

VPH-Share Research Platform

- VPH-Share is a 20-Partner FP7 Integrated Project that is constructing an online, cloud-based environment in which users can share software tools, applications and data, and can develop and execute *in silico* clinical workflows.
- Four Flagship Workflows are included as demonstrators and, in recent months a significant number of additional Use Cases have been added to the project, several of which are already active
- VPH-Share has been operational for over 12 months, with new features and content being added continuously.



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2

			
Unified Identity	Security	Workflows	Semantics
			Structured Data
High Performance	Applications		
		Cloud Computing	Unstructured data
<h2>Platform Building Blocks</h2>			
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VPH-Share - Research Partnerships



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4

Reviewers: Guided Introduction

At the project's second periodic review in April 2013 the Reviewers proposed that, to obtain an enriched appreciation of the system, they might have access to the infrastructure during the two week period prior to the 3rd Periodic Review. This has been arranged, and VPH-Share accounts have been enabled for each reviewer.

VPH-Share, although carefully designed, is none-the-less a complex infrastructure and, as with all such systems, the full benefits emerge after a degree of familiarisation.

To help with this learning process we have prepared a set of illustrated guidance slide-sets that show users how to begin using the system and carry out three common activities.



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5

For the Busy Reviewer

In all cases you'll need to see through the Login process. The three activities are then described in separate tutorials, and each requires around 40 minutes to complete. If time doesn't permit this degree of engagement, it may be that an agreement between Reviewers to split the three tasks amongst you may be a possible solution.

If such a split is palatable, the data-centred activities are probably the least challenging (perhaps 4/10), with the application and workflow development activities being the most challenging (perhaps 7/10).

If you're particularly short of time, but would still like to try the system, the Data activity includes as its final step a search exercise to identify semantically-tagged data; this will give a flavour of the system without requiring a large investment of time.

Finally, at the end of each presentation, video(s) show all the steps covered.

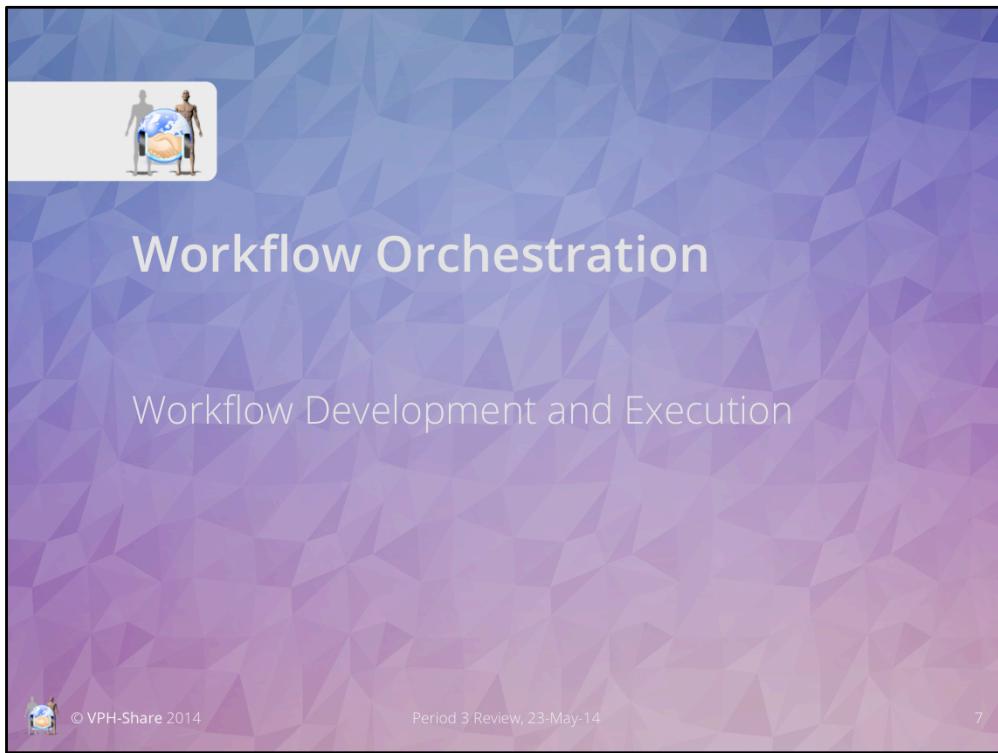


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6



Summary

The ultimate goal of many VPH-Share users is to employ the Infrastructure to develop complete workflows capable of accepting patient data as inputs and presenting clinically-relevant diagnostic or treatment information as outputs. These workflows are typically assembled from pre-existing Applications that are chained together to interact and provide clinical solutions. This **Workflow** guide covers the creation of such a workflow:

- We start with an incomplete workflow that will be finished by the addition of missing facilities
- The incomplete workflow is opened in the online workflow editor 'Taverna Online', which gives a diagrammatic view of the existing components and their interconnections
- A new service is added, its parameters are entered, and it is connected into the existing workflow
- The resulting workflow is saved with a new name
- We execute the new workflow, providing details of the required source data
- We inspect various details of the running workflow 'instance'
- Finally we share the completed and tested workflow with other users



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8

Workflow Execution

01 Search & Discovery

02 Workflow Development

03 Taverna Online

04 Workflow Execution

05 Sharing & Permissions



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9

01

Search & Discovery

- Click Search > Type '**Registration**' > Filter '**Workflow**'
- Click on '**ANTs Registration Workflow Template**'

The screenshot shows the VPH-SHARE web interface. At the top, there's a navigation bar with links for DATA, APPLICATIONS, WORKFLOWS, and SEARCH. The SEARCH tab is active. Below the navigation is a search bar with the text 'Registration' and a dropdown menu 'All resources'. To the right of the search bar is a 'Search' button and a link 'Or use Semantic search'. On the left, a sidebar displays 'We've found 5 repository results'. The first result is 'User ANTs Registration Workflow', described as an INCOMPLETE workflow for tutorial purposes. The second result is 'ANTs Registration Reference Workflow', described as a COMPLETE workflow for converting DICOM files to Metamage format. The third result, circled with a purple circle containing a white letter 'b', is 'ANTs Registration Workflow Template', also described as an INCOMPLETE workflow for tutorial purposes. To the right of the results is a 'Filter By' sidebar with categories: Dataset (1), Workflow (selected), Application (0), File (0), Semantic web service (0), User (0), and Institution (0). Below the filter sidebar are sections for 'Refine' with fields for Category, Author, Licence, and Tags.

VPH-Share provides pre-configured and template scientific workflows which are annotated with semantic concepts and may use internal and external services



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10

User Manual: <http://www.vph-share.eu/content/browse-and-search-workflows>

01

Search & Discovery

- a. Click Search > Type '**Registration**' > Facet '**Workflow**'
- b. Click on '**ANTs Registration Workflow**'
- c. View metadata and click '**Edit Taverna Online**'

The screenshot shows the VPH-SHARE interface for managing workflows. At the top, there's a navigation bar with links for DATA, APPLICATIONS, WORKFLOWS, and SEARCH. The current page is 'WORKFLOWS'. Below the navigation, a specific workflow template is displayed: 'ANTS Registration Workflow Template'. This template has a rating of 1 star from 5. The description notes it's an incomplete workflow for tutorial purposes, converting an input DICOM file to Metalmage format, then taking another Metalmage file and using ANTs Image Registration to register the Fixed Image to the Moving Image. It was created and last updated on May 9, 2014, at 11:13 a.m., and is published. The annotations section states there are no semantic annotations. To the right of the main content, there are several metadata fields: Type (Workflow), Views (16), Category (Multidisciplinary), Tags (ants, registration), and License (GPL). Below these are four green buttons: 'Configure to execute', 'Download workflow file', 'Edit in Taverna Online' (which is circled in purple), and 'Download input file'. At the bottom of the page, there are links for Terms of use, Privacy policy, Cookie policy, Security, Monitoring, Report a bug, and a copyright notice for OnlineHPC.

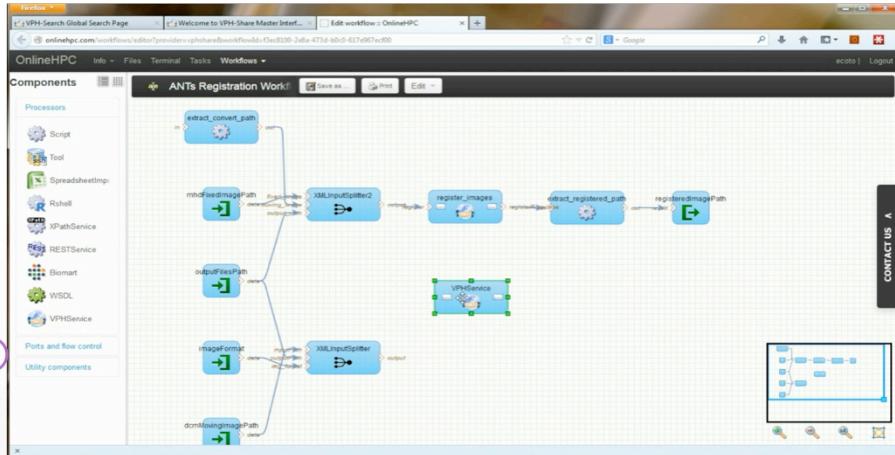
VPH-Share has collaborated with OnlineHPC to provide web-based workflow editing capabilities to users.

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User Manual: <http://www.vph-share.eu/content/browse-and-search-workflows>

02 Workflow Development

a. Drag & Drop 'VPHService' onto workflow



VPH-Share via Taverna Online allows users to import services, workflows and data into their Taverna Online workspace for development and execution.



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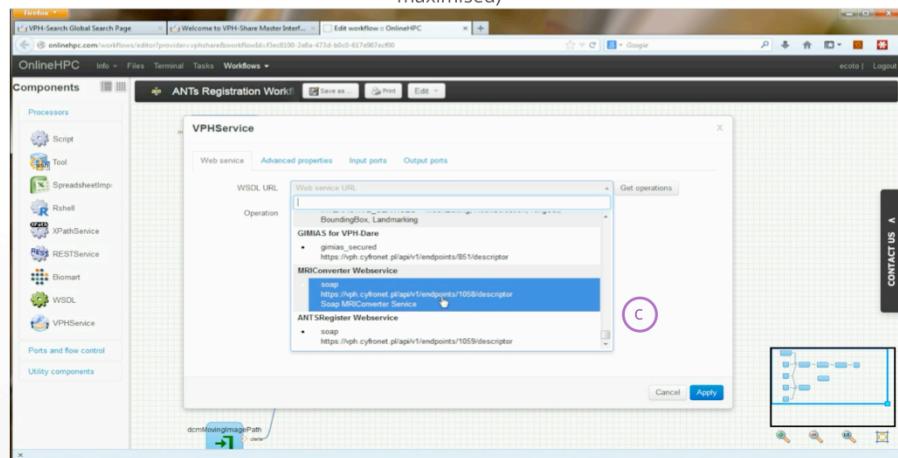
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12

User manual: <http://www.vph-share.eu/content/workflow-composition-taverna-online>

02 Workflow Development

- Drag & Drop '**VPHService**' onto workflow
- Double-click **VPHService** to configure the service
- Choose **MRIConverter Webservice** and **get operations**
- Choose **convert** and click **Apply** (ensure screen maximised)



VPH-Share via Taverna Online allows users to import services, workflows and data into their Taverna Online workspace for development and execution.



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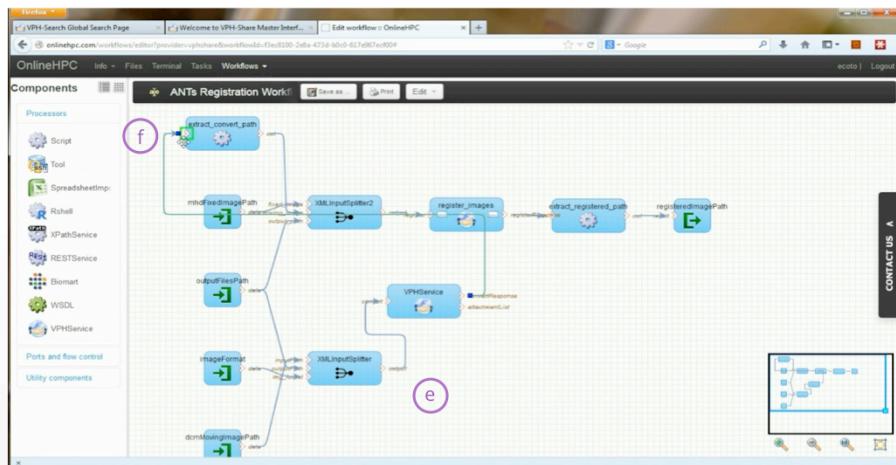
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User manual: <http://www.vph-share.eu/content/workflow-composition-taverna-online>

02 Workflow Development

- e. Connect **XMLInputSplitter** to the **VPHService convert**
- f. Connect **VPHService convertResponse** to **extract_convert_path**



VPH-Share via Taverna Online allows users to import services, workflows and data into their Taverna Online workspace for development and execution.



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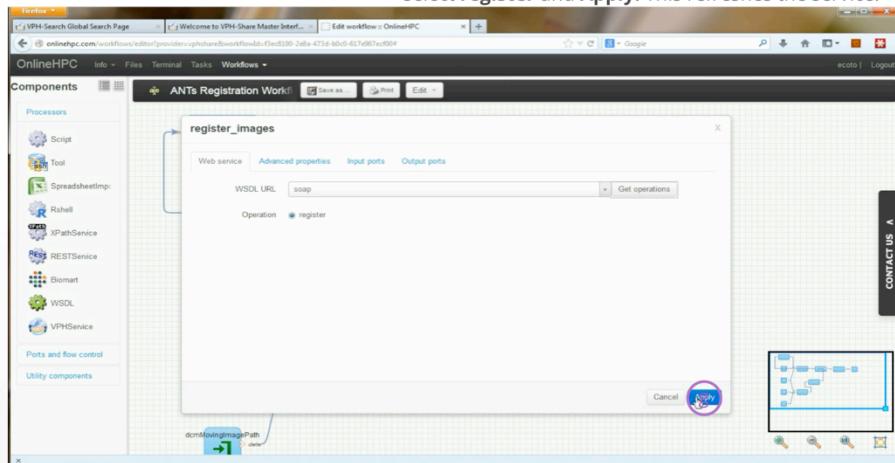
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14

User manual: <http://www.vph-share.eu/content/workflow-composition-taverna-online>

02 Workflow Development

- e. Connect **XMLInputSplitter** to the **VPHService convert**
- f. Connect **VPHService convertResponse** to **extract_convert_path**
- g. Double-click **register_images** and **get operations** and select **register** and **Apply**. This refreshes the service.



VPH-Share via Taverna Online allows users to import services, workflows and data into their Taverna Online workspace for development and execution.



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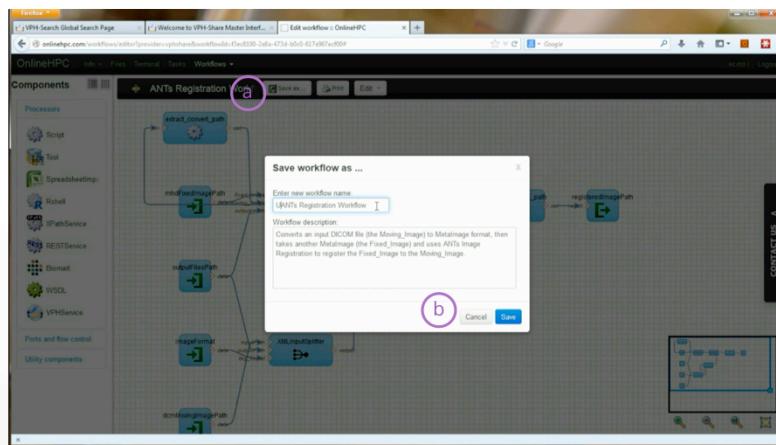
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15

User manual: <http://www.vph-share.eu/content/workflow-composition-taverna-online>

03 Taverna Online

- a. Click **Save as**
- b. Rename workflow as “**NAME ANTs Registration Workflow**” and click **Save**
- c. Click **Launch**



VPH-Share provides complete integration with Taverna Online as user are able to save and execute their workflows back to VPH-Share



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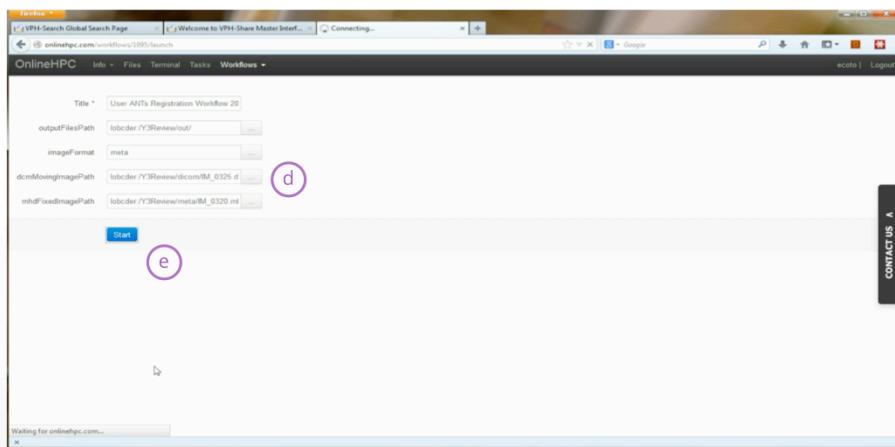
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03 Taverna Online

- d. Fill input parameters with:
outputFilesPath: Click browser button and pick **home > NAME > demo > out**
imageFormat: Type **meta**
dcmMovingImagePath: Pick **home > NAME > demo > dicom > Any.dcm** file
dcmFixedImagePath: Pick **home > NAME > demo > dicom > Any.dcm** file
e. Click **Start**



Users are able to configure their workflows with parameters and by selecting input files from VPH-Share



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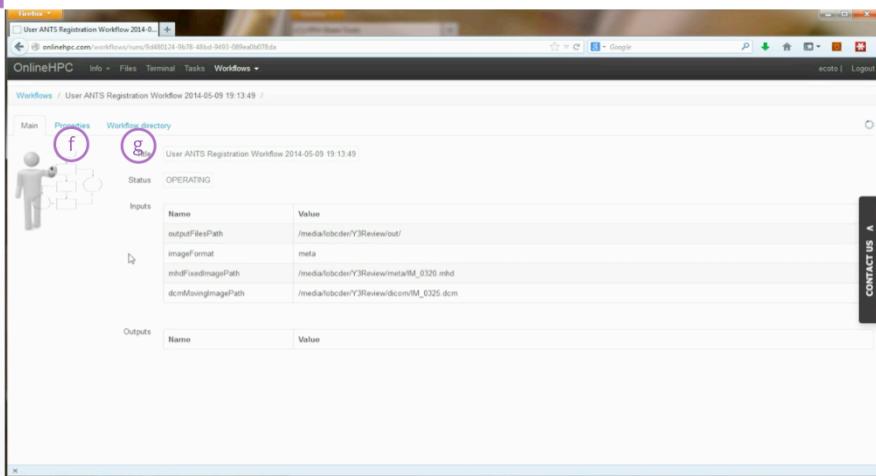
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17

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03 Taverna Online

- f. Click on **Properties** to view the workflow properties
- g. Click on **Workflow directory** to view



Workflows can also be executed from within Taverna Online



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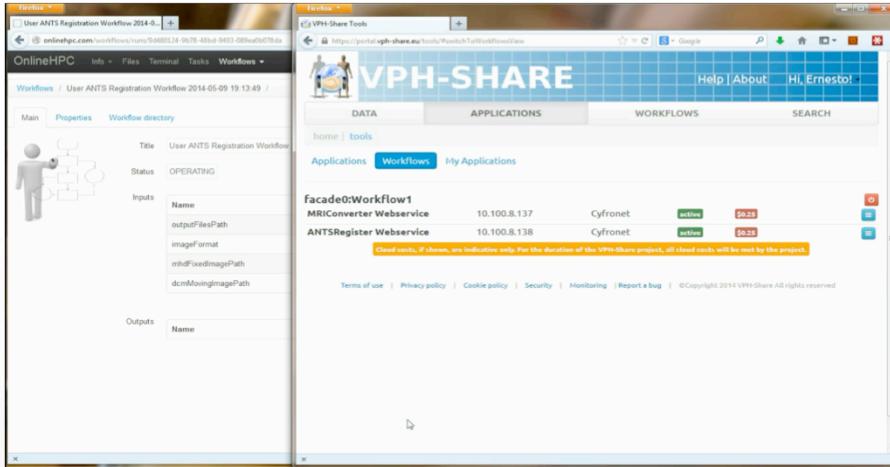
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04 Workflow Execution

- a. Navigate to **Applications > Workflows**
- b. View Applications automatically started by the workflow.
MRIConverter and **ANTSRegister**



Taverna Online executed workflows automatically starts Applications within VPH-Share for processing by the workflow



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04 Workflow Execution

- a. Navigate to **Applications > Workflows**
- b. View Applications automatically started by the workflow. **MRIConverter** and **ANTSRegister**
- c. On completion, navigate to **Data > FileStore** and your home directory to view the converted files.

o	dicom	owned by susheel	modified 06 May 2014		
o	meta	owned by ecoto	modified 08 May 2014		
o	out	owned by ecoto	modified 08 May 2014		
	IM_0320_IM_0325.nii	owned by ecoto	modified 09 May 2014	2097504 bytes	
	IM_0320_IM_03250GenericAffine.mat	owned by ecoto	modified 09 May 2014	137 bytes	
	IM_0320_IM_03251InverseWarp.nii.gz	owned by ecoto	modified 09 May 2014	9881 bytes	
	IM_0320_IM_03251Warp.nii.gz	owned by ecoto	modified 09 May 2014	9881 bytes	
	IM_0325.mhd	owned by ecoto	modified 09 May 2014	365 bytes	
	IM_0325.raw	owned by ecoto	modified 09 May 2014	524288 bytes	
	IM_0325_Info.txt	owned by ecoto	modified 09 May 2014	779 bytes	

VPH-Share allows



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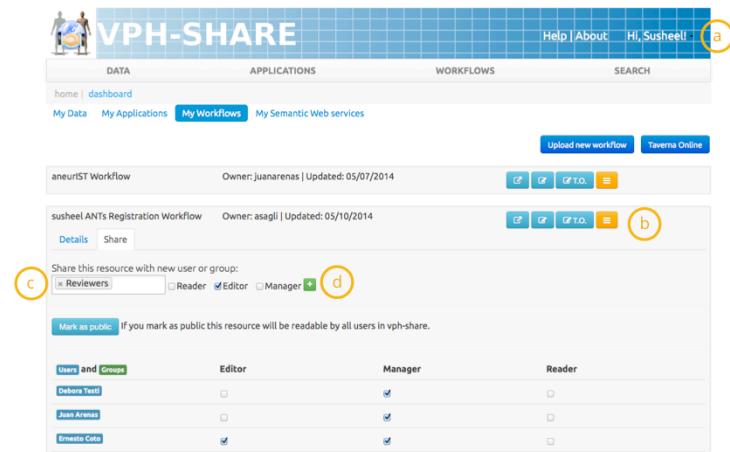
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05 Sharing & Permissions

- a. Click on your NAME > Dashboard > My Workflows
- b. Select your Application >  > Share Tab
- c. Search for individual or Group
- d. Choose permission 'Editor' and click the plus sign



The screenshot shows the VPH-SHARE interface. At the top, there's a navigation bar with links for DATA, APPLICATIONS, WORKFLOWS, and SEARCH. The user 'Hi, Susheel!' is logged in. Below the navigation, there are tabs for My Data, My Applications, My Workflows (which is selected), and My Semantic Web services. The main content area displays two workflows: 'aneurIST Workflow' and 'susheel ANT's Registration Workflow'. Each workflow has details like owner and update date. Below the workflows is a sharing section with a 'Share' button. Further down is a table titled 'Users and Groups' showing permissions for three users: Deborah Testi, Juan Arenas, and Ernesto Colio. The 'Manager' column has checked checkboxes for all three users, while the 'Editor' and 'Reader' columns have mixed checked and unchecked states.

Users and Groups	Editor	Manager	Reader
Deborah Testi	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Juan Arenas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ernesto Colio	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

VPH-Share allows fine-grained permissions on all resources. Sharing may be performed on individuals and/or groups according to the needs of the resource



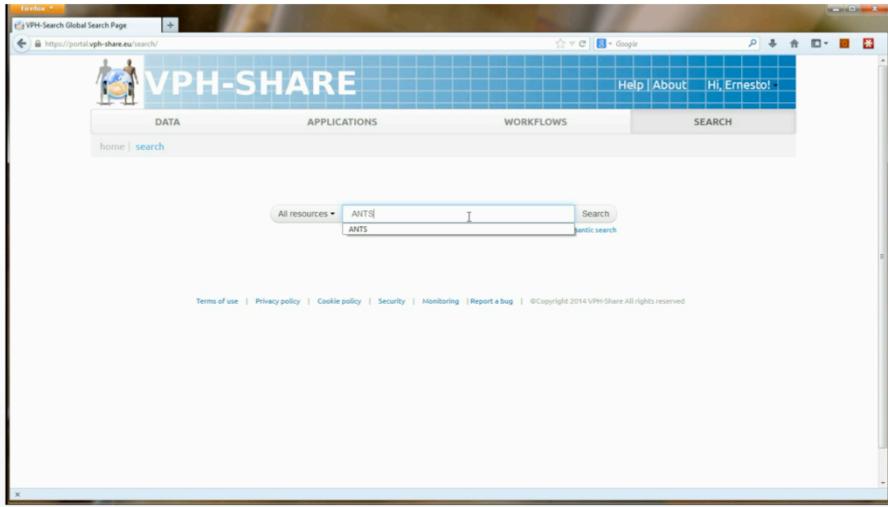
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User manual: <http://www.vph-share.eu/content/grant-permissions>

Video - Workflow Editing & Execution



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GLOSSARY

- API – Application Programming Interface
- Workflow – A sequence of steps configured to be performed by passing data or control signals



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