YAWL Engine User Manual

Beta – 8 Release

Faculty of Information Technology

Document Control

Date	Author	Version	Change
25 Aug 2004	Sean Kneipp	0.1	Initial Draft
30 Aug 2004	Sean Kneipp	1.0	Final Draft
4 Feb 2005	Guy Redding	1.1	Added YAWL XForms details
4 Feb 2005	Lachlan Aldred	1.2	Updated Issues & 3rd-Party Software Acknowledgements
12/04/2005	Lachlan Aldred	1.3	Updated troubleshooting section.
22/12/2005	Michael Adams	1.7	Updated for Beta 7 Version. Document version brought in line with Release Version
30/08/2006	Michael Adams	1.8	Minor updates for Beta 8

Contents

Getting Started

Overview

Before you jump straight into the YAWL Engine and start testing your favourite workflows, you will need to make sure that the Tomcat web-service has been started. YAWL is a browser-based web application that requires a server jsp environment, such as Apache Tomcat.

For full instructions on starting the Tomcat service, or obtaining the Apache Tomcat software, please consult the YAWL Installation Manual.

Launching the YAWL Engine

1. Open up your web browser.
2. Type the following address into the address line and press enter (see **Fig.2.**):

   http://localhost:8080/worklist.

Fig.2. Navigate to the YAWL Log In webpage

3. The YAWL Log In screen will be displayed
4. Log in with the following details (case sensitive):

   UserID: `admin`

   Password: `YAWL`

The YAWL Workspace

Key YAWL Pages

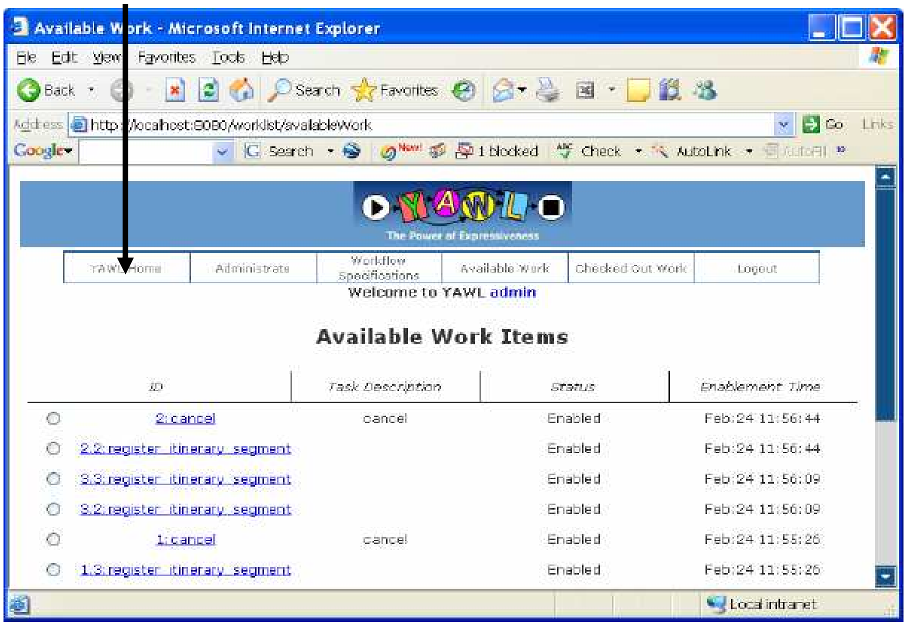


Fig.3. YAWL Workspace

Key YAWL Pages

The separate pages of the browser-based application, representing the different functions of the YAWL Engine:

- YAWL Home
- Administrate
- Workflow Specifications
- Available Work
- Checked Out Work
- Logout

YAWL Administration

Loading a YAWL specification

In additional to a graphical syntax, the YAWL language has an XML syntax. The runtime environment requires this YAWL XML syntax. To load a YAWL specification:

1. Navigate to the Administrate page:

   http://localhost:8080/worklist/admin.

2. In the Manage Specifications section of the page, Browse for a YAWL specification (.xml file) and choose Open.

   The installation package for YAWL contains a number of sample YAWL specifications (XML files). The specification used throughout this document refers to the "makeTrip3.XML" file.

3. Click on Upload.

4. You should now see the details of your specification. **Fig.4.**

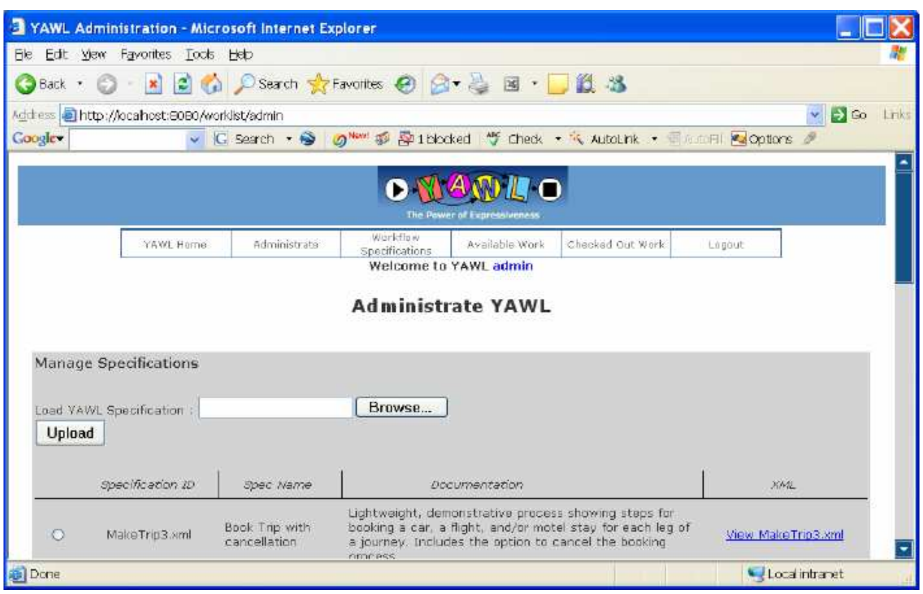


Fig.4. Upload YAWL Specification

Launching a YAWL Specification

In order to kick-off the workflow specification, you need to 'launch a case'. To launch a YAWL specification that has already been uploaded into the YAWL Engine:

1. Navigate to the Workflow Specifications page:

   http://localhost:8080/worklist/viewSpecifications.

2. In the Active YAWL Specifications section of the page, choose the specification to launch.

3. Click on the Launch Case button. **Fig.5.**

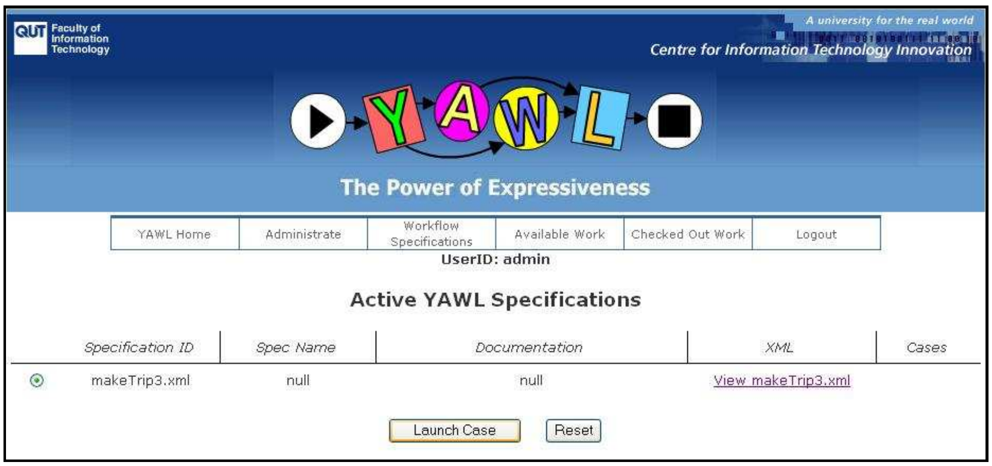


Fig.5. Launching the Case

4. Then in the following Launch Case section of the page, click on the Start Case button. **Fig.6.**

   Depending on the specification loaded, you may be required to launch the case with specific information for data elements. For more information on providing data throughout the case, consult the **Data Elements of a Case** section of this manual.

Fig.6. Starting the Case

5. You will then see a confirmation screen to indicate that a case has been launched with a specific identification number.

Unloading a YAWL Specification

You can remove a YAWL specification so that it is no longer available to be started. To remove a specification:

1. Navigate to the Administrate page:

   http://localhost:8080/worklist/admin.

2. In the Manage Specifications area of the Content Pane, choose the specification to remove.

3. Click on the Unload Specification button.

Data Elements of a Case

Data Perspective

Although the initial focus of YAWL was on control flow, it has been extended to offer full support for the data perspective. It is possible to define data elements and use them for conditional routing, for the creation of multiple instances, for exchanging information with the environment, etc. Most of the existing workflow management systems use a propriety language for dealing with data. YAWL is one of the few languages that completely relies on XML-based standards like XPath and XQuery.

Providing Data for the Case Using a Form

During certain activities of a YAWL Case, you may be required to provide some information for data elements that have been established in the XML specification. Requests for data can occur when "Launching a Case" or when editing "Checked Out Work" items.

Fig.8. depicts a request for data form for multiple data elements, while performing an edit of a "Checked Out Work" item. The red star next to a field indicates that input is required for that field. The form submits data back to YAWL only when all data in the forms is valid.

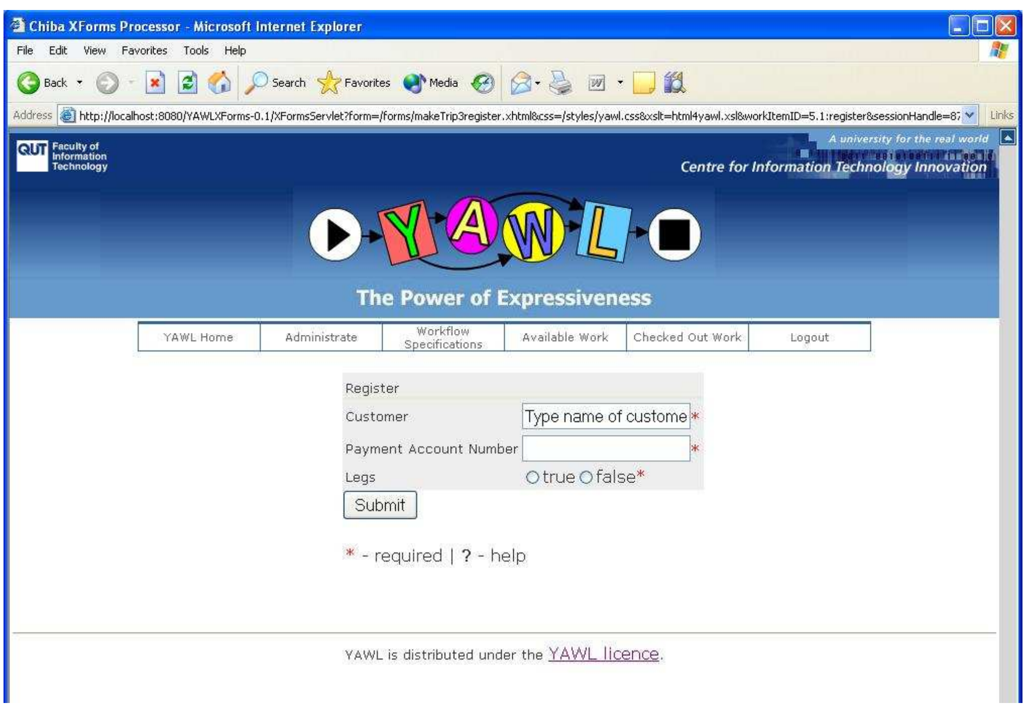


Fig.8. Request for Data using a Form

Providing Data for the Case Using XML

It is also always possible to enter data using XML. This method of user input is useful if data input using a form has failed for any reason. **Fig. 9** is the XML input page. To get to this page *click the link* for the work item ID on the Checked Out Work Items page (**Fig. 12**) instead of selecting the radio button for a Work Item and clicking the Edit Work Item button.

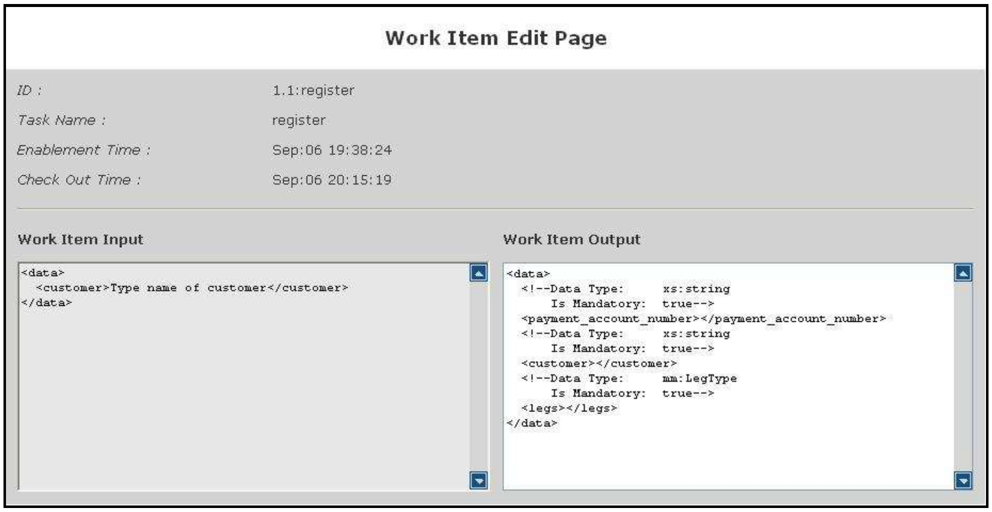


Fig. 9 Request for Data using XML

How to Input the Data Using XML

The structure of the request for data follows the XML format of opening and closing “tags”. The data is entered between the open and close tags that refer to that data element.

In the “makeTrip3.xml” specification, the example below (**Fig. 10.**) depicts a request to enter the name of the customer going on a trip, for the `customer` data element.

1. Firstly the **`data`** tag is opened.
2. Then the **`Data Type`** tag (or comments tag) is opened to let the user know the details of the data required.
3. The `Data Type` tag is requesting a **`string`** variable from the user and the information required is Mandatory. The tag is closed.
4. Then the **`customer`** tag is opened, referring to the data element to store the information.
5. The user then enters the **customer name** within the customer tags.
6. Finally the **`data`** tag is closed.

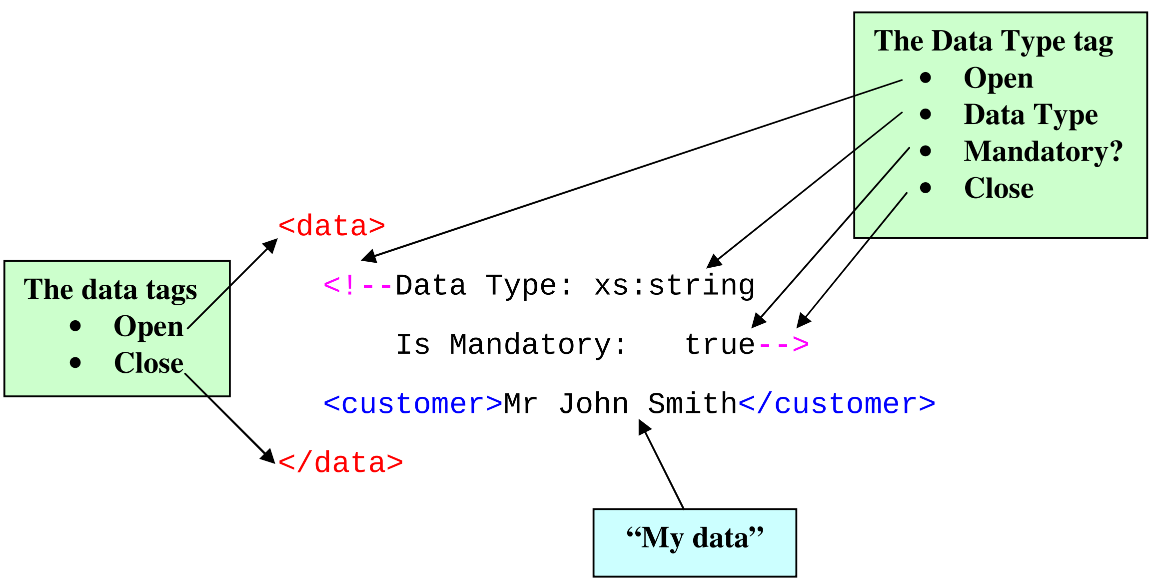


Fig. 10. Inputting the Data

Work Items

Viewing Available Work

Alternate user accesses to the YAWL Engine can be created through the Administrator. To create a new user access:

1. Navigate to the Available Work page:

   http://localhost:8080/worklist/availableWork.

2. All available work items will be listed, according to the specification loaded. Work items can be related back to a specific instance of a case, through their case number. **Fig.11.**

Fig. 11. Available Work Items

Checking Out Available Work

When a person is ready to start working on an available work item, the item is "Checked Out".

1. Navigate to the Available Work page:

   http://localhost:8080/worklist/availableWork.

2. Click on the radar button next to the work item and click the button "Check Out"

Saving Detailed Information for a Work Item

While a person is working on an item that has been "Checked Out", specific details may be required to be saved against that item.

Information saved against a work item can be used to launch other YAWL cases or provide data for other interfacing systems. For more information on providing data in work items, consult the **Data Elements of a Case** section of this manual.

1. Navigate to the Checked Out Work page:

   http://localhost:8080/worklist/checkedOut.

2. Click on the radar button next to the work item and click the button "Edit Work Item" **Fig.12.**

Fig. 12. Checked Out Work Items

3. Enter any required data using a form for the data elements that have been requested, in the Work Item Output section of the page and click Save Work Item. **Fig.13.**

4. Alternatively, click on the link for the Work Item ID to enter any required data for the requested data elements using XML. **Fig. 14.**

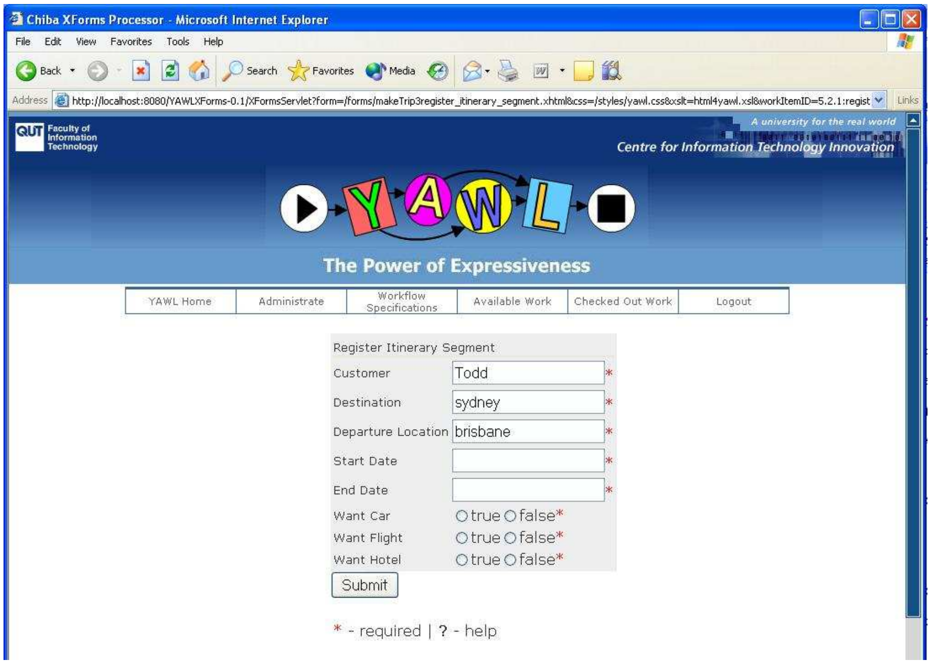


Fig 13. Work Item Edit Page Using a Form

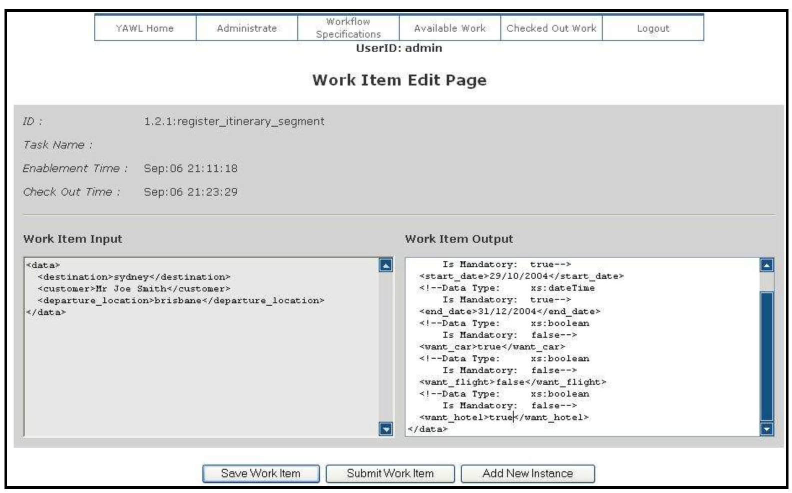


Fig. 14. Work Item Edit Page Using XML

Submitting a Work Item

Once a work item has been completed, it must be submitted for the token to be advanced in the workflow.

1. Navigate to the Checked Out Work page:

   http://localhost:8080/worklist/checkedOut.

2. Click on the radar button next to the work item and click the button "Edit Work Item" **Fig.12.**

3. Enter any required data for the data elements that have been requested in the Work Item Output section of the page. **Fig.13, 14.**

4. Click on the Submit Work Item button.

Creating a New Instance of a Work Item

If the specification supports it, new instances of a work item can be created as an item is "checked out", reflecting multiple instance tasks in the workflow.

The current example specification, "makeTrip3.xml" does not contain any multiple instance tasks, so instructions below refer to the specification "MakeMusic.XML".

1. Navigate to the Available Work page:

   http://localhost:8080/worklist/availableWork.

2. Check Out a work item that supports multiple instance creation.

   The "MakeMusic.XML" specification contains a multiple instance task on the work item "Write a Song".

5. Navigate to the Checked Out Work page:

   http://localhost:8080/worklist/checkedOut.

3. Click on the radar button next to the work item and click the button "Add New Instance" **Fig.12.**

4. Enter any required data for the data elements that have been requested and click on Create Instance. **Fig.15.**

Fig.15. Creating a New Instance of a Work Item

Your new instance of the Work Item will be now be listed as Available Work.

Suspending a Work Item

Work items that have been "checked out" to a person, can be returned to the available work items. All data that has been saved for that work item remains intact.

5. Navigate to the Checked Out Work page:

   http://localhost:8080/worklist/checkedOut.

6. Click on the radar button next to the work item and click the button "Suspend Task" **Fig.12.**

Managing Users

Alternate user accesses to the YAWL Engine can be created through the Administrator.

To create a new user access:

- Navigate to the Administrate page: http://localhost:8080/worklist/admin.
- Click on "Edit Organisational Model".
- Select "Resources" from the menu on the top.
- To delete a user, choose the user ID from the box "Select Human ResourceID" and press delete.

To add a user:

- Choose the "—New User—" item from the box "Select Human ResourceID" and then enter all required details for this user into the fields.
- Click "update resource".

To assign user roles.

- Select a role from the column on the left hand side.
- Use the right-pointing arrow to move the selected role to the column on the right hand side.

To remove user roles:

- Select a role from the column on the right hand side.
- Use the left-pointing arrow to move the selected role to the column on the left hand side.
- Select Updates roles by resource when complete. The resource is then set to have the roles which are on the list on the right hand side.

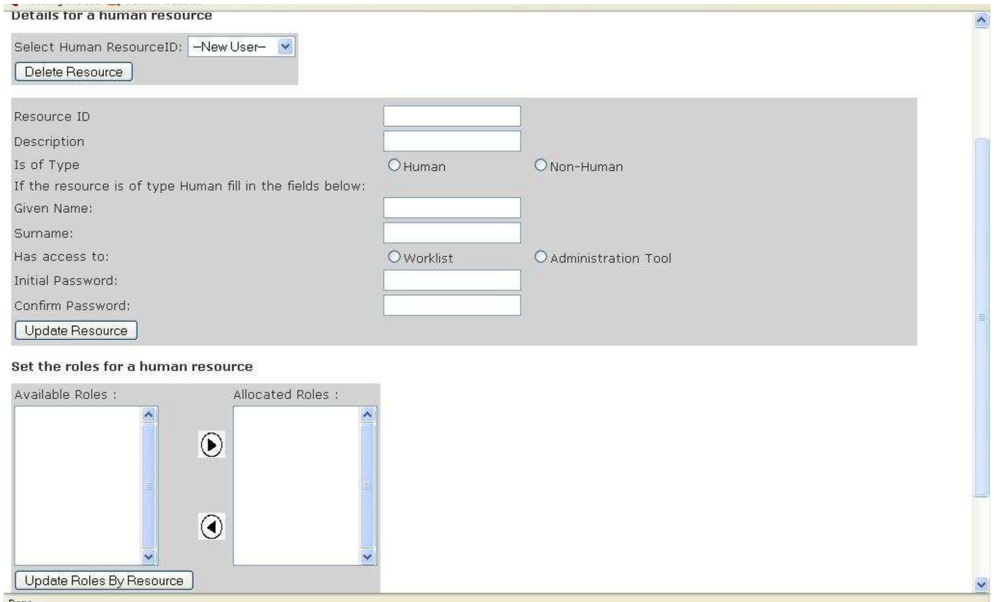


Figure 16: Managing Users

Managing Roles

Alternate user accesses to the YAWL Engine can be created through the Administrator.

To create a new role assignment:

- Navigate to the Administrate page: http://localhost:8080/worklist/admin.
- Click on "Edit Organisational Model"
- Select "Roles" from the menu on the top.

To delete a role, select the rolename from the "select role" list, and click delete.

To create a role, enter the rolename in the list at "Role" and click add role.

To assign resources to roles:

- Select a resource from the column on the left hand side.
- Use the right-pointing arrow to move the selected resource to the column on the right hand side.

To remove resource assignments to roles:

- Select a resource from the column on the right hand side.
- Use the left-pointing arrow to move the selected resource to the column on the left hand side.

To record the update in the system, press “Updates Resources by Role”. The role is then allocated to the resources which are on the list on the right-hand side.

Figure 17: Managing Roles

Creating Charts and Tables

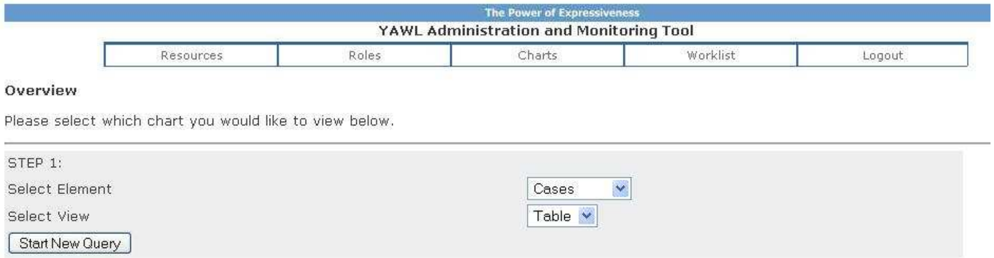
Charts and tables can be created by administrators in order to display reports of executions of previous cases and tasks. The chart building tool builds queries towards the database and displays results. Several different views can be created in order to compare the efficiency of different resources, tasks, and cases.

This tool requires that *database persistence is switched on* otherwise it will be marked as unavailable.

The chart building tool consists of three parts.

- Step 1: The initial set up
- Step 2: Adding filters
- Step 3: Displaying the results

Step 1:



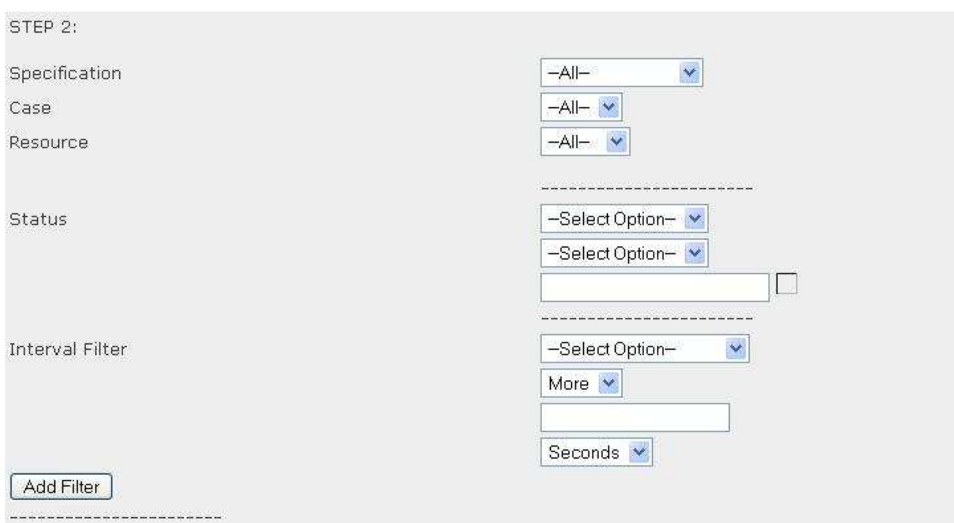
The first step is used to define the portion of the database which the queries will be performed over, as well as the type of view the result will be displayed as. The screen is shown in the figure above.

Queries may either be performed over Cases or Work-items. Case queries are used to examine how long cases took to execute, how many has executed etc. Work-item queries return similar results but regarding tasks instead. For example, it can display the number of tasks completed in each specification, or how long each tasks took to execute.

The view can be selected as either table, or chart. If a chart is selected, then the type of chart can be specified later.

After selecting these two elements, the “Start New Query” button can be pressed, and Step 2 is shown.

Step 2:



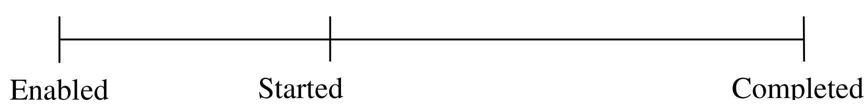
During the second step it is possible to add filters to the queries. Several types of filters can be added as shown in the Figure above.

A specification filter is inserted to restrict the results to a single specification. The list of specifications which can be filtered on, is provided from the database. The case filter is used to specify which case id the filtering should be made over. The resource filter specifies that results should only be returned if they relate to a particular resource (e.g. human user). Work-item queries have one addition filter, being a task name.

The status filter can be used to specify that a certain case was in a particular state, after or before a particular time. The time is specified by selecting the icon on the right hand side of the text field. A calendar pops up, and the time can be selected here.

The interval filter is used to specify that only cases which took more or less then a particular length of time is returned. For example, cases which took more than 7 days are returned. Administrators can select the interval of their choice, if it is more or less, the length of time, and the granularity of the time specified. The granularity can be seconds, minutes, hours, days, months or years.

For cases the interval specified is always started-completed. For work-items three intervals can be selected. These are either enabled, started, or completed. The relationship between these is shown below:



Work items become enabled when it is ready for execution. When it is checked out, it goes into the started state. Then when it is checked back in it is in the completed state. There are therefore three intervals which can be queried upon.

- Enabled-Started
- Enabled-Completed
- Started-Completed

After a filter has been created, the “add filter” button is pressed. This stores the filter in the system until the administrator requests that a chart or table is to be created. There must always be at least one filter, which could be an empty filter (i.e. nothing specified on any fields).

The administrator can create several filters, in which case the union of the results of all filters will be displayed. For example if the administrator wanted to display results from two specifications, then two filters must be added, one for each specification. If an empty filter is specified, then all results will be displayed regardless of what other filters are added. To restart the query mechanism and to remove all previously created filters, the “create query” button from step 1 must be pressed.

After all filters have been added, the admin may proceed to step 3.

Step 3:

In step 3, the developer specifies what elements should be viewed as part of the result set. Depending on whether a chart or table was selected as a view in step 1, different screens are shown.

Chart:

The chart screen lets administrators create results as a bar chart or a pie chart. Results can be grouped based on specifications, resources, or case ids (or task id in case of a work-item query). It the case id (or task id) is chosen, then no grouping is made. The value selected here is the value for the x-axis of a bar-chart.

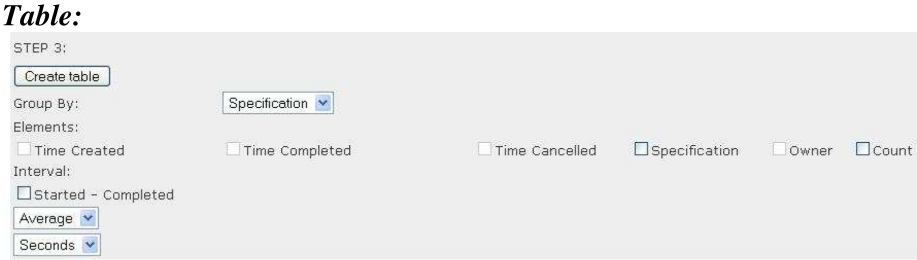
Then a display value can be selected, which is either an interval or a count. This is the y-axis in the bar chart.

If a grouping is selected, then the average of these is calculated and displayed.

Finally the granularity for displaying the intervals can be selected.

When the chart is ready for display, the "Create Chart" button is pressed. This causes the screen to be updated with the display of the chart.
(NOTE: if the proper chart is not shown, press the refresh button and it should be updated).

Table:



When creating table, the principles are the same, except that all elements to be displayed are ticked off on the screen. Different elements are shown depending on if it is a work-item query or a case query. Groupings can be made, in which case the developer can not show items which do not have aggregate functions. If grouping is made by specification, then only the count and intervals can be shown.

If no grouping is selected, all elements except count are available, but no average is calculated.

When the table is ready to be created, the “Create Table” button can be pressed. This will create the table, and display a link to the table in the top of the screen.

Known Issues

Engine (`yawl.war`)

Worklist (`worklist.war`)

- The engine does not support the allocation of tasks to separate resources. i.e., the traditional resource perspective of workflow is not yet supported.

Web Service Invoker (`wsInvoker.war`)

- The web service invoker does not support sending call back addresses to an asynchronous web service.
- The web service invoker component is not able to invoke web services with complex data types as their parameters.

YAWL XForms Processor (`YAWLXForms.war`)

- Currently forms cannot be generated for schemas that contain enumerated types.

Troubleshooting

Error in Uploading a Specification

When uploading a specification, the YAWL Engine performs three different sets of validation for the specification. Please check that your specification passes the following three validations:

- Schema Validation
- XML Validation
- YAWL Engine Application Validation.
  This validation is particular to the YAWL application and can represent inconsistencies in the workflow, for example, if a task is defined in the specification but doesn't appear between the input and output condition.

Specification with an identical id.

This error occurs when you are uploading a specification that has already been uploaded into the engine. If you have made changes to the specification and want to upload a newer version, then unload the existing specification before uploading the newer version.

Third–Party Software Acknowledgements

(a) Software developed by the JDOM Project (http://www.jdom.org/),

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(d) Chiba XForms processor version 0.9.9, available at http://sourceforge.net/projects/chiba/

(e) XSD and EMF (source available at http://www.eclipse.org/xsd)

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