

# AARNews

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'Sapphire String Quartet' (at UTS) streamed a live performance across the AARNet network to Reno, USA, during the opening night reception at Super Computing 2007.

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## CEO's Report

As we enter the final weeks of 2007 it's fair to say it's been one of most hectic yet satisfying years for AARNet.

Network traffic for the year to date has grown by 88% over the same period last year, with Off-Net growing at 68% but significantly On-Net, or dedicated research traffic growing at 200%.

During the 2nd half of the year, the capabilities of AARNet3 now appear to be coming to fruition and are worthy of mention. At the August APAN meeting in Xi'an, China, several major demonstrations were conducted. The first demonstration involved AARNet assisting with an advance in medical technology by facilitating a live, two-way digital connection between Korea University Hospital in Seoul, and seven other hospitals in Asia, Europe and Australia. The participation by Concord Hospital in Sydney allowed leading Australian Surgeons to collaborate in a shared surgical event.

In the second demonstration, AARNet broke new ground by successfully linking astronomers across the world via "light paths". The demonstration involved collaborators of the EXPReS project (Express Production Real-time

e-VLBI Service) which conducted the first successful e-VLBI observations to jointly use telescopes in China, Australia and Europe.

The demonstration covered an impressive 41,000kms in total with consistent data transfer rates of 250 Mbps.

In October, again as part of our contribution to the EXPReS project, AARNet collaborated with CSIRO's Australian Telescope National Facility and JIVE in the Netherlands, where astronomers in Australia and Europe were able to view the Supernova SN1987a. The first supernova discovered 20 years ago, SN1987a is located in the Magellanic Clouds some 167,000 light years from Earth. The data were recorded using telescopes at Parkes, Narrabri and Coonabarabran in NSW, and then transferred at 512 Mbps to JIVE's super computer using three AARNet light paths. The JIVE computer combined the signal from the three Australian telescopes to create an image of the supernova.

AARNet was also involved in coordinating a very successful US/Australia workshop that was held in Perth in October titled "Driving e-Research Collaboration across the Pacific". This event

brought together researchers in the areas of Earth and Marine Sciences, Astronomy, High Energy Physics and Remote Instruments, Geosciences and Biosciences.

Real Time Communications "road shows" were held in most states with attendance of over 120 from participating institutions. The main aims of the road shows were to conduct training on the new online video conferencing booking system, and to demonstrate a variety of applications that can be used with the AARNet conferencing bridge to create virtual meeting spaces.

2007 has been a very fruitful year for AARNet and I'd like to thank all CAUDIT members, the AARNet Advisory Committee and the AARNet Board for their support and encouragement. I would also like to express thanks to all AARNet employees who have once again displayed their talent and dedication throughout the year - they have been invaluable in making 2007 a success.

Wishing you all a very Happy Christmas and a healthy 2008!

Chris Hancock  
*Chief Executive Officer*

## FOCUS ON...

### AARNet Delivers for The Centre for Comparative Genomics

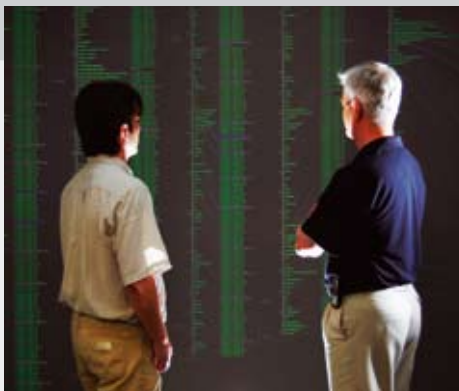
According to Professor Matthew Bellgard, Director of Murdoch University's Centre for Comparative Genomics, the infrastructure provided by AARNet has enabled the Centre to maximise its use of the Internet in delivering quality research outcomes.

Bioinformatics is the science of storing, sharing, analysing, visualising and integrating digitised biological information to understand the genetic make up of all living organisms. This understanding helps, for example, to identify potential vaccine candidates against pathogenic bacteria in both humans and animals, and improves crop breeding.

"The state-of-the-art connectivity solution provided by AARNet has provided the Centre with the capacity to maximise use of the Internet for a range of bioinformatics activities," Professor Bellgard said.

Amongst these uses is the Centre's access to high performance computing facilities around the globe for the purposes of data storage and computation. This enables the Centre to process raw molecular sequence data and identify genes contained within massive amounts of generated genomic data in a coordinated and systematic manner.

The Internet has also facilitated the Centre's access to remote bioinformatics resources. For example, the Centre can now access data and tools from other bioinformatics organisations and institutes which make their resources publicly available. Professor Bellgard says that Internet access has promoted a sharing of these resources in such a way that particular groups with an interest in bioinformatics do not have to reinvent the wheel. Open source resources and tools can be accessed by the Centre and customised to meet specific needs. Resources customised by the Centre are then made available to the international bioinformatics community.



The Display Wall enables scientists to examine the fine detail of complex genetic information to aid decision-making and further analysis.



Data analysis and bioinformatics workflow creation is simplified within the YABI Internet environment.

High speed connectivity has also made it possible to communicate more effectively with local, national and international collaborators and clients, says Professor Bellgard. Internet-based videoconferencing facilities have enabled the Centre to conduct online seminars and meetings to discuss bioinformatics issues, trends and projects with those with an interest in bioinformatics across the nation and in all parts of the world.

According to Professor Bellgard, the Internet is also used as a platform for software application development. The Centre, for example, has developed YABI, an Internet-based application which efficiently and effectively integrates a diverse range of bioinformatics resources and tools in a browser-based environment that makes the analysis of and integration of data relatively simple and intuitive.

Professor Bellgard also points to a further web-based software application, PBWeb, as an example of what is now possible with a high speed network. PBWeb is a joint initiative



The Bioinformatics Research Laboratory where CCG staff provide bioinformatics research support and services for collaborators and clients.



High resolution display of the 3D structure of the glutenin molecule.

of the Centre and the Western Australian Department of Agriculture and Food. This Internet application offers a unique approach in that it operates within an Internet browser and therefore provides mobile access to statistically valid trial designs and data associated with the multiple plant breeding programs within the Department. Professor Bellgard says that the way the system is designed it can interact with other Internet-based bioinformatics resources resulting in a more efficient decision making process when it comes to developing new and improved crop varieties.

The advent of DNA sequencing, and in particular, the third generation sequencing technologies and other biotechnologies have resulted in the production of massive amounts of genetic data at a relatively low cost. "Traditional methods of analysis and comparison are no longer feasible," Professor Bellgard said. "That's why the Internet and Internet-based resources now play an indispensable and ever increasing integration role in the world of life sciences".

## SPOTLIGHT ON...

### The Centre for Comparative Genomics Team

The Western Australian State Government Centre of Excellence in Comparative Genomics (CCG) based at Murdoch University aims to draw together and enhance the activities of diverse, intensive pockets of research activity which extend from the agricultural sciences through to biomedical research to create bioinformatics solutions for the rapidly expanding task of integrating and analysing large amounts of biological data.

The Centre's team, led by Professor Matthew Bellgard, has national and international expertise in bioinformatics, computational biology, comparative genomics, molecular biology, genome annotation, integrated systems development and high performance computing.

According to Professor Bellgard, the Centre represents a unique approach to research in Comparative Genomics through drawing together biomedical and agricultural research and development, bioinformatics activities and expertise in comparative genomics, in such a way as to promote shared understanding within and across fields of study.

"Our focus is research and development as well as service provision", said Professor Bellgard. "We have 23 staff including professors and research fellows in molecular



biology and related disciplines, software developers, system administrators, bioinformatics officers and administrative staff".

One of the Centre's goals is to enable scientists to interact with each other via the Internet to address common challenges of interest. These challenges include how to store, manage, analyse, visualise, curate and integrate large amounts of biological data. The Centre has a niche in developing web applications that efficiently use the Internet and provide a secure environment to find innovative solutions to these challenges.

At the heart of the Centre is the Bioinformatics Research Laboratory (BRL) which represents unique scientific infrastructure for Australia. Professor Bellgard says that the BRL offers a range of capabilities, including the development of computational tools, a vast range of data analysis and high resolution visualisation strategies, and the development of integrated web-based applications. The BRL is a dedicated

high performance computing facility that will soon be upgraded to 450+ cores. "The facility itself provides industry and academic researchers access to state-of-the-art computing infrastructure and support as well as a 4 metre wide by 3 metre high, 18 million pixel high-resolution display wall that enables researchers to visually interpret and conduct further analysis", said Professor Bellgard.

Formerly known as the Centre for Bioinformatics and Biological Computing, the CCG has attracted \$23 million in government and industry funding that includes the amount of \$9.5 million over four years from the National Collaborative Research Infrastructure Strategy (NCRIS) 5.1. NCRIS 5.1 funding will enable the Centre to provide advice, leadership, integration and coordination of bioinformatics activities to nationally support bio-molecular research platforms of genomics, proteomics and metabolomics.

### Australian Access Federation

Access federations provide the means of allowing member institutions to trust the information they receive from other members so that access to resources and secure communication can be conducted seamlessly, in a way that will support effective collaboration between users.

The Australian Access Federation (AAF) is a project sponsored by the former Australian Government's Department of Education, Science and Training (DEST). Its partners are the University of Queensland, the Australian

Computer Emergency Response Team (AusCERT) and Macquarie University. The AAF aims to:

- enable researchers, other staff members, or students at a university or research institution, to log in using a single account issued by their institution, and to access a wide range of resources both internal and external to their institution.
- enable resource managers to grant access to authorised members of the research and higher education community in a secure way without having to issue accounts.

- benefit institutions by enabling their research, academic, and administrative users to access a wide range of resources and to collaborate more easily with colleagues in Australia and in other countries with which the AAF has a peering relationship.

An animation to serve as an introduction to the concept of federated access management use within the AAF is available at <http://www.aaf.edu.au/aaf-federated-access-management-animation>.

Further information: <http://www.aaf.edu.au> (from which the above text is an edited extract)

## Swinburne shines at AusNOG 2007

It's been too many years since the Australian network operators got together and had their own workshop that was focussed on their common interests in network operational technology. Various 'NOGs' are active all over the world from New Zealand's NZNOG meetings in January of each year to NANOG in North America. It was therefore all the more welcome to see the first Australian Network Operators' Group meeting held in Sydney in mid-November 2007.

The topics that interest network operators are certainly many and varied, from the trials and tribulations of deployment of competitive DSL infrastructure in this country, to a detailed analysis of the differences between wireless and wired infrastructure for non-metropolitan areas. Being an island it's not surprising that if you want high capacity connectivity in and out of the country then submarine cable is an absolute requirement, and the latest developments in cable technology and forthcoming cable installations were presented. It's no longer an activity that is the exclusive preserve of the legacy telephone operators as a new wave of competition enters this once tightly controlled space.

A workshop providing an in-depth analysis of the next set of DSL standards also took place. It focused on how DSL is managing to get up to 50Mbps out of a single copper pair, with the prospect of a further doubling of this speed, with the latest Australian research on this topic.

It's pretty much mandatory at the moment to have an update on the looming exhaustion of IPv4 addresses and the state of IPv6 deployment, or lack of it, and this workshop was no exception. We also heard about a less well known exhaustion issue within the number space used by internet routing and the way in which this is being addressed at the operational level in the BGP protocol. Put this together with information about Botnet activity, device-driven networks and overlay service delivery, and you have a very full agenda of operational topics.

It's not all just network engineers and operators and the vendors who sell to this industry who were at this workshop. Some of the issues that

are exposed in these operational venues are themselves substantial research issues, and, like other NOG venues across the globe, the AusNOG workshop attracted interest from researchers who are working in this area. The participation at AUSNOG from the Centre for Advanced Internet Architecture of the Swinburne University of Technology was notable in this respect. Their approach to real time network monitoring using a 3D game engine was truly innovative, and if I had to nominate what I found to be the most interesting paper of the entire workshop it would have to be the researchers and their game engine. At one level there is something quite appealing to my inner geek about shooting an Access Control List into a recalcitrant router! At the same time at a slightly more serious level it is really heartening to see that there is still active academic and research interest in networking in Australia and that there are some truly innovative approaches being considered by Australian researchers to some of the tougher outstanding challenges in network operations.

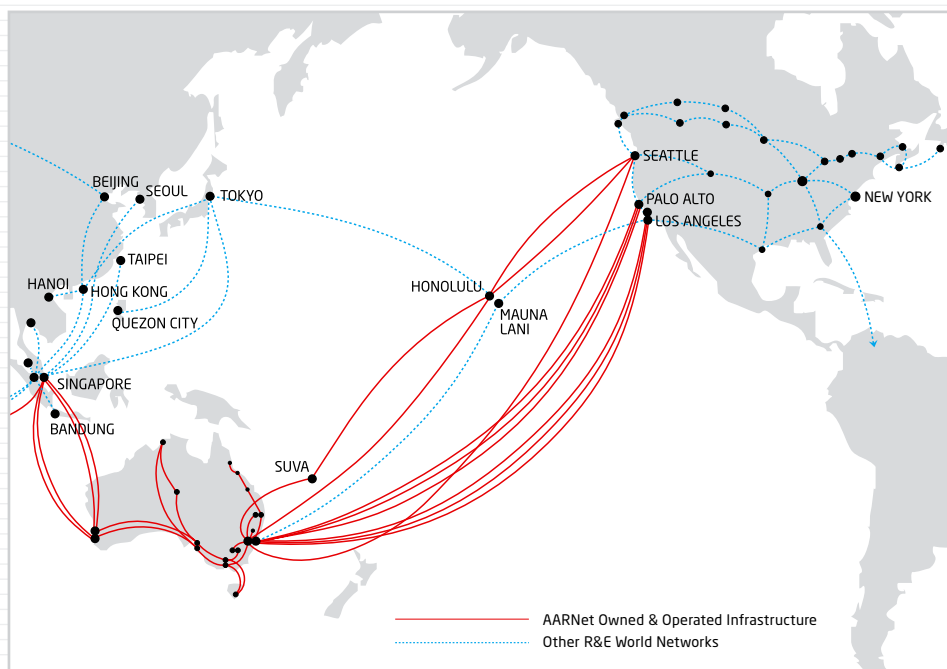
Geoff Huston  
*Chief Scientist, APNIC*

## International Capacity Upgrade

AARNet recently upgraded its international commodity Internet capacity by purchasing a third STM-4 circuit on the Southern Cross Cable Network (SCCN) service between Sydney and the USA. Because AARNet handles its own protection, each STM-4 is effectively two separate circuits - one on the SCCN northern route, and one on the SCCN southern route. An STM-4 is 622 megabits per second of capacity, and can carry approximately 1,200 TB per year at an average 50% utilisation.

The upgrade was necessary to handle expected traffic peaks at the beginning of first semester 2008. If current growth rates continue, a fourth STM-4 will also be required some time during 2008. However, AARNet will almost certainly convert these four circuits into a single STM-16 service to benefit from the discounted price of these circuits, and simpler management.

Annual commodity Internet traffic has grown at 70% during 2008, and traffic usually peaks in May and October.



## 2008 Subscription Options

2008 Subscriptions have now been posted to all shareholder customers. There are two options available in 2008 – a Usage Option and a Fixed Option. The form which accompanies the subscription notification should be used to nominate one of these options. If no response is received by AARNet by December 14th then the default will be the Usage Option.

Non shareholder customers should also have received advice on the new charge for 2008 which has been set at \$10 per GB. Associate customers should also receive their subscription notification in December.

## High Definition String Quartet

In November, AARNet participated in an international technology demonstration by transmitting uncompressed high definition video (at greater than 1.4Gbps) using iHDTV™ from Sydney across SxTransPORT and Internet2 to the Super Computing 2007 Conference in Reno, Nevada. Guests at the SC07 Gala Opening Night were treated to a wonderful performance by local Sydney string quartet, Sapphire.

iHDTV™ is a software suite developed by ResearchChannel along with the University of Washington consisting of software modules that work with commercially available components to capture, packetise and transport high-definition video in various formats over Internet protocol networks, spanning the range of HDTV quality levels, with the goal of providing wider access to high-definition content

“The video was stunning, and the uncompressed audio quality was close to being there,” said Michael Wellings, director of Engineering for the ResearchChannel consortium.

The SC07 showcased how high-performance computing, networking, storage and analysis lead to advances in research, education and commerce. This international conference was attended by scientists and engineers, software developers, policy makers, corporate managers, CIOs, and IT administrators from universities, industry, and government agencies.

## Surgery via Video Conference

In September, AARNet assisted in advancing remote medical collaboration by facilitating a live, multi-way digital video connection between Korea University Hospital in Seoul, Korea and seven other hospitals in Australia, China, Japan, Singapore, Philippines, India and France. The participation by Concord Hospital in Sydney allowed leading Australian Surgeons to collaborate in a shared surgical event, hosted at the 24th APAN (Asia Pacific Advanced Network) Meeting in Xi'an China.

Doctors were able to observe and comment on the laproscopic surgical procedure in real time via a high quality, high-resolution videoconferencing system, bridging geographical divides and enabling medical specialists around the world to learn and teach each other advanced procedures.

The linkup occurred using the Digital Video Transport System (DVTS) requiring a minimum 30Mbps link (higher bandwidth and quality than traditional H.323 videoconferencing), across SxTransPORT using the Southern Cross Cable Network (SCCN).



## Megaconference 2007

Megaconference 2007 was held on November 8-9 and hosted in Australia by AARNet who provided bridging ports across the standard and high definition Codian Multipoint Control Units (MCUs).

This event, running 12 hours from midnight Thursday until midday Friday, attracted significant international participation from approximately 400 endpoints distributed across the globe. MCUs from several vendors, with ports donated by other NRENs and institutions, were cascaded together to form a large scale voice-switched video conference.

The theme of this year's conference revolved around presentations that related to large-scale social issues with participants from Pakistan, Myanmar, India and the Ukraine.

The Australian contribution from Australian Catholic University on Indigenous Education Programs was well received and contributed to the overall theme of global cooperation.

AARNet was concurrently testing a Polycom HDX high definition conferencing endpoint in conjunction with remote parties who were using endpoints from the major video conferencing vendors. This allowed an in depth understanding to be gained on the principles of operation of large scale conferences involving disparate vendor equipment and was gauged a success by all involved.

## Project Group Update

### MCU Review Project Group

Project groups are funded by AARNet to support a range of projects designed to deliver new or enhanced applications across AARNet3 and provide direct benefits to the Academic and Research Network community. These groups consist of 6-8 AARNet members, staff (and in some cases partner organisations) who work together on short term projects or activities.

The MCU Review Project Group has deployed a pilot Codian Management Platform and easy 1-2-3 online booking form for Video Conferencing. The system is now available to other members to test. This platform enables:

- (1) Registered users to book video conferences, via a simple 1-2-3 online booking form;
- (2) Coordinators of Audio Visual Equipment (CAVEs) administrators to automatically schedule and manage videoconferences;
- (3) CAVE administrators to gain access to a pool of shared MCU ports (increasing port capacity and providing redundancy).

User Training has taken place and supporting documentation is available online. <http://www.aarnet.edu.au/Content.aspx?p=151>

Over the coming months, the group will improve the system's redundancy, develop additional training and support materials, and prepare a final report and evaluation of the pilot service (due April 2008).

### eduroam Project Group

eduroam is a federated authentication solution that allows users from participating institutions to gain secure access to other institutions' wireless networks using their standard username/password credentials as they do at their home institution.

An eduroam Project Group has been established to support greater deployment and use of eduroam through technical, managerial, policy and marketing efforts.

The group is preparing a uniform minimum standard for:

- eduroam authentication and authorisation
- monitoring deployment and use, and
- provision of local support.

The eduroam Project Group will also examine eduroam work taking place internationally to develop eduroam, and in efforts to expand eduroam coverage beyond campus network wifi hot spots.

Uniform Service documentation and a repository of technical information are in development.

More info: <https://wiki.aarnet.edu.au/display/eduroam/Home>

## Demonstrating Real Time Communication Applications

AARNet hosted real time communication road shows recently in Newcastle, Geelong, Brisbane, Adelaide and Perth, demonstrating a variety of applications that can be used to create a virtual meeting space. A majority of AARNet customers were represented at the road shows and AARNet obtained valuable feedback on the new applications and other services.

AARNet's online MCU video conferencing booking service, EVO personal collaboration tool and InSORS Access Grid solution were demonstrated as pilot services and the technologies ran successfully on a variety of customer network environments. Attendees were able to use these tools to join a "Brady bunch" to see and hear each other.

The MCU video conferencing booking service is available to customers free of charge and is used regularly by customers as a failover solution. The system uses an easy automated online booking form. More info: <http://www.aarnet.edu.au/Content.aspx?p=101>

EVO works like a desktop based access grid. It's a distributed collaboration tool incorporating video, audio, white board and shared file features. It uses java, integrates with H.323 and is firewall friendly. More info: <http://evo.caltech.edu/>

InSORS is a commercial grade Access Grid solution that claims to be easy to deploy and use. The application is currently being trialled by a small group of users at Flinders University, RMIT, University of Sydney, University of Queensland and AARNet. The group will assess InSORS over the coming months and provide feedback on its usability and interoperability with Access Grid (2 and 3 standards) and its ability to support research, teaching and learning needs. More information: <http://www.insors.com>

Links to the complete summary, presentations and photos can be found at <http://www.aarnet.edu.au/Blog/archive/2007/10/29/roadshow2007.aspx>



Jason Bordujenko (AARNet) and Steve Neville (Codian) at the WA RTC Road show



## Diary dates

### Sun Tech days coming to ANZ - 4th-6th March 08

The Sun Tech Days program is a 15 city world tour designed to educate developers in local markets on various technologies. The events are typically a 2.5 day format and range from hands on education, university training, community programs and technical sessions.

World renowned speakers from the Sun Java, Solaris evangelists teams Global Community leaders of NetBeans, OpenSolaris, Glassfish presentations and demonstration make this a must see event.

Tech Days are your opportunity to hear from and meet with some of the brightest from around the world. It's a chance to network with your peers, understand more about what's going on from Sun and the industry and all in a local environment.

Tech Days travels the globe to share expertise with the community about the Solaris OS, the Java EE, SE, and ME platforms, the NetBeans IDE, Sun Studio, Open Source and more.

#### Further information:

The presentation media will be made available on AARNet3. Updated information will appear at <http://www.aarnet.edu.au/Article/EventDetail.aspx?p=65&id=52>.

<https://au.sun.com/secure/events/techdays/interest.jsp>

<http://developers.sun.com/events/techdays/>

Contacts: [laurie.wong@sun.com](mailto:laurie.wong@sun.com) or [tracy.longster@sun.com](mailto:tracy.longster@sun.com)

### Wireless Security Video Conference - 22 January 2008

The Wireless LAN is a natural extension to traditional wired networks, enabling the key attribute of mobility. And yet, the very basis of its advantage, the pervasiveness of the network, exposes the LAN to threats in an entirely new way. Companies have long relied on physical security to secure access to the wired LAN, but the need for mobility has created a network which extends beyond those physical boundaries.

Mark Krischer, Engineer at Cisco Systems will discuss the ways in which International and Industry standards bodies, as well as Cisco itself, have worked to secure the Wireless LAN; and by extension, how security is not something to apply to a specific network or application, but rather something to be embedded into the foundation of the network itself.

More info: <http://www.aarnet.edu.au/Article/EventDetail.aspx?p=65&id=63>

## Future Events

### AARNet Ozeconference - Wireless Network Security (CISCO)

22 January, Video Conference

### APAN 25/Joint Techs

20-25 January, Hawaii

### Linux Conference

30 January-2 February, Melbourne

### AARNet Board Meeting

10 March, Brisbane

### Megaconference Junior

21-22 February, Video Conference

### SunTech Days Conference

4-6 March, Sydney

### IVEC Conference

31 March-4 April, Perth

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We welcome your suggestions/feedback.

If your institution can demonstrate an interesting/innovative use of the network please contact [aarnews@aarnet.edu.au](mailto:aarnews@aarnet.edu.au)

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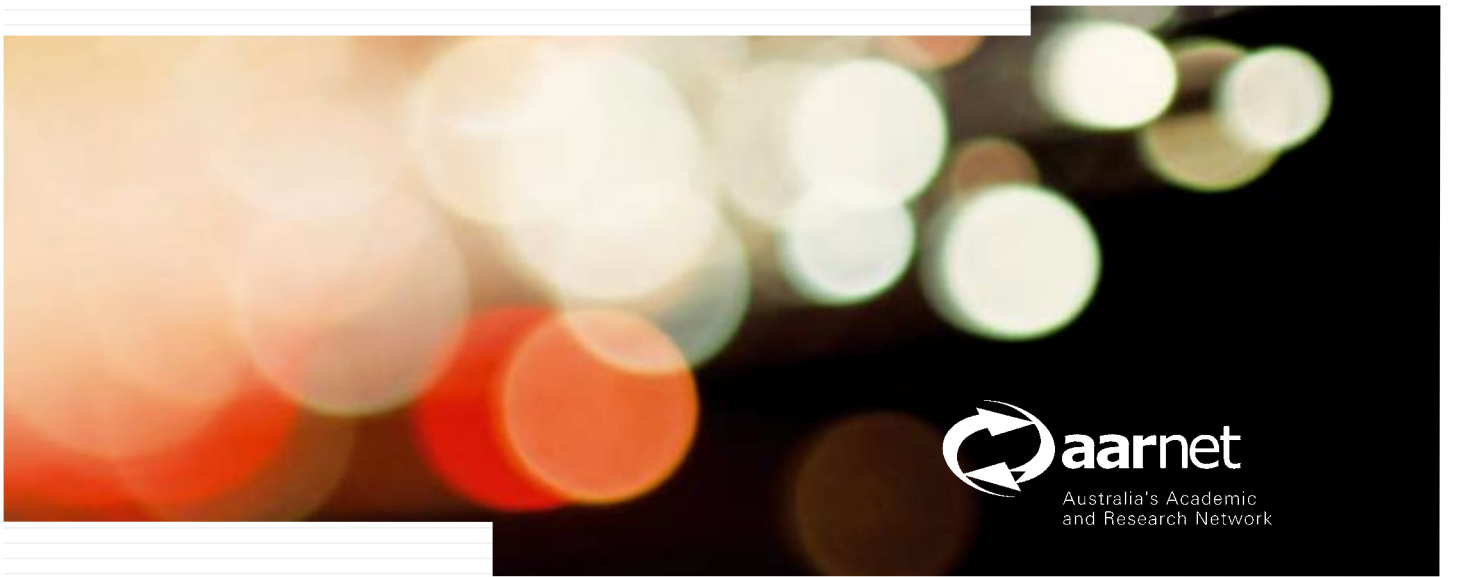
## Staff Profile - Edwin Wong

Edwin joined AARNet in June 2005 and is a member of the Operations Team who looks after AARNet PoPs, connections and customers in Victoria and Tasmania.

Edwin has brought a wealth of experience to AARNet. He was the Victorian Regional Network (VRN) Manager who looked after the equipment and members of VRN (through the University of Melbourne) for 9 years. Prior to this he was with Hong Kong Polytechnic University and also worked as a customer service engineer maintaining DEC computers for tertiary institutions in Hong Kong.



Edwin enjoys recreational travel, badminton, swimming, walking, gardening and listening to classical and traditional music. He is also doing Chinese calligraphy, collecting stamps and coins in his leisure time. Edwin is sharing his life in an eastern suburb of Melbourne with his wife, three children, a dog and a rabbit.



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