

# Architecture Model State of the Art and Open Issues

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# Digital Library “Systems” Evolution: Conceptual aspects

From *content-centric*

- in charge of simply organising and providing access to particular collections of data

... to *person-centric*

- aiming at providing facilities for communication, collaboration and any kind of user interaction

... to *person-wide oriented*

- aiming at **supporting the whole set of actors** working to realise the person-centric systems view, i.e. End-users, DL Designers, DL System Administrators, DL Application Developers

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# Digital Library “Systems” Evolution: Pragmatic aspects

The **request** for Digital Libraries **has changed**

- enabling tools supporting **virtual communities**
  - dynamic aggregative nature resulting from a task
  - highly evolving requirements
  - limited time-frames
  - limited budget

... **invalidating** current delivery practices, namely **“from-scratch”** and **ad hoc** solutions

*Moving DL “systems” development from an art to a discipline*

- *strong and widely accepted **models as foundations***

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# Architecture: a Foundational Concept with Modelling Issues

- to have a uniform and common terminology to describe competing systems at different level of abstractions
  - to help **decision makers** and **stakeholders** in **judging** different **solutions**
  - to help **DL System Administrators** in **controlling** potentially complex systems and making this **automatic** as much as possible (e.g., monitoring, dynamic deployment)
  - to help **DL Application Developers** in **implementing** **“standard” solutions** that re-use/integrate existing assets and can be re-used/integrated (cross/self-fertilisation)

*The aim is to identify the minimal set of **unifying concepts** (Reference Model), **abstract solutions** (Reference Architecture), and **blueprints** (Concrete Architecture) to implement Digital Library “systems”*



# Architecture: a Foundational Concept with Modelling Issues

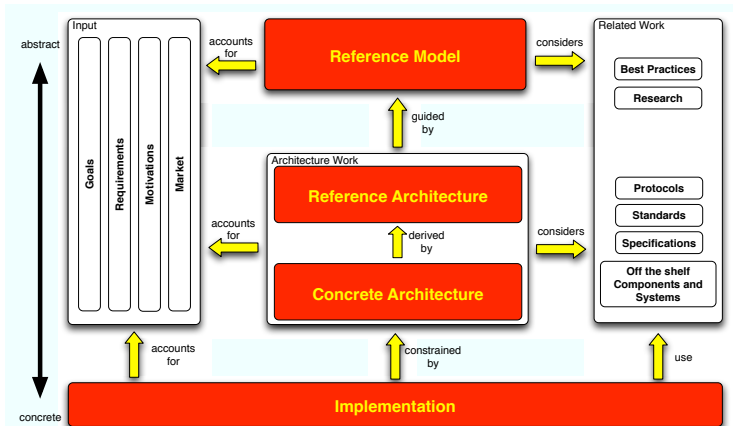
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# A Comprehensive and Programmatic Concretisation Stack



<sup>1</sup>Inspired by "Reference Model for Service Oriented Architecture 1.0"

# State-of-the-art

**Many models** exist (even standard), highly heterogeneous in goal and scope

- Architecture of the World Wide Web (W3C)
- Web Services Architecture (W3C)
- Ontologies, e.g. CSO/COSC/COWS, OWL-S, WSMO

... promoted patterns need **to be tailored and adapted** to the specific context(s) in a **systematic way**

Current wide-in-scope models in the Digital Library area

- 5S: Streams, Structures, Spaces, Scenarios, Societies
- The DLF Framework
- The DELOS Framework (in progress)

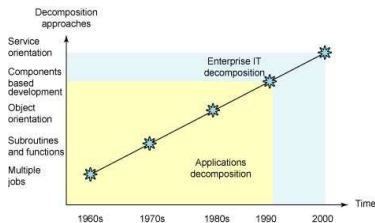
... having different focus on Architectural Models and their concretisation

# 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**

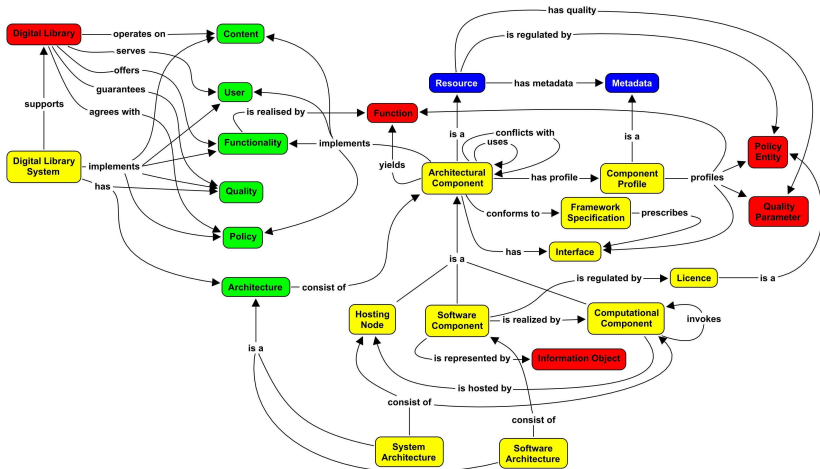
This also happens in software systems development<sup>2</sup>



<sup>2</sup><http://www-128.ibm.com/developerworks/webservices/library/artstyle/index.htm>

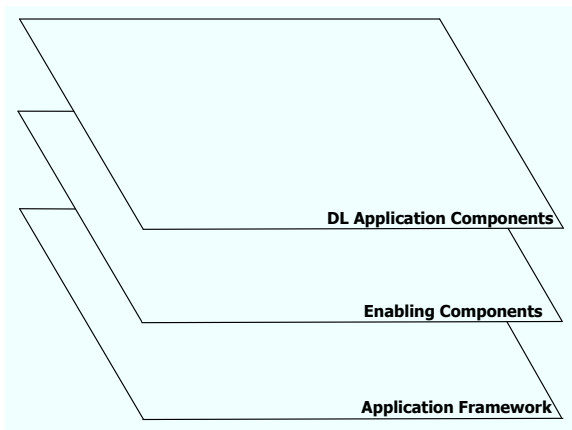


# Component as a new Resource Type



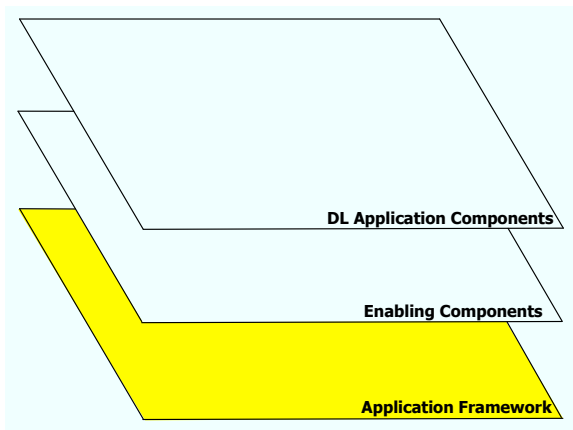
# Reference Architecture(s)

Layers organizing “different” functions



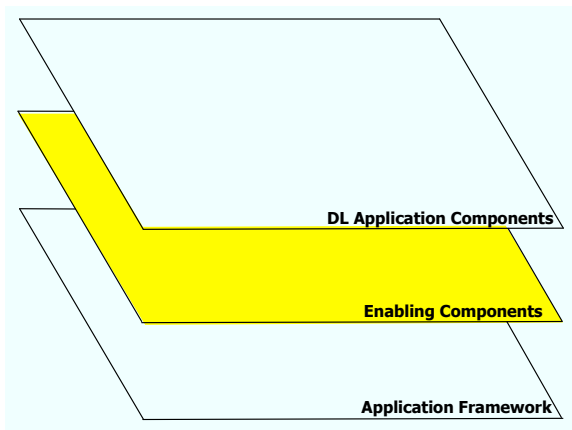
# Reference Architecture(s)

Supports component operation



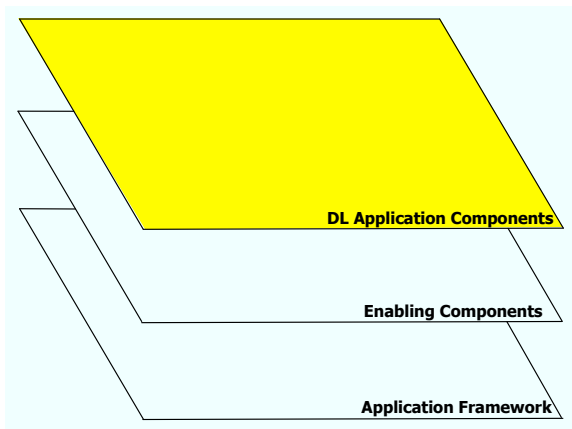
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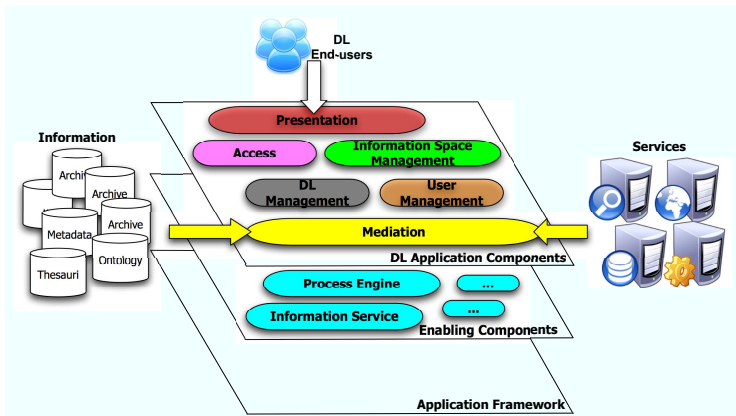
Provides application functions





# Reference Architecture(s)

Functional areas group homogeneous functions



# How Many Reference and Concrete Architecture(s)?

	<i>Ref. Model</i> (concepts & relationships)	<i>Ref. Arch.</i> (abstract solutions)	<i>Conc. Arch.</i> (blueprint)
Personal DL	Repository	local & centralised	JDBC
	Search	local	JDBC
Large Scale DL	Repository	remote & distributed	OAI-PMH
	Search	distributed	SRU

## Conclusion and Topics for Discussion

*A comprehensive and fully-fledged Architectural Framework is a mandatory “tool” to promote and support*

- *software and systems **interoperability***
- *assets **sharing and re-use***
- ***distributed and co-operative development***

### Open Questions

- Is the Architectural Framework a **DL Community need**?
- Has the Digital Architectural Framework **specific peculiarities** w.r.t. an Information System architecture?
- How many **classes** of Digital Library “systems” exist, i.e. how many Reference and Concrete Architecture need to be addressed?

Thank you!

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Additional slides

# The DELOS Resource Model

