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Digital Library Interoperability,
Best Practices and Modelling Foundations

Policy session

Kevin Ashley,
Perla Innocenti

6 October 2010

DL.org Autumn School – Athens, 3-8 October 2010

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About

- Your experience with DL policies
- Introduction to Policy definition and literature review
- Interoperability levels and Policy in the DELOS DLRM

- 10.30 – 11.00 Coffee break

- DL.org Policy WG approach
- DL.org Policy Interoperability Survey
- Hands-on exercise

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Lessons

- We all make, or influence, policy at some level
- We all have some control on how policy is implemented
- Policy is manifest at many levels of detail, and over different periods of time

What is policy?

"A **policy** is typically described as deliberate plan of action to guide decisions and achieve rational outcome(s). The term may apply to government, private sector organizations and groups, and individuals"

Source: http://en.wikipedia.org/wiki/Policy

What is a policy?

From the DELOS REFERENCE MODEL

"The policy concept represents the set or sets of **conditions, rules, terms and regulations governing interactions** between the **Digital Library** and its **users**, whether virtual or real. […]"

Definition(s) of Digital Library

"A digital library is the **infrastructure, policies and procedures**, and organisational, political and economic mechanisms necessary to enable access to and preservation of digital content".

Source: Ross, S., Digital Library Development Review. Final report, National Library of New Zealand, July 2003, http://eprints.erpanet.org/50/01/ross_report.pdf

"an **organisation**, which might be virtual, that comprehensively **collects, manages and preserves** for the long term rich digital content, and offers to its users communities specialised functionality on that content, of measurable quality and according to codified policies" **(DELOS DIGITAL LIBRARY REFERENCE MODEL)**

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Interoperability: yet another definition

- "**Interoperability** is a property referring to the ability of diverse systems and organizations to work together (inter-operate). The term is often used in a technical systems engineering sense, or alternatively in a broad sense, taking into account social, political, and organizational factors that impact system to system performance"

  Source: http://en.wikipedia.org/wiki/Interoperability

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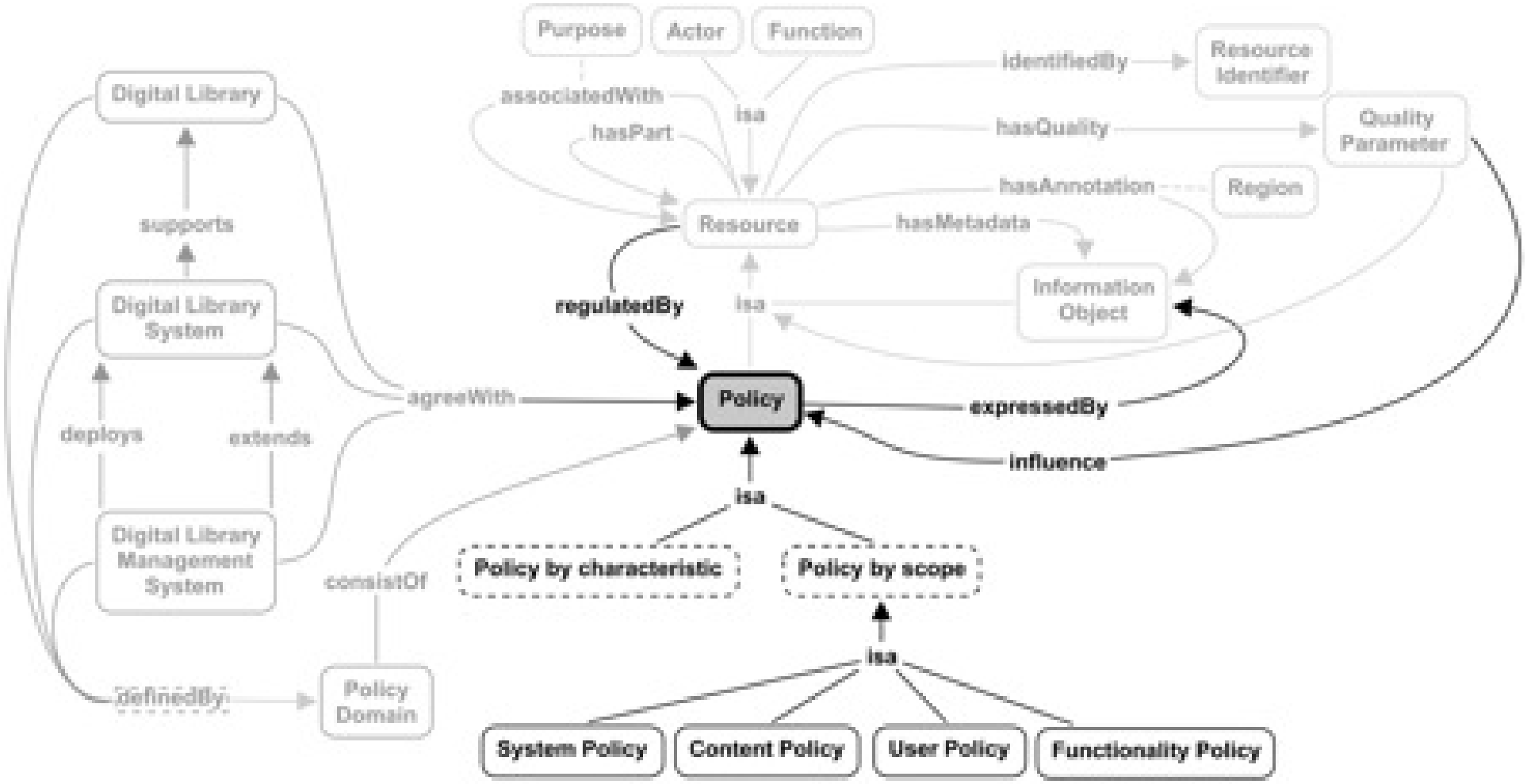
Policy in the reference model

- Policy is **expressed** by an Information Object
- Policy can be **regulated** by a Resource
- Policy can be **influenced** by Quality Parameters
- Policies can be compound
- Policies can have scope: User, Content, Functionality, System


Purpose
Actor
Function
associatedWith
hasPart
isa
identifiedBy
Resource Identifier
hasQuality
Quality Parameter
hasAnnotation
Region
Resource
hasMetadata
Information Object
regulatedBy
isa
Digital Library
supports
Digital Library System
agreeWith
Policy
expressedBy
influence
deploys
extends
isa
Digital Library Management System
consistOf
Policy by characteristic
Policy by scope
isa
definedBy
Policy Domain
System Policy
Content Policy
User Policy
Functionality Policy

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Policies and the DL

- DL is defined by policy
- Policy is manifest in the Architecture
- Policy is **implemented** by Functionality
- Policy must be **visible** to Actors

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Policy outside the DL

- Some policies are **intrinsic**: decided by the DL
- Some policies are **extrinsic**: imposed from outside
  - Wider organisational policy
  - Laws
  - Regulations
  - Custom

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More typology

- Policies are **explicit** or **implicit**
- **Explicit:** has been stated and approved
- **Implicit:** inherent by accident or design

- Q: how is an **implicit** policy **visible** to **actors**?

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THINK OF SOME POLICIES

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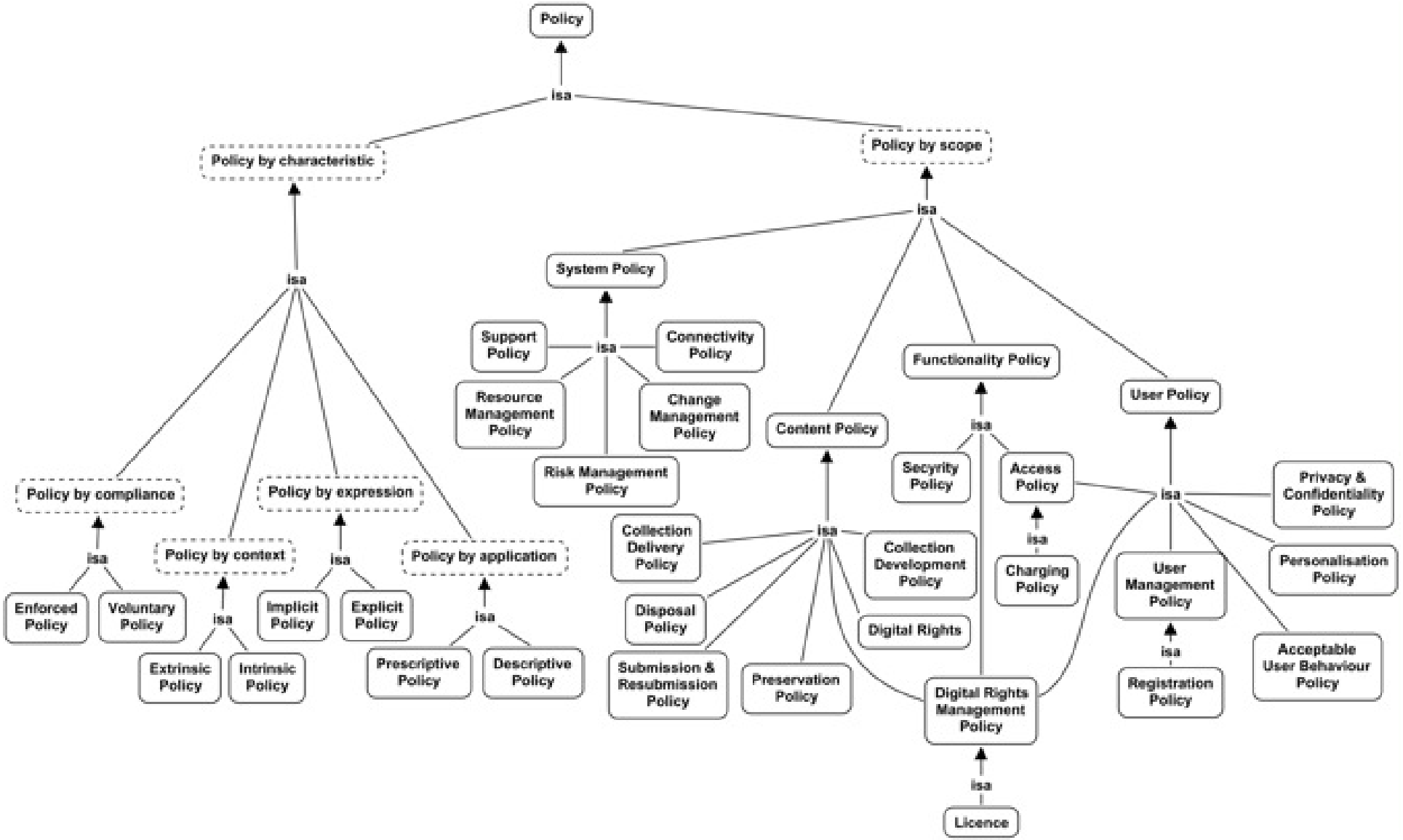
Examples of policies

- Risk Management
- Collection Development
- Object Delivery
- Support
- Purchasing
- Appraisal
- User Management
- ……..


Policy
isa
Policy by characteristic
Policy by scope
isa
isa
System Policy
Support Policy
isa
Connectivity Policy
Resource Management Policy
Change Management Policy
Risk Management Policy
Content Policy
Functionality Policy
User Policy
isa
Secyrity Policy
Access Policy
isa
Charging Policy
Policy by compliance
Policy by expression
Policy by context
Policy by application
isa
isa
isa
Enforced Policy
Voluntary Policy
Implicit Policy
Explicit Policy
Collection Delivery Policy
isa
Collection Development Policy
Disposal Policy
Digital Rights
Submission & Resubmission Policy
Preservation Policy
Digital Rights Management Policy
isa
Licence
isa
Privacy & Confidentiality Policy
Personalisation Policy
User Management Policy
isa
Registration Policy
Acceptable User Behaviour Policy
isa
Extrinsic Policy
Intrinsic Policy
isa
Prescriptive Policy
Descriptive Policy

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ON INTEROPERABILITY

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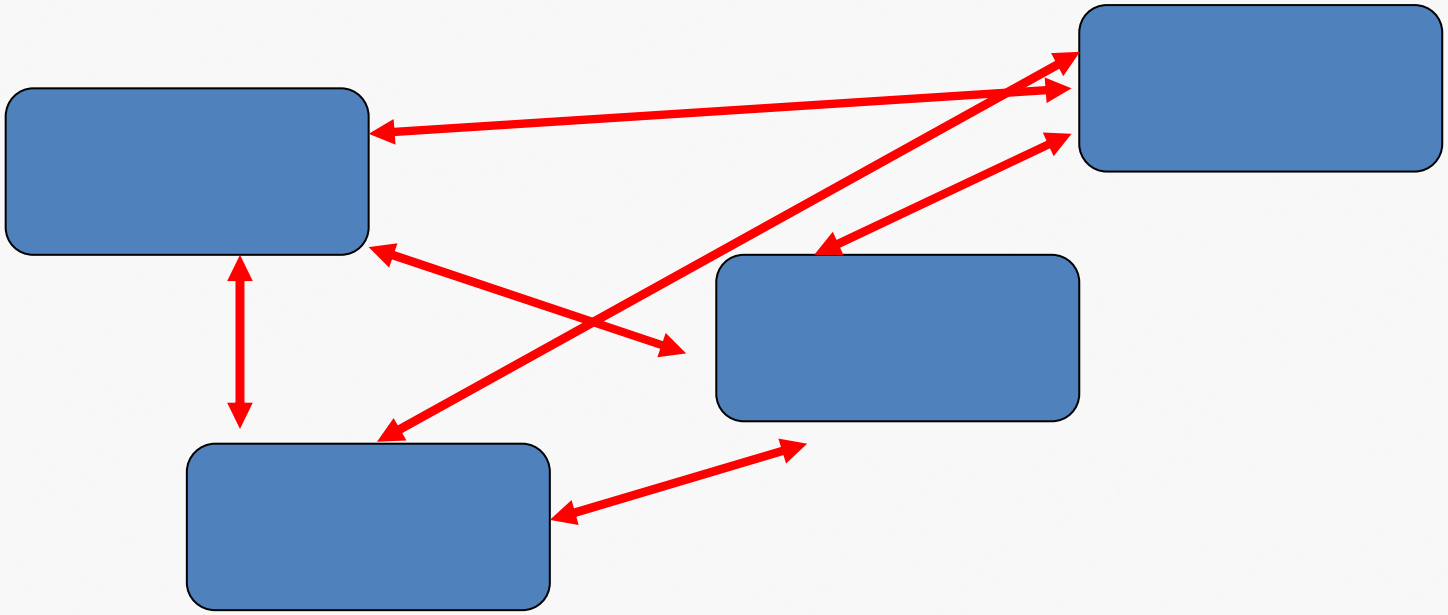

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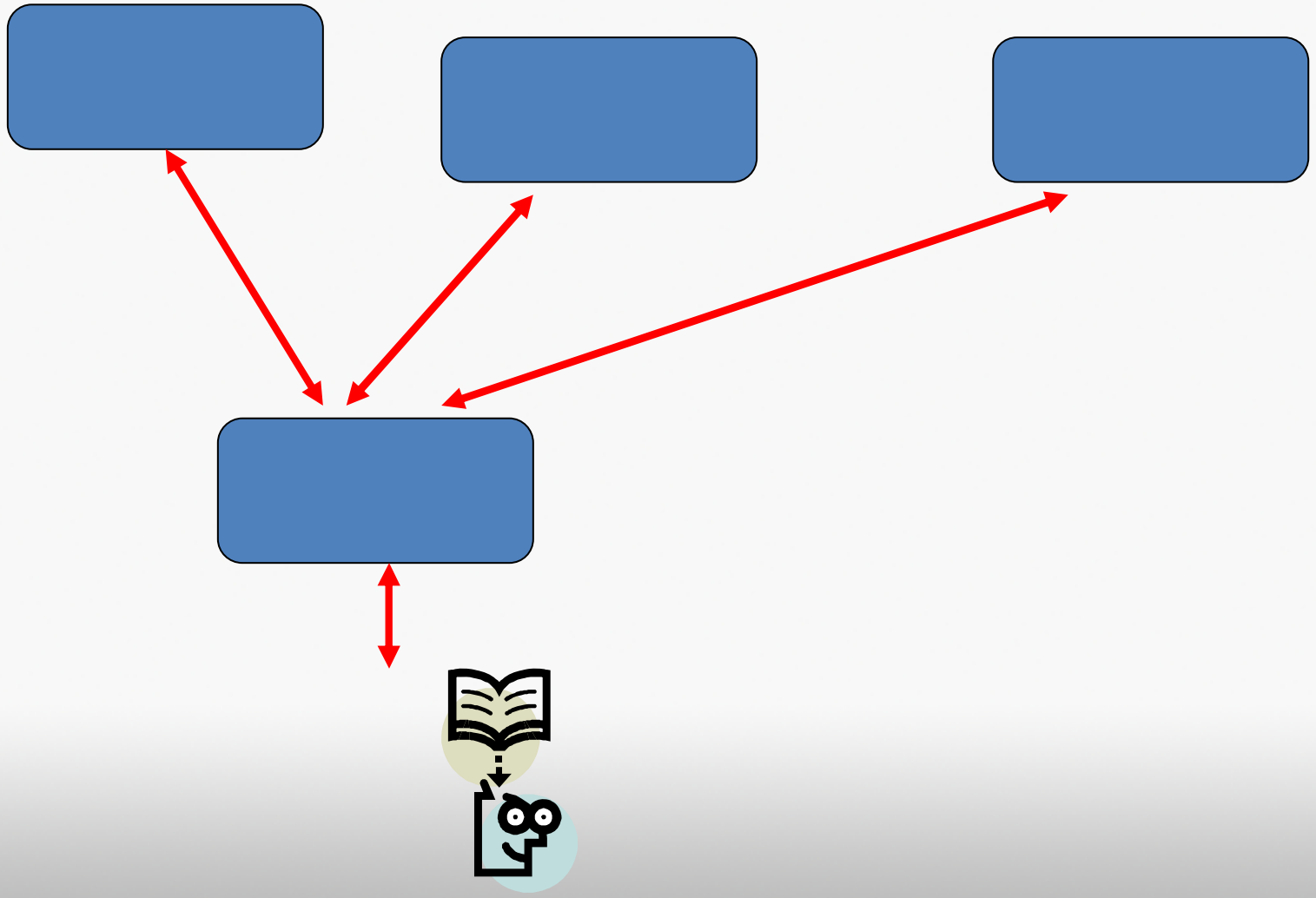

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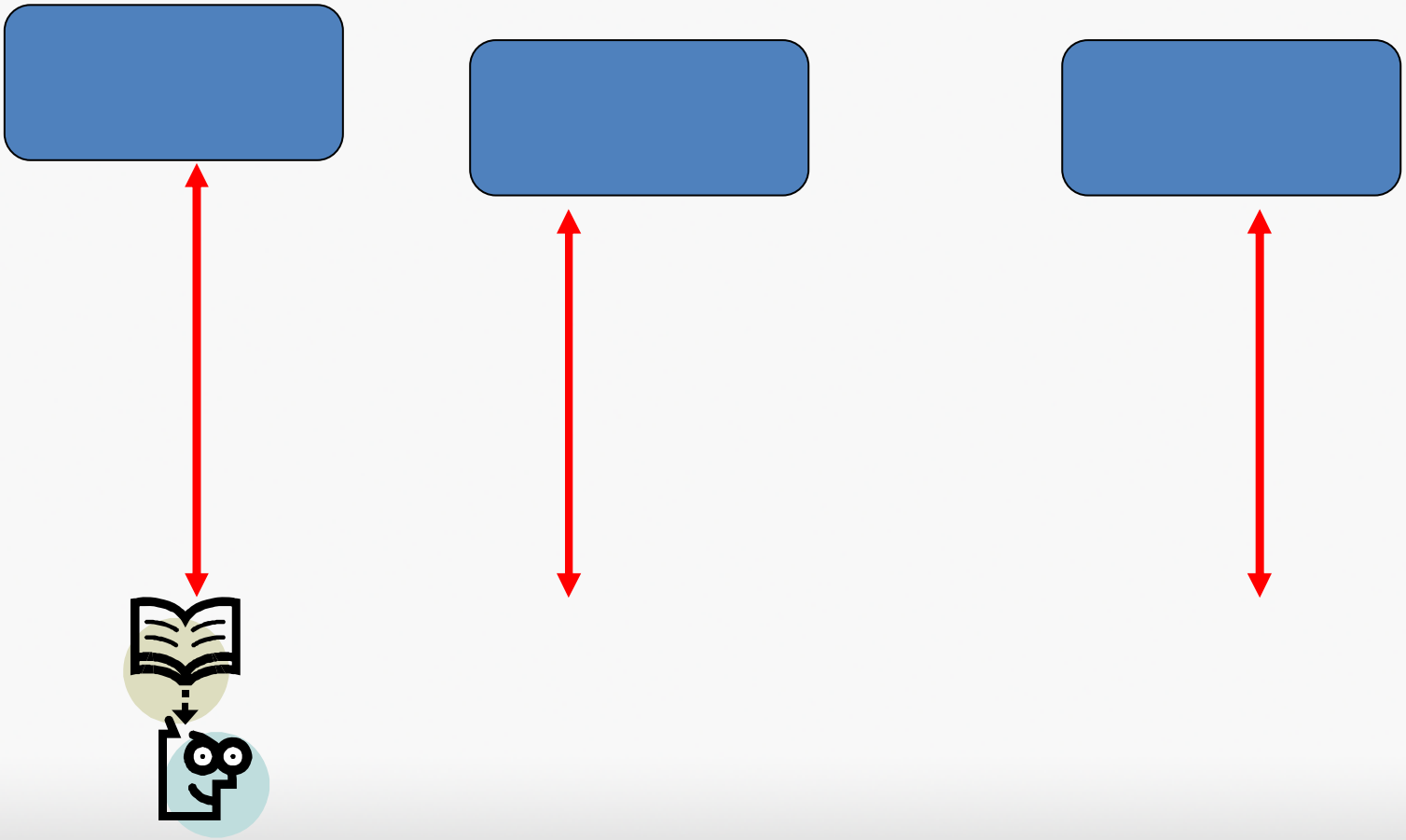

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7 keys interoperability issues

1. *Process* – what is the boundary between static content, representations, linkages
2. *Authenticity* – how do we (people and machines) know 'it' is authentic
3. *Quality* – how do we measure quality and does it change overtime
4. *Change over time* – how do we create 'dynamic interoperability' frameworks
5. ***Policy* – how do we reconcile policies in a contemporary context and how do we handle policy drift**
6. *Legal* – how can we address issues related to legal aspects
7. *Preservation* – how do we preserve 'interoperability potentiality' what do we preserve.

Source: Seamus Ross, ECDL2008

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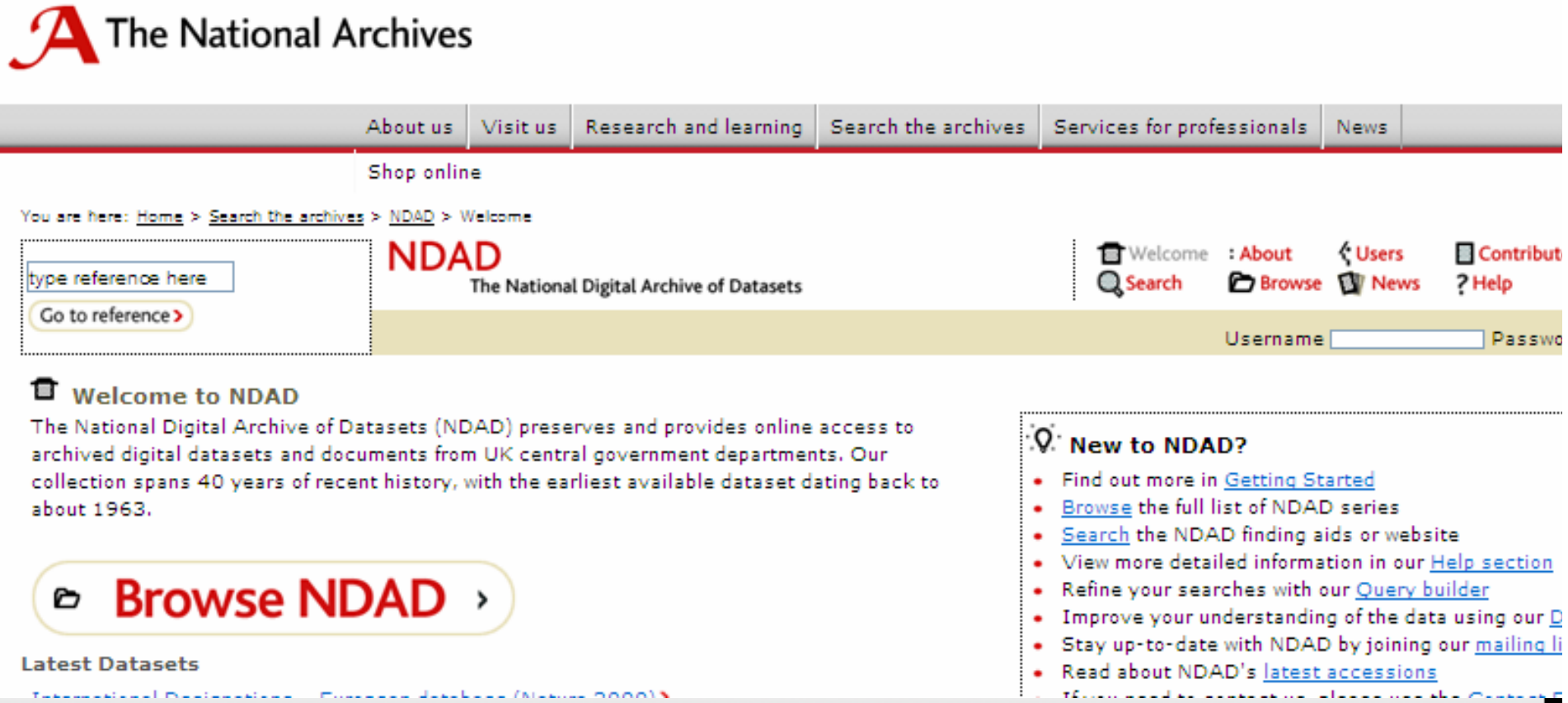

Policy over time - NDAD

- National Digital Archive of Datasets
  - Part of UK National Archives; run by ULCC
- Policies on deposit, access developed together
- Influenced by legislation
- Content now being transferred to data.gov.uk
- Legislation changes over time

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Policy and metadata

- File in NDAD – created 1989 – closed to access until 2019
- But really: closed to access until "Creation date + (time defined by law)"
- In 1998, time defined by law was 30 years
- Next year, it will be 20 years
- Metadata recorded absolute date, not rule
- External policy change invalidates metadata

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Interoperability levels

- The EIF approach:
- Technical: standards for presenting, collecting, exchanging, processing, transporting data
- Semantic: ensuring that transported data preserves meaning
- Organisational: organising processes and structures to enable technical and semantic interoperability

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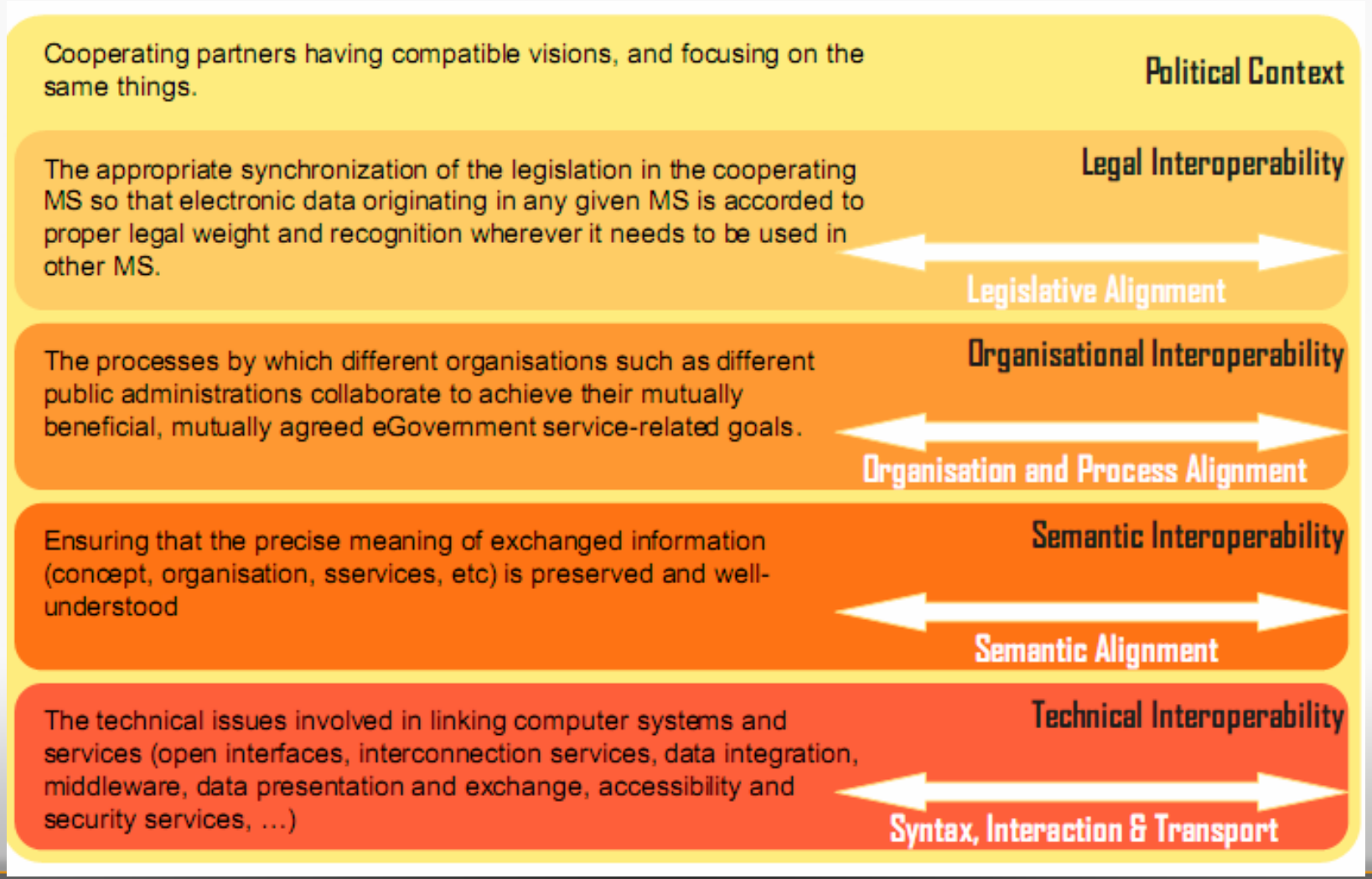
European Interoperability Framework 2.0. EC, 2008



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Wikidlorg view

- Technical
- Syntactic – abstract syntax (e.g. DC)
- Semantic – meaning of what is in the syntax
- Functional – e.g. I ask for 'delete', you understand and can process
- Operational – I can use the object I receive
- Behavioural – standards aren't everything!
- Secure – protecting in the same way
- Language – specific case of semantics ?
- Temporal – over time
- Business – processes, procedures, workflows

Policy in the DELOS DLRM

- Policies can **affect** interoperability
- Policies can **be** interoperable (or not)
- DLRM primarily concerned with second case; first is implicit
- Interoperable policies – especially at machine-machine level – are not common

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Basics of policy interoperability

- Our policies should speak about the same things
- They should speak about them in comparable ways
- We must be able to reconcile permissions and prohibitions
- We must be able to identity appropriate external as well as internal policies

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Examples of Policy Interoperability in Real Digital Libraries

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IRODS:Data Grids, Digital Libraries, Persistent Archives, and Real-time Data Systems

navigation
- Main Page
- FAQ
- Downloads
- Documentation
- Recent changes

client applications
- iRODS i-Commands
- iRODS Explorer for Windows
- iRODS Web Browser
- Other Clients

About this image

iRODS 2.4 Released

The new version includes Bulk Upload/Registration, a Connection Control and Monitoring System, numerous performance improvements, bug fixes, and more.

The release contains many new features developed in response to needs expressed by

WHAT IS iRODS

iRODS Fact Sheet | A Quick Overview of iRODS | Micro-Services | Attributes | Actions | Rules | Rule Engine | Execution Modes | Rule Classes | Semantics

Data Intensive Cyberinfrastructure Foundation & iRODS Overviews

DICE Center People

iRODS 2.4 Released July 23, 2010

Full Release Notes history of iRODS

Done, but with errors on page. Internet 100%

Slide 2 of 42 2 Tema di Office English (U.S.)

Irods – policy-driven storage

- Irods system allows policy on storage to be expressed & applied automatically
- Integrated Rule-Oriented Data System
- Allows preservation, annotation, replication, access control, etc
- Used by NARA, BNF, NASA, NSF,….

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Example Irods policies

- Observations from my telescope must be replicated at least 1000 miles away within 1 hour of observation
- Backup copies must be on non-volatile storage
- User A may annotate but not view my data; they can hide their annotations from me

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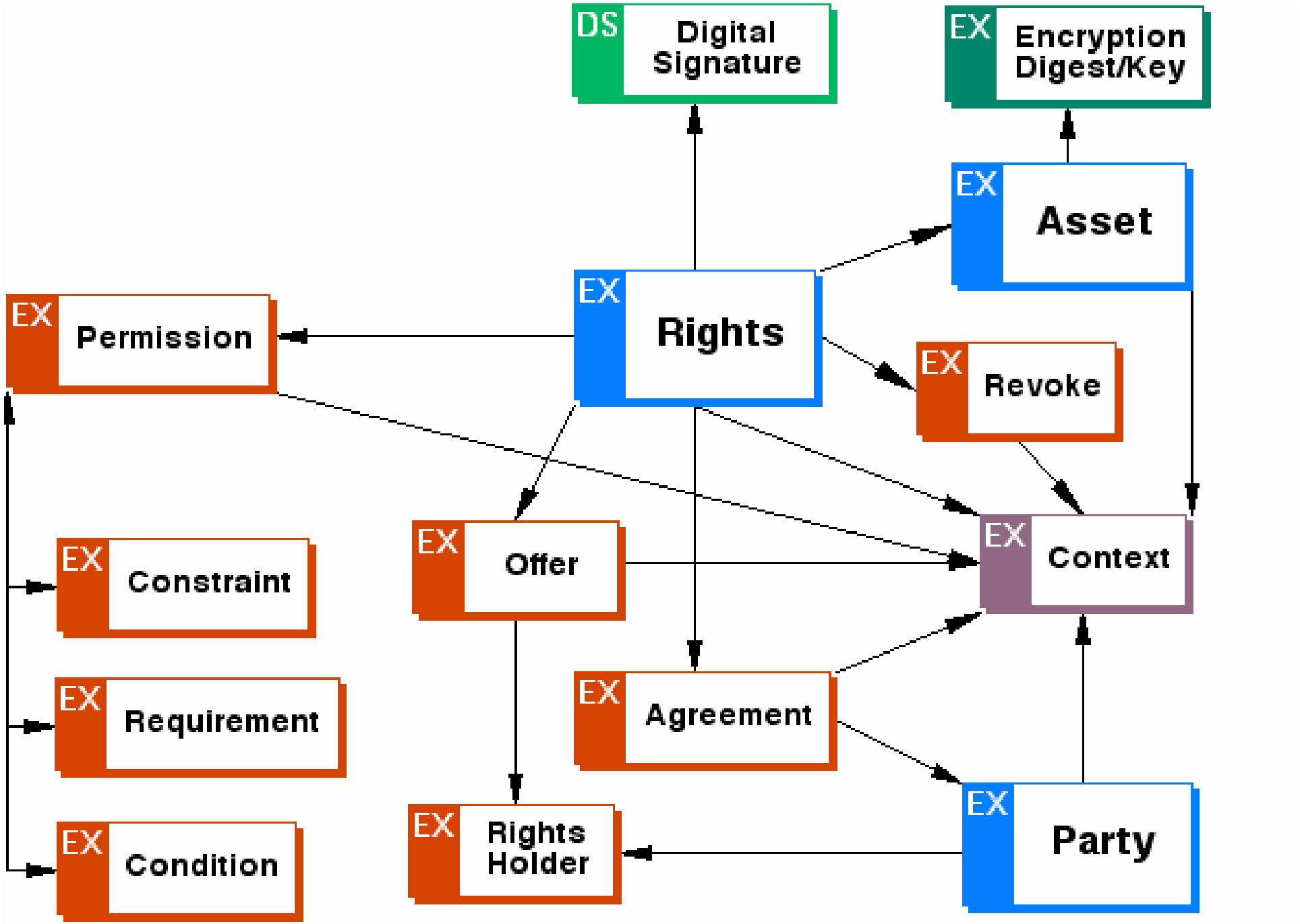
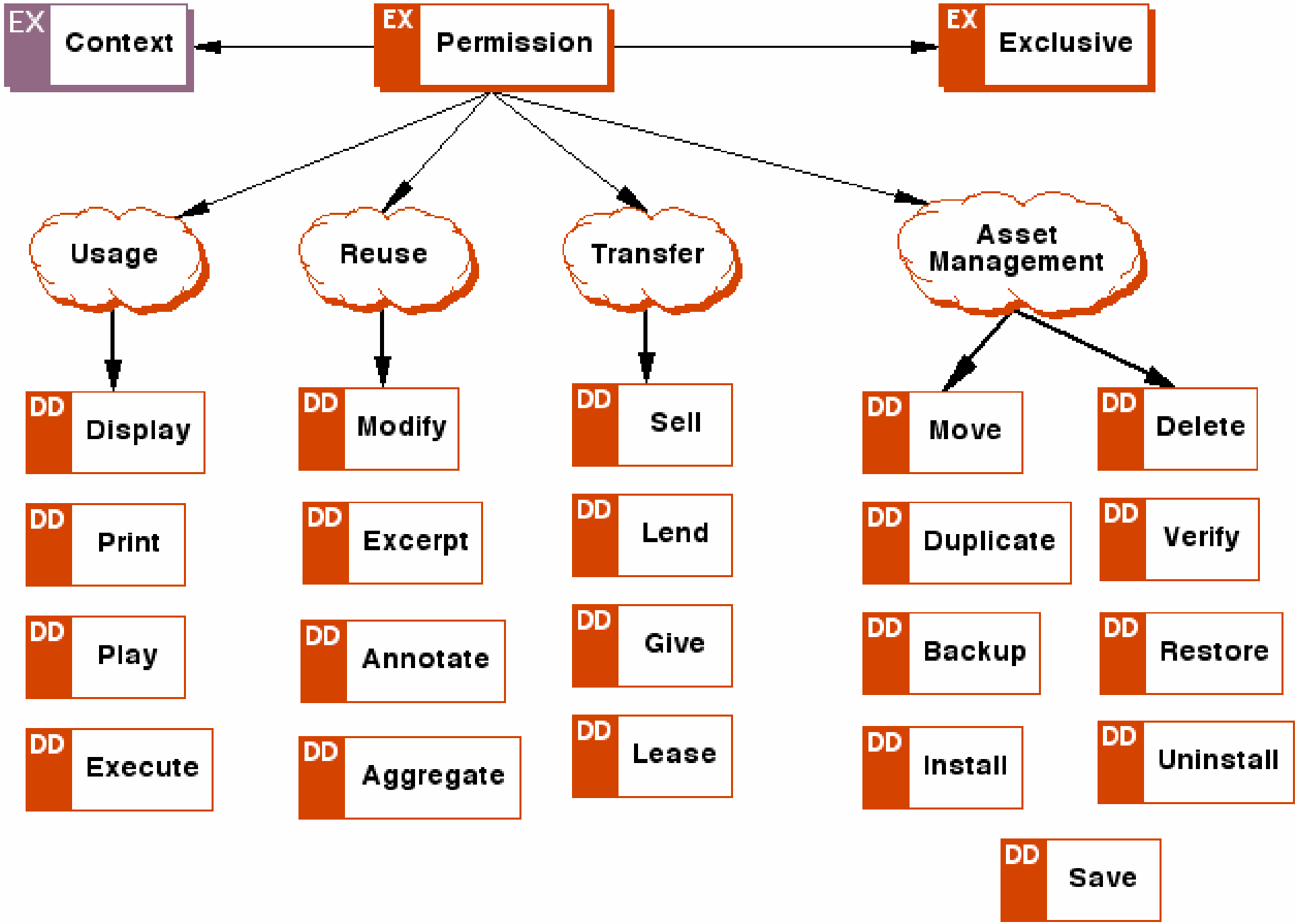
Policies and protocols

- Rights languages allow policy to be expressed, negotiated by machine
- Example: Open Digital Rights Language (odrl.net)


DS
Digital Signature
EX
Encryption Digest/Key
EX
Asset
EX
Rights
EX
Permission
EX
Revoke
EX
Context
EX
Offer
EX
Constraint
EX
Agreement
EX
Requirement
EX
Party
EX
Rights Holder
EX
Condition


EX Context
EX Permission
EX Exclusive
Usage
Reuse
Transfer
Asset Management
DD Display
DD Print
DD Play
DD Execute
DD Modify
DD Excerpt
DD Annotate
DD Aggregate
DD Sell
DD Lend
DD Give
DD Lease
DD Move
DD Duplicate
DD Backup
DD Install
DD Delete
DD Verify
DD Restore
DD Uninstall
DD Save

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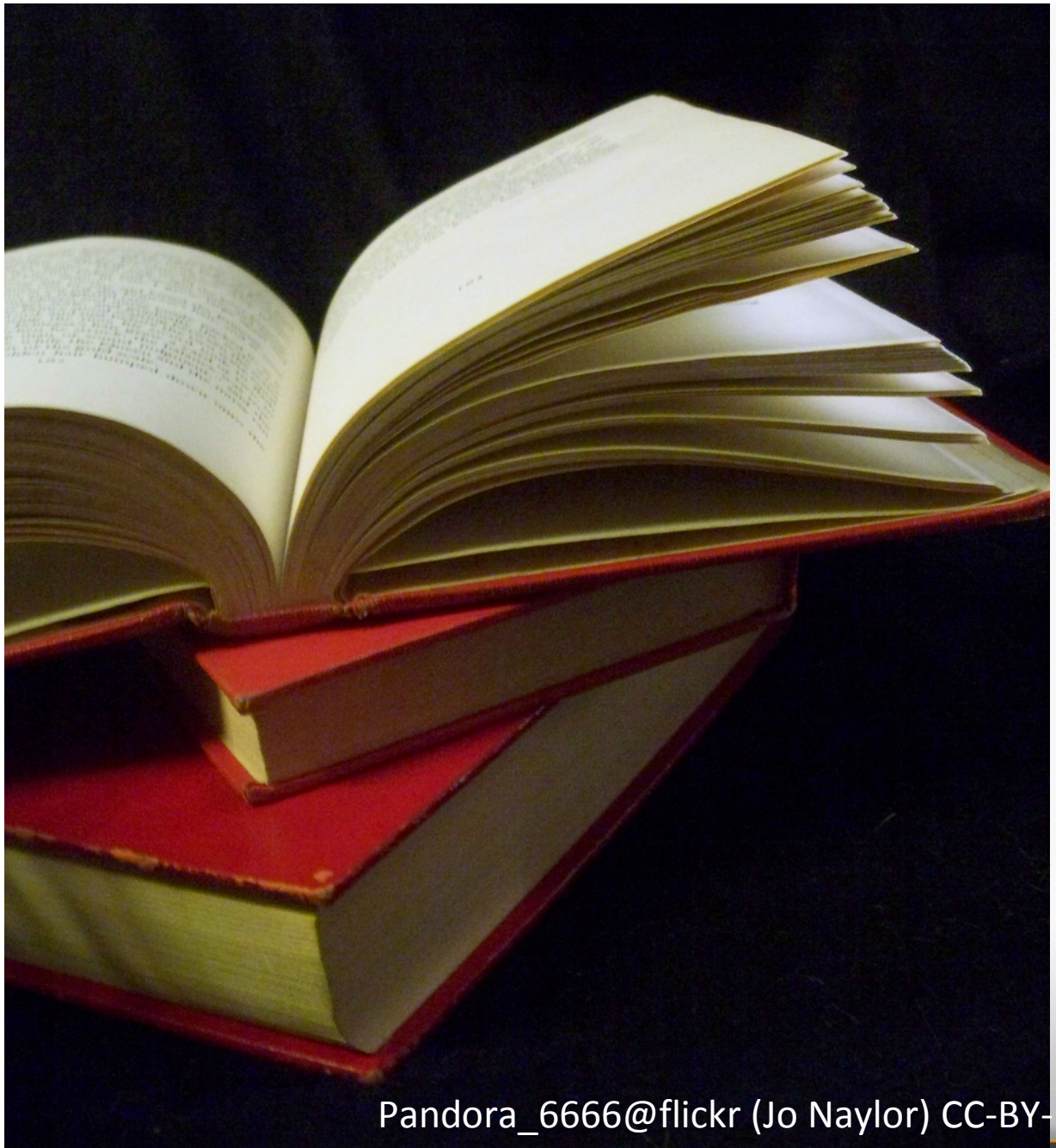
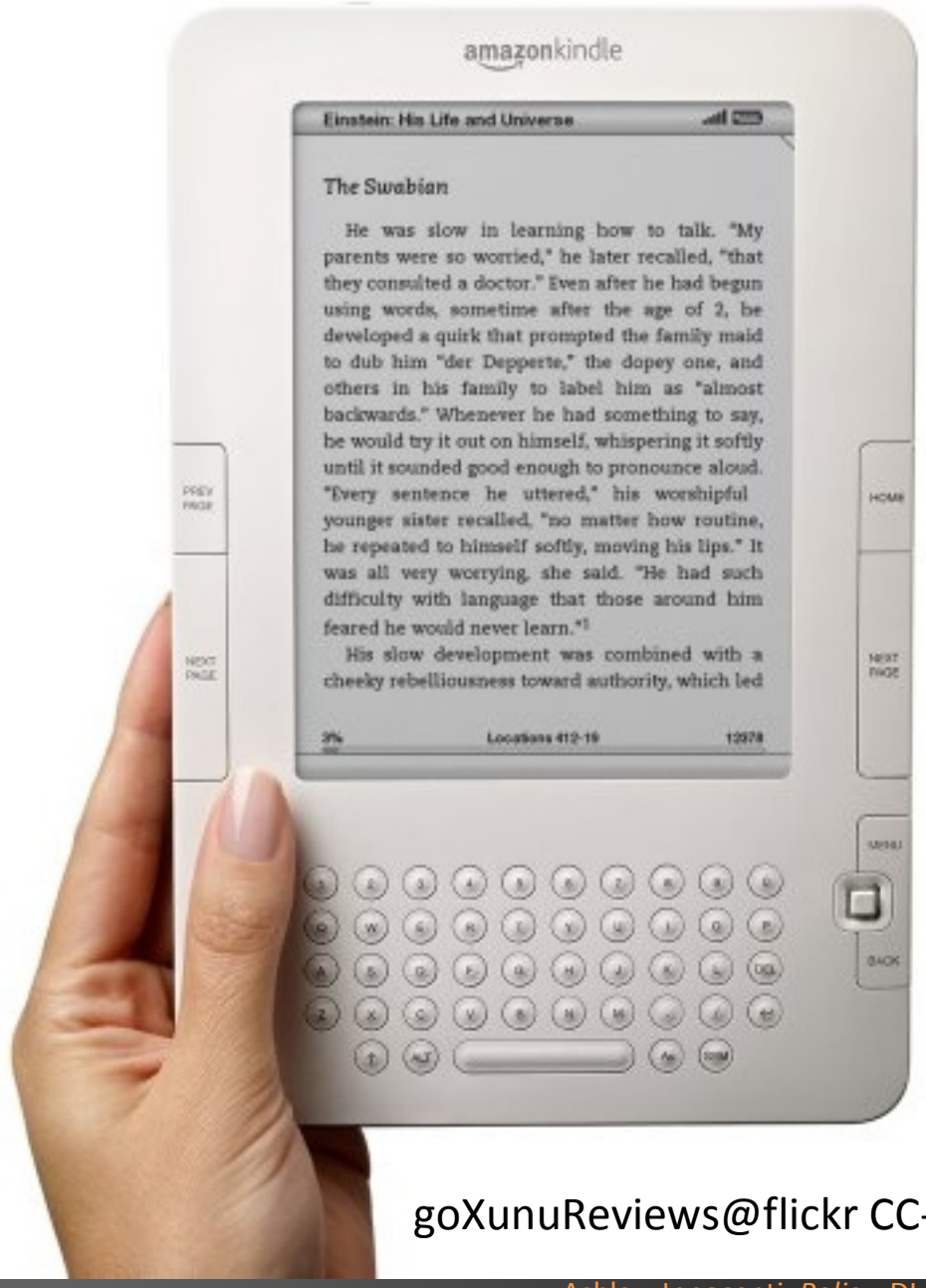
Practical ODRL

- Language is rich – but implementation can be easy
- JORUM offers only 3 choices for license
- But each is expressed by repository in ODRL
- Hence – learning objects can be automatically aggregated, harvested


humpalumpa@flickr CC-BY-BC-SAc



Pandora_6666@flickr (Jo Naylor) CC-BY-BC-SAc



goXunuReviews@flickr CC-BY


pedrosimoes@flickr CC-BY

bowmanlibrary@flickr CC-BY-NC


--- CLOSER THAN WE THINK!
by Rokeby
ELECTRONIC HOME LIBRARY
Some unusual inventions for home entertainment and education will be yours in the future, such as the "television recorder" that RCA's David Sarnoff described recently.
With this device, when a worthwhile program comes over the air while you are away from home, or even while you're watching it, you'll be able to preserve both the picture and sound on tape for replaying at any time. Westinghouse's Gwilym Price expects such tapes to reproduce shows in three dimensions and color on screens as shallow as a picture.
Another pushbutton development will be projection of microfilm books on the ceiling or wall in large type. To increase their impact on students, an electronic voice may accompany the visual passages.
Next week: Troop Transport Capsules
© 1959 by The Chicago Tribune.

சீர்காழி சிவசிதம்பரம் ராமலிங்கநாதன்

Ranganathan's Laws

Objects are for use

2. Every Actor his/her Object
3. Every Object its Actor
4. Save the time of the Actor
5. The library is a growing organism

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Coffee break!

Policy WG Participants

Iscientific leader

Kevin Ashley, DCC

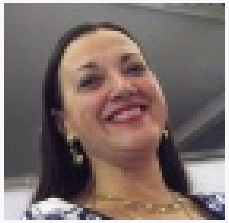
WG Coordinator

Perla Innocenti, HATII at UG

John Faundeen, USGS

Mackenzie Smith, MIT Libraries

Seamus Ross, UoT



Antonella De Robbio, UniPd

Hans Pfeiffenberger, AWI

*Steve Knight, NLNZ

Policy WG public wikipage:
https://workinggroups.wiki.dlorg.eu/index.php/Policy_Working_Group

DL.org Policy WG approach

- State of the Art investigation
- Survey of real life DLs
- Suggestion of considering three interoperability layers (organisational, semantic, technical)
- First set of suggestion for the DELOS DL RM
- Suggestions towards a Policy Interoperability Framework in the DL.org Cookbok
- A checklist for policy

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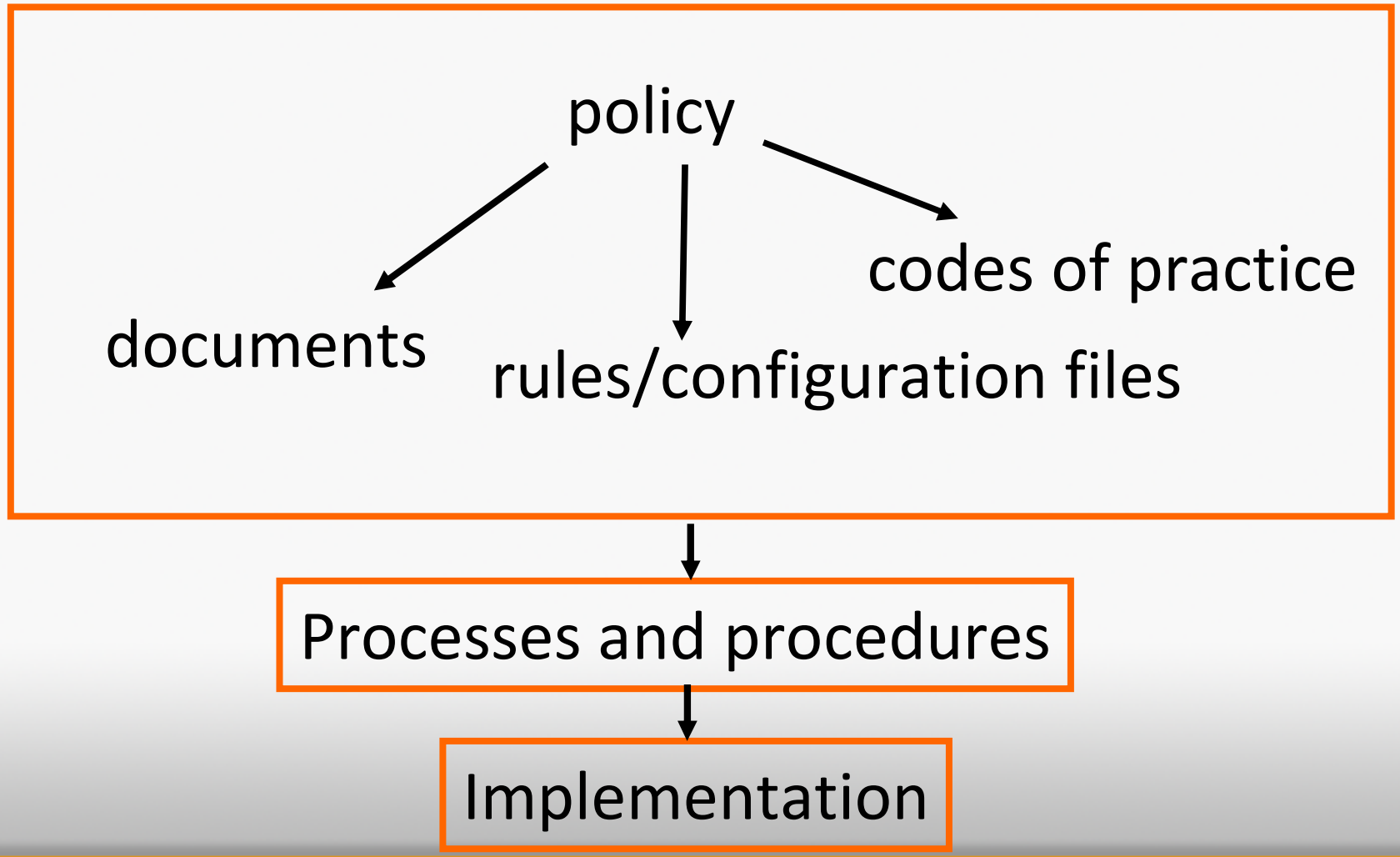
Polic(ies)



Identified Policy Interoperability Issues

Concept definition	**Underpinning every digital library**, there is an organisation governed by an **organisational policy framework, that makes the digital library viable.** The **policy domain is a meta-domain,** situated both outside the DL and any technologies used to deliver it, and within the DL
Interoperability level	Policy permeates the digital library **from conceptualisation through to operation and needs to be so represented at these various levels** https://workinggroups.wiki.dlorg.eu/index.php/Definition_of_Policy_and_Policy_Interoperability
State of the art	**Unexplored territory** at global organisational (rather than only technical) level & interdisciplinary research
Policy representation	**Lack of policy formalisation and representation methods in current DLs** https://workinggroups.wiki.dlorg.eu/index.php/Policy_enforcement
Time dimension	Handling **policy drift** over time

Identified Policy Interoperability approaches

Concept definition	Policy Interoperability defined as **Business Level Interoperability**
Interoperability level	**At high (organisational) level, then instantiated at process level** - whether those processes are being handled by human or machine
Policy representation	▪ **PLEDGE categorization** ▪ Analysis of **languages**: AIR Policy Language iRODS rules, SWRL, Turtle RDF Triples, REWERSE Policy Language, OWL, KAoS, WSPF-WS, WSPF, WSPL, XACML, Rei
Time dimension & Policy Assessment	▪ **Policy user scenarios** ▪ Survey of **current targeted DLs policies for interoperability** ▪ **SHAMAN Assessment Framework**

Towards a **Policy Interoperability Framework**

https://workinggroups.wiki.dlorg.eu/index.php/Policy_Interoperability_Approaches_Summary

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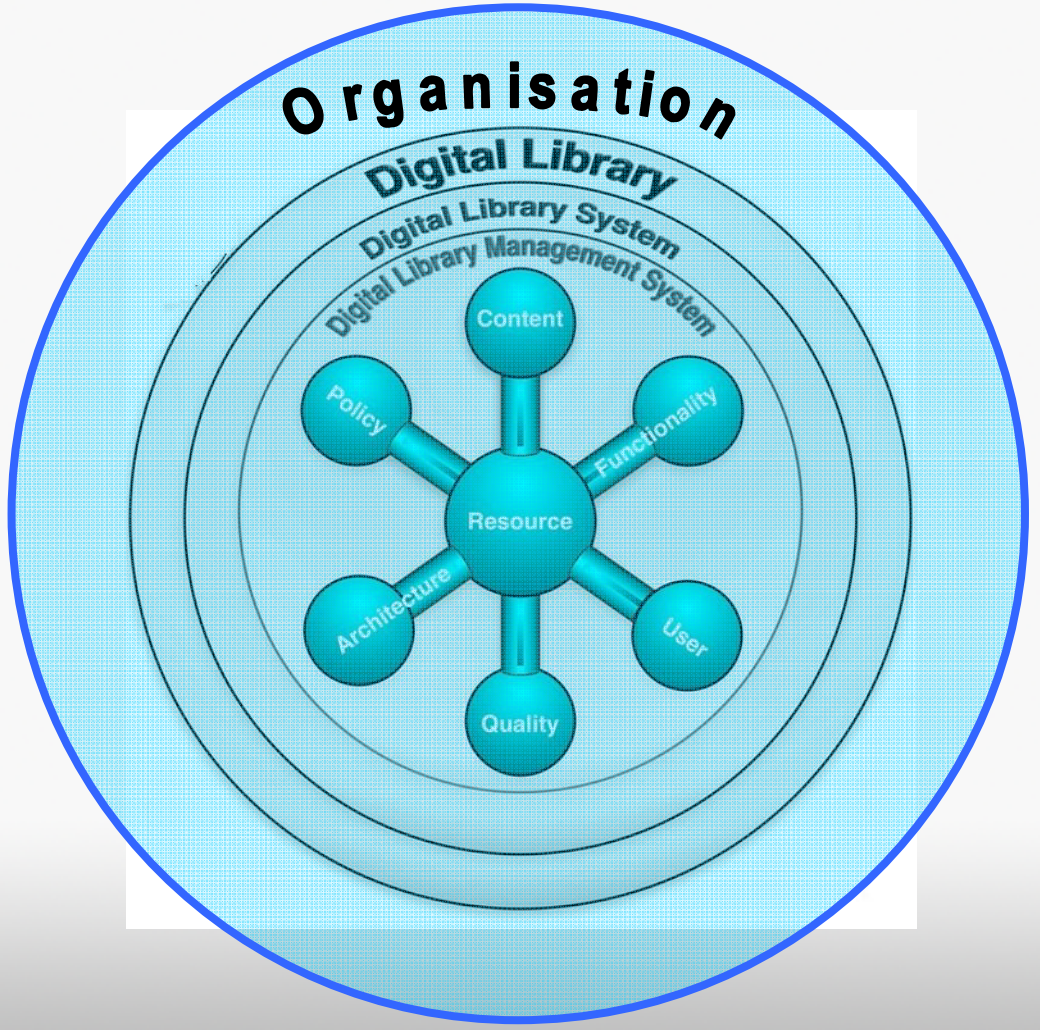
Shared Quality/Policy WGs Organisational Issues

A DL may operate within an organisation which defines over-arching policies (not necessarily specific to Digital Libraries) which affect interoperability



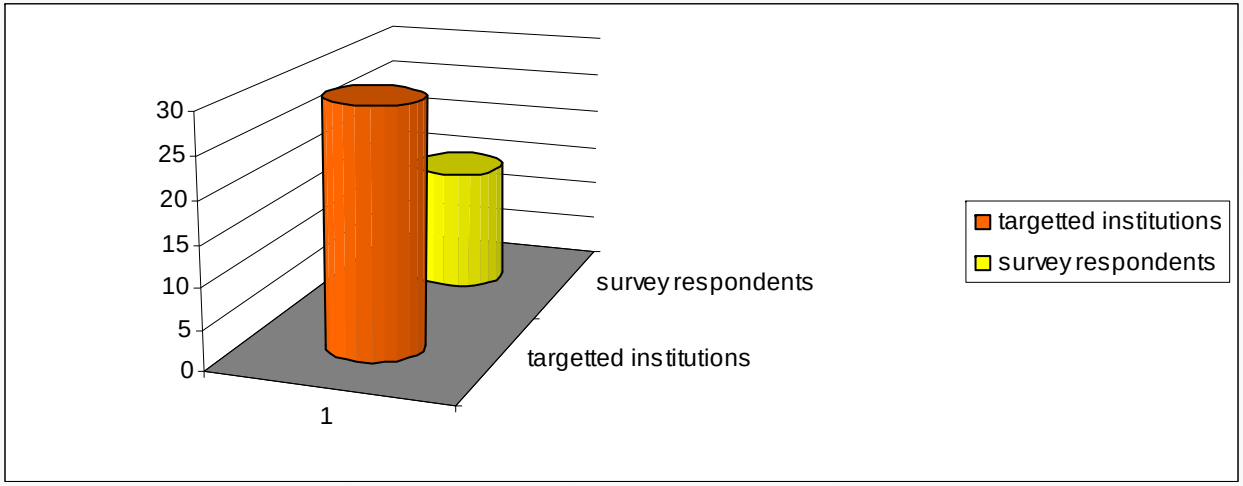
Kenney/
McGovern
2003

DL.org Policy Interoperability Survey

The survey investigated:

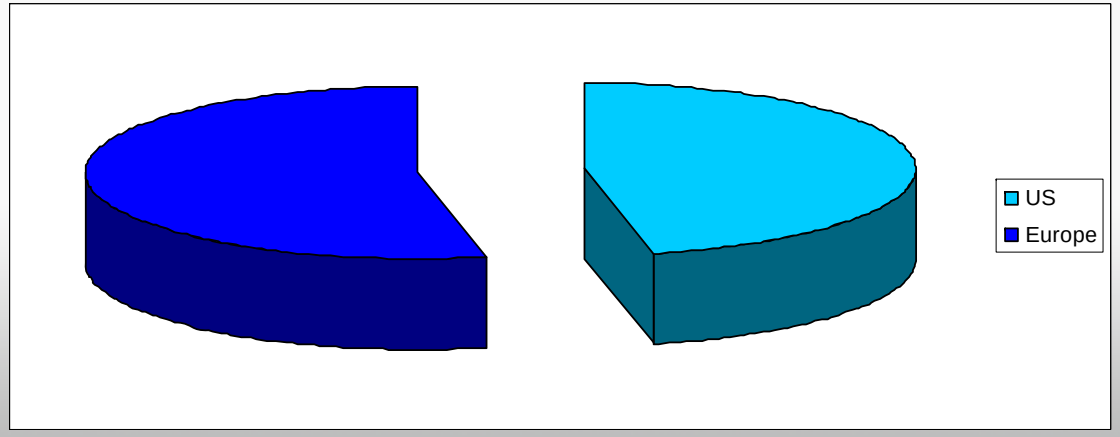
- Any policies, strategies, frameworks, programs, plans, or statements that have been prepared to guide how to **develop and exploit aspects of their digital library/digital repository's information management**.
- How these policies, strategies, frameworks, programs, plans, or statements **affects or are affected by interoperability**.

Policy Interoperability Survey: targeted institutions



- large/medium DL, repository, archive
- public and commercial sector
- at least some policies in place

- US
- Europe (UK, Italy, Greece, European initiatives)



Policy Interoperability Survey: first set of organisations

- ACM - Digital Library
- California Digital Library (CDL) - Calisphere
- DANS
- DRIVER
- ELis
- Europeana
- ITHAKA: JSTOR, PORTICO
- Liber Liber
- NARA
- Nemertes
- National Science Digital Library (NSDL)
- Padua@Research
- UK Data Archive
- University of Chicago Digital Repository
- USGS Digital Library

Policy Interoperability Survey: sections

1. **scoping** the digital library and organisation staff involved in the digital library policies
2. **questions focused on policies** for:

Access	Collection development
Preservation	Intellectual property
Metadata	Authentication
Networks	Service level agreements
.	

Policy Interoperability Survey: diagrams

A number of diagrams has been shown with preliminary results during this talk. The survey results will be presented to the forthcoming DCC2010 conference.

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What did we learn so far

- Policy is a multifaceted concept
- A variety of actors is involved
- Policy formalisation
- Policy representation
- ‘hot areas’ needed for policy interoperability (e.g. Machine-encoding, Interoperability assessment)
- What DLs are currently using and what might use for policy interoperability

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Hands-on exercise

- *3 groups – 3 real policies*
- *All from data libraries, or funders of data*
- *UK Data Archive – preservation policy*
- *UK Natural Environment Research Council – data policy (research funder & data archive operator)*
- *European Bioinformatics Institute – EGA deposit policy*
- *Pick one – match to the model & typology*
- *How does policy help or prevent interoperability ?*
- *Each group reports back at the end of the exercise*

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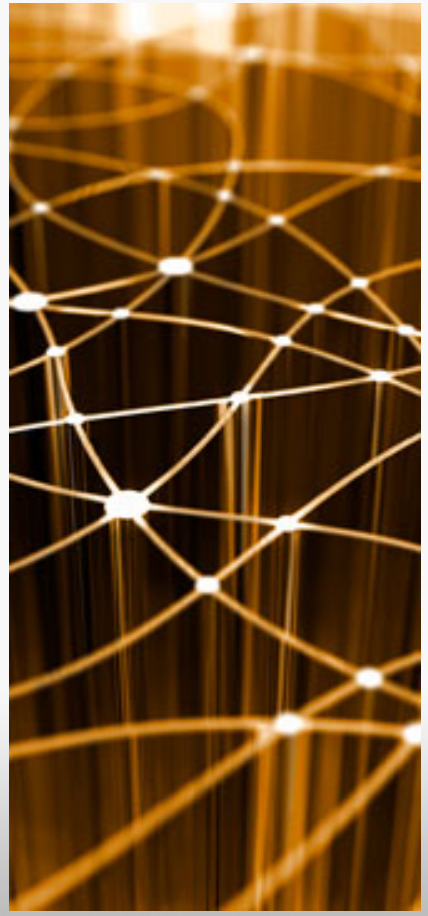

Thank you!

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