



A Zebra Technologies White Paper

# Zebra Bar Code Solution for Oracle<sup>®</sup> Retail Store Inventory Management





## Overview

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Using Oracle Retail Store Inventory Management (SIM) for bar code labeling helps you meet or comply with the labeling guidelines set down by your customer. The customer, whether it is a retail firm, shipper, or manufacturer, has created its own labeling specifications to fulfill its label requirement needs. It is up to the supplier to meet those guidelines. Failure to do so could result in return of product, penalties, or contract termination.

Organizations like the Uniform Code Council (UCC), the Automotive Industry Action Group (AIAG) and Health Industry Business Communications Council (HIBCC) have developed specific industry labeling standards. Their guidelines minimize problems between trading partners by creating a basic structure that all suppliers and customers can agree upon.

Oracle Retail Store Inventory Management provides a flexible label-printing architecture through Oracle Business Intelligence, and the ZebraLink™ Enterprise Connector enables you to comply with your customer-labeling requirements. This white paper elaborates on the configuration of Oracle Retail Returns and Shelf Labeling standards using Zebra Technologies' bar code printer products.

## Prerequisite

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This document is a supplement that describes the report elements of bar code labels for Oracle Retail using Zebra Technologies' bar code printer products with Oracle Business Intelligence Publisher.

## Related Documents

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For detailed information on implementation and configuration, refer to the following documents:

- *Oracle Retail Store Inventory Management User Guide*
- *Oracle Business Intelligence Publisher User Guide*
- *ZebraDesigner™ for XML User Guide*
- *ZebraLink Enterprise Connector for Oracle BI Publisher User Guide*
- *ZebraDesigner for XML Font and Graphics Downloader User Guide*
- *ZebraNet™ Bridge Enterprise User Guide*

## Labeling Overview

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Oracle Retail Store Inventory Management allows store personnel to quickly and easily perform an array of in-store operations to receive merchandise, manage physical inventories, conduct stock counts, order or transfer stock, ship and receive, handle direct store delivery, and manage pricing and printing of labels and tickets. Store Inventory Management provides store employees with the information and flexible capabilities that are needed to convert shoppers into buyers and maintain optimal inventory levels. Store Inventory Management enables floor-based inventory management through the use of mobile devices and store PCs. The handheld mobile device enables the user to bring powerful software that normally runs in the back office to the shop floor, increasing efficiency and enabling retail best practices. The handheld is used for capturing

and validating data. The data can then be sent to external systems, including the corporate level merchandising or warehousing system.

Oracle Retail Store Inventory Management is integrated with Oracle Business Intelligence to produce XML files as part of a transaction or a business event, such as a purchase order receipt, returns confirmation, shipping completion, or shelf label report generation. Often, the types of labels that might be required during certain transactions, and the source of the data for those labels, are identical for several different transactions.

Oracle XML reports can be associated with label types. The type of data that is included in each label differentiates the label types. For instance, the Returns label type includes all the attributes about a record, such as item description, part numbers and customer, while a shelf label includes item details about the product.

While the Oracle XML report type identifies the type of data that is available to each label, a label format identifies the exact fields that are included in each label, as well as the name to assign to each of those fields that the ZebraLink Enterprise Connector software identifies.

The Oracle Retail Store Inventory Management bar code printing solution is used in conjunction with Zebra Technologies bar code printing software and hardware offerings. The ZebraLink Enterprise Connector software processes the Oracle XML reports and delivers data to respective Zebra bar code and RFID printers.

This document outlines the Oracle Retail Store Inventory Management bar code printing solution.

## Oracle Retail Store Inventory Management Labeling

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Customers need their suppliers to be compliant with either industry standard labels or their own specified labels. Industry-wide standardization is more prevalent in retail and healthcare industries and less prevalent in other industries.

Examine the required label formats to be generated. In general, you can classify the labeling needs into three levels: shelf product labeling, carton labeling and shipping labeling.

**Shipping Labeling:** Shipping label is a label that is physically applied to a transport unit, which can be an individual item or carton. The shipping label can contain almost the same information as product or carton labels (if they are the transport units) and in addition contains information related to the customer order and carrier. This label can be mapped to Oracle XML report label type <SHIPPING>.

**Carton Labeling:** Once a container or carton has been packed with a quantity of products sharing a common/different UPC or part number, the carton or pallet is then labeled to identify the contents. This label can be mapped to Oracle XML report label type <RETURNS>.

There are two possibilities:

- The contents of the carton have the same UPC number.
- The contents of the carton may have different UPC numbers.

**Shelf Product Labeling:** Most common data fields in individual shelf labeling are Manufacturer Code, Item Code, Serial Number, Production Date and Expiry Date. These types of labels do not include any shipping information. They can be mapped to the Oracle XML report label type <SHELF>.

## Label Design

Oracle Retail SIM labels must be designed using the ZebraDesigner for XML bar code labeling software. Pre-design content is provided by Oracle Retail SIM. The root node of the XML report for each label identifies the label names.

Once you have decided on the label format to be generated, and have examined the label fields required in the label, look at the XML report generated by Oracle Business Intelligence Publisher and map the required labels to the XML tag as variable fields in the Zebra label design tool. The following steps outline this approach:

The XML Tags must match the Variable fields on the Label, for example: <ORGANIZATION> in the XML report will be represented as \$\$ORGANIZATION\$\$ in the label design.

Follow the instructions in "ZebraDesigner for XML" in the *ZebraLink Enterprise Connector for Oracle BI Publisher User Guide* to construct your label design.

After constructing the label format, you need to define label rules in the Zebra Enterprise Connector to print these labels. Modify the ReportsInfo.ini file in the \zebra\_ec\bin directory where the Enterprise Connector is installed. Follow the instructions in "ZEC Installation and Operation" in the *ZebraLink Enterprise Connector for Oracle BI Publisher User Guide*.

## Configuring Labels for Oracle Retail SIM

Label compliance is more strictly implemented in retail supply chains than in any other industry. Non-compliance invites rejection of goods along with heavy penalties. In this section, the field mapping relationship between the XML tags on XML Reports from Oracle BI Publisher and variable names on the label is described. All retailer labels are derived from Generic SSCC label with some variations.

### Shipping UCC-128 SSCC Label

The following is the UCC-128 SSCC label:



This is an Oracle XML shipping report, which needs to be printed and attached to the container. The fields in the above label can be mapped using the XML report from Oracle BI Publisher.

The following is a sample Oracle BI Publisher report:

```
<SHIPPING>
-
  <SHIP_LINE>
    <ORGANIZATION>0123</ORGANIZATION>
    <SUPPLIER>Zebra</SUPPLIER>
  <SHIP_FROM_ADDRESS1/>
    <SHIP_FROM_ADDRESS2/>
    <SHIP_FROM_CITY/>
    <SHIP_FROM_STATE/>
    <SHIP_FROM_ZIP/>
    <LPN>1</LPN>
    <PART_NUMBER>117-000-2050</PART_NUMBER>
    <ITEM_DESC>110 XiIII PLUS</ITEM_DESC>
    <SERIAL_NUMBER>ser1</SERIAL_NUMBER>
    <QUANTITY>1</QUANTITY>
    <SHIP_TO_CUSTOMER>Bills House of Patios</SHIP_TO_CUSTOMER>
  <SHIP_TO_ADDRESS1>21 Wacker</SHIP_TO_ADDRESS1>
    <SHIP_TO_ADDRESS_2/>
    <SHIP_TO_CITY>Chicago</SHIP_TO_CITY>
    <SHIP_TO_STATE>IL</SHIP_TO_STATE>
    <SHIP_TO_ZIP>60001</SHIP_TO_ZIP>
    <CUSTOMER>Bills House of Patios</CUSTOMER>
    <SUPPLIER>Zebra</SUPPLIER>
    <UOM>EA</UOM>
  </SHIP_LINE>
</SHIPPING>
```

The following table summarizes mapping for the label:

XML Nodes	Label Field in the Label	Label Field Name in Oracle Retail	Seeded	XML Report Field Tag Name
<SHIPPING>	\$\$ORGANIZATION\$\$	ORGANIZATION	Yes	<ORGANIZATION>
<SHIP_LINE>	\$\$SUPPLIER\$\$	SUPPLIER	Yes	<SUPPLIER>
	\$\$SHIP_FROM_ADDRESS1\$\$	SHIP_FROM_ADDRESS1	Yes	<SHIP_FROM_ADDRESS1>
	\$\$SHIP_FROM_ADDRESS2\$\$	SHIP_FROM_ADDRESS2	Yes	<SHIP_FROM_ADDRESS2>
	\$\$SHIP_FROM_CITY\$\$	SHIP_FROM_CITY	Yes	<SHIP_FROM_CITY>
	\$\$SHIP_FROM_STATE\$\$	SHIP_FROM_STATE	Yes	<SHIP_FROM_STATE>
	\$\$SHIP_FROM_ZIP\$\$	SHIP_FROM_ZIP	Yes	<SHIP_FROM_ZIP>
	\$\$LPN\$\$	LPN	Yes	<LPN>
	\$\$PART_NUMBER\$\$	PART_NUMBER	Yes	<PART_NUMBER>
	\$\$ITEM_DESC\$\$	ITEM_DESC	Yes	<ITEM_DESC>
	\$\$SERIAL_NUMBER\$\$	SERIAL_NUMBER	Yes	<SERIAL_NUMBER>
	\$\$QUANTITY\$\$	QUANTITY	Yes	<QUANTITY>
	\$\$SHIP_TO_CUSTOMER\$\$	SHIP_TO_CUSTOMER	Yes	<SHIP_TO_CUSTOMER>
	\$\$SHIP_TO_ADDRESS1\$\$	SHIP_TO_ADDRESS1	Yes	<SHIP_TO_ADDRESS1>
	\$\$SHIP_TO_ADDRESS_2\$\$	SHIP_TO_ADDRESS_2	Yes	<SHIP_TO_ADDRESS_2>
	\$\$SHIP_TO_CITY\$\$	SHIP_TO_CITY	Yes	<SHIP_TO_CITY>
	\$\$SHIP_TO_STATE\$\$	SHIP_TO_STATE	Yes	<SHIP_TO_STATE>
	\$\$SHIP_TO_ZIP\$\$	SHIP_TO_ZIP	Yes	<SHIP_TO_ZIP>
	\$\$CUSTOMER\$\$	CUSTOMER	Yes	<CUSTOMER>
	\$\$SUPPLIER\$\$	SUPPLIER	Yes	<SUPPLIER>
	\$\$UOM\$\$	UOM	Yes	<UOM>

**Returns UCC-128 SSCC Label**

The following is the UCC-128 SSCC label:



You can map all the fields in the label to the variable fields from the Returns XML Report in Oracle BI Publisher.

The following is a sample XML report:

```
<RETURNS>
  <RETURN_LINE>
    <TRANS_ID>1</TRANS_ID>
    <RET_AUTH>1</RET_AUTH>
    <TO_NAME>Solihull</TO_NAME>
    <TO_ADD1>950 Nicollet Mall</TO_ADD1>
    <TO_ADD2/>
    <TO_CITY>Minneapolis</TO_CITY>
    <TO_STATE>MN</TO_STATE>
    <TO_POSTAL>55403</TO_POSTAL>
    <FROM_NAME>Solihull</FROM_NAME>
    <FROM_ADD1>950 Nicollet Mall</FROM_ADD1>
    <FROM_ADD2/>
    <FROM_CITY>Minneapolis</FROM_CITY>
  </RETURN_LINE>
</RETURNS>
```

The following table summarizes the mapping for the label:

XML Nodes	Label Field in the Label	Label Field Name in Oracle Retail	Seeded	XML Report Field Tag Name
<RETURN>	\$\$TRANS_ID\$\$	TRANS_ID	Yes	<TRANS_ID>
<RETURN_LINE>	\$\$RET_AUTH\$\$	RET_AUTH	Yes	<RET_AUTH>
	\$\$TO_NAME\$\$	TO_NAME	Yes	<TO_NAME>
	\$\$TO_ADD1\$\$	TO_ADD1	Yes	<TO_ADD1>
	\$\$TO_ADD2\$\$	TO_ADD2	Yes	<TO_ADD2>
	\$\$TO_CITY\$\$	TO_CITY	Yes	<TO_CITY>
	\$\$TO_STATE\$\$	TO_STATE	Yes	<TO_STATE>
	\$\$TO_POSTAL\$\$	TO_POSTAL	Yes	<TO_POSTAL>
	\$\$FROM_NAME\$\$	FROM_NAME	Yes	<FROM_NAME>
	\$\$FROM_ADD1\$\$	FROM_ADD1	Yes	<FROM_ADD1>
	\$\$FROM_ADD2\$\$	FROM_ADD2	Yes	<FROM_ADD2>
	\$\$FROM_CITY\$\$	FROM_CITY	Yes	<FROM_CITY>
	\$\$FROM_STATE\$\$	FROM_STATE	Yes	<FROM_STATE>
	\$\$FROM_POSTAL\$\$	FROM_POSTAL	Yes	<FROM_POSTAL>

## Shelf UCC-128 SSCC Label

The following is the UCC-128 SSCC label:



You can easily map all the fields in the label to the variable fields from the Returns XML Report in Oracle BI Publisher.

The following is a sample XML report:

```
<SHELFLABEL>
  <LABEL>
    <ITEM_TICKET_ID>1</ITEM_TICKET_ID>
    <LONG_DESCRIPTION>z parent:Brown:Cherry:Medium:Cinnamon</LONG_DESCRIPTION>
    <CASE_SIZE>2</CASE_SIZE>
    <SKU>100017328</SKU>
    <ORDERABLE>Y</ORDERABLE>
    <SELLABLE_UOM>EA</SELLABLE_UOM>
  <UNIT_PRICE>1020</UNIT_PRICE>
    <UNIT_PRICE_CURRENCY_CODE>USD</UNIT_PRICE_CURRENCY_CODE>
    <COUNTRY_OF_MANUFACTURE>US</COUNTRY_OF_MANUFACTURE>
    <UOM_PRICE>1020</UOM_PRICE>
    <UOM_PRICE_CURRENCY_CODE>USD</UOM_PRICE_CURRENCY_CODE>
  </LABEL>
</SHELFLABEL>
```

The following table summarizes the mapping for the label:

XML Nodes	Label Field in the Label	Label Field Name in Oracle Retail	Seeded	XML Report Field Tag Name
<SHELFLABEL>	\$\$ITEM_TICKET_ID\$\$	ITEM_TICKET_ID	Yes	<ITEM_TICKET_ID>
<LABEL>	\$\$LONG_DESCRIPTION\$\$	LONG_DESCRIPTION	Yes	<LONG_DESCRIPTION>
	\$\$CASE_SIZE\$\$	CASE_SIZE	Yes	<CASE_SIZE>
	\$\$SKU\$\$	SKU	Yes	<SKU>
	\$\$ORDERABLE\$\$	ORDERABLE	Yes	<ORDERABLE>
	\$\$SELLABLE\$\$	SELLABLE	Yes	<SELLABLE>
	\$\$UNIT_PRICE\$\$	UNIT_PRICE	Yes	<UNIT_PRICE>
	\$\$UNIT_PRICE_CURRENCY_CODE\$\$	UNIT_PRICE_CURRENCY_CODE	Yes	<UNIT_PRICE_CURRENCY_CODE>
	\$\$COUNTRY_OF_MANUFACTURE\$\$	COUNTRY_OF_MANUFACTURE	Yes	<COUNTRY_OF_MANUFACTURE>
	\$\$UOM_PRICE\$\$	UOM_PRICE	Yes	<UOM_PRICE>
	\$\$UOM_PRICE_CURRENCY_CODE\$\$	UOM_PRICE_CURRENCY_CODE	Yes	<UOM_PRICE_CURRENCY_CODE>

## Label Configuring Summary

Label compliance is more strictly implemented in the retail supply chain than in any other industry. Non-compliance invites rejection of goods along with heavy penalties. The *ZebraLink Enterprise Connector for Oracle BI Publisher User Guide* will guide you through the design process, such as how to generate labels.

*Note: Remember that all retail labels are derived from Generic SSCC label with some variations.*

Printing to a Zebra Printer from Oracle BI Publisher assumes the following:

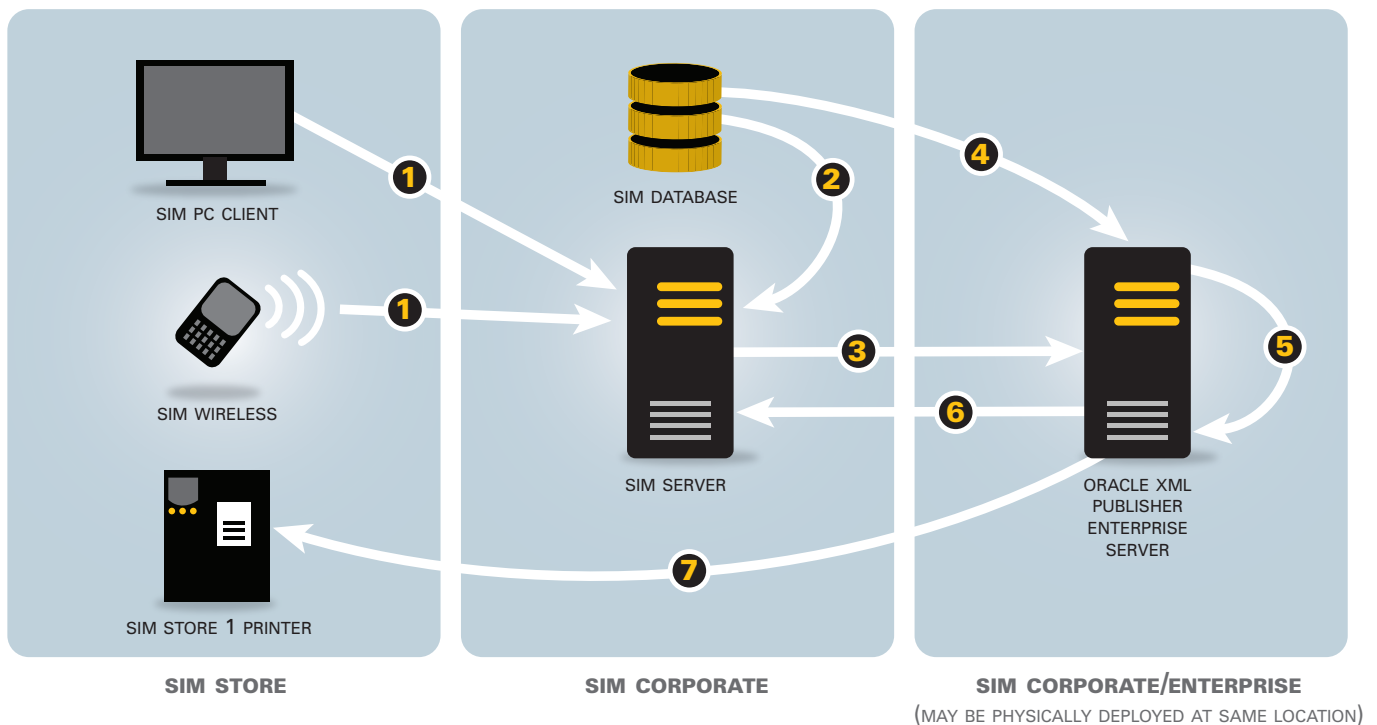
- The ZebraLink Enterprise Connector must be installed and running.
- A printer must be installed and configured.
- The Oracle Retail SIM must be configured with Oracle BI Publisher.
- A Zebra Programming Language (ZPL®) template appropriate to the Oracle XML report must be created and uploaded to the ZebraLink Enterprise Connector (ZEC) zplrepository directory.
- The ReportInfo.ini file must be configured appropriately.

Always refer to the ZebraLink Enterprise Connector for Oracle BI Publisher User Guide for detailed explanations.

# Oracle SIM Reporting Framework

The sequence of operations for a print request in SIM is as follows:

1. The user presses the Print button on the SIM interface (PC or wireless).
2. SIM gets the printer selection from the user, if it is the first print request in the session. For subsequent print requests, the printer defaults to the last-selected printer.
3. SIM builds a report request comprising standard parameters such as logical name of the report, selected printer name, locale and store ID in addition to any other report-specific parameters, such as Stock Count ID.
4. Using these request parameters, SIM constructs a report request and routes the request using http to the pre-configured Reporting Tool Request URL (which points to the BI Publisher installation URL).
5. BI Publisher identifies the report, queries the database to get the data needed for the report, formats the data, and sends the report to a destination (in this case, a logical name of a printer that is pre-configured on BI Publisher).
6. BI Publisher responds with a success or failure message. The response is only an indication of report success or failure, meaning the data for reporting is available and report formatting was successful. Any print failures are reported on BI Publisher's scheduler log.
7. The Oracle XML Report is sent to the ZebraLink Enterprise Connector located on the Oracle XML Publisher Enterprise Server where the data is parsed and merged with ZPL for final output to the Zebra bar code printer.

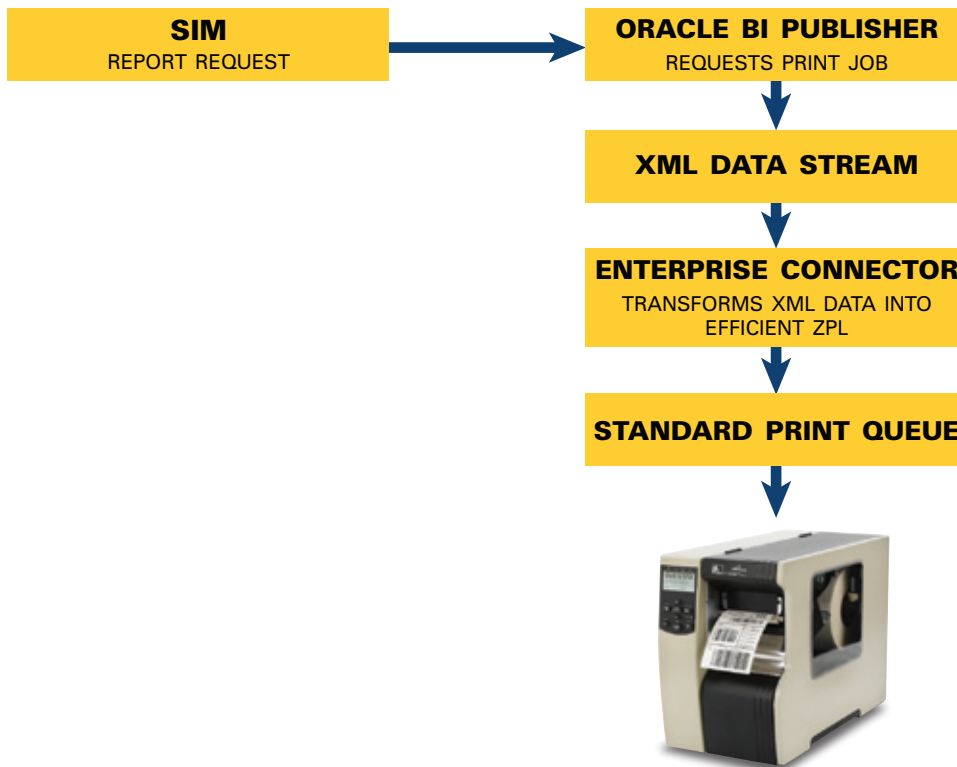


## Solution Diagram

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The ZebraLink Enterprise Connector Printing Solution has the ability to interpret and parse XML. This translates into major time and cost savings for bar code label printing. Label formats supporting various applications can be loaded into the Zebra Enterprise Connector's ZPL repository, facilitating XML printing from Oracle BI Publisher.

The ZebraLink Enterprise Connector Printing Solution enables convenient, accurate bar code and radio frequency identification label printing. Existing and new Oracle and Zebra customers using Oracle Retail SIM now have the ability to move from their legacy bar code label printing solutions by using the Zebra Enterprise Connector for their bar code label needs with Oracle Retail SIM.



## ZebraLink Enterprise Connector

The ZEC is a Java application (installed on the Oracle XML Publisher Enterprise Server) which accepts incoming XML from Oracle BI Publisher using the Oracle integrated xdelivery method and the Oracle Concurrent Manager. The program extracts the variable XML data, merges the data with a ZPL template and passes the print job to the operating system's printer subsystem. It is designed to overcome the fundamental challenges that most customers face with integrating bar code printing and with bar code printing's dependency on printer command languages. The design tool that is used to create the label formats for the Zebra Enterprise Connector includes sample formats, and can be found on the ZebraDesigner for XML CD-ROM. Though it might not be necessary, you can modify these formats to fit your business needs by using ZebraDesigner for XML and editing the <filename>.lbl files to create your own custom compliance labels.

ZPL Formats -- <filename>.ZPL

Bar code label formats are created by using ZebraDesigner for XML. These formats should be uploaded in the label repository folder located within the Zebra Enterprise Connector during setup.

XML data stream -- *<filename>.xml*

These are sample XML files that show how the data should be structured when it is sent to the ZebraLink Enterprise Connector from the Oracle Server.

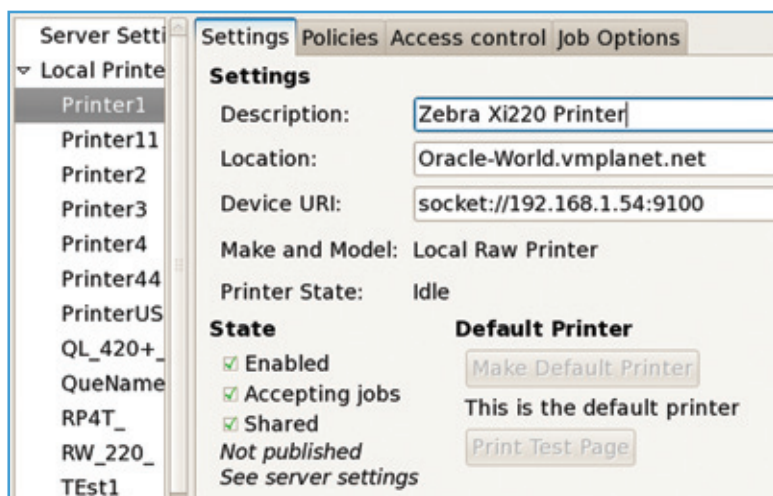
## Assumptions

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The following must be completed:

ZebraLink Enterprise Connector for Oracle BI Publisher is installed and running on the same host as Oracle BI Publisher. Refer to ZebraLink Enterprise Connector documentation for installation and system requirements.

Zebra printer has been configured using CUPS on the host:



CUPS Printer Driver

ZPL label template has been created. ZebraDesigner for XML can be used to design additional ZPL template files. Exported templates are uploaded to the ZebraLink Enterprise Connector's ZPL Repository for processing during printing. ZebraLink Enterprise Connector applies the ZPL template to an XML data stream to create the raw output for the Zebra® printer. So when creating a ZPL template, the dynamic variable names should match the element names in the XML data. For example, variable `$$$RETURN_ID$$` in the template should match `<RETURN_ID>` in the XML data. See "ZebraDesigner for XML" in ZebraLink Enterprise Connector for Oracle BI Publisher User Guide.

The ReportInfo.ini configuration file in ZebraLink Enterprise Connector has been configured for the ZPL template. This file is used to associate an XML root node to a ZPL template; this tells ZebraLink Enterprise Connector which ZPL template to apply for which XML root node. It also indicates the repeat node in the XML stream.

The repeat node is a repeating node in the XML stream that indicates to ZebraLink Enterprise Connector the number of labels to print. An XSL might also be specified here to transform the incoming XML stream before applying the ZPL template. See ZebraLink Enterprise Connector for Oracle BI Publisher User Guide for configuration details.

# Printer Configuration In SIM

Set up the printer in SIM database:

```
rk_retail_store_printer(<store_id>, rk_retail_store_printer_seq.nextval,2, Zebra label printer, <printer_server_name_in_BIP>)
```

Where:

<store\_id> is the id\_str\_rtl

rk\_retail\_store\_printer\_seq.nextval is the id\_printer

2 is the printer\_type

Zebra label printer is the printer\_description

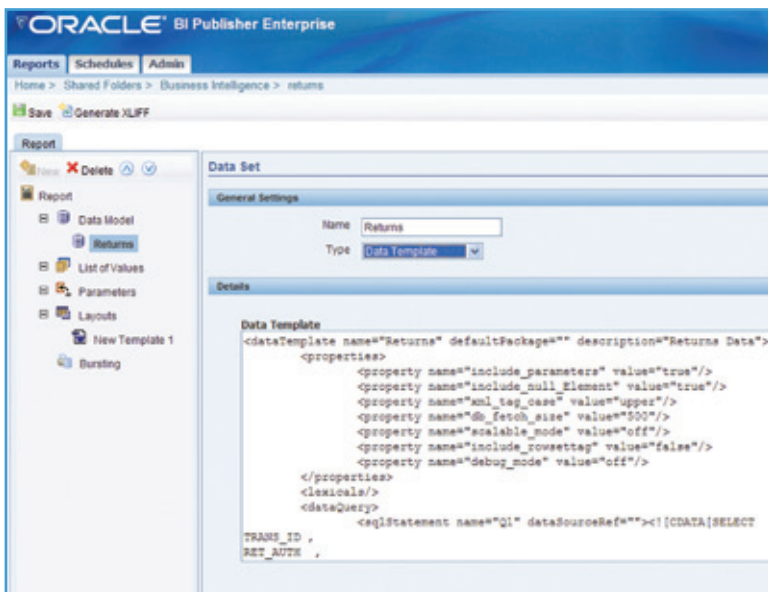
<printer\_server\_name\_in\_BIP> is the printer\_network\_address

*Note: The printer\_type should be 2 (Ticket printer), which indicates to BI Publisher that the report output should be raw XML data.*

## Oracle BI Publisher Setup

Do the following to set up the Data Model for the report:

1. Choose Data Template as type. Do not choose SQL Query. If SQL Query is chosen, the output XML data will not be customized, it will be of the form: <ROWSET><ROW><COLUMN1><COLUMN2>...
2. Use the data template to customize the XML to the form expected by ZPL label template (ZPL template is the template for the label that will be created in ZebraDesigner):



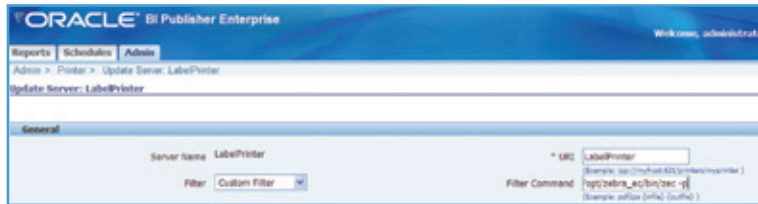
XML Report Setup

# Setting up the Label Printer in BI Publisher

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Do the following to set up the label printer in BI Publisher:

1. Go to Admin > Printer > Add Server.
2. The server name should match the printer\_network\_address that was set up in SIM (see Printer Configuration In SIM).
3. Configure the custom filter for ZebraLink Enterprise Connector (see “Configuring and using Oracle BI Publisher” in ZebraLink Enterprise Connector for Oracle BI Publisher User Guide).



Printer Server Setup

## Disclaimers

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It is your responsibility to check and validate the details specified in this document before implementing. You must verify the label content and check with your implementation partner about the feasibility of the XML mapping outlined in this document. Missing label fields in the labels often call for costly customizations and longer implementation life cycles. Custom label fields give you a powerful tool to model any compliant label, thereby eliminating the need for any customization.

The details in this white paper should be considered guidelines only, and neither Zebra nor Oracle are responsible for the correctness of the label or the mapping details. Neither Zebra nor Oracle are liable for any losses or damage whatsoever you might have incurred by implementing the mapping suggested in this document.

## Conclusion

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ZebraLink Enterprise Connector Solution represents the right choice for bar code printing from Oracle Retail SIM. Besides understanding the technical requirements, organizations need to analyze their support, software development, and architecture strategies to understand the rich bar-coding approach offered by Zebra.

Zebra offers solutions to our customers in order to make our printer products easy to use and easy to integrate within the enterprise, and will continue to work with our partner at Oracle to provide solutions for a variety of enterprise bar code printing activities.

With the full Zebra suite of label design, XML transformation and printer management solutions, your business can achieve simple, quick rollout to distribution centers, the supply chain, retail stores and retail warehouses. The result is expandability to an unlimited number of printers without added expenses, exceptional reliability, and improved operational efficiency.

Visit [www.zebra.com](http://www.zebra.com) to learn more about Zebra printers, labeling software, connectivity and support options and integration partners.

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