND_LOBS table.
- "blob://" - used for specifying data in any user-defined BLOB table.

The format for the "blob://" protocol is:

```
blob://[table_name].[blob_column_name]/[pk_datatype]:[pk_name]=[pk_value]/.../...
```

Command Line Options

Following is an example of the command line usage:

```
java oracle.apps.template.pdf.book.PDFBookBinder [-debug <true or false>] [-tmp <temp dir>] -xml <input xml> -pdf <output pdf>
```

where

-xml <file> is the file name of the input XML file containing the table of contents XML structure.

-pdf <file> is the final generated PDF output file.

-tmp <directory> is the temporary directory for better memory management. (This is optional, if not specified, the system environment variable "java.io.tmpdir" will be used.)

-log <file> sets the output log file (optional, default is System.out).

-debug <true or false> turns debugging off or on.

API Method Call

The following is an example of an API method call:

```
String xmlInputPath = "c:\\tmp\\toc.xml";
String pdfOutputPath = "c:\\tmp\\final_book.pdf";
PDFBookBinder bookBinder = new PDFBookBinder(xmlInputPath,
    pdfOutputPath);

bookBinder.setConfig(new Properties());
bookBinder.process();
```

Document Processor Engine

The Document Processor Engine provides batch processing functionality to access a single API or multiple APIs by passing a single XML instance document to specify template names, data sources, languages, output type, output names, and destinations.

This solution enables batch printing with BI Publisher, in which a single XML document can be used to define a set of invoices for customers, including the preferred output format and delivery channel for those customers. The XML format is very flexible allowing multiple documents to be created or a single master document.

This section:

- Describes the hierarchy and elements of the Document Processor XML file
- Provides sample XML files to demonstrate specific processing options
- Provides example code to invoke the processors

Hierarchy and Elements of the Document Processor XML File

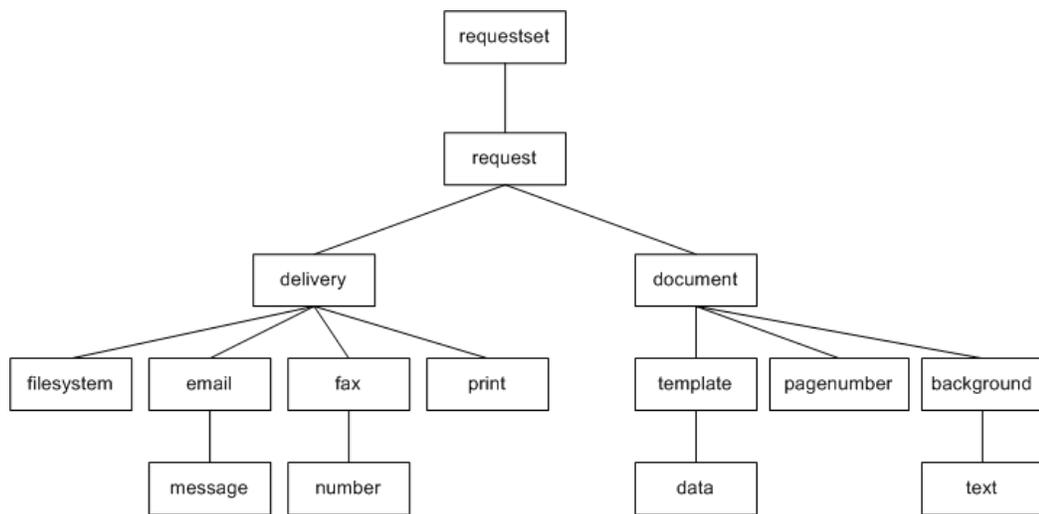
The Document Processor XML file has the following element hierarchy:

```

Requestset
  request
    delivery
      filesystem
      print
      fax
        number
      email
        message
    document
      background
      text
      pagenumber
      template
      data

```

This hierarchy is displayed in the following illustration:



The following table describes each of the elements:

| Element | Attributes | Description |
|------------|------------------|---|
| requestset | xmlns version | Root element must contain [xmlns:xapi="http://xmlns.oracle.com/oxp/xapi/"] block The version is not required, but defaults to "1.0". |
| request | N/A | Element that contains the data and template processing definitions. |

| Element | Attributes | Description |
|------------|---|---|
| delivery | N/A | Defines where the generated output is sent. |
| document | output-type | Specify one output that can have several template elements. The output-type attribute is optional. Valid values are: pdf (Default) rtf html excel text |
| filesystem | output | Specify this element to save the output to the file system. Define the directory path in the output attribute. |
| print | <ul style="list-style-type: none"> printer server-alias | The print element can occur multiple times under delivery to print one document to several printers. Specify the printer attribute as a URI, such as: "ipp://myprintserver:631/printers/printername" |
| fax | <ul style="list-style-type: none"> server server-alias | Specify a URI in the server attribute, for example: "ipp://myfaxserver1:631/printers/myfaxmachine" |
| number | | The number element can occur multiple times to list multiple fax numbers. Each element occurrence must contain only one number. |

| Element | Attributes | Description |
|------------|--|--|
| email | <ul style="list-style-type: none"> • server • port • from • reply-to • server-alias | <p>Specify the outgoing mail server (SMTP) in the <code>server</code> attribute.</p> <p>Specify the mail server port in the <code>port</code> attribute.</p> |
| message | <ul style="list-style-type: none"> • to • cc • bcc • attachment • subject | <p>The <code>message</code> element can be placed several times under the <code>email</code> element. You can specify character data in the <code>message</code> element.</p> <p>You can specify multiple e-mail addresses in the <code>to</code>, <code>cc</code> and <code>bcc</code> attributes separated by a comma.</p> <p>The <code>attachment</code> value is either <code>true</code> or <code>false</code> (default). If <code>attachment</code> is <code>true</code>, then a generated document will be attached when the e-mail is sent.</p> <p>The <code>subject</code> attribute is optional.</p> |
| background | where | <p>If the background text is required on a specific page, then set the <code>where</code> value to the page numbers required. The page index starts at 1. The default value is 0, which places the background on all pages.</p> |

| Element | Attributes | Description |
|------------|---|---|
| text | <ul style="list-style-type: none"> title default | <p>Specify the watermark text in the <code>title</code> value.</p> <p>A default value of "yes" automatically draws the watermark with forward slash type. The default value is yes.</p> |
| pagenumber | <ul style="list-style-type: none"> initial-page-index initial-value x-pos y-pos | <p>The <code>initial-page-index</code> default value is 0.</p> <p>The <code>initial-value</code> default value is 1.</p> <p>"Helvetica" is used for the page number font.</p> <p>The <code>x-pos</code> provides lower left x position.</p> <p>The <code>y-pos</code> provides lower left y position.</p> |
| template | <ul style="list-style-type: none"> locale location type | <p>Contains template information.</p> <p>Valid values for the <code>type</code> attribute are</p> <p>pdf</p> <p>rtf</p> <p>xsl-fo</p> <p>etext</p> <p>The default value is "pdf".</p> |

| Element | Attributes | Description |
|---------|------------|--|
| data | location | <p>Define the <code>location</code> attribute to specify the location of the data, or attach the actual XML data with subelements. The default value of <code>location</code> is "inline". If the <code>location</code> points to either an XML file or a URL, then the data should contain an XML declaration with the proper encoding.</p> <p>If the <code>location</code> attribute is not specified, the <code>data</code> element should contain the subelements for the actual data. This must not include an XML declaration.</p> |

XML File Samples

Following are sample XML files that show:

- Simple XML shape
- Defining two data sets
- Defining multiple templates and data
- Retrieving templates over HTTP
- Retrieving data over HTTP
- Generating more than one output
- Defining page numbers

Simple XML sample

The following sample is a simple example that shows the definition of one template (`template1.pdf`) and one data source (`data1`) to produce one output file (`outfile.pdf`) delivered to the file system:

Example

```
<?xml version="1.0" encoding="UTF-8" ?>
  <xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
    <xapi:request>
      <xapi:delivery>
        <xapi:filesystem output="d:\tmp\outfile.pdf" />
      </xapi:delivery>
      <xapi:document output-type="pdf">
        <xapi:template type="pdf" location="d:\mywork\template1.pdf">
          <xapi:data>
            <field1>data1</field1>
          </xapi:data>
        </xapi:template>
      </xapi:document>
    </xapi:request>
  </xapi:requestset>
```

Defining two data sets

The following example shows how to define two data sources to merge with one template to produce one output file delivered to the file system:

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\tmp\outfile.pdf"/>
    </xapi:delivery>

    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="d:\mywork\template1.pdf">
        <xapi:data>
          <field1>The first set of data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The second set of data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>
```

Defining multiple templates and data

The following example builds on the previous examples by applying two data sources to one template and two data sources to a second template, and then merging the two into a single output file. Note that when merging documents, the `output-type` must be "pdf".

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\tmp\outfile3.pdf"/>
    </xapi:delivery>

    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="d:\mywork\template1.pdf">
        <xapi:data>
          <field1>The first set of data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The second set of data</field1>
        </xapi:data>
      </xapi:template>

      <xapi:template type="pdf"
        location="d:\mywork\template2.pdf">
        <xapi:data>
          <field1>The third set of data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The fourth set of data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>
```

Retrieving templates over HTTP

This sample is identical to the previous example, except in this case the two templates are retrieved over HTTP:

```

<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\temp\out4.pdf"/>
    </xapi:delivery>

    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="http://your.server:9999/templates/template1.pdf">
        <xapi:data>
          <field1>The first page data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The second page data</field1>
        </xapi:data>
      </xapi:template>
      <xapi:template type="pdf"
        location="http://your.server:9999/templates/template2.pdf">
        <xapi:data>
          <field1>The third page data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The fourth page data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>

```

Retrieving data over HTTP

This sample builds on the previous example and shows one template with two data sources, all retrieved via HTTP; and a second template retrieved via HTTP with its two data sources embedded in the XML:

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\temp\out5.pdf"/>
    </xapi:delivery>

    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="http://your.server:9999/templates/template1.pdf">
        <xapi:data location="http://your.server:9999/data/data_1.xml"/>
        <xapi:data location="http://your.server:9999/data/data_2.xml"/>
      </xapi:template>

      <xapi:template type="pdf"
        location="http://your.server:9999/templates/template2.pdf">
        <xapi:data>
          <field1>The third page data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The fourth page data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>
```

Generating more than one output

The following sample shows the generation of two outputs: out_1.pdf and out_2.pdf. Note that a request element is defined for each output.

Example

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\temp\out_1.pdf"/>
    </xapi:delivery>
    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="d:\mywork\template1.pdf">
        <xapi:data>
          <field1>The first set of data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The second set of data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>

  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\temp\out_2.pdf"/>
    </xapi:delivery>
    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="d:\mywork\template2.pdf">
        <xapi:data>
          <field1>The third set of data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The fourth set of data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>
```

Defining page numbers

The following sample shows the use of the `pagenumber` element to define page numbers on a PDF output document. The first document that is generated will begin with an initial page number value of 1. The second output document will begin with an initial page number value of 3. The `pagenumber` element can reside anywhere within the document element tags.

Note that page numbering that is applied using the `pagenumber` element will not replace page numbers that are defined in the template.

```

<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\temp\out7-1.pdf"/>
    </xapi:delivery>
    <xapi:document output-type="pdf">
      <xapi:pagenumber initial-value="1" initial-page-index="1"
        x-pos="300" y-pos="20" />
      <xapi:template type="pdf"
        location="d:\mywork\template1.pdf">
        <xapi:data>
          <field1>The first page data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The second page data</field1>
        </xapi:data>
      </xapi:template>
    </xapi:document>
  </xapi:request>

  <xapi:request>
    <xapi:delivery>
      <xapi:filesystem output="d:\temp\out7-2.pdf"/>
    </xapi:delivery>
    <xapi:document output-type="pdf">
      <xapi:template type="pdf"
        location="d:\mywork\template2.pdf">
        <xapi:data>
          <field1>The third page data</field1>
        </xapi:data>
        <xapi:data>
          <field1>The fourth page data</field1>
        </xapi:data>
      </xapi:template>
      <xapi:pagenumber initial-value="3" initial-page-index="1"
        x-pos="300" y-pos="20" />
    </xapi:document>
  </xapi:request>
</xapi:requestset>

```

Invoke Processors

The following code samples show how to invoke the document processor engine using an input file name and an input stream.

Invoke Processors with Input File Name

Input:

- Data file name (String)
- Directory for Temporary Files (String)

Example

```
import oracle.apps.xdo.batch.DocumentProcessor;
.
.
.
public static void main(String[] args)
{
.
.
.
    try
    {
        // dataFile --- File path of the Document Processor XML
        // tempDir --- Temporary Directory path
        DocumentProcessor docProcessor = new DocumentProcessor(dataFile,
tempDir);
        docProcessor.process();
    }
    catch(Exception e)
    {
        e.printStackTrace();
        System.exit(1);
    }
    System.exit(0);
}
```

Invoke Processors with InputStream

Input:

- Data file (InputStream)
- Directory for Temporary Files (String)

Example

```
import oracle.apps.xdo.batch.DocumentProcessor;
import java.io.InputStream;
.
.
.
public static void main(String[] args)
{
.
.
.
    try
    {
        // dataFile --- File path of the Document Processor XML
        // tempDir --- Temporary Directory path
        FileInputStream fIs = new FileInputStream(dataFile);

        DocumentProcessor docProcessor = new DocumentProcessor(fIs,
tempDir);
        docProcessor.process();
        fIs.close();
    }
    catch(Exception e)
    {
        e.printStackTrace();
        System.exit(1);
    }
    System.exit(0);
}
```

Bursting Engine

BI Publisher's bursting engine accepts a data stream and splits it based on multiple criteria, generates output based on a template, then delivers the individual documents through the delivery channel of choice. The engine provides a flexible range of possibilities for document generation and delivery. Example implementations include:

- Invoice generation and delivery based on customer-specific layouts and delivery preference
- Financial reporting to generate a master report of all cost centers, bursting out individual cost center reports to the appropriate manager
- Generation of payslips to all employees based on one extract and delivered via e-mail

Usage

The bursting engine is an extension of the Document Processor Engine, page A-31 and has its own method be called to invoke it. The Document Processor XML structure has been extended to handle the new components required by the bursting engine. It

supports all of the delivery functionality that the Document Processor supports using the same format. It accepts the XML data to be burst and a control file that takes the Document Processor XML format (see Hierarchy and Elements of the Document Processor XML File, page A-31).

Control File

The control file takes the same format as the Document Processor XML, page A-31 with a few extensions:

- Use the attribute `select` under the `request` element to specify the element in the XML data that you wish to burst on.

Example

```
<xapi:request select="/EMPLOYEES/EMPLOYEE">
```

- Use the attribute `id` under the lowest level of the delivery structure (for example, for the delivery element `email`, the `id` attribute belongs to the `message` element. This assigns an ID to the delivery method to be referenced later in the XML file.

Example

```
<xapi:message id="123" to="jo.smith@company.com">
```

- Use the `delivery` attribute under the `document` element. This assigns the delivery method for the generated document as defined in the `id` attribute for the `delivery` element. You can specify multiple delivery channels separated by a comma.

Example

```
<xapi:document output-type="pdf" delivery="123">
```

- Use the `filter` attribute on the `template` element. Use this to apply a layout template based on a filter on your XML data.

Example

```
<xapi:template type="rtf" location="/usr/tmp/empGeneric.rtf">  
<xapi:template type="rtf" location="usr\tmp\empDet.rtf"  
filter="//EMPLOYEE[ENAME='SMITH']"/>
```

This will apply the `empDet` template only to those employees with the name "SMITH". All other employees will have the `empGeneric` template applied. This filter can use any XPATH expression to determine the rules for the template application.

Dynamic Delivery Destination

You can reference elements in the data to derive certain delivery attributes, such as an e-mail address or fax number. Enter the value for the attribute using the following form:

```
${ELEMENT}
```

where `ELEMENT` is the element name from the XML data that holds the value for the attribute.

For example:

```
<xapi:message id="123" to="{EMAIL}"/>
```

At runtime the value of the `to` attribute will be set to the value of the `EMAIL` element from the input XML file.

You can also set the value of an attribute by passing a parameter to API in a Properties object.

Dynamic Delivery Content

You can reference information in the XML data to be put into the delivery content. This takes the same format described above (that is, `{ELEMENT}`).

For example, suppose you wanted to burst a document to employees via e-mail and personalize the e-mail by using the employee's name in the subject line. Assuming the employee's name is held in an element called `ENAME`, you could use `{ENAME}` to reference the employee's name in the control file as follows:

```
subject="Employee Details for {ENAME}"
```

Sample Control File

The following sample control file shows an example control file to split data based on an `EMPLOYEE` element and send an e-mail to each employee with their own data. The sample file is annotated.

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
<xapi:request select="/EMPLOYEES/EMPLOYEE"><!-- This sets the bursting
element i.e., EMPLOYEE -->
  <xapi:delivery>
    <xapi:email server="rgmamersmtp.oraclecorp.com" port="25"
from="xmlpadmin1@oracle.com" reply-to="reply@oracle.com">
      <xapi:message id="123" to="{EMAIL}" cc="{EMAIL_ALL}"
attachment="true" subject="Employee Details
for {ENAME}"> Mr. {ENAME}, Please review the
attached document</xapi:message><!-- This assigns a delivery id
of '123'. It also sets the e-mail
address of the employee and a cc copy to a parameter value
EMAIL_ALL; this might be a manager's e-mail. The employee's
name (ENAME) can also be used in the subject/body
of the email. --></xapi:email>
    </xapi:delivery>
    <xapi:document output-type="pdf" delivery="123">
      <xapi:template type="rtf" location="/usr/tmp/empGeneric.rtf">
      <xapi:template type="rtf" location="/usr/tmp/empDet.rtf"
filter="//EMPLOYEE[ENAME='SMITH']"><!-- Employees with the name
SMITH will have
the empDet template applied -->
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>
```

Multiple Bursting Options

The bursting engine can support multiple bursting criteria and delivery options. Assume you have a report that generates data for all employees with their manager's information. You can construct a control file that will:

- Burst the employee data to each employee
- Burst a report to each manager that contains the data about his employees

You can provide a different template for each bursting level. You can therefore generate the employee report based on one template and the summary manager's report based on a different template, but still use the same data set.

To achieve this multibursting result, you must add a second `request` element to the control file structure.

Multibursting Example

The following sample shows how to construct a control file that will burst on the EMPLOYEE level and the MANAGER level:

```

?xml version="1.0" encoding="UTF-8" ?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi"><!--
First request to burst on employee -->
  <xapi:request select="/EMPLOYEES/EMPLOYEE">
    <xapi:delivery>
      <xapi:email <<server details removed>> />
        <xapi:message id="123" <<message details removed>>
          </xapi:message>
        </xapi:email>
      <xapi:fax server="ipp://mycupsserver:631/printers/fax2">
        <xapi:number id="FAX1">916505069560</xapi:number>
        </xapi:fax>
        <xapi:print id="printer1"
          printer="ipp://mycupsserver:631/printers/printer1"
          copies="2" />
        </xapi:delivery>
      <xapi:document output-type="pdf" delivery="123">
        <xapi:template type="rtf" location="usr\tmp\empDet.rtf" />
        </xapi:document>
      </xapi:request><!--
Second request to burst on department -->
    <xapi:request select="/DATA/DEPT/MANAGER">
      <xapi:delivery>
        <xapi:email server="gsmtp.oraclecorp.com" port=""
          from="XDOburstingTest@oracle.com" reply-to="reply@oracle.com">
          <xapi:message id="123" to="{MANAGER_EMAIL}"
            cc="{MANAGER_EMAIL}" attachment="true"
            subject="Department Summary for ${DEPTNO}">Please review
            the attached Department Summary for
            department ${DEPTNO}</xapi:message>
          </xapi:email>
        </xapi:delivery>
      <xapi:document output-type="rtf" delivery="123">
        <xapi:template type="rtf"
          location="d:\burst_test\deptSummary.rtf" />
        </xapi:document>
      </xapi:request>
    </xapi:requestset>

```

Bursting Listeners

The bursting engine provides a listening interface that allows you to listen to the various stages of the bursting process. Following are the supported modes that you can subscribe to:

- `beforeProcess()` - before the bursting process starts.
- `afterProcess()` - after the bursting process completes.
- `beforeProcessRequest(int requestIndex)` - before the bursting request starts. This interface provides an assigned request ID for the current request.
- `afterProcessRequest(int requestIndex)` - after the bursting request has completed; provides the request ID for the current request.
- `beforeProcessDocument(int requestIndex, int documentIndex, String deliveryId)` - before the document generation starts;

provides the request ID and a document ID.

- `afterProcessDocument(int requestIndex, int documentIndex, Vector documentOutputs)` - after the document generation completes; provides the request ID and document ID, plus a Vector list of the document objects generated in the request.
- `beforeDocumentDelivery(int requestIndex, int documentIndex, String deliveryId)` - before the documents in the request are delivered; provides the request ID, the document ID, and a delivery ID.
- `afterDocumentDelivery(int requestIndex, int documentIndex, String deliveryId, Object deliveryObject, Vector attachments)` - after the document delivery completes; provides a request ID, document ID, and delivery ID, plus a Vector list of the documents delivered in the request.

You can subscribe to any of these interfaces in your calling Java class. The listeners are useful to determine if the processing of individual documents is proceeding successfully or to start another process based on the successful completion of a request.

Calling the Bursting API

To call the bursting API, instantiate an instance of `DocumentProcessor` class using one of the following formats:

```
DocumentProcessor(xmlCtrlInput, xmlDataInput, tmpDir)
```

where

`xmlCtrlInput` - is the control file for the bursting process. This can be a string reference to a file, an `InputStream` object, or a `Reader` object.

`xmlDataInput` - is the XML data to be burst. This can be a string reference to a file, an `InputStream` object, or a `Reader` object.

`tmpDir` - is a temporary working directory. This takes the format of a `String` object. This is optional as long as the main BI Publisher temporary directory has been set.

Simple Example Java Class

The following is a sample Java class:

```

public class BurstingTest
{
    public BurstingTest()
    {
        try
        {
            DocumentProcessor dp = new DocumentProcessor
            ("\\burst\\burstCtrl.xml", "\\burst\\empData.xml", "\\burst");
            dp.process();
        }
        catch (Exception e)
        { System.out.println(e);
        }

        public static void main(String[] args)
        {
            BurstingTest burst1 = new BurstingTest();
        }
    }
}

```

Example Java Class with Listeners

To take advantage of the bursting listeners, add the interface to the class declaration and use the `registerListener` method. Then code for the listeners you want to subscribe to as follows:

```

public class BurstingTest implements BurstingListener
{
    public BurstingTest()
    {
        try
        {
            DocumentProcessor dp = new DocumentProcessor
            ("\\burst\\burstCtrl.xml", "\\burst\\empData.xml", "\\burst");
            dp.registerListener(this);
            dp.process();
        }
        catch (Exception e)
        { System.out.println(e);
        }

        public static void main(String[] args)
        {
            BurstingTest burst1 = new BurstingTest();
        }

        public void beforeProcess() {
            System.out.println("Start of Bursting Process");
        }
        public void afterProcess()
        {
            System.out.println("End of Bursting Process");
        }

        public void beforeProcessRequest(int requestIndex)
        {
            System.out.println("Start of Process Request ID"+requestIndex);
        }
        public void afterProcessRequest(int requestIndex)
        {
            System.out.println("End of Process Request ID"+requestIndex ");
        }

        public void beforeProcessDocument(int requestIndex,int
            documentIndex)
        {
            System.out.println("Start of Process Document");
            System.out.println(" Request Index "+requestIndex);
            System.out.println(" Document Index " +documentIndex);
        }

        public void afterProcessDocument(int requestIndex,int
            documentIndex,
            Vector documentOutputs)
        {
            System.out.println(" =====End of Process Document");
            System.out.println(" Outputs :"+documentOutputs);
        }

        public void beforeDocumentDelivery(int requestIndex,int
            documentIndex,
            String deliveryId)
        {
            System.out.println(" =====Start of Delivery");
            System.out.println(" Request Index "+requestIndex);
            System.out.println(" Document Index " +documentIndex);
            System.out.println(" DeliveryId " +deliveryId);
        }
    }
}

```

```

public void afterDocumentDelivery(int requestIndex,int documentIndex,
    String deliveryId,Object deliveryObject,Vector attachments)
    {
        System.out.println("    =====End of Delivery");
        System.out.println(" Attachments : "+attachments);

    }

}

```

Passing a Parameter

To pass a parameter holding a value to be used in the control file for delivery, add the following code:

```

...
Properties prop= new Properties();
prop.put ("user-variable:ADMIN_EMAIL", "jo.smith@company.com");
dp.setConfig(prop);
dp.process();
...

```

Bursting Control File Examples

All of the examples in this section use the following XML data source:

```

<?xml version="1.0" encoding="UTF-8"?>
<DATA>
<DEPTS>
<DEPT>
  <DEPTNO>20</DEPTNO>
  <NAME>Accounting</NAME>
  <MANAGER_EMAIL>tdexter@mycomp.com</MANAGER_EMAIL>
  <EMPLOYEES>
    <EMPLOYEE>
      <EMPNO>7369</EMPNO>
      <ENAME>SMITH</ENAME>
      <JOB>CLERK</JOB>
      <MGR>7902</MGR>
      <HIREDATE>1980-12-17T00:00:00.000-08:00</HIREDATE>
      <SAL>800</SAL>
      <DEPTNO>20</DEPTNO>
      <EMAIL>jsmith@mycomp.com</EMAIL>
    </EMPLOYEE>
    <EMPLOYEE>
      <EMPNO>7566</EMPNO>
      <ENAME>JONES</ENAME>
      <JOB>MANAGER</JOB>
      <MGR>7839</MGR>
      <HIREDATE>1981-04-02T00:00:00.000-08:00</HIREDATE>
      <SAL>2975</SAL>
      <DEPTNO>20</DEPTNO>
      <EMAIL>jjones@mycomp.com</EMAIL>
    </EMPLOYEE>
  </EMPLOYEES>
</DEPT>
<DEPT>
  <DEPTNO>30</DEPTNO>
  <NAME>Sales</NAME>
  <MANAGER_EMAIL>dsmith@mycomp.com</MANAGER_EMAIL>
  <EMPLOYEES>
    <EMPLOYEE>
      <EMPNO>7788</EMPNO>
      <ENAME>SCOTT</ENAME>
      <JOB>ANALYST</JOB>
      <MGR>7566</MGR>
      <HIREDATE>1982-12-09T00:00:00.000-08:00</HIREDATE>
      <SAL>3000</SAL>
      <DEPTNO>20</DEPTNO>
      <EMAIL>jscott@mycomp.com</EMAIL>
    </EMPLOYEE>
    <EMPLOYEE>
      <EMPNO>7876</EMPNO>
      <ENAME>ADAMS</ENAME>
      <JOB>CLERK</JOB>
      <MGR>7788</MGR>
      <HIREDATE>1983-01-12T00:00:00.000-08:00</HIREDATE>
      <SAL>1100</SAL>
      <EMAIL>jadams@mycomp.com</EMAIL>
    </EMPLOYEE>
  </EMPLOYEES>
</DEPT>
</DEPTS>
</DATA>

```

Example 1 - Bursting Employee Data to Employees via E-mail

The following sample shows how to apply a template (empDet.rtf) to every employee's

data, generate a PDF document, and deliver the document to each employee via e-mail.

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
<xapi:request select="/DATA/DEPTS/DEPT/EMPLOYEES/EMPLOYEE"> <!-- Burst
on employee element - >
  <xapi:delivery>
    <xapi:email server="my.smtp.server" port="25"
      from="xmlpadmin@mycomp.com" reply-to="">
      <xapi:message id="123" to="{EMAIL}"
<!-- Set the id for the delivery method - > <!-- Use the employees
EMAIL element to email the document to
the employee - > cc="{ADMIN_EMAIL}"
<!-- Use the ADMIN_EMAIL parameter to CC the document
to the administrator - > attachment="true" subject="Employee
Details for {ENAME}">
  Mr. {ENAME}, Please review the attached document</xapi:message><!--
Embed the employees name into the email message - >
</xapi:email>
  </xapi:delivery>
  <xapi:document output-type="pdf" delivery="123"><!--Specify the
delivery method id to be used - >
    <xapi:template type="rtf"
      location="\usr\empDet.rtf"></xapi:template>
  </xapi:document>
</xapi:request>
</xapi:requestset>
```

Example 2 - Bursting Employee Data to Employees via Multiple Delivery Channels and Conditionally Using Layout Templates

This sample shows how to burst, check the employee name, and generate a PDF using the appropriate template. The documents will then be e-mailed and printed.

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi" >
  <xapi:globalData location="stream">
  </xapi:globalData >
  <xapi:request select="/DATA/DEPTS/DEPT/EMPLOYEES/EMPLOYEE">
    <xapi:delivery>
      <xapi:email server="my.smtp.server" port=""
        from="xmlpserver@oracle.com"
        reply-to="reply@oracle.com">
      <xapi:message id="123" to="{EMAIL}" cc="" attachment="true"
        subject="Employee Details for {ENAME}"> Mr. {ENAME},
        Please review the attached document</xapi:message>
    </xapi:email>
    <xapi:print id="printer1"
      printer="ipp://ipgpc1:631/printers/printer1" copies="2" /><!-- Add an
id for this delivery method i.e. printer1 - > </xapi:delivery>
      <xapi:document output-type="pdf" delivery="printer1,123"><!--
Deliver to printer and email - > <xapi:template type="rtf"
location="/usr/empDetSmith.rtf"
      filter="//EMPLOYEE[ENAME='SMITH']"><!-- Specify template to be
used for employees called SMITH - >
      </xapi:template>
      <xapi:template type="rtf" location="/usr/empSummary.rtf"><!--
Default template to be used - >
      </xapi:template>
    </xapi:document>
  </xapi:request>
</xapi:requestset>
```

Example 3 - Bursting Employee Data to Employees and Their Manager

This sample shows how to burst an e-mail with a PDF attachment to all employees using the empDet template. It will also burst an employee summary PDF to the manager of each department via e-mail.

```
<?xml version="1.0" encoding="UTF-8"?>
<xapi:requestset xmlns:xapi="http://xmlns.oracle.com/oxp/xapi">
  <xapi:request select="/DATA/DEPTS/DEPT/EMPLOYEES/EMPLOYEE">
    <xapi:delivery>
      <xapi:email server="my.smtp.server" port=""
        from="xmlpserver@oracle.com" reply-to="">
      <xapi:message id="123" to="{EMAIL}" cc="{EMAIL}"
        attachment="true"
        subject="Employee Details for {ENAME}"> Mr. {ENAME},
        Please review the attached document</xapi:message>
    </xapi:email>
  </xapi:delivery>
  <xapi:document output-type="pdf" delivery="123">
    <xapi:template type="rtf"
      location="/usr/empDet.rtf"></xapi:template>
  </xapi:document>
</xapi:request>
<xapi:request select="/DATA/DEPTS/DEPT"><!-- Second request created to
burst the same dataset to the
manager based on the DEPT element -->
  <xapi:delivery>
    <xapi:email server="my.smtp.server" port=""
      from="xmlpserver@oracle.com" reply-to="">
  <xapi:message id="456" to="{MANAGER_EMAIL}"
    cc="{MANAGER_EMAIL}" attachment="true" subject="Department
    Summary for {DEPTNO}"> Please review the attached
    Department Summary for department {DEPTNO}</xapi:message>
  </xapi:email>
  </xapi:delivery>
  <xapi:document output-type="rtf" delivery="456">
    <xapi:template type="rtf"
      location="\usr\deptSumm.rtf"></xapi:template>
  </xapi:document>
</xapi:request>
</xapi:requestset>
```

BI Publisher Properties

The FO Processor supports PDF security and other properties that can be applied to your final documents. Security properties include making a document unprintable and applying password security to an encrypted document.

Other properties allow you to define font subsetting and embedding. If your template uses a font that would not normally be available to BI Publisher at runtime, you can use the font properties to specify the location of the font. At runtime BI Publisher will retrieve and use the font in the final document. For example, this property might be used for check printing for which a MICR font is used to generate the account and routing numbers on the checks.

See Setting Runtime Properties, page 11-13 for the full list of properties.

Setting Properties

The properties can be set in two ways:

- At runtime, specify the property as a Java Property object to pass to the FO Processor.
- Set the property in a configuration file.
- Set the property in the template (RTF templates only). See Setting Properties, page 5-90 in the RTF template for this method.

Passing Properties to the FO Engine

To pass a property as a Property object, set the name/value pair for the property prior to calling the FO Processor, as shown in the following example:

Input:

- XML file name (String)
- XSL file name (String)

Output:

- PDF file name (String)

Example

```
import oracle.apps.xdo.template.FOProcessor;
.
.
.
public static void main(String[] args)
{
    FOProcessor processor = new FOProcessor();
    processor.setData(args[0]); // set XML input file
    processor.setTemplate(args[1]); // set XSL input file
    processor.setOutput(args[2]); //set (PDF) output file
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
    Properties prop = new Properties();
    /* PDF Security control: */
    prop.put("pdf-security", "true");
    /* Permissions password: */
    prop.put("pdf-permissions-password", "abc");
    /* Encryption level: */
    prop.put("pdf-encryption-level", "0");
    processor.setConfig(prop);
    // Start processing
    try
    {
        processor.generate();
    }
    catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }

    System.exit(0);
}
```

Passing a Configuration File to the FO Processor

The following code shows an example of passing the location of a configuration file.

Input:

- XML file name (String)
- XSL file name (String)

Output:

- PDF file name (String)

```

import oracle.apps.xdo.template.FOProcessor;
.
.
.
public static void main(String[] args)
{
    FOProcessor processor = new FOProcessor();
    processor.setData(args[0]); // set XML input file
    processor.setTemplate(args[1]); // set XSL input file
    processor.setOutput(args[2]); //set (PDF) output file
    processor.setOutputFormat(FOProcessor.FORMAT_PDF);
    processor.setConfig("/tmp/xmlpconfig.xml");
    // Start processing
    try
    {
        processor.generate();
    } catch (XDOException e)
    {
        e.printStackTrace();
        System.exit(1);
    }
    System.exit(0);
}

```

Passing Properties to the Document Processor

Input:

- Data file name (String)
- Directory for Temporary Files (String)

Output:

- PDF File

Example

```
import oracle.apps.xdo.batch.DocumentProcessor;
.
.
.
public static void main(String[] args)
{
.
.
.
    try
    {
        // dataFile --- File path of the Document Processor XML
        // tempDir --- Temporary Directory path
        DocumentProcessor docProcessor = new DocumentProcessor(dataFile,
tempDir);
        Properties prop = new Properties();
        /* PDF Security control: */
        prop.put("pdf-security", "true");
        /* Permissions password: */
        prop.put("pdf-permissions-password", "abc");
        /* encryption level: */
        prop.put("pdf-encryption-level", "0");
        processor.setConfig(prop);
        docProcessor.process();
    }
    catch(Exception e)
    {
        e.printStackTrace();
        System.exit(1);
    }
    System.exit(0);
}
```

Advanced Barcode Font Formatting Implementation

For the advanced formatting to work in the template, you must provide a Java class with the appropriate methods to format the data at runtime. Many font vendors offer the code with their fonts to carry out the formatting; these must be incorporated as methods into a class that is available to the BI Publisher formatting libraries at runtime. There are some specific interfaces that you must provide in the class for the library to call the correct method for encoding.

Note: See Advanced Barcode Formatting, page 5-117 for the setup required in the RTF template.

You must implement the following three methods in this class:

```

/**
 * Return a unique ID for this barcode encoder
 * @return the id as a string
 */
public String getVendorID();

/**
 * Return true if this encoder support a specific type of barcode
 * @param type the type of the barcode
 * @return true if supported
 */
public boolean isSupported(String type);

/**
 * Encode a barcode string by given a specific type
 * @param data the original data for the barcode
 * @param type the type of the barcode
 * @return the formatted data
 */
public String encode(String data, String type);

```

Place this class in the classpath for the middle tier JVM in which BI Publisher is running.

Note: For E-Business Suite users, the class must be placed in the classpath for the middle tier and any concurrent nodes that are present.

If in the register-barcode-vendor command the `barcode_vendor_id` is not provided, BI Publisher will call the `getVendorID()` and use the result of the method as the ID for the vendor.

The following is an example class that supports the code128 a, b and c encodings:

Important: The following code sample can be copied and pasted for use in your system. Note that due to publishing constraints you will need to correct line breaks and ensure that you delete quotes that display as "smart quotes" and replace them with simple quotes.

Example

```
package oracle.apps.xdo.template.rtf.util.barcode;

import java.util.Hashtable;
import java.lang.reflect.Method;
import oracle.apps.xdo.template.rtf.util.XDOBarcodeEncoder;
import oracle.apps.xdo.common.log.Logger;
// This class name will be used in the register vendor
// field in the template.

public class BarcodeUtil implements XDOBarcodeEncoder
// The class implements the XDOBarcodeEncoder interface
{
// This is the barcode vendor id that is used in the
// register vendor field and format-barcode fields
    public static final String BARCODE_VENDOR_ID = "XMLPBarVendor";
// The hashtable is used to store references to
// the encoding methods
    public static final Hashtable ENCODERS = new Hashtable(10);
// The BarcodeUtil class needs to be instantiated
    public static final BarcodeUtil mUtility = new BarcodeUtil();
// This is the main code that is executed in the class,
// it is loading the methods for the encoding into the hashtable.
// In this case we are loading the three code128 encoding
// methods we have created.
    static {
        try {
            Class[] clazz = new Class[] { "" .getClass() };

            ENCODERS.put("code128a",mUtility.getClass().getMethod("code128a",
clazz));
            ENCODERS.put("code128b",mUtility.getClass().getMethod("code128b",
clazz));
            ENCODERS.put("code128c",mUtility.getClass().getMethod("code128c",
clazz));
        } catch (Exception e) {
// This is using the BI Publisher logging class to push
// errors to the XMLP log file.
            Logger.log(e,5);
        }
    }
}
```

```

// The getVendorID method is called from the template layer
// at runtime to ensure the correct encoding method are used
public final String getVendorID()
{
    return BARCODE_VENDOR_ID;
}

//The isSupported method is called to ensure that the
// encoding method called from the template is actually
// present in this class.
// If not then XMLP will report this in the log.
public final boolean isSupported(String s)
{
    if(s != null)
        return ENCODERS.containsKey(s.trim().toLowerCase());
    else
        return false;
}

// The encode method is called to then call the appropriate
// encoding method, in this example the code128a/b/c methods.

public final String encode(String s, String s1)
{
    if(s != null && s1 != null)
    {
        try
        {
            Method method =
(Method)ENCODERS.get(s1.trim().toLowerCase());
            if(method != null)
                return (String)method.invoke(this, new Object[] {
                    s
                });
            else
                return s;
        }
        catch(Exception exception)
        {
            Logger.log(exception,5);
        }
        return s;
    } else
    {
        return s;
    }
}

/** This is the complete method for Code128a */

public static final String code128a( String DataToEncode )
{
    char C128_Start = (char)203;
    char C128_Stop = (char)206;
    String Printable_string = "";
    char CurrentChar;
    int CurrentValue=0;
    int weightedTotal=0;
    int CheckDigitValue=0;
    char C128_CheckDigit='w';

    DataToEncode = DataToEncode.trim();

```

```

weightedTotal = ((int)C128_Start) - 100;
for( int i = 1; i <= DataToEncode.length(); i++ )
{
//get the value of each character
CurrentChar = DataToEncode.charAt(i-1);
if( ((int)CurrentChar) < 135 )
    CurrentValue = ((int)CurrentChar) - 32;
if( ((int)CurrentChar) > 134 )
    CurrentValue = ((int)CurrentChar) - 100;

CurrentValue = CurrentValue * i;
weightedTotal = weightedTotal + CurrentValue;
}
//divide the WeightedTotal by 103 and get the remainder, //this is
the CheckDigitValue
CheckDigitValue = weightedTotal % 103;
if( (CheckDigitValue < 95) && (CheckDigitValue > 0) )
    C128_CheckDigit = (char)(CheckDigitValue + 32);
if( CheckDigitValue > 94 )
    C128_CheckDigit = (char)(CheckDigitValue + 100);
if( CheckDigitValue == 0 ){
    C128_CheckDigit = (char)194;
}

Printable_string = C128_Start + DataToEncode + C128_CheckDigit +
C128_Stop + " ";
return Printable_string;
}

```

```

/** This is the complete method for Code128b ***/

public static final String code128b( String DataToEncode )
{
    char C128_Start = (char)204;
    char C128_Stop = (char)206;
    String Printable_string = "";
    char CurrentChar;
    int CurrentValue=0;
    int weightedTotal=0;
    int CheckDigitValue=0;
    char C128_CheckDigit='w';

    DataToEncode = DataToEncode.trim();
    weightedTotal = ((int)C128_Start) - 100;
    for( int i = 1; i <= DataToEncode.length(); i++ )
    {
//get the value of each character
        CurrentChar = DataToEncode.charAt(i-1);
        if( ((int)CurrentChar) < 135 )
            CurrentValue = ((int)CurrentChar) - 32;
        if( ((int)CurrentChar) > 134 )
            CurrentValue = ((int)CurrentChar) - 100;

        CurrentValue = CurrentValue * i;
        weightedTotal = weightedTotal + CurrentValue;
    }
//divide the WeightedTotal by 103 and get the remainder, //this is
the CheckDigitValue
    CheckDigitValue = weightedTotal % 103;
    if( (CheckDigitValue < 95) && (CheckDigitValue > 0) )
        C128_CheckDigit = (char)(CheckDigitValue + 32);
    if( CheckDigitValue > 94 )
        C128_CheckDigit = (char)(CheckDigitValue + 100);
    if( CheckDigitValue == 0 ){
        C128_CheckDigit = (char)194;
    }

    Printable_string = C128_Start + DataToEncode + C128_CheckDigit +
    C128_Stop + " ";
    return Printable_string;
}

/** This is the complete method for Code128c **/

public static final String code128c( String s )
{
    char C128_Start = (char)205;
    char C128_Stop = (char)206;
    String Printable_string = "";
    String DataToPrint = "";
    String OnlyCorrectData = "";
    int i=1;
    int CurrentChar=0;
    int CurrentValue=0;
    int weightedTotal=0;
    int CheckDigitValue=0;
    char C128_CheckDigit='w';
    DataToPrint = "";
    s = s.trim();

```

```

for(i = 1; i <= s.length(); i++ )
{
    //Add only numbers to OnlyCorrectData string
    CurrentChar = (int)s.charAt(i-1);
    if((CurrentChar < 58) && (CurrentChar > 47))
    {
        OnlyCorrectData = OnlyCorrectData + (char)s.charAt(i-1);
    }
    s = OnlyCorrectData;
    //Check for an even number of digits, add 0 if not even
    if( (s.length() % 2) == 1 )
    {
        s = "0" + s;
    }
    //<<<< Calculate Modulo 103 Check Digit and generate
    // DataToPrint >>>> //Set WeightedTotal to the Code 128 value of
// the start character
    weightedTotal = ((int)C128_Start) - 100;
    int WeightValue = 1;
    for( i = 1; i <= s.length(); i += 2 )
    {
        //Get the value of each number pair (ex: 5 and 6 = 5*10+6 =56) //And
assign the ASCII values to DataToPrint
        CurrentChar = (((int)s.charAt(i-1))-48)*10 + (((int)s.charAt(i))-48);
        if((CurrentChar < 95) && (CurrentChar > 0))
            DataToPrint = DataToPrint + (char)(CurrentChar + 32);
        if( CurrentChar > 94 )
            DataToPrint = DataToPrint + (char)(CurrentChar + 100);
        if( CurrentChar == 0)
            DataToPrint = DataToPrint + (char)194;
        //multiply by the weighting character
        //add the values together to get the weighted total
        weightedTotal = weightedTotal + (CurrentChar * WeightValue);
        WeightValue = WeightValue + 1;
    }
    //divide the WeightedTotal by 103 and get the remainder, //this is
the CheckDigitValue
    CheckDigitValue = weightedTotal % 103;
    if((CheckDigitValue < 95) && (CheckDigitValue > 0))
        C128_CheckDigit = (char)(CheckDigitValue + 32);
    if( CheckDigitValue > 94 )
        C128_CheckDigit = (char)(CheckDigitValue + 100);
    if( CheckDigitValue == 0 ){
        C128_CheckDigit = (char)194;
    }
    Printable_string = C128_Start + DataToPrint + C128_CheckDigit +
    C128_Stop + " ";
    Logger.log(Printable_string,5);
    return Printable_string;
}
}

```

Once you create the class and place it in the correct classpath, your template creators can start using it to format the data for barcodes. You must give them the following information to include in the template commands:

- The class name and path.

In this example:

```
oracle.apps.xdo.template.rtf.util.barcoder.BarcodeUtil
```

- The barcode vendor ID you created.

In this example: XMLPBarVendor

- The available encoding methods.

In this example, code128a, code128b and code128c They can then use this information to successfully encode their data for barcode output.

They can then use this information to successfully encode their data for barcode output.

Using the Delivery Manager APIs

Introduction

The Delivery Manager is a set of Java APIs that allow you to control the delivery of your BI Publisher documents. Use the Delivery Manager to:

- Deliver documents through established delivery channels (e-mail, fax, printer, WebDAV, FTP, Secure FTP, AS2, or HTTP) or custom delivery channels
- Track the status of each delivery
- Redeliver documents

Using the Delivery Manager

To use the Delivery Manager follow these steps:

1. Create a `DeliveryManager` instance
2. Create a `DeliveryRequest` instance using the `createRequest()` method
3. Add the request properties (such as `DeliveryRequest` destination). Most properties require a `String` value. See the supported properties for each delivery channel for more information.
4. Set your document to the `DeliveryRequest`.
5. Call `submit()` to submit the delivery request.

One delivery request can handle one document and one destination. This facilitates monitoring and resubmission, if necessary.

`DeliveryRequest` allows you to set the documents in three ways as follows:

- Set `InputStream` of the document to `DeliveryRequest`. The `DeliveryRequest` will read the `InputStream` when you call `submit()` for the first time. The `DeliveryRequest` does not close the `InputStream` so you must ensure to close it.
- Set the file name of the document to `DeliveryRequest`.

The Delivery Manager supports streamlined delivery when you set the direct mode. See *Direct and Buffering Modes*, page B-33.

The follow delivery channels are described in this document:

- E-mail
- Printer
- Fax
- WebDAV
- FTP
- Secure FTP
- HTTP
- AS2

Delivering Documents by e-Mail

The following sample demonstrates delivery via E-mail:

Example

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_SMTP_EMAIL);

// set email subject
req.addProperty(DeliveryPropertyDefinitions.SMTP_SUBJECT, "test
mail");
// set SMTP server host
req.addProperty(
DeliveryPropertyDefinitions.SMTP_HOST, "mysmtpost");
// set the sender email address
req.addProperty(DeliveryPropertyDefinitions.SMTP_FROM,
"myname@mydomain.com");
// set the destination email address
req.addProperty(
DeliveryPropertyDefinitions.SMTP_TO_RECIPIENTS,
"user1@mydomain.com, user2@mydomain.com" );
// set the content type of the email body
req.addProperty(DeliveryPropertyDefinitions.SMTP_CONTENT_TYPE,
"application/pdf");
// set the document file name appeared in the email
req.addProperty(DeliveryPropertyDefinitions.SMTP_CONTENT_FILENAME,
"test.pdf");
// set the document to deliver
req.setDocument("/document/test.pdf");

// submit the request
req.submit();
// close the request
req.close();
```

The following table lists the supported properties:

| Property | Description |
|---------------------|--|
| SMTP_TO_RECIPIENTS | Required Enter multiple recipients separated by a comma (example: "user1@mydomain.com, user2@mydomain.com") |
| SMTP_CC_RECIPIENTS | Optional Enter multiple recipients separated by a comma. |
| SMTP_BCC_RECIPIENTS | Optional Enter multiple recipients separated by a comma. |

| Property | Description |
|-------------------------|---|
| SMTP_FROM | Required Enter the e-mail address of the sending party. |
| SMTP_REPLY_TO | Optional Enter the reply-to e-mail address. |
| SMTP_SUBJECT | Required Enter the subject of the e-mail. |
| SMTP_CHARACTER_ENCODING | Optional Default is "UTF-8". |
| SMTP_ATTACHMENT | Optional If you are including an attachment, enter the attachment object name. |
| SMTP_CONTENT_FILENAME | Required Enter the file name of the document (example: invoice.pdf) |
| SMTP_CONTENT_TYPE | Required Enter the MIME type. |
| SMTP_SMTP_HOST | Required Enter the SMTP host name. |
| SMTP_SMTP_PORT | Optional Enter the SMTP port. Default is 25. |
| SMTP_SMTP_USERNAME | Optional If the SMTP server requires authentication, enter your username for the server. |

| Property | Description |
|-----------------------|--|
| SMTP_SMTP_PASSWORD | Optional If the SMTP server requires authentication, enter the password for the username you entered. |
| SMTP_ATTACHMENT_FIRST | Optional If your e-mail contains an attachment and you want the attachment to appear first, enter "true". If you do not want the attachment to appear first, enter "false". |

Defining Multiple Recipients

The e-mail delivery server channel supports multiple documents and multiple destinations per request. The following example demonstrates multiple TO and CC addresses:

Example

```
// set the TO email addresses
req.addProperty(
    DeliveryPropertyDefinitions.SMTP_TO_RECIPIENTS,
    "user1@mydomain.com", user2@mydomain.com, user3@mydomain.com");

// set the CC email addresses
req.addProperty(
    DeliveryPropertyDefinitions.SMTP_CC_RECIPIENTS,
    "user4@mydomain.com, user5@mydomain.com, user6@mydomain.com");
```

Attaching Multiple Documents into One Request

Use the Attachment utility class (`oracle.apps.xdo.delivery.smtp.Attachment`) to attach multiple documents into one request. Sample usage is as follows:

Example

```
:
:
// create Attachment instance
Attachment m = new Attachment();

// add PDF attachment
m.addAttachment(
    "/pdf_doc/invoice.pdf",      // file to deliver
    "invoice.pdf",              // file name as appears in email
    "application/pdf");         // content type

// add RTF attachment
m.addAttachment(
    "/rtf_doc/product.rtf",     // file to deliver
    "product.rtf",              // file name appears in the email
    "application/rtf");         // content type

// add XML attachment
m.addAttachment(
    "/xml_doc/data.xml",        // file to deliver
    "data.xml",                 // file name appears in the email
    "text/xml");                // content type

// If you want to attach HTML documents, use addHtmlAttachment().
// This method automatically resolves the image references
// in your HTML document and attaches those images.
m.addHtmlAttachment("/html_doc/invoice.html");

// add the attachment to the request
req.addProperty(DeliveryPropertyDefinitions.SMTP_ATTACHMENT, m);

:
:
```

Attaching HTML Documents

You can attach HTML documents into one request. If you have references to image files located in the local file system in your HTML document, the Attachment utility automatically attaches those image files also. The sample usage is as follows:

Example

```
Attachment m = new Attachment();
m.addHtmlAttachment("/path/to/my.html");
:
:

req.addProperty(DeliveryPropertyDefinitions.SMTP_ATTACHMENT, m);
```

Displaying the Attachment at the top of the e-mail

If you want to show your attachment at the top of the e-mail, set the property SMTP_ATTACHMENT_FIRST to "true". Sample usage is as follows.

Example

```
Attachment m = new Attachment();
m.addHtmlAttachment("/path/to/my.html");
:
:
req.addProperty(DeliveryPropertyDefinitions.SMTP_ATTACHMENT_FIRST,
"true");
:
```

Using a String Object as the e-Mail Body

You can use a String object for the e-mail body. This may be useful if you want to include a message with your attached files. The following sample code will deliver the message "Please find the attached invoice." in the e-mail body and one PDF document "invoice.pdf" as an attachment.

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_SMTP_EMAIL);

// set email subject
req.addProperty(DeliveryPropertyDefinitions.SMTP_SUBJECT, "Invoice");
// set SMTP server host
req.addProperty(
    DeliveryPropertyDefinitions.SMTP_HOST, "mysmtpost");
// set the sender email address
req.addProperty(DeliveryPropertyDefinitions.SMTP_FROM,
"myname@mydomain.com");
// set the destination email address
req.addProperty(
    DeliveryPropertyDefinitions.SMTP_TO_RECIPIENTS,
"user1@mydomain.com, user2@mydomain.com");
// set the document to deliver
req.setDocument("Please find the attached invoice. ", "UTF-8");

// create Attachment
Attachment m = new Attachment();
// add attachments
m.addAttachment(
    "/pdf_doc/invoice.pdf",           // file to deliver
    "invoice.pdf",                   // file name appears in the
email
    "application/pdf");             // content type
// add the attachment to the request
req.addProperty(DeliveryPropertyDefinitions.SMTP_ATTACHMENT, m);

// submit the request
req.submit();
// close the request
req.close();

:
:
```

Using an HTML Document as the e-Mail Body

You can also use an HTML document for the e-mail body. The utility automatically

resolves the local image references in your HTML document and attaches those images also.

Sample usage is as follows:

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_SMTP_EMAIL);

// set email subject
req.addProperty(DeliveryPropertyDefinitions.SMTP_SUBJECT, "Invoice");
// set SMTP server host
req.addProperty(
    DeliveryPropertyDefinitions.SMTP_HOST, "mysmtphost");
// set the sender email address
req.addProperty(DeliveryPropertyDefinitions.SMTP_FROM,
"myname@mydomain.com");
// set the destination email address
req.addProperty(
    DeliveryPropertyDefinitions.SMTP_TO_RECIPIENTS,
"user1@mydomain.com, user2@mydomain.com" );

// set the content type of the email body
req.addProperty(DeliveryPropertyDefinitions.SMTP_CONTENT_TYPE,
"text/html");
// set the document file name appeared in the email
req.addProperty(DeliveryPropertyDefinitions.SMTP_CONTENT_FILENAME,
"body.html");
// set the document to deliver
req.setDocument("/document/invoice.html");

// submit the request
req.submit();
// close the request
req.close();

:
:
```

Providing Username and Password for Authentication

If the SMTP server requires authentication, you can specify the username and password to the delivery request.

Example

```
:
req.addProperty(DeliveryPropertyDefinitions.SMTP_USERNAME, "scott");
req.addProperty(DeliveryPropertyDefinitions.SMTP_PASSWORD, "tiger");
:
```

Delivering Your Document to a Printer

The Delivery Server supports Internet Printing Protocol (IPP) as defined in RFC 2910 and 2911 for the delivery of documents to IPP-supported printers or servers, such as CUPS.

Common Unix Printing System (CUPS) is a free, server-style, IPP-based software that can accept IPP requests and dispatch those requests to both IPP and non-IPP based devices, such as printers and fax machines. See <http://www.cups.org/> for more information about CUPS. See *Setting Up CUPS*, page 12-1 for additional information about setting up CUPS in your system.

To print out your document with the IPP, you need to transform your document into the format that the target IPP printers or servers can understand before the delivery. For example, if the target printer is a Postscript printer, you must transform your document to Postscript format. Usually, printers do not natively understand PDF, RTF, Excel or Word document formats. The Delivery API itself does not provide the document format transformation functionality, but it does offer document filter support for this purpose. See *Document Filter Support*, page B-35 for more information.

Following is a code sample for delivery to a printer:

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();
    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);

    // set IPP printer host
    req.addProperty(DeliveryPropertyDefinitions.IPP_HOST, "myhost");
    // set IPP printer port
    req.addProperty(DeliveryPropertyDefinitions.IPP_PORT, "631");
    // set IPP printer name
    req.addProperty(DeliveryPropertyDefinitions.IPP_PRINTER_NAME,
"/printers/myprinter");
    // set the document format
    req.addProperty(DeliveryPropertyDefinitions.IPP_DOCUMENT_FORMAT,
    DeliveryPropertyDefinitions.IPP_DOCUMENT_FORMAT_POSTSCRIPT);
    // set the document
    req.setDocument("/document/invoice.ps");

    // submit the request
    req.submit();
    // close the request
    req.close();
```

The following properties are supported. A string value is required for each property, unless otherwise noted. Note that printer-specific properties such as IPP_SIDES, IPP_COPIES and IPP_ORIENTATION depend on the printer capabilities. For example, if the target printer does not support duplex printing, the IPP_SIDES setting will have no effect.

| Property | Description |
|----------|----------------------------------|
| IPP_HOST | Required Enter the host name. |

| Property | Description |
|------------------|---|
| IPP_PORT | Optional Default is 631. |
| IPP_PRINTER_NAME | Required Enter the name of the printer that is to receive the output. <ul style="list-style-type: none"> • If you use CUPS with the default setup, enter the printer name as /printers/<printer-name> • If you use the Microsoft Internet Information Service (IIS) with the default setup, enter the printer name as /printers/<printer-name>/printer |
| IPP_AUTHTYPE | Optional Valid values for authentication type are: IPP_AUTHTYPE_NONE - no authentication (default) IPP_AUTHTYPE_BASIC - use HTTP basic authentication IPP_AUTHTYPE_DIGEST - use HTTP digest authentication |
| IPP_USERNAME | Optional Enter the username for HTTP authentication. |
| IPP_PASSWORD | Optional Enter the password for HTTP authentication. |

| Property | Description |
|-----------------------|--|
| IPP_ENCTYPE | <p>Optional</p> <p>The encryption type can be set to either of the following:</p> <p>IPP_ENCTYPE_NONE - no encryption (default)</p> <p>IPP_ENCTYPE_SSL - use Secure Socket Layer</p> |
| IPP_USE_FULL_URL | <p>Optional</p> <p>Set to "true" to send the full URL for the HTTP request header. Valid values are "true" or "false" (default).</p> |
| IPP_USE_CHUNKED_BODY | <p>Optional</p> <p>Valid values are "true" (default) to use HTTP chunked transfer coding for the message body, or "false".</p> |
| IPP_ATTRIBUTE_CHARSET | <p>Optional</p> <p>Attribute character set of the IPP request. Default is "UTF-8".</p> |
| IPP_NATURAL_LANGUAGE | <p>Optional</p> <p>The natural language of the IPP request. Default is "en".</p> |
| IPP_JOB_NAME | <p>Optional</p> <p>Job name of the IPP request.</p> |
| IPP_COPIES | <p>Optional</p> <p>Define the number of copies to print (example: "1", "5", "10"). Default is 1.</p> |

| Property | Description |
|---------------------|--|
| IPP_SIDES | <p data-bbox="873 306 971 333">Optional</p> <p data-bbox="873 363 1365 453">Enable two-sided printing. This setting will be ignored if the target printer does not support two-sided printing. Valid values are:</p> <ul data-bbox="873 478 1365 978" style="list-style-type: none"> <li data-bbox="873 478 1284 506">• IPP_SIDES_ONE_SIDED - default <li data-bbox="873 548 1365 638">• IPP_SIDES_TWO_SIDED_LONG_EDGE - prints both sides of paper for binding long edge. <li data-bbox="873 680 1365 770">• IPP_SIDES_TWO_SIDED_SHORT_EDGE - prints both sides of paper for binding short edge. <li data-bbox="873 812 1365 875">• IPP_SIDES_DUPLEX : Same as IPP_SIDES_TWO_SIDED_LONG_EDGE. <li data-bbox="873 917 1365 980">• IPP_SIDES_TUMBLE : Same as IPP_SIDES_TWO_SIDED_SHORT_EDGE |
| IPP_ORIENTATIONS | <p data-bbox="873 1073 971 1100">Optional</p> <p data-bbox="873 1129 1365 1220">Sets the paper orientation. This setting will be ignored if the target printer does not support orientation settings. Valid values are:</p> <p data-bbox="873 1245 1338 1272">IPP_ORIENTATIONS_PORTRAIT (default)</p> <p data-bbox="873 1297 1268 1325">IPP_ORIENTATIONS_LANDSCAPE</p> |
| IPP_DOCUMENT_FORMAT | <p data-bbox="873 1371 971 1398">Optional</p> <p data-bbox="873 1428 1365 1482">The target printer must support the specified format. Valid values are:</p> <p data-bbox="873 1514 1338 1541">IPP_DOCUMENT_FORMAT_POSTSCRIPT</p> <p data-bbox="873 1566 1338 1593">IPP_DOCUMENT_FORMAT_PLAINTEXT</p> <p data-bbox="873 1619 1240 1646">IPP_DOCUMENT_FORMAT_PDF</p> <p data-bbox="873 1671 1365 1728">IPP_DOCUMENT_FORMAT_OCTETSTREAM (default)</p> |

| Property | Description |
|-----------------|--|
| IPP_MEDIA | <p>You can choose either the paper size or the tray number. If you do not specify this option, the default media of the target printer will be used. It will be ignored if the target printer doesn't support the media option. Valid values are:</p> <ul style="list-style-type: none"> • IPP_MEDIA_TRAY1 : Media on tray 1 • IPP_MEDIA_TRAY2 : Media on tray 2 • IPP_MEDIA_TRAY3 : Media on tray 3 • IPP_MEDIA_A3 : A3 Media • IPP_MEDIA_A4 : A4 Media • IPP_MEDIA_A5 : A5 Media • IPP_MEDIA_B4 : B4 Media • IPP_MEDIA_B5 : B5 Media |
| IPP_PAGE_RANGES | <p>Specify page ranges to print. By default, all pages are printed. Example valid values are:</p> <ul style="list-style-type: none"> • "3" : prints only page 3. • "2-5" : prints pages 2-5. • "1,3-5" : print page 1 and 3-5. |

Printing over an HTTP Proxy Server

To deliver documents to IPP printers or fax machines over an HTTP proxy server, you may encounter delivery problems due to differences in the HTTP implementations between CUPS and the proxy servers. Setting the following two properties can resolve most of these problems:

- DeliveryPropertyDefinitions.IPP_USE_FULL_URL - set to "true"
- DeliveryPropertyDefinitions.IPP_USE_CHUNKED_BODY - set to "false"

If you use CUPS with the default setup, the typical property settings are as follows:

- IPP_HOST : <host-name>
- IPP_PORT : 631
- IPP_PRINTER_NAME : /printers/<printer-name>

If you use the Microsoft Internet Information Service (IIS) with the default setup, the typical property settings are as follows:

- IPP_HOST : <host-name>
- IPP_PORT : 80
- IPP_PRINTER_NAME : /printers/<printer-name>/printer

Delivering Your Documents by a Fax Server

The delivery system supports the delivery of documents to fax modems configured on CUPS. You can configure fax modems on CUPS with efax (<http://www.cce.com/efax/>) and FAX4CUPS (<http://www.gnu.org/directory/productivity/special/fax4CUPS.html>).

Sample code for fax delivery is as follows:

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();
    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_FAX);

    // set IPP fax host
    req.addProperty(DeliveryPropertyDefinitions.IPP_HOST, "myhost");
    // set IPP fax port
    req.addProperty(DeliveryPropertyDefinitions.IPP_PORT, "631");
    // set IPP fax name
    req.addProperty(DeliveryPropertyDefinitions.IPP_PRINTER_NAME,
"/printers/myfax");
    // set the document format
    req.addProperty(DeliveryPropertyDefinitions.IPP_DOCUMENT_FORMAT,
"application/postscript");
    // set the phone number to send
    req.addProperty(DeliveryPropertyDefinitions.IPP_PHONE_NUMBER,
"99999999");
    // set the document
    req.setDocument("/document/invoice.pdf");

    // submit the request
    req.submit();
    // close the request
    req.close();
```

The supported properties are the same as those supported for printer documents, plus the following:

| Property | Description |
|------------------|-----------------------------------|
| IPP_PHONE_NUMBER | Required Enter the fax number. |

Delivering Your Documents to a WebDAV Server

The following is sample code for delivery to a Web-based Distributed Authoring and Versioning (WebDAV) server:

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();
    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_WEBDAV);

    // set document content type
    req.addProperty(DeliveryPropertyDefinitions.WEBDAV_CONTENT_TYPE,
"application/pdf");
    // set the WebDAV server hostname
    req.addProperty(DeliveryPropertyDefinitions.WEBDAV_HOST,
"mywebdavhost");
    // set the WebDAV server port number
    req.addProperty(DeliveryPropertyDefinitions.WEBDAV_PORT, "80");
    // set the target remote directory

req.addProperty(DeliveryPropertyDefinitions.WEBDAV_REMOTE_DIRECTORY,
"/content/");
    // set the remote filename
    req.addProperty(DeliveryPropertyDefinitions.WEBDAV_REMOTE_FILENAME,
"xdotest.pdf");

    // set username and password to access WebDAV server
    req.addProperty(DeliveryPropertyDefinitions.WEBDAV_USERNAME,
"xdo");
    req.addProperty(DeliveryPropertyDefinitions.WEBDAV_PASSWORD,
"xdo");
    // set the document
    req.setDocument("/document/test.pdf");

    // submit the request
    req.submit();
    // close the request
    req.close();
```

The following properties are supported. A String value is required for each, unless otherwise noted.

| Property | Description |
|-------------------------|--|
| WEBDAV_CONTENT_TYPE | <p>Required</p> <p>Enter the document content type (example: "application/pdf").</p> |
| WEBDAV_HOST | <p>Required</p> <p>Enter the server host name.</p> |
| WEBDAV_PORT | <p>Optional</p> <p>Enter the server port number.</p> <p>Default is 80.</p> |
| WEBDAV_REMOTE_DIRECTORY | <p>Required.</p> <p>Enter the remote directory name (example: "/myreports/").</p> |
| WEBDAV_REMOTE_FILENAME | <p>Required.</p> <p>Enter the remote file name.</p> |
| WEBDAV_AUTHTYPE | <p>Optional</p> <p>Valid values for authentication type are:</p> <p>WEBDAV_AUTHTYPE_NONE - no authentication (default)</p> <p>WEBDAV_AUTHTYPE_BASIC - use HTTP basic authentication</p> <p>WEBDAV_AUTHTYPE_DIGEST - use HTTP digest authentication</p> |
| WEBDAV_USERNAME | <p>Optional</p> <p>Enter the username for HTTP authentication.</p> |
| WEBDAV_PASSWORD | <p>Optional</p> <p>Enter the password for HTTP authentication.</p> |

| Property | Description |
|-------------------------------|---|
| WEBDAV_ENCTYPE | <p>Optional</p> <p>Valid values for encryption type are:</p> <p>WEBDAV_ENCTYPE_NONE - no encryption (default)</p> <p>WEBDAV_ENCTYPE_SSL - use Secure Socket Layer</p> |
| WEBDAV_USE_FULL_URL | <p>Optional</p> <p>Set to "true" to send the full URL for the HTTP request header. Valid values are "true" or "false" (default).</p> |
| WEBDAV_USE_CHUNKED_BODY | <p>Optional</p> <p>Valid values are "true" (default) to use HTTP chunked transfer coding for the message body, or "false".</p> |
| WEBDAV_URL_CHARACTER_ENCODING | <p>Encoding of the URL. It will be used if you use non-ASCII characters in the URL. Set the Java-supported encoding string for the value.</p> |

Delivering Your Document Using FTP

The following is sample code for delivery to a FTP server:

Example

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req = dm.createRequest(DeliveryManager.TYPE_FTP);

// set hostname of the FTP server
req.addProperty(DeliveryPropertyDefinitions.FTP_HOST, "myftphost");
// set port# of the FTP server
req.addProperty(DeliveryPropertyDefinitions.FTP_PORT, "21");
// set username and password to access WebDAV server
req.addProperty(DeliveryPropertyDefinitions.FTP_USERNAME, "xdo");
req.addProperty(DeliveryPropertyDefinitions.FTP_PASSWORD, "xdo");
// set the remote directory that you want to send your document to
req.addProperty(DeliveryPropertyDefinitions.FTP_REMOTE_DIRECTORY,
"pub");
// set the remote file name
req.addProperty(DeliveryPropertyDefinitions.FTP_REMOTE_FILENAME,
"test.pdf");
// set the document
req.setDocument("/document/test.pdf");

// submit the request
req.submit();
// close the request
req.close();
```

The following properties are supported. A String value is required unless otherwise noted.

| Property | Description |
|----------------------|---|
| FTP_HOST | Required Enter the server host name. |
| FTP_PORT | Optional Enter the server port number. Default is 21. |
| FTP_USERNAME | Required Enter the login user name to the FTP server. |
| FTP_PASSWORD | Required Enter the login password to the FTP server. |
| FTP_REMOTE_DIRECTORY | Required Enter the directory to which to deliver the document (example: /pub/) |

| Property | Description |
|---------------------|---|
| FTP_REMOTE_FILENAME | Required Enter the document file name for the remote server. |
| FTP_BINARY_MODE | Optional Valid values are "true" (default) or "false". |

Delivering Your Documents over Secure FTP

Secure FTP is the protocol based on the Secure Shell technology (ssh) and it is widely used to transfer files in a secure manner. Both Secure Shell and Secure FTP are defined by the Internet Engineering Task Force (IETF) and the specifications are available on their Web site: <http://www.ietf.org>. The delivery system supports the delivery of documents to secure FTP servers.

The following tables lists the supported properties. A string value is required for each property unless otherwise noted.

Example

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req = dm.createRequest(DeliveryManager.TYPE_SFTP);
// set hostname of the SFTP server
req.addProperty(DeliveryPropertyDefinitions.SFTP_HOST,
"mysftphost");
// set username and password to access server
req.addProperty(DeliveryPropertyDefinitions.SFTP_USERNAME,
"myname");
req.addProperty(DeliveryPropertyDefinitions.SFTP_PASSWORD,
"mypassword");
// set the remote directory that you want to send your document to
req.addProperty(DeliveryPropertyDefinitions.SFTP_REMOTE_DIRECTORY,
"pub");
// set the remote file name
req.addProperty(DeliveryPropertyDefinitions.SFTP_REMOTE_FILENAME,
"test.pdf");
// set the document
req.setDocument("/document/test.pdf");

// submit the request
req.submit();
// close the request
req.close();
```

| Property | Description |
|---------------------------|---|
| SFTP_HOST | Required Enter the target server host name. |
| SFTP_PORT | Optional Enter the target server SSH port number. Default is 22. |
| SFTP_USERNAME | Required Enter the login user name. |
| SFTP_PASSWORD | Required if you choose the SFTP_AUTH_TYPE_PASSWORD authentication type. Enter the login password. |
| SFTP_REMOTE_DIRECTORY | Enter the directory to which to deliver the document (example: /pub/). If no value is entered, the document will be delivered to the login directory. |
| SFTP_REMOTE_FILENAME | Required Enter the document file name on the remote server. |
| SFTP_AUTH_TYPE | Set either of the following: SFTP_AUTH_TYPE_PASSWORD (Default) Requires providing password at login. SFTP_AUTH_TYPE_PUBLIC_KEY - public key authorization type. |
| SFTP_PRIVATE_KEY_FILE | Enter the client private key file. Required if you choose SFTP_AUTH_TYPE_PUBLIC_KEY. |
| SFTP_PRIVATE_KEY_PASSWORD | Enter the client private key password. Required if you choose SFTP_AUTH_TYPE_PUBLIC_KEY. |

| Property | Description |
|----------------------|---|
| SFTP_FILE_PERMISSION | Enter the permissions to set for the file being created. Default is 0755. |

Authentication Modes

The secure FTP delivery supports two authentication modes: password authentication and public key authentication. Set the property SFTP_AUTH_TYPE to choose the mode. The default mode is password authentication.

```

:
    :
    // set public key auth type
    req.addProperty(DeliveryPropertyDefinitions.SFTP_AUTH_TYPE,
DeliveryPropertyDefinitions.SFTP_AUTH_TYPE_PUBLIC_KEY);
    // set username
    req.addProperty(DeliveryPropertyDefinitions.SFTP_USERNAME,
"myname");
    // set the client's private key file
    req.addProperty(DeliveryPropertyDefinitions.SFTP_PRIVATE_KEY_FILE,
"/path/to/the/key");
    // set the client's private key password

req.addProperty(DeliveryPropertyDefinitions.SFTP_PRIVATE_KEY_PASSWORD,
"myPrivateKeyPass");
    :
    :

```

The password authentication mode requires the username and password to log in to the secure FTP server. The following example shows sample code:

Example

```

:
    :
    // set password auth type
    req.addProperty(DeliveryPropertyDefinitions.SFTP_AUTH_TYPE,
DeliveryPropertyDefinitions.SFTP_AUTH_TYPE_PASSWORD);
    // set username and password to access server
    req.addProperty(DeliveryPropertyDefinitions.SFTP_USERNAME,
"myname");
    req.addProperty(DeliveryPropertyDefinitions.SFTP_PASSWORD,
"mypassword");
    :
    :

```

The public key authorization mode requires the username, your private key and password for the private key. This is a more secure method than the password authentication. Note that in order to use the public key authentication mode, you must set up the public key in the ssh/secure FTP server in advance. The following example shows sample code:

```

:
:
// set public key auth type
req.addProperty(DeliveryPropertyDefinitions.SFTP_AUTH_TYPE,
DeliveryPropertyDefinitions.SFTP_AUTH_TYPE_PUBLIC_KEY);
// set username
req.addProperty(DeliveryPropertyDefinitions.SFTP_USERNAME,
"myname");
// set the client's private key file
req.addProperty(DeliveryPropertyDefinitions.SFTP_PRIVATE_KEY_FILE,
"/path/to/the/key");
// set the client's private key password

req.addProperty(DeliveryPropertyDefinitions.SFTP_PRIVATE_KEY_PASSWORD,
"myPrivateKeyPass");
:
:

```

Delivering Your Documents over HTTP

The Delivery Manager supports delivery of documents to HTTP servers. The following sample sends a document through the HTTP POST method. Note that the receiving HTTP server must be able to accept your custom HTTP request in advance (for example via a custom servlet or CGI program).

Example

```

// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req = dm.createRequest(DeliveryManager.TYPE_HTTP);

// set request method
req.addProperty(DeliveryPropertyDefinitions.HTTP_METHOD,
DeliveryPropertyDefinitions.HTTP_METHOD_POST);
// set document content type
req.addProperty(DeliveryPropertyDefinitions.HTTP_CONTENT_TYPE,
"application/pdf");
// set the HTTP server hostname
req.addProperty(DeliveryPropertyDefinitions.HTTP_HOST, "myhost");
// set the HTTP server port number
req.addProperty(DeliveryPropertyDefinitions.HTTP_PORT, "80");
// set the target remote directory
req.addProperty(DeliveryPropertyDefinitions.HTTP_REMOTE_DIRECTORY,
"/servlet/");
// set the remote filename (servlet class)
req.addProperty(DeliveryPropertyDefinitions.HTTP_REMOTE_FILENAME,
"uploadDocument");

// set the document
req.setDocument("/document/test.pdf");

// submit the request
req.submit();
// close the request
req.close();

```

The following table lists the properties that are supported. A String value is required for

each property unless otherwise noted.

| Property | Description |
|-----------------------|---|
| HTTP_METHOD | Optional Sets the HTTP request method. Valid values are: HTTP_METHOD_POST (Default) HTTP_METHOD_PUT |
| HTTP_CONTENT_TYPE | Optional The document content type (example: "application/pdf"). |
| HTTP_HOST | Required Enter the server host name. |
| HTTP_PORT | Optional Enter the server port number. The default is 80. |
| HTTP_REMOTE_DIRECTORY | Required Enter the remote directory name (example: "/home/"). |
| HTTP_REMOTE_FILENAME | Required Enter the file name to save the document as in the remote directory. |
| HTTP_AUTHTYPE | Optional Valid values for authentication type are: HTTP_AUTHTYPE_NONE - no authentication (default) HTTP_AUTHTYPE_BASIC - use basic HTTP authentication HTTP_AUTHTYPE_DIGEST - use digest HTTP authentication |

| Property | Description |
|-----------------------------|--|
| HTTP_USERNAME | Optional If the server requires authentication, enter the username. |
| HTTP_PASSWORD | Optional If the server requires authentication, enter the password for the username. |
| HTTP_ENCTYPE | Optional Enter the encryption type: HTTP_ENCTYPE_NONE - no encryption (default) HTTP_ENCTYPE_SSL - use Secure Socket Layer |
| HTTP_USE_FULL_URL | Optional Set to "true" to send the full URL for the HTTP request header. Valid values are "true" or "false" (default). |
| HTTP_USE_CHUNKED_BODY | Optional Valid values are "true" (default) to use HTTP chunked transfer coding for the message body, or "false". |
| HTTP_TIMEOUT | Optional Enter a length of time in milliseconds after which to terminate the request if a connection is not made to the HTTP server. The default is 60000 (1 minute). |
| HTTP_URL_CHARACTER_ENCODING | Encoding of the URL. It will be used if you use non-ASCII characters in the URL. Set the Java-supported encoding string for the value. |

Delivering Documents over AS2

AS2 is one of the standard protocols defined in the Electronic Data Interchange-Internet

Integration (EDI-INT). AS2 is based on HTTP and other internet standard technologies and is designed to exchange data over the internet in a secure manner. The AS2 specification is defined in RFC4130 (available at <http://www.ietf.org/>). The delivery system supports the delivery of documents to AS2 servers. Sample code is as follows:

Example

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();
// create a delivery request
DeliveryRequest req = dm.createRequest(DeliveryManager.TYPE_AS2);

// set AS2 message properties
req.addProperty(DeliveryPropertyDefinitions.AS2_FROM, "Me");
req.addProperty(DeliveryPropertyDefinitions.AS2_TO, "You");
req.addProperty(DeliveryPropertyDefinitions.AS2_SUBJECT, "My EDI
Message");
req.addProperty(DeliveryPropertyDefinitions.AS2_CONTENT_TYPE,
"applications/EDIFACT");

// set HTTP properties
req.addProperty(DeliveryPropertyDefinitions.AS2_HTTP_HOST,
"as2hsot");

req.addProperty(DeliveryPropertyDefinitions.AS2_HTTP_REMOTE_DIRECTORY,
"/");

req.addProperty(DeliveryPropertyDefinitions.AS2_HTTP_REMOTE_FILENAME,
"as2");

// set the document
req.setDocument("/document/myEDIDoc");
// submit the request
DeliveryResponse res = req.submit();
// close the request
req.close();
```

The following table lists the supported properties. A string value is required for each property unless otherwise noted.

| Property | Description |
|-------------|---|
| AS2_FROM | Required. Enter the AS2 message sender. |
| AS2_TO | Required. Enter the AS2 message recipient. |
| AS2_SUBJECT | Required. Enter the message subject. |

| Property | Description |
|-------------------------|--|
| AS2_MESSAGE_COMPRESSION | Default value is False. Enter True to compress the message. |
| AS2_MESSAGE_SIGNATURE | Default value is False. Enter True to sign the message. |
| AS2_MESSAGE_ENCRYPTION | Default value is False. Enter True to encrypt the message. |
| AS2_CONTENT_TYPE | <p>Required.</p> <p>Enter the content type of the document. Valid values are:</p> <ul style="list-style-type: none"> • application/EDIFACT • application/xml |
| AS2_ENC_ALGO | <p>The AS2 encryption algorithm. Set one of the following:</p> <ul style="list-style-type: none"> • AS2_ENC_ALGO_RC2_40 • AS2_ENC_ALGO_RC2_64 • AS2_ENC_ALGO_RC2_128 • AS2_ENC_ALGO_DES • AS2_ENC_ALGO_DES_EDE3 (Default) • AS2_ENC_ALGO_AES_128 • AS2_ENC_ALGO_AES_192 • AS2_ENC_ALGO_AES_256 |
| AS2_DIGEST_ALGO | <p>Enter the AS2 digest algorithm for signing the messages. Set either of the following:</p> <ul style="list-style-type: none"> • AS2_DIGEST_ALGO_MD5 (Default) • AS2_DIGEST_ALGO_SHA1 |

| Property | Description |
|------------------------------------|--|
| AS2_ASYNC_ADDRESS | Enter the asynchronous address to which MDN notifications should be set. |
| AS2_ASYNC_EMAIL_SERVER_HOST | Enter the email server host for asynchronous email MDN. |
| AS2_ASYNC_EMAIL_SERVER_PORT | Enter the email server port for asynchronous email MDN. |
| AS2_ASYNC_EMAIL_SERVER_USERNAME | Enter the email server USERNAME for asynchronous email MDN. |
| AS2_ASYNC_EMAIL_SERVER_PASSWORD | Enter the email server PASSWORD for asynchronous email MDN. |
| AS2_ASYNC_EMAIL_SERVER_FOLDER_NAME | Enter the IMAP folder name for asynchronous email MDN. |
| AS2_SENDER_PKCS12_FILE | Location of the sender's PKCS12 (public/private key) file. |
| AS2_SENDER_PKCS12_PASSWORD | Password for the sender's PKCS12 (public/private key). |
| AS2_RECEIVER_CERTIFICATES_FILE | Location of the receiver's certificates file. |
| AS2_DELIVERY_RECEIPT_DIRECTORY | Directory to store the delivery receipts. This directory must be specified if you wish to receive delivery receipts. |
| AS2_HTTP_HOST | Required. Enter the server host name. |
| AS2_HTTP_PORT | Enter the server HTTP port number. The default is 80. |
| AS2_HTTP_REMOTE_DIRECTORY | Required. Enter the remote directory name. (Example: /home/) |

| Property | Description |
|--------------------------|---|
| AS2_HTTP_REMOTE_FILENAME | Required. Enter the remote file name. |
| AS2_HTTP_AUTHTYPE | Enter the HTTP authentication type. Valid values are: <ul style="list-style-type: none"> AS2_HTTP_AUTHTYPE_NONE - no authentication (Default) AS2_HTTP_AUTHTYPE_BASIC - Use HTTP basic authentication. AS2_HTTP_AUTHTYPE_DIGEST - user HTTP digest authentication. |
| AS2_HTTP_USERNAME | Enter the username for HTTP authentication. |
| AS2_HTTP_PASSWORD | Enter the password for HTTP authentication. |
| AS2_HTTP_ENCTYPE | Set the encryption type. Valid values are: <ul style="list-style-type: none"> AS2_HTTP_ENCTYPE_NONE - no encryption (default) AS2_HTTP_ENCTYPE_SSL - use secure socket layer (SSL) |
| AS2_HTTP_TIMEOUT | Enter the time out allowance in milliseconds. Default is 60,000 (1 minute) |
| AS2_HTTP_PROXY_HOST | Required. Enter the proxy server host name. |
| AS2_HTTP_PROXY_PORT | Enter the proxy server port number. Default is 80. |

| Property | Description |
|-------------------------|---|
| AS2_HTTP_PROXY_AUTHTYPE | <ul style="list-style-type: none"> AS2_HTTP_AUTHTYPE_NONE - no authentication (Default) AS2_HTTP_AUTHTYPE_BASIC - Use HTTP basic authentication. AS2_HTTP_AUTHTYPE_DIGEST - user HTTP digest authentication. |
| AS2_HTTP_PROXY_USERNAME | Enter the username for proxy authentication. |
| AS2_HTTP_PROXY_PASSWORD | Enter the password for HTTP proxy authentication. |

Delivery Receipt

The AS2 server always issues an AS2 delivery receipt for each AS2 request. Set the AS2_DELIVERY_RECEIPT_DIRECTORY property to specify the location to store the delivery receipts. If you do not specify this directory, delivery receipts will be ignored. Example code for setting the delivery receipt directory is as follows:

```

:
:
// Set the delivery receipt directory

req.addProperty(DeliveryPropertyDefinitions.AS2_DELIVERY_RECEIPT_DIRECTORY, "/my/receipt/dir");
:
:

```

Synchrony

You can send either synchronous or asynchronous delivery requests to the AS2 servers. By default, the request is synchronous so that you can see the Message Disposition Notification (MDN) immediately in the DeliveryResponse.

If you set the AS2_ASYNC_ADDRESS to your request, the request will be asynchronous. You can specify either an HTTP URL or an e-mail address where the delivery receipt will be delivered after processing. You must set up the HTTP server or e-mail address to receive the delivery receipts.

The Delivery API can track down the asynchronous request if you specify the e-mail address for the AS2_ASYNC_ADDRESS. If you provide the e-mail account information to the Delivery API, the Delivery API will periodically check the e-mail account to obtain the delivery receipt. Sample code for this is as follows:

Example

```
:
:
// Set the email address - async request
req.addProperty(DeliveryPropertyDefinitions.AS2_ASYNC_ADDRESS,
"async_target@acme.com");

// Set the delivery receipt directory

req.addProperty(DeliveryPropertyDefinitions.AS2_DELIVERY_RECEIPT_DIRECTO
RY, "/my/receipt/dir");

// Set the email server information where the delivery receipt will be
delivered to.
req.addProperty(
    DeliveryPropertyDefinitions.AS2_ASYNC_EMAIL_SERVER_HOST,
"mail.acme.com");
req.addProperty(
    DeliveryPropertyDefinitions.AS2_ASYNC_EMAIL_SERVER_USERNAME,
"async_target");
req.addProperty(
    DeliveryPropertyDefinitions.AS2_ASYNC_EMAIL_SERVER_PASSWORD,
"mypassword");
req.addProperty(
    DeliveryPropertyDefinitions.AS2_ASYNC_EMAIL_SERVER_FOLDER_NAME,
"inbox");

// set the document
req.setDocument("/document/myEDIdoc");

// submit the request with the DeliveryResponseListener
req.submit(myDeliveryListener);
:
:
```

Note that as shown in the preceding code, you must use the Delivery API's asynchronous delivery request mechanism to track down the asynchronous requests. See *Asynchronous Delivery Requests*, page B-34 for more information.

Document Signing

The Delivery API allows you to sign a document for the secure transaction. This is based on the public key architecture, so you must set up the following:

- Sender side: sender's public/private keys
Sender must have sender's public/private keys in a PKCS12 standard file. The file extension is .p12. Place that file in your local system where you want to run the Delivery API.
- Receiver side (AS2 server side) : sender's public key certificate
The receiver must have the sender's public key certificate. Installing certificates on the AS2 server can vary depending on your server. Generally, you must copy the .der or .cer certificates to a particular location. Consult your AS2 server manual for the procedure.

Once you have completed the setup, you can sign your document by setting properties in the delivery request. Sample code for this is as follows:

```
:
:
// Signing the document
req.addProperty(DeliveryPropertyDefinitions.AS2_MESSAGE_SIGNATURE,
"true");
req.addProperty(DeliveryPropertyDefinitions.AS2_SENDER_PKCS12_FILE,
"/path/to/mykey.p12");
req.addProperty(DeliveryPropertyDefinitions.AS2_SENDER_PKCS12_PASSWORD,
"welcome");
:
:
```

Document Encryption

The Delivery API allows you to encrypt documents for the secure transaction. This is based on the public key architecture, so you need to set up the following:

- Sender's side: Receiver's public key certificate

The sender side must have the receiver's public key certificate file. The file extension is .der or .cer. Place that file in your local system where you want to run the Delivery API. Please consult the manual of your AS2 server for the procedure to obtain the AS2 server's public key certificate.

- Receiver's side (AS2 server side): Receiver's public/private keys

The receiver side (AS2 Server) must have the receiver's public/private keys. Please consult the manual of your AS2 server for the procedure to set up keys.

Once set up, you can encrypt your document by setting properties in the delivery request. The sample code is as follows:

```
:
:
// Encrypting the document
req.addProperty(DeliveryPropertyDefinitions.AS2_MESSAGE_ENCRYPTION,
"true");

req.addProperty(DeliveryPropertyDefinitions.AS2_RECEIVER_CERTIFICATES_FILE,
"/path/to/server-certificate.der");
:
:
```

Delivering Documents Using an External Command

The Delivery API supports the use of external, Operating System (OS) native commands to deliver documents.

Specify your OS native command with the {file} placeholder. At runtime, this placeholder will be replaced with the document file name.

The delivery status is determined by the exit value of the OS command. If the value is '0', the request is marked successful.

Sample code is as follows:

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();
    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_EXTERNAL);
    // set the OS native command for delivery

req.addProperty(ExternalDeliveryPropertyDefinitions.EXTERNAL_DELIVERY_CO
MMAND,
    "/usr/bin/lp -d myprinter {file}");
    // set the document
    req.setDocument("/document/test.pdf");

    // submit the request
    req.submit();
    // close the request
    req.close();
```

The following property is supported and defined in DeliveryPropertyDefinitions:

| Property | Description |
|---------------------------|--|
| EXTERNAL_DELIVERY_COMMAND | Required. Enter the OS native command for delivery. |

Delivering Documents to the Local File System

The Delivery API supports the delivery of documents to the local file system where the Delivery API runs. The command copies the file to the location you specify.

The following sample code copies the file /document/test.pdf to /destination/document.pdf.

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();
    // create a delivery request
    DeliveryRequest req = dm.createRequest(DeliveryManager.TYPE_LOCAL);
    // set the document destination in the local filesystem.

req.addProperty(ExternalDeliveryPropertyDefinitions.LOCAL_DESTINATION,
"/destination/document.pdf");
    // set the document to deliver.
    req.setDocument("/document/test.pdf");

    // submit the request
    req.submit();
    // close the request
    req.close();
```

The following property is supported and defined in DeliveryPropertyDefinitons:

| Property | Description |
|-------------------|---|
| LOCAL_DESTINATION | Required. Full path to the destination file name in the local file system. |

Direct and Buffering Modes

The delivery system supports two modes: Direct mode and Buffering mode. Buffering Mode is the default.

Direct Mode

Direct Mode offers full, streamlined delivery processing. Documents are delivered to the connection streams that are directly connected to the destinations. This mode is fast, and uses less memory and disk space. It is recommended for online interactive processing.

To set the direct mode, set the BUFFERING_MODE property to "false". Following is a code sample:

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();

    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);

    // set the direct mode
    req.addProperty(DeliveryPropertyDefinitions.BUFFERING_MODE,
"false");
    :
    :
    :
```

This mode does not offer document redelivery. For redelivery requirements, use the buffering mode.

Buffering Mode

The buffering mode allows you to redeliver documents as many times as you want. The delivery system uses temporary files to buffer documents, if you specify a temporary directory (`ds-temp-dir`) in the delivery server configuration file. If you do not specify a temporary directory, the delivery system uses the temporary memory buffer. It is recommended that you define a temporary directory. For more information about the configuration file, see Configuration File Support, page B-45.

You can explicitly clear the temporary file or buffer by calling `DeliveryRequest.close()` after finishing your delivery request.

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();

    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);

    // set buffering mode
    req.addProperty(DeliveryPropertyDefinitions.BUFFERING_MODE,
"true");
    req.addProperty(DeliveryPropertyDefinitions.TEMP_DIR, "/tmp");
        :
        :
        :
    // submit request
    req.submit();
        :
        :
    // submit request again
    req.submit();
        :
        :
    // close the request
    req.close();
```

Asynchronous Delivery Requests

The Delivery API provides the ability to run the delivery requests asynchronously by registering the callback functions.

You can create your own callback logic by implementing the `DeliveryResponseListener` interface. You must implement the `responseReceived()` method. You can implement your logic in this method so that it will be called when the delivery request is finished.

Sample code is as follows:

```
import oracle.apps.xdo.delivery.DeliveryResponseListener;

class MyListener implements DeliveryResponseListener
{
    public void responseReceived(DeliveryResponse pResponse)
    {
        // Show the status to the System.out
        System.out.println("Request done!");
        System.out.println("Request status id : " +
pResponse.getStatus());
        System.out.println("Request status msg : " +
pResponse.getStatusMessage());
    }
}
```

Once you implement the callback, you can pass your callback when you call the `submit()` method of your `DeliveryRequest`. If you call the `submit()` with the callback, the delivery process will start in the background and the `submit()` method will immediately return the control. Sample code follows:

```

// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();

    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);
    :
    :
    // submit request with the callback logic
    req.submit(new MyListener());
    :
    :

```

Document Filter Support

The Delivery API supports the document filter functionality for all the supported protocols. This functionality allows you to call the native OS command to transform the document before each delivery request. To specify the filter, pass the native OS command string with the two placeholders for the input and output filename: {infile} and {outfile}. You can set your filter in your delivery request as a delivery property. Following are two samples:

```

// The easiest filter, just copy the file :)
req.addProperty(DeliveryPropertyDefinitions.FILTER, "cp {infile}
{outfile}");

```

```

// Call "pdftops" utility to transform the PDF document into Postscript
format
    req.addProperty(DeliveryPropertyDefinitions.FILTER, "pdftops {infile}
{outfile}");

```

Alternatively, you can also specify the filter for each server in the configuration file (see Configuration File Support, page B-45). In this case, the server will always use this filter for the requests to this server:

```

:
:
<server name="printer1" type="ipp_printer" default="true">
<uri>ipp://myserver:80/printers/MyPrinter1/.printer</uri>
<filter>pdftops {infile} {outfile}</filter>
</server>
:
:

```

This is useful especially if you are trying to call IPP printers directly or IPP printers on Microsoft Internet Information Service (IIS) because those printers usually do not accept PDF documents, but only limited document formats. With this functionality, you can call any of the native OS commands to transform the document to the format that the target printer can understand. For example, if you need to call the HP LaserJet printer setup on the Microsoft IIS from Linux, you can set Ghostscript as a filter to transform the PDF document into the format that the HP LaserJet can understand.

```
// specify filter
req.addProperty(DeliveryPropertyDefinitions.FILTER,
"gs -q -dNOPAUSE -dBATCH -sDEVICE=laserjet -sOutputFile={outfile}
{infile}");
```

Note that to use this functionality you must set the buffering mode must be enabled and a temporary directory must be specified. See Configuration File Support, page B-45 for information on setting these properties.

Date Expression Support

Three properties support date expressions. Use the date expression if you want to name a file by the date, and have the date automatically set at runtime.

The properties that support date expressions are:

- SMTP_CONTENT_FILENAME
- FTP_REMOTE_FILENAME
- WEBDAV_REMOTE_FILENAME

The supported date expressions are:

- %y : 4 digit year (ex, 1972, 2005)
- %m : 2 digit month (00 - 12)
- %d : 2 digit date (00 - 31)
- %H : 24h based 2 digit hour (00 - 24)
- %M : 2 digit minute (00 - 59)
- %S : 2 digit sec (00 - 59)
- %l : 3 digit millisec (000 - 999)

For example, if you specify `my_file_%y%m%d.txt` for the filename, the actual filename will be `my_file_20051108.txt` for November 8, 2005. All undefined expressions will be translated into 0 length string, for example, if you specify `my_file_%a%b%c.txt`, it would generate `my_file_.txt`. You can escape the '%' character by passing '%%'.

Internationalization Support

The Delivery Server API supports following internationalization features for the listed delivery channels:

SMTP

- Specify character encoding for the main document with `SMTP_CONTENT_TYPE`.
- Specify character encoding for the attachments by passing content type when you call `addAttachment()` method.
- Specify the character encoding for email To/From/CC/Subject with `SMTP_CHARACTER_ENCODING` property. The default value is "UTF-8".

IPP

- Specify character encoding for the IPP attributes by using `IPP_ATTRIBUTE_CHARSET` property. The default value is "UTF-8".
- Specify `IPP_URL_CHARACTER_ENCODING` property for encoding non-ASCII letters in a URL.

WebDAV

- Specify `WEBDAV_URL_CHARACTER_ENCODING` property for encoding non-ASCII letters in a URL.

FTP

- The FTP delivery channel automatically detects the internationalization support in the target FTP server. You can specify a non-ASCII directory name and file name only if the FTP server supports internationalization (see RFC 2640 for more detail). In that case, the UTF-8 encoding will be used automatically. If the server does not support internationalization and you specify a non-ASCII value, an exception will be thrown during the delivery process.

HTTP

- You can specify `WEBDAV_URL_CHARACTER_ENCODING` property for encoding non-ASCII letters in a URL.

Monitoring Delivery Status

The delivery system allows you to check the latest delivery status of your request by calling the `getStatus()` method. You can check the status of the request anytime, but currently you must retain the delivery request object. Status definitions are defined in the `DeliveryRequest` interface.

Monitoring delivery status is not available for the SMTP and HTTP delivery channels.

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();

    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);
    :
    :
    // submit request
    req.submit();
    :
    :

    // get request status
    int status = req.getStatus();
    if (status == DeliveryRequest.STATUS_SUCCESSFUL)
    {
        System.out.println("Request has been delivered successfully.");
    }
    :
    :
    // get request status again...
    status = req.getStatus();
    :
    :
```

Setting Global Properties

You can define the global properties to the DeliveryManager so that all the delivery requests inherit the global properties automatically.

The following global properties are supported:

| Property | Description |
|----------------|---|
| BUFFERING_MODE | Valid values are "true" (default) and "false". See Direct and Buffering Modes, page B-33 for more information. |
| TEMP_DIR | Define the location of the temporary directory. |
| CA_CERT_FILE | Define the location of the CA Certificate file generated by Oracle Wallet Manager. This is used for SSL connection with the Oracle SSL library. If not specified, the default CA Certificates are used. |

Example

```
// create delivery manager instance
DeliveryManager dm = new DeliveryManager();

// set global properties
dm.addProperty(DeliveryPropertyDefinitions.TEMP_DIR, "/tmp");
dm.addProperty(DeliveryPropertyDefinitions.BUFFERING_MODE, "true");

// create delivery requests
DeliveryRequest req1 =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);
DeliveryRequest req2 =
dm.createRequest(DeliveryManager.TYPE_IPP_FAX);
DeliveryRequest req3 =
dm.createRequest(DeliveryManager.TYPE_SMTP_EMAIL);
:
:
```

Adding a Custom Delivery Channel

You can add custom delivery channels to the system by following the steps below:

1. Define the delivery properties
2. Implement the `DeliveryRequest` interface
3. Implement the `DeliveryRequestHandler` interface
4. Implement the `DeliveryRequestFactory` interface
5. Register your custom `DeliveryRequestFactory` to the `DeliveryManager`

The following sections detail how to create a custom delivery channel by creating a sample called "File delivery channel" that delivers documents to the local file system.

Define Delivery Properties

The first step to adding a custom delivery channel is to define the properties. These will vary depending on what you want your channel to do. You can define constants for your properties. Our example, a file delivery channel requires only one property, which is the destination.

Sample code is:

Example

```
package oracle.apps.xdo.delivery.file;

public interface FilePropertyDefinitions
{
    /** Destination property definition. */
    public static final String FILE_DESTINATION =
"FILE_DESTINATION:String";
}
}
```

The value of each constant can be anything, as long as it is a `String`. It is recommend

that you define the value in `[property name]:[property value type]` format so that the delivery system automatically validates the property value at runtime. In the example, the `FILE_DESTINATION` property is defined to have a String value.

Implement DeliveryRequest Interface

`DeliveryRequest` represents a delivery request that includes document information and delivery metadata, such as destination and other properties. To implement `oracle.apps.xdo.delivery.DeliveryRequest` you can extend the class `oracle.apps.xdo.delivery.AbstractDeliveryRequest`.

For example, to create a custom delivery channel to deliver documents to the local file system, the `DeliveryRequest` implementation will be as follows:

```
package oracle.apps.xdo.delivery.file;
import oracle.apps.xdo.delivery.AbstractDeliveryRequest;

public class FileDeliveryRequest extends AbstractDeliveryRequest
implements FilePropertyDefinitions
{
    private static final String[] MANDATORY_PROPS = {FILE_DESTINATION};

    /**
     * Returns mandatory property names
     */
    public String[] getMandatoryProperties()
    {
        return MANDATORY_PROPS;
    }

    /**
     * Returns optional property names
     */
    public String[] getOptionalProperties()
    {
        return null;
    }
}
```

Implement DeliveryRequestHandler Interface

`DeliveryRequestHandler` includes the logic for handling the delivery requests. A sample implementation of `oracle.apps.xdo.delivery.DeliveryRequestHandler` for the file delivery channel is as follows:

Example

```
package oracle.apps.xdo.delivery.file;
import java.io.BufferedOutputStream;
import java.io.File;
import java.io.FileOutputStream;
import java.io.IOException;
import java.io.OutputStream;

import oracle.apps.xdo.delivery.DeliveryException;
import oracle.apps.xdo.delivery.DeliveryRequest;
import oracle.apps.xdo.delivery.DeliveryRequestHandler;
import oracle.apps.xdo.delivery.DeliveryStatusDefinitions;

public class FileDeliveryRequestHandler implements
DeliveryRequestHandler
{

    private FileDeliveryRequest mRequest;
    private boolean mIsOpen = false;
    private OutputStream mOut;

    /**
     * default constructor.
     */
    public FileDeliveryRequestHandler()
    {
    }

    /**
     * sets the request.
     */
    public void setRequest(DeliveryRequest pRequest)
    {
        mRequest = (FileDeliveryRequest) pRequest;
    }

    /**
     * returns the request.
     */
    public DeliveryRequest getRequest()
    {
        return mRequest;
    }

    /**
     * opens the output stream to the destination.
     */
    public OutputStream openRequest() throws DeliveryException
    {
        try
        {
            String filename =
                (String)
mRequest.getProperty(FileDeliveryRequest.FILE_DESTINATION);
            mOut = new BufferedOutputStream(new FileOutputStream(filename));

            mIsOpen = true;
            // set request status to open
            mRequest.setStatus(DeliveryStatusDefinitions.STATUS_OPEN);
            return mOut;
        }
    }
}
```

```

    }
    catch (IOException e)
    {
        closeRequest();
        throw new DeliveryException(e);
    }
}

/**
 * flushes and closes the output stream to submit the request.
 */
public void submitRequest() throws DeliveryException
{
    try
    {
        // flush and close
        mOut.flush();
        mOut.close();
        // set request status
        mRequest.setStatus(DeliveryStatusDefinitions.STATUS_SUCCESSFUL);
        mIsOpen = false;
    }
    catch (IOException e)
    {
        closeRequest();
        throw new DeliveryException(e);
    }
}

/**
 * checks the delivery status.
 */
public void updateRequestStatus() throws DeliveryException
{
    // check if the file is successfully delivered
    String filename =
        (String)
mRequest.getProperty(FileDeliveryRequest.FILE_DESTINATION);
    File f = new File(filename);

    // set request status
    if (f.exists())
        mRequest.setStatus(DeliveryStatusDefinitions.STATUS_SUCCESSFUL);
    else

mRequest.setStatus(DeliveryStatusDefinitions.STATUS_FAILED_IO_ERROR);

}
/**
 * returns the request status.
 */
public boolean isRequestOpen()
{
    return mIsOpen;
}

/**
 * closes the request, frees all resources.
 */

```

```
public void closeRequest()
{
    mIsOpen = false;
    try
    {
        if (mOut != null)
        {
            mOut.flush();
            mOut.close();
        }
    }
    catch (IOException e)
    {
    }
    finally
    {
        mOut = null;
    }
}
```

Implement DeliveryRequestFactory Interface

Implement the DeliveryRequestFactory interface to register your custom delivery channel to the delivery system.

A sample implementation of oracle.apps.xdo.delivery.DeliveryRequestFactory is as follows:

Example

```
package oracle.apps.xdo.delivery.file;

import oracle.apps.xdo.delivery.DeliveryRequest;
import oracle.apps.xdo.delivery.DeliveryRequestFactory;
import oracle.apps.xdo.delivery.DeliveryRequestHandler;

public class FileDeliveryRequestFactory
implements DeliveryRequestFactory
{
    /**
     * default constructor.
     */
    public FileDeliveryRequestFactory()
    {
    }
    /**
     * returns delivery request.
     */
    public DeliveryRequest createRequest()
    {
        return new FileDeliveryRequest();
    }
    /**
     * returns delivery request handler.
     */
    public DeliveryRequestHandler createRequestHandler()
    {
        return new FileDeliveryRequestHandler();
    }
    /**
     * returns this
     */
    public DeliveryRequestFactory getFactory()
    {
        return this;
    }
}
```

Register your custom DeliveryRequestFactory to DeliveryManager

The final step is to register your custom delivery channel to the delivery system. You can register your delivery channel in two ways:

- Static method

Use this method to register your delivery channel to the whole delivery system by specifying it in the configuration file. See Configuration File Support, page B-45 for more information.

- Dynamic method

Register the delivery channel to the Java VM instance by calling the Register API programmatically.

Sample code to register the file delivery channel using the dynamic method and call the file delivery channel is as follows:

Example

```
package oracle.apps.xdo.delivery.file;

import oracle.apps.xdo.delivery.DeliveryManager;
import oracle.apps.xdo.delivery.DeliveryRequest;

public class FileDeliverySample
{
    public static void main(String[] args) throws Exception
    {
        // register the file delivery channel
        DeliveryManager.addRequestFactory("file",
"oracle.apps.xdo.delivery.file.FileDeliveryRequestFactory");

        // create delivery manager instance
        DeliveryManager dm = new DeliveryManager();
        // create a delivery request
        DeliveryRequest req = dm.createRequest("file");

        // set the destination
        req.addProperty(
            FileDeliveryRequest.FILE_DESTINATION,
            "d:/Temp/testDocument_delivered.pdf");
        // set the document to deliver
        req.setDocument("D:/Temp/testDocument.pdf");

        // submit the request
        req.submit();
        // close the request
        req.close();
    }
}
```

Configuration File Support

The delivery systems supports a configuration file to set default servers, default properties, and custom delivery channels. The location of the configuration file is

```
{XDO_TOP}/resource/xdodelivery.cfg
```

where {XDO_TOP} is a Java system property that points to the physical directory.

This system property can be set in two ways:

- Pass `-DXDO_TOP=/path/to/xdotop` to the Java startup parameter
- Use a Java API in your code, such as

```
java.lang.System.getProperties().put("XDO_TOP",
"/path/to/xdotop")
```

The system property must be defined before constructing a `DeliveryManager` object.

Following is a sample configuration file:

Example

```
<?xml version='1.0' encoding='UTF-8'?>
<config xmlns="http://xmlns.oracle.com/oxp/delivery/config">
  <! - ===== - >
  <! - servers section - >
  <! - List your pre-defined servers here. - >

  <! - ===== - >
  <servers>
    <server name="myprinter1" type="ipp_printer" default="true">
      <uri>ipp://myprinter1.oracle.com:631/printers/myprinter1</uri>

    </server>
    <server name="myprinter2" type="ipp_printer" >
      <host>myprinter2.oracle.com</host>
      <port>631</port>

      <uri>ipp://myprinter2.oracle.com:631/printers/myprinter2</uri>
      <authType>basic</authType>
      <username>xdo</username>
      <password>xdo</password>

    </server>
    <server name="myfax1" type="ipp_fax" default="true" >
      <host>myfax1.oracle.com</host>

      <port>631</port>
      <uri>ipp://myfax1.oracle.com:631/printers/myfax1</uri>
    </server>
    <server name="mysmtp1" type="smtp_email" default="true">

      <host>myprinter1.oracle.com</host>
      <port>25</port>
    </server>
    <server name="mysmtp2" type="smtp_email" >

      <host>mysmtp12.oracle.com</host>
      <port>25</port>
      <username>xdo</username>
      <password>xdo</password>

    </server>
  </servers>
  <! - ===== - >
  <! - properties section - >
  <! - List the system properties here. - >
  <! - ===== - >
  <properties>

    <property name="ds-temp-dir">/tmp</property>
    <property name="ds-buffering">true</property>
  </properties>
  <! - ===== - >
  <! - channels section - >

  <! - List the custom delivery channels here. - >
  <! - ===== - >
  <channels>
    <channel
name="file">oracle.apps.xdo.delivery.file.FileDeliveryRequestFactory</ch
annel>
```

```
</channels>

</config>
```

Defining Multiple Servers for a Delivery Channel

You can define multiple server entries for each delivery channel. For example, the preceding sample configuration file has two server entries for the "ipp_printer" delivery channel ("myprinter1" and "myprinter2").

Load a server entry for a delivery request by calling `DeliveryRequest.setServer()` method. Following is an example:

Example

```
// create delivery manager instance
    DeliveryManager dm = new DeliveryManager();
    // create a delivery request
    DeliveryRequest req =
dm.createRequest(DeliveryManager.TYPE_IPP_PRINTER);

    // load myprinter1 setting
    req.setServer("myprinter1");
```

Specifying a Default Server for a Delivery Channel

To define a default server for a delivery channel, specify `default="true"`. In the configuration file example above, "myprinter1" is defined as the default sever for the "ipp_printer" delivery channel. If a user does not specify the server properties for "ipp_printer" delivery, the server properties under the default server will be used.

Supported Configuration File Properties and Elements

The following properties are supported in the `<properties>` section:

- `ds-temp-dir`: temporary directory location.
- `ds-buffering`: specify true or false for buffering mode.
- `ds-ca-cert-file`: specify the SSL certification file location.

The following elements are supported for `<server type="ipp_printer">` and `<server type="ipp_fax">`

- `<host>`
- `<port>`
- `<printerName>`
- `<uri>`
- `<username>`
- `<password>`

- <authType>
- <encType>
- <proxyHost>
- <proxyPort>
- <proxyUsername>
- <proxyPassword>
- <proxyAuthType>
- <filter>

The following elements are supported for <server type="smtp_email">

- <host>
- <port>
- <uri>
- <username>
- <password>
- <authType>
- <filter>

The following elements are supported for <server type="webdav">

- <host>
- <port>
- <uri>
- <username>
- <password>
- <authType>
- <encType>
- <proxyHost>

- <proxyPort>
- <proxyUsername>
- <proxyPassword>
- <proxyAuthType>
- <filter>

The following elements are supported for <server type="ftp"> and <server type="sftp">

- <host>
- <port>
- <uri>
- <username>
- <password>
- <filter>

The following elements are supported for <server type="external">

- <command>
- <filter>

Supported XSL-FO Elements

Supported XSL-FO Elements

The following table lists the XSL-FO elements supported in this release of BI Publisher. For each element the supported content elements and attributes are listed. If elements have shared supported attributes, these are noted as a group and are listed in the subsequent table, Property Groups. For example, several elements share the content element `inline`. Rather than list the `inline` properties each time, each entry notes that "inline-properties" are supported. The list of inline-properties can then be found in the Property Groups table.

| Element | Supported Content Elements | Supported Attributes |
|------------|----------------------------|----------------------|
| basic-link | external-graphic | inline-properties |
| | inline | external-destination |
| | leader | internal-destination |
| | page-number | |
| | page-number-citation | |
| | basic-link | |
| | block | |
| | block-container | |
| | table | |
| | list-block | |
| wrapper | | |

| Element | Supported Content Elements | Supported Attributes |
|-----------------|---|-----------------------------|
| bidi-override | bidi-override external-graphic instream-foreign-object inline leader page-number page-number-citation basic-link | inline-properties |
| block | external-graphic inline page-number page-number-citation basic-link block block-container table list-block wrapper | block-properties |
| block-container | block block-container table list-block wrapper | block-properties |
| bookmark-tree | bookmark | N/A |

| Element | Supported Content Elements | Supported Attributes |
|-----------------------------------|-----------------------------------|---|
| bookmark | bookmark bookmark-title | external-destination internal-destination starting-state |
| bookmark-title | N/A | color font-style font-weight |
| conditional-page-master-reference | N/A | master-reference page-position <ul style="list-style-type: none"> • first • last • rest • any • inherit odd-or-even <ul style="list-style-type: none"> • odd • even • any • inherit blank-or-not-blank <ul style="list-style-type: none"> • blank • not-blank • any • inherit |

| Element | Supported Content Elements | Supported Attributes |
|-------------------------|---|-----------------------------|
| external-graphic | N/A | graphic-properties src |
| flow | block block-container table list-block wrapper | flow-properties |
| inline | external-graphic inline leader page-number page-number-citation basic-link block block-container table wrapper | inline-properties |
| instream-foreign-object | N/A | graphic-properties |
| layout-master-set | page-sequence-master simple-page-master simple-page-master page-sequence-master | N/A |
| leader | N/A | inline-properties |
| list-block | list-item | block-properties |

| Element | Supported Content Elements | Supported Attributes |
|----------------------|--|-----------------------------------|
| list-item | list-item-label list-item-body | block-properties |
| list-item-body | block block-container table list-block wrapper | block-properties |
| list-item-label | block block-container table list-block wrapper | block-properties |
| page-number | N/A | empty-inline-properties |
| page-number-citation | N/A | empty-inline-properties ref-id |

| Element | Supported Content Elements | Supported Attributes |
|----------------------|-------------------------------------|--|
| page-sequence | static-content | inheritable-properties |
| | flow | id master-reference initial-page-number force-page-count <ul style="list-style-type: none"> • auto • end-on-even • end-on-odd • end-on-even-layout • end-on-odd-layout • no-force • inherit format |
| page-sequence-master | single-page-master-reference | master-name |
| | repeatable-page-master-reference | |
| | repeatable-page-master-alternatives | |
| region-after | N/A | side-region-properties |
| region-before | N/A | side-region-properties |
| region-body | N/A | region-properties margin-properties-CSS column-count |
| region-end | N/A | side-region-properties |

| Element | Supported Content Elements | Supported Attributes |
|-------------------------------------|---|-------------------------------------|
| region-start | N/A | side-region-properties |
| repeatable-page-master-alternatives | conditional-page-master-reference | maximum-repeats |
| repeatable-page-master-reference | N/A | master-reference maximum-repeats |
| root | bookmark-tree layout-master-set page-sequence | inheritable-properties |

| Element | Supported Content Elements | Supported Attributes |
|--------------------|--|--|
| simple-page-master | region-body region-before region-after region-start region-end | margin-properties-CSS master-name page-height page-width reference-orientation <ul style="list-style-type: none"> • 0 • 90 • 180 • 270 • -90 • -180 • -270 • 0deg • 90deg • 180deg • 270deg • -90deg • -180deg • -270deg • inherit writing-mode <ul style="list-style-type: none"> • lr-tb |

| Element | Supported Content Elements | Supported Attributes |
|------------------------------|--|--|
| single-page-master-reference | N/A | master-reference |
| static-content | block block-container table wrapper | flow-properties |
| table | table-column table-header table-footer table-body | block-properties |
| table-body | table-row | inheritable-properties id |
| table-cell | block block-container table list-block wrapper | block-properties number-columns-spanned number-rows-spanned |
| table-column | N/A | inheritable-properties column-number column-width number-columns-repeated |
| table-footer | table-row | inheritable-properties id |
| table-header | table-row | inheritable-properties id |

| Element | Supported Content Elements | Supported Attributes |
|----------------|---|------------------------------|
| table-row | table-cell | inheritable-properties id |
| wrapper | inline page-number page-number-citation basic-link block block-container table wrapper | inheritable-properties id |

Property Groups Table

The following table lists the supported properties belonging to the attribute groups defined in the preceding table.

| Property Group | Properties |
|------------------|---|
| area-properties | <p>overflow (visible, hidden)</p> <p>reference-orientation</p> <ul style="list-style-type: none"> • 0 • 90 • 180 • 270 • -90 • -180 • -270 • 0deg • 90deg • 180deg • 270deg • -90deg • -180deg • -270deg • inherit <p>writing-mode (lr-tb, rl-tb, lr, rl)</p> <p>baseline-shift (baseline, sub, super)</p> <p>vertical-align</p> |
| block-properties | <p>inheritable-properties</p> <p>id</p> |

| Property Group | Properties |
|--------------------------------------|---|
| border-padding-background-properties | background-color background-image background-position-vertical background-position-horizontal border border-after-color border-after-style (none, dotted, dashed, solid, double) border-after-width border-before-color border-before-style (none, solid) border-before-width border-bottom border-bottom-color border-bottom-style (none, dotted, dashed, solid, double) border-bottom-width border-color border-end-color border-end-style (none, dotted, dashed, solid, double) border-end-width border-left border-left-color border-left-style (none, dotted, dashed, solid, double) border-left-width border-right border-right-color border-right-style (none, dotted, dashed, solid, double) border-right-width border-start-color |

| Property Group | Properties |
|-------------------------|--|
| | border-start-style (none, dotted, dashed, solid, double) border-start-width border-top border-top-color border-top-style (none, dotted, dashed, solid, double) border-top-width border-width padding padding-after padding-before padding-bottom padding-end padding-left padding-right padding-start padding-top |
| box-size-properties | height width |
| character-properties | font-properties text-decoration |
| empty-inline-properties | character-properties border-padding-background-properties id color |

| Property Group | Properties |
|--------------------|--|
| flow-properties | inheritable-properties id flow-name |
| font-properties | font-family font-size font-style (normal, italic, oblique) font-weight (normal, bold) table-omit-header-at-break (TRUE, FALSE, inherit) table-omit-footer-at-break (TRUE, FALSE, inherit) |
| graphic-properties | border-padding-background-properties margin-properties-inline box-size-properties font-properties keeps-and-breaks-properties-atomic id |

| Property Group | Properties |
|------------------------------------|--|
| inheritable-properties | border-padding-background-properties box-size-properties margin-properties-inline area-properties character-properties line-related-properties leader-properties keeps-and-breaks-properties-block color absolute-position <ul style="list-style-type: none"> • auto • absolute • fixed • inherit |
| inline-properties | inheritable-properties id |
| keeps-and-breaks-properties-atomic | break-after (auto, column, page) break-before (auto,column) keep-with-next keep-with-next.within-page |
| keeps-and-breaks-properties-block | keeps-and-breaks-properties-inline |

| Property Group | Properties |
|------------------------------------|--|
| keeps-and-breaks-properties-inline | keeps-and-breaks-properties-atomic keep-together keep-together.within-line keep-together.within-column keep-together.within-page |
| leader-properties | leader-pattern (rule, dots) leader-length leader-length.optimum (dotted, dashed, solid, double) rule-thickness |
| line-related-properties | text-align (start, center, end, justify, left, right, inherit) text-align-last (start, center, end, justify, left, right, inherit) text-indent linefeed-treatment (ignore, preserve, treat-as-space, treat-as-zero-width-space, inherit) white-space-treatment (ignore, preserve, ignore-if-before-linefeed, ignore-if-after-linefeed, ignore-if-surrounding-linefeed, inherit) white-space-collapse (FALSE, TRUE, inherit) wrap-option (no-wrap, wrap, inherit) direction (ltr) |
| margin-properties-block | margin-properties-CSS space-after space-after.optimum space-before space-before.optimum start-indent end-indent |

| Property Group | Properties |
|--------------------------|--|
| margin-properties-CSS | margin margin-bottom margin-left margin-right margin-top |
| margin-properties-inline | margin-properties-block space-start space-start.optimum space-end space-end.optimum position <ul style="list-style-type: none"> • static • relative • absolute • fixed • inherit top left |
| region-properties | border-padding-background-properties area-properties region-name |
| side-region-properties | region-properties extent |

Configuration File Reference

BI Publisher Configuration Files

This chapter contains reference information about the following BI Publisher configuration files:

- Runtime Configuration Properties File
- Server Configuration File

The properties in the Runtime Configuration file are set through the Runtime Configuration Properties and Font Mappings pages (see Setting Runtime Properties, page 11-13). The properties in the Server Configuration file are set through the following Admin pages:

- System Maintenance Server Configuration
- System Maintenance Scheduler Configuration
- Security Center Security Configuration

Setting Properties in the Runtime Configuration File

As of the BI Publisher Enterprise version 10.1.3.2, the runtime properties are set through the Runtime Configuration Properties page and the Font Mappings page in the Admin interface.

If you do not use the Admin interface to set the properties, BI Publisher will fall back to the properties set in this file. Therefore if you are upgrading from XML Publisher Enterprise 5.6.2, you can use the settings in your existing xdo.cfg file, although it is recommended that you migrate your settings in this file to the Admin interface. See Upgrading from XML Publisher Enterprise 5.6.2 to BI Publisher Enterprise 10.1.3.2, page E-1.

It is important to note that the Admin interface does not update this file. Any settings in the Admin interface will take precedence over the settings in the xdo.cfg file.

File Name and Location

The configuration file is named `xdo.cfg`.

The file is located under the `<JRE_TOP>/jre/lib`, for example: `jdk/jre/lib`.

Namespace

The namespace for this configuration file is:

`http://xmlns.oracle.com/oxp/config/`

Configuration File Example

Following is a sample configuration file:

```
<config version="1.0.0"
  xmlns="http://xmlns.oracle.com/oxp/config/"><!-- Properties -->
<properties>
  <!-- System level properties -->
  <property name="system-temp-dir">/tmp</property>

  <!-- PDF compression -->
  <property name="pdf-compression">true</property>

  <!-- PDF Security -->
  <property name="pdf-security">true</property>
  <property name="pdf-open-password">user</property>
  <property name="pdf-permissions-password">owner</property>
  <property name="pdf-no-printing">true</property>
  <property name="pdf-no-changing-the-document">true</property>
</properties>

<!-- Font setting -->
<font>
  <!-- Font setting (for FO to PDF etc...) -->
  <font family="Arial" style="normal" weight="normal">
    <truetype path="/fonts/Arial.ttf" />
  </font>
  <font family="Default" style="normal" weight="normal">
    <truetype path="/fonts/ALBANWTJ.ttf" />
  </font>

  <!--Font substitute setting (for PDFForm filling etc...) -->
  <font-substitute name="MSGothic">
    <truetype path="/fonts/msgothic.ttc" ttcno="0" />
  </font-substitute>
</font>
</config>
```

How to Read the Element Specifications

The following is an example of an element specification:

```

<Element Name Attribute1="value"
      Attribute2="value"
      AttributeN="value"
      <Subelement Name1/>[occurrence-spec]
      <Subelement Name2>...</Subelement Name2>
      <Subelement NameN>...</Subelement NameN>
</Element Name>

```

The [occurrence-spec] describes the cardinality of the element, and corresponds to the following set of patterns:

- [0..1] - indicates the element is optional, and may occur only once.
- [0..n] - indicates the element is optional, and may occur multiple times.

Structure

The <config> element is the root element. It has the following structure:

```

<config version="cdata" xmlns="http://xmlns.oracle.com/oxp/config/">
  <font> ... </font> [0..n]
  <property> ... </property> [0..n]
</config>

```

Attributes

| | |
|----------------|---|
| version | The version number of the configuration file format. Specify 1.0.0. |
| xmlns | The namespace for BI Publisher's configuration file. Must be <code>http://xmlns.oracle.com/oxp/config/</code> |

Description

The root element of the configuration file. The configuration file consists of two parts:

- Properties (<property> elements)
- Font definitions (elements)

The and <property> elements can appear multiple times. If conflicting definitions are set up, the last occurrence prevails.

Properties

This section describes the <properties> element and the <property> element.

The <properties> element

The properties element is structured as follows:

```
<properties locales="cdata">
  <property>...
  </property> [0..n]
</properties>
```

Description

The `<properties>` element defines a set of properties. You can specify the `locales` attribute to define locale-specific properties. Following is an example:

Example

```
<!-- Properties for all locales -->
<properties>...Property definitions here...
</properties>

<!--Korean specific properties-->
<properties locales="ko-KR">
  ...Korean-specific property definitions here...
</properties>
```

The `<property>` element

The `<property>` element has the following structure:

```
<property name="cdata"> ...pcdata...
</property>
```

Attributes

| | |
|-------------|----------------------------|
| name | Specify the property name. |
|-------------|----------------------------|

Description

Property is a name-value pair. Specify the internal property name (key) to the `name` attribute and the value to the element value. See *Setting Runtime Properties*, page 11-13 for the list of the internal property names.

Example

```
<properties>
  <property name="system-temp-dir">d:\tmp</property>
  <property name="system-cache-page-size">50</property>
  <property name="pdf-replace-smart-quotes">>false</property>
</properties>
```

Font Definitions

Font definitions include the following elements:

- ``
- `<font-substitute>`
- `<truetype>`

- `<type1>`

For the list of TrueType and Type1 fonts, see *Predefined Fonts*, page 11-22.

** element**

The `` element is structured as follows:

```
<font locales="cdata">
  <font> ... </font> [0..n]
  <font-substitute> ... </font-substitute> [0..n]
</font>
```

Attributes

locales Specify the locales for this font definition. This attribute is optional.

Description

The `` element defines a set of fonts. Specify the `locales` attribute to define locale-specific fonts.

Example

```
<!-- Font definitions for all locales -->
<font>
  ..Font definitions here...
</font>

<!-- Korean-specific font definitions -->
<font locales="ko-KR">
  ... Korean Font definitions here...
</font>
```

** element**

Following is the structure of the `` element:

```
<font family="cdata" style="normalitalic"
weight="normalbold">
  <truetype>...</truetype>
or <type1> ... <type1>
</font>
```

Attributes

family Specify any family name for the font. If you specify "Default" for this attribute, you can define a default fallback font. The **family** attribute is case-insensitive.

style Specify "normal" or "italic" for the font style.

weight Specify "normal" or "bold" for the font weight.

Description

Defines a BI Publisher font. This element is primarily used to define fonts for FO-to-PDF processing (RTF to PDF). The PDF Form Processor (used for PDF templates) does not refer to this element.

Example

```
<!-- Define "Arial" font -->
<font family="Arial" style="normal" weight="normal">
  <truetype path="/fonts/Arial.ttf"/>
</font>
```

<font-substitute> element

Following is the structure of the font-substitute element:

```
<font-substitute name="cdata">
  <truetype>...</truetype>
or <type1>...</type1>
</font-substitute>
```

Attributes

name Specify the name of the font to be substituted.

Description

Defines a font substitution. This element is used to define fonts for the PDF Form Processor.

Example

```
<font-substitute name="MSGothic">
  <truetype path="/fonts/msgothic.ttc" ttccno=0"/>
</font-substitute>
```

<type1> element

The form of the <type1> element is as follows:

```
<type1 name="cdata"/>
```

Attributes

name Specify one of the Adobe standard Latin1 fonts, such as "Courier".

Description

<type1> element defines an Adobe Type1 font.

Example

```
<!--Define "Helvetica" font as "Serif" -->
<font family="serif" style="normal" weight="normal">
  <type1 name="Helvetica"/>
</font>
```

Predefined Fonts

BI Publisher has several predefined fonts. These fonts do not require any additional setup.

For the predefined fonts, see BI Publisher's Predefined Fonts, page 11-22.

The Server Configuration Files

The server configuration properties are set through the following pages under the Admin tab:

- System Maintenance Server Configuration
- System Maintenance Scheduler Configuration
- Security Center Security Configuration

The Repository location defined under System Maintenance Server Configuration is stored in `WEB-INF/xmlp-server-config.xml`.

All other server configuration properties are stored in a second instance of `xmlp-server-config.xml`. This file is located in `Admin/Configuration/xmlp-server-config.xml` in the repository.

The Admin user interface pages write the settings to these two files. Therefore the files can be manually updated. However, this is not recommended because the user interface ensures the validity of related property settings.

Important: Whenever you change any of the properties in this configuration file, you must restart the server in order for the changes to take effect.

Configuration File Structure

The file consists of the following sections: XML header, resource, scheduler, and general properties.

XML Header

The header consists of the XML declaration and the root element with the namespace attribute:

```
<?xml version="1.0" encoding="UTF-8"?>
<xmlpConfig xmlns="http://xmlns.oracle.com/oxp/xmlp">
```

Resource Section

Note: The repository location is now set using the Server Configuration page. See Setting Server Configuration Options, page 11-8.

The resource section defines the location of your repository. The resource section is mandatory. The resource elements are enclosed within `<resource>` `</resource>` tags.

Within the `<resource>` tags you must define either the `<file>` element or the `<xdb>` element to specify the path to your reports repository.

The `<file>` Element

If your reports repository exists on your file system, declare the absolute file path using the `file` element with its `path` attribute as follows:

```
<file path=""/>
```

Example: `<file path="d:/reports"/>`

The `<xdb>` element

If your reports repository is set up on your database, declare the absolute path using the `xdb` element with its `path` attribute as follows:

```
<xdb path="">
```

Example: `<xdb path="/public/Reports">`

The `xdb` element requires the `<connection>` element. Within the `<connection>` `</connection>` tags, define the `<connectionType>`. Valid values for `<connectionType>` are "jdbc" or "jndi".

jdbc connectionType

If the `<connectionType>` is `jdbc`, the following elements are required:

```
<url>
```

```
<username>
```

```
<password>
```

```
<driver>
```

Example:

```

<resource>
  <xdb path="/public/Reports">
    <connection>
      <connectionType>jdbc</connectionType>
      <url>jdbc:oracle:thin:@rpts.mycompany.com:1525:ora10g</url>
      <username>scott</username>
      <password>tiger</password>
      <driver>oracle.jdbc.driver.oracleDriver</driver>
    </connection>
  </xdb>
</resource>

```

jndi connectionType

If the connection type is "jndi", the following element is required:

```
<jndiName>
```

Example:

```

<resource>
  <xdb path="/public/Reports">
    <connection>
      <connectionType>jndi</connectionType>
      <jndiName>jdbc/pool/mydb</jndiName>
    </connection>
  </xdb>
</resource>

```

General Properties

The following table lists the general properties that can be specified in the configuration file. Specify the properties according to the following syntax:

```
<property name = "PROPERTY_NAME" value="value"/>
```

Example:

```
<property name = "CACHE_EXPIRATION" value="120"/>
```

Use the Admin Server Configuration page to set these properties (see Setting Server Configuration Options, page 11-8), with the exception of Guest Folder access. Guest Folder access is now set on the Security Configuration page (see Allowing Guest Access, page 10-2).

The properties listed here are not required. If not specified, the default value will be used. The following table lists the name, valid values, default value, and description of each property.

| Property Name | Values | Description |
|---------------------|----------------------------|---|
| CACHE_EXPIRATION | Default: 30 | <p>Enter the expiration period for the dataset cache in minutes.</p> <p>For reports that execute a SQL query, you have the option of caching the dataset returned by the query. The returned dataset will remain in cache for the period specified by this property. For more information about setting this option, see <i>Create a New Report</i>, page 3-2.</p> |
| CACHE_SIZE_LIMIT | Default: 1000 | Sets the maximum number of datasets that will be maintained in the cache at a given time. |
| CACHED_REPORT_LIMIT | Default: 50 | Specifies the number of reports that can be cached in memory at any given time. |
| OUTPUT_FORMAT | html, pdf, rtf, excel, xml | <p>The output types specified in this property will be displayed to the user by default for every report (PDF templates will still only allow PDF output). Enter each output type separated by a comma. Valid values are: html, pdf, rtf, excel, xml.</p> <p>This value is overridden by the Output Format types selected in the report definition. See <i>Create a New Report</i>, page 3-2.</p> |
| DEBUG_LEVEL | exception (Default), debug | Controls the amount of debug information generated by the system. If set to <code>exception</code> , only error information is generated. If set to <code>debug</code> , all system output is generated. |

| Property Name | Values | Description |
|-------------------|-----------------------|---|
| GUEST_FOLDER | true (Default), false | Enables a "guest" folder for your installation. A guest folder is a public folder accessible to anyone who can view the login URL. No credentials are required to view the reports in the guest folder. |
| GUEST_FOLDER_NAME | Default: Guest | Sets the name of the guest folder. |

The following properties must be specified if you are using an LDAP server with BI Publisher Enterprise. Set these properties from the Admin user interface. For more information about LDAP integration, see *Integrating with LDAP*, page 10-6.

| Property Name | Values | Description |
|------------------------------|---|---|
| LDAP_PROVIDER_URL | Example: ldap://myserver.mycompany.com:3060/ | Enter the URL for the LDAP server. |
| LDAP_PROVIDER_ADMIN_USERNAME | Example: Admin | Enter the administrator user name for the LDAP server. |
| LDAP_PROVIDER_ADMIN_PASSWORD | Example: welcome | Enter the administrator password for the username entered. |
| LDAP_PROVIDER_USER_DN | Example: cn=xdo,dc=myserver,dc=com | The LDAP distinguished name user suffix that distinguishes the group of users to have access to BI Publisher. |

| Property Name | Values | Description |
|--------------------------------------|---|--|
| LDAP_PROVIDER_FACTORY | Example: com.sun.jndi.ldap.c tl.LdapCtxFactory | The value of this property is the fully qualified class name of the factory class which creates the initial context for the LDAP service provider. It is used to select a particular LDAP service provider; it is not used by the provider itself. This property need not be set when the name argument to initial context methods is a URL. |
| LDAP_PROVIDER_GROUP_SEARCH | Example: (& (objectclass=groupofuniquenames) (cn=*)) | The search criteria to locate the qualified groups. This will be based on your LDAP server schema. |
| LDAP_PROVIDER_GROUP_SEARCH_ROOT | Example: cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=mpc11,dc=com | Indicates where in the tree structure to apply the group search criteria. |
| LDAP_PROVIDER_GROUP_ATTR_NAME | Example: cn | Indicates which attribute contains the Group name. |
| LDAP_PROVIDER_GROUP_ATTR_MEMBER | Example: uniquemember | Indicates which attribute contains the member names of the Group. |
| LDAP_PROVIDER_GROUP_ATTR_DESCRIPTION | Example:description | Indicates which attribute contains the description of the Group. |

The Oracle Single Sign-On properties are listed in the following table. These properties are now set through the Admin interface. For more information about setting up Single Sign-On, see Setting Up Oracle Single Sign-On, page 10-16.

| Property Name | Values | Description |
|---------------------|--|--|
| SINGLE_SIGN_OFF_URL | Example: http://server1.mycompany.com:7777/pls/orasso/orasso.wvssso_app_admin.ls_logout | Enter the Single Sign-Off URL retrieved from the SSO Partner Application Login page. |

Sample Configuration Files

Following is a sample WEB-INF/xmlp-server-config.xml file containing repository information:

```
<?xml version="1.0" encoding="UTF-8"?>
<xmlpConfig xmlns="http://xmlns.oracle.com/oxp/xmlp">
  <resource>
    <file path="d:/reports"/>
    <! -      <xdb path="/public/Reports"> - >
    <! -      <connection> - >
    <! -      <connectionType>jndi</connectionType> - >
    <! -      <jndiName>jdbc/pool/mydb</jndiName> - >
    <! -      </connection> - >
    <! -      </xdb> - >
  </resource>
</xmlpConfig>
```

Following is a sample Admin/Configuration/xmlp-server-config.xml file containing the BI Publisher server general and LDAP properties:

```
<?xml version="1.0" encoding="UTF-8"?>
<xmlpConfig xmlns="http://xmlns.oracle.com/oxp/xmlp">

<property name="CACHE_EXPIRATION" value="120"/>
<property name="CACHE_SIZE_LIMIT" value="1000"/>
<property name="OUTPUT_FORMAT" value="html, pdf, rtf, excel, xml"/>
<property name="DEBUG_LEVEL" value="debug"/>
<property name="CACHED_REPORT_LIMIT" value="10"/>
<property name="LDAP_PROVIDER_URL"
  value="ldap://myldapserver.com:3060/" />
<property name="LDAP_PROVIDER_ADMIN_USERNAME" value="orcladmin"/>
<property name="LDAP_PROVIDER_ADMIN_PASSWORD" value="welcome1"/>
<property name="LDAP_PROVIDER_USER_DN"
  value="cn=xdo,dc=myserver,dc=com" />
</xmlpConfig>
```

Upgrading from XML Publisher Enterprise 5.6.2 to BI Publisher 10.1.3.2

Overview

The following steps are required to migrate the Oracle XML Publisher Enterprise Edition version 5.6.2 to the Oracle Business Intelligence Publisher version 10.1.3.2:

1. Back up the existing data in the database.
2. Back up the configuration file (`xmlp-server-config.xml`).
3. Install BI Publisher 10.1.3.2 following the installation instructions in the *Oracle Business Intelligence Infrastructure Installation and Configuration Guide*.
4. Migrate the server configuration properties.
5. Migrate the delivery configuration properties.
6. Set up the Scheduler database.
7. Run the migration script.
8. Migrate LDAP server settings.
9. Update User Interface (UI) translations.
10. Restart BI Publisher 10.1.3.2.

The following sections describe these steps in detail. Note that these upgrade steps from XML Publisher Enterprise 5.6.2 are for Oracle database deployments only.

Upgrade Steps

1. Backup the existing data in the database.

Refer to the *Oracle Database Administrator's Guide 10g* for information and guidelines on backing up your data.

2. Back up the configuration file (`xmlp-server-config.xml`).

Backup the `xmlp-server-config.xml` under `xmlpserver/WEB-INF` in your XML Publisher 5.6.2 installation. Ensure to copy the `xmlp-server-config.xml` file to a location outside of the Web application area; otherwise the file will be removed when you install BI Publisher 10.1.3.2.

Example

```
% cp
${ORACLE_HOME}/j2ee/home/applications/xmlpserver/xmlpserver/WEB-INF/
xmlp-server-config.xml /tmp
```

3. Install BI Publisher 10.1.3.2.

You can remove XML Publisher Enterprise 5.6.2 and install BI Publisher 10.1.3.2, or you can install 10.1.3.2 in a separate location.

Important: In the installation process, specify the same repository location used in XMLP 5.6.2.

Refer to the *Oracle Business Intelligence Infrastructure Installation and Configuration Guide* for the installation steps.

Start up the server after the installation.

4. Migrate the server configuration properties.

BI Publisher 10.1.3.2 provides a user interface to enter server properties previously entered in the `xmlp-server-config.xml` file. Use the `xmlp-server-config.xml` file backed up in the previous step as a guide to enter the properties in the BI Publisher 10.1.3.2 user interface as follows:

- Migrate general properties and properties from the `<resource>` section.
Select the **Admin** tab. Under **System Maintenance**, select **Server Configuration**.
- Migrate properties from the `<scheduler>` section.
Select the **Admin** tab. Under **System Maintenance**, select **Scheduler Configuration**.

5. Migrate the delivery configuration properties.

Delivery configurations set under **Configuration** on the **Admin** tab in XML

Publisher Enterprise 5.6.2 are now set on the **Admin** tab under **Delivery Configuration** in BI Publisher 10.1.3.2.

Note that in XMLP 5.6.2 you had to specify the following properties to enable the use of filters for printers and fax servers. In BI Publisher 10.1.3.2 you are no longer required to set these properties.

- Temporary Directory - in 10.1.3.2 the system temporary directory is automatically used.
- Buffering Mode - in 10.1.3.2 the buffering mode is always on.

6. Set up the scheduler database for BI Publisher 10.1.3.2

Perform the steps for setting up the BI Publisher Scheduler in the *Oracle Business Intelligence Infrastructure Installation and Configuration Guide*, omitting the create user step. Use the same user and database that you used for XMLP 5.6.2.

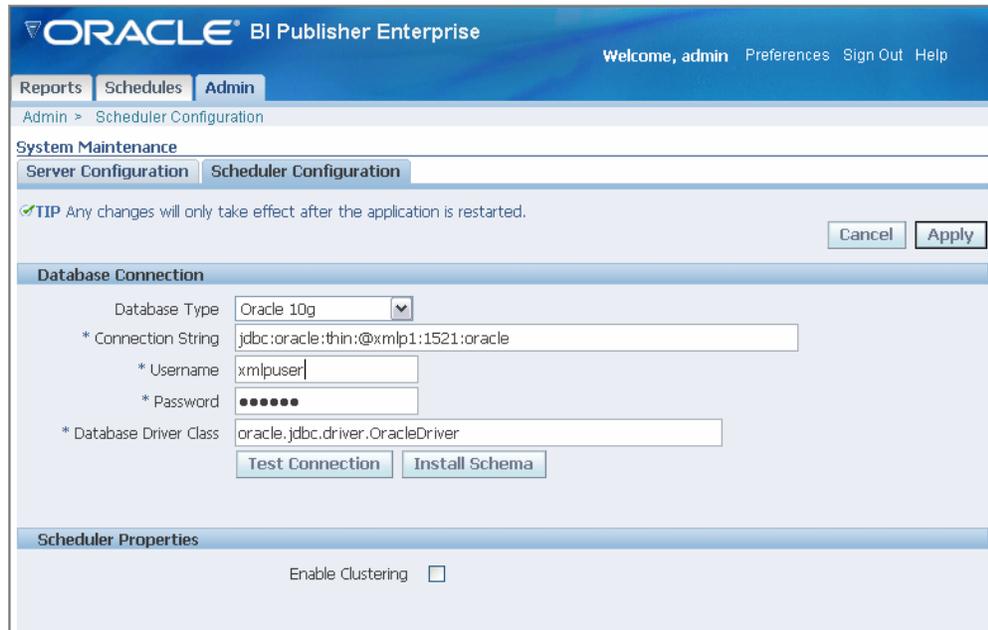
The database information you used in XMLP 5.6.2 is stored in the `xmlp-server-config.xml` file that you backed up in the previous step. Note that this process does not overwrite the existing data because the table names are different in 10.1.3.2.

```
[5.6.2 xmlp-server-config.xml sample]
:
:

<scheduler>
  <connection>
    <connectionType>jdbc</connectionType>
    <url>jdbc:oracle:thin:@xmlp1:1521:oracle</url>
    <username>xmlpuser</username>
    <password>xmlpuser</password>
    <driver>oracle.jdbc.driver.OracleDriver</driver>
  </connection>
</scheduler>
:
:
```

| Parameter in 5.6.2 Configuration File | Corresponding Field in 10.1.3.2 Scheduler Configuration Page | Value in the Sample Configuration File |
|---------------------------------------|--|--|
| url | Connection String | jdbc:oracle:thin:@xmlp1:1521:oracle |
| driver | Database Driver Class | oracle.jdbc.driver.OracleDriver |
| username | Username | xmlpuser |
| password | Password | xmlpuser |

The following figure shows a sample Scheduler Configuration page:



7. Run the migration script.

Log in to the database as the existing user and run the SQL script "migration_562to10132.sql". This script migrates all the data to the 10.1.3.2 tables.

To delete old data, you can run the SQL script "drop_562.sql".

Example

```
% sqlplus xmpuser/xmpuser@oracle
SQL*Plus: Release 10.1.0.3.0 - Production on Thu Jun 29 11:41:52
2006
```

```
Copyright (c) 1982, 2004, Oracle. All rights reserved.
```

```
Connected to:
Oracle Database 10g Enterprise Edition Release 10.1.0.2.0 -
Production
With the Partitioning, OLAP and Data Mining options
```

```
SQL> @migrate_562to1013.sql
```

```
SQL> @drop_562.sql
```

8. Migrate LDAP server settings.

If you have set up an LDAP server in 5.6.2, migrate the LDAP server configuration in 10.1.3.2 through the BI Publisher Admin interface.

Note: Open the 5.6.2 xmlp-server-config.xml and search for

the LDAP server information. If the properties that start with "LDAP_" are commented out, you are not using an LDAP server and you can skip this step.

To migrate the LDAP settings:

- Select the **Admin** tab.
- Under **Security Center**, select **Security Configuration**.
- Under **Security Model**, choose LDAP from the list.
- Enter the LDAP server information based on the 5.6.2 `xmlp-server-config.xml`. See the following sample configuration file, mappings table, and Admin page sample for more detail.

Example

```
[5.6.2 xmlp-server-config.xml sample]
:
:
<property name="LDAP_PROVIDER_URL"
value="ldap://ldap.server.com:389/" />
<property name="LDAP_PROVIDER_ADMIN_USERNAME"
value="orcladmin" />
<property name="LDAP_PROVIDER_ADMIN_PASSWORD" value="welcome" />
<property name="LDAP_PROVIDER_USER_DN"
value="cn=Users,dc=server,dc=com" />
<property name="LDAP_PROVIDER_FACTORY"
value="com.sun.jndi.ldap.LdapCtxFactory" />
<property name="LDAP_PROVIDER_GROUP_SEARCH"
value="(&(objectclass=groupofuniquenames)(cn=*))" />
<property name="LDAP_PROVIDER_GROUP_SEARCH_ROOT"
value="cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=
OracleContext,dc=server,dc=com" />
<property name="LDAP_PROVIDER_GROUP_ATTR_NAME" value="cn" />
<property name="LDAP_PROVIDER_GROUP_ATTR_MEMBER"
value="uniquemember" />
<property name="LDAP_PROVIDER_GROUP_ATTR_DESCRIPTION"
value="description" />
:
:
```

| Parameter in the 5.6.2 Configuration File | Corresponding Field in the Admin Security Configuration Page | Value in the Sample Configuration File |
|---|--|--|
| LDAP_PROVIDER_URL | URL | ldap://ldap.server.com:389/ |

| Parameter in the 5.6.2 Configuration File | Corresponding Field in the Admin Security Configuration Page | Value in the Sample Configuration File |
|--|---|--|
| LDAP_PROVIDER_ADMIN_USE RNAME | Administrator Username | orcladmin |
| LDAP_PROVIDER_ADMIN_PAS SWORD | Administrator Password | welcome |
| LDAP_PROVIDER_USER_DN | Distinguished Name for Users | cn=Users,dc=server,dc=com |
| LDAP_PROVIDER_FACTORY | JNDI Context Factory Class | com.sun.jndi.ldap.LdapCtxFactory |
| LDAP_PROVIDER_GROUP_SEA RCH | Group Search Filter | (&(objectclass=groupofunique names)(cn=*)) |
| LDAP_PROVIDER_GROUP_SEA RCH_ROOT | Distinguished Name for Groups | cn=OracleDefaultDomain,cn=OracleDBS ecurity,cn=Products,cn=OracleContext,d c=server,dc=com |
| LDAP_PROVIDER_GROUP_ATT R_NAME | Group Attribute Name | cn |
| LDAP_PROVIDER_GROUP_ATT R_MEMBER | Group Member Attribute Name | uniquemember |
| LDAP_PROVIDER_GROUP_ATT R_DESCRIPTION | Group Description Attribute Name | description |

Security Model

Security Model: LDAP

URL: ldap://ldap.server.com:389/

Administrator Username: orcladmin

Administrator Password: *****

Distinguished Name for Users: cn=Users,dc=server,dc=com
(Example: cn=Users,dc=example,dc=com)

JNDI Context Factory Class: com.sun.jndi.ldap.LdapCtxFactory
(Default Value: com.sun.jndi.ldap.LdapCtxFactory)

Distinguished Name for Groups: cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=server,dc=com
(Default Value: cn=OracleDefaultDomain,cn=OracleDBSecurity,cn=Products,cn=OracleContext,dc=example,dc=com)

Group Search Filter: (&(objectclass=groupofuniquenames)(cn=*))
(Default Value: (&(objectclass=groupofuniquenames)(cn=*))

Group Attribute Name: cn
(Default Value: cn)

Group Member Attribute Name: uniquemember
(Default Value: uniquemember)

Group Description Attribute Name: description
(Default Value: description)

9. Update User Interface (UI) translations.

To update the UI translation files, copy all the .xlf files under Admin/Translation in the 10.1.3.2 repository template to your existing repository.

Example

Assume you have the following:

- * 10.1.3.2 repository template location : /new10132repository
- * Your existing 5.6.2 repository : /my562repository

then execute:

```
% cp /new10132repository/Admin/Translation/*.xlf
/my562repository/Admin/Translation
```

10. Restart BI Publisher 10.1.3.2

Restart the 10.1.3.2 server to make your changes effective.

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