

## Interoperability in Focus

### Editorial

Interoperability is key to taking Digital Libraries (DLs) to the next level and to opening up new research perspectives. This issue of the DL.org eNewsletter focuses on our 2nd Workshop entitled *Making Digital Libraries Interoperable*, 9-10 September 2010 during the 14<sup>th</sup> European Conference on Digital Libraries (ECDL2010) in Glasgow, Scotland, UK. DL.org has issued a *Call for Papers* for both Research and Project papers detailed below.

One of this month's highlights is the interview with Tobias Blanke, Research Fellow at Kings College London, who serves as an expert in our Liaison Group. Tobias sheds light on the evolving eHumanities landscape, interoperability challenges and the key role of DL.org within this context. Other features include DL.org presentations and workshops at conferences across Europe and new strategic alliances with experts and stakeholder communities.

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### 2nd DL.org Workshop Call for Papers



The University of Glasgow, host of the 14<sup>th</sup> European Conference on Digital Libraries (ECDL2010), 6-10 September 2010.

The 2<sup>nd</sup> DL.org Workshop on *Making Digital Libraries Interoperable* takes place 9-10 September 2010 during the 14<sup>th</sup> European Conference on Digital Libraries (ECDL2010) in Glasgow, Scotland, UK. Interoperability is a multi-layered and context-specific concept, encompassing different levels along a multidimensional spectrum ranging from organisational and policy to technical issues.

The Workshop addresses this challenging area from several perspectives: content, user, functionality, policy, quality, and architecture. Presentations and deliberations will centre on relevant Digital Library interoperability aspects from conceptualisation at a high organisational level to instantiation at process level, as well as modelling techniques for representing and enabling interoperability between heterogeneous digital library mediation approaches, methods, and systems.

### Call for Papers - 2<sup>nd</sup> DL.org Workshop

We are soliciting two types of contributions: Research & Project papers.

#### Research Papers

Authors are invited to submit original research papers addressing current approaches and new research directions for tackling multi-faceted digital library interoperability issues.

Topics of interest include, but are not limited to:

- Theoretical Foundations of Interoperability in Digital Library
- Emerging interoperability issues
- Standard-based approaches toward interoperability
- Technologies promoting interoperability
- Mediator-based approaches toward interoperability
- Concrete implementations and exploitations of interoperability solution
- Evaluation of interoperability approaches and solutions
- Interoperability Models
- Ontology driven interoperability
- Metadata interoperability
- Interoperability levels

Research papers will have a full-length oral presentation and will be published in a high-quality proceedings volume. Each submitted paper must not exceed 10 pages in total.

#### Project Papers

Authors are invited to submit papers focusing on DL interoperability approaches and solutions adopted and lessons learned when implementing interoperable DL systems in the context of European, international and national projects.

These papers will have a short oral presentation and will be included in the "Project Papers" section of the Workshop proceedings. Each submitted paper must not exceed 8 pages in total.

#### Reviewing Process

The reviewing process will be carried out by the members of the Workshop International Programme Committee. Two referees will review each paper.

#### Important Dates & Paper Submission

Paper Submission: **20 June 2010**

Notification of Acceptance: **16 July 2010**

Camera ready Papers: **30 July 2010**

All contributions must be written in English. They must follow the formatting guidelines of Springer's Lecture Notes in Computer Science (LNCS):

<http://www.springer.com/computer+science/lncs?SGWID=0-164-6-793341-0>

and must be submitted via the workshop submission system:

<http://www.easychair.org/conferences/?conf=dlorg2010>

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### DL.org On the Road

#### DL.org Workshop on Policy & Quality, 29 April 2010 during ECA 2010 in Geneva, Switzerland

On 29 April 2010, Perla Innocenti and Giuseppina Vullo, co-ordinators of DL.org Policy and Quality Working Groups hosted a Workshop entitled "Policy and Quality Interoperability: an organisational approach for digital archives and digital libraries" during the 8<sup>th</sup> European Conference on Digital Archiving (ECA2010) running 28-30 April 2010.

The Workshop, from 15:30 to 16:15 and led by Giuseppina Vullo (pictured), revolved around the organisational approach to policy and quality interoperability, presenting an overview of how DL.org is investigating a shared policy and quality framework between diverse digital repositories. Interim outcomes of this investigation were described with a look at how external parties may also benefit from these findings.



The workshop aimed at delivering theoretical and practical insights on:

- Core policy and quality aspects affecting information systems
- DL.org policy and quality interoperability frameworks
- Formal policy languages
- Quality guidelines and criteria

#### Web links

DL.org Policy Working Group Wiki  
[https://workinggroups.wiki.dlorg.eu/index.php/Policy\\_Working\\_Group](https://workinggroups.wiki.dlorg.eu/index.php/Policy_Working_Group)

DL.org Quality Working Group Wiki  
[https://workinggroups.wiki.dlorg.eu/index.php/Quality\\_Working\\_Group](https://workinggroups.wiki.dlorg.eu/index.php/Quality_Working_Group)  
<http://www.ica.org/en/2010/04/28/8th-european-conference-digital-archiving-geneva-2010>

#### "Paving the way for Interoperability in Digital Libraries: The DL.org Project" at QQML2010,

Katerina El Raheb (pictured) is presenting the current



DL.org comprehensive and innovative approach to DL interoperability challenges at the 2nd International Conference on Qualitative and Quantitative Methods in Libraries (QQML), 25-28 May 2010, Chania, Crete, Greece. The talk draws on the interim

findings of the six thematic Working Groups focusing on content, functionality, user, policy, quality and architecture that DL.org co-ordinated. The talk is based on a paper by Katerina El Raheb and co-authored by members of the DL.org Consortium.

**Web link:** <http://www.isast.org/>

#### DL.org presentation on Policy & Quality Interoperability Challenges & Approaches for Digital Libraries on 2 June at Archiving 2010, The Hague, Netherlands

The DL.org Policy and Quality Working Group co-ordinators are presenting a paper on DL interoperability challenges and approaches on 2 June 2010 during the Archiving 2010 conference in The Hague.



The presentation, co-authored by Perla Innocenti, Seamus Ross and Giuseppina Vullo, is entitled "Towards Policy and Quality Interoperability: Challenges and approaches for Digital Libraries". Perla Innocenti (pictured) leads the presentation with a focus on:

- Policy and quality within the DELOS Digital Library Reference Model
- Core policy and quality aspects affecting information systems
- The DL.org policy and quality interoperability frameworks
- Real-world cases on policy and quality interoperability

#### Web link

Archiving 2010

<http://www.imaging.org/ist/conferences/archiving/index.cfm>

#### The Pioneering Work of Kings College London, DL.org Face-to-Face with Tobias Blanke



Tobias Blanke is a Research Fellow for the Arts and Humanities eScience Support Centre (AHeSSC) at King's College London. He also serves as an expert in DL.org's Liaison Group, which evaluates the main outcomes of the project. Here we explore the current Digital Library and interoperability landscape with particular reference to the eHumanities.

#### What is the main value-add of Digital Libraries and Research Infrastructures for the Arts and Humanities?

I've been heavily involved in setting up the arts and humanities e-Research work in the UK. This kind of initiative has been largely spearheaded by the UK and U.S. but has also spread to other European countries as the benefits have become manifest. DARIAH (Digital Research Infrastructure for the Arts and Humanities) is one of the projects supported by the European Strategy Forum on Research Infrastructures (ESFRI) and is

aimed at bringing together all such current initiatives together.

This is a very important initiative as it will put a European infrastructure dedicated to the Arts and Humanities firmly on the map. Early research infrastructures have been pioneered for eScience with advanced infrastructures to enable researchers to work together on topics of mutual interest and where cross-border collaboration is seen to be essential for tackling global challenges.

The Humanities field is a relatively late comer in this process, originally mainly interested in building digital libraries as spaces connecting artists and humanists for research, knowledge exchange and creativity. There has always been a fascination with the idea of a universal library that brings together archives and private collections, creating lots of work in traditional Digital Libraries for Humanities.

Recently Research Infrastructures have been discovered in the attempt to support Humanities research practices on digital library resources. One challenge lies here in transforming libraries into a "community space", where people can meet and work together, that is, an interactive forum as opposed to a simple collection of digital content available to researchers in the Humanities.

#### **Can you cite any success stories and top-level challenges moving forward?**

There have been a lot of success stories. While our understanding of "Digital Libraries" has evolved over time, there has always been an historical link between Digital Libraries and Digital Archives and humanists are highly specialised in cataloguing content.

Some good cases in point include the Blake Archive (pictured) in the U.S. and the Old Bailey (pictured)



Records Online dating back to the eighteenth century in the UK, which is of general public interest, as well as early work on data services with, for instance, the Oxford Text Archives founded in 1976.



One of the main challenges is to build on successful Digital Libraries in the field and particularly to foster the shift from a situation where individual repositories operate as silos, which makes it harder for researchers to make those all-important connections that lead to new research discoveries and facilitate cross-disciplinary research.

Another challenge is inextricably linked with the Semantic Web. Humanists have fostered new ways of publishing content and resources enhanced with annotations and semantics. However, this information disappears on the traditional world wide web as a collection of documents. Hence, it is essential that we have deeper information layers and bring the semantic layer to the fore to help connect content and resources. So when it comes to looking at what might be the next

steps, connecting and linking-up content is key. Addressing this challenge is of great interest to the community.

#### **In your view, what are the main specific challenges for DL interoperability?**



There is no doubt that achieving DL interoperability is essential not only in the shift towards an advanced information space and cross-disciplinary research but also to foster innovation across the board. In the old days of IT, the market was dominated by a few big players, so it is important that we open up new research perspectives by enabling more players to come on board. Interoperability is one way of achieving this goal. However, conveying the benefits of interoperability is a challenging task as most researchers are primarily interested in advancing their research and may not see the practical benefits of interoperability. They may even see interoperability as an impediment to creativity. Approaches should thus aim to demonstrate how we can combine grass-root research activities with an information and research environment that links people together and opens up new research perspectives, while at the same time seamlessly integrates additional requirements regarding the interoperability of resources.

This is very much a social challenge that needs to focus on changing mindsets. In this respect, DL.org, as a co-ordination action, has a very important role to play in conveying the benefits of interoperability for the diverse stakeholders, including key players in the Humanities space, not only DL end-users but also archivists and librarians as content curators, system librarians and decision-makers particularly on the policy and investment front. If we look back in history, all standardisation effort basically boils down to human-to-human interaction. Hence community engagement is key to bringing interoperability benefits and best practices into sharp relief.

#### **What approaches to interoperability would you recommend and how would you position DL.org in this landscape?**

DL.org has embarked upon a strategy to enable interoperability from a multi-layered perspective. Key assets of the project certainly comprise the Technology & Methodology Cookbook, which is being developed and will leverage this successful approach in computer science. The Cookbook is an excellent example of how interoperability can be embedded into everyday work and practices.

The enhanced DL Reference Model is a formal tool of value to the community. Showcasing user models and perspectives in this context is also of interest as we widen the scope and ensure a bottom-up approach and community-driven input, which will also help to gain a critical mass around DL interoperability.

### What role do standards play?

Standards and especially open standards play a very important role as the most successful means of providing interoperability. To this end, we need to pinpoint the most successful standards and understand their relevance to DL interoperability moving forward.

Looking at the success of the world wide web, we need to foster a bottom-up approach also in terms of DL interoperability. Communication is a vital part of this process, whereby expertise, knowledge and best practices should be interwoven to create a point of gravity on the development and implementation of standards, while also ensuring that any new knowledge acquired in this area is passed on to others, thereby ensuring collective knowledge and awareness. Standards are also effective in formalising the goals and outputs of any research project underpinned by advanced infrastructures, tools and systems. Ultimately, this can lead to new interoperable systems as advances are made in the field, enabling users to relate to and connect with others. It is therefore also important to showcase provision to the user.



### How will DARIAH contribute to this landscape?

The added value of DARIAH for national activities is that it provides a framework for pan-European cooperation and the sharing of work and experience. To this end, DARIAH has established relationships with national infrastructures to ensure a mutually beneficial approach to research infrastructures for the Arts and Humanities.

On the one hand, DARIAH can foster the development of new national infrastructures. DARIAH's governance model is highly distributed, too, and based on four core virtual competency centres that cover scholarly content expertise, technological expertise, research expertise and outreach. These VCC's are our model for advanced international collaboration in the field of research infrastructures in the arts and humanities.

One of the main challenges that need addressing lies in bringing together heterogeneous archives and resources to facilitate research in the Arts and Humanities and open up new, collaborative perspectives. In a nutshell, DARIAH will contribute to the shift towards collective knowledge, on which the value-add of European research infrastructures hinges.

Tobias Blanke is a Research Fellow for the Arts and Humanities eScience Support Centre (AHeSSC) at King's College London. His main interests are in the development and research of digital libraries and infrastructures for research, particularly in the arts and humanities. He is secretary of the Humanities, Arts and Social Science Community Group (HASS-CG) of the Open Grid Forum (OGF) and Co-Theme Leader for the e-Science in the Arts and Humanities Theme at the e-Science Institute in Edinburgh. He leads CeRch's technical architecture work package in DARIAH, a European ESFRI project to create an integrated research infrastructure for arts, humanities and cultural heritage data and is also Co-Investigator on the EPSRC network DReSNet which is hosted at CeRch.

**Interview by Nicholas Ferguson and Stephanie Parker, Trust-IT Services Ltd, UK**

### DL.org & Two New Strategic Alliances - Global Information Infrastructures for Science & Cultural Heritage: The Interoperability Challenge



By Costantino Thanos, Institute of Information Science & Technologies, National Research Council of Italy, coordinating partner of DL.org

As technology becomes more far-reaching and connected, interoperability is crucial when building heterogeneous interconnected information infrastructures. Interoperability is a multi-layered and context-specific concept, encompassing different levels along a multidimensional spectrum. At one end of the spectrum we have data and metadata interoperability while at the other end we have organisational, legal and policy interoperability.

Building global heterogeneous interconnected information infrastructures requires addressing all the dimensions of interoperability including content, user, functionality, architecture, quality, and policy. In addition, for each of these dimensions, diverse interoperability levels must be considered: technical/basic, syntactic, semantic, functional, operational, behavioural, secure, organisational/business, temporal, and language interoperability. These levels form dependent layers: operational interoperability is only possible if semantic interoperability is ensured; semantic interoperability is only possible if syntactic interoperability is ensured; and so on.

Two main impediments to achieving interoperability have been identified:

- The heterogeneity of the exchanged information which covers all types of syntactic, structural, and semantic diversities among systems used to modelling information.
- The inconsistency between the use of the information as intended by its originator and the intended exploitation of it by the recipient.

The main concept enabling interoperability is mediation. This concept has its roots in tackling the integration of heterogeneous data sources and has been used to address a number of dimensions of heterogeneity spanning terminology, representation format, transfer protocols, semantics, and so forth. The mediation concept is implemented by a mediator, which is a software device that supports a mediation schema capturing user requirements, and an intermediation function between this schema and the distributed information object sources. A key feature that characterises a mediation process is the kind of intermediation function implemented by a mediator. There are two main functions: Mapping and Matching.

Mapping refers to how information object structures, properties, relationships are mapped from one representation scheme to another one, equivalent from the semantic point of view. Matching refers to the action of verifying whether two strings/patterns match, or whether semantically heterogeneous information objects match. There are several approaches to implementing the intermediation function, of particular relevance the approaches based on standards and ontologies. In order to effectively implement the intermediation function exchanged information objects should be complemented with contextual, provenance/lineage, and quality information.



For approaches to interoperability to be successful, it is crucial not only to address all the dimensions along the spectrum but also to work closely with domain and stakeholder communities from both culture and science. To this end, DL.org is establishing strategic alliances with key stakeholders in the DL space. Two new alliances that have been established recently both bring to the fore the importance of interoperability with regard to the future development of information infrastructures and the Europe's goal of ensuring the free movement of knowledge for science and culture.

The **new alliances** are:

- GRDI2020 addressing enabling technologies for Global Data infrastructures.
- DC-NET addressing Cultural Heritage infrastructures.

Interoperability, with a special focus for the level of programmes and planning of investment, is a key issue for the DC-NET project, where eight Ministries of Culture are engaged in preparing a plan of joint activities for the implementation of the European digital cultural heritage e-Infrastructure.



To this end, DC-NET co-ordinates national and European programmes to enable the use and development of e-Infrastructures for pan-European cultural heritage research. It defines the interface between cultural heritage and e-Infrastructures nationally and internationally, with the ultimate aim of fostering tangible co-operation in the long term.

GRDI2020, Towards a Vision for Global Research Data Infrastructures, is a Coordination Action project aimed at providing a framework of technological, organisational and policy recommendations to guide the development of a GRDI ecosystem by mobilising user communities, international initiatives, worldwide experts and policy makers.



GRDI2020 co-ordinates two Working Groups addressing technological and organisational issues comprising experts with a proven track record in these fields. These focused activities are underpinned by insights delivered by an Advisory Board comprising internationally renowned experts. Additionally, GRDI2020 supports the EC's High Level Expert Group chartered with defining a 2030 vision for scientific data infrastructures. The final output of GRDI2020 will be a Roadmap addressing application, technological and organisational aspects involved in the development of a sustainable global scientific data infrastructure.

DC-NET and GRDI2020 are both funded by the GÉANT and e-Infrastructure Unit of the European Commission under the 7<sup>th</sup> Framework Programme.

### In Brief

#### A Gathering of Experts, 26-28 May 2010, Rome, Italy



Many of the internationally renowned experts forming part of our Working Groups are joining us in Rome next month for the All Working Group Meeting. The magnificent Centro Congressi Palazzo Rospigliosi in the centre of Rome provides the backdrop for an intense, three-day meeting delivering new insights into DL interoperability from the perspectives of content, functionality, user, policy, quality and architecture, the six concepts to which DL.org's Working Groups are dedicated. The meeting, which will ensure that the complexity of interoperability is addressed from each of these core DL domains, moving beyond current findings to define top-level priorities for DL interoperability moving forward.

The meeting opens on Wednesday 26 May with a focus on selected interoperability issues and approaches with an overview of current findings from each Working Group through parallel and joint sessions. Day 2 kicks off with a discussion on key project outputs, such as the Technology and Methodology Cookbook and the enhanced and expanded version of the Digital Library Reference Model, as well as a look at future DL.org events to disseminate achievements. Day 3 looks at both the conclusions of each group emerging from deliberations at the meeting and at taking activities forward over coming months, particularly in terms of cross-domain issues and an interoperability framework.

**Web link:** <http://www.dlorg.eu/index.php/dl-org-events/a-gathering-of-experts>

#### DL.org Welcomes New Members to its Working Groups

Several experts on Digital Library interoperability and best practices have joined our Working Groups in recent months. New members include Jan Molendijk, National Library of the Netherlands, Technical and Operations Director in Europeana, and Axel Poigné, Senior Researcher, Fraunhofer Institute Intelligent Analysis- and Information Systems (IAIS) and representative of the ESFRI LifeWatch project on Biodiversity, who have joined the Architecture Working Group, as well as René van Horik, Program Manager, Data Archiving & Networked Services (DANS), Netherlands, who joined the Quality Working Group. DL.org would like to thank all experts who have and continue make valuable contributions to core technical work.

#### Final Report on keeping Research Data Safe



JISC (UK) has recently published the final report for Keeping Research Data Safe 2 (KRDS2) presenting the results of a survey of available cost information, validation and further development of the KRDS activity cost model, and a new taxonomy to help assess benefits alongside costs. The KRDS2 study was conducted by Charles Beagrie Ltd. and associates.

Features in the KRDS2 include:

- A survey of cost information for digital preservation, collating and making available 13 survey responses for different cost datasets.
- The KRDS activity model has been reviewed and its presentation and usability enhanced.
- Cost information for four organisations (the Archaeology Data Service; National Digital Archive of Datasets; UK Data Archive; and University of Oxford) has been analysed in depth and presented in case studies.

A benefits framework has been produced and illustrated with two benefit case studies from the National Crystallography Service at Southampton University and the UK Data Archive at the University of Essex.

One of the key findings on the long-term costs of digital preservation for research data was that the cost of archiving activities (archival storage and preservation planning and actions) is consistently a very small proportion of the overall costs and significantly lower than the costs of acquisition/ingest or access activities for all the case studies in KRDS2. As an example the respective activity staff costs for the Archaeology Data Service are Access (c.31%), Outreach/Acquisition/Ingest (c.55%), Archiving (c.15%). This confirms and supports a preliminary finding in KRDS1.

**Web link:**

<http://www.jisc.ac.uk/publications/reports/2010/keepingresearchdatasafe2.aspx#download>

#### Boosting Cultural heritage online - A new Reflection Group on Digitisation is formed

On 21 April 2010 the European Commission set up a Reflection Group on Digitisation to Boost Cultural Heritage online. European Commission President José Manuel Barroso announced that the EC will entrust three personalities - Maurice Lévy (CEO of Publicis), Elisabeth Niggemann (Head of the German National Library) and Jacques De Decker (writer) - to come up with recommendations on how best to speed up the digitisation, online accessibility and preservation of cultural works across Europe.