ANNUAL REPORT / 2018

DATA CONNECTOR FOR THE FUTURE

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DATA CONNECTOR FOR THE FUTURE

“Our values – one team, creativity and trust – are fundamental to AARNet’s culture and drive how we work with each other and our customers and partners.”

CHRIS HANCOCK, CEO AARNET

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WHO WE ARE
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WHAT WE DO

Since 1989, AARNet, Australia's Academic and Research Network, has provided ultra high speed, ultra high quality broadband and collaboration services to institutions within the Australian education and research sector.

AARNet is a national resource, a National Research and Education Network (NREN), run by AARNet Pty Ltd, a not for profit company owned by 38 Australian universities and CSIRO.

AARNet's customers include the shareholder universities (listed on page 37) and CSIRO, as well as most of the publicly funded research agencies, such as Australian Nuclear Science and Technology Organisation, Geoscience Australia and Australian Institute of Marine Science, several state government agencies, hundreds of schools, many TAFEs and hospitals, and most state and federal galleries, libraries, archives and museums.

AARNet infrastructure interconnects over two million users—researchers, faculty, staff and students—at institutions across Australia with each other and research and education institutions worldwide, the public Internet, and resources such as scientific instruments, data storage and high performance computing facilities. We also interconnect content and service providers and organisations that collaborate with the research and education community.

AARNet underpins education across the life-long learning spectrum and research across a diverse range of disciplines in the sciences and humanities, including high energy physics, climate science, genomics, radio astronomy and the arts.

For researchers and educators working in today's increasingly globalised data-intensive world, AARNet removes barriers to discovery and innovation.

WHAT SETS AARNET APART?

We pride ourselves on being future focused and providing what commercial operators are unequipped or unable to provide: an ultra high speed network that pushes the boundaries of networking technology while delivering cost-effective and sustainable infrastructure for Australia. The research and education community relies on AARNet for outstanding service availability and service quality.

OUR VISION

is of a high bandwidth, globally connected Research and Education Network that connects Australian educators and researchers to those with whom they wish to collaborate anywhere in the world, with ease, speed and convenience that makes the issue of physical separation irrelevant. Unashamedly we care about enabling outcomes that benefit future generations of Australians.

OUR MISSION

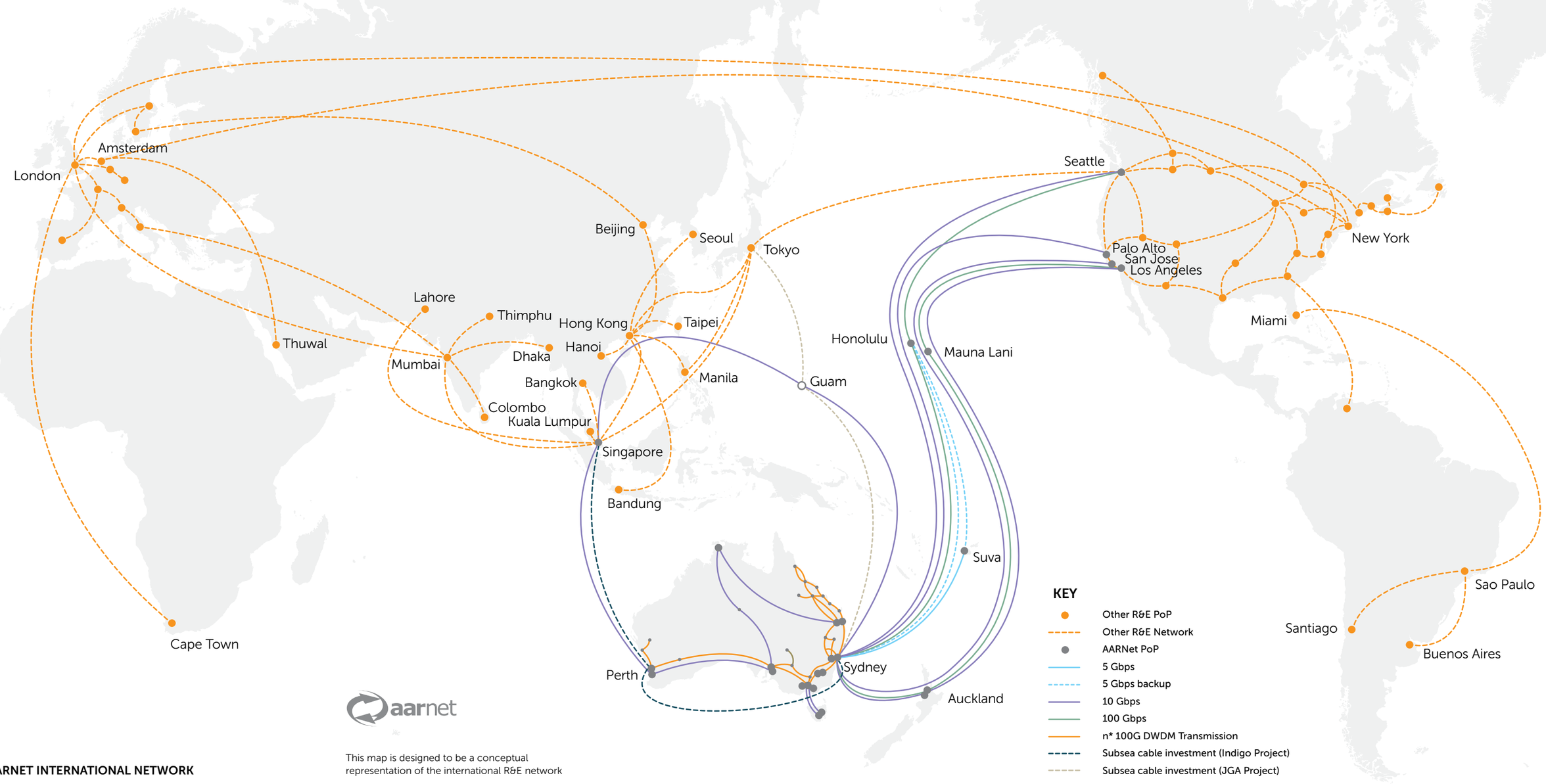
is to enable globally competitive research, education and innovation by providing transformational connectivity and collaboration services to meet the unique needs of our customers.

OUR VALUES

– **One Team**
Everyone counts and is accountable. We are committed to teamwork and partnerships – collaboration is at our heart.

– **Creativity**
Strive to innovate – it's in our DNA. We embrace creative solutions to problems, seek out diverse perspectives and enjoy what we do.

– **Trust**
Communication is open and transparent. We are honest and ethical, and always respect and support each other.



AARNET INTERNATIONAL NETWORK

This map is designed to be a conceptual representation of the international R&E network

AARNET NATIONAL NETWORK

aarnet

AARNet supports life-changing research across a diverse range of disciplines in the humanities and the sciences, including the work of Dr Bettina Berger, Scientific Director of the Australian Plant Phenomics Facility, pictured here in the high-throughput Smarthouses at the Facility's Adelaide node, The Plant Accelerator®.
Image courtesy Australian Plant Phenomics Facility.

MESSAGE FROM THE CHAIR

Chairman Gerard Sutton AO (left) with CEO Chris Hancock

I am pleased to report that it has been another successful year for AARNet. A great year for AARNet is one that not only generates a solid business performance, but one that enables our customers to improve the performance of research and education in Australia and which in turn sustains our nation's global competitiveness.

For nearly 30 years AARNet has been reporting on the development of its world-class national research and education network infrastructure and excellence in network operations and service delivery. This report is an update on our activities and the value that we are delivering to our shareholders. It also showcases some of the ways in which customers are leveraging the AARNet network and services to make the most of opportunities available to them.

Today, we believe AARNet remains a model business, an exemplar of an academic/business partnership that has endured in the highly regulated world of telecommunications to become one of the world's leading National Research and Education Networks (NREN)s. These are exciting times for AARNet. We are operating in a rapidly changing technology and regulatory environment that in recent years has seen the business evolve and quickly grow from a small organisation to a medium scale company to ensure the unique needs of our shareholders and customers continue to be met.

A number of factors are influencing our business: Australia's bipartisan approach to national security and fast-tracked legislation, coupled with the demands of the research and education sector's rapid adoption of cloud services and the growth of data. This means that information and network security are increasingly important to AARNet and we are looking at new ways to collaboratively support our shareholders and customers to manage security and risk.

AARNet is focused on ensuring that Australia's research and education community has the long-term infrastructure it needs to remain connected to peers and resources nationally and to international partners. To this end, we are consortia partners in the Indigo and JGA subsea cable system projects to boost capacity to Asia and across the country. We achieved significant progress against milestones this year, with Indigo set to be operational by mid 2019 and JGA the following year. Nationally, outstanding progress has been made on Project Triversity, which will see AARNet own more alternative network paths around the country to improve network redundancy and reliability.

With universities facing increasing pressure to both deliver an exceptional student experience and to support data-intensive research, AARNet continues to develop its portfolio of services in partnership with shareholders, NREN colleagues globally and vendors. Cross-institutional collaboration is evolving rapidly. In response, the AARNet team continues to grow our customer base, connecting schools, TAFEs, hospitals, galleries, libraries, archives and museums, providing pivotal linkages between our shareholders and the broader research and education ecosystem.

As Chair of the AARNet Board I would like to thank my fellow Board Members, the AARNet Advisory Committee and all of you our shareholders for being so supportive of the AARNet journey. Finally, I would especially like to acknowledge the CEO Mr Chris Hancock, his leadership team and each and every one of our AARNet team for their outstanding professionalism and dedication.

We are confident that we are continuing to create great value for our shareholders and customers and we look forward to delivering further success in the year ahead.

Gerard Sutton AO, Chair AARNet Board

MESSAGE FROM THE CEO

This past year has seen AARNet expand and scale-up its operations to meet the technical demands of the services required by our customers. We continue to believe that 'business as usual' is not an option for our position at the intersection of the telecommunications, information technology, research, education, and training sectors.

For many of the research domains we serve it is no longer a matter of simply connecting researchers to each other, the challenge is developing and optimising "big" data workflows throughout the research data lifecycle. AARNet's ability to provide support in real time for our teaching and learning colleagues has changed the very nature of AARNet's value proposition and relevance. In addition to this, cyber security has become a critical driver for how we deliver our existing services and how future capabilities are developed. Consequently, AARNet saw a massive shift of focus to project management and delivery in 2018.

This year was the first of our new five-year 2018-2022 strategic plan which lays out the strategic platform and priorities that guide our investments in network and technology solutions for our shareholders and customers. Our operations are underpinned by three key pillars that drive our strategic performance and successful delivery: operating Australia's research and education network, growing our communities and developing technology services to meet the needs of our customers.

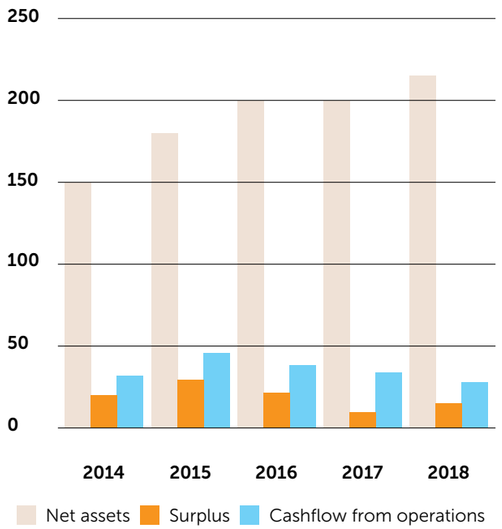
During 2018 we identified six strategic priorities. The first priority, Own the Infrastructure, captures a key plank of our how we build long-term sustainability and service differentiation. Domestically, this is about owning fibre optic cable in the ground, and Project Triversity, which will expand AARNet's national fibre backbone to alternative fully redundant and diverse paths and further strengthen the reach and reliability of our services. Internationally, this is exemplified by the Indigo and JGA subsea projects, which are now coming to fruition.

Our second priority is providing the necessary long-term Infrastructure for Health and Medical Research. AARNet has already commenced significant engagements with both Bioinformatics and Medical Research institutes and we see this as an area of significant development during the coming decade.

AARNet's CloudStor service now serves over 65,000 users across our community and forms the foundation for the development of a National Collaborative Research Storage Platform – our third priority. To achieve this AARNet is working in close collaboration with the eResearch ecosystem to become the data connector for Australia's innovation system and to ensure widespread delivery of effective services for all the key research domains.

Fourth, is to lead the sector in the development of Cyber Security Capability, Services and Infrastructure. During 2018 we developed an Early Warning System to proactively detect cyberattacks, introduced a DDoS mitigation product and developed the case for a Security Operations Centre to provide 24-hour surveillance and monitoring across our shareholder networks.

SELECTED FINANCIAL DATA ($M)



Figures for 2014-2016 do not include the effect from the adoption of AASB15: Revenue from Contracts with Customers.

THIS YEAR WAS THE FIRST OF OUR NEW FIVE-YEAR 2018-2022 STRATEGIC PLAN WHICH LAYS OUT THE STRATEGIC PLATFORM AND PRIORITIES THAT GUIDE OUR INVESTMENTS IN NETWORK AND TECHNOLOGY SOLUTIONS

Wherever possible, we have continued to focus on building Regional Infrastructure, our fifth priority, to extend the reach of the network to improve access to affordable broadband services for campuses, study hubs and scientific instruments across regional Australia.

Finally, our sixth strategic priority is to Optimise for Customer Value by developing processes and systems to improve the AARNet customer experience. This includes streamlining our 'on boarding' engagements and providing metrics that capture the value of the services our customers consume.

Throughout 2018, we undertook a process to identify, capture and introduce AARNet's values - One Team, Creativity and Trust. Our values are fundamental to our culture, embedded into our recruitment, training and performance management processes and underpinned by a strong emphasis on the development of Human Resource initiatives for all of our staff.

None of our achievements throughout 2018 would have been possible without a highly committed AARNet Board, AARNet Advisory Committee and our people. I would like to personally thank our customers and everyone engaged with AARNet this past year for their support and we look forward to continuing to grow our services and delivery to you all.

Chris Hancock, Chief Executive Officer

HIGHLIGHTS

THE YEAR IN NUMBERS

$214.20
Net assets in millions

$ 30.9 million
invested during 2018

144 AARNET4 VPNS DEPLOYED ^ 60% (COMPARED TO 2017)

zoom

106,683
Users

495,973
Meetings

cloudstor

61,588
Users

627 TB
Data stored

Panopto™

110,648
Users

78 TB
Data stored

522,175
Hours of video viewed

eduroam

435,790
Australian visitors to Australian institutions

80,323
Australian visitors to international institutions

140,286
International visitors to Australian institutions

100000000000000 BITS

TERABIT NETWORK FOR RESEARCH AND EDUCATION

OPERATING & ADVANCING AUSTRALIA'S RESEARCH & EDUCATION NETWORK

A key part of achieving AARNet's mission is the operation of a broadband network that provides ultra high quality, highly available and resilient national and international telecommunications services to meet the unique needs of the research and education sector.

AARNet provided high levels of network performance and availability in 2018. The average network availability was 99.92%, which was slightly lower than the level achieved in 2017 (99.95%). The reduction was due to prolonged outages experienced on a submarine cable between Australia and Singapore operated by a third party; excluding the effect of those outages the level of availability was 99.99%.

This exceptionally high level of reliability is achieved over the vast geographic footprint of our infrastructure through strategic long-term planning and well-architected network redundancy. Diversity in the network design and equipment enabled the operations team to deploy alternate paths and minimize the impact of the outages on AARNet customers.

CAPACITY PLANNING AHEAD OF DEMAND

One of the distinguishing features of a research and education (R&E) network is careful capacity planning to remain ahead of the demand curve, and to accommodate the increasingly data-intensive requirements of research.

The peak demands of the academic year determine the sustained capacity required, and the needs of the most data-intensive research disciplines, such as radio astronomy, climate science and bioinformatics, determine the absolute peak capacity.

AARNet continually monitors the network load of our customers, as a percentage of the capacity generated by each link rather than the absolute volume of traffic, to determine when network upgrades are required.

EXPANDING INTERNATIONAL CAPACITY

In early 2018, AARNet increased international capacity on the Perth to Singapore and Sydney to Singapore circuits from 2.5 gigabits per second (Gbps) to 10Gbps to support growth in traffic between Australia and Asia.

Significantly, AARNet secured long-term access to three new international cable paths to Asia and beyond, through the Indigo, JGA and CAE-1 projects.

INDIGO AND JGA SUBSEA CABLE SYSTEMS

In a first for the Global R&E community AARNet has invested in two new submarine cables; Indigo and Japan-Guam-Australia (JGA) South. Indigo is an approximately 9,000km cable system linking Sydney, Perth and Singapore, and JGA-S will link Sydney to Guam and onto North Asia. Participation in both these cable consortia will provide the research and education community in Australia with lifetime asset ownership of highly sought-after international cable capacity. Importantly AARNet will have the flexibility and capability to independently light its share of the

IN A FIRST FOR THE GLOBAL R&E COMMUNITY AARNET HAS INVESTED IN TWO NEW SUBMARINE CABLES; INDIGO AND JAPAN-GUAM-AUSTRALIA(JGA) SOUTH.

Image courtesy of Alcatel Submarine Networks.

international spectrum over time to meet the growing demand of bandwidth intensive applications. This mirrors the very successful model that AARNet has pursued for more than 15 years; lighting its own national dark fibre.

Building submarine cables is a very different, highly specialised business. AARNet has been fortunate to have as its partners in these two cable projects some of the world's most skilled and experienced submarine cable owners; among them Telstra, Singtel, Google and SubPartners, ensuring a quality system deployment. The cable commissioning phase of the Indigo project is complete, with "ready for service" expected in May 2019. All manufacturing of the JGA cable is complete, with "ready for service" expected in Q1 2020.

COLLABORATION ASIA EUROPE

The third major international initiative was the establishment by AARNet of a small consortium of international National Research and Education Networks (NRENs) to jointly procure 100G circuits from Singapore to London. Initiated and led by AARNet, this consortium is named CAE-1 (Collaboration Asia Europe) and comprises SURFnet, NORDUnet, GÉANT, SingAREN and TEIN*CC with AARNet making six partners in all. As a licenced telecommunications carrier and able to deal at the wholesale level, AARNet has entered into a long-term agreement for capacity on SeaMeWe5 from Global Switch in Singapore to Equinix London. This is a model framework for the world's R&E networks to aggregate their purchasing power and acquire long term tenancy on major international trunk routes.

When all three new investments become operational AARNet will have made a very significant contribution to research and education in Australia, mitigating our geographic disadvantage with lifetime ownership of economically sustainable international connectivity.

Within Australia, traffic between universities grew by 35% in 2018. This traffic was predominantly research data, reflecting an increase in cross-institutional collaborations and data-intensive research across the sector.

EXTENDING OUR REACH IN AUSTRALIA

Our customers increasingly value the reliability of the AARNet network, particularly for accessing the essential cloud services their operations depend upon. This year we continued to see a growing number of customers across the sector, including universities, schools, hospitals and health and other research institutes, upgrading their connections.

As their demand for bandwidth increases, more K-12 schools are now ordering multiple 10Gbps paths, rather than the single 1Gbps connection they historically opted for. Similarly, universities are choosing multiple 100Gbps connections to support not only big science research, but also their critical day-to-day business operations.

Around the country, AARNet's Infrastructure Development Group delivered a number of network upgrades and expansions to the network's fibre footprint, including:

- **Multiple 10Gbps diverse connections for K-12 schools in Sydney and Melbourne**
- **100Gbps diverse connections for University of Queensland data centres and numerous other data centres around the country**
- **Augmenting the thick fibre rings in capital cities: work completed in Melbourne, Sydney and Brisbane**
- **Supporting sport science education with a connection for the University of New England campus located in Sydney Olympic Park**
- **Supporting delivery of high-speed connectivity in regional Australia for K-12 schools, TAFEs and university campuses with fibre builds in the southern states from Mt Gambier and Whyalla in South Australia to Shepparton in Victoria, and in Queensland out to Emerald and Rockhampton**
- **Supporting health and medical research and education by continuing to connect numerous hospitals in New South Wales, and the Edith Cowan Sarich Neuroscience Research Institute near Perth Children's Hospital**

ON-NET DOMESTIC TRAFFIC

The best network experience for AARNet customers is realised when they are communicating with other AARNet-connected customers and AARNet-peered service providers. This is called "on-net" traffic. The amount of on-net domestic traffic continued to grow, accounting for 85% of all Internet traffic in 2018. The figure reflects the move by many global content and cloud services providers to host and deliver content and services accessed by our customers within Australia. As a consequence, AARNet has been increasing capacity to selected domestic service providers (peers).

AARNet continues to enter into partnerships to directly connect popular global content and service providers to the AARNet network. This improves the performance and availability of the services and because traffic to and from on-net sites is not metered, provides substantial cost savings for AARNet customers.

INFORMATION SECURITY

During 2018, AARNet defended against Denial-of-Service and Distributed-Denial-of-Service (DoS/DDoS) attacks and focused on helping stakeholders and the wider community understand, mitigate and respond to security issues.

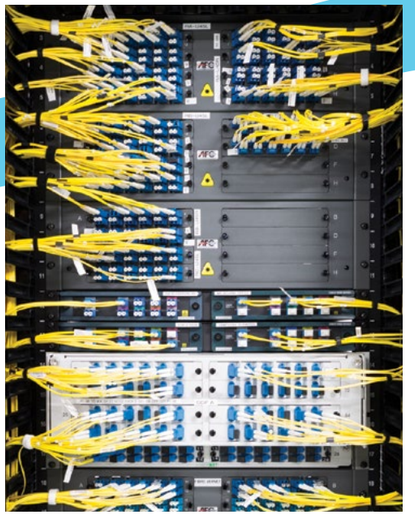
AARNet has now implemented an Early Warning System to reduce the time it takes to detect DDoS and other attacks affecting customers' networks, with 14 customers enrolled in this service by the end of 2018.

Following extensive laboratory testing using real network metadata, we have selected Flowmon as the preferred solution to implement a DDoS detection and mitigation capability. This solution was developed by CESNET, the Czech Republic National Research and Education Network.

We anticipate launching a pilot with a small number of universities early in 2019.

The Global NREN Security group, of which AARNet is a founding member, welcomed a number of new members during 2018. This brings the total number of NRENs represented in this forum to 20, plus ESnet (the United States Energy Sciences Network). During the Asia Pacific Advanced Network Meeting in New Zealand in August 2018 a briefing session was conducted to promote the Global group through the Asia Pacific region. Working closely with REANNZ (the New Zealand Research and Education Network), using the Global NREN Security Baseline document, we provided security expertise to MoRENet (the Mozambique Research and Education Network) and UbuntuNet Alliance (the regional networking organisation for Eastern and Southern Africa) to establish information security capabilities in their region.

As part of AARNet's customer engagement program, the AARNet security team conducted a cyber security state-based update session with the Victorian universities and a Table-top Incident Response exercise with the Western Australian universities.



ENGAGING & GROWING THE RESEARCH, EDUCATION & INNOVATION COMMUNITIES

AARNet fosters collaboration, knowledge sharing and discovery by connecting organisations with a research and education mission across Australia and working closely with them to provide the infrastructure and services they need to deliver excellence in research and education.

LIGHTING UP K-12 SCHOOLS AND TAFES

Throughout 2018, Australian schools and TAFEs continued to take advantage of the benefits of AARNet in increasing numbers; both new customers accessing powerful R&E network bandwidth for the first time, as well as schools already connected to AARNet that used their access to collaborate with content and cloud service providers and innovate in teaching and learning.

By the end of 2018 over half a million K-12 school students at more than 1,200 schools were connected to AARNet. AARNet continued to focus on improving access to high speed broadband for K-12 schools in regional Australia, notably connecting schools in regional Victoria, as well as in Emerald in Far North Queensland as part of a project underway with the Catholic Diocese of Rockhampton. This project will see all the schools in the diocese across regional Queensland progressively connected to the network during 2019.

AARNet worked with many K-12 schools, delivering network solutions and seeding interactions and collaborations between school students and universities, galleries, libraries and museums connected to AARNet.

COLLABORATING IN THE PACIFIC REGION

AARNet's long-standing effort to support better broadband for education and research in the South Pacific continued, with AARNet connecting Fiji National University (FNU) in 2018. AARNet's Enterprise Services team supported the rollout of this enhanced connectivity to 30 campuses across the Fiji islands. FNU staff also travelled to Australia during the year, visiting Australian universities and technology companies to help develop their own capabilities.

BUILDING DIGITAL PRESERVATION INFRASTRUCTURE FOR GLAMS

Many of Australia's national and state galleries, libraries, archives and museums (GLAMs) are now connected to AARNet. With this underlying network connectivity in place, AARNet is focused on delivering services "above the network" to enable the GLAM community to preserve and share their globally significant collections. AARNet's CloudStor service plays a key role in this endeavour and helps GLAMs strengthen their capacity to seize new opportunities for collaborative research, engagement and outreach; develop large scale, data driven services; and richly engage with their communities through high-fidelity video connections. GLAMs working with AARNet have the opportunity to leverage unequalled access to storage and compute resources all connected to the research network, enabling humanities, arts and social science research and partnerships to flourish.

AARNet is a participant with Swinburne University and the Australian Centre for the Moving Image in the Play it Again project awarded a grant in 2018 to investigate emulation as a service for the preservation of Australia's video game heritage.

SUPPORTING INNOVATION IN HEALTH AND MEDICAL RESEARCH AND EDUCATION

By connecting researchers and educators at university campuses, health research organisations, health systems and health precincts across Australia, AARNet underpins and enables life changing research and innovation in education for the next generation of health researchers and medical practitioners.

The number of health education and research facilities connected to AARNet continued to grow during 2018, while eduroam was deployed in more hospitals and health-related institutions to support mobility between campuses, research facilities and hospitals for students, faculty and researchers.

With the volumes of data used in health research increasing exponentially – primarily due to rapid advances in genomic sequencing capabilities – the need for high-speed network access has become vital for moving data generated in a clinic or laboratory to supercomputing resources for analysis and on to researchers at institutions across the country.

CO-DEVELOPING SOLUTIONS FOR COMMON CHALLENGES

AARNet is aligning effort and strategy across research disciplines in the sciences and humanities to find common research infrastructure elements that can then be rolled out more broadly as services to aid researchers in AARNet shareholder institutions.

During 2018, AARNet strengthened its collaboration with the national Data and Digital eResearch Platforms (DDeRPs): the Australian Research Data Commons (ARDC), Australian Access Federation (AAF), the National Computational Infrastructure (NCI) and the Pawsey Supercomputing Centre.

In partnership with the DDeRPs, AARNet participated in strategic discussions with NCRIS (National Collaborative Research Infrastructure Strategy) facilities and is working closely with the DDeRPs and wider eResearch community to develop solutions to address the collective need for sustainable persistent data tools and data services, secure cloud storage, transfer and compute services for sensitive data and a sustainable model for national data collections.

The eResearch team was also involved in developing the foundations of the Pathfinder Project for the Bioinformatics Commons. This project will be a joint undertaking of BioPlatforms Australia, the Australian Research Data Commons (ARDC) and AARNet. The activities of the project will significantly enhance our understanding of state-of-the-art life science data infrastructure with the specific future goal of establishing an Australian life science data infrastructure that will enable over 30,000 life science researchers across Australia.

We worked closely with the Australian Academy of the Humanities to provide information and advice to support initiatives aimed at scoping a national facility for humanities, arts and social sciences.

Our engagement with the international NREN, eResearch and Research Data communities also continued to ensure that our services are leading edge and leveraging international innovations. In 2018, AARNet joined the Research Data Alliance, an international organisation launched in 2013 by the European Commission, the United States National Science Foundation and National Institute of Standards and Technology, and the Australian Government's Department of Industry, Innovation and Science with the goal of building the social and technical infrastructure to enable open sharing of data.

TRAINING THE TRAINERS IN DATA AND DIGITAL SKILLS

The more technology intensive learning and research become, the more important it is that knowledge workers, researchers and educators build awareness of digital platforms and networked capabilities. Data processing and data handling practices need to be extended and strengthened.

With the aim of helping researchers make the most of the powerful AARNet infrastructure available to them and in recognition of the leadership role library, information technology and research support professionals are taking and how that plays into critical skills development in the research community, AARNet's eResearch team was involved in a number of collaborative projects in 2018, including:

- A partnership with the Australian National University (ANU) Library to unlock the Sydney Stock Exchange records and make them accessible as inputs to research. (Read more in the Spotlight story on page 46). The trial to use CloudStor as a transit space for a digitisation workflow (on-net) is complete and ANU digitisation specialists are able to choose from a range of tools and techniques as part of their digitisation workflow.
- A partnership with Macquarie University eResearch colleagues to lead, program, and deliver the first dedicated stream for humanities, arts, and social science researchers and academic and data librarians at the Sydney Research Bazaar. This afforded AARNet the opportunity to liaise with and call in research and data infrastructure specialists to deliver domain relevant introductory workshops (AURIN, Alveo virtual laboratory, Australian Data Archive, Trove/National Library of Australia).
- Partnerships with eResearch colleagues at University of Wollongong and Macquarie University to deliver workshops for social science researchers and research support staff from IT, the Library and Research Office.
- A partnership with University of Melbourne and Griffith University on the Humanities, Arts and Social Sciences data enhanced virtual lab project (rebranded as "Tinker") to establish a data curation framework and enable uptake of Jupyter Notebook for data handling and processing.
- A partnership with ARDC (Australian Research Data Commons) to launch a round of national events aimed at accelerating data skills training.

AARNET IS ALIGNING EFFORT AND STRATEGY ACROSS RESEARCH DISCIPLINES IN THE SCIENCES AND HUMANITIES TO FIND COMMON RESEARCH INFRASTRUCTURE ELEMENTS THAT CAN THEN BE ROLLED OUT MORE BROADLY AS SERVICES TO AID RESEARCHERS IN AARNET SHAREHOLDER INSTITUTIONS.

DEVELOPING SERVICES TO MEET THE NEEDS OF OUR CUSTOMERS

Although AARNet's primary focus continues to be on the provision of network and other telecommunications services, we are increasing our focus on developing services and solutions that leverage the network to enable seamless collaboration, data flow and mobility for the research and education sector. Our portfolio of services continues to expand and includes consulting, collaboration, storage, cloud and security services.

NETWORK SERVICES

In 2018, we completed migrations to AARNet4 for all shareholders and the majority of non-shareholder customers and for the first time offered 100Gbps customer connections for general institution Internet traffic. We continue to work with customer eResearch and IT teams to help researchers make the most of AARNet's powerful network infrastructure.

Take-up of AARNet4 VPN (Layer-2 and Layer-3 virtual private network) services grew by 60% this year, in step with customers migrating more services to the cloud. AARNet's Architecture and Applications team continues to explore opportunities and requests by our customers for partnerships with leading cloud technology companies. Our goal is to facilitate access to services and drive cost efficient initiatives for the benefit of research and education.

CLOUDSTOR

CloudStor is a research data storage and sharing service designed and built by AARNet to support data-intensive research collaborations. It is an on-net service for AARNet-connected institutions, providing individual researchers and staff with personal allocations of one terabyte free storage, with larger group allocations available on request. CloudStor storage is located in Australia, avoiding data sovereignty issues, and is currently connected to the AARNet backbone at 40Gbps with plans to upgrade this to 100Gbps for rapid and convenient access.

CloudStor maintained strong growth with over 61,588 unique user accounts logged by the end of 2018; up 38% from the end of 2017. The service is used by shareholders and other customers to share data with their collaborators in the research and education community, industry and government.

A number of new features were launched in 2018, including OnlyOffice collaborative online document editing, the DICOM medical image viewer, a 3D object viewer, the JSmol protein viewer, audio playback, the SWAN (Service for Web Based ANalysis) Jupyter Notebooks app, and increased storage and compute capacity aimed at improving the service experience and enhancing user collaboration.

The deployment of a new CloudStor node at the NCI (National Computational Infrastructure) is complete and is expected to go live in Q1 2019, along with an interconnect to be implemented to assist HPC (High Performance Computing) users with accessing their CloudStor data. As CloudStor grows AARNet is focused on continually developing and extending CloudStor to meet current and future needs of the research sector.

ZOOM

Our partnership with Zoom, to deliver cloud-based video conferencing to the sector, is flourishing. Use of the Zoom service experienced strong month-on-month growth in 2018, reaching over 100,000 users by the end of the year, up more than double the previous year. There were almost half a million meetings held using Zoom in 2018, also more than double 2017 numbers. The number of monthly Zoom meeting minutes peaked in August at over 10 million minutes. Each month in 2018 approximately 4,000 new users signed on, and a total of 82 customers, including universities, K-12 schools and cultural institutions, are now Zoom subscribers. Great performance and an intuitive user interface are key contributors to the rapid uptake of the Zoom video conferencing service.

Zoom combines cloud video conferencing, online meetings for up to 100, 200, 300 or 500 participants, webinars, group messaging and content sharing in one easy-to-use platform accessible on multiple devices. We host Zoom servers in Australia on the AARNet network, providing our customers with the best possible video conference experience, local Zoom support and Zoom cloud recording integration with our storage service, CloudStor. We have worked closely with Zoom to fine-tune features to meet the specific needs of our customers.

OUR PORTFOLIO OF SERVICES CONTINUES TO EXPAND AND INCLUDES CONSULTING, COLLABORATION, STORAGE, CLOUD AND SECURITY SERVICES.

PANOPTO

The Panopto video platform makes it easy to manage video assets, integrate video into a learning management system, capture lectures, record flipped classroom videos, and much more. Through the AARNet Panopto partnership, Panopto is hosted in Australia on the AARNet network to deliver a high-quality user experience while supporting thousands of simultaneous video streams. Uptake of the Panopto service continued to grow. By December 2018 the service streamed to over 110,000 users, with 78 terabytes of video stored and more than 500,000 hours of video viewed.

EDUROAM

On 1 September 2018, eduroam, the secure global roaming wireless network for the research and education sector, celebrated 10 years as a full production service. From small beginnings, eduroam has expanded to be a global success, available at more than 20,000 locations in 100 countries and with over a billion authentications every year. Eduroam is no longer restricted to university campuses and can be accessed by staff and students at an increasing number of locations around the world. In particular, airports, train stations, hospitals and sites throughout university cities are providing eduroam as a simple, scalable wifi access service for students and researchers.

By the end of 2018, eduroamAU logged 435,790 Australian and 140,286 international visitors to the campuses of 38 Australian universities, CSIRO and other AARNet customers. Eduroam was available at 87 locations around Australia including university campuses and various hospitals, schools, airports and museums. Local councils are seeking to partner with AARNet to deploy more eduroam hotspots in university cities around the country.

EXPANDING EDUROAM IN ASIA

The world of research and education networks is a global community that thrives on collaboration. This collaborative spirit is demonstrated by initiatives such as the TEIN eduroam in Asia project. The project saw research and education networks join forces to extend the eduroam (education roaming) service to countries in Asia with limited or no access to eduroam via an innovative train-the-trainer workshop program.

More than 30 people attended a workshop held in New Zealand in August 2018 to train local NRENs to deploy eduroam in Afghanistan, Bangladesh, Cambodia, Laos, and Vietnam. The project was led by AARNet in collaboration with KITSI + JNU (Korea), REANNZ (New Zealand), SingaREN (Singapore), and TEIN*CC, with funding provided by the European Union.

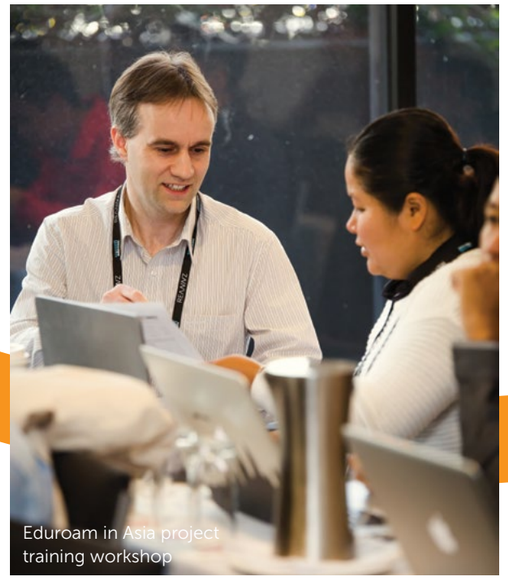
MANAGED SERVICES

In response to customers expressing interest in AARNet providing managed security services, AARNet consulted with shareholders during 2018 to scope the requirements and feasibility of AARNet providing a Security Operations Centre (SOC) as a shared service for the sector. As part of the evaluation process, a pilot with a small group of shareholders will be conducted in the first half of 2019.

Work to unify AARNet's Network Operations Centre (which supports the network) and Service Desk (which supports non-network products such as CloudStor, eduroam, Zoom and Panopto) progressed this year and is expected to conclude in early 2019. An internal review was undertaken to ensure that customer and staff needs are balanced in bringing these two groups together, and that appropriate tooling and reporting is developed to support the functions.

ENTERPRISE SERVICES

The Enterprise Services team provides highly valued professional and technical consulting services to assist with the provision of campus information technology across the research and education sector. The group experienced its fifth consecutive year of strong growth, delivering assignments to both shareholder and non-shareholder customers.



Eduroam in Asia project training workshop

The Enterprise Services team focused its development efforts on two fronts: the operation and further refinement of consulting and engineering services directly to customers and the development of campus network managed services (co-creating and developing with customers; and in parallel designing the multi-tiered service people, processes and platforms to support them).

The team delivered a wide range of projects for customers in 2018, including comprehensive reviews of campus information communications infrastructure, services and operations; network security reviews; advisories for the selection of next-generation firewall technologies; firewall upgrades; multi-campus eduroam upgrades; network storage architecture design; and onboarding, WAN stabilisation and the application of Quality of Service parameters for Fiji National University's 30 sites.

SOFTWARE DRIVEN SERVICE INNOVATION

With software development fundamental to providing innovative services for our customers, AARNet supported a number of R&E community software initiatives in 2018.

The partnership between AARNet and CERN established in 2017 continued to support the development of the EOS filesystem used by AARNet for CloudStor and a range of other storage and data software projects, such as SWAN (Service for Web-Based Analysis). We also continued our support for the Commons Conservancy, a foundation to preserve open source software developed by the NREN community, such as FileSender and EduVPN. Our partnership and the establishment of the ownCloud Foundation was formally announced in August 2018. The ownCloud Foundation has been formed to accelerate the global development, distribution and adoption of the ownCloud platform (another component of the CloudStor service). AARNet also participated in the development of a "synch and share stores as research infrastructures" plan with CERN, GÉANT, ownCloud and the European Commission's Joint Research Centre, and in a research storage scoping expert group (hosted by SWITCH in Switzerland).

We have also undertaken collaborative projects with the Australian eResearch community this year, including with ARDC (Australian Research Data Commons) to integrate CloudStor with the Nectar (National eResearch Collaboration Tools and Resources) Cloud compute services; and with Western Sydney University and Intersect Australia to develop an update (v1.2) to the CloudStor Collections plugin.

DIGITAL TRANSFORMATION

The first phase of AARNet's digital transformation project for automating and improving business processes drew to a close at the end of 2018. During this phase, the Software Development team delivered online customer-facing portals for ordering Zoom services and Layer-2 VPN services to cloud providers. They also developed an internal web portal for simplifying and automating elements of network services provisioning. The next phase of the project aims to automate aspects of the operation of network and is now underway.

OUR TEAM

Throughout 2018, AARNet continued to evolve and optimise our organisation through the development of and commitment to our people. During 2018 our team grew from 106 to 124 and we continued to expand our Product Development, Cyber Security and Infrastructure Development teams.

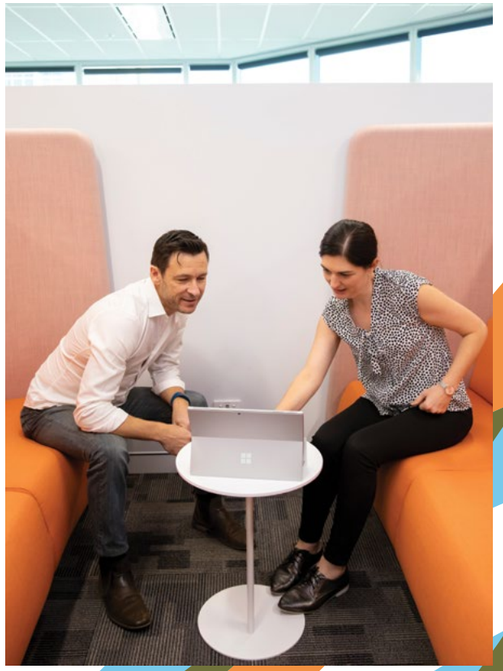
Significantly, during 2018 AARNet focused on four key areas – Diversity, AARNet Values, Staff Training, and Recruitment, and developed to a high level our offering in these important areas.

DIVERSITY

AARNet recognises the value of a diverse and skilled workforce and is committed to creating and maintaining an inclusive and collaborative workplace culture that will provide sustainability for AARNet into the future. We are committed to embracing the diverse backgrounds, experiences and perspectives of our employees to provide excellent service to our equally diverse shareholders and customers through an increasingly innovative and contemporary culture. Within the ever-evolving landscape of Diversity, AARNet has taken a leading role within the NREN community, in implementing a strong and meaningful approach through the four pillars of Policy; Diversity Council; Diversity Analytics; and support from the AARNet Board. Additionally, AARNet has put in place a full-service Employee Assistance Programme, to assist AARNet employees and their families in times of need.

AARNET VALUES

2018 saw the introduction and embedding of the AARNet Values: One Team; Creativity; Trust. The AARNet Values were developed collaboratively through an extensive consultation process involving all employees and rolled out to all employees through an Australia wide series of CEO roadshows and information sessions. Importantly, the AARNet Values have been embedded into our recruitment, training, and performance management processes. The AARNet Values have proved to be an important segment of employee engagement, as particularly evidenced through the wonderfully interactive sessions with broadcaster James O'Loughlin and body language expert Dr Louise Mahler at the All Staff Meeting at the conclusion of 2018.



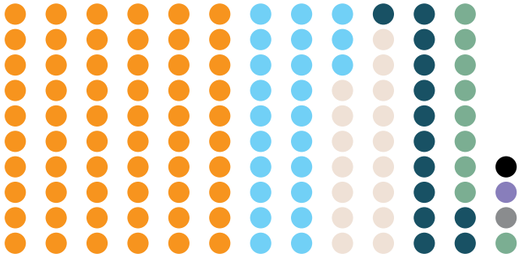
EMPLOYEE TRAINING & DEVELOPMENT

Under the guidance of our Human Resources department, AARNet has made a significant commitment to employee training and development with key focus on the areas of presentation & public speaking skills, corporate & personal resilience, team leadership skills, and communication & influencing skills. This work will continue into 2019 and beyond. Additionally, AARNet has also taken a global leadership role within our NREN community and developed a proposal for 2-year Leadership Training Programme for the global NREN group. The programme covers various areas of Personal Leadership skills and development as well as having a strategic technical focus on Cyber. We currently continue to work on refining this proposal with the global NREN CEO group, with a view to a pilot programme in 2020.

RECRUITMENT

During 2018, AARNet significantly strengthened our recruitment practices, with an increased focus on recruiting for workplace cultural development as well as technical skills. Additionally, we implemented new compliance practices, which are measurable and robust and peer with best practice models throughout the world. We continue to develop these areas and 2019 will see significant development of our recruitment strategies, to ensure that AARNet continues to attract the best and the brightest.

AARNET STAFF AS AT END 2018, TOTAL: 124



NSW 60 VIC 23 QLD 16 WA 13 ACT 9 SA 1 TAS 1 Netherlands 1

R+E COMMUNITY ENGAGEMENT

AARNet is involved in a broad range of research and education community events, including sponsorship and network support for conferences, workshops, working groups, forums and mentoring.

Technologists working on networking and networked technologies at AARNet-connected universities and research institutions gathered in Melbourne on 28 & 29 June 2018 for the second edition of Networkshop, a two-day technical community-building event organized and hosted by AARNet.

With an emphasis on technical collaboration, skills development and the exchange of ideas, Networkshop was well received by over 100 attendees and will be repeated in 2019.

In 2018, AARNet provided in-kind sponsorship – typically network connectivity, streaming and/or manpower – for research and education community conferences and events including Universities Higher Education Conference, Science Meets Parliament, FIRST® Robotics Competition, Museums Next, World Science Festival, RFLAN60, AIS ICT Conference, International Conference on Robotics and Automation, Collaborative Conference on Computational and Data Intensive Science (C3DIS), QUESTnet and eResearch Australasia.

Our staff participated as speakers, workshop hosts and delegates in a wide range of sector-relevant conferences and events, including VALA 2018, Council of Museums Directors Annual Meeting, Museums and Galleries Australia, Collaborate Innovate, Australian eResearch Organisation (AeRO) Forum, Digital Humanities Australasia, ResBaz Sydney, Brisbane and Perth, NCRIS Forum, C3DIS, QUESTnet, eResearch Australasia, CAUL, AusCERT, CAUDIT Members Meetings, AETM, Digital Directions, ALIA Information Online, SuperComputing 2018, World Digital Preservation Day, and others.

AARNet supports STEM (Science, Technology, Engineering and Maths) programs in our community as part of our commitment to inspiring young people to pursue tertiary STEM studies. For the fourth year running, in addition to providing network connectivity and streaming, AARNet staff participated in judging the FIRST® Robotics Competition hosted by Macquarie University. Teams from a number of universities and schools connected to AARNet took part.

AARNet staff also volunteered as judges for the National Young ICT Awards, an annual event that challenges school children from Year 3 to Year 12 to put the national ICT curriculum into practice by designing any technology project they are inspired to create.

AARNet continued its support for Australian Indigenous Mentoring Experience (AIME) by providing the high-speed broadband connectivity this innovative education program needs to strengthen and expand the services it offers Indigenous kids the length and breadth of Australia.

AARNet cycle enthusiasts took up the challenge to ride from Armidale to South West Rocks, NSW, in the Tour de Rocks 2018, a 300km in 3 days ride to raise funds for cancer.

INTERNATIONAL ENGAGEMENT

AARNet continued to host and oversee content production for the In The Field website (inthefieldstories.net), a global collaboration for sharing impact stories and promoting the value of research and education networks worldwide. By the end of the year, there were 208 stories published on the site, covering a wide range of topics in the sciences and humanities and featuring 89 networks.

AARNet staff continued to collaborate with their global peers and were involved in international projects, working groups, conferences and forums for the benefit of the research and education community. These included Asia Pacific Advanced Network (APAN) meetings, PITA Conference, TEIN*CC, Global Network Architecture Group and GLIF meetings, Global NREN CEO Forum, Global NREN PR Network, Global NREN Security Group, Internet2 Global Summit and Technology Exchange, TNC2018, eResearch NZ, Supercomputing 2018, CS3 Workshop, RDA 11th Plenary.

In 2018, AARNet joined the Research Data Alliance, an International Organisation launched in 2013 by the European Commission, the United States National Science Foundation and National Institute of Standards and Technology, and the Australian Government's Department of Innovation with the goal of building the social and technical infrastructure to enable open sharing of data.

CORPORATE GOVERNANCE

THE ORGANISATION

AARNet Pty Ltd [ACN 084 540 518] is the not-for-profit company that operates the AARNet network, Australia's national research and education network, also known as an NREN.

Shares in AARNet Pty Ltd [AARNet] are held by 38 Australian Universities and the CSIRO as listed on page 37. AARNet is a licensed Australian telecommunications carrier [#61 under the Telecommunications Act 1997 Cth].

The Chief Executive Officer is charged with the efficient and cost-effective operation of the company and reports to the Board of Directors, as listed on page 37.

THE AARNET BOARD OF DIRECTORS

The Board of Directors is responsible for the overall direction and management of AARNet.

For more than 28 years, AARNet and its predecessor have shared and exchanged expertise with shareholders and customers in many ways, supporting national and international collaboration and innovation in networking and associated services for research and education.

AARNet has been effective in making representations to government on policy, legislation, strategy and programs to improve the telecommunications facilities and services available not only to the education and research sector, but to all Australians.

THE AARNET ADVISORY COMMITTEE

The AARNet Advisory Committee [AAC] represents the interests of the members and is a source of advice on policy and business matters. Regional Network Organisations, which are generally state based, elect one representative to the AAC. Members of the AAC are listed on page 37.

LIST OF SHAREHOLDERS

Australian National University
Commonwealth Scientific and Industrial Research Organisation
University of Canberra
Charles Sturt University
Macquarie University
Southern Cross University
The Australian Catholic University
University of New England
University of New South Wales
University of Newcastle
University of Sydney
University of Technology, Sydney
Western Sydney University
University of Wollongong
Charles Darwin University
Bond University
Central Queensland University
Griffith University
James Cook University
Queensland University of Technology
University of Queensland
University of Southern Queensland
University of the Sunshine Coast
Flinders University
University of Adelaide
University of South Australia
University of Tasmania
Deakin University
La Trobe University
Monash University
RMIT University
Swinburne University of Technology
The University of Melbourne
Federation University Australia
Victoria University
Curtin University
Edith Cowan University
Murdoch University
The University of Western Australia

BOARD OF DIRECTORS

Chairman: Emeritus Professor Gerard Sutton AO*
Executive Director: Mr Chris Hancock (CEO)
Mr Chris Bridge (until 27 June 2018)
Dr Christine Burns
Professor Annabelle Duncan
Professor John Dewar (joined 23 March 2018)
Mr Rob Fitzpatrick*
Mr Jeff Murray
Mr John Rohan*
Professor Deborah Terry
Emeritus Professor Mark Wainwright AM*
Dr David Williams
*Denotes Independent Director

AARNET ADVISORY COMMITTEE

Chairman: Mr Jeff Murray (University of Tasmania)
CEO AARNet: Mr Chris Hancock
Mr Malcolm Caldwell (Charles Darwin University)
Mr David Formica (University of Canberra)
Mr Vito Forte (Edith Cowan University) joined November 2018
Mr Michael Grant (Murdoch University) until October 2018
Mr Tim Mannes (Charles Sturt University)
Ms Bev Wright (University of Adelaide)
Mr Tom Minchin (CSIRO)
Mr Scott Sorley (University of Southern Queensland)
Mr Zoran Sugarevski (Victoria University)

SPOT LIGHT

2018 was an exciting year for AARNet. Here's a closer look at some of the discoveries and success stories in the research and education community enabled by our powerful network and collaboration services.
To read more stories, go to news.aarnet.edu.au

Image courtesy University of Melbourne Networked Society Institute

CHANGING LIVES WITH VIRTUAL REALITY THERAPY RESEARCH

At the University of Melbourne's Networked Society Institute researchers are leveraging the AARNet network for developing and testing virtual reality technologies for health and medical applications.

After decades of experimentation, virtual reality (VR) technologies that have the power to hack our senses of sight, hearing and feeling are beginning to transform many aspects of the way we live and work.

At the University of Melbourne's Networked Society Institute (NSI), a small team has spent three years focusing on health and medical applications of Virtual Reality (VR) technology.

Ken Clarke, Academic Specialist, Electrical and Electronic Engineering, explains that VR's transformative ability makes it particularly well-suited for health research.

"VR is a flexible platform that gives us the ability to take people anywhere and to any time. It's very powerful because you can take people out of their everyday existence."

One of the group's projects, Music Therapy in Virtual Environments, has developed a proof-of-concept online virtual reality platform that brings quadriplegic patients together for virtual singing therapy sessions.

Previous clinical research demonstrated that group singing helped people with quadriplegia to breathe better, speak louder and make social connections. But many of the patients found it difficult to get to the rehab centre for sessions.

VR makes it possible for participants to receive music therapy in their own homes. Patients wear a virtual reality headset and sing with therapist and researcher Dr Jeanette Tamplin in virtual settings such as a campfire, or on stage in front of an audience.

"We've had a really good reaction from quadriplegic clients we have trialled the VR therapy with," Clarke said.

"On the whole they are very positive about escaping their home existence and joining a choir. As well as serving a rehabilitation purpose, it's enjoyable and sociable and helps them live longer and more healthily."

Any network latency can cause problems when attempting to link geographically separated users in a virtual world. It can mean users don't see and hear the same thing at the same time, making real-time group singing impossible.

As such, NSI take advantage of a dedicated gigabit connection to the AARNet network for developing and testing their VR technologies and carrying out user trials.

"AARNet connectivity allows us to pilot and further develop our VR world with users in diverse locations across Victoria from our location at the University of Melbourne's Parkville campus," Clarke said.

DESIGNING TECH SOLUTIONS FOR TOUGH HEALTH CHALLENGES

At the Australian Centre for Health Innovation in Melbourne, a simulated hospital leverages the ultra-high speed and reliability of the AARNet network to test and trial new and emerging technologies.

Connected to Australia's universities and hospitals via AARNet, the Australian Centre for Health Innovation (CHI) is a faithful replica of a hospital overlaid with a medical-grade IT testbed. It provides the ideal environment for healthcare solution providers to test and trial products that tackle the toughest health challenges.

CHI has helped vendors bring an array of innovations to market, explains Director of Technology, Frank Smolenaers.

One project involved designing and testing telehealth solutions to link regional GPs with metropolitan specialists.

"Together with an Australian telco, we modelled one room in our facility as the rural GP with the patient using a DSL link, and in the other room we used our AARNet link as the 'corporate hospital' link to a metropolitan specialist."

With the two rooms separated acoustically, CHI conducted a number of telehealth consults using real GPs and specialists along with actors as patients.

"By observing and improving, we had a whole cycle of testing and development and we were able to help the company produce two levels of tele-health solutions; one for the GP practice and the other for the specialist. Our AARNet link made it all possible."

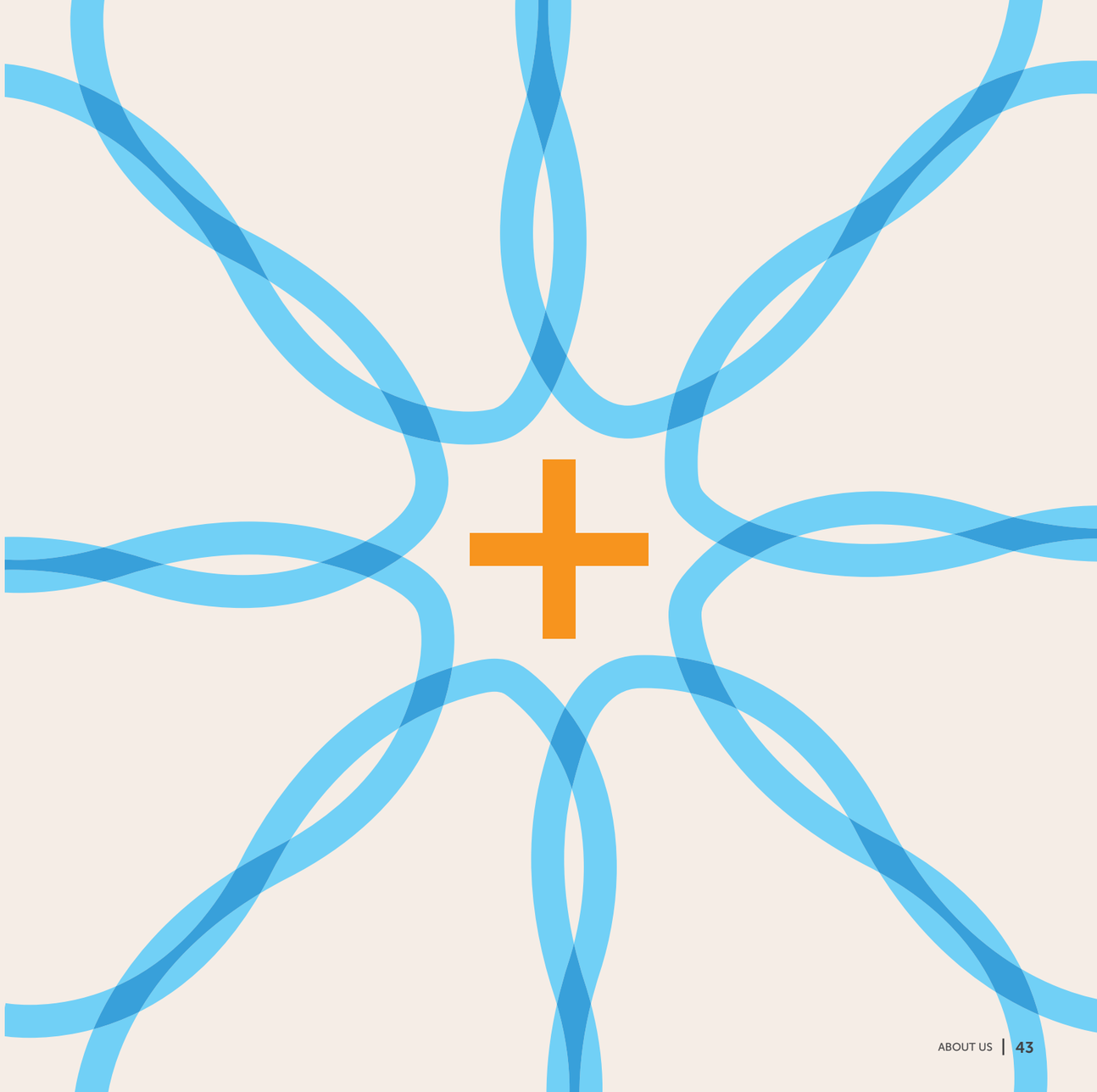
CHI has also taken its demonstrations on the road to conferences and hospitals around the country.

"With the formidable AARNet connection we have, I knew there wouldn't be an issue on our end as far as speed and throughput, and the whole experience would be optimised."

As well as a simulation of a physical hospital environment, CHI boasts the IT infrastructure found in a real hospital, including specifics such as firewalls, Active Directory for authentication and mail servers.

A medical grade IT testbed – called the Digital Health Design Laboratory – helps show organisations what's possible when it comes to technology by allowing the customer to immerse themselves in the new technology and workflows in the simulated hospital environment.

"Many organisations lack technology maturity in certain areas. CHI can show them what's possible and, if they can't come in person, we can remote them in and take them on a tour and show them the technology wherever they might be. We use AARNet to optimize that remote experience," said Mr Smolenaers.



SCALABLE CONNECTIVITY ENABLES A CLOUD-FIRST STRATEGY

For Presbyterian Ladies' College Sydney and Armidale, scalable AARNet connectivity has opened the door to ultra-fast teaching and learning experiences and highly available infrastructure.

When CIO David Savill arrived at the school, the Internet was slow, and there was lots of aging in-house equipment that was time consuming and expensive to maintain.

Then he heard how scalable a connection from AARNet would be and formulated a plan that would allow him to radically overhaul PLC's infrastructure, moving all the school's compute and storage to the datacentre and working with AARNet to architect and implement diverse connectivity across metropolitan Sydney.

"Our 10G connection from AARNet cost just a small amount more than 1G; when I realised this, I was blown away by how we could scale, and it opened up so many possibilities."

Savill and his team worked with AARNet to architect a solution involving building a 1.7km tail to the school, designing connectivity to the Equinix datacentre, and building dark fibre around the east of Sydney to provide complete diversity.

For Savill, the benefits of the new solution are clear. Both the Sydney and Armidale campuses are now on the one network and are able to take advantages of economies of scale.

User data is secure, replicated in real-time and with all systems backed up. Workloads can be moved between sites with little or no downtime allowing the school to mitigate significant events.

The school has avoided power and cooling infrastructure upgrade costs, as well as time spent managing in-house servers. It also provides quick and cheap connectivity to all of the major public cloud providers and other networks.

Crucially, fast and reliable connections mean the school's users can rely on live access to services for teaching and learning.

"Connectivity is now as fast as our internal network. Speed is the new normal and there's a lot more confidence in the classroom to deliver things live.

"We're really happy; it just works. I don't think I could have done this without AARNet, and I don't think I could have had this experience with any other telco."

Image courtesy PLC Sydney.

TRANSFORMING PAPER RECORDS INTO RESEARCH DATA

At the ANU library a project is underway to unlock the content held within 50 years' worth of paper-based stock exchange records using AARNet.

Handwriting recognition is being used to transform the Australian National University (ANU) library's Sydney Stock Exchange collection, which sheds light on Australia's economic and social past, into data that will be stored in CloudStor and made available to researchers and the community via the AARNet network.

An image facsimile of the paper record is stored in the university's digital repository and, alongside this, a cross-disciplinary team is working to convert the handwritten text into digital text and data that will be uploaded to AARNet's CloudStor.

University Librarian Roxanne Missingham says that with access to the information in data format, researchers will be able to more easily access, interrogate, categorise and manipulate the data to suit their needs.

"The Sydney Stock Exchange records tell interesting stories beyond economics; researchers can look at how local communities grow based on the amount of coal sold, the impact on social welfare, and on migration within the state; there are so many possibilities for cross-disciplinary research.

"But really important research like this gets lost unless we take the opportunity to make the information fully accessible."

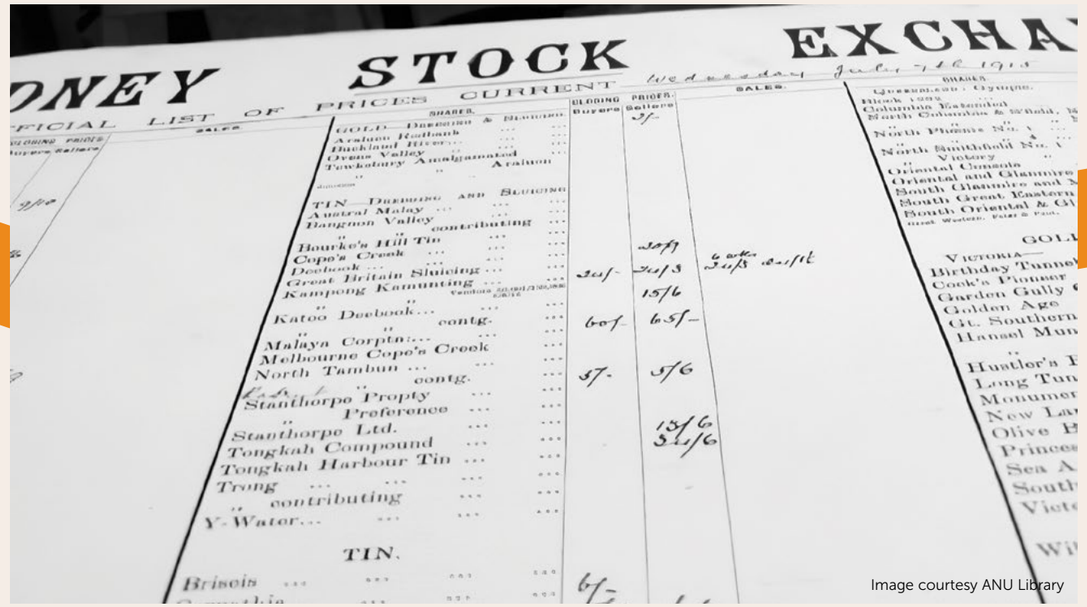


Image courtesy ANU Library

A CROSS-DISCIPLINARY TEAM IS WORKING TO CONVERT THE HANDWRITTEN TEXT INTO DIGITAL TEXT AND DATA THAT WILL BE UPLOADED TO AARNET'S CLOUDSTOR.

AARNet underpins the connectivity and storage for the Sydney Stock Exchange project, providing high-bandwidth connectivity that supports transfer of large volumes of data between ANU library, CloudStor, and researchers across the globe.

Missingham explains that CloudStor is ideally suited to storing research data because of its ease-of-use and efficient workflows.

"I'm not a technologist but from my point of view, everything happens by magic with CloudStor. It's extremely simple in terms of logging in, the messaging is great, and it's hyper-efficient."

But beyond the network and storage, Missingham says that AARNet's role as a technology expert is just as crucial to the project's success.

"Our workflows and the way we do things needs to be quite different. We're dealing with a lot of new technologies and processes associated with liberating the information held within the collection.

"Doing this together with AARNet is a great partnership because of its enormous technical expertise. AARNet plays a wonderful role as an interpreter between technology, researchers and collections, and this is helping us find new ways to provide better access to resources."

AARNET CONNECTIVITY GIVES US MORE POWER TO DO MORE SOPHISTICATED ANALYSIS AND MAKES OUR DATA MORE ACCURATE.

IMPROVING ACCESS TO SATELLITE IMAGERY FOR LAND MANAGEMENT

AARNet collaborated with the New South Wales Office of Environment and Heritage to solve the problem researchers faced around access to large volumes of imagery and data from the Copernicus satellite.

A customised AARNet network solution connecting the New South Wales Office of Environment and Heritage (OEH) and the Copernicus Australasia Regional Data Hub (the Hub) located at the National Computational Infrastructure (NCI) in Canberra means that OEH researchers now have the fast and reliable access they need to satellite imagery and geospatial data.

The Hub facilitates the flow and access of data from the European Union's Copernicus programme. Data, including the latest images of the Australian landscape beamed down to Earth from the constellation of European Sentinel satellites, are made available to OEH researchers via the Hub.

The researchers use these data for remote sensing analysis, mapping and modelling to generate information about vegetation and water patterns and changes to the environment. This information feeds into government policy making and compliance, and helps land owners manage stock and tree cover, as well as their interactions with wildlife, native vegetation and wetlands.

OEH Remote Sensing Scientist and Programmer Tony Gill said the OEH sought expertise from AARNet when the network speed and capacity offered by commercial Internet service providers proved to be unreliable for the daily transfer of thousands of high-resolution images required for their work.

"When we were reliant on commercial networks for transferring data from the Hub at NCI, the download speed was very slow. We had to be very judicious in the choice of imagery we used for analysis and this was impacting the accuracy of our modelling," said Gill.

AARNet engineers worked with Gill and the OEH IT team to develop the solution, which included the deployment of a new customized capability for accessing large data stores at the NCI and technical expertise to augment existing OEH IT resources.

A low latency scalable 1 Gigabit per second AARNet connection coupled with the implementation of Science DMZ architecture at the institution border — to separate the big data transfers from day-to-day business traffic — ensures reliable access to exponential volumes of Sentinel imagery for the scientists at the OEH.

"What used to take a week to download in an unreliable fashion, now takes 15 minutes. We can also now retrieve every image captured for NSW within a couple of days of being acquired instead of only being able to manage a small portion," says Gill. "AARNet connectivity gives us more power to do more sophisticated analysis and makes our data more accurate."

Images courtesy NSW Office of Environment and Heritage

Images left, courtesy Australian Museum,
bottom, courtesy National Museum of Australia

ARTEFACTS ALIVE! VIRTUAL TOURS IN THE CLASSROOM

AARNet is bringing learning from the museum to the classroom with seamless video conferencing, giving remote students a chance to become historians, scientists and movie producers.

Museums are repositories of history and help keep a physical connection to our past. For students, it's an opportunity to learn about humanity beyond a textbook. Students get to walk through halls of real history, learning about the people, places and artefacts that shaped humanity, with the help of teachers and museum staff. It builds a visceral connection to the past.

However, distance and the challenges of organising school trips have always limited student access to museums. Now, museums are being brought to schools across Australia with the help of AARNet's high-speed broadband and Zoom video conferencing service.

During 2018, the National Museum of Australia in Canberra brought its *Rome: City and Empire* exhibit to schools around Australia via virtual tours. The exhibit featured some of the British Museum's most important Roman artefacts and students experienced them first-hand without leaving their classrooms.

With video conferencing, Digital Programs Coordinator Robert Bunzli walked a classroom through an Ancient Roman household, showed students the night sky for a lesson in Aboriginal astronomy, and delved into Australia's complex colonial history with older students, showing them real pieces of Australia's past, to help them think about the nature of history and who records it.

Meanwhile, The Australian Museum in Sydney is engaging more than 10,000 students a year with science education. Manager of Outreach and Discovery, Karen Player, brings the science of geology, microbiology and fossil collection to classrooms that don't have the ability or the resources to travel to The Australian Museum themselves. The program helps bring science to students in regional schools, some of which have fewer than ten students, as well as children studying in hospital wards.

Programs are built to teach students about careers in STEM, including experimental work they can do with their teachers in class. One example is the citizen science program Frog ID, which allows students to record their local frogs with a phone app and contribute to real science, monitoring Australia's frog populations.

Video conferencing also helps promote students' creative side. The Australian Centre for the Moving Image (ACMI) in Melbourne brings their programs to schools through Zoom video conferencing.

Meet the Makers brought movie directors and producers, as well as animators and video game designers, to the classroom in 2018 to give students insider knowledge about the screen industry. Students learnt about careers in film, television and video gaming, received information and inspiration to create their own projects for the student moving picture competition *Screen It*.

Museums are bringing a new interactive dimension to classwork, thanks to AARNet. Low-latency, dark-fibre connections between museums and schools means video conferences run seamlessly, without streaming delays affecting immersion for students or creating a barrier for learning. High-speed connectivity engages students who have been limited by distance in the past, ensuring they get the same quality educational experiences as everyone else.

HELPING AUSTRALIAN CITIES PLAN FOR CLIMATE CHANGE

A dynamic new climate model has been developed with the help of AARNet. With greater resolution than other models, it's helping Australian cities protect and plan for the changing climate.

Australia's environment is set to change rapidly over the next few decades. Temperatures are increasing, and more extreme weather events are predicted. This will impact every part of Australian life, from our cities, to our water supply and our environment. Because of this, it's vital that Australia prepares for its future climate.

Professor Jason Evans of the Climate Change Research Centre and the ARC Centre of Excellence in Climate Extremes has developed a new climate model that predicts changing weather patterns with greater resolution. Professor Evans' model predicts weather patterns down to 50km^2 across Australia, even to a resolution of 10km^2 in Australia's heavily populated south east.

Climate models are designed to predict climate on a macro scale – over states and entire countries. What these simulations leave out is the more detailed picture of how weather changes locally. Vegetation, nearby water bodies, buildings and the topography of the land can all affect rainfall rates and temperature, leading to microclimates. By mapping these microclimates, Professor Evans' research is being used by industries including construction, insurance and city planning to plan their water future.

Climate simulations require huge amounts of data processing. Interactions between particles micrometres in length affect kilometre-long cloud movements across the entire planet. To get a truly accurate dynamic model, all this data needs to be considered.

Professor Evans' research requires large amounts of data output from Pawsey Supercomputing Centre and National Computational Infrastructure (NCI) to be transferred across the country and to his team at the University of New South Wales (UNSW). The data requires real-time streaming to allow simulations to run. To make this possible, AARNet's advanced research network connects all three institutions for high bandwidth data transfer.

"AARNet has been vital to this research. Achieving the workflow required terabytes of data to be transferred between NCI, Pawsey and UNSW on a regular basis. Without the high bandwidth available through AARNet this research could not have been done."

The work isn't finished, however. Professor Evans' research will now focus on predicting the effects of multiple extreme weather events within a short period. The model's resolution will also be increased, giving even greater detail to Australia's weather systems. These future simulations will require more supercomputing power and faster connection speeds from supercomputing centres to researchers like Professor Evans, a mission Australia can accomplish with the help of AARNet.

Image: Markus Gebauer/Shutterstock.com

HUNTING FOR GRAVITATIONAL WAVES, A NATIONAL AND GLOBAL COLLABORATION

Australian scientists on the hunt for gravitational waves rely on AARNet for transferring data from LIGO detectors in the USA to OzGrav nodes in Australia for analysis.

Dozens of researchers from the Australian Research Council Centre of Excellence for Gravitational Wave Discovery (OzGrav) are part of an international team of scientists making significant discoveries in the emerging field of gravitational-wave astronomy.

Gravitational waves carry unique information about their dramatic origins and the nature of gravity. In 2015, scientists detected gravitational waves for the first time and concluded they were produced during the final moments of the merger of two black holes to produce a single, more massive spinning black hole. This collision of two black holes confirmed predictions of Albert Einstein's 1915 general theory of relativity.

In 2018, the scientists detected the most massive binary black hole merger yet witnessed in the universe. The black hole that resulted from this cataclysmic event is more than 80 times as massive as our Sun. The discovery – along with evidence of nine other black hole mergers – came just over one year since scientists announced they had witnessed, for the first time, the violent death spiral of two dense neutron stars via gravitational waves.

Scientists use the extremely sensitive detectors LIGO (two interferometers in the states of Louisiana and Washington, USA) and VIRGO (an interferometer in Cascina, Italy) to survey space for gravitational waves arriving at the earth from a cataclysmic event in the distant universe. Detection data streams are analysed using high performance computing at the LIGO and VIRGO nodes. Some of this data is transferred to international collaborators over research and education networks for further analysis and discovery, including over AARNet to the OzGrav nodes at partner institutions in Australia.

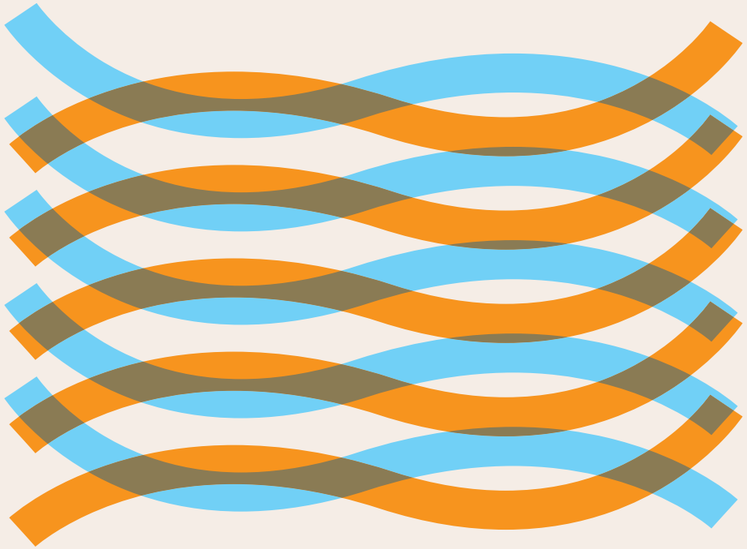
OzGrav is hosted at Swinburne University in partnership with the Australian National University, Monash University, University of Adelaide, University of Melbourne, University of Western Australia, CSIRO and the Australian Astronomical Observatory and collaborators in Europe and the USA.

Colm Talbot, an OzGrav scientist from Monash University says gravitational wave astronomy requires a global approach. " By studying black hole collisions and other wave-making events we act as cosmos archaeologists to understand how the universe works. From detecting events through to analysis and discovery, working together nationally and globally improves the quality of individual tasks and leads to better research outcomes," he said.

AARNet provides the reliable, scalable and secure high-speed network required for moving data between OzGrav scientists and their international collaborators to support gravitational wave research.

“WE ARE CONFIDENT THAT WE ARE CONTINUING TO CREATE GREAT VALUE FOR OUR SHAREHOLDERS AND CUSTOMERS AND WE LOOK FORWARD TO DELIVERING FURTHER SUCCESS IN THE YEAR AHEAD.”

Gerard Sutton AO, Chair AARNet Board



AARNet Pty Ltd Financial Report and Directors’ Report 2018

for the year ended 31 December 2018

ABN 54 084 540 518

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DIRECTORS' REPORT

Your Directors present their report on the Company, AARNet Pty Limited ("AARNet"), for the year ended 31 December 2018.

The following persons were Directors of AARNet during the whole of the financial year and up to the date of this report:

Emeritus Professor Gerard Sutton AO
Chair of the Board and Chair of the Nomination and Remuneration Committee

Dr Christine Burns

Professor Annabelle Duncan

Mr Rob Fitzpatrick
Member of the Audit, Finance and Risk Committee

Mr Chris Hancock
Chief Executive Officer

Mr Jeff Murray

Mr John Rohan
Deputy Chair of the Board, Chair of the Audit, Finance and Risk Committee and member of the Nomination and Remuneration Committee

Professor Deborah Terry

Emeritus Professor Mark Wainwright AM
Member of the Audit, Finance and Risk Committee and the Nomination and Remuneration Committee

Dr David Williams

Mr Chris Bridge was a director from the commencement of the financial year until his resignation on 27 June 2018.

Professor John Dewar was appointed a director on 23 March 2018, and remains a director at the date of this report.

PRINCIPAL ACTIVITIES

AARNet is a not for profit, proprietary company in which 38 Australian universities and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) have an equal shareholding.

AARNet's principal activity is the provision of internet and advanced telecommunication and network services to its shareholders ("Members") and to other relevant organisations. Services are provided in accordance with the AARNet Access Policy in order that Members and other customers may:

a) use AARNet's internet and other telecommunications facilities and services to provide educational programs and conduct research activities in an efficient and cost effective manner; and

b) collaborate with other parties (nationally and internationally) in furtherance of research and education objectives.

OTHER ACTIVITIES

In addition, AARNet:

a) facilitates the construction of connections (fibre tails) to the AARNet backbone and between campuses and other locations to facilitate services for Members and customers;

b) provides applications and services which operate across the AARNet network supporting education and research activities;

c) assists Members and other customers with network design, engineering and consulting services to optimise the end-to-end performance, robustness and resiliency of campus, data centre and cloud networks via the AARNet4 network;

d) participates in the design and deployment of advanced network infrastructure in partnership with network organisations in Australia and internationally, to develop national and global research and education networks; and

e) makes representations to all levels of government on policy, legislation and programs to improve the telecommunications facilities and services available to its Members and other customers.

DIVIDENDS

AARNet's constitution prohibits the payment of dividends or other distributions to its shareholders. Accordingly, no dividends have been paid, declared or recommended either during the financial year or in the period since that year ended (2017: nil).

REVIEW OF OPERATIONS

Traffic Growth and Network Performance

For over ten years, AARNet has experienced very significant growth in the traffic carried across the network. For the five years up to an including 2018, traffic delivered to AARNet's Members has grown at an average compound rate of 33.1% pa.

Even with this significant growth in traffic, the amounts paid by Members for the carriage of this traffic, in the form of subscriptions, access and traffic charges, grew by an average of only 0.5% pa over the same five-year period.

AARNet also provides services for a range of non-member customers across the research and education sector. Including traffic delivered to these organisations, traffic delivered has grown at an average compound rate of 57.2% over the five years to 2018.

Even with the growth in traffic across the network, AARNet again provided high levels of network performance and availability. For 2018 average network availability was 99.92% which was slightly lower than the level achieved in 2017 (99.95%). The reduction was due to prolonged outages experienced on a submarine cable between Australia and Singapore operated by a third party; excluding the effect of those outages the level of availability would have been 99.99%.

Network Expansion

During 2018 AARNet continued to invest to upgrade the capacity of the AARNet network and to expand the geographic reach of the network's fibre footprint.

Overall spending on communication assets (including network infrastructure and equipment) was $27,343,926 during the year which was substantially higher than the $13,574,599 invested in 2017 (refer to note 20 to the financial statements).

The increased investment reflected AARNet's participation in two significant submarine cable ventures (Indigo and JGA) as well as continued investment in AARNet's domestic fibre footprint.

Indigo Consortium

AARNet is a member of the Indigo consortium which is currently constructing a submarine optic fibre cable to provide capacity between Sydney and Perth as well as Perth to Singapore.

Indigo is scheduled to commence service during 2019 and, when it is commissioned, will provide AARNet with significantly enhanced capacity to connect with research networks in Asia as well as improved capacity and network resilience between the east and west coasts of Australia.

JGA South

AARNet is also a member of the JGA South consortium laying fibre between Sydney and Guam. Guam is a significant hub for telecommunications services and by participating in the construction and ownership of fibre between Sydney and Guam AARNet will gain high capacity bandwidth able to on-connect to research and education networks in Asia (particularly into North Asia).

We expect JGA to enter service during 2020.

Subscriptions and Telecommunications Revenues

AARNet's Members pay subscription and related fees for connection to the network and carriage of data across the network (to research and education facilities in Australia, international research and education networks, and to the general internet). These charges form the largest single component of AARNet's revenues.

During 2018 Members' subscription and related charges were only 0.5% higher than in 2017 despite the growth in Members' traffic discussed above. Included in Member's subscriptions for the first time in 2018 were charges for Third Party Users, agreed to as part of the latest AARNet Access Agreement between Members and AARNet. Without these charges, the growth in subscriptions would have been less than 0.2%.

	2018	2017	Increase
	$	$	
Members: Subscription, Traffic and Access	40,593,177	40,399,463	0.5%
Non-Member: Subscription, Traffic and Access	18,153,717	16,097,666	12.8%
Other Services	16,915,079	13,901,773	21.7%
Telecommunications Revenue	75,661,973	70,398,902	7.5%

Non-Member subscriptions continued to grow strongly with 2018 revenues up 12.8% on the previous year. This reflects continued growth in the number of non-member customers connected to the network.

Other Services

AARNet offers a range of other services to Members and other customers. Broadly, these services fall into two categories:

i) Transmission services providing point-to-point capacity: these enable Members and customers to link together geographically diverse campuses, research centres and remote research instruments; or to provide dedicated high-speed capacity between user facilities and third party data centres; and

ii) Above the network services which directly support the delivery of education and research outcomes (including Zoom, a video conferencing/meeting service offered in conjunction with Zoom Inc; Panopto a video recording, management and streaming service, which is used by many universities around the world as a teaching and research resource; and CloudStor, a service which is optimised for the storage and sharing of research data sets).

Revenue from these other services rose by 21.7% during 2018. AARNet's suite of video conferencing, video streaming and cloud storage services continue to be embraced by users across the research and education sector; and this was supplemented by continued growth in our more traditional services of transmission services and circuits.

Overall, subscriptions and service revenues increased by 7.5% from 2017.

Infrastructure Revenues

Infrastructure establishment fees (income from the provision of new fibre infrastructure) grew by 13.6% in 2018 reflecting the value of infrastructure projects completed and brought into service – including projects which completed in the latter part of 2017 contributing a full year's revenue in 2018.

During the year, AARNet adopted a new accounting policy for recognising revenue flowing from these establishment fees. The new policy was adopted to conform with the requirements of a new accounting standard (AASB 15 – Revenue from Contracts with Customers). AASB15 requires AARNet to bring establishment fees into income over a longer period than under the previous policy. Consequently, the effect of the change was to reduce establishment fee income for both 2018 and 2017 compared to what would have applied under the previous policy. Details of the adoption of AASB15 are contained in note 29 to the financial statements.

	2018	2017	Increase
	$	$	
Infrastructure Establishment Fees	4,742,009	4,210,075	**12.6%**
Infrastructure Construction Revenue	1,280,109	1,829,763	**(30.0%)**
	6,022,118	6,039,838	**0.4%**

Revenues from infrastructure construction and allied activities (such as services to relocate infrastructure) reduced by 30.0%. This income stream is very reactive to the impact of activity by utility providers, other telecommunications carriers and infrastructure projects (such as transport projects) and income can vary significantly from year to year.

Other Revenues

In addition to revenues from the provision of telecommunications services and infrastructure, AARNet also gains income from interest and dividends on invested funds. In 2018, this investment income totalled $3,125,896 (2017 $2,655,026) (see note 9 to the financial statements).

In 2018, AARNet also benefited from a significant gain on foreign currency contracts held to hedge against adverse movements in exchange rates. In 2018, a gain of $3,250,943 was recognised on these contracts compared to a loss of $2,336,325 in 2017 (see further discussion below).

Telecommunication Expenses

The largest category of operating costs, Telecommunication Expenses, was slightly higher than the costs incurred in the previous year. AARNet experienced increases in the costs of delivering new services (reflecting the growth in service income referred to earlier) but these were offset by savings in the cost of housing equipment in data centres and other premises operated by third parties.

Employee and Administration Costs

To support increasing the number of customers plus the ongoing infrastructure build and general growth in services and revenues, AARNet added staff to its service desk, infrastructure development and eResearch support teams across 2018.

Further personnel were also added to the product development and software support teams, in some cases replacing short term contractors and consultants. The additional resources support the development of new products, provide support for existing services and develop and deploy systems to support and streamline service delivery and other internal processes.

Depreciation and Amortisation Charges

Depreciation and Amortisation charges, inclusive of depreciation on equipment, depreciation on infrastructure and amortisation of Indefeasible Rights to Use (IRUs) totalled $19,510,012 in 2018 which was 8.9% higher than 2017 ($17,909,200).

The main factor behind this increase was the movement in the relative value of the Australian Dollar against the US Dollar over the course of the year. The Australian Dollar weakened across 2018 causing the contracted, but unpaid, US Dollar value of the international IRUs AARNet holds to increase when measured in Australian Dollars. Amortisation of the IRUs is calculated on the full value (including the unpaid portion) such that the declining dollar resulted in increased amortisation charges. (AARNet's hedging instruments recorded a gain offsetting much of the additional amortisation cost – see following section).

Finance Costs

AARNet has significant contractual commitments requiring it to make foreign currency denominated payments (mainly United States Dollars) for international transmission capacity (including the commitments for capacity under IRUs referred to in the previous section). These commitments, many of which extend for periods in excess of five years, are included in note 2(b) to the financial statements.

In order to hedge the exposure to exchange rate fluctuations with respect to these commitments (and other payments required in foreign currencies), AARNet arranges forward foreign currency purchases, purchases foreign currency options and maintains holdings of foreign currency balances. These arrangements are discussed in note 24 to the financial statements.

Across 2018, the Australian Dollar decreased in value relative to the United States Dollar with the effect that AARNet recorded a substantial gain on its hedging positions of $3,250,943 (see note 9 to the financial statements). This gain, as noted in the previous section, offset the increased amortisation of IRUs which arose from the same movement in the Australian Dollar. The gain recorded in 2018 was partly a reversal of the loss of $2,336,325 on foreign currency contracts recorded in 2017 (see note 10 to the financial statements).

ACCUMULATED SURPLUS AND RESERVES

In 2018 AARNet recorded a net surplus of $15,468,460 (2017: $9,524,132).

In the Board's view, it is prudent for AARNet to generate a surplus in order that investments in network capability and services may be funded without calling on Members to contribute further equity to the company.

Surpluses earned by AARNet cannot (by virtue of the terms of AARNet's constitution) be distributed to the shareholders.

Surpluses earned in prior years, aided by conservative financial management, have therefore been accumulated into significant holdings of cash and investments. In 2017 and 2018 a significant portion of these funds were invested in:

- **i)** the Indigo and JGA consortia constructing high capacity submarine fibre infrastructure (as described earlier);
- **ii)** extensions and enhancements of AARNet's own terrestrial fibre infrastructure to improve the reach, resilience and capacity of the domestic network.

These investments are expected to continue into future years. In addition, AARNet intends to use further funds to:finance investments in:

a) finance investments in technology to enhance the delivery of services to Members and other customers;

b) supplement Members' subscriptions and other income in future years; and

c) defray part of the significant financial commitments in respect of non-cancellable operating leases (principally rights to use the traffic paths of cable systems operated by other telecommunication carriers) which, at year end, were $121.7m, refer note 2(b) to the financial statements.

NET ASSETS

Net assets at 31 December 2018 were $214,198,927 (2017: $199,567,835). The increase represents the surplus for 2018 plus the change in value of available-for-sale financial assets during 2018.

SIGNIFICANT CHANGES IN THE STATE OF AFFAIRS

Except for the matters discussed under the heading "Review of Operations" there were no significant changes in the Company's state of affairs during the financial year ended 31 December 2018.

MATTERS SUBSEQUENT TO THE END OF THE FINANCIAL YEAR

Except for matters discussed under the heading "Review of Operations", no other matter or circumstance has arisen since 31 December 2018 that has significantly affected or may significantly affect:

a) AARNet's operations in future financial years;

b) the results of those operations in future financial years; or

c) AARNet's state of affairs in future financial years.

LIKELY DEVELOPMENTS AND EXPECTED RESULTS OF OPERATIONS

While the rate of traffic growth has slowed over recent years, AARNet expects network traffic will continue to grow at significant levels during 2019.

In addition, substantial investment in the Indigo and JGA submarine cable systems and in AARNet's domestic fibre network will continue during 2019. Indigo is expected to enter service in 2019 and will provide AARNet's Members and other users with a high capacity path to South East Asia and beyond.

ENVIRONMENTAL REGULATION

AARNet's operations are not adversely affected by any significant environmental regulation. AARNet believes its greenhouse gas emissions are substantially below the thresholds that are subject to the reporting requirements of either the *Energy Efficiency Opportunities Act 2006* and the *National Greenhouse and Energy Reporting Act 2007.*

INSURANCE FOR OFFICERS

During the financial year, AARNet paid a premium of $33,091 (2017: $30,274) in respect of liability insurance for the Company's Directors and Officers. The liabilities insured against are costs and expenses that may be incurred in defending civil or criminal proceedings that may be brought against the Directors and Officers in their capacity as Directors and Officers of AARNet, and any other payments arising from liabilities incurred by the Officers in connection with such proceedings, other than where such liabilities arise out of conduct involving a wilful breach of duty by the Directors or Officers or the improper use by the Directors or Officers of their position or of information to gain advantage for themselves or someone else or to cause detriment to AARNet. It is not possible to apportion the premium between amounts relating to the insurance against legal costs and those relating to other liabilities.

No known liability has arisen under these indemnities to the date of this report.

AGREEMENT TO INDEMNIFY OFFICERS

Under the terms of its Constitution, AARNet provides indemnity to persons who are, or have been, an officer or auditor of AARNet, but only to the extent permitted by law and to the extent that the officer or auditor is not indemnified by Directors' and Officers' liability insurance maintained by AARNet. The indemnity is against liability incurred by that person as an officer or auditor of AARNet to another person and for costs and expenses incurred by the officer or auditor in defending such proceedings.

Separately, AARNet and each director of AARNet have entered into a Deed of Indemnity under which AARNet indemnifies each director against any liability:

a) to a third party (that is, other than to AARNet) unless the liability arises out of conduct involving a lack of good faith, and

b) for legal costs incurred in successfully defending civil or criminal proceedings or in connection with proceedings in which relief is granted under the *Corporations Act 2001*.

No known liability has arisen under these indemnities as at the date of this report.

AUDITOR

A copy of the Auditor's Independence Declaration as required under s.60-40 of the Australian Charities and Not-for-profits Commission Act 2012 is included on page 9 of this financial report.

PricewaterhouseCoopers continues in office in accordance with section 327 of the *Corporations Act 2001*.

This report is made in accordance with a resolution of Directors.

Emeritus Professor GR Sutton AO
Director

Mr CM Hancock
Director

Sydney

19rd March 2019

AUDITOR'S INDEPENDENCE DECLARATION

Auditor's Independence Declaration

As lead auditor for the audit of AARNet Pty Ltd for the year ended 31 December 2018, I declare that to the best of my knowledge and belief, there have been no contraventions of any applicable code of professional conduct in relation to the audit.

Scott Walsh
Partner
PricewaterhouseCoopers

Sydney
19 March 2019

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STATEMENT OF SURPLUS

	Notes	2018 $	2017 $
Services revenue	8	**81,684,091**	76,438,740
Other revenue	9	**7,046,809**	3,469,645
Grants and contributions received	9	**403,189**	536,161
Total revenue		**89,134,089**	80,444,546
Telecommunications expenses		**(19,257,202)**	(18,964,895)
Depreciation and amortisation - Telecommunications	10	**(12,306,825)**	(10,294,042)
Employee benefits expense - Telecommunications		**(17,816,230)**	(15,469,888)
Administration - Telecommunications		**(10,000,233)**	(8,805,657)
Infrastructure project construction		**(2,837,920)**	(3,148,751)
Depreciation and amortisation - Infrastructure projects	10	**(7,203,185)**	(7,615,157)
Employee benefits expense - Infrastructure Development Group		**(3,226,181)**	(2,993,170)
Administration - Infrastructure Development Group		**(913,733)**	(657,143)
Other expenses (including finance costs)	10	**(104,120)**	(2,971,710)
Total expenses		**(73,665,629)**	(70,920,414)
Net surplus		**15,468,460**	9,524,132
Movement in the fair value of available-for-sale financial assets		**(837,368)**	239,659
Total comprehensive surplus for the year		**14,631,092**	9,763,791

The above Statement of Surplus should be read in conjunction with the accompanying notes.

BALANCE SHEET

	Notes	31 December 2018 $	31 December 2017 $
ASSETS			
Current assets			
Cash and cash equivalents	11	**23,702,332**	23,566,326
Receivables	13	**51,997,349**	36,747,108
Derivative financial instruments	24	**834,915**	-
Accrued income	14	**797,885**	597,039
Financial instruments at amortised cost	16	**33,557,323**	35,500,000
Total current assets		**110,889,804**	96,410,473
Non-current assets			
Receivables	19	**214,195**	-
Financial assets at fair value through statement of changes in equity	18	**9,302,267**	12,825,223
Financial instruments at amortised cost	17	**38,192,198**	33,237,788
Derivative financial instruments	24	**485,492**	-
Other financial assets- Non-controlling investment in Smart Services CRC Pty Ltd		**-**	1
Property, plant and equipment	20	**107,615,408**	87,683,386
Indefeasible Rights to Use traffic paths	21	**67,448,514**	75,746,689
Total non-current assets		**223,258,074**	209,493,087
Total assets		**334,147,878**	305,903,560
LIABILITIES			
Current liabilities			
Payables	3	**11,929,419**	10,148,411
Derivative financial instruments	24	**-**	700,888
Provisions	6	**5,171,758**	4,738,680
Other liabilities		**326,746**	193,548
Income in advance	4	**56,311,337**	43,654,225
Total current liabilities		**73,739,260**	59,435,752
Non-current liabilities			
Income in advance	5	**45,468,827**	45,207,438
Derivative financial instruments	24	**-**	1,229,649
Provisions	7	**740,864**	462,886
Total non-current liabilities		**46,209,691**	46,899,973
Total liabilities		**119,948,951**	106,335,725
Net assets		**214,198,927**	199,567,835
EQUITY			
Contributed equity	22	**39,039**	39,039
Reserve (accumulated unrealised gain/loss on investments)	23	**(248,511)**	588,857
Retained earnings	23	**214,408,399**	198,939,939
Capital and reserves attributable to members of AARNet Pty Ltd		**214,198,927**	199,567,835
Total equity		**214,198,927**	199,567,835

The above Balance Sheet should be read in conjunction with the accompanying notes

STATEMENT OF CHANGES IN EQUITY

	2018 $	2017 $
Total equity at the beginning of the financial year	**199,567,835**	189,804,044
Changes in financial assets at fair value, net of tax	**(837,368)**	239,659
Net surplus for the year	**15,468,460**	9,524,132
Total recognised surplus and expense for the year	**14,631,092**	9,763,791
Total equity at the end of the financial year	**214,198,927**	199,567,835

The above statement of changes in equity should be read in conjunction with the accompanying notes.

STATEMENT OF CASH FLOWS

	Notes	2018 $	2017 $
Cash flows from operating activities			
Receipts from members and customers (inclusive of goods and services tax)		**91,861,883**	92,152,847
Payments to suppliers and employees (inclusive of goods and services tax)		**(63,609,595)**	(59,300,557)
		28,252,288	32,852,290
Net cash inflow from operating activities	12	**28,252,288**	32,852,290
Cash flows from investing activities		**(30,894,755)**	(17,406,467)
Payments for property, plant and equipment		**(30,894,755)**	(17,406,468)
Payments for Indefeasible Rights to Use traffic paths (intangible assets)		**-**	(192,335)
Payments for financial assets at fair value through statement of changes in equity		**(1,889,492)**	(4,222,870)
Payments for financial instruments at amortised cost		**(89,569,935)**	(101,375,661)
Proceeds from sale of financial assets at fair value through statement of changes in equity		**4,647,677**	3,229,342
Proceeds from financial instruments at amortised cost		**86,611,580**	89,425,000
Dividends received		**518,049**	553,833
Interest received		**2,460,594**	2,201,293
Proceeds from sale of property, plant and equipment		**-**	8,000
Net cash outflow from investing activities		**(28,116,282)**	(27,779,866)
Net increase/(decrease) in cash and cash equivalents		**136,006**	5,072,424
Cash and cash equivalents at the beginning of the financial year		**23,566,326**	18,493,902
Cash and cash equivalents at end of year	11	**23,702,332**	23,566,326

The above statement of cash flows should be ready in conjunction with the accompanying notes.

NOTES TO THE FINANCIAL STATEMENTS

1. BASIS OF PREPARATION

These general purpose financial statements have been prepared in accordance with Australian Accounting Standards and interpretations issued by the Australian Accounting Standards Board and the Australian Charities and Not-for-profits Commission Act 2012. AARNet Pty Ltd is domiciled in Australia and is a not-for-profit entity for the purpose of preparing the financial statements. The registered address of AARNet Pty Ltd is Tower A, Level 7, 799 Pacific Highway, Chatswood, NSW, 2067.

Historical cost convention

The financial statements have been prepared on a historical cost basis, except for the following: financial assets at fair value through statement of changes in equity, financial assets and liabilities (including derivative instruments) and certain classes of property, plant and equipment.

Income tax

AARNet is exempt from income tax under Section 50-5 of the Income Tax Assessment Act 1997 and therefore, no provision for income tax is included in these financial statements.

2. COMMITMENTS AND CONTINGENCIES

(a) Expenditure and capital commitments

	31 December 2018 $	31 December 2017 $
Within one year	**26,154,945**	20,496,787
Later than one year but not later than five years	**8,746,604**	8,746,604
Later than five years	**102,600**	148,238
	32,923,342	29,391,629

(b) Lease and capacity commitments: AARNet as lessee

	31 December 2018 $	31 December 2017 $
Commitments for minimum lease payments in relation to non-cancellable operating leases are payable as follows:		
Within one year	**10,714,908**	7,451,125
Later than one year but not later than five years	**50,107,150**	47,068,560
Later than five years	**60,826,167**	66,195,834
Commitments not recognised in the financial statements	**121,648,225**	120,715,519

c) Contingent Liabilities

AARNet's bankers have issued bank guarantees in favour of the Company's landlords and a third-party contractor with total face value of $ 906,363 (2017: $1,064,584).

3. CURRENT LIABILITIES - PAYABLES

	31 December 2018 $	31 December 2017 $
Current liabilities		
Trade payables	**3,795,181**	2,855,890
Other payables	**8,134,238**	7,292,521
	11,929,419	10,148,411

Trade payables and accruals are expected to be paid within 30 days.

These amounts represent liabilities for goods and services provided to AARNet prior to the end of the financial year which are unpaid. The amounts are unsecured and are usually paid within 30 days of recognition.

Accounting Policy

The fair value of financial liabilities for disclosure purposes is estimated by discounting the future contractual cash flows at the current market interest rate that is available to AARNet for similar financial instruments.

4. CURRENT LIABILITIES - INCOME IN ADVANCE

	31 December 2018 $	31 December 2017 $
Infrastructure establishment fees	**18,085,038**	11,581,080
Other deferred income	**1,271,242**	1,296,242
Infrastructure service fees	**7,359,282**	5,986,271
Subscriptions	**29,595,775**	24,790,632
	56,311,337	43,654,225

Accounting Policy

The Accounting Policy for Income in Advance is described in note 8.

5. NON-CURRENT LIABILITIES - INCOME IN ADVANCE

	31 December 2018 $	31 December 2017 $
Infrastructure establishment fees	**42,262,308**	41,445,565
Infrastructure projects	**1,475,755**	1,719,016
Other deferred income	**1,730,764**	2,042,857
	45,468,827	45,207,438

Accounting Policy

The Accounting Policy for Income in Advance is described in note 8.

6. CURRENT LIABILITIES - PROVISIONS

	31 December 2018 $	31 December 2017 $
Employee benefits	**5,171,758**	4,619,539
Make good provision	**-**	119,141
	5,171,758	4,738,680

Accounting Policy

Wages and salaries and annual leave

Liabilities for wages and salaries, including non-monetary benefits and leave entitlements expected to be settled within 12 months of the reporting date, are recognised in respect of employees' services up to the reporting date and are measured at the amounts expected to be paid when the liabilities are settled.

7. NON-CURRENT LIABILITIES - PROVISIONS

	31 December 2018 $	31 December 2017 $
Employee benefits	**303,961**	342,823
Make good on leased premises	**436,903**	120,063
	740,864	462,886

Movements in provisions

Movements in each class of provision during the financial year, other than employee benefits, are set out below:

2018	Make good on leased premises $
Non-current liabilities - Provisions	
Carrying amount at start of year	**120,063**
Additional provision to make good	**343,491**
Decrease in provision recognised	**(26,651)**
Carrying amount at end of year	**436,903**

2017	Make good on leased premises $
Non-current liabilities - Provisions	
Carrying amount at start of year	239,204
Decrease in provision recognised	(119,141)
Carrying amount at end of year	120,063

Accounting Policy

Employee benefits

These are liabilities for long service leave and annual leave not expected to be settled wholly within 12 months after the end of the period in which the employees render the related service. They are therefore recognised in the provision for employee benefits and measured as the present value of expected future payments to be made in respect of services provided by employees up to the end of the reporting period using the projected unit credit method.

Consideration is given to expected future wage and salary levels, experience of employee departures and periods of service. Expected future payments are discounted using market yields at the end of the reporting period of corporate bonds with terms and currencies that match, as closely as possible, the estimated future cash outflows. Re-measurements as a result of experience adjustments are recognised in the Statement of Surplus.

Make good on leased premises

Provisions for make good costs on leased premises are recognised when AARNet has a present legal or constructive obligation as a result of past events; it is more likely than not that an outflow of resources will be required to settle the obligation; and the amount has been reliably estimated.

8. SERVICE REVENUE

	2018 $	2017 $
Telecommunications		
Members: Subscription, Traffic and Access	**40,593,177**	40,399,463
Non-Member: Subscription, Traffic and Access	**18,153,717**	16,097,666
Other Services	**16,915,079**	13,901,773
	75,661,973	70,398,902
Infrastructure & service agreements		
Infrastructure Establishment Fees	**4,742,009**	4,210,075
Infrastructure Project Construction	**1,280,109**	1,829,763
	81,684,091	76,438,740

a) Disaggregation of revenue from contracts with customers

AARNet derives revenue from the transfer of goods and services over time and at a point in time in the following major product lines:

	Teleco-Members	Teleco-Non-Member	Teleco-Other Services	Infra Establishment Fees	Infra Project Construction	Total
2018						
At a point in time	-	-	-	-	1,280,109	1,280,109
Over time	40,593,177	18,153,717	16,915,079	4,742,009	-	80,403,982
Total	**40,593,177**	**18,153,717**	**16,915,079**	**4,742,009**	**1,280,109**	**81,684,091**

	Teleco-Members	Teleco-Non-Member	Teleco-Other Services	Infra Establishment Fees	Infra Project Construction	Total
2017						
At a point in time	-	-	-	-	1,829,763	1,829,763
Over time	40,399,463	16,097,666	13,901,773	4,210,075	-	74,608,977
Total	40,399,463	16,097,666	13,901,773	4,210,075	1,829,763	76,438,740

b) Assets and liabilities related to contracts with customers

AARNet has recognised the following assets and liabilities related to contracts with customers:

	31 December 2018 $	31 December 2017 $
Current Liabilities- Income in Advance in relation to:		
Infrastructure Establishment Fees	**18,085,038**	11,581,080
Other Deferred Income	**1,271,242**	1,296,242
Infrastructure Service Fees	**7,359,282**	5,986,271
Subscriptions	**29,595,775**	24,790,632
Non-Current Liabilities- Income in Advance in relation to:		
Infrastructure Establishment Fees	**42,262,308**	41,445,565
Infrastructure Projects	**1,475,755**	1,719,016
Other Deferred Income	**1,730,764**	2,042,857

(i) Significant changes in contract assets and liabilities

Contract liabilities for Infrastructure and service agreements have significantly increased due to an increase in establishment fees for new projects that have not been completed as at 31 December 2018. The increase of establishment fees billed for the year is $10,659,560 (2017: $4,733,813) despite no change in the timing of satisfied performance obligations; the nature of the goods supplied; nor the terms of payment.

(ii) Revenue recognised in relation to contract liabilities

The following table shows how much of the revenue recognised in the current reporting period relates to carried forward contract liabilities.

	31 December 2018 $	31 December 2017 $
Revenue recognised that was included in the contract liability balance at the beginning of the period		
Members: Subscription, Traffic and Access	**22,304,930**	24,352,521
Non-Members: Subscription, Traffic and Access	**3,103,862**	2,858,949
Other Services	**4,585,761**	3,359,629
Infrastructure Establishment Fees	**4,083,926**	3,831,242
Infrastructure Project Construction	**36,667**	36,667
Total Service Revenue	**34,115,146**	34,439,008
Other Revenue	**745,684**	281,254
Total Revenue	**34,860,830**	34,720,262

There are no material amounts of revenue recognised for both financial years in relation to performance obligations satisfied in previous periods.

(iii) Unsatisfied long-term transmission service contracts

As permitted under the provisions in AASB 15, the transaction price allocated to (partially) unsatisfied performance obligations is not disclosed where the entity has a right to invoice the customer in the amount that corresponds directly with the value of the entity's performance completed or the original expected duration of the underlying contract is one year or less. For Infrastructure establishment fees the total amount allocated to unsatisfied performance obligations is $60,347,346. The anticipated timing for revenue recognition of liabilities related to contracts with customers (including Infrastructure establishment fees) is as follows:

	31 December 2018 $	31 December 2017 $
Within one year	**56,311,337**	43,654,225
Later than one year but not later than five years	**16,935,177**	15,586,465
Later than five years	**28,533,650**	29,620,973
	101,780,164	88,861,663

Accounting Policy

Service revenues (derived from contracts with customers) have been accounted for under the new accounting standard, AASB15 Revenue from Contracts with Customers. The effects on both the current and comparative financial years are addressed under note 29, *Other significant accounting policies*, within these financial statements.

(i) Transmission Services

Transmission services consist of a series of performance obligations where revenue is recognised as data services have been delivered in accordance to the contract.

The performance obligation for Transmission service is coupled with a performance obligation relating to access rights to the AARNet network, for the service agreement performance obligation cannot be executed without an access agreement.

An establishment fee forms part of the transaction price for transmission services. The establishment fee is not a consideration for performance obligation in its own right, for the work to enable a transmission service cannot be separated from the transmission service itself.

(ii) Infrastructure Project Construction Revenue

Revenue from the provision of infrastructure where the infrastructure becomes the property of the customer is recognised when the underlying performance obligation is completed.

(iii) Stand alone selling price in the application of AASB15 Revenue from Contracts with Customers

The stand alone selling price in relation to all performance obligations contained within service contracts with customers is judged to be the fair value of those performance obligations if bought within a common market.

(iv) Discounts and Taxes

Amounts disclosed as revenue are net of any discounts or taxes paid.

(v) Income in Advance

Amounts received or due and receivable in respect of future subscription periods or for services which have not been delivered are recorded as Income in Advance and appear as a liability (refer notes 4 and 5). Income in Advance is classified as either a current liability or a non-current liability depending on whether the relevant subscription expires or the related service is expected to be delivered.

9. OTHER REVENUE, GRANTS AND CONTRIBUTIONS RECEIVED

In 2018 and 2017 AARNet recorded significant amounts of Other Revenue, Grants Received and Other Contributions.

These amounts are a material component of the surplus recorded by AARNet.

	2018 $	2017 $
Interest	**2,507,380**	2,126,636
Dividends	**618,516**	528,390
Gain on foreign currency contracts	**3,250,943**	-
Gain on financial assets at fair value through statement of changes in equity	**84,177**	225,594
Other income	**585,793**	589,025
Other Revenue	**7,046,809**	3,469,645
Grants and Contributions received	**403,189**	536,161

Gain on Foreign Currency Contracts

AARNet hedges a significant proportion of its exposure to foreign currency movements (refer note 24) and does not apply hedge accounting. The accounting policy adopted with respect to derivatives and hedging activities is described below. During 2018 movements in the Australian dollar produced a gain (including realised and unrealised gain) on the hedging instruments held during and as at the end of the year of $3,250,943 (2017: loss of $2,336,325 (refer note 10)).

Grants and Contributions Received

This item includes amounts received by AARNet by way of grants and contributions where AARNet does not supply a service to the organisations providing the funding.

Accounting Policy

Interest and Dividend Income

Interest and dividend income is recognised as it accrues and dividends are recognised as revenue when the right to receive payment is established.

Foreign Currency Contracts

At year end, Foreign Currency Contracts are recognised at fair value as described in note 24 (see Derivative Financial Instruments). Realised and unrealised gain or losses on such contracts are taken into account each year in the Statement of Surplus. AARNet does not apply hedge accounting.

Contributed Assets

Contributed assets (including the contribution of funds by government agencies or other persons to facilitate the construction of infrastructure for the AARNet network) are recognised at fair value when title and control of the asset passes or when the conditions to receive or retain funding are met.

10. EXPENSES

		2018 $	2017 $
Depreciation			
Office equipment		**1,203,732**	817,034
Leasehold improvements		**627,276**	148,584
Communication assets		**9,326,292**	9,955,386
Software		**51,466**	66,391
Buildings		**3,071**	-
Total depreciation	20	**11,211,837**	10,987,393
Amortisation			
Intangibles - Indefeasible Rights to Use traffic paths	21	**8,298,175**	6,921,805
Total depreciation and amortisation		**19,510,012**	17,909,198
Other expenses (including finance costs)			
Loss on foreign currency contracts		**-**	2,336,325
Loss on foreign currency transactions		**102,589**	635,385
Loss on disposal of assets		**1,531**	-
Total other expenses		**104,120**	2,971,710
Rental expense relating to operating leases			
Minimum lease payments - premises		**1,619,850**	1,148,152
Superannuation expense		**2,333,695**	2,324,579

Accounting Policy

Depreciation and Amortisation

The accounting policy for depreciation and amortisation is described in notes 20 and 21 respectively.

11. CURRENT ASSETS - CASH AND CASH EQUIVALENTS

	31 December 2018 $	31 December 2017 $
Current assets		
Cash at bank and in hand (AUD)	**12,865,159**	9,685,550
Cash at bank (USD and EUR)	**2,265,361**	7,578,080
Deposits at call - all denominated in AUD	**8,571,812**	6,302,696
	23,702,332	23,566,326

Cash at bank and on hand

Cash at bank and on hand is held at interest rates varying between 0.00% and 1.36% (2016: 0.00% and 1.16%). During the year, cash is transferred to or from term deposits to meet liquidity requirements.

Deposits at call

Interest bearing deposits at call attracted interest rates between 0.40% and 0.50% (2017: 0.50% and 0.60%).

Accounting Policy

For the purpose of presentation in the statement of cash flows, cash and cash equivalents includes cash on hand, deposits held at call with financial institutions, bank overdrafts and other short-term, highly liquid investments with original maturities of three months or less that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value.

12. RECONCILIATION OF NET SURPLUS TO NET CASH INFLOW FROM OPERATING ACTIVITIES

	31 December 2018 $	31 December 2017 $
Surplus for the year	**15,468,460**	15,472,662
Depreciation and amortisation	**19,510,012**	17,909,199
Dividend income	**(618,516)**	(528,390)
Interest received	**(2,460,594)**	(2,201,293)
Net gain on sale of investments	**(84,177)**	(225,594)
Net amortised interest income	**(41,798)**	(41,417)
Net loss/ (gain) on sale of assets	**1,531**	(8,000)
Write off of CRC share	**1**	-
Decrease/ (increase) in trade receivables	**(14,495,477)**	3,800,249
Decrease/ (increase) in accrued income	**(100,379)**	705,208
Decrease/ (increase) in prepayments and other debtors	**(968,959)**	20,337
Decrease/ (increase) in derivative financial instruments	**(3,250,944)**	2,336,325
Increase/ (decrease) in trade payables	**873,864**	(1,630,127)
Increase in other operating liabilities	**133,198**	9,240
Increase in provisions	**367,565**	1,086,923
Increase/(decrease) in income received in advance	**13,918,501**	(3,853,032)
Net cash inflow from operating activities	**28,252,288**	32,852,290

13. CURRENT ASSETS - RECEIVABLES

	31 December 2018 $	31 December 2017 $
Trade receivables	**48,212,007**	33,716,530
Provision for impairment of receivables	**(255,000)**	(255,000)
	47,957,007	33,461,530
Prepayments and Other Debtors	**4,040,342**	3,285,578
	51,997,349	36,747,108

Trade Receivables

Trade receivables are due for settlement no more than 30 days from the date of recognition.

At 31 December 2018, trade receivables included balances of $1,015,845 (2017: $95,599) which are past due but not impaired or considered uncollectable. These amounts have been outstanding for more than 90 days. These relate to a number of customers for whom there is no history of default.

Prepayments and Other Debtors

Payments for goods and services which are to be provided in future years are recognised as prepayments.

Other debtors generally arise from transactions outside the usual operating activities of AARNet. Interest is not normally charged.

Fair Value

Due to the short-term nature of these receivables, their carrying amount is assumed to approximate their fair value.

Accounting Policy

Trade receivables are recognised at fair value, less provision for impairment.

Collectability of trade receivables is reviewed on an ongoing basis. Debts which are known to be uncollectible are written off. The group applies the simplified approach to providing for expected credit losses prescribed by AASB 9, which permits the use of the lifetime expected loss provision for all trade receivables. To measure the expected credit losses, trade receivables have been grouped based on shared credit risk characteristics and the days past due. The amount of the provision is recognised in the Statement of Surplus in Administration-Telecommunications expenses.

The carrying value less impairment provision of trade receivables is assumed to approximate fair value due to the short-term nature of the receivables.

14. CURRENT ASSETS - ACCRUED INCOME

	31 December 2018 $	31 December 2017 $
Current assets		
Infrastructure projects	**34,356**	49,042
Other	**267,467**	157,391
Accrued interest receivable	**496,062**	390,606
	797,885	597,039

15. FINANCIAL ASSETS AND INVESTMENTS

AARNet holds financial assets and investments (other than prepayments or trade receivables) including

- Financial instruments at amortised cost (notes 16 and 17)
- Financial assets at fair value through statement of changes in equity (note 18)
- Derivative financial instruments (shown on the Balance Sheet)

Accounting Policy

Financial instruments at amortised cost

Financial instruments at amortised cost are non-derivative financial assets with fixed or determinable payments and fixed maturities that management has the positive intention and ability to hold to maturity. If AARNet were to sell other than an insignificant amount of financial instruments at amortised cost, the whole category would be tainted and reclassified as financial assets at fair value through statement of surplus. Financial instruments at amortised cost are included in non-current assets, except for those with maturities less than 12 months from the end of the reporting period, which are classified as current assets.

At initial recognition, AARNet measures a financial instrument at amortised cost at fair value plus transaction costs that are directly attributable to the acquisition of the investment. Financial instruments at amortised cost are subsequently carried at amortised cost using the effective interest method.

If a financial instrument at amortised cost has a variable interest rate, the discount rate for measuring any impairment loss is the current effective interest rate determined under the contract. As a practical expedient, AARNet may measure impairment on the basis of an instrument's fair value using an observable market price.

Purchases and sales of financial assets are recognised on the date on which AARNet commits to purchase or sell the asset. Financial assets are derecognised when the rights to receive cash flows from the financial assets have expired or have been transferred and AARNet has transferred substantially all the risks and rewards of ownership.

Financial assets at fair value through statement of changes in equity

Financial assets at fair value through statement of changes in equity are held at fair value with gains and losses recognised in Statement of changes in equity. Debt or equity securities that are not held to maturity are recognised as financial assets at fair value through statement of surplus. They are included in non-current assets unless the investment matures or management intends to dispose of the investment within 12 months of the end of the reporting period.

At each reporting period, AARNet assesses whether any financial assets at fair value through statement of changes in equity are impaired. Impairment exists if one or more events have occurred which have a negative impact on the security's estimated cash flows which can be reliably estimated.

If financial assets at fair value through statement of changes in equity are impaired, the cumulative loss - measured as the difference between the original cost and the current fair value, less any impairment charge previously recognised in the Statement of Changes in Equity - is removed and recognised in the Statement of Surplus.

Impairment losses on equity financial assets at fair value through statement of changes in equity previously recognised in the Statement of Surplus are not reversed in subsequent periods. If the fair value of a debt security which has been impaired increases, due to an event which has occurred after the impairment was recognised, the impairment charge is reversed through the Statement of Surplus.

When securities classified as financial assets at fair value through statement of changes in equity are sold, the accumulated fair value adjustments recognised in Statement of changes in equity are reclassified to the Statement of Surplus.

Derivatives and hedging activities

Derivatives are initially recognised at cost on the date a derivative contract is entered into and are subsequently remeasured to their fair value at each reporting date.

AARNet has entered into forward exchange contracts which are economic hedges for foreign currencies to be traded at a future date but do not satisfy the requirements for hedge accounting. Any changes in fair values are taken to the Statement of Surplus immediately.

Fair value measurements

AARNet measures and recognises the following assets and liabilities at fair value on a recurring basis:

- Financial assets at fair value through profit or loss; and
- Derivative financial instruments.

AASB 13 Fair Value Measurement requires disclosure of fair value measurements by level of the following fair value measurement hierarchy:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2: inputs other than quoted prices included within level 1 that are observable for the asset or liability, either directly or indirectly; and
- Level 3: inputs for the asset or liability that are not based on observable market data (unobservable inputs).

The following table presents the company's assets and liabilities measured and recognised at fair value at 31 December 2018 and 31 December 2017:

31 December 2018	Level 1 $	Level 2 $	Level 3 $	Total $
Assets				
Derivative financial instruments	-	1,320,407	-	1,320,407
Financial assets at fair value through statement of changes in equity				
Equity securities	5,200,622	-	-	5,200,622
Bonds	4,101,645	-	-	4,101,645
Total assets	**9,302,267**	**1,320,407**		**-10,622,674**

31 December 2017	Level 1 $	Level 2 $	Level 3 $	Total $
Assets				
Financial assets at fair value through statement of changes in equity				
Equity securities	5,901,795	-	-	5,901,795
Bonds	6,923,428	-	-	6,923,428
Total assets	**12,825,223**	**-**		**-12,825,223**
Liabilities				
Derivative financial instruments	-	1,930,536	-	1,930,536
Total liabilities	**-**	**1,930,536**	**-**	**1,930,536**

The fair value of financial instruments traded in active markets (such as financial assets at fair value through statement of changes in equity) are based on quoted market prices at the end of the reporting period. These instruments are included in level 1.

The fair value of financial instruments that are not traded in an active market (such as derivative financial instruments) are determined using valuation techniques. These valuation techniques maximise the use of observable market data where it is available and rely as little as possible on entity specific estimates. If all significant inputs required to fair value an instrument are observable, the instrument is included in level 2.

16. CURRENT ASSETS - FINANCIAL INSTRUMENTS AT AMORTISED COST

	31 December 2018 $	31 December 2017 $
Debt securities (fixed and floating rates)	**3,757,323**	1,000,000
Term deposits	**29,800,000**	34,500,000
	33,557,323	35,500,000

Bank guarantee and credit facilities

AARNet has a $1,500,000 Bank Guarantee Facility provided by the National Australia Bank. AARNet has drawn on this facility to provide bank guarantees in favour of the landlords for leased premises and a third party contractor. AARNet has an unsecured credit card facility of $300,000.

17. NON-CURRENT ASSETS - FINANCIAL INSTRUMENTS AT AMORTISED COST

	31 December 2018 $	31 December 2017 $
Debt securities (fixed and floating rates)	**38,192,198**	33,237,788

18. NON-CURRENT ASSETS - FINANCIAL ASSETS AT FAIR VALUE THROUGH STATEMENT OF CHANGES IN EQUITY

	31 December 2018 $	31 December 2017 $
Non-current assets		
Debt securities (fixed and floating rates)	**4,101,645**	6,923,428
Equity securities	**5,200,622**	5,901,795
	9,302,267	12,825,223

19. NON-CURRENT ASSETS - RECEIVABLES

	31 December 2018 $	31 December 2017 $
Prepayments	**214,195**	-

20. NON-CURRENT ASSETS - PROPERTY, PLANT AND EQUIPMENT

	Leasehold improvements $	Office equipment $	Communication assets $	Software $	Total $
At 1 January 2018					
Cost or fair value	2,426,981	5,818,235	139,026,289	1,107,765	148,379,270
Accumulated depreciation	(1,685,804)	(4,764,969)	(57,834,037)	(1,000,372)	(65,285,182)
Net book amount	**741,177**	**1,053,266**	**81,192,252**	**107,393**	**83,094,088**
Year ended 31 December 2018					
Opening net book amount	741,177	1,053,266	77,448,668	143,583	79,319,027
Additions	100,431	1,854,413	12,741,600	51,209	13,565,407
Depreciation charge	(148,584)	(817,034)	(9,955,386)	(66,391)	(10,987,395)
Closing net book amount	**693,024**	**2,090,645**	**84,811,465**	**88,252**	**87,683,386**
At 31 December 2018					
Cost or fair value	2,527,412	7,656,237	152,406,631	1,155,015	163,745,295
Accumulated depreciation	(1,834,388)	(5,565,592)	(67,595,166)	(1,066,763)	(76,061,909)
Net book amount	**693,024**	**2,090,645**	**84,811,465**	**88,252**	**87,683,386**

	Buildings $	Leasehold improvements $	Office equipment $	Communication assets $	Software $	Total $
Year ended 31 December 2017						
Opening net book amount	-	693,024	2,090,645	84,811,465	88,252	87,683,386
Additions	81,927	2,121,196	2,589,341	27,343,926	9,000	32,145,390
Disposals	-	-	(1,531)	-	-	(1,531)
Additions (finance leases)	-	-	-	260,796	-	260,796
Disposal (finance leases)	-	-	-	(1,260,796)	-	(1,260,796)
Depreciation charge	(3,071)	(627,276)	(1,203,732)	(9,326,292)	(51,466)	(11,211,837)
Closing net book amount	**78,856**	**2,186,944**	**3,474,723**	**101,829,099**	**45,786**	**107,615,408**
At 31 December 2018						
Cost or fair value	81,927	4,521,238	10,226,227	178,261,159	1,164,015	194,254,566
Accumulated depreciation	(3,071)	(2,334,294)	(6,751,504)	(76,432,060)	(1,118,229)	(86,639,158)
Net book amount	**78,856**	**2,186,944**	**3,474,723**	**101,829,099**	**45,786**	**107,615,408**

Communication Assets- Finance Leases

AARNet provides other parties with rights to use components of AARNet's fibre and other infrastructure in return for that party providing AARNet with similar rights to use components of its fibre and infrastructure.

These arrangements are in the nature of two separate finance leases with each party acting as lessor and lessee. Each lease is treated as settled when both sides of the swap agreement come into force. Consequently, there is no lease finance cost or outstanding lease liability arising in respect of such transactions.

Assets in the course of construction

Included in the carrying amounts of the assets shown above are assets that were in the course of construction as at the end of the reporting period. The relevant amounts are as follows:

	31 December 2018 $	31 December 2017 $
Communication assets	**34,931,114**	12,729,760
Office equipment	**1,601,048**	113,616
Leasehold improvements	**464,155**	-
Total assets in the course of construction	**36,996,317**	12,843,376

Accounting Policy

Acquisition

Property, plant and equipment is stated at historical cost less depreciation. Historical cost includes expenditure that is directly attributable to the acquisition of the items.

Subsequent costs are included in the asset's carrying amount or recognised as a separate asset, as appropriate, only when it is probable that future economic benefits associated with the item will flow to AARNet and the cost of the item can be measured reliably.

Fibre and Infrastructure Swaps

AARNet may enter into arrangements granting other parties the right to use AARNet's fibre or infrastructure in return for receiving rights to use fibre or infrastructure owned by the other party ("swaps"). Where such swaps involve significant values of assets, AARNet records an asset disposal in respect of the assets used by the other party at the carrying value of the relevant assets at the time the swap becomes effective. AARNet then recognises an asset of equivalent value, being the right to use the fibre or infrastructure of the other party.

Unincorporated Joint Operations

AARNet accounts for interests in unincorporated joint operations by recognising its share of the assets and liabilities held or owed by the joint operation along with its share of the expenses incurred by the joint operation.

Where the assets held within the joint operation include assets in the course of construction, AARNet's share of those assets is included in the values for assets in the course of construction shown in this note.

Depreciation

Property, plant and equipment is depreciated using the straight-line method to allocate cost, net of residual value, over each item's estimated useful life, as follows:

Leasehold improvements	10 years
Office equipment	3 years
Leased communication assets	5 - 6 years
Leased office equipment	3 years
Communication assets	3 - 20 years
Software	2 - 3 years

The assets' residual values and useful lives are reviewed, and adjusted if appropriate, at the end of each reporting period; such adjustments may result in a revised useful life shorter than that shown above.

Impairment of Assets

Assets that are subject to depreciation or amortisation are reviewed for indicators of impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. As a not-for-profit entity, value in use is calculated on the basis of the depreciated replacement cost, which represents the current replacement cost of an asset less, where applicable, accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired future economic benefits of the asset.

For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash generating units). The company has only one cash generating unit.

Gains and Losses

Gains and losses on disposals are determined by comparing proceeds with carrying amount. These are included in the Statement of Surplus.

21. NON-CURRENT ASSETS - INDEFEASIBLE RIGHTS TO USE TRAFFIC PATHS (INTANGIBLE ASSETS)

	Total $
At 1 January 2017	
Total payments	163,815,583
Accumulated amortisation on a straight line basis	(81,339,424)
Net book amount	82,476,159
Year ended 31 December 2017	
Opening net book amount	82,476,159
Additions	192,335
Amortisation charge	(6,921,805)
Closing net book amount	75,746,689
Total payments	164,007,918
Accumulated amortisation on a straight line basis	(88,261,229)
Net book amount	75,746,689
Year ended 31 December 2018	
Opening net book amount	75,746,689
Amortisation charge	(8,298,175)
Closing net book amount	67,448,514
At 31 December 2018	
Cost	164,007,918
Accumulated amortisation	(96,559,404)
Net book amount	67,448,514

AARNet's intangible assets are indefeasible rights to use (IRU) capacity on traffic paths across communication infrastructure owned by other parties.

Accounting Policy

The value of each IRU is amortised from the date each right become available for service and will continue to be amortised over the term of the right, which varies from 10 to 28 years. The longest remaining amortisation period is approximately 20 years.

Impairment

IRUs are also subject to impairment review as described in note 20.

22. CONTRIBUTED EQUITY

	31 December 2018 Shares	31 December 2017 Shares	31 December 2018 $	31 December 2017 $
Ordinary shares				
Fully paid ordinary shares	**78**	78	**39,039**	39,039

Movements in ordinary share capital

Date	Details	Number of shares	$
1 January 2017	Opening balance	78	39,039
31 December 2017	Balance	78	39,039
31 December 2018	Balance	78	39,039

AARNet's shareholders are 38 Australian Universities and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Each shareholder holds two ordinary shares.

Holders of ordinary shares are entitled to one vote per share on resolutions put before the members. Holders of ordinary shares are not entitled to dividends and have no right to receive any distribution during a winding up.

23. RETAINED EARNINGS AND RESERVE

Retained earnings

Movements in retained earnings were as follows:

	31 December 2018 $	31 December 2017 $
Balance 1 January	**198,939,939**	189,415,807
Surplus for the year	**15,468,460**	9,524,132
Balance 31 December	**214,408,399**	198,939,939

Reserve - accummulated unrealised gain/loss on investments

Movements in reserve were as follows:

	31 December 2018 $	31 December 2017 $
Balance 1 January	**588,857**	349,198
Changes in the fair value of available-for-sale financial assets	**(837,368)**	239,659
Balance 31 December	**(248,511)**	588,857

24. FINANCIAL RISK MANAGEMENT

AARNet's activities are exposed to a variety of financial risks including:

a) Market risk (including currency risk, interest rate risk and equity price risk);

b) Credit risk; and

c) Liquidity risk.

This note explains the Company's level of exposure to these risks, how these risks could affect the Company's future financial performance and how AARNet manages the impact of these risks.

AARNet's overall risk management program focuses on managing its liquidity and seeking to minimise potential adverse effects on financial performance. The Board, through the Audit, Finance & Risk Committee, is responsible for setting the overall objectives for risk management and provides specific policies where necessary.

The day to day risk management is carried out by identifying, evaluating and hedging financial risks. This is the responsibility of the Chief Executive Officer (CEO) and the Chief Financial Officer (CFO) and they are supported by operating management.

a) Market risk

(i) Currency risk

AARNet operates equipment at international locations and deals with certain suppliers in foreign currencies and is impacted by changes in foreign exchange rates. The Company is primarily exposed to changes in the US dollar (USD) and to a smaller extent, the Euro (EUR). AARNet currently has monthly requirements in excess of USD200,000, for the purchase of international communications capacity and other services. These requirements are expected to increase over time.

Currency risk is measured using sensitivity analyses and cash flow forecasting, summarised below.

Currency risk is managed by holding foreign currency, entering into forward foreign exchange contracts and purchasing options to acquire foreign currency. At year end, AARNet held USD1,479,782 (AUD2,100,239) in USD denominated bank accounts and EUR101,559 (AUD165,122) in a EUR denominated bank account.

AARNet's risk management policy is to hedge at least 60% of anticipated short-term cash flows (mainly for the purchase of capacity to the USA) in USD.

The following table summarises the sensitivity of the Company's financial assets and financial liabilities to foreign exchange risk for the year.

		-100 bps		+100 bps	
At 31 December 2018	Carrying amount $	Surplus $	Equity $	Surplus $	Equity $
Cash and cash equivalents	23,702,332	(251,707)	(251,707)	205,942	205,942
Trade Receivables	49,067,561	(357,593)	(357,593)	292,576	292,576
Derivative financial instruments (liabilities)	1,320,407	(146,712)	(146,712)	120,037	120,037
Trade payables	**(3,795,181)**	**201,382**	**201,382**	**(164,767)**	**(164,767)**

		-100 bps		+100 bps	
At 31 December 2017	Carrying amount $	Surplus $	Equity $	Surplus $	Equity $
Cash and cash equivalents	23,566,326	(842,009)	(842,009)	688,916	688,916
Trade Receivables	33,716,530	-	-	-	-
Derivative financial instruments (assets)	(1,930,536)	214,504	214,504	(175,503)	(175,503)
Trade payables	**(2,855,890)**	**2,285**	**2,285**	**(1,869)**	**(1,869)**

(ii) Interest rate risk

AARNet's main interest rate risk arises from its cash at bank, cash in deposits and financial instruments at amortised cost.

The Company's interest rate risk is monitored using sensitivity analysis and is reviewed by management and the company's external investment consultant.

The following table summarises the sensitivity of the Company's financial assets and financial liabilities to interest rate risk for the year.

		Interest rate risk			
		-10%		+10%	
At 31 December 2018	Carrying amount $	Surplus $	Equity $	Surplus $	Equity $
Financial assets					
Cash and cash equivalents	23,702,332	(126,721)	(126,721)	214,370	214,370
Financial instruments at amortised cost, term deposits	29,800,000	298,000	298,000	298,000	298,000
Financial instruments at amortised cost, floating rate notes	41,949,521	419,495	419,495	419,495	419,495

		Interest rate risk			
		-10%		+10%	
At 31 December 2017	Carrying amount $	Surplus $	Equity $	Surplus $	Equity $
Financial assets					
Cash and cash equivalents	23,566,326	(90,674)	(90,674)	159,882	159,882
Financial instruments at amortised cost, term deposits	34,500,000	(345,000)	(345,000)	345,000	345,000
Financial instruments at amortised cost, floating rate notes	34,237,788	(342,378)	(342,378)	342,378	342,378

(iii) assets at fair value through statement of changes in equity (price risk)

AARNet's equity price risk arises from holding financial assets at fair value through statement of changes in equity such as equity instruments, listed bonds and hybrid investments.

Price risk is measured and using sensitivity analysis and is monitored by management and the company's external investment consultant.

The following table summarises the sensitivity of the Company's financial assets and financial liabilities to price risk for the year.

		Other price risk			
		-1%		+1%	
At 31 December 2018	Carrying amount $	Surplus $	Equity $	Surplus $	Equity $
Financial assets					
Financial assets at fair value through statement of changes in equity	9,302,267	(93,023)	(93,023)	93,023	93,023

		Other price risk			
		-1%		+1%	
At 31 December 2017	Carrying amount $	Surplus $	Equity $	Surplus $	Equity $
Financial assets					
Financial assets at fair value through statement of changes in equity	12,825,223	(128,252)	(128,252)	128,252	128,252

b) Credit risk

Credit risk arises where a debtor fails to make contractual payments to AARNet as and when they fall due. AARNet is exposed to credit risk on its holdings of cash and cash equivalents, term deposits, corporate bonds and loan notes, hybrid securities and derivative financial instruments. Further credit risk arises from credit exposures to customers in the form of outstanding receivables and committed transactions.

AARNet's credit risk is mainly managed through the following measures:

Credit risk source	Management
Bank deposits and derivative financial instruments	• Principally deal with highly rated financial institutions.
Investments in hybrid loan notes and bonds	• Bound by an approved investment policy which stipulates minimum ratings or other criteria for investment funds. • Investment decisions based on recommendations from a licensed investment advisor.
Customers	• Assessment of credit quality of the customer, taking into account its financial position, past experience and other factors. • Invoicing in advance for significant portion of income.

(i) Trade receivables

AARNet applies the simplified approach to providing for expected credit losses prescribed by AASB 9, which permits the use of the lifetime expected loss provision for all trade receivables. To measure the expected credit losses, trade receivables have been grouped based on shared credit risk characteristics and the days past due.

Amounts recognised in Statement of Surplus

During the year, no material gain/(loss) was recognised in Statement of Surplus in other expenses in relation to impaired receivables.

In the prior year, the impairment of trade receivables was assessed based on the incurred loss model. Individual receivables which were known to be uncollectible were written off by reducing the carrying amount directly. The other receivables were assessed collectively, to determine whether there was objective evidence that an impairment had been incurred but not yet been identified. For those receivables, the estimated impairment losses were recognised in a separate provision for impairment. The group considered that there was evidence of impairment if any any of the following indicators were present:

- Significant financial difficulties for the debtor
- Probability that the debtor will enter bankruptcy or financial reorganisation, and
- Default or delinquency in payments (more than 60 days overdue).

(ii) Other financial assets at amortised cost

Other financial assets at amortised cost include debt securities and term deposits (previously held-to-maturity). All of these financial assets are considered to have low credit risk, and thus the impairment provision recognised during the period was zero. Management consider 'low credit risk for listed bonds to be an investment grade credit rating with at least one major rating agency. Other instruments are considered to be low credit risk when they have a low risk of default and the issuer has a strong capacity to meet its contractual cash flow obligations in the near term.

c) Liquidity risk

Prudent liquidity risk management implies maintaining sufficient cash to meet the needs of the business. Management monitors AARNet's liquidity and cash and cash equivalents on a rolling forecast expected cash flow basis. This analysis is prepared in Australian Dollars.

AARNet's Board periodically considers longer range financial forecasts (5+ years) provided as part of the normal course of its deliberations. The Board also considers the expenditure commitments disclosed in note 2 when assessing the liquidity of the Company.

25. CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

The preparation of financial statements requires the use of certain critical accounting estimates. It also requires management to exercise its judgement in the process of applying the Company's accounting policies.

Often, this involves estimates and assumptions concerning the future. The resulting accounting estimates will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

(i) Useful life of intangible assets

The Director's have assumed in the ordinary course of business that AARNet's customers will continue to use AARNet's services into the forseeable future. The useful economic lives assigned for intangible assets are based on the contractual terms agreed for each Indefeasible Right to Use.

(ii) Useful life of assets

AARNet is the owner of a significant amount of assets and infrastructure. Estimates are made as to the useful life of these assets which can affect the amount of depreciation and amortisation expense during the year.

26. DIRECTORS

The Directors of AARNet Pty Ltd during the financial year were:

Chairman - non-executive
Emeritus Professor Gerard Sutton AO*

Executive Directors
Mr Chris Hancock, CEO

Directors
Mr Chris Bridge
Dr Christine Burns
Professor John Dewar
Professor Annabelle Duncan
Mr Robert Fitzpatrick*
Mr Jeff Murray
Mr John Rohan*
Professor Deborah Terry
Emeritus Professor Mark Wainwright AM*
Dr David Williams

**Denotes independent director*

27. KEY MANAGEMENT PERSONNEL DISCLOSURES

Key management personnel compensation

The key management personnel are those who had authority and responsibility for planning, directing and controlling the activities of AARNet, directly or indirectly, during the year. The remuneration for key management personnel including directors is as follows:

	31 December 2018 $	31 December 2017 $
Short-term and long-term employee benefits	**2,722,364**	2,533,016
Post-employment benefits	**335,417**	290,976
	3,057,781	2,823,992

Transactions with key management personnel

Several directors (Messrs CM Bridge, J Murray and Dr C Burns) are members of the Council of Australian University Directors of Information Technology (CAUDIT) to which AARNet provides payroll bureau services. AARNet receives no consideration for this service.

A director, Emeritus Professor MS Wainwright AM, is Chair of Smart Services CRC Pty Ltd. AARNet owned one share and made in-kind contributions to this company. During 2018, Smart Services CRC Pty Ltd applied for voluntary deregistration.

During 2017 a Director, Mr Robert Fitzpatrick provided consulting services to the company in return for remuneration of $54,750.

Other directors represent, act for, or hold offices at certain AARNet shareholders and customers. AARNet provides services to these shareholders on arm's length terms.

28. REMUNERATION OF AUDITORS

PricewaterhouseCoopers

Audit and other assurance services

	2018 $	2017 $
Audit and other assurance services		
Audit and review of financial statements	**217,500**	211,000
Total remuneration for audit and other assurance services	**217,500**	211,000
Taxation services		
Taxation Services	**54,208**	112,389
Other services		
Remuneration for advisory services	**65,540**	69,030
Total remuneration of PricewaterhouseCoopers	**337,248**	392,419

29. OTHER SIGNIFICANT ACCOUNTING POLICIES

New, revised or amending Accounting Standards and Interpretations adopted

AARNet has applied the following standards and amendments for the first time for their annual reporting period commencing 1 January 2018:

- AASB 9 Financial Instruments (AASB 9)
- AASB 15 Revenue from Contracts with Customers (AASB 15)

AARNet had to change its accounting policies and make certain retrospective adjustments following the adoption of AASB 9 and AASB 15.

a) Impact on the financial statements

As a result of the changes in the entity's accounting policies, prior year financial statements had to be restated. As explained in note 29 (b) below, AASB 9 was generally adopted without restating comparative information.

The following tables show the adjustments recognised for each individual line item. Line items that were not affected by the changes have not been included. As a result, the sub-totals and totals disclosed cannot be recalculated from the numbers provided. The adjustments are explained in more detail by standard below.

Balance sheet (extract)	31 December 2017 as originally presented	AASB 15	31 December 2017 Restated	AASB 9	1 January 2018 Restated
Current Assets					
Held to Maturity Investments	35,500,000	-	35,500,000	(35,500,000)	-
Financial Assets at Amortised Cost	-	-	-	35,500,000	35,500,000
Non-Current Assets					
Available for sale Financial Assets	12,825,223	-	12,825,223	(12,825,223)	-
Fair Value Through Statement of Changes in Equity	-	-	-	12,825,223	12,825,223
Held to Maturity Investments	33,237,788	-	33,237,788	(33,237,788)	-
Financial Assets at Amortised Cost	-	-	-	33,237,788	33,237,788
Current Liabilities					
Income in advance- Infrastructure					
Establishment Fees	16,784,255	(5,203,175)	11,581,080	-	11,581,080
Income in advance- Other	1,369,742	(73,500)	1,296,242	-	1,296,242
Non-Current Liabilities					
Income in advance- Infrastructure					
Establishment Fees	19,243,926	22,201,639	41,445,565	-	41,445,565
Equity					
Retained Earnings	215,864,903	(16,924,964)	198,939,939	-	198,939,939

Balance sheet (extract)	31 December 2016 as originally presented	AASB 9	AASB 15	1 January 2017 Restated
Current Liabilities				
Income in advance- Infrastructure				
Establishment Fees	14,979,243	-	(5,089,608)	9,889,635
Non-Current Liabilities				
Income in advance- Infrastructure				
Establishment Fees	24,308,000	-	16,066,042	40,374,042
Equity				
Retained Earnings	200,392,241	-	(10,976,434)	189,415,807

Statement of Surplus (extract)	31 December 2017 as originally presented	AASB 9	AASB 15	31 December 2017 Restated	AASB 9	1 January 2017 Restated
Service Revenue						
Infrastructure						
Establishment Fees	10,158,603	-	(5,948,529)	4,210,074	-	4,210,074

b) AASB 9 Financial Instruments

AASB 9 replaces the provisions of AASB 139 that relate to the recognition, classification and measurement of financial assets and financial liabilities, derecognition of financial instruments, impairment of financial assets and hedge accounting.

The adoption of AASB 9 Financial Instruments from 1 January 2018 resulted in changes in accounting policies and reclassifications to the amounts recognised in the financial statements. The new accounting policies are set out in note 15 above. In accordance with the transitional provisions in AASB 9, comparative figures have not been restated.

On 1 January 2018 (the date of initial application of AASB 9), AARNet's management has assessed which business models apply to the financial assets held by AARNet and has classified its financial instruments into the appropriate AASB 9 categories. The main effects resulting from this reclassification are as follows:

Financial assets 1 January 2018	Fair Value Profit or Loss	Available for Sale 2017	Held to Maturity	Amortised Cost
Reclassify Current Assets – Held to Maturity				
Investments to Financial Assets at Amortised Cost	-	-	(35,500,000)	35,500,000
Reclassify Non-Current Assets – Available for Sale Financial Assets to Financial Assets at Fair Value Through Profit or Loss	-	-	(35,500,000)	35,500,000
Reclassify Non-Current Assets - Held to Maturity	12,825,223	(12,825,223)	-	-
Investments to Financial Assets at Amortised Cost	-	-	(33,237,788)	33,237,788

c) AASB 15 Revenue from Contracts with Customers

AARNet has adopted AASB 15 Revenue from Contracts with Customers from 1 January 2018 which resulted in changes in accounting policies and adjustments to the amounts recognised in the financial statements. In accordance with the transition provisions in AASB 15, AARNet has adopted the new rules retrospectively and has restated comparatives for the 2017 financial year. In summary, the following adjustments were made to the amounts recognised in the balance sheet at the date of initial application (1 January 2018) and the beginning of the earliest comparative year (2017).

	AASB 118 carrying amount 31 Dec 2017	Reclassification	Remeasurements	AASB 15 carrying amount 1 January 2018
Current Liabilities - Income in Advance				
Infrastructure				
Establishment Fees	16,784,255	73,500	(5,276,675)	11,581,080
Other	1,369,742	(73,500)	-	1,296,242
Non-Current Liabilities- Income In Advance				
Infrastructure				
Establishment Fees	19,243,926	-	22,201,639	41,445,565

	AASB 118 carrying amount 31 Dec 2016	Reclassification	Remeasurements	AASB 15 carrying amount 1 January 2017
Current Liabilities - Income in Advance				
Infrastructure				
Establishment Fees	14,979,242	-	(5,203,176)	9,889,634
Other	-	-	-	-
Non-Current Liabilities- Income In Advance				
Infrastructure				
Establishment Fees	24,308,001	-	16,179,610	40,487,611

The impact on the group's retained earnings as at 1 January 2018 and 1 January 2017 is as follows:

	2018 $	2017 $
Opening retained earnings 1 January - AASB 9 (before restatement for AASB 15)	**215,864,903**	200,392,241
Increase in Non-Current Liabilities- Income in Advance-Infrastructure Establishment Fees	**(22,201,639)**	(16,066,042)
Decrease in Current Liabilities - Income in Advance - Infrastructure Establishment Fees	**5,203,175**	5,089,608
Decrease in Current Liabilities - Income in Advance - Other	**73,500**	-
Opening retained earnings 1 January - AASB 9 and AASB 15	**198,939,939**	189,415,807

(i) Accounting for Establishment Fees under AASB15

There has been a significant change with the accounting for establishment fees and represents all adjustments as shown within the tables above. Establishment fees consist of upfront payments used to cover the costs for establishing connections necessary to facilitate the transmission services. Prior to the implementation of AASB 15, establishment fees were recognised over the initial term of the contract. AASB 15 requires the consideration of the period of any options to extend the contact term providing that a material right exists that makes it probable that the customer will exercise the right for renewal. A material right will exist where there is a contractual right to extend the contract; and an establishment fee that was paid within the initial period of the contract, will not be payable again should the customer exercise the right to extend the contract.

In the absence of a material right to renew the contractual period, the establishment fee is recognised over the initial period, consistent with the prior accounting standard.

Where a material right exists, the period of recognition will either be a combination of all the extended periods permissable under the contract, or, if the contract provides for a continual roll over of the contractual term, revenue is recognised over the period of the estimated customer life. It should be noted that a material right must exist within the extended period that the establishment fee is recognised.

(ii) Presentation of assets and liabilities related to contracts with customers

There has been a reclassification between the contract liability Income in advance - Other and Income in advance - Infrastructure Establishment Fees in relation to a project that became ready for use. The amount was $73,500 as at 31 December, 2017 and nil as at 1 January, 2017. The classification is shown within the above table.

Foreign currency translation

Foreign currency transactions are translated into the functional currency using the exchange rates prevailing at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the Statement of Surplus.

Revenue recognition

The accounting policies for the group's revenue from contracts with customers are explained in Note 8.

Leases

Leases of property, plant and equipment where AARNet, as lessee, has substantially all the risks and rewards of ownership are classified as finance leases. Finance leases are capitalised at the lease's inception at the fair value of the leased property or, if lower, the present value of the minimum lease payments. The corresponding rental obligations, net of finance charges, are included in other short-term and long-term payables. Each lease payment is allocated between the liability and finance cost. The finance cost is charged to the Statement of Surplus over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. The property, plant and equipment acquired under finance leases are depreciated over the asset's useful life or over the shorter of the asset's useful life and the lease term if there is no reasonable certainty that AARNet will obtain ownership at the end of the lease term.

AARNet may, as described in note 20, enter into arrangements which are considered off-setting finance leases. Such leases are considered to be settled immediately after coming into effect with the result that no finance cost, or finance income is recognised, and no finance liability or receivable remains outstanding. Assets acquired under such arrangements are depreciated over the shorter of the asset's useful life or the lease term.

Leases in which a significant portion of the risks and rewards of ownership are not transferred to AARNet as lessee are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) are charged to the Statement of Surplus on a straight-line basis over the period of the lease.

Goods and Services Tax (GST)

Revenues, expenses and assets are recognised net of the amount of associated GST, unless the GST incurred is not recoverable from the Australian Taxation Office (ATO). In this case it is recognised as part of the cost of acquisition of the asset or as part of the expense.

Receivables and payables (except accrued expenses) are stated with the amount of GST included.

The net amount of GST recoverable from, or payable to, the ATO is included as a current asset or liability in the Balance Sheet.

Cash flows are included in the Statement of Cash Flows on a gross basis. The GST component of cash flows arising from investing and financing activities which are recoverable from, or payable to, the ATO are classified as operating cash flows.

Comparative figures

Comparative figures have been adjusted to conform to the presentation of the financial year, where required.

Investments and other financial assets

The accounting policies for the group's revenue from investments and other financial assets are explained in Note 8.

New Accounting Standards and Interpretations not yet mandatory or early adopted

For the annual reporting period ended 31 December, 2018, Australian Accounting Standards and Interpretations that have recently been issued or amended but are not yet mandatory have not been early adopted by AARNet. AARNet's assessment of the most relevant new or amended Accounting Standards and Interpretations are set out below.

AASB 16 Leases (AASB 16)

This standard is applicable to annual reporting periods commencing on or after 1 January 2019. The standard replaces AASB 117 Leases and for lessees will eliminate the classification of operating leases and finance leases. The new standard requires the lessee to recognise its leases in the Balance Sheet as an asset (the right to use the leased item) and a liability reflecting future lease payments. Depreciation of the leased asset and interest on lease liability will be recognised over the lease term.

AARNet will be applying AASB 16 from 1 January 2019.

AARNet (with assistance from engaged advisors) has completed a preliminary assessment on AASB 16 and is currently understanding the financial statement impact of this new standard. The key impacts identified to date are in respect to the recognition of operating leases as right of use assets and operating lease liabilities in Balance Sheet. AASB 16 effects the timing of lease expenses, with the amount of expense recognised at the beginning of the lease to be higher than under previous lease standards, resulting, for a particular lease, a decrease in Net Surplus in the early periods of the lease. The magnitude of the financial impacts on transition and on the comparative financial year is yet to be determined, as a result, at this time AARNet cannot make a reasonable quantitative estimate of the effects of the new standard.

DIRECTORS' DECLARATION

In the Directors' opinion:

(a) the financial statements and notes set out on pages 8 to 31 are in accordance with the Australian Charities and Not-for-profits Commission Act 2012, including:

  (i) complying with Accounting Standards and other mandatory professional reporting requirements, and

  (ii) giving a true and fair view of the entity's financial position as at 31 December 2018 and of its performance for the year ended on that date, and

(b) there are reasonable grounds to believe that the Company will be able to pay its debts as and when they become due and payable.

This declaration is made in accordance with a resolution of Directors.

Emeritus Professor GR Sutton AO
Director

Mr CM Hancock
Director

Sydney

19rd March 2019

Independent auditor's report

To the members of AARNet Pty Ltd

Our opinion

In our opinion:

The accompanying financial report of AARNet Pty Ltd (the Company) is in accordance with Division 60 of the *Australian Charities and Not-for-profits Commission (ACNC) Act 2012*, including:

(a) giving a true and fair view of the Company's financial position as at 31 December 2018 and of its financial performance for the year then ended

(b) complying with Australian Accounting Standards and Division 60 of the *Australian Charities and Not-for-profits Commission Regulation 2013*.

What we have audited

The financial report comprises:

- the balance sheet as at 31 December 2018
- the statement of surplus for the year then ended
- the statement of changes in equity for the year then ended
- the statement of cash flows for the year then ended
- the notes to the financial statements, which include a summary of significant accounting policies
- the directors' declaration.

Basis for opinion

We conducted our audit in accordance with Australian Auditing Standards. Our responsibilities under those standards are further described in the *Auditor's responsibilities for the audit of the financial report* section of our report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence

We are independent of the Company in accordance with the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* (the Code) that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with the Code.

Other information

The directors are responsible for the other information. The other information comprises the information included in the annual report for the year ended 31 December 2018, but does not include the financial report and our auditor's report thereon.

Our opinion on the financial report does not cover the other information and accordingly we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial report, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial report or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

If, based on the work we have performed on the other information that we obtained prior to the date of this auditor's report, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the directors for the financial report

The directors of the Company are responsible for the preparation of the financial report that gives a true and fair view in accordance with Australian Accounting Standards and the *Australian Charities and Not-for-profits Commission (ACNC) Act 2012* and for such internal control as the directors determine is necessary to enable the preparation of the financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

In preparing the financial report, the directors are responsible for assessing the ability of the Company to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial report

Our objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial report.

A further description of our responsibilities for the audit of the financial report is located at the Auditing and Assurance Standards Board website at: http://www.auasb.gov.au/auditors_responsibilities/ar4.pdf. This description forms part of our auditor's report.

PricewaterhouseCoopers

Scott Walsh
Partner

Sydney
19 March 2019

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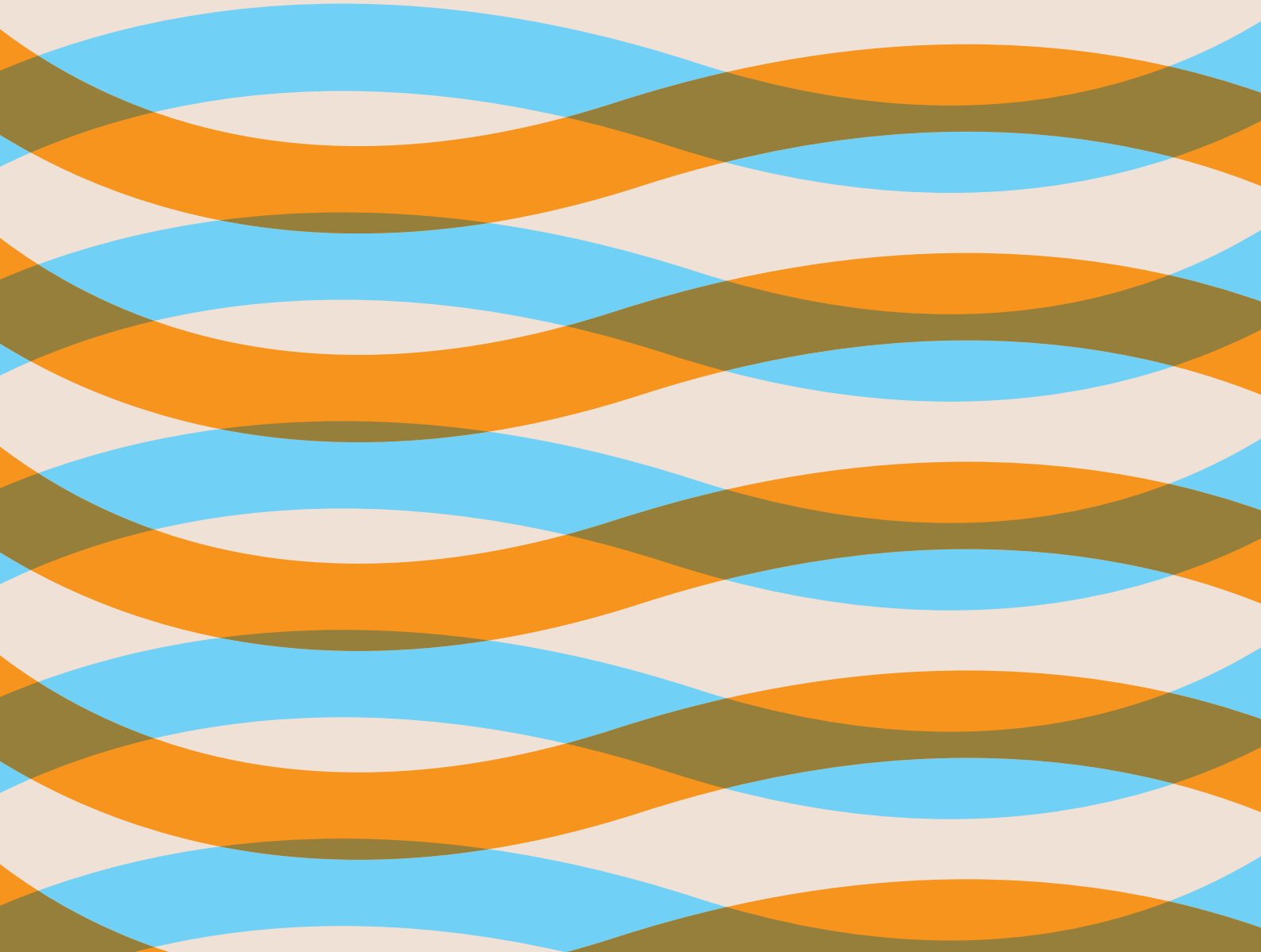
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