

Cover Sheet for Proposals (All sections must be completed)	<i>JISC Capital Programme</i>
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Name of Capital Programme: e-Infrastructure			
Programme Strand: (Please tick ONE BOX ONLY, as appropriate)			
e-Research Community Engagement & Support			
<input type="checkbox"/>	Call I – Barriers to Take-Up of e-Infrastructure Services	<input type="checkbox"/>	Call II – Support for Research: Tools & Standards
		<input checked="" type="checkbox"/>	Call III – Use Cases and Service Usage Models
e-Infrastructure Security		Knowledge Organisation and Semantic Services	
	Call IV – Federated Tools and Services <input type="checkbox"/> a) Integration of Grid and Shibboleth <input type="checkbox"/> b) Developing and Applying n-tier Web Service Architectures <input type="checkbox"/> c) Applying existing virtual home for identity solutions		Call V – Virtual Organisation Management Tools and Services <input type="checkbox"/> a) Tools for the establishment of VOs <input type="checkbox"/> b) Services and UIs for management of VOs <input type="checkbox"/> c) Federation membership models for VOs <input type="checkbox"/> d) Delegated authorisation
			Call VI – Semantically Coordinating Resources and Services Across Registries <input type="checkbox"/> a) Area A – integration of Resources and Services from Existing JISC Services <input type="checkbox"/> b) Area B – Metadata for Services, Data, and Published Literature
Name of Lead Institution:		Oxford University	
Name of Proposed Project:		eIUS: e-Infrastructure Use Cases and Service Usage Models	
Name(s) of Project Partner(s): University of Manchester (ESRC NCeSS)			
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Length of Project:		24 months	
Project Start Date:		1 March 2007	Project End Date: 28 February 2009
Total Funding Requested from JISC:		£336,873	

Funding Broken Down over Financial Years (April - March):		
Apr06 – Mar07	Apr07 – Mar08	Apr08 – Mar09
£12,559	£168,635	£155,679
Total Institutional Contributions:		
Percentage Contributions over the Life of the Project:	70% JISC	30% PARTNERS
Outline Project Description		
<p>The overall aim of eIUS, the e-Infrastructure Use Cases and Service Usage Models project, is to articulate, through the publication of use cases and the contribution of domain and Service Usage Models (SUMs), how the research community across different disciplines are actually or planning to engage with e-infrastructure. A deeper analysis of the use of existing e-infrastructure provision, both national and local, will also inform service development models which have hitherto been driven by the requirements of the early adopters. A crucial outcome of this project therefore, through the provision of dynamic use cases, is to broaden participation in the use and the future development of e-infrastructure services. The project will develop a comprehensive set of structured use cases, each containing a series of scenarios, which encapsulate how members of the UK research community are, or intend, to use e-infrastructure services as a key element in their research workflows. The use cases will form the basis for developing domain models and SUMs. Whilst the project assumes a broad definition of e-research, not restricted solely to activities within the e-Science Core Programme, it is recognised that the UK e-Science programme has achieved significant success in promoting the adoption of e-infrastructure across a range of research fields (including the social sciences and, increasingly, the arts and humanities). In order to achieve a broad sweep of disciplines and facilitate the prioritisation of scenarios for inclusion within the use cases, the project will collaborate with the existing e-infrastructure providers to develop a network of researchers formed from existing e-infrastructure service user communities. The eIUS project will be undertaken jointly between the National Centre for e-Social Science (NCeSS) at the University of Manchester and the Research Technologies Service (RTS) together with the e-Horizons Institute and the Oxford e-Research Centre (OeRC) at the University of Oxford. Both institutions are leading international centres in e-Science. The project will build on a range of relevant activities in which the partners are already engaged with members of their respective communities. The project will be led by the Research Technologies Service within Oxford University Computing Services.</p>		
I have looked at the example FOI form at Appendix A and included an FOI form in the attached bid (Tick Box)	YES	
I have read the Circular and associated Terms and Conditions of Grant at Appendix B (Tick Box)	YES	

Introduction

1. The overall aim of the eIUS: e-Infrastructure Use Cases and Service Usage Models project is to articulate, through the publication of use cases and the contribution of domain and service usage models (SUMs), how the research community across different disciplines are actually or planning to engage with e-infrastructure. We understand e-infrastructure to be the distributed network, services, tools, middleware and support operations which facilitate the research community's discovery of, and access to, data collections and repositories, computational resources, data analysis and simulation tools, advanced communication or collaboration technologies. Examples include the National Grid Service (NGS), the national data centres, the visualisation and text mining networks, support centres for the Access Grid, digital curation, and the Open Middleware Infrastructure Institute (OMII). The project will not confine itself to national e-infrastructure but also gather evidence from the use of international and local, institutional e-infrastructure, taking advantage of relevant services and tools being developed within the partner institutions (e.g. institutional repositories and campus grids). We define the research which requires the use of e-infrastructure to be e-research and our assumption is that whilst e-research includes all discipline areas, there are some research areas which are increasingly dependent on e-infrastructure services. Virtual research environment and digital repository projects, for example, offer a potentially useful source of user interaction with e-infrastructure across a range of subject areas. A deeper analysis of the use of existing e-infrastructure provision will also inform service development models which may have hitherto been driven by the requirements of the early adopters. A crucial outcome of this project therefore, through the provision of dynamic use cases, is to broaden participation in the use and the future development of e-infrastructure services.
2. The eIUS project will develop a comprehensive set of structured use cases, each containing a series of scenarios, which encapsulate how members of the UK research community are, or intend, to use e-infrastructure services as a key element in their research workflows. The use cases will form the basis for developing domain models and SUMs. Whilst the project assumes a broad definition of e-research, not restricted solely to activities within the e-Science Core Programme, it is recognised that the UK e-Science programme has achieved significant success in promoting the adoption of e-infrastructure across a range of research fields (including the social sciences and, increasingly, the arts and humanities). However, the experiences of early adopters which are potentially so valuable for widening the e-infrastructure community are in danger of being lost. Gathering an understanding of the working methods of e-research is critical for determining the future direction for service provision. The project will therefore help to keep service and technology provision aligned with actual requirements. Through the development of a structured schema to represent use cases, the project will capture experiences in an accessible form, for human interactive consumption and machine-to-machine Web Services-based consumption.

Strength of the partnership

3. The eIUS project will be undertaken jointly between the National Centre for e-Social Science (NCeSS) at the University of Manchester and the Research Technologies Service (RTS) together with the e-Horizons Institute and the Oxford e-Research Centre (OeRC) at the University of Oxford. Both institutions are leading international centres in e-Science. The project will build on a range of relevant activities in which the partners are already engaged with members of their respective communities. The project will be led by the Research Technologies Service within Oxford University Computing Services.
4. The project will build on the partners' existing work in the area of social shaping of e-infrastructures, specifically: the NCeSS Oxford e-Social Science node (Marina Jirotko); the NCeSS ESRC-funded e-infrastructure project; the e-Science Institute Theme on 'Adoption of e-Research Technologies: from prototype to commodity' (lead by Alex Voss, and overseen by Rob Procter and Tom Rodden); and Accelerating Transition to Virtual Research Organisation in Social Science (AVROSS), an EU funded project which is studying requirements and options for accelerating the transition from traditional research to virtual research organisations through e-infrastructures (co-investigator Rob Procter).
5. Since the inception of the UK e-Science Programme in 2001, Oxford (through both the RTS and the OeRC) has been involved in over 40 projects, intersecting all seven of the research disciplines defined by the UK research councils. Examples of the use of e-Infrastructure developed by these projects are found in activities as diverse as conducting large-scale distributed earthquake simulation experiments (UK-NEES), protein synthesis and trajectory simulation (BioSimGrid), the remote control of scanning electron microscopes, and the decipherment and textual analysis of damaged and degraded ancient documents (Virtual Workspace for the Study of Ancient Documents). Facilities used range from high performance compute resources such as the National Grid Service (NGS) and HPCx, to institutional repositories, digital libraries, and resource discovery services such as Intute and the Arts and Humanities Data Service (AHDS). Virtual Research Environments (VREs), tailored for specific communities, are beginning to form the central point of access or gateway to these e-Infrastructure facilities and increasingly used on a day-to-day basis to carry out research. Oxford is currently leading or is a partner in three VRE projects (Integrative Biology, Sakai VRE demonstrator, and Building a VRE for the Humanities).

6. There are several projects at Oxford that aim to examine in detail the issues that can affect the uptake of these technologies. The IMaGE project aims to investigate and extend theories of intellectual property rights (IPR) protection, in particular for collaborative computing environments, building on the experiences and outcomes from large and ambitious projects like eDiaMoND. The Oxford e-Social Science (OeSS) project is looking at the ethical, legal and institutional dynamics of e-research. Usability considerations for e-Infrastructure technologies are investigated in the 'Embedding e-Science Applications: Designing and Managing for Usability' project, a collaboration between the OeRC and the Oxford Internet Institute (OII). A follow-on from the Evaluation of Shibboleth and PKI for Grids (ESP-GRID) project is investigating, in conjunction with the e-Horizons Institute, the barriers to initial involvement for novice Grid users. Oxford also hosts a number of related e-infrastructure or advisory services within the RTS (e.g. NGS node, OSS Watch, AHDS centre) and has previously contributed to the JISC e-learning framework through toolkit projects such as Web Services for Reflective Learning (WS4L); Middleware for Distributed Cognition (MDC); Tracking and Learning in E-Learning Contexts (TRECX); and the Accessing and Storing Knowledge (ASK) repository project.
7. The National Centre for e-Social Science (NCeSS) was established in 2004 by the ESRC as part of their e-Social Science strategy to stimulate the take-up of e-research technologies and tools within the social sciences. NCeSS has two main aims. The first is to develop Grid-based research tools and environments for the social sciences. The second is to investigate the 'social shaping' of e-research, i.e., how it is being developed, how it is being used, and what its impacts and implications are. NCeSS programme members are involved in numerous projects and activities in support of these aims, with the following being of particular relevance to this proposal: NCeSS has recently been awarded £550K by the ESRC to begin building an e-Infrastructure for the social science research community; NCeSS is a partner with eSI in a study of the barriers to the adoption of e-Science and is also a partner in an EU-funded comparative study of the adoption of e-Infrastructure within the social sciences, arts and humanities. NCeSS has been working closely with the Usability Task Force to promote usability research within the UK and US e-Science communities. A series of workshops on this topic have been organised over the past fifteen months, most recently at the ACM Computer-Human Interaction Conference in April, 2006. We have established links over the past two years with leaders of the UK, European and US e-Infrastructure research communities (e.g., JISC, NGS, OMII-UK, EGEE, TeraGrid, Collaboratory for Research on Electronic Work).
8. The Schools of Social Science and Computer Science at the University of Manchester both obtained a 5* rating in the last RAE. The former established the National Centre for e-Social Science and hosts the NCeSS Hub; the latter has had a substantial engagement in the UK e-Science Programme from the outset, building on its established record of bringing advanced computing to bear on applications in the health and life sciences. Manchester hosts the e-Science North West Regional Centre, the National Text Mining Centre, the Northwest Institute for Bio-Health Informatics, the Access Grid Support Centre and is a partner in OMII-UK.
9. This solid bedrock of expertise in understanding and interpreting user experience and needs, combined with an extensive network of actively engaged e-Infrastructure users in a range of subject disciplines, contributes to the formation of an excellent evidence base upon which to base a comprehensive analysis and definition of usage models across a series of domain communities.

Developing authentic use cases

10. The development of useful models is dependent on the recording of authentic use cases. The authenticity of the use case collection as a whole will derive not only from direct engagement with the research community but also a representative sampling of e-research methods or activities, e-infrastructure services and tools, and subject domains. It is recognised that the mapping of research methods and subject domains is complex. Within any one of the research communities, there exists a myriad working practices and approaches, and within a single discipline a variety of techniques can be employed (in economics, for instance, there are notable differences in methodology between economic theorists, empirical economists, and econometricists). The question of how more general conclusions can be drawn from specific experiences is one that has exercised researchers working on the use of ethnographic methods in systems design. We would argue that developing use cases from the experience reports (as well as domain models and SUMs) is a problem of the same order and therefore we will gain insights into how this work can be effectively organised from the field of requirements engineering. Specifically, we would draw on the experience of the Coherence project¹ and more recent work on the use of patterns to represent practices and distil what one can say in general about them.² An important issue is the traceability of generic formulations, i.e. the path back to the original experience which we will provide through the inclusion of links to the experience reports and supporting material such as video vignettes or demonstrations. With regard to the latter, we will explore the trade-offs between using 'raw' material from observational studies (in the sense of a naturalistic account) versus the potential benefits of using them as forms of reportage where the content is edited by the project team in collaboration with the participating researchers.

1 Viller, S. and Sommerville, I. (1998) *Coherence: Ethnographically informed analysis for software engineers*. Cooperative Systems Engineering Group, Technical Report CSEG/15/1998, Lancaster University.

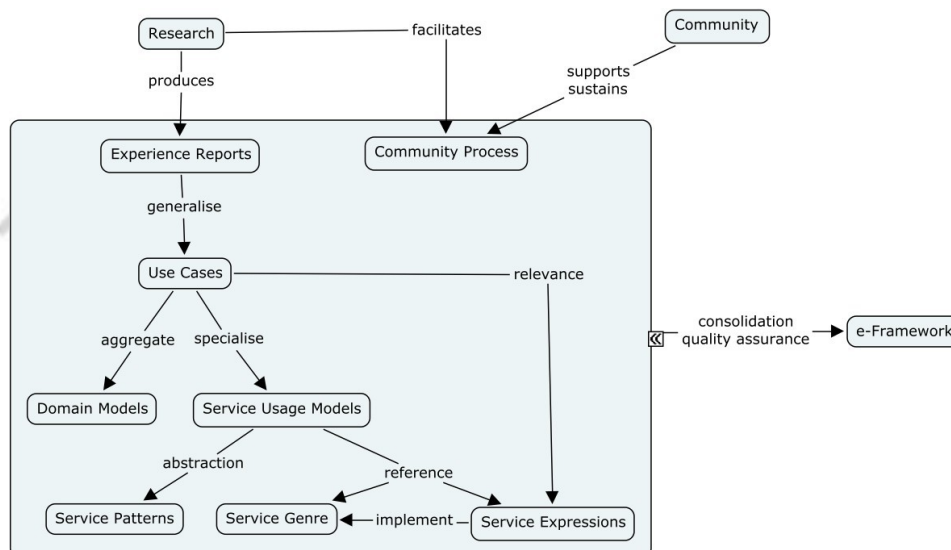
2 Martin, D., Rouncefield, M. and Sommerville, I. (2002) "Applying patterns of cooperative interaction to work (re)design: e-government and planning". *Proceedings of the SIGCHI conference on Human factors in computing systems*. pp. 235-242.

11. In order to achieve a broad sweep of disciplines and facilitate the prioritisation of scenarios for inclusion within the use cases, the project will collaborate with the existing e-infrastructure providers to develop a network of researchers formed from existing e-infrastructure service user communities. During the development of this proposal we have contacted a selection of e-infrastructure services. They are listed below with an indication, where available, of related activities which also have the potential to contribute to the project:
 - National Grid Service (NGS);
 - OMII (e.g. SUPER project);
 - AHRC ICT Methods Network and Arts and Humanities e-Science Support Centre (AHeSSC) (e.g. e-Science Scoping Study; e-Science demonstrators and research grants);
 - Digital Curation Centre (and through HATII, the PLANETS and CASPER projects);
 - Access Grid Support Centre (and relevant AG projects such as CSAGE and MEMETIC VRE projects);
 - VizNet;
 - NaCTeM (working with NCeSS to develop text mining services for social science);
 - MIMAS (e.g. GEMs);
 - EDINA (e.g. GEESE, OGC Grid Collision).
12. The deliverables from the project will be designed to serve different but related stakeholder requirements:
 - Members of the research community seeking examples of e-infrastructure usage appropriate to their methodologies and/or disciplinary context;
 - Existing and future e-Infrastructure providers using the use cases and models to inform research and development strategies;
 - The e-Framework initiative building a critical mass of structured content;
 - JISC and other funding bodies using the collected data to inform strategic development of services;
 - Institutions investigating the deployment of virtual research environment frameworks, and local, interoperable e-infrastructure facilities.
13. Each use case will be identified with a particular research goal and be linked to a series of experience reports (structured accounts of particular experiences). Variables within the reports will include the role or domain of the principal actors, and the means by which the goal is addressed. The use cases will share a common structure but the content of the experience reports will be reasonably informal in style and designed to appeal to researchers who, to a large extent, are both the providers and the consumers of the use cases. However, we are keen to avoid a simple docucentric approach to the development of use cases. Given the complex matrix of role, subject domain, goals, methodology and e-infrastructure components we propose to develop a dynamic form of use case. The dynamic use case will have the following aspects:
 - Use cases will be developed incrementally, they will be published early and often, to encourage review and validation by the stakeholders represented;
 - The consumer of use cases, principally the researcher, will be able to specify some combination of role, subject, method and goal and, in effect, build an appropriate use case from the structured data already gathered.
 - The integration of the use cases with the experience reports will enable richer content, such as demonstrations or multimedia, to be provided and thus offer a more meaningful interaction with the use cases.
 - The consumer will have the opportunity to act as provider by adding content to existing scenarios or submitting an entirely new component. Contributions will be edited as appropriate to ensure consistency and relevance. The primary means of collecting data will remain personal contact.
 - The community portal will support informal communication between the use case provider or consumer and the project team through the integration of appropriate collaboration tools.

Deriving viable service usage models

14. The service usage models (SUMs) aim to further the adoption of e-infrastructure services by providing coherent data which connects the research activities (from the evidence base) with the ways in which they can be supported, using particular service genres or expressions. The SUMs articulate the notion that for each research activity there will be a typical configuration of services that support this activity. The usefulness of SUMs lies in defining the elements required to interoperate in order to create the application instances which serve the functional requirements. Implementers of such applications can use SUMs as templates ('beaten paths'), thus reducing the effort involved in developing the structure and organisation of a technical configuration. Through the link with use cases and actual experiences, an application developer will be able to better appreciate what role services play in a given domain. Finally, technology developers, service providers and funders may use SUMs to help ensure the strategic development of services corresponds with usage patterns. *Figure 1* shows the inter-relationship between the service patterns, service genres or service expressions. Equally important as the creation of the models is the refinement of the *process* for creating and

maintaining them. This work will be undertaken in close collaboration with the e-Framework and its stakeholders. The involvement of service providers, researchers and relevant intermediaries (such as IT and library services) will be crucial. The development of SUMs encompasses business process interoperability as well as semantic and technical interoperability. Another dimension in this work will be coordination with other initiatives such as the e-Bank project or efforts within research domains that have consonant aims, e.g. the NCRI Cancer Informatics Initiative. The development of metadata standards and ontologies to support searching, browsing and automatic discovery of as well as automatic reasoning about services and service usage models will be explored in collaboration with the e-Framework and the projects funded within the e-infrastructure programme (e.g. Call IV). As noted earlier, we envisage that the resources we provide will be consumed both interactively and automatically; providing semantic markup of the resources is an important precondition for the latter.



15. Figure 1. View of the research and community process proposed for the project.

Relationship with other e-infrastructure community engagement projects

16. There are obvious points of overlap and complementarity with the other two projects to be funded in this theme, namely the *Barriers to Take-Up* and *Tools and Standards* projects. The *Barriers to Take-Up* project (for which NCESS has submitted a proposal) will also be working closely with JISC-funded e-infrastructure providers and it would make sense to undertake appropriate elements of this activity together; assisting in the selection of use cases and SUMs, for example. We would also expect to support and be informed by the awareness-raising and training activities of the *Barriers to Take-Up* project. Where possible, use cases will link directly to appropriate training material. The *Tools and Standards* project will engage with the research community in the gathering of data and the provision of an advisory service. We would wish to maintain a close connection with this project in order to exchange information and strengthen the network of early adopters we seek to establish. It would also make sense to integrate use case data with the proposed 'tool finder'.

Length of project and proposed start date

17. The project will start in March 2007 and run for two years.

Summary of Outcomes and Value to Community

18. The experience reports and models created as part of this project are crucial for the successful future development and/or the implementation of e-infrastructure services, whether aligned with the practice of a particular discipline or to meet the common requirements of an interdisciplinary community. To be cost-effective and sustainable, e-infrastructure tools and services must be readily adaptable for generic, particular and synthesised research methods. The project will develop a repository of material of value to understanding the perception and use of e-infrastructure from the point of view of the researcher. It has a clear aim to establish a community network of service providers and researchers – assisting in bringing together, for example, research council-funded practitioners with JISC-funded services or centres of expertise. The close cooperation with the research community will contribute to the strategic development of existing or new e-infrastructure components, as well as assist in the managing of expectations within the research domain. Providers of e-infrastructure should benefit from the more formal articulation of use cases and overview of the e-infrastructure landscape from the point of view of the various research groups; reports on the disciplinary differences in the use of services and data; and the service usage models as a potential source of information for service development strategies. The project intends to work closely with the funded VRE projects and other activities funded under the banner of e-research.

A. Project Description

Overview

19. The eIUS project will be run as a joint partnership between the University of Oxford (RTS, e-Horizons Institute) and the University of Manchester (ESRC National Centre for e-Social Science). Oxford will be the lead site for the purpose of administration. A key component of the project will be operating in collaboration with existing e-Infrastructure providers and current or planned projects (especially within the core e-Science, VRE and digital repositories programmes). The project will develop at least 15 use cases, each based around a specific methodology and each comprising a series of scenarios with different combinations of subject domains and goals. SUMs and domain models will be derived from and linked to these use cases. A report summarising disciplinary differences and commonalities will be one outcome from the analysis of the use cases. Whilst the project intends to be broad in its subject coverage, we acknowledge that the partnership also has clear internal strengths in the arts and humanities, social sciences, biotechnology and medical sciences.

Project Plan

Methodology

20. The eIUS project will conduct a series of structured investigations of researchers' working practices using a combination of interviews, observation and focus groups. It is proposed to devise a structured format for the experience reports, in order to aid the process of making the process of contrast and comparison easier. The limitations of an overly rigid structure are recognised and so, initially at least, the structure would operate as an *aide memoire*. The development of the structure will be iterative, informed by the nature of the evidence gathered. Our approach is to develop an application profile for the use cases which will enable us to reuse elements from different, appropriate namespaces (e.g. Text Encoding Initiative; Dublin Core; IESR schema) and maximise potential reuse of the data through machine and human interfaces. The entire process from experience reports, to use cases and domain or service usage models will be undertaken on an iterative development cycle, enabling the project to maintain close contact with both researchers and service providers alike. The methodological approach applies lessons learnt from projects, such as IB VRE, which have taken an agile development approach to embedding e-infrastructure within the research process. The need for iterative refinement also reflects the complexities of the research domains as well as the continuing evolution of research practice. The proposed organisational and technical infrastructure of the project will help to ensure consistency, validity, and version control.

Organisational Structure

21. The eIUS project is based within two institutions with an international reputation for e-research and the provision of e-infrastructure (both local and international). The principal investigators have complementary expertise. Whilst each will be responsible for directing individual workpackages, collectively they will provide the necessary direction and networking to ensure that the project remains a community-oriented activity. The project will be supported by a steering committee comprising invited representatives from key stakeholders, both within the research community and from the e-infrastructure service providers. The JISC Support of Research (JSR) committee and the e-Infrastructure Programme will be invited to nominate representatives. The project team will comprise a project manager, analyst and research assistant. The project manager (0.4 FTE) will have responsibility for the day to day coordination of the project; including maintaining the project plan, developing the team, and contributing to the community engagement and dissemination workpackages. The research assistant and analyst (totalling 1.6 FTE), with complementary expertise in social and computing science methodologies will together have responsibility for gathering data, developing the use cases and domain or service usage models. This work will be under the direction from the co-PIs located within NCeSS and the e-Horizons Institute (together totalling 0.25 FTE).

Workpackage 1. Project Management

Description: This workpackage will run throughout the project. Project management will be undertaken by 0.4 FTE based at Oxford who will have responsibility for the day to day coordination of the project, team leadership and line management. Tasks falling within this workpackage include developing the project plan, including a more detailed list of workpackages; establishing and servicing the project steering group; reporting to JISC and other stakeholders at agreed intervals; representing the project at Programme meetings; budgetary control. The project manager will be located within the RTS.

Deliverables: Project plan; quarterly project reports; final report.

Responsibility: Oxford

Estimated working days: 150 (Oxford)

Workpackage 2. Survey and Scoping e-Infrastructure

Description: Through desk research and consultation with stakeholders and service providers, this workpackage

will provide an analysis of existing and planned activities relating to user requirements, use case development and other formal means of recording interactions between researchers and e-infrastructure services or tools. We intend to undertake this work at the beginning and also towards the end of the project. The initial scoping study will inform the selection of experience reports and the development of use cases. The later work will highlight new research and inform proposals for any subsequent phase of the project. The workpackage builds on work already undertaken by the project partners detailed above (e.g. Adoption of e-Research Technologies theme) and the outcomes from other relevant projects relating to e-Science (e.g. e-Bank, AHRC Scoping e-Science); Virtual Research Environments (e.g. IB VRE, BVREH, Growl, Isme, Sakai VRE for educational research, Political Discourse and Silchester VREs, Mimetic and Iugo), and digital repositories (e.g. R4L, PERX, SPECTRa, and Cladder projects). The scoping study will also take account of more general work such as the UK e-Infrastructure Strategy Working Groups, and activities funded under the EU Research Infrastructures programme and through the NSF Office of Cyberinfrastructure. The work will be undertaken by the analyst and the research assistant under the direction of, and with contributions from, the principal investigators.

Deliverables: Literature review; matrix of existing activities by e-infrastructure component, subject domain and method/goal.

Responsibility: NCeSS, Oxford

Estimated working days: 35 (Oxford), 40 (NCeSS)

Workpackage 3. Experience Reports

Description: Data gathered for the experience reports will initially be based on an analysis of the recorded interactions with e-infrastructure in the published scholarly literature. The primary activity underpinning this workpackage will be a series of short and focused observational studies and interviews with key actors. Reports will be written in a semi-structured format that allows for comparison and contrasting. A set of focus groups will contribute to the definition of differences and similarities in preparation for the more general use cases. In addition to the project's own research, we will encourage the community to contribute material, to be edited and integrated with the overall corpus by the analyst and research assistant under the supervision of PIs from NCeSS and the e-Horizons Institute.

Deliverables: Collection of at least 30 experience reports, together with facilitator reports from the focus groups.

Responsibility: NCeSS, Oxford

Estimated working days: 70 (Oxford), 120 (NCeSS)

Workpackage 4. Use Cases and analysis

Description: Use cases will be assembled according to research goals common to a number of experience reports. Each use case will comprise a series of scenarios differing in the actors involved and/or the means used to achieve the goal. In this way we hope to capture the similarities as well as differences between different experiences and make them available in a more generic form that simplifies matching any given case with the model. The use cases will be fed back to the community for validation and comment at regular points and responses will feed iteratively into their development. Focus groups (or a combined workshop) will assist in producing milestone versions of the corpus. A period of analysis will seek to extract and consolidate evidence from each use case in order to identify, through a process of interpretation, what is common and what is distinct, especially (but not only) according to subject domain.

Deliverables: 15+ use cases; disciplinary overview report.

Responsibility: NCeSS, Oxford

Estimated working days: 70 (Oxford), 120 (NCeSS)

Workpackage 5. Domain and Service Usage Models

Description: This workpackage will undertake a deep analysis of the use cases to derive a series of service usage models. Each model will relate to a defined business function within the research domain (but noting where the SUM might be applicable to other domains), and articulate the relevant service patterns and the required service genres or service expressions. The SUMs will be developed in accordance with, but also in dialogue with, the e-Framework. One outcome from this work is likely to be a contribution to the e-Framework guidelines for the creation of domain and service usage models.

Deliverables: 15+ SUMs

Responsibility: NCeSS, Oxford

Estimated working days: 70 (Oxford), 120 (NCeSS)

Workpackage 6. Stakeholder and Community Engagement

Description: The project operates within a broader vision which seeks to identify interdisciplinary approaches to research questions. E-infrastructure is a facilitator of interdisciplinary (as well as multidisciplinary) research but its success in doing so is partly dependent on a supporting culture which promotes the mutual understanding of

methodologies and practice within particular disciplines and recognises both the shared and domain-specific assumptions which underpin such approaches. This workpackage will operate throughout the project and is intended to undertake community building around the project and help develop a sustainable model for future development and refinement of the use cases and scenarios. Activities include: developing the network of e-infrastructure providers and engaging the research community in the development and refinement of the use cases (to ensure consensus where appropriate, whether on shared methods or agreed differences); developing a working relationship with the Barriers to Take-up and Tools and Standards projects. Specific tasks include establishing participatory tools (e.g. wiki, dynamic use cases ('myUseCase')), identifying academic 'champions', establishing a series of focus groups and other events which bring together providers and researchers at key points in the project.

Deliverables: Reports from focus groups and seminars;

Responsibility: Oxford, NCeSS

Estimated working days: 15 (Oxford), 10 (NCeSS)

Workpackage 7. Model review and validation

Description: This workpackage will establish a peer-review mechanism to provide an element of quality assurance for the use cases and SUMs. Within the iterative cycle for the development of these components it is essential to seek and receive validation if the outputs are to be useful for both the research community and the future development of e-infrastructure components. This workpackage interacts with the Community Engagement workpackage and partly depends on the existence of the community portal. The project will align itself with, but also contribute to, the e-Framework review process.

Deliverables: Peer-review mechanism for the use cases

Responsibility: Oxford, NCeSS

Estimated working days: 10 (Oxford), 10 (NCeSS)

Workpackage 8. Community portal

Description: The aim of the infrastructure work package is to create a community portal that allows resources produced by the project to be worked up, managed, quality assured and consumed. We will implement a document repository, which allows experience reports, use cases, domain models and service usage models to be created and iteratively refined through a community process. At the time of writing we would plan to deploy the Alfresco open source content management system in conjunction with Gridsphere or an equivalent framework. Service usage models adopted by the e-Framework can link back to the community process and the other resources that have been created to underpin their formulation. We will enable the consumption of resources both interactively by people and automatically through web services using appropriate standards for semantic mark up (such as WSMO descriptions of services as provided by the e-Framework and Dublin Core metadata to describe the resources themselves). In this respect, the project will reuse appropriate metadata schemas and workflows developed by the Information Environment Service Registry (IESR). This workpackage takes advantage of an existing commitment by NCeSS to deploy the necessary portal and repository infrastructure. The consultancy budget allocated to this workpackage will enable the development of web-based interfaces to the resources (e.g., using Xforms to enable editing and viewing of structured documents) and necessary customisations.

Deliverables: Community portal underpinned by a document repository, and offering Web Services interface as well as interactive browse, search and contribute interfaces.

Responsibility: NCeSS

Estimated working days: 40 (consultancy)

Workpackage 9. Dissemination

Description: This workpackage, running throughout the project, will exploit the network of stakeholders created in workpackage 6 as well as our close links with UK e-Science stakeholders, including NeSC, AHeSSC, NaCTeM, OMII-UK and the National Grid Service. As part of the dissemination activities we will organise a workshop, possibly in collaboration with an appropriate event or organisation (e.g. eSI). Outputs from the project will be published through the community portal described in workpackage 8. We will establish a JISCmail mailing list and RSS newsfeeds to disseminate news about the project. In addition, we will disseminate to the wider research community through conferences and journals such as Computer Supported Cooperative Work, All Hands e-Science Meetings, International Conference on e-Social Science, Digital Resources for the Humanities and Arts, Conference on the Design of Cooperative Systems, Conference on Human Factors in Computing Systems, Access Grid-related conferences, such as AG Retreats, SC Global, and the Workshop for Advanced Collaborative Environments. The project team will also respond to invitations to contribute to events and publications (e.g. organised by participating service providers and projects) as resources permit.

Deliverables: Workshop proceedings; Project website; JISCmail mailing list

Responsibility: Oxford, NCeSS

Estimated working days: 20 (Oxford); 20 (NCeSS)

Workpackage 10. Project Evaluation

Description: We propose to undertake formative evaluation of the project through the appointment of two external evaluators, drawn from amongst current and former JISC project investigators, and appointed by the project steering group. The evaluators will provide assurance to the project that it is operating in accordance with good and proven practice. Evaluators will have early access to project documentation; be ex officio members of the project steering group; and requested to submit a short report for each year of the project.

Deliverables: Two evaluation reports

Responsibility: Steering Group

Estimated working days: 10

Timetable

22. The project operates over a 24 month period. We propose to undertake at least two cycles illustrated in *figure 1*. The outline timetable is as follows (a detailed Gantt chart will be submitted as part of any project plan).

	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
Project Management	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Survey and Scoping e-Infrastructure	█	█	█																		█	█		
Experience Reports			█			█			█			█			█			█						
Use Cases and analysis				█			█			█			█			█			█					
Domain and Service Usage Models					█			█			█			█			█			█				
Stakeholder and Community Engagement	█		█	█		█			█			█			█	█			█	█				█
Model review and validation			█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Community portal			█	█																				
Dissemination	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Project Evaluation										█												█		

Deliverables

- Literature review and planning matrix; overview report distilling use cases and SUMs;
- Focus group reports and other event proceedings, quarterly project reports;
- Community portal and open access repository of 30+ experience reports and 15+ use cases;
- 15+ service usage models contributed to e-Framework;
- 2 project evaluation reports.

Risk Assessment

Risk	Prob 1-5	Impact 1-5	Score (PxI)	Mitigation
Key staff may leave or be unavailable	2	4	8	Expertise is spread across a number of individuals at each institution, with the possibility of reallocation of staff.
Researchers or service providers reluctant to engage	3	3	6	Support received from a number of service providers. Each partner institution has a broad evidence base.
Difficulties in managing partnership may impact on project	1	4	4	Both institutions are experienced in working within consortium projects. A partnership agreement will be established early in the project.
Project does not keep pace with e-infrastructure developments	2	2	4	Community network intended to assist with knowledge gathering.
E-Framework process proves too complex to complete in lifetime of project	2	2	4	Early contact with e-Framework and work in collaboration with similar projects. Seek support from JISC Programme.

IPR Statement

23. Under the two universities' policies on intellectual property (IP), all rights in IP created by their employees in

the course of their employment will generally belong automatically to the university, except that the universities do not normally assert any claim to the ownership of copyright in scholarly materials. Results from this project will therefore be owned in the first instance by the universities as the employing institutions. The universities seek to maximise the commercial potential of its IP through their wholly-owned technology transfer companies. The project will put in place a partnership agreement which makes explicit where IP is to be held solely or jointly. In accordance with the desires of the e-Infrastructure Programme it is proposed to release project deliverables under either a Creative Commons licence or, in the case of software, under an OSI-approved open source software license to maximise the benefit for the wider community.

Value to Institutions and Sustainability

24. Since the project will provide a valuable body of evidence to contribute to the partner universities' own strategic plans for the development of ICT infrastructure services that will enable and support world-class research, they are willing to contribute 30% of the full economic cost. To sustain the project we will seek to develop a network comprising relevant partners from the research disciplines and JISC to oversee and nurture the community process after the project ends. We will seek to apply the principles of successful community building articulated by OSS Watch. We would also be likely to apply for research network funding from the research councils. NCeSS will underwrite the operation of the community portal as part of its existing IT infrastructure for the duration of five years.

B. Budget

[Removed from public version.]

C. Key Personnel

University of Oxford (RTS/e-Horizons Institute)

25. **Michael Fraser** is head of the Research Technologies Service at Oxford University Computing Services, an Associate Director of the Oxford e-Research Centre, and Director of Intute Arts and Humanities. He is a co-investigator for three VRE projects (Integrative Biology; Sakai VRE Demonstrator; and Building a VRE for the Humanities). He has also been principal investigator for a number of other projects relating to access management, institutional repositories, and humanities computing. He is a member of various advisory committees and is currently Technical Secretary for Oxford's ICT Strategy. He has an academic background in the humanities with a PhD in theology from Durham University.
26. **Marina Jirotko** is Director of the Oxford Centre for Requirements and Foundations, Lecturer in Requirements Engineering at Oxford University Computing Laboratory and Fellow of St Cross, Associate Director of the Oxford e-Research Centre (OeRC), and James Martin Research Fellow at the eHorizons Institute. Her main areas of research have been developing novel methods and techniques for requirements capture drawn from the social sciences, focussing on workplace studies, practice driven requirements and design elicitation. She developed the Requirements Engineering module that forms part of the MSc in Software Engineering and the MSc in Computer Science. She has also worked on various industrially funded research projects, DTI and ESRC and EPSRC projects. She has been the requirements analyst on flagship e-Science projects such as eDiaMoND and is advisor on requirements methods and techniques for e-Science projects such as Integrative Biology and Virtual Research Environments for Humanities. She is Co-Director of the Oxford e-Social Science NCeSS node investigating the Ethical, Legal and Institutional Dynamics of Grid Enabled e-Sciences and is Principal Investigator of the EPSRC project Embedding e-Science Applications: Designing and Managing for Usability.
27. **Matthew Mascord** is the manager of the JISC-funded Integrative Biology VRE project based at Oxford University and is also a co-investigator on the EPSRC/AHRC-funded project 'Virtual Workspace for the Study of Ancient Documents'. Previous roles include several years working in the software industry, undertaking business and requirements analysis as well as system design and development for the energy, automotive, and publishing sectors. More recently, at the Rutherford Appleton Laboratory (RAL), he made major contributions to a scoping study for, and led the implementation of, an Open Access Institutional Repository for the Council for the Central Laboratory of the Research Councils (CCLRC). His professional interests include management methodologies for e-research projects, and putting into practice novel methods for requirements capture in authentic research settings. Matthew will undertake both the Analyst and the Project Manager roles for the project.

University of Manchester (NCeSS)

28. **Rob Procter** is Professor and Research Director of the ESRC-funded National Centre for e-Social Science (NCeSS). His role at NCeSS focuses on developing Centre research strategy, coordinating development of applications of Grid tools and services in social science research, and leading the investigation of socio-technical issues which may influence the wider take up of Grid-based solutions. Professor Procter is a member of the EPSRC e-Science Strategic Advisory Team, the JISC Virtual Research Environments Programme

Advisory Board, the JISC e-Infrastructure Programme Advisory Board, the e-Science Institute Scientific Advisory Board, e-Science Usability Task Force, the e-Science User Group, the OMII-UK User Group and the AHRC ICT Programme Steering Committee.

29. **Peter Halfpenny** is Professor of Sociology and Executive Director of the ESRC-funded National Centre for e-Social Science (NCeSS). His role in NCeSS is overall strategic management of the Hub, seven Research Nodes and 12 Small Grant Projects, and he is responsible to the ESRC for the success of the Centre's programme of research, outreach and capacity-building. His own research interests are in the integration of Grid tools and services into a comprehensive support environment for social science researcher practitioners, and the investigation of the adoption and adaptation of support tools across the social research community.
30. **Alex Voss** is a computer scientist with an interest in the organisational use of ICT and the relationship between design and use of IT systems. His technical interests and skills revolve around enterprise computing (esp. J2EE technologies) and component architectures. His practical experience in building working systems, both in research and in industry contexts resonate with a number of issues involved in the organisational use of technologies, esp. regarding various aspects of dependability such as availability, maintainability or security. In addition to his post as a research associate at NCeSS, Alex is a research theme leader at the e-Science Institute, working on the uptake and sustainability of e-Research.

Historical Document

D. Supporting Letters

Letters of support were received from:

Paul Jeffreys, University of Oxford
Sharon Hammond, University of Manchester
Malcolm Atkinson, eScience Institute
Julia Chruszcz, MIMAS
David Medyckyj-Scott, EDINA
Sheila Anderson, AHDS
Andrew Richards, NGS
Seamus Ross, HATII
Steven Newhouse, OMII-UK
Sophia Ananiadou, NaCTEM
Michael Daw, Access Grid Support Centre

Historical Document