



ARCS Annual Business Plan

1 July 2010 to 30 June 2011

**Professor Anthony G Williams
Executive Director of ARCS**

<http://www.arcs.org.au>

Contents

1. MISSION STATEMENT AND CONTEXT	4
2. EXECUTIVE SUMMARY	5
3. LEGAL STRUCTURE	8
4. GOVERNANCE	8
5. STAFFING	10
6. POLICIES & PROCEDURES	11
6.1.1. Quality Management	11
6.1.2. Procurement Management	11
6.1.3. Service Delivery	11
6.1.4. Safety	11
6.1.5. Access and Pricing	12
6.1.6. Information Management	12
6.1.7. Intellectual Property	12
7. RISK MANAGEMENT	13
8. ORGANISATIONAL CHART	17
9. ARCS STRATEGIC OBJECTIVES	18
9.1. Executive Summary of Objectives	18
9.1.1. Summary of Progress and Planned Activities	18
9.1.2. Review of Key Goals for the Final NCRIS Year	19
9.1.3. Measurements	20
9.2. Processes for Transitioning Services and Retaining Staff in the Sector	20
9.3. Core National Services	21
9.3.1. Summary	21
9.3.2. Service Architecture	22
9.3.3. Standards	23
9.3.4. National Enabling Services	23
9.3.5. Operations and Support of National Enabling Services	24
9.3.6. Operations and Management	25
9.3.7. Support	25
9.3.8. Extensibility	25
9.3.9. The Operations Group	25
9.3.10. Goals of the Operations Group	25
9.3.11. Approach	Error! Bookmark not defined.
9.3.12. Organisation of Operations Group	26
9.3.13. Issues and Opportunities	26
9.3.14. Core National Service Nodes	27
9.4. Development for ICI	28
9.4.1. Milestones for ICI	28

9.5. Development for Security Services	29
9.5.1. Milestones for Security Services/Authorisation	29
9.6. NeAT Projects	31
9.6.1. Summary of Progress	31
9.6.2. NeAT Project Governance	32
9.6.3. Planned Activities for the Period	32
9.6.4. NeAT Round 1 Projects - Summary	33
9.6.5. NeAT Round 2 Projects - Summary	34
9.6.6. Milestones	35
9.6.7. Staffing Levels	36
10. MARKETING AND OUTREACH	37
11. NATIONAL & INTERNATIONAL ENGAGEMENT	37
11.1.1. Cooperative Relationships	37
12. COLLABORATION WITH NCRIS AND RESEARCH CAPABILITY AREAS	38
13. BUDGET	42
13.1.1. Staff Funding Levels & Rates	42
13.1.2. ICI Agreement Funding Conditions	43
13.1.3. Authorisation Services Agreement Funding Conditions	43
13.1.4. NeAT Funding	43
13.1.5. Cash Management	43
13.1.6. Non-Personnel	44
13.1.7. In-kind for Service Areas	44
13.1.8. In-kind for NeAT	44
APPENDIX A: ARCS KEY PERFORMANCE INDICATORS FROM AERIC	45
APPENDIX B: ARCS FINANCIAL BUDGET 2011/2012	48
APPENDIX C: ARCS STAFFING LIST	49
APPENDIX D: ANDS-ARCS AGREED NEAT GOVERNANCE	51

1. Mission Statement and Context

ARCS' mission is to provide national eResearch support services for the Australian research community with a particular focus on authorisation, interoperability and collaboration infrastructure, tools, services and support.

Furthermore, ARCS is delivering against two Commonwealth NCRIS Funding Agreements: one for Interoperability and Collaboration Infrastructure (ICI) and one for Authorisation Services. Each of these agreements is entering its last funding year, 2010-11. The Project Objectives for each of these Agreements are shown below.

The *Objectives* for the NCRIS Interoperability and Collaboration Infrastructure (ICI) Project Plan (from section C.1 of Schedule 1 of the Commonwealth *Funding Agreement for the National Collaborative Research Infrastructure Strategy - ICI*) are:

- Establish, operate and provide access to an interoperation and collaboration infrastructure (ICI) and to improve access by researchers to digital repositories, scientific instruments, virtual environments, on-line collaborative interaction and seamless resource sharing in accordance with the NCRIS Principles set out in section one of the NCRIS Roadmap.
- Expand the facilities, services and user base developed by the grid program of the Australian Partnership for Advanced Computing (APAC).
- Offer open access to the ICI infrastructure to all researchers undertaking research across NCRIS capabilities as well as researchers accessing other affiliated resources.
- Under the auspices of AeRIC, operate collaboratively with the other components of the NCRIS Platforms for Collaboration capability (see section 1.3).
- Undertake activities to increase the uptake of ICI facilities and therefore e-Research.

The *Objectives* for the NCRIS Authorisation Services Project Plan (from section C.1 of Schedule 1 of the Commonwealth *Funding Agreement for the National Collaborative Research Infrastructure Strategy – Authorisation Services*) are:

- Work in close collaboration with relevant national and international identity providers to develop and enable the Authorisation Services for the Australian research community allowing them seamless access to eResearch resources and services;
- Be a source of authorisation tools, expertise, exemplars, best practice, training and advice on how eResearch service providers and research communities can best meet their authorisation requirements, as described in the Project Plan and subsequent Implementation Plan and Annual Business Plans 1 and 2 as required by this agreement - for the avoidance of doubt, these expected outcomes should be set out in accordance with the templates provided at Attachments A, B and C respectively - and in accordance with the 2006 NCRIS Principles set out in section 1 of the NCRIS Roadmap;
- Encourage the take up of authorisation capabilities by participants and relevant stakeholders;
- Offer knowledge, expertise and support to resource providers in the deployment of authorisation technologies; and

- Encourage the spread of expertise in authorisation technologies across ARCS and other resource providers.

2. Executive Summary

Purpose

What follows in this document is the **Australian Research Collaboration Service (ARCS)** Annual Business Plan for the period 1 July 2010 to 30 June 2011. This is the last ARCS NCRIS Business Plan and contains both the final Interoperability and Collaboration Infrastructure (ICI) Plan and the final Authorisation Services (referred to herein as Security Services) Plan as required by the respective **Department of Innovation, Industry, Science and Research (DIISR)** funding agreements.

In broad terms during the first 9 months of the business year there will be a focusing down on the core services that would otherwise not be available without ARCS and on the professional and enterprise-level hardening of these. In addition, ARCS will be striving to provide simpler multi-platform access, increased ease-of-use, minor requested discipline-specific enhancements and to increase uptake of these now mature core services.

In parallel for the first nine months, effort will be directed toward collaboratively developing plans for the transition of ARCS services and staff as appropriate culminating in an agreed Transition Plan. The last three months will be devoted to implementing the agreed transition strategies in this Transition Plan. The Transition Plan for services will be on a service-by-service basis and may involve a service being taken on by eRCI and/or one or more other service providers or may involve particular services being wound down with users migrated to other similar services in an orderly fashion. The Transition Plan for staff will be a plan to provide a continuous employment pathway for each ARCS-funded staff member wherever possible. In the event that a transition pathway for a particular Team Member cannot be established despite best efforts, they will in any event cease to be supported by ARCS NCRIS funds as of June 30, 2011.

History and Current Status

The Australian Research Collaboration Service (ARCS) was initially founded as an unincorporated joint venture of organizations involved in the delivery of eResearch Services to the Australian research community and had the purpose of delivering interoperability, collaboration and authorization infrastructure at the national level with a focus on national disciplines and research communities. In particular, ARCS was initially constructed to be the vehicle for the delivery of the Interoperation and Collaboration Infrastructure (ICI) component of the NCRIS Platforms for Collaboration (PfC) capability. Subsequently, ARCS was also contracted to deliver Authorisation Services. The components of PfC include, along with ARCS, the Australian National Data Service (ANDS), the National Computational Infrastructure (NCI) and the Australian Access Federation (AAF). The funding for these ARCS NCRIS activities totalled \$22.5m over the period July 2007 – June 2011.

ARCS currently provides:

- IT services such as national desktop video conferencing and a nationwide “data fabric” shared file system;
- an underlying ICT layer to assist the ICT infrastructure in different institutions to co-operate with each other, for example, to enable the transfer and sharing of data from the synchrotron to any university; and
- assistance with the development of research community and discipline specific eResearch services and collaboration tools needed by researchers within research communities.

ARCS current core services have enjoyed significant growth in uptake within the past year. For example, the number of registered users of ARCS currently supported Desktop Video

Collaboration platform, EVO, has increased from approximately 750 in June 2009 to 1680 in February 2010, i.e., the number of registered users has more than doubled in the last 7 months. Similarly usage of the ARCS Data Fabric has increased from 123 registered users (with 3 million files and 6.5 TB of data) in June 2009 to 280 registered users (with 10 million files and 19.5 TB of data) in February 2010, i.e., more than double the users and a three-fold increase in data storage on the Data Fabric in the last 7 months. ARCS has also played a key role in the development and initial implementation of the AAF as well as working closely with ANDS, e.g., the impending integration of the ANDS Persistent Identifier (ANDS PID) service into the ARCS Data Fabric. ARCS has also built a strong relationship with CAUDIT and indeed has recently strengthened this by ARCS Associate Director, Dr Nick Tate, becoming an Associate Member of CAUDIT. The ARCS-CAUDIT relationship recognises the need to rely on IT services at universities and institutions for Tier 1 helpdesk support and for the integration of services.

ARCS continues to deliver well against all of the NCRIS *Project Objectives* shown above and will be refocusing on hardening services, increasing ease of use and enhancing uptake in the coming year.

To meet its ICI obligations ARCS has to date: established, operated and provided access to the ARCS Data Fabric, the ARCS Data Transfer Service, the ARCS National Grid (becoming the Compute Cloud), one of the two pilot nodes for the Australian Access Federation (AAF), ARCS Access Service for Authentication/Authorisation, the ARCS SLCS Certificate Service, EVO, AccessGrid; web-based collaboration services and a Help Desk including 1-800 telephone and email ticketing system; expanded on and hardened the APAC grid; opened ICI services to all researchers; collaborated strongly with ANDS and the AAF in Platforms for Collaboration; undertaken activities to increase uptake of ICI facilities and hence eResearch (via NeAT and ARCS other outreach activities).

To meet its Authorisation Services obligations ARCS has to date: participated strongly to the formation of the AAF at every stage, including building and operating one of the two current AAF nodes; operates an ARCS AAF Identity Provider for researchers who do not have access to their own; contributed to AAF policy and management (e.g., the ARCS Executive Director is a member of the AAF Interim Executive Committee); worked in close collaboration with identity providers in Australia and internationally (e.g., the International Grid Trust Federation, BestGRID in NZ, etc.) to enable seamless access; has built the ARCS Access Service as a core product and exemplar to allow any research community or service provider to adopt and deploy it and to so couple registration and access to their services through the AAF; has built the ARCS Short-Lived Certificate Service (ARCS SLCS) currently used in two AuScope services (and currently being considered for use to couple Monash's Nimrod application to the AAF as well as by Murdoch for some bioinformatics tools such as YABI and BLAST); encouraged and enabled uptake of authorisation capabilities by the research sector in general; provided knowledge and expertise, e.g., to the AAF, to university identity providers trying to join the AAF, to NCRIS and other research communities; encouraging spread of expertise through ARCS and other eResearch service providers by promoting the uptake of the AAF and through the availability of tools such as the ARCS Access Service and the ARCS SLCS Service.

A brief summary of current ARCS services to the NCRIS and Research Capability areas is presented in Section 12 and includes significant services to: ANDS, AAF, Biomolecular Platforms, Atlas of Living Australia, Phenomics, Characterisation, ABIN, Astronomy, TERN, IMOS and AuScope.

Future of ARCS beyond NCRIS

It is currently anticipated that the ARCS Collaboration Agreement will be wound up by the ARCS Parties shortly after the final NCRIS reporting period ends on 30 September 2011. It is also anticipated that an association of eResearch Service Providers, open to all eResearch service providers, may be formed in order to take over from the ARCS Collaboration as a vehicle for cooperative eResearch activities into the future.

It is understood that the closely related \$47 million EIF Super Science Collaboration Infrastructure Project component of the 2009 budget measure for Data Storage and Collaboration Infrastructure will be administered by a contract between DIISR and the EIF CI Lead Agent, the University of Melbourne. This project is now known as the EIF eResearch Collaboration Infrastructure Project (eRCI). It is further understood that the eRCI Lead Agent will administer the funds and act under the direction of a senior research sector eRCI Governance Board, who will oversee the entire eRCI Project. It is expected that the abovementioned association of eResearch Service Providers, if and when formed, will also seek to establish a close working relationship with the eRCI.

Key Goals for the Final NCRIS Year

Summary: As described above, ARCS has now successfully constructed and established its core of national services, is operating them at high-availability within current hardware constraints and is providing easy access to them. The first nine months of the coming year will be devoted to hardening the operation of these services to an enterprise level, further increasing their transparency and ease of use, providing simple and multiple pathways to them and in significantly enhancing uptake of them both directly by users and through providing them for embedding as the foundations for value-added services by other eResearch service providers, NCRIS Capabilities and research communities and organisations. In parallel during the first nine months, effort will be directed toward collaboratively developing plans for the transition of ARCS services and staff as appropriate with eRCI and other relevant service provider organisations. This will take the form of an agreed Transition Plan informed by studies of who is using what service and what they are using it for. The last three months will be devoted to implementing these agreed transition strategies with eRCI and others. In the event that a transition pathway for a particular service or staff member cannot be established, they will in any event cease to be supported by ARCS NCRIS funds as of June 30, 2011.

A primary objective of ARCS in the coming year is to form a close, cooperative and constructive working relationship with eRCI in order to ensure a smooth transition of relevant services from ARCS to one or more enduring organisations designated by eRCI, while at the same time delivering on its obligations to DIISR for both the NCRIS ICI and NCRIS Authorisation Services. As part of the process of meeting this objective, ARCS will pursue the following Key Goals:

1. In partnership with eRCI, develop, document and implement a detailed plan for transitioning appropriate ARCS services and their users by the end of the ARCS funding period;
2. Significantly increase the demand and uptake of current ARCS services during the year through promotion and outreach including: promotion at conferences and meetings, visits to individual universities and research organisations and a road show of ARCS products and services;
3. Select and focus on the priority core of national services and decrease effort in other services (primarily collaboration services excepting video collaboration which has high use). Make these core national services highly reliable and robust so that users can have confidence and can rely on them. Make services interoperate with commercial offerings wherever it is viable to do so;
4. In order to retain key staff in the eResearch sector, work in close partnership with eRCI and other service providers as required to ensure that the transitioning of ARCS is smooth and handled with care and that, in particular, the perceptions of skilled staff are carefully managed so that they are not lost to the sector and that as far as possible they each have an employment transition plan;
5. As appropriate make minor extensions and enhancements of the most important services to more efficiently meet user needs – to be achieved through increased functionality and ease of use of core national services;

6. Give every reasonable assistance requested by eRCI during their upcoming broad sector consultation process and carefully avoid any activities that may impede or add confusion to this. For example, while ARCS will strongly promote and work toward increased uptake of its existing services, it will do so in a manner that is clearly not seen to be part of any consultation process.

ARCS will continue to focus on providing essential interoperability, collaboration and authorisation services that could not otherwise be delivered. As the year is likely to see significant changes during the transition process, it will be necessary to revisit the budget on a quarterly basis.

In order to maximise impact and as part of the promotion and marketing strategy, at least 20% of ARCS team member time will be spent in outreach activities to NCRIS and research capability areas and in assisting their local MARCS in awareness and uptake of ARCS tools and services amongst their stakeholders.

Major Risks

The primary risk associated with the final year of NCRIS funding to ARCS and the transition to eRCI is the loss of key staff due to uncertainty (rated High).

3. Legal Structure

ARCS is an unincorporated collaborative venture formally constituted on 15 November 2007 for the purposes of providing long-term eResearch support to the Australian research community. ARCS activities and governance processes are defined in the ARCS Collaboration Agreement. ARCS activities include, but are not limited to, the provision of national eResearch support services in the form of: interoperability and collaboration infrastructure and services; authorization services; services to the National Collaborative Research Infrastructure Strategy (NCRIS) capability areas; services to other national discipline-based research communities; and other related activities as appropriate.

The ARCS members, referred to hereafter as the Members of ARCS (MARCS), are: the Australian National University (ANU) in the Australian Capital Territory; the Commonwealth Scientific and Industrial Research Organisation (CSIRO) nationally; eResearch SA (eRSA) in South Australia; Intersect in New South Wales; Queensland Cyber Infrastructure Foundation (QCIF) in Queensland; iVEC in Western Australia; the Tasmanian Partnership for Advanced Computing (TPAC) in Tasmania; and the Victorian Partnership for Advanced Computing (VPAC) in Victoria.

The NCRIS funding period is from 1 July 2007 to 30 June 2011 and the primary initial purpose of ARCS is to deliver the Interoperability and Collaboration Infrastructure (**ICI**) component of the NCRIS capability area known as Platforms for Collaboration (**PfC**) to DIISR. The ICI funding is \$20 million over four years with \$14 million allocated to ICI-related operations and \$6 million for the ARCS components of projects selected and approved by the National eResearch Architecture Taskforce (**NeAT**). In June, 2008 DIISR provided an additional funding of \$500K under the ICI funding agreement to provide assistance in the delivery of Collaboration Services. A further \$2 million has also been provided to ARCS to deliver Authorisation Services.

The delivery of ICI and Collaboration services by ARCS to the Commonwealth is specified through an **ICI Funding Agreement**. A separate **Authorisation Funding Agreement** has been put in place between DIISR and ARCS to cover the delivery of the Authorisation Services.

4. Governance

ARCS is governed by the processes set out in the ARCS Collaboration Agreement. All ARCS activities are subject to the governance of the Executive Committee, which includes a nominated

representative of each of the MARCS, the Executive Director (ex-officio), a member appointed by Affiliates and up to three Independent Members.

The Executive Committee is chaired by an Independent Member, Dr Trevor Powell. The Executive Director is appointed by and reports to the Executive Committee.

As ARCS is an Unincorporated Collaborative Venture it must operate through a legal agent. ARCS refer to this role as the Lead Agent and this is currently VPAC although this can change if necessary. The ARCS Collaboration Agreement states that the Lead Agent will act at all times under the direction of the Executive Committee in relation to its activities as Lead Agent. VPAC is the Lead Agent for the collaboration as well as being the legal agent for the ICI and Authorisation Services Funding Agreements with the Commonwealth.

ARCS activities are by definition subject to the governance procedures of ARCS and as such will involve the Executive Director and the Executive Committee in their development and their delivery; ARCS Business by definition has associated monies flowing through the ARCS accounts.

All substantial business decisions and directional strategies are decided through the regular processes of the Executive Committee in a manner consistent with the ARCS Collaboration Agreement. For ICI and Authorisation related business the activities of ARCS are in addition bound by the conditions of the ICI and Authorisation Services Funding Agreements respectively. The Executive Director is responsible for the day-to-day management of ARCS with the assistance of the Associate Director and various Managers. The ARCS Delegation of Powers sets out the authority levels for each Manager which is approved by the Executive Committee.

The Management Team is convened by the Executive Director and reports to the Associate Director. The Management Team is the primary management group of the organisation. The Management Team is directly responsible for managing the day-to-day operations in accordance with the ARCS Business Plan. This group has overall responsibility for:

- Identification and implementation of strategy, planning, prioritisation and execution of activities and delivery mechanisms;
- Establishment and monitoring of policy and objectives through assessment of needs, risk analysis and opportunities;
- Evaluation of performance against objectives outlined in the Business Plan;
- Management and best use of resources;
- Promotion of the organisation and its services/products to stakeholders.

The Management Team meet quarterly to report and review KPIs as described in the Business Plan. The Management Team has adopted a formal Risk Management process and this is reviewed on a quarterly basis.

Secondment Agreements are in place for members of the Management Team between ARCS and their respective employing institution where possible. ARCS is responsible for setting each of the Managers positions descriptions, key performance indicators (KPI's) and remuneration through a performance-based management system.

The Management Team position descriptions are reviewed annually along with their performance to ensure they are consistent with the goals and objectives of ARCS. All ARCS Management and Staff are required to disclose Conflicts of Interest as outlined within Position Descriptions.

In order to carry out its role the Management has established a number of consultative groups listed below to assist with technical input and coordination.

Group or Committee	Role
ARCS Management Forum	Consisting of the ARCS Managers and similar

	senior level technical staff in the MARCS and other key participants. Oversees seamless technical development and integration of services.
Cloud Computing Steering Committee	Oversees and advises on the management and operation of the ARCS Compute Cloud. Assists in identifying relevant user communities and resources in the execution of the project.
Data Fabric Steering Committee	Provides advice and direction for the management and operation of data interoperability systems and their applicability to the research community.
Security Services Steering Committee	Provides advice and direction for the management and operation of authorisation and related security systems and their applicability to the research community.
Focus Groups for Services	These groups provide user perspective and feedback on individual tools and services.

5. Staffing

Funding will be provided for effort up to approximately 22.5 Equivalent Full Time (EFT) staff excluding NeAT Project related staff (1.75 EFTs) and the Executive and Associate Directors and administrative team members (5.47 EFTs).

The 22.5 EFTs comprise 21.5 EFTs in Operation under the Associate Director, Nick Tate, and 1 EFT for the Business Development Manager, Andrew Alexander.

The 21.5 EFTs in Operations are further divided into Production Systems (9.5 EFTs), Maintenance (4.25 EFTs), Security Services (4 EFTs), Service Desk (3 EFTs) and Service Delivery (0.75 EFT).

It is anticipated that as required to appropriately deliver on their activities staff will be seconded to ARCS. The Business Development Manager will maintain a high quality of service for video collaboration while devoting the majority of his attention to promoting and increasing uptake of all of ARCS existing core services.

An Organisational Chart is presented in Section 8 and a complete Staff List is shown in Appendix C.

6. Policies & Procedures

6.1.1. Quality Management

ARCS are implementing a Quality Management Planning process covering all its service delivery and management activities. A Quality Management Group has been established to lead the development of a planning and quality framework within ARCS, addressing four key areas of planning and policies; monitoring, coordination and advice; accreditation, audit and self assessment; and promotion. An ARCS Quality Management Plan has been established with the primary aims of:

- demonstrating the ability to consistently provide products and services that meet customer and applicable regulatory requirements; and
- enhance customer satisfaction through the application of the Quality Management System (QMS) including processes for continual efficiency and effectiveness improvements of the system.

6.1.2. Procurement Management

ARCS Management is responsible for identification, sourcing and procurement of resources. ARCS will develop and adopt a transparent and equitable procurement process, based on best practice in the Higher Education and Research sector, which will deliver value for money for the organisation and its stakeholders when purchasing goods or services. This process will take account of applicable standards within government and universities. This process will define levels of authorisation within the context of procurement and will also define approved methods of procurement including the requirement to normally undertake a tendering process when the purchase value is above an amount agreed with the executive committee. The procurement process will also apply to the contracting of staff resources and standard contracts will be developed for this purpose.

6.1.3. Service Delivery

In conjunction with its stakeholders, ARCS has continuously developed a Service Delivery Framework which will underpin the development of core national services. This framework encompasses the lifecycle of a service, including Definition, Delivery, Operation and the expected lifetime of a Service.

The ongoing Definition phase of the framework includes feedback from key stakeholders to both clearly define the service definition and achieve agreement on expected service levels. The Delivery phase includes the identification and implementation of an appropriate delivery approach, whether it requires minor development, procurement or integration and the initiation of appropriate development projects. The Operations phase includes the identification of the customer service, operations, maintenance and management requirements of a service. It includes the initiation of any minor development projects needed to support essential improvements of the service to better meet sector-wide and discipline-specific needs.

6.1.4. Safety

ARCS provides 24 x 7 support for its critical systems. This support requires participating ARCS team members with the appropriate expertise to partake in an on-call roster to support these systems. Regular and ongoing consultation is required between ARCS and participating Employing Organisations/Institutions and their respective Employees to ensure that award conditions and occupational health and safety is being adhered to.

6.1.5. Access and Pricing

As a general rule, no charge shall be applied for the use of project services. Individual component services, such as data storage, might however vary and access arrangements for these are detailed in the implementation plans. Organisations may contribute some of their own resources to contribute to the development and/or operation of a service, e.g., university IT service departments will be expected to contribute some Tier 1 support for key services such as Desktop Video Collaboration. Where specific services are in high-demand and exceed ARCS ability to develop and/or operate from existing funding, then a suitable cost-recovery model would be developed in partnership with the research community or organisation requesting the service.

6.1.6. Information Management

ARCS have established a development and operational environment based on accepted best practice management processes including Project Management, Change Management, Release Management and Customer Engagement processes.

The adoption of these processes has ensured that production systems are increasingly robust and reliable and that the user community has opportunities for input and is kept informed of developments and changes.

ARCS uses established project management methodology to document project processes, decisions and deliverables, and keep records appropriate to enable scrutiny of its decisions and outcomes.

The use of this methodology will ensure that:

- There is a structured, consistent approach to managing the project (initiation, planning, execution, handover, review);
- There are tools and guides provided for the initiation, planning, execution, monitoring, control and completion of the project, to minimise project management effort and maximise effectiveness.

6.1.7. Intellectual Property

Intellectual Property (IP) will be owned and held for the benefit of the Research Community by the ARCS Lead Agent.

All projects will require a Project Plan to be written. Project IP will be owned in accordance with the Project Plan. The Lead Agent will maintain a register recording all Background IP and Project IP provided under such plans.

Each party participating in the project will be required to make its Background IP available to the project in accordance with the Project Plan. The party providing Background IP is required to grant to the other project participants an irrevocable non exclusive, royalty-free, worldwide licence to use the party's Background IP made available to the project for the purposes of carrying out the project and for purposes that may not directly relate to the conduct of the project, subject to any restrictions on its use as specified in the Project Plan. The parties to the Project Plan acknowledge and agree that a Party retains the right to control and use its Background IP and that ownership of the Background IP does not change.

7. Risk Management

Risk management is recognised as an integral part of ARCS Management practises. ARCS has adopted a formal Risk Management Policy that defines risk management, lists the responsibilities of staff and sets out the process for achieving ARCS' strategic objectives while ensuring appropriate management of risks.

ARCS maintains a Risk Register that provides a systematic view of the risks it faces in the course of its activities. The risk assessment methodology is adapted from Australian Risk Management Standard AS/NZS 4360:2004

The Risk Register will be reviewed at quarterly intervals by Management to review implementation of risk reduction strategies and to capture any new risks arising from changing circumstances. A summary review of the Risk Register will be Included within the Executive Director's report to the Executive Committee.

The key risks to ARCS in executing the project and the mitigation strategies to be employed are summarised below. Risks can be grouped into four major categories:

1. Governance
2. Delivery
3. Impact
4. Resources
5. Transition to EIF

Each of the risks listed below is given a preliminary assessed risk rating which seeks to identify the effective risk to ARCS taking into account the listed mitigation strategies.

Governance

Risk 1 – Loss of a Member of ARCS (MARCS)

Risk Factors:

- Lack of collaborative delivery and support capability in a particular state or territory;
- Lack of engagement options for universities and research institutions in a particular state or territory

Risk Mitigations:

- Regular engagement with senior personnel at MARCS
- Clear exposition of the ARCS' financial and strategic value to the MARCS
- Continuous monitoring of benefits to each of the MARCS

Assessed Risk Rating: Low

Risk 2 – There are negative perceptions of ARCS among funding agencies, MARCS and stakeholders leading to lack of engagement

Risk Factors:

- Lack of confidence in governance, management or delivery of projects and services;
- Change of policy with regard to public funding of collaborative services; and
- Lack of co-funding by MARCS and other stakeholders.

Risk Mitigations:

- Ensure that the project reflects the government's expectations through regular dialogue;
- Maintain close contact with key DIISR officers to ensure that they provide input to decision making;

- Consult regularly with MARCS and other stakeholders; and
- Clearly articulate the benefits of ARCS services and projects.

Assessed Risk Rating: Medium

Delivery

Risk 3 – ARCS is not effectively managed

Risk Factors:

- Lack of effective mechanisms for strategic planning, leadership and management;
- Management structure fails to manage rapid growth;
- Financial impropriety; and
- Breach of contractual or legislative responsibilities.

Risk Mitigations:

- Regular strategic planning including a facilitated annual planning day;
- Regular reviews of strategic planning at executive committee and management meetings with the Chair of ARCS;
- Regularly review the organisational structure;
- Regular transparent financial reporting with independent audits; and
- Implementation of processes for contract management and legal review.

Assessed Risk Rating: Low

Risk 4 – ARCS services are not delivered with appropriate reliability and service levels

Risk Factors:

- ARCS services do not meet required levels of reliability leading to a lack of confidence in the services
- ARCS services do meet required performance criteria leading to a lack of confidence in the capability of the services

Risk Mitigations:

- Realistic and appropriate service levels agreed with key stakeholders;
- Implementation of processes for monitoring, backup, recovery and availability management;
- Implementation of a robust change control process; and
- Establishment of an operations group with suitably qualified staff.

Assessed Risk Rating: Medium/Low

Impact

Risk 5 – Researchers and MARCS do not take up the offered services

Risk Factors:

- Researchers find that ARCS services are not appropriate or use inappropriate technologies;
- Researchers take up services from other service providers;
- There is no co-ordinated national delivery of eResearch services; and
- Researchers find that access mechanisms for services are too complex or restrictive.

Risk Mitigations:

- Implementation of a service delivery framework, which incorporates collaborative decisions on services, service levels and technologies;
- Implementation of ARCS advisory groups for products and services;
- Continuous consultation with key stakeholders;
- Ensuring adequate communications and training strategies for each service; and

- Close liaison with the AAF to ensure appropriate access mechanisms.

Assessed Risk Rating: Medium

Risk 6 – Research sector stakeholders are not effectively engaged

Risk Factors:

- Research community is unaware of available services and projects leading to sub-optimal research support;
- Research support groups are unaware of available services and projects leading to unnecessary duplication; and
- Lack of feedback from the research community leading to projects and services that lack relevance.

Risk Mitigations:

- A focus on promotion, outreach and engagement adopted by ARCS management;
- Development and implementation of a marketing and outreach plan; and
- Regular reviews of services with relevant stakeholders in the research sector.

Assessed Risk Rating: Medium

Resources

Risk 7 – High quality project staff are hard to recruit

Risk Factors:

- Lack of availability of skilled staff to perform the required roles in ARCS;
- Limited tenure roles potentially on offer are not attractive to candidates;
- Underskilled staff are employed because of staff shortages; and
- There is an over reliance on key staff.

Risk Mitigations:

- Be highly selective in recruitment;
- Establish collaborative recruitment programmes with MARCS and other stakeholders;
- Consider selective and appropriate project level outsourcing to MARCS, universities, other stakeholders or the market; and
- Institute effective workload management and succession planning programmes within ARCS.

Assessed Risk Rating: Low

Risk 8 – Funding for ARCS is inadequate to achieve its objectives

Risk Factors:

- Commonwealth budget constraints and/or lack of contributions from stakeholders results in reduced funding;
- Commonwealth policy constrains effective use of available funds; and
- ARCS fails to manage expectations of what can be achieved within the allocated budget.

Risk Mitigations:

- Promote ARCS and visibility of ARCS activities in Australia and Internationally using events such as the eResearch conference;
- Implement appropriate co-investment models;
- Ensure that ARCS's contribution into various states and research communities is suitably recognised; and
- Manage expectations through frequent communication with stakeholders.

Assessed Risk Rating: Medium

Transition to EIF

Risk 9 – Loss of trained quality staff due to future employment uncertainty leading to the loss of capability to deliver ARCS services

Risk Factors:

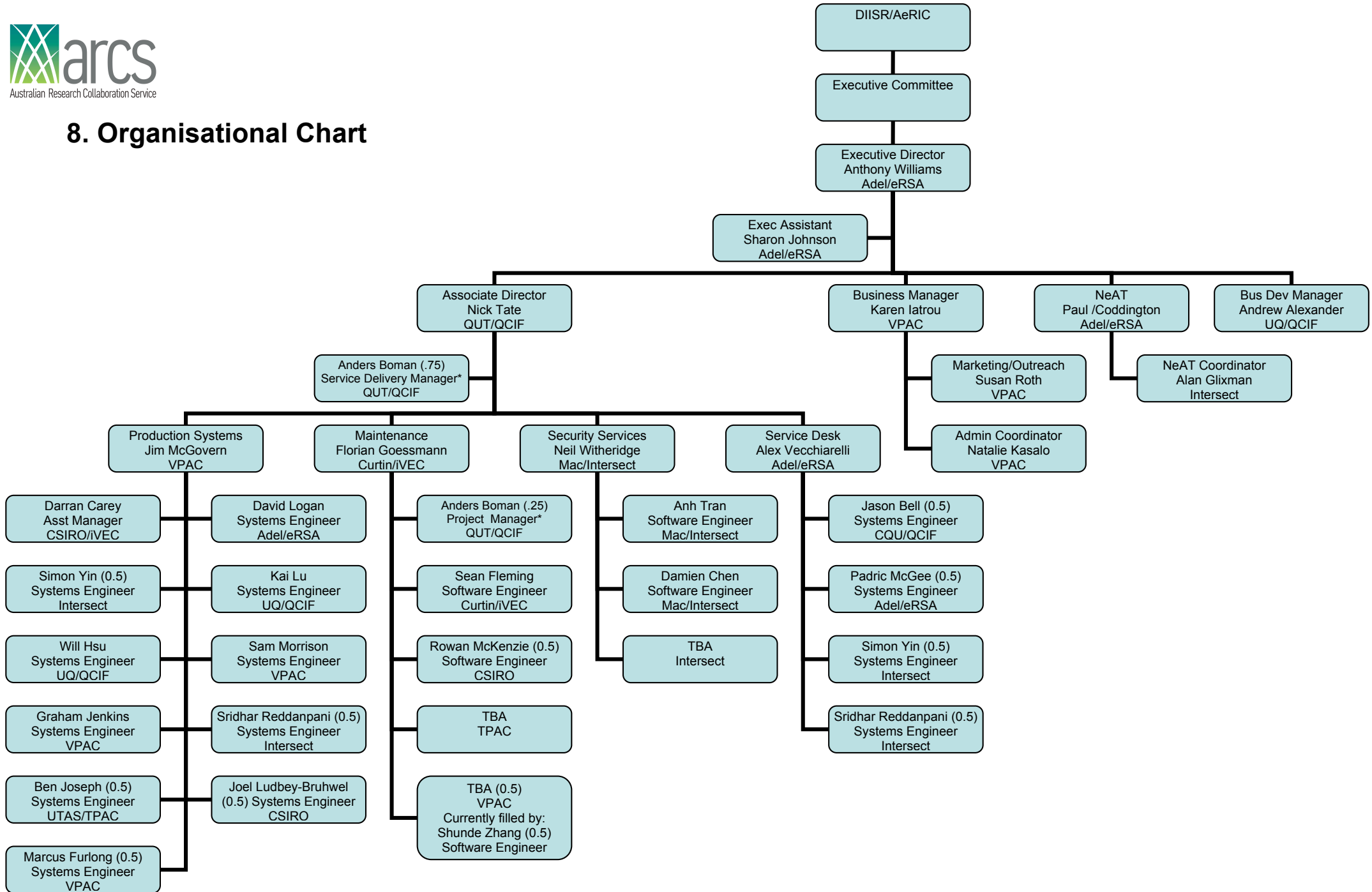
- Loss of skilled ARCS staff from the eResearch sector due to uncertainty regarding continued employment with subsequent inability of the sector to deliver on NCRIS and EIF obligations;
- Loss of quality ARCS staff to EIF-funded activities resulting in inability of ARCS to deliver NCRIS obligations;

Risk Mitigations:

- Counsel individual staff with their host employer and try to establish with them a credible future employment pathway – many staff are effectively seconded from their host and their employment is not at risk while, for others there is a need to assume EIF or other funding will come to their host in order that their employment continue beyond the NCRIS funding period;
- Be prepared to scale back planned activities and replace with outsourced project based activities as the need arises;
- Ensure that knowledge is passed and shared between staff so that the loss of a few staff members does not lead to a complete loss of a set of expert knowledge or the need to cease an aspect of ARCS services;
- Consider selective and appropriate project-level outsourcing to MARCS, universities, other stakeholders or the market where staff have left and the effort needs to be replaced.

Assessed Risk Rating: High

8. Organisational Chart



9. ARCS Strategic Objectives

9.1. Executive Summary of Objectives

9.1.1. Summary of Progress and Planned Activities

The 2009-10 business year has seen some major changes in ARCS. The constant changes around expectations of the EIF Super Science Data Storage and Collaboration Infrastructure provided some considerable challenges both for staff morale and for planning and also introduced unhelpful uncertainties around the future of services and staff. On a more positive note, this previous year saw the key appointments of Dr Nick Tate as the ARCS Associate Director and of Susan Roth as the Marketing and Outreach Manager. Their skills and expertise will be essential in successfully managing what is certain to be a challenging transition year.

This year will be a year of continuing evolution. There will be a reduction in the number of overall staff as the intended sharing of some central costs between the NCRIS and EIF funding will not now be possible. It will be a year of focusing down on the hardening and increased ease of use of ARCS core national services and in increasing their uptake and impact through a program of promotion, and marketing of ARCS existing services. Where minor enhancements can increase ease-of-use and where simple user-facing tools and services building directly on these core services can lead to increased uptake, they will also be pursued. There will be a decreased effort on the range of collaboration services as it is felt that these can be largely supported by others, such as the MARCS and the various university eResearch organisations. There will not be any significant new development of video collaboration services (EVO and AccessGrid) but there will be a continuation of effort to ensure their reliable operation and increased uptake. As part of the promotion and marketing of ARCS existing services, ARCS will work with a number of key NCRIS and Research Capability areas to develop specific enhancements as required on top of our existing core services.

As a result of the changes to activities for this year, the team structure will change accordingly. There will be a group of Operations team members who will be responsible for the robust operation, hardening and enhancement of the ARCS core national services. The ARCS Associate Director will oversee the Operations Team, which will contain within it the Production Systems, Maintenance, Security Services and Service Desk Teams. There will also be a 0.75 EFT position of Service Delivery Manager assisting the Associate Director. Operations will be responsible for designing a hardened three-node delivery mechanism for ARCS existing core national enabling services, including but not limited to the ARCS Data Fabric and the ARCS Grid and Compute Cloud as well as potentially services that support the AAF as needed. There will be three geographically distributed and entirely redundant sets of servers, each of which could independently run all of the core national services and each of which will be connected to a high-capacity AARNet POP. These three sets of servers will be available for use by eRCI or other service provider(s) at the end of the NCRIS funding period if required as part of the transition. The sole purpose of these three sets of servers is to harden ARCS existing core national services to allow for their enterprise-level delivery at a significantly higher volume in the face of anticipated broader uptake across the research sector.

The Security Services Development team will deliver against the Authorisation Services NCRIS contract and capitalise on their outstanding work in supporting the development of the AAF and in integrating the AAF into the Access Service which is a product in its own right that can be offered to research communities and other eResearch Service Providers.

Andrew Alexander will move from Collaboration Services Manager, given the reduction of effort in that area, and will take on the role of ARCS Business Development Manager. As such he will oversee the ARCS promotion and outreach activities and help drive uptake of ARCS existing services. He will also continue to oversee the quality provision of video collaboration services in the form of EVO for desktop and AccessGrid for room-based services.

Paul Coddington will continue to represent ARCS in the various NeAT governance committees and to coordinate the efficient operation of the NeAT activities with ANDS. There will be a strong focus on ensuring that the NeAT Projects are successfully completed on time by 30 June 2011. Paul will continue to receive assistance from the NeAT Coordinator, Alan Glixman.

There will also be significant effort directed toward making ARCS core national services as interoperable as possible with cognate commercial offerings in order to increase the seamlessness with which researchers and research communities can access the ICT resources and services that they need. Currently we are investigating the integration of the ARCS Data fabric and Amazon S3 to increase interoperability of this commercial service with NCRIS activities.

Where funds are freed up through the departure of staff and where these staff do not need to be replaced in order to offer and operate ARCS core national services, additional discipline-specific enhancements of existing core services will be undertaken in partnership with the relevant NCRIS and Research capability areas. In the event that this was done, the choice of which enhancements and which community would arise from a set of transparent criteria including: impact on the relevant research community; leveraging and use of the core national services; ability to be adopted by other research communities or for other uses; and cost and affordability.

A key milestone of Q1 2011 will be the completion of a Transition Plan for ARCS services and staff developed in collaboration with eRCI and other key stakeholders and will be submitted to DIISR for approval by 31 March 2011. The Transition Plan for services will be on a service-by-service basis and may involve a service being taken on by eRCI and/or one or more other service providers or may involve particular services being wound down with users migrated to other similar services in an orderly fashion. The Transition Plan for staff will be a plan to provide a continuous employment pathway for each ARCS-funded staff member wherever possible. In the event that a transition pathway for a particular Team Member cannot be established despite best efforts, they will in any event cease to be supported by ARCS NCRIS funds as of June 30, 2011.

9.1.2. Review of Key Goals for the Final NCRIS Year

The Key Goals (KGs) outlined in the Executive Summary in a convenient and abbreviated form are:

1. **Transition:** Assist with the development, documentation and implementation of a detailed plan for transitioning current and relevant ARCS services and their users in partnership with eRCI;
2. **Uptake:** Significantly increase the demand and uptake of existing ARCS services during the transition period – targeted promotion of existing services and outreach activities to support this;

3. **Harden:** Select, focus on and harden the priority core of national services to an enterprise-level and decrease effort in other services (primarily collaboration services excepting videocollaboration which has high use);
4. **Retain:** Retain key staff in the sector by cooperatively assisting with the transitioning of ARCS in a careful and smooth manner, particularly with regard to staff;
5. **Enhance:** Extend and enhance the most important services to meet user needs – increased and discipline-specific functionality and ease of use of core national services as required.

9.1.3. Measurements

This financial year ARCS will continue its established processes to measure and improve the success and impact of the ARCS tools and services. These are aimed in part at assisting ARCS meet its AeRIC KPIs.

These will include the monitoring of customer satisfaction as well as measuring the impact of services, the rate of new uptake of services and tools, the reach of the dissemination of knowledge and expertise into the research communities, the quality of services, the responsiveness of teams to new requirements and the implementation of change management practices to maintain production services at a professional level. Measures will include, but are not limited to:

- Quarterly analysis of service usage with a focus on demonstrating impact into new research areas and communities - **Uptake**;
- Reporting of task-based activity including outstanding tasks, completed tasks, number of tasks per sector and completion rates in line with Service Level Agreements - **Harden**;
- Annual user satisfaction surveys, carried out before April each year on a service by service basis – **Uptake** and **Harden**;
- Written feedback from the ARCS User Reference Groups – **Uptake** and **Harden**;
- Invited feedback submissions from a significant cross-section of the existing major stakeholder research communities, including the NCRIS Capability Areas, as well as established discipline areas – **Uptake** and **Harden**;
- Invited feedback from AeRIC, other national eResearch Service Providers, DIISR and other key existing stakeholder communities – **Uptake** and **Harden**;
- Number of key ARCS staff with confirmed employment pathways in the eResearch sector for one or more years after the transition period – **Retain**;
- Demonstrated increase in robustness of core national enabling services through small number of outages, minimal downtime, failures etc. – **Harden**;
- User feedback indicating increased ease of use of core national services – **Uptake** and **Enhance**;
- Number or priority core national services taken up by eRCI or others with a detailed and credible transition plan for their continued development and/or operation – **Transition**;
- Number of Workshops and Meetings attended and number of presentations given - **Uptake**.

9.2. Processes for Transitioning Services and Retaining Staff in the Sector

The exact processes for meeting the two Key Goals of **Transition** and **Retention** are difficult to describe in any detail until the processes necessary to complete the Transition Plan are complete. It is further expected that the detailed eRCI activities will not be finalised until after the completion of an extensive sector consultation, which will run though until March 2011.

ARCS will actively contribute to the consultation by working with and providing every possible assistance to eRCI and ARCS will continue to provide this assistance until its NCRIS activities cease on 30 June 2011.

ARCS will explain the rationale and value of its services to eRCI and will work with them, the MARCS and other eResearch Service Providers in the sector to ensure that a viable plan exists for the continued high availability operation and development of each of the priority core national services. ARCS and the MARCS will work with these same organizations during the year to try to ensure that an employment pathway exists for each of the key ARCS staff.

In particular, in order to manage the transition process of services and staff smoothly ARCS will:

- In the first nine months ARCS will seek to establish a close, constructive and productive relationship with eRCI and will begin discussions with them and other service providers about possible transition pathways for services and staff. Establish an agreed Transition Plan coordinated with the eRCI Project Plan as far as possible and submit to DIISR by 31 March 2011.
- In the last three months, ARCS will work with eRCI and other relevant service providers to implement the agreed Transition Plan for services and staff. Where a transition pathway for a staff member cannot be established, they will in any event cease to be supported by ARCS NCRIS funds as of June 30, 2011.

9.3. Core National Services

9.3.1. Summary

ARCS will continue to provide and harden its existing set of services to support researchers across Australia. The focus of ARCS services is to provide core collaboration services and the middleware “glue” that allows the resources of others to be integrated and interoperable at a local, regional, national and as relevant at the international level. These services will include:

- Continued support and operation of EVO and AccessGrid to meet the video collaboration requirements of the sector;
- Continued provision of the ARCS Data Fabric and associated data services;
- Continued provision of the ARCS Compute Cloud (in the form approved in the 2009-10 Business Plan) and will include the completion of the web interface between the Data Fabric and Compute Cloud providing ease-of-use by the research community;
- An open collaboration environment based on standards;
- Continued support of the Access Service - a common authentication and authorisation service which utilises the Australian Access Federation (AAF) to allow researchers to access the services of ARCS and other eResearch Services providers using their own institution’s identity credentials;
- Continued provision of its national operations and support functions to complement these services; and
- Maintenance of a trusted secure collaboration environment between participating institutions to support the deployment of collaborative services across institutional boundaries.

In order that ARCS existing services can have significantly increased uptake and yet scale to meet the requirements of researchers across Australia, without incurring a significant expansion in staffing and cost, ARCS will continue to promote a model of service provision that leverages the capabilities of partners through the adoption of standards, the provision of key management and control systems and the availability of a robust operations and support

framework. As part of this process, services will have differentiated levels of delivery as appropriate, which reflect both the needs of the research community and the capability of delivery partners. Delivery partners may be MARCS, universities, other research organisations or commercial providers who would provide capability to the national services at agreed service levels and with an agreed technical architecture. Implicit within this model of service provision is that ARCS will provide those services which enable or enhance the ability of the research community to collaborate nationally and internationally whilst leveraging and not competing with the services from its delivery partners.

In order to meet the Key Goal of **Harden** for its core national services, ARCS will design and build high-availability, robust infrastructure as outlined below. The Key Goals of **Uptake** and **Enhance** are also met in part by these proposed activities.

9.3.2. Service Architecture

The ARCS Data Fabric is a middleware service that integrates storage from many underlying providers to provide a single national file system that is fully integrated with the Australian Access Federation (AAF). The national file system, or data fabric, allows researchers to collaborate across institutional boundaries by providing folders that may be accessed by any user or combination of users of the data fabric, depending on the permissions that have been granted by the owner of the folder. Permissions are at all times under the control of the resource owner and access to hardware resources is also similarly be under the control of its owner to whatever extent is required and/or desirable. The Data Fabric therefore supports collaboration by projects, disciplines or any group of users irrespective of the institution to which they belong.

The middleware that underpins the Data Fabric integrates many different types of storage that can be sourced from different vendors, using different architectures and operating systems and presents a unified file system across them. This unified view is presented to users through two views; a web interface that allows direct control of permissions and other aspects of the file system; and an industry standard protocol called WebDav. Many applications on all the major platforms (Windows, Mac, Linux, iPhone and iPad) use this protocol with a prominent example being Microsoft Office.

The middleware for the data fabric uses a master/slave architecture with a master controller communicating with slave middleware running at each storage node. Storage is currently provided by seven groups (CSIRO, eRSA, Intersect, iVEC, QCiF, TPAC, and VPAC) with storage nodes available in Brisbane, Sydney, Melbourne, Hobart, Adelaide and Perth and it is intended that this arrangement is continued for the coming year and others who wish to add storage will be welcome to do so. Each storage node is also running the slave middleware and this too is intended to continue. Currently the master node and its backups are located on servers that are relatively heavily loaded and this is constraining the ability to utilise all the available storage for the coming year. The server configuration is also limiting the ability to have sufficient backup capacity to provide reliable redundancy for the master controllers.

It is proposed to upgrade the master controllers for the ARCS middleware by investing in 3 small commodity servers at three locations near AARNet PoPs to improve reliability and handle the increasing load on the controllers. It should be emphasised that this is not a general computing facility but simply some relatively modest commodity servers with good network interfaces and some local storage, which can run the middleware controllers with greater reliability and capacity for the next year. As they will be standard commodity servers, they can easily be redeployed in future for other purposes and at other locations as

necessary. They are will not have sufficient capacity to make much a significant contribution to any computational resource but can be redeployed to operate national or other services as needed.

In the same way that the data fabric is middleware that integrates underlying storage to produce a single national file system, the ARCS Compute Cloud uses grid middleware with a web interface to integrate compute resources from providers across the sector to produce a single view of the resources on which to run applications. Just as with the data fabric, this requires the use of a master controller and it is intended to take advantage of the commodity servers being acquired for the data fabric, to run master controllers for the grid and compute cloud and also for the AAF if and as required. This will provide significant benefits through increased reliability and the capacity to integrate more compute nodes.

In summary and as stated previously in the Executive Summary of Objectives: There will be three geographically distributed and entirely redundant small sets of servers (Core National Service Nodes), each of which can independently run all of the core ARCS national services and each of which will be connected to a high-capacity AARNet POP. These three sets of servers can be available for use by eRCI or other service providers at the end of the NCRIS funding period if required as part of the transition arrangements. It is emphasized that they are not a computing resource. The sole purpose of these three sets of servers is to harden ARCS existing core national services to allow for their enterprise-level delivery in the face of broad uptake across the research sector.

9.3.3. Standards

In conjunction with its stakeholders, ARCS will establish standards for interoperability and deployment on the core ARCS infrastructure. This will include standards for interoperability with the ARCS enabling services (ARCS Collaborative Environment, ARCS Data Fabric and Trusted Collaboration Environment) as well as standards for security and the User Interface (UI). Defining the standards must be an activity that involves participants from throughout the eResearch community so that there is substantial buy-in. Appropriate fora, such as the CAUDIT technical standards group should also be involved. An example of how this can be successfully achieved is the sector wide agreement that was achieved on the auEduPerson schema that underpins the AAF. This used a working group with representatives across the sector as well as overseas participants. The standard was enacted through the CAUDIT Technical Standards Committee.

9.3.4. National Enabling Services

As previously identified, ARCS will act as a Systems Integrator providing the middleware, interfaces, management, operations and support infrastructure that is necessary to integrate a set of resources from underlying Infrastructure Service and Support Providers (ISSPs) to form a robust and coherent set of national enabling services. It is intended that all services will use a common approach to authentication, based on the AAF. These underlying resources will primarily be store and compute facilities. The services will be:

ARCS Data Fabric

This service provides access to a national file system, long lived data archives and data transport mechanisms through a set of standard interfaces. By providing reliable national data storage middleware services, applications can be written to take advantage of them and by having published and agreed interface standards, applications and tools developers can take advantage of a common approach to storage access that will allow them to concentrate on the functionality of their development. The data fabric is likely to require the capability of supporting multiple virtual environments and can be integrate with the proposed national data

stores if and as required. It is proposed to integrate the Data Fabric with at least one commercial data storage provider and it is proposed to purchase a cost-effective sector-wide licence for a product that can have the Data Fabric as an external drive on Windows desktops as part of the hardening process. It is emphasized that the ARCS Data Fabric is integration and interoperability middleware that allows data storage resources to be seamlessly connected and accessed. It is not the data storage resources themselves.

ARCS Grid and Compute Cloud

Efforts in relation to the ARCS Grid and Compute Cloud will be limited to the general principles specified in last year's approved ARCS Business Plan, where for example it was stated that *"By the end of 2009/2010, the ARCS Compute Cloud will be provided as the basis of the main means of access to resources now accessed through the ARCS Compute Grid. Discipline specific tools and interfaces will be developed and available to make the use of the Cloud as simple and rewarding as possible for non-expert users."*

ARCS will provide ongoing support for underlying grid computing services and will continue to concentrate on the support and hardening of the ARCS Grid and Compute Cloud, which provides researchers with simple web enabled access to applications which can take advantage of a grid or high performance computing infrastructure. The compute cloud will be integrated with the data fabric through an easy-to-use common web interface. Specifically, the coming year of 2010-11 will see hardening, increased ease-of-use, additional discipline-specific interfaces and increased uptake of the ARCS Grid and Compute Cloud. It is emphasized that the ARCS Grid and Compute Cloud is integration and interoperability middleware that allows computing resources to be seamlessly connected and accessed. It is not the computing resources themselves.

Trusted Collaboration Environment

There are barriers to collaboration between organisations that derive from the security policies, network policies and network and security infrastructure at each organisation. Collaboration between researchers at each organisation will only become routine if systemic approaches for collaboration between organisations are developed. This service will establish and maintain secure connections to organisations who wish to participate with the aim of co-operatively working with each institution to have pre-agreed trusted access which is greater than for normal internet users. This would involve agreement on security configurations and, potentially, a security monitoring service.

The Trusted Collaboration Environment includes support for the ARCS common access service, including authentication (based on the AAF) and authorisation as it is developed. Because ARCS national enabling services are critically dependent on the AAF to provide effective authentication services, ARCS may discuss the operation of the AAF, on a chargeable basis, with CAUDIT.

ARCS Collaborative Environment

ARCS supports a suite of collaboration tools which use underlying technologies from EVO, Plone and Sakai. EVO, in particular, has provided an affordable option for multipoint video conferencing for many researchers. ARCS will support the existing services whilst working with the stakeholder community to identify the next generation of collaboration tools and who should provide them.

9.3.5. Operations and Support of National Enabling Services

Just as the provision of national enabling services will integrate resources from underlying infrastructure providers, the operations and support of the services will leverage and be

integrated with existing support structures in MARCS, universities and research organisations.

9.3.6. Operations and Management

The ARCS operations team will directly manage and support the core ARCS infrastructure and, where appropriate, will integrate its management and monitoring with that of the underlying infrastructure providers.

9.3.7. Support

ARCS will establish a tiered support model in which ARCS will transition to providing Tier 2 and Tier 3 support with suitable systems to provide incident management. ARCS would integrate with, rather than duplicate, existing support services from infrastructure providers and others in the sector. The tiered support model would be broadly defined as follows:

Tier 0 - Self Service (maintained by the Tier2 group)

Tier 1 – First level support that relies on defined processes and procedures for incident resolution. It will be implemented through an extensive training and outreach programme. This programme would be established to persuade all university and research organisation helpdesks to undertake some level of Tier 1 support of ARCS services for their users. The aim of this approach is to embed eResearch support into existing service desk functions across the sector to improve buy in, reduce duplication and provide clear and straightforward support for researchers.

Tier 2 – Generalist ARCS support (relying less on procedural solutions) and Incident controllers. This team would manage the escalation process for all calls, monitor tier 1 call resolution, would themselves satisfy a further proportion of calls and would act as the controllers of calls for further escalation to Tier 3 and Tier 4.

Tier 3 – Dealing with incidents that require substantial domain knowledge to address. This would be undertaken by senior operational staff within each team under direction from the incident controller in Tier 2.

Tier 4 – Dealing with incidents that require support from developers or product vendors. Tier 2 controller would manage these calls which should be rare.

9.3.8. Extensibility

This approach to operations and support may allow ARCS to provide operations and support services that would be useful to other eResearch Service providers if they did not wish to establish their own support organisation.

9.3.9. The Operations Group

Leveraging the resources of infrastructure providers and integrating with support infrastructures that already exist within the community will allow lean resourcing levels within the operations group.

9.3.10. Goals of the Operations Group

- in conjunction with the eResearch community, continue to establish, maintain and implement standards which enable the interoperability of services, tools and applications deployed by ARCS;
- to continue to implement a deployment environment, based on the agreed standards, that will support the deployment of ARCS core services, and will be sufficiently extensible to allow applications, tools and services from other parties (including

MARCS and potentially vendors) to be delivered in this environment. It should also be possible to clone the environment for others to use;

- to ensure an operations function that can ensure the reliability and availability of ARCS services and can be extended to cover other services that support the research community;
- to provide a national service desk function that will support ARCS services and is sufficiently extensible to be able to provide support for other services with the research community as required;
- to provide domain expertise in the areas of cloud/grid computing, national data fabric, video collaboration and trusted authentication, authorisation and security services to support collaboration;
- as required and in conjunction with the eResearch community, to develop roadmaps for core national services that include appropriate choices of technology (whether open source or commercial) and appropriate sourcing (whether internal or outsourced);
- to implement service lifecycle management for core national services;
- to engage the ITS and eResearch communities throughout MARCS, universities and research organisations in the definition, delivery and support of ARCS services.

9.3.11. Organisation of Operations Group

ARCS Operations will report through the Associate Director, Dr Nick Tate, and would initially be established with the staffing levels in the table below. It is anticipated that there will be some changes between functions over the coming year as required.

AREA	FTE	COMMENTS
<i>Service Delivery</i>	0.75	ICI funds
<i>Maintenance</i>	4.25	ICI funds
<i>Production Systems</i>	9.5	0.5 EFT from Authorisation Services funds & 9 EFTs coming from ICI funds
<i>Security Services</i>	4	Authorisation Services funds
<i>Service Desk</i>	3	ICI funds
TOTAL	21.5	

9.3.12. Issues and Opportunities

Because ARCS is dependent on the AAF as the authentication layer for its services, there is a requirement that the AAF is operated reliably, that all eResearch organisations participate and that it moves into production as quickly as possible. In this context there is a reasonable case that ARCS should offer to operate all or part of the AAF on a cost recovery basis. It has been assumed that this would provide additional funding which would translate into additional staffing. It is not yet clear what path the AAF will take.

Both the support and operations models that have been proposed are extensible and could be used to provide operational and support capability to other groups within the eResearch community who wish to deliver services.

The existing arrangements for the supply of hardware services to ARCS without any real SLAs will limit the opportunities for providing overall SLAs. Consideration should be given to locating compute and data storage capacity together with the new data storage locations established for the wider data storage function, requiring binding SLAs and potentially

considering commercial providers of infrastructure. Although it is outside the scope of this document, the cost of such infrastructure will be reduced if collaborative purchasing arrangements with CAUDIT are used.

9.3.13. Core National Service Nodes

In order to offer robust and high-availability national core services three completely redundant, 24/7 supported and automatic fail-over Core National Service Nodes will be constructed at high availability sites with redundant AARNet backbone connectivity.

Items for consideration when establishing the hosting sites are how many sites, how they should be distributed by region and what characteristics would define an ideal hosting site.

Number of Sites

Three sites looks like the best arrangement, because:

- Multiple sites needed for resilience;
- One site is obviously not enough;
- Two sites gives a problem during planned downtime;
- Three sites deals with this problem;
- Four sites and more, adds complexity with the number of network links and greater requirement for management.

Number of Regions

One site per region looks like the best arrangement, because:

- Single AARNet/NextGen PoP in most regions;
- Avoid Network bottlenecks;
- Avoid dependence on a single regional network.

Characteristics of a Site

Ideal Characteristics of a hosting site are:

- Multiple links to AARNet PoPs;
- 10Gbps links;
- Data Centre Space;
- Resilient Air-conditioning;
- Resilient UPS;
- Backup Generator;
- 24 Hour access.

The current estimates for the cost of the Core National Service Nodes comprising quality servers, remote control devices, switches, hardware support, software, rack-space and modest data storage to enable data staging totals over the three sites to \$190k. Quotes from vendors are still being competitively assessed. Without this modest investment in redundant enterprise-level servers for core services it will not be possible to increase the usage without unacceptably high-risk for significant down-times and loss of data. These nodes are exclusively for the production operation of ARCS Core National Services and are not compute nodes.

9.4. Development for ICI

The development component of ICI activities is relevant for achieving three of the Key Goals: **Uptake**, **Harden** and **Enhance**. As required, there will be development of user-oriented and user-friendly enhancements that build on the core national services in order to improve suitability for purpose, increase ease-of-use and lead to greatly enhanced uptake in general. Minor development of the core components of the national services themselves will be primarily to harden them and improve performance.

The development of standards for interoperability and deployment on the core ARCS infrastructure was discussed earlier in section 9.2.3.

A summary of combined milestones for the compute cloud, grid and data fabric representing the activities of the operations group is shown below.

9.4.1. Milestones for ICI

Delivery Date	Milestone
Q3 2010	<ul style="list-style-type: none"> • Integrate Grid & Compute Cloud with Data Fabric • Identify exemplars for grid & compute cloud and data fabric • Develop Proof of Concept web portal for the compute grid/cloud and identify communities for major pilots • Implement Drop Box • Link ANDS to the Data Fabric (PIDS) • Implement Data Transfer Service Options as appropriate • Initiate High Availability Options for the Data Fabric • Define Trusted Collaboration Model through community engagement • Define standards for Core National Service Nodes • Implement revised ARCS 24x7 Framework • Develop tiered service model and engagement approach for MARCS and universities • Ongoing review of services: who are the existing users and what form does the use take?
Q4 2010	<ul style="list-style-type: none"> • Demonstration of integrated Grid/Compute Cloud and Data Fabric and exemplars at eResearch conference • Implement at least one requested community portal • Select and implement Data Transfer service as appropriate • Implement at least one requested minor discipline enhancement on the Data Fabric • Complete and implement High Availability on the Data Fabric • Implement Trusted Collaboration Model through CAUDIT and others • Implement hosted sites subject to resource availability • Implement grid & cloud computing and data fabric on new Server Nodes • eResearch conference • Implement tiered service model • Develop Transition Plan with eRCI and others stakeholders coordinated with eRCI Project Plan • Ongoing review of services: who are the existing users and what form does the use take?
Q1 2011	<ul style="list-style-type: none"> • Finalise a Transition Plan in conjunction with eRCI and other service providers and stakeholders for submission to DIISR by 31 March 2011.
Q2 2011	<ul style="list-style-type: none"> • Implement approved Transition Plan with eRCI and other service providers

9.5. Development for Security Services

The development component of Security Services (previously referred to as Authorisation Services) is relevant for achieving three of the Key Goals: **Uptake**, **Harden** and **Enhance**. This occurs in the same way as for ICI above. To date, Security Services has focused on assisting with the construction and implementation of the Pilot AAF and unifying AAF authentication with ARCS services both as an exemplar/template and to meet ARCS own authentication and authorisation needs. Federated authentication has been directly applied to web-based services, and used to create short-lived X509 credentials (conforming to the IGTF SLCS profile) for authentication to GSI enabled services. For those services that aren't Shibboleth-enabled, and can use LDAP for authentication, ARCS has established the ARCS Access Service to generate an ARCS username and password. Authorisation Services has provided the ARCS IdP to enable researchers without membership of an AAF IdP to access ARCS and other federated resources, and has also provided tools for generating and porting auEduPersonSharedToken.

ARCS Access Service has been developed and deployed to provide a common gateway to ARCS Services. To date only the Data Fabric is fully integrated with the Access Service (i.e. users must register with the Access Service to use the DF). During 2010, Authorisation Services will work with Systems Services to integrate the Compute Cloud/Grid with the Access Service, and will undertake work as required to integrate collaboration tools with the AAF and ARCS Access Service (e.g. Sakai AAF-enablement funding from the AAF).

During the first nine months of the final year of the NCRIS funding, while still improving authentication infrastructure, and engaging where possible directly with research groups, Authorisation Services will complete construction of infrastructure for authorisation, based on Research Group/VO membership and roles. Research Group leaders/administrators will use the ARCS Authorisation Rights Management service to specify Research Group members, select the ARCS Services the group will use, and define authorisation rights that will be used to auto-provision access control for Group members to selected Services.

Enforcement of authorisation policies and rules at Services will be accomplished using a XACML-based authorisation engine (XAE). This will provide for common access policy editing interfaces across services, and allow auto-provisioning of access rules using Authorisation Rights defined using the Authorisation Rights Management service. Investigation will be undertaken into auto-provisioning services via native authorisation mechanisms, in order to evaluate the advantages offered by the XAE solution.

The Access Service and Authorisation Rights components are designed to be usable by other research service providers. During the first nine months of 2010-11 FY, Authorisation Services will 'package' the Access Service, Authorisation Rights Management and XACML-based authorisation components and deliver this technology as self-contained tools.

Summary milestones for the authorisation/security services activities are shown below.

9.5.1. Milestones for Security Services/Authorisation

Delivery Date	Milestone
Q3 2010	<ul style="list-style-type: none">• Initial Integration of Compute Cloud and Grid with ARCS Access Service• Initial Authorisation Rights Management and External Authorisation Engine (Data Fabric integration)• Ongoing review of services: who are the existing users and what form does the use take?

Q4 2010	<ul style="list-style-type: none"> • Release of Packaged Access Service as ARCS service offering • Completion of Authorisation Rights Management and External Authorisation Engine • Completion of Data Fabric and Compute Cloud integration with ARCS Access Service (advanced implementation demonstration at eResearch Australasia 2010) • Develop Transition Plan with eRCI and other service providers • Ongoing review of services: who are the existing users and what form does the use take?
Q1 2011	<ul style="list-style-type: none"> • Public release of Packaged Access Service with Authorisation Rights Management as ARCS service offering • Finalise a Transition Plan in conjunction with eRCI and other service providers and stakeholders for submission to DIISR by 31 March 2011.
Q2 2011	<ul style="list-style-type: none"> • Implement approved Transition Plan with eRCI and other service providers

9.6. NeAT Projects

The NeAT Projects activities in this final NCRIS year help ARCS to meet its Key Goals of **Transition**, **Uptake** and **Enhance**. They help transition in that the majority of NeAT Projects will result in a service that will be operated by others and not ARCS. They assist uptake because they are services built with and by the researchers to do things that they want and need. They enhance the core national services to the extent that they build value-add tools and services on top of them.

9.6.1. Summary of Progress

The primary purpose of the ARCS Projects activities is the delivery of the ARCS components of the NeAT Projects and to coordinate with ANDS, NeAT and AeRIC on this. This is the responsibility of the ARCS Projects Manager. As each of ARCS and ANDS have received \$6 million to jointly fund NeAT projects over the NCRIS funding period and as it is expected that every Project will have both ARCS and ANDS components, agreements have been made by ARCS and ANDS on processes to facilitate collaboration on management and funding of these Projects.

NeAT is set up to develop integrative activities between PfC and the other NCRIS capabilities as well as the broader research community. Importantly, NeAT is the only source of such integrative funding. NeAT funding is budgeted for \$12 million in total over 4 years. NeAT has decided to allow for two rounds of decision-making: an initial round of projects starting 2008/09 and a second round of projects starting 2009/10.

Six Round 1 projects were approved by NeAT and commenced in 2008/09. These projects were reviewed by the NeAT Executive in October 2009 and all projects except DataMINX were approved to continue for a third year, contingent on a revised project plan being approved by the project committee by June 2010.

The DataMINX project aimed to provide services for data and metadata management for NCRIS Characterisation facilities, particularly at ANSTO, the Australian Synchrotron and the AMMRF. In 2009 it was decided to restructure the DataMINX project into three separate projects:

- A project to develop and deploy a searchable metadata catalog and metadata ingest for the Australian synchrotron and ANSTO, funded by the ANDS Data Capture program
- A project focussed on the needs of the AMMRF (PfC-AMMRF), funded by NeAT
- A project to develop a data transfer service (DTS) for moving data from instruments at ANSTO, the Australian Synchrotron and AMMRF, funded by NeAT

This restructure increased the total investment from PfC to support the eResearch needs of NCRIS Characterisation facilities, due to the addition of ANDS EIF funds. It is anticipated that services and software will be shared between these projects and the different characterisation facilities where appropriate, as was anticipated in the DataMINX project. The PfC-AMMRF project started

Eight Round 2 projects were approved by NeAT to commence in 2009/10. Three of the projects started in July 2009, another three were well under way with most or all staff on board in Q4 2009. The remaining two projects have had some delays in finalising project plans, however the Auscover Workflow project commenced in Q2 2010 and some work on the BioFlows project has commenced in anticipation of the project plan being completed and approved in Q2 2010.

Most of the Round 1 projects have already deployed some operational services. All of the Round 1 projects and some of the Round 2 projects have created prototype services that are being tested by members of the target user community. All projects are currently tracking fairly well against project milestones. Some projects are slightly behind schedule on some milestones, however the effects of these delays are minor and in some cases are compensated for by progress in other areas, so are not expected to affect completion of project deliverables. Brief summaries of the status of each project are given in Sections 9.6.4 and 9.6.5.

A full-time NeAT Projects Coordinator, Alan Glixman, commenced in August 2009 and has greatly assisted in documentation and implementation of processes for administration, reviews, financials and reporting for NeAT projects. A short monthly report and more detailed quarterly reports on the NeAT program are now being generated for key stakeholders, including the Executive Directors of ARCS, ANDS and AeRIC, the ARCS Executive Committee, and DIISR.

A web site <http://plone.arcs.org.au/neat/neat-projects> for NeAT projects administration has been set up, hosted by ARCS. It contains information and documentation on all NeAT projects, including project proposals, project plans, project committee membership, documentation of project funding approval, minutes of project committee meetings, staff reviews, project reports and financial information. The site is accessible (with a AAF login) to members of NeAT project committees, the ARCS Executive Committee and ANDS Steering Committee, DIISR, ARCS and ANDS management and administrative staff.

Brief summaries of the aims of each NeAT project are available on the new ARCS web site, at <http://www.arcs.org.au/index.php/services/research-community-projects>.

9.6.2. NeAT Project Governance

ARCS and ANDS have jointly agreed on the governance and management of NeAT Projects. These are unchanged from the 2009-10 ARCS Business Plan and included here in Appendix D: ANDS-ARCS Agreed NeAT Governance.

9.6.3. Planned Activities for the Period

Fifteen NeAT projects will be running in 2010-11, with a total of more than 60 NeAT-funded staff from 20 different organizations working on the projects. This will require significant effort from the projects management office for project oversight, involvement in project committees, feedback on six-monthly project reports, quarterly staff reviews, project administration and finances.

All NeAT projects will be finishing at the end of the 2010-11. One of the main activities during this year will therefore be to ensure that the tools and services being developed by the projects are moved to an operational basis by the end of the project, to ensure long-term delivery and support of the eResearch services. Each project will be required to submit a written plan for migrating their tools and services to production operational status, and for long-term hosting and support of the services.

Another key activity will be the promotion of the tools and services being delivered by NeAT projects. Promotional material and activities to increase awareness and uptake of the project outcomes by researchers and relevant organizations will be coordinated with the projects, relevant discipline communities and organisations, and ARCS and ANDS communications staff.

Currently NeAT-funded staff are funded quarterly in arrears, after a review of the effort delivered by the staff member. With such a large number of staff to review, and the need to invoice ANDS for half-payment before ARCS can make the full payment, it is very difficult to make timely payments at the end of each quarter. Employers of staff on NeAT projects are always in the red for more than a quarter of funding, which has been one of the main complaints about NeAT projects. To address these problems, the payment process for NeAT-funded staff will be changed to make payments quarterly in advance in 2010-11. Quarterly staff reviews will still be undertaken to ensure delivery of the expected effort. The same change will be made for ARCS operations staff.

9.6.4. NeAT Round 1 Projects - Summary

Summaries of the progress and planned activities for Round 1 NeAT Projects are provided below.

ASeSS: ASSDA Services for e-Social Sciences

\$1M over 3 years, commenced July 2008

Mostly on schedule. Milestones relating to automated data deposit have slipped from December 2009 to (projected) June 2010 as the scope of these activities has widened based on a review of the ASSDA archive ingest and curation workflows and tools, with new web-based curation tools being developed to support current manual or semi-manual archive workflows. The project plan has recently been updated to reflect revised technology choices, progress on a more consistent approach across archives and sub-archives, and to align with related international activities.

Aus-e-Lit: Collaborative Integration and Annotation Services for Australian Literature Communities

\$760K over 3 years, commenced July 2008

On schedule overall. A beta version of the federated search capability is available on the Austlit web site. Some milestones for related to inclusion of additional databases in the federated search have been delayed waiting on the National Library of Australia's project to federate their internal archives. Work on the collaborative annotation and compound objects has been accelerated in the meantime and is ahead of schedule, with testing of prototypes by a selection of end users currently underway. Annotation and compound object authoring tools were extended to include search facilities and alternative views of compound objects, including a new editing interface. The Aus-e-Lit services will be demonstrated at the annual conference of the Association for the Study of Australian Literature.

DataMINX: A Data Fabric for Characterisation – Microscopy, Imaging, Neutron and X-ray Facilities

Currently being restructured, to be replaced with two new NeAT projects and one ANDS project. Staff funded by DataMINX have been working on activities related to these new projects while their project plans are being developed. The ANDS project started early Q2 2010. The two new NeAT projects replacing DataMINX are:

DTS: Data Transfer Service

Approx \$140K for 9 months, expected to commence Q2 2010

This project will work with the ARCS Data Services team to develop a general-purpose data transfer service with initial deployments at NCRIS Characterisation facilities. Initial work has been done as part of DataMINX. Project plan has not yet been completed but the project is expected to formally commence in Q2 2010.

PfC-AMMRF: Platforms for Collaboration in the Australian Microscopy and Microanalysis Research Facility (AMMRF)

\$387K for 1 year, commenced 1 April 2010

Project plan has been approved and work on the project commenced 1 April. This project will deploy data management services at one of the AMMRF nodes, and develop a Capability Finder to allow researchers to select AMMRF instruments that match their research requirements. Initial requirements analysis and a prototype of the Capability Finder have been developed.

DIAS-B: Data Integration and Annotation Service in Biodiversity

\$1M over 3 years, commenced September 2008

On schedule. Project plan for final year is being revised to focus on annotation services, authentication and authorization. The work on the design and implementation of a prototype metadata registry and metadata harvesting has been completed and further work to develop and deploy a production system has been migrated to the Atlas of Living Australia development team as a core ALA activity.

MACDDAP: Marine and Climate Data Discovery and Access Project

\$1M over 3 years, commenced July 2008

Most of the seven sub-projects are on schedule or already completed. Some are running late due to technical problems (now fixed) or a late start for some developers, but all are now progressing well and expected to complete on time. Several new and improved services have been completed and deployed, including new versions of the metadata harvester, portal and data aggregation service. A revised project plan with minor changes for activities in the third year of the project has been approved by the Project Committee.

SISS: Spatial Information Services Stack

\$1M over 3 years, commenced July 2008

On schedule. SISS has been deployed at several organizations for serving a variety of geoscience data sets. The AuScope Discovery Portal is using the SISS services. Expect to have planned functionality of SISS completed by end of June 2010 with final year spent on bug fixes, hardening of code, improving ease of install, documentation and further deployments. Development and deployment of SISS to meet the needs of geospatial data providers outside of the geosciences is being supported by the Australian Spatial Research Data Commons (ASRDC) project funded by ANDS EIF.

9.6.5. NeAT Round 2 Projects - Summary

Summaries of the progress and planned activities for Round 2 NeAT Projects are provided below.

AusCover Workflow: Workflow Services to enable a Large-Scale Temporal-Spatial Ecosystem Digital Information Service

\$480K over 1.5 years, commenced May 2010

Project plan has recently been approved and the project started in May. Some staff are ready to start but some still need to be recruited. The project has already explored the use of the same workflow tools as the Bioinformatics Workflow project and is expecting to adopt this approach.

Aus-e-Stage: Collective Intelligence and Collaborative Visualisation for Creative eResearch *\$500K over 1.5 years, commenced December 2009*

Project plan has been revised to allow for completion of the project in 1.5 years instead of 2. All project staff have been recruited and started work. A prototype of the mapping services has been completed and had initial user testing. Technical specifications have been developed for the mobile audience response project and development will commence soon.

Bioflows: Bioinformatics Workflows

\$800K over 2 years, expected to formally commence May 2010

Some revisions are being done to the project plan, it is expected to be finalised in early May. Significant work on interfacing the workflow system with the ARCS grid has already been undertaken in anticipation of project plan approval. The project should formally start in May.

Biosecurity: *Biosecurity Collaboration Platform*

\$800K over 2 years, commenced July 2009

On schedule. A prototype system has been set up at the CSIRO ICT Centre and is in the process of being deployed at the Australian Animal Health Laboratory (AAHL). Staffing has been confirmed following a CSIRO restructure that affected the project, including a change of project manager. CSIRO has agreed to provide additional in-kind EFTs and funding for equipment. In the coming year the system will be deployed at two state government agencies.

Human Variome: *Software and Data Support for the Australian Node of the Human Variome Project*

\$500K over 2 years, commenced September 2009

Slightly behind schedule, but good progress given delays in finalising staffing and getting project underway. Staff for initial proof-of-concept phase are in place, system and database design have been completed and the prototype system is expected to be completed by July 2010. Good progress has also been made on engagement of data providers and formalisation of data sharing protocols and a governance model for the long-term operation of the production system. The production system will be developed and deployed in 2010-11.

NCJRDN: *National Criminal Justice Research Data Network*

\$500K over 2 years, commenced August 2009

Milestones have been pushed back due to delay in starting the project and hiring of staff, but some are still a little behind schedule, due to slow responses by state agencies to a survey on available data sets. The survey has been completed a Data Availability Register compiled. Staff to implement the system in 2010-11 will be recruited soon.

PODD: *Phenomix Ontology Driven Data Management*

\$600K over 2 years, commenced July 2009

Slightly behind schedule due to delays in hiring some staff. The two bioinformaticians who are in-kind contributions to the project have both recently left to take up other positions, which is a setback to the project, but most of their work on development of data models has been completed and replacement staff will continue to assist the project. A prototype repository and interface has been implemented, and some initial ontologies developed.

Remote CT: *Remote Computed Tomography Reconstruction, Simulation and Visualisation Service*

\$660K over 2 years, commenced July 2009

Slightly behind schedule due to delays in recruiting staff, setting up a test compute cluster, and clarifying activities of ANU staff. All these issues have now been resolved and good progress is being made on enhancing the functionality and robustness of the reconstruction code, and porting the current Windows code so that it can also run under Linux. Work has started at ANU on 3D visualisation of very large 3D reconstructions. Delays in procurement of the MASSIVE cluster may impact future milestones.

9.6.6. Milestones

Objectives, deliverables and milestones for each NeAT project are specified in their Project Plans. General milestones for the NeAT program are given below.

10. Marketing and Outreach

The ARCS Marketing Plan is designed to effectively and efficiently enable ARCS to achieve its business goals by positively influencing current and potential stakeholders. This will be done primarily through the creation of marketing materials and stakeholder promotion and outreach activities. Members will be included in ARCS marketing initiatives as often as feasible.

A Marketing Plan has been developed with a strong focus on being results driven, market specific and cost effective by using high-impact activities that can be quickly executed to drive near-term opportunities.

The specific objectives of the Marketing Plan are:

- To increase awareness and uptake of ARCS tools and services by 50%
- To enhance positive perception of ARCS by 10%
- To expand brand awareness through message retention by 10%
- To educate audiences about ARCS and its national, collaborative, interoperable services and solutions via a minimum of one roadshow event in each state (except NT) and two nationally-available webinars or training sessions
- To increase marketing endeavours with our Members by 50%

It is emphasised that the sole purpose of the promotion and marketing, including the roadshow event(s) in each state, is to promote and to enhance uptake of ARCS existing services. No consultation processes will occur and indeed every attempt will be made to carefully distinguish ARCS promotion activities from the eRCI managed sector consultation. ARCS would attempt to assist with the eRCI consultation process if and only if requested by eRCI to do so and in the manner requested.

In order to avoid potential confusion around the eRCI consultation process, ARCS undertakes that there will be no further press releases regarding the ARCS Compute Cloud unless it has the advance approval of both DIISR and eRCI. ARCS will further attempt to minimise confusion by talking of the “ARCS Grid & Compute Cloud” wherever appropriate.

11. National & International Engagement

11.1.1. Cooperative Relationships

Broadband enabled Science and Technology GRID - (BeSTGRID)

A Memorandum of Understanding (MOU) has been established between ARCS and BeSTGRID. This MOU recognises the mutual benefits to be gained through a co-operative relationship to develop, facilitate and promote eResearch Infrastructure, Tools and Services.

The MOU sets out the commitment to collaboration in eResearch and sharing of resources that benefit both entities and their user communities. The new funding period will see enhanced cooperation and some targeted collaborative activities.

Distributed European Infrastructure for Supercomputing Applications - (DEISA)

A Memorandum of Understanding (MOU) has been established between ARCS and DEISA. The scope of this MOU sets out the plans for how ARCS and DEISA intend to collaborate on the development, provision and support of eResearch Infrastructure. The MOU sets out the commitment to collaboration in eResearch and sharing of resources that benefit both entities

and their user communities. The new funding period will see enhanced cooperation and some targeted collaborative activities.

AARNet Pty Ltd - (APL)

An agreement is currently in place with APL regarding the development and use of the EVO software platform and associated technology (EVO) by ARCS and APL. In July, 2008 ARCS entered into an agreement with EVOGH, Inc. (Licensor) under which the Licensor has granted ARCS a non-exclusive licence to develop EVO to offer a software solution and services, known as 'EVO@AU', and use EVO as part of EVO@AU in Australia for research and education purposes (Head Licence). Amongst the terms of that licence is that the EVO@AU solution and services will be made available to the research and education community in Australia through APL's telecommunications network. This agreement sets out the terms of operation.

Caltech

ARCS will be continuing to explore development and deployment of EVO with Caltech at a relatively low level.

AAF

ARCS will continue to actively contribute to the AAF. ARCS is a Member of the AAF and the Executive Director is a member of the AAF Interim Executive Committee.

CAUDIT

ARCS will continue to actively engage with CAUDIT and will cooperate on issues associated with firewall configurations, the trust fabric and Tier 1 support of ARCS services by the university IT services staff. ARCS has recently joined CAUDIT in the sense that the ARCS Associate Director, Dr Nick Tate, has been appointed as an Associate Member of CAUDIT.

12. Collaboration with NCRIS and Research Capability Areas

Almost all of the NCRIS capabilities listed below make use of some of the generic collaboration services hosted by ARCS, including EVO for videoconferencing, the TRAC and SVN services for software development and project management, and web collaboration services including Sakai, twiki and Plone.

Australian National Data Service

ARCS has worked closely with ANDS on numerous projects, particularly on integration of the ANDS services with the ARCS data services. This work includes the integration of the ANDS Persistent Identifier (ANDS PID) service into the ARCS Data Fabric. ARCS has also contributed expertise to assist ANDS in the establishment of its Service Provider in the AAF.

ANDS are using an ARCS hosted Plone web content management system, and looking to use a vTiger CRM system hosted by ARCS.

ANDS and ARCS are working closely together to jointly fund and manage the 15 NeAT projects. The ARCS Collaboration Services team developed the NeAT Project Portal, a Shibboleth-enabled document management portal that allows the NeAT Projects Management Office to organise all information and documentation related to NeAT Projects, and make it accessible to ARCS, ANDS and NeAT project staff through AAF authentication. ANDS has asked ARCS to provide a similar portal to help manage ANDS projects.

Australian Access Federation

ARCS played a key role in the development and initial implementation of the AAF. ARCS is contributing to the uptake of the AAF by supporting the MARCS and other organisations in joining the AAF, deploying their AAF Identity Providers (IdPs), releasing the auEduPersonSharedToken attribute, and using the AAF for their services. ARCS continues promoting the use of the AAF, including ensuring that ARCS services use the AAF. ARCS has spent considerable effort developing and deploying AAF-enabled implementations of the ARCS Grid, Data Fabric, and Plone and Twiki web collaboration services. The ARCS Access Service is a valuable service accessible via the AAF. Through its deployment, ARCS services are more closely tied to the AAF.

ARCS is contributing to the high-availability deployment of the AAF by hosting a load-balanced Discovery Service, and provides a backup of the AAF Resource Registry database.

Evolving Biomolecular Platforms and Informatics

The NeAT BioFlows project will provide a simple web-based workflow tool to enable life sciences researchers to specify genomics and proteomics workflows that can be executed on the ARCS Grid and interface with the ARCS Data Fabric. The system will be deployable as an "appliance" that provides the required software, middleware and server hardware and can be installed at a site and managed remotely if required. The appliance will interface to local HPC systems and/or submit compute jobs to the ARCS Grid. The appliance concept will be tested with initial deployments at the IVEC Informatics Facility at Murdoch University, the Queensland Facility for Advanced Bioinformatics (QFAB) and the Life Sciences Computation Centre (LSCC) in Victoria. Although in its initial stages, a functioning prototype system has been created.

Atlas of Living Australia

ARCS is providing virtual machines to host services for the Atlas of Living Australia (ALA). ALA is also looking to store large amounts of data on the ARCS Data Fabric. Some of the data will be served through a THREDDS Data Server via OPeNDAP. Setup of this server has been completed but is waiting for data.

The Data Integration and Access Services for Biodiversity (DIAS-B) NeAT project is working with the ALA to develop a metadata repository to enable integration, discovery and searching of multiple distributed biodiversity data sets, and to provide a service for researchers to annotate biodiversity data, particularly for flagging possible errors or data quality issues. Initial versions of the metadata repository and annotation service have been implemented and will be used in the public release of the ALA later this year.

Phenomics

The Phenomics Ontology Driven Data Management (PODD) NeAT project will deliver a data management service for the Australian Plant Phenomics Facility (APPF) and Australian Phenomics Network (APN) that can manage multiple data types (text, image, video), phenotyping platforms and data formats. The project will also provide a repository of the associated metadata. A range of tools and other features will be developed to provide web-based discovery interfaces for users, external repositories and services and will support the automatic capture and annotation of data and metadata from instrumentation, where possible. The project will also deliver the ability to publish data, or make it publicly available after a pre-determined period.

The PODD repository will store data on the ARCS Data Fabric. ARCS experts are providing guidance related to IT and data storage planning for the APN and APPF data. ARCS has worked with PODD developers to set up a test instance of the Fedora Commons repository that is used by PODD, and successfully connect this to the ARCS Data Fabric. More work is planned, with data to start flowing through between July and September.

Characterisation

The Virtual BeamLine (VBL) service developed by VeRSI allows data to be transferred from the Australian Synchrotron to the ARCS Data Fabric or the user's desktop.

A NeAT Data Transfer Service project will work with the ARCS Data Services team to develop a general-purpose data transfer service, with initial deployments at NCRIS Characterisation facilities. Initial work, including a detailed design and a prototype implementation, has been done as part of DataMINX project, in collaboration with a similar project in the UK.

Platforms for Collaboration in the Australian Microscopy and Microanalysis Research Facility (AMMRF) is a NeAT project that will deploy data management services at one of the AMMRF nodes, and develop a Capability Finder to allow researchers to select AMMRF instruments that match their research requirements. A prototype of the Capability Finder has already been developed.

The Remote Computed Tomography Reconstruction, Simulation and Visualisation NeAT project is developing services for 3D Computed Tomography (CT) reconstruction, simulation, analysis and visualization that will be run on high-performance computing systems, but accessible remotely from the researcher's desktop. The services will be deployed for the Imaging and Medical Beamline at the Australian Synchrotron and the ANU micro-CT facility (which is part of AMMRF), and are expected to be applicable to other characterisation facilities. A prototype of the remote CT service has been developed and is being tested on some small test compute clusters.

Networked Biosecurity Framework

ARCS experts helped the Australian Biosecurity Information Network (ABIN) to set up its initial IT infrastructure, as well as design, develop and implement a web portal hosted on a virtual machine. The portal forms the basis of its operational, outreach and internal project document repository, which it shares with all ABIN member organisations.

ARCS will be doing a pilot for ABIN offsite backup on the ARCS Data Fabric. We are aiming to have this set up and tested by August 2010.

The NeAT BioSecurity Collaboration Project is implementing a collaboration platform at the Australian Animal Health Laboratory (AAHL) facility, comprising two nodes, one on each side of the bio-containment barrier. This will greatly assist in the flow of complex information across the containment barrier, from a variety of data sources such as pathology and microscopy systems, live in-vivo animal experiments and simulation models. The collaboration platform will provide video conferencing, shared displays, and access to applications software for local machines. It will integrate critical technology platforms (microscopy and pathology) into a common, shared visual workspace. A prototype system has been developed and is currently being deployed at AAHL. Following the successful implementation of the collaboration platform at the AAHL facility, two additional nodes will be deployed within state government departments that collaborate with AAHL on biosecurity research and emergency response. It is expected that this collaboration platform may have broader applicability within the Australian Biosecurity Information Network (ABIN).

Astronomy

The ARCS Data Team has provided a data transfer service for the Australia Telescope National Facility (ATNF), recently renamed CSIRO Astronomy and Space Sciences (CASS), that facilitates large-scale data transfers between telescopes and data repositories, reducing delays and the possibility of data loss, interruption and corruption in transit.

Terrestrial Ecosystems Research Network

The TERN Ecoinformatics facility will use ARCS infrastructure for hosting its servers and data. This is likely to include hosting data from other TERN facilities, including ACEAS, the National Scientific Monitoring Network and the TERN Supersites.

The TERN Auscover facility will use the ARCS Data Fabric and OPeNDAP servers for data management, and the ARCS compute grid or cloud for data processing, utilising tools and services being developed by the Auscover Workflow, MACDDAP and SISS NeAT projects.

The NeAT Auscover Workflow project will provide easy-to-use workflow tools and services that will allow AusCover data providers to use the ARCS Cloud Computing infrastructure to more easily process raw satellite data to generate derived data products in the standard formats that users require. The data will be stored on the ARCS Data Fabric. The same workflow tools will also enable researchers to process AusCover data sets using ARCS infrastructure.

Integrated Marine Observing System

In addition to hosting several virtual machines and services for IMOS, ARCS has provided a unified, transparent and integrated system to access and maintain distributed data via the ARCS Data Fabric. This has greatly improved efficiency and productivity, as well as the ability to deliver sustained marine observations to the Australian research community. The Data Fabric also has reduced the resources, budget and expertise required to manage and administer data storage and access – freeing IMOS to focus on its core capabilities.

The NeAT Marine and Climate Data Discovery and Access Project (MACDDAP) is working closely with IMOS to develop software to enable researchers to more easily find the data they need by searching across multiple data sets using standard metadata, and to access the data using standard interfaces. New versions of data server software that supports Open Geospatial Consortium (OGC) standards have been completed and deployed at some sites, and improvements are being made to data aggregation services, metadata repositories and web portals.

ARCS Authorisation Services is working closely with the MACDDAP project to enable access to OPeNDAP servers using X509 credentials generated via AAF authentication.

AuScope

ARCS supports AuScope's use of the ARCS Grid, and provided AuScope software developers with information and assistance so that AuScope can build applications based on the ARCS Grisu services and client toolkit for using the ARCS Grid. ARCS provided a SLCS Delegation Service for AAF-based authentication and assisted with incorporating it into the new Auscope portal.

The Spatial Information Services Stack (SISS) NeAT project is providing support for a spatial data commons by developing and enhancing a set of open source software packages and

Appendix A: ARCS Key Performance Indicators from AeRIC

Introduction

Following a review of the 2008-09 ARCS Annual Business Plan, AeRIC advised DIISR that a set of strategic Key Performance Indicators (KPIs) should be developed to drive the further development of ARCS.

The proposal canvassed at the meeting, was to develop a set of metrics and to provide a base level of measurement against them this year, so that developments by the 2009 Annual Report (due in September 2009) can be more easily identified.

Framework

The Objectives identified in the ICI contract were to:

1. Establish, operate and provide access to an interoperation and collaboration infrastructure (ICI) and to improve access by researchers to digital repositories, scientific instruments, virtual environments, on-line collaborative interaction and seamless resource sharing in accordance with the NCRIS Principles set out in section one of the NCRIS Roadmap.
2. Expand the facilities, services and user base developed by the grid program of the Australian Partnership for Advanced Computing (APAC).
3. Offer open access to the ICI infrastructure to all researchers undertaking research across NCRIS capabilities as well as researchers accessing other affiliated resources.
4. Under the auspices of AeRIC, operate in a collaborative manner with the other components of the NCRIS Platforms for Collaboration capability (see section 1.3).
5. Undertake activities to increase the uptake of ICI facilities and therefore e-Research.

In addition, the participating organisations are to establish and operate ICI services which:

- A. takes into account the long-term strategic requirements of NCRIS research capability areas;
- B. enhances national and international research collaboration in research;
- C. provides leading-edge research capability for NCRIS research capabilities;
- D. provides for open access to the ICI capabilities;
- E. has a strong emphasis on service provision to the research community; and
- F. has a strong emphasis on the effective use and management of data resources.

Because a framework of *strategic* KPIs would provide for only a limited set of measures, and taking the above into account, a set of measures could be formed as follows:

- Objectives 3 and 4 and qualities D and E to be measured by overall ARCS performance and user satisfaction measures, where evaluations may be sought from users and other service providers on an annual basis
- Objectives 1, 2 and 5, and qualities B and C to be measured through a set of service delivery and usage reports derived from ARCS operational data related to service use by identified user communities and research facilities

- Quality A to be measured by a survey of CEOs of NCRIS capabilities
- Quality F to be measured by an analysis of the extent of ARCS effort and the use of ARCS service that are related to data management and data resources

Proposed KPIs

Service Performance

These measures address Objectives 3 and 4 and Qualities D and E, which include open access to services, an open and collaborative approach by ARCS, and an emphasis on service provision to the research community.

Proposed Measures:

- Annual user satisfaction surveys, carried out on a service by service basis
- Invited submissions from existing users across a significant cross-section of the major research communities, including the NCRIS Capability Areas, as well as established discipline areas
- Total measures of usage per service
- Number of services in the PfC and NCRIS investments with which ARCS services inter-operate

Developing eResearch

These measure address Objectives 1, 2 and 5 and Qualities B and C, which include access to resources, and to an increased range of resources, leading to increased usage of both ARCS and accessible resources which increases national and international research collaboration and support NCRIS capabilities through leading edge eResearch services.

Proposed Measures:

- Number of agreements between ARCS and research resource providers and research communities
- Analysis of service usage showing shares of use related to NCRIS capabilities, other identified research facilities, the various research communities
- Specific usage analysis of the Australian Grid
- Summary of collaborative initiatives established or supported by ARCS

Strategic Alignment to NCRIS

These measures address Quality A, which is that ARCS takes into account the long-term strategic requirements of NCRIS research capability areas.

Proposed Measures:

- Number of packaged services tailored to specific NCRIS capabilities
- Survey of NCRIS CEOs on value derived from ARCS

Focus on Data

These measures address Quality F, which is that ARCS has a strong emphasis on the effective use and management of data resources.

Proposed Measures:

- The extent to which ARCS resources are focussed on data services, in financial and effort terms
- Specific usage analysis of the ARCS Data Fabric
- Feedback from ANDS and NCI on ARCS assistance with their data needs

Appendix D: ANDS-ARCS Agreed NeAT Governance

NeAT Project Governance:

All NeAT projects should aim to establish services that are useful both for the discipline involved and as potential national services. There should be only two levels of governance, where the distinction is clear between the governance and the deep technical and domain involvement needed for the project to succeed.

ARCS and ANDS have therefore discussed and jointly agreed on the management of NeAT Projects as follows:

- Each NeAT Project will have a NeAT Project Committee consisting of an ANDS representative (the Executive Director or delegate) and an ARCS representative (the Executive Director or delegate), representatives from any other institutions that would manage the enduring services provided by the NeAT Project, community nominated discipline representatives, a designated NeAT Project Manager (ex officio) and a prominent discipline leader as the NeAT Project Committee Chair. Where a suitable discipline Chair could not be found, the Chair will be either the ANDS or ARCS representative depending on whether the project was more ARCS or ANDS;
- Each NeAT Project will have a Project Manager selected by the relevant NeAT Project Committee;
- The Project Manager must be the person who manages the day to day work of the project;
- Project Managers must report to and be directed by the Project Committee;
- The governance structures of ANDS and ARCS will need to be satisfied with the Project Committee's management of the project in order to ensure the funds keep flowing, which provides the appropriate checks and balances and ensures accountability;
- At the start of the Project and subsequently once each quarter the Project Manager will attend a review meeting chaired by the AeRIC Executive Director and attended by the Executive Directors of ANDS and ARCS and their nominees as well as the Project Managers of the other NeAT Projects;
- The Project Manager must meet no less than every four weeks with the Project Committee: in order to discuss the progress and evolution of the Project; to ensure that the Project is making optimal use of existing and planned services of project participants; and to ensure that the Project is being developed in a way consistent with the long-term delivery of the Services as per the project plan;
- Core responsibilities of each of the NeAT Project Committees include: overseeing and approving the design and implementation of an appropriate and relevant enduring service; and at the end of the Project identifying the key stakeholders and service providers to manage this enduring service into the future and to take over from the NeAT Project Committee.
- ARCS and ANDS will jointly review the progress of each NeAT Project every three months using their standard processes and the NeAT Project Committees would review their project every six months with a written report from the Project Manager. NeAT would review all NeAT Projects annually in September, beginning 2009, as part of the established NeAT processes.
- ANDS and ARCS will provide NeAT Project funds quarterly in arrears based on acceptable performance on a per EFT basis for each NeAT Project. The ANDS and ARCS quarterly reviews will be the trigger for either approving or withholding NeAT funding for that quarter from a NeAT Project or a component of that project as appropriate.