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Building an European Research Community through Interoperable Workflows and Data

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Deliverable D*5.5*
Description of applications ported to the SSP (year 2)
Annex A – Astrophysics Community

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4 Status and Change History

Status:	Name:	Date:	Signature:
Draft:	Gabriele Pierantoni	16/08/2014	n.n. electronically
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Table 1, Deliverable Status

Version	Date	Pages	Author	Modification
0.1	29/09/14	All	GP	Created
1.0	23/10/14	All	CV	Created sections for each application and atomic workflow
2.0	24/10/14	All	GC	Connected link with documents in the SHIWA Repository
3.0	25/10/14	All	CV, GC	Added new sections for the science cases and connected links with documents in the SHIWA Repository

Table 2, Deliverable Change History

5 Glossary

AMIGA	Analysis of the interstellar Medium of Isolated GAlaxies
POCA	Point of Closest Approach
DEC	Declination
FITS	Flexible Image Transport System
GOES	Geostationary Operational Environmental Satellites
HST	Hubble Space Telescope
NED	NASA/IPAC Extragalactic Database
RA	Right Ascension
RO	Research Object
RODL	Research Object Digital Library
SDSS	Sloan Digital Sky Survey
SIAP	Simple Image Access Protocol
SSP	SHIWA Simulation Platform
UCD	Uniform Content Descriptor
URL	Uniform Resource Locator
VO	Virtual Observatory
WP	Work Package

Table 3, Glossary

6 Astrophysics Science Cases, Applications and Atomic Workflows

This section is dedicated to the detailed description of the:

- 3 Science Cases,
- 5 Applications,
- 11 Atomic Workflows,

selected by the astrophysical community for the second year of the ER-flow project.

6.1 Science Cases

The three astrophysical science cases selected for the second year of the ER-flow project are based on the 5 applications and the 11 atomic workflows selected for the Y2 plus the Planck application which is one of the five astrophysical applications developed during the Y1 of ER-flow.
The relationship between science cases and applications/atomic workflows is summarized in Table 4 below:

ID	Name	Description	Applications & Atomic Workflows
1	Virtual Observatory	Virtual Observatory Interface	Table 5
2	Planck	Simulations of the ESA Planck satellite mission	Y1 application 4978 in the SHIWA repository
3	Visualization	Muon workflow and gateway for displaying tomographic images	Section 6.2.5

Table 4, Relationship between science cases and applications/atomic workflows

The Table 5 below lists all applications and atomic workflows related to the "Virtual Observatory" science case.

Workflow	Type
Discovery of Brown Dwarfs mining the 2MASS and SDSS databases	Application
Retrieving information from HST ConeSearch and Image VO Services	Application
Concatenates several VOTables into one	ATOMIC
Create configuration files from a template and a VOTable	ATOMIC
Astronomical object name to equatorial coordinates Resolver	ATOMIC
Run scripts from a column in a VOTable	ATOMIC
Create VOTable from ellipse results	ATOMIC
Add columns to a VOTable resulting from the execution of sextractor	ATOMIC
Extract a column from a VOTable into a List	ATOMIC
Perform a ConeSearch query to a VO Service	ATOMIC
Split VOTables into its values	ATOMIC
Extract content of columns from VOTables	ATOMIC
Find events in x-ray and radio	Application
Create a VOTable of NED (NASA/IPAC Extragalactic Database) images from a list of objects	ATOMIC
Galaxies Sample Selection Research Object	Application

Table 5, Applications/atomic workflows of the "Virtual Observatory" science case

6.1.1 Science Case 1

Name: Virtual Observatory

6.1.1.1 Technical Details

The documentation in PDF format related to this science case can be found in the SHIWA repository under the Y2 application 5958 “HSTConeSearch”.

Information	URL
Documentation	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5958&filename=VO-Science-Case.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 6, Technical Details of Science Case 1

6.1.2 Science Case 2

Name: Planck

6.1.2.1 Technical Details

The documentation in PDF format related to this science case can be found in the SHIWA repository under the Y1 application 4978 “Planck”.

Information	URL
Documentation	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=4978&filename=Planck-Science-Case.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 7, Technical Details of Science Case 2

6.1.3 Science Case 3

Name: Visualization

6.1.3.1 Technical Details

The documentation in PDF format related to this science case can be found in the SHIWA repository under the Y2 application 5103 “MuonWf”.

Information	URL
Documentation	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5103&filename=Visualization-Science-Case.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 8, Technical Details of Science Case 3

6.2 Applications

6.2.1 Application 1

Name: BrownDwarfsDiscovery

Short Description: Discovery of Brown Dwarfs mining the 2MASS and SDSS databases

6.2.1.1 Nature and Relevance

Brown dwarfs are objects occupying the gap between the least massive stars and the most massive planets. They are intrinsically faint objects so their detection is not straighforward and, in fact, was almost impossible until the advent of global surveys at deep optical and near-infrared bands like SDSS, 2MASS or DENIS among others. Here we propose to mine the SDSS and 2MASS databases to identify T-type brown dwarfs through an appropriate combination of colours in the optical and the infra-red.

6.2.1.2 Workflow Details

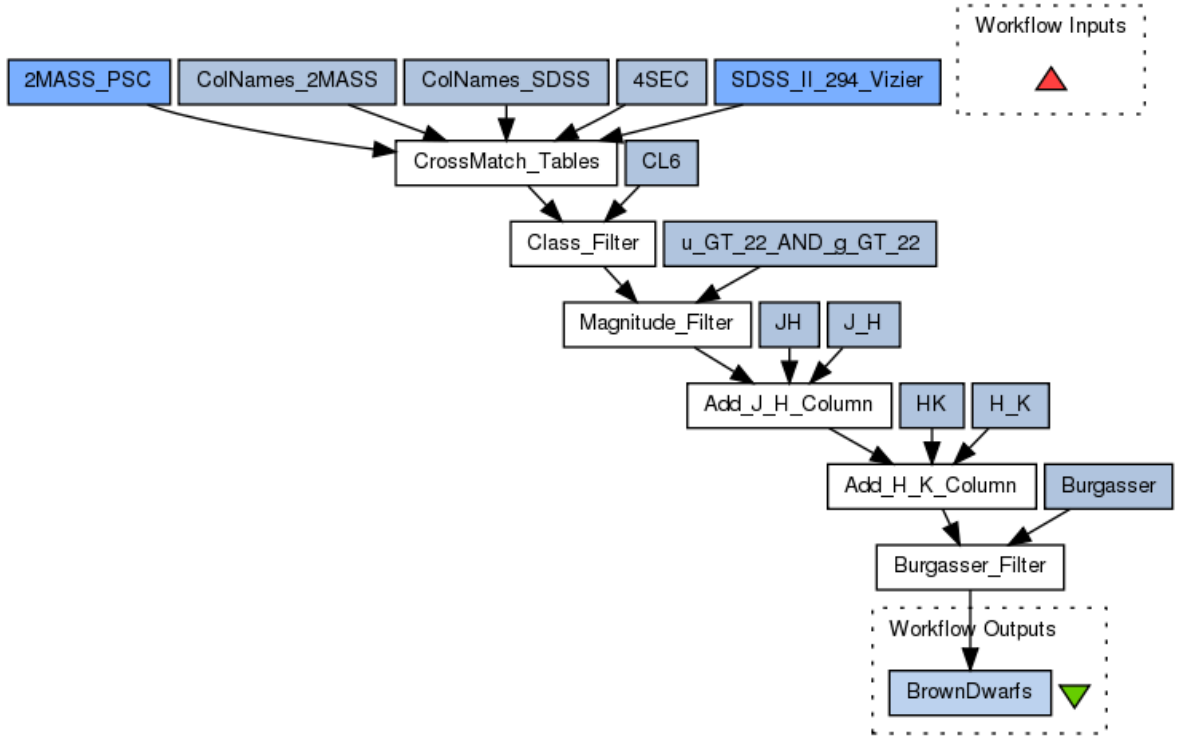

Figure 1, Graph of Application 1

6.2.1.3 Input/Output

Input

No input

Output

Name	Type	Description
BrownDwarfsDiscovery	file	1 object --> RA:127.703265deg; DEC:1.475320deg

Table 9, Output of Application 1

6.2.1.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5725
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5725&filename=BrownDwarfsDiscovery-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 10, Technical Details of Application 1

6.2.2 Application 2

Name: FindEventsInXRayAndRadio

Short Description: Find events in x-ray and radio

6.2.2.1 Nature and Relevance

Search for events which have data from Rhessi and Phoenix2.
Events between start and stop and between GOES min and max are considered for overlaps; if you want to search without GOES filter enter an empty string for these variables.

6.2.2.2 Workflow Details

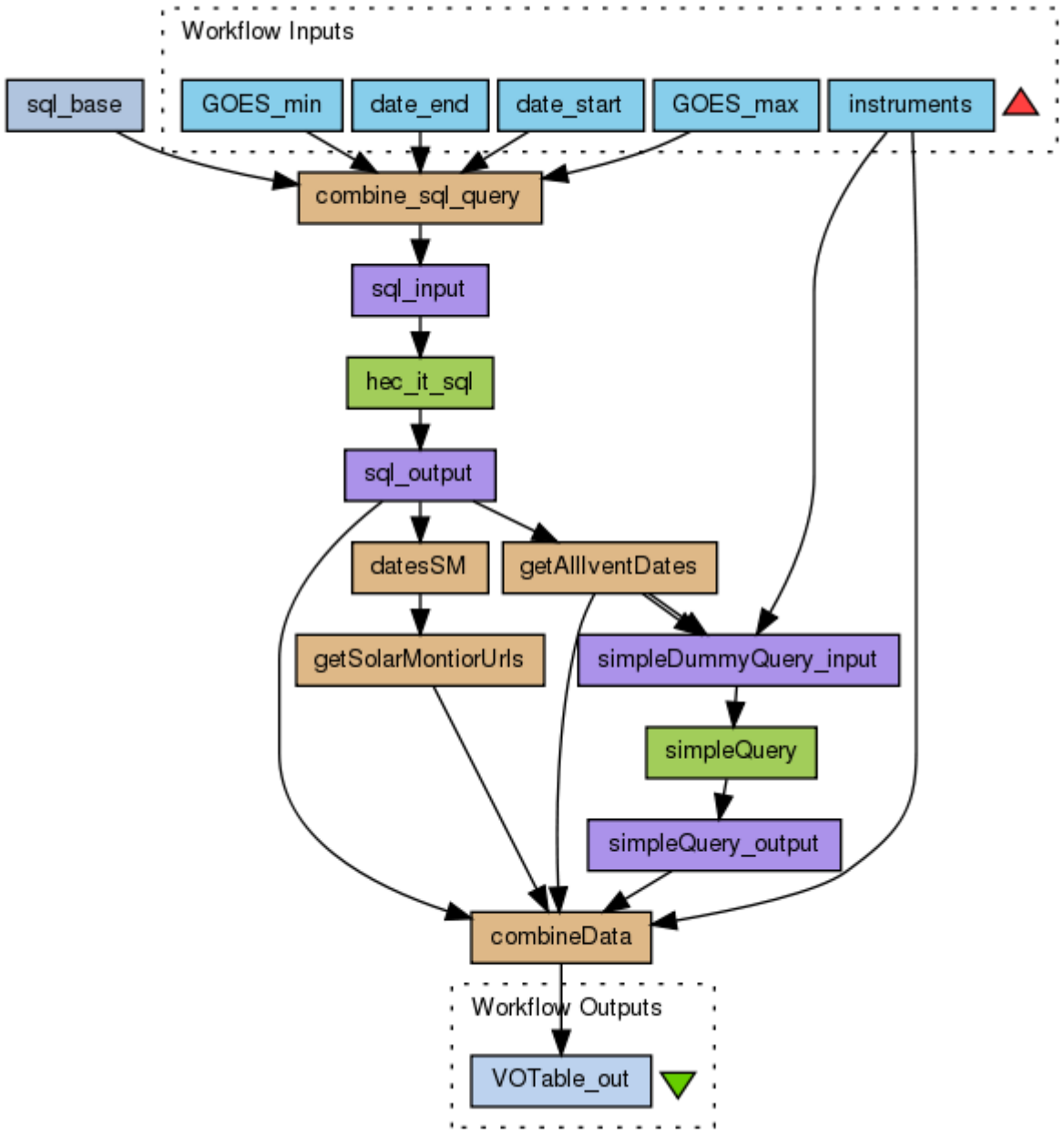

Figure 2, Graph of Application 2

6.2.2.3 Input/Output

Input

Name	Type	Description
date_start	file	the start date of the periode where the overlap search happens
date_end	file	The end date of the periode
GOES_min	file	Goes filter parameter xray_class > value Goes filter parameter xray_class > value empty string for none
GOES_max	file	Goes filter parameter xray_class < value Goes filter parameter - optional Goes filter parameter Goes filter parameter xray_class < value empty string for none
instruments	file	a list of instruments a list of instruments (hessi, hessi-ec, phoenix2)

Table 11, Input of Application 2

Output

Name	Type	Description
VOTable_out	file	The VOTable which contains the X-Ray and Radio events

Table 12, Output of Application 2

6.2.2.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5954
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5954&filename=FindEventsInXRayAndRadio-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 13, Technical Details of Application 2

6.2.3 Application 3

Name: HSTConeSearch

Short Description: Retrieving information from HST ConeSearch and Image VO Services

6.2.3.1 Nature and Relevance

This workflow retrieves information from Hubble Space Telescope VO Services in the form of VOTables. The input of the workflow is an ASCII file with a list of source names. This file is converted to a VOTable, and coordinates added with an extra-column needed to query SIAP Image service. The final result are two different VOTables issued as the response of both VO Services; Images VOTable has been previously filtered.

6.2.3.2 Workflow Details

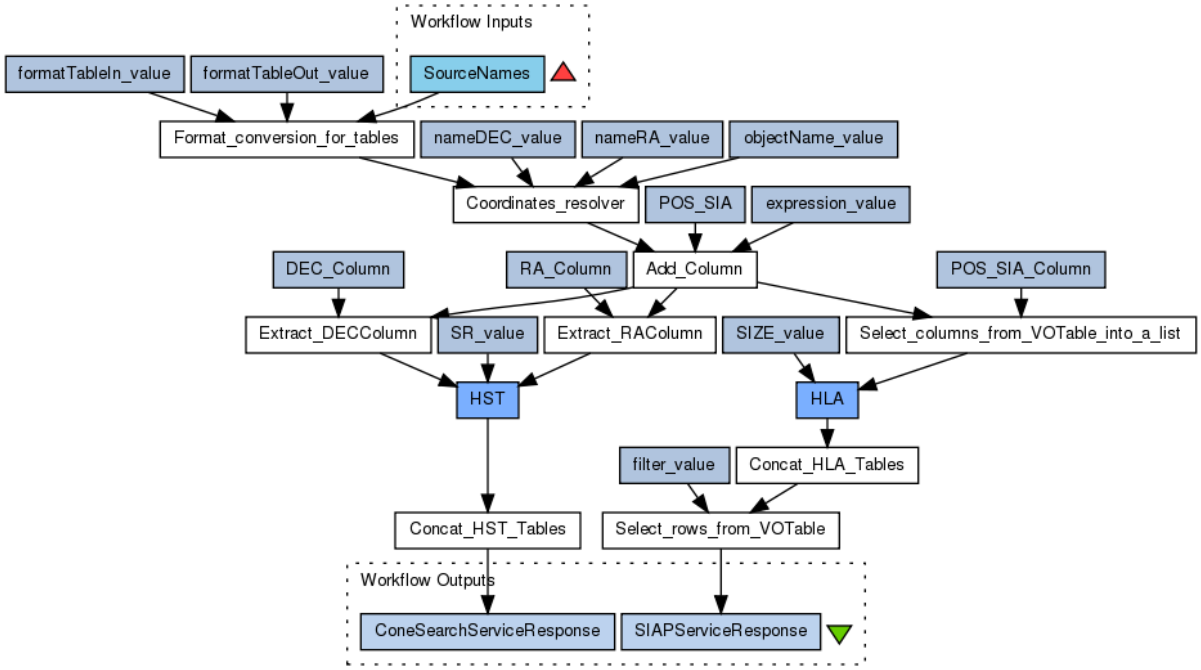

Figure 3, Graph of Application 3

6.2.3.3 Input/Output

Input

Name	Type	Description
SourceNames	file	List of Source Names

Table 14, Input of Application 3

Output

Name	Type	Description
ConeSearchServiceResponse	file	Response coming from the Cone Search service
SIAPServiceResponse	file	Response coming from the SIAP service

Table 15, Output of Application 3

6.2.3.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5958
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5958&filename=HSTConeSearch-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 16, Technical Details of Application 3

6.2.4 Application 4

Name: GalaxiesSampleSelectionResearchObject

Short Description: Galaxies Sample Selection Research Object

6.2.4.1 Nature and Relevance

In order to understand the evolution of galaxies, detailed analysis of images plays a key role. During the last years telescopes working at different wavelengths have been imaging the whole sky. One example of this is the SDSS (Sloan Digital Sky Survey). The generated images provides a wealth of information, publicly available, and hence allowing them to be used by any interested group in the study of their own samples of objects or generation of new samples. The two main processing of the images generated by sky surveys are "Extraction of sources" and "Structural analysis of the light"

Extraction of sources: point and extended objects can be found in images of the sky, most frequently the first corresponding to stars, and the second to galaxies. Although their visual identification is in general straightforward, production of samples of objects according to different criteria becomes not only more complex, but inefficient to be done in an interactive non-automated visual process. For this reason, the first Research Object of the 2nd Golden Exemplar of the Astronomy use case in the Wf4Ever project is focused on tasks to generate samples of objects with specific characteristics.

The result of this study will be applied by the AMIGA group of astronomers of the Wf4Ever project in order to determine the properties of isolated galaxies, those who spend most of their life in absence of strong interactions with neighbours, and test the hypothesis that for this sample the bulge component has a smaller size than for other interacting samples. This would be expected if bulges grow, as models predict, due to accretion of material from interactions. Such study requires the analysis of a large sample so that it has a statistical value. However the implied processes are complex enough to prevent for an efficient work when they have to be executed manually and the protocol is not thoroughly described.

6.2.4.2 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5960
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5960&filename=GalaxiesSampleSelectionResearchObject-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 17, Technical Details of Application 4

In MyExperiment this application corresponds to a pack which is composed of two workflows and two files that are described in the following sections.

6.2.4.3 Items of Application 4

6.2.4.3.1 Workflow 1 of Application 4

Name: Environment

6.2.4.3.1.1 Nature and Relevance

From a previously selected cube of galaxies residing in a remote database, we provide extragalactic environment parameters for all galaxies sample.

This workflow takes as input the path of the tabular *.pckl Python pickle dataset created in the previous workflow, as well as the database connection settings and several criteria on how to filter the potential companions of the target galaxies. It provides a file with the SDSS identifiers of each target galaxy of the sample, environmental estimators and radius where the 10th companion has been found. The workflow looks for potential companions in radius ranging from 3Mpc to 11Mpc, with a step of 1Mpc. The user may modify these numbers at the input stage, as well as several limits and ranges needed in the filtering process. As in the previous workflow other provided input values are the Working Path of the digital experiment and the database connection settings: hostname, login and password.

Execution Environment: The first requirement to run the workflows provided by both ROs is Taverna Workbench2 2.4 or higher. AstroTaverna (Taverna plugin) is also needed in order to get functionalities related with Virtual Observatory web services queries and management of standard VOTable data formats. In general, the execution environment is a Linux distribution including Python4 2.x and a bash shell, with psycopg and numpy Python packages. Access to a PostgreSQL database storing the physical parameters provided by SDSS is also needed; a dump file of database may be downloaded from the AMIGA web server in order to be deployed and accessible from a local execution environment.

6.2.4.3.1.2 Workflow Details

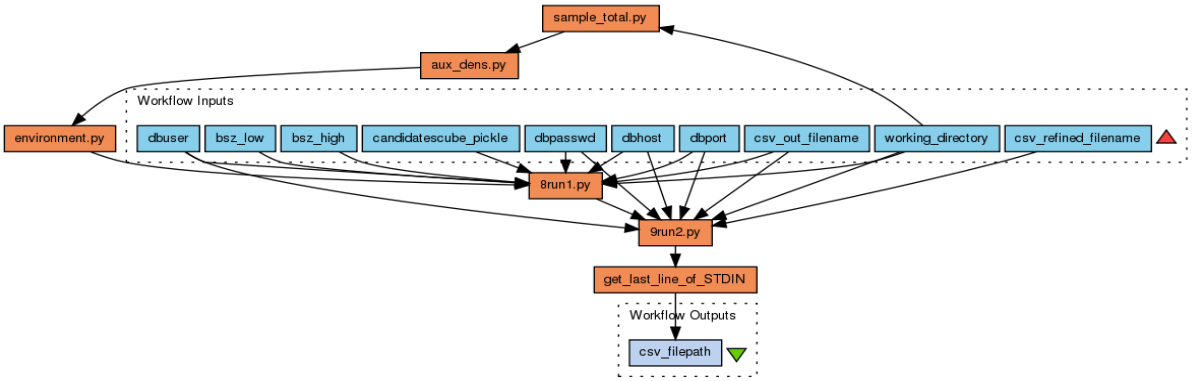

Figure 4, Graph of Workflow 1 of Application 4

6.2.4.3.1.3 Input/Output

Input

Name	Description
dbuser	
dbpasswd	
dbhost	
dbport	
candidatescube_pickle	
csv_out_filename	
csv_refined_filename	
working_directory	
bsz_low	
bsz_high	

Table 18, Input of Workflow 1 of Application 4

Output

Name	Description
csv_filepath	

Table 19, Output of Workflow 1 of Application 4

6.2.4.3.1.4 Further Technical Details

Information	URL
MyExperiment Repository	http://www.myexperiment.org/workflows/3352.html
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 20, Technical Details of Workflow 1 of Application 4

6.2.4.3.2 Workflow 2 of Application 4

Name: IntializeSample

6.2.4.3.2.1 Nature and Relevance

This workflow saves a tabular *.pckl Python pickle dataset in the local file system, containing values calculated on physical parameters associated to potential companions of a sample of target galaxies. These original physical parameters are extracted from a postgreSQL database, containing information of all galaxies covered by the SDSS spectroscopic survey. The workflow first access the external database located in the AMIGA server and selects the target galaxies from the sample (those having spectroscopic redshift between 0.03 and 0.1). It then creates a tabular gridded datacube with values associated to potential neighbours. These values are calculates for each point of a 3D space defined by the axes: magnitude in r band, photometric redshift and sigma level of detection. The input default values to build the parameterised datacube are:

- 14.5<mr><22.5><z><0.11><sigma><3.2>

Auxiliary function libraries and scripts are also copied in local file system, and the PYTHONPATH environmental variable is set to a value provided by the user as the Working Path of the digital experiment. Other user provided input values are the database connection settings: hostname, login and password.

Execution environment: The first requirement to run the workflows provided by both ROs is Taverna Workbench 2 2.4 or higher. AstroTaverna (Taverna plugin) is also needed in order to get functionalities related with Virtual Observatory web services queries and management of standard VOTable data formats. In general, the execution environment is a Linux distribution including Python 4 2.x and a bash shell, with psycopg and numpy Python packages. Access to a PostgreSQL database storing the physical parameters provided by SDSS is also needed; a dump file of database may be downloaded from the AMIGA web server in order to be deployed and accessible from a local execution environment.

6.2.4.3.2.2 Workflow Details

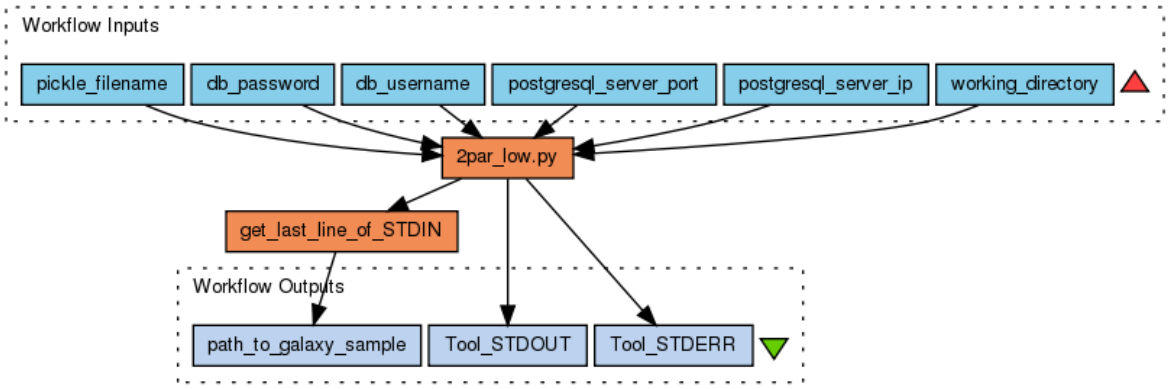

Figure 5, Graph of Workflow 2 of Application 4

6.2.4.3.2.3 Input/Output

Input

Name	Description
working_directory	POSIX Path to the working directory were data will be saved
postgresql_server_ip	Hostname or IP adress of the PostgreSQL server
postgresql_server_port	TCP/IP port number of the PostgresSQL server (default: 5432)
db_username	Database username
db_password	Database password for db_username
pickle_filename	Name of the pickle file to save the initial sample

Table 21, Input of Workflow 2 of Application 4

Output

Name	Description
path_to_galaxy_sample	
Tool_STDOUT	
Tool_STDERR	

Table 22, Output of Workflow 2 of Application 4

6.2.4.3.2.4 Further Technical Details

Information	URL
MyExperiment Repository	http://www.myexperiment.org/workflows/3351.html
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 23, Technical Details of Workflow 2 of Application 4

6.2.4.3.3 File 1 of Application 4

Name: D5.3v2_1.0.pdf

Short Description: D5.3v2 Calculation of Luminosity Profiles for a Sample of Galaxies extracted from Catalogues using Isolation Criteria

6.2.4.3.3.1 Description

This document describes the development of the second Golden Exemplar proposed in the WP 5 of the Wf4Ever project – Workflow Astronomy Preservation – and provides discussion about user-driven issues risen in this process and related with general objectives of the Wf4Ever project. The document pertains to the assembly of two Research Objects (RO) packing the digital experiment undertaken for the extraction of a sample of galaxies based on environmental criteria and the calculation of luminosity profiles in several bands for each of the galaxies. The main purpose of the deliverable D5.3v2 is to produce the workflows and ROs for the second Golden Exemplar in order to provide feedback based on a user experience for the models and technologies developed in the Wf4Ever project. The workflows and ROs developed may be accessed publicly in the MyExperiment portal, where the two ROs produced have been uploaded as MyExperiment Packs, as well as in the RODL Wf4Ever Sandbox.

6.2.4.3.4 File 2 of Application 4

Name: SampleSelection_HOWTO.pdf

Short Description: Extraction of Properties from a Sample of Galaxies

6.2.4.3.4.1 Description

This document describes the “Galaxies Sample Selection” Research Object.

6.2.5 Application 5

Name: MuonWf

Short Description: VISIVO MUON

6.2.5.1 Nature and Relevance

This visualisation-oriented workflow use VisIVO Tools for the inspection of cargo containers carrying high atomic number materials, by displaying tomographic images. The datasets containing coordinates of the muon tracker planes are first uploaded to our gateway and filtered by using the Point of Closest Approach (POCA) algorithm to create a representation containing the scattering deflection of cosmic radiations. The result is then visualized using point rendering. Further processing is then applied based on user-defined thresholds, followed by conversion into data volumes using the deflection angle field distribution by employing the 3D Cloudin-Cell (CIC) smoothing algorithm. Finally, a tomography is performed for inspection.

6.2.5.2 Workflow Details

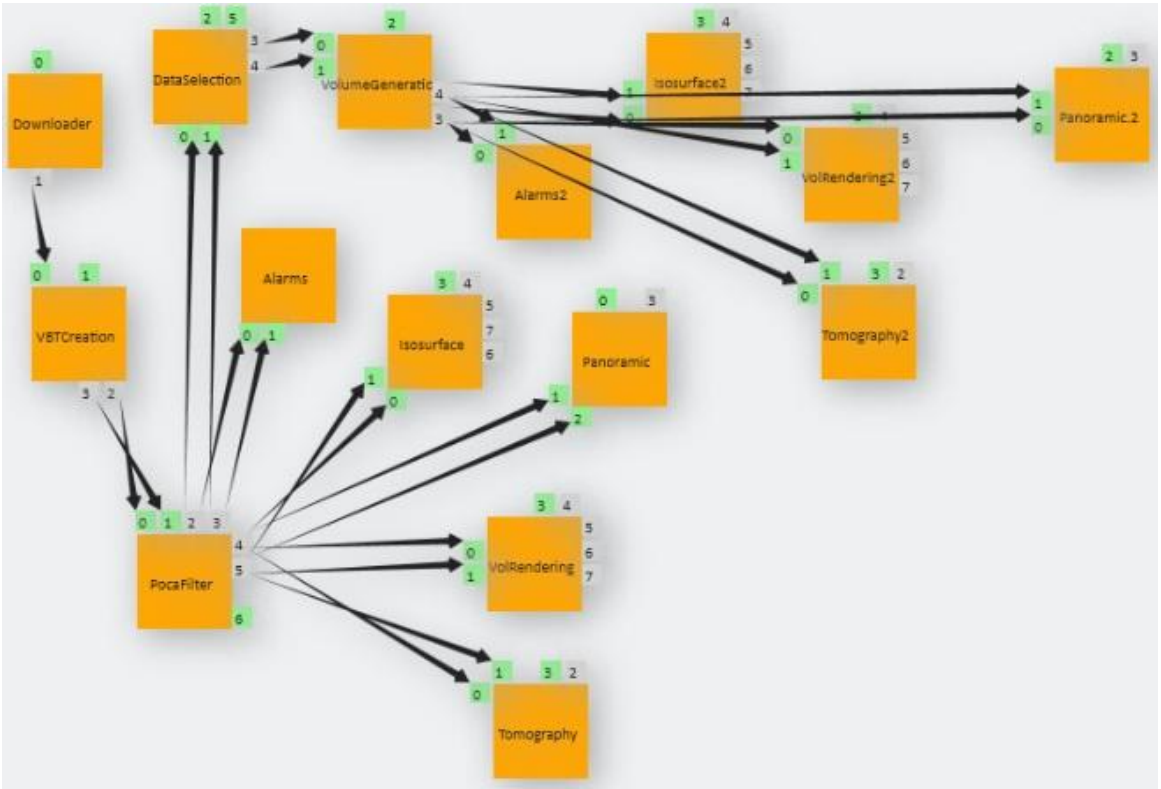

Figure 6, Graph of Application 5

6.2.5.3 Input/Output

Input

Name	Type	Description
VolumeGeneration_paramFile	file	Description of Port
VolRendering2_paramFile	file	Description of Port
Isosurface_paramFile	file	Description of Port
PocaFilter_paramFile	file	Description of Port

Tomography2_paramFile	file	Description of Port
VBTCreation_input	file	Description of Port
VBTCreation_param	file	Description of Port
Isosurface2_paramFile	file	Description of Port
DataSelection_paramFile	file	Description of Port
DataSelection_limits.txt	file	Description of Port
Panoramic_viewPar	file	Description of Port
VolRendering_paramFile	file	Description of Port
Panoramic.2_viewPar	file	Description of Port
Tomography_paramFile	file	Description of Port

Table 24, Input of Application 5

Output

Name	Type	Description
VolRendering2_VisIVOServerImage0.png	file	Description of Port
VolRendering2_VisIVOServerImage1.png	file	Description of Port
VolRendering2_VisIVOServerImage2.png	file	Description of Port
VolRendering2_VisIVOServerImage3.png	file	Description of Port
Isosurface_VisIVOServerImage0.png	file	Description of Port
Isosurface_VisIVOServerImage1.png	file	Description of Port
Isosurface_VisIVOServerImage3.png	file	Description of Port
Isosurface_VisIVOServerImage2.png	file	Description of Port
Tomography2_out.tar	file	Description of Port
Isosurface2_VisIVOServerImage0.png	file	Description of Port
Isosurface2_VisIVOServerImage1.png	file	Description of Port
Isosurface2_VisIVOServerImage2.png	file	Description of Port
Isosurface2_VisIVOServerImage3.png	file	Description of Port
Panoramic_finale.mp4	file	Description of Port
VolRendering_VisIVOServerImage0.png	file	Description of Port
VolRendering_VisIVOServerImage1.png	file	Description of Port
VolRendering_VisIVOServerImage2.png	file	Description of Port
VolRendering_VisIVOServerImage3.png	file	Description of Port
Panoramic.2_finale.mp4	file	Description of Port
Tomography_out.tar	file	Description of Port

Table 25, Output of Application 5

6.2.5.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5103
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5103&filename=MuonWf-adt.pdf
Contact details	E. Sciacca – eva.sciacca@oact.inaf.it G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 26, Technical Details of Application 5

6.3 Atomic Workflows

6.3.1 Atomic Workflow 1

Name: VOTablesConcatenation

Short Description: Concatenates several VOTables into one

6.3.1.1 Nature and Relevance

Snippet showing how to use AstroTaverna tool for concatenating several VOTables. The input is four VOTables with the same number of columns. The result if using sample values provided will be a four times vertically duplicated VOTable.

6.3.1.2 Workflow Details

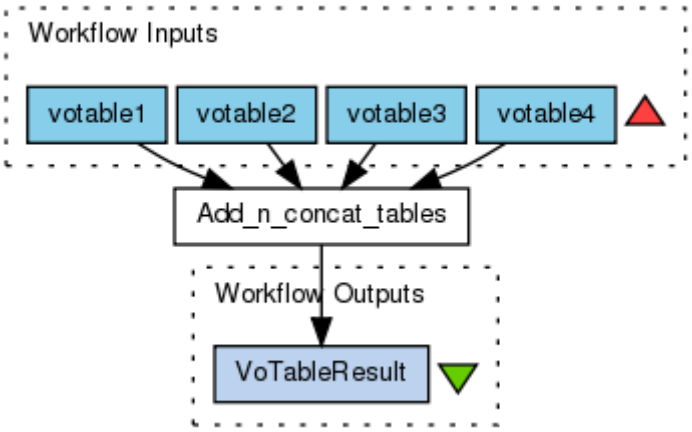

Figure 7, Graph of Atomic Workflow 1

6.3.1.3 Input/Output

Input

Name	Type	Description
votable4	file	VOTable4
votable3	file	VOTable3
votable2	file	VOTable2
votable1	file	VOTable1

Table 27, Input of Atomic Workflow 1

Output

Name	Type	Description
VOTableResult	file	

Table 28, Output of Atomic Workflow 1

6.3.1.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5726
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5726&filename=VOTablesConcatenation-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 29, Technical Details of Atomic Workflow 1

6.3.2 Atomic Workflow 2

Name: FileCreationFromTemplateAndVOTable

Short Description: Create configuration files from a template and a VOTable

6.3.2.1 Nature and Relevance

This workflow uses AstroTaverna artifacts. It creates files by using a template whose keys are replaced by data from a VOTable.
A configuration file is created for every row in the VOTable.
The keys must appear also in the vocabulary file and match column names in the VOTable.
A column in the VOTable must contain the name of the result configuration file.

6.3.2.2 Workflow Details

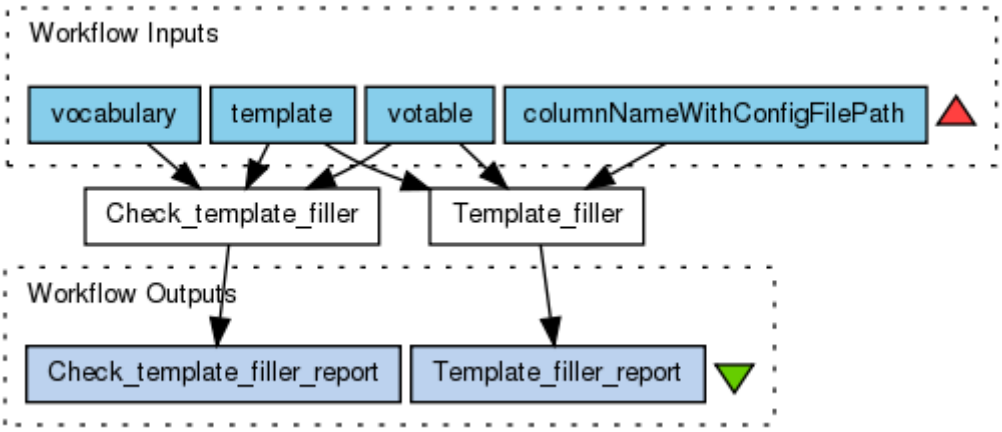

Figure 8, Graph of Atomic Workflow 2

6.3.2.3 Input/Output

Input

Name	Type	Description
votable	file	
vocabulary	file	
template	file	
columnNameWithConfigFilePath	file	

Table 30, Input of Atomic Workflow 2

Output

Name	Type	Description
Check_template_filler_report	file	
Template_filler_report	file	

Table 31, Output of Atomic Workflow 2

6.3.2.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5729
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5729&filename=FileCreationFromTemplateAndVOTable-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 32, Technical Details of Atomic Workflow 2

6.3.3 Atomic Workflow 3

Name: EquatorialCoordinatesResolver

Short Description: Astronomical object name to equatorial coordinates Resolver

6.3.3.1 Nature and Relevance

Resolve equatorial coordinates of a list of objects (names) with AstroTaverna plugin.

6.3.3.2 Workflow Details

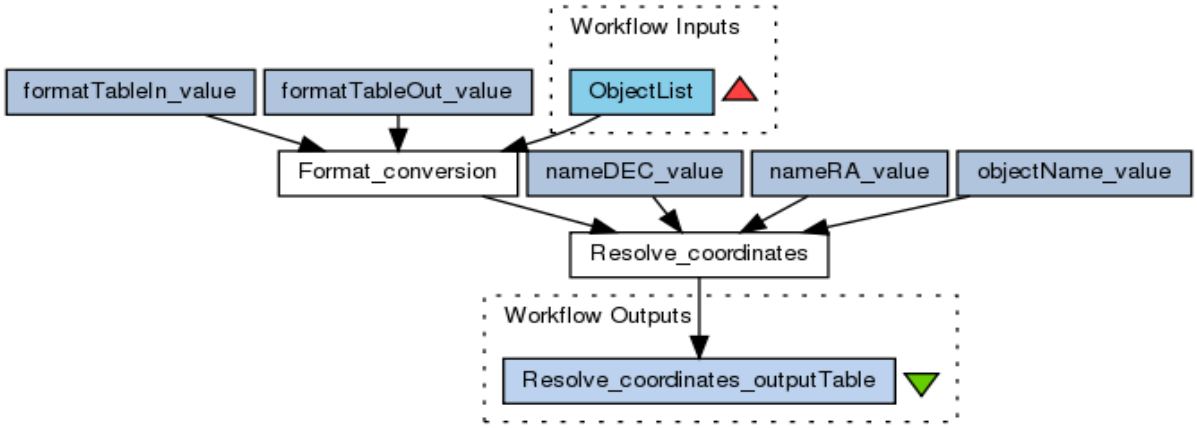

Figure 9, Graph of Atomic Workflow 3

6.3.3.3 Input/Output

Input

Name	Type	Description
ObjectList	file	

Table 33, Input of Atomic Workflow 3

Output

Name	Type	Description
Resolve_coordinates_outputTable	file	

Table 34, Output of Atomic Workflow 3

6.3.3.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5140
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5140&filename=EquatorialCoordinatesResolver-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 35, Technical Details of Atomic Workflow 3

6.3.4 Atomic Workflow 4

Name: RunScriptsFromVOTable

Short Description: Run scripts from a column in a VOTable

6.3.4.1 Nature and Relevance

It runs scripts whose pathname are values of a column in a VOTable.

6.3.4.2 Workflow Details

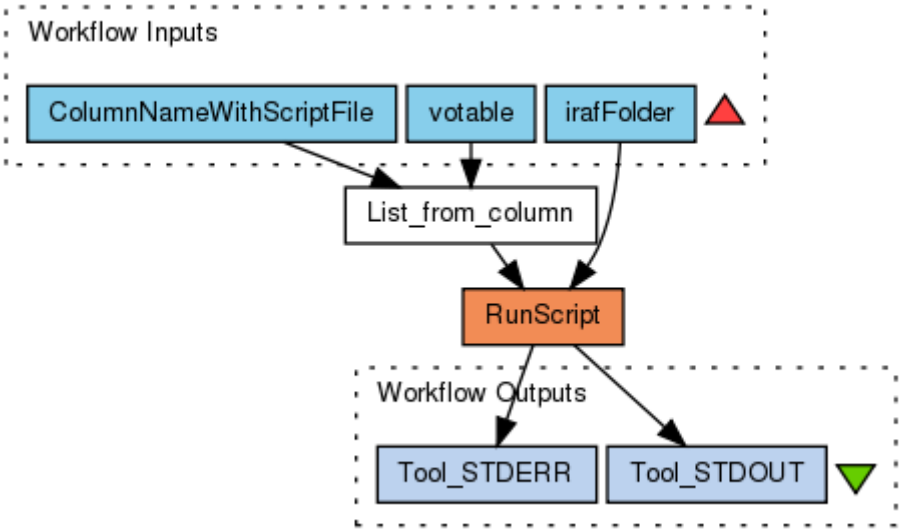

Figure 10, Graph of Atomic Workflow 4

6.3.4.3 Input/Output

Input

Name	Type	Description
ColumnNameWithScriptFile	file	
votable	file	
irafFolder	file	

Table 36, Input of Atomic Workflow 4

Output

Name	Type	Description
Tool_STDOUT	file	
Tool_STDERR	file	

Table 37, Output of Atomic Workflow 4

6.3.4.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5730
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5730&filename=RunScriptsFromVOTable-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 38, Technical Details of Atomic Workflow 4

6.3.5 Atomic Workflow 5

Name: CreateVOTableFromEllipseResults

Short Description: Create a VOTable from ellipse results

6.3.5.1 Nature and Relevance

The workflow takes from a VOTable the names of files where the ellipse result is stored. These files contain data for several ellipses and the workflow takes the centre from the inner ellipse and the ellipticity from one of the outer ones. It uses AstroTaverna plugin (http://wf4ever.github.com/astrotaverna/).

6.3.5.2 Workflow Details

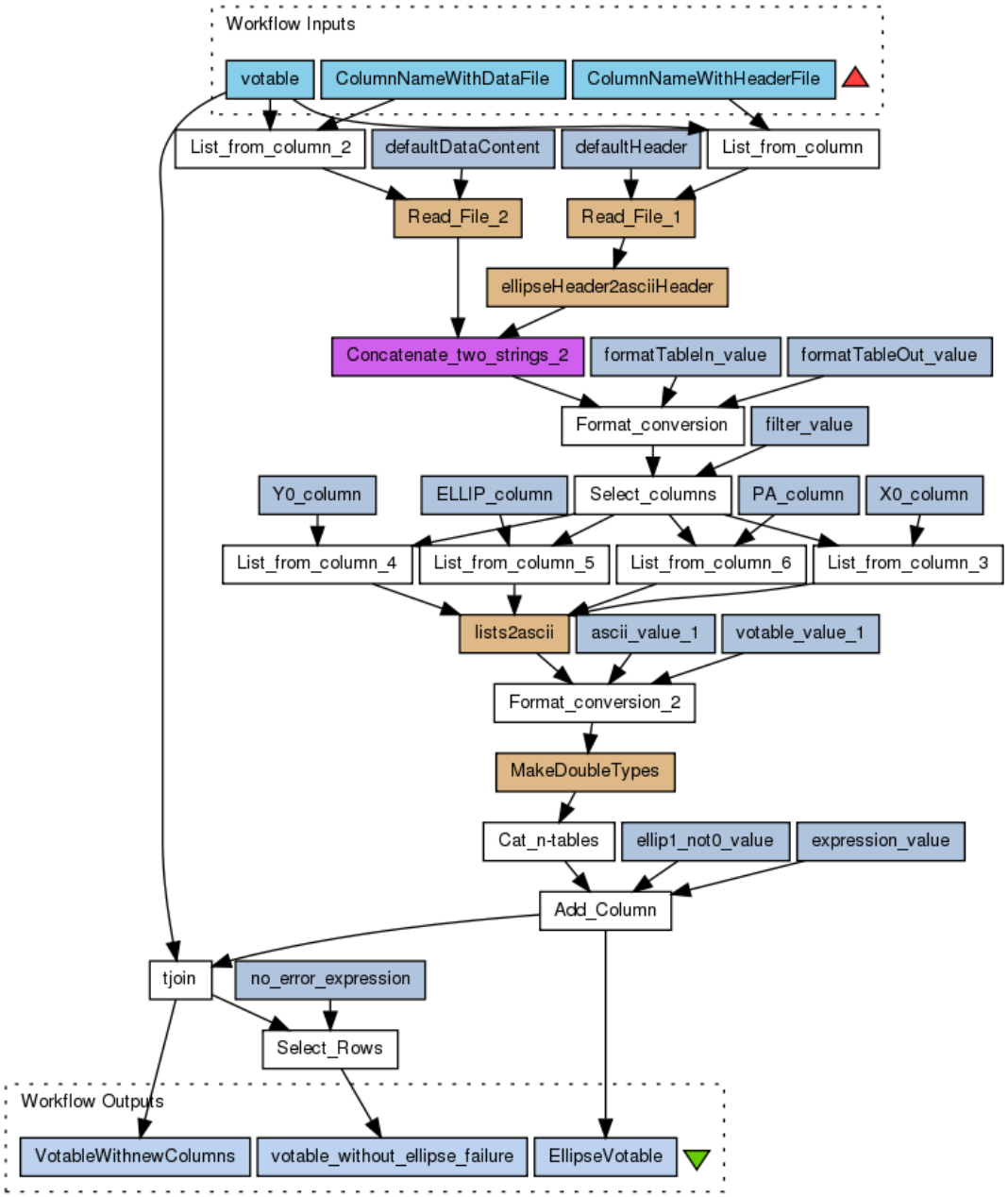

Figure 11, Graph of Atomic Workflow 5

6.3.5.3 Input/Output

Input

Name	Type	Description
ColumnNameWithHeaderFile	file	
votable	file	
ColumnNameWithDataFile	file	

Table 39, Input of Atomic Workflow 5

Output

Name	Type	Description
VotableWithnewColumns	file	
EllipseVotable	file	
votable_without_ellipse_failure	file	

Table 40, Output of Atomic Workflow 5

6.3.5.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5142
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5142&filename=CreateVOTableFromEllipseResults-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 41, Technical Details of Atomic Workflow 5

6.3.6 Atomic Workflow 6

Name: AddColumnsToVOTableFromSextractor

Short Description: Add columns to a VOTable resulting from the execution of Sextractor

6.3.6.1 Nature and Relevance

Add columns that are needed to run galfit and ellipse. It requires columns coming from Sextractor and the AstroTaverna plugin.

6.3.6.2 Workflow Details

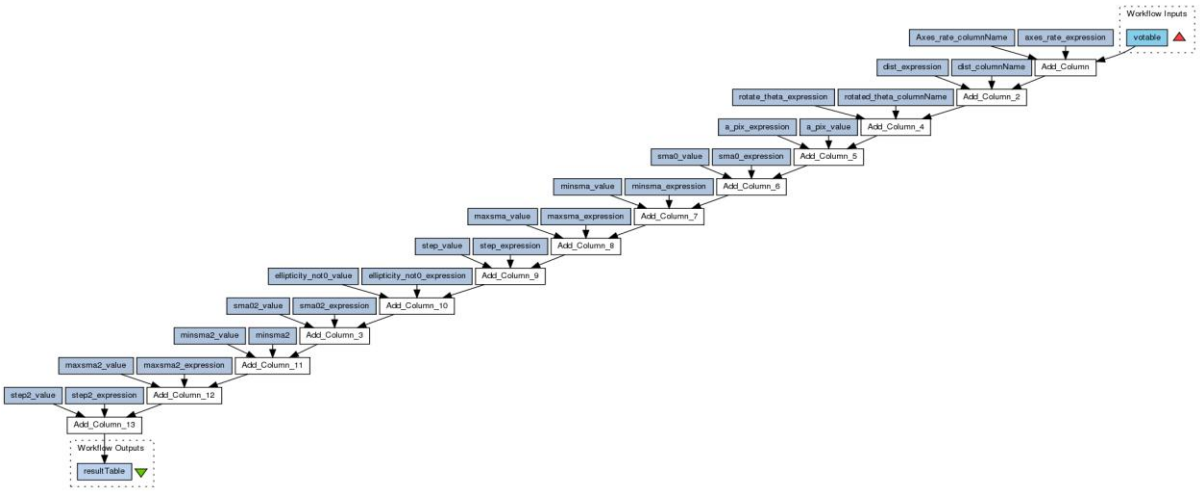

Figure 12, Graph of Atomic Workflow 6

6.3.6.3 Input/Output

Input

Name	Type	Description
votable	file	

Table 42, Input of Atomic Workflow 6

Output

Name	Type	Description
resultTable	file	

Table 43, Output of Atomic Workflow 6

6.3.6.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5143
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5143&filename=AddColumnsToVOTableFromSextractor-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 44, Technical Details of Atomic Workflow 6

6.3.7 Atomic Workflow 7

Name: ExtractColumnFromVOTableIntoList

Short Description: Extract a column from a VOTable into a List

6.3.7.1 Nature and Relevance

Snippet showing how to use AstroTaverna tool for the extraction of a column from a VOTable into a single List.

6.3.7.2 Workflow Details

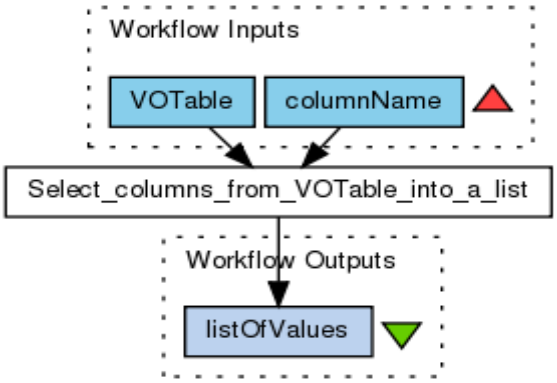

Figure 13, Graph of Atomic Workflow 7

6.3.7.3 Input/Output

Input

Name	Description
columnName	Name of the column to be extracted
VOTable	VOTable where we can to extract a column from

Table 45, Input of Atomic Workflow 7

Output

Name	Description
listOfValues	

Table 46, Output of Atomic Workflow 7

6.3.7.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5144
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5144&filename=ExtractColumnFromVOTableIntoList-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 47, Technical Details of Atomic Workflow 7

6.3.8 Atomic Workflow 8

Name: SplitVOTableIntoItsValues

Short Description: Split VOTables into its values

6.3.8.1 Nature and Relevance

This workflow takes a single VOTable and splits it up in a vector for the names of fields, a vector for the UCDs of the fields, a vector for the UTypes of the fields, and a two-dimensional vector for the values.

6.3.8.2 Workflow Details

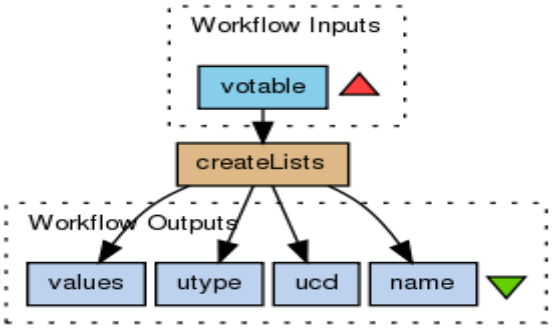

Figure 14, Graph of Atomic Workflow 8

6.3.8.3 Input/Output

Input

Name	Type	Description
votable	file	VOTable which will be split up

Table 48, Input of Atomic Workflow 8

Output

Name	Type	Description
name	file	Name of Fields in the VOTable
ucd	file	UCDs of Fields in the VOTable
utype	file	UTypes of fields in the VOTable
values	file	two dimentional array with values of VOTable

Table 49, Output of Atomic Workflow 8

6.3.8.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5952
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5952&filename=SplitVOTableIntoItsValues-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 50, Technical Details of Atomic Workflow 8

6.3.9 Atomic Workflow 9

Name: ExtractContentOfColumnsFromVOTables

Short Description: Extract the content of columns from VOTables

6.3.9.1 Nature and Relevance

Extracts all values from all columns which are passed from the input ColumnNames.

6.3.9.2 Workflow Details

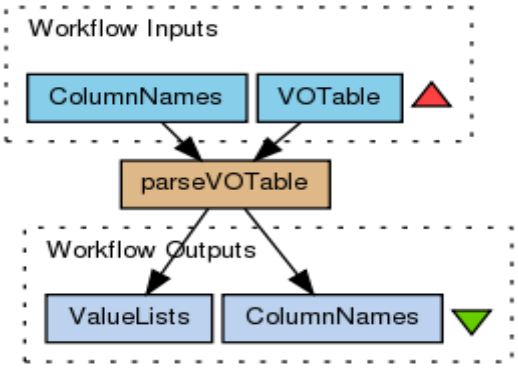

Figure 15, Graph of Atomic Workflow 9

6.3.9.3 Input/Output

Input

Name	Type	Description
VOTable	file	VOTable from which values should be extraced
ColumnNames	file	List of Strings with Column names of the VOTable

Table 51, Input of Atomic Workflow 9

Output

Name	Type	Description
ColumnNames	file	Column names - in the order of the value list
ValueLists	file	contains vectors of values, the order is specified by ColumnNames

Table 52, Output of Atomic Workflow 9

6.3.9.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5953
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5953&filename=ExtractContentOfColumnsFromVOTables-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 53, Technical Details of Atomic Workflow 9

6.3.10 Atomic Workflow 10

Name: VOTableOfNEDImagesFromListOfObjects

Short Description: VOTable and NED Images from a list of Objects

6.3.10.1 Nature and Relevance

Extraction of metadata using NED Image Virtual Observatory Service into a single VOTable, providing a list of objects and the width for each field in arcmin. Among the most relevant metadata are the URL link to the FITS images. This workflow makes use of a Tool developed as an internal pyhton script file.

6.3.10.2 Workflow Details

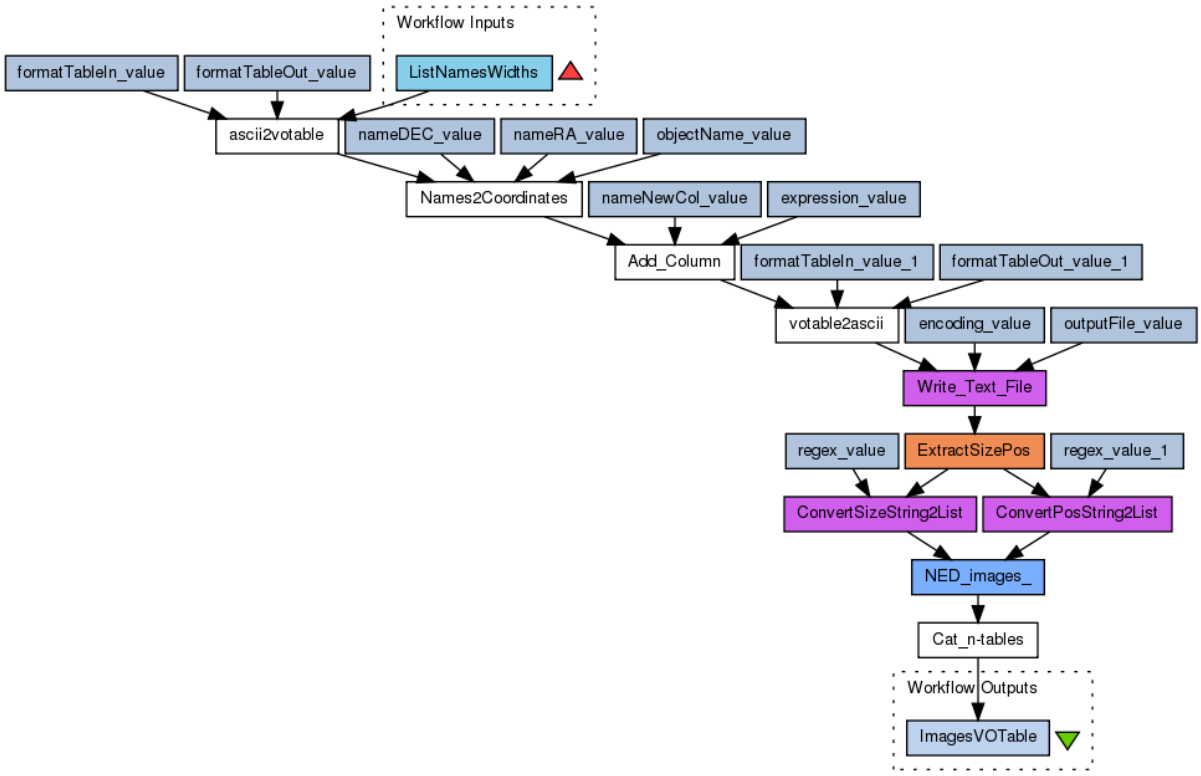

Figure 16, Graph of Atomic Workflow 10

6.3.10.3 Input/Output

Input

Name	Type	Description
ListNamesWidths	file	“Object Name”, “Width of field in arcmin”

Table 54, Input of Atomic Workflow 10

Output

Name	Type	Description
ImagesVOTable	file	

Table 55, Output of Atomic Workflow 10

6.3.10.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5955
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5955&filename=VOTableOfNEDImagesFromListOfObjects-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 56, Technical Details of Atomic Workflow 10

6.3.11 Atomic Workflow 11

Name: ConeSearchQueryToVOService

Short Description: Perform a ConeSearch query to a VO Service

6.3.11.1 Nature and Relevance

Snippet showing how to use AstroTaverna "VO service perspective" for performing ConeSearch queries on VO Services. The result is a VOTable that may be renderized properly in the perspective Results, choosing Value Type as VOTable.

6.3.11.2 Workflow Details

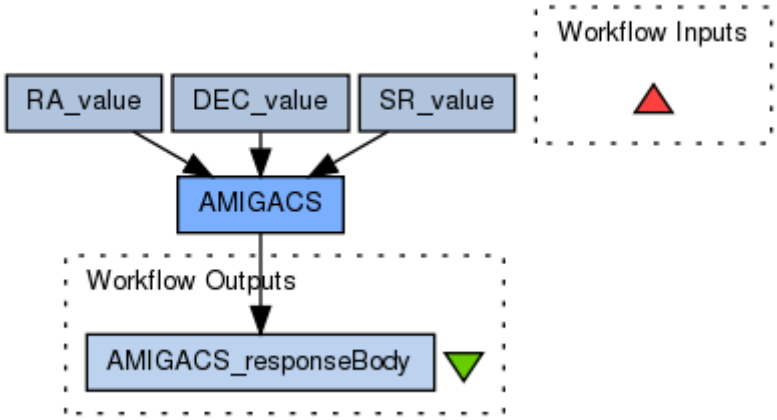

Figure 17, Graph of Atomic Workflow 11

6.3.11.3 Input/Output

Input

No input

Output

Name	Type	Description
AMIGACS_responseBody	file	

Table 57, Output of Atomic Workflow 11

6.3.11.4 Further Technical Details

Information	URL
SHIWA Repository	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/public/details-view.xhtml?appid=5959
Application description template	http://shiwa-repo.cpc.wmin.ac.uk/shiwa-repo/download?appid=5959&filename=ConeSearchQueryToVOService-adt.pdf
Contact details	G. Taffoni – taffoni@oats.inaf.it G. Castelli – giuliano.castelli@oats.inaf.it

Table 58, Technical Details of Atomic Workflow 11