

Implement CPQ-EBS Inventory On Hand Balance Integration

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Purpose

This white paper describes how to implement the Reference Integration between Oracle Configure, Price and Quote (CPQ) Cloud and Oracle E-Business Suite (EBS) Inventory On-Hand Balance.

Prerequisite

The CPQ – EBS Reference Integration is implemented on CPQ Cloud Release 2015 R1 or later of Oracle E-Business Suite Order Inventory On-Hand Balance. CPQ base reference application must be deployed in the environment. Relevant E-Business Suite Inventory On-Hand Balance web services must be up and running.

Introduction

CPQ – EBS Reference Integration enables CPQ to check the availability of an item. Even though there is no validation preventing the creation of an order, it can be added per the customer's needs.

Implementation Overview

FOM Web Services

For FOM order creation, the web service invoked is "INV_QUANTITY_TREE_PUB_Port" operation "UPDATE_QUANTITIES".

Web Service Generation:

1. Login to the EBS environment.
2. Navigate to the web service as follows:
 - a) **UPDATE_QUANTITIES**: Integrated SOA gateway > Integration Repository > Supply Chain Management > Inventory Management > Inventory On Hand Balance > Quantity tree Application Program Interface
3. Check the "UPDATE_QUANTITIES" operation under procedures and functions to generate the corresponding web service.
4. Click **Generate**.
A WSDL link for the SOAP web service is generated.
5. Select **Username Token** as the **Authentication Type**.
6. Click **Deploy**.
7. Click View WSDL and copy the value of the "soap:address location" element, which is the endpoint.
8. Select the **Grants** tab.
9. Select the object for which the grant is created.
10. Keep the **Grantee Type** as **All Users**.
11. Click **Create Grant**.

Commerce Process

The Reference Integration makes changes to the "Oracle Quote to Order" commerce process from the base reference application in the following areas:

- » **Attributes**
- » **Actions**
- » **Library Functions**
- » **Step Transitions**

Additional Changes

Additional changes outside the Commerce process include:

- » **Data Table**
- » **File Manager**

Implementation Details

Attributes

Create the following attributes for the “Oracle Quote to Order” Commerce process.

Document	Attribute Name	Attribute Variable Name	Type	Description
Transaction Line	Availability Status	availabilityStatus	Text	Sets status as “Available”, “Not Available” or “Not Checked”
Transaction Line	Available Units	availableUnits	Text	Updates the available units for the items
Transaction Header	Integration Status	integrationStatusTransaction	Text	Shows the status of the integration process
Transaction Header	Warehouse Organisation ID	warehouseOrgID	Text	Used to set value of the warehouse organization ID

File Manager

Template file format information is located in the below table.

Folder	Description	Template Files
EBS	Inventory on Hand Balance	Refer Appendix A: Inventory On Hand Balance Template

Data Table

INT_SYSTEM_DETAILS

This table contains the information regarding the EBS-Order Management end point.

System(Ke)	UserName	WebService	SoapEndPoint	RestEndPoint
QUERY_ON_HAND	<Enter the username here to call the webservice endpoint>	<Enter the webservice SOAP/REST>	<Enter the SOAP webservice endpoint to call the service related to EBS-OM>	<Enter the REST webservice endpoint to call the service related to EBS-OM>

INT_SYSTEM_TEMPLATES

This table contains the information regarding the supporting template stored in File Manager.

System(Key)	Operation(Key)	Template
EBS	queryOnHandSoap	<Enter the template URL path that is uploaded in File manager>

Library Functions

The Commerce process library functions used are identified in this section:

getPassword

This library function provides the password to get templates.

```
pswd = "";

if ( sysName == "EBS" ) {
    pswd = "welcome";
}

if ( sysName == "MATERIAL RESERVATION" ) {
    pswd = "sysadmin";
}

if ( sysName == "QUERY_ON_HAND" ) {
    pswd = "sysadmin";
}

if ( sysName == "CLEAR_CACHE" ) {
    pswd = "sysadmin";
}

if ( sysName == "EBS-Customer" ) {
    pswd = "sysadmin";
}

if ( sysName == "EBS-Address" ) {
    pswd = "sysadmin";
}

return pswd;
```

Return Type and Input information for the library function are shown below.

Commerce BML Library Function Editor: Properties & Parameters

Name: getPassword
Variable Name: getPassword
Description:
Return Type: String

#	Parameter Name	Parameter Type
1	sysName	String

Function Editor
Hide Tools | Editor Help

Attributes | Function Wizard | Debugger | Library Function(s)

Main Document Attribute | **Sub Document Attribute** | **System Attribute**

#	Attribute
	transactionLine

#	Attribute

getTemplateLocation

This library function gets the template location.

```
//1. Get Template File
templateUrl = "";
//bmq1 query
resultSet = bmql("Select Template from INT_SYSTEM_TEMPLATES where System = $system
and Operation = $operation");

//loop through the records
for record in resultSet {
    templateUrl = get(record,"Template");
    print templateUrl;
}

temp=split(templateUrl,"image");

return temp[1];
```


getDataSecurity

This library function is used for getting the data security parameters for the SOAP header request.

```
headerFile_mod=headerFile;
// For Material Reservation
if(system == "MATERIAL RESERVATION" AND operation == "Reserve"){
    headerFile_mod= replace(headerFile_mod , "{{Responsibility_Name}}", "System
Administrator");
    headerFile_mod= replace(headerFile_mod , "{{Application_Name}}", "SYSADMIN");
    headerFile_mod= replace(headerFile_mod , "{{Security_Group_Name}}", "STANDARD");
    headerFile_mod= replace(headerFile_mod , "{{Language}}", "AMERICAN");
    headerFile_mod= replace(headerFile_mod , "{{Org_Id}}", "204");
}
if(system == "MATERIAL RESERVATION" AND operation == "Relieve"){
    headerFile_mod= replace(headerFile_mod , "{{Responsibility_Name}}", "System
Administrator");
    headerFile_mod= replace(headerFile_mod , "{{Application_Name}}", "SYSADMIN");
    headerFile_mod= replace(headerFile_mod , "{{Security_Group_Name}}", "STANDARD");
    headerFile_mod= replace(headerFile_mod , "{{Language}}", "AMERICAN");
    headerFile_mod= replace(headerFile_mod , "{{Org_Id}}", "204");
}
if(system == "EBS" AND operation == "queryOnHandSoap"){
    headerFile_mod= replace(headerFile_mod , "{{Responsibility_Name}}", "System
Administrator");
    headerFile_mod= replace(headerFile_mod , "{{Application_Name}}", "SYSADMIN");
    headerFile_mod= replace(headerFile_mod , "{{Security_Group_Name}}", "STANDARD");
    headerFile_mod= replace(headerFile_mod , "{{Language}}", "AMERICAN");
    headerFile_mod= replace(headerFile_mod , "{{Org_Id}}", "204");
}
return headerFile_mod;
```

Return Type and Input information for the library function are shown below.

Commerce BML Library Function Editor: Properties & Parameters

Name:	<input type="text" value="getDataSecurity"/>	#	Parameter Name	Parameter Type
Variable Name:	<input type="text" value="getDataSecurity"/>	1	system	String
Description:	<input type="text"/>	2	operation	String
Return Type:	<input type="text" value="String"/>	3	headerFile	String

Function Editor

Hide Tools | 🔍 🗨️ Editor Help

🏠 Attributes | 🔧 Function Wizard | 🐛 Debugger | 📁 Library Function(s)

Main Document Attribute	Sub Document Attribute	System Attribute
# Attribute	transactionLine # Attribute	# Attribute

Actions

Query Quantity

The integration is implemented using a single action, "Query Quantity", as shown below.

System Variable Name	Type	Description
N/A		
Variable Name for (Transaction)	Type	Description
bs_id	String	Transaction ID
orgID	String	Organization ID
warehouseOrgID	String	Warehouse organization ID
Variable Name for (Transaction Line)	Type	Description
transactionLine	Collection of Sub Documents	
_document_number	String	Document Number
_part_number	String	Part Number
lineNumber_l	String	Line #
requestedQuantity_l	Integer	Quantity
quantityStatus	String	Availability Status
Imported Commerce Functions		
String getDataSecurity(String system, String operation, String headerFile)		
String getTemplateLocation(String system, String operation)		
String getPassword(String sysName)		

IMPORTANT: Refer to [Appendix B: Query Quantity BML](#) for the Query Quantity action. Define the action using Advanced Modify – After Formula section.

Step Transitions

Action Variable Name	Available Step	Comments
queryQuantity (Action : Query Quantity)	Displayed in all steps from "Approved"	Query Quantity is displayed only when the order is approved.

Sample Payload

Refer to [Appendix C: Sample Query Quantity Payload](#).

Appendix A: Inventory On Hand Balance Template

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:inv="http://xmlns.oracle.com/apps/inv/soapprovider/plsql/inv_quantity_tree_pub/"
"
xmlns:quer="http://xmlns.oracle.com/apps/inv/soapprovider/plsql/inv_quantity_tree_pub
/query_quantities/">
```

```
<soapenv:Header>
```

```
<inv:SOAHeader>
```

```
<inv:RESPONSIBILITY_NAME>{{RESPONSIBILITY_NAME}}</inv:RESPONSIBILITY_NAME>
```

```
<inv:RESPONSIBILITY_APPL_NAME>{{RESPONSIBILITY_APPL_NAME}}</inv:RESPONSIBILITY
_APPL_NAME>
```

```
<inv:SECURITY_GROUP_NAME>{{SECURITY_GROUP_NAME}}</inv:SECURITY_GROUP_NAME>
```

```
<inv:NLS_LANGUAGE>{{NLS_LANGUAGE}}</inv:NLS_LANGUAGE>
```

```
<inv:ORG_ID>{{ORG_ID}}</inv:ORG_ID>
```

```
</inv:SOAHeader>
```

```
<wsse:Security soapenv:mustUnderstand="1"
```

```
xmlns:env="http://schemas.xmlsoap.org/soapenv/envelope/" xmlns="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
```

```
xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
secext-1.0.xsd"><wsse:UsernameToken xmlns="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
```

```
xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
secext-1.0.xsd">
```

```
<wsse:Username>{{USERNAME}}</wsse:Username>
```

```
<wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-
wss-username-token-profile-1.0#PasswordText">{{PASSWORD}}</wsse:Password>
```

```
</wsse:UsernameToken>
```

```
</wsse:Security>
```

```
</soapenv:Header>
```

```
<soapenv:Body>
```

```
<quer:InputParameters>
```

```
<quer:P_API_VERSION_NUMBER>{{P_API_VERSION_NUMBER}}</quer:P_API_VERSION_NUMBER
```

```
>
```

```
<quer:P_INIT_MSG_LST>{{P_INIT_MSG_LST}}</quer:P_INIT_MSG_LST>
```

<quer:P_ORGANIZATION_ID>{{P_ORGANIZATION_ID}}</quer:P_ORGANIZATION_ID>

<quer:P_INVENTORY_ITEM_ID>{{P_INVENTORY_ITEM_ID}}</quer:P_INVENTORY_ITEM_ID>

<quer:P_TREE_MODE>{{P_TREE_MODE}}</quer:P_TREE_MODE>

<quer:P_IS_REVISION_CONTROL></quer:P_IS_REVISION_CONTROL>

<quer:P_IS_LOT_CONTROL></quer:P_IS_LOT_CONTROL>

<quer:P_IS_SERIAL_CONTROL></quer:P_IS_SERIAL_CONTROL>

<quer:P_DEMAND_SOURCE_TYPE_ID>{{P_DEMAND_SOURCE_TYPE_ID}}</quer:P_DEMAND_SOURCE_TYPE_ID>

<quer:P_DEMAND_SOURCE_HEADER_ID>{{P_DEMAND_SOURCE_HEADER_ID}}</quer:P_DEMAND_SOURCE_HEADER_ID>

<quer:P_DEMAND_SOURCE_LINE_ID>{{P_DEMAND_SOURCE_LINE_ID}}</quer:P_DEMAND_SOURCE_LINE_ID>

<quer:P_DEMAND_SOURCE_NAME></quer:P_DEMAND_SOURCE_NAME>

<quer:P_LOT_EXPIRATION_DATE></quer:P_LOT_EXPIRATION_DATE>

<quer:P_REVISION></quer:P_REVISION>

<quer:P_LOT_NUMBER></quer:P_LOT_NUMBER>

<quer:P_SUBINVENTORY_CODE></quer:P_SUBINVENTORY_CODE>

<quer:P_LOCATOR_ID></quer:P_LOCATOR_ID>

<quer:P_ONHAND_SOURCE>{{P_ONHAND_SOURCE}}</quer:P_ONHAND_SOURCE>



```
<quer:P_TRANSFER_SUBINVENTORY_CODE></quer:P_TRANSFER_SUBINVENTORY_CODE>

    <quer:P_COST_GROUP_ID></quer:P_COST_GROUP_ID>

    <quer:P_LPN_ID></quer:P_LPN_ID>

    <quer:P_TRANSFER_LOCATOR_ID></quer:P_TRANSFER_LOCATOR_ID>
</quer:InputParameters>
</soapenv:Body>
</soapenv:Envelope>
```

Appendix B: Query Quantity BML

```
system = "EBS";
operation="queryOnHandSoap";

//Header Values
headerValues = dict("string");
put(headerValues, "Content-Type", "text/xml; charset=utf-8");

//Get Endpoint for SOAP request
endpointResultSet = bmql("Select SoapEndPoint from INT_SYSTEM_DETAILS where System =
'QUERY_ON_HAND'");
endpoint = "";
for record in endpointResultSet {
    endpoint = get(record,"SoapEndPoint");
}
print endpoint;
//Payload dictionary
payload = dict("string");
//Get User Info from data table and put in dictionary
resultSet = bmql("Select UserName from INT_SYSTEM_DETAILS where System
='QUERY_ON_HAND'");
for record in resultSet {
    username = get(record,"UserName");
    password = commerce.getPassword("QUERY_ON_HAND");
    put(payload,"USERNAME", username);
    put(payload,"PASSWORD", password);
}
put(payload ,"P_API_VERSION_NUMBER", "1");
put(payload ,"P_INIT_MSG_LST", "T");
put(payload ,"P_ORGANIZATION_ID", warehouseOrgID);
put(payload ,"P_TREE_MODE", "3");
put(payload ,"P_DEMAND_SOURCE_TYPE_ID", "2");
if (headerID <> ""){
```

```

    put(payload , "P_DEMAND_SOURCE_HEADER_ID", headerID);}
else{
    put(payload , "P_DEMAND_SOURCE_HEADER_ID", bs_id);}
put(payload , "P_ONHAND_SOURCE", "1");
put(payload , "P_IS_REVISION_CONTROL", "");
put(payload , "P_IS_LOT_CONTROL", "");
put(payload , "P_IS_SERIAL_CONTROL", "");

result = "";
defaultErrorMessage="";
templateLocation = commerce.getTemplateLocation(system, operation);

//part-numbers of all lines
partNumbers = dict("string");
checkQuantityResponse = "";
quantityCheckPayload = "";

for line in transactionLine{
    //line-specific values added to dictionary
    put(payload, "P_INVENTORY_ITEM_ID", line._part_number);
    put(payload, "P_DEMAND_SOURCE_LINE_ID", line.lineNumber_1);

    //apply template
    quantityCheckPayload
=applytemplate(templateLocation, payload, defaultErrorMessage);

    //add data security to the payload
    quantityCheckPayload = commerce.getDataSecurity(system, operation,
quantityCheckPayload );

    //check quantity
    reservableQuantity = "";
    checkQuantityResponse = urldatabypost(endpoint, quantityCheckPayload, "",
headerValues, true);
    print checkQuantityResponse + "\n\n";

```

```

foundError = find(checkQuantityResponse,"ERROR:");
if( foundError > -1){
    return "1~integrationStatusTransaction~" + checkQuantityResponse +
"|1~soapResponse~" + checkQuantityResponse + "|1~soapRequest~"+quantityCheckPayload
+"|";
}

foundAuthError = find(checkQuantityResponse,"<faultstring>");
if( foundAuthError > -1){
    foundAuthEnd= find(checkQuantityResponse, "</faultstring>");
    authError = substring(checkQuantityResponse, foundAuthError + 13,
foundAuthEnd);

    return "1~integrationStatusTransaction~" + authError +
"|1~soapResponse~" + checkQuantityResponse + "|1~soapRequest~"+quantityCheckPayload
+"|";
}

foundReturnStatus = find(checkQuantityResponse,"<X_RETURN_STATUS>");
if( foundAuthError > -1){
    foundReturnStatusEnd= find(checkQuantityResponse, "</X_RETURN_STATUS>");
    returnStatus = substring(checkQuantityResponse, foundReturnStatus + 17,
foundReturnStatusEnd);

    if(trim(returnStatus) == "E"){
        foundError = find(checkQuantityResponse,"<X_MSG_DATA>");
        foundErrorEnd= find(checkQuantityResponse, "</X_MSG_DATA>");
        error = substring(checkQuantityResponse, foundError + 12,
foundErrorEnd);

        return "1~integrationStatusTransaction~" + error +
"|1~soapResponse~" + checkQuantityResponse + "|1~soapRequest~"+quantityCheckPayload
+"|";
    }
}

foundStartPattern= find(checkQuantityResponse,"<X_ATR>");
if (foundStartPattern > -1){
    foundEndPattern= find(checkQuantityResponse, "</X_ATR>");

```

```

        reservableQuantity = substring(checkQuantityResponse,
foundStartPattern+7, foundEndPattern);
    }
    quantity = line.requestedQuantity_1;
    isExisting = get(partNumbers, line._part_number);
    print isExisting;

    //In BM we might create two lines with the same part-number. In such a case,
the web-service
    //call for each line is independent, even though we need to consider the sum
of the quantities.
    //So a part-numbers dictionary is maintained.
    //if line is not in the partnumbers dictionary, then add it
    if(trim(isExisting) == ""){
        put(partNumbers, line._part_number, string(quantity));
    }
    //if partnumber of line present in dictionary, update the quantity
    else{
        quantity = quantity + atoi(isExisting);
        put(partNumbers, line._part_number, string(quantity));
    }
    isAvailable = "Not Available";
    if(reservableQuantity == ""){
        return "1~integrationStatusTransaction~Error in quantity
retrieval|1~soapResponse~" + checkQuantityResponse +
"|1~soapRequest~"+quantityCheckPayload +"|";
    }
    if(atoi(reservableQuantity) >= quantity){
        isAvailable = "Available";
    }
    result = result + line._document_number + "~quantityStatus~" + isAvailable +
"|";
        + line._document_number + "~availableUnits~" + reservableQuantity +
"|";
}

```



```
result = result + "|1~soapResponse~" + checkQuantityResponse +  
"|1~soapRequest~"+quantityCheckPayload +"|";  
return result;
```

Appendix C: Sample Query Quantity Payload

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:inv="http://xmlns.oracle.com/apps/inv/soapprovider/plsql/inv_quantity_tree_pub/"
"
xmlns:quer="http://xmlns.oracle.com/apps/inv/soapprovider/plsql/inv_quantity_tree_pub
/query_quantities/">
  <soapenv:Header>
    <inv:SOAHeader>
      <inv:RESPONSIBILITY_NAME>System Administrator</inv:RESPONSIBILITY_NAME>
<inv:RESPONSIBILITY_APPL_NAME>SYSADMIN</inv:RESPONSIBILITY_APPL_NAME>
<inv:SECURITY_GROUP_NAME>STANDARD</inv:SECURITY_GROUP_NAME>
<inv:NLS_LANGUAGE>AMERICAN</inv:NLS_LANGUAGE>
      <inv:ORG_ID>204</inv:ORG_ID>
    </inv:SOAHeader>
    <wsse:Security soapenv:mustUnderstand="1"
xmlns:env="http://schemas.xmlsoap.org/soapenv/envelope/" xmlns="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
secext-1.0.xsd"><wsse:UsernameToken xmlns="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd"
xmlns:wsse="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
secext-1.0.xsd">
      <wsse:Username>sysadmin</wsse:Username>
      <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-
wss-username-token-profile-1.0#PasswordText">sysadmin</wsse:Password>
    </wsse:UsernameToken>
  </wsse:Security>
</soapenv:Header>
<soapenv:Body>
  <quer:InputParameters>
    <!--Optional:-->
<quer:P_API_VERSION_NUMBER>1</quer:P_API_VERSION_NUMBER>
    <!--Optional:-->
    <quer:P_INIT_MSG_LST>T</quer:P_INIT_MSG_LST>
    <!--Optional:-->
<quer:P_ORGANIZATION_ID>207</quer:P_ORGANIZATION_ID>
    <!--Optional:-->
```

```
<quer:P_INVENTORY_ITEM_ID>149</quer:P_INVENTORY_ITEM_ID>
  <!--Optional:-->
  <quer:P_TREE_MODE>2</quer:P_TREE_MODE>
  <!--Optional:-->
<quer:P_IS_REVISION_CONTROL></quer:P_IS_REVISION_CONTROL>
  <!--Optional:-->
  <quer:P_IS_LOT_CONTROL></quer:P_IS_LOT_CONTROL>
  <!--Optional:-->
<quer:P_IS_SERIAL_CONTROL></quer:P_IS_SERIAL_CONTROL>
  <!--Optional:-->
<quer:P_DEMAND_SOURCE_TYPE_ID>2</quer:P_DEMAND_SOURCE_TYPE_ID>
  <!--Optional:-->
<quer:P_DEMAND_SOURCE_HEADER_ID>1000</quer:P_DEMAND_SOURCE_HEADER_ID>
  <!--Optional:-->
<quer:P_DEMAND_SOURCE_LINE_ID>1002</quer:P_DEMAND_SOURCE_LINE_ID>
  <!--Optional:-->
<quer:P_DEMAND_SOURCE_NAME></quer:P_DEMAND_SOURCE_NAME>
  <!--Optional:-->
<quer:P_LOT_EXPIRATION_DATE></quer:P_LOT_EXPIRATION_DATE>
  <!--Optional:-->
  <quer:P_REVISION></quer:P_REVISION>
  <!--Optional:-->
  <quer:P_LOT_NUMBER></quer:P_LOT_NUMBER>
  <!--Optional:-->
<quer:P_SUBINVENTORY_CODE></quer:P_SUBINVENTORY_CODE>
  <!--Optional:-->
  <quer:P_LOCATOR_ID></quer:P_LOCATOR_ID>
  <!--Optional:-->
  <quer:P_ONHAND_SOURCE>3</quer:P_ONHAND_SOURCE>
  <!--Optional:-->
```



```
<quer:P_TRANSFER_SUBINVENTORY_CODE></quer:P_TRANSFER_SUBINVENTORY_CODE>
  <!--Optional:-->
  <quer:P_COST_GROUP_ID></quer:P_COST_GROUP_ID>
  <!--Optional:-->
  <quer:P_LPN_ID></quer:P_LPN_ID>
  <!--Optional:-->
<quer:P_TRANSFER_LOCATOR_ID></quer:P_TRANSFER_LOCATOR_ID>
  </quer:InputParameters>
</soapenv:Body>
</soapenv:Envelope>
```



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