How To... Integrate EP Unified Worklist to XI cross-component Business Process Management via Business Workflow

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Applicable Releases:
SAP NetWeaver '04
(EP6.0, XI3.0, WAS6.40)
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1 Business Scenario

Cross-component BPM (ccBPM) drives and controls complex business processes across applications and the enterprise boundaries. As such, it is imperative for BPM to integrate with a variety of products and components – including the components of SAP NetWeaver. The present paper deals with integration to the Universal Work List (UWL) of EP/KMC. SAP UWL gives users a unified and centralized way to access their work and the relevant information. It aggregates all work items and notifications from multiple and different systems in one universal list. In general, ccBPM requests an approval that is routed via Business Workflow (BWF) to the UWL. The user takes action. Based on the user decision, the process is aborted or being continued.

2 Introduction

This document describes how to trigger a BWF within ccBPM of XI, and to display the corresponding work item in the UWL of EP. The solution is based on EP 6.0, XI 3.0, and WAS 6.40 that are part of SAP NetWeaver '04. To exemplify the technical aspects of integration, a simple business process is considered. A multiple line item XML message is sent to XI containing a list of different users. Within ccBPM, the message is split according to the number of users. For each user, a workflow is started by sending a single message to the application system that hosts the BWF. Hence, for each user a separate approval is required. The workflow is based on BOR object User. In general, it consists of a decision step: lock, or unlock specified user. All work items are displayed within the UWL, waiting for user interaction. Dependent on the decision of the responsible manager, the appropriate method is applied, and a message with the user’s status is sent back to XI (see swim-lane).
XI 3.0 provides a variety of technical adapters in order to connect different application systems, e.g. File/FTP, JDBC, JMS, RFC, SOAP etc. R/3 systems as of 3.1h can be connected using either RFC or IDOC. However, for SAP systems as of WAS 6.20, the standard communication is done using ABAP Proxy. It is the natural approach connecting SAP systems since no adapters are required. Furthermore, proxies support full Quality of Service “Exactly Once In Order”. Hence, the connection between the integration server and the application is done using ABAP Proxy.

The authors assume that the reader is familiar with the tools that are deployed. Hence, the paper is not describing each single step to implement the overall solution, but focuses rather on integrative aspects.
3 The Step By Step Solution

3.1 Prerequisites

1. In the Integration Repository (Design) of the XI Integration Builder (transaction code SXMB_IFR), the following Repository Objects are already maintained:

<table>
<thead>
<tr>
<th>Message Interfaces (mode: asynchronous):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>User_Abs</td>
</tr>
<tr>
<td>User_IB</td>
</tr>
<tr>
<td>Users_Abs</td>
</tr>
<tr>
<td>Users_OB</td>
</tr>
<tr>
<td>UserStatus_Abs</td>
</tr>
<tr>
<td>UserStatus_IB</td>
</tr>
<tr>
<td>UserStatus_OB</td>
</tr>
</tbody>
</table>

2. In the Integration Directory (Configuration) of the XI Integration Builder (transaction code SXMB_IFR), a scenario is created (here: XI30LighthouseScenario9), and the appropriate business systems are assigned to the scenario (here: SendUser, ReceiveUser, U6X_105).
3. In the Workflow Builder (transaction code SWDD), a workflow is created consisting of following steps (here: workflow ID WS45600003):
   - Container Operation in order to assign input parameter of type string to Workflow Container of BOR type “USER”.
   - Decision Step.

4. For the workflow, following Workflow Container Elements are available:

```
<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>namestring</td>
<td>SY-UNAME</td>
<td>import/export</td>
</tr>
<tr>
<td>forename</td>
<td>string</td>
<td>import</td>
</tr>
<tr>
<td>surname</td>
<td>string</td>
<td>import</td>
</tr>
<tr>
<td>baduser</td>
<td>BOR USER</td>
<td></td>
</tr>
<tr>
<td>return</td>
<td>BAPIRET2</td>
<td>multiline</td>
</tr>
</tbody>
</table>
```

5. For the Universal Worklist, you need:
   - Release 3.1H or higher
   - Workplace Plug-In 6.0 installed for Release 620 and below
   - PI_Basis installed for Release 640
   - Connection to the SAP Internet Transaction Server (ITS)

Each user must be:
   - Known to all connected SAP R/3 Systems (UID exists)
   - Authorized for RFC access to function group SWK1 and transaction SWK1
6. For SAP Enterprise Portal, you need to have a working connection to your backend workflow system. You can verify this by accessing ITS transaction via the support menu without explicitly logon to the backend system.
3.2 XI Integration Repository: Define cross-component Business Process


   Enter name, and description.

   Press “Create”.

8. Create new Container Elements of category “Abstract Interface” to store message data.

   Enter name, and interface.

   The Container Element “CO_Users” is used to receive a message containing the user information.

   The multi-line Container Element “CO_UserList” is an array of messages. It is used to store the splitted messages.

9. Create new Receiver Step by Drag & Drop the receive symbol from the toolbar.

   Enter name, and select Container Element “CO_Users” where incoming messages are stored.

   The Receiver Step starts the Business Process instance.
10. Create a new Transformation Step in order to split the received message into multiple messages.

Choose 1:n Interface Mapping “UsersToUser”, the Source Message “CO_Users”, and the Target Message “CO_UserList”.

<table>
<thead>
<tr>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Step Name</td>
</tr>
<tr>
<td>Interface Mapping</td>
</tr>
<tr>
<td>Source Messages</td>
</tr>
<tr>
<td>Users_Abs</td>
</tr>
<tr>
<td>Target Messages</td>
</tr>
<tr>
<td>User_Abs</td>
</tr>
</tbody>
</table>

11. Create new Block “ParallelBlock”.

12. Create new local Container Elements of category “Abstract Interface”. They are only used within the Block.

Enter name, and interface.

The Container Element “CO_UsersSingle” is used to send a message to start the workflow.

The Container Element “CO_UserStatus” is used to receive, and to send the message containing the status of a user.
13. Create a new Correlation “CorrelationUser” in order to assign incoming messages to the appropriate Business Process instances.

Define a Correlation Container. It should be a unique key in order to ensure unique correlation at runtime.

Specify the Involved Messages. Add the interface “UserStatus_Abs” since it is used in a receiver step that uses the correlation.

For the interface “UserStatus_Abs”, define which fields of the incoming messages have to be compared to the Correlation Container Elements at runtime. Here: “UserStatus/Uname”.

14. For the Block “ParallelBlock”, choose the mode “ParForEach”, the Multiline Element “CO_UserList”, and the Current Line “CO_UserSingle”. For each line of the multi-line Container Element “CO_UserList”, all steps within the Block are executed in parallel. The Container Element “CO_UserSingle” is used to store the values of a single line of “CO_UserList”.

Specify the Correlation “CorrelationUser” as local to ensure unique correlation for each Block instance.
15. Create new Send Step “SendUser” in order to start workflow.

Choose asynchronous mode.

Select Container Element “CO_UserSingle”.

Activate Correlation “CorrelationUser” as to make it available for subsequent receiver steps.

Define which fields of the Container Element have to be assigned to the Correlation Container Elements. Here: “User/Uname”.

16. Create new Receiver Step “ReceiveStatus” to receive the status of the user sent by the workflow.

Use Correlation “CorrelationUser” in order to determine appropriate Business Process instance, and Block instance, respectively.

17. Create new Send Step “SendStatus” in order to send user status back to source application.

Choose asynchronous mode.

Select Container Element “CO_UserStatus”.
18. Save the Business Process, and activate the Change List on tab “Changelist”.
3.3 Proxy Framework: Outbound Proxy

19. Create Outbound Proxy in the Application System.

Run transaction code SPROXY.

Click on the Message Interface “UserStatus_OB”, and choose “Create Proxy” in the context menu.

Choose a package, and a prefix.

Activate the Proxy.
3.4 Business Workflow

20. Create subtype “ZUSER”.

Run transaction code SWO1 (Business Object Builder).

Choose object “USER”, and create subtype “ZUSER”.

21. Enhance methods of “ZUSER”.

Run transaction code SWO1.

Choose “ZUSER”, and enter change mode.

Redefine method “lock” and “unlock”, respectively (F6 or appropriate button).

Enhance methods according to sample code in appendix:

- Create instance of class ZLHCO_USER_STATUS_OB.

- Add call of method EXECUTEASYNCHRONOUS of class ZLHCO_USER_STATUS_OB in order to send status message via outbound proxy.

Save, and generate.
22. Enhance Workflow.

Run transaction code SWDD, and choose workflow above (here: Workflow WS45600003).

Choose change mode.

Insert new Activity step “Lock User” by Drag & Drop from step area.

23. Create new Task.

Enter name, and abbreviation.

Choose Object Type “ZUSER”, and Method “lock”.

Save task.

24. Define Container Elements and Binding.

Confirm proposed bindings.
25. Same proceeding for the second branch of the Decision Step.

Create Activity “Unlock User”.

Create new Task, and choose method “unlock”.

Save workflow.
3.5 Proxy Framework: Inbound Proxy


Run transaction code SPROXY.

Click on the Message Interface “User_IB”, and choose “Create Proxy” in the context menu.

Choose a package, and a prefix.

Activate the Proxy.

27. Go to the implementing class ZLHCL_USER_IB by double clicking.

Put Cursor on method EXECUTEASYNCHRONOUS, and choose button “Code”.

Choose the change mode, and implement the method according to sample coding in the appendix:

- Fill internal table. Take into account that names of elements within internal table must correspond to container elements of workflow (input parameters).
- Call function module SAP_WAPI_START_WORKFLOW in order to start workflow.

Save, and activate method, class, and interface.
3.6 XI Integration Directory: Configuration

28. Choose “New” in the context menu of “Business Process” to define the business process from the Integration Repository as a service within the Integration Directory.

Select business process, and enter name.

29. Create a communication channel for the business system where the workflow is running (here: U6X_105). Communication is done by ABAP proxy.

Maintain Adapter Type, Transport Protocol, Message Protocol, and Addressing Type according to figure on the right. Here, for addressing the business system, an SM59 destination is specified where all required system data is defined. Alternatively, by choosing the addressing type “URL Address”, host, port, path, and authentication data have to be specified within the communication channel.

30. Create Receiver Determination, Interface Determination, and Receiver Agreement according to figure on the right.

Save, and activate the Change List on tab “Changelist”.

3.7 Unified Worklist

31. With the system created in the prerequisite, you need to register the item types for the system with UWL.

Go to System AdministratorÆSystem ConfigurationÆUniversal Worklist Administration. Click on “Register Item Types for New Systems Only”.

All your systems should appear in the registered list after that.

32. Create a role with a folder name “Universal Worklist”. Make sure that the Entry Point for the role is set to “Yes”:

33. Assign the Universal Worklist page (Portal ContentÆContent Provided by SAPÆEnd User ContentÆStandard Portal UsersÆPagesÆUniversal Worklist) to the role as Delta Link.
34. Now go to the User Administration, and assign the role to the user:

35. Logon with the user. You should see a new role for this user, and in this user’s top level navigation, you will see the Universal Worklist:
3.8 Runtime: Send User Data & Decide on Workflow Item

36. In order to verify the scenario, the Plain HTTP Adapter of the Integration Server is used. It is a simple way to send an XML file to XI.

Run transaction code SICF, and activate the Plain HTTP adapter of the integration server, if not already done.

For an HTTP client sample program, please refer to the How-To paper “How to integrate BW to XI”.

37. Save the XML data on the right to a file on your PC, modify if necessary (e.g. namespace, user names), and send it to XI by using the HTTP client mentioned above.

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<nr1:Users xmlns:nr1="http://sap.com/xi/XI/LightHouse/Scenario9">
  <User>
    <Uname>BUNDSCHUHA</Uname>
    <Forename>Alexander</Forename>
    <Surname>Bundschuh</Surname>
  </User>
  <User>
    <Uname>RICKAYZEN</Uname>
    <Forename>Alan</Forename>
    <Surname>Rickayzen</Surname>
  </User>
</nr1:Users>
```

38. Now, navigate to UWL in EP. If you cannot see the 2 workflow items, click on the Refresh button:
39. Select “Alan” work item by clicking on the subject description, select “unlock”, and click “Submit”.

40. Select “Alex” work item by clicking on the subject description, select “lock”, and click “Submit”.

41. Both work items should now disappear from the Tasks summary.
42. Click on the Completed Tasks tab, and you should see both work items in it:

43. As a result, you should receive the status of each user in XML format.
4 Appendix (Sample ABAP Coding)

4.1 Inbound Proxy: Method EXECUTEASYNCHRONOUS

method ZLHII_USER_IB~EXECUTEASYNCHRONOUS.
  constants: c_uname(10) type c value 'NAMESTRING',
             c_forename(8) type c value 'FORENAME',
             c_surname(7)  type c value 'SURNAME'.
  data: wf_user type SY-UNAME value 'BUNDSCHUHAL',
         wf_task type SWW_TASK value 'WS45600003',
         l_container type SWR_CONT,
         t_container like table of l_container,
         l_exchange_fault_data type ZLHEXCHANGE_FAULT_DATA.

  * fill container
    refresh t_container.
    clear l_container.
    l_container-ELEMENT = c_uname.
    l_container-VALUE = input-user-uname.
    append l_container to t_container.
    l_container-ELEMENT = c_forename.
    l_container-VALUE = input-user-forename.
    append l_container to t_container.
    l_container-ELEMENT = c_surname.
    l_container-VALUE = input-user-surname.
    append l_container to t_container.

  * call function module to start workflow
    CALL FUNCTION 'SAP_WAPI_START_WORKFLOW'
      EXPORTING
        TASK                      = wf_task
        DO_COMMIT                 = 'X'
        USER                      = wf_user
        TABLES
          INPUT_CONTAINER           = t_container.
    if sy-subrc <> 0.
      l_exchange_fault_data-fault_text = 'start workflow failed'.
      RAISE EXCEPTION TYPE ZLHCX_WORKFLOW_FAILED
        EXPORTING
          standard = l_exchange_fault_data.
    endif.
endmethod.

4.2 BO User: Method Lock

BEGIN_METHOD LOCK CHANGING CONTAINER.
  data: RETURN LIKE BAPIRET2 OCCURS 0.
  * Enhancement: data declaration
    data: l_status type ZLHUSER_STATUS,
          l_status1 type ZLHUSER_STATUS1,
          lo_status TYPE REF TO ZLHCO_USER_STATUS_OB.

  * SWC_GET_TABLE CONTAINER 'Return' RETURN.
    CALL FUNCTION 'BAPI_USER_LOCK'
      EXPORTING
        USERNAME = OBJECT-KEY-USERNAME

TABLES
  RETURN = RETURN
EXCEPTIONS
  OTHERS = 01.
CASE SY-SUBRC.
  WHEN 0.            " OK
  WHEN OTHERS.       " to be implemented
ENDCASE.
SWC_SET_TABLE CONTAINER 'Return' RETURN.
* Enhancement: call XI Outbound Proxy
  l_status-uname = object-key-username.
  l_status-lock_status = 'locked'.
  l_status1-user_status = l_status.
  create object lo_status.
  call method lo_status->execute_asynchronous
    EXPORTING
      output = l_status1.
  *
END_METHOD.