



Project Document Cover Sheet

Project Information			
Project Acronym	iREAD		
Project Title	iRODS Evaluation and Demonstrator		
Start Date	1 st March 2008	End Date	31 st May 2009
Lead Institution	University of York		
Project Director	Professor Jim Austin		
Project Manager & contact details	Dr Tom Jackson, Department of Computer Science, University of York, York YO10 5DD, tom.jackson@cs.york.ac.uk tel 01904 567711		
Partner Institutions	None		
Project Web URL	www.cs.york.ac.uk/~iREAD		
Programme Name (and number)			
Programme Manager	James Farnhill		

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Document History		
Version	Date	Comments
1.a	28.05.08	Initial Draft, for JISC evaluation
1.b	09.06.08	Revised draft following JISC review



Overview of Project

This project will provide an in-depth evaluation and demonstration of the iRODS system¹, assessing its capabilities and role within a distributed data management scheme and complex virtual organisation driven by real-world requirements from the CARMEN² e-Science project.

Distributed data management issues are still a major challenge in addressing the ubiquity and usability of Grid systems, particularly within the context of complex virtual organisations (VO) where flexible security models and fine-grained role based access are a pre-requisite. The Storage Request Broker (SRB) software from SDSC has established itself as one of the leading Grid middleware applications to support the management of highly distributed large scale datasets for science applications. SRB provides the capability to virtualise distributed datasets, and to provide standardised access to a broad range of underlying storage technologies, spanning flat file systems through to database servers and tape archiving systems. Through the use of SRB, end-users are freed from concerns about the location of data and determining the correct procedures to recall or transfer data to their local or host compute environment. SRB abstracts these challenging aspects of distributed data management away from the end-user, and provides a simplified and uniform way to recall data via indexing systems (metacatalogs) which keep a logical mapping of the underlying distributed data. SRB has been widely adopted within large-scale Grid applications, particularly in the science communities, and provides the data management backbone for the National Grid Service (NGS).

However, SRB does have limitations particularly in regard to integration with complex VO's. These have been recognised by the developers of SRB at SDSC and a new version, iRODS, has recently been released to address the short-comings within SRB. Many of the limitations within SRB relate to the metadata schemes used to describe and annotate the data collections. In many cases these metadata mechanisms are too restrictive and inflexible to support complex meta-data schemes for complex role-based Grid systems. iRODS is now in beta release, and as part of the objectives of the JISC e-infrastructure initiative, this project will assess the impact that the new features and functions within iRODS will have on the UK e-Science community, and assess its potential for deployment within the NGS.

2. Aims and Objectives

This project provides a 15month, in-depth evaluation to investigate and demonstrate the capabilities of iRODS, within the context of the UK e-Science activities and initiatives.

The project will address this evaluation through five main work-packages:

1. A demonstration implementation of the iRODS system data management system deployed for open access and evaluation via the White Rose Grid and NGS system, which will demonstrate controlled access to distributed data across a collaborative VO environment;
2. An evaluation of the iRODS system for fine-grained role-based access in a real-world Grid based virtual organisation scenario, driven by the use-case requirements from an active national large-scale e-Science project, CARMEN;
3. An assessment of the maturity of the iRODS technology for integration with existing UK e-Science security infrastructures and systems such as Grid-shib and Kerberos;
4. Analysis of the capabilities of iRODS for integration with existing e-Science SOA infrastructure and middleware systems, notably the York PMC middleware stack for distributed data-mining;

1. _____

¹ See http://irods.sdsc.edu/index.php/Main_Page

² See <http://www.carmen.org.uk>

5. Wide-scale dissemination and technology transfer of the project results via national initiatives including the National Grid Service, White Rose Grid e-Science centre, the OMII and WUN.

The White Rose Grid (WRG) computing infrastructure, operating since 2002 between the Universities of Leeds, Sheffield and York will serve as the basis for the investigations. The WRG will provide a well established Grid infrastructure, has a large user base and supports a broad range of science and research software applications. In particular, the WRG hosts one node of the CARMEN e-Science infrastructure, which provides a data archiving and collaborative working environment for neuroscience research. The CARMEN system is being actively developed, already deploys SRB and has complex security and data management requirements, hence it will provide an ideal case study environment to assess the capabilities of iRODS within a wide user community.

3. Overall Approach

The project will focus on development of demonstrators, deployed on the White Rose Grid to assess the functionality and viability of iRODS for e-Science deployment, from different technical perspectives.

The project will also draw use case material and deployment scenarios from the CARMEN project, which will provide real world drivers for iRODS deployment and assessment.

4. Project Outputs

Output	Brief description
Demonstrators	
D1.2 WRG iRODS demonstrator	Reference implementation on WRG
D3.2 Integration with SOA	Integrate iRODS with typical SOA middleware application
D4.3 Security iRODS demonstrator	Integration of iRODS with Grid security schemes on WRG
D5.4 WUNGrid Demonstrator	Demonstration of iRODS on Global WUNGrid system
Reports	
D1.3 Migration to iRODS	Report on migrating from SRB to iRODS infrastructure
D2.4 iRODS Role-based Access	Report on findings of role-based access studies
D3.3 SOA Integration	Report on integration of iRODS with SOA architectures
D4.4 iRODS security Integration	Report on integrating iRODS with Grid security infrastructures
D5.5 iREAD Final Project Report	Final report to JISC on assessment of iRODS
Workshops/Events	
D5.1 AHM Presentation	Presentation/Demos at EPSRC AHM events
D5.2 WRG Workshop	Workshop event to disseminate the results of the study to regional stakeholders and WRG partners (NGS, ETF, EPSRC)
D5.3 OMII Presentation	Presentation of results to OMII

5. Project Outcomes

The primary outcome of the project will be an in-depth analysis of the capabilities of the iRODS data management system, and its impact for deployment within the UK e-Science community and NGS. The new functions of the system will be evaluated from the perspective of their potential for integration with UK e-Science SOA middleware and community security schemes such as Grid-Shib and Kerberos.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
JISC Programme Committee	JISC e-Science infrastructure	High
WRG	Grid strategy development	High
National Grid Service	Impact of iRODS for NGS	High
CARMEN Consortium	Use of iRODS	High

OMII	UK e-Science middleware	Medium
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The study will involve key stakeholder groups from a diverse range of user, support and developer interests.

- JISC Programme Committee – results of the study will feed into the UK e-Science infrastructure strategy;
- WRG – Will inform WRG Exec and technical committees on role of iRODS for future White Rose Grid development;
- National Grid Service - NGS will need to formulate policy on future adoption and deployment of iRODS, and are involved in development of iRODS code-base.
- OMII – development of UK middleware tools and services;
- CARMEN Consortium – a large scale EPSRC e-Science pilot project which will be a likely adopter of iRODS if the technology meets operational requirements.

7. Risk Analysis

Risk	Like- lihood (1-5)	Impact (1-5)	Rank	Risk Mitigation
Staffing				
Recruitment delays	1	4	4	The project staff are already in place
Learning Curve for iRODS	2	3	6	Experienced SRB developers will be deployed on the project from an existing project team
Technical				
Incompatibility of iRODS with UK e-Science infrastructure	1	4	4	The purpose of the project is to assess this issue and to influence the iRODS development programme where possible
Project Scope creep	1	3	3	Focused deliverables and demonstrators have been defined.
Impact of other software services/solutions	1	3	3	SRB is leading edge in terms of Grid data virtualisation
Instability of iRODS software	3	4	12	Project team will maximise working relationship with SDSC to promote bug fixes and feature enhancement
Organisational				
Accessibility to CARMEN stakeholders	1	4	4	Key personnel will be shared between the projects to ensure close collaboration
Access to WRG resource	1	3	3	WRG support staff will be on the project team and WRG Exec have committed to support of the project
Legal				
None anticipated				
External Suppliers				
Access to iRODS	1	5	5	iRODS is open-source and the working relationship with SDSC will prevent any issues in regard to access to the code base

8. Standards

Name of standard or specification	Version	Notes
Web Service Standards		Will comply to current best practice (OASIS) standards for web service development

Apache Tomcat	Ver 6.0.x	Latest version will be deployed
AXIS	Ver 1.4	Current SOAP standard for web service deployment
iRODS	Ver 1.0	Will work against first formal release of iRODS

9. Technical Development

The iREAD project is primarily an evaluation of an existing software application, iRODS, and hence, only minimal software development is anticipated during the project. However, the project will be carried out against current software engineering best practices within the Department of Computer Science. Requirements and modelling will be achieved through the use of UML.

Software versioning and control will be achieved through the use of a SVN system.

Any software developed will be documented to an appropriate level, both at the code level and at the user documentation level.

10. Intellectual Property Rights

In line with JISC's policy the results of the project evaluation and the demonstration system will be made available to the wide UK HE and FE community. This will be ensured through dissemination of outputs via the OMMI, NeSC and the WRG. The demonstration system will be made available for assessment and interaction via the WRG, and will remain supported as a demonstration system beyond the life of the study. IP on the outputs will remain with the University of York, and its WRG partners.

The PMC software used for one demonstration application is proprietary to Cybula (University of York spin-out company) and the IP for this will remain with Cybula. Cybula will grant full rights for use during the project and for the life of the demonstrator system

Project Resources

11. Project Partners

The project is led solely by the University of York. However, some collaboration will be supported via the White Rose Grid consortium. No funding provision has been made for this, and as such no collaboration agreement is required.

12. Project Management

The University of York will run the project, with close collaboration with the development teams, user-groups, support staff teams from the White Rose Grid, the WRG e-Science Centre and the CARMEN consortium (in which York are also a lead partner).

The project management team will be drawn from the academic leaders, Prof. Austin and Dr Tom Jackson. The project management team will be charged with the tasks of:

- Developing Project Management plans
- Managing the projects technical progress;
- Reporting and collaboration with JISC Programme Manager;
- Managing coordination between diverse e-Science stakeholders;
- Liaison with the WRG e-Science Centre and the WRG Executive;
- Coordination with stakeholder parties, including NGS, CARMEN, and OMII.
- Wider UK dissemination and exploitation;

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Project progress will be reviewed against the project's work-plan at regular project team meetings, and in consultation with the JISC project manager. Meetings with the JSIC project manager will take place twice (at York) during the project to review progress.

The management team have considerable experience of managing the successful implementation of large-scale e-Science projects and the management formalisms and experience from those projects will be applied.

Staff Resources:

PI - Professor Jim Austin,
Department of Computer Science, University of York, York YO10 5DD tel 01904 432734 fax 01904 432767 austin@cs.york.ac.uk

Project Manager - Dr Tom, Jackson
Department of Computer Science, University of York, York YO10 5DD tel 01904 567711 fax 01904 432767 tom.jackson@cs.york.ac.uk

Senior RA - Mark Jessop
Department of Computer Science, University of York, York YO10 5DD tel 01904 567712 fax 01904 432767 mark.jessop@cs.york.ac.uk

Technician – Mark Hewitt
Department of Computer Science, University of York, York YO10 5DD tel 01904 567712 fax 01904 432767 mark.hewitt@cs.york.ac.uk

Training Requirements:

The development team will attend the NeSC iRODS training week, to gain a quick insight into the deployment or iRODS. No other training requirements are anticipated, due to the team's prior experience with SRB.

13. Programme Support

The project will be looking for support in coordinating with other e-Infrastructure projects, where appropriate synergy can be obtained.

14. Budget

See Appendix A.

Detailed Project Planning

The study will be addressed in five main work packages identified above, and leading to key deliverables under the following themes:

1. Reference implementation and Demonstrator
2. Demonstration of fine-grained access control for VO's (within CARMEN)
3. UK NGS/e-Science integration
4. Security infrastructure integration
5. Dissemination activities

Phase 1: iRODS Demonstration Implementation

A core element of the project will be the development of a reference demonstration implementation of the iRODS system, which will be accessible to the wider e-Science community. This will be hosted on the White Rose Grid, and where possible will be federated with the NGS SRB infrastructure to provide exemplar usage across existing reference datasets.

There are several benefits to implementation within the WRG environment:

1. The White Rose Grid is a fully operational Grid environment, running a mix of leading edge middleware infrastructure with a distributed user-base across the three host University sites (Leeds, Sheffield, and York). This environment provides the opportunity to assess the impact of iRODS deployment in a realistic, large-scale operating environment, across a range of diverse security policies and user authentication schemes (such as Grid-shib).
2. The White Rose Grid has an existing and functional SRB infrastructure, which is populated with a diverse range of datasets across numerous data zones. This will provide:
 - a. The opportunity to assess the impact of migration from SRB to iRODS (particularly those features of iRODS which have been developed to support this migration path)
 - b. The opportunity to build upon existing WRG SRB demonstrators and data sets to provide a demonstration system for the wider e-Science community. This re-use will remove the overhead associated with building new demonstration applications and allow the development team to focus on the core functional capability assessment of iRODS
 - c. The WRG is a compute node within the National Grid Service (NGS) and hence is ideally placed to scale the demonstration capability to the NGS and to provide demonstration access to NGS users.

DELIVERABLES:

- D1.1 iRODS reference implementation
- D1.2 iRODS application demonstrator on WRG
- D1.3 Report on migration to iRODS infrastructure

Phase 2 – iRODS Role-based access in VO Context

An important aspect of the project will be the assessment of iRODS within the context of real-world operating constraints for Grid-based VO's. To this end, iRODS assessment will be extensively supported by an evaluation within the scope of the CARMEN e-Science project. The CARMEN project brings together experimental and theoretical neuroscientists with computer scientists to address the complete lifecycle of neuroscience knowledge, and to develop a collaborative working environment for neuroscience data management and data analysis. The system will rely heavily on distributed data management capability, and is a complex VO with diverse stakeholders and highly sensitive datasets which must be securely managed, including authorised and authenticated role-based access. CARMEN will be a live UK system, used by neuroscientists in the project. It is being aligned with the international neuroscience initiative (INCF), as well as the national INCF node.

CARMEN is already deploying SRB across its Grid nodes, CAIRNS, which is being used to provide data virtualisation. However, issues of role-based access and integration with the CARMEN security infrastructure, GOLD, and sophisticated meta-data management will be pivotal to the success of the project. GOLD is a UK e-Science EPSRC funded project investigating practical aspects of developing and deploying virtual organisations (VOs) and developing proof-of-concept OGSA/SOA middleware and tools for VO management. The project focuses on highly dynamic VOs across full R&D lifecycles. The developed middleware is generic and applicable to other e-Science sectors. As such it has been adopted as the VO and security framework for CARMEN. Assessment of iRODS will be carried out to investigate the mapping between the GOLD VO mechanisms, and the ability to support rules for role-based access in iRODS.

This study will permit a parallel evaluation path, whereby the iRODS system can be fully evaluated alongside the current SRB deployment, **with a view to early adoption in CARMEN** if the iRODS functionality is stable. The functional requirements for CARMEN) will produce a set of detailed use-case and scenario documents which will form the basis of the iRODS reference implementation. Having clear e-Science project driven requirements for role-based access and security schemes will permit the development team to approach the iRODS evaluation from an applied, systems integration approach rather than as an abstract academic assessment.

DELIVERABLES:

- D2.1 Use Case scenarios for complex Grid-based VO
- D2.2 IRODS implementation of role-based access for VO
- D2.3 Integration with GOLD VO infrastructure
- D2.4 Documentation and reports on iRODS role-based access mechanisms
- D2.5 Analysis for CARMEN pilot project adoption

Phase 3 – Integration with UK e-Science Infrastructure

Early UK e-Science adoption of iRODS will be dependent upon its ability to readily integrate with existing e-Science infrastructure. To this end, an example pilot integration of iRODS with the Pattern Match Control system from York will be assessed. PMC has been developed by the York proposal team, and provides a highly representative OGSA/SOA compliant, e-Science middleware infrastructure.

Pattern Match Controller (PMC) is a distributed data mining technology for remote data management and analysis. It provides the capability to mine remote, non-relational datasets in-situ, and to abstract away the problems of distribution from the end-user or client. The current system has been deployed on top of several federated SRB data zones. It is a critical component within the CARMEN system for managing distributed pattern matching on neural spike train data. It serves as a well-understood, highly functional middleware application that can benefit from integration with iRODS. Key integration issues will include:

- a. Assessment of the ability to transmit semantic search constraints with a request for a PMC driven search, such that the search can be directed or constrained at a remote node.
- b. Assessment of the ability to launch remote OGSA services via iRODS, at a remote data node, to facilitate pre or post-processing of the data.

The results of integration with this SOA middleware system will serve as the basis for 'lessons-learnt' documents, describing the development route for iRODS and its level of compatibility with UK e-Science infrastructure. Successful integration with the PMC technology will also lead to its early adoption within the deployed CARMEN system.

DELIVERABLES:

- D3.1 iRODS integration with middleware SOA system, the PMC
- D3.2 Demonstration implementations on the WRG
- D3.3 User Documentation and reports on middleware integration process

Phase 4 – Integration with Grid Security Frameworks

Distributed security models which are scalable and flexible are a critical requirement for the real-world creation of dynamic VO's in Grid based systems. The UK e-Science programme has funded extensive research in these issues and a number of security frameworks and middleware stacks are emerging as a result. Two emerging security models with wide academic take-up are Kerberos and Shibboleth (and its derivative Grid-Shib). IRODS will need to interact with these two security models if it is to be widely adopted within the UK e-Science community. Hence, the proposal will seek to evaluate and demonstrate the integration of both Shibboleth (Grid-Shib) and Kerberos security models within a Grid deployment. Key aspects of the iRODS technology that will be evaluated are its publicised features for GSI authentication, Shibboleth authentication, and access controls on rules and micro-services. A successful integration of these two technologies will demonstrate how iRODS can underpin a complex VO in a distributed Grid framework.

This work will be aided by existing experience and infrastructure within the WRG, which has instances of both Kerberos and Grid-Shib already deployed.

DELIVERABLES:

- D4.1 iRODS assessment for integration with Grid-Shib security framework
- D4.2 iRODS assessment for integration with Kerberos security framework

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- D4.3 Demonstration implementation on the WRG
- D4.4 User Documentation and reports on integration process

Phase 5 – Dissemination Activities

Dissemination of the project results to the wider e-Science community and within the JISC e-Science infrastructure will be an important focus within the project.

The White Rose Grid consortium will provide full support for the project, including the host evaluation environment and, where required, technical support for hosting the demonstration system. The WRG is a node of the NGS system, and hence there will be immediate transparency of the WRG demonstration system through to the NGS community.

A number of specific activities will be conducted to disseminate the results of the evaluation and study:

1. A **Workshop event** will be hosted within the framework of the WRG e-Science centre. The e-Science centre is ideally placed to host and advertise a workshop event, given its established position within the UK e-Science community and due to its links with the NGS, the ETF and the other regional e-Science centres.
 - A **themed conference session** on distributed data management will be hosted by the project team as part of the Fifth International Conference on Condition Health Monitoring³, Edinburgh 15-18th July 2008. The ongoing project results will be presented.
 - A **demonstration and presentation** will be made at the EPSRC All Hands Meeting as part of the WRG e-Science centre activities at the AHM.
 - A **demonstration** will be provided across the WUNGrid infrastructure to present the results to the wider WUN membership (SDSC are a partner member);
 - A **presentation** to the **OMII** will be made on the project outcomes and wider implications of iRODS use within other OMII initiatives such as OGSA-DAI.
 - Participation in JISC e-infrastructure events will be fully supported, including participation in:
 - JISC bi-annual programme meetings
 - Cluster meetings and topic-related workshops, where appropriate
 - JISC CETIS special interest groups

A **website** will be developed to support the ongoing activities of the project and to disseminate the final project results. This will be hosted within the current WRG website portal⁴, to ensure wide exposure of the project activities and to maximise longevity of the website, as part of the WRG's ongoing portfolio of projects and community reports.

DELIVERABLES:

- D5.1 AHM Presentation and Demonstration
- D5.2 iRODS WRG workshop event
- D5.3 OMII Presentation
- D5.4 WUNGrid Demonstration
- D5.5 iREAD Final Project Report

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³ See www.cm2008-mfpt2008.org

⁴ See <http://www.wrgrid.org.uk/>

15. Workpackages

WORKPACKAGES	Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1: iRODS Reference Implementation	6mth															
2: iRODS VO Assessment	5mth															
3: SOA Integration	4mth															
4: Grid Security Integration	6mth															
5: Dissemination	3wks															
Total	15mth															

See Appendix B for detailed deliverable breakdown.

16. Evaluation Plan

As the project is an evaluation of an existing software application, iRODS, for which the control is outside the scope of the project, there will be no formal evaluation of the software deliverables. Any deliverables will be developed as assessment mechanisms or demonstrators of iRODS functionality and there will no formal software services delivered as a result of the study.

17. Quality Plan

Output	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
Sep 08	Effective iRODS Demonstration	Independent User Evaluation	Report	T Jackson	
Jan 09	Effective VO integration demonstration	Independent User Evaluation	Report	T Jackson	
May 09	iRODS security demonstration	Independent User Evaluation	Report	T Jackson	
Jun 09	iRODS SOA demonstration	Independent User Evaluation	Report	T Jackson	

18. Dissemination Plan

Timing	Dissemination Activity	Audience	Purpose	Key Message
July 08	Condition Monitoring workshop	UK engineering and academic community	Disseminate project vision and plans	Relevance of iRODS for data management applications
July 08	JISC Innovation Forum	UK e-Science community	Disseminate project vision and plans	Project plans and vision for iREAD
Sept 08	EPSRC All Hands Meeting	UK e-Science community	Disseminate project progress	Availability of iRODS demo system
Jan 09	WUNGrid	Global WUN community	Promote uptake of iRODS on WUNGrid	Relevance of iRODS for global collaborative e-Science
Mar 09	Grid Computing Now Webinar	UK grid computing	Disseminate results to Grid	Relevance of iRODS to Grid

		community	community	computing
May 09	WRG E-Science Workshop	UK e-Science community	Report project outcomes	Viability of iRODS for UK e-Science
May 09	OMII presentation	OMII community	Disseminate project outcomes to UK OMII	Viability of iRODS for UK e-Science
July 09	JISC Innovation Forum	UK e-Science community	Disseminate project outcomes to JISC community	Viability of iRODS for UK e-Science

19. Exit and Sustainability Plans

The major project deliverables will be technology demonstrators and evaluation reports. The demonstrators will be maintained on the WRG for a period of two years after the project end, supported via the WRG e-Science centre. Evaluation reports and assessments will be maintained on the iREAD project website. Findings and outcomes will be disseminated to relevant UK e-Science communities via the mechanisms listed above in Section 18.

Where a User Community has been established using iRODS, efforts will be pursued to support the continued work of the project via this User Community, supported by joint activity between the WRG e-Science Centre and the OMII.

Key findings will be fed back to the SDSC iRODS development team to encourage enhancements and upgrades to the iRODS functionality, where and if required.

Project Outputs	Action for Take-up & Embedding	Action for Exit
WRG Demonstrators	Will be maintained via the WRG e-Science centre on the WRG	Hand over demonstration code and systems to WRG e-Science staff
Evaluation Reports	Archived on iREAD website	Updating iREAD website

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
WRG demonstrators	Demonstrators will have useful purpose to e-Science community beyond the scope of the evaluation	Supported via WRG e-Science centre	Upgrades to iRODS software

Appendixes: Appendix A. Project Budget

Directly Incurred Staff	Mar 07 - Apr 08	Apr 08 – Mar 09	Apr 09 – Mar 10	TOTAL £
Total Directly Incurred Staff (A)	£5,277	£63,320	£10,553	£79,150
Non-Staff	Mar 07 - Apr 08	Apr 08 – Mar 09	Apr 09 – Mar 10	TOTAL £
Travel and expenses	£200	£ 2,400	£400	£3,000
Hardware/software				
Dissemination		£4,000	£1,000	£5,000
Evaluation				
Other – WRG Facility Costs	£267	£3,200	£533	£4,000
Total Directly Incurred Non-Staff (B)	£800	£9,600	£1,600	£12,000
Directly Incurred Total (A+B=C) (C)	£6,077	£72,920	£12,153	£91,150
Directly Allocated	Mar 07 - Apr 08	Apr 08 – Mar 09	Apr 09 – Mar 10	TOTAL £
Staff	£991	£11,893	£1,982	£14,866
Estates	£1,711	£20,526	£3,421	£25,658
Other				
Directly Allocated Total (D)	£2,702	£32,419	£5,403	£40,524
Indirect Costs (E)	£5,942	£71,302	£11,884	£89,128
Total Project Cost (C+D+E)	£14,720	£176,642	£29,440	£220,802
Amount Requested from JISC	£11,776	£141,313	£23,552	£176,642
Institutional Contributions	£2,944	£35,328	£5,888	£44,160
Percentage Contributions over the life of the project		JISC 80 %	Partners 20 %	Total 100%

Appendix B. Workpackages

Workpackage and activity	Earliest start date	Latest completion date	Outputs (clearly indicate deliverables & reports in bold)	Milestone	Responsibility
<p>WORKPACKAGE 1: iRODS Demonstration Implementation</p> <p>Objective: Provide a reference system implementation of iRODS for UK e-Science community</p>					
1. Deploy iRODS on WRG	01.03.08	30.04.08	Full iRODS installation		MJ/MH
2. Develop demonstrator application	01.05.08	30.08.08	Public iRODS Demonstrator on WRG	D1.2	MJ/MH
3. Report on migration to SRB	15.08.08	30.10.08	Interim Progress Report on Migration to iRODS	D1.3	MJ/TJ
<p>WORKPACKAGE 2: iRODS Role Based Access</p> <p>Objective: To assess to the use of iRODS rules for integrating with role-based access policies</p>					
4. Use Case scenarios for Grid-based VO	01.08.08	30.08.08	Requirements and Use cases for RBA		MJ/TJ
5. IRODS implementation of RBA for VO	01.09.09	30.11.08	Develop iRODS RBA rule set		MJ/MH
6. Integration with GOLD VO infrastructure	01.10.08	31.12.08	Integrate into CARMEN security infrastructure	D2.3	MJ/MH
7. Documentation and reports on iRODS role-based access mechanisms	01.12.08	31.01.09	Report on iRODS Role-base access	D2.4	MJ/TJ

8. Analysis for CARMEN pilot project adoption	01.12.08	31.12.08	Progression plan for CARMEN		TJ/MJ
WORKPACKAGE 3: SOA Middleware Integration					
<u>Objective:</u> Demonstrate iRODS integration with SOA middleware architecture					
9. iRODS integration with middleware SOA system, the PMC	01.11.08	31.12.08	Complete integration of the iRODS system with the SOA PMC tool		MJ/MH
10. Demonstration implementations on the WRG	01.01.09	28.02.09	Demonstrator of iRODS integration with SOA middleware application on WRG	D3.2	MJ/MH
11. User Documentation and reports on middleware integration process	15.02.09	31.03.09	User documentation and reports on process		TJ/MJ
WORKPACKAGE 4: Integration with Grid Security Frameworks					
<u>Objective:</u> To investigate the integration of iRODS with Grid security schemes such as Shiboleth and Kerberos					
12. iRODS assessment for Shiboleth integration	01.12.08	28.02.09	Report on feasibility of integrating iRODS with Shiboleth security framework		MJ/MH
13. iRODS assessment for Kerberos integration	01.12.08	28.02.09	Report on feasibility of integrating iRODS with Kerberos security framework		MJ/MH
14. Demonstrator on WRG	01.03.09	31.05.09	Demonstration facility for security integration on WRG	D4.3	MJ/MH
15. User Documentation and Integration reports	01.05.09	31.05.09	Reports on Security Integration process	D4.4	MJ/TJ
WORKPACKAGE 5: Dissemination Activities					
<u>Objective:</u> Dissemination of the project results to					

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the wider e-Science community				
16. AHM presentation	08.09.08	11.08.08	Raising awareness of iREAD activities via the WRG booth at AHM	TJ/MJ
17. WunGrid Demonstration	15.02.09	28.02.09	Demonstration of iRODS capability to WUNGrid community	TJ/MJ
18. OMII Presentation	15.05.09	30.05.09	Dissemination of project results to OMII	TJ/MJ
19. iRODS WRG Workshop event	15.05.09	30.05.09	Dissemination of project results via the WTG e-Science centre	TJ/MJ
20. iRODS Final Report	15.05.09	30.05.09	Dissemination of project results via the WTG e-Science centre	TJ/MJ

Milestones	Owner			Due
WORKPACKAGE 1: WRG Implementation				
1. D1.2 iRODS Application Demonstrator	York		iRODS application to demonstrate iRODS capability	M1 30.08.08
2. D1.3 Interim Report	York		Migration to iRODS from SRB	M2 30.10.08
WORKPACKAGE 2: VO Assessment				
3. D2.3 GOLD VO Integration	York		Implementation of iRODS with GOLD VO	M3 31.12.09
4. D2.4 Interim Report	York		Report on iRODS support for role-based access	M4 31.01.09
WORKPACKAGE 3: Grid Security				
5. D3.2 WRG Demonstration Integration	York		Demonstration of iRODS with PMC SOA system	M5 28.02.09
6. D3.3 Interim Report	York		Report on iRODS Integration with SOA Architectures	M6 31.03.09
WORKPACKAGE 4: SOA Assessment				

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7. D4.3 WRG SOA Demonstrator	York		Integration of iRODS with WRG Grid security system	M7 31.05.09
WORKPACKAGE 5: Dissemination				
8. D5.5 Final Report	York		iREAD Final Report and Recommendations	M8 31.05.09