

A Reference Architecture for Digital Library Systems: Principles and Applications

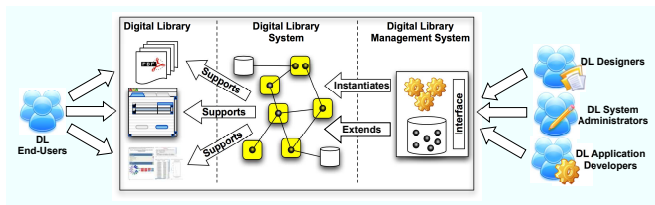
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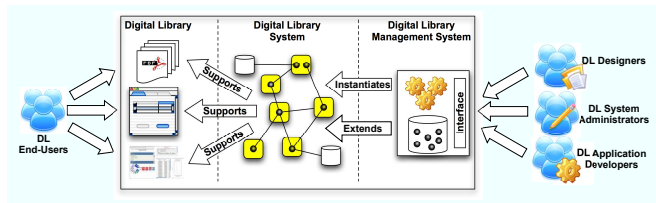
DL, DLS, and DLMS: a Three-Tier Framework



Definition (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**.

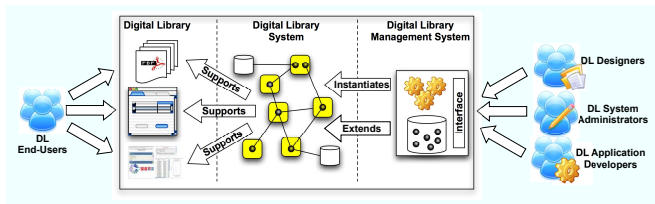
DL, DLS, and DLMS: a Three-Tier Framework



Definition (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.

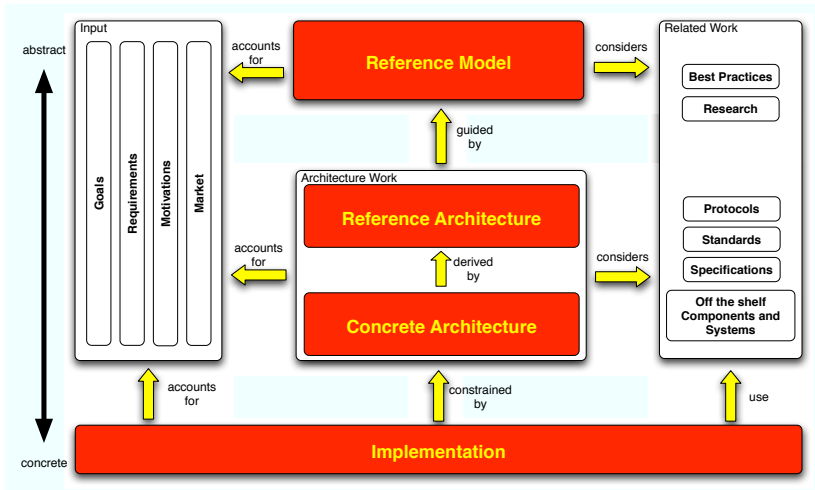
DL, DLS, and DLMS: a Three-Tier Framework



Definition (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.

Modeling the DL Universe



Reference Architecture(s): Motivations

A plethora of “Digital Library Systems” have been produced

- pragmatic “from-scratch” approaches
- heterogeneous systems making interoperability, sharing, and reuse very difficult

A Reference Architecture is an **architectural design pattern** indicating how abstract mechanisms and relationships cooperate in **satisfying a set of requirements**

- different application domains imply different needs
- DLSs and DLMSs are sw systems with different goals

... **many Reference Architectures** each one suitable for a class of application scenarios

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A Reference Architecture for Large-scale Digital Library Systems

Identifies the design pattern for a class of application scenarios characterized by:

- organizational model based on resource sharing
- (dynamic) growing number of participants
- evolving user requirements

Despite the pattern focuses on DLSs it envisages and promotes also a DLMS

- DLMS instantiating DLSs by aggregating the pool of needed resources



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Reference Model and Component-oriented Approach

From system theory: the more complex a system is, the more “unknowns” it contains and thus, the harder it is to automate it

- **decomposing** complex systems into smaller, more manageable ones that are **easier to control**
- treating the whole system as a **composition of its parts**

This also happens in software systems development¹

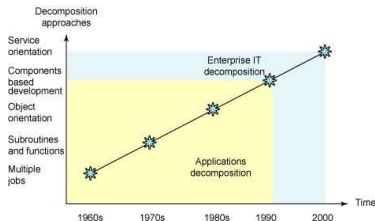
¹<http://www-128.ibm.com/developerworks/webservices/library/wax/inst/inst.html>

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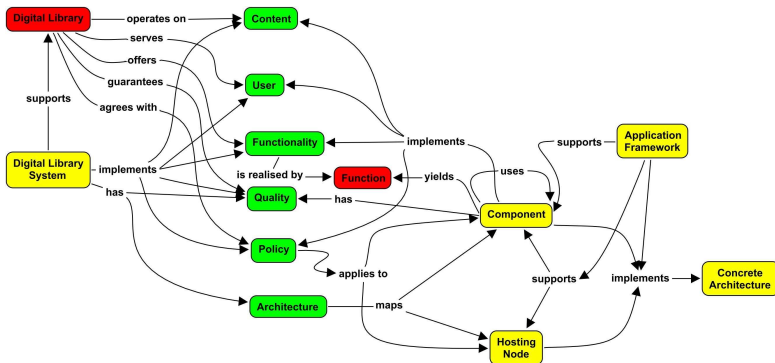


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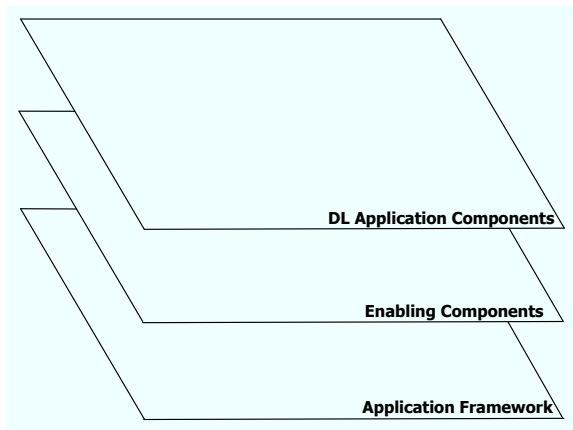
Reference Model and Component-oriented Approach

Architecture = {component} + {hosting node}



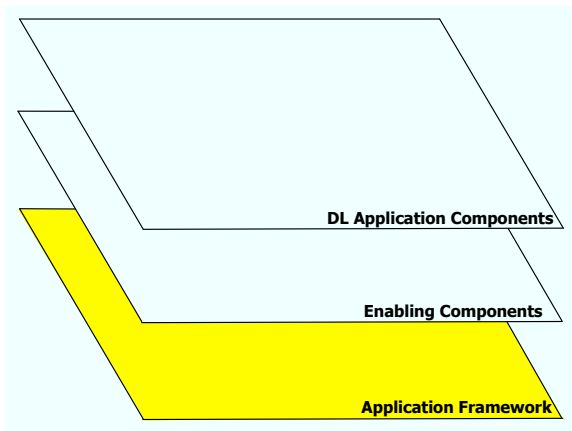
Layers and Functional Areas

Layers organizing “different” functionalities



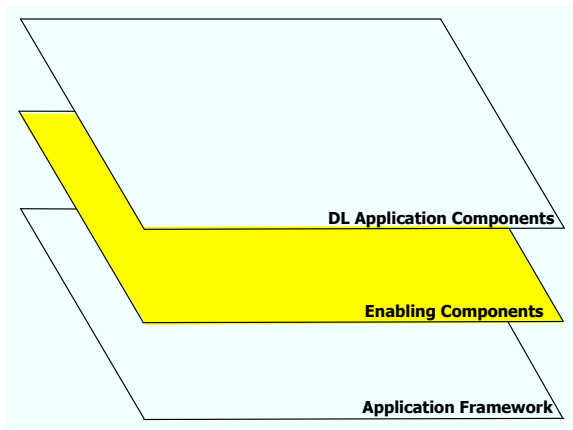
Layers and Functional Areas

Supports component operation



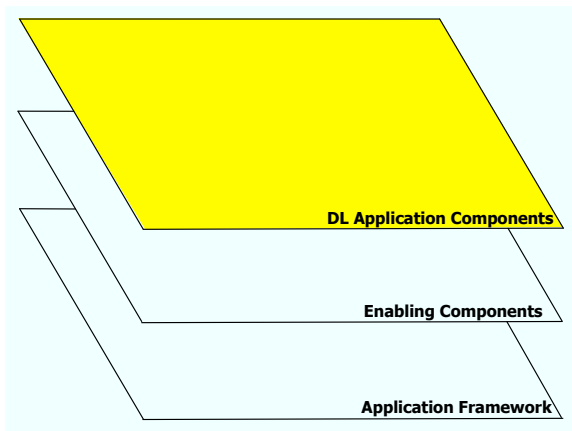
Layers and Functional Areas

Supports component to component cooperation



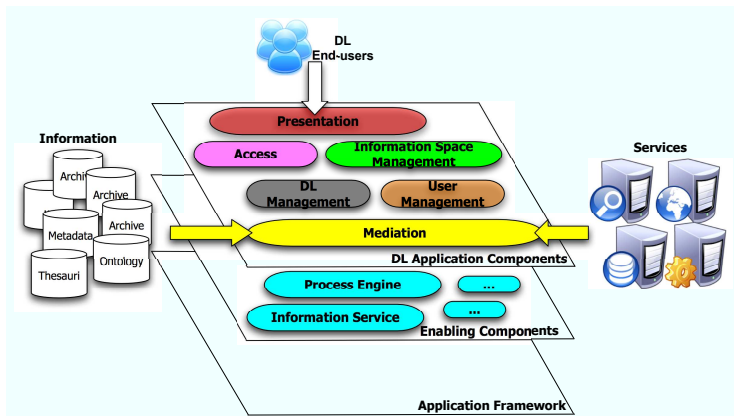
Layers and Functional Areas

Provides application functionality

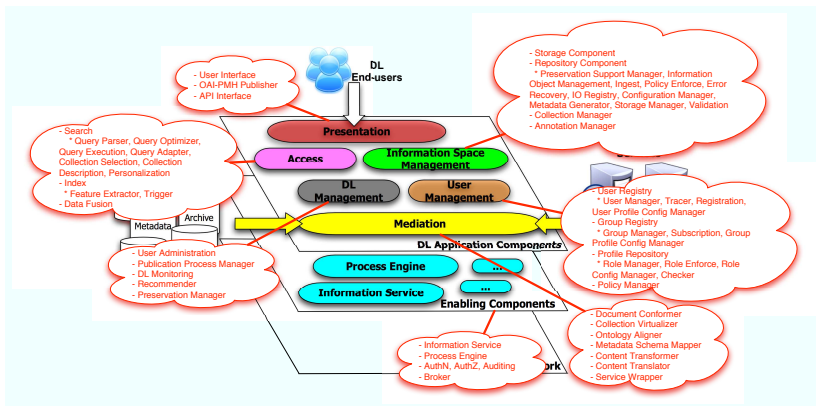


Layers and Functional Areas

Functional areas group homogeneous functionalities



Components



DRIVER: Digital Repository Infrastructure Vision for European Research

- **Ongoing** IST project (Jun '06 – Nov '07)¹
- Developing an **organization** and a **system** for **integrating** existing national, regional, or thematic repositories
- The first public release provides access to **51 Institutional Repositories**
 - various European countries (Netherlands, Germany, France, Belgium and the UK)
 - half million of documents
 - various topics, media, format, languages
- Requirements
 - organizational model based on resource sharing
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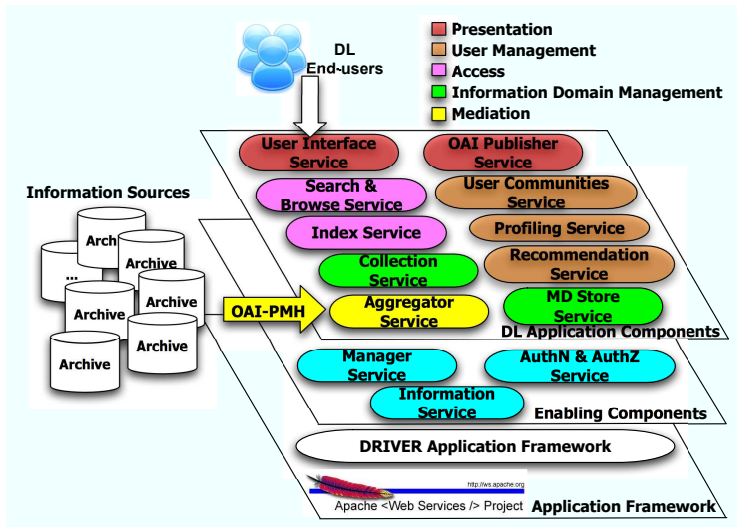
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DRIVER Architecture



DILIGENT: A Digital Library Infrastructure on Grid ENabled Technology

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- Developing a **test-bed** integrating Digital Library and Grid technologies
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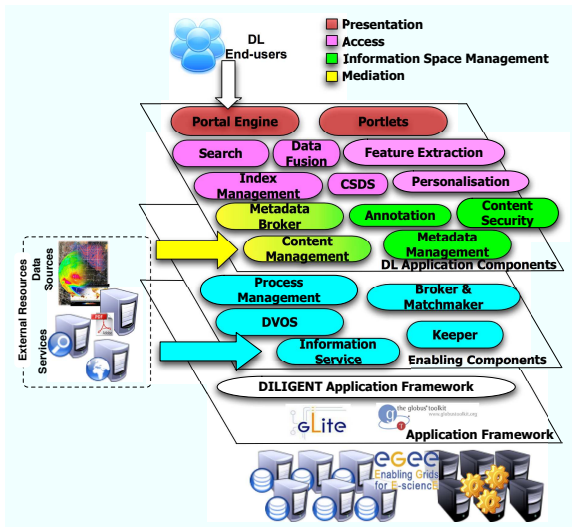
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DILIGENT Architecture



Conclusion

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- Some parts are **quite consolidated** (e.g. enabling components) others still **need more work** (e.g. mediation)
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Clarify the relation between **DL(M)S** and the emerging notion of **“knowledge infrastructure”**

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