

ITEM 2 – SCOPE AND VISION

Following is a summary of activities relevant to capability 5.16 that have been or are currently being conducted/supported through the EST portfolio, namely:

- Australian Research and Education Network (AREN)
- Review of the Australian Partnership for Advanced Computing (APAC)
- SII FRODO and MERRI projects
- New 2006 Systemic Infrastructure Initiative (SII) projects
- Copyright Reform
- e-Research Coordinating Committee
- PMSEIC Data for Science Working Group.

AUSTRALIAN RESEARCH AND EDUCATION NETWORK (AREN)

- The SII has provided \$84 million to date to help build the AREN, one of the largest and most advanced fibre optic research and education networks in the world.
- The AREN is operated and managed by AARNet. AARNet, the Universities, CSIRO and several state governments or agencies have invested substantially in the network.
- The AREN provides a national high bandwidth backbone with significant international links for Australian universities and the wider research community. Operating as AARNet3, the network spans the country, connecting universities and research institutes in all capital cities and many regional centres, as well as isolated research facilities such as radio telescopes. Typically, the inter-capital city backbone is 10 gigabit per second (Gbps) (except from Brisbane to Townsville where a 2.5 Gbps link exists). An increasing number of major campuses and research facilities are connected at 1 Gbps.
- The network also has a huge international footprint with high bandwidth links to Europe, Asia, Fiji, Hawaii and the US west coast, connecting to the major research and education networks of the world.
- The most recent development is the signing of contracts to establish the Mitchell link fibre optic link (Sydney-Lithgow-Bathurst-Orange-Dubbo) through a joint venture involving the NSW Government, Soul Communication, Charles Sturt University (CSU) and AARNet. In addition to providing the backbone links for the NSW Government network, it will provide dark fibre which AARNet will light to serve CSU campuses at Orange and Bathurst. The link also provides further redundancy for AARNet's NextGen network.
- There is significant potential for schools and TAFE institutes to use this publicly funded infrastructure. DEST is in discussion with schools and TAFE jurisdictions and AARNet to explore opportunities for closer collaboration between the sectors and to provide better access to educational content available across the AARNet3 and the international research and education networks it peers with.
- Further detail is at **Attachment A**.

**REVIEW OF THE AUSTRALIAN PARTNERSHIP FOR ADVANCED COMPUTING
(APAC)**

- The review of APAC forms part of the Government's normal evaluation process. As well as satisfying accountability requirements, it aims to evaluate APAC's achievements to date against agreed milestones and inform future government investments in advanced computing, data management, grid infrastructure and services. It will assist in assessing future demand for advanced computing, data management and grid infrastructure and services arising as a consequence of additional investments in research infrastructure made through NCRIS.
- The Review Panel is to be chaired by Professor Lance Twomey, former Vice-Chancellor of Curtin University. The other members of the Panel are:
 - Dr George Collins, Chief of Research, ANSTO;
 - Professor Ah Chung Tsoi, Head, Monash University e-Research Centre;
 - Professor Chris Barter, former Head, Computer Science, University of Adelaide;
 - Professor Michael Levine, Scientific Director, Pittsburgh Supercomputing Centre, Pittsburgh, USA;
 - Dr Daniel Reed, Vice-Chancellor of Information Technology Services, the University of North Carolina at Chapel Hill, USA.
- The Panel has been asked to provide an interim report to DEST in **late September 2006**, and its final report by the **end of October 2006**. The Department will refer the interim report to the NCRIS Committee to inform its consideration of an appropriate level of investment of NCRIS funding in advanced computing, data management, grid infrastructure and services before it makes a recommendation to the Minister.
- To assist the Review Panel in its deliberations, and on behalf of the Chair (who is currently overseas), DEST has invited APAC and its partners to provide their views by 15 August 2006. The Panel will also take account of the views of the wider research community, including those communities formulating proposals for funding under the nine NCRIS capabilities for which investment plans are currently being developed.

SII FRODO AND MERRI PROJECTS

Managing And Integrating Large Data Sets

BlueNet: The Australian Marine Science Data Network

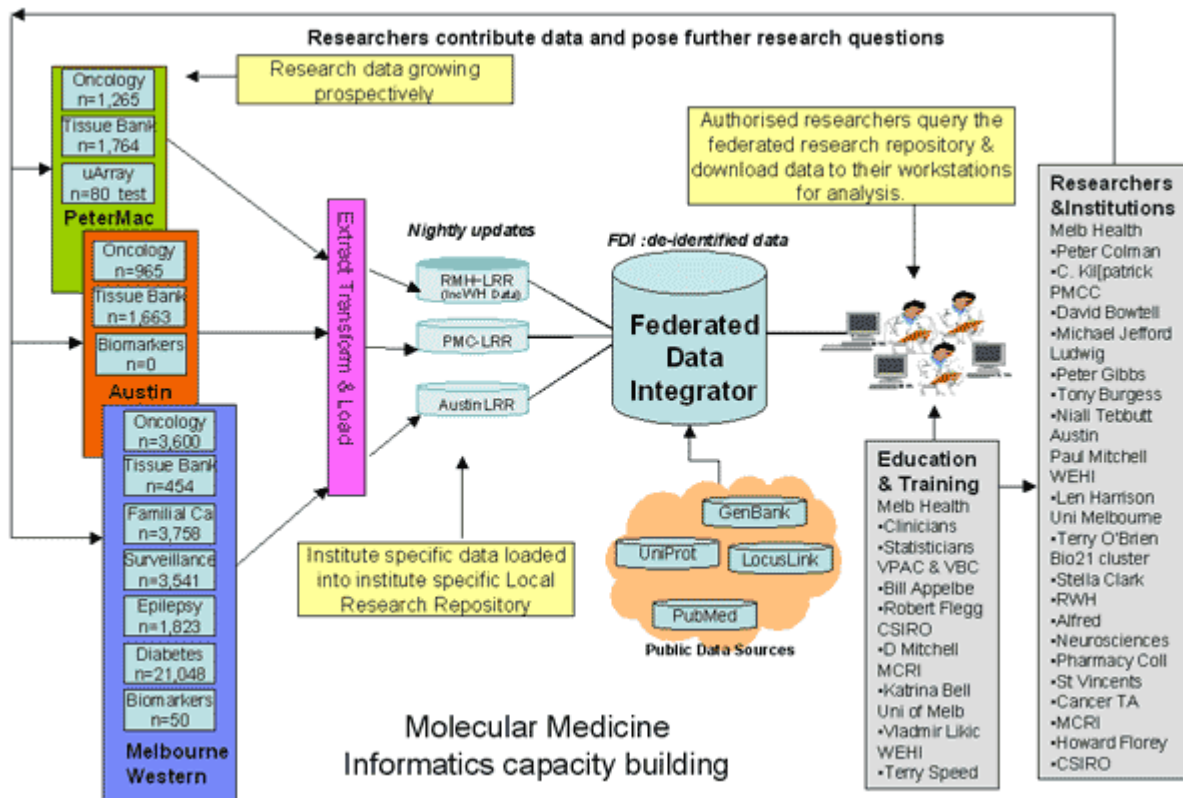
<u>Lead Institution:</u>	University of Tasmania
<u>Partners:</u>	University of Sydney, University of Melbourne, University of Queensland, University of Western Australia, Flinders University, University of Adelaide, James Cook University, Australian Partnership for Advanced Computing
<u>Contact:</u>	Kate Roberts (03) 6226 2873
<u>Web:</u>	http://www.bluenet.org.au/index.html
<u>Link with NCRIS capabilities:</u>	5.12 Integrated Marine Observing System

- BlueNet will provide a highly distributed archiving facility to support the long term data curation requirements of Australia's marine science researchers. It will link vast data repositories and marine resources that currently reside in individual academic institutions and government agencies in Australia and overseas.
- One third of Australia 's marine R&D is undertaken by publicly funded Australian government agencies, and the remaining two thirds is carried out by state/local government and academic institutions. For Australia to maximise current and past investments in marine R&D it is imperative that, as a nation, research data are made more widely available, are more readily discoverable, and that we curate and provide access to these data in a way that more seamlessly permits its re-use. Presently, three quarters of the Australia's marine science data is contained in individual universities and not accessible to the wider researcher community.
- BlueNet will build infrastructure to enable the discovery, access and online integration of multi-disciplinary marine science data on a very large scale to support current and future marine science and climate change research, ecosystem management and government decision making. The objectives of the BlueNet project are to:
 - Extend and enhance the existing marine science information infrastructure being developed to support the functions of the Australian Ocean Data Centre Joint Facility (AODCJF), enabling universities and other non-government agency groups to join and extend the collaborative network;
 - Build a vast, on-line federated repository of marine science data that is available to support current and future marine science research, ecosystem management and government decision-making;
 - Provide a distributed archiving facility to support the long-term marine data curation requirements of the university sector and Australia 's marine science researchers; Demonstrably add significant value to both Australia 's higher education and marine research sector.

Molecular Medicine Informatics Model: A Multi-Institutional, Multi-disciplinary Research and Training Platform for Clinical Research (MMIM)

Lead Institution: University of Melbourne
Partners: Victorian Partnership for Advanced Computing (VPAC), Multiple Hospitals and Medical Institutions affiliated with the Universities of Melbourne, Monash University and the University of Tasmania.
Contact: Marianne Hibbert (03) 9342 7066
Web: <http://mmim.ssg.org.au/>
Link with NCRIS capabilities: 5.7 Population health and clinical data linkage

- The MMIM platform provides clinical researchers access to data from disparate existing databases across multiple disease types at multiple institutions, co-located in a virtual repository, which can be linked with publicly available research and genetic profiling data. The MMIM provides a flexible and secure method for interrogating the multiple data sources, where 80,000 records of patient data is record-linked across all databases and institutions. Researchers can extract sub-sets of data, transform where required and test hypotheses using their own analytical tools. The data is extracted nightly from all source databases where it is mapped into the Bio21: MMIM local repositories, adhering to subject area standards where appropriate. It provides a flexible way of adding new data sources, with a “plug-in” facility, and, as research requirements change with new discoveries, it has the flexibility to evolve and expand accordingly.



TimeSync: Mapping the Global Financial System

<u>Lead Institution:</u>	University of New South Wales
<u>Partners:</u>	ANU, Australian Stock Exchange, Macquarie University, Reuters LLC and National Electricity Market Management Company
<u>Contact:</u>	Michael Briers (02) 9236 9117
<u>Web:</u>	http://www.sirca.org.au/
<u>Link with NCRIS capabilities:</u>	N/A

- TimeSync will provide real time solutions for research organisations and provide flow on benefits to financial and business organisations that need to manage and synchronise massive data transfers within secure environments. The project will develop best practice e-Research principles for data security and sustainability of time critical data using data from the Reuters financial databases in the UK, and moving this over the education and research networks to Australia and to the APAC centre at the Australian National University.
- The main outcome of the project will be the establishment of a world leading and vibrant financial services research and innovation hub. Specific outcomes will include:
 - Growth in size, scope, quality and impact of research, through access to a broad integrated data repository;
 - Growth in number and quality of researchers using the facility, through increased ease of access whilst preserving data security;
 - Growth in the quality and number of students/graduates available to the financial services sector;
 - Increased reliability and integrity of the underlying databases;
 - The development of robust processing systems, enabling researchers to have near to real-time access to deep history databases;
 - The combination of skills developed in a range of government sponsored research initiatives which providing synergistic outcomes;
 - Raising Australia's profile in financial services research and innovation;
 - Establishment of a viable international university subscription model, leading to increased levels of international research collaboration; and
 - Growth in research and innovation activities, and in particular providing a foundation for opportunities for commercialisation of the IP developed from use of the infrastructure.

Technical Development and Deployment Projects

Australian Service for Knowledge of Open Source Software (ASK-OSS)	
<u>Lead Institution:</u>	Macquarie University
<u>Partners:</u>	Oxford University, Open Source Industry Association and Open Source Law
<u>Contact:</u>	Ray Warouw (02) 9850 7852
<u>Web:</u>	http://ask-oss.mq.edu.au/
<u>Link with NCRIS capabilities</u>	Relevant as a service to all capabilities

- ASK-OSS provides unbiased, pragmatic advice/guidance to researchers on: selection of appropriate OSS for research; choosing appropriate OSS licenses; management/governance for OSS development; and a national service for storage and community development of OSS. Open source software is now the primary basis for most e-Research analysis and computation. The storage of complex E-Research raw data is no longer the only challenge; analysis and compute software is of equal or greater importance. ASK-OSS provides a national focal point for advice on open source software for research effectiveness as computation and analysis, particularly to support e-research, become more complex.
- The outcomes of the ASK-OSS project include:
 - Increasing the understanding of OSS issues in relevant Government organisations, and within appropriate sections of the research community
 - Building capacity in the development, management and governance of OSS for research, and by extension to other areas of OSS adoption (such as the wider education sector)
 - Assistance through education the reduction in “missteps” related to open source software, particularly in selection of appropriate open source licenses.

Middleware Action Plan and Strategy (MAPS)

<u>Lead Institution:</u>	University of Queensland
<u>Partners:</u>	Macquarie University, Monash University, ANU, CAUDIT, CAUL, AARNet, GrangeNet
<u>Contact:</u>	Nick Tate (07) 3365 3521
<u>Web:</u>	http://middleware.edu.au/
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- The MAPS project will identify the software and services (middleware) that are currently being used in Australia to link applications across a range of resources on networks and computer systems in Australian universities. 'Middleware' is a set of common software and services designed to connect people to a range of resources in distributed environments. These resources include major research facilities, information and communications technology infrastructure, data repositories, and other resources that support e-research, scholarly communication, and e-learning. The MAPS project will identify areas of activity in the university and research sectors, and use these results to tap into the expertise across the sector to build a strategic plan of activities and projects for an Australian collaborative middleware strategy. This project will enable other projects to leverage off common infrastructure and focus on providing new services that can be shared across the education and research sectors.
- The MAPS project is working to:
 - identify middleware activity that has so far been undertaken within the Australian research and higher education sector;
 - identify international middleware activity and best practices that could benefit Australia;
 - commission position papers from domain experts within a number of domains of middleware activity;
 - develop a draft roadmap for middleware activities to support research and higher education in Australia;
 - disseminate the draft roadmap widely and seek feedback from the sector;
 - produce a completed roadmap and action plan.

Open Access to Knowledge Law Project (OAK Law)

<u>Lead Institution:</u>	Queensland University of Technology (QUT)
<u>Partners:</u>	NICTA, ANU, UNE, UNSW, University of Wollongong, Charles Darwin University, ODRL Initiative, Earlham College, Stanford University, Creative Commons, University of Melbourne (Intellectual Property Research Institute of Australia (IPRIA) and Centre for Media and Communications Law (CMCL)).
<u>Contact:</u>	Professor Brian Fitzgerald bf.fitzgerald@qut.edu.au
<u>Web:</u>	http://www.oaklaw.qut.edu.au
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- Extraordinary technical advances in our capacity to disseminate and share the results and outputs of publicly funded research have not been matched by the required changes in legal and contractual arrangements.
- The OAK Law project responds to the growing trend to share knowledge as a form of promoting innovation through collaborative research. The OAK Law project aims to clarify issues involving copyright management (particularly licensing) in an “open access” environment in which people and institutions are willing and wanting to share knowledge in a seamless manner. To this end the project will develop protocols for managing copyright issues in an open access environment and investigate provision and implementation of a rights expression language for implementing such protocols at a technical level.
- The project will produce:
 - Nationally and internationally applicable legal protocols based on the Creative Commons model that can be used to facilitate open access to copyright material;
 - Legal solutions in the form of guidelines on best practice models for managing copyright issues in open access environments e.g. where further commercial publication is expected — E-Prints model;
 - A Rights Expression Language (REL) that can be used to technologically enhance open access;
 - An application of the legal protocols and solutions and REL to existing and proposed repositories.

Technical Interoperability and Accessibility Projects

DART - Dataset Acquisition, Accessibility, and Annotation e-Research

Technologies

<u>Lead Institution:</u>	Monash University
<u>Partners:</u>	James Cook University, CRC for Enterprise Distributed Systems Technology, University of Queensland
<u>Contact:</u>	Andrew Treloar (03) 990 53024
<u>Web:</u>	http://www.dart.edu.au/
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- The DART project is working to support and enable researchers, end-users, and appropriate computer systems to manage the creation and collection of data and to gain greater access to data and documents by gathering, managing and archiving data and documents and managing their access so that researchers are more easily able to perform their work and do so at a much higher level of insight and productivity than was previously possible, and so that the Australian public has greater visibility of, and access to, publicly funded research.
- The DART project will undertake a coordinated program of e-Research requirements analysis, software development, policy and guideline creation and prototyping to investigate how best to:
 - collect, capture and retain large data sets and streams from a range of different sources;
 - deal with the infrastructural issues of scale, sustainability and interoperability between repositories;
 - support deposit into, access to, and annotation by a range of actors, to a set of digital libraries which include publications, datasets, simulations, software and dynamic knowledge representations;
 - assist researchers in dealing with intellectual property issues during the research process; and
 - adopt next-generation methods for research publication, dissemination and access.

ARROW - Australian Research Repositories Online to the World

<u>Lead Institution:</u>	Monash University
<u>Partners:</u>	Swinburne University of Technology, UNSW, National Library of Australia
<u>Contact:</u>	David Groenewegen (03) 9905 4563
<u>Web:</u>	http://arrow.edu.au/
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- The ARROW project is developing a national research resource discovery service using metadata harvested from participating institutional repositories. The ARROW Project is also exposing metadata to provide services via protocols, toolkits and software solutions to support best-practice institutional repositories comprising e-prints, digital theses and electronic publishing. The solutions developed are open-standards based and facilitate interoperability within and between participating institutions. A wide range of digital content types including images, text and sounds are being managed in these repositories.
- As other institutions move to develop their institutional repositories, the ARROW project will provide advice on how to proceed and how to ensure that the material stored can be made discoverable and usable. In addition, the ARROW project is also working to create tools that will make institutional reporting for the RQF more efficient and effective. Through the growing repository users/developers community, the ARROW project is providing the means through which the community is able to learn from the experience of others and plan for emerging technical and cultural challenges and opportunities.
- As part of this work, the ARROW project has built up a number of key partnerships with relevant bodies and projects across Australia and the rest of the world. Some of these relationships have already resulted in improved functionality and usefulness for the existing repositories. Others have created greater understanding and theoretical knowledge that is only now becoming ready to be implemented. Some relationships need ongoing involvement by ARROW to ensure that our future needs can be met.

Australian Partnership for Sustainable Repositories (APSR)

<u>Partners:</u>	National Library of Australia, University of Queensland, University of Sydney, APAC, University of Melbourne, UTS
<u>Lead Institution:</u>	Australian National University
<u>Contact:</u>	Adrian Burton (02) 6125 6659
<u>Web:</u>	http://www.apsr.edu.au
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- The APSR Project is establishing a centre of excellence for the management of scholarly assets in digital format. It has an overall focus on the critical issues of the access continuity and the sustainability of digital collections. Building on a base of demonstrators for digital continuity and sustainability embedded in developmental repository facilities within partner institutions, the APSR project will contribute to national strength in this area by encouraging the development of skills and expertise and providing coordination throughout the sector. It will actively provide international linkages and national services.
- The University of Sydney Library is working with the APSR partners in developing a set of guidelines to assist repository planning, creation and management. A variety of presentation approaches is required to allow choice and flexibility in the browsing and retrieving of the mountains of available information. Where some people might feel comfortable doing a free search of the information, others may prefer answering a series of questions to narrow down the scope or empathising with scenarios that describe real-life situations.
- An example of APSR's contribution is the Sustainability Guidelines for Australian Repositories (SUGAR) which will provide an online information service for people seeking guidance on digital sustainability issues. The guidelines, drawing on international best practice, will be developed as a prototype and tested with reference to digital repository projects within and beyond the University of Sydney. The underlying data management system will be sufficiently flexible to enable presentation of content through a variety of models and scenarios. The service will include advice and link to sources on topics such as project planning, costs, digital conversion standards and processes, legal and copyright issues, metadata schemas and modes of access.

Australian Digital Theses Project

<u>Lead Institution:</u>	University of New South Wales
<u>Partners:</u>	CAUL, University of Melbourne, University of Queensland, University of Sydney , ANU, Curtin University of Technology, Griffith University
<u>Contact:</u>	Howard Amos (02) 9385 3965
<u>Web:</u>	http://adt.caul.edu.au/adtariic.html
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- Completed in 2006, the Australian Digital Theses (ADT) project has established a distributed database of digital versions of theses produced by the postgraduate research students at Australian universities. With the inclusion of metadata tags in the documents which are given a higher weighting by the more sophisticated search engines, 150,000 theses are available worldwide via the web; 6000 of which are full-text available. This number is growing rapidly as more researchers are depositing their works in accessible repositories. In addition, several institutions in New Zealand have also joined the project. The ADT program is designed to improve access to, and enhance transfer of, the research information contained in theses by providing a full text version available from the desktop via the web. The ADT also provides a new model for deposit and archiving of theses that takes into account the tools and technologies that students are now using to prepare their theses.
- The program has two major components, digitisation of theses as part of the deposit process and the digitisation of a selected number of frequently requested existing theses. As each University is responsible for maintaining an archival copy of the theses of their own institution, each participant in the program will mount their own theses on a server located in their respective institution. The participants will use the same database configuration, standards and metadata system to ensure compatibility. The document format will be Adobe Acrobat Portable Document Format (PDF) ensuring that the data is independent of the platform on which it is created. Adobe PDF ensures that a high quality printed version can be provided if needed. Acrobat is relatively easy to use, with a high quality free reader readily available. PDF has also become an electronic publishing standard.

E – Security Framework for Research

<u>Lead Institution:</u>	University of Queensland
<u>Partners:</u>	Macquarie University, CAUDIT, APAC, AARNet
<u>Contact:</u>	Nick Tate (07) 3365 3521
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- This project is establishing an E-Security framework which integrates different two types of security systems, Public Key Infrastructure (PKI) and Shibboleth, to foster collaboration and enable the secure sharing of resources and research infrastructure within Australia and with international partners. The project leverages off existing work in both areas, building on the advantages of these different systems and creating a platform to enable the secure sharing of resources and research infrastructure.
- Secure access and the authentication and authorisation of researchers, who access services and infrastructure across global networks, are fundamental building blocks for e-research. The E-Security framework is developing solutions that address these issues as well as a system where a researcher can get information from another university, without having to use different security measures to access it.
- The E-Security Framework has four main objectives:
 - Build upon the existing Public Key Infrastructure (PKI) standards project and move PKI into production for the Higher Education and Research Sector.
 - Build upon the existing PKI and MAMS projects and the Production PKI project to develop models and pilot implementations of a common trust federation which would support both PKI and Shibboleth and therefore support a common approach to authentication and authorisation across the sector.
 - Reduce the barriers for entry to PKI for all universities and research institutions by providing cost effective access to a free or low cost Certificate Management System for the sector (including access to the source code).
 - Investigate the requirements and develop appropriate technologies to allow the APAC Grid infrastructure to become properly Shibboleth aware. It will provide opportunities for research activities in high-performance computing and large-scale data initiatives to test the functionality and scalability of the Shibboleth authentication architecture and associated authorisation architectures being developed by groups such as PERMIS.

Regional Universities Building Research Infrastructure Collaboratively (RUBRIC)

<u>Lead Institution:</u>	University of Southern Queensland (USQ)
<u>Partners:</u>	UNE, University of the Sunshine Coast, University of Newcastle, Massey University (NZ). Projectis a joint initiative between DEST and the UK JISC (Joint Information Systems Committee).
<u>Contact:</u>	Associate Professor Alan Smith (07) 4631 2296
<u>Web:</u>	http://rubric.edu.au
<u>Link with NCRIS capabilities</u>	Relevant to all capabilities

- Regional universities often face different challenges to larger institutions in developing information management infrastructure. At the same time, these smaller universities may have some advantages over larger institutions through their greater agility for adopting innovations with less bureaucracy. The RUBRIC partners recognize the need to keep pace with larger institutions in building appropriate infrastructure to support research and allied educational processes. Repository infrastructure becomes a core mechanism to support a University's research mission. It brings a responsibility to manage levels of access management, a scrutiny of content retained for the purpose of establishing collection development policies, retrieval, re-use and federation of objects and to explore links between repository content and full text sources. For smaller organizations these are significant areas of specialty where a collaborative approach is of considerable benefit, if not strategically vital.
- The RUBRIC Project aims to meet the needs of smaller and regional universities by developing sustainable infrastructure for the deployment of best practice emerging from the SII first round projects known as FRODO (Federated Repositories of Digital Objects) and other projects funded in the second round known as MERRI (Managed Environments for Research Repository Infrastructure).
- The project aims to achieve the following outcomes for its partners:
 - Adopt "best practice" emerging from the FRODO projects to be able to contribute regional experiences to debate in the Australian context;
 - Provide a centralized base for assistance to RUBRIC partners, which are generally smaller regional organizations with limited resources;
 - Set up a first generation solution for all partners (or second generation for partners with some existing experience, such as USQ);
 - To build a central resource for investigating, researching and making recommendations on IR developments - where issues can't be resolved, they will at least be documented and thrown open for debate;
 - Building a knowledge base for software evaluation, data management issues, community engagement and monitoring of national and international developments in this field.

Meta Access Management System Project (MAMS)

Lead Institution: Macquarie University

Partners: National Library of Australia, education.au, Telstra Research Labs, University of Southern Queensland, UNE, University of Tasmania, University of Newcastle – Australia, UWA, Curtin University of Technology, Edith Cowan University, Murdoch University, The University of Notre Dame – Australia, Internet2/MACE 'Shibboleth', University of Ulster, National Library of New Zealand, Massachusetts Institute of Technology, Open Knowledge Initiative (OKI), Joint Information Systems Committee (JISC), Centre for Educational Technology Interoperability Standards (CETIS) UK

Contact: James Dalziel (02) 9850 7539

Web: <http://www.melcoe.mq.edu.au/projects/MAMS/>

Link with NCRIS capabilities Relevant to all capabilities

- The MAMS project is developing next generation access and identity management infrastructure and related common technical services to support research effectiveness, and implementation advice and programs, together with support for practical implementations among project partners.
- The MAMS project is developing a prototype middleware system for access and identity management, supported by additional common services such as search services, digital rights management and metadata management. This will include the implementation of an “umbrella” or meta access management system for intra-institutional authentication and authorization based on a multi-modal approach to the process of single-sign-on that recognizes the realities of current legacy environments. In addition, implementation of an inter-institutional authentication and authorization regime based on attribute exchange and automated decision-making using machine-readable policy
- The MAMS project is working to disseminate its accomplishments with a focus on development and trials of implementation of new approaches to access and identity management and other common technical services. Given the focus of this project on middleware, this project provides core information infrastructure to ensure that the national investment in hardware and networks is complemented by the necessary software infrastructure to unleash the potential of higher education research information infrastructure.

NEW 2006 SYSTEMIC INFRASTRUCTURE INITIATIVE (SII) PROJECTS

- The following are newly funded projects (July 2006) structured as next stage activities for some of the existing SII projects described previously. These projects will reinforce the momentum already established by:
 - Progressing information infrastructure technologies into a new phase of deployable production-ready software and services.
 - Enlarging the network of digital repositories and the community of users through direct collaboration with phase 1 NCRIS capabilities and other institutions in the sector.
 - Supporting universities and other research agencies in their ongoing use and development of digital repositories, allowing greater discovery, preservation, access, and sharing of research data and research outputs.
 - Facilitating the introduction of the emerging RQF through development, integration and deployment of technical solutions designed to support researchers and research institutions in meeting RQF reporting requirements.
 - Further developing the underpinning technologies supporting authorisation, authentication, and access including identify management solutions.
 - Development of tools to enable researchers to publish online in the current regulatory environment.

Australian Research Enabling Environment (ARCHER))

Lead Institution: Monash University
Link with NCRIS capabilities Relevant to all capabilities

- This project will build on the architecture and prototype software developed by the Dataset Acquisition Accessibility & Annotation e-Research Technologies (DART) project to adopt a common information management architecture and infrastructure across the many data intensive research areas **represented** in the 9 high priority capability areas under NCRIS. It will similarly address the information management needs of capability areas in the Social, Behavioural and Economic Sciences and in the Humanities and Creative Arts.

Research Activityflow and Middleware Priorities (RAMP)

Lead Institution: Macquarie University
Link with NCRIS capabilities Relevant to all capabilities

- The RAMP project aims to improve national research effectiveness by addressing two challenging aspects of a national research information infrastructure: the development and implementation of open standards authorisation for protected repositories; and research into and demonstration of people-oriented research workflows (often referred to as research activityflows).

ARROW-2

Lead Institution: Monash University
Link with NCRIS capabilities Relevant to all capabilities

- The Australian Research Repositories Online to the World (ARROW) project has been very successful in providing tools to enable accessibility and discoverability of research from institutional repositories. ARROW Stage-2 will build upon this success to support the building of institutional repositories for project partners and advise new members on how to proceed and what to expect. An important aspect of the ARROW Stage 2 project will be the establishment of sustainable pathways for institutional repositories beyond the term of the project.

ICE-RS

Lead Institution: University of Southern Queensland
Link with NCRIS capabilities Relevant to all capabilities

- ICE-RS will create open standards based technical solutions to facilitate and encourage the efficient creation of flexible documents in the process of conducting and reporting on research. ICE-RS will deliver a research authoring environment that assists researchers to systematically create, structure, and manage their publications and reports, and aids the automation of research workflows. The project will build on existing work undertaken at the University of South Queensland, and The Australian National University along with contributions from the Regional Universities Building Research Infrastructure Collaboratively (RUBRIC) project.

Legal Frameworks for e-Research

Lead Institution: Queensland University of Technology
Link with NCRIS capabilities Relevant to all capabilities

- This project will extend and reinforce the work already being undertaken by the Legal Protocols for Copyright Management for Open Access project. It will create an online intellectual property and licensing database that will augment and interoperate with the JISC funded Securing a Hybrid Environment for Research Preservation and Access (SHERPA) project. One part of the project will examine and categorise existing publishing agreements of key Australian and other relevant publishers and present these results via a web interface. The second part of the project will map out a sophisticated legal framework for e-Research and collaborative innovation.

APSR-2

Lead Institution: ANU

Link with NCRIS capabilities Relevant to all capabilities

- APSR is an open partnership of research and higher education institutions, funded under SII, committed to strengthening the national research infrastructure through the development of digital repositories and the provision of associated research-linked discovery, access and management services. This extension to APSR will build on the existing strengths and success of the partnership and continue its role as a key organisation for promoting best practice and expertise in managing digital collections.

COPYRIGHT REFORM

- DEST, through a number of SII-funded projects and with specific internal DEST funding, has advocated the education and research sectors' interests in copyright law reform for several years.
- In particular, the amendments to the Copyright Act 1968 arising from the Australia-United States Free Trade Agreement (AUSFTA) shifted the copyright balance in favour of copyright owners (extension to copyright term, anti-circumvention provisions for Technological Protection Measures amongst others). Recent review processes have sought both to finalise implementation of those provisions and to re-examine copyright exceptions in light of technological change and common consumer practice.
- DEST has played a central role in coordinating the responses from a range of education sector interests to recent copyright law reform processes. DEST made substantial submissions to the Attorney-General's Department's inquiry into Fair Use and Fair Dealing Exceptions in the Digital Age, the House of Representatives Legal and Constitutional Affairs Committee's Inquiry into Technological Protection Measures Exceptions and the Attorney-General's review of Carriage Service Providers.
- DEST's stakeholders are both creators and users of copyright. DEST has an interest in maximizing the commercialisation and national return on research through the collaboration of industry, universities and CSIRO.
- There is also an important public interest in encouraging innovation, and in ensuring effective access to copyright materials for education and research purposes. Such access determines the opportunities for students, teachers and researchers to take their place in a competitive global information economy.
- As well as seeking an appropriate balance between different interests, DEST's approach to copyright law reform has been that changes to the Act should seek:
 - to maintain technological neutrality between the operation of copyright law in the digital and non-digital environment;
 - to maintain neutrality and consistency of treatment as between different categories of subject matter;
 - to balance flexibility and certainty;
 - to maximise the simplicity of the provisions; and
 - to lower compliance costs for creators and users.

E-RESEARCH COORDINATING COMMITTEE

- In September 2004, in *Information Technology: Connecting an Innovative Australia*, the Government made an election commitment to implement a coordinated structure for e-Research, modelled on the UK e-Science Programme.
- The Government's election commitment is being carried out in two phases:
 - An initial investigation and consultation phase, "to involve relevant stakeholders in an overarching e-Research Coordinating Committee"; and
 - An implementation phase, to put into place the Committee's recommendations, subject to Ministerial approval.
- In April 2005, the e-Research Coordinating Committee was established jointly by the Minister for Education, Science and Technology and the Minister for Communications, Information Technology and the Arts to provide expert advice to the Government about developing Australia's e-Research capacity. The Ministers appointed Dr Mike Sargent AM to chair this Committee.
- To provide it with expert advice in key areas, the Committee established a Technical Working Group and a Computer Sciences Expert Group. It also sought advice from the participants in relevant programmes funded under the Systemic Infrastructure Initiative.
- In December 2005, The Ministers accepted the Interim Report of the Committee: *An e-Research Strategic Framework*, as the basis for further work to develop an e-Research implementation strategy. The Committee has now completed its Final Report: *An Australian e-Research Strategy and Implementation Framework* following extensive consultations on the e-Research agenda with stakeholders around Australia, in parallel with the NCRIS Committee consultations.
- Feedback from stakeholders and experts engaged by the Committee confirms strong support from state governments, universities, industry stakeholders and the research community, for a national strategic framework to coordinate and accelerate the development of Australia's e-Research capabilities. This is recognised as a priority if Australian research is to remain relevant and competitive and we are to avoid creating incompatible research silos.
- Key findings of the Committee are:
 - Skills acquisition and skills transfer are vital in developing Australia's e-Research capability.
 - An e-Research Centre, consisting of a set of nodes located in areas of research concentration, should be established to assist the research sector to develop e-Research capabilities by coordinating outreach and awareness raising, promoting skills transfer, providing support and undertaking strategic research.
 - An e-Research Committee, chaired by a high profile e-Research Leader / champion, should be appointed to oversee the implementation of the e-Research agenda. (The experience of the UK e-Science

initiative strongly suggests that the appointment of a well respected member of the research community, recognised by government, the research sector and industry as the visible face of e-Research is essential in engaging the research community in e-Research.)

- The Government should establish a working group to develop an Australian Research Data Strategy that will support a standardised national approach to the management of data collected, generated and used by the Australian research community.
- The e-Research Strategic Framework outlined in the Committee's Final Report is designed to be implemented over a period of five years. It is expected that the outcomes of implementing this Framework will be:
 - Australian researchers will be world leaders in the use of advanced and innovative information and communications technologies, to achieve internationally recognised, high quality research outcomes across Australia's national research priorities;
 - Australian researchers will be able to access data, instruments, computing capability and to collaborate with each other, through advanced ICT, enabling them to engage readily in collaborative research and contribute significantly to the solution of major national and international research challenges;
 - Australian researchers will have the necessary education, training and skills, and support from ICT and information management specialists, to use advanced ICT efficiently and effectively;
 - The implementation of e-Research capabilities across the Australian research sector will provide a leading influence on the uptake and enhancement of such technologies by Australian business and industry; and
 - The Australian community and economy will benefit from the advanced capability enabled by e-Research.
- The activities of the e-Research Strategic Framework are intended to be integrated closely with initiatives under NCRIS and the Systemic Infrastructure Initiative, in order to inform and maximise returns on these key infrastructure investments. The Framework will also build upon initiatives in the Communications, Information Technology and the Arts portfolio, including the Advanced Networks Programme, Connect Australia and the National Broadband Blueprint.
- The e-Research capabilities to be developed under the Framework are expected to underpin future Government initiatives in e-Health, e-Education and e-Go.

PMSEIC DATA FOR SCIENCE WORKING GROUP

- The Prime Minister's Science, Engineering and Innovation Council working group on Data for Science was essentially established to address the central question of "Should Australia have a national approach on managing data for science?". The working group's (draft) terms of reference are defined as follows:
 - Provide an overview of current approaches to the management of large amounts of scientific information and data for research;
 - Outline the issues surrounding the nature of data and data repositories and libraries, including access, storage, authentication, sustainability, protection and standards for interoperability;
 - Examine whether there are advantages in Australia for a single virtual repository or key multiple domain-specific repositories of scientific information covering all research institutions, both Universities and Government (and, if they wanted to, private companies);
 - Identify issues relating to the development of an Australian virtual repository and infrastructure mediating access to the repository;
 - Identify issues relating to industry participation in the development of, and access to, an Australian virtual repository or repositories;
 - Identify strategies that could be introduced to improve access to research undertaken by publicly funded research agencies (eg. protocols around repositories), including international access and collaboration;
 - Identify a data management strategy to ensure Australia's scientific sector is globally competitive and provides benefits to the Australian economy, environment and society;
 - Take into account the conclusions and recommendations of the e-Research Coordinating Committee.

- The working group has met twice so far (in May 06 and June 06) and will meet again in July and August. It is expected to deliver a report and present its findings to the PMSEIC meeting to be held at the end of this year. The working group is able to invite input from experts outside of its membership and as such is considering consulting with experts from academia, research agencies, other government bodies, and from industry. The e-Research Coordinating Committee's final report has been provided as input to the working group, as has information on the Systemic Infrastructure Initiative funded projects. DEST is also preparing a snapshot on international government funded initiatives in related areas, such as research infrastructure and e-Science.

Attachment A

ADDITIONAL DETAIL ON AREN

National status

- AARNet on behalf of its members and the ARENAC negotiated with the receivers of NextGen Networks to gain access for AREN to that network. The result was an agreement to acquire access to the network for a 15-year period.
- In Queensland, the Sunshine Backbone provides gigabit capacity from Townsville and Rockhampton to Brisbane. Over the next three years this network backbone will be extended to Cairns, Hervey Bay, Gladstone and the University of the Sunshine Coast.
- The Tasmanian Research and Education Network (TREN) will use optic fibre provided by the Tasmanian Government on intra-state links, and the Bass Link cable currently being laid across Bass Strait (expected to be available in 2006).
- The Victorian Education and Research Network (VERN) will connect sites in the greater Melbourne area and link the Bass Link cable from its landing site at Loy Yang power station in Gippsland back to the AREN (Stage 1). Stage 2 will extend the network from Traralgon into eastern Victoria as far as Lakes Entrance.
- The acquisition of NextGen fibre has provided connectivity for Sydney, Canberra, Wollongong and Newcastle. The associated NextGen regional project will provide connectivity for several regional campuses, western NSW sites such as Albury, Parkes and Dubbo and north coast sites. It also connects major radio telescopes at Narrabri, Coonabarabran and Parkes.
- Perth is connected via the NextGen network, however only one fibre pair is lit currently. A proposal is being developed by the WA Regional Network Organisation (WARNO) to light the second fibre pair which would allow for the deployment of dedicated network layers for particular disciplines. Kalgoorlie could be connected as part of the NextGen project. DEST and the WA universities have also co-invested in a fibre build between Perth and Mandurah which involves laying fibre during the construction of the Perth Transit Railway.
- The NextGen network does not reach into the Northern Territory and negotiations of architecture and price are constrained by the absence of competition in supply. Notwithstanding these difficulties, a three-year solution is currently being negotiated with a view to providing significantly improved links to institutions and agencies in Alice Springs and Darwin. It will also provide a connection in to Charles Darwin University's intra-Territory network, thus providing better access to the resources across the AREN and the international networks it peers with for learning centres in regional and remote parts of the Territory.
- SABRENet in South Australia will establish an 80km north-south high-speed metropolitan network, connecting all major university campuses, teaching hospitals, South Australian government research facilities, the CSIRO and the Defence Science and Technology Organisation in South Australia. Major

routes will extend from the Adelaide CBD and reach north to Roseworthy, south to Flinders, east to Magill and west to Woodville. The Adelaide Innovation Constellation precincts of Waite, Thebarton, Mawson, Flinders and Florey, identified in the State Government's STI10 Science vision, will all be linked by the network.

Overseas

- In November 2004, the 10 Gigabits per second (Gbps) dual link from Sydney to the west coast of the USA became operational. It was through this link that the landing data from the European Cassini-Huygens Mission to Titan collected by the Australian telescopes at Parkes and Mopra were relayed to the Joint Institute for VLBI¹ in Europe (JIVE) facility in the Netherlands.

- AARNet now has six circuits between Australia and the US West Coast.
 - Dual 155 Megabits per second (Mbps) circuits:
 - (i) one from Sydney to Fiji to Hawaii to Seattle, and
 - (ii) one from Sydney to Seattle via an alternate path
 - Dual 622Mbps circuits
 - (i) one from Sydney to San Jose
 - (ii) one from Sydney to Los Angeles
 - Dual 10Gbps circuits
 - (i) one from Sydney to Hawaii (Manoa) to Seattle
 - (ii) one from Sydney to Hawaii (Big Island) to Los Angeles
 - Over the past six months, AARNet has secured 622 Mbps links to Frankfurt via Singapore in order to support further research and collaboration.

¹ Very Long Baseline Interferometry