



# ANNUAL PROGRESS REPORT

TO THE DEPARTMENT OF INNOVATION  
INDUSTRY SCIENCE AND RESEARCH

1 July 2008 to 30 June 2009

Version 1.0  
29 September 2009

**Professor Anthony G Williams**

**Executive Director of ARCS**

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

## TABLE OF CONTENTS

<b>1</b>	<b>OVERVIEW OF STATUS.....</b>	<b>3</b>
<b>2</b>	<b>DESCRIPTION OF THE ACTIVITIES UNDERTAKEN .....</b>	<b>8</b>
<b>3</b>	<b>DESCRIPTION OF PROGRESS AGAINST MILESTONES .....</b>	<b>26</b>
<b>4</b>	<b>DEVIATIONS FROM THE PROJECT PLAN .....</b>	<b>32</b>
<b>5</b>	<b>DISCUSSION OF CASH AND IN-KIND CO-INVESTMENT .....</b>	<b>34</b>
	<b>APPENDIX A: ARCS PRODUCTS AND SERVICES.....</b>	<b>35</b>
	<b>APPENDIX B: ARCS ORGANISATION STRUCTURE.....</b>	<b>37</b>
	<b>APPENDIX C: PERFORMANCE AGAINST AGREED PERFORMANCE INDICATORS .....</b>	<b>38</b>
	<b>APPENDIX D: SUMMARY OF NEAT ROUND ONE PROJECTS.....</b>	<b>44</b>
	<b>APPENDIX E: ARCS NCRIS CEO SURVEY .....</b>	<b>47</b>
	<b>APPENDIX F: AUDITED FINANCIAL STATEMENTS.....</b>	<b>50</b>
	<b>APPENDIX G: CONFIDENTIAL INFORMATION .....</b>	<b>58</b>

## 1 OVERVIEW OF STATUS

This document is the annual Progress Report of the Australian Research Collaboration Service (ARCS) to the Commonwealth Government Department of Innovation, Industry, Science and Research (DIISR). The report covers ARCS' activities during the period 1 July 2008 to 30 June 2009, and it relates to the goals, objectives and planned activities included in the ARCS Annual Business Plan 2008-2009.

### 1.1 Overview of ARCS

**ARCS** 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.

**Mission and Activities** The ARCS mission is to enable and enhance research through the provision of long-term eResearch support, services and tools. To achieve this, ARCS conducts activities to provide national eResearch support services in the form of:

- interoperability and collaboration infrastructure and services;
- authorisation 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.

**ARCS Members** The members of ARCS (MARCS) at 30 June 2009 are:

- Australian National University (ANU) in the Australian Capital Territory;
- Commonwealth Scientific and Industrial Research Organisation (CSIRO) nationally;
- eResearch SA (eRSA) in South Australia;
- INTERSECT in New South Wales;
- iVEC in Western Australia;
- Queensland Cyber Infrastructure Foundation (QCIF);
- Tasmanian Partnership for Advanced Computing (TPAC) in Tasmania; and
- Victorian Partnership for Advanced Computing (VPAC) in Victoria.

**ARCS Funding** ARCS is funded in part by the Department of Innovation, Industry, Science and Research through its Platforms for Collaboration (PfC) capability within NCRIS. During the funding period from 1 July 2007 to 30 June 2011 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.

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).

The delivery of ICI services by ARCS to the Commonwealth is specified through an ICI Funding Agreement, which is included as a Schedule in the ARCS Collaboration Agreement. A separate Authorisation Funding Agreement has been put in place between DIISR and ARCS to cover the delivery of the Authorisation Services. It has been included in the ARCS Collaboration Agreement as an additional Schedule.

## 1.2 ARCS Products and Services

ARCS main products and services are offered to Australian eResearch communities through four ARCS service areas:

- **Collaboration Services** providing services that assist researchers to work collaboratively within research groups and between research groups using inexpensive and readily-accessible computing equipment and Internet services.
- **Data Services** providing a scalable and reliable data repository service (the ARCS Data Fabric) and associated tools to all Australian research groups assisting them to meet the ARC and NHMRC requirements for proper research data management.
- **Systems Services** providing assistance and expertise to Australian researchers who submit compute jobs to one or more of the High Performance Computing (HPC) facilities available through the ARCS Grid.
- **Authorisation Services** working with other ARCS Services Teams, its Platforms for Collaboration siblings (in particular, the Australian Access Federation (AAF)), research groups and research Service Providers to build a unified authorisation infrastructure for eResearch Services and Tools throughout Australia.

and through managing, in collaboration with ANDS, the processes and operation of **Projects** for the National eResearch Architecture Taskforce (NeAT).

An extended description of the capabilities, products and services of these service areas are included in Appendix A.

## 1.3 ARCS Structure and 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. During this report period, ARCS has appointed Trevor Powell, an Independent Member, as the Chair of the Executive Committee. This appointment was approved by DIISR within this reporting period. The Executive Director is appointed by and reports to the Executive Committee. The current Executive Director is Professor Anthony Williams.

As ARCS is an unincorporated collaborative venture it must operate through a legal agent. ARCS refers to this role as the *Lead Agent*. 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. It is also possible in principle to have different Members acting as legal agents for each individual contract that ARCS has with an external entity as well as a separate Member acting as Lead Agent for the ARCS collaboration itself. At present VPAC is the Lead Agent for the collaboration as well as being the legal agent for the ICI Funding Agreement with the Commonwealth. VPAC is also the current Lead Agent for Authorisation Funding Agreement with the Commonwealth.

ARCS activities are subject to the ARCS governance procedures and as such will involve the Executive Director and the Executive Committee in their development and their delivery. The Members have agreed that ARCS is the preferred vehicle for the delivery of national e-Research support services and to work together to pursue opportunities for sustainability and growth of ARCS.

The structure of ARCS core services consists of four Services teams, each headed by a Service Manager, and a Projects area headed by a Projects Manager. These are:

- Collaboration Services headed by Andrew Alexander,
- Authorisation Services headed by Neil Witheridge,
- Systems Services headed by Jim McGovern,
- Data Services headed by Florian Goessmann, and

- Projects headed by Paul Coddington.

While other groups continued their operation during the reporting period, the Authorisation Services commenced its operation from 1 July 2008.

Details of the ARCS services can be found in Appendix A.

#### 1.4 Management and Processes

All substantial new 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-related business, the activities of ARCS are further bound by the conditions of the ICI Funding Agreement. Similarly, Authorisation Services is further bound by the Authorisation Services Agreement.

The Executive Director is responsible for the day-to-day management of ARCS with the assistance of the various Managers. The Delegation of Powers within ARCS was amended by the Executive Committee in 2 December 2008. The Executive Director is the Line Manager for each of the Managers and each of the Managers are in turn the Line Managers for the ARCS-funded staff and the activities in their respective area. Since some staff may work across more than one area, they may have more than one Line Manager.

**The Management Group** The Management Group is convened by the Executive Director and it includes the Projects Manager, Collaboration Service Manager, Data Services Manager, Authorisation Services Manager, Systems Services Manager and the Business Manager. The ARCS organisation chart can be found in Appendix B.

All members of the Management Group are existing employees of MARCS and are seconded to ARCS through the Lead Agent. Secondment Agreements are now in place for most members of the Management Group between ARCS and their employer. ARCS is responsible for setting each of the Manager's key performance indicators (KPI's) and remuneration through a performance-based management system. The Local Host for members of the Management Group may be any of the MARCS or any of their member institutions. ARCS compensates each Local Host for the salary and on-costs for these appointments.

All positions have performance target agreements in place with performance being reviewed biannually.

Both the management group and their teams are geographically located across Australia. All management activities are conducted using ARCS collaboration tools and services.

**Coordination** Coordination across Services and project teams and activities is ensured through weekly videoconferences of the Management Group. Each Team also has weekly or fortnightly videoconferences. All ARCS activities carried out by ARCS-funded staff are under the effective control of the Executive Committee governance through the ARCS line management arrangements. This is necessary in order to ensure that all ARCS activities are subject to the governance procedures of ARCS. ARCS funded staff may also deliver non-ARCS incidental services to the Local Host under the direction of the Local Host line manager.

**Policies and Procedures** ARCS has embraced a strong commitment to Quality Assurance (QA) and has established clear management structures and processes to ensure planned and systematic production changes and enhancements. An Advisory Group has been established to oversee and provide direction on Quality Management for ARCS. This is to ensure product confidence to satisfy our user and developer requirements in a systematic, reliable fashion.

ARCS have in place policies governing customer support and engagement with consideration provided to pro-actively deliver customer-oriented, production infrastructure, tools and services with appropriate change management and QA processes in place. ARCS is currently reviewing requirements for Project Management and Customer Relationship

Management systems that will further improve processes.

During this period ARCS has responded to the need to measure its progress against KPIs by introducing a performance management system, and by initiating the process of having all of its constituent functions report progress against the KPIs. The system will be fully implemented during the next reporting period. A detailed report on performance during this year can be found in Appendix C.

A cross-team leadership advisory group has been established with the aim of examining and evaluating ARCS Quality Management framework.

**Risk Management** Risk management is recognised as an integral part of ARCS management practices. ARCS 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 processes and procedures that provide a systematic view of the risks that it faces in the course of its activities. Where appropriate, these procedures are consistent with the Australian Risk Management Standard AS/NZS 4360:1999.

The key element of the Risk Management strategy is the establishment of a Risk Matrix Register. The Register documents and categorises all potential risk exposures to ARCS, their severity level, proposed mitigation strategy and the appropriate "Risk Manager" from the ARCS Management Group responsible to manage this risk.

The Risk Matrix Register is reviewed quarterly by management to examine the implementation of risk reduction strategies and to capture any new risks arising from changing circumstances. The Risk Matrix Register is reported within the Director's Report at Executive Committee Meetings.

**Access and Pricing** The access and pricing policy adopted by ARCS is:

- For legitimate research users all generic ARCS Services will be supplied at no charge wherever possible;
- Where specialised services are required and/or heavy demand occurs then the general principle is to use a combination of co-investment of effort and at-cost charges for such ARCS services;
- Where ARCS elects to deliver commercial solutions to non-research clients this would be at standard competitive commercial rates.

## 1.5 Key Appointments

The two remaining Services Manager positions have been filled. Andrew Alexander has been appointed the Collaboration Services Manager in December 2008 and Neil Witheridge has been appointed the Authorisation Services Manager in December 2008. Florian Goessmann has been elevated to manage the Data Services team.

Karen Iatrou was appointed the ARCS Business Manager (40% FTE) during the year and then later filling the role at 70% FTE. With these appointments, all management positions are filled.

## 1.6 Key Achievements

ARCS is a maturing organisation developing effective processes underpinning its operations at the same time as positioning itself as a professional and innovative service provider to the Australian research community. Its success will be measured by the extent to which it supports the rapid adoption of eResearch by Australian researchers and provides cost-effective infrastructure supporting both NCRIS capability areas and the rest of the research community.

While still young and growing to meet this challenge, ARCS has been able to achieve recognition as a vital service provider while introducing innovative services and expanding its clientele. There are initial signs of a period of rapid growth in the use of ARCS services. The following list of key achievements highlights these developments during 2008-2009:

1. Completion of a stable governance and management system for ARCS including the Executive Committee, the MARCS, NCRIS and the Management Group positioning ARCS as the premier eResearch service delivery vehicle for the Australian research sector.
2. Construction of a system of management processes to drive and measure an organisation delivering high quality professional services to the Australian research sector.
3. Recognition of ARCS technical achievements in delivering advanced eResearch services by the international eResearch community.
4. Adoption of ARCS services by nine out of the 12 NCRIS capability areas.
5. Effective collaborations established with ANDS, NCI and AAF within the PfC umbrella and with the MARCS to channel an integrated and interoperating set of eResearch services.
6. A cost effective high-quality low-cost desktop videoconferencing service for all Australian researchers with promising usage growth patterns during its first six months of operation.
7. Introduction of integrated access to a high-capacity managed distributed data repository service for all Australian researchers supported by tools encouraging usage by NCRIS and other user groups.
8. Virtualisation of research computation through seamless access for all Australian researchers to high-performance computing facilities countrywide.
9. Collaboration with the AAF to introduce secure single sign-on services for Australian researchers which will eventually be able to encompass all ARCS, MARCS and research institution computational services.
10. The selection and operation of 14 NeAT projects that will accelerate the adoption of eResearch by the Australian research community by developing new services supporting, and strongly supported by, seven of the 11 NCRIS capability areas as well as four research disciplines in the humanities and social sciences.

### 1.7 Financial Status

Detailed financial information and auditor's reports are provided in the Appendix F.

## 2 DESCRIPTION OF THE ACTIVITIES UNDERTAKEN

The Annual Business Plan 2008-2009 has defined a set of key initiatives and strategies to be implemented in this reporting period. These initiatives and strategies focus on the pro-active delivery of customer-oriented, production tools and services with appropriate change management and quality assurance processes in place.

### 2.1 ARCS Activities

The Annual Business Plan 2008-2009 has defined key activities for this reporting period. These include:

- Provide enhanced Tools and Services including training and consulting.
- Conduct process Improvement with particular focus on implementing Quality Assurance (QA) and Change Management (CM).
- Conduct promotion, outreach and market communication programs as defined in the business plan.
- Develop business and technical capabilities and core competence including embracing existing and commodity-like tools and services and adopting and participating in the development of international best practice.

During the reporting period, ARCS has conducted activities in all these areas. ARCS and all the service teams have implemented the strategies outlined in the 2008-9 Business Plan to transform the organisation to a more customer-focussed, results-driven and proactive eResearch service provider.

**Enhanced Tools and Services** All four services areas have delivered new and enhanced products and services according to the 2008-9 business plan. These services and products include:

- The EVO@AU desktop-based videoconferencing service combined with the IP Phone Bridge
- Web-based collaboration tools including Drupal, Plone, Twiki, and Sakai
- A single help-desk service for researchers using ARCS and ANDS services
- A new version of ARCS Data Fabric data storage repository services
- Data access tools, Davis and OPeNDAP
- Database creation and access tools, MySQL and PostgreSQL
- Large scale data transfer services
- ARCS National Grid Submission tool (Grisu)
- ARCS Virtual Machine (VM) Hosting service pilot
- Authorisation Advisory Services
- Pilot AAF infrastructure (Discovery Service)
- Other Authorisation service components including IdP, SLCS Server and CA, SLCS client libraries and command-line tool.

Details of these new and enhanced services are presented in Sections 2.2 to 2.6 of this report.

**Process Improvement: Quality Assurance** QA processes are being implemented within each of the ARCS teams involving separate development and testing environments and mandatory QA processes prior to deployment. A cross-team leadership group is set up with the aim of developing a single merged framework for quality assurance of services across all ARCS teams within 2009-10.

The ARCS help desk has piloted the collection of qualitative data as part of a quality improvement cycle to be fully implemented in 2009-10.

### **Change Management**

In 2008-9, ARCS introduced an IT services change management process used by all teams. The process is loosely based on ITIL<sup>1</sup> and ensures that change is planned, communicated, documented and quality assured, and considers roll back and reduces risks of downstream failures. A leadership group across teams is meeting with the aim of refining and broadening the change management process for 2009-10 and PRINCE2 is being considered.

ARCS Change Management procedures are documented and published in the internal website: <http://wiki.arcs.org.au/bin/view/Main/ChangeControl> and <http://wiki.arcs.org.au/bin/view/Main/ChangeNotes>.

### **Customer Relationship Management**

In early 2009, the Collaboration services team was given responsibility to establish a Customer Relationship Management (CRM) system for ARCS. This is part of the initiative to improve customer-focused service delivery and continuous process improvement for the organization.

A rigorous analysis of CRM systems was conducted with the view of providing a service that could be used by ARCS and by other research based organisations.

The VTiger system has been targeted as a primary candidate for full assessment. The VTiger system enables participating organisations to use the same customer contacts base while keeping their institutional activity private.

The system was demonstrated to a number of research groups and to ANDS, who have been working with ARCS to assess the service and identify its value to ANDS and the wider research community. A number of customisations have been made and further work is required to make it more research oriented and user friendly. The final selection will be made after the full assessment of customisations is complete.

The ARCS intranet has been developed which will provide a central repository to store ARCS' policies and procedures including the QA and CM procedures.

### **Performance Measurement**

ARCS has defined a performance management framework including four key performance areas and a set of measurements in each area and implemented a performance management and reporting process during 2008-9. In this process, each Services Manager is responsible for collecting and collating measurement data and based on them to report the overall team performances. This is reported biannually at 31 December and 30 June.

Each services team has made a start establishing the necessary data collection mechanisms to measure their performance. Not all necessary measurements have been implemented within this year. The remaining measurements and quantitative performance reporting will be achieved progressively in the following years.

### **Risk Management**

The ARCS Risk Management process has been comprehensively reviewed and a risk management strategy has been put in place in this reporting period. In February 2009, the ARCS Management Group identified and generated a comprehensive list of all potential risk exposures to ARCS. Each risk was then analysed in terms of its likelihood and its possible severity or magnitude and then categorised by considering the control environment and determining an assessed or residual risk level. Minor risks were excluded from further analysis and the more serious risks were flagged for treatment. Risks in the category of High and Very High have been assigned an appropriate "Risk Manager" from the ARCS Management Team and a risk management strategy or treatment action plan was documented and implemented. These risks have been documented with their proposed mitigation strategy in a Risk Matrix Register.

---

<sup>1</sup> Information Technology Infrastructure Library, a global industry standard for IT service management, <http://www.itil-officialsite.com/home/home.asp>

**Promotion** ARCS engaged a Marketing Consultant with extensive marketing experience in February 2009 to develop a Marketing Strategy and Promotional Plan. ARCS have also contracted services to redevelop the ARCS Website and branding.

ARCS will be seeking the approval of the Executive Committee at the September 2009 meeting (this was granted and recruitment is proceeding) to employ a full-time Outreach and Communications Officer to assist in the development of Brand Awareness, Media & Public Relations, a newsletter and case studies. The Outreach and Communications Officer will replace the efforts of the Marketing Consultant.

**Outreach** Through ongoing engagement with the Council of Australian University Directors of Information Technology (CAUDIT), ARCS has established a formal relationship with all CAUDIT members for the purpose of delivering ARCS services. Initial collaboration between ARCS and CAUDIT has seen the deployment of ARCS EVO service on different campuses.

ARCS and CAUDIT have collaborated on agreed set of firewall configurations that will facilitate the provision of ARCS services. This will allow both ARCS and CAUDIT members be responsive to each other's needs when ARCS services are to be made available to a CAUDIT member.

ARCS has developed a new strategy to enhance its market reach and support from the eResearch provider community during the reporting period. The strategy responds to the expectation from the Commonwealth that ARCS would be inclusive in its mission and would work in close association with Australian eResearch service providers. ARCS plans to create two new categories of strategic relationships with eResearch providers: *Associate of ARCS* and *Supporter of ARCS*. These categories will replace the need for an *Affiliates* program.

Associates of ARCS include any Australian eResearch organization working closely and collaborating with ARCS. This includes any organisation that:

- provides Tier 1<sup>1</sup> support for ARCS services;
- has significant ongoing financial arrangements between ARCS and the Associate;
- collaborates closely on the development and/or delivery of tools and services; or
- provides staff embedded in or working closely with ARCS Teams.

Supporters of ARCS include any Australian eResearch organization endorsing and encouraging the uptake of ARCS infrastructure, services and tools.

Plans have been made to actively recruit Associates and Supporters from the Australian eResearch provider community in the coming year.

**Capability Development** ARCS intends to raise the levels of eResearch capabilities throughout Australian research institutions and service providers, including MARCS. ARCS has conducted 9 workshops and participated in events at 41 sites, encouraged research institutions to make greater use of ARCS tools, and deployed infrastructure that will form the infrastructure for future capability enhancement.

ARCS has delivered the services intended for use by all Australian researchers to NCRIS, created customised services for some NCRIS capabilities and managed NeAT projects with significant NCRIS group involvement. To ARCS knowledge nine out of the 12 NCRIS areas have started to adopt one or more ARCS services. ARCS has delivered custom solutions to NCRIS capabilities areas which are listed in the Appendix C.

---

<sup>1</sup> A university can become a *Tier One Support Partner* for an ARCS product. In doing so they provide a commitment to connect to the ARCS infrastructure associated with that product, increase the product usage within their institution, provide internal level 1 support for that product and become part of the ARCS development process for that product or service.

During 2008-9 ARCS has collaborated with the MARCS to employ expert staff who are effectively seconded to work for ARCS, to manage the implementation of ARCS projects, to provide support for ARCS services to research institutions and to jointly promote ARCS capabilities.

### 2.2 Collaboration Services

ARCS aims to provide services that assist researchers to work collaboratively within research groups and between research groups using inexpensive and readily-accessible computing equipment and Internet services. This includes communications services and web-based services that encourage collaborative research work. The Collaboration Services team is responsible for providing a range of services including:

- Video and teleconferencing services
- Web-based collaboration tools
- Help desk for all ARCS services including those offered by the Collaboration Services.

Through the Collaboration Services team, ARCS also builds customized collaboration environments and hosts web portals for individual user groups.

#### Video and Teleconferencing Services

ARCS provides free and easy to use videoconferencing services for all researchers in Australia enhancing their ability to meet with domestic and international colleagues. Access Grid is a multi-window video meeting service connecting people who gather in special Access Grid rooms. EVO is a desktop based video meeting service connecting people using their desktop and inexpensive audio and video devices.

#### 2008-9 Activities

1. Commissioning the EVO@AU desktop-based video collaboration service as a national service for Australian researchers to work together. EVO is a product supported by the California Institute of Technology (CalTech) and connects Australia with the international research community.
2. Development of a bridge between EVO and the Access Grid so that users can attend the same meeting.
3. Introduction of the ARCS National IP Phone Bridge that enables researchers who cannot use videoconference facilities to attend EVO meetings for the cost of a local call using the standard phone network.
4. Various current and future upgrades to EVO services in collaboration with CalTech including meeting management, better broadband utilization, adding Shibboleth<sup>1</sup> for single sign-on, and integration with Cisco MeetingPlace and other videoconference systems in common use in Australia.
5. Introduction of the Access Grid QA testing system and standardisation of hardware and software configurations.

#### New and Upgraded Services

Researchers can choose between EVO, Access Grid and phone services to attend meetings using video and teleconferencing from PCs or special purpose rooms. The EVO and IP Phone services were introduced in 2008-9.

The bridge between EVO and the Access Grid enhances the past investments in Access Grid and adds new capability to Australia's existing research infrastructure.

---

<sup>1</sup> The Shibboleth System is a standards based, open source software package for web single sign-on across or within organizational boundaries. It allows sites to make informed authorization decisions for individual access of protected online resources in a privacy-preserving manner.

The Access Grid QA testing system provides universities with the ability to test their systems and identify areas where performance elements can be improved. This system was introduced as a service in December 2008.

**Service Usage** The number of registered EVO users in Australia (754 researchers) in June 2009 has more than doubled in the last 4 months. At the same time the average total monthly EVO meeting hours has doubled to 452 hours, and the number of regular meeting attendees increased to 197 researchers a month, demonstrating not just an increase in the number of users but also an increase in EVO utilisation.

No definitive numbers are available on the use of Access Grid rooms but consistent customer feedback indicates that both the frequency of use and reliability of the Access Grid rooms continues to grow.

**Benefits to research** While the EVO service is at an early stage of maturity, the service is expected to grow rapidly. With planned enhancements in usability and integration with other systems, it is expected to further enhance the communication between research groups remote from each other, and in particular with international research groups.

#### Web-Based Collaboration Services

ARCS provides access to web-based collaboration products and services for researchers and expertise in their application and improvement. Products and services currently supported include Drupal, Plone, Twiki, and Sakai.

- 2008-9 Activities**
1. **The Global Snakebite Initiative<sup>1</sup>**. The Global Snakebite Initiative is an international group of snake bite experts, including Melbourne University, who were founded to coordinate an international effort to reduce snake bite morbidity and mortality. ARCS has worked with the University of Melbourne to support the group and host a Drupal information portal which is updated and accessed globally.
  2. **TRaCK – Tropical Rivers and Coastal Knowledge<sup>2</sup>**. TRaCK is an initiative of the Commonwealth Department of Environment, Water, Heritage and the Arts to provide the science and knowledge that governments, communities and industry need for the sustainable use of Australia's tropical rivers and estuaries. ARCS has provided a low-cost high-capacity scalable Sakai based hosting service for the TRaCK data repository.
  3. **ANDS – Australian National Data Service**. ANDS have their internal collaboration portal located on the ARCS Plone server. ARCS administers the site and ANDS maintains the content and access to the material on the site.
  4. **ABIN – Australian Biosecurity Intelligence Network (ABIN)** has been established to provide a Networked Biosecurity Framework. ARCS hosts the ABIN web services on its infrastructure and supports ABIN staff in developing and managing their web portal and videoconferencing needs.
  5. **DataMINX - DataMINX** is a NeAT project to deliver data access, transport, management and repository services for the researcher community using and operating microscopy imaging, neutron and X-ray facilities, for the determination of molecular and materials structure. The project has a particular focus on the Australian Microscopy and Microanalysis Facility (AMMRF), the OPAL neutron facility and the Australian Synchrotron Facility (ASF). The project uses ARCS Web and Grid technologies and collaboratively engages in outstanding national and international endeavours.

**New and Upgraded** Collaborative Services has improved the functionality and reliability of the ARCS web services and continues to develop enhancements and improvements for web services with three new

---

<sup>1</sup> [www.snakebiteinitiative.org](http://www.snakebiteinitiative.org)

<sup>2</sup> [www.track.gov.au](http://www.track.gov.au)

**Services** products under evaluation, a generic research project portal, a source code repository for developers and a more graphics capable web portal tool. Enhancements to existing services have included:

- Website upgrade and enhancement, adding forums and plug-ins for Google Mail & Google Docs as well as improvements to the behaviour of link tracking in documents and other features
- Creation of new production instances for Plone, Sakai, Twiki, Trac Mailing Lists, Test bed and redundancy instances for Plone and Sakai and development servers for Sakai, Plone & Trac.
- ARCS has started to work with groups of researchers to define general research needs in the development and hosting of customised web portals on a co-investment basis. Customer groups benefit from discounted collaborative service development and hosting, and ARCS builds an understanding of customer requirements that can be re-employed for future generic service development.

**Service Usage** The Collaboration Services team cannot yet measure the exact number of users using the portals on ARCS infrastructure because this usage is not administered. However, the team is currently supporting five separate web collaboration technologies and is in the testing phase for two others. The team currently deploys an average of three additional research collaboration sites per month with a total of over 40 research groups currently supported. These numbers will increase rapidly when the self-service sites are introduced.

**Benefits to Research** ARCS has gained invaluable experience in hosting sites for international and Australia-wide research collaborations. Research groups have been able to enjoy unrestricted access, a security model based around their collaborative group structure, self-administration of the site hosted by ARCS, advice as required from ARCS specialist staff and the availability of the extensive storage capability offered by ARCS Data Services.

Help-Desk

ARCS provides a single help-desk service for researchers using ARCS services.

- 2008-9 Activities**
1. Upgrading internal trouble ticketing procedures and customer service management processes to align with industry standard ITIL incident management and problem identification frameworks.
  2. Implementing *How To* videos and *Frequently Asked Questions* in the support section of the ARCS website to enable out of hours self help for users of ARCS products.
  3. Employing a Help-desk Coordinator and dedicated help desk staff to allocate tasks, track tasks and monitor the resolution of incidents.
  4. Evaluating Open Source CRM systems to identify a potential suitable eResearch CRM system which could track customer activity and manage customer engagement.
  5. Creating a survey feedback process to assess service levels aimed at continuous improvement.

**Service Usage** Response and resolution times for trouble tickets has been three times better in the second half-year compared to the first, despite an increase in tickets from 424 to 915. The provision of specialist staff and a dedicated help desk coordinator have resulted in an increased professionalism in customer engagement and a negligible level of customer dissatisfaction.

**Benefits to Research** Greatly improved customer service levels means that researchers are able to access the ARCS services more quickly and meet their research outcomes. Plans for further improvements include the implementation of online resources and performance measurement systems as well as proactive customer engagement systems for improving ease-of-use and reducing costs.

## 2.3 Data Services

ARCS provides a federated data storage service (the ARCS Data Fabric) together with tools to allow researchers to upload, access and share data. The data repository is available to all Australian researchers and research groups and provides a scalable and reliable storage environment.

Services offered by the Data Services Team include:

- ARCS Data Fabric data storage repository
- Data access tools (Davis and OPeNDAP<sup>1</sup>)
- Database creation, hosting and access services
- Large scale data transfer services.

The Data Services Team liaises closely with ANDS to develop and provide a comprehensive data access and data maintenance regime available to all researchers in Australia, and to promote international linkages.

### ARCS Data Fabric

The ARCS Data Services Team developed the Data Fabric as a federated data storage service and associated tools to assist Australian researchers and research groups with growing data storage needs. These services and tools include federated storage, easy to use desktop discovery, access, replication and backup.

The Data Fabric has been created by federating data storage facilities provided by MARCS linked into a single service through the open access technology iRODS (Integrated Rule Oriented Data System) from the University of California at San Diego (UCSD).

As well as the production Data Fabric, the Data Services team has deployed Test and Development systems that mirror the functionality of the production system. This setup allows Data Services to plan and develop robust upgrade strategies and feature progression paths without interfering with the production system.

**2008-9 Activities** Two major activities were undertaken in this reporting period:

- the deployment of the first revision of the ARCS Data Fabric service based on the Storage Resource Broker (SRB).
- the conversion of the ARCS Data Fabric technology from SRB to iRODS. During the initial phase of the ARCS Data Fabric, UCSD announced that the development of SRB was to be discontinued and that future efforts would be targeted towards their improved integrated Rule Oriented Data System. ARCS Data Services undertook to upgrade the core technology to provide the second generation of the ARCS Data Fabric based on iRODS in early 2009.

**New and Updated Services** The ARCS Data Fabric service was introduced during the year. In early 2009, the second generation of the ARCS Data Fabric based on iRODS was deployed. The second generation of Data Fabric also included a number of improvements suggested by the users of the first generation. The usage has been continuously increasing ever since its launch.

**Service Usage** By the end of the year, 123 users had registered accounts for the ARCS Data Fabric consuming 6.5 terabytes of storage. Because the Data Fabric allows anonymous read access the total number of users is probably much higher.

---

<sup>1</sup> Open-source Project for a Network Data Access Protocol, <http://opendap.org>

**Benefits to Research** The ARCS Data Service offers a data storage system which can be easily accessed by research groups crossing organisational boundaries. It is the first and only service of its kind in Australia.

The Development and Test systems ensure that the processes of creating new functionality, tools and services and bug fixes will not impact the production system. This has greatly improved the service development and deployment environment and significantly increased service reliability.

#### Data Access Tools

ARCS offers two tools facilitating access to data stored in the ARCS Data Fabric:

- Davis is a frontend for iRODS developed by ARCS to provide researchers with two convenient ways to access the ARCS Data Fabric. It allows users to mount the ARCS Data Fabric as a drive on their desktop using the WebDAV protocol (a standard built into all modern operating systems) or to access their Data Fabric files through a web interface compatible with all leading web browsers. Davis is the first interface of its kind in the world and has gained significant traction in the international communities that run their own iRODS instances
- The OPeNDAP service allows multiple science disciplines to make data available through tools very common in the respective international communities. OPeNDAP enables applications to access sections of the ARCS Data Fabric using standard Network Data Access Protocol. This capability was provided as a direct response to the demand from the ARCS data user community.

**2008-9 Activities** Data Services has developed the Davis service and deployed both Davis and OPeNDAP, a widely user open access service originally developed by the Distributed Oceanographic Data Systems project.

**New & Updated Services** Both Davis and OPeNDAP are services newly deployed for ARCS users during this reporting period.

**Service Usage** The development and deployment of Davis led to a significant increase (from a handful to well over 100) in uptake of the ARCS Data Fabric and established ARCS Data Services as a major group in the international community.

NCRIS IMOS/eMII has been working very closely with ARCS Data Services and uses ARCS OPeNDAP Network and Digital Library together with the ARCS Data Fabric as the backbone of their data delivery system.

A more detailed service monitoring capability will be developed in the next year to accurately measure customer profiles and service uptake.

**Benefits to Research** Research groups are able to collaborate more easily accessing data that is distributed across physical storage and owned by different research groups and institutions that use the ARCS Data Fabric service. The Data Access tools facilitate international collaboration.

Davis is proving to be a popular tool amongst researchers worldwide increasing the profile and status of ARCS as a provider of globally significant eResearch software.

#### Database Creation and Access

The ARCS Database Service offers MySQL to research groups with capabilities to host relational databases in an environment that allows access from within any institution. The service offers data backup and restore services for reliability and security. The ARCS Database Service also provides PostgreSQL databases supporting the same functionality.

**2008-9 Activities** Data Services has developed and rolled out the Database Services and planned a series of upgrades meeting the expressed needs of the Australian eResearch community.

**New and Updated Services** The Database Services are newly deployed for ARCS users during this reporting period.

**Service Usage** Currently, this service is offered to seven external projects. These are:

- LOVD Backend for Human Variome Project
- BCEES database for OccIDEAS (for WA Breast Cancer Study)
- Balmoral
- Callitris Terc
- Creekton
- Ohurakura
- Mount Read: CSIRO projects studying high resolution tree growth and wood property responses

There are also six ARCS internal projects using this service. These are:

- Data Fabric Usage Stats
- Data Base Service Projects List
- Digital Library Backend
- Sakai Development System
- vTiger Backend
- AAF Statistics Backend

**Benefits to Research** Database Services provide researchers, for the first time, with access to collaborative databases that can be accessed from within any collaborating institution.

#### Large-Scale Data Transfer Services

The ARCS Data Services Team provides technology consulting services on large-scale data transfer to Australian research communities. The services are delivered by:

- working closely with key research communities in order to facilitate large scale transfers needs, and
- providing advice to these communities on the development of easy to use, scalable services that an individual researcher can operate.

**2008-9 Activities** ARCS Data Services have facilitated large scale transfers for Australian research groups and started the process of developing a general easy to use service.

**New and Updated Services** ARCS Data Services investigated several transfer options and was able to identify and utilize the tools best suited for the needs of its clients. These tools include gridFTP, LDR and rsync.

**Service Usage** The service has provided NCRIS Astronomy with about 40TB of mission critical data.

**Benefits to Research** The service offered to the Astronomy community by ARCS Data Services is a world first and is regarded as an advantage within the international community.

## 2.4 Systems Services

ARCS aims to assist Australian researchers to access remote computational, data repository, instruments and other facilities using high-capacity network and software systems that join researchers across Australia into a single Grid or Cloud.

Services and products offered by Systems Services team include:

- ARCS National Grid
- ARCS Compute Cloud
- ARCS Application Hosting service
- ARCS Services Infrastructure
- Product Components for Authorisation Services

### ARCS National Grid

The Systems Services team has responsibility for operating, supporting and extending usage of the ARCS National Grid. The major focus is on keeping the Grid as a highly available service, providing access to the high-performance computer (HPC) clusters accessible through the ARCS Grid and providing tools that make it easier for users to submit jobs via the ARCS National Grid.

**2008-9 Activities** New clusters at UQ, ANU and iVEC have been added to the ARCS National Grid.

The team has formally released Grisu as a robust, supported service. The Grisu service provides a range of functions to support easy access to the ARCS National Grid. ARCS provides a number of applications and a generic interface to the Grid. The team also developed tools that allow research users to build specific custom interfaces to the Grid. ARCS also assists the users to develop these specific custom interfaces.

Single sign-on based on Shibboleth supported by AAF has been provided to all Grisu service users.

A Grid User Services Steering group has been set up to guide development and deployment of the Grisu service.

A graphic client interface based on GDIS<sup>1</sup> modelling has been developed for the computational chemistry community to use the Grisu service.

ARCS has introduced a number of new Underworld<sup>2</sup> users to the Grisu service through a workshop of Australian earth scientists conducted jointly with AuScope and Monash University.

ARCS has worked with third party developers from AuScope to build a customised application based on the Grisu service.

**New and updated services** Grisu service enhanced and formally released.

**services** New clusters added to the ARCS National Grid.

<sup>1</sup> GTK Display Interface for Structures. GDIS is a freely available crystal and molecular structure visualization program employed by computational chemists. See <http://gdis.sourceforge.net/>

<sup>2</sup> Underworld is a geodynamic modelling framework used by researchers to model such as mantle convection and tectonic plate movement. Underworld is under collaborative development by Monash University and the VPAC, as part of the NCRIS AuScope capability in the Simulation and Modelling Victoria program. See <http://www.underworldproject.org/>

**Service usage** During 2008-9 there were 129,045 jobs consuming 1,157,266 CPU hours submitted through the ARCS National Grid. This represents an increase from 43,548 jobs and 556,129 CPU hours in the 2007-08 period.

**Benefit to research** Increasing clusters on the Grid provide more resources for Grid users and makes access to those clusters easier using the ARCS National Grid and its support services such as Grisu.

The release of Grisu provides a single tool to access all HPC and makes it easier for a wider range of users to access HPC. It reduces users' training and preparation to use HPC and it improves the customer experience.

#### ARCS Compute Cloud

Work towards the definition and development of an ARCS Compute Cloud was commenced. The ARCS Compute Cloud aims to provide an even easier interface to use the resources available through MARCS. The user will have an experience comparable to using their desktop, but with all the power of HPC. The ARCS Compute cloud will present the collective HPC resources available as a single computing resource, providing simplicity for the user, and higher utilisation of HPC.

**2008-9 Activities** The Systems Services team continued to develop the concepts and tools that underpin the ARCS Compute Cloud. The activities include:

- Established a Compute Cloud Advisory Group to commence development of an ARCS Compute Cloud,
- Collected requirements for ARCS Compute Cloud,
- Developed a proof of concept system that demonstrates web access and meta scheduling.

The Systems Team is now working towards development of rendering and Blast search portals, which will provide researchers with a simple web-based interface to the ARCS Compute Cloud.

**New and updated services** Simple meta-scheduling functionality has been added to the ARCS services making it easier for users to access ARCS Compute Cloud. Researchers no longer need to select a HPC resource to submit compute jobs. The cloud will automatically select a resource to process the compute jobs on the researcher's behalf.

**Service usage** At the current time, the Compute Cloud is at the testing stage, further strengthening of the product and service offering are planned in the future years.

**Benefit to research** The ARCS Compute Cloud will allow researchers to access the power of HPC in a simple manner. For example a small 3D rendering job took 20 hours on a PC and only 1.5 hours using the proof of concept ARCS Compute Cloud. The scheduling of jobs based on capacity improves completion time and utilisation of HPC resources.

#### ARCS Applications Hosting Service

ARCS has provided an application hosting service for a number of research groups. This service supports other teams, for example in data collection or output for the Data Fabric, but also provides a stand-alone service for research groups who do not have capacity or capability to host applications.

**2008-9 Activities** Hosted applications for IMOS ([www.imos.org.au](http://www.imos.org.au)) and BCEES ([www.bcees.org.au](http://www.bcees.org.au)) among others.

**New and updated services** Piloted a Virtual Machine (VM) hosting service on infrastructure at eRSA with IMOS as the client.

**Service usage** Total of five applications supported for external parties outside of those supported for other ARCS teams.

**Benefit to research** This service means that research groups need not acquire their own infrastructure nor use valuable resources in its support.

ARCS Services Infrastructure

One of the main ARCS objectives in this reporting period is to enhance ARCS' overall IT infrastructure in order to support production level quality of services to customers.

**2008-9 Activities** The team has refreshed and extended the hardware infrastructure, coordinating the acquisition of around 20 new servers to provide up to date grid infrastructure, dedicated data fabric hosts at each host, a replicated database service and development and production hosts for collaboration and authorisation teams.

A change management system has been developed and implemented across all ARCS systems.

**New and updated services** Put in place systems monitoring, coordinated trouble-shooting resources and conducted 24 x 7 support trial.

The team commenced a backup and recovery plan, including redundancy and high availability.

**Benefit to research** These activities led to a more reliable and available offering of services equivalent to commercial services. Critical systems are now monitored around the clock and many failures can be rectified as they occur. Users of ARCS services can operate more confidently across different time zones.

Product Component to Authorisation Services

The Systems Services Team is responsible for working with the ARCS Authorisation Services Team to implement various solutions that improve the ease of access to ARCS services while maintaining appropriate security for the research user.

Details of these activities are included in the section 2.5.

## 2.5 Authorisation Services

ARCS Authorisation Services team aims to provide infrastructure and services that assist researchers to work collaboratively within research groups and between research groups with authentication and access control appropriate to the security requirements of the projects.

This includes providing advice and support for research projects in the use of authorisation services. The Authorisation Services team is responsible for delivering and supporting a range of services including:

- Authorisation Advisory Service
- Pilot AAF Deployment and Service Implementation Assistance
- ARCS Identity Provider (IdP)
- ARCS Short Lived Credential Service (SLCS) and SLCS Proxy Service

Through the Authorisation Services team, ARCS participates in and guides other authorisation activity such as the work of the Australian Access Federation (AAF). Authorisation Services continues to enable access to ARCS products and services integration via the AAF Shibboleth Federation infrastructure.

Authorisation Services is responsible for establishing a strategy for the unification of authentication and authorisation mechanisms across ARCS services, and to deliver technology components to satisfy authorisation requirements for Australian research groups.

### Authorisation Advisory Services

ARCS provides authorisation advisory services to all researchers in Australia enhancing their ability to collaborate with domestic and international colleagues.

**2008-9 Activities** Provided authorisation advisory services to researchers through the ARCS help desk.

**Service Usage** Quantitative measurements have not yet started. Customers of the ARCS Advisory Service have included: ARCS service teams, the MARCS, AuScope, CAUDIT, IMOS, ANDS, AAF, ABIN and MACDDAP.

While the ARCS Authorisation Advisory service is at an early stage of maturity, the service is expected to grow rapidly, greatly enhancing the ability to enable connectivity and trust between institutions and research groups.

**Benefits to Research** Researchers are now able to obtain authorisation advice using video and teleconferencing from PCs or by email and telephone.

### Pilot AAF Deployment and Service Assistance

The Australian Access Federation (AAF) brings together cutting edge technologies as a framework for trusted electronic communications and collaboration within and between universities and research institutions in Australia and overseas. The AAF promotes mobility and inter-university collaboration via automatic identification services, that allow authentication of people and resources between participating institutions.

ARCS Authorisation Services has contributed significant in-kind effort towards the establishment and deployment of the Pilot AAF Service.

**2008-9 Activities** ARCS is a Pilot AAF Club foundation member, with active participation in the Pilot AAF Steering Committee and Technical Working Group as well as contributing seed funding.

ARCS Authorisation Services undertook a comparative evaluation of SWITCH Federation<sup>1</sup> management infrastructure and MAMS<sup>1</sup> technology in order to inform functional requirements for the AAF.

ARCS Authorisation Services collaborated with Systems Services to deploy a redundant Discovery Service, and to establish usage logging for the ARCS Discovery Service.

Promotion of use of the Pilot AAF to ANDS and others, and assistance to MARCS identity providers in migrating from the MAMS Level-2 Federation to the Pilot AAF.

ARCS Authorisation Services contributed to the integration of the Australian Access Federation (AAF) with ARCS tools and services.

Assisted MARCS with **IdP** (Identity Provision) and Service Provider Shibboleth 2.0 installation and integration with ARCS services.

Implementation of **auEduPersonSharedToken generation (IMAST)** for Shibboleth 2.1 and database storage of SharedToken (for IdPs that cannot write to institutional directory), and SharedToken portability based on SLCS certificates.

---

<sup>1</sup> The Shibboleth-based production federation in Swiss higher education and research, coordinated and led by SWITCH. See <http://www.switch.ch/aai/>

**New and Upgraded Services** Following new and improved services have been delivered:

- Discovery Service high-availability
- Discovery Service logging
- auEduPersonSharedToken generation, storage using IMAST, and portability
- MAMS Level-2 Testbed to Pilot AAF Migration Advisory Service.

**Service Usage** While quantitative measurements have not been established, users of the Pilot AAF infrastructure include ARCS service groups, MARCS, AuScope, CAUDIT, IMOS, ANDS, AAF, ABIN, MACDDAP and QUT. This list will expand as more institutions join the Pilot AAF.

Establishment of an operational AAF is vital to ARCS Authorisation as Federated access underpins the Authorisation Services strategy.

#### ARCS Identity Provider Service

ARCS provides an ARCS Identity Provider (IdP) service in both the MAMS Testbed Level-2 Federation and the Pilot AAF. This enables researchers who are not members of Identity Provider to obtain IdP membership and access ARCS and other Federation services using their ARCS IdP identity.

**2008-9 Activities** Develop and deploy an ARCS IdP Registration web application and associated user Directory, and produce associated registration authority processes and policies

Deploy a Shibboleth IdP that links to the Directory.

**New and Upgraded Services** Version 1.0 of the ARCS IdP released, including website, associated software, policy and end-user documentation

**Service Usage** The ARCS IdP currently has 139 users registered.

**Benefits to Research** Users who are not yet members of a Federation IdP that need to access ARCS and other Federation services may do so by joining the ARCS IdP.

#### ARCS Short Lived Credential Service and SLCS Proxy Service

ARCS provides a service which enables Grid users to generate a Grid services trusted certificate based on their Shibboleth login via a Short Lived Credential Service . ARCS Authorisation Services has provided an SLCS Server and Certification Authority (CA), and implemented SLCS client software libraries for integration with Grid access client tools (e.g. Grix and Grisu).

**2008-9 Activities** Development, deployment and maintenance of the SLCS Server and CA for issuing SLCS certificates. Virtual Organisation Management (VOMRS) integration so that end-users join a default Virtual Organisation when their certificate is created.

Preparation for SLCS Level-2 CA's which will include IGTF<sup>2</sup> accreditation. Draft of a Certificate Policy/Certification Practices Statement CP/CPS which will be submitted for IGTF accreditation.

Modification of the SLCS Server to enable portals to obtain a proxy certificate chain for delegated authentication, allowing interaction with Grid services on behalf of the user.

---

<sup>1</sup> Meta Access Management System, a project that allows for the integration of multiple solutions to managing authentication, authorisation and identities, together with common services for digital rights, search services and metadata management. See <http://mams.melcoe.mq.edu.au>

<sup>2</sup> International Grid Trust Federation

Implementation and support of an SLCS client library and command-line client. Performance of security analysis examining issues related to entering IdP credentials into an ARCS provided interface (SLCS client).

Analysis and drafting of an ARCS position paper on SLCS Client usage to be submitted to CAUDIT in order to obtain their endorsement of its use by researchers.

**Service Usage** The ARCS SLCS service is used by all end-users accessing Grid services via the Australian Access Federation or MAMS Level-2 Testbed Federation.

The SLCS Proxy service is being used by AuScope and DataMINX, and will be used for integrating ARCS collaboration and data services (content management systems and data fabric).

The SLCS Client software is used by Systems Services tools such as Grix and Grisu clients.

**Benefits to Research** Extends access to Grid Services to all Federation IdP end-users. Provides increased efficiency and effectiveness for researchers who use Grid resources.

## 2.6 ARCS Projects

The ARCS Projects area works with ANDS, AeRIC and NeAT to manage the processes of selecting, establishing, developing, operating and completing NeAT projects. Round 1 of the NeAT projects were selected in the 2007-8 financial year and have been established during 2008-9. The selection process for Round 2 of NeAT was conducted during 2008-9 and is being established with projects starting early in 2009-10.

The Round 1 projects are described in the ARCS Business Plan 2008-9 and the Round 2 project descriptions appear in the Business Plan 2009-10. The Project Plans for all six of the Round 1 projects are available from the Platforms for Collaboration website. Status updates for each of the Round 1 projects can be found in Appendix D.

### NeAT Projects – Round 1

Six projects were approved by NeAT in Round 1 to commence in 2008-9.

NeAT Round 1 Project	NCRIS or HASS	Organisations involved	Start Month	Current status
<b>Aus-e-Lit</b> – Collaborative Integration and Annotation Services for Australian Literature Communities	HASS	UQ	July 2008	Good progress despite delays with provision of metadata from data providers.
<b>MACDDAP</b> – Marine and Climate Data Discovery and Access Project	5.12	TPAC, UTas, CSIRO, BoM	July 2008	Good progress despite slow recruitment and contracting of some staff.
<b>SISS</b> – Spatial Information Services Stack	5.13	IVEC, CSIRO	July 2008	Good progress despite slow staff recruitment, due to in-kind effort.

NeAT Round 1 Project	NCRIS or HASS	Organisations involved	Start Month	Current status
<b>DIAS-B</b> – Data Integration and Access Services for Biodiversity	5.2 5.11	UQ, CSIRO	Sept 2008	Good progress in second half year. Start delayed by project modifications.
<b>ASeSS</b> – ASSDA Virtual Organisation Services for e-Social Science	HASS	ANU	July 2008	Good progress in parallel with development and approval of project plan.
<b>DataMINX</b> – Data Management for Microscopy, Imaging, Neutron and X-Ray Facilities	5.3	Intersect, USyd, VeRSI, Monash	January 2009	Modest progress due to late start and slow recruitment. Delay due to merging two proposals.

HASS stands for the Humanities, Arts and Social Sciences.

These projects are scheduled to complete by June 2010, with possible extension to June 2011. Deliverables are expected to appear in the second half of 2009.

**2008-9 Activities** Completion and approval of Project Plans for each NeAT Round 1 project. The ARCS Projects Manager is the ARCS representative on all NeAT Project Committees and provided significant input to all Project Plans.

Working with the ARCS Business Manager, and in collaboration with ANDS, on project governance, management and administration.

The activities undertaken by the NeAT Round 1 projects are included in the full project reports which can be found in ARCS intranet.

**Service Usage** Most of the new services being developed by NeAT Round 1 projects will not be ready for production use until late 2009 or 2010, so only limited usage is expected until 2010. Anticipated usage is described in the project plans, and any usage during the reporting period is described in the project reports. Some of the software and data products and services produced by the NeAT projects are intended to be developed into services that will be hosted by ARCS for researchers throughout Australia,

**Benefits to Research** Each of these projects is designed to meet the expressed eResearch needs of important components of the Australian eResearch community, particularly NCRIS capabilities. The projects have wherever possible been constructed to meet broader needs.

## NeAT Projects – Round 2

Eight projects have been approved by NeAT in Round 2 to commence in 2009-10.

NeAT Round 2 Project	NCRIS or other area	Organisations involved
<b>Remote Tomography</b> - Remote Computed Tomography Reconstruction, Simulation and Visualisation Service	5.3	CSIRO, VeRSI, VPAC, ANU
<b>Human Variome</b> – Software and Data Support for the Australian Node of the Human Variome Project	5.1 (indirectly)	Melbourne, VPAC
<b>Aus-e-Stage</b>	HASS	Flinders
<b>PODD</b> – Phenomics Ontology Driven Data Management	5.2	UQ, CSIRO, Adelaide
<b>NCJRDN</b> – National Criminal Justice Research Data Network	HASS	UWA
<b>Biosecurity</b> Collaboration Platform	5.8	CSIRO
<b>Bioflows</b> – Bioinformatics Workflows	5.1	Murdoch, iVEC, QFAB, VLSCI
<b>AusCover Workflow</b> – Workflow Services to enable a Large-Scale Temporal-Spatial Ecosystem Digital Information Service	5.11	CSIRO, Curtin, IVEC

These projects are scheduled to start in July 2009 and complete in June 2011.

Several other submissions were considered worthwhile, but it was decided that these could be supported by ARCS or ANDS operational teams rather than through a NeAT project. Some submissions had potential overlap with the round 1 NeAT projects, and these synergies will be explored with the aim of possibly refocussing or expanding the existing projects to address the requirements outlined in these submissions. Many other ideas had merit but it is unlikely that ARCS or ANDS could help without additional funding for projects, although it is possible that the MARCS may be able to help some of these research groups.

**2008-9 Activities**

A call for ideas for new eResearch services yielded 67 submissions from a wide range of disciplines and organisations. Seven were selected by NeAT to proceed to the development of full proposals and one proposal carried over from Round 1 was included. All eight of the project proposals were completed and approved to continue to develop detailed Project Plans.

All the projects have established Project Committees and completed draft Project Plans. Three of the plans are close to finalisation and ARCS anticipates that all plans will be completed and almost all projects started by the end of September 2009.

**Benefits to Research**

Eight new projects are being established, each with great potential value to their sponsoring Australian research communities, including four NCRIS capabilities.

## NeAT Project Administration Processes

In consultation with ANDS and AeRIC, processes for administration, coordination and governance of NeAT projects have been put in place.

However, it has become clear from Rounds 1 and 2 that the processes of developing, establishing and approving NeAT projects is considerable, and creates delays to prompt project commencements. Processes will be further revised and streamlined for any further project Rounds.

The forthcoming appointment of a NeAT Projects Coordinator, reporting to the ARCS Projects Manager, will provide additional dedicated effort to assist with the processes for administration and coordination of NeAT projects.

**2008-9 Activities** ANDS and ARCS have agreed on a process for payments to employers of staff funded by NeAT, which closely follows the payment processes for ARCS staff. The NeAT projects will each be funded 50% by ANDS and 50% by ARCS. To avoid the employers of NeAT-funded staff having to invoice both ARCS and ANDS, all payments will go through ARCS to one of the MARCS, and then to the employer, which is usually a MARCS or one of its members (e.g. a university). This approach also has the advantage that ARCS and ANDS do not need to create contracts with the employers of all NeAT-funded staff for all NeAT projects.

Governance processes for NeAT projects were slightly modified to address some issues that arose with some projects. A document describing NeAT processes was written.

The position of NeAT Projects Coordinator was advertised in early June 2009. The position has subsequently been filled, with the appointment of Alan Glixman at Intersect.

### 3 DESCRIPTION OF PROGRESS AGAINST MILESTONES

This section reports the status of the progress against milestones as defined in the ARCS Annual Business Plan 2008-2009.

Date	Activities	Responsibility	Status
July 2008	Announces ARCS formally 'Open for Business' and widely advertises and promotes this	ARCS	Completed. An awareness campaign has been conducted across the Australian research provider community, in particular the NCRIS groups.
July 2008	Communication and Outreach Strategies finalised and initiated	ARCS	Completed. A marketing consultant with extensive marketing experience has been engaged to develop a marketing strategy and promotional plan. The ARCS website has been redeveloped during the year.
July 2008	Telephone Helpdesk fully deployed with the phone answered during all standard Australian business hours and with the email Helpdesk available for registering issues after hours	Collaboration Services	<p>Complete, including the establishment of 1800 number help desk support. Established a Help Desk Coordinator and dedicated help desk support staff to track incidents and monitor resolution of incidents with internal and external customers.</p> <p>Completed Help Desk ticketing systems and customer service management process</p>
July 2008	Establish an ARCS User Reference Group to provide advice and guidance on appropriate ARCS Services and new service directions	All Service Teams	<p>Separate user reference groups are being established for each service.</p> <p>Systems Services has established a Grid Users Services Steering group which meets regularly.</p> <p>Collaboration Service has discussed and recruited membership of the Collaboration Service Advisory panel but has not initiated its first meeting.</p> <p>Data Services established a working group included technical people from the MARCS, but are looking for more users representation. Plans were made for the next year to achieve this.</p>

## **ARCS Progress Report 2008-2009**

July 2008	ARCS web site completed including clear and accessible explanations of the full suite of ARCS Production Services including exemplars and use cases	ARCS	Initial review of the website was conducted in December 2008 which included an upgrade of the visual appeal of the home page, product training videos and navigation.  A detailed usability study was completed in June.  The website upgrade is due to be implemented in October 2009
July 2008	ARCS and EVOGH enter into a formal agreement for the licensing of EVO use in Australia, where legitimate use will encompass all activities and entities involved in furthering research and education in Australia	Collaboration Services	Completed: Signed off and accepted in December 2008
July 2008	Authorisation Services Manager appointed and Authorisation Services activities underway	ARCS	Completed, Neil Witheridge was appointed in December 2008.
July 2008	Collaboration Services Manager appointed and Collaboration Services undertakes a structured program of enthusiastic and proactive engagement with regional and discipline-based research communities and University IT Directors	ARCS and Collaboration Team	Completed: Andrew Alexander was appointed in December 2008.  Completed: Collaboration team program commenced.
July 2008	Engagement with New Zealand counterparts initiated and opportunities for cooperation explored	ARCS and Systems Service Team	Completed: Established close working relations with NZ partners. MOU signed. NZ participation in ARCS activities.
July 2008	NeAT Project Committees established and NeAT Project Managers appointed and NeAT Projects underway	Projects Manager and NeAT Project Committee	All six NeAT projects had Project Committees established by July 2008, four projects had project managers appointed and were underway by July 08, one in Sept 08, one in Oct 08.
July 2008	Each of ARCS Collaboration, Systems, Data and Authorisation Services Teams produce a written document describing their Quality Assurance and Change Management Procedures so that they can be placed on the ARCS web site and available for the research community and other Service Providers	All Services	Change Management for IT Systems is in place. Procedures are published and adopted by every services team.  ARCS wide Quality Assurance process being developed. These processes are available on the ARCS wiki at <a href="http://wiki.arcs.org.au/bin/view/Main/ChangeControl">http://wiki.arcs.org.au/bin/view/Main/ChangeControl</a> and <a href="http://wiki.arcs.org.au/bin/view/Main/ChangeNotes">http://wiki.arcs.org.au/bin/view/Main/ChangeNotes</a>

## **ARCS Progress Report 2008-2009**

July 2008	Each NeAT Project Committee establishes its own Quality Assurance and Change Management Procedures and wherever possible these should be consistent with those of ANDS and ARCS	ARCS Projects Manager and NeAT Project Committees	Ongoing: Projects have varied QA and change management processes, will work on alignment with ARCS/ANDS processes when the services move towards deployment
July 2008	Explore with the NT Government and Charles Darwin University the possibility of establishing a MARCS in the Northern Territory to enable the delivery of ARCS Services and Capabilities into the region	ARCS and Collaboration team	Ongoing: Established contact in December 2008 and continued contact. Presented to a number of research groups and NT government
July 2008	Complete planning of the ARCS 1-day Workshop at the eResearch Australasia 2008 Conference in Melbourne	ARCS	Completed: Workshops were held for all service areas except the new Authorisation Services Team.
September 2008	Each Services Team establishes and targets a set of new user sub-disciplines and or communities and proactively establishes a cooperative relationship in order to explore and ultimately deliver a set of relevant services to that community	All Service Teams	<p>Ongoing.</p> <p>Data services established very close relations with a number of disciplines and provide services to them. These include: IMOS, Astronomy, TERN - AusCover, ANDS, Characterisation.</p> <p>Systems services established relationships with Comp Chemistry, High Energy Physics, Geosciences.</p> <p>Authorisation services targeted IMOS and AuScope, ANDS and AAF, and established cooperative relationship.</p> <p>Collaboration team have informal collaborative activity with 3 user organisations in EVO (Monash, University of Melbourne and QUT). Agreements will be formalised in a MOU currently being prepared.</p> <p>Collaboration team also have informal relationships with JCU in Plone development and with pending relationships with ABIN, University of Queensland and RMIT.</p> <p>Collaboration team also have an informal Sakai development relationship with University of Melbourne which will be formalised into a formal MOU when documentation can be completed.</p>

## **ARCS Progress Report 2008-2009**

September 2008	EVO@AU deployed and operational and Communities established	Collaboration Services	EVO@AU was formally accepted after exhaustive testing and the final payments were made to Caltech for the Australian Licence by ARCS and AARNet.
September 2008	University roll-out of EVO@AU to Monash and interested first-round universities	Collaboration Services	A Pilot program was established at Monash in the eResearch centre to make EVO available to the rest of the university, requirements have been identified and a formal MOU is being created to enable Monash, University of Melbourne and QUT to provide EVO to their wider community
September 2008	Enhanced functionality of ARCS Data Fabric deployed	Data Services	Next level of DF was deployed early 09 due to delay in availability of required software
September 2008	First ARCS Affiliate signs on	ARCS	The affiliate strategy has been re-defined.
September 2008	Formal engagement with CAUDIT established and first joint activities undertaken	ARCS	Complete: Agreements are in place. Formal engagement with CAUDIT AAF project. Prof Anthony Williams is a member of the AAF Interim Executive Committee. There is a joint firewall configuration agreement between ARCS and CAUDIT.
September 2008	Formal cooperative relationships with New Zealand counterparts established and activated	ARCS	An MOU has been signed with BeSTGrid <sup>1</sup> , and planning of joint workshops commenced. ARCS and BeSTGrid share technology and experiences. BeSTGrid staff now attend ARCS meetings.
December 2008	Full functionality of ARCS Data Fabric deployed and available	Data Services	On going: a new version of Data Fabric based on iRODS was deployed in early 09. New functions will be continuously deployed.
December 2008	Enhanced compute grid, Grisu and related services deployed, operating and documented	Systems Services	Completed

<sup>1</sup> BeSTGRID (Broadband enabled Science and Technology GRID) is a NZ Tertiary Education Commission Innovation and Development Fund project which builds true eResearch capability on the new Kiwi Advanced Research and Education Network.

**ARCS Progress Report 2008-2009**

December 2008	Possible formal establishment of a Northern Territory MARCS and signing on to the ARCS Collaboration Agreement	ARCS	A number of visits have been made to NT in late 2008 and early 2009 to provide training in ARCS services to NT researchers, provide awareness of ARCS and discuss with key NT government members the options and advantages of NT having a member of ARCS. This is currently under review with NT stakeholders considering action and further progress towards an NT MARCS is expected in 2009-2010.
December 2008	First ARCS Internships offered and accepted with internships underway	ARCS	Internships were not offered this year due to financial reasons. A new arrangement with MARCS was planned to offer national internship through co-investment.
December 2008	Second and third ARCS Affiliates sign on	ARCS	The affiliate strategy has been re-defined.
March 2009	Review of performance of ARCS on a <b>service-by-service basis</b> using a suite of measures designed to establish: growth of user base by absolute number; distribution of user base by discipline/community; user satisfaction; user participation and engagement with ARCS	All Service Teams	<p>Collaboration Services: Work process performance and service uptake records have been taken. Customer surveys have been created and will be implemented in year 2009-10 to measure customer satisfaction. Individual product and service measurements are not in place yet and need to be established for reporting purposes.</p> <p>Data Services: Initial set of measurements are in place. Advanced monitoring setup is planned.</p> <p>Systems Services: Grid usage statistics routinely collected and published. Working to collect and report more performance measures.</p> <p>Authorisation Services: Informal review as part of Management Performance Review.</p>

The following table lists the additional milestones and their status set up by individual services teams after the completion of Business Plan 2008-9.

<b>Date</b>	<b>Activities</b>	<b>Responsibility</b>	<b>Status</b>
July 2008	ARCS Data Fabric available to the whole research community with basic functionality and modest storage for free and for more significant storage needs at hardware cost	Data Services	Completed: The initial deployment of the ARCS Data Fabric was made public in Jul 08
July 2008	ARCS compute grid and Grisu production services well-defined, in full production-mode operation and well-documented on the ARCS web site with exemplars and use case studies	Systems Services	Completed: Completed production mode release of Grisu. Documentation on web site. Underworld case study documented.
June 2009	NeAT project administrator hired to handle admin tasks for NeAT projects	ARCS Projects Manager	Position was advertised by June, first round of recruitment was unsuccessful, however an appointment will be made in Aug 2009
June 2009	Project Plans for NeAT round 2 projects completed and approved	ARCS Projects Manager and NeAT Project Committees	Project Committees for all round 2 projects set up and draft project plans developed

## 4 DEVIATIONS FROM THE PROJECT PLAN

As expected with a rapidly developing organisation there have been a number of deviations from the 2008-9 business plan during the reporting period. These have included:

- Opportunities that emerged during the year to start new initiatives aimed at making rapid progress towards ARCS objectives
- The replacement of mechanisms described in the Business Plan with new ones that are expected to be more effective.
- De-prioritising a few activities whose business cases became less compelling, or where more time was needed to partner or seek alternative funding.
- Re-arranging priorities so that activities were completed during the year but somewhat earlier or later than anticipated.

This dynamic approach to delivering to the milestones outlined in the business plan has been effective in allowing ARCS to deliver results to its customer base as and when they were needed, while retaining the flexibility needed to grow a young and innovative organization. Significant deviations are reported below.

**ARCS** The strategy to establish ARCS Affiliates MOUs and to recruit affiliates has been replaced by an ARCS Associates and ARCS Supporters program. This has been explained in the Section 2.1.

The planned internship program was not carried out during the year due to adjustments in financial priorities. A new arrangement with MARCS has been planned to offer national internship through co-investment.

Additional process improvement has been introduced during the reporting period including the introduction of an ARCS performance management and reporting system, CRM and completion of a Risk Management strategy. These are explained in the section 2.1.

An additional marketing and communication program has been established and completed during the reporting period including the engagement of a marketing consultant and the establishment of an Outreach and Communications Officer position.

**Collaboration Services** The EVO Phone Bridge and Access Grid Bridge were developed outside the Business Plan. This resulted in a meetings service to researchers with improved the reliability and accessibility at reduced cost.

Collaboration Services has taken responsibility for a unified ARCS Help Desk under a Help Desk Coordinator providing a much improved user experience for all ARCS customers.

The introduction of a co-funded web portal development and hosting service for research groups leading to the definition of requirements for a generic research portal.

**Authorisation Services** **Pilot AAF** : Effort contributing to the Pilot AAF has exceeded plans, including work in contributing to Pilot AAF high-availability infrastructure, policy establishment, comparative analysis of SWITCH and MAMS Federation management technologies, and strategy, implementation plan and technical guidelines for migration from the MAMS Level-2 to the Pilot AAF Federation.

**Registration and Authorisation Rights Management** : Requirements analysis and prototype implementation of the ARCS Access Service (Service Registration and Authorisation Rights Management) has taken priority due to the key role of registration and access management for Data Fabric and other services.

**Delegated Authentication** : customer requirement to provide a 3rd party service (portal) with

SLCS Proxy credentials in order to authenticate to Grid services on behalf of a user.

**SLCS Level-2 CA and Certificates** : Work on establishing the SLCS Level-2, drafting of the CP/CPS, and seeking IGTF accreditation, has not progressed as planned, due to prioritisation of other activities. The SLCS Level-2 CA requires that IdPs are able to release eduPersonAssurance corresponding to a defined identity 'level of assurance'.

**Recruitment** : Staffing delays in ARCS Authorisation Services have had an impact on the ability to deliver all planned outcomes. The staffing situation is expected to be remedied during 2H09.

**Systems Services** The concept of the Compute Cloud was introduced as a focus for Systems Services team in early 2009.

The Systems Services team has not been able to focus on QA processes to the extent desired due to the resource constraints.

**Other Services and Projects** No deviations from plan.

## 5 DISCUSSION OF CASH AND IN-KIND CO-INVESTMENT

ARCS adopted the Australian Research Council standard in-kind multiplier of 1.25 based on salary plus on-costs in order to estimate university indirect in-kind contributions as outlined in the 2008/9 Business Plan.

During this reporting period a total of \$3,155,350 of in-kind was resourced equating to 23 FTE Team Members, 5 FTE Managers and 1.5 FTE Administrative staff.

## APPENDIX A: ARCS PRODUCTS AND SERVICES

ARCS offers products and services to support national eResearch activities. Its services are structured into four major areas:

- Authorisation Services
- Collaboration Services
- Systems Services, and
- Data Services

**Authorisation Services** The ARCS Authorisation Services team provides help and expertise to Australian researchers in all questions related to authentication and authorisation and protection of resources. ARCS Authorisation services team works with eResearch Service Providers to build a unified authorisation infrastructure for eResearch Services and Tools and to work with national discipline-based research groups to provide tools, services and support that:

- allow research service providers to protect resources and services;
- allow research groups and individuals to access protected research resources and services (including ANDS and ARCS Tools and Services);
- provide authorisation solutions which are integrated with the Australian Access Federation;
- provide exemplars of authorisation infrastructure deployment demonstrating use of best-practice authorisation mechanisms;
- provide expertise and up-to-date information on authorisation trends and best-practices.

ARCS Authorisation Services Team has contributed to integration of the Australian Grid infrastructure and the Australian Access Federation by deployment of:

- Shibboleth Identity Providers and Service Providers;
- auEduPersonSharedToken generation mechanisms (for Identity Providers);
- Short Lived Credential Service (SLCS) client implementations and server deployment;
- SLCS Certificate Authority deployment (including CP/CPS authoring);
- SLCS integration with Virtual Organisation Management (VOMRS).

**Collaboration Services** The ARCS Collaboration Services support a wide range of Tools and Services allowing researchers, groups, and research communities to share ideas and collaborate across organisational boundaries. ARCS operates to assist the Australian Research Community by offering free services to the research community, these service include:

- Video Collaboration - ARCS can help provide Video Collaboration, using EVO or Access Grid technologies, allowing researchers to communicate interactively with other researchers no matter where they are. This includes the provision for a telephone bridge to EVO that enables people without internet to participate in meetings via their telephone.
- Web based Collaboration - ARCS provides researchers with vendor agnostic advice in deciding which Web based Collaboration tools (Content Management Systems, Collaboration Environments, Instant Messaging and Shared Applications like Google Apps, etc.) are best meeting their needs. ARCS also provides hosted services in collaboration tools such as Sakai, Drupal, Plone and Jabber.
- Custom Collaboration - ARCS provides consulting services for organisations requiring unique and complex collaboration solutions. These organisations may require integration of multiple e-Research tools. ARCS staff are highly trained and have multidisciplinary capabilities so assist with these organisations.

**Data Services** The ARCS Data Services Team provides help and expertise to Australian researchers in all questions related to movement of data and access to data storage and databases. It works with researchers from many different areas to provide them with tools and services that:

- allow research groups and individuals to store, maintain and share their data,
- mirror large datasets between two or more data centres,
- make databases accessible by research collaborators based in different organisations,
- receive and store large data sets from international partners,
- collect datasets locally and make them accessible nationally,
- provide storage targets for data generated with scientific instruments.

The ARCS Data Services Team delivers these capabilities through four core services:

- The ARCS Data Fabric
- The ARCS Database Service
- The ARCS Digital Library and OPeNDAP Network
- The ARCS Data Transfer Service.

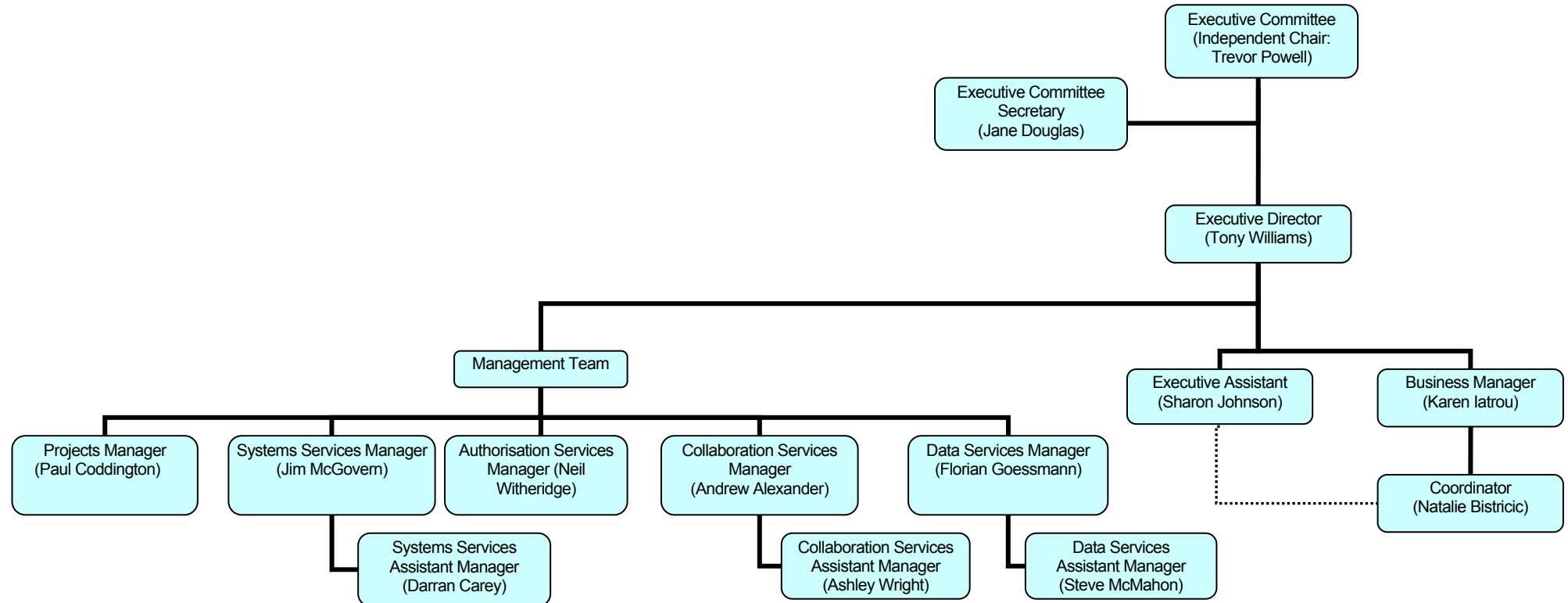
**Systems Services** The ARCS Systems Services Team provides assistance and expertise to Australian researchers who submit compute jobs to one or more of the High Performance Computing (HPC) facilities available through the ARCS Grid. The ARCS Grid allows users to collaborate with remote groups and to conduct their research on the facilities that best suit their needs, regardless of its location.

The ARCS Grid enables users to submit remote jobs with little more difficulty than using desktop applications, and the tools and services provided by the ARCS Systems Services team to facilitate this include:

- **Authentication and Authorisation:** ARCS provides tools and techniques to assure the compute service provider of the user identity, and continues to work to make secure access even easier.
- **Data Movement:** ARCS tools help users move data around, as input or output to or from a compute job, and to distribute data between team members, as well as archiving or publishing data to a particular community.
- **Compute Jobs:** ARCS tools, such as Grisu (Gris submission tool) allow users with a minimum of ICT knowledge to launch jobs. The Systems Services Team is working to provide even easier ways to submit jobs, including web-based interfaces.
- **Custom User Interfaces:** ARCS Systems Services staff work with research communities to develop specific application interfaces, so that applications can be accessed to fit the needs of their users.
- **Workflow:** complex workflows can be implemented automatically across the ARCS Grid, and Systems Services staff work with potential users to implement their required workflows.

**APPENDIX B: ARCS ORGANISATION STRUCTURE**

The structure of ARCS consists of Teams in Collaboration Services, Data Services, System Services, Authorisation Services and Projects. Each Team has a dedicated Manager. The purpose of this structure is to provide nationally coherent, high-quality, robust and customer-oriented eResearch infrastructure, services and tools.



## APPENDIX C: PERFORMANCE AGAINST AGREED PERFORMANCE INDICATORS

ARCS has developed a set of four strategic Key Performance Indicator (KPI) categories and a set of metrics to provide a base level measurement against specific KPIs. These four KPI categories are defined as:

- Service performance
- Developing eResearch
- Strategic alignment to NCRIS
- Focus on data

ARCS has implemented a performance management and reporting process to maintain its momentum towards meeting these targets. In this process, each Services Manager is responsible for collecting and collating measurement data and based on them to report the overall team performances. This is reported biannually at 31 December and 30 June.

This is the first year this framework is used to assess overall performance. As ARCS transforms itself into a customer and service oriented eResearch service provider, processes, tools and products have been upgraded to support this initiative. Some data collection and correlation capabilities were progressively added into products and services for capturing performance measurement purposes. With these interim support systems being incrementally introduced throughout the year, ARCS is able to partially report performances quantitatively for last year. It is planned that by the next year, ARCS will be able to have a fully quantitative performance reporting system.

### Service performance

This KPI and the measures address open access to services, an open and collaborative approach by ARCS, and an emphasis on service provision to the research community.

**Objectives** This KPI is defined to support the following key Objectives under the ICI contract and ARCS Membership agreement:

- 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 in a collaborative manner with the other components of the NCRIS Platforms for Collaboration capability.
- Provides for open access to the ICI capabilities
- Has a strong emphasis on service provision to the research community.

**Measurements** Four measurements are defined to assess this KPI:

- Annual user satisfaction surveys.
- Invited submissions from 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.

#### Annual user satisfaction surveys

Most ARCS services are at the early stage of deployment to users. No annual user satisfaction surveys were conducted in this reporting period, although the Collaboration

Services have been using service-by-service satisfaction ratings. Periodic user satisfaction surveys are planned for all ARCS service areas commencing from the 2010 financial year.

Invited submissions

These submissions have not been invited during the reporting period. They are incorporated as part of ARCS 2009-2010 performance measurement implementation plan.

Measurements of service usage

ARCS services have been developing, maturing and improving during the reporting period. Some services have developed to the stage where they have been able to implement data collection and monitoring functions. This has led to partial measurement of some service usages during the year. *Quantifiable Customer based Metrics* were defined for all services which will stimulate much improved measurements for service usage for next year.

**Collaboration services usage**

The following table represents the usage of EVO services for the period from Jan 09 to June 09.

Month	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
Attendees	65	114	159	138	173	197	846
Meetings	60	109	128	128	149	148	722
Total Meeting Time in Days	10	14	22	18	25	24	113

The following table presents the growth of registered users of EVO service during the same period:

	2Feb2009	4Apr2009	30Jun2009
General	303	490	678
AuScope	17	26	29
CSIRO	21	28	36
IMOS	0	0	3
TRIN	6	6	8

The following table presents the help desk service performance, indicated by the number of tasks performed for customers and resolution times for tasks recorded through the ARCS Request Tracker:

SERVICE	1Jul08-31Dec08		1Jan09-30Jun09	
	Number	Avg Days to Resolve	Number	Avg Days to Resolve
Collaboration	15	31.3	176	16.2
CollabSprints			67	25.4
General	134	11.5	311	3.7
Mailman	45	6.8	87	2.2
VideoCollab	3	34.9		
Wiki	123	6.8	78	2.5

**Data Services usage**

Usage statistics for the ARCS Data Fabric are currently collected on a per user/group basis. Analysis of the data shows that the use of the ARCS Data Fabric increases in blocks indicating it is most commonly used to store and share pre-existing large datasets. Currently,

123 users and 18 groups are registered with the ARCS Data Fabric. The number of actual users is higher due to the anonymous access service provided to large parts of the ARCS Data Fabric. New usage statistics that will allow the measurement of traffic accessing data stored in the Data Fabric as well as storage capacity used are currently being developed. The ARCS Data Fabric currently holds about 6.5 terabytes in 4.3 million files. The largest NCRIS user is IMOS with about 1.8 terabytes in close to 1 million files. One unplanned service interruption of about 24 hours was recorded on Easter 2009.

The ARCS OPeNDAP Network is primarily used by NCRIS IMOS/eMII and currently provides access to about 81,000 files.

The ARCS Database Services has seen steady growth in uptake and now supports seven external and six internal projects.

As part of the work with NCRIS Astronomy, ARCS Data Services staff organized the timely and reliable transfer of about 36 terabytes of data from several sources in Australia to the processing facility in Perth.

Number of PfC and NCRIS services inter-operate with ARCS

AuScope uses Grisu and authorization tools in developing applications for the Auscope Grid.

All NeAT projects are jointly funded and overseen by ARCS and ANDS, with the aim of ensuring that the new eResearch services developed by NeAT projects utilize and interoperate with ARCS, ANDS and AAF services where possible. ARCS services that are (or will be) used by NeAT Round 1 projects and the services they are developing include:

Data fabric and OPeNDAP servers	DataMINX, MACDDAP, SISS
Authorisation Services	DataMINX, DIAS-B, MACDDAP
EVO	Used for meetings by almost all projects
Collaboration Services (TRAC, SVN, Jabber, Sakai, etc)	DataMINX, MACDDAP, SISS

### Developing eResearch

This KPI addresses increased usage of both ARCS and accessible resources that lead to growth in the adoption of eResearch by Australian researchers, to increasing national and international research collaboration and to infrastructure support delivered to NCRIS capabilities through leading edge eResearch services.

**Objectives** This KPI is defined to support the following key Objectives under the ICI contract and ARCS Membership agreement:

- 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).
- Undertake activities to increase the uptake of ICI facilities and therefore e-Research.
- Enhance national and international research collaboration in research;
- Provide leading-edge research capability for NCRIS research capabilities

**Measurements** Four measurements are defined to assess this KPI:

- 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

Agreements between ARCS and research providers

ARCS has established the collaboration agreements with research resource providers and research communities to provide services. These include:

- ARCS Service deployment agreements: ARCS is finalising agreements with a few lead universities to deploy one or more ARCS services. The following are in play

EVO	Monash, Melbourne, QUT
Sakai	Melbourne
Data Fabric	Monash, Melbourne
- ARCS and the MARCS have agreed to host or support services developed by most of the NeAT Round 1 projects, including MACDDAP, SISS, DIAS-B, ASeSS, DataMINX.
- Service support agreements: Four Australian universities are interested in becoming ARCS Tier 1 support sites and intend to host either an EVO server in their institutional network or assist in the development of other ARCS services.

Service usage related to NCRIS capabilities

The service management capabilities are still been defined and developed to enable ARCS services to monitor and log the access and usage level. These full management capabilities will lead to a more accurate and comprehensive usage analysis to establish ARCS service contribution to NCRIS capabilities. These measurements will be implemented in progressively from the next year.

Usage analysis of the Australian Grid

During 2008-9 there were 129,045 jobs consuming 1,157,266 CPU hours submitted through the ARCS National Grid, tripling the number of jobs and doubling the CPU hours compared to that in the 2007-08 period.

Collaborative initiatives established

The six NeAT Round 1 projects are collaborative initiatives between ARCS, ANDS and the target research communities.

ARCS and ANDS Integrated Data Services.

### Strategic Alignment to NCRIS

This KPI category addresses the long-term strategic requirements of NCRIS research capability areas.

**Measurements** Two measurements are defined to assess this KPI:

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

Number of packaged services tailored to specific NCRIS capabilities

The following table presents ARCS services and projects that are specifically developed or tailored to NCRIS capabilities.

ARCS Services	NCRIS Capabilities
Data transfer service	NCRIS Astronomy
Data Fabric and OPeNDAP Network services	NCRIS IMOS/eMII, NCRIS Characterisation, NCRIS TERN
SLCS Proxy Delegation Service	NCRIS Structure and Evolution of the Australian Continent

The NeAT projects are developing services specifically targeted at the specified NCRIS capabilities.

NeAT Project Services	NCRIS Capabilities
MACDDAP	IMOS, NCRIS 5.12
SISS	Auscope, NCRIS 5.13
DIAS-B	Atlas of Living Australia, NCRIS 5.2 and TERN Ecoinformatics, NCRIS 5.11
DataMINX	Characterization, NCRIS 5.3

Five of the eight NeAT round 2 projects that were being set up during the reporting period are aiming to develop services targeted at NCRIS capability areas, including bioinformatics (NCRIS 5.1), biosecurity (NCRIS 5.8), phenomics (NCRIS 5.2), tomographic reconstruction of characterisation data (NCRIS 5.3), and workflows processing of remote sensing data (TERN AusCover, NCRIS 5.11).

Survey of NCRIS CEOs on value derived from ARCS

ARCS has planned to conduct a survey of NCRIS CEOs on value derived from ARCS products and services by the end of 2009. A form used in this survey is included in the Appendix E.

### Focus on Data

This KPI category addresses a strong emphasis on the effective use and management of data resources.

**Measurements** Three measurements are defined to assess this KPI:

- 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

ARCS resources focused on data services

The ARCS resources focused on delivering data services in the reporting period include:

- 100% of Data Services,
- All collaboration activities with ANDS,

- All of the NeAT Round 1 projects and half of the NeAT Round 2 projects are strongly focussed on data management and access, while the other Round 2 projects are concerned with data analysis tools and workflows or collaborative visualization and analysis of data,
- Authorisation Services aimed at access to data.

Specific usage analysis of the ARCS Data Fabric

Data Services team is currently developing new capabilities to capture usage statistics and data traffic measurements. This will enable a more accurate usage and traffic analysis for next year.

The largest NCRIS user is NCRIS IMOS with about 1.8 terabytes (representing 25% of the total capacity).

Feedback from ANDS and NCI on ARCS assistance with their data needs

The main objective ARCS Data Services collaborate with ANDS and NCI is to achieve integration between their respective services. To achieve this, ARCS Data Services team worked closely with ANDS and NCI to organize workshops and demonstrations for integrated solutions.

ARCS Data Services team have conducted a successful symposium together with ANDS in Sydney. ARCS and ANDS have presented together to researchers at a number of occasions. In order to present a coherent picture, ARCS Data Services and ANDS are in continuously consultation and collaboration to develop the interfaces between their two systems.

ARCS and ANDS will deliver a hands-on workshop together at eResearch 09.

## APPENDIX D: SUMMARY OF NEAT ROUND ONE PROJECTS

This Appendix provides a summary of status for NeAT round 1 projects.

### ASeSS

- Aims** The ASeSS project aims to provide to the ASSDA community, for the first time, a simplified, unified, national access to ASSDA datasets from a variety of sources and in a wide variety of data formats, e.g. unit record, data cubes, electoral, historical. The ASeSS also provides a standardized platform for topic and theme-specific ASSDA sub-archives to be created in, for example, historical documents, indigenous data, and qualitative data.
- Outcomes**
- A thorough analysis of ASeSS data sources and formats has been conducted to better support future project development.
  - A review of the ASSDA archiving workflows has been conducted and the results will support the development of new web-based workflow tools for ASSDA.
  - Evaluations of storage foundation technologies were conducted and a short-medium term solution chosen (Fedora).
  - Modifications and fixes to the existing ASSDA workflow tools, website and data foundation.
  - Demonstrations of key technologies for GIS and InfoViz analysis of ASSDA datasets.
- Benefits**
- Better support of future ASeSS storage and tool developments informed by the reviews of ASSDA data formats and sources.
  - Replacement of legacy desktop workflow tools with web based versions informed by the reviews of ASSDA workflows and archiving practices
  - ASSDA tools and services to be based on a modern, scalable data and services “cloud” hosted at ANUSF.
  - Changes to the existing ASSDA IT infrastructure allow day-to-day operations to continue while development proceeds on replacement infrastructure under ASeSS.
  - Access for ASSDA researchers to modern tools for GIS and InfoViz visualization of ASSDA datasets.

### Aus-e-Lit

- Aims** Provide eResearch services to address the needs of researchers involved in the study of Australian literature, building on the existing AustLit web portal. New services will be developed to enable data integration and search across multiple relevant databases including AustLit, Scholarly Electronic Text and Image Service (SETIS), Australian National Bibliographic Database, Australian Digital Theses, National Library of Australia's PeopleAustralia and PictureAustralia; for collaborative annotation of digital resources such as documents; and for compound object authoring, editing and publishing.
- Outcomes**
- A collection of full-text was imported from SETIS that has supported the development of a Full-text Search across all available AustLit data.
  - A Federated Search (beta version) has been added to the AustLit searching options, awaiting the advancement of metadata harvesting from target databases.
  - An Annotation Service and Compound-object Authoring Service (prototype) has been developed and is being tested by a small group of researchers in the field of Australian literary studies.
- Benefits**
- Strong foundation for future development of new services for AustLit users, ensuring that users will receive a secure, robust and enduring service.

- Provision of a new full-text search service across a corpus of hundreds of works of fiction, poetry and criticism from the early 19th century to the 1930s, enabling users to quickly locate word usage and themes within hundreds of selected works.
- Delivery of the Federated Search service (beta version) will enable users to quickly review and organize search results from up to nine databases in addition to AustLit.
- Development of the Annotation Service and Compound-object Authoring Service prototype will support a number of trial projects with the assistance of a small group of researchers, raising awareness of the potential of collaborative interpretation and scholarship in literary studies.

#### DataMINX

**Aims** Provide data access and management services for the NCRIS 5.3 Characterisation community, i.e. the users and operators of high-end microscopy and imaging, neutron source, synchrotron and X-ray facilities. The essence of DataMINX is to capture scientific instrument data and the associated metadata, deliver it to appropriate repositories in standard formats, and make it easily discoverable and accessible by researchers. The services developed are expected to build on existing work in the UK on a scientific metadata model and information catalog (ICAT) and a data transfer service for the Australian Synchrotron (the VBL Gateway Service) developed by VerSI.

- Outcomes**
- Comprehensive ICAT system review.
  - Initial pilot ICAT deployments at OPAL and University of Sydney,
  - Initiation of pilot metadata ingest processes from data file content and local databases initiated at OPAL and USyd AMMRF node and USyd crystallography.
  - Agreement for VerSI Gateway service to be installed at OPAL, and USyd and UWA nodes of AMMRF in the third quarter of 2009.
  - Development of prototype Data Transfer Service to extend capabilities provided by VerSI Gateway data transfer service. Use of Open Grid Forum standards (GFD 134 and 135) and liaison with OGF representatives including standards extensions.
  - Collaborative linkages established with the UK STFC (eScience, National Grid Service, ISIS neutron source and Diamond synchrotron), Open Middleware Infrastructure Institute (OMII-UK) and UKOLN (repository and preservation expertise).
- Benefits**
- Gained knowledge and experience with ICAT and metadata ingest ahead of proposed deployments for AMMRF and Australian Synchrotron Facility.
  - Joint software and standards development with STFC, OMII, UKOLN.

#### DIAS-B

**Aims** To develop an operational metadata repository for biodiversity data resources, including registration, discovery and annotation services. The use of community annotation services is aimed at improving description and quality control for biodiversity data resources. This project will provide core services required by the NCRIS 5.2.3 *Atlas of Living Australia* (ALA) capability to support management and discovery of biodiversity data resources.

- Outcomes**
- Completion of study into metadata repository options with decision to move forward with Fedora.
  - Establishment of a prototype metadata repository based on Fedora
  - Delivery of a prototype and demonstrator annotations environment, including support for a wide range of browsers and annotation of images and bubbles on a Google Earth map
- Benefits**
- Work to date lays platform for successful delivery of data integration components during 2009/10.
  - Annotation demonstrator proved very successful in that stakeholders have been able to try out the annotations service and provide feedback into the development process.

MACDDAP

**Aims** Integrate large marine and climate data sets and to deliver these data sets through a wider range of data streams, using standard metadata, data formats and access interfaces, enabling data to be more easily discoverable, searchable and accessible to researchers.

- Outcomes**
- New release of the TPAC Digital Library with geo-spatial search capabilities.
  - New release of the IMOS-Geonetwork Metadata Entry Search Tool (MEST) with enhanced capabilities.
  - First release of the aggregator service, which at this stage is capable of amalgamating several datasets, provided they are held on the same web server.
  - Command line version of the data format translation service completed and currently undergoing restricted user testing, but not yet released to the general user community.
  - Release of a new version of the THREDDS Data Server (TDS4.0) providing an OPeNDAP server with OGC-standard Web Map Service (WMS) capabilities for the first time.

- Benefits**
- Enhanced functionality for portals that are currently in regular use by marine- and climate-related research communities, including federated search across multiple data sets, improved metadata and geo-spatial search.
  - Adding support for international standards for data formats, metadata and data access.

SISS

**Aims** Develop some of the component services and functional capabilities needed to realise a spatial information data commons within Australia, leveraging Open Geospatial Consortium (OGC) and ISO standards, and to work with the providers and consumers of data to assist them in adopting the common spatial data access and exchange mechanisms supported by the Spatial Information Services Stack (SISS).

- Outcomes**
- Geoserver app-schema module incorporated into the trunk release of Geoserver by the open source community
  - Deployment of the SISS to government geological surveys in VIC and SA with commitment to production services deployment as the SISS improves
  - CSIRO Minerals Down Under (MDU) flagship program and two WA Centres of Excellence utilizing components of the SISS with a view to more complete enduring deployment on research data holdings.

- Benefits**
- AuScope Portal utilizing all components of the SISS provides access to geoscience information holdings at multiple organizations that have deployed SISS.
  - Interest and uptake from organizations outside of Geoscience data (BoM announced at Spatial@Gov they intend on using SISS) and international uptake of Geoserver app-schema extensions.

## APPENDIX E: ARCS NCRIS CEO SURVEY

NCRIS CAPABILITY AREA: \_\_\_\_\_

### SURVEY PURPOSE

The Australian Research Collaboration Services (ARCS) has been established and funded as part of the NCRIS program to enable and enhance research through the provision of long-term eResearch support, services and tools. To achieve this ARCS specifically conducts activities to provide national eResearch support services in the form of: services to the National Collaborative Research Infrastructure Strategy (NCRIS) capability areas, amongst other research user groups.

As part of its performance review process aimed at continuous improvement of its services and the quality of its service delivery, ARCS is committed to conducting an annual survey of NCRIS CEO's to assess the value it is providing to a critical user group.

We would be grateful if you would take the time to answer this short survey and return it to Anthony Williams, CEO, ARCS before 31 December 2009. The results of the survey will be presented to the ARCS Executive Committee and reported to DIISR as part of the ARCS Annual Progress Report.

In the following tables please assess the degree to which

- your Capability Area has made use of the ARCS service: 0 = not at all; 5 = extensively
- use has delivered value and quality: 0 = no value; 3 = meets current expectations; 5 = exceptional
- using ARCS services has made a significant impact on your area in terms of your capabilities and productivity: 0 = no impact; 3 = it has made a difference; 5 = we would never have got where we are without it.

Please use the comments area to make suggestions for improvements.

### COLLABORATION SERVICES

Service	Usage	Value	Impact	Comments
Video and teleconferencing services				
Web-based collaboration services				

#### NOTES:

- i. Video and teleconferencing services include Access Grid, EVO@AU and the National IP Phone Bridge.
- ii. Web-based collaboration services include Drupal, Plone, Wiki and Sakai.

## DATA SERVICES

Service	Usage	Value	Impact	Comments
Data fabric				
Data access tools (Davis, OPeNDAP)				
Database creation and access				
Large-scale data transfer services				

### NOTES:

- i. Database creation services include MYSQL and PostgreSQL

## SYSTEMS SERVICES

Service	Usage	Value	Impact	Comments
National Grid				
Applications hosting service				

## AUTHORISATION SERVICES

Service	Usage	Value	Impact	Comments
Authorisation advisory services				
Pilot AAF				
Identity Provider service (IdP)				

## NeAT PROJECTS

Service	Usage	Value	Impact	Comments
MACDDAP				
SISS				
DIAS-B				
DataMINX				

## OVERALL ASSESSMENT

Service	Usage	Value	Impact	Comments
Gathering NCRIS area requirements				
Communications from ARCS				
Training and education in ARCS services				
Help desk and support				

## SUGGESTIONS FOR IMPROVEMENTS

Please add other comments on ARCS overall and particularly, at this early stage of ARCS development, provide suggestions for the improvement of ARCS services and their delivery.