DELOS
NETWORK OF EXCELLENCE ON DIGITAL LIBRARIES

Towards a Long Term Research Agenda for Digital Library Research

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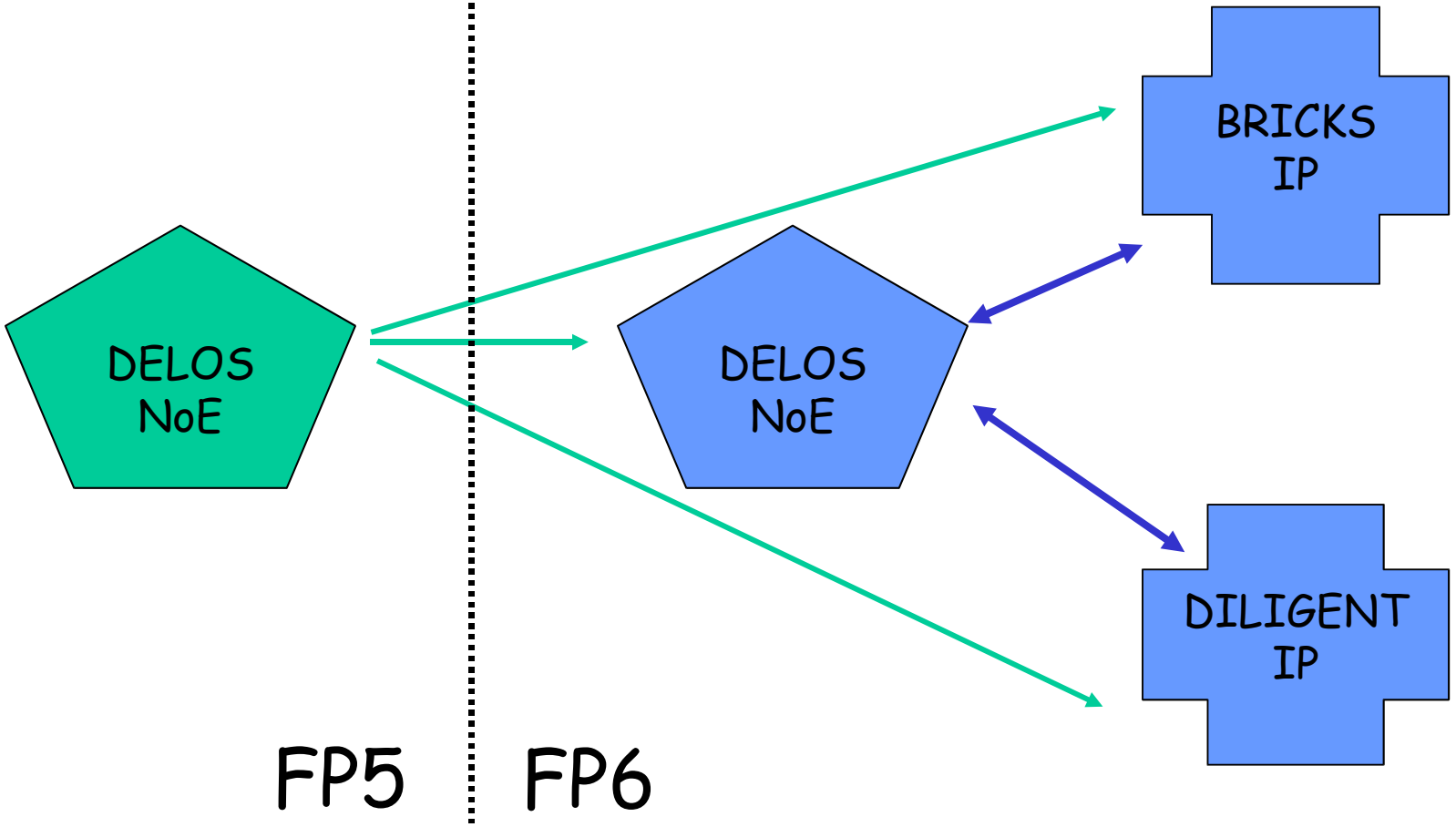
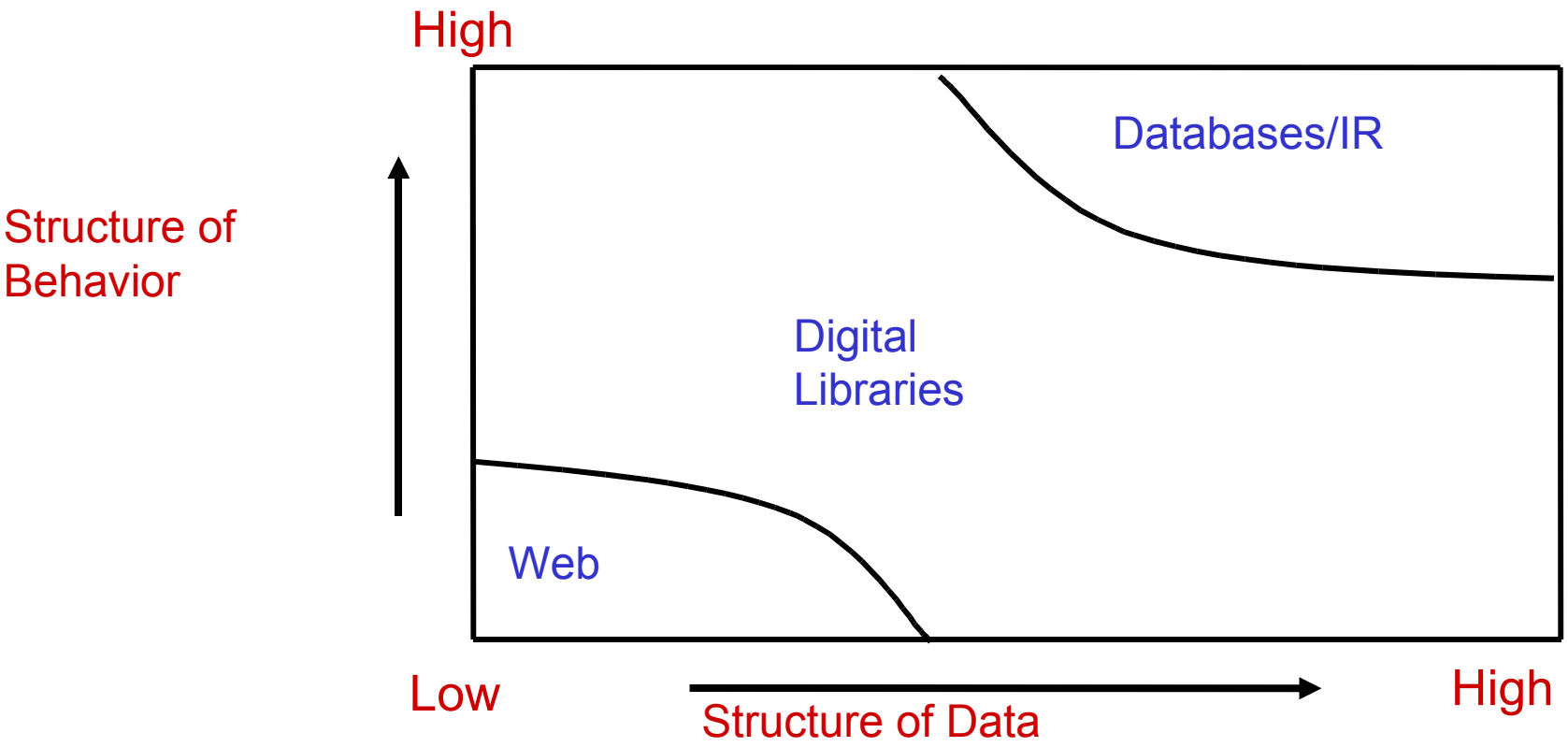
DELOS Project Family Tree



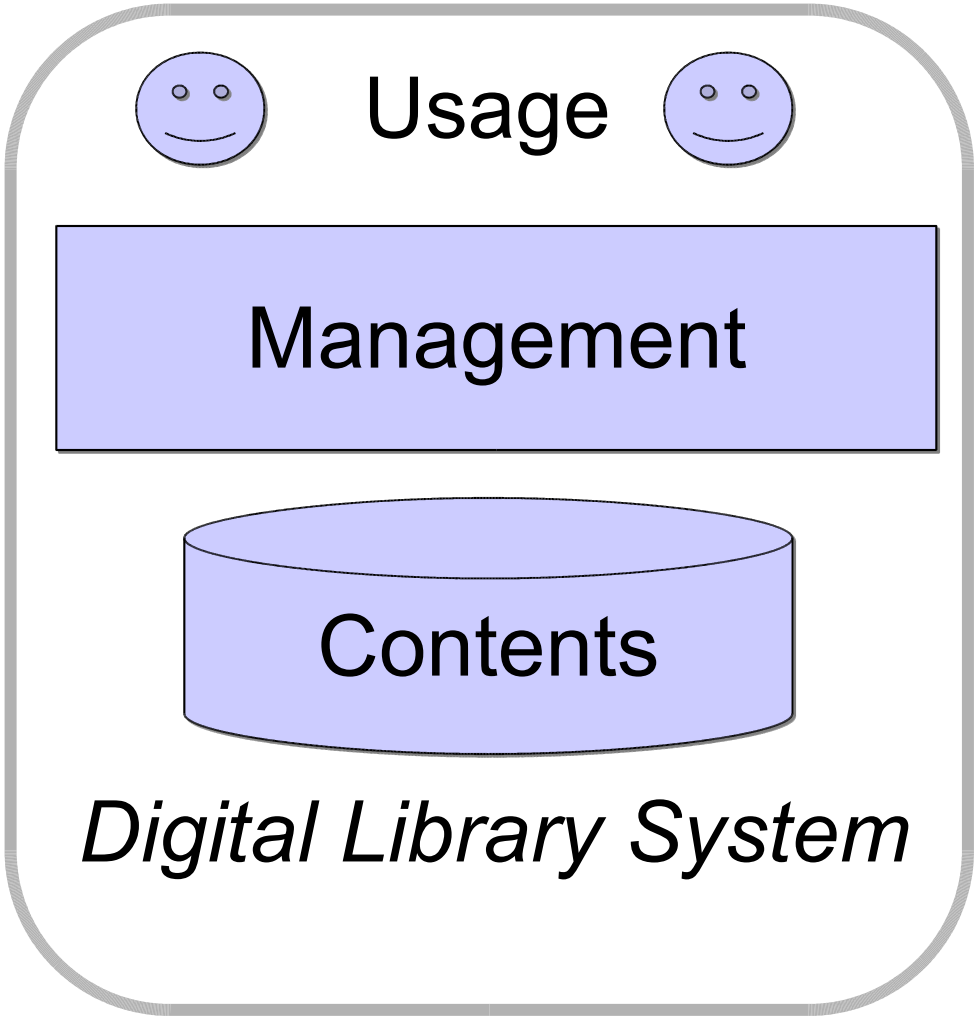
DL Definition

- What: information and services
  - comprehensive
  - rich forms and kinds
  - read-and-expand-only
- Why: learning and research
- When: value at depth of time

Information Space for DLs



Conceptual Framework



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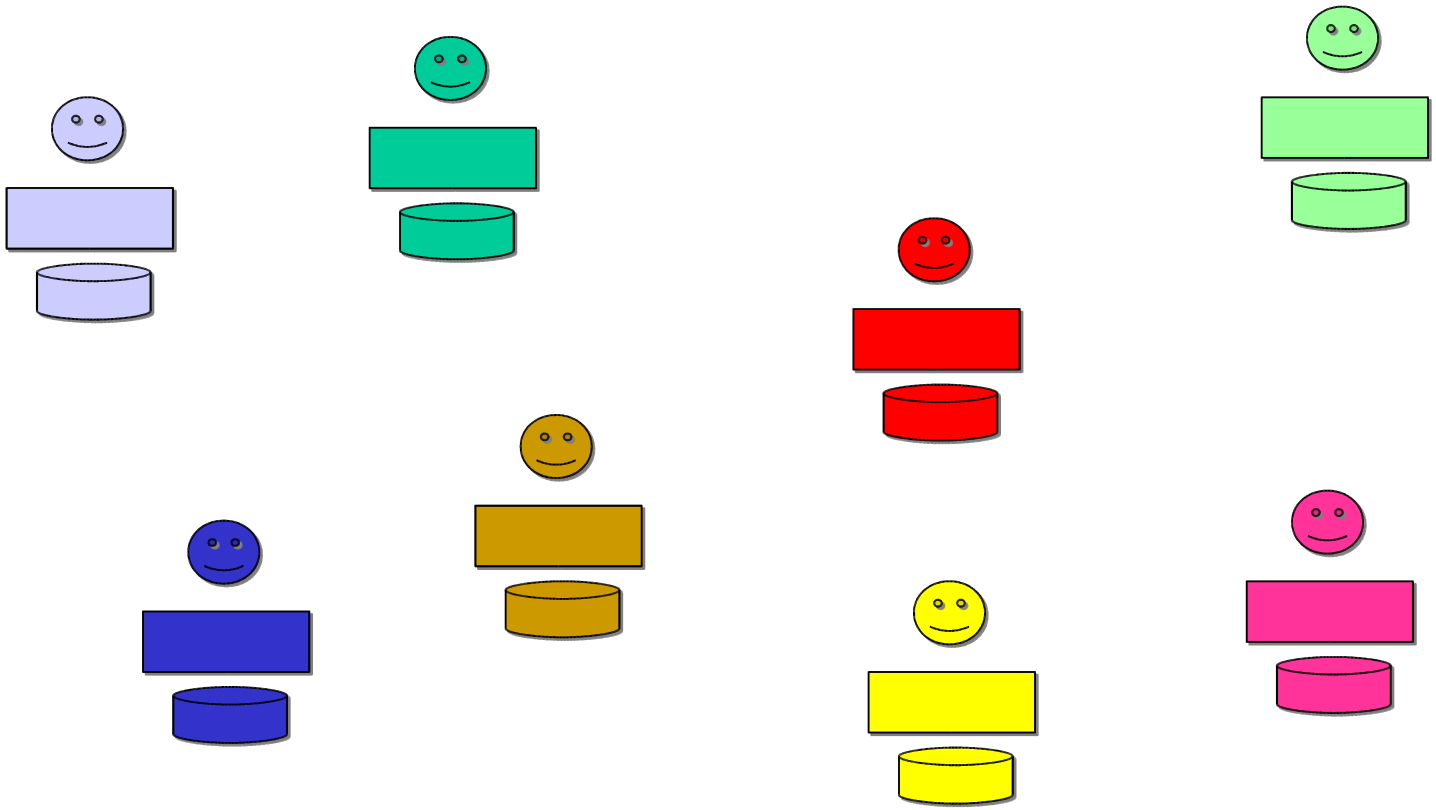
Current Methodology



Current Methodology

Content-centric

Targeted for static storage

Environment-specific

Isolated and repeated efforts

Isolated systems

Current Myths

Digital Libraries are for things in Libraries only

Digital Libraries are for Cultural Heritage only

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Grand 10-Year Vision #1

Digital libraries should enable any citizen
to access all human knowledge
anytime and anywhere,
in a friendly, multi-modal, efficient,
and effective way,
by overcoming barriers of distance,
language, and culture
and by using multiple Internet-connected
devices

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Grand 10-Year Vision #2

The potential exists for digital libraries to become the universal knowledge repositories and communication conduits for the future, a common vehicle by which everyone will access, discuss, evaluate, and enhance information of all forms

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Future Digital Libraries

Content-centric

Person-centric

Targeted for static storage

Targeted for active communication/collaboration

Environment-specific

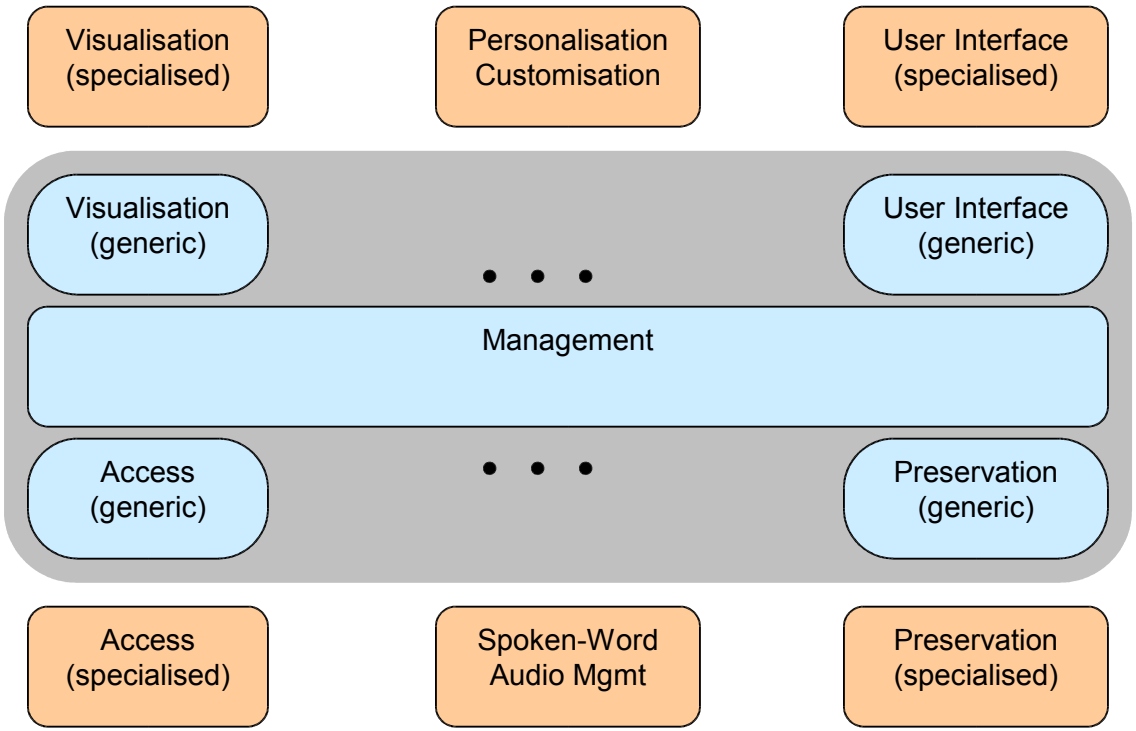
Isolated and repeated efforts

Isolated systems

Global distributed interacting systems

"All" applications

Digital Library Management Systems



Future Digital Libraries

Person-centric

Targeted for active communication/collaboration

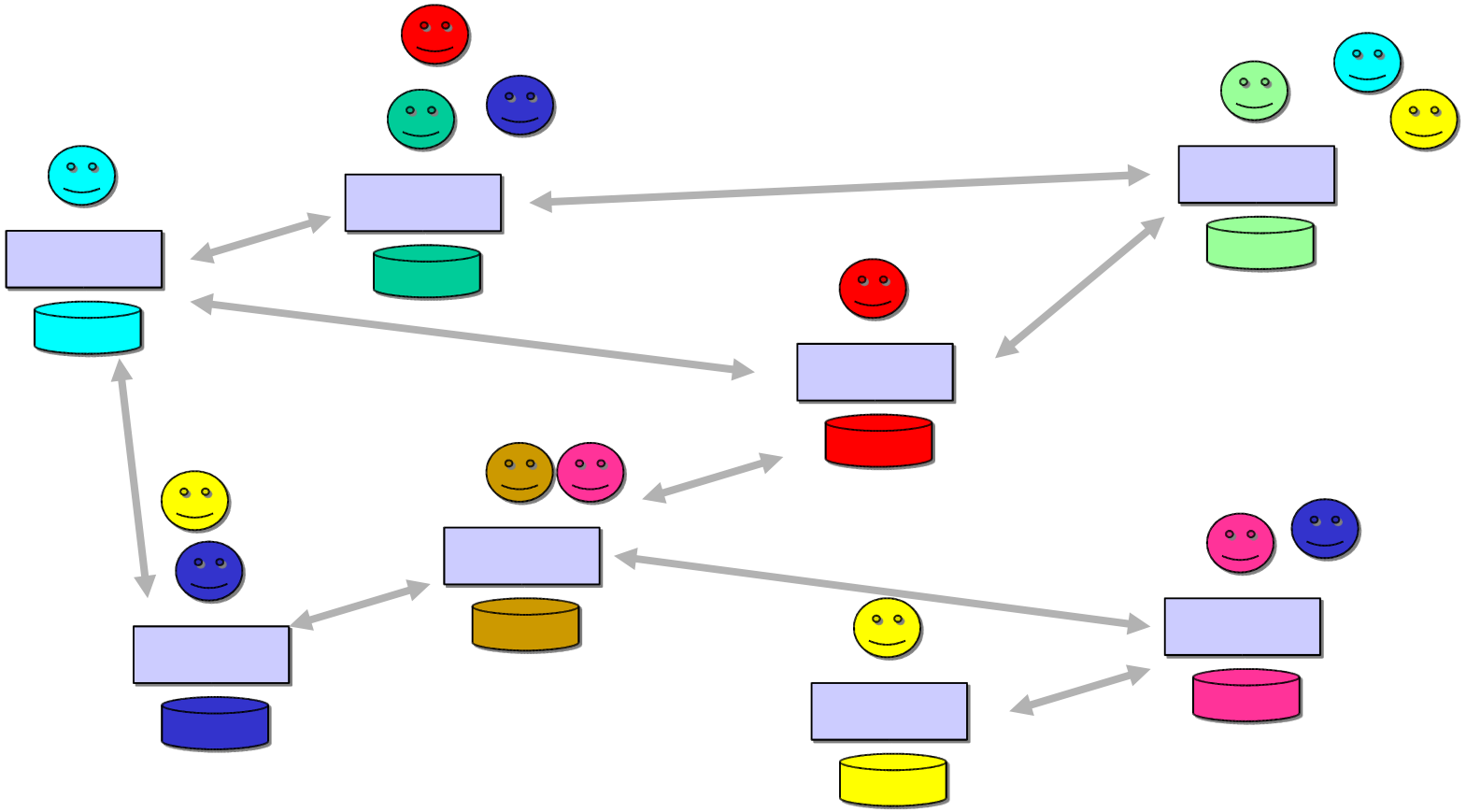
Generic technology for DLMS
Environment-specific needs on top of them

Maximum reuse

Global distributed interacting systems

“All” applications

Future Digital Library Development



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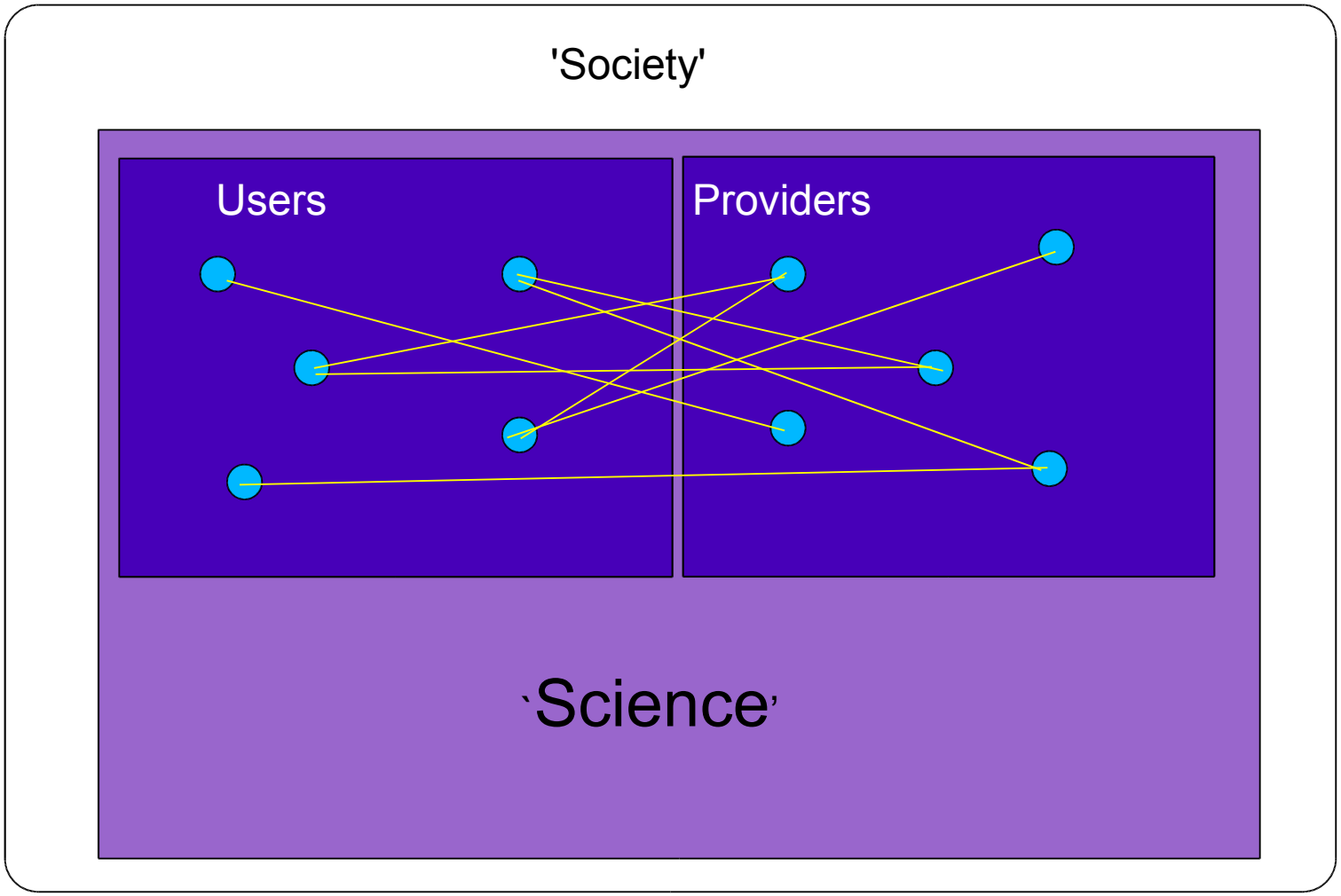
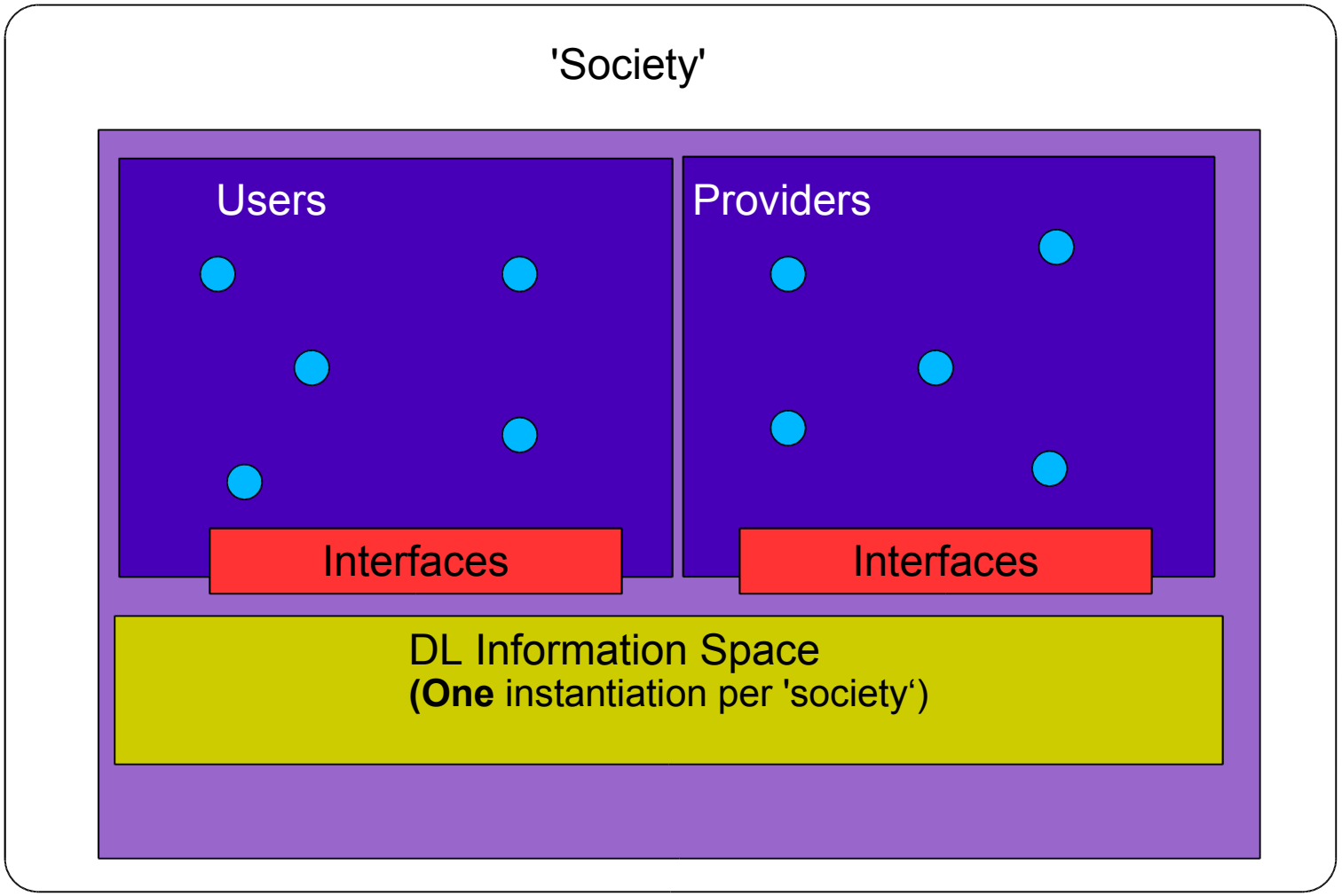
Conceptual Frameworks

- Operational Context
- Stakeholders
- Architectural Environment
- Information Object Abstractions
- Functional Power and Workflow Environment

Operational Context



Operational Context



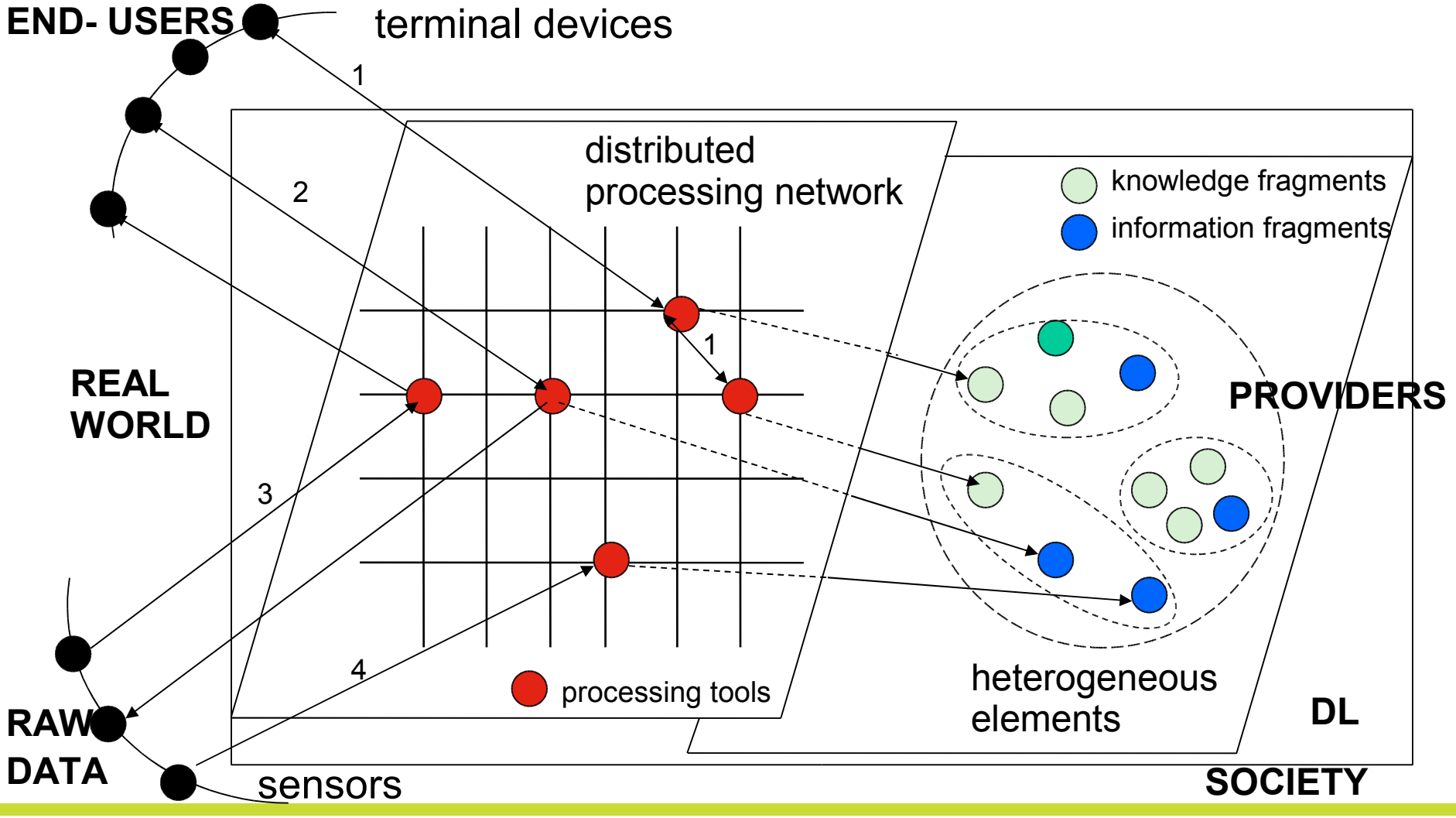
Stakeholders

- Past-Present: users and providers are mutually exclusive sets
- Future: `user' and `provider' are **roles**
  - Same actor may play both roles at different times
  - DLs at the center of scientific activity (collaboration & communication tool)
  - Increases set of actors and set of applications

Stakeholders - Applications

- DLs as parts of larger organizations and application contexts:
  - Health
  - Inclusion
  - Science
  - Government
  - Culture
  - Learning ...
  - Libraries, Museums, Archives, Hospitals, …

Architectural Environment



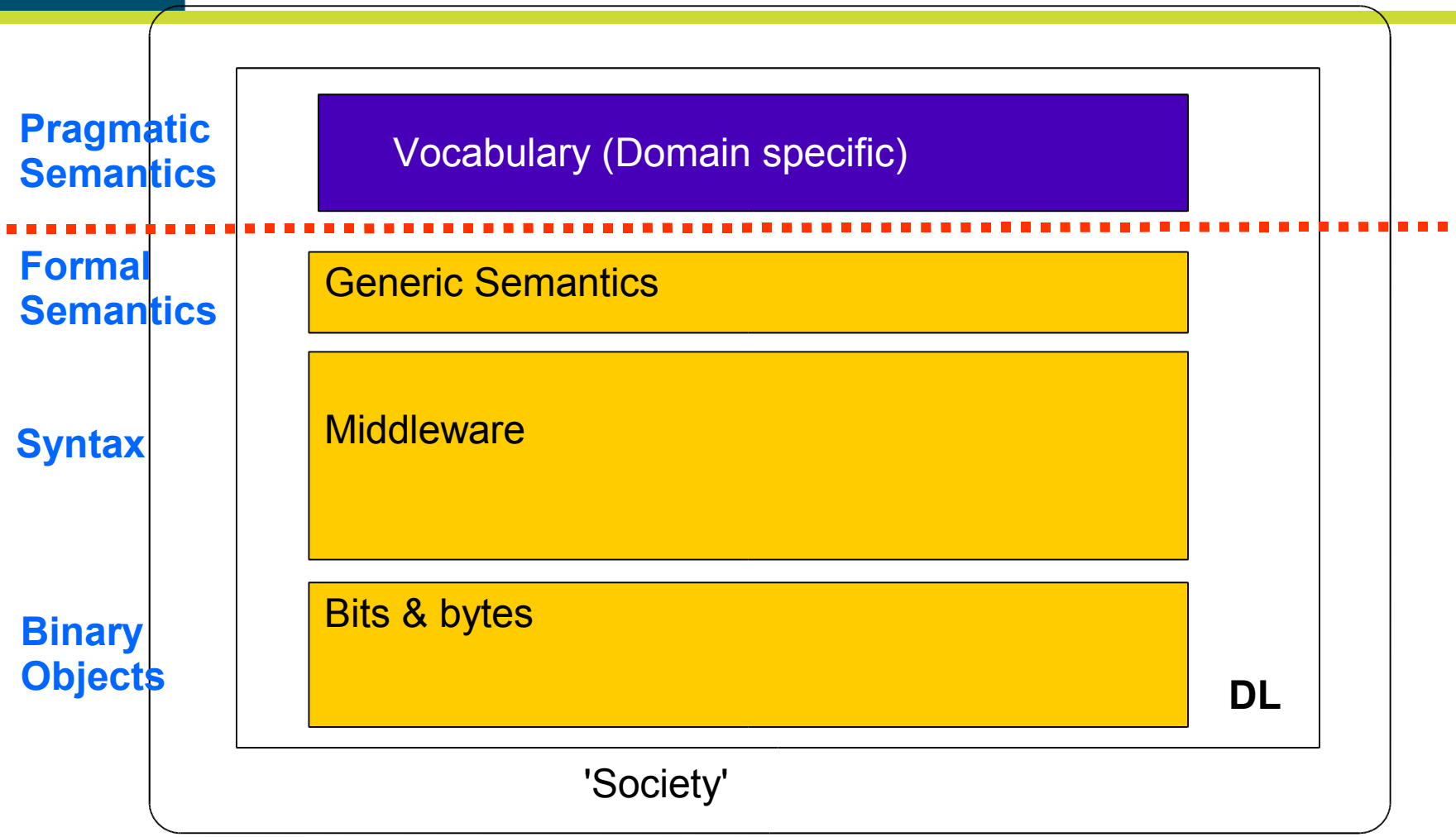
Architectural Environment

- Raw data
- Information fragments
- Knowledge fragments

- User terminal devices
- Sensors

- Network of processing units

Information Object Abstractions



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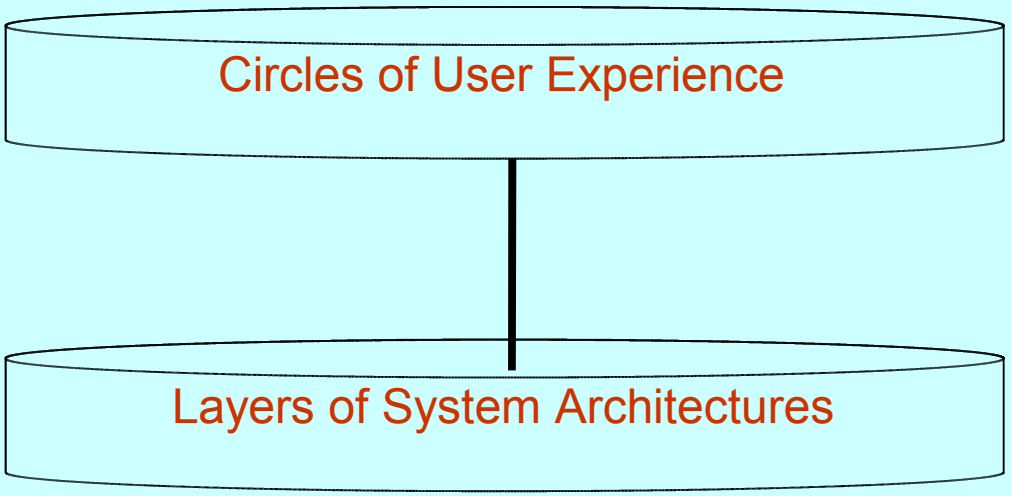
Functional Power & Wflow Environment

- Acquisition
- Modeling
- Management
- Mediation
- Access
- Distribution
- Interpretation and translation
- User-defined task-specific activities

Future Research Directions



Person-centric research

System-centric research

Foundation research

Foundations

- Functionality specification for new objects
- Multi-perspective object access and tagging
- Integrated/unified access to digital repositories
- Lifecycle management
- Multi-modal functionality combination
- On-line availability and transcoding
- DLMS specification, design, development
- Application interfaces
- Evaluation (metrics, benchmarks....)

Foundations

- Architectures
  - Grid?
  - Peer-to-Peer?
  - Service-oriented?
  - All of the above?
- Theories
- Unifying paradigms
- DL models

Digital Library Reference Model

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Person-Centric Research

- Balancing cognitive load between user and information environment
- Collaboration, social context
- Personalized, customized, context-dependent, task-specific, knowledge-based, goal-oriented user/information interaction
- Harvest info across linguistic boundaries

Person-Centric Research

- Adding personal memory to global memory, originator notification
- Distributed (peer-to-peer) data creation/publication
- Communication via annotations
- Tools for building communities
- Accessibility, usability

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System-Centric Research

- Interoperability, system integration
- Security, privacy, authorization
- Mobile environments
- Lossless workflow management
- Information transformations across media types
- Multi-perspective functionality (multi-level features)

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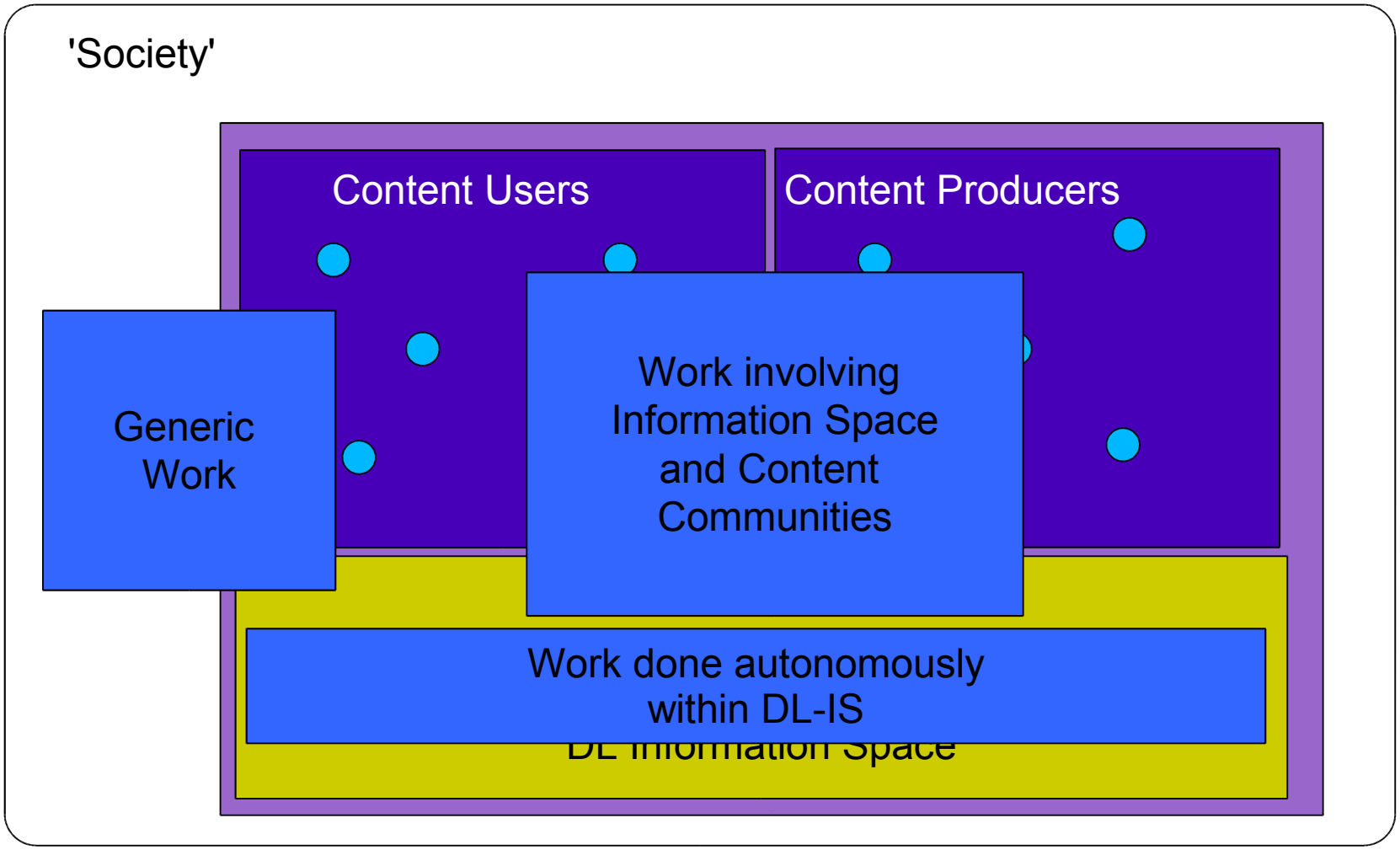
System-Centric Research

- Optimization of search processes (distributed, multi-feature, multi-object optimization)
- Transactional processes, service composition, process verification/check
- Perceptual object manipulation and transformation, doc recombination
- Information trading in DL federations

Vision Danger Antidotes

- Dealing with the avalanche of information available
- Protection of individuals' privacy from sensors
- Balance between privacy and personalization

Research Methodology



DELOS Brainstorming Workshop Corvara, 7/2004

- About 25 participants
  - Most from Europe, two from the US
- Initial plenary session
  - Results of DELOS FP5 activities (brainstorming workshops, working groups, etc.)
  - Participants' visions of future
- Parallel sessions of three "competing" groups
- Plenary session of groups' results
- Plenary session of integrated outcome

Name

- (Adjective) (bit abstraction) (created entity)
- Digital Libraries
  - Adjective = digital
  - Bit abstraction = <>
  - Created entity = library

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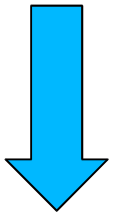
Name

Digital	Data	Libraries
Pervasive	Information	Environments
Dynamic	Knowledge	Spaces
Universal		Gardens
Ambient		Architectures
Collaborative		Forums
		Factories
		Worlds
		Realms
		Agoras

Rebirth of the Field

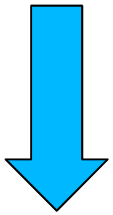
DIGITAL LIBRARIES



DYNAMIC
UNIVERSAL
KNOWLEDGE
ENVIRONMENTS

Rebirth of the Field

DIGITAL LIBRARIES



DYNAMIC
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COMMONS of
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Rebirth of the Field

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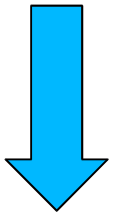

KNOWLEDGE

COMMONS