Fourteenth International Conference on Grey Literature



An Environment Supporting the Production of Live Research Objects

Massimiliano Assante – Leonardo Candela – Donatella Castelli – Pasquale Pagano

Understanding Scientific Research





"Publishing data in a reusable form to support findings must be mandatory" [Science as an Open Enterprise, The Royal Society]

- all the elements exploited (primarily grey elements)
 are not available or not linked to the scientific result;
- It makes difficult to completely understand the results;
- ↗ It makes difficult to validate the results.





- An abstraction for communicating, sharing and reusing research results:
 - aggregate all the "pieces" that contribute to a research result.



How can all these pieces stand together?

How can you produce live research objects?

The idea: producing live research object/ Virtual workspace



Producing live research object/ Editing phase



Producing live research object/ collaborative work





- オ Virtual Workspace
 - **7** from binary files to compound information objects
- Editing framework
 - オ define the structure of a live research object
 - entering content and compile them
- Workflow Engine
 - define the workflow governing their production
 - specifying the phases and users





- Users can organise and share very different items
 - オ tabular data, species distribution maps, time series





Defining the structure

- オ define the structure of a live research object
- component oriented approach (static & dynamic)

Insert Options Table Section			
	Toolbox		×
	Fit layo	ıt	
FISHERY AND AOUACULTURE COUNTRY PROFILE - Template	·····x	Title	
See instructions at the bottom of the template.	a di seconda di s	Heading 1	
		riodding i	
		Heading 2	
[Country name]		Handian 2	
		Heading 3	
Language: en es fr ar zh ru	×	Image	
		r lext	
Citation Date of Creation		Instruction area	
	Ex E	Comment area	
		Attribute	
		Page break	
insert date (yyyy-mm-dd, e.g. 2004-08-05)	×		
Chables Data of Hadata			



- Compiling a Live research object
 - compliant with one of the defined templates
 - **7** complete or instantiate the dynamic components



Workflow Engine – defining a workflow



- Work collaboratively to the creation of a live research object
- Define the workflow governing the production of a live research object





Workflow Engine – associating Research Objects

- ✓ Specify the steps and the relative responsible actor(s)
 - 3 phases



ISTITUTO DI SCIENZA E TECNOLOGIE DELL'INFORMAZIONE "A. FAEDO"

Production of live research objects: behind the scenes

exploits the capabilities offered by an underlying *Data Infrastructure** (DI).
 [*digital infrastructure for data sharing and consumption]

- The gCube software system, whose technological development has been coordinated by ISTI-CNR and funded by E.C implements the DI approach.
 - operates a large federation of computational and storage resources;
 - equipped with software frameworks for data management;
 - supported data types cover a wide spectrum ranging from tabular data to research products.







- Production of Live Research Objects aimed at estimating the probability of marine species distribution in a global scale:
 - オ some descriptive text
 - data on the species gathered from authoritative data sources
 - environmental data reporting on ecological elements
 - algorithms aimed at estimating the probability of the occurrence of a species in a given area
 - images of maps resulting from the algorithm(s)





- A comprehensive framework supporting the entire lifecycle of Live
 Research Objects production and management
- It has been designed and implemented in the context of two successive EU projects:
 - D4Science-II (<u>www.d4science.eu</u>)
 - オ iMarine (<u>www.i-marine.eu</u>)
- Available as a WebApp in the D4Science e-Infrastructure <u>http://www.d4science.org/</u>