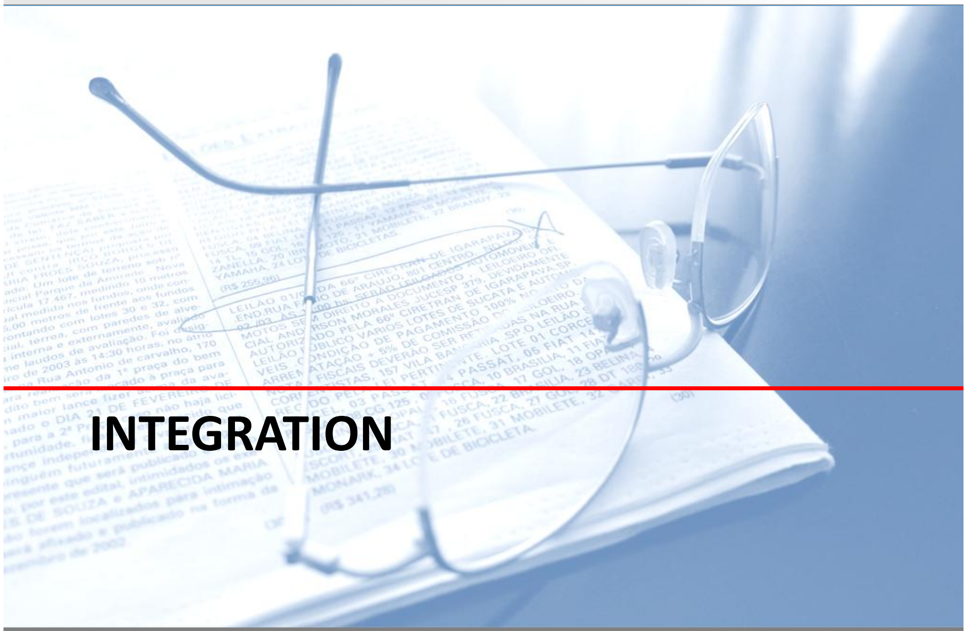

INTEGRATION

Web Service Node

- Web service node can be used to invoke web services from process
- Web service can be used as a Node or can also be added as action at other nodes.
- Web Service action provides easy way to configure client to invoke web service.
- Web service node may have error and compensation actions to handle web service errors.

Web Services Setting: General

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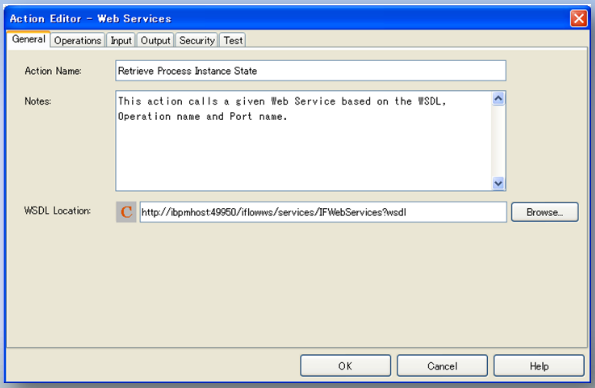
- Specify the WSDL URL to start setting up web service action.
- WSDL URL can be typed in or can be selected from a UDA or application variable
- Application variables are shown as “**%**<variable name>**%**”


Action Editor – Web Services
General | Operations | Input | Output | Security | Test
Browse...
OK
Cancel
Help

Action Name: Retrieve Process Instance State

Notes: This action calls a given Web Service based on the WSDL, Operation name and Port name.

WSDL Location: http://ibpmhost:49950/iflowws/services/IFWebServices?wsdl

Web Services Setting: General

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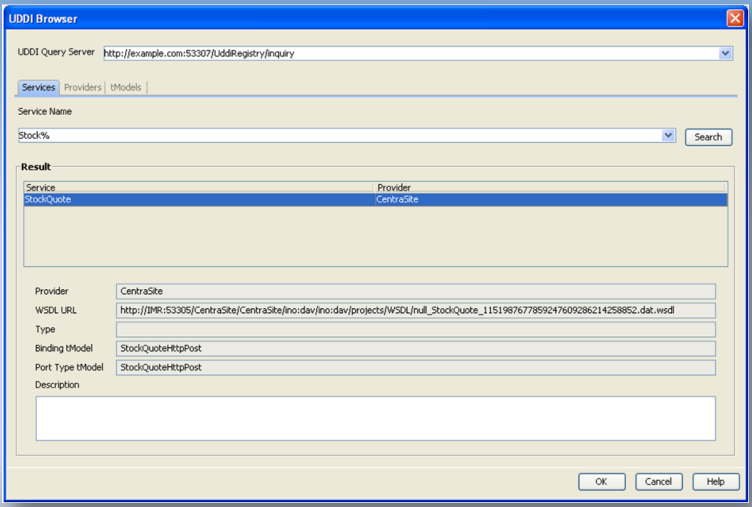
- Web service can also be browsed and located on UDDI



UDDI Query Server: http://example.com:53307/UddiRegistry/inquiry

Service Name: Stock%

Result

Service	Provider
StockQuote	CentraSite

Provider: CentraSite

WSDL URL: http://IMR:53305/CentraSite/CentraSite/ino:dav/ino:dav/projects/WSDL/null_StockQuote_11519876778592476092862l4258852.dat.wsdl

Type:

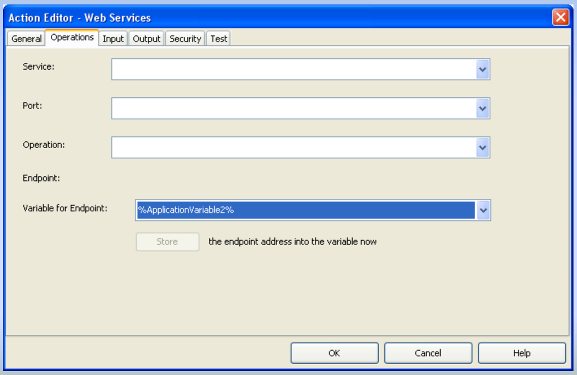
Binding tModel: StockQuoteHttpPost

Port Type tModel: StockQuoteHttpPost

Description:

Web Services Setting: Operations

- Select Service, Port and Operations from the dropdowns
- Dropdown values are populated from WSDL
- Endpoint can be dynamically specified using a UDA or an application variable.


Action Editor - Web Services

Service:

Port:

Operation:

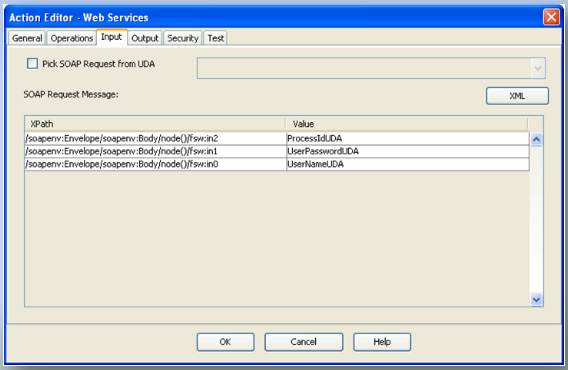
Endpoint:

Variable for Endpoint: %ApplicationVariable2%

the endpoint address into the variable now

Web Services Setting: Input

- Input is the input payload for the service invocation.
- Input can be read from an XML UDA, typed-in or constructed using UDAs
- For using XML UDA as input, select the checkbox, “Pick SOAP Request from UDA” and select UDA from dropdown


Action Editor - Web Services

☐ Pick SOAP Request from UDA

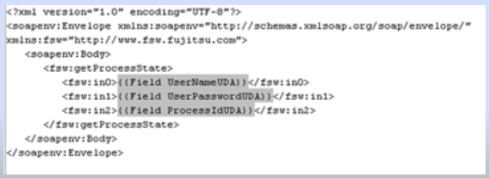
SOAP Request Message:

XPath	Value
/soapenv:Envelope/soapenv:Body/node()/fsw:in2	ProcessIdUDA
/soapenv:Envelope/soapenv:Body/node()/fsw:in1	UserPasswordUDA
/soapenv:Envelope/soapenv:Body/node()/fsw:in0	UserNameUDA

Web Services Setting: Input

- Using UDAs
  - Based on the input information from WSDL and selected operations, XPath table is populated
  - Select UDA in each row to update the attribute value
- XML
  - Select XML button, it shows the free text editor with default input XML
  - Update XML as required.
  - Attribute values can be hardcoded
  - To use UDAs for attribute values

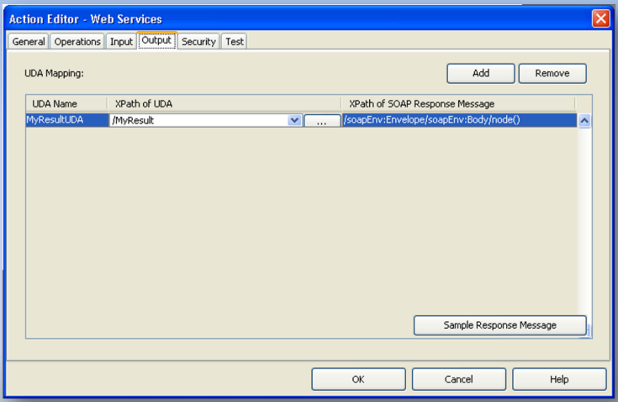
    *{{Field **<uda_name>**}}*



```
<?xml version="1.0" encoding="UTF-8"?>
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:fsw="http://www.fsw.fujitsu.com">
   <soapenv:Body>
      <fsw:getProcessState>
         <fsw:in0>((Field UserNameUDA))</fsw:in0>
         <fsw:in1>((Field UserPasswordUDA))</fsw:in1>
         <fsw:in2>((Field ProcessIdUDA))</fsw:in2>
      </fsw:getProcessState>
   </soapenv:Body>
</soapenv:Envelope>
```

Web Services Setting: Output

- Output from web service, or response processing can be configured in this section.
  - Store response in an XML UDA
  - Extract data from response using XPath and store in UDAs



UDA Mapping:

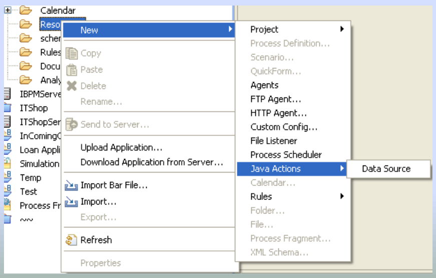
UDA Name	XPath of UDA	XPath of SOAP Response Message
MyResultUDA	/MyResult	/soapEnv:Envelope/soapEnv:Body/node()

Web Services Setting: Security

- If web service requires authentication, username/password can be specified in Security tab
- Test tab allows to test the service in Studio

Database Action

- There are four database actions available to perform CRUD operations on any database.
  - Delete SQL Java Action
  - Insert SQL Java Action
  - Select SQL Java Action
  - Update SQL Java Action
- Database connection information is specified in an XML file
- Create Database configuration



Data source Configuration

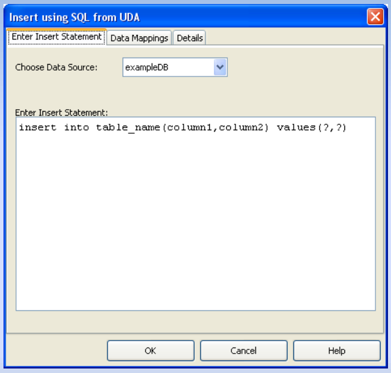
- Database connection information is stored in DataSourceDefinition.xml file

```
<DataSources>
<DataSource name="JAVAACTION_DB">
    <property name="UserName" type="String">DB_USERNAME</property>
    <property name="Password" type="String">DB_PASSWORD</property>
    <property name="URL" type="String">DATABASE_URL</property>
    <property name="DriverClassName" type="String">DATABASE_DRIVER_CLASS_NAME</property>
</DataSource>
</DataSources>
```

- There may be more than one data source settings in the file.
- Database action settings start with selecting the Data source

DB Action: Settings

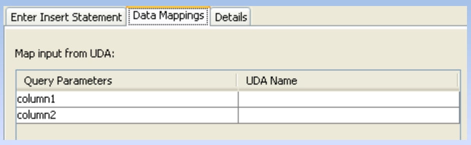
- Specify the query
  - Only simple queries can be used with this action
  - Use “?” for each column value, ? Can be mapped with UDAs to substitute values at runtime.



Choose Data Source: exampleDB

Enter Insert Statement:

```
insert into table_name(column1,column2) values(?,?)
```



Map input from UDA:

Query Parameters	UDA Name
column1	
column2	

Agents

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- Agents are configurable system nodes, executed by server
- Agents can be used to connect to external systems to perform some task or exchange data.
- Agents are Java Programs, configuration information is stored in XML files.
- There are two agents available out-of-the-box
  - FTP
  - HTTP
- Interstage BPM provides a framework for creating custom Agents

Creating Agents

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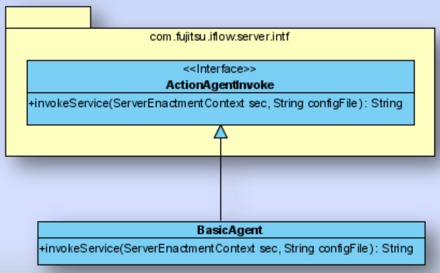
- Create a Java class that implements the *ActionAgentInvoke* interface
- Implement method
  - *invokeService(ServerEnactmentContext sec, String configFile)*
  - This method is invoked by engine automatically when agents execute.
- Create XML Configuration File


com.fujitsu.iflow.server.intf
<<Interface>>
ActionAgentInvoke
+invokeService(ServerEnactmentContext sec, String configFile): String
BasicAgent
+invokeService(ServerEnactmentContext sec, String configFile): String

Agent Config File

- To create config file
  - right click on “resources” folder in the application
  - Select “New → Agents”
  - It creates a default *agentsConfig.xml* in the resources folder
  - Edit config file to add configuration for agents.
  - File can contain multiple agent configurations.

```
<ActionAgentList>
 <ActionAgent>
  <Name>@BasicAgent</Name>
  <Description>Demonstrate Basic Agent</Description>
  <RetryInterval>20</RetryInterval>
  <EscalationInterval>1</EscalationInterval>
  <ClassName>com.fujitsu.fast.BasicAgent</ClassName>
  <ClassPath>\\Interstage\\IBPM\\classes</ClassPath>
  <ConfigFile></ConfigFile>
 </ActionAgent>
</ActionAgentList>
```

Agent Class

```
package com.fujitsu.iflow.server.intf;

public class ServiceAgent implements interface ActionAgentInvoke
{
        public String invokeService(ServerEnactmentContext sec, String configFile)
                throws Exception;
        {
                ……………………………..<code/logic here>…..
                …
                ..
                return <String>;
        }
}
```

- invokeService method in Agent, returns a string value which is interpreted by engine as “choice” to continue processing
  - Return “null” : engine continues to retry based on config setting
  - Return a string value: engine tries to match it with names of outgoing arrows and makes choice on the matching arrow. If none of the choices match, throws exception
  - Agent throws exception: process goes to error state.

Assigning Agent to a Node

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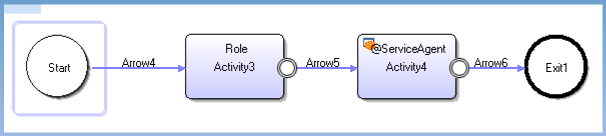

- Agent is associated with an Activity Node
- Activity node's role should match with Agent name in agentConfig.xml file, prefixed with "@" e.g. "@ServerAgent"

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Trigger and Listener

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- Triggers allow Business Processes to respond to external events
- Trigger can be
  - An incoming email
  - An incoming file
- Triggers are typically used to
  - Create and Start a process instance
  - Take action on an Activity node
- Listeners are configured to listen to events, and Triggers process the event to take necessary action.
- File Listener
  - Can process XML files, extract data and update UDAs

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File Trigger and Listener

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- Configuring a file based trigger and listener requires
  - Listener
    - Create listener configuration file
    - Specify listener settings
  - Trigger
    - Add trigger to process or node
    - Configure event setting
    - Provide data mapping
    - Define action

Listener Configuration

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- To add a file listener configuration
  - Right click on “resources” folder in application
  - Select “New → File Listener”
  - Default config file *FileListenerConf.xml* will be created in resources folder.

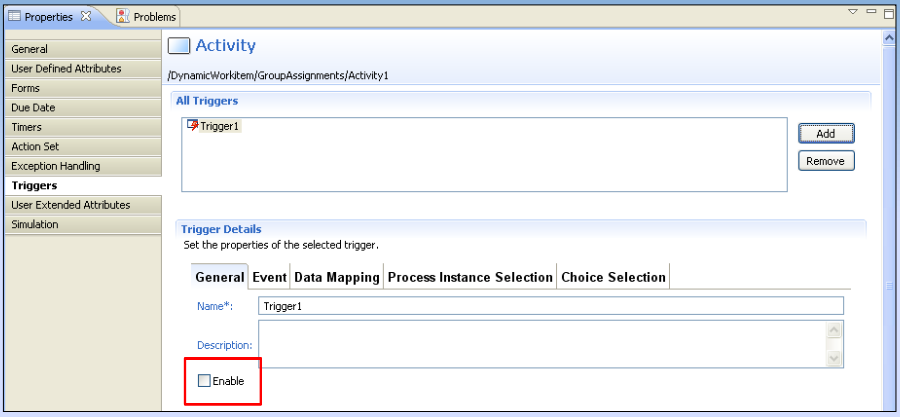
```
<FileListener>
<Directory>
<Path></Path>
<ScanInterval>60000</ScanInterval>
<StabilizationPeriod>2000</StabilizationPeriod>
<FileHandlerClass>com.fujitsu.iflow.server.impl.serverimpl.TriggerHandler</FileHandlerClass>
<PostProcessing>
  <onSuccess>
    <Delete></Delete>
  </onSuccess>
  <onError>
    <Move></Move>
  </onError>
</PostProcessing>
</Directory>
</FileListener>
```

Listener Configuration

Tag	Description
<directory>	Listener monitors file directory for incoming files, each directory tag represents one directory to be monitored
<path>	Path of the directory
<ScanInterval>	Time interval in milliseconds after which the directory is scanned for any new incoming file
<StabilizationPeriod>	Time interval in milliseconds for which the size of the file is observed (to see if it has changed) before it is processed.
<PostProcessing><onSuccess>	Action to be taken if the file is successfully processed. Possible actions are <Delete> or <Move>
<PostProcessing><onError>	Action to be taken if the file is not successfully processed. Possible actions are <Delete> or <Move>.
<Delete>	Deletes the file.
<Move>	1. In non-SaaS mode, move file to any specified directory 2. In SaaS mode or non-SaaS mode when path is not specified moves the file to: *“<ServerSharedRoot>/tenants/<tenant name>/apps/<application ID>/filelistener/**<error/success>***

Trigger

- Add trigger to process or activity node



Activity
/DynamicWorkitem/GroupAssignments/Activity1
All Triggers
Trigger1
Trigger Details
Set the properties of the selected trigger.
Name*: Trigger1
Description:
☐ Enable

Trigger Settings: Event

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- Event settings are used to filter and process the event
  - URL for XML Schema
    - Specify the URL of the schema against which the incoming file will be validated and processed
    - This is a mandatory field
  - Event Filter
    - Used to filter and process only specific events, conditions can be specified using JavaScript.
    - For example: the condition to start an instance only if the price of the item is greater than $20.00 is

```
Packages.java.lang.Float.parseFloat(
            eventData.getXMLData("/shiporder/item/price/text()")) > 20
```

Trigger Settings: Data Mapping

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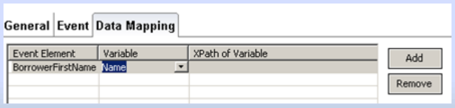
- In this section we define the mapping between XML data and UDAs to extract data from XML file
- Data mapping table allows mapping data using schema

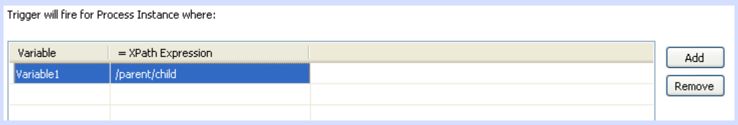
- To map data
  - Click “add” to add a row
  - Event Element: schema or xml element name
  - Variable: UDA variable
  - XPath of Variable: if UDA is an XML type, then define XPath to update an element value.



Event Element	Variable	XPath of Variable
BorrowerFirstName	Name	

Trigger Settings: Process Instance Selection

- This option is available only for activity level trigger
- Allows to filter process instances based on predefined condition
- Incoming file data is matched with UDAs in waiting process to filter the right process to invoke for this file.
- If there are one or more instances waiting for the event, it will be processed if
  - Value of UDA matches the element value in XML data defined by XPath
  - There can be one or more UDA mappings defined here


Trigger will fire for Process Instance where:

Variable	= XPath Expression
Variable1	/parent/child

Trigger Settings: Choice Selection

- This option is available only for activity level trigger
- Allows to make choice on the node as part of trigger action, based on predefined conditions
- Choice Conditions
  - Name of the choice
  - True/False or JavaScript expression using the data from XML that evaluates in true or false.
  - Engine will make choice on whichever choice evaluates to true.
  - There can be a default choice, in case none evaluates to true.

Email Listener

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Property Name	Value
EmailListenerAutoReplyEnabled	enables or disables the Interstage BPM Server sending out a message in response to the 1. receipt of the task completion email message 2. receipt of the email message containing Trigger payload
EmailListenerDeleteInvalidMessages	This parameter enables or disables the deletion of invalid task completion email messages
EmailListenerEmailAddress	Email message of the listener account
EmailListenerEnabled	Enable/disable (true/false) listener
EmailListenerPassword	Password for the mail server
EmailListenerPollingInterval	Initial value 900 seconds
EmailListenerPOPPort	Initial value 110
EmailListenerPropertiesFile	Properties file containing parameters required to access POP3 (optional)
EmailListenerServerHost	
EmailListenerUserName	Username for the mail server
EmailStyleSheetFile	Style sheet file for formatting task messages

Email Trigger

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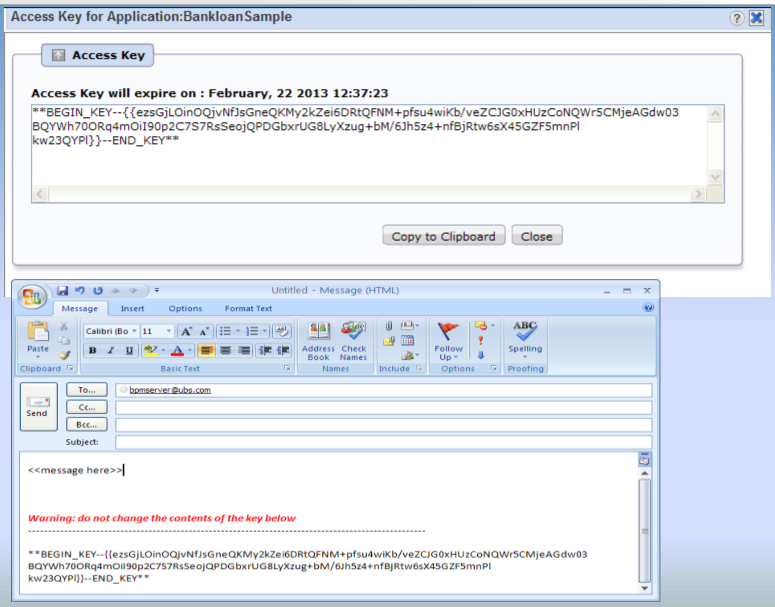
- Triggers for email listeners work the same way as for file listeners.
- Email message must have xml file as attachment for event processing
- If more than one files are attached, 1st attachment is processed.
- Email message must be sent to email specified in "*EmailListenerEmailAddress*" setting

- Message body must also contain ***access key*** for the application.
  - Access keys are unique encryption keys that allows external systems to access BPM application and perform action.
  - Application key can be generated from application settings in console.
  - By default, key expires in 365 days. Expiration period can be changed by updating configuration parameter "*ApplicationAccessKeyExpiration*"

    ApplicationAccessKeyExpiration.BankLoanApplication = 120

Access Key


Access Key for Application:BankloanSample

Access Key

Access Key will expire on : February, 22 2013 12:37:23

```
**BEGIN_KEY--{{ezsGjLOinOQjvNfJsGneQKMy2kZei6DRtQFNM+pfsu4wiKb/veZCJG0xHUzCoNQWr5CMjeAGdw03
BQYWh70ORq4mOiI90p2C7S7RsSeojQPDGbxrUG8LyXzug+bM/6Jh5z4+nfBjRtw6sX45GZF5mnPl
kw23QYPl}}--END_KEY**
```

Copy to Clipboard Close

Untitled - Message (HTML)

To... bpmserver@ubs.com

Cc...

Bcc...

Subject:

<<message here>>

Warning: do not change the contents of the key below

```
-----------------------------------------------------------------------------------------------------

**BEGIN_KEY--{{ezsGjLOinOQjvNfJsGneQKMy2kZei6DRtQFNM+pfsu4wiKb/veZCJG0xHUzCoNQWr5CMjeAGdw03
BQYWh70ORq4mOiI90p2C7S7RsSeojQPDGbxrUG8LyXzug+bM/6Jh5z4+nfBjRtw6sX45GZF5mnPl
kw23QYPl}}--END_KEY**
```

Email Notification

- Users can receive notifications when tasks are assigned to them.
- Receive and save task as calendar event for easy reminders
- Complete task by replying to emails
- Useful for users in the field, they can access their emails on smart phones and complete the task without requiring to login to BPM console.

Email Notification

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- Email Message contains
  - Task details:
    - Name, with ID;
    - Description;
    - URL (which will take the users to the console);
    - List of all the responsible users for this task (Assignees);
    - Task Priority;
    - Name of the Process, with ID;
  - Work List UDAs (name/value pairs);
  - List of Workitem Choices;
  - iCal Event for the Task;
  - All choices for the task will be shown as "mailto" links. The users make their choice by clicking on the appropriate "mailto" link and then sends the auto generated response email with any comments.

Email Notification Message

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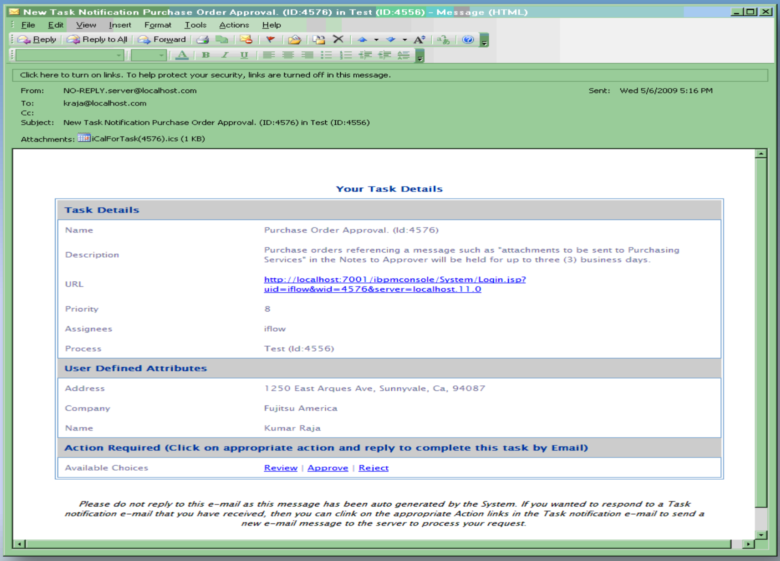

New Task Notification Purchase Order Approval. (ID:4576) in Test (ID:4556) - Message (HTML)
File Edit View Insert Format Tools Actions Help
Reply Reply to All Forward

Click here to turn on links. To help protect your security, links are turned off in this message.

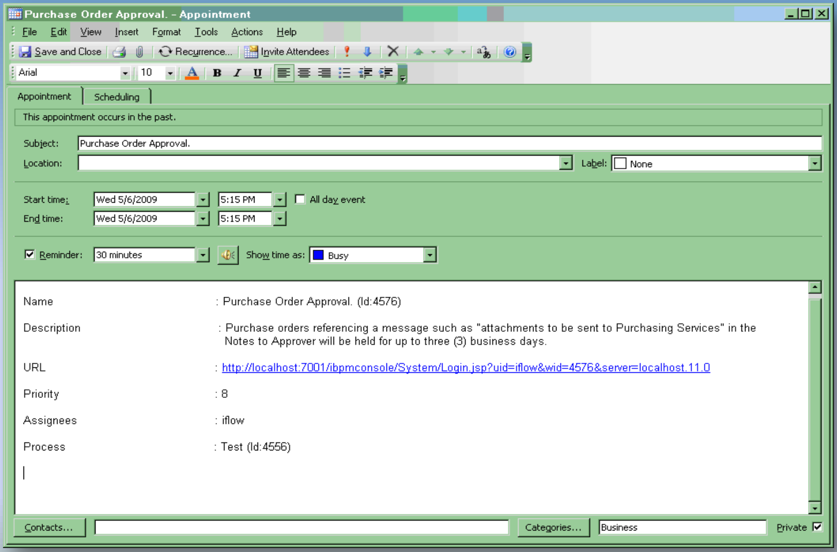
From: NO-REPLY.server@localhost.com Sent: Wed 5/6/2009 5:16 PM
To: kraja@localhost.com
Cc:
Subject: New Task Notification Purchase Order Approval. (ID:4576) in Test (ID:4556)
Attachments: iCalForTask(4576).ics (1 KB)

Your Task Details

Task Details	
Name	Purchase Order Approval. (Id:4576)
Description	Purchase orders referencing a message such as "attachments to be sent to Purchasing Services" in the Notes to Approver will be held for up to three (3) business days.
URL	http://localhost:7001/ibpmconsole/System/Login.jsp?uid=iflow&wid=4576&server=localhost.11.0
Priority	8
Assignees	iflow
Process	Test (Id:4556)
User Defined Attributes	
Address	1250 East Arques Ave, Sunnyvale, Ca, 94087
Company	Fujitsu America
Name	Kumar Raja
Action Required (Click on appropriate action and reply to complete this task by Email)	
Available Choices	Review | Approve | Reject

Please do not reply to this e-mail as this message has been auto generated by the System. If you wanted to respond to a Task notification e-mail that you have received, then you can clink on the appropriate Action links in the Task notification e-mail to send a new e-mail message to the server to process your request.

Send Email to Complete Task



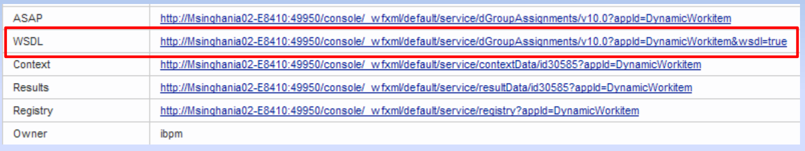
This appointment occurs in the past.

Subject:	Purchase Order Approval.
Location:	
Label:	None
Start time:	Wed 5/6/2009 5:15 PM
End time:	Wed 5/6/2009 5:15 PM
All day event	☐
Reminder:	✓ 30 minutes
Show time as:	Busy
Categories:	Business
Private	✓

Name	: Purchase Order Approval. (Id:4576)
Description	: Purchase orders referencing a message such as "attachments to be sent to Purchasing Services" in the Notes to Approver will be held for up to three (3) business days.
URL	: http://localhost:7001/ibpmconsole/System/Login.jsp?uid=iflow&wid=4576&server=localhost.11.0
Priority	: 8
Assignees	: iflow
Process	: Test (Id:4556)

Process as Web Service

- All processes are published as web service
- External applications can access process using Web service clients and perform operations.
- WSDL URLs are available on Process Definition Details Tab



ASAP	http://Msinghania02-E8410:49950/console/_wfxml/default/service/dGroupAssignments/v10.0?appId=DynamicWorkitem
WSDL	http://Msinghania02-E8410:49950/console/_wfxml/default/service/dGroupAssignments/v10.0?appId=DynamicWorkitem&wsdl=true
Context	http://Msinghania02-E8410:49950/console/_wfxml/default/service/contextData/id30585?appId=DynamicWorkitem
Results	http://Msinghania02-E8410:49950/console/_wfxml/default/service/resultData/id30585?appId=DynamicWorkitem
Registry	http://Msinghania02-E8410:49950/console/_wfxml/default/service/registry?appId=DynamicWorkitem
Owner	ibpm

- Operations
  - Create Instance
  - List Instances
  - GetProperties
  - GetDefinition
  - SetDefinition

Web Service Interface

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- There are number of web service interfaces available for accessing BPM engine
- WorkItem List (Task List) Web Service Interface
  - WSDL URL:
    - <ServerBaseURL>/_wfxml/<tenantname>/service/wilist?appId=<application ID>&wsdl=true
  - Operations
    - GetWorkitemList
- Process Instance List Web Services
  - WSDL URL
    - <ServerBaseURL>/_wfxml/<tenant name>/service/pilist?appId=<application ID>&wsdl=true
  - Operation
    - GetProcessInstanceList

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Web Service Interface

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- Process Definition List Web Services
  - WSDL URL
    - <ServerBaseURL>/_wfxml/<tenant name>/service/pdlist?appId=<application ID>&wsdl=true
  - Operation
    - GetProcessDefinitionList
- Workitem (Task) Web Services
  - WSDL URL
    - <ServerBaseURL>/_wfxml/<tenant name>/service/w<workitemID>?appId=<application ID>&wsdl=true
  - Operation
    - GetProperties
    - UpdateWorkItem

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Web Service Interface

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- Process Instance Web Services
  - WSDL URL
    - <ServerBaseURL>/_wfxml/<tenant name>/service/p<processInstanceID>?appId=<application ID>&wsdl=true
  - Operation
    - GetDetails
    - UpdateDataItems
    - ChangeState

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