



**How-to Guide
SAP NetWeaver '04**

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

Version 1.00 – December 2004

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

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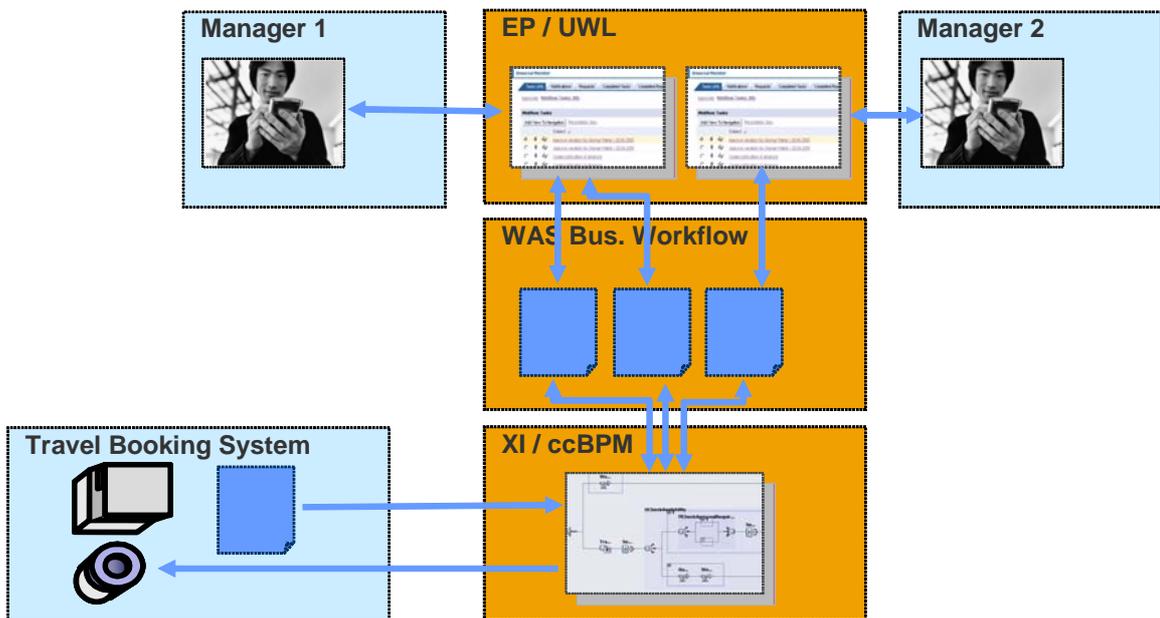
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1 Business Scenario

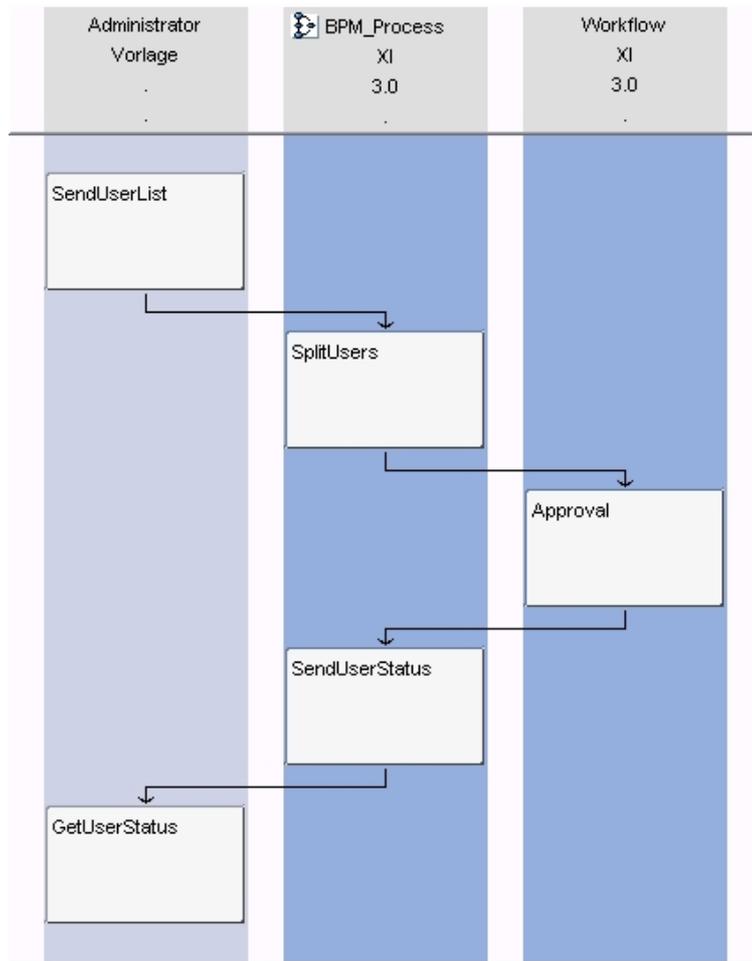
Cross-component BPM (ccBPM) drives and controls complex business processes across applications and the enterprise boundaries. As such, it is imperative for BPM to integrate with a variety of products and components – including the components of SAP NetWeaver. The present paper deals with integration 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).



SAP Exchange Infrastructure, Business Scenario Editor

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:

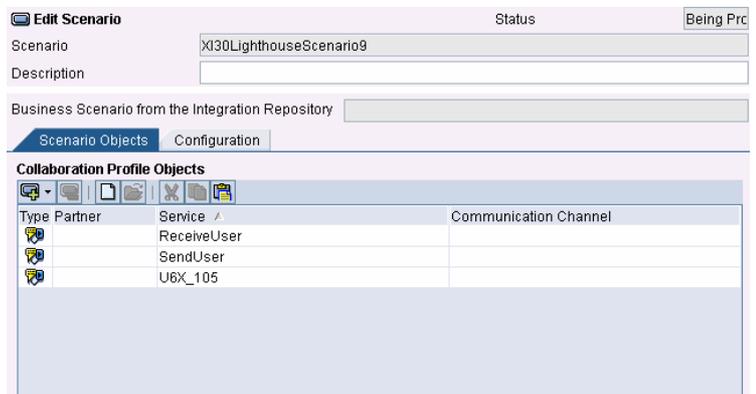
Message Interfaces (mode: asynchronous):

Interface	Category	Message	Fault Message
User_Abs	Abstract	User	
User_IB	Inbound	User	
Users_Abs	Abstract	Users	
Users_OB	Outbound	Users	
UserStatus_Abs	Abstract	UserStatus	
UserStatus_IB	Inbound	UserStatus	WorkflowFailed
UserStatus_OB	Outbound	UserStatus	

Interface Mapping:

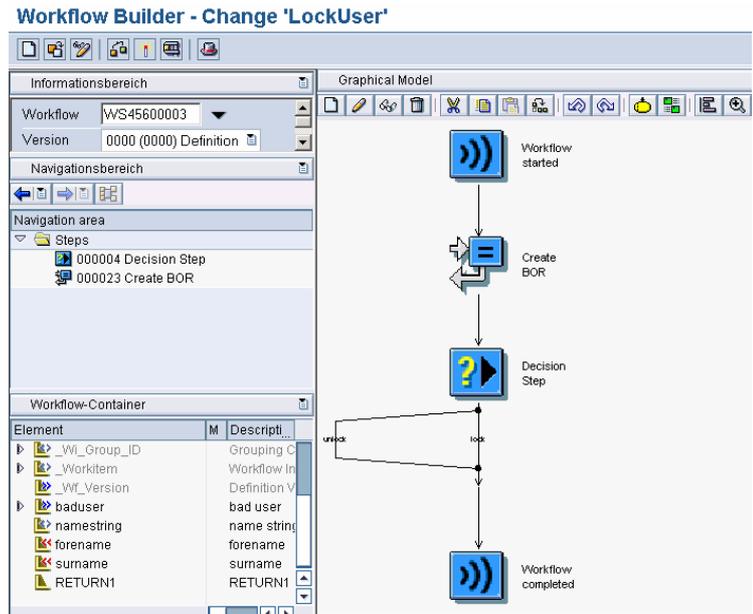
Name: UsersToUser
 Source Interface: Users_Abs (occurrence: 1)
 Target Interface: User_Abs (occurrence: unbound)

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:

Container Elements:

Name	Type	Settings
namestring	SY-UNAME	import/export
forename	string	import
surname	string	import
baduser	BOR USER	
return	BAPIRET2	multiline

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)

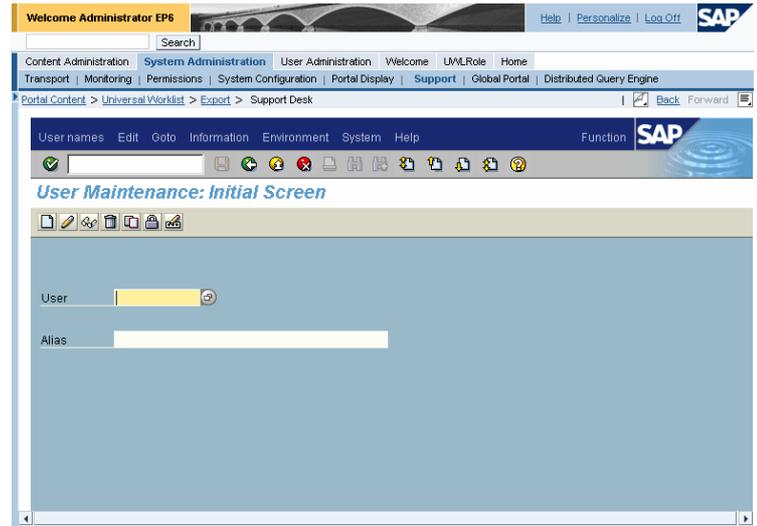
The screenshot shows a table titled 'System Component information'. The first row is for 'WP-PI' with the following details: Release 500_620, Level 0000, Highest Support -, and Short Description of Software Component: SAP Portals Enterprise Portal Plug-In.

Software Component	Release	Level	Highest Support	Short Description of Software Component
WP-PI	500_620	0000	-	SAP Portals Enterprise Portal Plug-In

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.

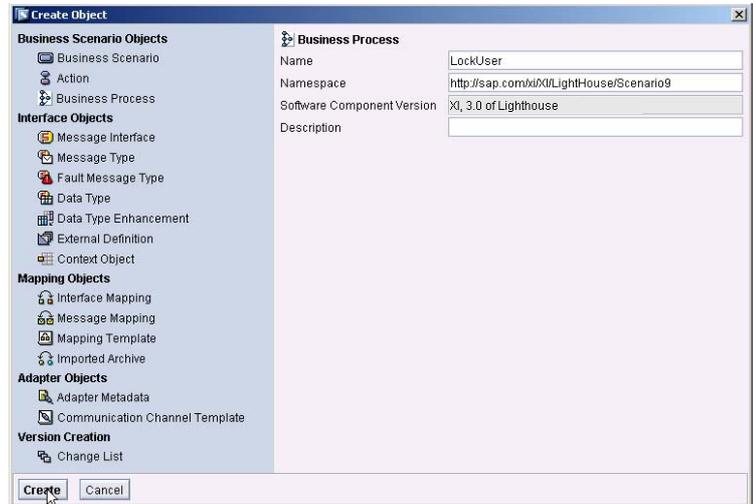


3.2 XI Integration Repository: Define cross-component Business Process

7. Choose “New” in the context menu of “Business Processes” to create a new cross-component Business Process.

Enter name, and description.

Press “Create”.

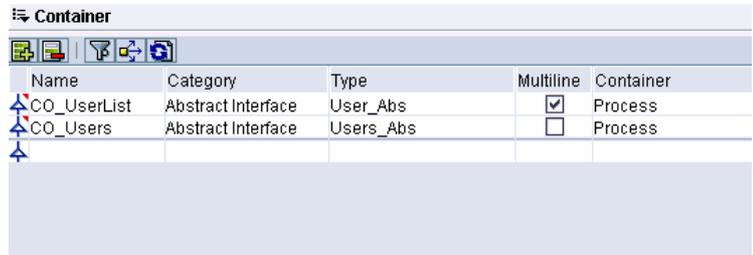


8. Create new Container Elements of category “Abstract Interface” to store message data.

Enter name, and interface.

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

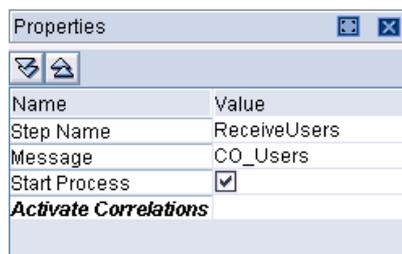
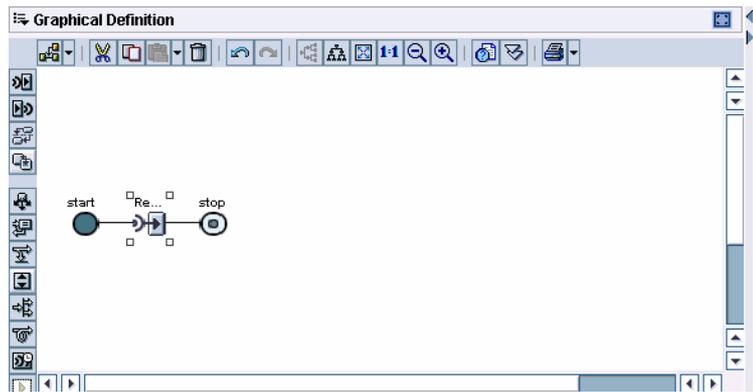
The multi-line Container Element “CO_UserList” is an array of messages. It is used to store the splitted messages.



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”.

Properties	
Name	Value
Step Name	SplitUsers
Interface Mapping	UsersToUser
Source Messages	
Users_Abs http://sap.com/xi/XI/LightHouse/Scenario9	CO_Users
Target Messages	
User_Abs http://sap.com/xi/XI/LightHouse/Scenario9	CO_UserList

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_UserSingle” 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.

Container				
Name	Category	Type	Multiline	Container
CO_UserList	Abstract Interface	User_Abs	<input checked="" type="checkbox"/>	Process
CO_Users	Abstract Interface	Users_Abs	<input type="checkbox"/>	Process
CO_UserSingle	Abstract Interface	User_Abs	<input type="checkbox"/>	ParallelBlock
CO_UserStatus	Abstract Interface	UserStatus_Abs	<input type="checkbox"/>	ParallelBlock
				Process
				ParallelBlock

13. Create a new Correlation "CorrelationUser" in order to assign incoming messages to the appropriate Business Process instances.

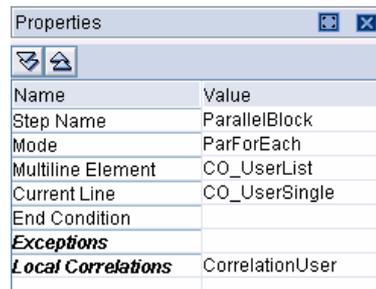
Define a Correlation Container. It should be a unique key in order to ensure unique correlation at runtime.

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.



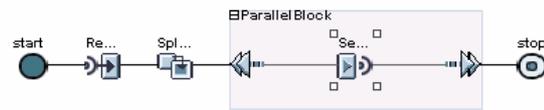
15. Create new Send Step "SendUser" in order to start workflow.

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/Username".



Properties	
Name	Value
Step Name	SendUser
Mode	Asynchronous
Message	CO_UserSingle
Acknowledgment	None
Receiver From	Send Context
Send Context	
Exceptions	
System Error	
Activate Correlati...	CorrelationUser
CorrelationUser	
User	CO_UserSingle./p1:User/Username

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.



Properties	
Name	Value
Step Name	ReceiveStatus
Message	CO_UserStatus
Use Correlations	CorrelationUser
Activate Correlations	

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

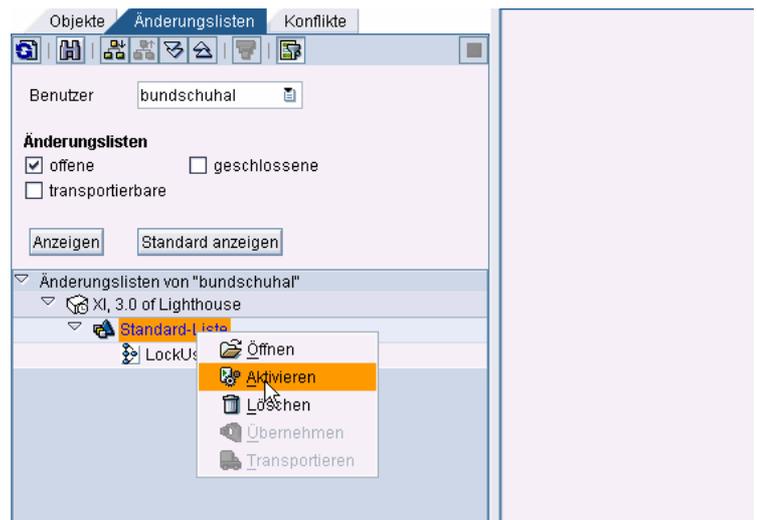
Choose asynchronous mode.

Select Container Element "CO_UserStatus".



Properties	
Name	Value
Step Name	SendStatus
Mode	Asynchronous
Message	CO_UserStatus
Acknowledgment	None
Receiver From	Send Context
Send Context	
Exceptions	
System Error	
Activate Correlations	

18. Save the Business Process, and activate the Change List on tab "Changelist".



3.3 Proxy Framework: Outbound Proxy

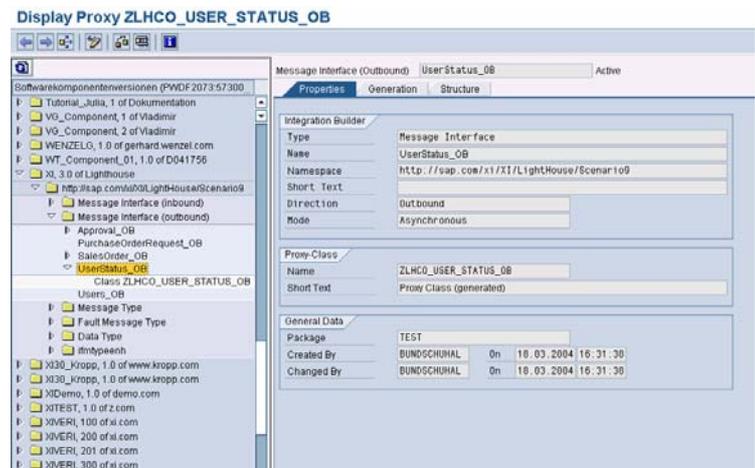
19. Create Outbound Proxy in the Application System.

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.

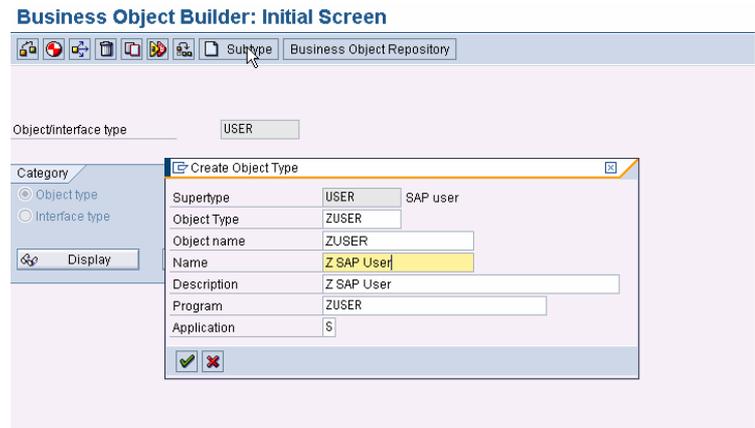


3.4 Business Workflow

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.

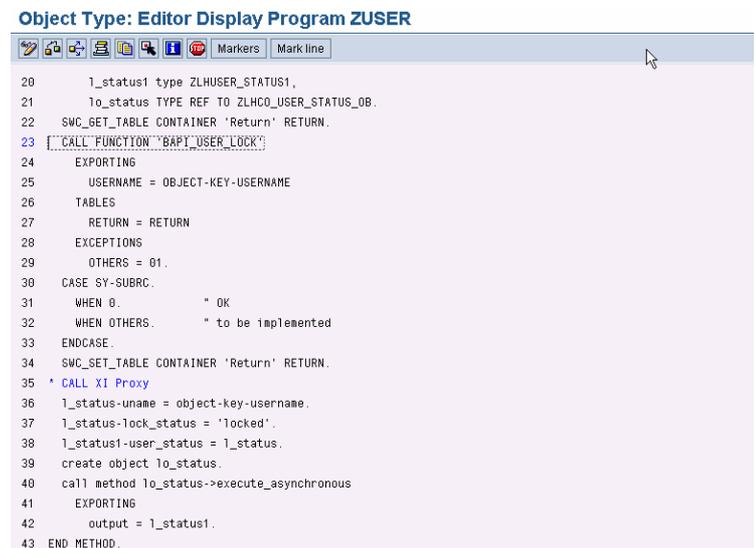
Choose "ZUSER", and enter change
mode.

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 EXECUTE_ASYNCHRONOUS of class ZLHCO_USER_STATUS_OB in order to send status message via outbound proxy.

Save, and generate.

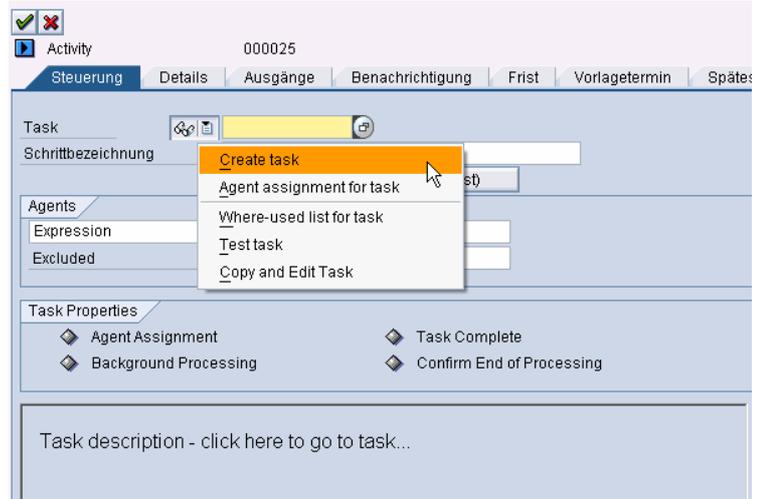


22. Enhance Workflow.

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.

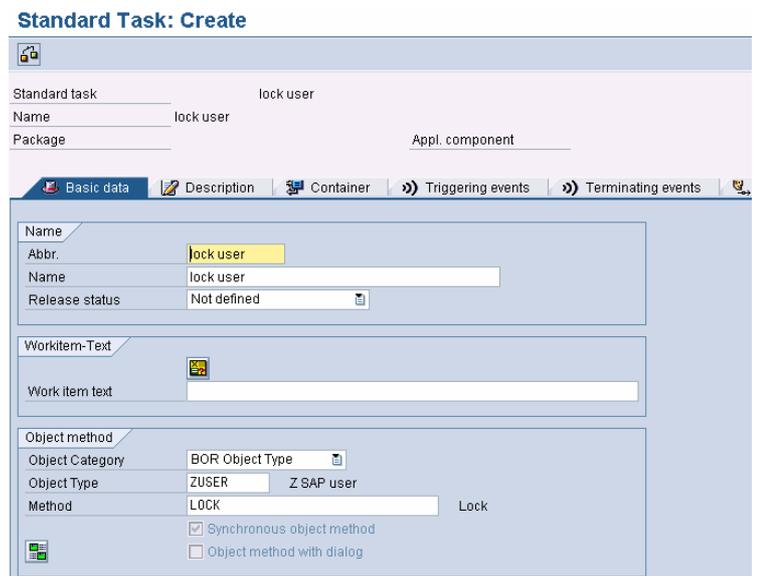


23. Create new Task.

Enter name, and abbreviation.

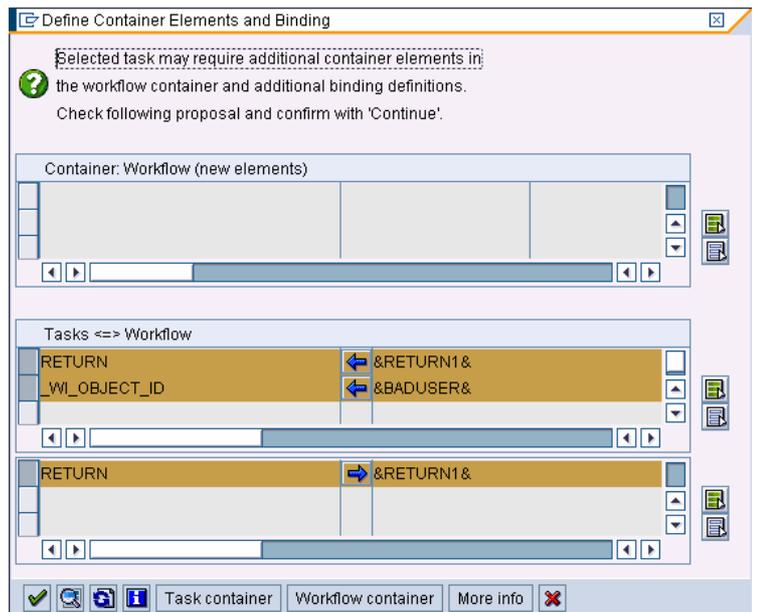
Choose Object Type "ZUSER", and Method "lock".

Save task.



24. Define Container Elements and Binding.

Confirm proposed bindings.

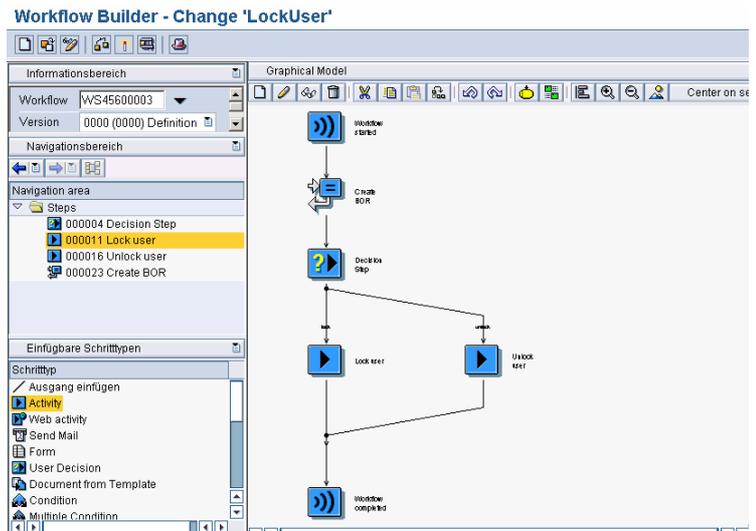


25. Same proceeding for the second branch of the Decision Step.

Create Activity “Unlock User”.

Create new Task, and choose method “unlock”.

Save workflow.



3.5 Proxy Framework: Inbound Proxy

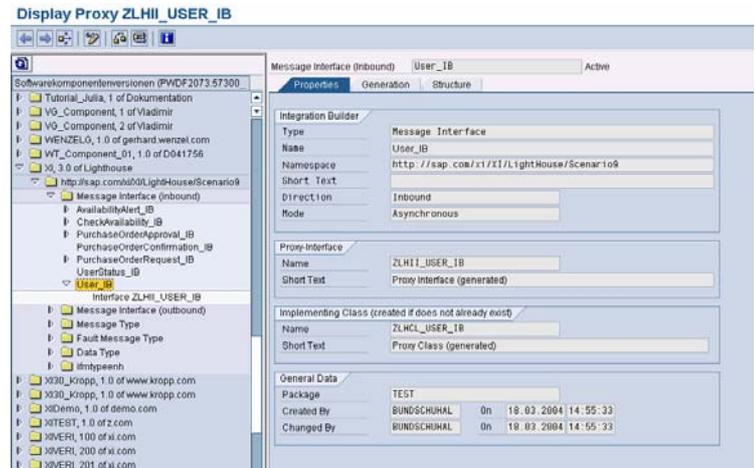
26. Create Inbound Proxy in the Application System.

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.



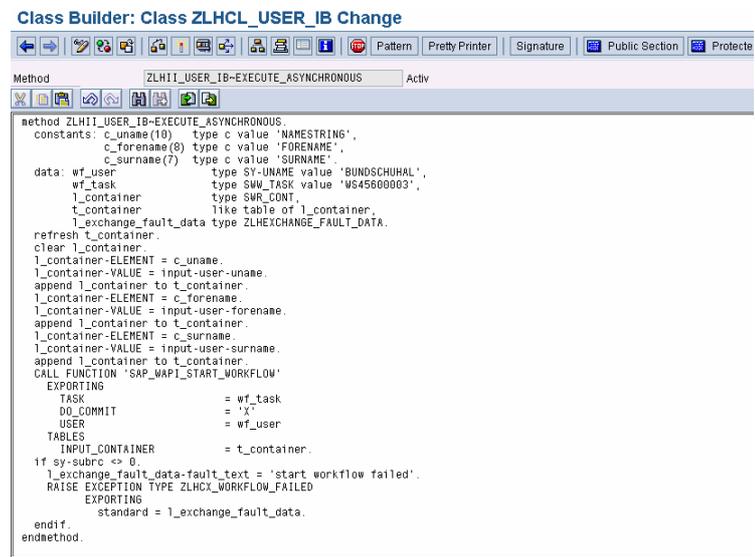
27. Go to the implementing class ZLHCL_USER_IB by double clicking.

Put Cursor on method EXECUTE_ASYNCHRONOUS, 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.

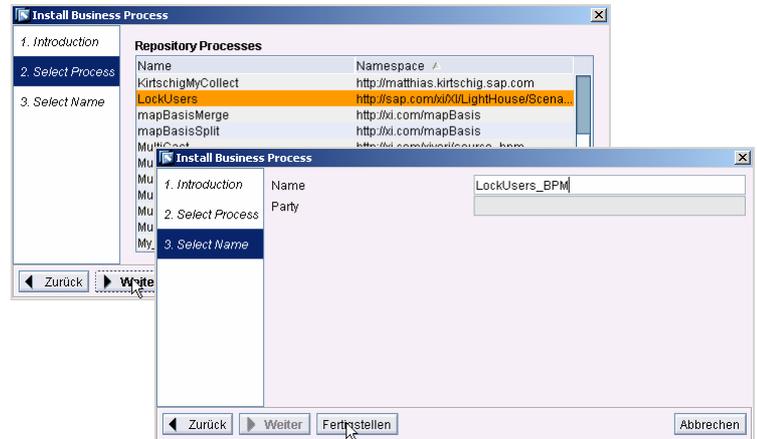
Save, and activate method, class, and interface.



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.



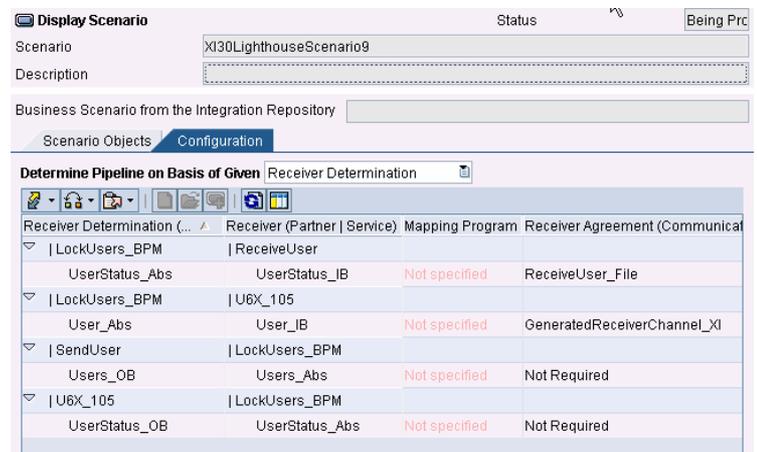
29. Create a communication channel for the business system where the workflow is running (here: U6X_105). Communication is done by ABAP proxy.

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”.

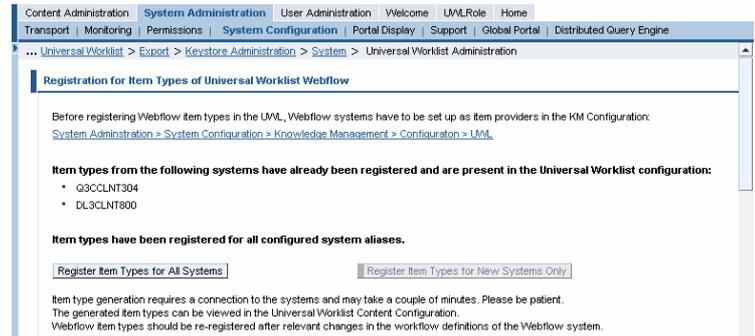


3.7 Unified Worklist

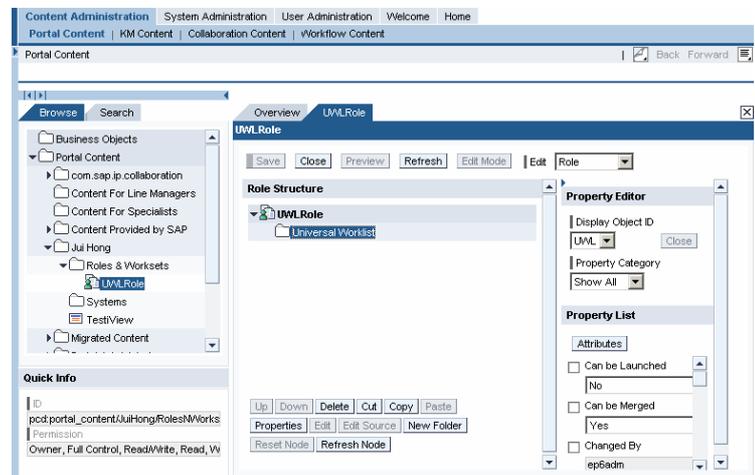
- With the system created in the prerequisite, you need to register the item types for the system with UWL.

Go to System Administrator → System Configuration → Universal Worklist Administration. Click on “Register Item Types for New Systems Only”.

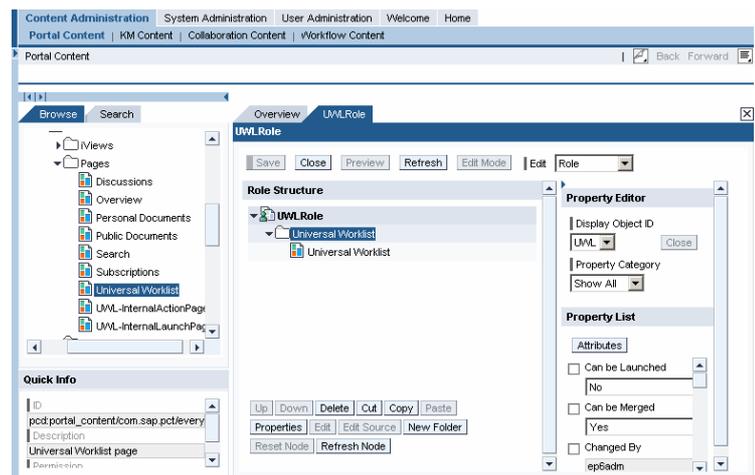
All your systems should appear in the registered list after that.



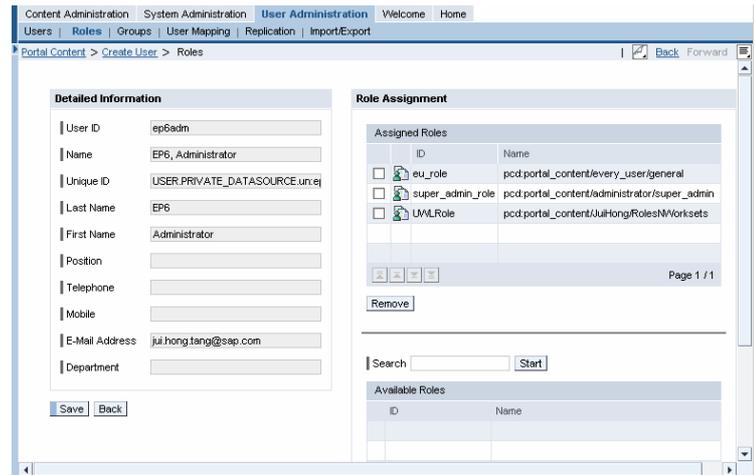
- Create a role with a folder name “Universal Worklist”. Make sure that the Entry Point for the role is set to “Yes”:



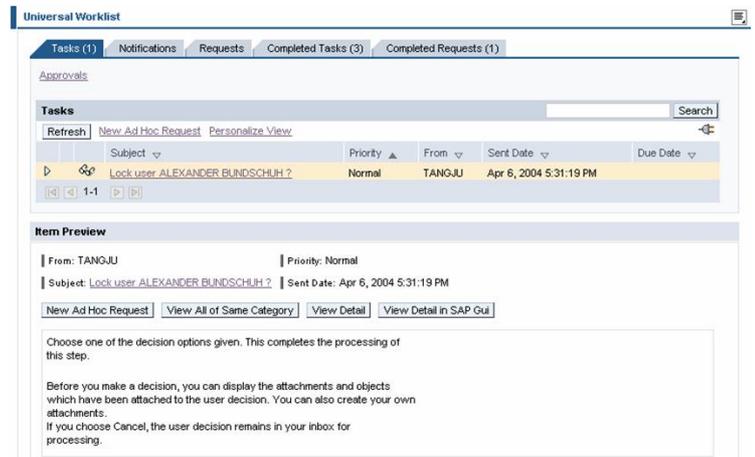
- Assign the Universal Worklist page (Portal Content → Content Provided by SAP → End User Content → Standard Portal Users → Pages → Universal Worklist) to the role as Delta Link.



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 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:

Subject	Priority	From	Sent Date	Due Date
Lock user ALAN RICKAYZEN ?	Normal	TANGJU	Apr 26, 2004 10:52:20 AM	
Lock user AL EXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 26, 2004 10:51:08 AM	
Check Trip of Ellen Rilke	Normal	USI011698	Apr 26, 2004 10:30:41 AM	
Check Trip of Anja Mueller	Normal	USHRMANAGER	Apr 20, 2004 1:56:49 PM	
Check Trip of Mr. Matthew Black	Normal	USBLACKM	Apr 14, 2004 1:02:25 PM	
Check Trip of Timmy Tabasco	Normal	USTABASCOT	Apr 13, 2004 9:13:49 AM	
Check Trip of Miss Ana Maria Magalhães	Normal	USI007765	Apr 12, 2004 9:36:05 PM	
Check Trip of Mr. João Silva	Normal	USI007766	Apr 12, 2004 2:17:16 PM	
Check Trip of Timmy Tabasco	Normal	USTABASCOT	Apr 12, 2004 1:54:47 PM	
Check Trip of Mr. Jack Douglas	Normal	USPROFS_CONS	Apr 8, 2004 9:46:12 AM	

39. Select "Alan" work item by clicking on the subject description, select "unlock", and click "Submit":

Item Detail - Lock user ALAN RICKAYZEN ?

From: TANGJU | Priority: Normal
 Subject: Lock user ALAN RICKAYZEN ? | Sent Date: Apr 26, 2004 10:52:20 AM

[New Ad Hoc Request](#) | [View All of Same Category](#) | [View Detail in SAP Gui](#)

Lock user ALAN RICKAYZEN ?

lock
 unlock

Attributes
 External ID: 00000003006
 Status: Created

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

Item Detail - Lock user ALEXANDER BUNDSCHUH ?

From: TANGJU | Priority: Normal
 Subject: Lock user ALEXANDER BUNDSCHUH ? | Sent Date: Apr 26, 2004 10:51:08 AM

[New Ad Hoc Request](#) | [View All of Same Category](#) | [View Detail in SAP Gui](#)

Lock user ALEXANDER BUNDSCHUH ?

lock
 unlock

Attributes
 External ID: 00000003004
 Status: Created

41. Both work items should now disappear from the Tasks summary:

Universal Worklist

The decision has been completed successfully.

Tasks (12) | Notifications (58 / 55 Unread) | Requests | Completed Tasks (5) | Completed Requests (1)

Approvals

Tasks

[Refresh](#) | [New Ad Hoc Request](#) | [Personalize View](#)

	Subject	Priority	From	Sent Date	Due Date
▶	Check Trip of Ellen Rilke	Normal	USI011698	Apr 26, 2004 10:30:41 AM	
▶	Check Trip of Anja Mueller	Normal	USHRMANAGER	Apr 20, 2004 1:58:49 PM	
▶	Check Trip of Mr. Matthew Black	Normal	USBLACKM	Apr 14, 2004 1:02:25 PM	
▶	Check Trip of Timmy Tabasco	Normal	USTABASCOT	Apr 13, 2004 9:13:49 PM	
▶	Check Trip of Miss Ana Maria Magalhães	Normal	USI007765	Apr 12, 2004 9:36:05 PM	
▶	Check Trip of Mr. João Silva	Normal	USI007766	Apr 12, 2004 2:17:16 PM	
▶	Check Trip of Timmy Tabasco	Normal	USTABASCOT	Apr 12, 2004 1:54:47 PM	
▶	Check Trip of Mr. Jack Douglas	Normal	USPROFS_CONS	Apr 8, 2004 9:46:12 AM	
▶	Check Trip of Timmy Tabasco	Normal	USI007766	Apr 7, 2004 2:56:19 PM	
▶	Check Trip of Mr. Matthew Black	Normal	USBLACKM	Apr 2, 2004 2:19:58 PM	

1-10 11-12

42. Click on the Completed Tasks tab, and you should see both work items in it:

The screenshot shows the 'Universal Worklist' interface with the 'Completed Tasks' tab selected. The table below represents the data shown in the screenshot.

	Subject	Priority	From	Sent Date	Completed Date	Decision
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 26, 2004 10:51:08 AM	Apr 26, 2004	
▶	Lock user ALAN RICKAYZEN ?	Normal	TANGJU	Apr 26, 2004 10:52:20 AM	Apr 26, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 26, 2004 4:37:31 AM	Apr 26, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 12, 2004 2:18:48 PM	Apr 26, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 6, 2004 5:31:19 PM	Apr 6, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 6, 2004 5:28:51 PM	Apr 6, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Low	TANGJU	Apr 6, 2004 5:23:10 PM	Apr 6, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 2, 2004 12:42:28 PM	Apr 6, 2004	
▶	Lock user ALEXANDER BUNDSCHUH ?	Normal	TANGJU	Apr 2, 2004 11:47:11 AM	Apr 2, 2004	

43. As a result, you should receive the status of each user in XML format.

The screenshots show the XML responses received in Internet Explorer. The top window shows the XML for user BUNDSCHUH, and the bottom window shows the XML for user RICKAYZEN.

```
<?xml version="1.0" encoding="utf-8" ?>
- <nr1:UserStatus xmlns:nr1="http://sap.com/xi/XI/Lighthouse/Scenario9">
  <Uname>BUNDSCHUH</Uname>
  <LockStatus>locked</LockStatus>
</nr1:UserStatus>
```

```
<?xml version="1.0" encoding="utf-8" ?>
- <nr1:UserStatus xmlns:nr1="http://sap.com/xi/XI/Lighthouse/Scenario9">
  <Uname>RICKAYZEN</Uname>
  <LockStatus>unlocked</LockStatus>
</nr1:UserStatus>
```

4 Appendix (Sample ABAP Coding)

4.1 Inbound Proxy: Method EXECUTE_ASYNCHRONOUS

```
method ZLHII_USER_IB~EXECUTE_ASYNCHRONOUS.
  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.

```

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