



Annual Business Plan 2008-2009

31 March 20, 2008



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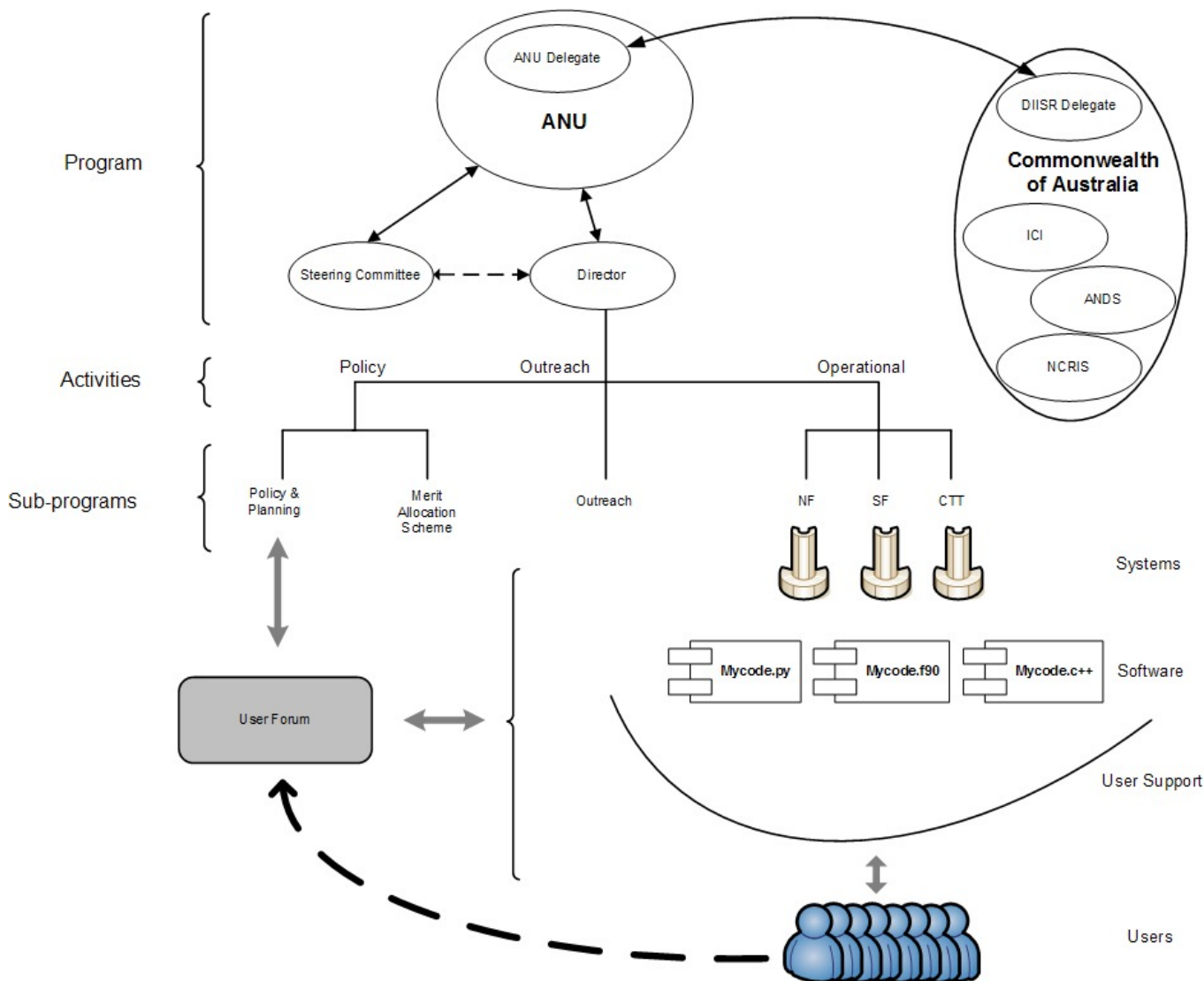
1 Introduction

The National Computational Infrastructure (NCI) project is funded as part of the Platforms for Collaboration (PfC) Investment plan. Its purpose is to provide state of the art national computational infrastructure facilities and services to the Australian research community. NCI is required to build on the successful Australian Partnership for Advanced Computing (APAC) National Facility (NF) program.

The NCI project is established and funded under a contract between The Australian National University (ANU) and the Commonwealth of Australia. The Agreement was signed with the Commonwealth, Represented by the Department of Education, Science and Training on June 22, 2007. Following the Federal election in November 2007, the Commonwealth's Representative has been the Department of Innovation, Industry, Science and Research (DIISR).

This document is the first Annual Business Plan, called for under the Agreement as a milestone to be put in place by 31 March 2008.

The program has three main activities –Operational, Outreach and Policy. The broad structure of the program is depicted in the following diagram:





2 Project Status

An initial committee to oversee the transition from APAC and the implementation of NCI, put in place at the beginning of the Project, completed its work in January 2008. In particular, research services derived from the NF are now delivered under arrangements overseen by the NCI Steering Committee (NCI/SC). A merit allocation Call for 2008 has been made and research projects established accordingly. Technical projects, tool development and operating system enhancements among them, have also been changed to report under NCI governance and management arrangements.

The NCI/SC was created as part of the implementation phase of NCI. For a period it operated in parallel with the APAC-NCI transition committee. Professor Mark Wainwright has been appointed to the key position of independent Chair of the NCI/SC.

An NCI Merit Allocation Committee (MAC) has been established. Terms of Reference for the new MAC are being drafted by the NCI/SC. Whilst modelled on the APAC operating guidelines, the NCI version will include consideration of priority settings established by the NCI/SC. Professor Brian Yates has been appointed to the Chair of the MAC.

Professor Jim Williams was appointed as Acting Director of NCI pending the outcome of a search and selection process for the substantive appointment. Following an extensive search process, short listed applicants were interviewed and, at the time of finalising this Plan, the Selection Committee has submitted its recommendation. It is expected that an offer will be made in the first week of April.

An NCI office has been established as an ANU organisation unit. Delegations to operate with the NCI Director as Head of the organisational unit, along with delegations under which the Director can take responsibility for finances falling under the NCI project have been assigned. The Director will also have access to ANU administrative services and legal services, and support for maintaining all NCI official files and accounts.

The domains nci.org.au and nci.edu.au have been registered, and a Plone-based website is under construction.

Substantial steps have been taken to build relationships between NCI and prospective stakeholders in the university sector. Similar steps have been taken with respect to the needs of other National Computational Research Infrastructure Strategy (NCRIS) capability facilities. It is expected that these relationships will develop once the NCI Director has started and the NCRIS capability facilities have had 12 months or more of operation to become firmly established.

Consideration of NCI's role as a framework within which a strategic plan for national high performance computing (HPC) can be forged led to discussions between ANU, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology (BoM) and Geosciences Australia (GA). Subsequently, relationships have emerged along with an undertaking to work together on HPC issues. With support from DIISR, the NCI/SC membership criteria have been modified to provide for those organisations to become members of the NCI/SC with a view to participation through integration of needs. ANU and CSIRO are committed to being long term partners of NCI. BoM and GA are serving on the NCI/SC as prospective partners.

Also, as part of the emerging collaboration, a working party involving ANU, BoM and CSIRO has been formed to guide the procurement of a transitional (also known as a pathfinder) system in preparation for the next peak system scheduled for installation by mid 2009.

Discussions with universities about their relationships with NCI have focussed, in the first place, on the Go8. In general terms, universities are considering their research infrastructure computational interests in an environment of overlapping institutional, regional and national opportunities. Several universities have made informal commitments to the NCI framework.

A budget for the next four years for the NF has been drawn up. Costs for utilities and plant infrastructure have risen significantly beyond those envisaged in the notional budget. Co-investment discussions to date are tentative except for CSIRO and ANU.

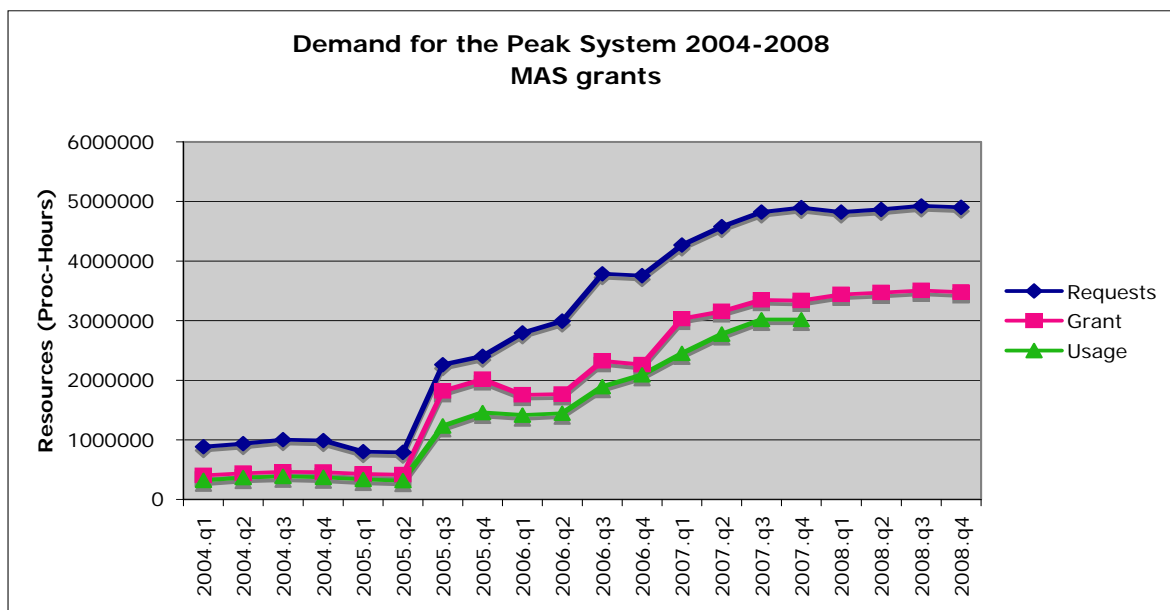
As indicated above, HPC services have been transitioned from APAC to NCI. Interruptions to the user community have been avoided. Highlights from the merit allocation round for 2008 resources include:

- The Merit Allocation Scheme (MAS) received 73% of available cycles for 2008 (12.8M processor hours)



- There were 142 applications, of which 29 were new projects
- 19.5 M processor hours requested, which is 1.5 times the available
- 13.9M processor hours allocated, which is 1.1 times the available
- The largest grant was 1M processor hours

The historical demand for NF resources continues to exceed supply, as shown in the following graph:





3 Activities to Progress the Project

3.1 Operations and Services

3.1.1 National Facility

The central focus for developing the NF over the 2008-2009 period is to increase peak performance by at least a factor of ten.

This objective will be pursued within a framework within which the ANU, CSIRO and BoM will ensure their plans, and associated resources, are used cooperatively. It is anticipated that all three organisations will become NCI Partners for this purpose. An agreed objective under the framework is to develop the NF so that it is capable of inter-working with the BoM's operational facility, creating a computational environment for the national earth systems science community which spans research, development and operations. This objective is tied to achieving far higher degrees of functionality and collaboration than would otherwise be the case.

Although this earth systems science focussed objective is likely to have a major impact on the NF acquisition process, arrangements are in place to ensure that outcomes also benefit other research areas supported under the NCI funding Agreement.

Under the plan the new NF system will be acquired in a joint process under which BoM will also acquire a system. The specifications for the two systems will be coordinated to ensure interoperability for earth systems and climate modelling research. The schedule involves issuing an RFT in early April. The RFT will seek from the market a high availability production weather forecasting and climate research system to be located at BoM, and a larger, primarily research system to be located in the NF at the ANU. The latter will be configured to meet the needs of researchers gaining access under the NCI-MAC along with the needs associated with interoperating with the BoM facility.

Tenderers will be invited to provide innovative solutions to meet this requirement. Funds from ANU, BoM, CSIRO and NCI will be pooled for this procurement. It is anticipated that a number of research intensive universities will also contribute. The acquisition process provides for contracts to be entered into in the mid to late 2008 time frame.

The research system is expected to be built in stages, with the majority of the system being installed in mid to late 2009. An important activity in this procurement will be determining power and cooling requirements, and instigating associated capital works. The ANU has sufficient space to accommodate the kind of new system anticipated by consideration of budget projections. This timetable and associated expectations may change when more is known from vendor responses.

As part of the process of preparing for the next generation peak system there are a number of technologies that require investigation. These technologies and the software systems that make them manageable need to be implemented and verified at reasonable scale to verify their suitability for the next peak system. This activity can be achieved in a way consistent with increasing the available capacity for production use, and is the reason for the developmental system identified for procurement in 2007-2008.

Experience with previous systems has shown that vendors are generally not able to meet the demands that the NF places on the system software. Of particular concern are elements such as a large-scale global file-system and a resource manager suitable for a mixed workload with applications of quite different performance characteristics. Managing these resources effectively is essential to creating a productive, high availability Facility. Like most of the national scale supercomputer facilities in the US and Europe, the NF has developed a high level of expertise in these fields, including adopting best of breed open source components, to better address a number of these issues. Dealing with these issues is important in planning the acquisition.

There is substantial commonality across the vendor community in the assertion that value from emerging technology is to be found in systems built around multi-core x86_64 with InfiniBand interconnects. Such hardware options are cost effective for the vendor, but their suitability for the needs of a NF will be evaluated in the acquisition process. Given that the next peak system is due for installation in the next 18 months, it is very likely that such a system configuration will be proposed by several of the leading vendors. The rapidity of technology



change raises timing and scalability issues over the lifetime of a system. This is a challenging area for NCI which will be addressed within the proposed joint acquisition process.

Such systems at smaller scale may also be attractive to other groups within the Australian HPC community and as part of its role the NF will be able to provide appropriate advice on their performance and management issues.

The above issues will be explored with the developmental cluster identified in the Interim Implementation Plan. Further information on the cluster appears below.

ANU will continue to provide access to its mass storage system for users of the NF. An annual fee, based on marginal costs and covering tape library, disks, computational and analysis systems and network infrastructure will be negotiated and endorsed by the NCI/SC. Access to other resources, such as visualisation facilities, is available on a case by case basis.

3.1.1.1 Asset Acquisition

Peak System

For 2008-2009, the major asset identified is a new peak system and associated plant and equipment at the NF. The system will be owned by ANU, and housed at the Leonard Huxley Building on ANU campus, assuming there is sufficient space, power and cooling capacity. Current estimates are positive in this regard. The anticipated expenditure is \$12M for the computer system and \$4M for power and cooling infrastructure. The total cost of ownership for the system has significant annual expenditure on items like staff and electricity, and so is dependent on the expected lifetime of the system. A realistic figure is 4 years, in which case NCRIS will obtain approximately 60% of the resource, based on the NCRIS contributions in the notional budget from the overall Project Plan.

Development Cluster

A Linux cluster developmental system will be acquired, providing additional computational resources to the National Facility. This purchase is designed to:

- Address the increased user demand. The oversubscription of the Merit Allocation Scheme needs to be continually addressed as demand increases. In addition the NCI/SC has determined there is an increased requirement for HPC cycles in 2008. CSIRO in particular are in a process of encouraging use of the National Facility. The development cluster will add computational power to a suitable subset of jobs in a more cost effective way than expanding the SGI machine.
- Gain further capability in managing next generation HPC systems based on new technologies in order to prepare the facility for the next peak system expected in 2009.
- Provide a step toward a facility-wide global file system that can be migrated across several generations of computational resources.

The system would also help with preparation for the interruption to services during the transition from the current SGI system to the next peak system.

3.1.2 Specialised Facilities

A call for Expressions of Interest (EoI) in participating in the Specialised Facility (SF) sub-program will be made. The call may be restricted. Minimally NCRIS facilities, state-based eResearch infrastructure providers and universities with relevant infrastructure projects will be included. The NCI/SC will oversee broad consultations on this matter.

Key criteria for participation in the SF sub-program will be:

- extent of the demand from 'high-end' users in the Australian research community and particularly NCRIS capability areas;
- Arrangements for providing access and user support that for researchers Australia-wide;
- value of NCI investment in comparison to other ways of achieving similar outcomes, especially the NF;



- capability of the host organisation for providing services at the standard set by NCI the; and
- ability of the host organisation to implement policies, system scheduling and associated processes to support projects granted resources under the MAS.

More specifically, funding provided under the SF program will be tied to meeting the following:

- acceptability to DIISR;
- an appropriate level of co-funding;
- put in place through contractual agreements linking accountability to NCI;
- arrangements for allocation of associated resources through the NCI-MAC.

Through the NCI, the host of a SF may operate a shares based model to allow other investments to take place through the NCI program, similar to that of the NF; and

Hosts of SF will provide the NCI Office with adequate accounting and reporting for the resources funded. In addition, these hosts will provide the NCI Office with appropriate audited accounts relating to the funding received, and report on and assist reviews of the performance and reliability of the facility and its services.

3.1.3 Computational Tools and Techniques (CT&T)

The CT&T program supports the development of software tools to improve particular applications. With the formation of National eResearch Architecture Taskforce, and the growing internationalisation of the research software development effort, it also makes sense for the CT&T program to broadly support a specific user community in their use of NCI facilities.

The NCI/SC will issue a call for EoI from the research community to co-fund activities to assist that community (such as astronomy, geosciences, computational chemistry) to improve the software development environments for users of the facilities in NCI. The CT&T EoI will go through a similar process as the SF call.

The criteria for supporting a project will include:

- The extent to which it improves computational research for a targeted user community;
- Co-investment by the community;
- The extent of the user demand for the tools and techniques; and
- The track record of the key people in the project team and their relationship with user groups.

3.2 Planning, Access and Policy Activities

3.2.1 Planning

Planning activities include network provisioning between ANU, BoM and CSIRO and harmonising operational requirements and practices of the three organisations.

3.2.2 Access

The MAS will be developed to provide for the broad NCI research community. Further information is provided in the section on Merit Access.

Non merit access for the coming year will also be provided.

3.2.2.1 Merit Access

In keeping with NCRIS principles, public sector researchers are expected to be eligible to apply for time on the NF. This process will be extended to any NCI-funded SFs. NCI awaits advice from the Department regarding detailed eligibility criteria.



There are two Merit Allocation Schemes at the NF: one for processor time (MAS) and one for data storage (MAS-D). As the Australian National Data Service (ANDS) component of PfC matures, discussion between ANDS and NCI regarding the NCI MAS-D may be required.

Under MAS, research groups apply for computational time in October for the following year with an application of approximately four pages that specifies the research being undertaken, the resources required and a justification for those resources. A mid-year call is made to pick up typically smaller requests from groups not ready for the major annual round. The MAC also considers requests out of session. The MAS-D considers data projects under similar arrangements but based on data intensive computation and storage projects requiring services on the NF. A single MAC allocates resources under both schemes.

The committee consists of a Chair, researchers, and the NF Manager (ex-officio). The MAC can request additional specialised assistance for discipline areas (or can include special advisors for some components). Associate Professor Brian Yates has been appointed as the chair of the NCI MAC. A process for determining other members will be finalised at a later NCI/SC meeting.

The merit assessment criteria are:

- **Research quality**
 - Research merit including the potential of the work to generate new knowledge in an important area, the comparative scientific merits of the work within its discipline, originality and international competitiveness.
 - Commercial potential.
 - Experience and demonstrated research capacity of the applicant and the project team.
 - Identified priority research, including recognition of the NCRIS priority areas and roadmap.
- **Appropriateness of the NF**
 - The need for such resources to conduct the research.
 - Suitability of the system (hardware and software) and its operational environment to support the project.
 - Evidence or experience to demonstrate that the project will use the facilities efficiently.
- **Reasonableness of the level of resources requested**
 - Relative to the total amount available.
 - Needed to make adequate progress in the proposed research program.
- **Track record of the applicant in using the NF resources where relevant**
 - In the case of proposals to continue a project, the record of achievement and efficient use of previous allocations.

The MAS-D will be integrated with ANDS as appropriate. The evaluation of applications is based on the following criteria:

- The research merit including the potential of the work to generate knowledge in an important area, the comparative research merits of the work within its discipline, originality and international competitiveness;
- The extent to which the data is nationally significant and support collaboration by researchers at different institutions;
- The extent to which the data is available and the end-user community is identified;
- The capacity and complexity of the data requirements;



- The demand for the data sets to be managed on the NF Data System; in particular that the data requirements cannot be met by the systems currently used for managing the data or reasonable enhancements to them;
- The suitability of the NF Data system to manage the data; in particular:
 - Storing and accessing the data sets on the NF do not incur unacceptable network charges to APAC or the host institution.
 - Storing and accessing the data sets on the NF do not adversely affect the operation of the system or networks by unsustainable usage patterns.
- The track record of the applicant in using the NF data system where relevant.

For the 2009 allocations, discussions and a trial with selected known large users will occur to consider multi-year allocations to provide more certainty regarding research programmes and staff employment, and to potentially align better with Australian Research Council and National Health and Medical Research Council grant dates. A process for determining allocations across the NCI and BoM systems will need to be formulated during 2008.

3.2.2.2 *Non-merit Access*

NCI will refine the definitions of partner and affiliates as follows:

- A partner must contribute an indicative \$1 million per annum for the life of the NCI program, ie until June 2011. They will receive a share, ie a percentage resource allocation, of an NCI facility.
- An affiliate will be a co-investor who does not make this level of investment, and they will receive a fixed resource allocation for the year in which they invest.

The pricing basis of fixed resources will be set by the calculating the lifetime total cost of the system and dividing by the resources the system can deliver. Historically, this figure has been approximately \$0.50 per processor hour. The NCI/SC has determined that resources for the current NF systems will be charged at \$0.50 per processor hour for publicly-funded research institutions.

The size of a partner share will be calculated in a similar way, but due to expected increases in system capacity over time, the absolute resources available to a partner will grow.

Resources can be purchased for specific projects, by public sector as well as commercial organisations and individuals. Commercial use will incur costs that take into account market factors and Australian Government competitive neutrality guidelines.

In all cases, additional software or other requirements will be expected to be provided by the investor, unless a case is made that a broader community will be served.

DIISR-mandated priority access, as for example in analysis and planning of a natural disaster, will be negotiated as required.

3.2.3 **Policy**

Policy activities include development of access and acceptable use policies for systems which are subject to government information security requirements.

3.3 **Outreach Activities**

A logo and words meeting the Commonwealth's requirements have been accepted by ANU Marketing and Communication. This business plan uses a version of the proposed template.

Registration of nci.edu.au and nci.org.au has occurred. A website is being developed and will be hosted by ANU. Material will be progressively added, including papers and minutes in a secure area for access by NCI/SC members. A web developer has been engaged to develop templates and establish a Plone content management system for simplified ongoing management and enhancement of the site. The NF has its own extensive website, complete with detailed user guides and online applications for obtaining resources.



The biennial APAC conference encompassed a broader community than NCI. The eResearch Australasia conference held in Brisbane in June 2007 will be repeated in Melbourne from 29 September to 1 October, 2008, with workshops on October 2 and 3 (see <http://www.eresearch.edu.au>). A call for workshops will be issued in March, and NCI will submit a proposal for the NF to conduct a User Forum at the Conference where users will be able to discuss operational issues and enhancements with NF support staff.

Planning will commence for an APAC09 conference, with a view to co-hosting with the eResearch conference.

Workshops, training courses and seminars will be given by relevant staff at any eligible institution as required. These activities have typically been driven by user demand.

Attendance, possibly with displays, at major HPC events internationally will continue; examples for 2008 include SC08 (the premier international supercomputing conference) and WATOC08 (computational chemistry).

The NCI Director will be responsible for establishing links with overseas organisations that had relationships with APAC, such as the National Center for Supercomputing Applications, Pittsburgh Supercomputer Center and San Diego Supercomputer Center in the US.



4 Governance and Management

The NCI/SC established according to the NCI Agreement, has the following membership:

- Emeritus Professor Mark Wainwright, Independent Chair
- Professor Robin Stanton, ANU
- Professor Brian Yates, MAC Chair
- Professor Jim Williams, NCI Acting Director

In addition, consent has been received from DIISR for the following prospective partners and affiliates to be represented on the NCI/SC as full members until September 30, 2008:

- CSIRO, represented by Dr Alex Zelinsky
- BoM, represented by Dr Neville Smith,
- GA, represented by Dr Chris Pigram,
- Research intensive universities represented by Professor Doug McEachern, UWA.

The NCI/SC advises the ANU on:

- strategic plans for the national computational infrastructure and services;
- business and marketing plans for the Program;
- project plans for outreach activity;
- budget allocations within the Program;
- the general direction of implementation of the Program and associated delivery of services to users; and
- arrangements for promotion, collaboration and cooperation among the contributors, counterparts, and research organisations nationally and internationally.

The NCI/SC will make these recommendations based on considerations and reports on all the NCI activities.

To be considered as an NCI Partner, a major contribution, as determined by the NCI/SC, for the remaining life of the NCI program is required. An indicative figure is that \$1M per annum, either as cash or in-kind will be required. NCI Affiliates will require a smaller commitment. The prospective partners will remain on the NCI/SC until September 30, 2008, at which time they will have made the necessary commitment to be a full Partner, or their current tenure on the NCI/SC will cease.

The NCI/SC will also act as a council, for the purpose of developing advice on the strategic policy settings for advanced computing in the country. The NCI Funding Agreement allows for other organisations or individuals to be appointed as NCI/SC members for their expertise. This procedure may be used to ensure that strategic policy formulation is well-informed.

Meetings were held in December 2007 and February 2008, and are scheduled for April, June, September and November in 2008.

The NCI Director position was advertised in January, and interviews occurred on March 13. The Director will be an ANU employee or secondee, and is responsible for overall management of the program. An Executive Officer will provide support for operational issues relating to the management of the program. ANU will keep appropriate financial records and official files to satisfy accountability requirements.



5 Staffing and Financial Projections

The staffing projections for the NF continue as they have for the last few years, and consist of 16 equivalent full-time staff (EFT) at a cost of \$2.4M per annum, which is an in-kind contribution by ANU, and entitles them to a share of the system as identified in the section on non-merit access. Staffing projections for SFs have not been included, as no such system is currently funded. Staffing resources associated with BoM for supporting researchers still needs to be finalised.

A four year plan for the NF has been developed. Due to significant cost increases in the supporting infrastructure and consumable utilities, the original plan has been modified to fully fund a single peak system during the lifetime of NCRIS, and make preparations for a replacement system in the 2011 to 2012 timeframe, from funds other than NCRIS. This plan has been endorsed by the NCI/SC.

The four year financial projections are provided, with the 2008-2009 financial year highlighted.

The significant expenditure by APAC has allowed for continued operation of the NF during 2008, with a substantial resource share available to NCRIS for merit allocation.

The \$9.5M from NCRIS in 2009 is not due until after September 30, and there may be a cash flow problem depending on acceptance date and final payment for the peak system to be deployed in 2009.

5.1 Staffing

Staff for the NF are provided out of a larger group of staff at the ANU Supercomputer Facility. These staff provides services beyond a peak computational facility, and some of these services may be of use to users of the NCI NF.

Staffing will exceed the following approximate numbers (several people have both system and application support roles):

- Management: 1 EFT
- System support: 6 EFT
- Application support: 9 EFT

5.2 Co-investment

Minimal co-investment has been formally committed by other parties, and expectations for redressing this are not high in the short term. With the expected level of co-investment from ANU and CSIRO, and investment by BoM in their production system, a system that meets minimal requirements for Australia's research competitiveness can be achieved. If significant co-investment does occur, the system can be expanded at close to marginal costs, ie there are less "step" increases in the price performance with new technologies than has been historically the case.

Obtaining co-investment, especially from the research-intensive universities, is a priority activity in 2008 for the NCI Director and NCI/SC Chair.



6 *Milestones*

Activity	Expected Date
Director appointed	Q2 2008
Start procurement process for new peak system	Q2 2008
Call for EoI issued for SFs	Q2 2008
Call for EoI issued for CT&T projects	Q2 2008
Transitional system installed	Q2/Q3 2008
Participate in eResearch conference; User Forum	September 2008
MAS call	October 2008
Attend SC08 conference	November 2008
MAC meeting	December 2008
Contract for new peak system signed	Q4 2008
Deploy stage 1 of new peak system	Q2 2009
Although not directly part of the NCI Plan, the BoM procurement, carried out in tandem with NCI, will have the following milestones:	
Activity	Expected Date
Contract for production system at BoM signed	Q3 2008
Deployment of production system at BoM	Q4 2008 / Q1 2009



7 Risk Management

Risks to NCI fall in to several categories:

Services: Medium to high risk

- Two international reviews have made highly favourable assessments of ANU services through APAC.
- With the SF sub-program there is the possibility that no suitable facility to provide Australia-wide services for domain specific applications exists. This risk can be managed by actively working with potential providers.
- There is a risk of a mismatch of the organisational culture and operational procedures between ANU and any other organisation hosting an NCI Facility. This will be mitigated through an appropriate Memorandum of Understanding and operational working groups as required.
- There is the risk that a broad range of communities may not be optimally served by one system. This does not imply though that a “specialised” system for every community is the best investment as pooling of resources is advantageous in increasing the scale of a peak system.

Security: Low risk

- Existing APAC levels of assurance will continue.

NCRIS objectives: Low risk

- Existing APAC process support open access by merit assessment. Extension beyond APAC user base is straightforward. NCI/SC will work to incorporate any priority requirements as determined by DIISR.

Adequacy of resources: Medium to High risk

- The notional budget for NCI has a high dependency on co-investment. Failure to achieve the expected level of co-investment (cash and in-kind) has a medium to high probability of occurrence and a negative impact. Negotiations with a range of potential co-investor organisations are underway to manage this risk.
- Completion of CSIRO’s investment process might post date the current timetable for the 2008-2009 Business Plan and CSIRO’s proposed 4 year commitment may not be synchronous with their in-principle support.
- As cost estimates for out year utilities and infrastructure became firmer, the expenditure profile in the current notional budget has had to be revised.



8 Key Performance Indicators

Objectives	Key Performance Indicators	Outcomes
Develop a national strategy for advanced computing to support eResearch in Australia.	<p>A national advanced computing strategy to support eResearch is in place and maintained.</p> <p>Demonstrated progress towards the implementation of the strategy.</p>	A long-term commitment by NCI and its partners to strengthening the Australian advanced computing infrastructure for eResearch in line with international trends.
Strengthen relationships to provide national cooperation on Australia's advanced computing infrastructure.	<p>Membership and participation in NCI categorised by degree of involvement and contribution of organisations.</p> <p>Funding received from sources other than NCRIS.</p>	NCI leading the development and use of an Australia-wide advanced computing infrastructure for eResearch.
Improve the peak computing capabilities of the NCI NF to serve the demands of Australian researchers.	<p>Achievements</p> <p>Key research achievements obtained by users of the NF.</p> <p>Significant developments in computational tools and techniques on the NCI and partner facilities.</p>	Significant research achievements by users of the NCI NF.
	<p>Capability</p> <p>Capability of the NF relative to countries of similar size and development such as Canada, Sweden and Korea.</p> <p>Capability of the NF relative to the needs of the Australian research community as indicated by extent and type of demand.</p>	Australian advanced computing capabilities commensurate with comparable countries.
	<p>Accessibility</p> <p>Extent of use of the NF indicated by the number of States represented by users, projects, users and resource allocations.</p> <p>Availability and performance of the NF indicated by the available system units, used system units, efficiency of operation and extent of parallel computation on the NF.</p>	Australia as a leader in the development and use of advanced computing services for eResearch.
	<p>Customer Service</p> <p>Summary of surveys of users of the NF showing their level of satisfaction.</p>	Demands of major Australian researchers for advanced computing services satisfied by the NCI NF.
Implement specialised computing capabilities through NCI SFs to serve the demands of Australian	<p>Achievements</p> <p>Key research achievements obtained by users of SFs.</p>	Significant research achievements by users of the NCI SFs.



Objectives	Key Performance Indicators	Outcomes
<p>researchers.</p>	<p>Capability Capability of SFs relative to the needs of the Australian research community as indicated by extent and type of demand.</p>	<p>Australian advanced computing capabilities commensurate with comparable countries.</p>
	<p>Accessibility Extent of use of SFs indicated by the number of States represented by users, projects, users and resource allocations. Availability and performance of Specialised Facilities is comparable to the NF.</p>	<p>Demands of major Australian researchers for advanced computing services satisfied by NCI SFs.</p>
	<p>Customer Service Summary of surveys of users of SFs showing their level of satisfaction.</p>	<p>Demands of major Australian researchers for advanced computing services satisfied by NCI SFs.</p>
<p>Develop and deliver outreach services for users of advanced computing infrastructure. Participation and contribution of organisations in the Outreach program. Number and types of outreach activities conducted.</p>	<p>Extent and nature of working linkages between industry and research organisations. Increased skills of users of advanced computing infrastructure.</p>	<p>Increased uptake of advanced computing and grid services in Australian industry.</p>



9 *Acronyms*

ANDS	Australian National Data Service
ANU	Australian National University
APAC	Australian Partnership for Advanced Computing
BoM	Bureau of Meteorology
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CT&T	Computational Tools and Techniques
DIISR	Department of Innovation, Industry, Science and Research
EFT	Equivalent full time staff
EOI	Expression of Interest
GA	Geoscience Australia
HPC	High Performance Computing
MAC	Merit Allocation Committee
MAS	Merit Allocation Scheme
MAS-D	Merit Allocation Scheme - Data
NCI	National Computational Infrastructure
NCI/SC	National Computational Infrastructure Steering Committee
NCRIS	National Collaborative Research Infrastructure Strategy
NF	National Facility
PfC	Platforms for Collaboration
SF	Specialised Facility