Abstract

As cloud adoption increases across businesses, one of the key complexities is the interaction between cloud-based systems and non-cloud devices and systems. For example, the connectivity between Oracle Fusion and Zebra printers is challenge. There is a need for third-party software to establish communication between cloud and non-cloud infrastructure to achieve the desired result. For example, to print a label after batch generation during work execution, a middleware layer and a third-party software is required to interpret, translate, and print labels with Zebra printers. When labels include context-sensitive images, the task is further complicated.

The ideal manufacturing label printing solution eliminates the need for third-party software and prints directly from Oracle Fusion Manufacturing Cloud to Zebra printers. This solution can also be leveraged to print labels from any other module to any other printer for which Oracle Cloud does not have drivers.
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The conventional solution for printing manufacturing labels from Oracle Cloud systems to Zebra and other printers requires a third-party software to be bought and maintained. Customers find it challenging to identify compatible software and obtain budget approvals for procurement within project timelines.

This leads to the need for a solution that can print directly from Oracle Cloud onto Zebra printers with some required middleware.

**Recommended Solution**

**Figure 1 - Conventional solution**

**Figure 2 – Recommended solution**
Figure 2 depicts the recommended solution. Oracle Cloud needs to generate a Zebra programming language (ZPL) script which is understandable by Zebra printers in e-text format.

The script must contain all required data such as information to be printed on the label, placement of each field on the label, size of the label, name of the image to be printed (stored at item master level), logo information if the label is meant for the external world, and bar code information. The ZPL script must also contain the name of the printer on which this label is to be printed. This information is sent in e-text format from Oracle to the Zebra printer. When a user completes a transaction in Oracle, Zebra prints the information at specified locations on the label and uses the image name to retrieve the image from its storage and print it on the label.

This solution avoids the use of third-party software and its maintenance and reduces the cost of implementation.
Pre-requisites for the Recommended Solution

For the recommended solution to work smoothly, there are some pre-requisites:

- Images need to be stored on all printers that are planned to be used
- The name with which the image is stored on the Zebra printer must be maintained at master item level in SaaS (Oracle, in this case) as an attachment

Further, the following steps need to be taken:

**Maintain printer name at resource level**

At the SaaS level, maintain the printer name in DFF for equipment resources

**Printer registration in SaaS**

The printer must be registered in Oracle using the IPP server of the Zebra printer

**Lookup to maintain item classes**

Maintain a lookup in SaaS to identify the number of labels to be printed for a class of item inventory organization-wise for which a transaction is being executed. The use case in this paper is work order transaction, but lookup can be used in other transaction types such as shipping and receiving where a business event is available. The lookup shown in Figure 4 also consists of label layout information for a specific class of item.
Solution Execution

- Item categorized under item classes
- Image name stored as an attachment at item level at master org
- Lookup to maintain layout name for individual item class
- Maintain printer mapping at resource level

- Store images in Zebra printer with same file name as mentioned at item level in SaaS

- Prepare ZPL script for Zebra printers
  - Script to contain transactional information, printer name, image name, and label layout

- Prepare BiP report using ZPL script in e-text output format
  - Call OIC business event and generate e-text output by middleware

- Send e-text output to IPP server queue
  - Take printout using Zebra printer

Prerequisites

Technical

Output

Printing label directly from Oracle Manufacturing Cloud onto Zebra printer without use of third-party software
If all the pre-requisites are met, when a user executes a transaction (in this case, work order completion), a business event is generated and sent to OIC. The middleware calls the required application programming interface (API) to fetch information about the item, class of item, inventory organization, label layout information from the lookup and the number of labels to be printed, the image name from the item level, and the printer name from the resource level to generate an e-text. The e-text contains all this information and the script sends additional information about placement of transactional information and the font to be used to the Zebra printer. Zebra reads the e-text format script, identifies the printer from which this label needs to be printed, retrieves image information, and prints the required number of labels. Table 1 shows a sample e-text format ZPL script template.

### Technical Details of the Solution

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<tbody>
<tr>
<td>&lt;MAXIMUM LENGTH&gt;</td>
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<td>&lt;NEW RECORD&gt;</td>
<td>Label</td>
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<td>&lt;DISPLAY CONDITION&gt;</td>
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JavaScript at the transaction screen

```html
<html>
<button type="submit" onclick="UserAction()">Print</button>
<script type="text/javascript" language="javascript">
function UserAction() {
    var xhttp = new XMLHttpRequest();
    xhttp.onreadystatechange = function() {
        if (this.readyState == 4 && this.status == 200) {
            document.getElementById("response").innerHTML = this.responseText;
        }
    }
    xhttp.open("POST" , https://fbosboomi.thermatru.com:8444/ws/rest/orcl/test/, true);
    xhttp.setRequestHeader("Content-type" , "application/json");
    xhttp. send ();
    xhttp. send ();
}
</script>
</html>
```

Middleware process
The manufacturing label printing solution presents several benefits over the conventional method followed currently. The solution has the potential to work with printers other than Zebra if Oracle can generate printer-understandable language. Some of the key benefits are:

**Technology**

- Use of native technology stack
- Use of open-source technology
- Zero recurring cost of third-party software
- No need to purchase third-party software
- No new skills required to manage third-party software
- Reusable code

**User experience**

- Easily maintainable master data
- Seamless integration
- Option to reprint
Scalability

- Scalable solution
- Can be used in other modules such as shipping and warehouse
- Easy to:
  - Add new item classes
  - Change layouts
  - Change images
  - Change the number of labels for each item class
  - Change the printer name as required
Resources

- SR 3-30032840931

- ZPL Command Information and Details

About the Author

Viswanadham Sighakolli,
Principal Consultant

Viswanadham is an Enterprise Solution Architect with expertise in SCM including several Oracle SCM modules. He has extensive experience in designing systems for change management in IT project operations and custom designing solutions (process and product). Viswanadham has in-depth knowledge of business process analysis and design, application-based process reengineering, process optimization, and revenue maximization. He is skilled in performing user acceptance testing (UAT) execution as well as tracking test cases to ensure that applications developed are compliant with pre-set technical specifications.