

# AARNetNews



Senator the Hon. Kim Carr with Australian and New Zealand representatives at the Banff Conference



Kate Cornick, Executive Director of the Institute for a Broadband-Enabled Society, receives the Young Achiever award at the recent ACOMM dinner from the event host Julia Zemiro

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## CEO's Report

Traffic growth for 2011 year-to-date has been around 50%, comparable to the long-term average. More remarkably, unmetered traffic now constitutes 80% of total traffic, due in particular to the extension of Off Peak by another 4 hours each day. We are also pleased to announce the inclusion of weekends as Off Peak from 1 July.

All five National Research Network (NRN) projects, and particularly the Greater Sydney Basin Network project, have continued to make good progress. The long form proposal for this project has now been approved by both the National Steering Committee and DIISR.

AARNet has become an endorsed Early Access Seeker for the NBN in order to supply services in the First Release sites of Armidale, Townsville, Kiama, Willunga and Brunswick. Three of these five first release sites, Armidale, Townsville and Brunswick are all popular student residential areas due to their proximity to both the universities and TAFEs. Our interest is to offer the connection to up to 50 homes in each of these first release areas for staff and students of UNE, JCU, RMIT, The University of Melbourne and Kangan Institute.

AARNet participated in the "Megaconference via IPv6" event as part of World IPv6 Day. As the official Australian coordinator of IPv6 connectivity testing, AARNet led the initiative alongside Internet2 and other international partners.

AARNet is pleased to announce it will host and operate a Cisco Telepresence Exchange service free of charge for three years. The service will offer point-to-point and point-to-multipoint services to Cisco TelePresence systems only, but is a major breakthrough for institutions using Cisco across the sector.

Finally, AARNet linked a "live" demonstration into the SKA Conference in Banff connecting the telescopes at Auckland NZ, Hobart, Parkes, Coonabarabran, Narrabri, with the new ASKAP dish at the Murchison Radio Observatory in Western Australia. All these telescopes were connected to a super computer at Curtin University in Perth WA. The combined sustained data rate was 5.5 Gbps for a 12 hour period.

Chris Hancock  
*Chief Executive Officer*

## FOCUS ON...

### ASKAP and the SKA



#### 2011 International SKA Public Forum, Banff, Canada

The SKA Public Forum is a day of presentations and events that brings together scientists, industrialists, policy makers and representatives of government departments and funding agencies who are working together to advance the implementation plan for the Square Kilometre Array.

The most recent Forum was held in Banff, Canada on 6 July and was attended by representatives of the two competing proposals – Southern Africa and Australasia. From Australasia were the Honourable Kim Carr (Minister for Innovation, Industry, Science and Research), Professor Brian Boyle (Project Director, Australia and New Zealand SKA Project), Professor Steven Tingay (Deputy Director, International Centre for Radio Astronomy Research, Perth), and many others.

A number of articles in this edition of AARNews are related to the SKA, and their inclusion was prompted by the recent SKA Public Forum.

#### The Fast(er) Road to the SKA

Australia's bid for the Square Kilometre Array (SKA) project came a step closer in June when AARNet and Cisco successfully deployed a

Above: Dr Brian Boyle addressing the SKA Public Forum  
Below: A view of Banff from the top of Sulphur Mountain



trial 40 Gbps service for the CSIRO and the radio astronomy community.

The trial linked three CSIRO facilities across some 1,300km from the Parkes Radio Telescope in central NSW to the Narrabri Observatory in northwest NSW and the radio headquarters in Marsfield Sydney. It was supported by AARNet's existing optical network infrastructure, based on Cisco's Multiservice Transport Platform. To achieve the bandwidth upgrade, new 40 Gbps muxponders were installed on the AARNet optical network backbone, enabling the transmission of parallel wavelengths without regeneration.

The trial is just the first step towards achieving even higher capacities of 100 Gbps per wavelength. While the 40 Gbps muxponders are

already in production, the 100 Gbps equipment is only in pre-production – the 40 Gbps equipment can easily be replaced by the 100 Gbps muxponders to achieve an almost instant upgrade.

The timing of the demonstration was critical. Only Australia and South Africa are left in the bid to host the SKA, which is expected to generate enormous bandwidth demand. Representatives of the SKA project met in Banff, Alberta, Canada in July for a key meeting (see separate article).

#### Lighting Adelaide to Perth

AARNet is looking forward to finally lighting its own fibre optic capacity from Adelaide to Perth. Sufficient funding was not available to do this when the optical network was first rolled out in 2004/5, but subject to confirmation, funding from the NRN project will soon be allocated to enable this network upgrade.

Since the construction of AARNet3, a single 10 Gbps wavelength provided by NextGen has supported AARNet's primary backbone capacity between Adelaide and Perth. Greater backbone capacity requirements, and especially projects such as ASKAP, mean that 10 Gbps of capacity is no longer adequate. The network build from Adelaide to Perth will provide 80 channels - each capable of 100 Gbps. This 8 Tbps network effectively increases AARNet's total capacity by 800 times. This dramatic increase will underpin AARNet's ability to support research and education needs between the eastern states, Western Australia and onwards to Asia and Europe, well into the future.

The fibre distance between Adelaide and Perth is 2,700 km – consisting of 30 spans each of about 90 km. Lighting this network will involve AARNet installing new optical transmission equipment at each end, and also in the 29 Controlled Environment Vaults (CEVs) along the way. Many of the CEVs are solar powered, and will require significant upgrades, even though this newer equipment is more power and space efficient than earlier generations. The network design includes provision to deliver services into Kalgoorlie and Port Augusta, as well as services from Adelaide to Perth.

Earlier preliminary network designs required all active wavelengths to be re-generated at a half-way point, but recent network designs mean that regeneration won't be required. Activating new wavelengths will merely require installation of a new transponder at each end.

### MRO First Light

The Australian Square Kilometre Array Pathfinder (ASKAP) is a CSIRO project associated with Australia's bid to host the internationally funded Square Kilometre Array. ASKAP is being constructed in remote Western Australia, about 300 km north-east inland from Geraldton at Boolardy Station. The facility is now better known as the Murchison Radio-astronomy Observatory (MRO).

The MRO will eventually be linked via fibre optic cable to the Pawsey Centre in Perth via Geraldton. AARNet has been responsible for constructing the link from the MRO to Geraldton, and the link to Perth is being constructed by NextGen through the Commonwealth Government's Regional Backbone Blackspots Program.

The project passed a major milestone on 17 June when the first "end-to-end" light (network connectivity) was achieved between the MRO and Geraldton. There is now a single 1 Gbps connection "daisy-chained" through service-provider class switches in each of the Controlled Environment Vaults (CEVs, also known as repeater huts) and Boolardy Station.



Road to Boolardy following heavy rains



The CLOUDS team

## University of Melbourne CLOUDS Lab

Pioneering research at The University of Melbourne's Department of Computer Science and Software Engineering is leading the next wave of computing. Professor Rajkumar Buyya, Director, Cloud Computing and Distributed Systems (CLOUDS) Lab, Dept of Computer Science and Software Engineering at The University of Melbourne and his research team are leading research into flexible cloud computing economics based platforms across multiple private and public clouds in an automated and seamless way.

The latest research has led to new breakthroughs in greater flexibility to access computing resources and storage based on a wider variety of market based policy options for a pay as you use like service that can support multi-tenant users across multiple data centres and cloud service providers. Parameters can be assigned for the number of processors, time, energy and carbon emitting options that are then used to determine workload schedules to host a number of different applications and services including content delivery networks.

CloudBus is the group's flagship project for cloud based software platforms that includes research into different computing mode support, application hosting, support for the green cloud (follow the sun or close to energy source solutions) and options for scalability. The team has developed a market oriented cloud platform known as "ANEKA" to support different types of computing modes via a software development toolkit that can be deployed across multiple data centres and can seamlessly extend to public cloud based services via an intracloud solution.

CloudBus was recently extended to support LIGO (Laser Interferometer Gravitational) - Wave Observatory, one of the world's largest physics projects, involving CALTECH, MIT and researchers in the US, Italy and Australia to interrogate data across multiple clouds including Amazon EC2 and Microsoft Azure to successfully move large data sets and processing capabilities easily. The work enabled researchers to have the capability to access compute storage and datasets to search for difficult to detect gravitational waves that are generated by massive, compact objects such as white dwarfs,

neutron stars and black holes, moving at close to light-speed. Advanced technology has now brought the direct detection of these waves within reach which will open a new window to the Universe allowing astronomers to probe environments thus far inaccessible to conventional telescopes.

"Being able to access a high speed networks like "AARNet3" makes this LIGO/Cloudbus research possible on a national and international scale. "We certainly want to expand awareness of our work and involve the broader research community to embrace the opportunities that cloud computing can bring across high speed networks such as AARNet" said Professor Buyya. Professor Buyya's team has recently won the Institute of Electrical and Electronics Engineers' (IEEE) SCALE 2011 international award for their work with LIGO.

Examples of commercial use of the ANEKA platform in use today include:

1. The Indian Department for Space which is using the platform to analyse high resolution satellite imagery onto a global mapping system for many concurrent data analysts and researchers to use.
2. Chinese locomotive design images based on Computer Aided Design (CAD) where intensive image processing on a 30 node private cloud normally takes many hours to complete. With ANEKA the loads can be better distributed within that cloud and extended if required to multiple public clouds to enable the processing to be completed in a more timely manner.

The team is keen to explore new ways to use the platform across national and international research and education communities. For more information about The University of Melbourne's Cloud Computing and Distributed Systems (CLOUDS) Laboratory please contact [raj@csse.unimelb.edu.au](mailto:raj@csse.unimelb.edu.au).

For more information about the Melbourne CLOUDS lab and its research see <http://musse.unimelb.edu.au/june-11-63/university-researchers-cloud-nine-after-international-win> and <http://www.buyya.com/papers/AnekaCloud-CSI-India2011.pdf> and <http://www.cloudbus.org>.

## NSW State-wide Complex Epilepsy Service

The newest affiliate customer of AARNet is the NSW State-wide Complex Epilepsy Network (SCEN).

Academic teaching and epilepsy services in New South Wales like many other medical super specialties has grown out of a mosaic of medical specialists, allied health staff and hospital services whose disparate natures resulted in less than optimum outcomes.

In 2008 in an effort to improve access and care of patients with epilepsy in New South Wales, NSW Health established a state-wide network bringing together expertise from five comprehensive epilepsy centres in New South Wales. These consist of adult services located at the Prince of Wales Hospital (POW), the Royal Prince Alfred (RPA) and The Westmead Hospital and two paediatric services at the Sydney Children's Hospital and the Children's Hospital at Westmead. The senior members of this network are affiliates of the major teaching hospitals in Sydney.

Critical to the success of the SCEN is their conduct of regular weekly sessions covering developments in research and patient care. Given the geographical separation of the key members and their home campuses, the SCEN recognised a need for high quality videoconferencing capabilities between the sites. These capabilities critically needed to include the transmission of high quality streams of EEG data, DICOM and jpeg images as well as conventional PowerPoint slides.

The SCEN has established AARNet 1 Gbps services into the Children's Hospital at Westmead, The Royal Prince Alfred Hospital and Sydney Children's Hospital and use these connections to access the AARNet National Video Conferencing Bridge. Critical to the establishment of the links to the hospitals was the cooperation of the University of NSW and the University of Sydney both of whom encouraged the connections and made available fibre infrastructure to enable the completion of the circuits.

## World IPv6 Day

The first World IPv6 Day was held on Wednesday 8 June 2011. An initiative of the Internet Society (ISOC), World IPv6 Day, was a global scale trial of the new Internet Protocol IPv6. The current IPv4 protocol used on the general internet has run out of available address space and the newer IPv6 protocol will be required to allow seamless end-to-end connectivity between internet users in the future.

Top websites and internet service providers around the world, including Google, Facebook, Yahoo!, Akamai and Limelight Networks joined together with more than 1,000 other participating websites for a successful global-scale trial of the new Internet Protocol, IPv6.

AARNet has been using IPv6 in a production environment since 2003. The AARNet website <http://www.aarnet.edu.au> and the AARNet Mirror have been IPv6 enabled for a number of years, and AARNet has been in the forefront of establishing links with major content providers over IPv6.

As part of the day's activities, AARNet participated in the first IPv6 Megaconference with video participants from all over the world.

Over 400 Australian organisations joined the trial, including Monash University and the Australian National University (ANU). As one of the early adopters of IPv6, AARNet's role is to help ensure the internet continues to work and keep organisations and individuals connected to the information that sustains their work and personal lives. By participating in World IPv6 Day, top websites serving billions of users have demonstrated progress towards the largest transition in Internet's history.

## Off Peak traffic extended to weekends

Following the introduction of unmetered Off Peak traffic in mid 2009, and the extension in 2011, Off Peak has been further extended to include all of the weekend. This means that Off Net subscriptions now only cover traffic downloaded between 9:00am and 5:00pm, Monday to Friday. Traffic downloaded at any other time is both unmetered and unlimited.

Since 2005, the proportion of traffic regarded as unmetered has increased steadily from 15% of total traffic, to 80% in 2011. The inclusion of weekend traffic as unmetered is expected to increase the proportion of unmetered traffic to around 85% of total traffic by the end of 2011.

## AARNet Mobile Broadband Project

The AARNet Board has approved a new service offering - a mobile broadband data service which should be available from the start of 2012. As mobile data usage is increasing more rapidly than other data usage, this new service is seen as providing AARNet's end users with high quality data connectivity - off campus, in fact everywhere.

AARNet will deliver the service by either an iPad SIM or by a Mifi device, creating a WiFi hotspot with the ability to connect up to five separate devices. The advantages of the AARNet service over competing service providers include:

- + it will be of a higher quality at a lower price;
- + prices can be adjusted regularly to remain competitive;
- + it will provide unmetered access to some data.

This service will be provided via a data bucket. The data bucket has the advantages of reducing the risk and uncertainty of high end users by providing a means to control usage leading to potentially large cost savings. Data buckets will range from 30 GB per month shared by 30 users, up to 500 GB per month shared by 500 users. Individual plans will range in size from 1.5 GB per month up to 12 GB per month.

If you need any further information, please contact Rob Ewin, James Sankar or myself.

Lee Ridge  
CFO, AARNet

## SPOTLIGHT ON...

### QUESTnet 2011 Conference

The annual QUESTnet Conference took place at Jupiters Casino on the Gold Coast from 12-15 July. While the event is organised by the Queensland universities, it also attracts participants from universities across Australia, as well as other institutions engaged in research and education at all levels.

This year's conference was hosted by the University of Queensland, with the assistance of the QRNO, AARNet and CAUDIT. The theme was "Preparing for the Next Big Wave". As well as a number of plenary sessions and three streams of presentations, there were also full day sessions on K12 and Digital Outreach. These latter two programs have been introduced in recent years and are organised and sponsored by AARNet.

Keynote speakers included Simon Hackett from Internode, Gary McLaren from NBN Co, Dennis Gannon from Microsoft USA and Martin Bech from UNI-C Denmark. Further information is contained in other articles on this page.



From top: Delegates at a plenary session of the QUESTnet 2011 conference; Delegates attending the K12 stream; Simon Hackett, CEO of Internode, addressing a plenary session of the conference. Left: David Wilde (AARNet), Mark Laffan (ACU) and Warwick Mitchell (AARNet) at the AARNet booth at the QUESTnet2011 conference

Minister Garrett discusses aspects of 21C schooling with students



### QUESTnet K12 Stream

AARNet again hosted a K12 stream at this year's QUESTnet Conference on the Gold Coast in July.

As in previous years the highlight of the K12 stream was the student collaboration sessions. This year there were two sessions each bringing together presenters and students from Tasmania, Victoria and New South Wales via High Definition videoconferencing.

The first session titled 'Why Music Matters' brought together Sabiene Heindl (Music Industry Lawyer) and Nick O'Byrne (Australian Independent Record Labels Association Executive and Musician) to discuss with students issues around intellectual property, creativity and music distribution.

In the second session entitled the '21st Century School' the discussion was led by the Minister for School Education, Early Childhood and Youth, the Hon. Peter Garrett.

For these sessions the medium is the message, the power of the network to bring together young Australians to engage directly with those in positions of responsibility in managing issues that directly impact their lives.

### QUESTnet Digital Outreach Stream

The inaugural Digital Outreach Stream was an exciting extension to QUESTnet and was structured to bring together a broad national representation of Museums, Libraries, Historic Trusts, Cultural Organisations, Education Systems and Vendors to share their experiences in establishing Digital Outreach programs.

This event was the first national forum of this community. Presenters included NSW DET Connected Classrooms, National Film and Sound Archive, Great Barrier Reef Marine Park Authority, Australian Museum, History SA, Field of Mars, Questacon and Polycom.

Topics covered new enabling technologies, how to identify and develop a market, production values and program design considerations for

video collaboration, multimodal delivery using a range of technologies, and curriculum integration into schools, TAFE and University programs.

All sessions were well attended with this community dedicated and enthusiastic about the Digital Outreach agenda and the potential of pushing their specialised knowledge resources into classrooms and lecture theatres both nationally and internationally.

## BITS & BYTES

### AARNet Unified Communications Exchange (UC-X)

The Applications and Services team is connecting trial member institutions to the new AARNet UC-X. The service is designed to connect unified communications platforms from different vendors and to allow services such as personal video calls between institutions. A publicly accessible wiki page has been created to provide more details about the project including information on how to get involved at <https://wiki.aarnet.edu.au/display/UCX/Home>.

There are currently six active institutions using the service. We expect to connect another institution during July/August. Time has been set aside with each institution to conduct more in depth service testing to fine tune the solution. We are particularly keen to speak with any institution using Microsoft OCS/Lync who would be happy to trial the Exchange. Please refer to the wiki link for details.

### AARNet Cisco TelePresence Exchange

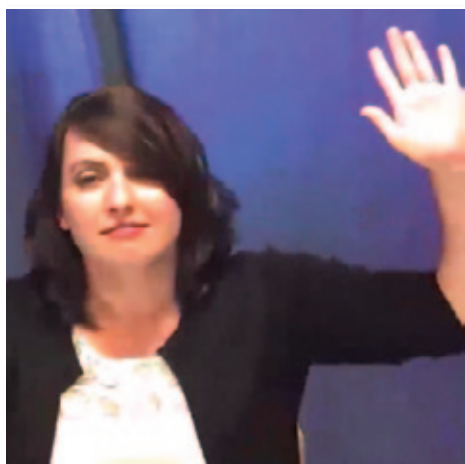
AARNet recently announced a strategic agreement with Cisco that will see AARNet connect multiple academic institutions locally and internationally via a Cisco TelePresence Exchange System™ to facilitate cross institutional meetings. The Cisco TelePresence solution will enable customers on AARNet's network to enjoy life-like virtual meeting experiences via Cisco TelePresence systems located at different locations. It enables customers to invite meeting participants from across Australia to a virtual table at highly immersive high definition resolution.

AARNet's efforts to participate in the Global Research & Education TelePresence Community (GRETC) mirror those of the National Lambda Rail (NLR) Network in the USA which AARNet kindly acknowledges for its assistance and stewardship in this area. The new service is expected to move into production in October 2011.

### Market developments in the unified communications personal video area

Unified Communications developments have been moving rapidly driven by new devices, applications and capability sets, not to mention the ever changing marketplace with mergers and acquisitions. The main players in the Unified Communications market are now no longer seen as video companies but rather as 'eyeball' companies with their market share the key metric: think Microsoft, Apple, Google and Facebook. Microsoft's US\$8B purchase of Skype, Apple's iOS and device dominance, Google's new social foray Google+ with 'Video Hangouts' and Facebook's native integration of Skype point-to-point video all highlight this shift in communications from an 'over the top' model to core product offerings forming a user's collaboration network.

The Unified Communications Interoperability Forum (UCIF) and the Open Visual Communications Consortium (OVCC) are the key industry organisations that will drive the interoperability



Heather Wiese-Walsh joined from Philadelphia via High Definition VC

## Conference Reports

### Education Outreach

It has been a big few months on the conference trail in the world of Education Outreach during May, June and July.

In May AARNet was actively involved in the Association of Independent Schools (NSW) IT Managers Conference. This conference brings together around 350 K12 IT/ICT leadership delegates from around Australia. IPv6 was a topic of great interest as many schools begin to come to terms with the design and deployment considerations. Glen Turner was on hand to contribute to a session on v6.

In June AARNet was a major sponsor at the Education Revolution in Action hosted at John Paul College (JPC) in Daisy Hill. JPC connected to AARNet in December and provides a national ICT leadership role in the K12 ICT Community.

A highlight of the program was the exuberant and engaging keynote delivered by Heather Wiese-Walsh from US partner NREN MAGPI (<http://www.magpi.net/>). Heather delighted delegates with her experiences and strategies for building global competencies through interactivity.

AARNet demonstrated its Interactive Global Learning Environment (IGLEw), which was operated throughout the conference and with great aplomb by brother and sister duo Mackenzie Angel (aged 9) and her brother Zander (aged 6), both students at JPC, who led delegates on tours of the known universe. This technology belongs in the hands of students and is at its most powerful when done so. AARNet also demonstrated the Swinburne 3D Theatre, still some of the best 3D animation and content going around (<http://astronomy.swin.edu.au/production>).

## The AARNet Conferencing Scheduler System launched

AARNet has launched its enhanced Conferencing Scheduling Service, developed to facilitate growing demand for videoconferencing services. The system was built for AARNet by Renovo Software and has been designed to offer a streamlined user experience as well as significant advances in functionality. The new system has already captured the attention of the international community with expressions of interest from research networks in the US and Europe.

Interoperability is a key feature of the new system, which works seamlessly with both Cisco and Polycom conferencing bridges, recording and streaming technology and will even recommend which bridge to use based on conference and network connection parameters.

The new scheduling service offers a host of additional functionality for users, including:

- + Streaming and recording facilities: With the tick of a box, customers can elect to record or live stream their conference.
- + Privilege based access: Four Tier based user levels provide privilege based access to different levels of functionality.
- + Improved email notifications: Pre-set email templates have been built into the system to streamline communications.
- + Improved reporting functionality: Administrators can run over 25 reports including usage management, bridge capacity and reports on a per institution basis.

AARNet is observing a huge growth in demand for videoconferencing services and is committed to providing customers with streamlined user-friendly access to these facilities. The Renovo solution gives users the power to manage their conferences online in a few simple steps. For more about the new AARNet Conferencing Scheduling System see <http://bit.ly/pgXE0I>.

## Future Events

**2011 AIEC (Australian International Education Conference)**

11-14 October 2011, Adelaide

**APAN32, 22-26 August 2011**

New Delhi, India

**GLIF 11th Annual Global LambdaGrid Workshop**

13-14 September 2011, Brazil

**Internet2 Fall 2011 Member**

3-6 October 2011, Raleigh, North Carolina

**eResearch Australasia 2011**

6-10 November 2011, Melbourne

**7th Annual IEEE eScience Conference**

5-8 December 2011, Sweden

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We welcome your suggestions/feedback.

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

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## STAFF PROFILE

### Neil Witheridge

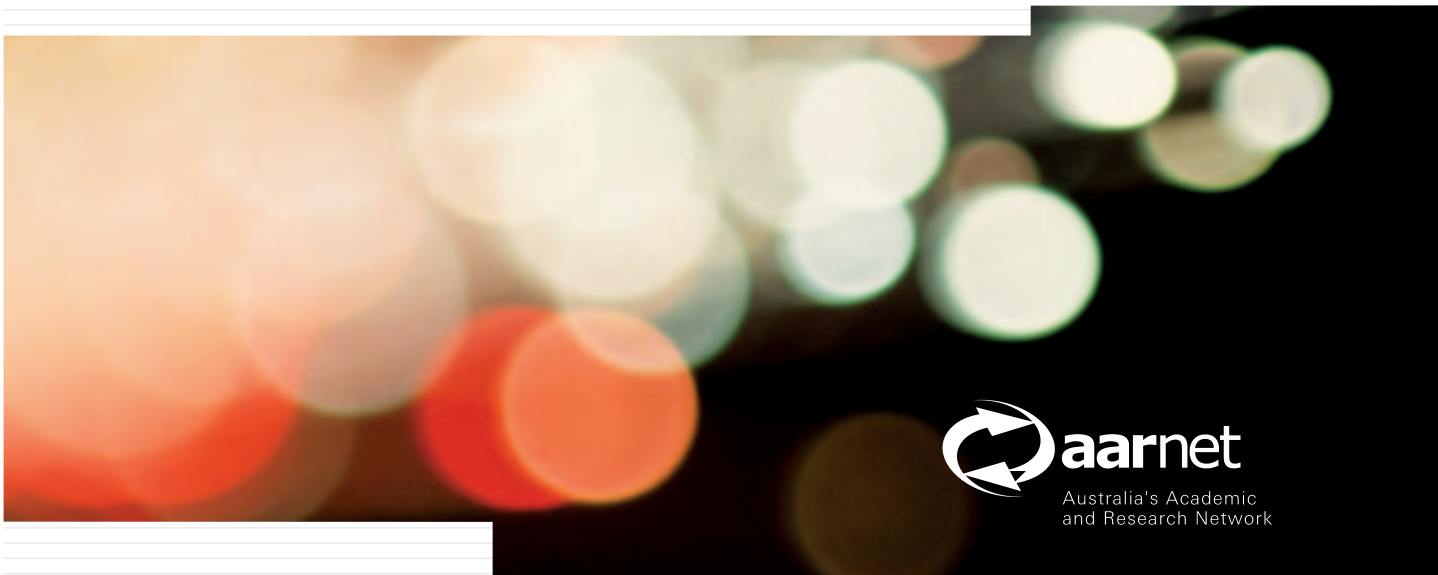
Neil Witheridge joined AARNet in March 2011 as Authentication and Authorisation Services Technical Manager. Over the past seven years Neil has been involved in research (Macquarie) and development (Australian Research Collaboration Service) related to federated identity management, enabling secure services to be offered by a Higher Education or related institution to staff, researchers and students across the entire HE sector, relying on users authenticating at their 'home' institution.

At AARNet he is responsible for the technical and operational aspects of the eduroam service (a federated service allowing users to access network resources when they travel to other institutions), advancing AARNet's use of the Australian Access Federation, and contributing to local and international developments related to federated identity management. In general, he is responsible for identifying opportunities for AARNet related to authentication and authorisation.



Prior to becoming involved in federated identity, Neil's career included working for the Australian Broadcasting Corporation, Sony Technology Centre Australia, Bell Northern Labs Australia (Wollongong University), and Canon Information Systems Research Australia, primarily in the area of software engineering.

Neil lives in Epping, Sydney, with Rowena, and their children Katherine (20), Tim (18) and Phillip (16). His major interests are internet technology and music; he enjoys reading, watching TV, going to the movies and bush and urban walking to keep fit.



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