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Building a Custom BPM Worklist

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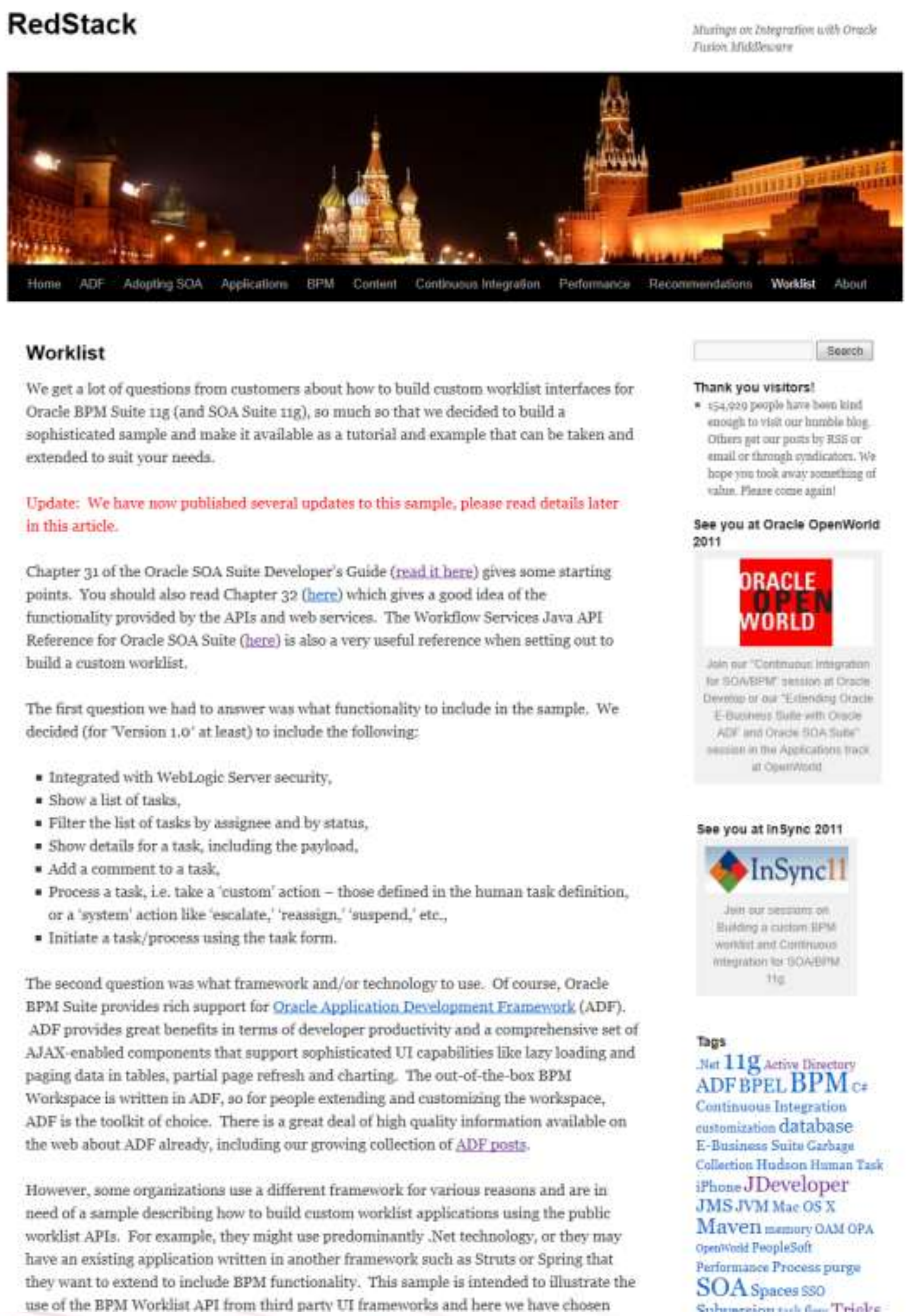
Overview

Overview

- Lots of people ask us how to build a custom BPM worklist, so we decided to build a sample!
- The (as-is) sample is available in three ways:
  - A complete walkthrough on http://redstack.wordpress.com/worklist
  - Full source code and (Javadoc) documentation from our Subversion server on OTN
  - WAR files you can download and deploy



Worklist

We get a lot of questions from customers about how to build custom worklist interfaces for Oracle BPM Suite 11g (and SOA Suite 11g), so much so that we decided to build a sophisticated sample and make it available as a tutorial and example that can be taken and extended to suit your needs.

Update: We have now published several updates to this sample, please read details later in this article.

Chapter 31 of the Oracle SOA Suite Developer's Guide (read it here) gives some starting points. You should also read Chapter 32 (here) which gives a good idea of the functionality provided by the APIs and web services. The Workflow Services Java API Reference for Oracle SOA Suite (here) is also a very useful reference when setting out to build a custom worklist.

The first question we had to answer was what functionality to include in the sample. We decided (for 'Version 1.0' at least) to include the following:

- Integrated with WebLogic Server security,
- Show a list of tasks,
- Filter the list of tasks by assignee and by status,
- Show details for a task, including the payload,
- Add a comment to a task,
- Process a task, i.e. take a 'custom' action – those defined in the human task definition, or a 'system' action like 'escalate,' 'reassign,' 'suspend,' etc.,
- Initiate a task/process using the task form.

The second question was what framework and/or technology to use. Of course, Oracle BPM Suite provides rich support for Oracle Application Development Framework (ADF). ADF provides great benefits in terms of developer productivity and a comprehensive set of AJAX-enabled components that support sophisticated UI capabilities like lazy loading and paging data in tables, partial page refresh and charting. The out-of-the-box BPM Workspace is written in ADF, so for people extending and customizing the workspace, ADF is the toolkit of choice. There is a great deal of high quality information available on the web about ADF already, including our growing collection of ADF posts.

However, some organizations use a different framework for various reasons and are in need of a sample describing how to build custom worklist applications using the public worklist APIs. For example, they might use predominantly .Net technology, or they may have an existing application written in another framework such as Struts or Spring that they want to extend to include BPM functionality. This sample is intended to illustrate the use of the BPM Worklist API from third party UI frameworks and here we have chosen

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Join our sessions on Building a custom BPM worklist and Continuous Integration for SOA/BPM 11g

Tags

.Net 11g Active Directory ADF BPEL BPM C# Continuous Integration customization database E-Business Suite Garbage Collection Hudson Human Task iPhone JDeveloper JMS JVM Mac OS X Maven memory OAM OPA OpenWorld PeopleSoft Performance Process purge SOA Spaces SSO Subversion task flow Tricks

Overview

- What functionality does it cover (currently)?

- Task list
  - Filter by status and assignee
- Task details
  - Payload
  - Comments
  - Attachments
  - Process task (custom and system actions)
  - Navigate to owning instance

- Process instance list
  - Filter by status
- Process instance details
  - Show tasks that are part of instance
  - Show audit image (process map)
- Sample chart

Overview

- What technology is it built with?

- Java (of course)
- Spring Web MVC
- JSP and JSTL for the view

But designed so you can easily replace the front end

- Protovis from Stanford Visualization Group for charting
- Maven for dependency management and build
- Hudson for continuous integration
- Subversion for version control
- vi for editing source files ☺

- No ADF – there are plenty of ADF samples available already

Setting up the development environment

Setting up the development environment

- Version control
  - Subversion ☺
  - git?
- Build management
  - Install dependencies into Maven repository – use the script to populate Maven from an Oracle Home
- Set up a test environment
  - Installation of the BPM server
  - Define some processes/tasks to use for testing

Creating the skeleton project

Creating the skeleton project

```
/                                 project root
  - src                           source files
  | - main                        source files for our application
  | | - java                      java source files
  | | | - com
  | | | | - oracle
  | | | | | - ateam               Spring Controllers
  | | | | | | - domain            'business logic' - the Model
  | | | | | | - util              utility classes
  | | - webapp                    web source files (JSPs, CSS, etc.)
  | | | - WEB-INF                 deployment descriptors and config files
  | | | | - jsp                   Spring Views (JSPs)
  | | | | | - common              common JSP fragments (headers, etc.)
  | | | - images                  images
  | - test                        source code for our test cases
  - target                        output files from builds
  - pom.xml                       The Maven POM
```

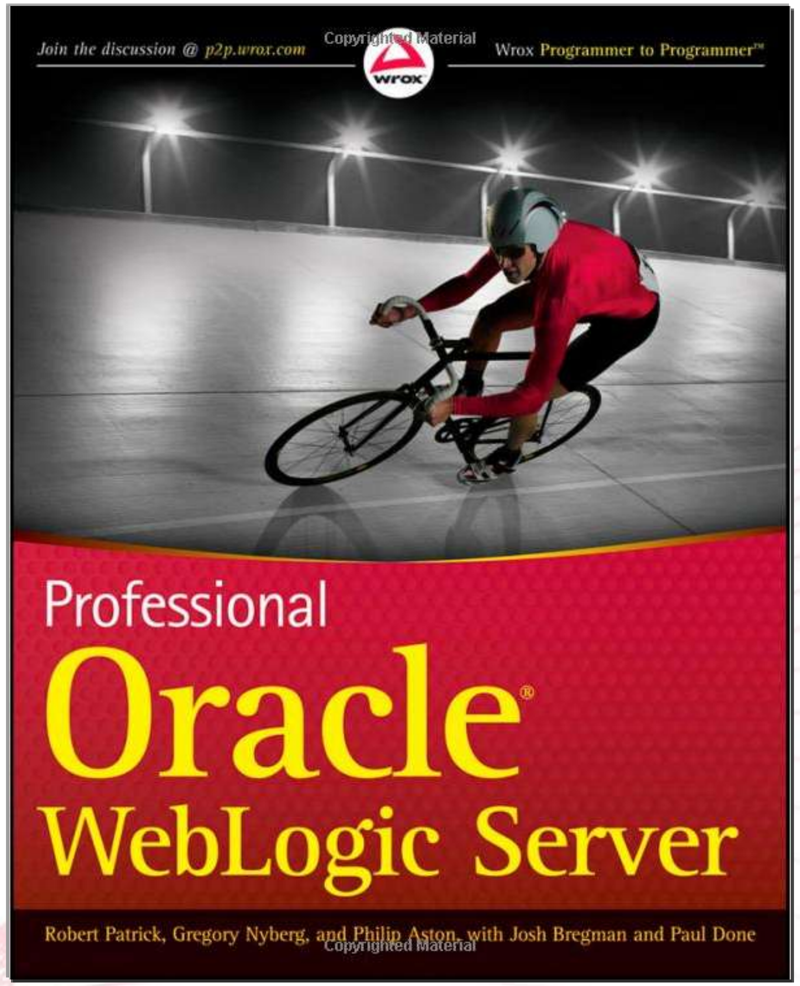
Use Maven **webapp-javaee6** archetype

Setting up the POM

- Important sections:
  - Dependencies for each JAR required
  - maven-compiler-plugin configuration to set Java 6
  - maven-war-plugin configuration with failOnMissingWebXml=false
  - weblogic-maven-plugin configuration to handle deployment to test environment
  - scm, respositories and distributionManagement if you are planning to use Maven release process

Setting up Spring Controllers

- Create a SimpleSuccessFailure Controller, as per POWLS
  - Allows parameterisation of view
- Create an Error Controller to handle failures
  - Invalidate session
  - Log out user
  - Display error view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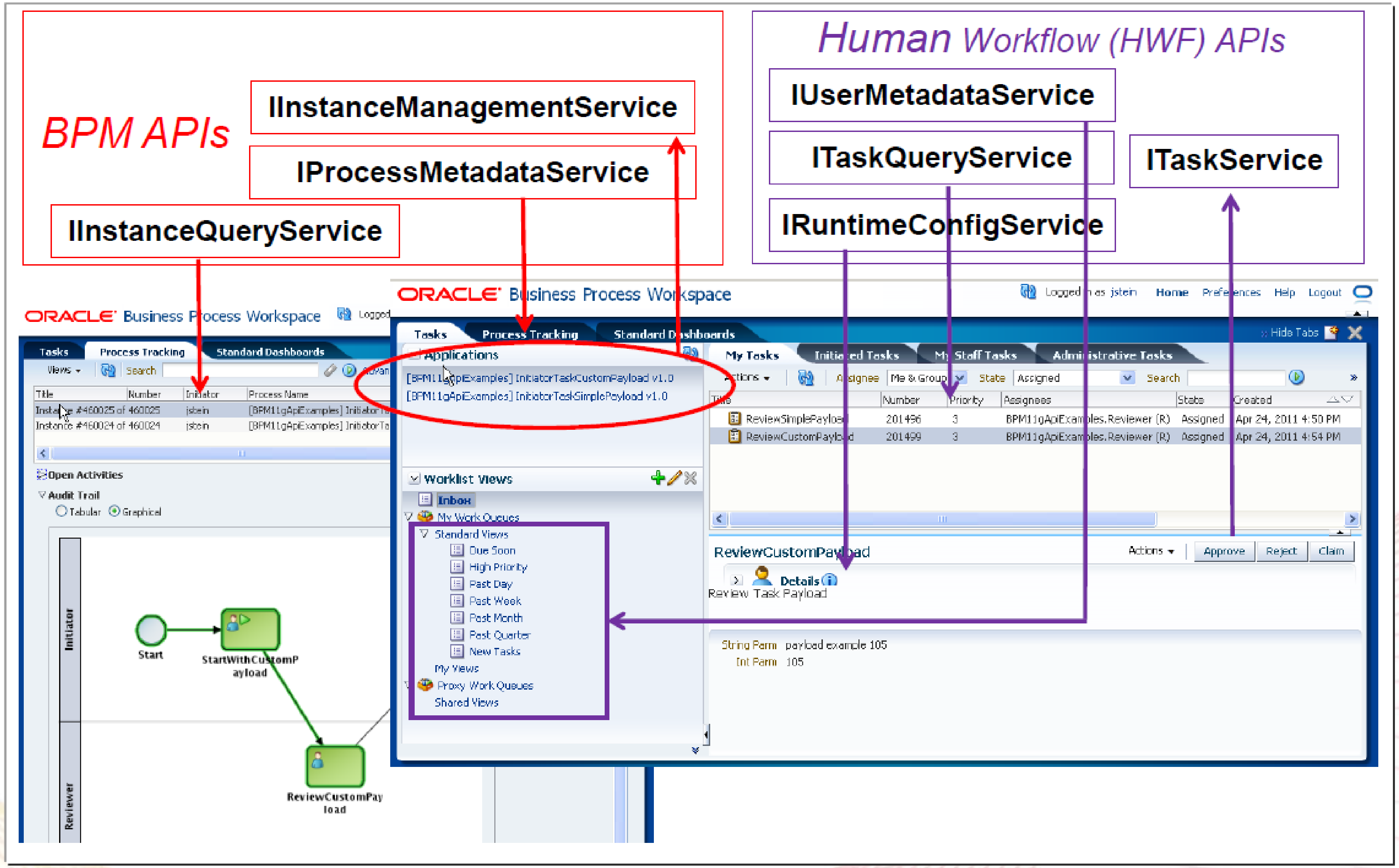
Writing the ‘domain logic’

Writing the ‘domain logic’

- This is the part that actually talks to the BPM and Human Workflow APIs

- This is kept in a separate package
  - So that it is easy to reuse with other front-ends, i.e. other than Spring Web MVC
  - So that all the code that depends on BPM is in one place
  - So that view designers are not exposed to the complexity of the underlying APIs

Which API?



BPM APIs

- IInstanceManagementService
- IProcessMetadataService
- IInstanceQueryService

Human Workflow (HWF) APIs

- IUserMetadataService
- ITaskQueryService
- IRuntimeConfigService
- ITaskService

Title	Number	Initiator	Process Name
Instance #460025 of 460025		jstein	[BPM11gApiExamples] Initiator T
Instance #460024 of 460024		jstein	[BPM11gApiExamples] InitiatorTa

Applications

- [BPM11gApiExamples] InitiatorTaskCustomPayload v1.0
- [BPM11gApiExamples] InitiatorTaskSimplePayload v1.0

Title	Number	Priority	Assignees	State	Created
ReviewSimplePayload	201496	3	BPM11gApiExamples.Reviewer (R)	Assigned	Apr 24, 2011 4:50 PM
ReviewCustomPayload	201499	3	BPM11gApiExamples.Reviewer (R)	Assigned	Apr 24, 2011 4:54 PM

ReviewCustomPayload

Review Task Payload

String Parm payload example 105

Int Parm 105

Important Classes

- MTaskList
  - This is the main workhorse of the whole sample, it contains all the methods that interact with BPM
- MTask
  - This is a wrapper around the BPM/HWF Task object that simplifies the interface for view designers
- ContextCache
  - This class is used to cache security credentials to improve performance of the application

MTaskList

- The **MTaskList** is responsible for:
  - retrieving a list of tasks, in **getMTasks()**,
  - getting details for a task, in **getTaskDetails()**,
  - take an action on a task, in **processTask()**,
  - add a comment to a task, in **addComment()**,
  - authenticate the user to the workflow engine, in **login()**,
  - get a list of tasks that the user can initiate, in **getInitiateLinks()**, and
  - initiate a task (start a process instance), in **initiateTask()**.

MTaskList (continued)

- The **MTaskList** is responsible for:
  - adding an attachment to a task, in **addAttachment()**,
  - get a list of process instances, in **queryInstances()**,
  - get details for a process instance, in **getInstanceDetails()**,
  - find all of the tasks for a given process instance, in **findTasksForProcess()**,
  - get the process instance that a given task belongs to, in **getProcessInstanceId()**, and
  - get the audit image for a process instance, in **getAuditImage()**.

Setting up security

Setting up security

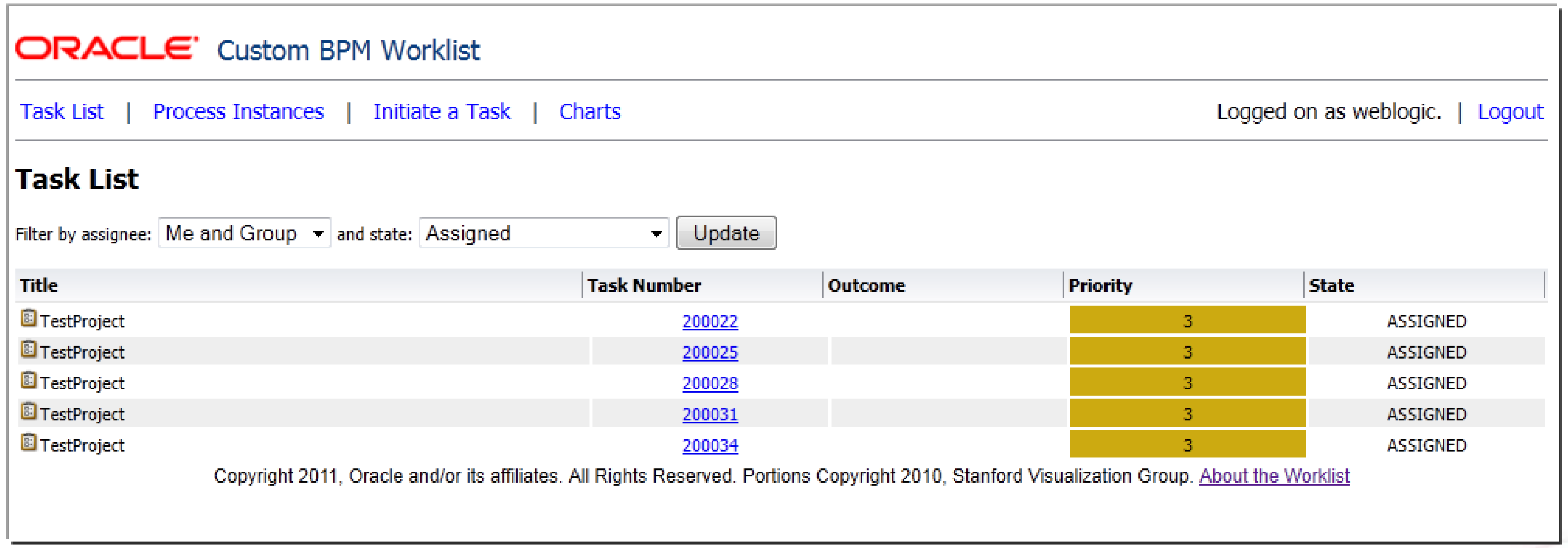
- The sample uses WebLogic security, so that:
  - The application never has knowledge of the user’s password – making it more secure
  - All user management is done in WebLogic – no need to implement any user management functionality
  - Allows for easy integration with SSO solutions

Security

- Login form POSTs to WebLogic login (j_security_check)
- Declarative configuration of security protection
  - weblogic.xml defines the welcome, login, error and success pages, which URL patterns are protected, what login/user/role is required to access protected resources
- Additional security design:
  - All JSPs hidden in WEB-INF/jsp so that there is no way for user to access them by URL

Task list and details

Task list



ORACLE Custom BPM Worklist
Task List | Process Instances | Initiate a Task | Charts
Logged on as weblogic. | Logout

Task List

Filter by assignee: Me and Group and state: Assigned Update

Title	Task Number	Outcome	Priority	State
TestProject	200022		3	ASSIGNED
TestProject	200025		3	ASSIGNED
TestProject	200028		3	ASSIGNED
TestProject	200031		3	ASSIGNED
TestProject	200034		3	ASSIGNED

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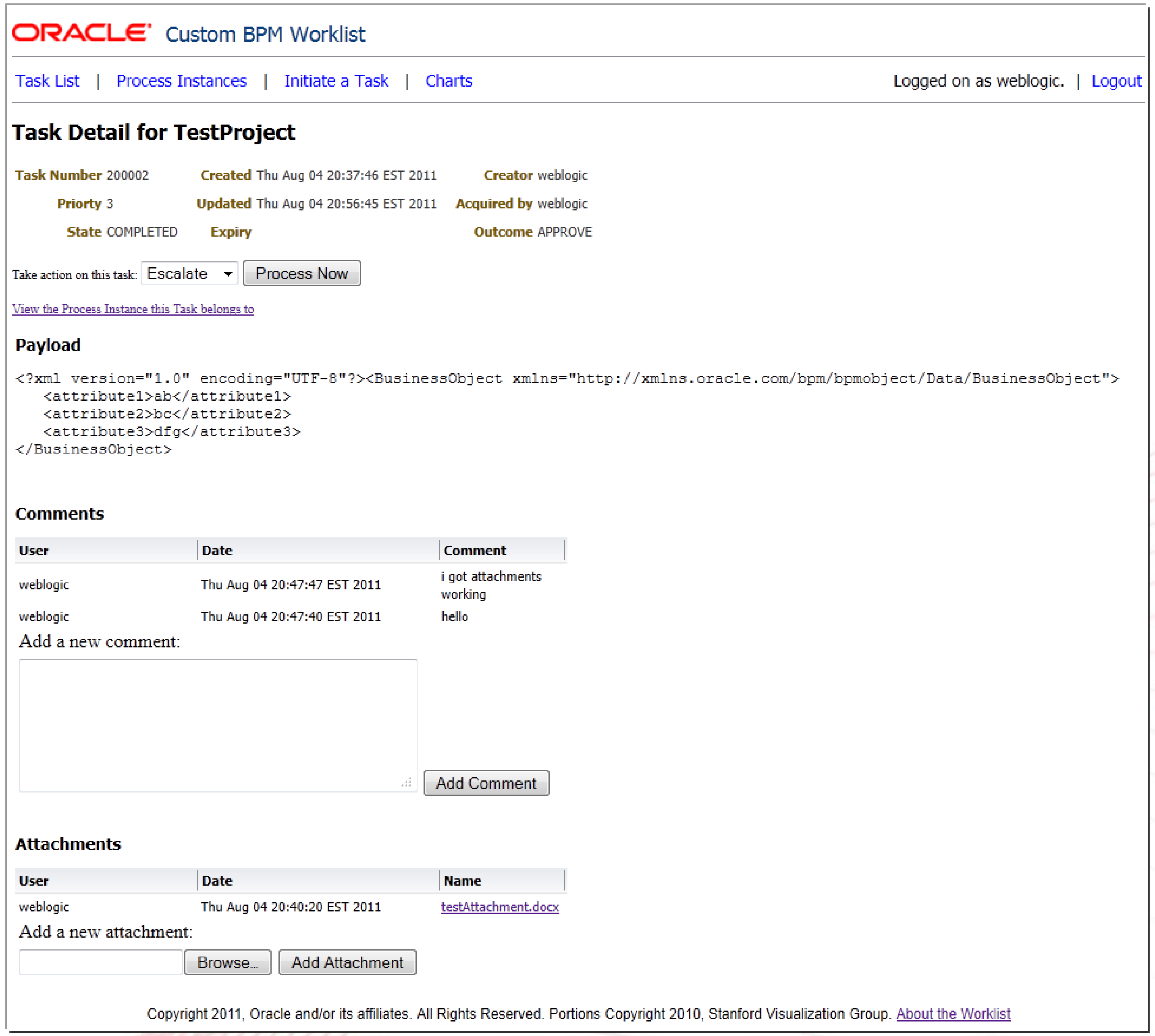
- The Task list shows a list of tasks with some information about them
- We get this information from the TaskQueryService.queryTasks() API
  - It returns partially populated Task objects, which we wrap in MTask objects
  - We tell it which fields we want, and can pass in filters
  - This dramatically improves query performance

Task details

- This page displays details about the task and allows to user to:
  - Take a 'custom' or 'system' action on the task
  - View the payload
  - View and add comments
  - View and add attachments
- To create this page, we need to get the fully populated (M)Task object


ORACLE Custom BPM Worklist
Task List | Process Instances | Initiate a Task | Charts
Logged on as weblogic. | Logout
Escalate
Process Now
Add Comment
Browse...
Add Attachment

Task Detail for TestProject

Task Number 200002	**Created** Thu Aug 04 20:37:46 EST 2011	**Creator** weblogic
Priorty 3	**Updated** Thu Aug 04 20:56:45 EST 2011	**Acquired by** weblogic
State COMPLETED	**Expiry**	**Outcome** APPROVE

Take action on this task: Escalate

View the Process Instance this Task belongs to

Payload

```
<?xml version="1.0" encoding="UTF-8"?><BusinessObject xmlns="http://xmlns.oracle.com/bpm/bpmobject/Data/BusinessObject">
   <attribute1>ab</attribute1>
   <attribute2>bc</attribute2>
   <attribute3>dfg</attribute3>
</BusinessObject>
```

Comments

User	Date	Comment
weblogic	Thu Aug 04 20:47:47 EST 2011	i got attachments working
weblogic	Thu Aug 04 20:47:40 EST 2011	hello

Add a new comment:

Attachments

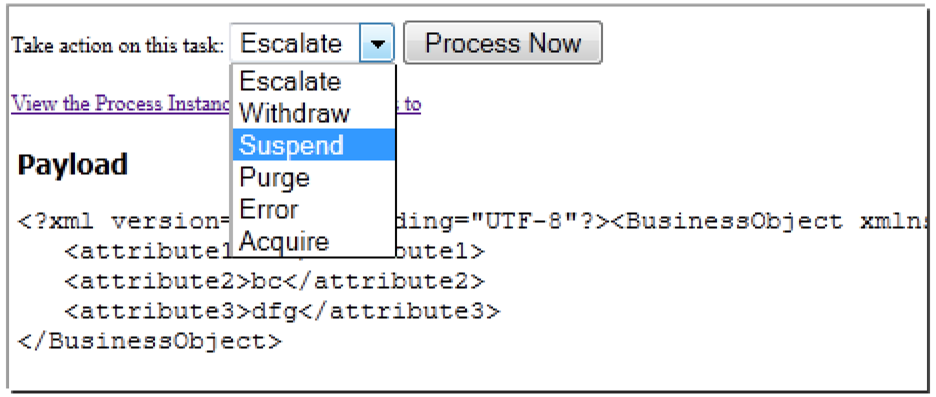
User	Date	Name
weblogic	Thu Aug 04 20:40:20 EST 2011	testAttachment.docx

Add a new attachment:

Processing tasks

Processing tasks

- Tasks are completed by setting an ‘OUTCOME’ on them
- There are two kinds:
  - ‘CUSTOM’ – which are defined in the task definition in JDeveloper
  - ‘SYSTEM’ – which are always available, subject to task state and user privileges


Take action on this task: Escalate

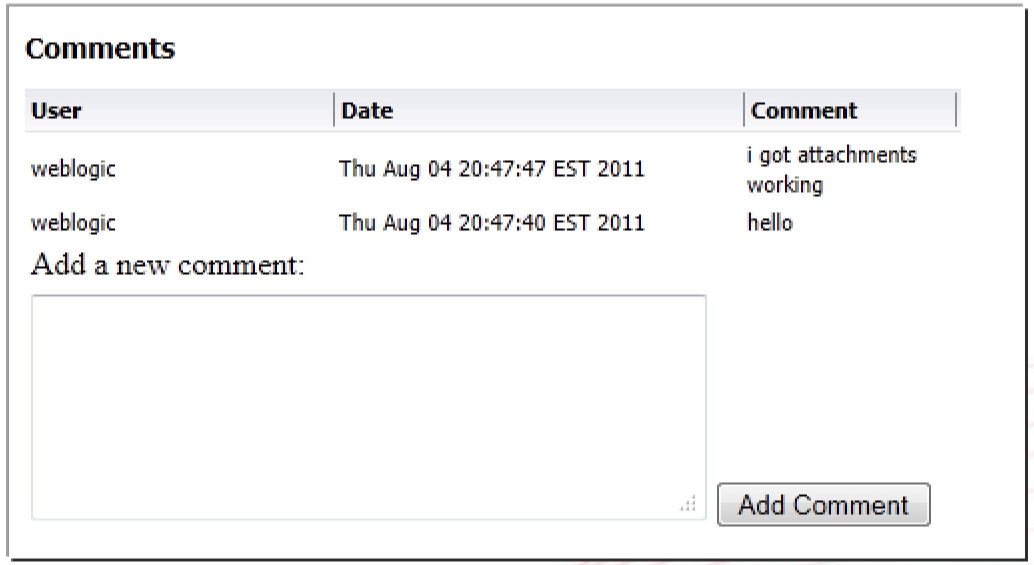
Payload

```
<?xml version=          ding="UTF-8"?><BusinessObject xmln
   <attribute1          bute1>
   <attribute2>bc</attribute2>
   <attribute3>dfg</attribute3>
</BusinessObject>
```

Adding comments

Adding comments

- Users can add comments to a task and read comments from other users
- Comments on initiate tasks are attached to the process and are visible in all subsequent tasks
- Comments on other types of task are just visible in the task they are added to



Comments

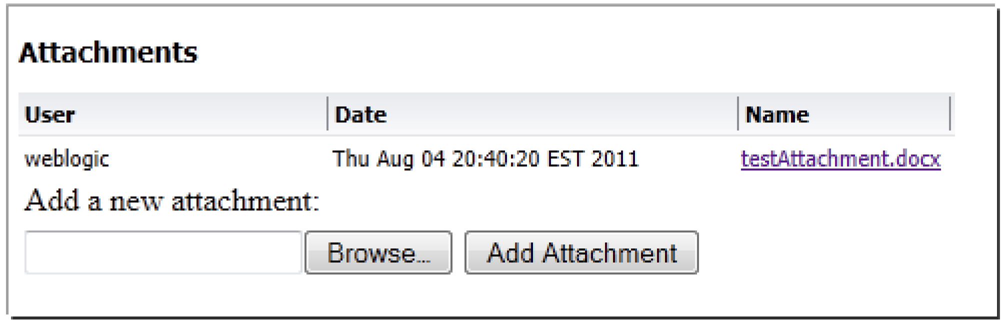
User	Date	Comment
weblogic	Thu Aug 04 20:47:47 EST 2011	i got attachments working
weblogic	Thu Aug 04 20:47:40 EST 2011	hello

Add a new comment:

Attachments

Attachments

- Users can add attachments to a task and view (download) attachments from other users



Attachments

User	Date	Name
weblogic	Thu Aug 04 20:40:20 EST 2011	testAttachment.docx

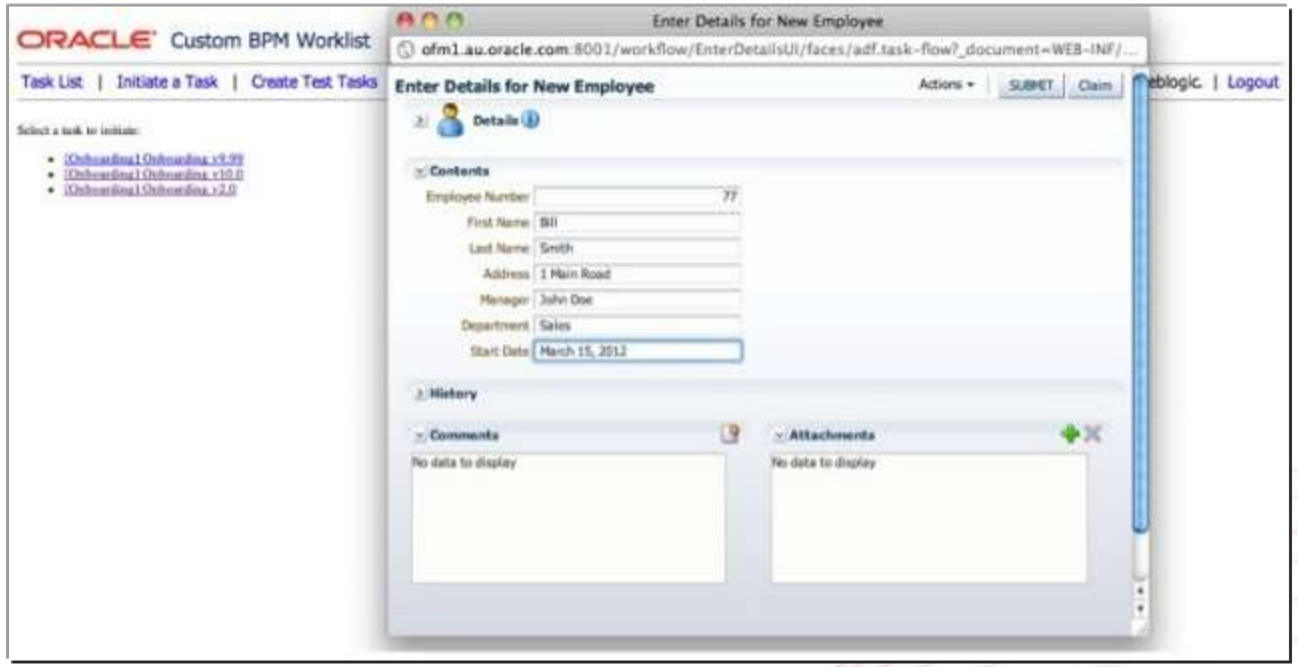
Add a new attachment:

- The API to view/download an attachment returns binary data in an InputStream – we use a little Spring Controller trick to force the browser to download it (return null from Controller)
- The API to add an attachment is introduced in 11.1.1.5.1 (not released yet) so we need to use a helper class
  - Available on redstack.wordpress.com/worklist
  - Closely resembles the planned API – should not be too much change

Initiating a task

Initiating a task

- Allows user to start a process which has an initiate task
- We present the same list as shown in the OOTB workspace’s ‘Applications’ list


ORACLE Custom BPM Worklist
Task List | Initiate a Task | Create Test Tasks
eblogic | Logout
Enter Details for New Employee
Actions ▾
SUBMIT
Claim
Details
Contents
History
Comments
Attachments

ofm1.au.oracle.com:8001/workflow/EnterDetailsUI/faces/adf.task-flow?_document=WEB-INF/...

Select a task to initiate:

- [Onboarding]Onboarding v9.99
- [Onboarding]Onboarding v10.0
- [Onboarding]Onboarding v2.0

Enter Details for New Employee

Employee Number: 77
First Name: Bill
Last Name: Smith
Address: 1 Main Road
Manager: John Doe
Department: Sales
Start Date: March 15, 2012

Comments: No data to display

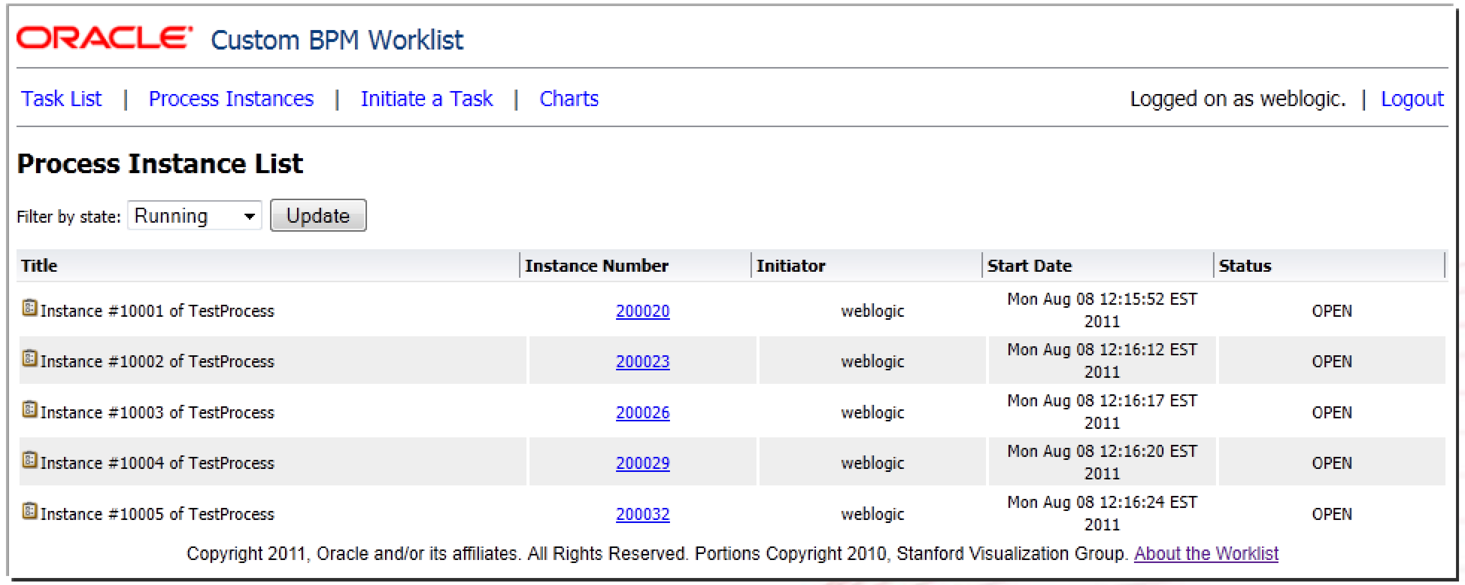
Attachments: No data to display

- When user selects the task, we pop the registered task URL in a new window (ADF or other)
- This is a two step process – start a process instance, then get the task URL

Process instance list and detail

Process instance list

- The process list page uses an (undocumented) BPM API to retrieve a list of process instances
- We plan to release documentation for the BPM APIs in the future
- For now, this sample shows you what is available and how to use them



Custom BPM Worklist
Task List | Process Instances | Initiate a Task | Charts
Logged on as weblogic. | Logout
Update

Process Instance List

Filter by state: Running

Title	Instance Number	Initiator	Start Date	Status
Instance #10001 of TestProcess	200020	weblogic	Mon Aug 08 12:15:52 EST 2011	OPEN
Instance #10002 of TestProcess	200023	weblogic	Mon Aug 08 12:16:12 EST 2011	OPEN
Instance #10003 of TestProcess	200026	weblogic	Mon Aug 08 12:16:17 EST 2011	OPEN
Instance #10004 of TestProcess	200029	weblogic	Mon Aug 08 12:16:20 EST 2011	OPEN
Instance #10005 of TestProcess	200032	weblogic	Mon Aug 08 12:16:24 EST 2011	OPEN

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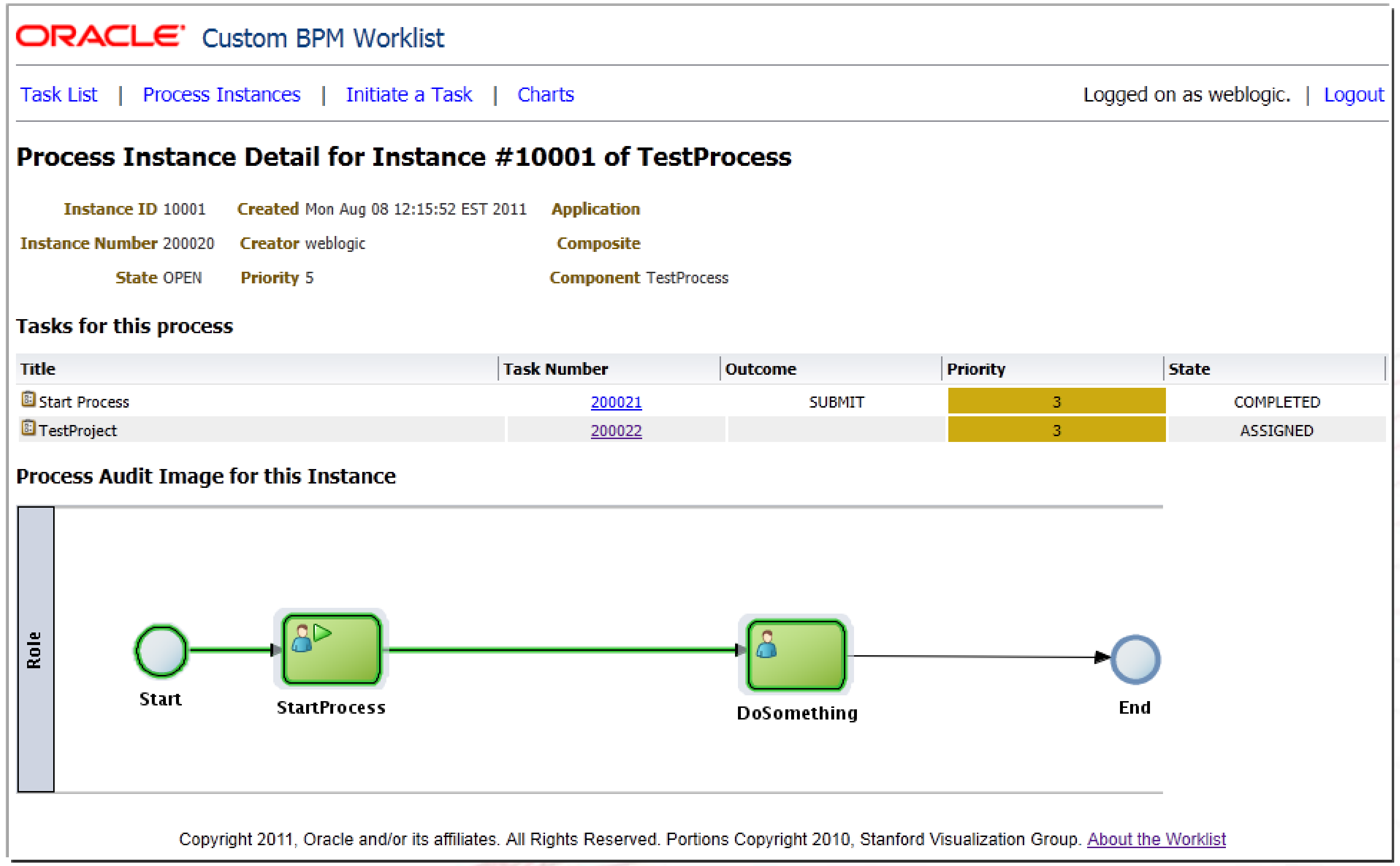
Process instance detail

- This page shows:
  - Details about the process instance
  - A list of the tasks that are a part of this process instance, and links to view their details
  - The process audit image for this instance (discussed shortly)



ORACLE Custom BPM Worklist

Task List | Process Instances | Initiate a Task | Charts

Logged on as weblogic. | Logout

Process Instance Detail for Instance #10001 of TestProcess

Instance ID 10001 **Created** Mon Aug 08 12:15:52 EST 2011 **Application**

Instance Number 200020 **Creator** weblogic **Composite**

State OPEN **Priority** 5 **Component** TestProcess

Tasks for this process

Title	Task Number	Outcome	Priority	State
Start Process	200021	SUBMIT	3	COMPLETED
TestProject	200022		3	ASSIGNED

Process Audit Image for this Instance

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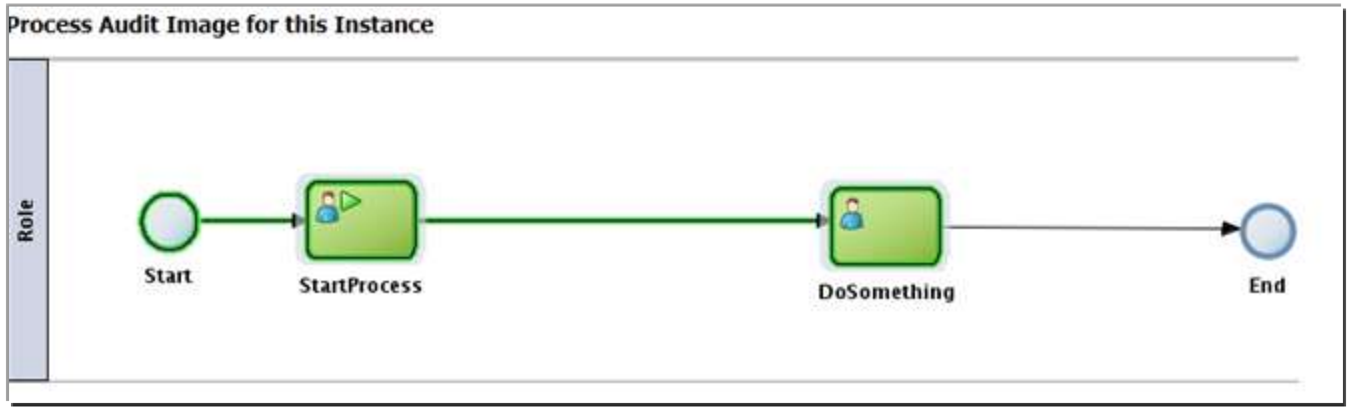
Getting the audit image

Getting the audit image

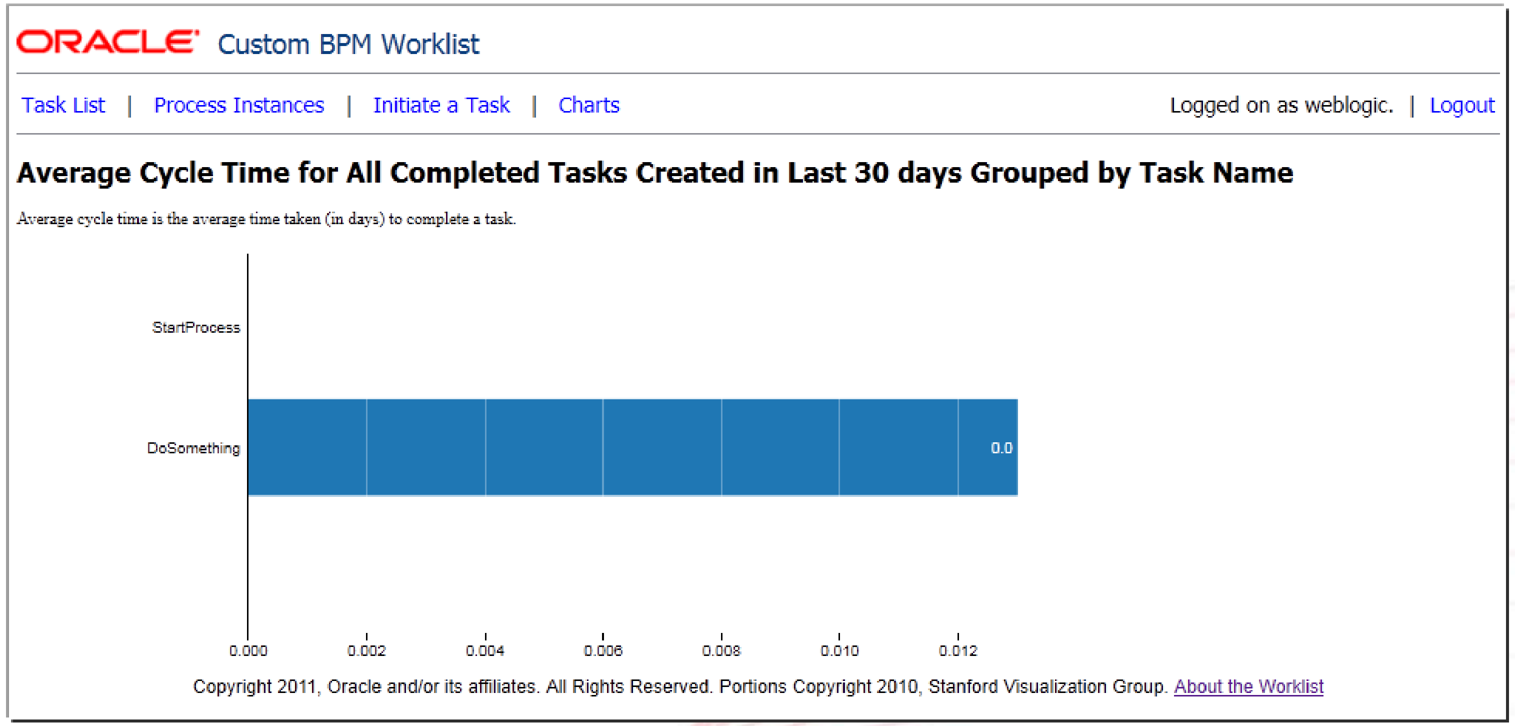
- The audit image shows where the process instance is up to, and how it got there
- We currently need to use a utility class to get access to the audit image – this is provided on redstack.wordpress.com/worklist
- The API provides a PNG format image in an InputStream



Charts

Charts

- The documentation lists several examples of charts you may wish to include in a worklist application
- The sample demonstrates how to create one of these charts
- Uses the (JavaScript based) Protovis charting library from the Stanford Visualization Group


ORACLE Custom BPM Worklist
Task List | Process Instances | Initiate a Task | Charts
Logged on as weblogic. | Logout

Average Cycle Time for All Completed Tasks Created in Last 30 days Grouped by Task Name

Average cycle time is the average time taken (in days) to complete a task.

StartProcess
DoSomething
0.0
0.000
0.002
0.004
0.006
0.008
0.010
0.012

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More Information

- Find the sample, documentation and source code at:

  http://redstack.wordpress.com/worklist

- What’s next for the sample?
  - Internationalization support
  - Refactor into a library + application with the library exposing web services for non-Java clients, maybe REST, JSON
  - Silverlight, Android and iOS front ends

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