Capturing ICAN end-user requirements for NETMAR

Declan Dunne, CMRC

d.dunne@ucc.ie

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Outline

- User Feedback
- Geo-processing services
- Cookbooks

User Feedback

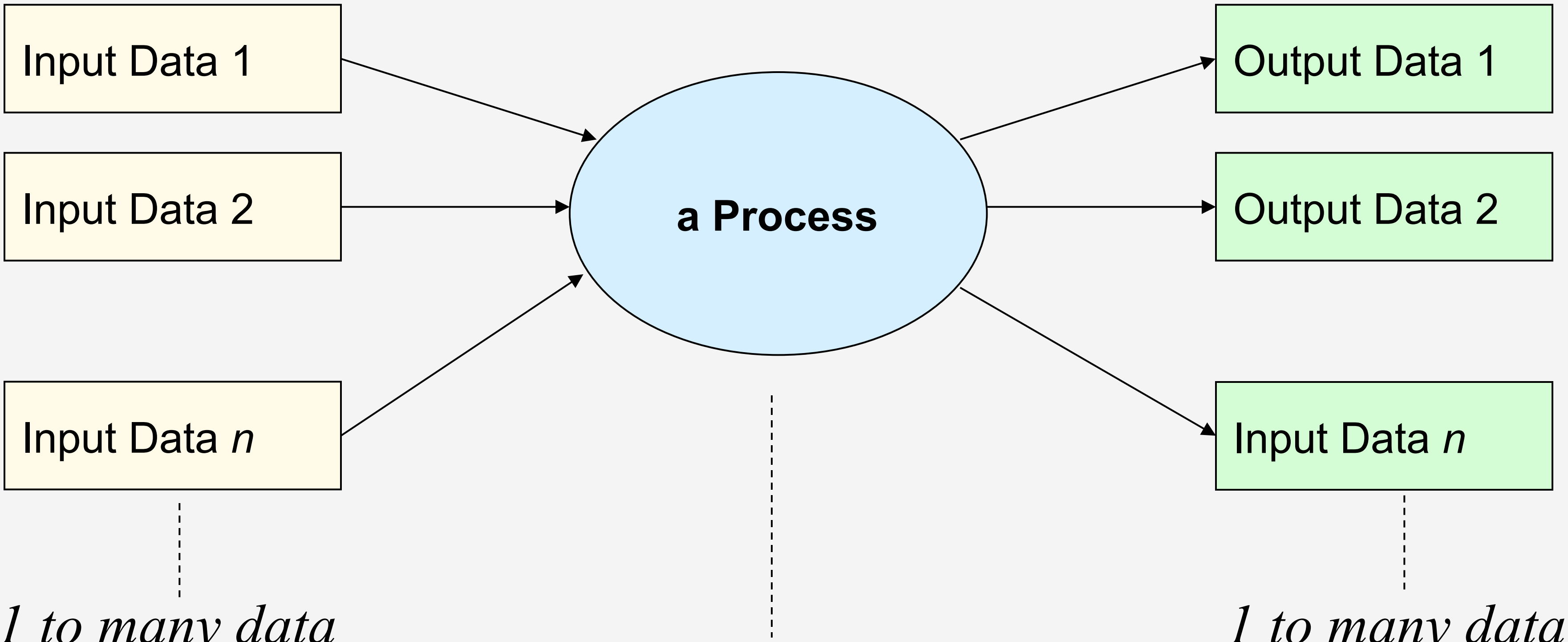
- We require user feedback for NETMAR work
  - Atlas developers
- Evaluation of NETMAR system V1
  - Includes the ICAN semantic interoperability use case
  - September 2011 to October 2011 (formal period)
- Feedback
  - Verbal feedback and discussion today
  - Follow-up (conference calls, questionnaire, etc.)

Geo-processing services

- OGC Web Processing Service (WPS)
  - Originally named “Geoprocessing Service”
  - It specifies a framework for geo-processing of spatial data over the web
  - Plugin your geo-processing algorithm(s) into the framework
  - These geo-processes are published as web services

- Other NETMAR research tasks
  - Semantic interoperability of geoprocessing services
  - Uncertainty propagation

WPS: Overview



Input Data 1

Input Data 2

Input Data *n*

a Process

Output Data 1

Output Data 2

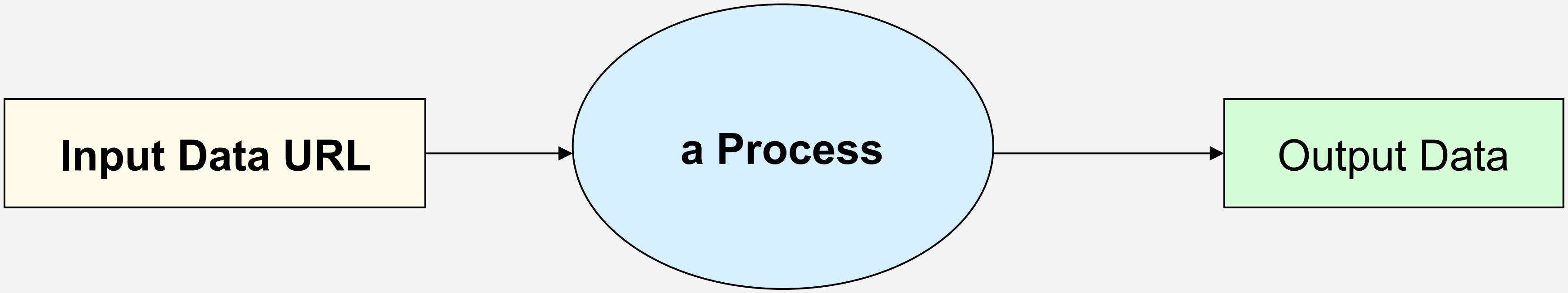
Input Data *n*

1 to many data inputs possible

Any geo-algorithm (be it simple or complicated)

1 to many data outputs possible

Geo-processing services



Input Data URL

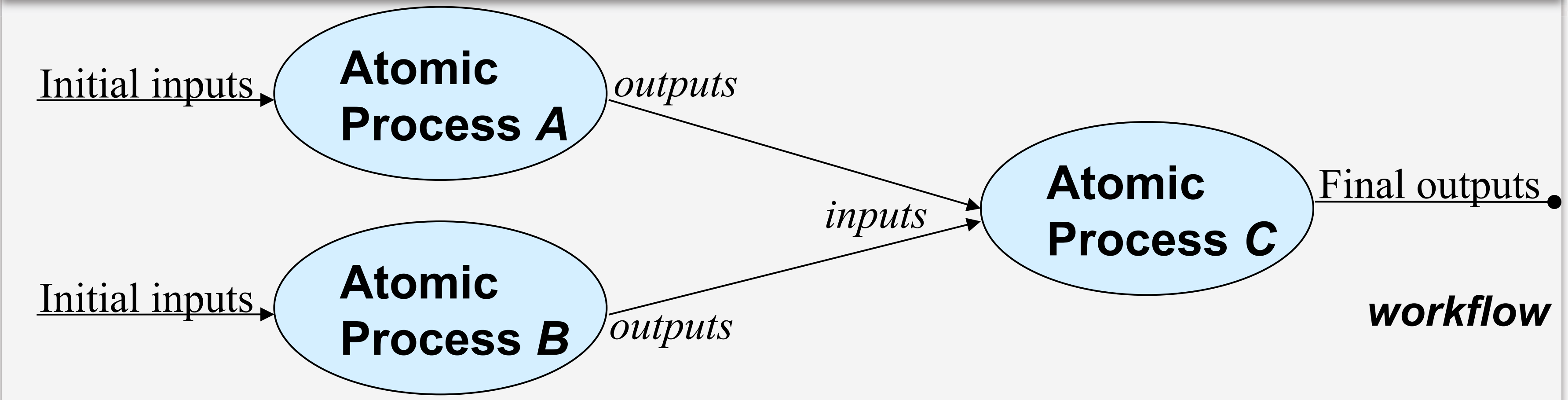
a Process

Output Data

- Input data is typically in URL form

- Therefore, can input data from:
  - OGC WMS / WFS / WCS web services
  - Flat files published at a URL
  - etc.

Service chaining with WPS



- WPS process is normally an atomic function
  - It performs a specific geospatial algorithm
- Service chains
  - WPS processes can be incorporated into workflows
  - e.g. SCUFL2 XML workflow descriptions

Semantic interoperability of geoprocessing services

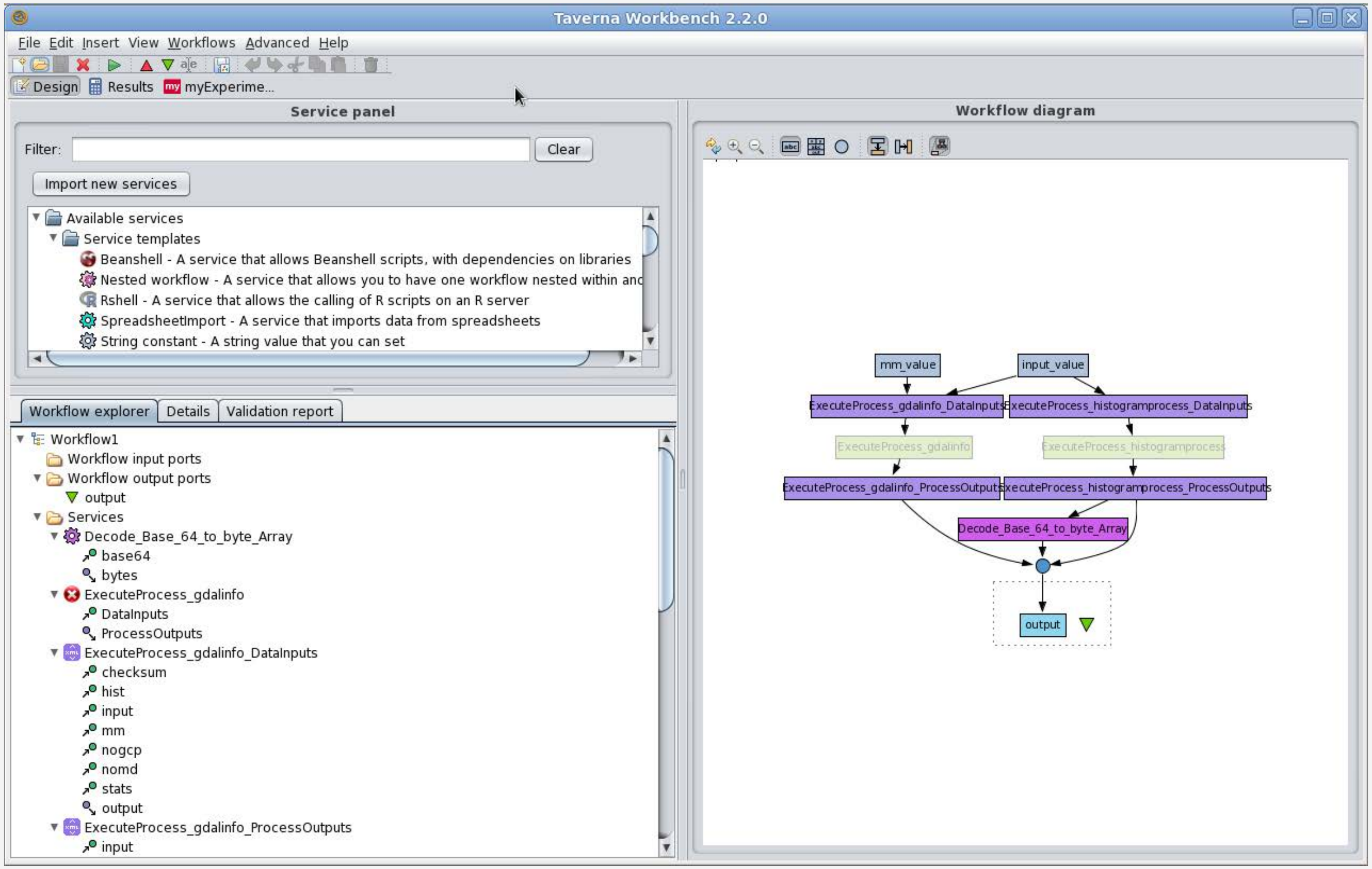
- e.g. processing service: calculate sea water density

- verify that the input parameters supplied are:
    - pressure in decibars
    - practical salinity in dimensionless units
    - water body temperature in degrees Celsius

Uncertainty propagation

- i.e. management of uncertainty/error propagation through a service chain
- Data Scientist to be able to estimate the reliability of the end result of this process and to determine its fitness for purpose

Taverna

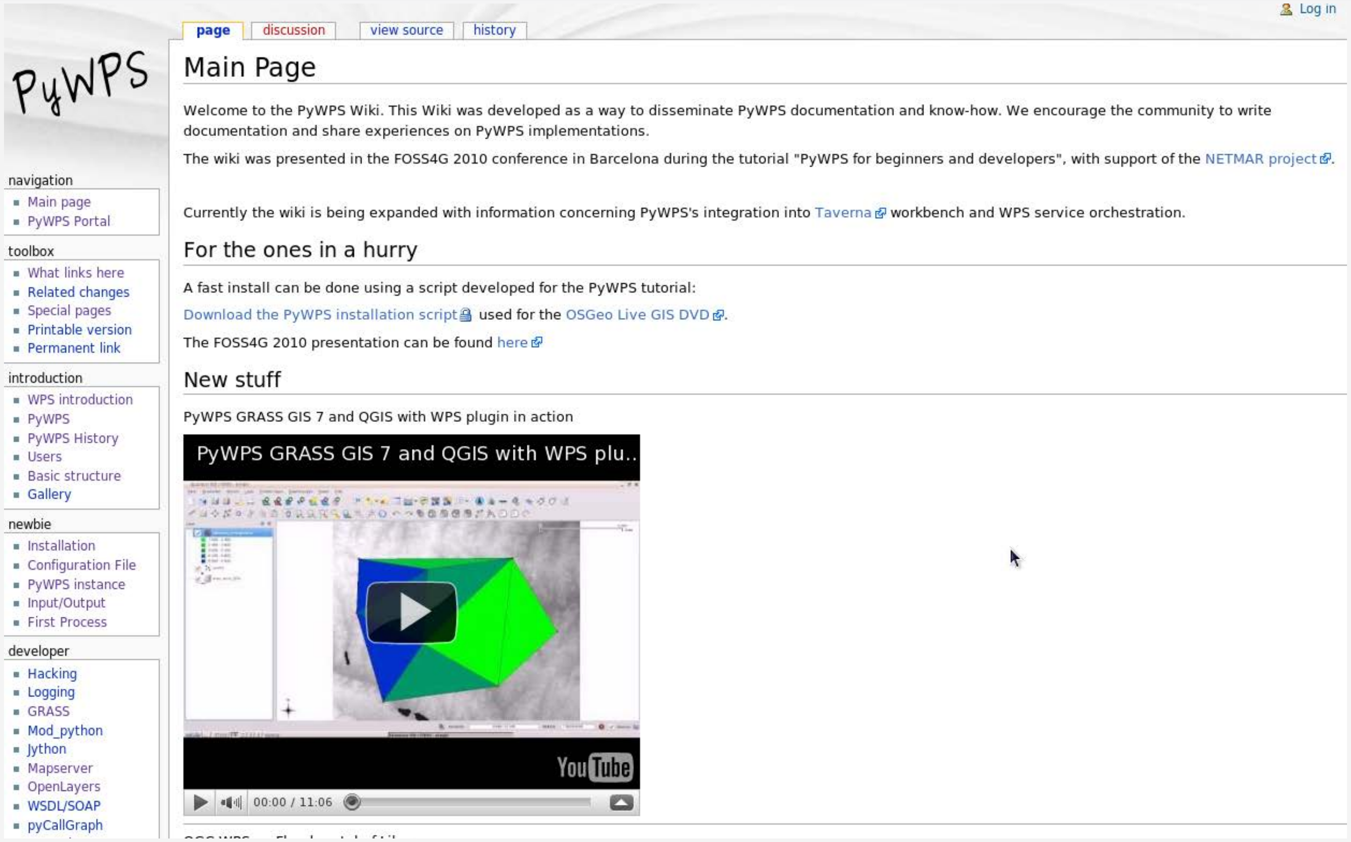


Taverna Workbench 2.2.0
File Edit Insert View Workflows Advanced Help
Design Results myExperime...
Service panel
Filter:
Clear
Import new services
Workflow explorer Details Validation report
Workflow diagram
mm_value
input_value
ExecuteProcess_gdalinfo_DataInputs
ExecuteProcess_histogramprocess_DataInputs
ExecuteProcess_gdalinfo
ExecuteProcess_histogramprocess
ExecuteProcess_gdalinfo_ProcessOutputs
ExecuteProcess_histogramprocess_ProcessOutputs
Decode_Base_64_to_byte_Array
output

- Available services
  - Service templates
    - Beanshell - A service that allows Beanshell scripts, with dependencies on libraries
    - Nested workflow - A service that allows you to have one workflow nested within anc
    - Rshell - A service that allows the calling of R scripts on an R server
    - SpreadsheetImport - A service that imports data from spreadsheets
    - String constant - A string value that you can set

- Workflow1
  - Workflow input ports
  - Workflow output ports
    - output
  - Services
    - Decode_Base_64_to_byte_Array
      - base64
      - bytes
    - ExecuteProcess_gdalinfo
      - DataInputs
      - ProcessOutputs
    - ExecuteProcess_gdalinfo_DataInputs
      - checksum
      - hist
      - input
      - mm
      - nogcp
      - nomd
      - stats
      - output
    - ExecuteProcess_gdalinfo_ProcessOutputs
      - input

WPS implementation: PyWPS



Main Page

Welcome to the PyWPS Wiki. This Wiki was developed as a way to disseminate PyWPS documentation and know-how. We encourage the community to write documentation and share experiences on PyWPS implementations.

The wiki was presented in the FOSS4G 2010 conference in Barcelona during the tutorial "PyWPS for beginners and developers", with support of the NETMAR project.

Currently the wiki is being expanded with information concerning PyWPS's integration into Taverna workbench and WPS service orchestration.

For the ones in a hurry

A fast install can be done using a script developed for the PyWPS tutorial:

Download the PyWPS installation script used for the OSGeo Live GIS DVD.

The FOSS4G 2010 presentation can be found here

New stuff

PyWPS GRASS GIS 7 and QGIS with WPS plugin in action

PyWPS wiki (http://wiki.rsg.pml.ac.uk/pywps)

supported by NETMAR project and hosted on PML's servers

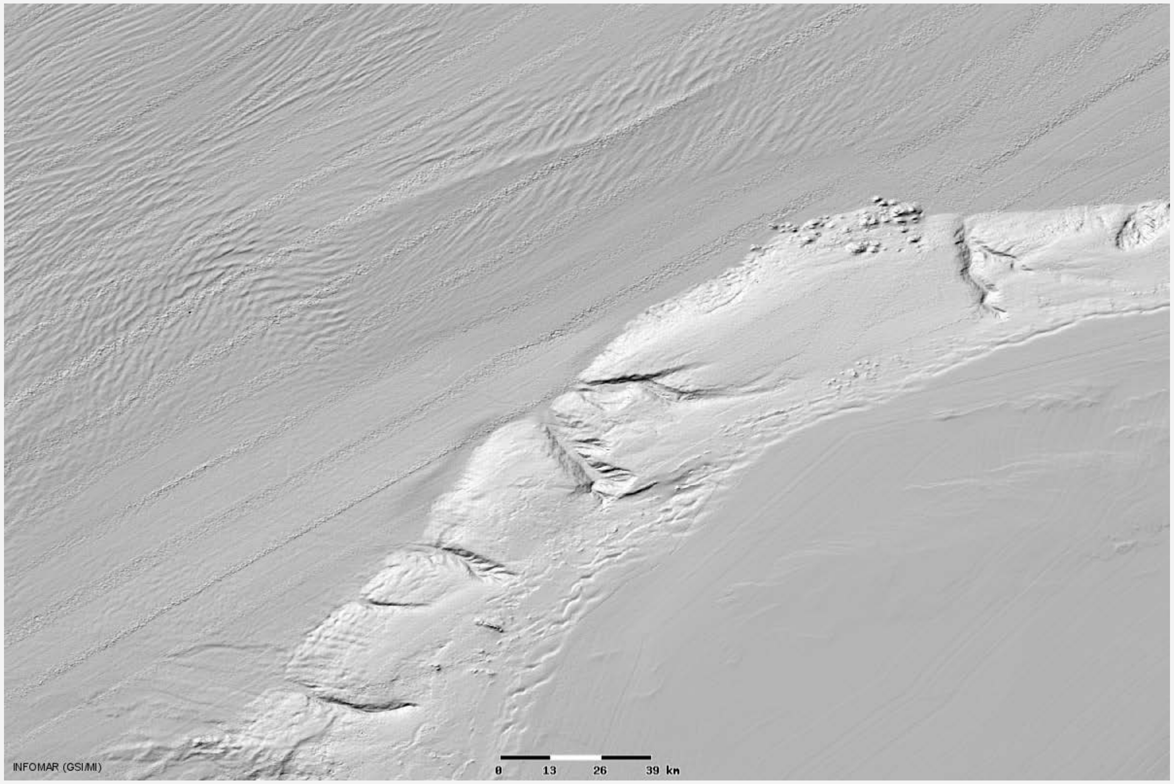
Need to define some geo-processing use cases

- Main goal is to demonstrate WPS and service chaining technologies to ICAN community

- Propose demo: bathymetry hill shade & colour relief use case
  - Use existing tools: GDAL utilities and OGC WCS
  - Task mainly focused on wrapping these existing tools

- Other use cases are possible…

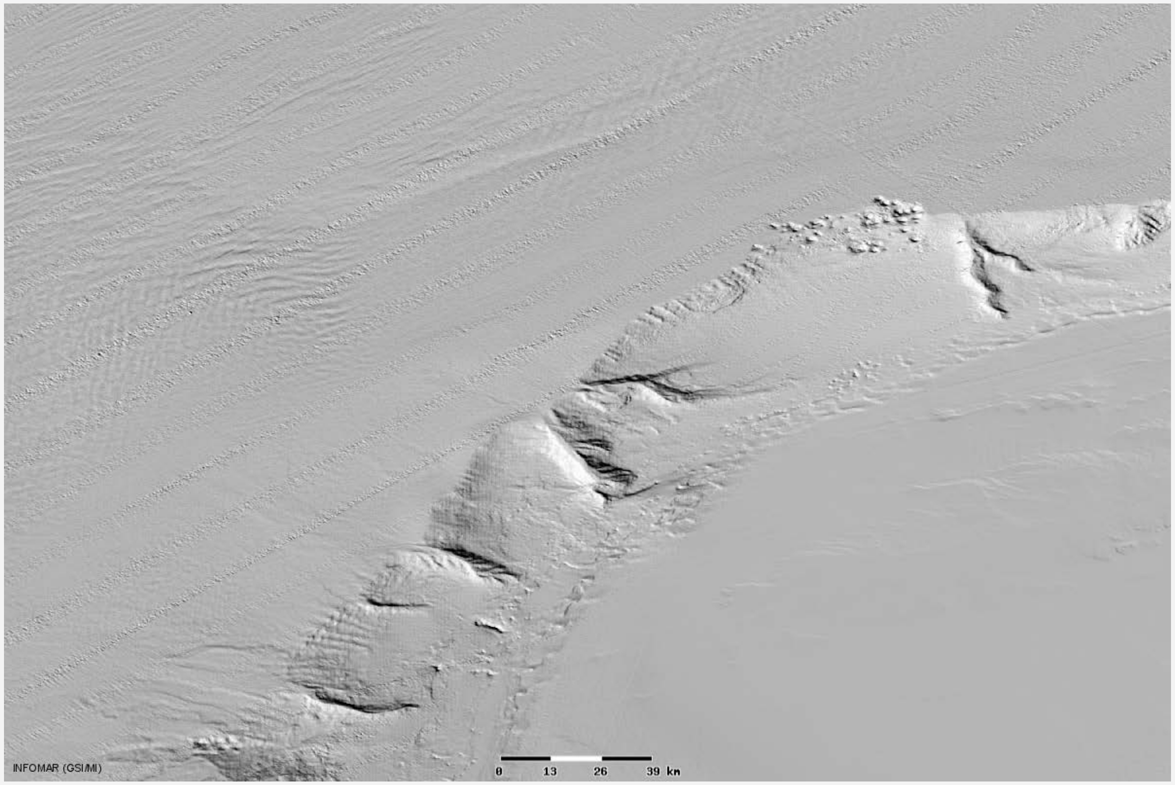
Process: GDAL hillshade



GDAL hillshade command:

```
gdaldem hillshade -s 27780 -az 315 -alt 45 inputFile outputFile
```

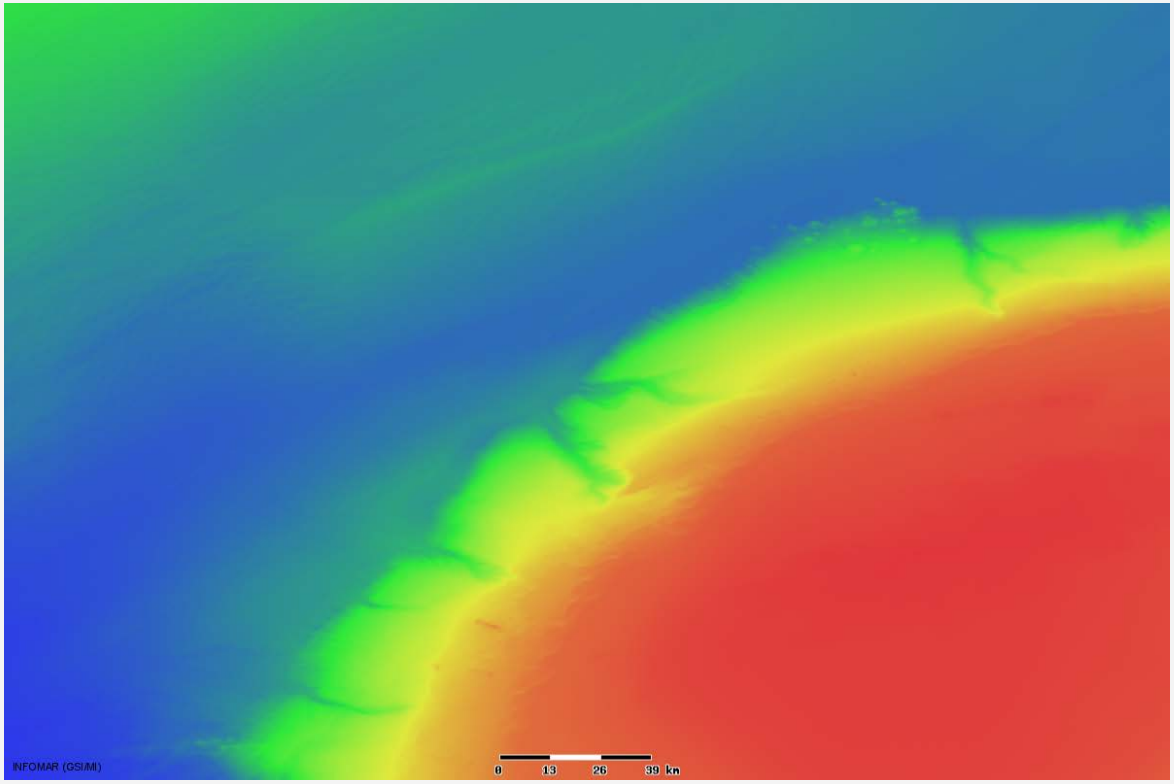
Process: GDAL hillshade



GDAL hillshade command:

```
gdaldem hillshade -s 27780 -az 45 -alt 45 inputFile outputFile
```

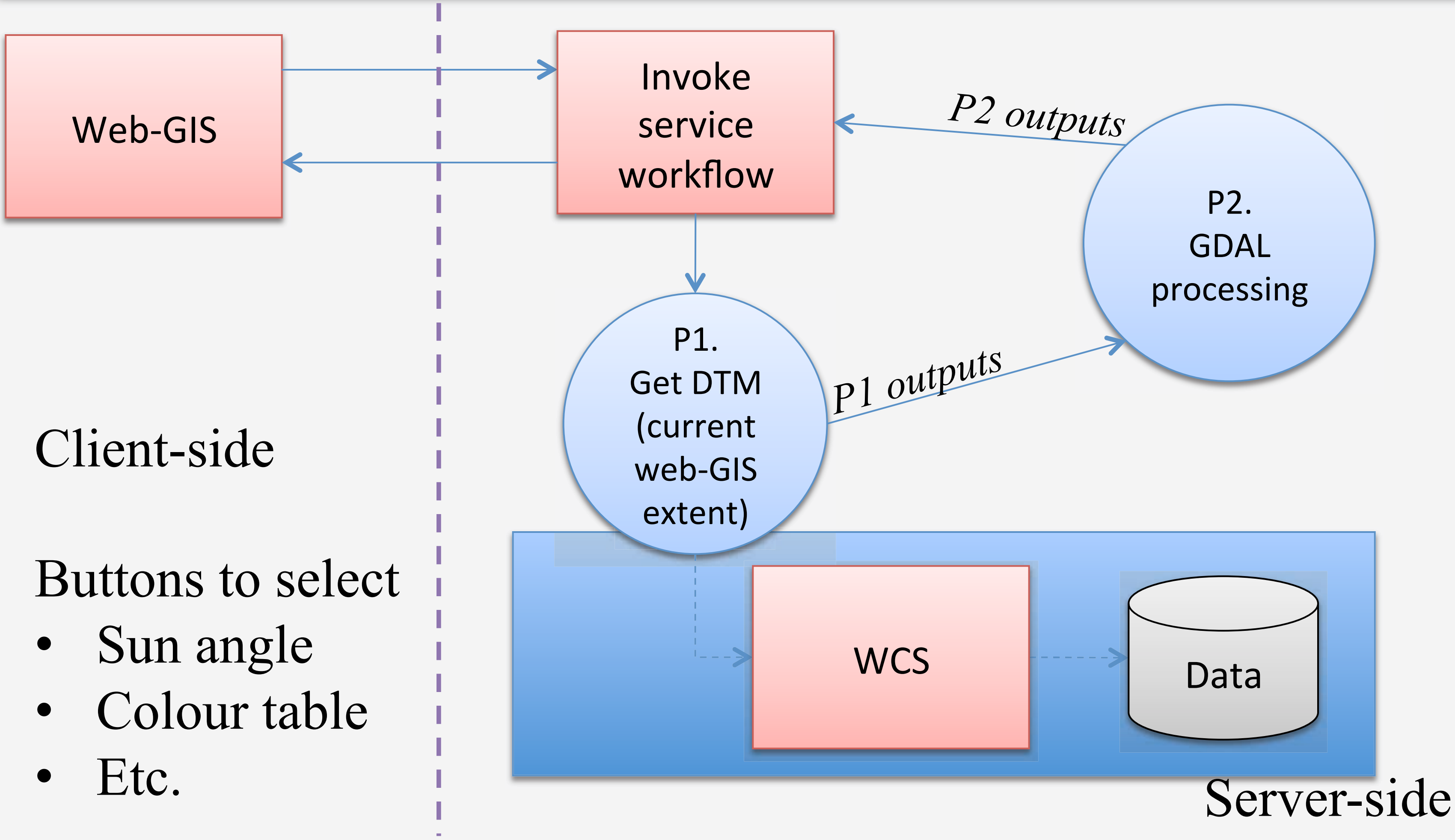
Process: GDAL colour relief



GDAL colour relief command:

```
gdaldem color-relief inputFile colourRamp outputFile
```

Dynamic hillshade & colour relief use case



Client-side

Buttons to select

- Sun angle
- Colour table
- Etc.

Cookbooks

- NETMAR task
  - ICAN semantic interoperability pilot cookbooks
  - December 2011, updated at July 2012

- Understanding Metadata [CMRC]
- Installing GeoNetwork [CMRC]
- Understanding Semantics [BODC/CMRC]
- How to connect my coastal atlas to the ICAN semantic interoperability pilot [CMRC/BODC]

- Need a more detailed discussion on topic layouts…

1) Metadata

- Existing ICAN topic layout:
  - – Metadata
    - What is Metadata? Why do you need it?
    - Different Types of Metadata
    - Metadata and Search
    - How to create Metadata

2) CSW Servers & Clients

- Existing ICAN topic layout:
  - CSW Servers & Clients
    - What is CSW? Why would you want a CSW Server?
    - Different options for CSW Servers
    - How to install a CSW Server
    - Examples of CSW Clients

3) Ontologies

- Existing ICAN topic layout:
  - Ontologies
    - What are Ontologies? Why would you want an ontology?
    - How to make an Ontology
    - How to connect one Ontology to another one (Mapping)

3) Ontologies → Semantics

1. What are vocabularies, thesauri and ontologies?
2. Why would one use a “knowledge organization system”?
3. How would one define the content of a knowledge organization system (KOS)?
   – What is the domain scope of the KOS
   – Identifying the content of the KOS
     - How narrow or broad should the concept definitions be? (Granularity)
     - Ensure concept definitions at the same hierarchical level have the same granularity
     - Linking concept definitions together – internal mapping
   – Ensuring the quality of the content of the KOS (content governance / register manager and technical governance / control body)
4. Making the content available
   – Deploying the KOS within the NETMAR semantic framework
   – Mapping the KOS to existing KOSs (external mapping)

4) Prototype Demo

- Existing ICAN topic layout:
  - Prototype Demo
    - What is the ICAN Prototype?
    - What exactly does it demonstrate?
    - How can I get my project connected to the Prototype?
    - How can I bring data from other ICAN connected Atlases into my own?

Thank you!

Declan Dunne, CMRC

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