

Report of First year of Operation

Serving New South Wales with advanced computing & communications

The establishment of the Australian Centre for Advanced Computing and Communications (**ac3**) represents a major step forward in the provision of advanced computing and communications infrastructure to the NSW education and research community, as well as providing state-of-the-art services to NSW industry, commerce and government. The company opened its doors for business at the end of 2000, and this report coincides with the end of the first year of operation.

Mission

The company's mission is to provide business, research and educational services that are based on advanced computing and communications technologies in order to create and exploit opportunities for economic and employment growth.

ac3 was established with seed funding of \$12M from the NSW State Government. The NSW Government holds 57% equity, with 8 NSW-based Universities holding the remainder. The following universities have committed to collectively contribute a further \$3M: Sydney, NSW, UTS, Macquarie, Western Sydney, Newcastle, Wollongong, and Charles Sturt.

Minister Yeadon officially launched the Centre on 16th November 2000 at a function at the Australian Technology Park attended by over 300 guests.



The NSW Minister for Information Technology, the Hon Kim Yeadon MP (right), at the opening of **ac3** with Dr Peter Jones, the interim CEO.

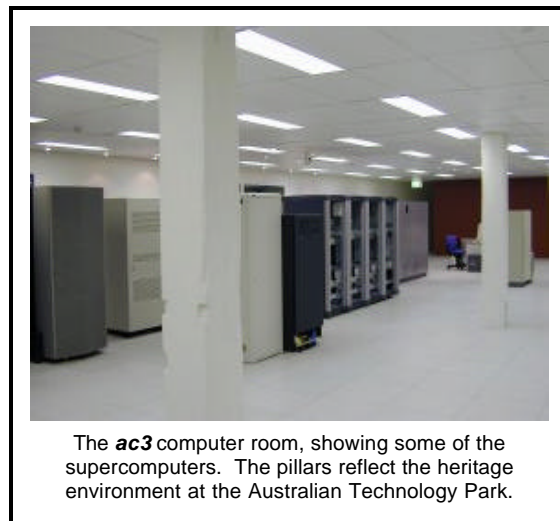
ac3 is a member of the Australian Partnership for Advanced Computing (APAC), a national program linking high performance computing facilities and resources across the nation to support advanced research. APAC programs are delivered through a national facility based in Canberra, as well as state-based partners such as **ac3**.

During the establishment phase, the NSW Department of Information Technology & Management managed the affairs of the centre pending incorporation in November 2000, with accounting handover completed in February 2001.

The facility

ac3 operates a purpose-built premium data centre occupying approximately 350 square meters. The data centre is **highly secure**, complying with Defence Signals Directorate CR4 specifications.

The data centre is also **highly available**, with power coming from 3 separate sources. Primary power comes from a gas-fired fuel cell, with the grid supply as backup. If the fuel cell were to fail or be taken off-line for maintenance, the power is automatically switched (via a dual UPS) to the grid. If this grid should fail, the power is automatically switched to a different power grid.



The **ac3** computer room, showing some of the supercomputers. The pillars reflect the heritage environment at the Australian Technology Park.

The data centre is also **highly connected**. Commercial users access **ac3** by means of a 155Mbps fibre connection to the Optus backbone, while academic users have access via two 100Mbps connections to AARNet, the academic network. These will be upgraded to Gigabit capacity next year.

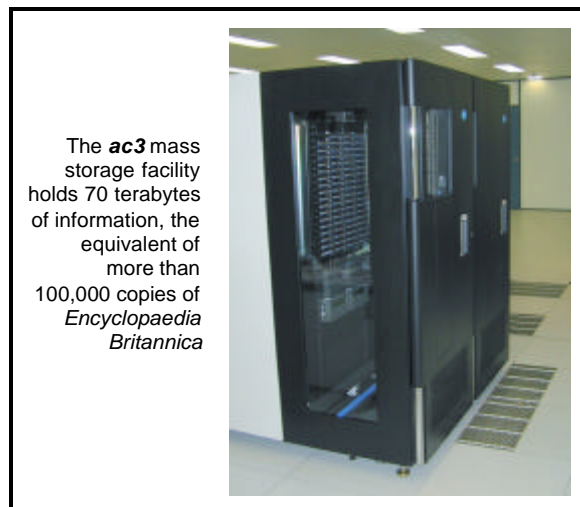
Supercomputers

Supercomputers, because of the cost and operational requirements, are typically shared by a number of organisations. The **ac3** data centre houses three state-of-the-art machines representing one of the most versatile and powerful installations in Australia:

- IBM SP-2, with 68 processors
- NEC SX-5, vector computer
- SGI Origin 2400, with 64 processors.

These machines access common storage:

- 5 Terabytes of disk storage
- 70 Terabytes of cartridge storage.



Support for academic programs

Use of ac3 facilities by Researchers

Researchers from **ac3**'s shareholder universities use the facilities extensively. The competition to use **ac3**'s computing resources is keen. Merit applications for computing resources, invited twice a year, are over-subscribed several times over. A peer review group drawn from **ac3**'s shareholder universities governs access.

Some selected comments from researchers, taken from a recent Customer Satisfaction Survey:

"I needed computing power and can (now accommodate) a size and number of jobs not able to be done before. It has sped up my research."

"Projects where I was simply unable to get the calculations done have now been completed; it has made possible the impossible."

"**ac3** has contributed to two refereed papers and one book chapter. It has allowed me to undertake a computational study of a type where analytical methods are not currently available, and that has shed significant light on the application."

Capital Markets CRC

ac3 is a member of this recently established Cooperative Research Centre, the aim of which is to shorten the settlement time for transactions in global financial markets. **ac3**'s commitment is in-kind, comprising CPU time and professional support. **ac3** is a participant in the first project agreement within the CRC. It is envisaged that **ac3** will be the IT 'engine room' for the CRC.

Centre of Expertise in Visualisation

ac3 has established a Centre of Expertise in Visualisation, with the assistance of funding from APAC. This has been carried out by supporting *Sydney VisLab*, an existing research institution based at the Australian Technology Park and funded by a consortium of NSW Universities.

Sydney VisLab is using the funds to develop an *Access Grid*. This is a collaborative computing environment that builds on digital video conferencing to support large-scale distributed meetings, collaborative work sessions, and training.



Dr Philip McCrea, CEO of **ac3** (left), Professor Bernard Pailthorpe of Sydney VisLab (centre) and Professor John O'Callaghan of APAC (right) at the opening of the Access Grid in November (courtesy *The Australian*).

Centre of Expertise in Computational Finance

This Centre of Expertise, which is led by Professor Tony Hall (UTS), has been established within the framework of the new CRC for Capital Markets. The operation of this Centre is also supported financially by APAC.

The Centre was launched on November 27 at a successful Financial Engineering Conference organised by **ac3**, which attracted some 85 attendees from both industry and academia. The morning session focussed on industry issues, and speakers included the chief risk managers from 3 of the big 4 banks. The afternoon session was focussed more on research.



Education

ac3's High Performance Computing Education Program, led by Professor Lindsay Botten of UTS, is progressing well. The program acts as a coordinating and brokering unit for HPC related courses between the shareholder Universities as well as TAFE.

Commercial Operations

While **ac3**'s research infrastructure is providing immediate and highly valued support to the academic community, the company's mission extends beyond this client base. Unlike most other supercomputer centres, which are primarily research based, **ac3** has an objective of building profitable, commercial client relationships in the government and private sector. Universities have access to around one third of the centre's capacity without charge. The development of commercial operations is contributing to cash flow, so as to minimise the need for future capital from the shareholders to sustain the operations of the facility beyond 2003.

Development of **ac3**'s commercial business is progressing well, after an initial evaluation and trial stage. The depressed state of the information technology services market during the last twelve months has presented some difficulties, and at the same time the commercial application mix in supercomputing is undergoing a transition, reflecting the trend towards a services economy. Despite these factors, **ac3** is now well placed to grow its commercial revenues based on a business strategy that focuses on two main areas:

Government services

ac3's business with Government is based around its premium data centre. **ac3** provides co-location services for NSW Government agencies and in so doing is establishing itself as a hub for electronic service delivery in the NSW Government.

Current government business includes:

- Hosting www.nsw.gov.au for the Department of Information Technology and Management.
- Web-casting parliamentary proceedings for the NSW Parliament.
- Hosting NSW legislation for the Parliamentary Counsel's Office.

Financial Services

The second main application focus for **ac3**'s commercial operations is the Financial Services sector. Most financial services organisations, particularly the banks, operate market models to analyse their risk exposure. These models are computationally intensive, and are typically run overnight to provide new starting points for the next day's trading.

ac3 is working with a small start-up company, SuperQuant, to provide financial institutions with computational power on an as-needs basis. The results have been spectacular, producing a factor of 200 speed improvements. This business model is under active development with two financial institutions.

Regional activities

ac3 is promoting interest in the use of high performance computing at four selected regional nodes in Wollongong, Newcastle, Western Sydney, and Bathurst/Central West.

Regional committees operate autonomously under a set of guidelines agreed to by the committees and the **ac3** board

Two of the regions – Western Sydney and the Illawarra – have commissioned consultants to carry out a needs analysis for high performance computing in their regions.

Technology Diffusion

ac3 is participating in a national technology diffusion programme, coordinated by APAC. The programme is based on Computational Engineering, and is focussed on the Manufacturing Sector.

The recently appointed APAC Technology Diffusion Manager, Geoff Goeldner is based in **ac3**'s facility.

The technology diffusion focus in NSW will be in the regions. Manufacturing companies in the Hunter, Illawarra and Western Sydney will be encouraged to use computational engineering in their R&D, design and manufacturing processes.

Financial Highlights

2000/1 Financial Year

Total revenue for the 2000/1 FY was \$789K. This includes grant monies from APAC, and \$80K for the first commercial contract. Expenses for the 2000/1 FY were \$4,378K, reflecting significant establishment costs and resulting in an (expected) operating loss of \$3,589K. As of June 30 the Balance Sheet stood at \$5,351K.

2001/2 Financial Year

Despite an unfavourable business climate, **ac3**'s commercial business is growing, and over \$550K was invoiced for the first 5 months of this financial year. Clients include:

- The Securities Industry Research Centre of the Asia Pacific (SIRCA) for the provision high performance computing and storage services.
- The NSW Parliament for web-casting and library services.
- A mining company for processing of survey results. (**ac3** has been able to reduce their processing time from 10 days to several hours).

The company is on track to meet budgeted revenue for this financial year of \$1.2M, with expenses contained to planned levels.

Board and Staff

Chief Executive Officer	Dr Philip McCrea
Chief Technology Officer	Mr Paul Davis
Business Development Manager	Mr Eric Whitehouse
Customer Relationship Manager	Ms Cloudye Carew-Reid
Office Manager	Ms Jodi Blissett
Senior Systems Manager	Mr Frank Crawford
Network & Security Manager	Mr Michael Nancarrow
Systems Specialists	Mr Janos Nagy
	Mr Youzhen Cheng
	Mr Paul Ryan
	Mr Do Hoang

Board:

Mr Phil Singleton (Chair)	Company Director
Mr Les Hosking	CEO, Axiss Australia
Mr Tony Benson	Company Director
Mr Tony Brady	TAFE
Mr Robert Wheeler	DITM
Prof Elizabeth More	Macquarie University
Ms Gail Burke	Macquarie Bank
Prof Mark Wainwright	Univ of NSW
Prof Chris Brink	Univ of Wollongong
Prof Trevor Cairney	Univ of Western Sydney
Prof Lindsay Botten	UTS

The Board meets every second month. Board Committees have been established and meet as needed to support the Chief Executive and governance requirements.

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