



# **ARCS Progress Report 2007-08**

**1 July 2007 to 30 June 2008**

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

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

## Contents

1. Overview of Status of Project as at 30 June 2008 .....	3
1.1. Structure and Governance .....	3
1.2. Management and Processes .....	4
1.3. Collaboration Services Manager .....	5
1.4. Financial Status .....	6
2. Description of the Activities Undertaken .....	8
2.1. Collaboration Services .....	8
2.2. Operational Services: Systems Services .....	9
2.3. Operational Services: Data Services .....	10
2.4. Proto-NeAT Projects .....	11
2.5. NeAT Projects Development .....	13
2.5.1. The NeAT Process .....	13
2.5.2. Status of NeAT Projects as at 30 September 2008 .....	14
3. Description of Progress Against Milestones .....	17
4. Deviations from the Implementation Plan .....	19
5. Discussion of Cash and In-kind Co-investment .....	19
Appendix A: ARCS Data Fabric Announcement .....	20
Appendix B: Draft ARCS KPIs for 2008-09 Onwards .....	21
Appendix C: Performance Against Agreed Performance Indicators .....	23
Appendix D: Confidential Information .....	29
Appendix E: Audited Financial Statements .....	30

## 1. Overview of Status of Project as at 30 June 2008

The Australian Research Collaboration Service (ARCS) is an unincorporated collaborative venture formally constituted on 15 November 2007 for the purposes of providing long-term eResearch support to the Australian research community. ARCS activities and governance processes are defined in the **ARCS Collaboration Agreement**. ARCS activities include, but are not limited to, the provision of national eResearch support services in the form of: interoperability and collaboration infrastructure and services; 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.

The ARCS members, referred to hereafter as the **Members of ARCS (MARCS)**, are: the Australian Centre for Advanced Computing and Communications (**ac3**) in New South Wales; the Australian National University (**ANU**) in the Australian Capital Territory; the Commonwealth Scientific and Industrial Research Organisation (**CSIRO**) nationally; eResearch SA (**eRSA**) in South Australia; **iVEC** in Western Australia; the Queensland Cyber Infrastructure Foundation (**QCIF**); the Tasmanian Partnership for Advanced Computing (**TPAC**) in Tasmania; and the Victorian Partnership for Advanced Computing (**VPAC**) in Victoria. **INTERSECT** will be formed in NSW in the next Business Year and will soon join as the MARCS replacing and subsuming ac3.

The NCRIS funding period is from 1 July 2007 to 30 June 2011 and the primary initial purpose of ARCS is to deliver the Interoperability and Collaboration Infrastructure (**ICI**) component of the NCRIS capability area known as Platforms for Collaboration (**PfC**) to the Department of Science Education and Technology (**DEST**). 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**).

Subsequent to the formation of ARCS, the component of DEST relevant to ARCS has been taken up by the Department of Innovation, Industry, Science and Research (**DIISR**). DIISR has indicated that additional funding of \$2 million will be provided to ARCS to deliver Authorisation Services and a further \$500k has been provided to assist in the delivery of Collaboration Services. 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. The additional \$500k for Collaboration Services is the subject of an amendment to the ICI Funding Agreement. A separate **Authorisation Funding Agreement** will be put in place between DIISR and ARCS and will be included in the ARCS Collaboration Agreement as an additional Schedule to cover the delivery of the Authorisation Services.

### 1.1. 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. No Affiliates have yet joined as ARCS is in the process of defining what an appropriate Affiliate would be and no Independent Members have yet been appointed although this may change during the coming business year. The Executive Committee has expressed a preference for an Independent Member to be appointed and remunerated as Chair and such an appointment is currently being investigated. The Executive Director is appointed by and reports to the Executive Committee.

As ARCS is an Unincorporated Collaborative Venture it must operate through a legal agent. ARCS refers to this role as the **Lead Agent** and this is currently VPAC although this can change if necessary. The ARCS Collaboration Agreement states that **the Lead Agent will act, all times, under the direction of the Executive Committee in relation to its activities as Lead Agent**. It is also possible in principle to have different MARCS act as legal agents for each individual contract that ARCS has with an external entity as well as a separate MARCS 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. It is expected that VPAC will also be the legal agent for the Authorisation Funding Agreement with the Commonwealth.

ARCS activities are by definition subject to the governance procedures of ARCS and as such will involve the Executive Director and the Executive Committee in their development and their delivery; ARCS Business by definition has associated monies flowing through the ARCS accounts; and the MARCS 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 was adjusted to its new form during Q1 of 2008. It consists of Collaboration Services, Systems Services, Data Services, Authorisation Services and Projects. The Systems Services Team and the Data Services Team are sometimes collectively referred to as Operational Services. The Authorisation Services activities could not begin until after 1 July 2008 as the funding was unavailable until then.

## **1.2. 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 in addition bound by the conditions of the ICI Funding Agreement. A similar situation will exist for Authorisation Services once the Authorisation Services Agreement is in place. The Executive Director is responsible for the day-to-day management of ARCS with the assistance of the various Managers. 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 Team. Since some staff may work across more than one area, they may have more than one Line Manager.

The Management Group is convened by the Executive Director and includes the Systems Services Manager, the Data Services Manager, the Projects Manager, the Collaboration Services Manager and the Authorisation Services Manager. The Data Services Manager is Florian Goessmann and the Assistant Manager is Stephen McMahon. The Projects Manager is Paul Coddington. Important new appointments of Managers have very recently occurred outside of the 2007-08 reporting window. However, it seems appropriate to record them here in any case for completeness. As of October 2008 the System Services Manager is Jim McGovern and the assistant manager is Daniel Cox (previously interim Manager). The Collaboration Services Manager is now Andrew Alexander and the Assistant manager is Ashley Wright (previously interim manager). The Authorisation Services Manager will be Neil Witheridge and he is expected to be appointed very soon. The Manager positions are professional positions with significant responsibilities to ARCS and appropriate recruitment processes will be used to fill and, as needed, replace these positions. Processes similar to those used to recruit the Executive Director have been used. The remuneration for the Managers is determined by ARCS based on skills and experience and on a case-by-case basis. The Local Host for a Manager can be any of the MARCS or any of their partner

institutions. The Local Host offering to host the Manager will second him/her to the local MARCS if he/she is not already an employee and then on-second them to ARCS itself. The local MARCS will receive the standard ARCS funding for a Manager in return for providing the hosting for the Manager. ARCS will ensure that the salary plus on-costs at the Local Host does not exceed the standard ARCS funding for a Manager. ARCS will work with the host MARCS and the Local Host institution to ensure a consistent relationship between ARCS Management processes and needs and the Local Host human resources requirements.

Coordination across Services, Teams and activities is ensured through weekly EVO videoconferences of the Management Group. Each Team also has weekly or fortnightly videoconferences convened by the Team Manager. In addition, the Position Description for each Team Member position makes it clear that 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 incidental non-ARCS services to the Local Host under the direction of the Local Host line manager.

**Promotion and outreach** strategies have been developed and are being implemented. These include web page enhancement and elaboration with a user focus. It is anticipated that a further re-design will occur in 2008-09. Other activities include for example: implementation of training workshops in videocollaboration tools; frequent talks on ARCS by the Executive Director and the ARCS Managers to research communities and NCRIS capabilities; planned presentation on ARCS to CAUDIT in October; three half day ARCS workshops have been scheduled into the program of the eResearch Australasia Conference in Melbourne in September; three oral presentations on ARCS at this same meeting; distribution of the ARCS Data Fabric flyer to all CAUDIT members and to all DVCRs in Australia. An MOU is being negotiated with BeSTGRID in New Zealand and ARCS is currently working with BeSTGRID and relayed New Zealand organizations on the planning of joining Summer Schools and eResearch Workshops. The New Zealand Ministry of Research, Science + Technology is about to fund, initially for 3-years, an Advanced Video Conferencing and Collaboration Support Service with an initial focus on Video Collaboration. ARCS has been recently invited to cooperate with this initiative and is now setting about doing so. The development and delivery of other outreach and promotional activities will be a high-priority in the new business year.

**Risk management:** Risk in ARCS is low in general terms, however the greatest risks are (i) a failure to deliver high quality services that enhance research outcomes and (ii) a failure to achieve significant uptake of these services by the research community. A Risk Matrix analysis for all of ARCS activities is to be developed early in the new Business Year.

**Access and pricing** policy for ARCS is that 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 philosophy 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.

### **1.3. Collaboration Services Manager**

An additional \$500k has been added to the original ICI funding to enhance the delivery of Collaboration Services through the appointment of a Collaboration Services Manager for the three-year period 1 July 2008 – 30 June 2011. Ashley Wright, from the Collaboration Services Team, has filled the role of interim Collaboration Services Manager very capably

pending the appointment of the. While strictly speaking it is outside the reporting period of this Progress Report, it is useful to note that this position was advertised nationally, attracted high quality candidates and was filled on 22 September 2008 by Andrew Alexander, who will work out of the University in Queensland via QCIF.

#### **1.4. Financial Status**

Some underspending has occurred with respect to the budgeted expenditure outlined in Section A3 of Appendix A of the Implementation Plan. This has occurred primarily because the 2007-08 year was the ARCS start-up year and involved numerous new appointments with inevitable delays due to appointment processes and deferred start-up times for staff. These unspent funds remain in the ICI account of the ARCS Lead Agent and will only be used for the purposes of carrying out approved ICI activities. This underspend of funds in the start-up year is welcome in that it will be used for new initiatives in Service Delivery, to meet increasing and new demands on existing Services, for the possible part-time appointment of a Marketing and Promotions person and to off-set staff cost increases with CPI and Enterprise Bargaining increases over the funding period through to mid-2011. It is not anticipated that there will be any significant underspending in the 2008-09 Business Year or in subsequent Business Years.

It is further to be expected that all NCRIS funds will be expended by the end of the NCRIS funding period. This will be achieved through the development of a **revised ARCS Business Plan Budget**, which will be submitted to the ARCS Executive Committee at the December Executive Committee Meeting and which will be subsequently be submitted to AeRIC and DIISR for approval.

	<b>1 July 2007 - 30 June 2008</b>		
	<i>Actual</i>	<i>Budget</i>	<i>Variances</i>
<b>Income</b>			
Commonwealth Funding	\$9,600,000	\$7,000,000	\$2,600,000
Interest Accrued	\$251,392	\$240,407	\$10,985
<b>Total Income</b>	<b>\$9,851,392</b>	<b>\$7,240,407</b>	<b>\$2,610,985</b>
<b>Expenses</b>			
Administration	\$548,574	\$568,958	-(20,384)
Operational Services & User Support	\$2,437,861	\$2,784,375	-(346,514)
Proto-NeAT	\$621,876	\$676,564	-(54,688)
Travel	\$70,830	\$225,000	-(154,170)
Other	\$129,067	\$182,500	-(53,433)
<b>Total Expenses</b>	<b>\$3,808,208</b>	<b>\$4,437,397</b>	<b>-(629,189)</b>
<b>Net Profit/(Loss)</b>			
Total Income	\$9,851,392	\$7,240,407	\$2,610,985
Total Expenditure	\$3,808,208	\$4,437,397	-(629,189)
<b>Net Surplus</b>	<b>\$6,043,184</b>	<b>\$2,803,010</b>	<b>\$3,240,174</b>

#### **Explanation of Variances:**

##### **Income**

***Commonwealth Funding:***

There is a variance of + \$2.6M - due to a payment made for \$2.1 for the ICI Business Plan, and \$500k for the fourth payment for Collaboration Services.

***Interest Accrued:***

There is a variance of + \$10,985 - due to improved cash balances and higher interest rates.

**Expenses**

***Proto-NeAT:***

The "variances" for Proto-NeAT are primarily due to the Proto-NeAT projects changing in the transition from Proto-NeAT 1 (first 6 months) to Proto-NeAT 2 (second 6 months). This budget uncertainty was flagged in the Implementation Plan. Funding for Proto-NeAT 2 projects was less than for Proto-NeAT 1, mainly due to the Grid Enabled Sequence Assembly Tools project not proceeding.

***Systems Administration and User Services:***

ANU reported a variance of -\$6,250 - due to withheld project funds as a result of the unsatisfactory completion in milestones

CSIRO reported a variance of -\$100,000 - due to not appointing a person for the position for the whole period

QCIF reported a variance of + \$9,375 - due to a change in funding level from \$100K to \$125K for some staff

TPAC reported a variance of + \$4,688 - due to a change in funding level from \$100K to \$125K for some staff

***Data Collaboration Services:***

ANU reported a variance of - \$3,125 - due to a change in funding level from \$125K to \$100K for some staff

CSIRO reported a variance of -\$93,750 - due to not appointing a person for the position for the whole period

ac3 reported a variance of -\$19,351 - due to the position not being filled for the whole period

***Administration:***

eRSA reported a variance of -\$9,509 - due to Sharon Johnson not coming on board until the 1st Jan, however budgeted to commence 1st Oct

VPAC reported a variance of -\$10,875 - due to the Operations Manager finished up a month earlier and the Business Managers 1 month of effort which was not budgeted for

***User Support and Collaboration Services:***

ANU reported a variance of -\$31,250 - due to this position not being filled for the whole period and some effort being moved to Proto-NeAT

ac3 reported a positive variance of -\$10,097 - due to the positions not filled for the full period

CSIRO reported a variance of -\$93,750 - due to positions not being filled for the whole period

***Travel:***

A variance of - \$154,170 - due to unspent funds

***Other:***

A variance of - \$53,433 - due to other miscellaneous unspent funds.

## 2. Description of the Activities Undertaken

*The continuing ARCS Mission is to provide long-term eResearch support services for the Australian research community with a particular focus on services, tools and support for interoperability and collaboration infrastructure and for authorisation. Careful attention will be paid to the pro-active delivery of customer-oriented, production tools and services with appropriate change management and quality assurance processes in place.*

### 2.1. Collaboration Services

The Collaboration Services group was started in Q2 2008. Prior to the formation of this group, there was a User Services team that operated under Operational Services. The User Services group has worked closely with the Operational Services Group to further the development and deployment of authorisation and job submission toolkits, Grix and Grisu. Additionally during the period many improvements have been made in the quality of ARCS' Information Services, based on MDS (Monitoring and Discovery service). It is now possible to make use of the Information Service to determine the necessary information needed to submit grid jobs. Use of this Information Service has been developed into ARCS' job submission tools. Further work has also been put into ARCS Testing Services, based on INCA, to provide a robust framework for testing the availability and correctness of a wide range of ARCS' production services. Responsibility for the above technologies has been merged into Systems services with the formation of this and the Collaboration Services groups.

The formation of the Collaboration Services group has seen a number of new web and video based tools being deployed within ARCS for the use of the Australian research community. Web based collaboration tools, such as Sakai, have been deployed and sites set-up for a number of Australian research groups and for DIISR to support the NCRIS Roadmap Review. Feedback from these groups has been very positive to date, with one group of medical researchers using these tools to collaborate with researchers in Japan. A Plone site has been set up for ANDS and for the International Lattice Data Grid (ILDG) Project. Progress has also been made in the areas of video collaboration, with an agreement with Caltech to provide EVO support in Australia (signed in July 2008). EVO is being extensively used by ARCS itself as well as by ANDS and a number of research groups such as AuScope. In order to make the Access Grid more robust, Quality Assurance processes have been initiated including certification for AG sites and we have worked with AARNet to improve the performance of multicast. In addition an email based Help Desk has been established, with work well under way to have a 1-800 telephone Help Desk operational in the beginning of the 2008-9 year.

The decision was made to provide support for Sakai and wikis and these have been deployed to a number of research groups and initial experiences are positive. See below for a list of groups. Recommendations were to support both AccessGrid and EVO. As part of the EVO support, it was decided to produce an Australian site, [EVO@AU](mailto:EVO@AU), for members of the Australian research community and this is expected to be in place by the end of 2008.

#### **Some Usage Statistics as of September 2008**

**Sakai:** 129 Registered Users and 5 Active Sites

- DataMinx - Data Management for Microscopy, X-ray and Neutron Facilities.
- IPPN - International Pediatric Pulmonary Network
- NCRIS Roadmap Review 2008
- TERN - Terrestrial Ecosystem Research Network

- ARCS Collaboration Services Team

**Wiki:** Wikis have been created for:

- Climate Futures for Tasmania
- Australian Climate Ocean Model
- CCRC

**EVO:** One deployed Panda Server in Brisbane and one at Monash (by Monash)

The number of users of EVO in Australian communities is 236 as of September 2008.

The primary Australian community is ARCS-AARNet with 222 users. In addition, two other sub communities for EVO have been created through ARCS and Caltech for:

- AuScope – 8 users
- National Taxonomy Research and Information Network (TRIN) – 6 users

## **2.2. Operational Services: Systems Services**

The Systems Services Group incorporates the old APACGrid Compute Infrastructure Project and a number of activities that were in the hands of the APACGrid Portals Project. During the ARCS Establishment Period, the User Services and User Support groups came into existence and have now been merged into either Systems Services or the newly formed Collaboration Services group. Systems Services, while known previously under other names, has been responsible for operating and further developing the Compute Grid infrastructure that is now installed at fourteen HPC sites around Australia and New Zealand. Until recently this group's activities included providing support for ARCS' Collaboration Services activities and currently continues to provide the Authentication and Authorisation activities used by Grid and related researchers in Australia.

Daniel Cox was appointed Team Leader in recognition of the leadership he showed to the APACGrid Grid Admin group. Initially the Systems Services concentrated on transitioning from an APACGrid model to the ARCS model and from range of developmental models to production quality services. To this end the re-badging processes are effectively completed and web, wiki and Trac content ported and reviewed. The Grid and other system resources are now increasingly robust, with a new focus on Quality Assurance and appropriate change management processes. A help system is now in place that is already widely used.

The Compute Grid has seen over 550,000 CPU hours delivered to researchers from July to June 2008. During that time we saw the completion of the transition from a remarkably reliable but still officially developmental Grid to a production quality service placing emphasis on customer satisfaction and usability. The Certificate Authority has 620 current certificates issued and the VO Management System has over 330 researchers subscribed. The certificate management tool, Grix, was developed early in this period and is now widely used and considered stable. The adoption of this tool by researchers is a good example of ARCS' approach of making things easier for end users by hiding the complexity but still providing the power users the capability of leveraging their skills. Considerable progress has been made with the recently developed Grisu tool kit that allows easy creation of application specific desktop graphical user interfaces for remote job submission using ARCS grid infrastructure. Already much of the existing grid usage is now being launched via Grisu.

The Systems Services group manages the grid as well as numerous underlying services for other ARCS Teams and user communities, including but not limited to: DNS; APAC Certificate Authority; Jabber server & services; Access Grid (upgraded to 3.1) and EVO infrastructure; mailing lists for ARCS, AuScope and others; RT system for Helpdesk and for INCA (System status reports) and Certificates awaiting approval; MDS (Monitoring and Discovery Service) allowing users to discover services and software on the grid; maintaining

grid gateways; monitoring grid gateways with INCA; Grid Operations Centre (GOC) status page; Identity Providers (IdPs) set up at all MARCS sites plus ANSTO; SLCS certificate server; backups of all systems; Gridway metascheduler; Startup Virtual Organisation (VO); and Sakai, Wiki, Drupal and soon Plone etc.

Some current usage statistics are included in Appendix C.

### **2.3. Operational Services: Data Services**

The ARCS Data Team arose out of the APACGrid Data project, referred to as the Information Infrastructure Project at the time, and was formally set up as a team under ARCS Operations in July 2007. Stephen McMahon from the ANU, who had been active in the APACGrid, was appointed as Team Leader. His role is to provide technical leadership in the range of activities that ARCS has determined the Data Team should conduct. While membership of the team has varied over time, it currently involves eight people and at least a half time commitment from all states of the Commonwealth.

The Team initially inherited much of its technology from the APACGrid, but in ARCS it has needed to work much more closely with other ARCS groups and has done so very successfully. The Data Team has clearly defined, from a user point of view, the data services that are appropriate for ARCS to provide and is working on the underlying technology that these services depend on. A range of reliable and regularly tested services now exists between 11 sites and the groundwork is in place to expand both the number of services and the number of involved sites. The group has regular team meetings and is active with other ARCS groups and, importantly, the wider research community. Concentrating on data staging, data movement, data replication and distribution the team has documented some good clear examples of how end users can make good use of our capabilities on the web site <http://www.arcs.org.au>.

The members of the Data Services Team are well integrated into the local hosts and hence allow the Data Services Team to roll out and support services spanning several or all MARCS. The Data Services Team heavily uses tools supported by the Collaboration Services Team such as Jabber and EVO to co-ordinate its efforts.

The Data Services Team supports the mainstays of the ARCS Data Services. GridFTP and SRB, which are the foundation of the **ARCS Data Fabric** (see Appendix A), a service designed to deliver data transport and storage services across the MARCS and any other nodes added onto the Data Fabric as required. GridFTP servers are deployed at all MARCS. SRB servers (the main technology behind the ARCS Data Fabric) are currently deployed at iVEC, eRSA, ANUSF, TPAC, ac3 and QCIF (UQ). These SRB servers are federated in order to allow users to move data from one MARCS to another and to allow data sharing amongst users across the country. Each of the SRB servers also runs a GridFTP interface into SRB space to enable direct data staging to and from grid compute jobs. The GridFTP and SRB services are continuously tested and monitored using INCA. The SRB servers are tested using both the SRB protocol as well as the GridFTP interface.

If a client's requirement can't be met with either of these two tools, Data Services is able to provide other custom solutions to meet the user's need. To date, such solutions include FTP, LDR, OpenDAP and dCache. The Data Services Team collects detailed daily usage statistics of the ARCS Data Fabric (see Appendix C). These statistics allow the monitoring of the progress of the uptake of the Data Fabric on different levels ranging from fabric wide figures to MARCS based statistics and down to the single user level.

The ARCS Data Services Team maintains close relations with current and potential users and user groups. In particular, Data Services is working with ASRP (Australian Synchrotron and the Australian Synchrotron Research Program), ANSTO (Australian Nuclear Science and Technology Organisation), AuScope and IMOS (Integrated Marine Observing System) to provide services and expertise in all questions related to data transport and storage. In addition, the Data Services Team keeps in close contact with the ANDS (Australian National Data Service) Establishment Program and PHCDL (Population Health and Clinical Data Linkage) to provide advice on data related questions early in the establishment process.

### **Current Use Cases**

**Australian MODIS Archive:** All MODIS observations of Australia from NASA satellites are continuously pushed from NASA in the USA to an ARCS Data Services' supported FTP server at iVEC. The data set's volume is currently about 20 TB and is constantly mirrored to ANUSF using LDR.

**ANSTO:** ANSTO experimental data is stored at the ac3 node of the ARCS Data Fabric. The data set currently contains about 1.5 million files. The upload to the Data Fabric is not yet complete.

**ASRP:** The Australian Synchrotron is developing a web-based interface that allows the users of the synchrotron to transport experimental data off the instrument. ARCS Data Services has a good working relation with the Australian Synchrotron and the ARCS Data Fabric is a tested and supported destination of the synchrotron's data portal.

**eMII/IMOS:** eMII is responsible for making IMOS (NCRIS 5.12) data sets available to researchers. They have expressed strong interest in the Data Fabric and the first storage and transfer tests of IMOS data on the Data Fabric are underway.

## **2.4. Proto-NeAT Projects**

Much activity in Proto-NeAT projects and related User Support activities has occurred during the first year of ARCS ICI funding. This is briefly outlined below:

**Virtual Observatory Web Services for Astronomy Data (ANU and ac3):** The astronomy community has developed international standards for metadata, data formats and web interfaces for searching astronomy data through the International Virtual Observatory Association (IVOA). The ANUSF hosts the Massive Compact Halo Objects (MACHO) data set, an important astronomical data resource consisting of 127,000 images (~7 TBytes) collected from 1991 to 2003 by the ANU Mount Stromlo 50" telescope, and an associated database of 75 million stars. This project has made the MACHO data set available using IVOA standards, which required developing software to process the images and database to generate standard IVOA metadata, and developing web services for searching and accessing the data using standard IVOA interfaces. Work has started on developing prototypes of similar services for data from the SkyMapper project, which generates over 1 TByte of data per night. A related project at ac3 has developed IVOA services for two telescopes managed by UNSW.

**Bioinformatics Data Sets Available Over The Grid (QCIF):** Genomic and proteomic data sets including GENBANK, GO, PDB, UNIPROT have been stored at the Queensland Facility for Advanced Bioinformatics (QFAB) using Storage Resource Broker (SRB), and made available via SRB client tools that are supported by ARCS, and through standard tools such as the Sequence Retrieval System (SRS) and the UCSC Genome Browser. Mirroring and synchronisation of required data sets has been implemented. Authentication and

authorisation mechanisms using Shibboleth are being deployed, in collaboration with the ARCHER team at JCU, and using software that will be supported by ARCS.

**Bioinformatics Portal and Workflow Development (SAPAC/eRSA):** A web portal was developed for submission of BLAST sequence alignment jobs for large numbers of sequences, by splitting the job into multiple tasks and using Nimrod to run the jobs concurrently using multiple processors. The portal has been deployed at SAPAC/eRSA and used by the Australian Centre for Plant Functional Genomics (ACPFPG) and other research groups. A variety of workflow solutions were investigated for comparative analysis of genomic data for agriculturally significant grasses such as wheat and barley. A custom workflow solution was developed that uses grid job submission. The Grisu grid job submission portal that is being developed and supported by ARCS was customised for use with phylogenetic applications (Mr Bayes, PAUP and BEAST) and used by researchers at University of Adelaide. A web-based customised microarray data analysis portal was developed for ACPFG.

**Grid-enable Sequence Assembly Tools (iVEC):** This project investigated available sequence assembly tools for traditional and next generation genome sequencing instruments (such as 454 and Solexa), selected the open source tools that could be run most effectively on parallel computers, and developed software to enable them to be accessed via standard grid middleware supported by ARCS. A web-based workflow system (YABI) was developed to allow users to easily specify workflows for sequence assembly. The tools were used by the Centre for Comparative Genomics for assembly of 454 sequences for the wheat genome, as part of the International Wheat Genome Sequencing Consortium (IWGSC), and *Ixodes Scapularis*, for the Beef CRC.

**Proteomics Laboratory System (ac3):** A laboratory information system was developed that enabled researchers to upload information about proteomics experiments to a database using a web interface running on a desktop or laptop computer or a wireless PDA. Information included photographs of the experiment taken using the PDA with associated metadata. A framework for a digital mentor expert system was also developed and trialed. The system has been deployed and used at UTS.

**Collaboration Services Infrastructure (QCIF):** Access Grid (AG) is widely used for collaboration and videoconferencing by researchers and by the MARCS and other participants in PfC. QCIF runs many of the national AG services and is involved in the international development of AG software and services. This project worked on improving the reliability of AG in Australia and developing additional functionality. Work on improved reliability included the development, documentation and operation of a quality assurance program for AG nodes; monitoring and improvement of multicast network performance over AARNet; improving fault tolerance by reducing reliance on single servers (e.g. the Jabber server used for the AG chat client); improved unicast bridge support and deployment; and bug fixing in AG code releases. Work on improved functionality included adding support for new video codecs and high-definition digital video; and a shared whiteboard.

**gLite Adoption (VPAC):** gLite is the grid middleware used by the Enabling Grids for E-Science (EGEE) project, predominantly in Europe. The main project using gLite middleware is the CERN Large Hadron Collider (LHC) Grid. ARCS does not currently support gLite, but it is required by Australian researchers involved in international experimental high-energy physics collaborations including ATLAS (one of the LHC detectors) and Belle. This project supported the development of expertise in gLite, the deployment of an EGEE node using gLite middleware at the University of Melbourne, and the development of a plan for a broader deployment of gLite by ARCS, which is currently under discussion.

**Grid Enabling Training Courses (ac3):** This project supported the development of training material in grid computing.

**Integrated Environment for Computational Chemistry (ANU, ac3, iVEC):** Computational chemists are probably the largest users of high-performance computers at the MARCS and NCI. This project has developed a desktop application called JMOlEditor that allows users to more easily specify and submit computational chemistry jobs to remote supercomputers, monitor the progress of the jobs, and visualise the results (e.g. molecular structures and molecular dynamics trajectories). This phase of the project focussed on developing additional visualisation functionality, adding support for a wider range of programs and input and output data formats, providing more complete grid job submission and monitoring capability, improving documentation and tutorials, and talking to many existing or potential users of the software to identify and address their requirements. The software is currently used by several research groups, and is used in undergraduate and honours computational chemistry courses at the University of Adelaide. Related work at iVEC developed a GUI client tool targeted at solid state chemistry applications such as GULP and SIESTA. The tool provides remote job submission to supercomputers on the ARCS national grid using grid client libraries and web services developed by ARCS.

**Neutron and X-Ray Data Grid (ac3):** This project aimed to develop a pilot implementation of the data management and access system that is being proposed for NCRIS 5.3, which is based on the system being developed by the UK Science and Technology Facility Council (STFC) for its neutron and synchrotron facilities. The pilot project targeted the OPAL neutron facility at ANSTO and X-ray diffraction instruments at the University of Sydney. Target services include metadata capture at source, generation of data in standard interchange format (imgCIF and NeXus/HDF), storage of data using Storage Resource Broker (SRB), a metadata catalog (ICAT) based on the STFC Scientific Metadata Model, and a web portal service (the STFC DataPortal) providing search and retrieval across facilities and platforms. Due to late delivery of code from STFC, and significant staff turnover at ac3 during the course of the project, limited progress was made in implementing the prototype services. However, progress was made in understanding the related systems in use and under development in the UK, related work being done in the ARCHER project, and the current and future status of iRODS and its utility for this application. Some preliminary work was done on software for metadata capture and data transformation to standard image formats.

**Nimrod Support (VPAC):** Nimrod is a tool used for computational parametric studies, where multiple compute jobs with different input parameters are run concurrently on many processors. A version of Nimrod has been developed to submit jobs using the Globus Grid Toolkit middleware supported by ARCS. A web portal for Nimrod has been developed to allow users to easily specify, submit and monitor parametric jobs. This project supported the deployment, maintenance and user support of a Nimrod portal at VPAC that can submit jobs to compute resources at multiple MARCS sites; the development of documentation to assist users in making use of the portal; the development and presentation of tutorials on the use of Nimrod; and the development of additional functionality and bug fixes for Nimrod and the Nimrod portal.

## **2.5. NeAT Projects Development**

### **2.5.1. The NeAT Process**

An explanation of the National eResearch Architecture Taskforce (NeAT) and associated NeAT projects is given in the Investment Plan for NCRIS Platforms for Collaboration, available from the Platforms for Collaboration (Pfc) web site at <http://www.pfc.org.au/>. NeAT projects aim to create new eResearch services that will be of enduring value to major

national research communities such as NCRIS capabilities. The projects are jointly funded by ARCS and ANDS with expectation of significant in-kind effort from the research community and service providers. The total funding available for NeAT projects is \$12 million split evenly between ARCS and ANDS. Governance arrangements for NeAT projects were developed by ARCS and ANDS in consultation with AeRIC and were included in the ARCS Business Plan 2008-09.

The process for acceptance of NeAT projects is as follows:

1. Project proposals are developed by NeAT or by research communities and/or eResearch service providers in consultation with NeAT.
2. Project proposals are considered by NeAT and approved or rejected.
3. The amount of funding for approved projects is determined by ARCS and ANDS in consultation with AeRIC and the project proponents.
4. A Project Committee is set up for each project, with membership as defined by the NeAT governance arrangements. This includes a representative of ARCS and ANDS and representatives from the user community and other major stakeholders. The Project Committee is chaired by a prominent leader from the discipline.
5. A Business Plan, providing a brief overview of the project and the funding allocated to it, is included in the ARCS and ANDS Business Plans.
6. The Business Plan is included in the yearly Business Plans for ARCS and ANDS that are approved by their governing bodies (ARCS Executive Committee and ANDS Project Management Committee).
7. A detailed Project Plan is developed and approved by the Project Committee.
8. The Project Plan is approved by the ARCS Executive Committee and ANDS Project Management Committee (or its successor).

There will be 2 rounds of NeAT projects, the first for projects starting 2008/09 and the second for projects starting 2009/10. Projects are for 2 years. First round projects may be extended for a third year, subject to a review by NeAT and by the Project Committee, and the amount of funding still available.

### **2.5.2. Status of NeAT Projects as at 30 September 2008**

Six projects have been accepted by NeAT in the first round. Two other proposals are being revised for further consideration. The status of the approved projects is given below. The Project Proposals for each accepted NeAT project are available on the PfC web site. The Business Plans for each project are included in the ARCS Business Plan and the ANDS Interim Business Plan.

Four projects have now had Project Plans approved by their Project Committees. These Project Plans are available on the ARCS Executive Committee wiki located at <http://wiki.arcs.org.au/bin/view/Exec/ARCSNeat> and will be circulated to the ARCS Executive Committee and ANDS Project Management Committee for approval.

#### **SISS: Spatial Information Services Stack**

Main user community is geoscience, including Auscope (NCRIS 5.13).

Business Plan specified NeAT funding of \$400K per annum.

Project Plan approved by Project Committee on 2 July 2008.

Project Manager is Rob Woodcock at CSIRO.

NeAT funding for 0.4 EFT of Project Manager (\$60K, CSIRO) and 3 software developers (\$340K, expected to be hosted at iVEC).

Recruiting process for software developer positions started in July, still not complete.

Project information will be on AuScope twiki.

**MACDDAP: Marine and Climate Data Discovery and Access Project**

Main user community is marine and climate, including NCRIS 5.12.

Business Plan specified NeAT funding of \$400K per annum.

Project Plan approved by Project Committee on 4 July 2008.

Project Manager is Ray Williams, funded 0.5 EFT by TPAC.

NeAT funding via TPAC to fund personnel at TPAC, Bureau of Meteorology, CSIRO, Mediaflux.

Most of the NeAT-funded staff identified in the Project Plan. Work begun 3 July.

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

Main user community is humanities, particularly the Association for the Study of Australian Literature.

Business Plan specified NeAT funding of \$250K per annum.

Project Plan approved by Project Committee 13 Jun 2008, revised version addressing some governance issues approved by Project Committee 2 Aug 2008.

Project Manager is Roger Osborne, funded 0.5 by NeAT and 0.25 by University of Queensland (UQ).

All NeAT funding to UQ via QCIF, for 0.5 EFT project manager and 2 software developers.

All NeAT-funded staff identified in the Project Plan. Work began 18 July.

Project web site set up at <http://www.aus-e-lit.net/>

The Project Plans for the above three projects were approved by ANDS PMC on 18 Aug 2008. They were submitted for approval by the ARCS EC on 19 Aug 2008 and were subsequently approved.

**DIAS-B: Data Integration and Annotation Services in Biodiversity**

Main user community is environmental science, including Atlas of Living Australia (NCRIS 5.2) and probably also TERN (NCRIS 5.8)

Business Plan specified NeAT funding of \$400K per annum.

Project Plan approved by Project Committee on 1 Sept 2008.

Project Manager is Lynette Woodburn, funded by ALA.

NeAT funding for 1.5 EFTs at CSIRO (\$200K) and 2 EFTs at UQ (\$200K, via QCIF), UQ staff identified in Project Plan, starting early Sept,

Initial project workshop to be held in Canberra on 8-9 Sept 2008.

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

Main user community is characterisation, including NCRIS 5.3.

Business Plan specified NeAT funding of \$600K per annum.

Project Plan is expected to be approved at the next Project Committee Meeting. Project should start October 2008.

Project Manager still to be decided.

Distribution of NeAT funds is still to be decided, but expected to go primarily to NSW and VIC.

Sakai site set up by ARCS for Data-MINX.

**ASeSS: ASSDA Services for e-Social Science**

Main user community is social science.

Business Plan specified NeAT funding of \$400K per annum.

A Project Plan has been drafted, however there are still some governance issues to be finalised, particularly concerning how the NeAT project relates to the work to be undertaken using the additional funding to be provided to ASSDA by DIISR.

NeAT funding is expected to go primarily to ANU.

**Other Projects Under Development:** Project proposals for astronomy and bioinformatics are being revised for submission to NeAT within the next few weeks. If accepted, these projects could potentially start in 2008/09.

### 3. Description of Progress Against Milestones

The original milestones taken from the **ICI Implementation Plan** are copied below with the current status for each shown in the right-most column. The Table is as shown in Section 6 of the Implementation Plan, but in addition to the Table contains additional items from the *Expected Outcomes* separately listed on pages 9, 10, 11 and 12 of the Implementation Plan. The latter are included with an asterix (\*).

<b>Date</b>	<b>Activity</b>	<b>Responsibility</b>	<b>Status</b>
October 2007	Signing of ARCS Joint Venture Agreement	DEST, ARCS Partners	Completed
Oct-Dec 2007	Implement ICI governance arrangements	AeRIC, DEST, ARCS EC	Completed
October 2007	ARCS Executive Director appointed	ARCS EC	Completed - Prof Tony Williams appointed 6 December 2007
*October 2007	Development of ARCS Data Services Team	ARCS EC	Completed
October 2007	ARCS and Grid Australia web sites set up	ARCS	Completed – renamed ARCS Grid (Grid Australia was too confusing to users)
*From October 2007	Provide effective and timely helpdesk support to users, using the new ARCS helpdesk system	ARCS	Completed
November 2007	Selection of proposed proto-NEAT projects for 2008H1 and specification of funding	AeRIC, ARCS EC, ARCS	Completed
* November 2007	Standard Data Services at each site - GridFTP & LDR	ARCS	Completed
November 2007	Projects Manager appointed	ARCS EC	Completed – Dr Paul Coddington appointed
December 2007	Information about most ICI services available on ARCS and Grid Australia web sites	ARCS	Completed – Combined into a single ARCS site
*December 2007	Migrate existing information and user guides about ARCS services to the new ARCS web site	ARCS	Completed – Public site available; developer related material has been moved to Trac site
December 2007	Automated testing of ICI services using INCA	ARCS	Completed – finds many issues not apparent with old manual system
December	Deployment of standard	ARCS	Completed – ARCS

2007	data storage services		Data Fabric available
December 2007	Toolkit for developing portals for grid job submission	ARCS	Completed – Grisu available but still in development; popular and well used already
December 2007	Acceptance of project plans for proto-NeAT projects	AeRIC, ARCS EC, ARCS	Completed
January 2008	Review of ARCS services and projects	ARCS	Completed – Revised Teams & Management implemented
January 2008	Decision on supported videoconferencing tools	ARCS, AeRIC	Completed – primarily EVO and Access Grid; also as needed Skype, iChat etc
January 2008	Decision on supported collaboration tools	ARCS, AeRIC	Completed – Sakai, Drupal, Plone, Wiki, Plone, Google Calendar, Google Apps
January 2008	Plan for gLite deployment and trial deployment at one ARCS partner site	ARCS plus gLite proto-NeAT project	Pending – waiting request from High-Energy Physics community for deployment
March 2008	Performance indicators and usage information available for most services	ARCS	Completed – but still being actively refined
*March 2008	Investigation of Condor and development of a plan for supporting it (or not)	ARCS	Pending - Some work at iVEC & eRSA but not yet high-profile pending user demand
March 2008	Collaboration tools provided for some research groups	ARCS	Completed – Sakai, Twiki, Mailing lists for various groups TWiki
*March 2008	Provide a simple generic job submission portal	ARCS	Completed - Grisu now supports running generic jobs; able to use MDS
March 2008	Selection of NeAT projects starting 1/7/2008 and specification of funding	AeRIC, ARCS EC, ARCS Management	Completed
March 2008	Business Plan for year 2 submitted	ARCS Executive Director	Completed
June 2008	Provide solutions for metascheduling	ARCS	Partially completed - Gridway development done & a number of issues resolved including support for MDS and Myproxy. Not yet deployed

*June 2008	Assist user groups in developing and deploying customized portals for widely-used applications		Partially completed – we will encourage use of Grisu web service when released (Oct08)
June 2008	More extensive information about all ICI services and activities available on ARCS and Grid Australia web sites	ARCS Management	Completed – all on ARCS web site now; basic material present; continual development and deployment of enhanced material
*June 2008	Provide improved information, user guides and FAQs for all ARCS services		Partially completed – Content being ported to ARCS public web site; additional material being developed
*June 2008	Explore Data Replication Services	ARCS	Completed
*June 2008	Increase Data User Groups	ARCS	Completed – includes ANSTO and AMMRF (via DataMINX etc)
*June 2008	Work with ANDS on services to be supported by ARCS	ARCS	Completed – ARCS Data Fabric plus cooperation with Authorisation Services
June 2008	Increased usage of ICI services based on defined usage metrics and number of users	All ARCS staff	Partially completed – increased use of ARCS Services; metrics now in place to track this
June 2008	Acceptance of project plans for NeAT projects	AeRIC, ARCS EC, ARCS	Nearly completed – will be completed October 2008

#### 4. Deviations from the Implementation Plan

There have been no significant deviations from the activities described in the ICI Implementation Plan with the exception of some underspending as outlined in Section 1.4 Financial Status. As explained in that Section this underspend of funds will be used for new initiatives in Service Delivery to meet evolving demands, for Marketing and Promotions and to off-set staff cost increases with CPI and Enterprise Bargaining increases over the funding period through to mid-2011.

#### 5. Discussion of Cash and In-kind Co-investment

The cash and in-kind co-investment has been implemented exactly as outlined in the Implementation Plan and the ARCS Business Plan 2008-09 and as expressed through the Budgets in each of those documents. The only variation has been the underspending referred to and explained above. The underlying financial model has not changed.

## Appendix A: ARCS Data Fabric Announcement



### Announcing the ARCS Data Fabric An easy to use data storage service, 9 May 2008

The ARCS Data Fabric is a simple production service allowing researchers, research groups, research organizations and research communities to store their data. In addition to the storage itself, it can also provide features useful for data collaboration, replication, and transfer and for building into other eResearch services as required.

#### What storage options are available and at what cost?:

- **Free storage of 25GB:** Researchers and/or research groups will be provided with their own free virtual storage of 25GB on request - (free storage quota may be reduced if demand becomes excessive);
- **Additional storage at hardware cost:** ARCS will also provide additional raw storage at hardware cost. Given current hardware costs and useful lifetimes of three years, ARCS expects to supply 3 years of storage for \$2,500 per Terabyte of RAID and \$1,000 per Terabyte of tape silo to researchers. Continuation beyond 3 years will be charged at the prevailing hardware cost.
- **Managed storage:** Additional managed services, e.g., enduring storage, archiving, backups, data replication etc can also be provided at the effective cost to ARCS. Information on costs will be provided on request.

#### What storage capabilities are available?:

- **ARCS storage:** ARCS will provide storage at a location within its members' facilities, however a user will be able to select a location if desired.
- **Easy to use desktop access:** There will be an easy to use desktop graphical interface to this storage as well as command line tools and a web interface.
- **Choice of location and replication:** ARCS will work with users to replicate or move their data within ARCS should data locality become important.
- **Data caching:** It will be possible to cache user's data in locations close to other resources to improve the performance of compute workflows.
- **Seamless integration with ARCS services:** The ARCS Data Fabric will integrate well with other ARCS services such as compute job submission.
- **Cooperation with ANDS:** There will be close cooperation between ARCS and ANDS (Australian National Data Service) in the operation of the ARCS Data Fabric so that it is tightly integrated with the services to be provided by ANDS.
- **Exemplars and use cases:** Examples and common use cases will soon be available on the ARCS web site [www.arcs.org.au](http://www.arcs.org.au).

**For further information on ARCS Data Fabric services and pricing please contact:** Stephen McMahon, ARCS Data Services Manager, 02 6125 0539, email: [data@arcs.org.au](mailto:data@arcs.org.au) or the ARCS Helpdesk [help@arcs.org.au](mailto:help@arcs.org.au) .

## Appendix B: Draft ARCS KPIs for 2008-09 Onwards

### ARCS Key Performance Indicators

#### ***Introduction***

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

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

#### ***Framework***

The Objectives identified in the ICI contract were to:

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

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

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

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

- Objectives 3 and 4 and qualities D and E to be measured by overall ARCS performance and user satisfaction measures, where evaluations may be sought from users and other service providers on an annual basis
- Objectives 1, 2 and 5, and qualities B and C to be measured through a set of service delivery and usage reports derived from ARCS operational data related to service use by identified user communities and research facilities
- Quality A to be measured by a survey of CEOs of NCRIS capabilities
- Quality F to be measured by an analysis of the extent of ARCS effort and the use of ARCS service that are related to data management and data resources

## ***Proposed KPIs***

### **Service performance**

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

Proposed Measures:

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

### **Developing eResearch**

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

Proposed Measures:

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

### **Strategic Alignment to NCRIS**

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

Proposed Measures:

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

### **Focus on Data**

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

Proposed Measures:

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

## **Appendix C: Performance Against Agreed Performance Indicators**

The Key Performance Indicators (KPIs) included in Appendix B are intended for use in the years 2008-09 onwards. However, as an indication of the way in which ARCS will respond to this future need for metrics the following pages show sample statistics currently available on the ARCS web site and which are being automatically harvested. This is a very preliminary response to the newly developed KPIs and the current data is indicative rather than definitive. The metrics will be continually refined and expanded as the year progresses, but the present examples illustrate how we propose to collect data that can be automatically captured. ARCS Marketing and Outreach activities will be used as a means to collect other more subjective data.

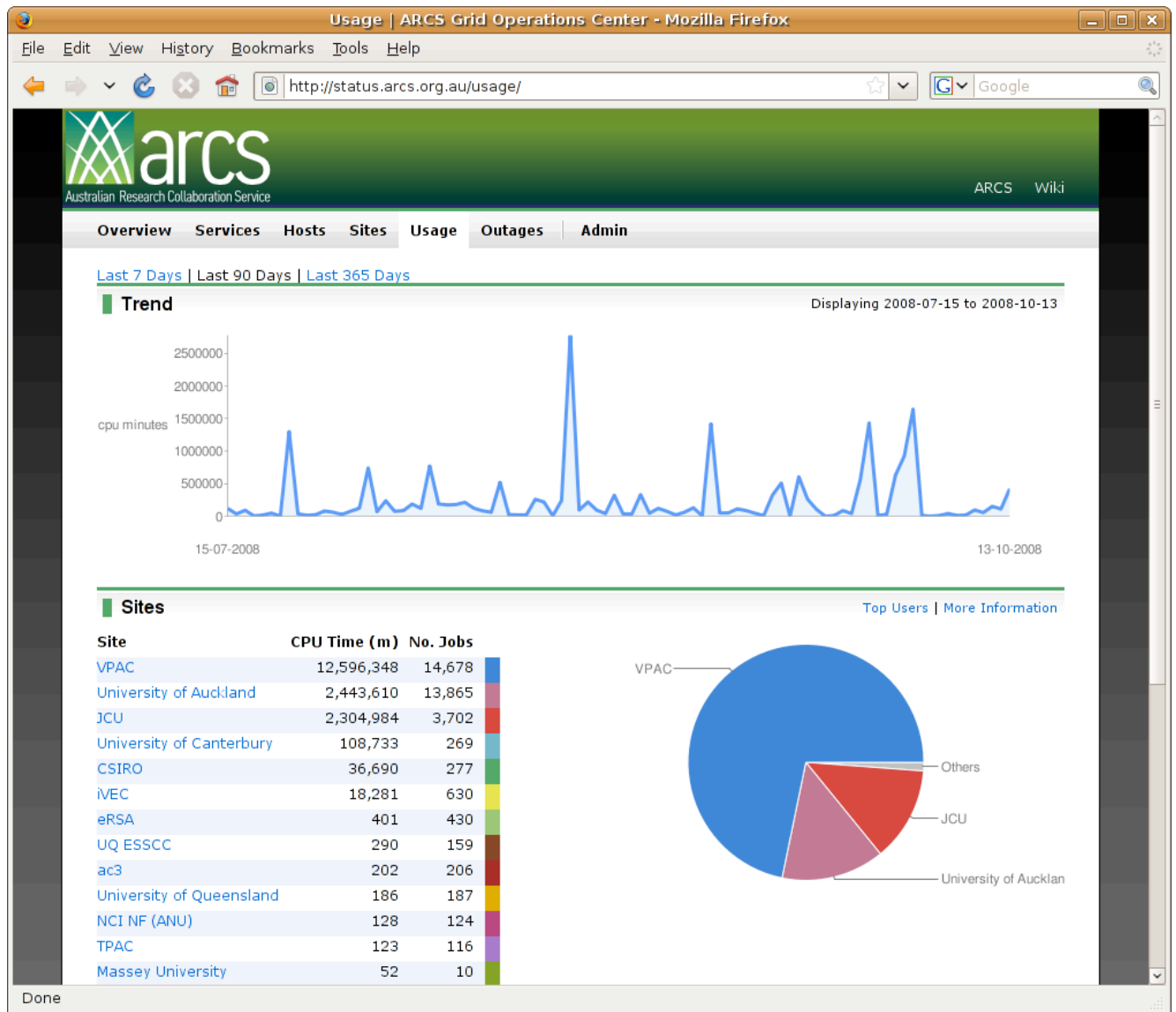
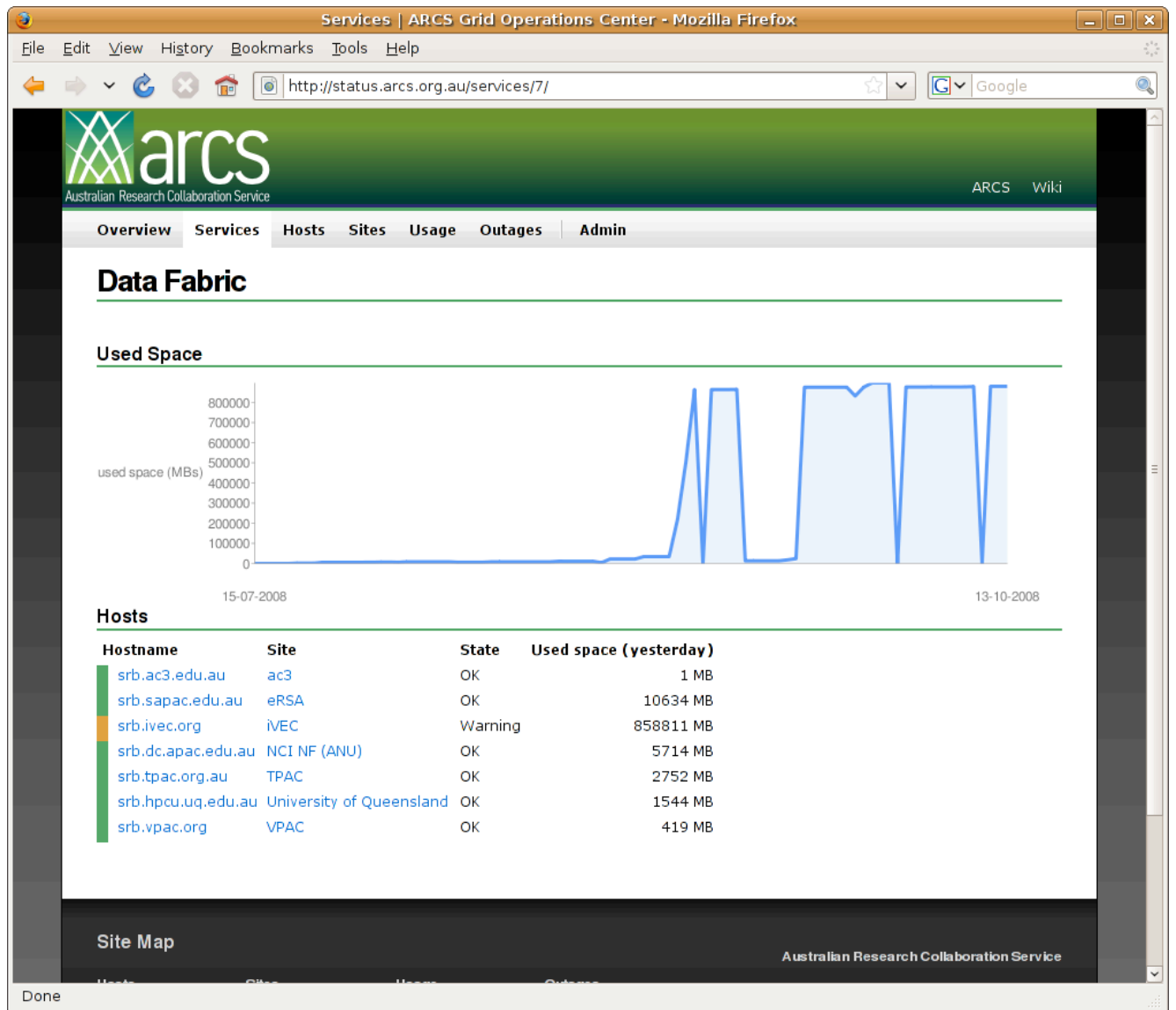
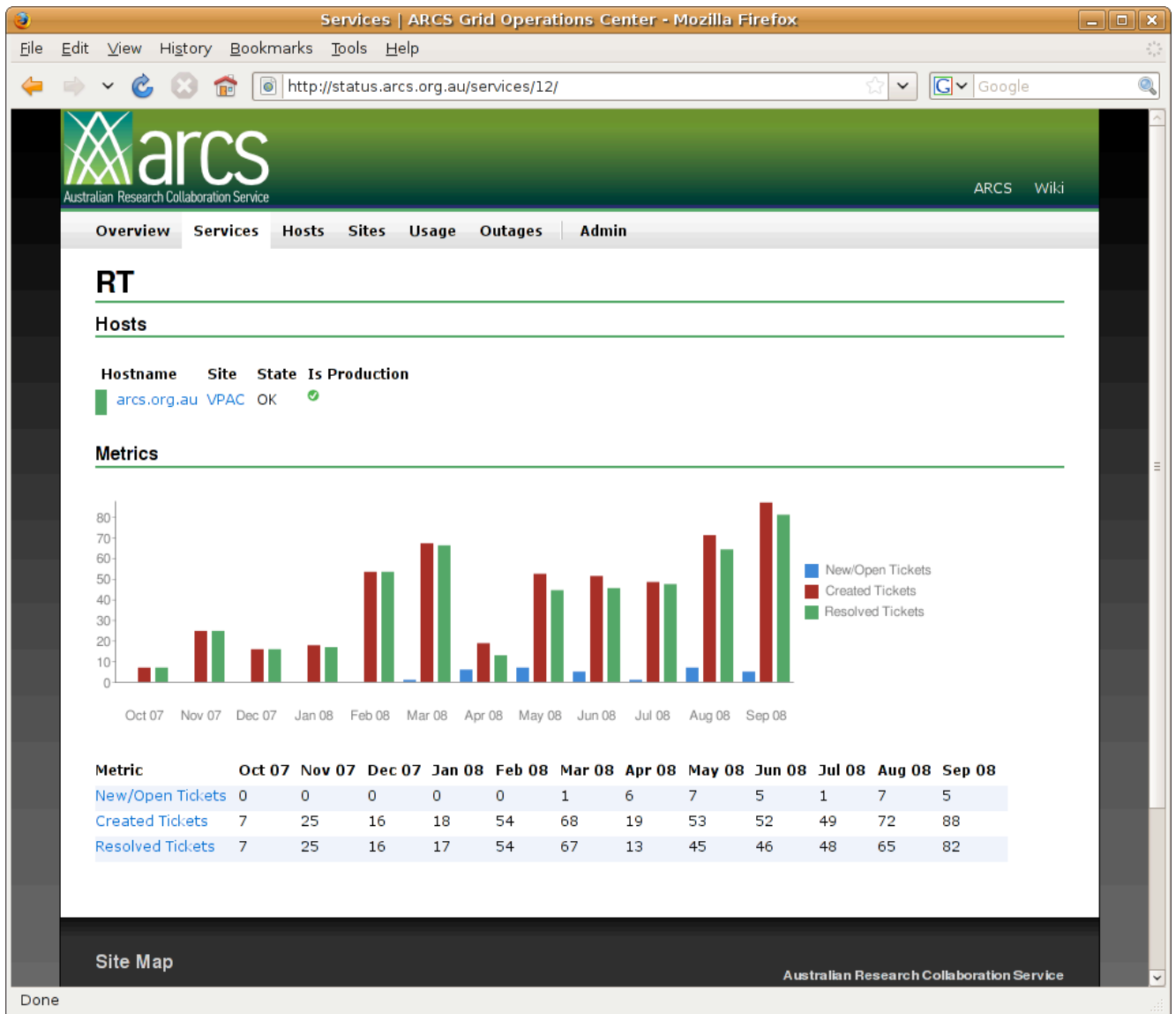


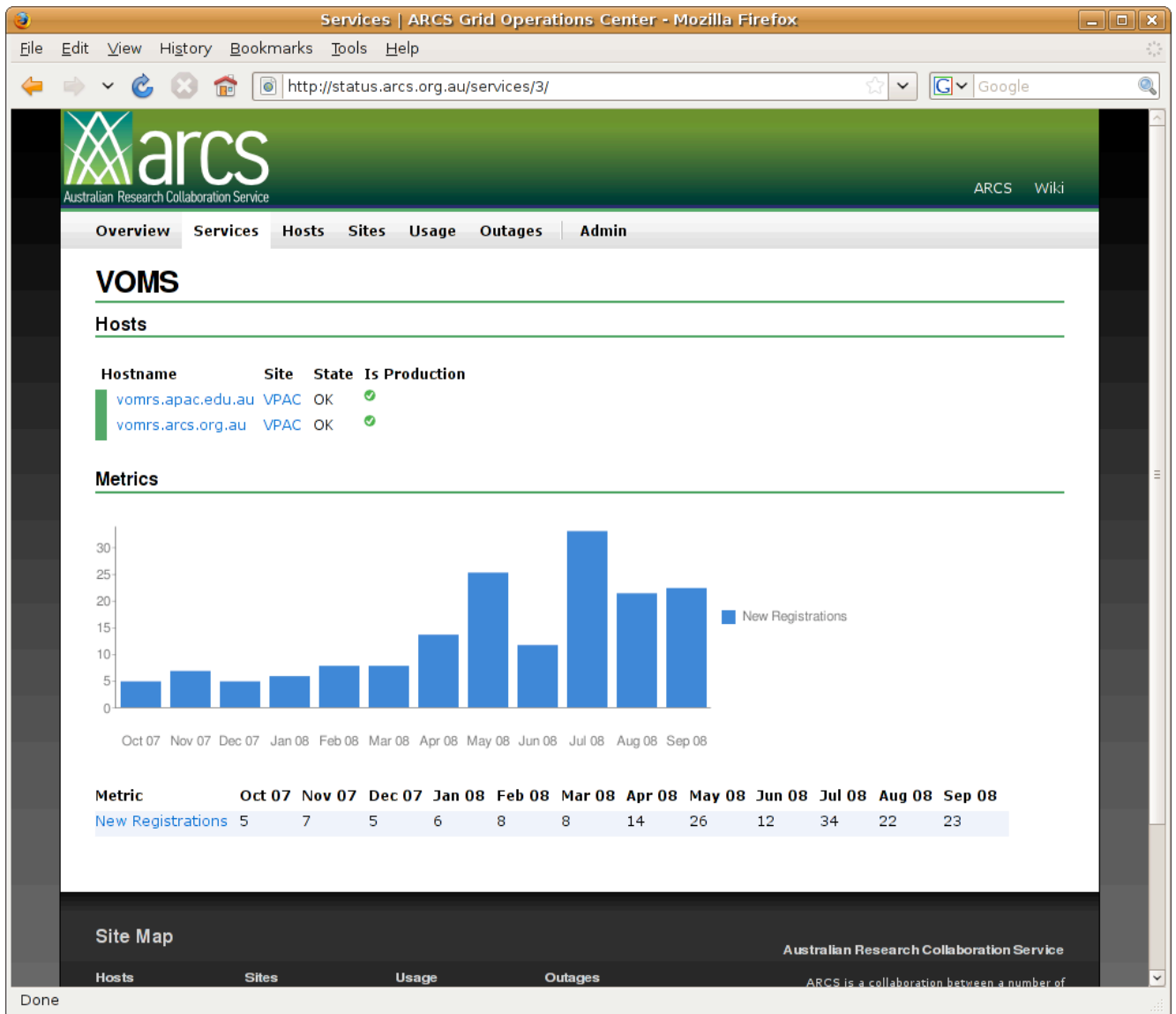
Illustration of a new tool for tracking ARCS Grid usage with some preliminary data for a recent three month period of grid compute use. The High-Performance Computing (HPC) Grid usage page of the Grid Operations Centre (GOC) shows a graph for the cumulative usage of the grid in CPU minutes over a period of three months (top), an overview of the grid sites with their respective usage in CPU minutes and number of executed compute jobs (bottom left) and a graphical representation of the individual sites' contributions to the cumulative usage (bottom right pie-chart).



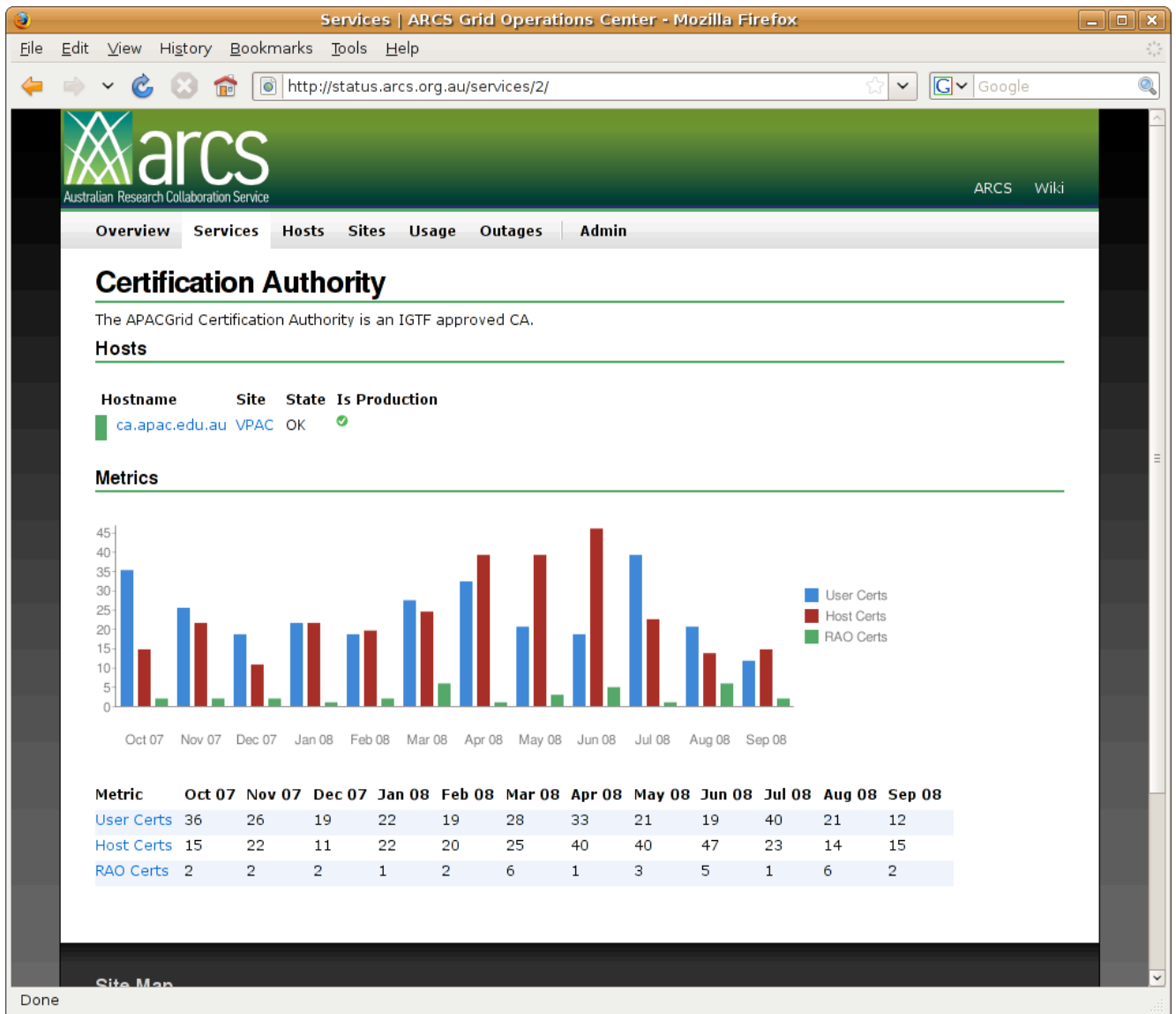
Recent ARCS Data Fabric usage statistics to illustrate data tracking to be employed. The GOC's ARCS Data Fabric page shows the a graph of the data volume (in MB) stored in the Data Fabric over the last three month (top) and an overview of the individual Data Fabric nodes with their current status and stored data volume (bottom).



Summary of Helpdesk RT system requests over an approximate 12 month period. The HelpDesk/Request Tracker (RT) page shows the status if the RT system (top) a graphical (middle) and numerical (bottom) representation of the number of new/open, created and resolved tickets that occurred on the RT each month over the last 12 months.



Statistics for the Virtual Organisation Management Systems (VOMS) usage over approximately 12 months. Belonging to a Virtual Organisation (VO) allows a user the authorisation rights that are automatically granted through that membership, e.g., the right to submit a grid job as allowed by that VO. The usage page for the VO shows the status of the host systems (top) and a graphical (middle) and numerical (bottom) representation of the newly registered VOMS users each month over the last 12 months.



Statistics for the APAC Certificate Authority over approximately 12 months. Certificates are used on the ARCS Grid to allow an authorised user to access computing and data resources at one or more Service Providers (SP). The Certification Authority page displays the status of the hosting system (top) and a graph (middle) and table (bottom) showing the number of newly issued User, Host and RAO certificates issued each month over the last 12 month.

## **Appendix D: Confidential Information**

There is no confidential information to report.

## **Appendix E: Audited Financial Statements**

**AUSTRALIAN RESEARCH COLLABORATION SERVICES**

**INTEROPERATION COLLABORATION INFRASTRUCTURE**

**FINANCIAL STATEMENTS**

**FOR THE PERIOD ENDED 30 JUNE 2008**

**AUSTRALIAN RESEARCH COLLABORATION SERVICES  
INTEROPERATION COLLABORATION INFRASTRUCTURE  
NOTES TO AND FORMING PART OF THE FINANCIAL  
STATEMENTS  
FOR THE YEAR ENDED 30 JUNE 2008**

NOTE 1 – STATEMENT OF SIGNIFICANT ACCOUNTING POLICIES

- (a) This financial report is a special purpose financial report prepared for use by Victorian Partnership for Advanced Computing Ltd (VPAC) as lead agency under a funding agreement with Commonwealth Department of Education, Science and Training for funding the implementation of an Interoperation and Collaboration Infrastructure. VPAC has determined that the entity is not a reporting entity.

The financial report has been prepared in accordance with the requirements of the following Australian Accounting Standards:

- AASB 1031 Materiality; and
- AASB 110 Events after the Balance Sheet Date.

No other Accounting Standards, Australian Accounting Interpretations or other authoritative pronouncements of the Australian Accounting Standards Board have been applied.

The financial report is prepared on an accruals basis and is based on historic costs and does not take into account changing money values or, except where specifically stated, current valuations of non-current assets.

The following specific accounting policies, which are consistent with the previous period unless otherwise stated, have been adopted in the preparation of this report.

- (b) REVENUE RECOGNITION

Government grants are recognised when effective control passes to the project. Generally, this will be on receipt of the grant funds as the project expects that all grant funds will be applied for the purposes of the project, the conditions of the grant have been and will continue to be satisfied and it is not likely that the project will be required to refund grant monies for any purpose.

- (c) REPORTING PERIOD

This is the first financial report for the project. The funding agreement was signed on 22 June 2007 and the first grant funds were received on 9 July 2007. Accordingly, this financial report is for the year ended 30 June 2008, and no comparative information exists.

**AUSTRALIAN RESEARCH COLLABORATION SERVICES**

**INTEROPERATION COLLABORATION INFRASTRUCTURE**

**VPAC DIRECTOR AND CHIEF EXECUTIVE OFFICER DECLARATION  
AND CERTIFICATION**

Victorian Partnership for Advanced Computing Ltd (VPAC), as the lead agency for the project has determined that the entity is not a reporting entity and that this special purpose financial report should be prepared in accordance with the requirements of the funding agreement with the Commonwealth Department of Education, Science and Training for Implementing an Interoperation and Collaboration Infrastructure for the National Collaborative Research Infrastructure Strategy's Research Capability known as 'Platforms for Collaboration'.

VPAC declares that:

1. The financial statements, comprising the income statement, balance sheet and notes to and forming part of the financial statements, present a true and fair view of entity's financial position as at 30 June 2008 and its performance for the year ended on that date in accordance with the accounting policies described in Note 1 to the financial report; and
2. In the opinion of the governing body, there are reasonable grounds to believe that the entity will be able to pay its debts as and when they become due and payable.

In addition, VPAC certifies that, except for unspent funds, all funding received to date has been expended for the project in accordance with this agreement.

This declaration and certification is made by:

SIGNED		SIGNED
Prof Anthony Williams		Bill Appelbe
EXECUTIVE DIRECTOR		CHIEF EXECUTIVE OFFICER
Dated this                      day of September 2008		

**AUSTRALIAN RESEARCH COLLABORATION SERVICES  
INTEROPERATION COLLABORATION INFRASTRUCTURE  
INDEPENDENT AUDITOR'S REPORT  
FOR THE YEAR ENDED 30 JUNE 2008**

**Report on the Financial Report**

We have audited the accompanying financial report, being a special purpose financial report, of Australian Research Collaboration Services – Interoperation Collaboration Infrastructure (the project), which comprises the balance sheet as at 30 June 2008, and the income statement for the year then ended and a summary of significant accounting policies and the director's and chief executive officer's declaration and certification.

*Directors' Responsibility for the Financial Report*

The directors and chief executive officer of Victorian Partnership for Advanced Computing Ltd (VPAC) as lead agency for the project are responsible for the preparation and fair presentation of the financial report and have determined that the accounting policies described in Note 1 to the financial statements, which form part of the financial report are appropriate to meet the financial reporting requirements of the funding agreement. VPAC's responsibilities also include establishing and maintaining internal control relevant to the preparation and fair presentation of the financial report that is free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

*Auditor's Responsibility*

Our responsibility is to express an opinion on the financial report based on our audit. No opinion is expressed as to whether the accounting policies used, as described in Note 1, are appropriate to meet the requirements of the funding agreement. We conducted our audit in accordance with Australian Auditing Standards. These Auditing Standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial report.

The financial report has been prepared for distribution to the Commonwealth Department of Education, Science and Training for the purpose of fulfilling the financial reporting obligations under the project's funding agreement. We disclaim any assumption of responsibility for any reliance on this report or on the financial report to which it relates to any person other than the members, or for any purpose other than that for which it was prepared.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

**AUSTRALIAN RESEARCH COLLABORATION SERVICES  
INTEROPERATION COLLABORATION INFRASTRUCTURE  
INDEPENDENT AUDITOR'S REPORT (CONT'D)  
FOR THE YEAR ENDED 30 JUNE 2008**

*Independence*

In conducting our audit, we have complied with the independence requirements of the Australian professional ethical pronouncements.

*Auditor's Opinion<sup>1</sup>*

In our opinion, the financial report presents fairly, in all material respects the financial position of Australian Research Collaboration Services – Interoperation Collaboration Infrastructure (the project) as of 30 June 2008 and of its financial performance for the year then ended in accordance with the accounting policies described in Note 1 to the financial statements.

WHK DAY NEILSON

Ross Fraser  
Principal (Registered company auditor)

Signed at Melbourne, this                      day of September 2008.

---