

# Heliophysics Integrated Observatory

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# **Tutorial: Running Workflows in Taverna** Draft

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1	Intro	oduction	. 1
	1.1	Taverna	. 1
	1.2	Install	. 2
	1.3	myExpriment	. 2
2	Find	ing workflows in myExpriment	. 2
	2.1	Find workflows in a group	. 4
	2.2	Overall search in myExperiment	. 5
3	Loa	ding workflows in Taverna	. 6
4	Running workflows in Taverna		. 7
5	Und	erstanding the outputs and intermediate values	. 9

# **1** Introduction

This tutorial is to introduce users how to run already written workflows in Taverna.

## 1.1 Taverna

Taverna is an open source workflow system. It is actively developed and supported by the MyGrid team. At the time of writing this document the current version was Taverna 2.3. It is a Java based development and runs on all operating systems with a Java Virtual Machine. Taverna is closely integrated with other MyGrid products. For the HELIO project the MyExperiment repository is the most useful integration which allows the sharing of workflows and other files with the science community.

There are two Taverna products, the Taverna Workbench is for creating workflows in a graphical user interface environment (Figure 1), and the Taverna Server is for executing workflows on a server. The server is released in its first version with a more complete and security enabled version waiting to be released next month.



Figure 1: Taverna Workbench GUI

This document will focus on running workflows in the Taverna Workbench only. There is a separate tutorial for writing workflows in Taverna and a document will be written for the installation, maintenance, and use of the Taverna Server.

## 1.2 Install

The latest version of Taverna is available from the <u>http://www.taverna.org.uk</u> web side. A button on the front page directs you to the download area where you sections for all operating systems and for the source code. Download the file suitable for the environment in which you want to work and follow the instructions given on the page

## 1.3 myExpriment

myExperiment is a social web repository for scientists to safely publish and share workflows and experiment plans. It combines social web attributes such as the provision of groups, friends, the ability to leave comments, gaining credits for work shared with colleagues, and ranking of workflows with semantic web features such as keeping the repository Linked Data compliant an providing the option of using an OpenID for logging in.

myExperiment was launched in November 2007. It is developed by the myGrid team which are also developing the Taverna Workbench and Server. There is a well supported link between Taverna and myExperiment. Taverna provides a plug-in with which it is possible to access, browse, and upload Taverna workflows to the myExperiment web site. myExperiment on the other hand understands the Taverna file format and is therefore able to extract information such as title, authors, annotations and example values to input and output ports, and statistics to components from that file. myExperiment is not restricted to Taverna workflows but supports other workflow formats as well.

myExperiment is the largest public repository for scientific workflows. It currently has 5390 members, 291 groups and 2276 workflows.

The data in the myExperiment repository is backed up every day and provides therefore a secure storage place.

## 2 Finding workflows in myExpriment

The URL of the main myExperiment web page is: <u>http://www.myexperiment.org</u>. Workflows which are created for the HELIO project are shared with the myExpriment group 'helio'. Users have different rights on workflows depending on whether they are the owners, members of the group with which the workflow is shared, friends of the author, or do not have any special privileges. The author of the workflow decides who can see, execute, or alter a workflow. If you are interested in being able to see and run all workflows shared with the 'helio' group register or login on myExeriment front page see Figure 2, Label 1. Find the group 'helio' by selecting 'groups' from the drop-down (Label 2) menu and typing 'helio' in the text box (Label 3) and request membership (Figure 3, Label 4). One of the administrators has to grant the request before you will become a member.



Figure 2: Screenshot myExpriment main page

my experiment	About   Mailing List   Publications	🗐 Logout   🔗	Give us Feedback   🔱 Invite
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This group is for workflows in the domain of he	liophysics and solar physics	(1) Owner	🚟 Anja Le Blanc
Created at: Thursday 14 August 2008 @ 13:06:20 Unique name: helio Administrato	I (GMT) NS	André Csillaghy	My Profile [edit] My Messages My Memberships My History My News
André Csillaghy	Anja Le Blanc	8 members 45 shared items 1 announcements	1 new group request     From Mazhar     (for Group: HELIO)
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		Add Tags () Announcements (private & public) HELIO Taverna Workshop 01/02/2012 4 days ago by Anja Le Blanc [See All]	Groups HELIO My Favourites 1 favourite Workflows

Figure 3: HELIO group page

## 2.1 Find workflows in a group

Find a group as described in Chapter 2. Click on the tab *Shared Items (X)* see Figure 4 Label 1. You can change the order of the presented items with the drop down menu Label 2. In this list you can read the title and the description of the workflows. Click on one in which you might be interested to see more details and the link for the download.

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Anja Le Blanc	Rating: 0.0 / 5 (0 ratings)   Versions: 4   Reviews: 0   Comments: 0   Citations: 0 Viewed: 44 times   Downloaded: 17 times		

Figure 4: Shared Items of Group

## 2.2 Overall search in myExperiment

Click on the tab *Workflows* (Figure 5, Label 1) and type a term in which you are interested into the text box (Label 2). The search returns with a list of result types. Tick the boxes for the types you are interested in and the list of workflows on the right updates.

Click on any item you are interested to see more detail or find the download link.



Figure 5: Workflow explorer

# 3 Loading workflows in Taverna

Either download a workflow first from myExperiment or copy the URL to the workflow (on Windows right click on the URL and select option 'Copy Link Location'). If you want to load a workflow from a file click on *File* and chose the option *Open Workflow*. An dialog opens which allows you to navigate to the location of the workflow, select the workflow you want to open and click on the button *Open*.

If you want to open a workflow by its URL click on *File* and chose the option *Open Workflow location* ...see Figure 6. A dialog opens in which you can type or copy the URL of the workflow you want to run. After loading the workflow the workflow diagram will update with a visualisation of the workflow.

You can have open several workflows at the same time. The *Workflows* menu allows you to change between workflows.

## HELIO Coordinate Systems

#### Draft

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Workflow output ports			
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Data links			
Figure 6 : Load aWorkflow			

# 4 Running workflows in Taverna

To execute a workflow press on the green Arrow indicated in Figure 7 Label 1. If the workflow has input variables a dialog window opens see Figure 8. You have to provide input values for all input variables.Port description and Example values can provide some information about what is required. Click on the tab of each input port (Figure 8, Label 1), press the button *Set value* (Label 2), the Example value will automatically be provided which you can change to a value required by you. For some workflows it is possible to provide a list of input values. For these you press *Set value* for every input value you require. When you have provided all required input values press the *Run workflow* button (Label 3).

Taverna automatically switches into the Results view (Figure 9) in which you can watch the progress of your execution. Successfully executed services are displayed in gray, if there was an error the service where the error occurred is drawn in red colour.



#### Figure 7 : Screenshot of Taverna



Figure 8: Dialog for Input Values to run a workflow



Figure 9: Results view

## 5 Understanding the outputs and intermediate values

When starting an execution Taverna will automatically switch into the *Results* view. After the execution is finished, which you can see on the status label in Figure 10, Label 1, you can view the results in the table at the bottom. In the tabs with the red triangle you can review the input values and in the tabs with the green triangle the results from the output ports are displayed. On the left hand side (Label 2) the list of output values is presented. Click on any of the values to view the content on the right hand side (Label 3). If a value is written in red colour there was an error during the processing of that run. You can click on the error value to see more details about it.

Depending on the type of output you can chose the representation type (Label 4). For VOTables either the view as Text or as XML tree is appropriate.

If you want to understand how the results were composed you can click on any of the processor types in the workflow diagram (Label 5) to view the input and output values of this service. The values are again displayed in the lower half of the view (Labels 2, 3).

You can save one of all outputs of the workflow or of immediate values by pressing the button 'Save value' or 'Save all values' (Labels 6, 7).



Figure 10: Viewing of the resuls