Taverna Workflows
a bio diversity example

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Bonn University, 2014-09-01
http://www.taverna.org.uk/

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Bio-diversity research example

- In this example we are going to use Taverna to help find the occurrences of Marmota marmot
- Optionally we will then show the locations using google earth.
- Alternatively a xpath service could be added to extract interesting data.

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Find the service in Biocatalogue

- Go to http://biocatalogue.org
- Search for occurrence
- Find the GBIF occurrence service and copy the address where the web page shows the ‘base URL’
  - GBIF have several different REST services (or REST endpoints)
- (It should look like this:

http://data.gbif.org/ws/rest/occurrence)

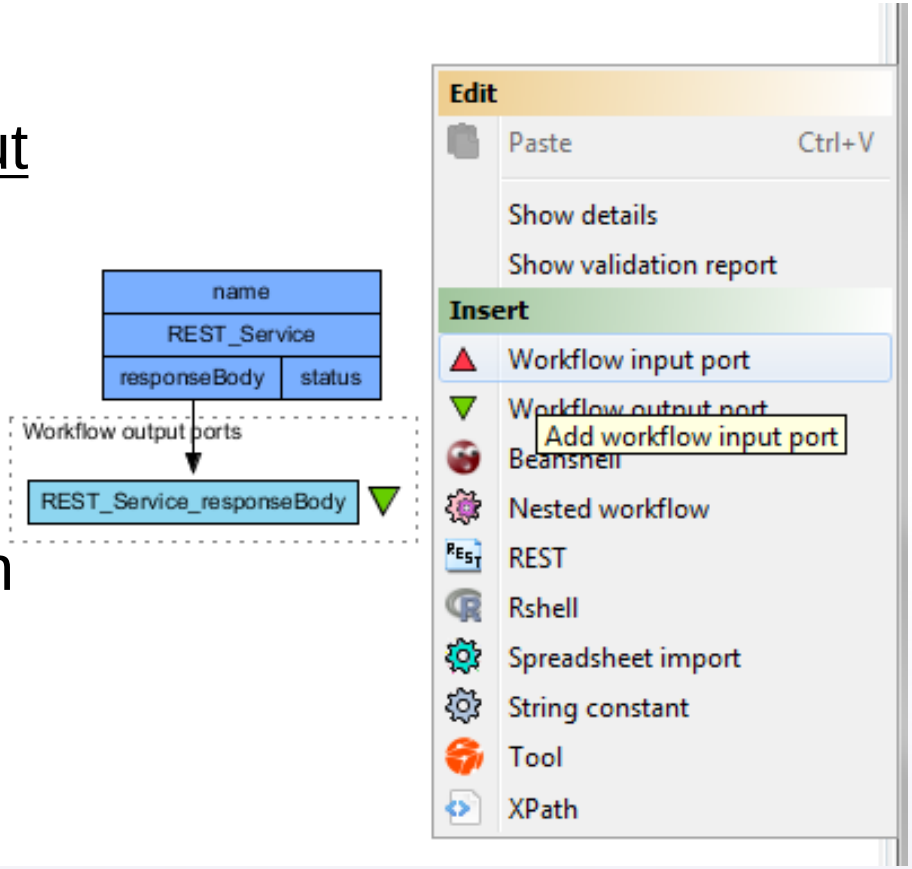
- Hint: Sometime opening the base URL in a web browser will open a useful help page
  - We used this information to get the parameters used on the next slides

Configure the Service

- In Taverna, paste the GBIF base URL into the REST pop-up window (this should already be open – if not, right-click on the REST service in the workflow diagram and select ‘Configure REST Service’ in the drop-down menu).
- To the end of the address, add /list?scientificname={species_name}
- Make sure the HTTP Method is set to ‘GET’, click ‘apply’ and close the pop up window.

Input & Output Ports

- In a blank area of the workflow diagram, right-click and select ‘add workflow input port’ and name it ‘species’
- Link the new input to the REST service by clicking and dragging the arrow across
- Repeat the process to add an output port to the responseBody



Test Run the Workflow

- Save the workflow by going to ‘file -> save’
- Run the workflow by going to ‘file -> run’
- In the pop-up ‘run workflow’ window, click-on ‘set value’ and type ‘Marmota marmota’ where it says ‘some data goes here’

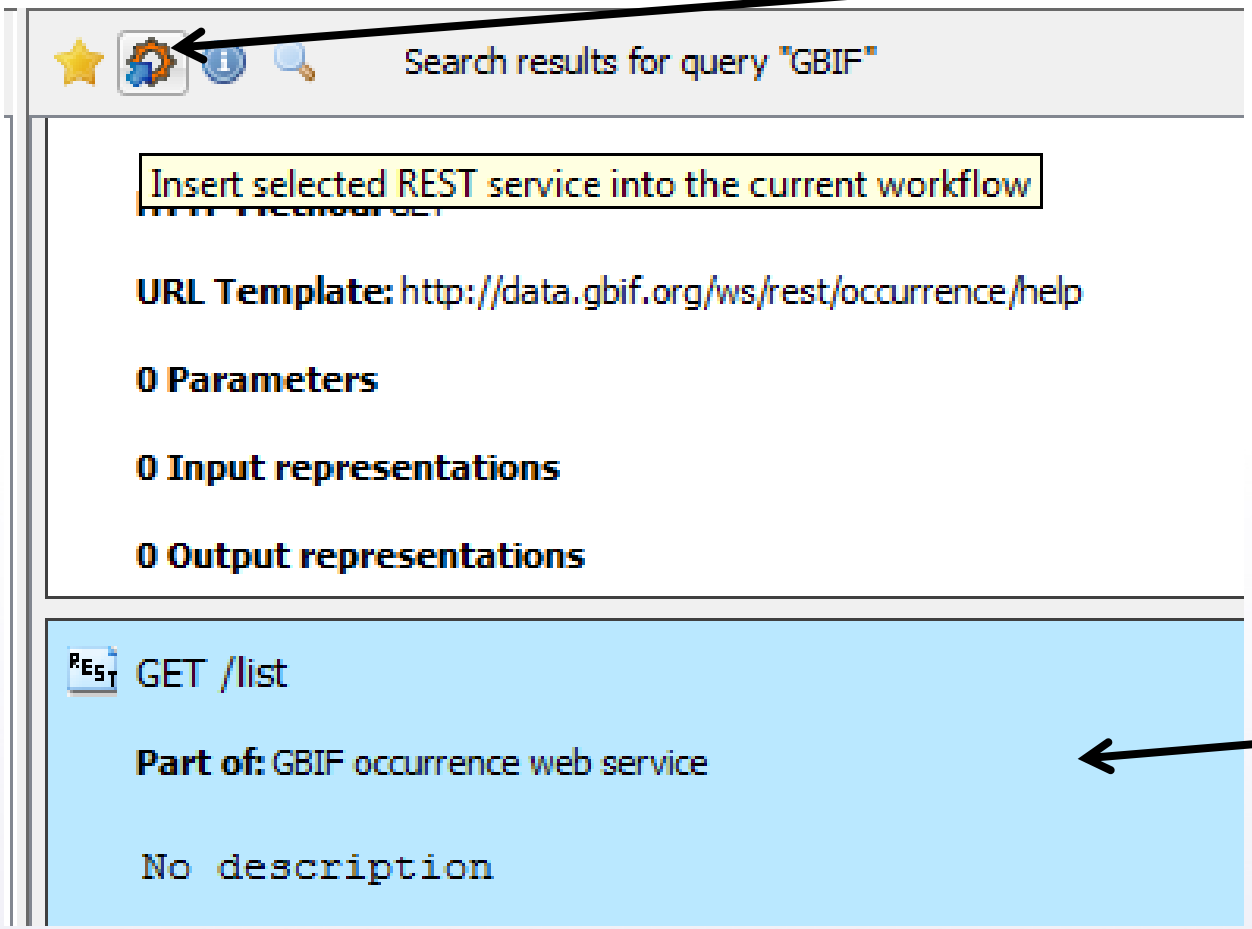
As the workflow runs, you can see the progress in the Results window, which you are automatically switched to

- View the results by clicking ‘value’ in the bottom left panel

Add More Parameters

- These results show all the occurrence data. To restrict it to a particular geographical area, substitute the simple GBIF endpoint for one that will allow you to add latitude and longitude values.
- We do this by adding more parameters to the REST service address.
- You could find this by going to the BioCatalogue web page, or by going to the BioCatalogue plugin in Taverna.
- Go to the top of the workbench and click on ‘Service Catalogue’ and search for “occurrence” again.

Add More Parameters



2. ...and add it to the workflow here

1. Select this service.....

Explore the Ports

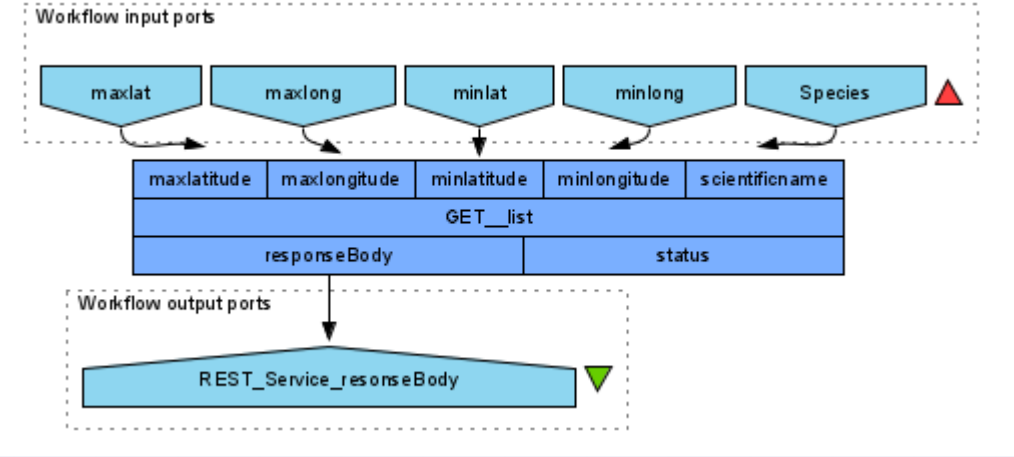
This is an easier way of adding new REST services, but it only works if they are registered in the BioCatalogue.

- Go back to the workflow window by clicking on the ‘Design’ tab and expand the workflow view to show all input and output ports
- Now you will see the new REST service.

Show all ports

Redesign the Workflow

- Delete the original REST service by right-clicking and selecting ‘delete service’
- Connect the new service to the original input and output by dragging arrows between the boxes
- Make new input ports for the co-ordinates by right-clicking on the workflow diagram and selecting ‘add new workflow inputs’
- Connect the new inputs to the REST service



Provide co-ordinates

- Run the workflow, entering Marmota marmota and the following co-ordinates:
  - -89 (for minlat)
  - 89 (for maxlat)
  - -179.9 (for minlong)
  - 179.9 (for maxlong

Handle XML

- The service returns XML data. This is good for computers, but not easy to read.
- You can plot the data on Google earth to make it easier to interpret. We have already written a workflow that does this.
  - See the next 2 slides
- Alternatively try adding an Xpath service to extract some interesting data from the XML

Google Earth Plot

- In Taverna, go to file -> ‘Open workflow location’ and copy the following link into the pop-up box:

  http://www.myexperiment.org/workflows/2592/download?version=1

  It is possible to load workflows from a file, or from a web link
- This workflow opens a local copy of Google Earth. If you don’t, have it, please go to Google Earth and install it: http://www.google.com/earth
- For windows See also http://www.myexperiment.org/workflows/2592.html

Google Earth Plot

- Run this workflow with the same parameters as you used in your own workflow (e.g. Marmota marmota and lat, long). NOTE: there are some example values in the workflow, but you may need to select or change them.
- You need to specify an additional parameter for the location of your local Google Earth program.
- This time, the results are plotted on Google Earth.
- Additionally, an interactive step allows you to modify lat/long values while the workflow is running.

Test the Workflow with other Species

- The workflow you ran only has information from one species, but selecting species can be complex
- Re-run the workflow twice, once with the species Abraxas sylvatus, and once with Abraxas sylvata. Do you get different results?
- They both represent the same species, but one is simply a different spelling. You may need to discover all species names and synonyms and combine data before continuing with your modelling.