

An Oracle White Paper
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Creating Custom PDF Reports with Oracle Application Express and the APEX Listener

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Executive Overview

Oracle Application Express 4.2.2 has introduced report printing enhancements and a new option for PDF printing. You can now use APEX Listener release 2.0.2 or above to enable PDF printing for your classic reports, interactive reports, and report queries. The FOP libraries for PDF printing are built into the APEX Listener. Therefore, with this new PDF printing option, you do not need to configure an external printing engine such as BI Publisher or Apache FOP anymore.

This white paper provides an overview of different options for PDF printing in Oracle Application Express. The focus of this document is how to configure and use APEX Listener as a print server with Oracle Application Express. This white paper outlines the steps to create custom report layouts using third party tools such as Altova StyleVision or Stylus Studio, and then how to use these custom report layouts for PDF printing.

Prerequisites

Before performing the examples and steps discussed in this white paper, you should:

- Install Oracle Database 11g
- Install Oracle Application Express 4.2.2 or above
- Install and configure Oracle Application Express Listener 2.0.2 or above as a web listener for Oracle Application Express
- Download and install any of the following third party tools:
 - Altova StyleVision: <http://www.altova.com/stylevision.html>
 - Stylus Studio: <http://www.stylusstudio.com>

Note: APEX Listener 2.0.2 supports only the Base-14 fonts. To configure additional fonts, see this document: <http://xmlgraphics.apache.org/fop/0.95/fonts.html>

The examples provided in this document use Oracle Application Express 4.2.2. The screenshots might be different for later versions of Oracle Application Express 4.2.2.

Oracle Application Express PDF Printing Architecture

Oracle Application Express allows you to configure a classic report region to print by exporting it to an Adobe portable document format (PDF), Microsoft Word rich text format (RTF), Microsoft Excel format (XLS), or Extensible Markup Language (XML). By taking advantage of region report printing, your application users can view and print reports that have a predefined orientation, page size, column headings, and page header and footer.

In the releases prior to Oracle Application Express 4.2.2, the report printing functionality requires an externally defined print server such as Oracle BI Publisher, Oracle Application Server Containers for J2EE (OC4J) with Apache FOP, or any other standard XSL-FO processing engine. PDF printing using APEX Listener as a print server has been added as a third option in APEX 4.2.2.

All of the PDF printing options in APEX share the same underlying architecture. When an application user clicks a print link on a report, the request is sent to the Oracle Application Express

engine. The APEX engine then generates the corresponding report data in XML and transfers this XML to a print rendering engine along with an XSL-FO or an RTF stylesheet. Based on the stylesheet, your data gets formatted, rendered in PDF and then downloaded to your browser.

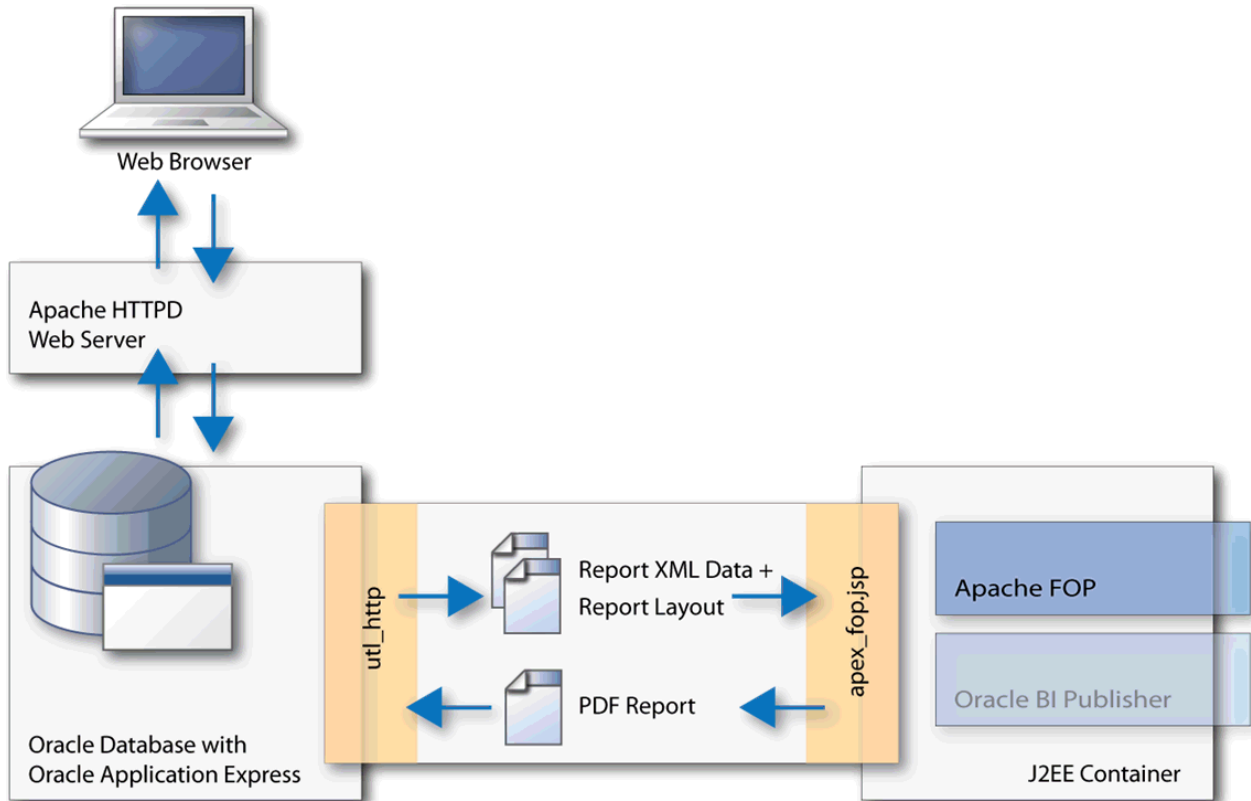
Configuring PDF Printing in Oracle Application Express

With the latest addition of APEX Listener based printing, now you can use any of the following three different options for PDF printing in Oracle Application Express:

- Oracle APEX with Apache FOP
- Oracle APEX with BI Publisher
- Oracle APEX with APEX Listener

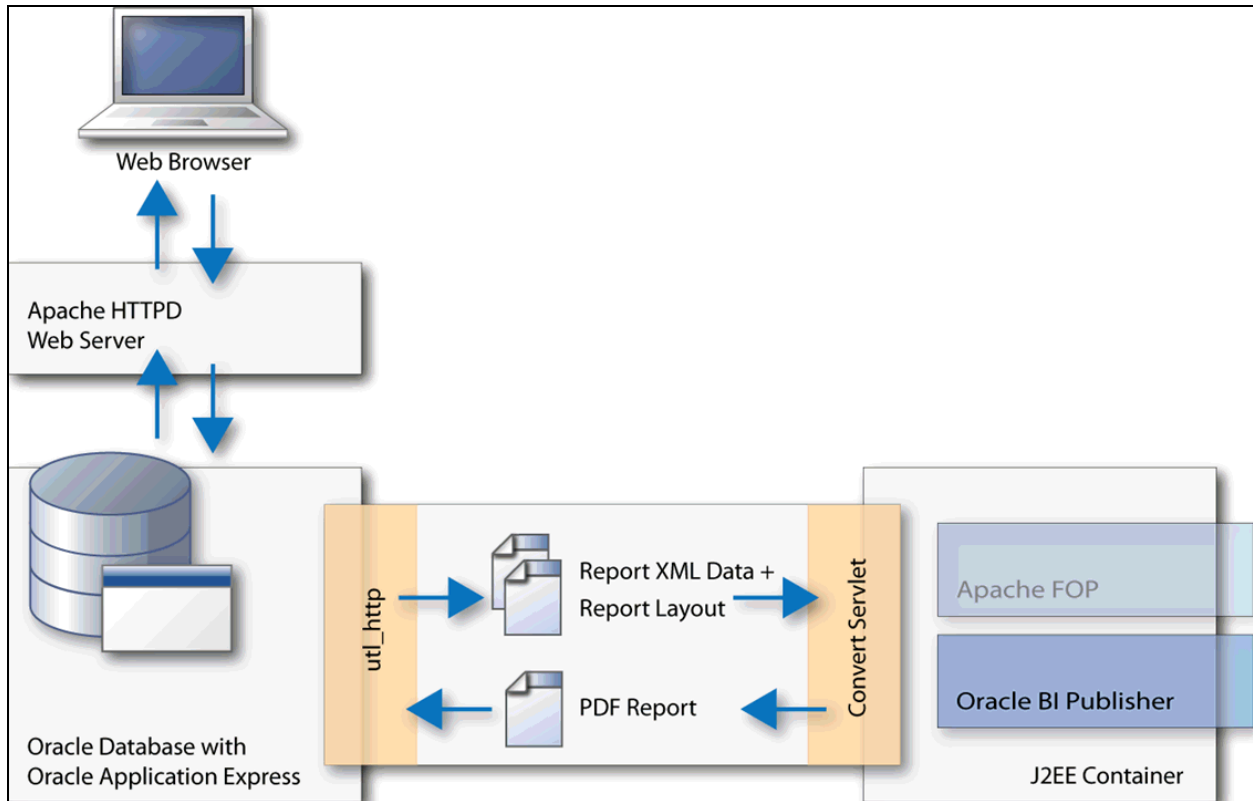
Oracle APEX with Apache FOP

To use this option, you must configure your Oracle Application Express instance to use the FOP print server. Oracle Application Express includes a supported configuration of Apache FOP in conjunction with Oracle Containers for J2EE. The Apache FOP installation is included in the Oracle Application Express distribution under `/home/oracle/utilities/fop/fop.war`. After installing this war file, you need to configure Oracle Database to enable network services for APEX to call out to the FOP rendering engine through `utl_http`. Oracle Application Express Instance administrator has to enter the server URL and script information under the Manage Instance > Instance Settings > Report Printing in the APEX instance administration. Once this is setup, developers can enable PDF printing on their classic, interactive reports, and report queries. With the Apache FOP option, you can use either the generic built-in XSL-FO layout or a custom report layout.



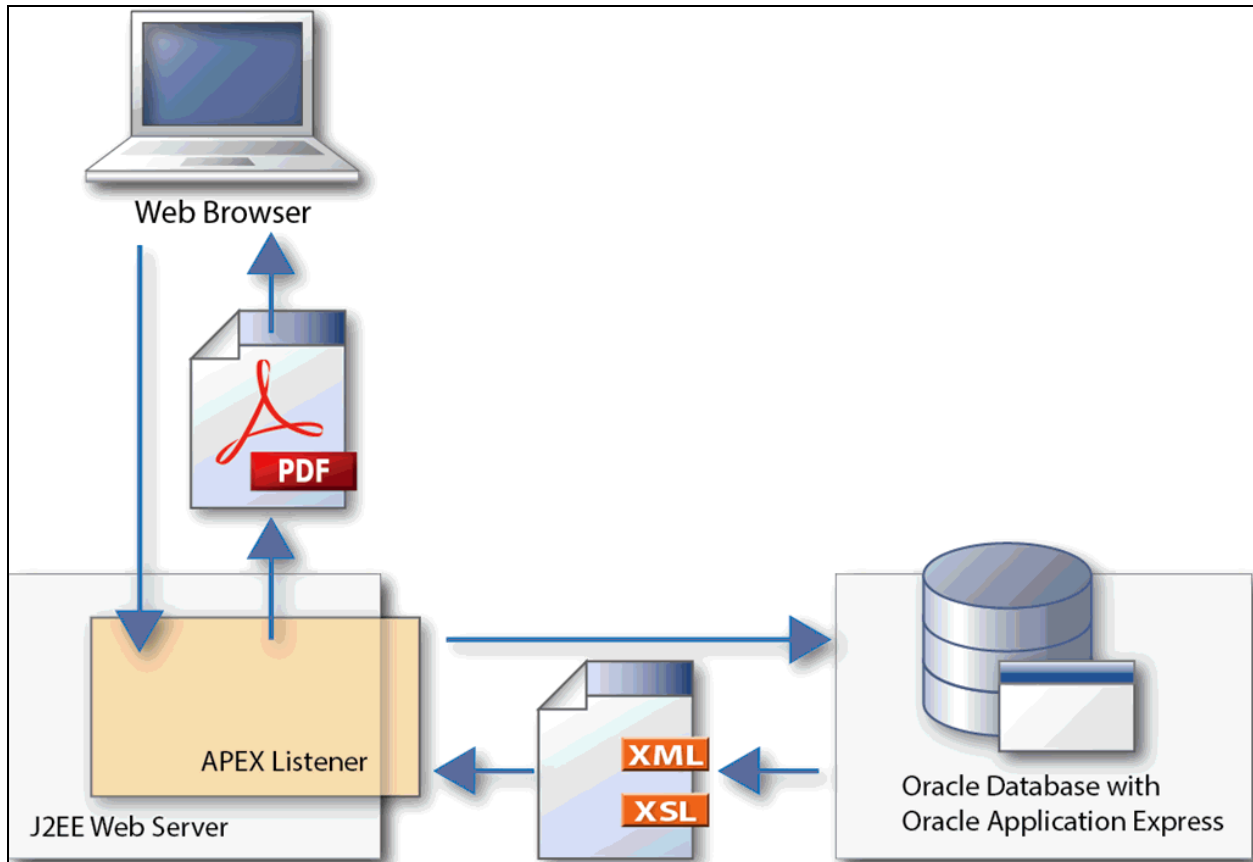
Oracle APEX with BI Publisher

This option requires a valid license for Oracle BI Publisher. With this configuration, you have all the capabilities available with Apache FOP configuration plus the ability to define RTF-based report layouts developed using the BI Publisher Word Template Plug-In. This provides easy graphical control over every aspect of your report. You can add logos to your pages, add complex control breaks, and have full pagination control. You can even embed charts and create reports that look exactly like standard government forms.



Oracle APEX with APEX Listener

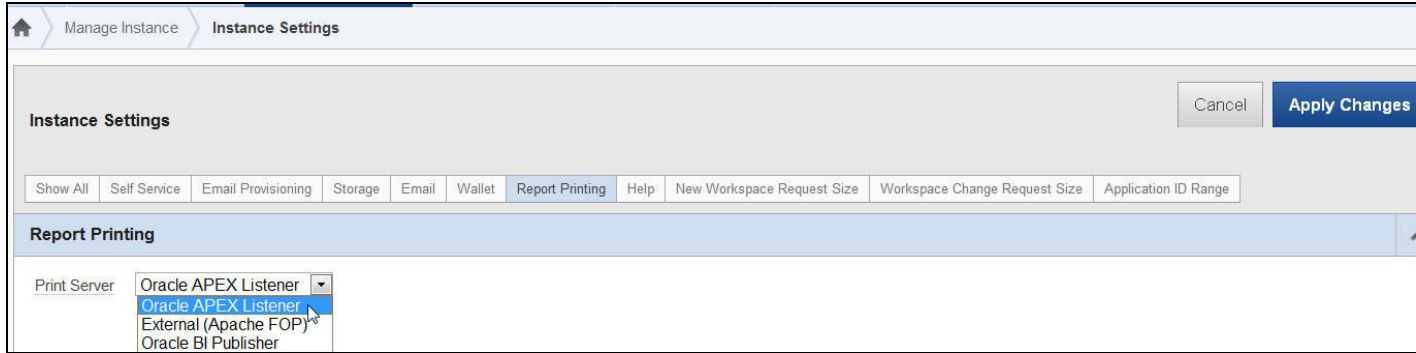
APEX Listener 2.0 and above includes FOP support. Oracle Application Express generates report XML data with XSL-FO stylesheet in single document. APEX Listener intercepts this file and renders PDF document that is downloaded straight into your browser. With the APEX Listener option you can either use the built-in generic report layout that allows for limited customization or your own custom report layout.



Configuring APEX Listener as a Print Server

The APEX Listener based printing option loads your reports straight to the APEX Listener. Then the APEX Listener renders these reports in PDF format and downloads them to your browser. Therefore, unless you are calling APEX Print APIs directly in your custom PL/SQL code, you do not need to enable networking services in Oracle Database 11g anymore. You need to perform the following simple steps to enable APEX Listener as the print server in Oracle Application Express:

1. Log in to Oracle Application Express instance administration
2. Click **Manage Instance > Instance Settings**
3. Select **Report Printing**
4. Select **Oracle APEX Listener** for Print Server and then click **Apply Changes**.



When using the PL/SQL Print APIs (`apex_util.get_print_document` and `apex_util.download_print_document`), it is still necessary to enable networking services in Oracle Database 11g. If you are using the PL/SQL Print APIs, perform the following two additional steps:

1. Enable networking services in Oracle Database 11g. For instructions on how to enable networking services in Oracle Database 11g, see Oracle Application Express 4.2 Release Notes: http://docs.oracle.com/cd/E37097_01/doc/doc.42/e35121/toc.htm#HTMRN119
2. Configure the APEX Listener to enable FOP based PDF rendering via http requests from the database. To enable FOP, navigate to the `/apex` directory of the APEX Listener configuration folder, edit the `defaults.xml` file and add the following code:


```
<entry key="misc.enableOldFOP">true</entry>
```

Printing a Simple Classic Report as PDF

This example shows how to quickly create a classic report and print the report data as PDF.

1. First, create a database application with a classic report implementation on the EMP table. In the Create Application wizard, specify the following:
 - Name: **Employees**
 - Select Page Type: **Report**
 - Page Source: **Table**
 - Table Name: **EMP**
 - Implementation: **Classic**
2. Edit the Print Attributes of this classic report. Click **Printing** and select **Yes** for Enable Report Printing. Then, click **Apply Changes**.

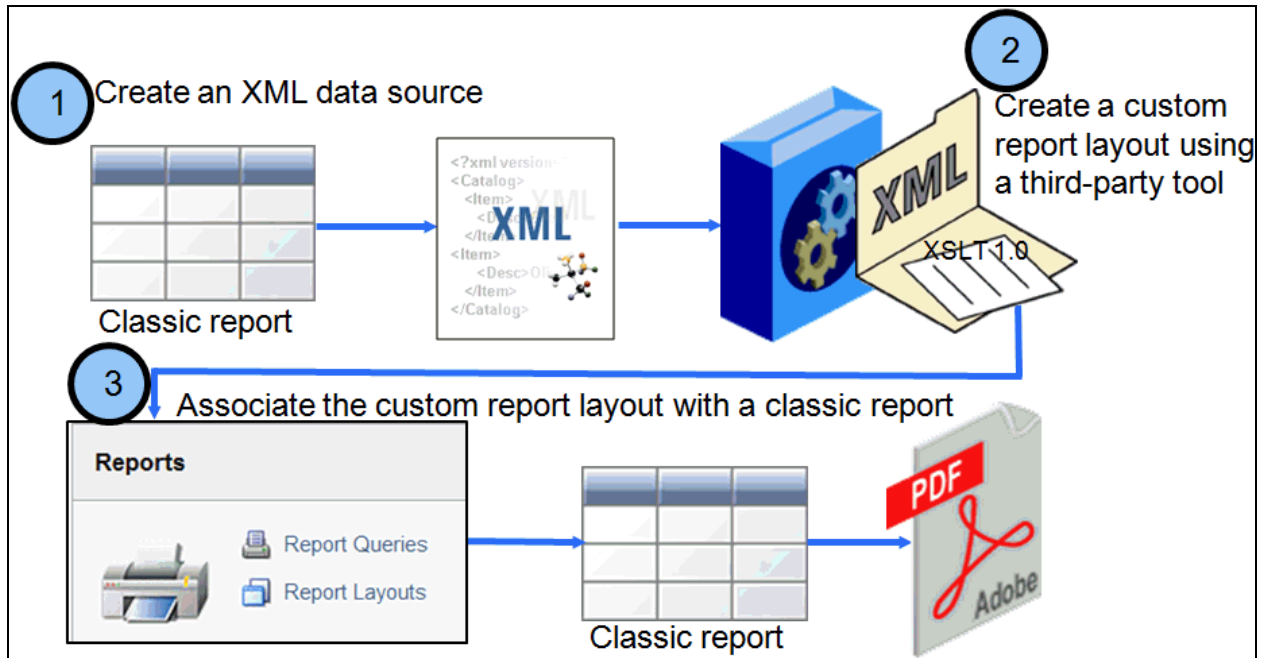
- Now, run the page and click the **Print** link. You should see the PDF format of the report.

The screenshot shows a PDF report viewer interface. At the top, there is a toolbar with navigation and zoom controls. The main content area displays a table with the following data:

Empno	Ename	Job	Mgr	Hiredate	Sal	Comm	Deptno
7369	SMITH	CLERK	7902	17-DEC-80	800		20
7499	ALLEN	SALESMAN	7698	20-FEB-81	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1250	500	30
7566	JONES	MANAGER	7839	02-APR-81	2975		20
7654	MARTIN	SALESMAN	7698	28-SEP-81	1250	1400	30
7698	BLAKE	MANAGER	7839	01-MAY-81	2850		30
7782	CLARK	MANAGER	7839	09-JUN-81	2450		10
7788	SCOTT	ANALYST	7566	09-DEC-82	3000		20
7839	KING	PRESIDENT		17-NOV-81	5000		10
7844	TURNER	SALESMAN	7698	08-SEP-81	1500	0	30
7876	ADAMS	CLERK	7788	12-JAN-83	1100		20
7900	JAMES	CLERK	7698	03-DEC-81	950		30
7902	FORD	ANALYST	7566	03-DEC-81	3000		20
7934	MILLER	CLERK	7782	23-JAN-82	1300		10

Creating and Using a Fully Custom Report Layout

Oracle Application Express 4.2.2 includes improved support for custom XSL-FO layouts. You can now easily customize your PDF reports to your requirements using third-party tools such as Altova Stylevision or Stylus Studio that allow for drag and drop layout of XSLT stylesheets. If you have a Report Query or a Classic Report Region, you can simply download your report data in XML format and use this XML data as the data source for any of these tools. Once loaded into the tool, all components of your report data, including information about your application, page, report region, user name as well as session state can be easily included in the layout via drag and drop.



The screenshot above shows the three steps that you need to perform to create and use a fully custom report layout:

1. Create an XML Data Source: First, download your report data in XML format
2. Create a custom report layout using a third-party tool: In this step, you load the XML data source into a third-party tool, drag and drop components of your report data into the empty layout and finally save the report layout as an XSLT 1.0 file
3. Associate the custom report layout to your report: Finally, you upload the XSLT 1.0 file as a report layout into APEX under Shared Components > Reports > Report Layouts. Then, update your report query or classic report region to use this custom layout when exporting your report in PDF format

Creating an XML Data Source

You need to first create an XML data source for your report layout. In this example, you use the database application that you created in the previous section. Perform the following steps:

1. Edit the employees classic report page
2. Under Print Attributes, set the output format to **XML** and click **Apply Changes**

3. Run the page. Click the **Print** link at the bottom of the page and then save the XML document on your desktop folder.

Creating a Custom Report Layout Using a Third party Tool

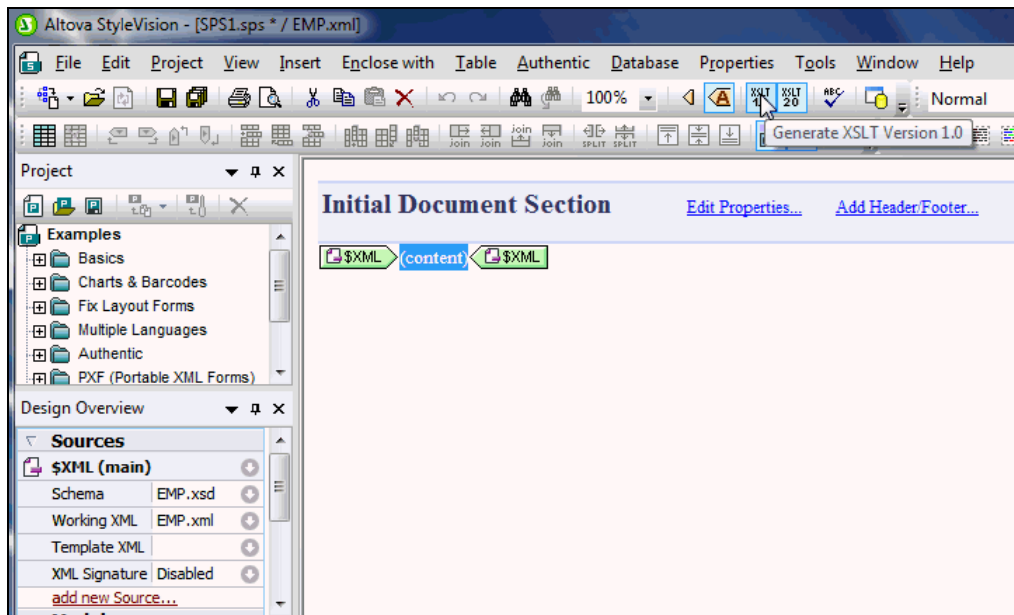
Once you have the XML data source, you need to load this XML into a third party tool such as Altova StyleVision or Stylus Studio. After loading the XML, you add elements to the empty layout by using the drag and drop functionality and then make some formatting changes to the layout. Finally, you save this report layout as an XSLT-FO file.

This document shows examples of creating a custom report layout using both Altova StyleVision and Stylus Studio. You can choose to use either of this third party tools.

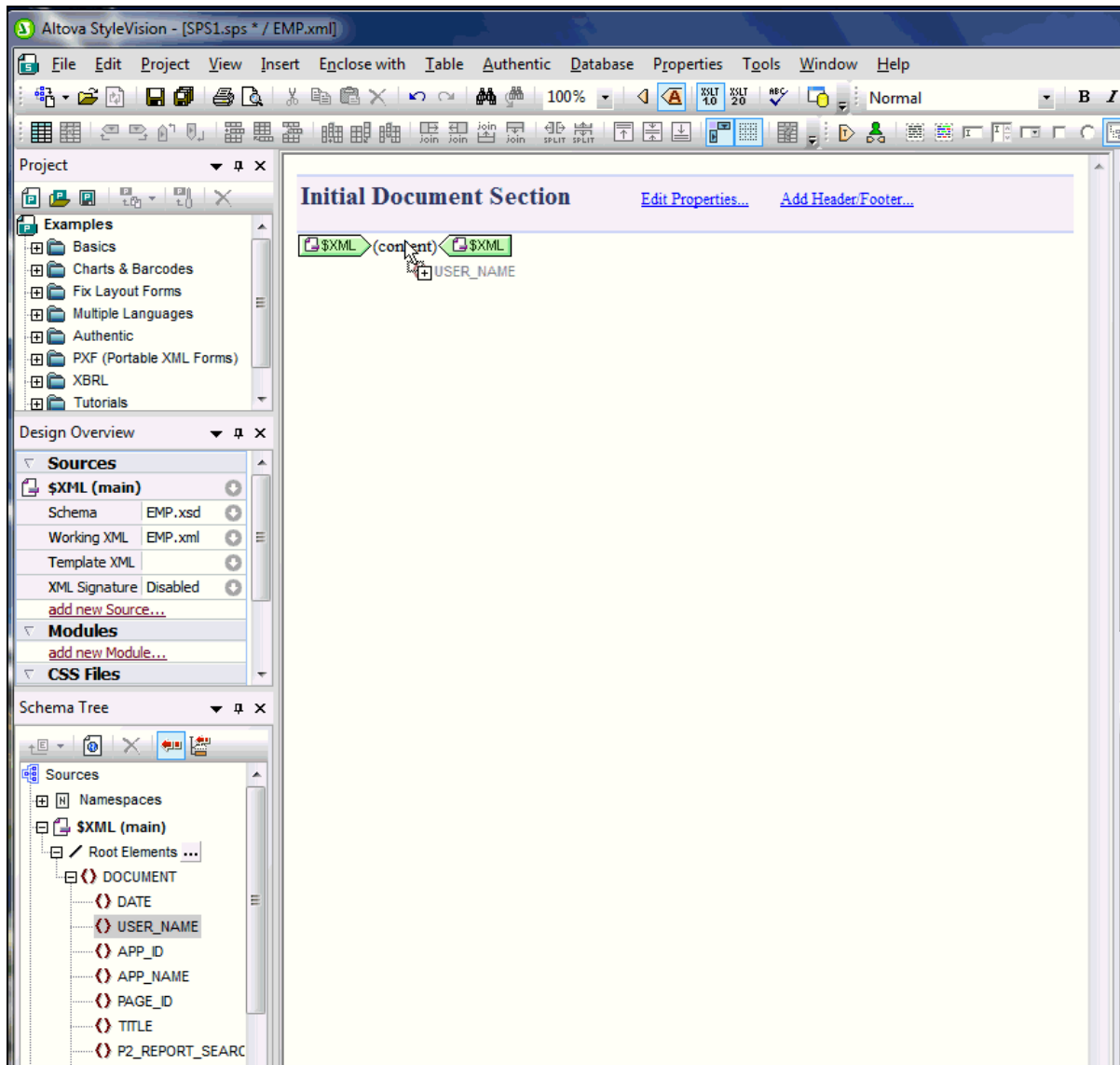
Using Altova StyleVision

To create a custom report layout using Altova StyleVision, perform the following steps:

1. Open Altova StyleVision and click **File > New > New from XML Schema/DTD/XML...**
2. Select the **EMP.xml** file that you created in the previous section and click **Open**
3. Select **Generate new XML Schema** and click **OK**. Save the XML Schema file on your desktop folder
4. Select **Create a free-flow document** and click **OK**. Now you see a tree view of the XML document (Schema Tree) at the left side bar.
5. FOP currently supports only XSLT 1.0 version. Click the **XSLT 1.0** icon to set the XSLT version for your layout.
Note: If you do not see this icon on the tool bar, click **Customize > Add or Remove Buttons > Standard** and then select **Generate XSLT Version 1.0**.



6. You can drag and drop XML elements from this Schema Tree to the empty layout. Drag and drop the **USER_NAME** element from the Schema Tree to the layout and then select **Create Contents**.



7. In this example, you create a table based on your report data. Navigate to the Schema Tree and then drag and drop the **ROW** element to the layout. Select **Create Table** and then in the Create Dynamic Table window click **OK**.
8. Now apply some formatting options to the layout. For example, increase the font size, and then change the background color and foreground color of the column header.
9. Click **Add Header/Footer** to add a header and footer for all pages.
10. You can add an image to your layout. Click the **Insert Image** icon and point to the location on the layout where you want the image to be displayed. Click **Browse** and then click **Switch to URL**. For File URL, enter a fully qualified URL of an image. This URL needs to

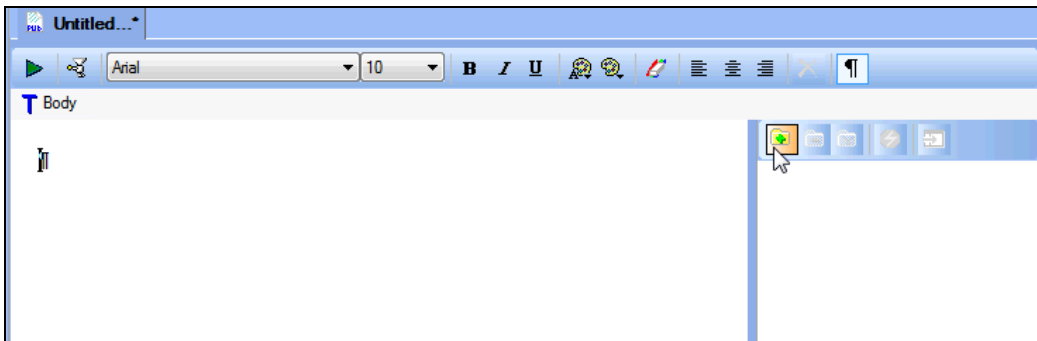
be accessible from the instance where the APEX Listener is running.

11. Click the **HTML** tab to preview your report layout. You need to save this generated file. Click **File > Save Generated Files > Save Generated XSLT-FO File**. Enter a file name and click Save. In this example, enter **employees1** for file name.

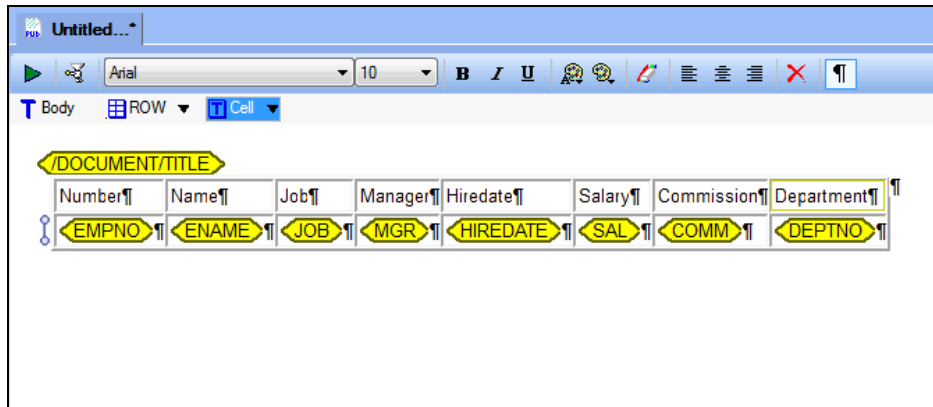
Using Stylus Studio

To create a custom report layout using Stylus Studio, perform the following steps:

1. Open Stylus Studio and click **File > New > XML Report**
2. Select **XSL-FO (PDF)** and click **OK**.
3. Click the **Add Data Source** icon, locate and then double click **EMP.xml**.



4. The XML document is now displayed on the tool and you can drag and drop elements to the empty layout. First, drag and drop the **Title** element. Then click **Insert Value**.
5. Now you want to add your report data to the layout. Drag and drop the **ROW** element and click **Insert Table > Populate Columns**.
6. You need to create a report row header. Right click the first row and select **Add Row Before**. Then enter appropriate text for each of the empty fields as shown in the screenshot below.



7. Make some formatting changes such as applying background and foreground colors to the column headers, changing the font size etc.
8. You might want to preview the report now. Select **Report > Preview**, enter **employees2.report** and click **Save**.
9. Select **Report > Generate**, choose an appropriate folder location for **Save Into** and click **OK**. The report layout is generated as an XSLT 1.0 file. You can also review the XSLT file within the Stylus Studio tool.


Associating the Custom Report Layout with a Classic Report

Once you have the custom report layout ready as an XSLT-FO file, you need to load this file to Oracle Application Express and then associate the layout with your report query or region.

1. Navigate to your application **Home page > Shared Components > Reports > Report Layouts**
2. Click **Create**. Select **Named Columns (XSL-FO)** for Report Layout Type.
3. Enter a name for Layout Name and click **Browse** to select the XSLT-FO file that you have saved in the previous section. If you select the XSL file generated by Altova StyleVision, enter **employees1** for Layout Name and enter **employees2** if you select the XSL file generated by Stylus Studio. Click **Create Layout**.
4. Now edit your employees report page. Right click the report region and select **Print Attributes**.
5. Under Printing, select **PDF** for Output Format
6. Select your report layout name for Report Layout and click **Apply Changes**.

7. Now run your report. Click the **Print** link and open the PDF document.

If you have selected **employees1** report layout (layout created using Altova StyleVision), the PDF document output would look like:

Employees Report							Page:1
Welcome CHAITANYA							
							
EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	17-DEC-80	800		20
7499	ALLEN	SALESMAN	7698	20-FEB-81	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1250	500	30
7566	JONES	MANAGER	7839	02-APR-81	2975		20
7654	MARTIN	SALESMAN	7698	28-SEP-81	1250	1400	30
7698	BLAKE	MANAGER	7839	01-MAY-81	2850		30

Note: If you do not see the header and footer in the printed PDF document, edit the XSLT file to locate the attributes such as **overflow="hidden"** under page master section. Remove these attributes and save the file. Then load this XSLT file to APEX associate it to your report. The following code snippet shows an example of the page master section in the generated XSLT file.

```

<fo:layout-master-set>
...
    <fo:region-before region-name="even-page-header"
overflow="hidden" extent="0.49in"/>
    <fo:region-after region-name="even-page-footer"
overflow="hidden" extent="0.49in"/>
...
    <fo:region-before region-name="odd-page-header"
overflow="hidden" extent="0.49in"/>
    <fo:region-after region-name="odd-page-footer"
overflow="hidden" extent="0.49in"/>
</fo:simple-page-master>

```

If you have selected **employees2** report layout (layout created using Stylus Studio), the PDF document output would look like:

Emp							
Number	Name	Job	Manager	Hiredate	Salary	Commission	Department
7369	SMITH	CLERK	7902	17-DEC-80	800		20
7499	ALLEN	SALESMAN	7698	20-FEB-81	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1250	500	30
7566	JONES	MANAGER	7839	02-APR-81	2975		20
7654	MARTIN	SALESMAN	7698	28-SEP-81	1250	1400	30
7698	BLAKE	MANAGER	7839	01-MAY-81	2850		30
7782	CLARK	MANAGER	7839	09-JUN-81	2450		10

Summary

Oracle Application Express 4.2.2 has introduced a new PDF printing option by using APEX Listener. You can now build a custom report layout using third-party tools and associate the layout with your report.

The key benefits of using APEX Listener as a printing option are:

- No separate external printing engine is required
- Using a supported Oracle product, APEX Listener
- Single step configuration as a print server for Oracle Application Express



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Creating Custom PDF Reports with
Oracle Application Express and APEX
Listener

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