An ecologically influenced approach

Towards a European ecology

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Overview

- Context
- Ecology
- Restatement of Purpose
- Basic concepts
- An ecological mindset

Context

- Dissatisfaction with the limits of only having an architectural model.
- Ecology presents a metaphor that has been adopted by other domains and is – to a degree – intuitive
- Some previous use of ecology in information science:
  - Nardi & O'Day introduced some concepts from ecology in *Information Ecologies: using technology with heart*
  - Davenport addressed similar questions in the context of ICT in a business setting in *Information Ecology: Mastering the Information and Knowledge Environment*
  - Neither offer a structured method to support thinking ecologically. Rather, they present relevant issues and concepts from ecology.
  - Blinco and Maclean's 'Cosmic view' on repository ecologies offers a tool to identify or type repositories.
- Some natural usage of the term ecology or ecosystem
  - Blog posts – the term has been picked up within the elearning community
  - Netvibes 'ecosystem' (but now netvibes 'universe' !)

Ecology

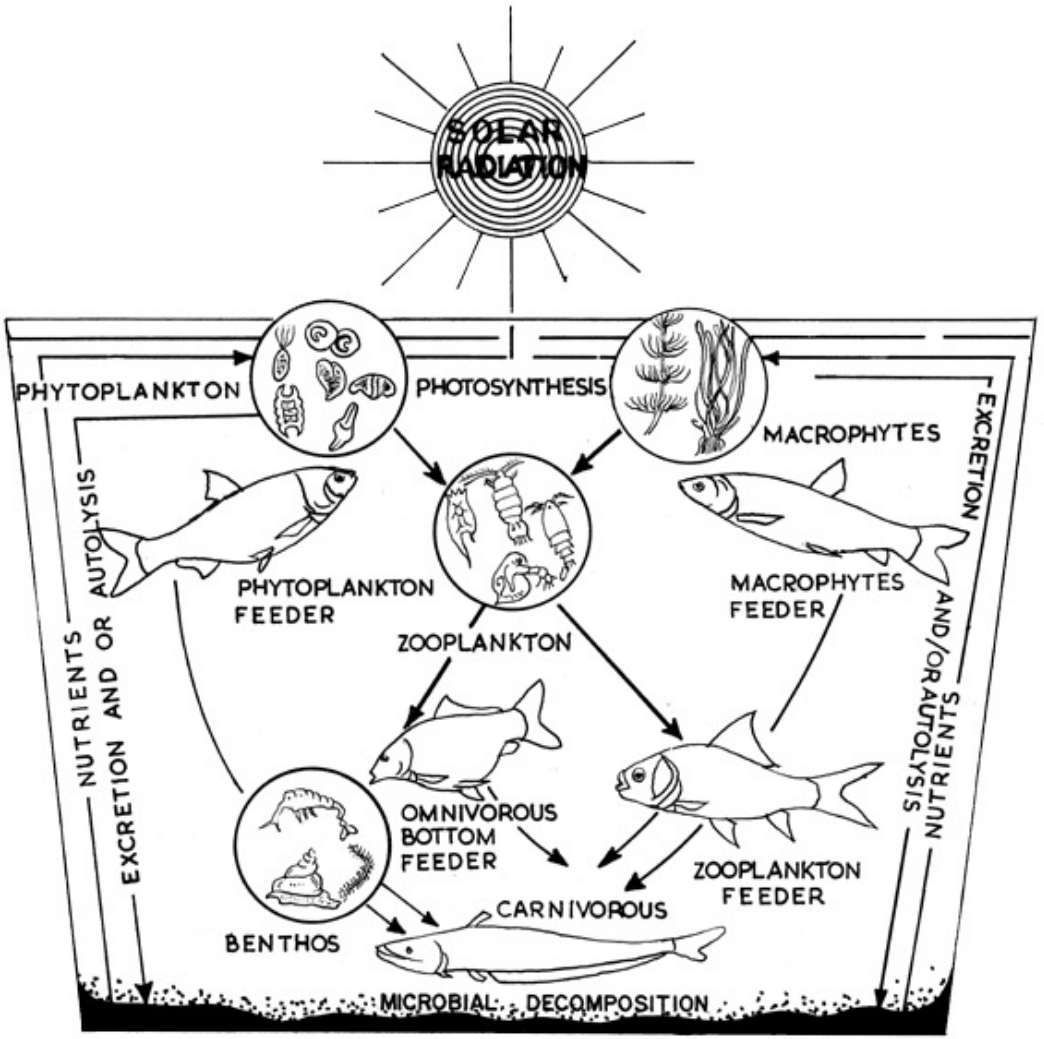

Brewbrooks (2007)
http://creativecommons.org/licenses/by-nc-sa/2.0/
http://flickr.com/photos/brewbooks/397936799/

Ecology (2)

- Ecology may be defined as:

  "the branch of biology dealing with the relations and interactions between organisms and their environment, including other organisms".
  (Dictionary.com)

- A classic example is a pond.



Pond ecology © FAO

Restatement of Purpose

- What are we trying to do?
  - Articulate the human alongside the technical
  - Articulate the complexity and messiness
  - Support better communication and management
- What are we not trying to do?
  - This is not a replacement for architectures; whenever you start to design an system or implementation you still need to start here
  - This is not a replacement for service usage models, service expressions, or related soa work.
- Feedback: metaphorical usage
  - We treat repositories and services as ‘living’ things; they obviously are not but they exhibit some comparable characteristics.
  - Or at least they are not directly living – the development and need for a particular repository or service can also can be considered as a shorthand understanding of the desire and commitments of a particular group.

An aside: defining a repository

- "a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. While operational responsibility for these services may reasonably be situated in different organizational units at different universities, an effective institutional repository of necessity represents a collaboration among librarians, information technologists, archives and records mangers, faculty, and university administrators and policymakers. At any given point in time, an institutional repository will be supported by a set of information technologies, but a key part of the services that comprise an institutional repository is the management of technological changes, and the migration of digital content from one set of technologies to the next as part of the organizational commitment to providing repository services. An institutional repository is not simply a fixed set of software and hardware."

(Clifford Lynch ARL: A Bimonthly Report, no. 226 (February 2003) "Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age" http://www.arl.org/resources/pubs/br/br226/br226ir.shtml ;

Basic concepts from ecology that are relevant to digital libraries, repositories, and services

- A dynamic system
- Scale
- Entities and species
- Interactions
- Environmental factors

A dynamic system

- A system
  - The actions of one entity in the system can effect other entities and possibly the whole system
  - Changes in the environment of the system can affect entities and their interactions
- Constantly changing
  - There is an implicit understanding that the environment is constantly changing (and any representation only produces a snapshot)
- Character
  - Successful changes need to work with the ecology

Scale

- In ecology there is a clear need to articulate what level of interaction you are trying to describe or model. Are you describing a microbe , a herd of giraffes, a river valley, or a city?
- There is overlap and interaction between different scales but an analysis focuses on one scale at a time
- Within the repository domain a similar caution is required. Is the discussion about interactions between repository networks, repositories, objects, or metadata? Is it about the policies of a region, country, institution, class, academic?

Scale

Organism

Population: Group of interacting and interbreeding organisms.

Community: Different populations living together and interacting.
Populations can interact as competitors, predator and prey, or symbiotically.

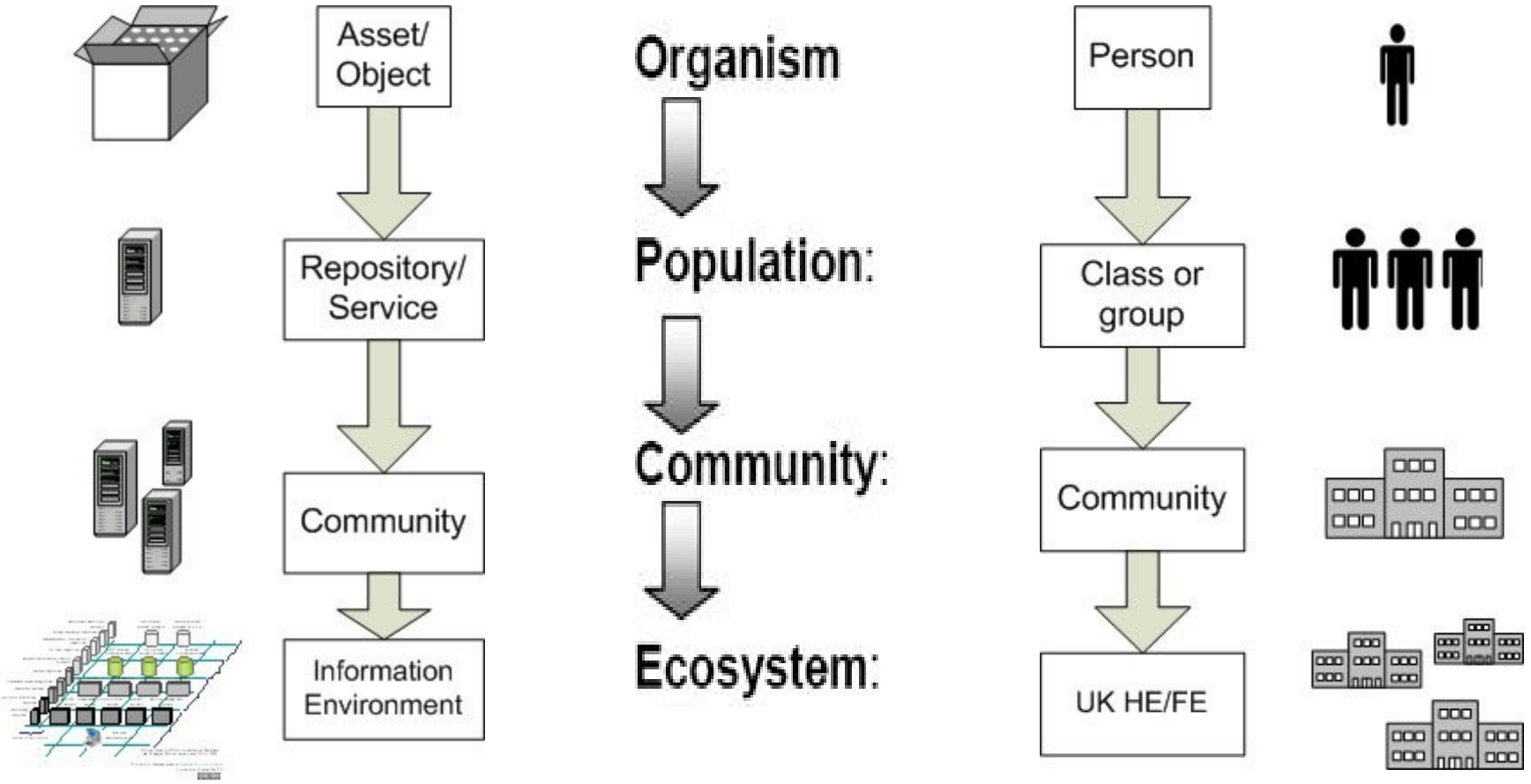
Ecosystem: Organisms and their physical and chemical environments together in a particular area.
"The smallest units that can sustain life in isolation from all but atmospheric surroundings."

Biome: Large scale areas of similar vegetation and climatic characteristics.

Biosphere: Thin film on the surface of the Earth in which all life exists, the union of all of the ecosystems. This is a highly ordered system, held together by the energy of the sun.

Figure: Scales at which ecology can be pursued. Figure adapted from Fundamentals of ecology Fall 2003; lecture 1
http://ocw.mit.edu/OcwWeb/Civil-and-Environmental-Engineering/1-018JFall2003/LectureNotes/index.htm

Scale

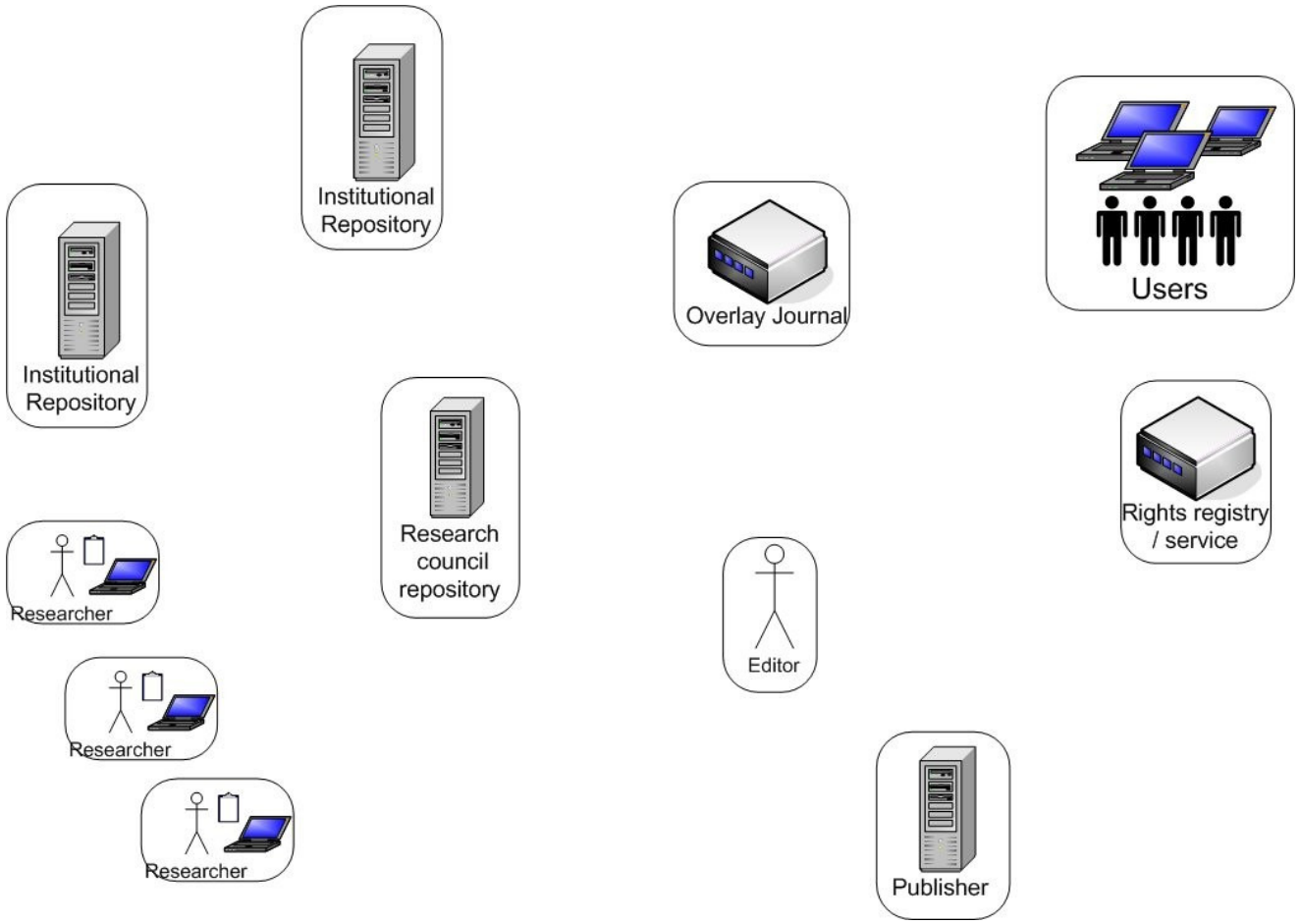


Mapping of the repositories and people to the scales of ecology outlined in figure X

Entities and species

- "An entity is a tangible thing that exists within a repository ecosystem."
  - William, the repository administrator
  - E-lis, a subject repository
  - An article by Alan (http://eprints.cdlr.strath.ac.uk/1062/)
  - Oaister, an aggregated search service
- "A species within an ecosystem is a collective name for a particular type of entity."
  - It allows what is known about the behaviour of the species to help understand the actions of a particular entity.
  - It also enables the description of how a particular entity interacts with any member of a given type.
  - Common types of entities are: users; repositories; services; objects; metadata records.

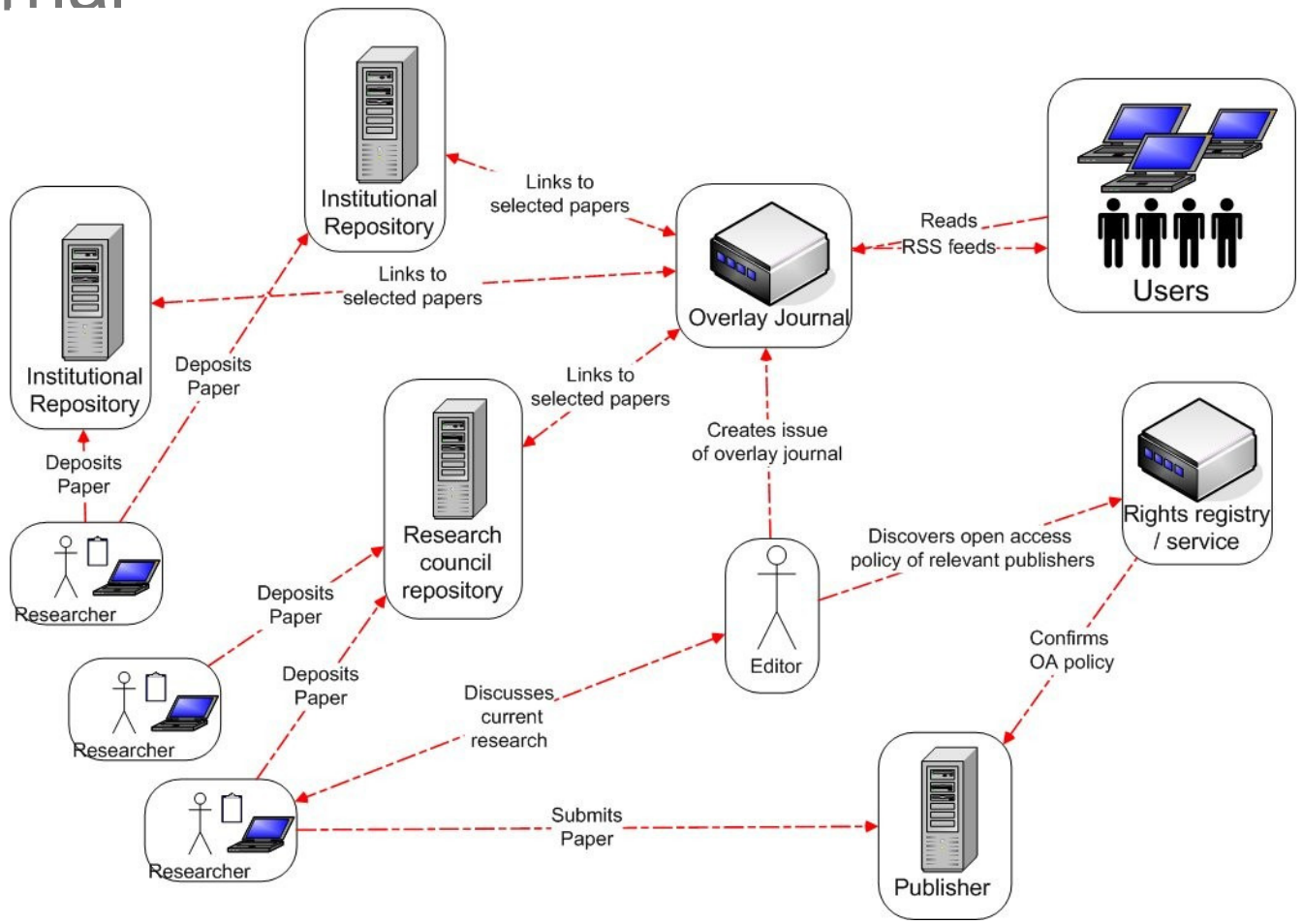
Example: entities in an overlay journal



Interactions

- “An interaction is a connection, relationship, or link between two or more entities or species in a population, community, or ecosystem”
- This is a broad definition, it is not just related to a function or technical request and can be between any type of entity; for example:
  - harvest records using oai-pmh
  - contact repository administrator
  - locate article
  - share information
- Although it is not required we consider is useful to include the nature of the interaction [submits, approves, informs, talks about] and the object (pdf , thesis, image, knowledge, rights)

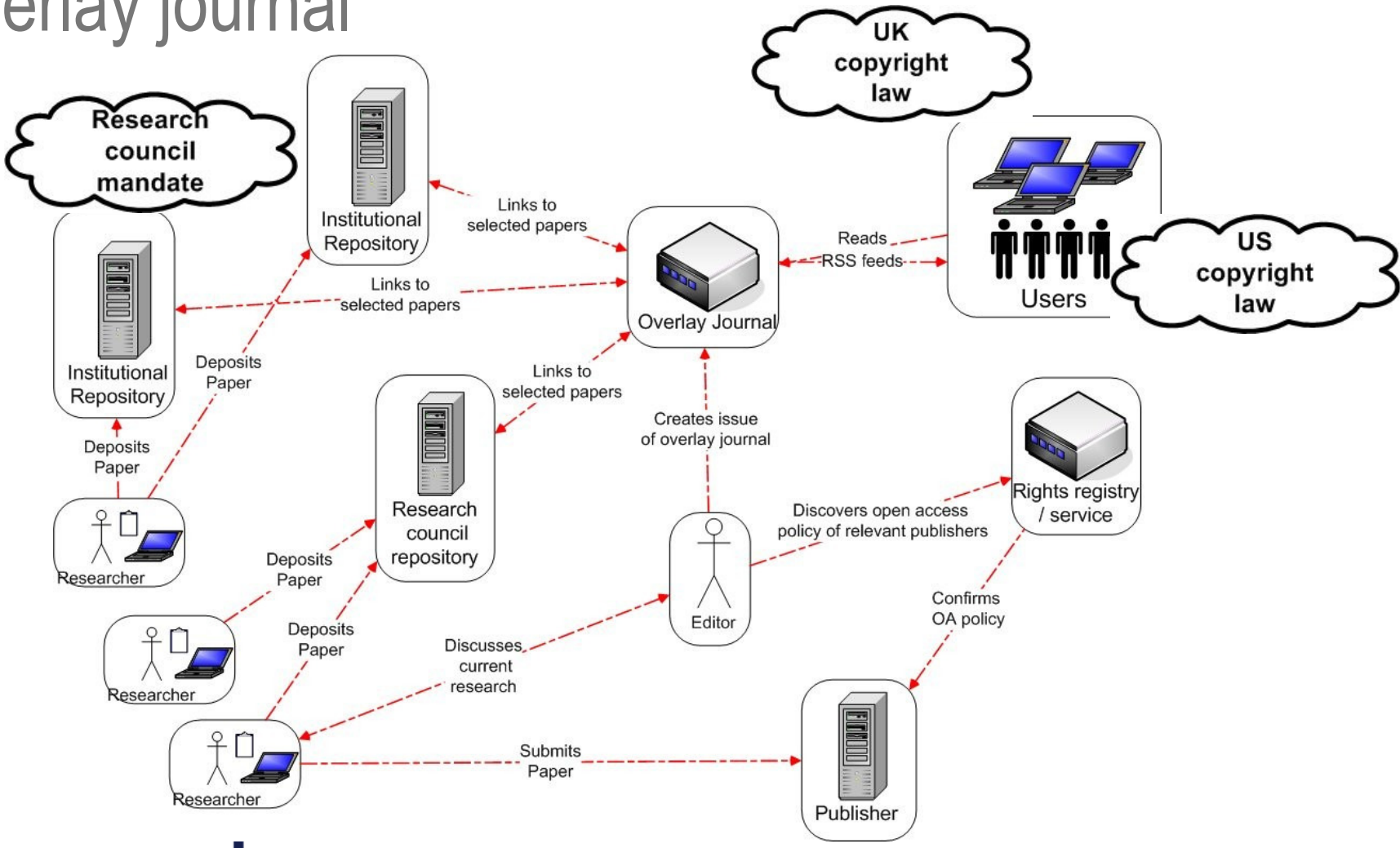
Example: interactions in an overlay journal



Environmental factors

- “An environmental factor is something that influences an entity, community, or ecosystem but is more general [i.e. wide ranging] than an interaction between constituent entities. ”
- It can be
  - Something that affects the whole environment (a change in copyright law, a university-level review of national research output)
  - Something affecting particular entities or species (the availability of a funding stream for Open Access publishing costs)
  - A direct effect from an entity not involved in the particular environment under consideration (competition for funding or political manoeuvring)
  - Something that would be an interaction if considered on another scale (the release of a new specification, or an new trend in the web environment)

Example: environmental factors in an overlay journal



An ecological mindset

- Modelling questions
  - What sort of thing (repository or service) is this? – identifying species and entities
  - What does it relate to (other repositories or services)? – specify interactions
  - What does it depend on? – environmental factors and key interactions
- Analysing questions
  - How adaptable is it?
  - What helps it to thrive? -

Further information

- Draft report
  - An ecological approach to repository and service interactions http://www.ukoln.ac.uk/repositories/digirep/index/Ecology
- Related reading
  - Bonnie A. Nardi, and Vicki L O'Day, First Monday Vol 4 No 5 May 3, 1999. Information ecologies: using technology with heart. Chapter Four: Information ecologies. http://www.firstmonday.org/issues/issue4_5/nardi_chapter4.html
  - Thomas H. Davenport, Information ecology, OUP, 1997
  - R. Heery and A. Powell, Digital Repositories Roadmap: looking forward http://www.ukoln.ac.uk/repositories/publications/roadmap-200604/
  - Rachel Heery and Sheila Anderson, Digital Repositories Review, UKOLN and AHDS, 2005 (Final version)http://www.jisc.ac.uk/uploaded_documents/digital-repositories-review-2005.pdf
  - R. J. Robertson and J. Barton, "Optimising Metadata Workflows in a Distributed Information Environment", Digital Repositories: Interoperability and Common Services, The Foundation for Research and Technology, 11-13 May 2005 , Hellas (FORTH), Heraklion, Crete, 2005, http://delos-wp5.ukoln.ac.uk/forums/dig-rep-workshop/robertsonbarton.pdf
  - Robertson, R.J. et al. EThOS, the new UK e-theses service, national and institutional repository interaction. JISC Conference, March 2007. http://www.jisc.ac.uk/media/documents/events/2007/03/ethos.ppt
  - J. Barton and R.J. Robertson, "Developing a metadata lifecycle model" Workshop at CoLIS 5, June 2005, http://mwi.cdlr.strath.ac.uk/Colisworkshop.htm
  - Kerry Blinco and Neil McLean, 'A 'Cosmic' View of the Repositories Space (Wheel of Fortune)', 2004, http://www.rubric.edu.au/extrafiles/wheel/main.swf

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