The DELOS Reference Model

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CNR-ISTI

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Outline

- **Motivations**
- **Overview of the model**
- **Examples of concrete usages**

The DL Universe

DIENST

NDLTD

NSDL

ECHO

ADEPT

ACM DL

DSPACE

PERSEUS

FEDORA

OPENDLIB

TEL

DILIGENT

DELOS-DLMS

BRICKS

DRIVER

Issues when dealing with DLs

- Comparison among systems is hard
  - Different focus
  - Different concepts used
  - Different terminology

- Lack of DL systems design and development methodologies

- No systematic approach to interoperability & integration of solutions

- No guidelines for teaching DLs related issues

Lack of foundations

To set the foundations and identify the cornerstone concepts within the universe of Digital Libraries, facilitating the integration of research and proposing better ways of developing appropriate systems

….. through the exploitation of the collective understanding acquired on DLs by the DELOS Network of Excellence members as well as by other groups around the world

Reference Model

- A reference model is an abstract framework for understanding significant relationships among the entities of some environment, and for the development of consistent standards or specifications supporting that environment

- A reference model is not directly tied to any standards, technologies or other concrete implementation details, but it does seek to provide a common semantics that can be used unambiguously across and between different implementations

The DL "systems"
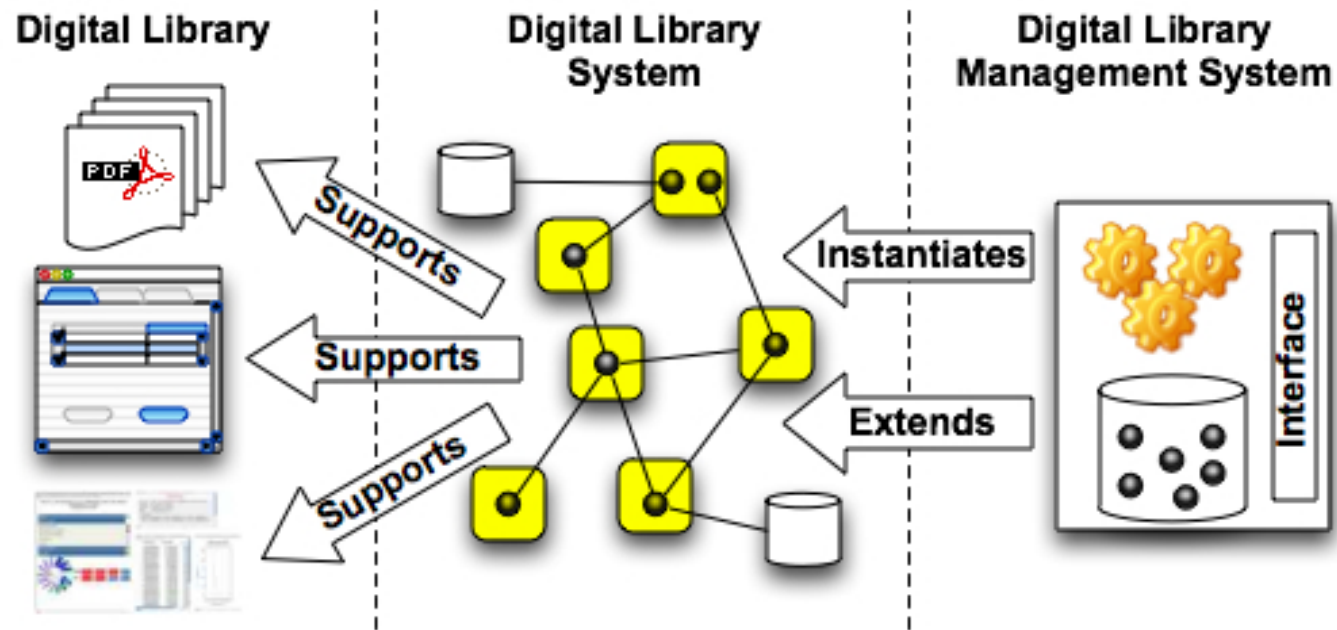
Digital Library

A (potentially virtual) organization that comprehensively collects, manages, and preserves for the long term rich **digital content** *and offers to its* **user** *communities specialized* **functionality** *on that content, of measurable* **quality***, and according to prescribed* **policies**
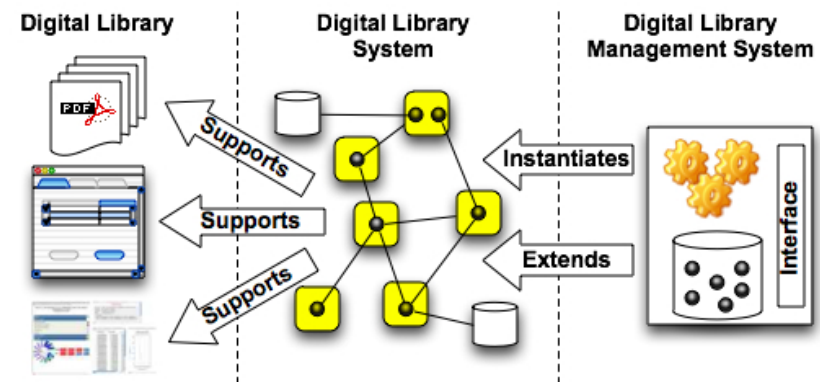
Digital Library System

A software system that is based on a (potentially distributed)
architecture *and provides all functionality that is required by*
a particular Digital Library. Users interact with a Digital
*Library through the corresponding Digital Library System*
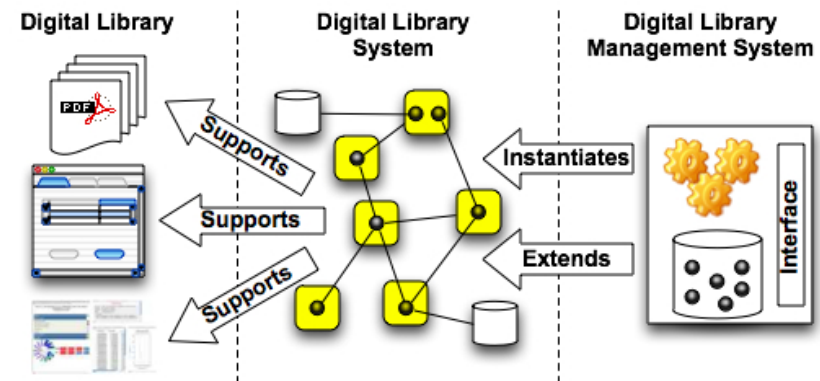
Digital Library Management System

A generic software system that provides the appropriate software infrastructure to both (i) produce and administer a Digital Library System that incorporates all functionality that is considered foundational for Digital Libraries and (ii) integrate additional software offering more refined, specialized, or advanced functionality

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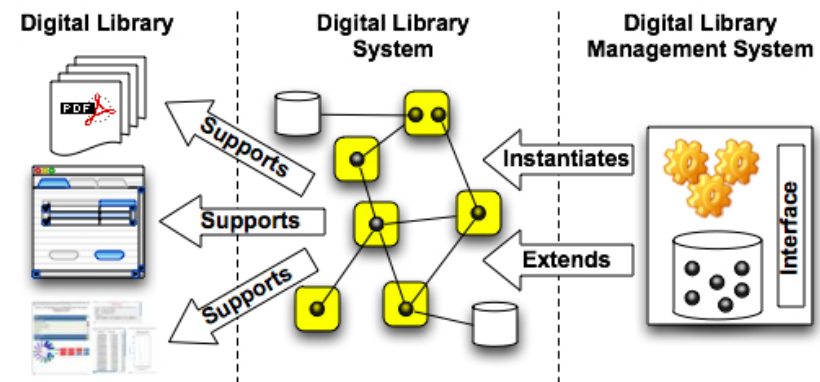
Hierarchy of conceptualizations
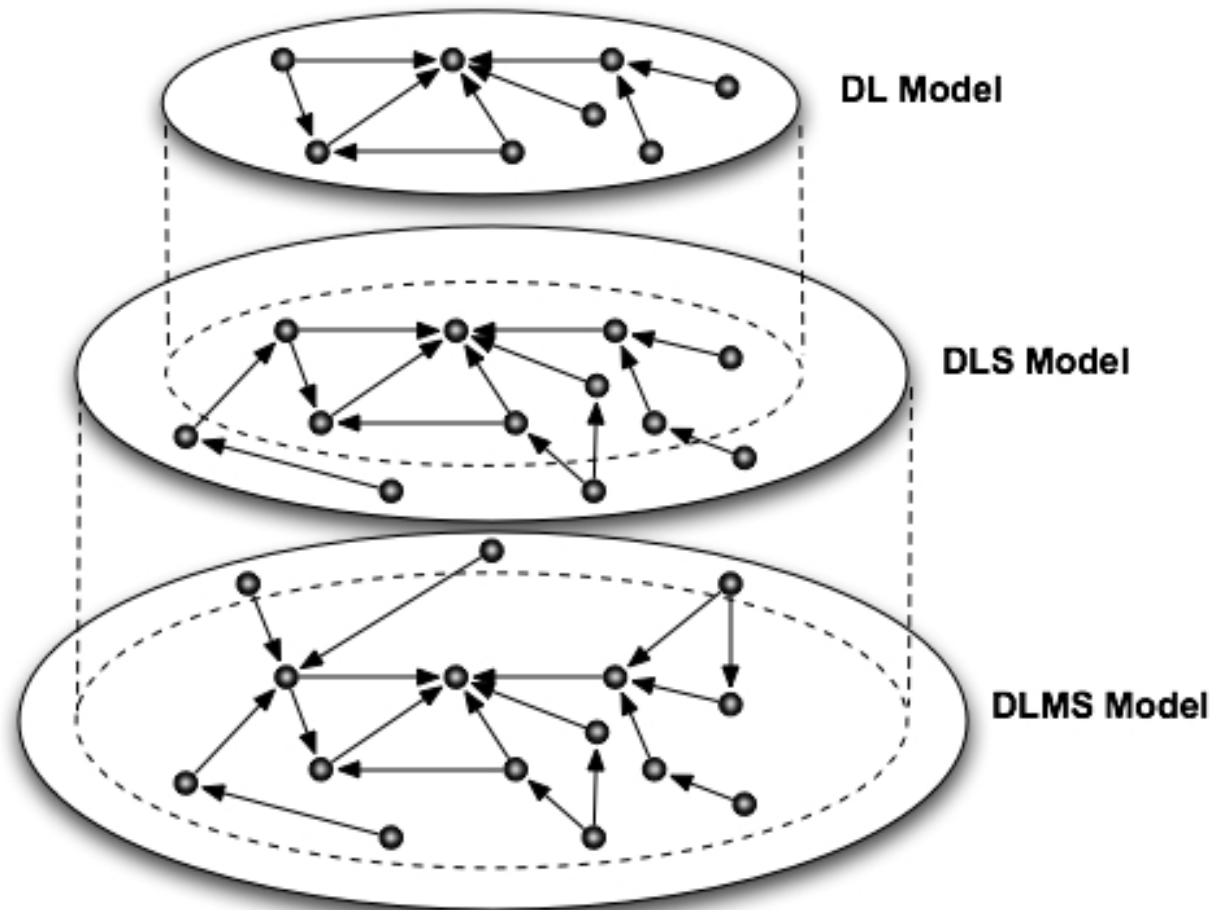
The main user roles

- **End-users**

DL Users

- **DL designers**

DL Designers

- **DL system administrators**

DL System Administrators

- **DL application developers**

DL Application Developers

DL End-Users

- Exploit the DL functionality for providing, consuming, and managing the DL Content as well as some of its other constituents. They perceive the DL as a stateful entity that serves their functional needs. DL end-users may be further partitioned into
    - *Content Creator*
    - *Content Consumer*
    - *Librarian*

DL Users

DL Designers

- Exploit their knowledge of the application semantic domain to define, customize, and maintain the Digital Library so that it is aligned with the information and functional needs of its end-users. To perform this task, they interact with the DLMS providing functional and content configuration parameters.

DL System Administrators

- Select the software components necessary to create the Digital Library System needed to serve the required DL and decide where and how to deploy them. They interact with the DLMS by providing architectural configuration parameters, such as the selected software components, the hosting nodes, and the components allocation.
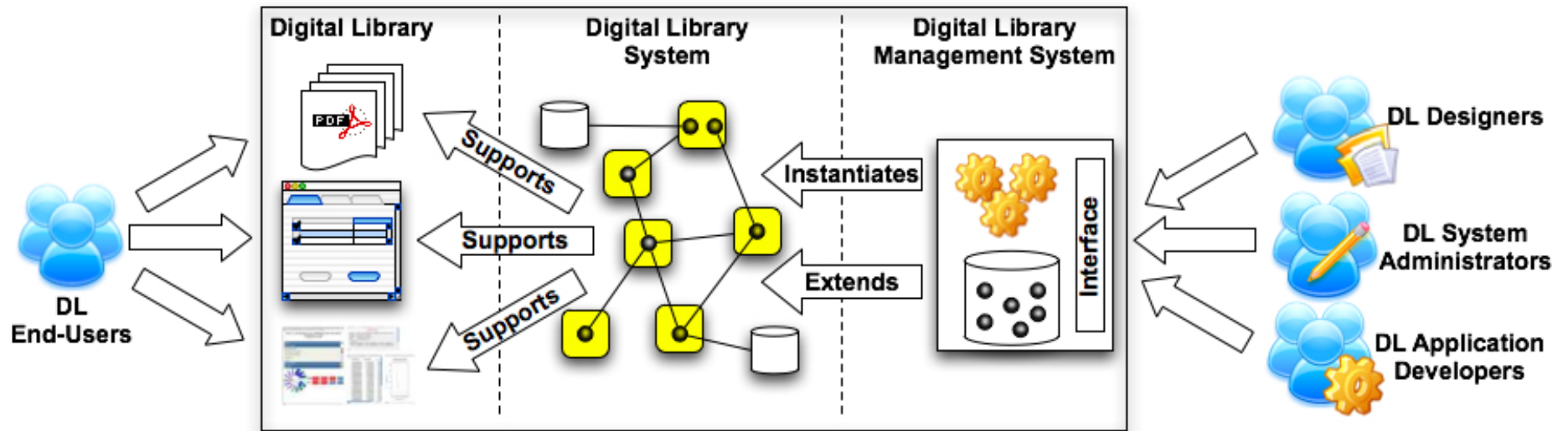
DL System Administrators

DL Application Developers

- These develop the software components of DLMSs and DLSs, realizing the necessary functionality
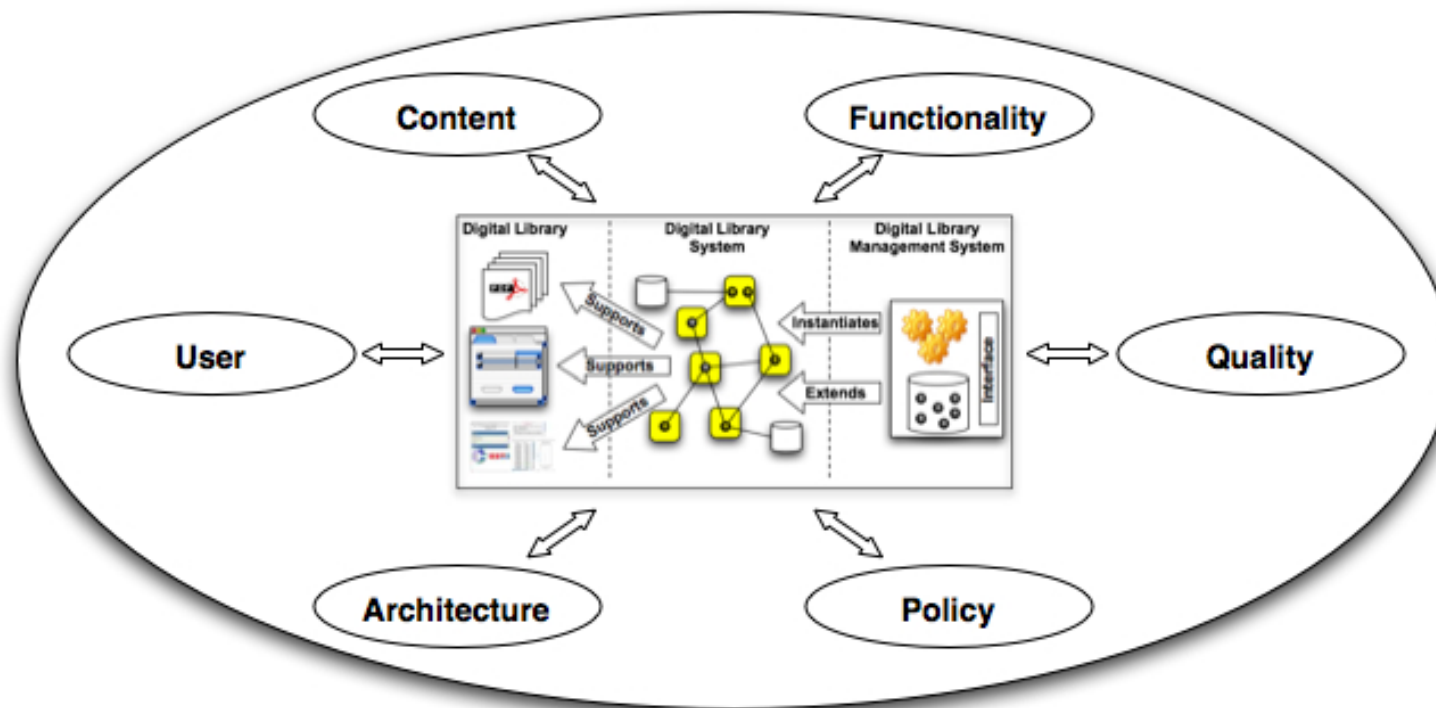
The user's views

The DELOS Model

Set of concepts and relationships that represent the significant aspects of the different type of DL "systems"
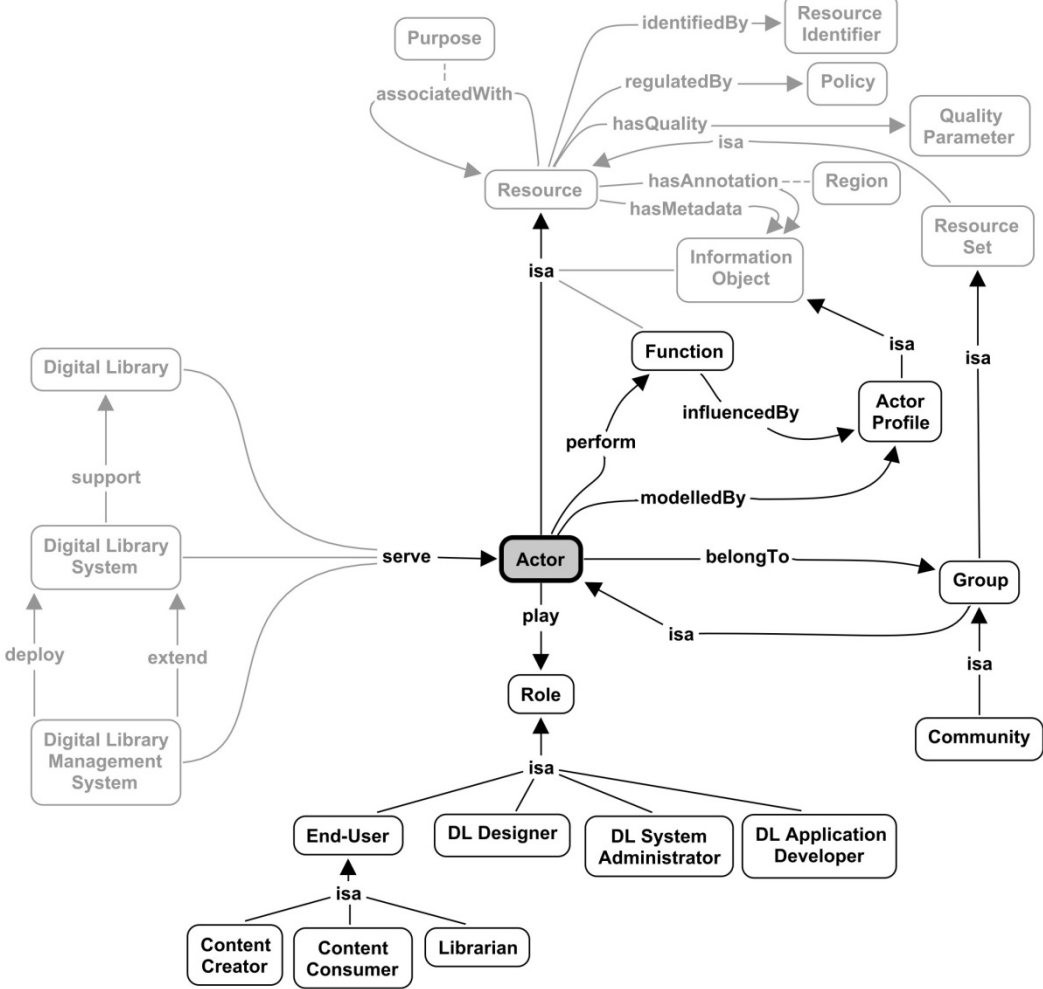
DELOS Reference Model documents

- **The DELOS Digital Library Reference Model**

  (Foundations for a Digital Library Universe)

  - The Digital Library Manifesto
  - The Digital Library Model in a Nutshell
  - Concept and Relationship definitions

Concept & Relationship maps

Concept & Relationship definitions

C19 Actor

Definition: A *Resource* that represents an external entity that interacts with the Digital Library and it is identified by a *Resource Identifier*. Furthermore, it may have at least one *Actor Profile* and it may belong to at least one *Group* and be regulated by a set of *Policies*. An *Actor* may be characterized by *Quality Parameters* and may be linked to other *Actors*.

Relationships: *Actor <isa> Resource*
Actor is <identifiedBy> Resource Identifier (inherited from Resource)
Actor is <regulatedBy> Policy (inherited from Resource)
……

Rationale*: An Actor captures any entity external to a Digital Library that interacts with it or with other similar entities through the Functions offered by the Digital Library and includes humans, and inanimate entities, ……*
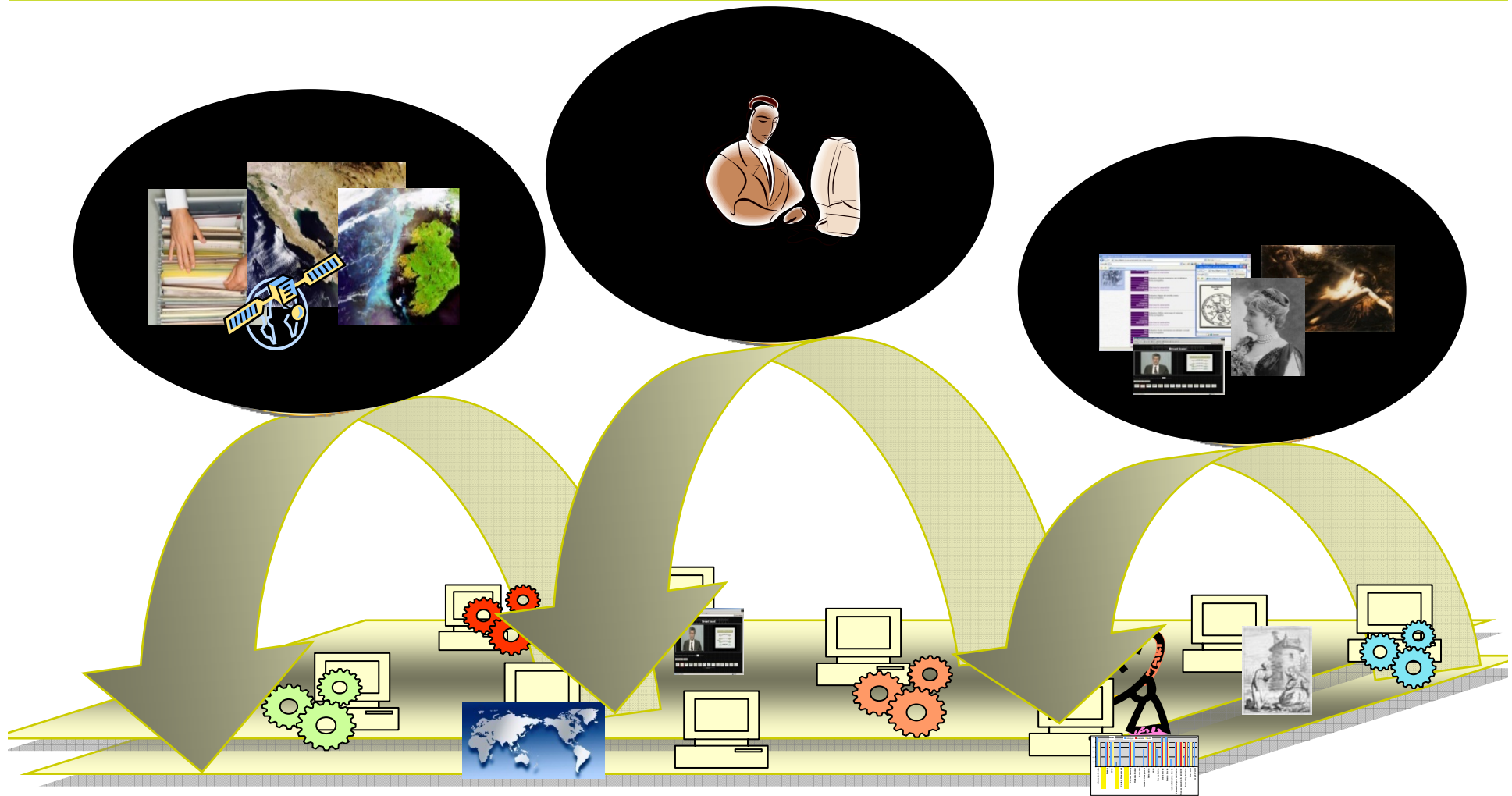
Examples:
*   *A Group is an Actor*
*   *A Community is an Actor*
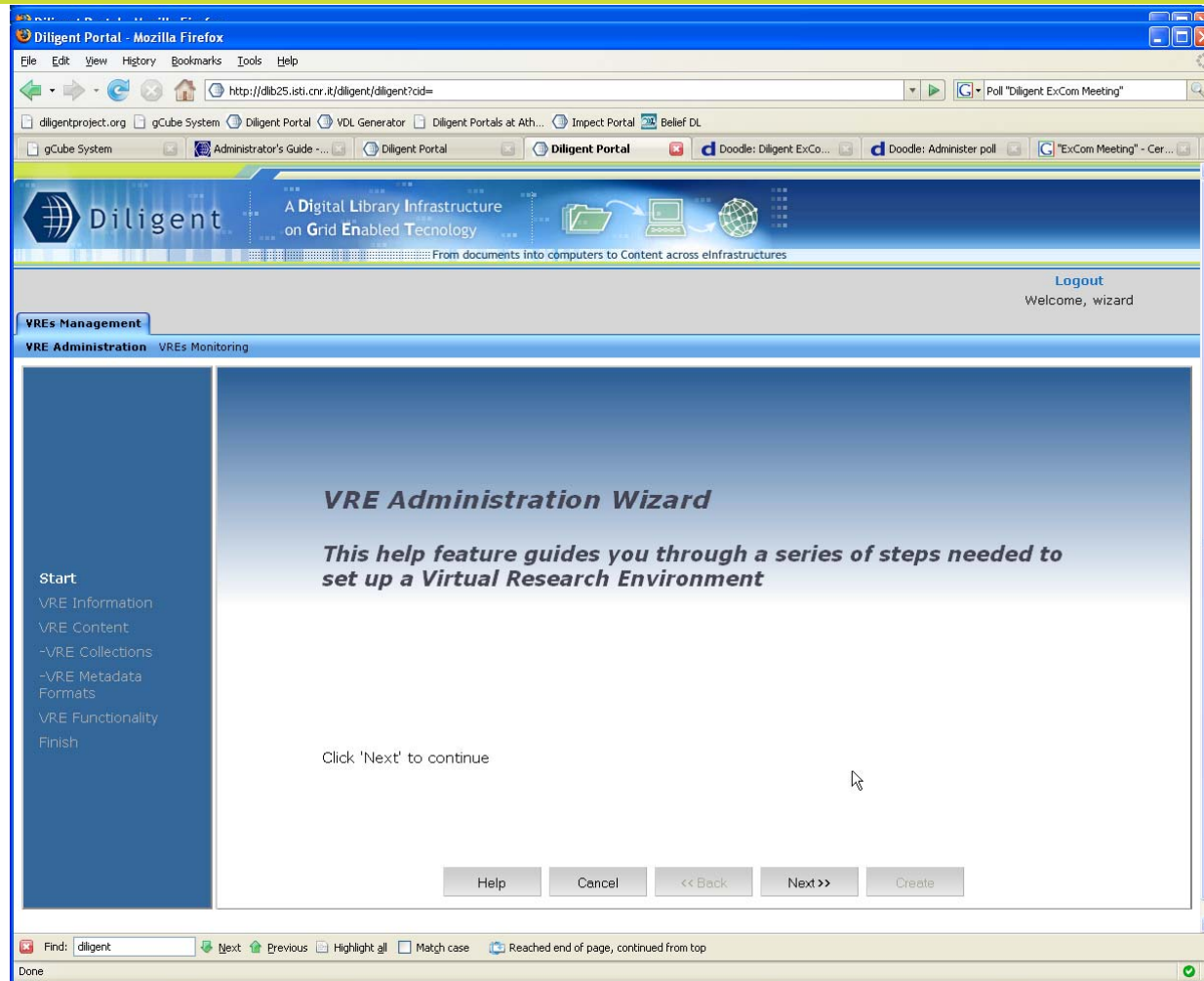
Example-1: Reference Model in action
(by Marianne Backes)

- Defining concepts

- Understanding concepts

- Defining the ENA strategic Framework

- Developing a new ENA DL architecture

- Explaining DL concepts and explaining the complexity of the ENA DL

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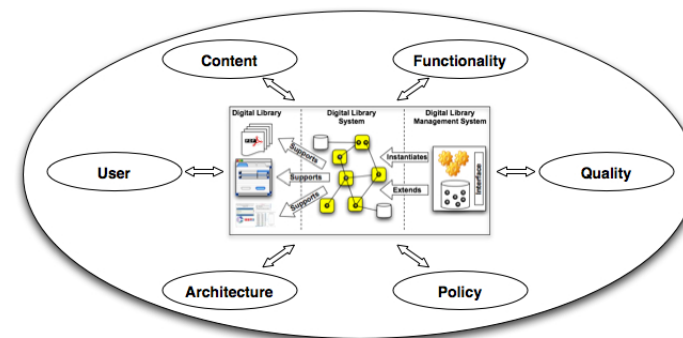# Example-2:
On-demand Virtual DL (or VREs)

Selecting VRE resources

Example-3: interoperability

- **Better focus on interoperability issues**
  - **Scope**: interoperability involves concepts belonging to any of six domains
  - **Measure**: the level of interoperability is a function of the range of covered concepts

Main Contributors

- CNR-ISTI (Italy)
- University of Athens (Greece)
- University of Glasgow (UK)
- Univ. of Padua (Italy)
- Univ. of Maryland (US)
- Tech.Univ. of Crete (Greece)
- Univ of Basel (Switzerland)

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Participants to:

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  - Jose Borbinha (DEI-IST-UTL)
  - Norbert Fuhr (Univ. of Duisburg)
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- 1st Workshop on Digital Libraries Foundations, Vancouver, June 23, 2007

- 2nd Workshop on Digital Libraries Foundations, Budapest, 20 September 2007

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Request for Comments

- Thursday, December 6th, 14.30 - 16.00
  Session 12: Reference Model

- RefModel_comment@delos.info

http://www.delos.info/ReferenceModel

A step toward a systematic approach to development

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