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RENARDUS: PROJECT DELIVERABLE

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Abstract	This report provides an introduction to the business issues that relate to Internet information gateways in order to feed requirements into the development of the Renardus functional model. The report includes an attempt to define the main business models that have been adopted by information gateways, but also outlines in more detail some relevant issues, including gateway sustainability, co-operation and collaboration, intellectual property rights and branding issues.
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PART II - MANAGEMENT OVERVIEW

DOCUMENT CONTROL

<i>Issue</i>	<i>Date of Issue</i>	<i>Comments</i>
0.1	2 August 2000	First draft - missing sections 2, 3 and 4. For review by WP8 participants.
0.2	30 August 2000	Second draft - missing executive summary. For review by partners and for discussion at the management meeting in Paris.
0.3	15 September 2000	Third draft - first complete version. For final review by partners.
1.0	22 September 2000	Final deliverable version.

EXECUTIVE SUMMARY

Until the present time, gateway services have not needed to concern themselves overly with what are known as 'business issues'. The majority of existing gateways receive some form of public funding - many, for example, being first set up as part of research and development projects. As services develop, this kind of funding becomes harder to justify. Information gateways, therefore, need to find alternative ways of ensuring the longer-term sustainability of their services. In addition, services that broker access to a number of gateways - like that proposed by Renardus - also need to ensure that any service that they provide can be sustainable.

It is the aim of this report to introduce business issues as they relate to Internet information gateway services. Firstly it proposes a typology of business models based on that initially developed by Dempsey (2000). This attempts to delineate the different business models in use and to give examples of them from existing services. The models in use include:

- Collective activity through membership
- Shared public investment
- Publicly funded research and development
- Public investment as part of the role of cultural, educational or scholarly institutions
- Commercial models
- Mixed models

It is acknowledged that - in practice - most gateways adopt mixed business models as different types of funding are appropriate for different stages of an information gateway's life cycle. Many gateway services have been initially funded as time-limited research projects. Established gateways tend to look for alternative, more sustainable, forms of funding. They are also often interested in establishing co-operative relationships with other gateways, both to help improve the service provided to an end-user and to help with improving the efficiency of the service provision itself. In some cases, this type of co-operation can be relatively informal. Other relationships might be more formally collaborative, based - say - on a particular user-community, subject area or geographical region. Examples of these more formal types of collaboration are the UK's Resource Discovery Network (RDN) and the Finnish Virtual Library (FVL). These types of collaboration tend to be based on the development of broker services that mediate access to a number of different gateways. Renardus itself is an example of this type of collaboration.

The second part of the report outlines in more detail a number of more specific business issues that might affect the development of a broker service like Renardus.

1. *Intellectual property rights (IPR)* - gateway services (or those who host them) own the IPR in the resource descriptions (metadata) that they have created and maintain. These are resources of significant value in their own right. Some gateways may be willing to let their records be freely used by broker-type services. Others may not be willing to do so without some written contract (or agreement) that would, for example, restrict the broker service's ability to provide records to a third party. Such agreements might influence the broker architecture adopted. For example, they might stipulate that a broker service must be based on a decentralised model (where resource descriptions remain the responsibility of each individual gateway) and that records may not be combined into any form of centralised database.
2. *Branding and display issues* - gateways (or those who host them) may be concerned that their 'brand' remains visible in the interface of any broker system with which they are involved. Gateways may insist that any end-user is able trace the origin of any individual records back to the gateway that created them. In many implementations this would mean that the name or logo of the individual gateway is fixed (in some way) to each record in the broker interface. Again, branding issues should be clearly dealt with in any written contract made between gateways and broker services.
3. *Co-operation and collaboration* - strategies for collaboration - including involvement in broker services - need to be decided by gateways with reference to their own aims and objectives. Many different types of co-operation and collaboration are possible. Apart from an involvement in broker-type services, gateways can group together to share metadata, marketing expertise and technical infrastructure and support.
4. *Model agreements* - the development of broker-type services is dependent upon the existence of appropriate agreements or written contracts. Agreements may need to be made between gateways and their host organisations; between gateways and broker services; and between broker services and other broker services. It might be useful to ensure that model agreements are published in order to guide the process of negotiation between these general groupings.

SCOPE STATEMENT

This report is the first of three deliverables being produced as part of work package 8 (business issues) of the Renardus project. It is concerned with identifying any business issues that might affect the Renardus functional model being developed by other work packages - chiefly WP1. Rather than attempting to produce a detailed review of the business models in use within Renardus (which will be the main function of public deliverable D8.2), this report has tried to take a wider view, including a look at gateways that are not an integral part of the project. Business issues are an important - but often neglected - part of the development of sustainable gateway services, for co-operation between gateways and for the development of broker services like that proposed by Renardus. The report will provide essential background information for deliverable D8.2 as well as feeding into the work being undertaken by WP1 (functional model) and WP6 (data model and data flow). It will also inform the development of the Renardus organisational infrastructure in WP3.

PART III - DELIVERABLE CONTENT

INTRODUCTION

Work package 8 (WP8) of the Renardus project concerns the business issues of Internet information gateways. This report (internal deliverable D8.1) introduces some general business issues in the context of information gateways in order to feed requirements into the development of the Renardus functional architecture. In common with the IMesh Workshop report (Dempsey, et al., 2000), this paper takes a broad conception of business issues. It includes an attempt to define the main business models that have been adopted by information gateways but also identifies some relevant issues, including sustainability, intellectual property rights, collaboration and branding issues. As deliverable D8.2 will be mainly concerned with business models in use within the Renardus partner's gateways, the opportunity was taken in this report to take a look at gateways outside Renardus, including some of the Australian gateways and initiatives like OCLC's CORC. A list of gateways mentioned in the report with URLs is attached in section 5.

This report is an internal deliverable intended to be read by Renardus project partners. It should provide some background on business issues for the development of the Renardus broker and functional architecture. It may also be of interest to those involved in information gateway development and especially for those interested in collaborating with other gateways, either on a one-to-one basis or as part of a service based on the brokering of information.

The report was written by Renardus participants from UKOLN and SUB and mainly based on desk research. It was edited by Michael Day of UKOLN. The editor would like to thank Leona Carpenter, Rachel Heery and Richard Waller of UKOLN for their detailed comments on earlier drafts.

GLOSSARY

AAC-Guide

Anglo-American Culture guide - an SSG-FI subject information guide (gateway) for Anglo-American Culture

ADAM

Art, Design, Architecture and Media Information Gateway

AERADE

UK gateway for aerospace and defence resources

AGRIGATE

An Australian gateway for agricultural resources

AHDS

Arts and Humanities Data Service - an UK service, funded by the JISC and the AHRB to collect, preserve and promote the re-use of digital resources that result from research in the arts and humanities

AHRB

Arts and Humanities Research Board

AVEL

Australasian Virtual Engineering Library

BIOME

The RDN hub for the medicine, health and the life sciences

Biz/ed

A Web-based service for business and economics

CORC

Cooperative Online Resource Catalog - an OCLC initiative to build a union catalogue of resource descriptions of Internet resources

DAINet

Das Deutsche Agrarinformationsnetz - the German Agricultural Information Network, a gateway run by the Zentralstelle für Agrardokumentation und -information (ZADI)

DC

See: Dublin Core

DCMI

Dublin Core Metadata Initiative

DEF

Danmark's Elektroniske Forskningsbibliotek - Denmark's Electronic Research Library

DESIRE

Development of a European Service for Information on Research and Education - a project funded by the European Union

DFG

Deutsche Forschungsgemeinschaft

DNER

Distributed National Electronic Resource - the JISC's concept of a managed environment for accessing heterogeneous, quality-assured information resources on the Internet

Dublin Core

A fifteen-element core metadata set defined and developed by the DCMI

EdNA

Educational Network of Australia

EdNA Online

An Australian gateway for education resources provided by EdNA

EELS

Engineering Electronic Library Sweden

EEVL

Edinburgh Engineering Virtual Library

eLib

The Electronic Libraries Programme - a series of UK higher education-based networking projects, funded by the JISC

EMC

The RDN hub for engineering, maths and computing

ESRC

Economic and Social Research Council

GeoGuide

An SSG-FI subject information guide (gateway) for pure earth sciences, geography, geophysics and thematic maps

Hub

The RDN term for faculty based information services

HUMBUL

The RDN hub for the arts and humanities

IMesh

International Collaboration on Internet Subject Gateways - an international initiative with the aim of supporting communication and collaboration amongst gateway providers and related parties

Internet Scout Project

Project located in the Computer Sciences Department at the University of Wisconsin-Madison providing summaries of selected high-quality Internet resources

IPR

Intellectual Property Rights

JISC

The Joint Information Systems Committee - a committee funded by the Higher Education Funding Council for England, the Scottish Higher Education Funding Council, the Higher Education Funding Council for Wales and the Department of Education Northern Ireland. JISC's mission is "to stimulate and enable the cost effective exploitation of information systems and to provide a high quality national network infrastructure for the UK higher education and research councils communities"

MARC

Machine-Readable Cataloguing - a group of formats based on ISO 2709

MathGuide

An SSG-FI subject information guide (gateway) for pure mathematics

MetaChem

An Australian gateway for chemistry resources

NetFirst

OCLC service giving access to a database of Internet resource descriptions

OCLC

Online Computer Library Center

OCLC MARC

MARC format used by OCLC

OMNI

Organising Medical Networked Information

PSIgate

Physical Sciences Information Gateway

RDN

Resource Discovery Network

ROADS

Resource Organisation and Discovery in Subject-oriented services - an open-source software toolkit for Internet subject gateways. Development was originally funded by JISC as part of the eLib programme

SOSIG

Social Science Information Gateway - the RDN hub for the social sciences, business and law

SSG-FI

Sondersammelgebiets-Fachinformationsprojekt - a project consisting of a series of subject guides (gateways) based at the Niedersächsischen Staats- und Universitätsbibliothek Göttingen

ZADI

Zentralstelle für Agrardokumentation und -information

1 BUSINESS ISSUES AND INTERNET INFORMATION GATEWAY SERVICES

1.1 Introduction

It is the purpose of this report to introduce the business models that support Internet information gateway services and feed any related requirements into the functional model that is being developed elsewhere in Renardus. It is probably fair to point out that those developing information gateways have tended to spend time considering technical and intellectual issues like interoperability and gateway selection criteria rather than to review the business and legal context in which gateways exist. It is difficult to explain why this should be the case but it may be related to the fact that gateways are often initially funded as projects and that specific project outcomes are given priority over business issues in any dissemination activity.

This focus now needs to change. Information gateway services that were once funded as part of relatively short-term research and development projects are increasingly attempting to develop into services with long-term sustainability. It is becoming clear that the development of sustainable gateway services will be dependent upon a clear understanding of the business and legal context in which information gateway services operate. This is even more crucial for co-operation between gateways and for the development of Renardus-type services that broker access to one or more gateways. Business and legal issues could be seen as an additional strand of the interoperability problem - one that may be ultimately more difficult to solve than the technical and standards-based interoperability problems that formed part of the focus of 'first-generation' gateway-related projects like ROADS and DESIRE.

1.2 A typology of business models

Business issues were considered at the first IMesh Workshop held at the University of Warwick in 1999. The workshop report noted that gateways were currently funded in several different ways. However, it noted that many relied to some extent upon 'soft money' - project or research funding that is temporary, unpredictable, or fragile. It added that this reliance on soft money, "created issues for long term planning, collaboration, and service development" (Dempsey, et al., 1999).

Dempsey (2000, p. 17) has begun to schematise the different types of business models in use by Internet information gateways. He outlined four main business models in use by public sector initiatives and two alternative commercial models.

1.2.1 *Collective activity through membership*

In this model, information gateways would indulge in collective activity through the membership of some kind of organisation. There are, however, many different ways in which such an organisation might work. Some might be relatively informal and unstructured, with low entry costs; where the status of being a member is more important than any other consideration. Others might have higher entry costs, and be more commercially based.

This type of model might be facilitated by the creation of, for example, membership-based consortia. Such consortia could be formed on a not-for-profit basis with - for example - sponsoring organisations, but would still need to develop services that might attract paying members. There are no exact exemplars of this type of consortia in the information gateway community (IMesh is a more informal collaboration) but a similar model has been adopted by the Text Encoding Initiative (TEI) for the development of the TEI standard (Burnard, 2000).

A more specialised example of this type of collaborative model is that adopted by OCLC for the initial phase of the Cooperative Online Resource Catalog (CORC) system and database. CORC originated as an OCLC Office of Research project but the service was developed in partnership with a large number of participating libraries (Hickey, Childress and Watson, 1999; Hickey, 2000). The CORC database was 'seeded' with records from InterCat and NetFirst but participating libraries were able to contribute additional records for Web resources in OCLC MARC or Dublin Core formats, and to freely access the CORC database during the initial project phase. During this phase, CORC operated as a type of membership organisation. It has since moved to a more commercial model. In July 2000, CORC became an OCLC production system, meaning that most OCLC

cataloguing members now have access to the database (OCLC, 2000). Hickey (2000, p. 52) points out that it is unlikely that the CORC database would ultimately be made freely available for end-users over the Web but that it would probably form part of an institutional subscription service like OCLC's FirstSearch.

1.2.2 Shared public investment

In this model, information gateways are funded as a service by some public body (e.g., by government agencies). The most prominent example of the shared public investment type of model is the UK's Resource Discovery Network (RDN). The RDN is a service funded by the Joint Information Systems Committee (JISC) of the UK higher education funding councils with support from the Economic and Social Research Council (ESRC) and the Arts and Humanities Research Board (AHRB). The RDN is a co-operative network consisting of a central organisation, the Resource Discovery Network Centre (RDNC) and a number of independent service providers called 'hubs' (Dempsey, 2000). In the RDN's case, however, this business model is just a transitional one. Many of the gateways that make up the RDN were funded originally as research and development projects, and eventually it is expected that the RDN will move to other business models, less dependent upon centralised public funding.

1.2.3 Publicly funded research and development

The receiving of research and development funding is a business model that has been used by many gateways - especially at the start-up stage. Good examples abound; e.g. the Access to Network Resources (ANR) services funded by the UK Electronic Libraries (eLib) programme (e.g. ADAM, Biz/ed, EEVL, History, OMNI, SOSIG) and Australian gateways like AVEL and MetaChem (partly funded by the Australian Research Council). Other examples are the SSG-FI services based at SUB Göttingen that are funded by the Deutsche Forschungsgemeinschaft (DFG). In addition, research and development funding can also be used to provide software and other technical and intellectual support for the development of gateways. Good examples of these are the software tools and guidance (cataloguing guidelines, selection criteria, etc.) produced by projects like ROADS, the Nordic Metadata Project and DESIRE. The main problem with this business model is that research and development funding tends to be limited in both scope and time-scale. It is therefore good for the short-term funding of first stages of gateway creation and for the development of tools, but less useful for the development of sustainable services in the longer term.

1.2.4 Public investment as part of the role of cultural, educational or scholarly institutions

This model sees the funding of gateways as a type of public investment; typically as part of the role of developing cultural, educational or scholarly institutions - including libraries, museums, archives, universities, learned societies and research institutes. This is an increasingly popular business model for information gateways as these institutions begin to recognise the importance of developing Internet-based services for their given constituency. Library-based examples might include gateways largely co-ordinated by national libraries (e.g. DutchESS, PADI), academic libraries (e.g. FVL, EELS, the Leeds University Library selected Web sites service). Other gateways are part of a museum service (e.g. Port) or are funded by government agencies. For example, Danida, the Danish national aid agency - part of the Royal Danish Ministry of Foreign Affairs (Udenrigsministeriet) - funds the ELDIS development information gateway hosted by the Institute of Development Studies at the University of Sussex.

1.2.5 Commercial models

Dempsey (2000, p. 17) in his schematisation of information gateways' business models noted two potential commercial-type business models:

- Investment in resource description activity as 'added value' to, or as a component within, a range of subscription-type services. This is (in broad terms) one of OCLC's suggested future models for CORC - to become part of an institutional subscription service like FirstSearch (e.g. Hickey, 2000, p. 52).
- Providing data supported by advertising or other services based on the value of the attention of visiting users. This model is dependent upon attracting large numbers of visitors to a Web site on the basis that a certain proportion are likely to visit advertisers. Most of the large Internet search services rely on this model, although it is also used by some smaller Web-based services.

Commercial models like these may not be widely used by gateways at the moment, but in the absence of other available funding, it is possible that services currently funded with 'soft' research-type money may need to consider alternative ways of funding its service. For example they may need to consider things like commercial sponsorship, collaborative ventures with commercial information providers and other ways of broadening support from non-public funding sources.

1.2.6 Mixed models

All of these business models have advantages and disadvantages but it should be stressed that they are not mutually exclusive. Different types of funding may be appropriate for different stages of an information gateway's life cycle. For example, it is perfectly possible for a gateway to be set up as part of a time-limited research and development project, but later for it to evolve into a core service supported by a cultural institution like a national library or museum. Established services might even be able to collaborate with commercial information services or to experiment with more commercial business models.

1.3 Business issues

Much of the work on the development of broker systems has concentrated upon technical and intellectual interoperability issues (e.g. Dempsey, 1999; Dempsey, Russell and Murray, 1999). This work is of great value, but in the emerging information gateway context it is likely that business and legal issues will be just as important. As gateways increasingly strive for sustainability, it is important that both gateways themselves and the systems that broker to them are aware of the emerging business and legal context that they inhabit. The following sections consider these issues in more detail.

1.3.1 The development of sustainable information services

Choosing an appropriate business model is important for gateways because it has a strong influence on how sustainable any given service is. It has been noted above that many gateways - at least in the start-up phases - depend upon research and development funding that is mostly project-based and is temporary, unpredictable, and fragile (Dempsey, et al., 1999). This type of business model does not tend to lead to the development of sustainable services, unless the funding-stream can be regularly renewed. At some point, therefore, project-type services will have to evolve into services funded by different business models, broadly either to become part of a membership-based organisation, or to receive some kind of support from cultural, educational, scholarly or professional organisations. Alternatively, some kind of deal could be made with commercial organisations (sponsorship, etc.) in an attempt to gain additional support from outside the cultural or educational sector. In any case, whatever form of business model - or mixture of models - is chosen, it will usually mean a move from working to project timetables to some form of business planning process that might include the production of service level agreements.

One example of this type of enforced transition is the Internet Scout Project, a project located in the Computer Sciences Department of the University of Wisconsin-Madison. Production and publication of the Scout Reports were initially funded by the National Science Foundation (NSF) under a series of grants from the division of Advanced Networking Infrastructure and Research (ANIR). However, this funding ceased in early 2000, and would not be renewed by the NSF, "because the reports have proven their effectiveness so well that they can no longer be considered 'research'" (Calcari, 1999).

The Australian information gateways have also needed to consider moving beyond project-based funding. For example, in 1999 some gateways began an attempt to identify 'exit strategies' based on gaining additional project funding or some possible collaboration with commercial organisations (Campbell 1999a). Because most of the Australian gateways were initially funded for one year only, they were very aware of the sustainability issue. At a meeting held at the National Library of Australia in February 2000, a group of gateway owners considered that the most significant issue facing them was their long-term sustainability (NLA, 2000).

The group discussed a range of options including individual applications for short-term grant funding, various subscription models including free of advertising for paying customers or free services with advertising, subscriptions for institutions while remaining free to the end-user.

After considering these options, the gateways agreed that co-operative approaches, including - for example - a national framework for collaboration with joint requests for funding, might have a greater chance of success. A NLA document entitled *A National Framework for the Development of Australian Subject Gateways* published in July 1999 emphasised that the "development of sustainable business cases for subject gateways is a critical issue to be addressed in Australia" (NLA, 1999).

In the UK higher education sector, the development of a sustainable business case for information gateways is one of the functions of the RDN. Although the RDN is funded by JISC to promote, sustain and develop the UK network of information gateways, the core funding will be reduced each year, ensuring that the RDN will need to seek alternative means of financial support. These means might include, for example, institutional investment or a membership model based on institutional subscription. Additional support might be achieved through sponsorship or by collaboration with commercial information providers.

1.3.2 Co-operation and collaboration between gateways and brokers

Co-operation and collaboration between gateways was an important theme of the first IMesh Workshop. Heery (2000, p. 41) has noted that collaboration has been established as "essential for the growth and sustainability of existing gateways." The IMesh Workshop report recognised that inter-gateway collaboration had two distinct broad motivations (Dempsey, et al., 1999):

- To improve the service provided to the end-user;
- To help improve the efficiency of gateways themselves.

Co-operation and collaboration might take many different forms. At the most informal level, it might include general agreements on gateway coverage to avoid unnecessary duplication of effort and the sharing of best practice (gateway co-operation). Alternatively it might take the form of a more formal collaboration between two or more gateways, including the development of broker services.

The business model adopted by a gateway will often influence its willingness (or ability) to participate in collaborative activity like Renardus. For example, a gateway funded as part of a research and development project may welcome the opportunity to test how it might interact with some other research activity. Gateways funded as part of the work of cultural, educational or scholarly organisations may wish to participate in a wider broker-type service, but find that they are unable to do so without the permission of the organisations of which they form a part.

In addition, it is unclear where the best forms of collaboration should take place. Subject based gateways may wish to collaborate, regardless of geographical location or business model. For example, geographically distributed engineering-based gateways like AVEL, EELS and EEVL may wish to collaborate with each other in order to share cataloguing and development effort. On the other hand, the same gateways may wish to collaborate on a national or domain level, through something like the RDN or Finnish Virtual Library (FVL). It is additionally possible, that these national or domain level broker services might also want to co-operate, for example, through an initiative like Renardus.

In practice, gateways would want to co-operate in as many ways as possible, assuming that there would be some benefits to end-users or some cost savings. This may bring confusion. A gateway that is part of a larger domain-based or nationally based service may not be able to co-operate fully with gateways outside that particular domain or nationality without the support of the wider grouping. Also, a domain or nationally based broker service may not be able to co-operate with other broker services without having negotiated the appropriate rights with all of its constituent gateways.

Successful collaboration might also be compromised by cultural and national differences between gateways. One example is differences in target audience. For example, a gateway aimed at research-level users may not wish to share metadata records with any gateways that have different resource selection criteria. Other differences that may affect collaboration would include differences in metadata quality and culturally different views of subject hierarchies and headings. The latter is a key issue. For example, a DESIRE project deliverable (Koch and Day, 1997) has indicated the range of different subject classification schemes used by information gateways. It remains to be seen whether broker services like that proposed by Renardus would either be able to offer successful cross searching and cross browsing services where different schemes are in use and, even if this

could be done, whether the solution would be acceptable to all participants. Solutions might include (Heery, 2000, p. 43):

- Mapping between different schemas and controlled lists
- An agreed 'top-level' scheme that would be used by all participating gateways
- Applying a common scheme by means of automatic classification

2 BUSINESS ISSUES AND BROKER SERVICES

2.1 Introduction

Renardus is concerned with developing a broker system that would integrate access to a number of gateway services. The development of sustainable broker services has many associated business issues. These issues can only (in many cases) be resolved by contractual agreements made between individual gateways and the broker service. The following sections outline some of these issues.

2.2 Intellectual property rights (IPR) issues

Among other issues, Intellectual Property Rights (IPR) will have an impact on the Renardus functional model.

One definition of Intellectual Property, which might be suitable within the Renardus context, characterises the types of material that have to be protected by rights and/or contracts (CATRIONA II project, 1998):

Intellectual property (IP), as referred to in these guidelines, includes, but is not necessarily limited to, multimedia packages, courseware, lecture notes, material subject to copyright, computer software, designs, video and similar material, animations, still images, audio items, research results and associated background material, and professional knowledge and skills. Essentially, it entails any intellectual output or associated skills that may be of strategic or commercial value to the University.

In connection with IPR the term "copyright" is frequently used, sometimes synonymously with IPR. As the following definition points out they are not to be confused with each other. Rather, copyright is one of the several items that Intellectual Property Rights cover (ERMES Consortium, 1998a):

1. Copyright. They deal with the words, images, sounds, etc., used to express an idea, the selection and arrangement of ideas, but not ideas or facts themselves.

2. Patent protects (as long as they are new and non-obvious) ideas expressed as an invention, and new uses for them.

3. Trademark protects (given particularly strong enforcement by the owner) names, titles, short phrases.

4. Trade secrets protect an idea, written words, formula, process, procedure, technical design, list, marketing plan, etc. or any other non-public information that offers their owner a competitive advantage.

5. Other forms of protection also exist. The most obvious example is protection guaranteed by a specific contract.

6. Database Right. This is a 15 year non copyright right which aims to protect investment in obtaining, verifying or presenting the contents of a database. It is an additional right and does not affect copyright in any copyright works contained in a database. This right is set out in the EU Directive on the Legal Protection of Databases.

Another example for the definition of copyright is taken from the Dutch Copyright Act (Koelman, 1998):

Copyright is the exclusive right of the author of a literary, scientific or artistic work or his successors in title to communicate that work to the public and to reproduce it, subject to the statutory exemptions.

It is the copyright that is of special interest in the Renardus context. As Renardus is all about databases the Database Right might also be important in future Renardus work. The business model will have to take into account these aspects of Intellectual Property Rights, ensuring that Renardus has the copyright to use material and is not violating any IPR of others (of the contributing partners). The IPR FAQ at the ERMES site points out that "the copyright to use a material does not imply to have the right to modify it." (ERMES Consortium, 1998b). Changing or modifying a material requires special agreements that should be taken care of in the Renardus business model.

How important IPR issues are can be seen, for example, on the DECOMATE II project pages. DECOMATE II, entitled "Developing the European digital library for economics," dedicates a whole workpackage to IPR-related issues (DECOMATE II project, 1998).

When working out a business model for Renardus, one should be clear about where and when intellectual properties IPR are concerned: with every (trans)action within the Renardus system, IPR and copyright are affected.

Individual gateways have created resources of significant value and are governed by different rights management frameworks. Some gateways may be willing to let their records be used by a larger broker-type service, others may not be. This can affect the architectural model of the broker service itself. It may be agreed, for example, that gateway records can be searched as part of a wider cross-search service but that the records themselves should not be replicated within a centralised union database. Other gateways may require authentication mechanisms to be in place before they make their services available to broker systems or they may want use to be monitored.

A first overview about IPR within the Renardus community can be found in the results of the D6.1 questionnaire and the D6.1 deliverable respectively:

<http://www.sub.uni-goettingen.de/ssgfi/reynard/wp6/d6.1/index.html>

[http://db1-www.sub.uni-goettingen.de/servlets/renaList?Table=ipr&Head=Intellectual+Property+Rights+\(IPR\)](http://db1-www.sub.uni-goettingen.de/servlets/renaList?Table=ipr&Head=Intellectual+Property+Rights+(IPR))

These sum up Renardus partners' answers concerning IPR at a glance. Some of the answers are quite vague, which suggests that some questions should be reformulated, and should be discussed further with the individual partner(s) as new insights will be gained in the course of WP8.

Here is a summary of the partners' answers. In some cases the gateways themselves hold IPRs in their metadata (e.g. NOVAGate, DAINet, FVL), in other cases IPRs are held by the institutions that contribute to the gateways (e.g. the consortium of libraries participating in DutchESS, the Swedish technology libraries co-operating with EELS). Within the RDN the individual gateways hold the IPR of their records. This implies certain agreements between gateways and their contributors, gateways and their brokers (e.g. the RDN). For each type of collaboration different agreements might be negotiated on how to handle IPR. In cases where the contributing partners hold IPRs themselves, there should be a contract between contributors and target service.

Almost all records of the participating gateways can be made available to the Renardus project for inclusion in its pilot service. For two participants (DEF Fagportal, RDN) this cannot be said for certain but seems very likely after terms and conditions of availability have been discussed. One FVL organisation allows only the non-public test use of their records.

Some partners state that they want to negotiate terms and conditions under which their records can be made available to the Renardus system: DutchESS, DAINet, and FVL need some sort of contract regardless of the architectural model. If a centralised system is envisaged, the number of gateways needing a contract will increase (DutchESS, SSG-FI).

Possible solutions are provided in sections 2.4 and 2.5 (Collaboration and Model agreements).

Individual gateways have created resources of significant value and are governed by different rights management frameworks. Some gateways may be willing to let their records be used by a larger broker-type service, others may not be. This can affect the architectural model of the broker service itself. It may be agreed, for example, that gateway records can be searched as part of a wider cross-search service but that the records themselves should not be replicated within a centralised union database. Other gateways may require authentication mechanisms to be in place before they make their services available to broker systems or they may want use to be monitored.

2.3 Branding and 'display' issues

On the basis of the deliberations regarding IPR and copyright it is important that the contributions of each individual partner (and their respective Subject Gateway or hub) to Renardus be marked to ensure that the originating source can be clearly identified. Certain display mechanisms should be established to lay the foundation for any further agreements.

The following passage exemplifies branding issues:

An important decision that needs to be decided during the development of a broker-architecture for the Renardus system is what branding (or other gateway identity) needs to be preserved within the system. As commented before, gateways have created resources of significant value. They may insist that the user can trace the origin of any records retrieved from a Renardus cross-search back to the original gateway that created it. This may involve the maintenance of branding (through the use of a gateway's logo) or other indications of provenance. This may be an important part of the agreements that need to be negotiated between broker services and gateways, and the relevant information could form part of some kind of service-level description of each gateway held by the Renardus system.

In the same way as gateway collaboration, branding issues are complicated where a broker service like Renardus is brokering access to a broker-type service like the RDN. As noted before, the RDN is a collaborative venture of a number of subject gateways, all managed by independent faculty-level hubs. Within the RDN ResourceFinder, each record retrieved has some text attached that indicates which particular gateway the resource has been taken from. This text could be just as easily an image (e.g. a logo). If the Renardus broker was to broker access only to the ResourceFinder, in some circumstances, it may be necessary to retain the information that identifies each record as 'belonging' to a particular gateway. In other circumstances, it may be appropriate just to identify the record as being from the RDN. In other words, it would be possible to 'brand' the same record in at least two different ways. Which of these is the most appropriate will depend upon the agreements made between the individual gateways and the RDN, and - to a lesser extent - that made between the RDN and a Renardus-type broker.

2.4 Strategies for collaboration

The IMesh Workshop envisaged that gateway type services would need to consider opportunistic or tactical alliances and agreements with other gateways. The report said that typically, "collaboration might develop on a bilateral basis or between small groups of initiatives" (Dempsey, et al., 1999). In this context, collaboration means more than some kind of informal co-operation between gateways. It means, for example, the sharing of metadata, shared investment in infrastructure, shared marketing, etc.

Strategies for collaboration need to be decided by gateways with reference to their own aims and objectives. It also relates to gateway content. Heery (2000, p. 41) suggests that collaboration on content activity "can extend from informal sharing of experience to formulation of shared policies and agreement on service levels."

Sharing of experience might lead to a more formal recognition of 'best practice', while shared policies might encompass selection criteria and collection building. Service level agreements would be appropriate for managing the exchange of metadata and maintenance of cross searching services.

Collaboration between gateways would appear to offer many advantages for enhancing their coverage. For example, particular gateways could concentrate on describing and giving access to resources in particular subject areas, regions or languages. Effective collaboration would help to remove some duplication of effort, avoiding a situation where different gateways describe (to a large extent) the same resources - and help build up a sizeable database of resource descriptions. Gateways could agree to divide responsibility for producing resource descriptions based, for example, on subject coverage or language. Even so, ensuring that there is no duplication at all will depend upon the use of unique identifiers. Heery (2000, p. 42) says that any attempt "to manage and measure overlap between gateways, and to de-duplicate retrieved lists [will] require unambiguous identification of resources."

Information gateways are services and, as such, need to ensure that their published collection management policies meet the specific requirements of their target user group. Any collaboration with other gateways should not compromise this basic goal. There are major differences in gateway coverage (e.g., the quality selection criteria adopted, resource descriptions tailored for particular audiences, etc.) and it is important that the requirements of end-users are not forgotten in any rush to collaborate. Some duplication of effort may, in these cases, be unavoidable and appropriate.

Collaboration may take several different forms, but the most likely ones are the sharing of metadata (or of metadata creation), shared marketing or branding, and possibly some common investment in infrastructure. The most important of these for Renardus is metadata sharing.

Heery (2000, p. 42) comments that "creating resource descriptions is one of the most time consuming and costly tasks for gateways, and opportunities for making this process more efficient are attractive to service providers."

Co-operative metadata creation has the big advantage of reducing the need for several service providers to create metadata for the same resource. Co-operation enables 'inheritance' of metadata, a service can take metadata created elsewhere and enhance its quality by adding additional data (e.g. subject terms), applying authority control, or adding multi-lingual data.

Library cataloguing departments have realised this for many years and the sharing of metadata (i.e. of catalogue records) is a familiar part of the traditional library cataloguing process, as it is part of related Internet resource projects like CORC. CORC uses a union catalogue model, although it is conceivable that individual gateways could negotiate the exchange of metadata with others.

2.5 Model agreements

In addition, the development of broker-type services (like Renardus) may depend on appropriate agreements being made between, e.g.:

- Gateways and their host organisations
- Gateways and broker services (e.g. between Renardus and DutchESS)
- Broker services and other broker services (e.g. between Renardus and RDN)

It would be useful if Renardus could identify any examples of best practice in this area and produce some model agreements - especially for those between brokers and target services. A study could look at potential interaction between brokers and services, the potential for record sharing, and the development of model agreements that would be applicable for a variety of service types.

In some cases, Renardus may need to broker access to other broker services. For example, the RDN brokers access to gateways that are arranged into subject-based hubs. The hubs are essentially independent service providers who (typically) provide one or more Internet gateway-type services, but which are also encouraged to develop a range of other services as well (Dempsey, 2000, p. 19). Each gateway also may provide access to other services. For example, EEVL (now part of the EMC hub) has added a number of services to compliment their Internet resource catalogue, including search services for newsgroup archives and for full-text e-journals in the engineering domain (MacLeod, 2000). Indeed, in 1998 the EEVL team pointed out that "the main database is responsible for less than half of the total usage of EEVL, and [that] several additional services contribute to the development of a more comprehensive subject gateway" (MacLeod, Kerr and Guyon, 1998, p. 217). Furthermore, in the context of the UK higher education Distributed National Electronic Resource, the RDN hubs are being encouraged to provide additional service layers, brokering access to heterogeneous services through protocols like Z39.50. These services are referred to as DNER Portals. Dempsey (2000, p. 19) has said, in this context, that "the 'subject gateway' or resource catalogue is one component in a network of communicating services which may be assembled to meet particular business and user needs."

Taking all this into account, there are several different levels within the RDN where different types of business issues become relevant:

- The gateway level - each RDN gateway will own intellectual property rights in its database of Internet resource descriptions (metadata), and will (presumably) have 'ownership' of other components of its service, including user-interfaces, user-guidance, brokers, etc.
- The intermediate level - each RDN hub will own intellectual property rights in the service that they provide, e.g. user-interfaces, user-guidance, brokers, etc.
- The RDN level - the JISC/DNER will have responsibility for the services and information provided by the RDN - e.g. user-interfaces, cross-searching services, etc.

The JISC/DNER would not itself own the IPR of the hubs' databases, but would need to negotiate access to the contents of these databases through some form of written agreement or contract.

In the Renardus context, agreements would need to be made between representatives of the broker and gateways. If Renardus develops into a full production service, it would be wise for these agreements to be based on some kind of written agreement or contract. It would be useful if exemplars of these agreements - i.e. model agreements - could be published.

3 RECOMMENDATIONS FOR THE RENARDUS FUNCTIONAL MODEL

Business issues can have a significant impact on the development of broker architectures. In any production service, the contractual-type agreements made between gateways and broker systems will need to take precedence over purely technical considerations. Therefore, it would be wise (where possible) to ensure that such agreements can support the technical infrastructure that is being adopted, rather than to undermine it. A few specific recommendations can be identified:

1. Agreements made between gateways and broker systems (like Renardus) will need to take account of the individual requirements of gateways regarding use and reuse of the metadata that they produce. For example, such an agreement may stipulate exact conditions on the use or re-use of metadata. For example, gateways may insist that resource descriptions created by them cannot be harvested into central databases for centralised processing. Even if they can be harvested into a central database, there are likely to be some restrictions on what the broker can do with that information. For example, there may be restrictions on the distribution of resource descriptions to third parties or on what should be displayed.

2. In most broker systems there will need to be some way in which records from any particular gateway can be visibly identified. There are several ways in which this could be implemented (e.g.: each metadata record could have a "Gateway-ID" field or the broker identifies (in some way) the server from which a particular record is retrieved) but this need not concern us here. In whatever way, broker systems would be able to display where each retrieved record comes from, either by some text that would note that the record was, for example, "From GeoGuide," by the displaying of the gateway's logo (the brand), or by some other means. It is possible that legal agreements made between two or more gateways, or between a gateway and a broker service would stipulate precisely how the "ownership" of records should be indicated. This is broadly the same requirement identified as an 'essential' in the Renardus user requirements document (D1.2): "service providers want Renardus to be transparent to the end-user, i.e., the end-user must always be made aware of the origin of the metadata records" (Tuominen, et al., 2000).
3. Legal agreements made between individual gateways and broker systems may require the broker to identify the host institutions of gateways and/or their funding bodies. This would have to be agreed on a gateway to gateway basis.

PART IV - REMAINDER

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5 GATEWAY-TYPE SERVICES MENTIONED IN THE TEXT

AAC-Guide (Anglo-American Culture guide) - a subject information guide for Anglo-American culture based at the Niedersächsischen Staats- und Universitätsbibliothek Göttingen. It is part of the SSG-FI project. The guide is divided into the History Guide and the Anglistik Guide for language and literature. <http://www.sub.uni-goettingen.de/ssgfi/anglo-americana.html>

ADAM (Art, Design, Architecture & Media Information Gateway) - an UK-based gateway giving access to Internet resources in the subject areas of fine and applied art, architecture, design and the media. The development of ADAM was funded by JISC as part of the eLib programme. ADAM is described in more detail in Bradshaw (1997). <http://www.adam.ac.uk/>

AERADE - an UK-based gateway for Internet resources on aerospace and defence based at the University of Cranfield. It provides records on these subjects to EEVL and is part of the RDN. <http://aerade.cranfield.ac.uk/>

AGRIGATE - this gateway is an Australian-based gateway concerned with the subject of agricultural research. AGRIGATE is a project of the libraries of the universities of Melbourne, Adelaide and Queensland and the CSIRO. It has been partly funded by the Australian Research Council. <http://www.agrigate.edu.au/>

AVEL (Australasian Virtual Engineering Library) - this gateway is described as a "portal to quality Australasian engineering and information technology (IT) resources." Partners are the universities of Queensland, New South Wales and Melbourne, Monash University, Queensland University of Technology, the Centre for Mining Technology and Equipment (CMTE), the CRC for Enterprise Distributed Systems Technology and the Institution of Engineers, Australia. It is part-funded by a grant from the Australian Research Council with additional contributions from the partner institutions. <http://avel.library.uq.edu.au/>

BIOME - the RDN hub for the life sciences and medicine. <http://omni.ac.uk/biome/>

Biz/ed - a Web-based service centred on business and economics run at Institute for Learning and Research Technology, University of Bristol. The Biz/ed service gives access to both Internet resources and learning materials. The service was originally funded as part of the eLib programme. <http://www.bized.ac.uk/>

CORC (Cooperative Online Resource Catalog) - this is a project undertaken by the OCLC Office of Research in collaboration with a large number of participating libraries. The CORC project is described in more detail in Hickey (2000). <http://www.oclc.org/oclc/corc/>

DAINet (Das Deutsche Agrarinformationsnetz) - the German Agricultural Information Network, a gateway for nutrition, agriculture and forestry run by the Zentralstelle für Agrardokumentation und -information (ZADI). <http://www.dainet.de/>

DEF (Danmarks Elektroniske Forskningsbibliotek) - Denmark's Electronic Research Library, a project of the Danish Ministry of Culture, the Danish Ministry of Research and the Danish Ministry of Education. DEF is a vision of a virtual library for researchers, students, lecturers and other users of Danish research institutions. The primary forces in DEF are Denmark's 12 largest and 44 medium-sized research libraries and the Danish National Library Authority, but other libraries will also be involved. <http://www.deflink.dk/english/>

DutchESS (Dutch Electronic Subject Service) - this is a gateway is for high-quality Internet resources that either relate to the Netherlands or that are of importance to the participating organisations. The gateway is a collaborative effort between the Koninklijke Bibliotheek (National Library of the Netherlands) and a number of academic libraries. The gateway originated in 1993 as a gopher-based service and moved to the Web in 1995 as the Nederlandse Basisclassificatie Web (NBW). From 1996-1998, DutchESS received additional support from the funding body Innovatie Wetenschappelijke Informatie (IWI), but the gateway is now co-ordinated by the KB, who provide technical support. DutchESS is described in more detail in Peereboom (2000). <http://www.konbib.nl/dutchess/>

EdNA Online - this is a gateway for resources created and used by the education community operated by the Educational Network of Australia (EdNA). <http://www.edna.edu.au/>

EELS (Engineering Electronic Library Sweden) - this is a gateway for high quality Internet resources in the subject area of engineering. It is a co-operative project of the Swedish Universities of Technology Libraries - a consortium of six research libraries. <http://eels.lub.lu.se/>

EEVL (Edinburgh Engineering Virtual Library) - an UK-based gateway for engineering resources created and led by a team of information specialists from Heriot-Watt University Library, Edinburgh. EEVL was funded by JISC as part of eLib, but is now part of the RDN EMC hub. EEVL is described in more detail in MacLeod, Kerr and Guyon (1998). <http://www.eevl.ac.uk/>

ELDIS - an UK-based gateway for development information hosted by the Institute of Development Studies at the University of Sussex and funded by Danida, the Danish national aid agency - part of the Royal Danish Ministry of Foreign Affairs (Udenrigsministeriet). <http://www.ids.ac.uk/eldis/eldis.htm>

EMC - the RDN hub for engineering, maths and computing. <http://www.emc.ac.uk/>

FVL (Finnish Virtual Library) - this is a project that is developing gateways for the use of the Finnish academic and higher education community. The project, which is partly financed by the Finnish Ministry of Education, was initiated in 1996. The project involves information specialists from a large number of Finnish scientific information services. The FVL Project also co-operates with the Nordic NOVAGate and EELS gateways. <http://www.jyu.fi/library/virtuaalikirjasto/engvirli.htm>

GeoGuide - a subject information guide for pure earth sciences, geography, geophysics and thematic maps based at the Niedersächsischen Staats- und Universitätsbibliothek Göttingen. It is part of the SSG-FI project. <http://www.sub.uni-goettingen.de/ssgfi/geo/index.html>

History - an UK-based gateway to history resources hosted by the Institute of Historical Research (IHR) of the University of London. Originally known as IHR-Info, it was one of the gateway services funded under eLib and is currently based on ROADS. <http://ihr.sas.ac.uk/>

Humbul Humanities Hub - the RDN hub for the humanities. <http://www.humbul.ac.uk/>

Internet Scout Project - Project located in the Computer Sciences Department at the University of Wisconsin-Madison providing summaries of selected high-quality Internet resources. <http://scout.cs.wisc.edu/>

Leeds University Library selected Web sites - a searchable ROADS-based catalogue of selected high-quality Web sites produced by the Leeds University Library - primarily intended for University of Leeds staff and students. <http://www.leeds.ac.uk/ROADS/web.htm>

MathGuide - a subject information guide for pure mathematics based at the Niedersächsischen Staats- und Universitätsbibliothek Göttingen. It is part of the SSG-FI project. <http://www.sub.uni-goettingen.de/ssgfi/math/index.html>

MetaChem - an Australian-based Web-based service giving access to a variety of information resources in the subject area of chemistry, including an information gateway. The Australian Defence Force Academy, the University of New South Wales and other collaborators maintain MetaChem with technical support from DSTC. The project is funded by the Australian Research Council and by in-kind contributions from participating partners. <http://metachem.ch.adfa.edu.au/>

OMNI (Organising Medical Networked Information) - an UK-based gateway to Internet resources in the general areas of medicine, biomedicine, allied health, health management and related topics. Originally funded by JISC as part of the eLib programme, OMNI is now part of the BIOME RDN hub. The gateway team is based at the University of Nottingham. <http://www.omni.ac.uk/>

NOVAGate - a Nordic gateway to selected Internet resources in the fields of forestry, veterinary, agricultural, food and environmental sciences. The database is produced and maintained by the libraries of the NOVA University. NOVAGate is described in more detail in Price (2000). <http://novagate.nova-university.org/>

PADI (Preserving Access to Digital Information) - a gateway to Web sites concerned with digital preservation hosted by the National Library of Australia. <http://www.nla.gov.au/padi/>

Port - a gateway to maritime-related Internet resources hosted by the UK National Maritime Museum (NMM), Greenwich. <http://www.port.nmm.ac.uk/>

PSIgate (Physical Sciences Information Gateway) - the RDN hub for the physical sciences. <http://www.psigate.ac.uk/>

RDN (Resource Discovery Network) - an UK-based co-operative network that provides access to high-quality Internet resources selected and catalogued by a number of subject-based gateways organised into faculty-level hubs. The resources can be accessed at several different levels: through individual gateways, through hubs, or through the RDN ResourceFinder cross-search service. RDN is funded by the JISC, with additional support from the ESRC and AHRB. <http://www.rdn.ac.uk/>

SOSIG (Social Science Information Gateway) - an UK-based gateway to Internet resources in the social sciences. Originally funded by the ESRC and (later) by JISC through eLib, it is now the RDN hub for the social

sciences, business and law. The gateway team is based at the Institute for Learning and Research Technology (ILRT) of the University of Bristol. SOSIG is described in more detail in Hiom (2000). <http://www.sosig.ac.uk/>

SSG-FI (Sondersammelgebiets-Fachinformationsprojekt) - a series of subject information guides (AAC-Guide, GeoGuide and MathGuide) funded by the Deutsche Forschungsgemeinschaft (DFG) and hosted by the Niedersächsischen Staats- und Universitätsbibliothek (SUB) Göttingen). A brief description of the project and the SSG-FI gateways is available in Fischer et al. (1999) and in Fischer and Neuroth (2000). <http://www.sub.uni-goettingen.de/ssgfi/index.html>