

Oracle WMS and MSCA Printing

Choosing the best approach

A Technical White Paper from:

LOFTWARE, INC.

Global Marking Solutions for Enterprise Applications

Introduction

If you are using Oracle WMS or MSCA applications there are several choices for adding the ability to print bar code or RFID labels. Each choice has its benefits and drawbacks depending on the requirements of the system. The purpose of this white paper is to examine each solution so that our customers can make an informed decision as to how they may proceed.

Solution 1: The Software Connector

The Connector is a Java application installed into the Oracle database. It integrates with the WMS or MSCA application through Oracle's 'Synchronous Mode' application program interface (API). Each time a label printing event is triggered in the Oracle system, the XML request containing the appropriate data is handed off to the Connector via this API. The Connector then modifies or supplements the XML request according to preset parameters before handing it off to the Software Print Server (LPS) for processing.

When the LPS receives the request, it merges the variable data into a predefined label format and converts the result into low level printer language. After the conversion, the request is placed in a high speed queue for the target printer.

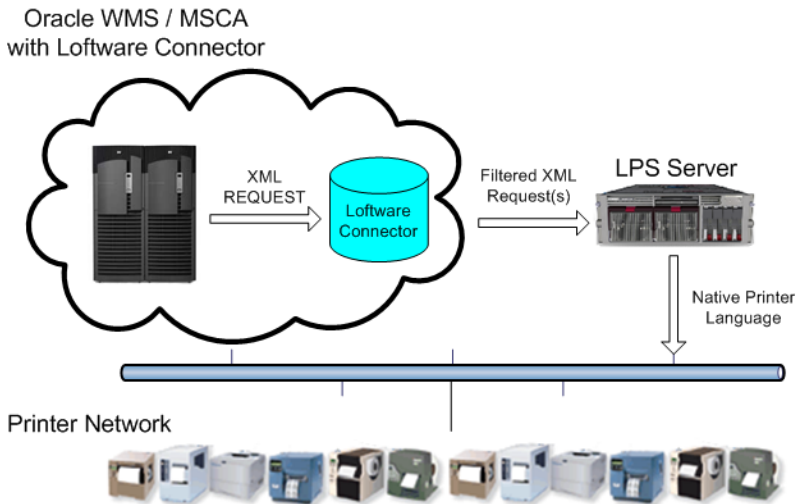


Figure 1: WMS → Connector → LPS → Printers. The 'cloud' indicates that the Connector resides on the host computer with the Oracle Database. It is broken out here for clarity.

There are many reasons that you may wish to change the request coming out of the Oracle application using the Connector. Our experience in the field has shown us that no two companies printing requirements are alike. All have requirements stemming from the way that they operate, hence a lot of special cases can and do 'come up'. The following list summarizes some of the different things the Connector can do before handing the request to the LPS. All were added to the Connector based on customer requirements.

Label format substitution – based on a print request with a generic label format, creates a request for a specific label based on data in the print request, e.g. convert a request for a shipping label to a customer specific label based on the customer id in the request.

Label group expansion – based on a print request for a single label, creates additional requests for other labels using the request data, e.g. convert a request for a shipping label into a request for a shipping label on one printer and a bill of lading label on another.

Label group instance expansion – based on a print request for a label group, creates one more instances of a specific label(s) in the group, e.g. create a shipping label for each item in a shipment.

Label group substitution – similar to label format substitution; generate a request based on a generic label group name to a specific label group, e.g. convert a generic shipping group request to a customer specific group of labels based on the customer id in the print request.

Label request attribute lookup – lookup or compute request-level attributes such as `_PRINTERNAME`, `_QUANTITY` and `_DUPLICATES` based on the value of an existing request-level attribute(s), e.g. lookup `_PRINTERNAME` based on the `_FORMAT` attribute. Request-level attributes are the default attributes for the labels in the request. If the label does not define an attribute and a lookup has not been configured, the request attribute is used.

Dynamic Label Attributes – lookup or compute print request attributes such as `_QUANTITY`, `_DUPLICATES` or `_TRAY` based on data in the print request, e.g. compute the number of labels to print based on the order quantity data in the requests.

Label Data Lookups – lookup label data not included in the print request based on data in the print request, e.g. lookup or compute a serial number based on the product number in the print request.

Database query – Database select statements against tables or views in any JDBC supported database. Print request variables can be used for WHERE clause parameters.

Database stored functions – Database stored procedures can be invoked by the Connector if a request meets certain criteria. Print request variables can be used for procedure variable bind parameters.

Java method – a Java class that has been loaded into the Loftware schema can be invoked if the request meets certain criteria.

Literal value – E.G. default value company phone number or address.

If you have any requirements that fall into one of the categories above, you are going to need the Connector. If not, Solution 2 or Solution 3 below would be options for you.

Systems using the Connector-LPS combination are massively scaleable. Many installations have over 1000 printers spread across their LAN's and WAN's. Print volumes of over 200,000 labels per day are commonplace in these types of environments. Similar scalability can also be achieved in Solution 2.

Solution 2: Oracle Direct to Loftware Print Server (LPS)

If you do not have any need to customize the XML print requests coming from the Oracle system, you have the option of sending the request directly to the LPS. As shown in Figure 2, the Oracle system passes the XML request through a TCP/IP socket connection to the LPS.

When the LPS receives the request, it merges the variable data into a predefined label format and converts the result into low level printer language. After the conversion, the request is placed in a high speed queue for the target printer.

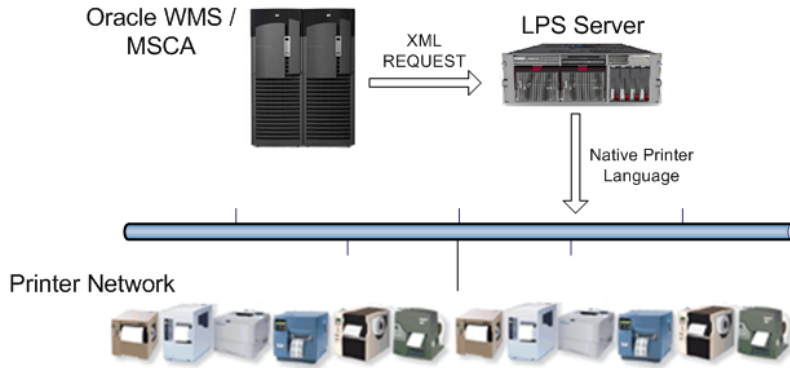


Figure 2: WMS → LPS → Printers

Solution 3: WMS Direct to Printers

This solution depends on you having XML enabled thermal transfer printers. At the time of this writing, the only manufacturer to offer this capability is Zebra Technologies in their XiIII Plus series of printers. By going direct to the printer, the extra layer of middleware is removed thus producing the simplest, least expensive solution.

Label formats are pre downloaded into the printer and are merged with the data in the XML file at print time. Zebra XML printers come with the popular formats that the Oracle system uses preloaded into their memory. For other formats that are added after the fact, it is important to have procedures for 'seeding' the printers with the proper formats if a new printer is added to the system or an existing printer is serviced. If your printing requirements are straight-forward and all of your printers are the same, this could be a good solution for you.

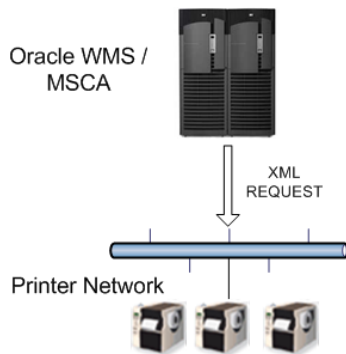


Figure 3: WMS → Printers

Comparison Matrix

	Solution 1	Solution 2	Solution 3
Filtering Support for modifying XML	X		
Allows for Custom programming if needed	X		
Supports a mixture of bar code printers from various manufacturers	X	X	
Support for Laser Jet type printers	X	X	
Provides Audit Trail Support	X	X	

Requires budget for Enterprise Class Middleware	X	X	
Provides Notifications for Critical Error conditions	X	X	
Queuing on a massive scale for 'printer down' situations	X	X	
Status Client for obtaining printing metrics and printer status across enterprise	X	X	
RFID Smart Label Support	X	X	X
Lowest Cost			X
Fewest 'layers'			X
Simplest Configuration			X

Conclusion

The three solutions covered in this white paper should address most printing needs for most enterprises. The ability to write custom code for Solution 1 fills the gap for enterprises that have printing requirements beyond the normal scope of a 'canned' system. Loftware has been selected as the vendor of choice for many Oracle based WMS systems. As a result, our experience level affords us the confidence that we can do it for your organization as well. For more information, please visit www.loftware.com

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