



REANNZ ANNUAL REPORT

Year ended 30 June 2020

REANNZ

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Presented to the House of Representatives under Sections 150–157 of the *Crown Entities Act 2004*.

REANNZ is the Research and Education Advanced Network New Zealand.
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VISION /

REANNZ provides the pathways and connections with global research leaders so that by 2027, New Zealand will be a global innovation hub, a world class generator of new ideas for a productive, sustainable and inclusive future.

MISSION /

Design, build and operate New Zealand's high-performance network, provide network and other services to members and users, enabling them to connect to and collaborate with each other and the global NREN ecosystem.

VALUES AND DRIVING PRINCIPLES /

- › **Being fair, open and respectful** – To be open minded and respectfully discuss and debate thoughts, ideas and plans to broaden and further inform beliefs and approaches. To be a reliable, stable, non-commercial and neutral partner for members.
- › **Being good partners** – Collaboration and strategic partnerships are fundamental to improving science and research outcomes for New Zealand. REANNZ is developing partnerships that benefit all parties and increase public value.
- › **Exercising responsible stewardship** – Careful and responsible management of the assets and resources that have been entrusted to the care of REANNZ.

The driving principles are:

- › Technical excellence
- › Focus on the important
- › Leverage off strengths for the common good
- › Be flexible and adaptive
- › Be outward looking and curious

OUR ACHIEVEMENTS 2019-2020 /



88,421
devices

no. of unique device
connections in NZ made
via eduroam



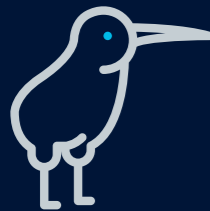
38,438
devices

no. of device connections
via eduroam from
overseas visitors



76.94
Petabytes

Total traffic flows



59.79
Petabytes

in national
traffic volumes



99.9982%
availability

International network
availability



99.999995%
packet delivery

(< 1 packet lost in every
1 million packets sent)



100 Gbps
Core national
backbone availability



60 Gbps
Core international
backbone availability

BOARD CHAIR'S REPORT /

On behalf of the REANNZ Board and team I am pleased to present the Annual Report for 2019/20.

This year has seen a lot of change, disruption and progress.

The board was delighted to welcome two new board members from within the sector, Jim Metson, Deputy Vice-Chancellor Research at the University of Auckland and Liz Gosling, Chief Information Officer at Auckland University of Technology. Their contribution has added to the richness of discussion in the boardroom. The board also said farewell to Judith Johnston and Steve Weaver. I would like to thank them both for their insights and valuable contribution.

The board also welcomed Dianna Taylor, who joined us as CEO in August. In her role as CEO, she has focussed on developing the REANNZ people; building a depth of capability through leadership and focusing on implementing a delivery culture.

As indicated last year, there were a number of areas of focus for board and management this year. One was to continue with implementing the recommendations of the Sapere Report - this has been ongoing and largely completed. There has been a focus on increasing engagement across multiple levels within the community. This has been well received and has resulted in increased opportunities to collaborate more effectively across the community.

Another area of focus was to increase all REANNZ's stakeholders understanding of the benefits of being a member of a global NREN community. In particular the role an NREN can play in supporting the Government's research, science, and innovation strategy. REANNZ continues to evolve in bringing this to life, so that members can take advantage and gain the full value provided by having access to both an international and national research and education network.

COVID-19 has also led to some accelerated change for many of our stakeholders. We were reminded of the importance of reliable international connectivity, as the REANNZ network offers one of the two gateways into New Zealand. There continues to be a greater need for online learning and remote (including offshore) teaching tools. Real-time collaboration and the increased sharing of medical research reflects the importance of the role of the REANNZ network; supporting and enabling this work through consistent latency and high levels of reliability.



REANNZ Chair Janine Smith, MNZM

Stakeholder feedback suggests that REANNZ has been successful in many of its endeavours this year. We do however recognise that this is the start of the journey which was interrupted by the COVID-19 pandemic.

My thanks go to my fellow Directors and to the REANNZ team for their continued dedication and hard work. It is also particularly pleasing for the REANNZ team to have a year without further review. It has been a year of disruptions and we have asked a lot of our team. They rose to the occasion and continue to be committed to REANNZ's success.

Also, we thank you - our members - for your support over an important year, and for your work and contribution to global efforts and New Zealand's COVID-19 response. We look forward to working with you next year and further understanding your needs and future direction so that REANNZ can ensure that we deliver to your requirements.

Janine Smith MNZM
Chair

CHIEF EXECUTIVE'S REPORT /

Kia ora tātou

The course of this year has seen solid progress towards REANNZ's development as an organisation that is focused on member engagement and effective delivery. Since joining REANNZ I have been proud of the passion and commitment that the team and board have demonstrated to maintaining a more open, transparent and member focused outlook. Our commitment to our members and stakeholders has also been demonstrated through our sustainable business approach, with well managed costs for the year and the development of a funding model that will support a sustainable and future fit network.

This year has seen some unprecedented challenges not just for REANNZ as an organisation, but for the whole world, with the impact of the COVID-19 pandemic. In February, the REANNZ team moved to working remotely at short notice due to structural reinforcement works at our Wellington Head Office. Despite the disruption caused by the building move, and continued distributed working during lockdown and changing alert levels, REANNZ has remained fully operational and available to our members as an essential service. We have since found temporary accommodation and our team members in Auckland, Wellington and Christchurch are able to manage their work responsibilities around other personal commitments. Being able to transition smoothly between distributed and office working was enabled by our commitment to support a flexible work environment.

As the extended impact of the COVID-19 pandemic becomes clearer over time, our focus remains to support our members' and their changing needs. Despite the challenges caused by COVID-19, the science, research and innovation community in New Zealand has demonstrated its commitment to data-intensive research collaboration, nationally and internationally, through their essential contributions to New Zealand's response and collaboration efforts.

REANNZ's key purpose is to enable New Zealand research institutions to utilise and participate in international research and science collaboration. This year has seen our partnerships and internal projects enable us to better meet these growing research needs, with purposeful engagement with the wider NREN community benefitting the membership and research organisations across New Zealand.



Dianna Taylor, Chief Executive

There are exciting opportunities ahead to support and enable our members. A huge percentage of the community agree that a number of science initiatives with large data requirements could not occur without the reach, reliability and speed of an advanced network. It is our role to continue to enable and facilitate its use and support our member's needs.

With a clear purpose and alignment across the organisation to deliver on our strategic initiatives (detailed in our [Statement of Intent and Statement of Performance Expectations](#)) I look forward to the coming year, executing our commitments in those documents and ensuring that New Zealand as a whole benefits from REANNZ and the innovative people, technologies, ideas and knowledge that is shared and developed within the NREN community.

Ngā mihi,

Dianna Taylor
Chief Executive

ABOUT REANNZ /

Our Board



Janine Smith MNZM, Chair

Janine Smith MNZM, was appointed a Director and Chair of REANNZ in November 2018. She has over 20 years' experience as a non-executive director with experience in public-listed, private and Crown-owned companies. Janine has held her most recent role as Chair of AsureQuality for the last nine years. Janine also trains and advises board's in governance through her role as an executive director of The Boardroom Practice Ltd. She is currently a member of the AUT University Council, an independent member of Fonterra's Governance Development Committee, President of London Business School's Auckland chapter and a director of several private companies. Janine was awarded a Member of the New Zealand Order of Merit in 2015 for services to corporate governance. Janine is appointed until 30 June 2021.



Ross Peat, Deputy Chair

Ross is Executive Director and co-owner of health technology companies HealthSoft New Zealand Ltd and HealthSoft Australia Ltd, and is Chair of AUT Ventures Ltd. He is a Founding Investor of the Tuhua Ventures Fund (angel and early stage investment), a director of e-waste recycler Mint Innovation, and is deputy Chair of the NZ Health IT (NZHIT) industry body. Ross' appointment to the REANNZ board has been renewed until 30 June 2021.



David Skinner

David is an executive director of Gravelroad Consulting specialising in infrastructure and public policy risk economics. He has had a management career in telecommunications, electronic banking, and defence. Previous positions include Managing Director of Netway, Hypercom, and COO positions in Clear Communications. He has lived and worked previously in the UK, Europe, and Australia. He holds a BE from Canterbury University and an MBA from Auckland University and is an associate fellow of the NZIM. David is appointed until 30 June 2021.



Dr Judith Johnston, Finance and Audit Committee Chair

Judith is an independent management consultant with significant senior executive experience in the public and private sectors. She is currently a Commissioner on the Library Information Advisory Commission and a former board member of the New Zealand Qualifications Authority, the Tertiary Education Commission, Environmental Science and Research CRI and the Otago Polytechnic Auckland International Campus amongst others. In addition, Judith is a member of governance boards and audit and risk committees for major government agencies, and convenes a number of professional conduct committees under the Health Practitioners Competency Assurance Act. Judith's tenure ended on 30 June 2020.



Liz Gosling, People and Culture Committee Chair

Liz is the Chief Information Officer at Auckland University of Technology (AUT). She brings three decades of experience in the IT sector in New Zealand, the US, UK and Europe. She was a Director and faculty member of the Council of Australasian University Directors of Information Technology (CAUDIT) Leadership Institute in Australia, and the New Zealand invited representative on the CAUDIT Executive. Liz has chaired the Universities NZ Information and Communications Technology Committee and is a previous Chair of TUANZ. Liz has an MBA (HR Management) and is appointed until 30 June 2022.



Professor Jim Metson

Professor Jim Metson is the Deputy-Vice Chancellor (Research) at the University of Auckland. He is a materials scientist, was a founding member of the MacDiarmid Institute for Materials Science and Nanotechnology, a co-founder of the University of Auckland Research Centre for Surface and Materials Science and of the Light Metals Research Centre. Jim served as Chief Science Advisor to MBIE, chaired the MoRST Research Infrastructure Advisory Group and represented the New Zealand government on the Australian National Science Advisory Committee that oversaw the development of the Australian Synchrotron. Jim is appointed until 30 June 2022.



Sara Brownlie

Sara is the Managing Director of Fargher Woods Ltd providing Programme Management services, an Independent Director for Catalyst.net Ltd and Independent Member of the Risk and Assurance Committee for Upper Hutt City Council. She is a Fellow Member of CPA Australia and a Chartered Member of the Institute of Directors in New Zealand and the Chartered Accountants Australia and New Zealand. Sara has had an extensive career working in senior management roles in the public sector. Sara is appointed until 30 June 2021.



Professor Steve Weaver

Steve is Emeritus Professor at the University of Canterbury where he was formerly Deputy Vice-Chancellor. His research on the geological evolution of the Southern Pacific rim has included 7 deep field Antarctic expeditions and Weaver Peninsula, in the Antarctic Peninsula is named after him. He is a Fellow of the Royal Society of New Zealand. Steve's tenure ended on 30 June 2020, having been a director since July 2014.

OUR ROLE /

Moving data, mobilising knowledge.

REANNZ, the Research and Education Advanced Network New Zealand, is New Zealand's National Research and Education Network (NREN). REANNZ is a not-for-profit Crown-owned company under Schedule 4A of the Public Finance Act 1989. Our Shareholding Ministers are the Minister of Finance and the Minister of Research, Science and Innovation. Governance is provided by an independent Board of Directors appointed by the Ministers. REANNZ is funded through MBIE's Strategic Science Investment Fund (SSIF) and by our member organisations.

REANNZ operates and supports a specialist high-performance digital network that is engineered to meet the unique performance demands of scientists, researchers, innovators and educators. The network is built to meet the unique needs of big science and research data - it delivers massive transfers at high speed, with consistent latency (minimal delays) and no packet loss (no data loss).

Members have direct access to REANNZ's specialist teams that can help to resolve technical issues, support network infrastructure needs and facilitate the uninterrupted transfers of research data. This unique support and expertise leads to the development of solutions, systems, and platforms that address the complex technical issues that can arise in these specialist research environments.

REANNZ acts as a fundamental part of the science and research system in New Zealand, connecting people, knowledge and capability to support developing ideas and innovations. REANNZ ensures that New Zealand can not only participate, but remain at the competitive edge of science and research. New Zealand's research communities produce world class contributions across all fields of science and innovation. The REANNZ network has supported the dissemination of datasets that have included key developments within climate change modelling, healthcare research, natural hazards and incident monitoring, genomics sequencing, bio protection and agricultural research data. The REANNZ team and network has been readily available to support New Zealand's epidemiologists, biomedical researchers,

scientists and lab technicians as they all work together to compile their latest findings and perform critical testing in order to support New Zealand's COVID-19 response.

Large-scale science and data-intensive disciplines need networks optimised for very different traffic patterns than the commercial internet. Commercial networks see many millions of small, short duration flows that, when aggregated, produce smooth and easy to predict traffic patterns. A research networks' mix of traffic is dominated by bursty, high-throughput, multi-terabyte flows that may last for days. REANNZ exists to address a niche market that commercial networks don't meet - through provisioning unique services and enabling collaborations. Data-intensive research provides a significant value opportunity; increasing the amount of internationally connected and data driven research helps the sector to stay relevant and effective in an ever changing and developing environment.

The nature of science activity has changed dramatically due to the increasing availability of optical fibre networks. These fibre-based networks have enabled science to become increasingly distributed, with remote access to instruments, wider collaboration on projects between institutions and countries, and the sharing of massive datasets between multiple users for different research purposes. This ability to work and connect with people remotely is crucial now more than ever with the continuing need for reliable, resilient connectivity that facilitates access to the growing body of medical research, online learning and remote teaching tools available.

Purpose-built network platforms like the one REANNZ provides to its community are oxygen for data-intensive research and advanced applications, and are proving to be essential in the recruitment and retention of world-class talent.

Networks are the common infrastructure that bind communities. REANNZ is part of the research, education and innovation ecosystem, connecting participants in those sectors to each other and the world.

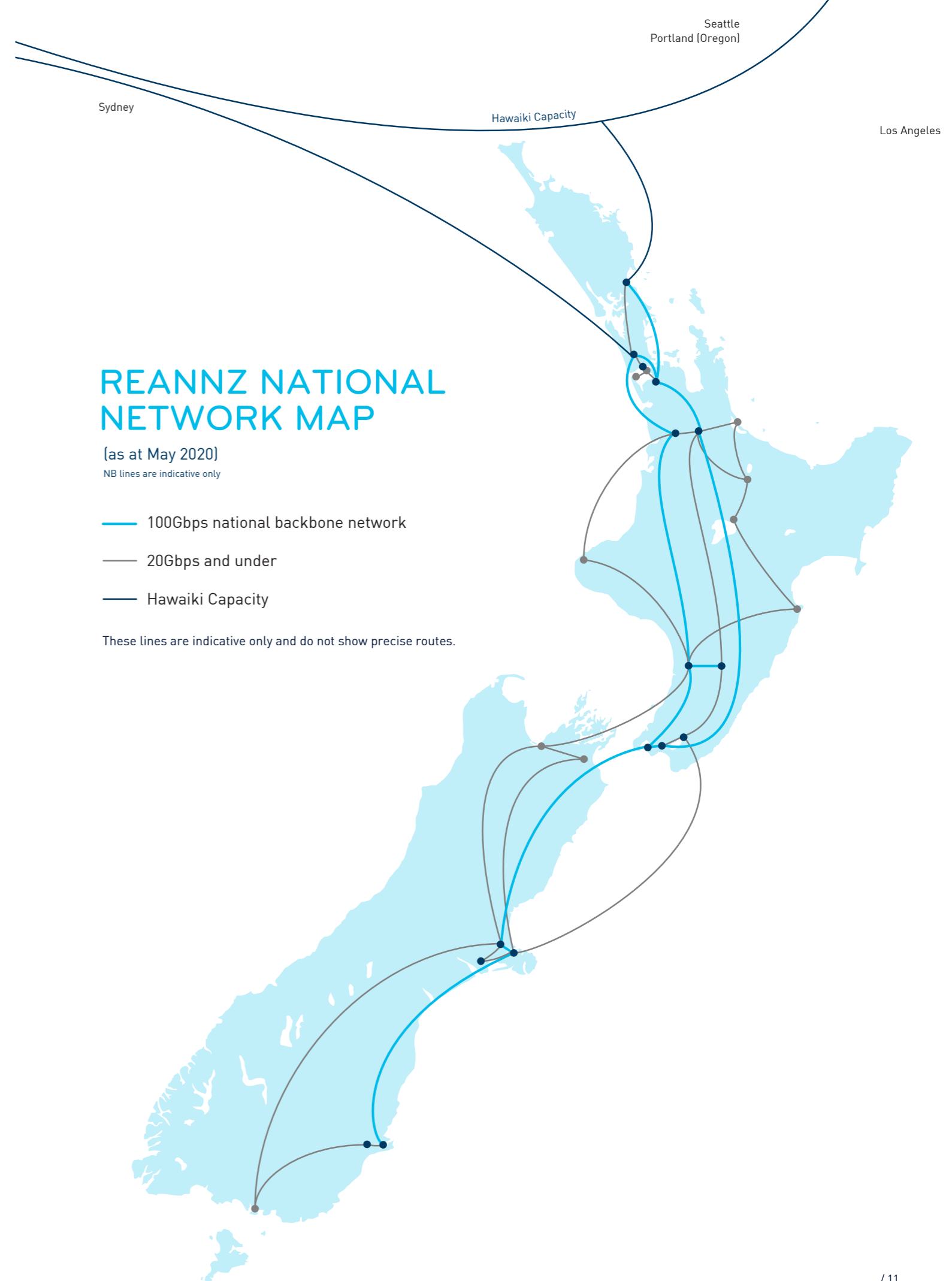
Characteristics of the REANNZ network

National research and education networks are engineered with low latency, low packet loss and with sufficient head-room capacity to support bursts of intense data transfers. Some of the key features that set research and education networks apart from commercial networks include:

- › **Big pipes:** the network's large bandwidth easily handles big, bursty research traffic that can be made up of petabytes and terabytes of data.
- › **Ultra-fast:** the transfer times of these large datasets are drastically reduced from months to weeks, from days to minutes.
- › **High quality:** the network processes massive volumes of data without disruption to transfers, which can be catastrophic for research processing.

- › **Highly secure:** Security best practice is at the forefront of what REANNZ and the wider NREN community provide, internally through the protocols and systems that are implemented and the partnerships that we form.

REANNZ core, backbone network extends the length of the New Zealand, from Invercargill in the south to Mangawhai Heads in Northland where it connects to the Hawaiki Cable. Our 30 points of presence (PoPs) in major centres along the way act as core network switching points that direct member traffic. Utilising the REANNZ network provides members with a unique experience, enabling them to achieve their desired outcomes efficiently and effectively, often through custom and dedicated solutions.



Our users

The ability to connect and collaborate is crucial now more than ever, with the growing body of research projects and collaboration opportunities across all fields of science. Our users and their organisations are able to contribute to research, science, innovation and education in New Zealand and globally. Our small team supports 42 member organisations from New Zealand's Universities, Crown Research Institutes, Institutes of Technology and Polytechnics, Wānanga and the wider education, research and innovation sector.

People are at the heart of the research, science and innovation community in New Zealand. Across the country 350,000 researchers, academics, educators, innovators, staff and students have access to and utilise the REANNZ network. REANNZ actively and purposefully partner and collaborate with services, vendors and other members of the New Zealand Research Science and Innovation (RSI) ecosystem for the benefit of our members. We connect with eResearch infrastructure partners like NeSI as part of the Data Transfer Platform that connects other partner and member research institutions through Globus data transfer nodes. We collaborate on, participate in and organise key activities and events like the annual eResearch conference that bring together the whole community.

Our users also have access to the wider NREN community, that have agreed processes and protocols that enable them to collectively provide a seamless international research infrastructure for the benefit of New Zealand research organisations. Access to this wider community supports collaboration and the development of solutions for global challenges, and enables opportunities to share expertise and research infrastructure.

See the full list of members on pages 64 and 65.

Our global role and relationships

Through REANNZ, New Zealand has access to a global community of more than 120 countries who together provide seamless, high-performing global research and education networks, on a not-for-profit basis, to support research. This community works together as a global 'network of networks' to provide seamless connectivity and tailor-made services for their education and research communities.

Establishing a research and education network gives a country access to the world, to scientific instruments, computational resources and cloud services, all at high-speed.

In 2005 the Crown formed REANNZ with the constitutional purpose to "establish and operate the New Zealand research and education network that provides research and education users with high speed, wide bandwidth, and domestic and international connections to enable new forms of research and new research collaborations".

REANNZ was tasked with undertaking a number of related public good objectives that could not be delivered by the commercial provider sector. Understanding the education and research space provides REANNZ with a unique opportunity to support the public good, stimulate innovation and facilitate collaboration on a global scale.

NRENs are....

National Research and Education Networks (NRENs) connect and support creators and users in the science, research and education sectors (R&E), both nationally and internationally, by providing a specialised high-performance network and other supporting services.

An NREN is essential to support research, productivity and collaboration, that is achieved through data movement at a scale not commonly found outside of the sector. Capacity alone is not sufficient, other technical features such as a commitment to very low packet loss, consistent and known latency, and dedicated data transfer support make it possible for end users to perform their work.

It is not just these technical specifications that support the development of science and research, but the people, ideas and innovations that come from within the NREN community. The NREN community as a whole participate in value-added offerings such as forums for collaboration and discussion, technical support and expertise, and vendor and supplier management. Each NREN develops and maintains the cost of their national infrastructure with the understanding and expectation that it will be used by other NRENs. They send and receive traffic between each other, at no cost to other parties.

There are four common denominators for all NRENs, they:

- > provide services for a closed user or member group,
- > are not-for-profit organisations - their mission is to provide services at the lowest possible cost,
- > provide national and international connectivity at a minimum, and
- > provide additional services that support and enable effective use of the advanced networks.

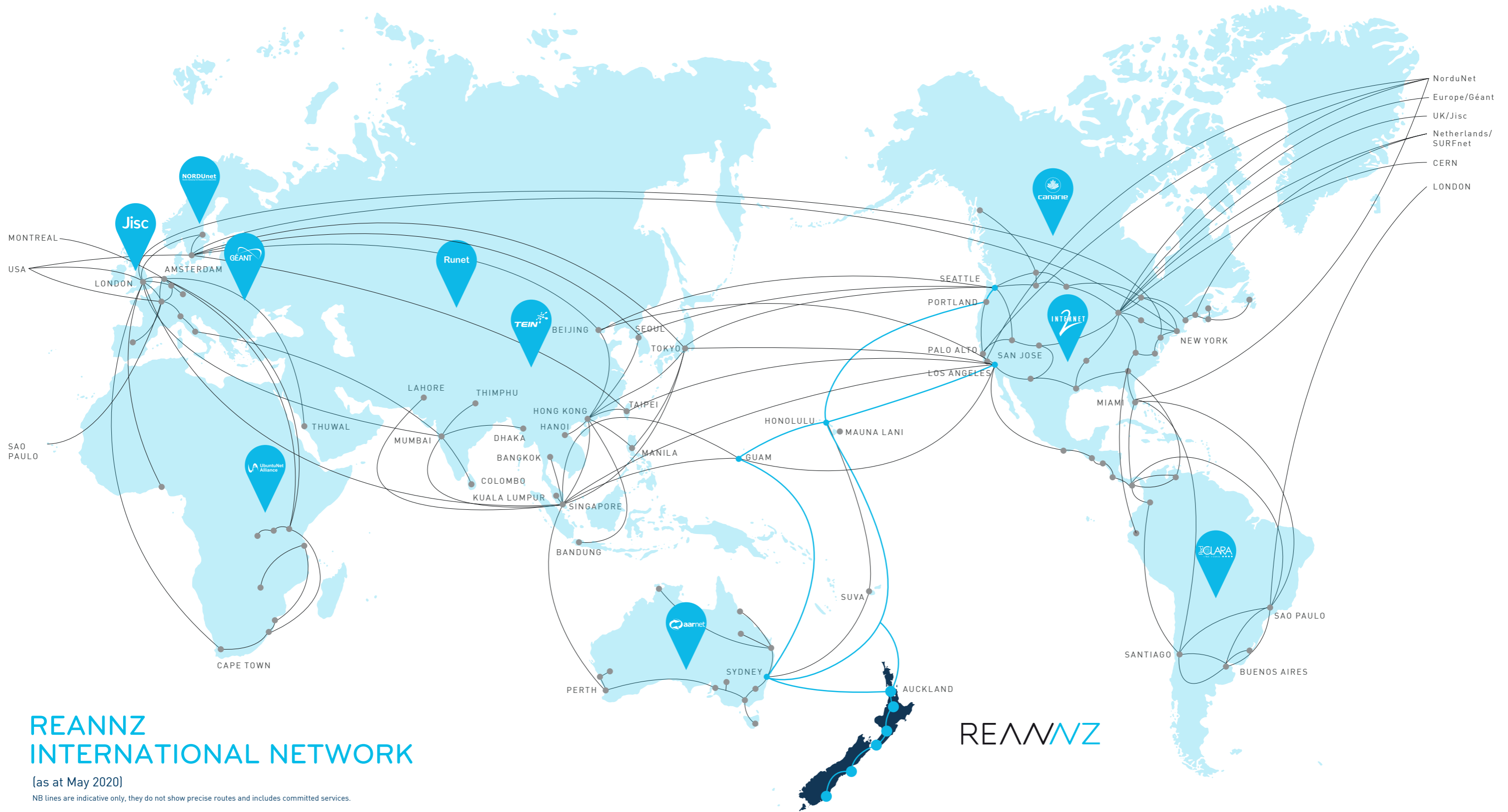
The development and management of these services has been essential and especially valuable as an offering for all NREN users during the Covid-19 pandemic. They facilitate research collaboration on a global scale and have supported the ongoing transition and capability of member organisations to work in a distributed way. Some of these services include:

- > [eduroam, the secure world-wide roaming wifi service,](#)
- > [Tuakiri and eduGAIN, the federated identity services,](#)
- > [and eduVPN, the secure virtual personal network that supports remote access to organisation's internal networks.](#)

REANNZ actively participates in the international NREN CEO forum and is an active member of APAN, the Asian Pacific Advanced Network, which connects, coordinates and shares research and technology between NRENs in the Asia and Oceania regions. The REANNZ team also works closely with GÉANT and Internet2 who represent the European and US regional NREN communities, as well as other individual regional NRENs.

REANNZ is able to connect with our wider community and support global research collaboration for New Zealand through the international network. The international network is made up of physical links to other countries via subsea cable systems, peering exchanges with other network operators, connections to research and education exchange hubs around the world, dedicated links with large content providers and IP transit.

GLOBAL RESEARCH AND EDUCATION COMMUNITY /



CASE STUDIES /

How do REANNZ members utilise the network?

University of Auckland goes live with 100 Gbps

The University of Auckland (UoA) increased its data transfer speeds tenfold by going live with a 100 gigabit per second (Gbps) connection to REANNZ, New Zealand's high-performance research and education network, enabling its researchers to collaborate and contribute to solving local and global issues.

The University upgraded its bandwidth to REANNZ earlier this year (October 2019) from two 10 Gbps links to two 100 Gbps links. The increased capacity has enabled the university to provide dedicated connections to multiple scientific instruments, such as the Nectar (Australian National eResearch Collaboration Tools and Resources) federated research cloud.

The University has also worked on standing up a dedicated data transfer node (DTN) that can transmit up to 10 Gbps directly to the REANNZ network and onto a worldwide network of other DTNs; enabling seamless data sharing and collaboration with national and international partners for UoA researchers, as well as efficient means to transfer data between UoA's research data repositories and NeSI's (New Zealand eScience Infrastructure) HPC clusters.

Initial tests with the DTN and Nectar have shown 10 Gbps speeds with the intention to upgrade the Nectar cluster to 40/100 Gbps in the near future.

REANNZ is managing the 100 Gbps CPE (customer premise equipment) on behalf of the University. It is also providing the University with a managed Science DMZ that creates a dedicated path to the network so that UoA's researchers can transfer large volumes of data, from multi-gigabyte to terabytes, all while retaining the data's integrity.

University researchers are using the increased data transfer speed on a range of projects.

The University's Centre for eResearch is investigating using the network to enable real-time access to the Australian Synchrotron's accelerator technology, which is one of Australia's most significant pieces of scientific infrastructure. The Synchrotron's intense beams of light reveal the innermost, sub-macroscopic composition of materials, from human tissue to plants to metals and more. Access to the Synchrotron enables a range of research applications and supports the research needs of Australia's and New Zealand's major universities, research centres and businesses.

The 100 Gbps connection to REANNZ has been a game changer for the University of Auckland, enabling them to easily access and share big data to contribute to and lead research to solve national and global issues.

“Working with REANNZ on the network-related aspects of the data transfer node (DTN) was great. They are very engaged, responsive, and keen to get the best result for the benefit of research. Being connected with 100 Gbps will allow us to scale up the data transfer service in the future.”

- Martin Feller
eResearch Platform &
Services Lead



Successful 100 Gbps testing at AUT a boon for large scale radio astronomy projects

Researchers from Auckland University of Technology (AUT) put the REANNZ network to the test, using a custom 100 Gbps-capable FPGA card to send packets around a 1,200 km loop, passing through more than 700 live devices and travelling through multiple PoP sites around the country.

The test had been designed to transit the REANNZ network in a way that didn't affect other member traffic, running alongside production traffic with no faults or issues. The testing not only demonstrated the effectiveness of the custom FPGA cards and the software written for the receiving servers, but the reliability of the network, and the efforts that REANNZ engineers go to in order to support our members research goals and overall network access.

The Field Programmable Gate Arrays, or FPGA cards, used to direct the raw data are unique. They are programmable silicon devices which allow specific high-speed digital circuits to be programmed on to the chip, in order to achieve the required functionality.

The test was hugely successful, with the transfer resulting in zero packet loss and sustained speeds of 96.4Gbps for more than an hour.

The challenge with transferring huge volumes of raw data lies in the distance and the duration that the data has to travel, with an ineffective solution resulting in packet loss or latency issues. The tests AUT conducted were designed to demonstrate that the FPGA card and the custom software developed by the team were capable of achieving sustained 100 Gbps speeds. If possible, the card and the network could then be used to directly transfer raw data at line rate straight into GPUs (graphics processing units), where the data could then be analysed in real time before being sent on to storage.

There was no delay caused at the receiving end for the transfer which can often become a bottleneck, as the messages were sent using the RoCE (Remote direct

memory access over Converged Ethernet) protocol, where commodity ethernet networking equipment is used to deliver packets directly to system memory. This prevented packet loss as the receiver could ingest the data at line rate speeds all the while maintaining the integrity of the data.

Successfully building these technologies and deploying these solutions will be a huge contribution to the field of radio astronomy, with numerous collaborative research projects happening around the world, and countries like Australia and South Africa each hosting large scale radio astronomy arrays for the Square Kilometre Array Project.

AUT's own 30m diameter radio telescope near Warkworth is globally networked through REANNZ. It is connected through a managed optical service that directly links our point of presence in Auckland and the telescope's site within the Institute for Radio Astronomy and Space Research. New Zealand's largest radio telescope contributes to many projects, including maintenance of GPS systems and mapping of the Milky Way galaxy.

Scientific instruments like these produce petabytes worth of raw data. Deploying these new technologies on site will enable researchers to send transfers straight into a data centre to be processed in real time, an essential capability that the FPGA card and high-throughput software enable.

Where REANNZ comes in:

The process began with lab testing the FPGA card with REANNZ equipment, to simulate transmitting data over a distance. This was used to inform the setup of a network data collection point, the repository where the FPGA card would direct the data.

REANNZ was able to use its unique network, specifically designed to be flexible for research use, by reconfiguring the core to directly mirror the conditions in the field for the radio telescope arrays. REANNZ engineers looped traffic across the REANNZ New Zealand backbone to directly simulate the distances and intermediate conditions that would be encountered once the FPGAs were deployed.

Initial tests from the FPGA card through a switch to the REANNZ server transferred 468 TB of incrementing integer data, at a throughput of 95 Gbps in a period of 11 hours. Importantly, this occurred with zero packet loss. A second test also ran flawlessly for 22 hours, transferring 936 TB of data. Reliably preventing packet loss over long distance across high bandwidth connections is a key component of specialised science enabling infrastructures like the REANNZ network.

Proving that data could be sent across the network over a sustained period, the next stage was to test the transfer over a large distance. Working with REANNZ network

engineers, the team were able to test the long distance 100 Gbps capability of the FPGA card and the REANNZ core network. One branch of the 100 G network was dedicated to the testing, to run a continuous stream of data from Auckland to Wellington and back again, resulting in a 1,200 km round trip. The other branch of the network remained open and accessible for the use of REANNZ members.

This testing led to the largest sustained transfer speeds yet seen on the REANNZ backbone by a research group - with sustained speeds in excess of 96 Gbps over a nearly 1,200km distance.

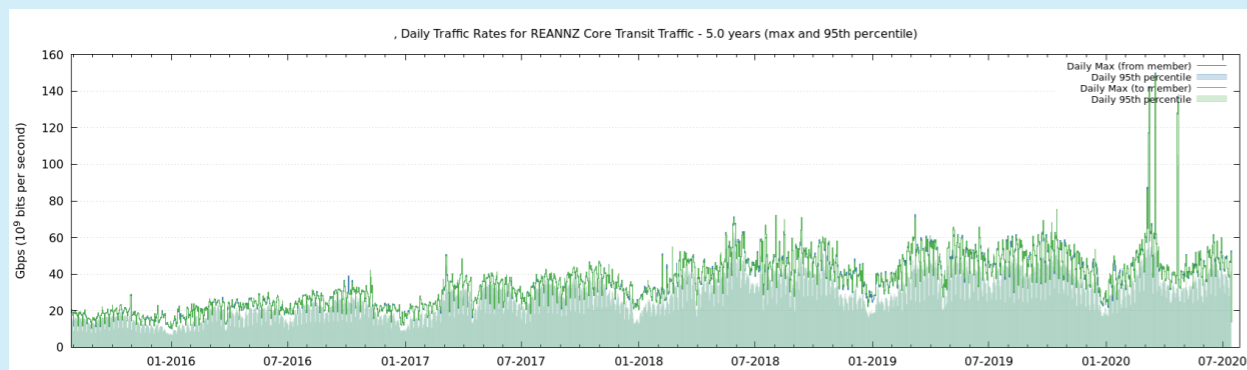
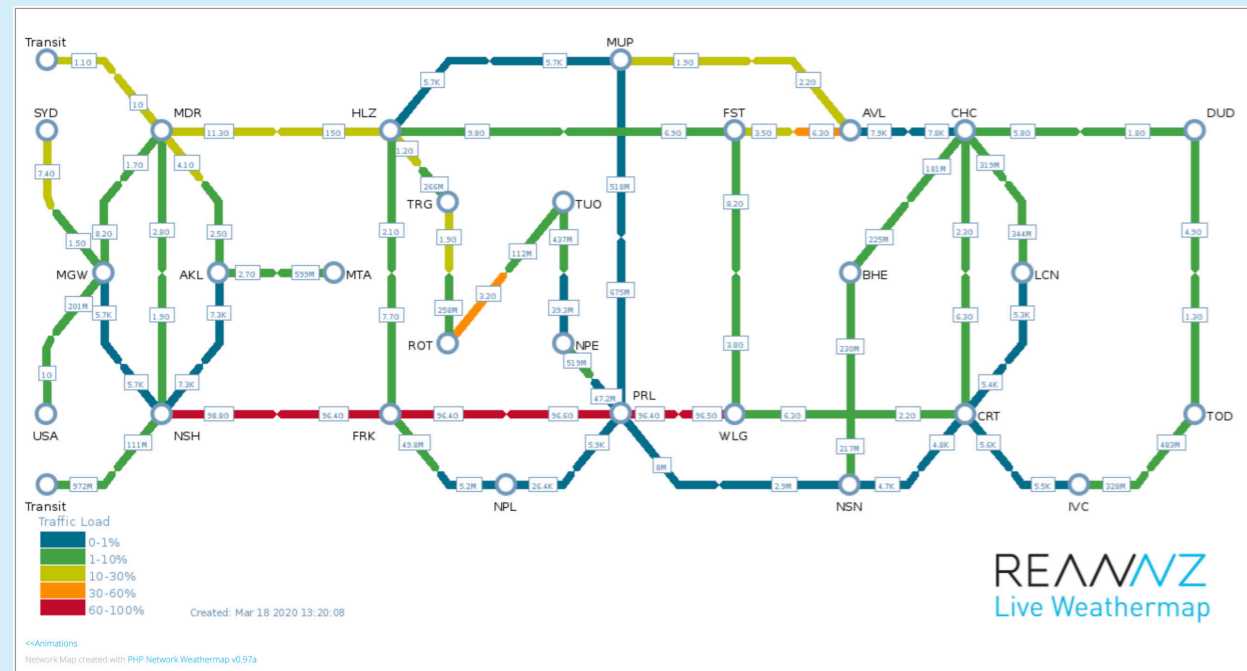


Milky Way

“ The people at REANNZ are great to collaborate with, they continue to be enthusiastic in helping with our research to demonstrate that long distance, high rate transport of data is possible without packet loss. I had prepared for an hour of panicked troubleshooting in our testing window, but Daniel almost instantly reconfigured the REANNZ network to route our traffic via Wellington and the REANNZ network performed so flawlessly that there was nothing to do apart from set the test running and go to lunch.

We are tremendously pleased with and proud of the results we obtained. Now we have the ears of our international collaborators, and the confidence to push New Zealand technology into mega-science projects around the globe. Having a world class research network with the knowledgeable people to run it is an absolute asset to Aotearoa.”

- Dr William Kamp - AUT



A storage complication with a Cloud solution - AgResearch, Microsoft Azure and REANNZ

The REANNZ network was ready to take on an unexpected transfer that contained terabytes of data, working efficiently and at incredible speed to effortlessly assist AgResearch with their storage issue.

When an unexpected amount of data was placed in AgResearch’s current storage solution, Dan Sun, an HPC consultant with AgResearch, and the infrastructure team were able to recover quickly and effectively by utilising the REANNZ network and Microsoft Azure.

The storage system that AgResearch had in place was based on Network Attached Storage (NAS) technologies. These devices are flexible with scalable capacity, but they also have limitations. When an individual fileserver is used to capacity it can cause a significant strain on its performance, which is what the team at AgResearch were experiencing.

The amount of data that was placed on the user accessible fileserver pushed its utilisation to over 85%. With no other storage space available on site to offload this additional data, and with the fileserver’s performance degrading, Dan and the infrastructure team at AgResearch had to come up with a solution.

The solution – Cloud storage

They decided to move large datasets that had not been accessed by users for some time to reclaim capacity quickly. The team had to maintain the same level of data protection, that ensured two separate copies of the same data were stored at separate locations. Using the REANNZ network Dan was able to move 2 TB of copy datasets from the AgResearch data centre in Christchurch offsite to the Microsoft Azure Blob storage instance in Australia.

Among other uses, Microsoft Azure Blob storage is designed for storing data for backup and restore, disaster recovery, and archiving. This suited AgResearch’s storage situation as they were able to choose from four storage tiers depending on how often they would access the data. Dan and the team were able to configure the Cloud storage to automatically migrate data to archive after being in the Cloud for seven days.

REANNZ Network performance

The REANNZ connection to AgResearch Christchurch is 10 Gbps. This meant that the connection was working at speed, as fast as the connection can go, throughout the majority of the transfer. It then took the team another two hours to remove the dataset on the fileserver that was running out of capacity, meaning that it actually took longer to remove the dataset files than it did to send them across to Australia via the REANNZ network.

In just under three hours the fileserver was stabilised. When the situation was resolved, Dan went on to upload a further 6TB of data on to the Microsoft Azure Cloud system to reclaim capacity from the same fileserver with ease.

With the accelerated uptake of digital tools and services during the COVID-19 pandemic, there has been significant changes to the ways in which research organisations store and process the data they produce. Via the REANNZ network, members are able to connect directly with Cloud service providers like Microsoft Azure, achieving considerable cost savings and efficiencies in performance.

“We were extremely pleased by the performance of REANNZ’s network when we were uploading data to the Microsoft Azure’s instance in Australia. We were able to upload 2TB of data in just over 37 minutes, which translates to 7 Gbps on average.”

- Dan Sun, AgResearch

PRODUCTS & SERVICES /

REANNZ develops and supports a range of products and services that meet the specialist needs of our members in the science, research and education community.



Managed Access and Edge

Connecting member's local network with the REANNZ network.

Edge devices, including switches and routers, connect a member's local network with the REANNZ network, enabling members to transfer data. Members use either a REANNZ managed edge device or manage this entry point themselves. REANNZ managed edge devices are engineered and configured for high performance, and where required high availability, to meet the specialist needs of the research community when transferring large volumes of data.



Managed Firewall Service

Creating a secure perimeter.

A well-managed firewall protects security by allowing only authorised traffic while still facilitating collaboration and data sharing with external research partners. The REANNZ managed firewall service is designed to meet the specialist performance, protection, visibility and information requirements of members, and the wider research and education community.



Science DMZ

A scalable network design model to optimise science data transfers.

Science DMZ provides a lightweight and high performing on-ramp to the REANNZ international research and education network. It creates a dedicated path that facilitates the transfer of large volumes of data, from multi-gigabyte to petabytes and terabytes, all while retaining the integrity of the data. The Science DMZ is a portion of the network, built at or near the campus or laboratory's local network perimeter. It is designed so that the equipment, configuration, and security policies are optimised for high-performance scientific applications, rather than general-purpose business systems or "enterprise" traffic. The Science DMZ is scalable, incrementally deployable, and easily adaptable to incorporate high performance and advanced technologies such as 100 Gigabit network services and virtual circuits.



Cloud Connect

Leverage the REANNZ network to connect with your cloud service provider.

REANNZ Cloud Connect Service enables members to use an existing REANNZ network connection to directly connect with a cloud service provider, achieving considerable cost savings and efficiencies. REANNZ Cloud Connect Service connects to cloud service providers, data centres, head offices, or co-location environments.



Tuakiri

Federated identity management.

Tuakiri provides trusted and secure federated identity and access management that enables access to online content for New Zealand's research, science, innovation and education sectors. It's seamless - users have single sign-on access to online content, services, subscriptions and resources for the research and education community. Tuakiri reduces the number of accounts that users and IT support teams have to manage, saving costs and reducing complexity and security risks. No identity data is shared with REANNZ - it is shared securely, directly between the member and the service providers.



eduGAIN

Providing an efficient, flexible way for participants to interconnect and access resources.

eduGAIN interconnects identity federations around the world, simplifying access to content, services and resources for the global research and education community. eduGAIN coordinates the necessary elements of a federations' technical infrastructure and provides a policy framework for controlling the exchange of this information between Identity federations. Online services are crucial for research and education, and the importance of accessing these services is only growing due to the impacts of the current COVID-19 pandemic. Students, teachers, researchers and institution staff can utilise these services for e-learning, teaching and conferencing, analysing and sharing data, as well as accessing journals and libraries.



eduroam

Secure, world-wide roaming wifi service.

eduroam is a free, secure, world-wide roaming wifi service available for REANNZ members. It provides researchers, staff and students from participating institutions with wifi across campus and when visiting other participating institutions automatically. Today, over 30 New Zealand institutions are using and providing eduroam. It is also available in 106 countries and over 10,000 hotspots around the world.



Professional Services

Partnering, consultancy and collaboration.

REANNZ's highly-skilled engineers and engagement team work with members to ensure each organisation meets the growing requirements of end users, researchers, educators and staff. REANNZ's objective is always to support member's goals and find the best solution. A technical solution is never 'one size fits all'. Working together with IT staff and management within each member organisation's, REANNZ can support with current state assessments which inform the products and recommended solutions, as well as supporting members to utilise the network to its full capability and value.

INDEPENDENT AUDITOR'S REPORT /

To the readers of Research and Education Advanced Network
New Zealand's financial statements and performance information
for the year ended 30 June 2020

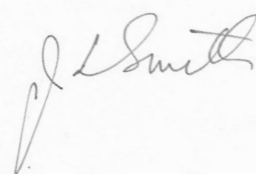
Statement of Responsibility

The Board of REANNZ accept responsibility for the preparation of the annual financial statements and statement of performance, and for the judgements made in them.

The Board is responsible for any end-of-year performance information provided by REANNZ under Section 19A of the Public Finance Act 1989.

The Board and management of REANNZ accept responsibility for establishing and maintaining a system of internal control designed to provide reasonable assurance as to the integrity and reliability of the financial reporting.

In the opinion of the Board, the financial statements and statement of performance fairly reflect the financial position and operations of REANNZ for the year ended 30 June 2020.



Janine Smith, MNZM
Chair



Sara Brownlie
Finance & Audit Committee Chair

15 December 2020
Signed on behalf of the Board

The Auditor-General is the auditor of Research and Education Advanced Network New Zealand (REANNZ). The Auditor-General has appointed me, Andrew Clark, using the staff and resources of Audit New Zealand, to carry out the audit of the financial statements and the performance information, of REANNZ on his behalf.

Opinion

We have audited:

- the financial statements of REANNZ on pages 44 to 62, that comprise the statement of financial position as at 30 June 2020, the statement of comprehensive revenue and expense, statement of changes in equity and statement of cash flows for the year ended on that date, and the notes to the financial statements including a summary of significant accounting policies and other explanatory information; and
- the performance information of REANNZ on pages 31 to 43.

In our opinion:

- the financial statements of REANNZ on pages 44 to 62:
 - present fairly, in all material respects:
 - its financial position as at 30 June 2020; and
 - its financial performance and cash flows for the year then ended; and
 - comply with generally accepted accounting practice in New Zealand in accordance with the Public Benefit Entity Reporting Standards Reduced Disclosure Regime; and
- the performance information on pages 31 to 43:
 - presents fairly, in all material respects, REANNZ performance for the year ended 30 June 2020, including:
 - for each class of reportable outputs:
 - its standards of delivery performance achieved as compared with forecasts included in the

statement of performance expectations for the financial year; and

- its actual revenue and output expenses as compared with the forecasts included in the statement of performance expectations for the financial year; and
- complies with generally accepted accounting practice in New Zealand.

Our audit was completed on 15 December 2020. This is the date at which our opinion is expressed.

The basis for our opinion is explained below, and we draw attention to the impact of COVID-19 on REANNZ. In addition, we outline the responsibilities of the Board and our responsibilities relating to the financial statements and the performance information, we comment on other information, and we explain our independence.

Emphasis of matter – Impact of COVID-19

Without modifying our opinion, we draw attention to the disclosures about the impact of COVID-19 on REANNZ's financial and performance information as set out in note 24 on page 62 to the financial statements.

Basis for our opinion

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the Professional and Ethical Standards and the International Standards on Auditing (New Zealand) issued by the New Zealand Auditing and Assurance Standards Board. Our responsibilities under those standards are further described in the Responsibilities of the auditor section of our report.

We have fulfilled our responsibilities in accordance with the Auditor-General's Auditing Standards.

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

Responsibilities of the Board of REANNZ for the financial statements and the performance information

The Board is responsible on behalf of REANNZ for preparing financial statements and performance information that are fairly presented and comply with generally accepted accounting practice in New Zealand. The Board is responsible for such internal control as they determine is necessary to enable them to prepare financial statements and performance information that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements and the performance information, the Board is responsible on behalf of REANNZ for assessing REANNZ's ability to continue as a going concern. The Board is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting, unless there is an intention to merge or to terminate the activities of REANNZ, or there is no realistic alternative but to do so.

The Board's responsibilities arise from the Crown Entities Act 2004 and the Public Finance Act 1989.

Responsibilities of the auditor for the audit of the financial statements and the performance information

Our objectives are to obtain reasonable assurance about whether the financial statements and the performance information, as a whole, are 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 carried out in accordance with the Auditor-General's Auditing Standards will always detect a material misstatement when it exists. Misstatements are differences or omissions of amounts or disclosures, and can arise from fraud or error. Misstatements are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of readers, taken on the basis of these financial statements and the performance information.

For the budget information reported in the financial statements and the performance information, our procedures were limited to checking that the information agreed to REANNZ's statement of performance expectations.

We did not evaluate the security and controls over the electronic publication of the financial statements and the performance information.

As part of an audit in accordance with the Auditor-General's Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. Also:

- We identify and assess the risks of material misstatement of the financial statements and the performance information, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- We obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of REANNZ's internal control.
- We evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board.
- We evaluate the appropriateness of the reported performance information within REANNZ's framework for reporting its performance.
- We conclude on the appropriateness of the use of the going concern basis of accounting by the Board and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on REANNZ's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements and the performance information or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause REANNZ to cease to continue as a going concern.
- We evaluate the overall presentation, structure and content of the financial statements and the performance information, including the disclosures, and whether the financial statements and the performance information represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the Board regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Our responsibilities arise from the Public Audit Act 2001.

Other information

The Board is responsible for the other information. The other information comprises the information included on pages 3 to 62, but does not include the financial statements and the performance information, and our auditor's report thereon.

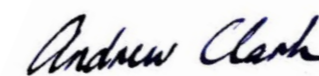
Our opinion on the financial statements and the performance information does not cover the other information and we do not express any form of audit opinion or assurance conclusion thereon.

In connection with our audit of the financial statements and the performance information, our responsibility is to read the other information. In doing so, we consider whether the other information is materially inconsistent with the financial statements and the performance information or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on our work, 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.

Independence

We are independent of REANNZ in accordance with the independence requirements of the Auditor-General's Auditing Standards, which incorporate the independence requirements of Professional and Ethical Standard 1: International Code of Ethics for Assurance Practitioners issued by the New Zealand Auditing and Assurance Standards Board.

Other than in our capacity as auditor, we have no relationship with, or interests, in REANNZ.



Andrew Clark
Audit New Zealand
On behalf of the Auditor-General
Wellington, New Zealand

GOVERNANCE STATEMENT /

Organisational form

REANNZ is a not-for-profit Crown-owned company under Schedule 4A of the *Public Finance Act 1989*. Our shareholders are the Minister of Finance and the Minister of Research, Science and Innovation. At balance date, each shareholder held 908 shares on behalf of the New Zealand public.

REANNZ acts in a manner consistent with the *Crown Entities Act 2004*. REANNZ is subject to the *Official Information Act 1982*.

Role of the Board

REANNZ's Shareholding Ministers appoint a governing Board of Directors. The company's constitution sets the size of the Board at a minimum of two and a maximum of nine directors. There were eight directors appointed for the year ending 30 June 2020.

The Board is responsible under the company's constitution to manage, direct and supervise the company's business affairs. In practice, day-to-day management of the company is delegated to the Chief Executive.

The Board establishes the company's strategic and business plans, approves annual budgets and monitors management's performance against established goals. The Board also considers and approves new policies and business initiatives, authorises transactions outside the prescribed delegated authorities of management and appoints the Chief Executive. Procedures are in place at Board, corporate and operational levels to safeguard the company's assets and its wider commercial interests.

A well-established regime of regular reporting is designed to maintain a high standard of internal communication, and to ensure the Board remains appropriately informed of all aspects of the company's business and activities. Board fees are set by the Shareholding Ministers.

Risk management

The Board is also responsible for ensuring that the company has effective policies in place to manage its risks. The Board decides the level and nature of the risks that are acceptable to the company, taking advisement from the Strategy & Risk Committee. The Chief Executive is delegated responsibility for managing normal business risks. As part of managing its broader risk profile, the Board maintains and regularly reviews a risk register, and approves and reviews all company policies.

Legislative compliance

The Board acknowledges its responsibility to ensure the organisation complies with all legislation. The Board has delegated responsibility to the Chief Executive for the development and operation of a programme to systematically identify compliance issues and ensure staff are aware of relevant legislative requirements.

Board changes during FY2020

There were six directors on the Board for the full year. Liz Gosling and Jim Metson were appointed from 1 September 2019. The tenures of Judith Johnston and Steve Weaver ended on 30 June 2020.

Board meetings

The Board generally meets every six weeks. These meetings are supplemented with additional meetings as required for strategic planning purposes and to progress specific decisions. The Board attended seven scheduled and three special meetings for the year ended 30 June 2020. One special meeting was to approve international resiliency procurement and one was for financial review. The other special meeting covered strategic planning and review of Board capabilities.

Board committees

The Board has formally constituted three committees.

The Finance and Audit Committee (formerly Audit and Risk Committee) has a focus on the integrity of financial reporting, internal controls and compliance of financial statements with appropriate standards and legislation. The Committee reviews and recommends that the Board approves statutory financial statements for publication. There were three directors on the Committee for the year. Three meetings were held during the year.

There are two directors on the People and Culture Committee. The Committee provides oversight on the company's People and Culture strategy and policy. This includes remuneration, performance management and employment conditions of the Senior Leadership team as well as health and safety, and other employment matters. A committee member is involved in the recruitment of any senior manager, including the Chief Executive. Three committee meetings were held during the year.

During the year, a Strategy and Risk Committee was formed. Risk management transferred to this committee from the Finance and Audit Committee. In addition, the Committee oversees the Network Technology and Application roadmap, service development and other strategic plans. There are two directors on the Strategy and Risk Committee. There was one meeting held during the year.

All Directors are entitled to attend committee meetings.

Interest procedures

The REANNZ Board has a documented conflict of interest policy that sets out procedures for identifying and addressing potential conflicts of interest. This policy applies to the directors and staff of REANNZ.

The key determination when considering whether an interest might create a conflict is whether it incentivises the director or staff member to act in a way that may not be in the best interests of REANNZ. It must be determined whether a reasonably informed objective observer would perceive from the circumstances that the director or staff member's judgement is likely to be influenced.

A register of director and senior management's interests is maintained and updated regularly.

Auditor

Audit New Zealand, acting on behalf of the Controller and Auditor-General, is the auditor of REANNZ in accordance with Section 32 of the *Public Audit Act 2001*.

Registered office

Research and Education Advanced Network
New Zealand Limited

Level 13, Plimmer Towers,

2-6 Gilmer Terrace,

Wellington 6011.

GOOD EMPLOYER STATEMENT /

REANNZ as a good employer

Policies are in place to guide REANNZ in what it means to be a good employer, and to ensure we provide equal employment opportunities and support our people.

Capability

As a small organisation, REANNZ is critically dependent on its people. The highly specialised nature of REANNZ's work means that they are highly valued. REANNZ promotes and supports a flexible working environment that encourages our team to maintain a positive work-life balance. This includes the ability to agree flexible working hours as well as the option to split time between remote working and our office spaces. The nature of our work provides exciting, leading edge opportunities for personal and professional development.

Leadership, accountability and culture

REANNZ has a small and dynamic team, with fewer than 30 staff. The culture is built upon a platinum rule: 'treat others as they would like to be treated'. We encourage all members of the team to lead by example, supporting others to behave in a way that is consistent with our culture and the values of being fair, open and respectful, being good partners to our members and wider community and exercising responsible stewardship of the assets, people and skills within REANNZ.

Recruitment, selection and induction

REANNZ recruits new staff members through a number of channels, some through a recruitment agency and others through industry networks and recommendations. All positions are openly advertised. Prospective employees have the option to meet the team as part of the interview, allowing staff to participate in the recruitment process and have open engagement with their potential co-workers.

Employee development, promotion and exit

Being a small and diverse organisation, there is opportunity for continual development and experience across multiple disciplines. External training and development is also encouraged and specific budget is set aside for courses and conferences to ensure staff remain current in their field.

Remuneration, recognition and conditions

There is a commitment to attracting, retaining and motivating high-performing people. REANNZ continues to provide an environment that identifies, encourages and rewards excellence, innovation and high-quality services by using a remuneration structure that is competitive and fair. Flexible working hours are offered by agreement and REANNZ invests in the right tools and systems to make work easier from any location.

Harassment and bullying prevention

The REANNZ policy on harassment and bullying has a zero-tolerance approach. An employee assistance programme is available to all staff to enable them to get confidential support. Open communication between staff and the leadership team is supported and encouraged.

Safe and healthy environment

Health and safety is taken seriously at REANNZ and policies and procedures are in place to minimise risks, particularly when handling network equipment or when visiting our point of presence (PoP) locations. Staff wellbeing is high priority and REANNZ supports the processes, work environment and culture that enables the team to be successful, happy and healthy.

STATEMENT OF PERFORMANCE /

For the year ending 30 June 2020

The quality of our work in designing and providing a high-performance network and other services, in collaboration with our community, are key to enabling data-intensive science, research, education and innovation, which in turn impacts on the provision of a strong research ecosystem and a growing economy. Our performance framework shows how we measure and monitor success, and the impact we make.

REANNZ contributes towards New Zealand's success in global science, research, education and innovation

Outcomes

REANNZ is one of many contributors to New Zealand's high-performing and globally competitive research, education and innovation system. As with other research infrastructures, it is difficult to measure the direct impact our advanced network and services have on the country's innovation ecosystem. For this reason, we track trends for this outcome using external, publicly available indicators of the performance of New Zealand's research, education and innovation ecosystem, but we do not forecast specific changes in the trend indicators. While the New Zealand research, education and innovation ecosystem has declined in world standings, New Zealand remains a strong international participant.

Outcomes	Trend Indicators	Results
REANNZ outcome To provide pathways and connectivity for New Zealand to be at the forefront of digitally advanced science, research, education and innovation.	Maintain the cumulative ranking of all New Zealand universities in the QS World University Rankings ¹ .	The cumulative ranking is 2,229. This is a 8.6% decrease from the previous ranking and a 3.7% decrease since 2017. Despite the slight drop in rankings, all New Zealand Universities are still within the top 500.
	New Zealand maintains its ranking for "university-industry collaboration in R&D" in the WEF global competitiveness index.	This ranking in the WEF report, ranks New Zealand 49th for the quality of Research Institutions. Although this ranking has fallen since 2017 (19th place), New Zealand remains in the top 35% of all countries surveyed.
	An improvement in New Zealand's ranking for "capacity for innovation" in the WEF global competitiveness index.	New Zealand dropped from 20 (2018) to 27 (2019). This still puts New Zealand inside the top 20% for its ability to innovate.

¹ This measure differs from the one in the 2019/20 Statement of Performance Expectations (SPE). For consistency with the 2019 Annual Report, the QS World University Rankings have been used. The rankings are published annually, giving a more timely measure than the report referenced in the SPE that is published every two years.

Measuring our impacts

We track the impact and effectiveness of our work through impact measures.

REANNZ is one of the many contributors to the globally connected science, research, education and innovation system. REANNZ provides trusted and secure pathways and high speed connectivity so that New Zealand institutions can fully participate and partner in digitally advanced science, research, education and innovation initiatives, wherever they occur.

Our impact measures indicate how effectively we are at enabling:

- > member collaboration with the world’s leading research, science, education and innovation organisations,
- > high-speed member access to the local and global content, systems and tools they need, and
- > enabling researchers across all fields to conduct data-intensive research with local and global partners.

Our performance monitoring includes measures for the quality, quantity, timeliness and cost of our services. This data then allows us to assess our efficiency of service delivery for our members with regards to:

- > The delivery of NREN network services, and other professional services.
- > A network funded, designed and deployed to deliver very low latency, high-speed and high availability data transfer services.
- > An engaged and innovative member community.

The following results for 2019/20 demonstrate that where REANNZ had the opportunity to directly influence and manage the network, performance targets were achieved. However, where outcomes could be influenced by other factors outside REANNZ control, targets may not have been fully met. In particular the impact that the COVID-19 pandemic has had on New Zealand research institutions use of the REANNZ network.

During 2019/20 REANNZ has established a new 2020 – 2024 Statement of Intent and 2020/21 Statement of Performance Expectation. REANNZ’s priority going forward is to ensure the successful delivery on the new measures and initiatives within the new accountability documents. These align with what being an NREN truly means for the facilitation of research, science and innovation, and how REANNZ is contributing to and enabling the RSI community in New Zealand.

Impact 1 : Researchers across all fields are able to conduct data-intensive research

A number of science initiatives with large data requirements are being conducted that could not occur without the reach, reliability and speed of an advanced network. Examples include high-performance computing applications such as: climate and geological science facilitated by the National eScience Infrastructure project (NeSI); genomics work with international collaborators; and radio astronomy data analysis related to the international SKA project.

All of these involve scientific instruments that generate massive datasets. These datasets need to be transported quickly and accurately from the instruments to hosting or processing centres, then shared across the globe to contributing scientists and researchers.

An indication of the amount of data-intensive science occurring, is the amount of data transmitted over the REANNZ network, as well as in our users’ assessment of the network’s importance and value.

Goal: Total traffic flows increase

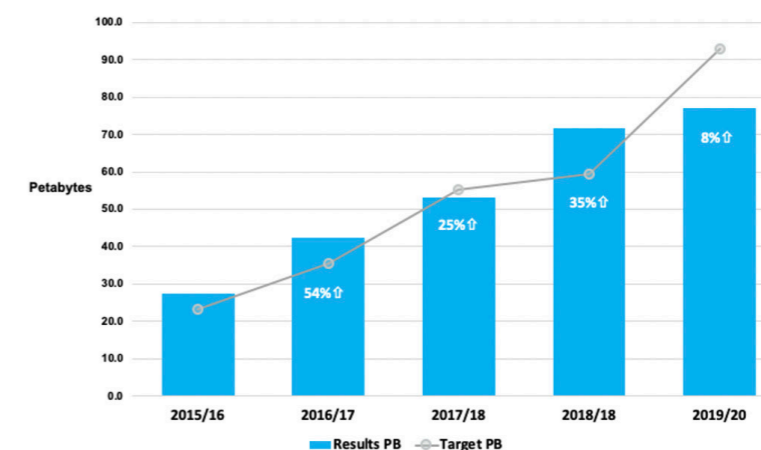
	Result June 2019	Target June 2020	Result June 2020
Total traffic flows increase			
Year-on-year growth	+35%	+30%	+8%
Total traffic volume	71.56 PB	93.03 PB ²	76.94 PB

Measurements are in petabytes (PB)

REANNZ year-on-year 8% traffic growth was less than the 30% target in the 2019/20 Statement of Performance Expectations

The lower growth over the year shows the impact of COVID-19 and the slower growth levels of research data being transferred over the network by our members. The annual growth target was in line with maturing research and education networks internationally, pre COVID-19, which was growing at rates between 20% to 30% per annum.

Total traffic growth



REANNZ actively works with members to support improvements to their institution’s network performance, with tools and services that enable high-speed data transfers.

Across the network, REANNZ continues to focus on improving network resilience, availability and performance through network upgrades. Domestically, we have continued to focus on improving access to content through settlement-free peering, content caches, and increased use of NREN services such as eduroam, all of which increase the value that the network brings to the community.

² The Target PB is based on prior year actual results, since that number was not included in the SoP

Goal: Total traffic destined for international research and education networks increase

Measure	Result June 2019	Target June 2020	Result June 2020
Traffic destined for international research and education increases	+2% 1.84 PB	+10% 2.02 PB ²	-24% 1.40 PB

Measurements are in petabytes (PB)

Research and education traffic (traffic flowing internationally between REANNZ members and members of global NRENs) decreased 24% for the year ending 30 June 2020.

It should be noted that traffic to/from NREN networks account for less than 2% of REANNZ total traffic volumes. Small changes in traffic volumes can result in large percentage change measures.

Traffic volumes to/from NREN networks have been influenced by both the increasing use of Cloud based services and data storage and the COVID-19 pandemic. Further details are provided under Impact Area 2 below.

Goal: Users consider the REANNZ network valuable or essential to their work

Measure	Result June 2019	Target June 2020	Result June 2020
Users consider the REANNZ network valuable or essential to their work	100%	>80%	82%

The FY2020 survey was sent to 384 respondents (prior year 109) covering 42 members. There were 68 individual respondents of which 68% (prior year 44%) were from our core member base. It was noted that some non-core and non-data intensive members responded with a neutral reply.

Impact Area 2: Collaboration between science, innovative business and education sectors is enhanced

Collaboration takes many forms, it can be as simple as having a conversation over video conference or as complex as the multi-step process of turning one scientist’s research project into a commercial product. REANNZ enables these collaborations by providing the connectivity and the tools to make working together easier and more effective.

Increasing amounts of traffic flowing through our network is an indirect indicator of increased collaboration with both national and international participants.

While growth rates have reduced during 2019/20, REANNZ has experienced exceptional growth since 2014, in both international and national traffic volumes, as network upgrades have been implemented.

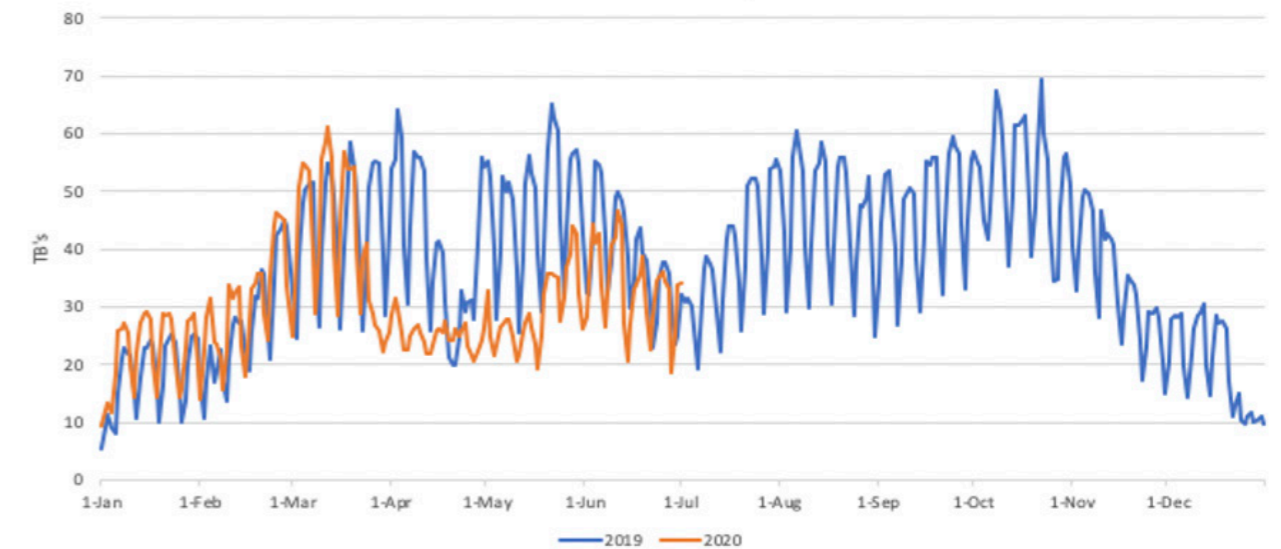
Goal: Total traffic flows increase

Measure	Result June 2019	Target June 2020 ³	Result June 2020
International traffic volume			
Year-on-year growth	+1%	+30%	-1%
Total traffic volume	17.36 PB	22.57 PB	17.15 PB
National traffic volume			
Year-on-year growth	+51%	+30%	+10%
Total traffic volume	54.20 PB	70.46 PB ⁴	59.79 PB
Total traffic volume			
Year-on-year growth	+35%	+30%	+8%
Total traffic volume	71.56 PB	93.03 PB ⁵	76.94 PB

Total traffic has increased seven-fold from 9.87 PB in FY2014 to 70.46 PB in FY2020, and these high levels of increasing traffic flows is an indirect indicator that REANNZ is enabling increased collaboration with both national and international research and education participants.

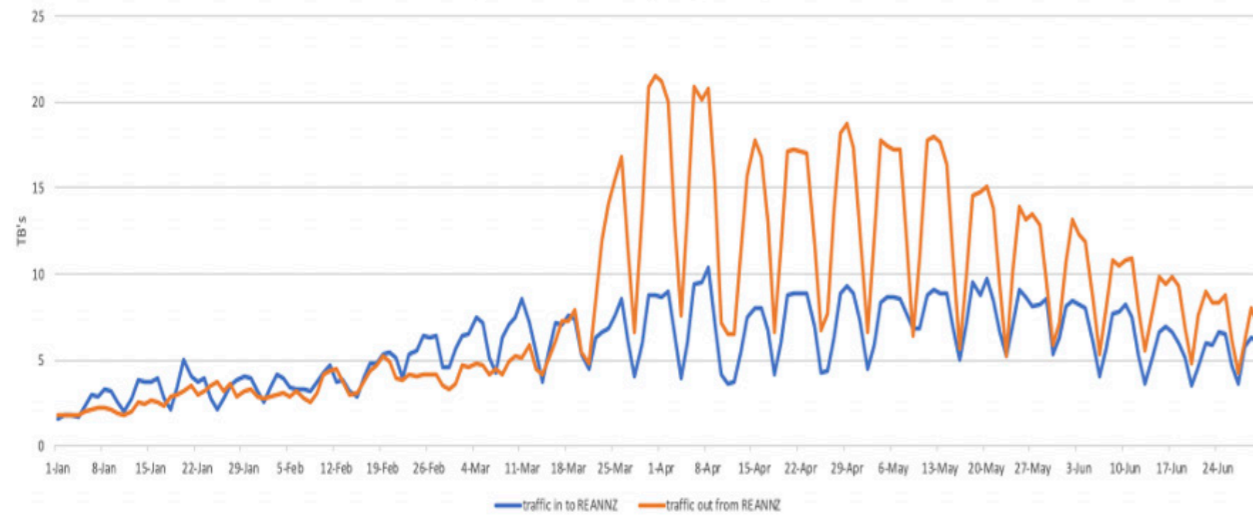
Traffic volumes were particularly impacted by the COVID-19 Pandemic. The following graphs show the impact on traffic volumes over the past 6 months of 2020, compared with the prior year’s traffic. The particular period of interest relating to COVID-19 is from March to May 2020, with a lockdown date from 25 March 2020.

REANNZ International Traffic



The New Zealand COVID-19 lockdown saw a steep decline of traffic on REANNZ’s international circuits, which reflected the move of our members’ staff and students from their institutions to working from home. Their traffic, the daily internet use of hundreds of thousands of people across the country, shifted to consumer networks. REANNZ’s remaining international traffic includes institutional traffic with content providers like Google commercial services, Dropbox Inc. or Amazon Cloud resources in Sydney and further afield, many of whom REANNZ connects with directly via NREN-grade links.

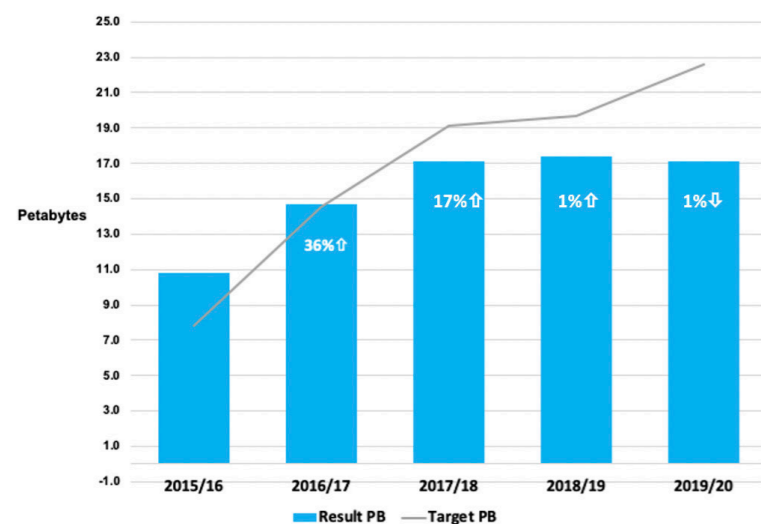
REANNZ National Traffic via NZ Peering Exchanges



Conversely, REANNZ became a net-exporter of daytime data to New Zealand public networks during the NZ COVID-19 lockdown. REANNZ traffic to major NZ consumer networks peaked at about four times our pre-lockdown volume. Traffic from our member's institutional services and systems supported those now working from home. REANNZ was well positioned to support this new pattern of use as we have high capacity connections to the major networks, who provide internet to the NZ public, at peering exchanges across the country. This graph sums our domestic traffic with Spark, 2Degrees, Vodafone and Vocus.

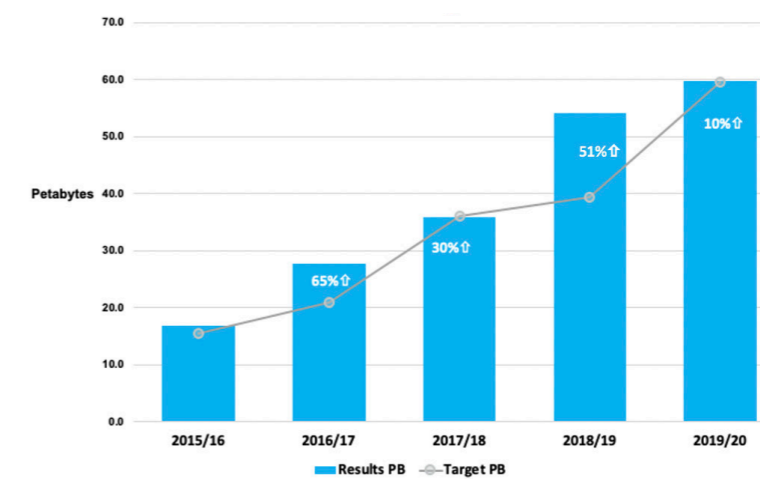
Overall International traffic for 2019/20 reduced by 1% and is lower than the targeted 30%. International traffic volumes are impacted by both the COVID-19 pandemic and the increasing use of Cloud based services and data-storage. There has been an increasing presence of providers of Cloud based services and data storage within New Zealand, resulting in a shift of traffic volumes from International to National.

International traffic growth



National traffic growth was up 10% during 2019/20 as REANNZ became a net-exporter of daytime data to New Zealand public networks during the COVID-19 lockdown.

National traffic growth



Impact Area 3: Users have access to the content and tools they need

REANNZ continues to develop services that meet the unique needs of our members, across research, academia, teaching and learning. We partner with our members to deliver services that add value, through leveraging the investment in network infrastructure, developing customised solutions where it is not available in the market, and creating a communal resource to increase production while lowering costs for our member community.

Examples of these services include eduroam (a global wifi roaming service between research and education organisations), Tuakiri (identity and access management), security and technical advisory services, managed network services, high-quality internet, caching, Cloud and data centre connectivity.

An increase in members subscribing to REANNZ services indicates REANNZ's ability to deliver services that are relevant and provide value-for-money to our members.

Goal: Subscriptions to services increase

Measure	Result June 2019	Target June 2020	Result June 2020
Subscriptions to services increase	+8%	+10%	+2%

COVID-19 resulted in delays with the installation of services that were in the pipeline, enquiries and approval processes of new services. Post COVID-19 lockdown, these pipeline installations continued, but also resulted in members reassessing their future needs and budgets.

REANNZ has increased the number of service subscriptions by 47 over a three year period at an average yearly increase of 16% per annum.

Over recent years, REANNZ has worked to bring new value-added services to the community. By the end of FY2020 there were four 100 Gbps services in use by our members. 100 Gbps connectivity is under consideration by other members.

Goal: eduroam™ usage increases

Users have access to content and tools they need	Result June 2019	Target June 2020	Result June 2020
Total visitors – number of device connections in New Zealand made via eduroam™	70,974	71,884	88,421
Total visitors – number of different institutions the visitors came from	2,371	2,676	2,377
Overseas visitors – number of device connections in New Zealand made via eduroam™	39,460	37,440	38,438
Overseas visitors – number of different countries the visitors came from	74	75	76
New Zealand travellers – number of device connections made via eduroam™ by New Zealand users at other sites in New Zealand or overseas	79,920	80,719	105,867

Increasing eduroam usage shows the value of this service, which allows participants to automatically join the wifi networks of any participating institution, anywhere in the world. Use of this service is another indicator of the quality of NREN services provided and their value to both our members and visitors to New Zealand from within the global R&E community. eduroam usage has grown significantly in FY2020 but has since been constrained by COVID-19 travel restrictions.

Goal: Member satisfaction with level of network availability

Measure	Result June 2019	Target June 2020	Result June 2020
Member satisfaction with level of network availability	-	>80%	89%

This is a new measure for FY2020. Network availability is vital to the network's ability to carry big bursts of data, as and when required by the members. Research datasets can be large and unpredictable in nature. Available burst capacity, or headroom, is essential to network availability and large data transfers.

Measuring our output

Output: Provide the REANNZ network, and, support the member community

Output performance measures tell us how well our work is delivering the desired results. We measure quality, quantity, timeliness and cost-effective performance measures.

Output measures: Quality

Network availability >99.90%

National and international network availability measures the reliability of the network. Network downtime includes faults and other connectivity or hardware outages, but excludes planned maintenance outages. The standard network availability for research and education networks internationally is 99.90%.

Network availability is crucial for our users to be able to perform their work when they need to. Network design is one way to maintain availability, even during outages, by the use of physically diverse paths, fail-over hardware and protected circuits. REANNZ's impressive network availability statistics are the result of our focus on operational excellence and designing for network resilience.

Packet delivery is a key element of network quality and one of the defining features of research and education networks. Research and education networks aim to eliminate 'packet loss' because it is catastrophic for large data transfers, which are typical of our user groups. Packet loss directly effects the quality of the user experience and the integrity of the information transferred.

Network availability	Result June 2019	Target June 2020	Result June 2020
National network availability	99.99%	99.90%	99.99%
International Network	99.95%	99.90%	99.99%*
Packet Delivery	99.999993%	99.99999%	99.999995%

* Since the cross over to the Hawaiki international submarine cable during 2019, the international network availability measure is an average of the network availability to Australia (FY2020 100.0%) and US (FY2020 99.99%)

Packet loss - poorly tuned networks that experience hardware or software faults or network congestion will drop packets – this is referred to as 'packet loss'. Our community, who globally collaborate and participate in research, science, education and innovation, cannot accept packet loss. If they did, the time taken to transmit large datasets would extend from hours or days into weeks and months. In the worst case scenario, datasets couldn't be sent and members simply couldn't collaborate.

REANNZ focuses on operating a 'packet loss-less' network. We actively measure packets sent and if packet loss is found it is immediately minimised or eliminated. Some packet loss (errors) can occur while we're fixing a network segment, but because of our resilient design, traffic would have been diverted and therefore most packet loss does not impact our community. The majority of the time, our network is without packet loss.

That is why our packet delivery targets are well beyond the levels of a regular telecommunications provider and it is the reason we have reported an average packet delivery of over 99.9999% across our network over the last 3 years. Telecommunications providers aim for 99.90%.

Output measures: Quantity

The number and size of our members' network connections demonstrates the quantity of services that we provide.

Capacity of connected sites increases - volume

Volume	Result June 2019	Target June 2020	Result June 2020
Network Scale and reach (Volume of member connections)	+23% 1,395 Gbps	+10% ⁴ 1,515 Gbps	+20% 1,671 Gbps

Gbps = Gigabits per second

The volume of member connections is a calculation based on the number of member connections and their size. Volumes have grown over the last financial year, as our members increased the size of their connections to meet increased demand. For some members we have added a second connection to the network for resiliency. We have also added new members and connected new sites to the network.

Network capacity – speed

	Result June 2019	Target June 2020	Result June 2020
Core national backbone capacity (speed)	100 Gbps	100 Gbps	100 Gbps
Core international network capacity (speed)	60 Gbps	60 Gbps	60 Gbps

Gbps = Gigabits per second

The success of delivering large volumes of data is the result of the distance the data travels, multiplied by the speed the data travels, multiplied by the packet delivery ratio.

REANNZ has no control over the distance the data is required to travel, but it can impact on speed through network capacity and packet delivery through a finely tuned and monitored network. The increasing capacity demonstrates the network's improved ability to deliver large data sets.

Services Offerings

New services added	Result June 2019	Target June 2020	Result June 2020
Service offerings added	1 100 Gbps national connection	1 New service offering available to members	1 Product Variation

Variations to our existing product range are continuously being developed and implemented, like the ability for Tuakiri members to access eduGAIN, a global repository of research tools and resources. In the last quarter, work was completed on the Proof of Concept of the eduVPN base, and will soon be turned into a fully offered service that supports secure connections to the internet and an institution's internal network. In the year ahead, MAE Lite will also be launched as a new service to support the connection of member's remote research sites.

REANNZ will continue to engage and assist members to support their recovery and provide solutions for issues that arise as a result of COVID-19.

⁴ The SPE target of 1,515 Gbps was based on 10% of estimated 2018/2019 results, whereas the annual target of 1,395Gbps is based on the actual 2018/19 results.

Output measures: Timeliness

More than 80% members consider any issues resolved in a timely manner

Survey of responsiveness	Result June 2019	Target June 2020	Result June 2020
Users consider reported issues to be resolved in a timely manner (based on member survey)	95%	80%	90%

The speed at which we identify and resolve faults and other network performance issues is not only a measure of the quality of our customer service, but also a measure of the timeliness of our network management activity. We actively manage the network to identify issues before they affect our members and proactively advise of issues rather than being reactive to member calls. The REANNZ helpdesk logs incident reports from users and although we have internal resolution time targets, the true test of our timeliness is our members' opinion of our responsiveness to their challenges.

Our target of 80% of responses resolved in a timely manner represents an appropriate balance between responsiveness and the cost of resourcing to increase responsiveness. Falling below this target would indicate that we had not adequately resourced the helpdesk facility.

In the FY2020 survey 90% (target 80%) of the respondents indicated that their issues were understood and resolved in a timely manner.

Output measures: Cost-effectiveness

In a developing big-data community that is growing its ability to optimise the benefits of international data-intensive collaboration, cost-effectiveness is critical. The cost-effectiveness measure of the REANNZ network is currently demonstrated by retaining our core membership base and growing overall membership. If we are not cost-effective in providing valuable networking solutions, or able to obtain funding to support the specialist network services at a level that keeps prices affordable for members, our members will consider their participation in data-intensive research and REANNZ membership.

REANNZ addresses a niche market that commercial networks cannot – the provisioning of the unique services that meet the needs of science, research and education. Direct comparisons of cost with commercial telecommunications providers are misleading. Not only is our network designed to support time-sensitive and bursty traffic flows globally, but the network has other performance attributes, such as very low packet loss thresholds, low latency and jitter. Commercial networks are not designed to support the same requirements.

REANNZ maintains its core membership base

Memberships maintained	Result June 2019	Target June 2020	Result June 2020
Service offerings increase	5/8 Universities 7/7 CRIs 1/1 ATI 8/16 ITPs 1/3 Wānanga	8/8 Universities 7/7 CRIs 1/1 ATI 8/16 ITPs 1/3 Wānanga	8/8 Universities 7/7 CRIs 1/1 ATI 8/16 ITPs 1/3 Wānanga
Core participating members	22	25	25
Other participating members	20	20	17
Total participating members	42	45	42

During FY2020 the three universities who discontinued their services in 2018, agreed to return. However, not all of our members currently require the same degree of high-performance the network offers. During the year three non-core members discontinued their membership with REANNZ.

Annual year-on-year decrease in membership fee per Petabyte of network traffic volume

This new measure shows the cost-effectiveness of the REANNZ services, in terms of the unit membership price per Petabyte of traffic sent each year.

Users have access to content and tools they need	Result June 2019 ⁵ (unaudited)	Target June 2020	Result June 2020
Total traffic (measured in Petabytes, PB)	71.55 PB	90.66 PB	77.55 PB
Annual membership fee (NZ\$)	\$6.1M	\$6.5M	\$6.1M
Unit price per PB (NZ\$)	\$0.085	\$0.072	\$0.079
% year-on-year price reduction	-43%	-15% ⁶	-7%

Comparing FY2019 to FY2020:

- > Member fees remain consistent with the prior year, as a result of the 3 yearly contracts.
- > Network traffic increased 8% from 71.55 PB to 77.55 PB.
- > Price per Petabyte fell 7% from the prior year \$0.085M to \$0.079M per PB.
- > Target was not met due to the lower PB traffic for Q4 due to COVID-19.

Annual year-on-year decrease in network operating cost per Petabyte of network traffic volume

This new measure shows the cost-effectiveness of REANNZ operations in terms of the cost of providing network services per Petabyte of traffic sent each year. Through design and increasing network scale REANNZ can effectively reduce network operating costs.

Users have access to content and tools they need	Result June 2019 ⁷ (unaudited)	Target June 2020	Result June 2020
Total traffic (measured in Petabytes, PB)	71.55 PB	90.66 PB	77.55 PB
Total network operating costs (NZ\$)	\$15.9M	\$15.3M	\$12.0M
Network cost of REANNZ services per PB of network traffic (NZ\$)	\$0.222M	\$0.200M	\$0.155M
% unit cost per PB annual reduction	-4%	-10% ⁸	-30%

Comparing FY2019 to FY2020:

- > Network operating costs decreased by 30% from \$15.9M to \$12.0M, as a result of the AARNet contract coming to an end.
- > Network traffic increased 8% from 71.55 PB to 77.55 PB.
- > Network operating costs per Petabyte decreased 30% from \$0.222M to \$0.155M per PB.

⁵ The SPE 2019 figures were based on estimates, whereas the annual report reflects the actual results

⁶ The target % was based on estimated results, whereas the annual report target is based on the actual results

⁷ The SPE 2019 figures were based on estimates, whereas the annual report reflects the actual results

⁸ The target % was based on estimated results, whereas the annual report target is based on the actual results

Output: The advanced research, education and innovation network and related tools

	Actual 2020 \$ 000	Budget 2020 \$ 000
Revenue		
Strategic Science Investment Fund grant	3,000	3,000
Network revenue	6,094	6,320
Other revenue	4,657	5,650
Total Revenue	13,751	14,970
Expenses		
Depreciation and amortisation	2,374	2,591
Network expenses	9,798	12,744
Operating expenses	3,132	4,164
Total Expenditure	15,304	19,499
Loss before gains	(1,553)	(4,529)
Plus: Foreign currency gains	354	-
Surplus/(deficit)	(1,199)	(4,529)

FINANCIAL STATEMENTS /

Research and Education Advanced Network New Zealand Limited

Statement of Comprehensive Revenue and Expense for the year ended 30 June 2020

	Note	Actual 2020 \$ 000	Budget 2020 \$ 000	Actual 2019 \$ 000
Revenue				
Grant revenue				
Strategic Science Investment Fund	2	3,000	3,000	3,000
Hawaiki contribution		-	-	3,000
Network revenue		6,094	6,320	6,096
Other revenue	2	4,147	5,224	4,603
Interest revenue		510	426	601
Total Revenue		13,751	14,970	17,300
Network Expenses				
Depreciation and amortisation		2,220	2,413	2,199
Employment expenses		2,034	2,577	2,389
Network operating expenses	3	7,763	10,167	11,318
Total Network Expenses		12,017	15,157	15,906
Gross Surplus/(Loss)		1,734	(187)	1,394
Less:				
Operating Expenses				
Audit		34	35	33
Depreciation and amortisation		154	178	193
Directors fees	4	180	193	161
Employment expenses		1,590	1,888	2,131
Other operating expenses		538	1,014	945
Professional services		65	441	150
Operating leases		658	285	247
Travel expenses		68	308	187
Total Operating Expenses		3,287	4,342	4,047
Surplus/(Deficit) excluding gains		(1,553)	(4,529)	(2,653)
Foreign currency gains/(losses)	5	354	-	125
Surplus/(Deficit)		(1,199)	(4,529)	(2,528)
Other comprehensive revenue		-	-	-
Total Comprehensive Revenue and Expense		(1,199)	(4,529)	(2,528)

Explanations of major variances to budget are provided in note 23.

The accompanying notes form part of these financial statements.

Research and Education Advanced Network New Zealand Limited

Statement of Financial Position as at 30 June 2020

	Note	Actual 2020 \$ 000	Budget 2020 \$ 000	Actual 2019 \$ 000
CURRENT ASSETS				
Cash and cash equivalents	6	2,165	3,955	3,909
Receivables and debtors	7	2,063	2,903	3,810
Investments	8	21,106	14,000	16,131
Derivative financial instruments	9	178	11	91
Prepayments		655	394	529
Prepaid network expenses	10	1,885	998	1,080
Total current assets		28,052	22,261	25,550
NON-CURRENT ASSETS				
Property, plant and equipment	11	9,140	10,446	11,103
Intangibles	12	-	-	3
Derivative financial instruments	9	73	-	48
Prepaid network expenses	10	17,281	17,285	18,084
Total non-current assets		26,494	27,731	29,238
TOTAL ASSETS		54,546	49,992	54,788
CURRENT LIABILITIES				
Accounts payable and accrued expenses	13	1,294	821	1,506
GST payable		86	315	210
Employee entitlements	14	219	151	155
Revenue in advance	15	1,934	2,117	1,117
Provisions	16	301	-	-
Deferred lease incentive		-	17	17
Total current liabilities		3,834	3,421	3,005
NON-CURRENT LIABILITIES				
Provisions	16	159	-	-
Deferred lease incentive		-	14	31
Total non-current liabilities		159	14	31
TOTAL LIABILITIES		3,993	3,435	3,036
NET ASSETS		50,553	46,557	51,752
EQUITY				
Share capital		16,001	16,001	16,001
Accumulated surplus		34,552	30,556	35,751
TOTAL EQUITY	17	50,553	46,557	51,752

Explanations of major variances to budget are provided in note 23.

The accompanying notes form part of these financial statements.

Research and Education Advanced Network New Zealand Limited

**Statement of Cash Flows
for the year ended 30 June 2020**

	Actual 2020 \$ 000	Budget 2020 \$ 000	Actual 2019 \$ 000
CASH FLOWS FROM OPERATING ACTIVITIES			
Cash was provided from/(applied to)			
Receipts from the Crown	3,000	3,000	3,000
Network revenue	7,495	6,320	4,685
Other revenue	4,275	5,205	4,503
Interest revenue	535	427	692
GST (net)	(36)	276	265
Payments to suppliers and employees	(9,171)	(14,586)	(14,473)
Prepayments for network connectivity	(2,774)	(2,380)	(6,864)
Realised gain on foreign currency	315	-	337
Net cash flow from operating activities	3,639	(1,738)	(7,855)
CASH FLOWS FROM INVESTING ACTIVITIES			
Cash was provided from/(applied to)			
Sale of plant and equipment	21	-	-
Purchase of plant and equipment	(404)	(1,872)	(452)
Funds transferred from escrow	-	-	4,029
Term deposit investments	(5,000)	4,500	3,000
Net cash flow from investing activities	(5,383)	2,628	6,577
CASH FLOWS FROM FINANCING ACTIVITIES			
Cash was provided from/(applied to)			
Net cash flow from financing activities	-	-	-
Net (decrease)/increase in cash held	(1,744)	890	(1,278)
Cash at beginning of year	3,909	3,065	5,187
Cash at end of year	2,165	3,955	3,909
Represented by			
CASH AT BANK	2,165	3,955	3,909

Explanations of major variances to budget are provided in note 23.

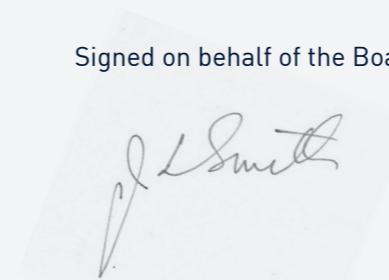
The accompanying notes form part of these financial statements.

Research and Education Advanced Network New Zealand Limited

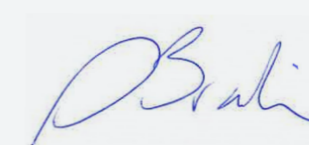
**Statement of Changes in Equity
for the year ended 30 June 2020**

	Note	Actual 2020 \$ 000	Budget 2020 \$ 000	Actual 2019 \$ 000
Balance at 1 July		51,752	51,086	54,280
Total Comprehensive Revenue and Expense for the year		(1,199)	(4,529)	(2,528)
Equity at end of year	17	50,553	46,557	51,752

Signed on behalf of the Board:



Janine Smith, MNZM
Chair
15 December 2020



Sara Brownlie
Finance & Audit Committee Chair
15 December 2020

Explanations of major variances to budget are provided in note 23.

The accompanying notes form part of these financial statements.

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1. Statement of accounting policies

REPORTING ENTITY

The reporting entity is Research and Education Advanced Network New Zealand Limited ('REANNZ'), a Crown entity as defined by the Crown Entities Act 2004 and a New Zealand incorporated company. As a Crown entity, REANNZ's ultimate parent is the New Zealand Crown.

REANNZ's primary objective is to establish, own and operate a high-speed communications network for the research and education sector. As such, REANNZ's aim is to provide services to the public, rather than make a financial return.

Accordingly, REANNZ has designated itself as a public benefit entity for the purposes of Public Benefit Entity (PBE) accounting standards with reduced disclosures.

The financial statements for REANNZ are for the year ended 30 June 2020 and were approved by the Board on 15 December 2020.

BASIS OF PREPARATION

The financial statements have been prepared on a going-concern basis, and the accounting policies have been applied consistently throughout the year.

Statement of compliance

The financial statements of REANNZ have been prepared in accordance with the Crown Entities Act 2004, which includes the requirement to comply with generally accepted accounting practice in New Zealand (NZ GAAP).

The financial statements comply with Public Benefit Entity accounting standards.

The financial statements have been prepared in accordance with Tier 2 PBE Accounting Standards with reduced disclosures. REANNZ is eligible to report as a Tier 2 reporting entity on the basis that it does not have public accountability and is not large.

Presentation currency and rounding

The financial statements are presented in New Zealand dollars (NZD) and all values are rounded to the nearest thousand (\$000).

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Accounting policies are selected and applied in a manner that ensures that the resulting financial

information satisfies the concepts of relevance and reliability. REANNZ accounting policies, therefore, are designed to report the substance of the underlying transactions undertaken by the entity.

Significant accounting policies are included in the notes to which they relate. Policies that do not relate to a specific note are outlined below:

Foreign currency transactions

Transactions in foreign currencies, including those for which forward foreign exchange contracts are held, are translated to New Zealand dollars (the functional currency) at the spot rate on the date of transaction.

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 Comprehensive Revenue and Expense.

Statement of Cash Flows

The Statement of Cash Flows is prepared exclusive of GST, which is consistent with the method used in the Statement of Comprehensive Revenue and Expense.

Definitions of the terms used in the Statement of Cash Flows are:

"Cash" includes coins and notes, demand deposits and other highly liquid investments readily convertible into cash used by REANNZ as part of its day-to-day cash management.

"Investing activities" are those activities relating to the acquisition and disposal of long-term assets and other investments not included in cash equivalents.

"Financing activities" are those activities relating to changes in equity of REANNZ.

"Operating activities" include all transactions and other events that are not investing or financing activities.

Goods and Services Tax (GST)

These financial statements have been prepared on a GST exclusive basis except for accounts receivable and accounts payable that are stated inclusive of GST.

The net GST paid to, or received from, Inland Revenue, including the GST relating to investing and financing activities, is classified as an operating cash flow in the Statement of Cash Flows.

Commitments and contingencies are disclosed exclusive of GST.

Income tax

As a public entity under section CW 38(2) of the Income Tax Act 2007, the company is exempt from income tax. Accordingly, no provision has been made for income tax.

Budget figures

The budget figures are those that form part of the REANNZ 2019/20 Statement of Performance Expectations dated 30 June 2019 and approved by the Board.

The budget figures have been prepared in accordance with generally accepted accounting practice and are consistent with the accounting policies adopted by REANNZ for the preparation of the financial statements.

Critical accounting estimates and assumptions

In preparing these financial statements, REANNZ has made estimates and assumptions concerning the future. These estimates and assumptions may differ from subsequent actual results. Estimates and assumptions are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances.

The estimates and assumptions that have significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are:

- Useful lives and residual values of property, plant and equipment – refer to note 11.

2. Revenue

Accounting Policy

The specific accounting policies for significant revenue items are explained below:

Grant revenue

REANNZ is funded in part by the Crown from the Strategic Science Investment Fund (SSIF). The SSIF grant is provided to partially fund the delivery of specialist services and activities to meet the Government's goals for research and education. REANNZ delivers an agreed work plan and the grant is recognised as revenue when paid because there are no other conditions attached.

Other grants are recognised as revenue when they become receivable unless there is an obligation in substance to return the funds if conditions of the grant are not met. If there is such an obligation, the grants are initially recorded as deferred income in

the Statement of Financial Position and recognised as revenue when conditions of the grant are satisfied.

Network and other revenue

Revenue is measured at the fair value of the consideration received or receivable. All transactions are exchange transactions.

Interest revenue

Interest revenue is recognised by accruing the interest due for the investment on a time proportion basis.

i. Grant revenue

	2020 \$ 000	2019 \$ 000
Non-exchange transactions		
Ministry of Business, Innovation & Employment Strategic Science Investment Fund contract	3,000	3,000
Ministry of Business, Innovation & Employment Crown funding agreement - Hawaiki Cable Managed Capacity	-	3,000
Total grant revenue	3,000	6,000

REANNZ and the Ministry of Business, Innovation and Employment ('MBIE') entered into a SSIF Infrastructure Platform Investment contract during the 2018 financial year. The contract is for seven years, expiring on 30 June 2024, and provides REANNZ with an annual grant of \$3M (total grant \$21M).

All conditions relating to the SSIF contract have been met.

In June 2014, REANNZ received a \$15M grant from MBIE expressly for the initial fee of a 25-year lease of managed capacity with Hawaiki Submarine Cable Limited Partnership ('Hawaiki'). The grant was recognised in line with payments to Hawaiki upon the achievement of agreed milestones, with the final milestone being paid in August 2018.

ii. Other revenue

	2020 \$ 000	2019 \$ 000
Exchange transactions		
Managed services	2,453	2,403
Internet	1,201	1,224
Other	493	763
APAN 46 Conference fees & sponsorship	-	213
Total other revenue	4,147	4,603

3. Network operating expenses

	2020 \$ 000	2019 \$ 000
National network		
Fibre circuits & maintenance	1,958	1,958
Other network expenses	763	751
PoP accommodation	324	375
Connectivity	21	21
Total national network expenses	3,066	3,105
International network		
International connectivity	4,131	7,661
Fibre Circuits	259	247
Other network expenses	187	187
PoP accommodation	120	118
Total international network expenses	4,697	8,213
Total network operating expenses	7,763	11,318

During the last financial year there was a crossover period with two international connectivity supply contracts. There was only one supply contract this year so international network costs are significantly lower.

Network expenses include \$231K relating to operating lease expenses recognised during the year (2019: \$378K).

4. Directors' fees

	2020 \$ 000	2019 \$ 000
The total value of remuneration paid or payable to each Board member during the year was:		
J Smith (Chair)	40	28
R Peat (Deputy Chair)	25	31
S Brownlie	20	19
E Gosling^	16	-
J Johnston*	21	16
J Metson^	16	-
D Skinner	21	46
S Weaver*	21	21
Total directors' fees	180	161

^ appointed 1 September 2019

* tenure ended 30 June 2020

The Deputy Chair was Acting Chair from July 2018 until the Chair was appointed in November 2018. This is reflected in the 2019 comparative amounts.

There no special director fees include paid during the year (2019: \$37K).

There have been no payments made to committee members appointed to the Board who are not directors during the year.

REANNZ provides a deed of indemnity to directors for certain activities undertaken in performance of REANNZ's functions.

REANNZ holds Directors and Officers Liability and Professional Indemnity insurance cover in respect of the liability of Board members and employees.

No Board members received compensation or other benefits in relation to cessation (2019: \$Nil)

5. Foreign currency gains/(losses)

	2020 \$ 000	2019 \$ 000
Realised foreign currency gains/(losses)	315	463
Unrealised foreign currency gains/(losses)		
Fair value gains on derivatives*	112	(398)
Bank account (USD)	(73)	60
Total foreign currency gains/(losses)	354	125

*includes reversal of unrealised gains on settlement of trades

Realised gains arose from the settlement of forward contracts to purchase USD and payment of supplier payments in foreign currency.

Unrealised gains were made on forward USD contracts held with the New Zealand Debt Management Office (NZDMO) and ASB reflecting the net movement in fair value of open contracts for the year. The reversal of unrealised gains on settlement of the trades were offset by unrealised gains on open trades at balance date.

On 30 June 2020, REANNZ held eight forward contracts (2019: seven contracts) to purchase a total of US\$4.03M (2019: US\$4.28M). Four contracts will settle during the next financial year. The contracts were entered into to mitigate foreign exchange exposure arising from annual network connectivity payments contractually required to be paid in USD.

6. Cash and cash equivalents

	2020 \$ 000	2019 \$ 000
Cash at bank and on hand	2,165	3,909
Total cash and cash equivalents	2,165	3,909

The total above includes NZ\$819K held in USD (2019: \$6K).

7. Receivables and debtors

Accounting Policy

Accounts receivable are reported at the amount due less an allowance for credit losses. REANNZ applies the simplified credit loss model of recognising lifetime expected credit losses for receivables.

In measuring expected credit losses, receivables have been assessed on an entity-type basis as this determines shared credit risk characteristics.

Receivables are expensed in the Statement of Comprehensive Revenue and Expense when there is no reasonable expectation of recovery. Indicators that there is no reasonable expectation of recovery include the debtor being in liquidation.

Breakdown of receivables and debtors	2020 \$ 000	2019 \$ 000
Exchange transactions		
Trade receivables	2,049	2,923
Less: provision for uncollectibility	(18)	(40)
Total receivables	2,031	2,883
Forward USD contract receivable	-	926
Sundry debtors	32	1
Total receivables and debtors	2,063	3,810

Membership fees are due quarterly in advance and service fees are due monthly in advance. Of the total receivables and debtors above, \$1.96M including GST (2019: \$1.26M including GST) relate to membership fees and services to be provided by REANNZ during the coming financial year. These fees are shown as income received in advance until the service period begins, at which time the fees are recognised as revenue in the Statement of Comprehensive Revenue and Expense.

REANNZ holds no collateral as security or other credit enhancements over receivables that are past due or impaired.

8. Investments

Accounting Policy

Bank term deposits

Investments in bank term deposits are initially measured at the amount invested.

Interest is subsequently accrued and added to the investment balance. A loss allowance for expected credit losses is recognised if the estimated loss allowance is not trivial.

Breakdown of investments	2020 \$ 000	2019 \$ 000
Term deposits (maturity one year or less)	21,106	16,131
Total investments	21,106	16,131

There is no impairment provision for investments as there is no expectation of credit losses. All term deposits are held with major trading banks with Standard & Poor's AA- rating.

9. Derivative financial instruments

Accounting Policy

REANNZ enters into derivative financial instruments, including forward foreign exchange contracts, as part of its normal operations to manage its exposure to foreign exchange rate risk. REANNZ does not hold or issue derivatives for trading purposes. REANNZ has not adopted hedge accounting.

Derivatives are initially recognised at the fair value on the date a derivative contract is entered into and are subsequently re-measured to their fair value at each balance date with the resulting gain or loss recognised in the Statement of Comprehensive Revenue and Expense.

A forward foreign exchange derivative is classified as current if the contract is due for settlement within 12 months of balance date. Otherwise, the full fair value of forward foreign exchange derivatives is classified as non-current.

Derivative financial instruments are recognised at fair value in the Statement of Financial Position.

On 30 June 2020, the fair value of derivative financial instrument assets was \$251K (2019: \$139K). Of this amount, \$178K relates to USD forward contracts due to be settled within 12 months, with the remaining amount to be settled in FY2022.

The fair value of forward foreign exchange contracts has been determined using a discounted cash flows valuation technique based on quoted market prices. The inputs into the valuation model are from independently sourced market parameters such as currency rates. Most market parameters are implied from forward foreign exchange contract prices.

10. Prepaid network expenses

Prepaid network expenses relate to core connectivity and network service operations and management. These prepayments will be expensed to the Statement of Comprehensive Revenue and Expense on a straight-line basis over the contract term.

	2020 \$ 000	2019 \$ 000
Balance at beginning of year	19,164	15,681
Prepayment expensed during year	(3,403)	(3,381)
Payments made during the year	3,405	6,864
Net book value	19,166	19,164
Current/non-current split		
Current	1,885	1,080
Non-current	17,281	18,084
Total prepaid network expenses	19,166	19,164

REANNZ and the Hawaiki Submarine Cable Limited Partnership entered into a 25-year lease contract for managed international capacity in July 2014. The contract required four milestone payments in USD. The milestone payments were converted into NZD at the spot rate on payment date. The total amount of the four milestone payments (including taxes) was NZ\$19.31M. Annual amortisation of the initial fee of \$774K is on a straight-line basis over the 25-year life of the contract from August 2018.

Annual payments in advance associated with the Hawaiki contract are recognised evenly over the prepaid period. Prepayments of \$3.41M were made during the year.

11. Property, plant and equipment

Accounting Policy

Property, plant and equipment consists of six classes, which are measured as follows:

- › Leasehold improvements, at cost less accumulated depreciation and impairment losses.
- › Routers, switches and optical equipment, at cost less accumulated depreciation and impairment losses.
- › Information technology equipment, at cost less accumulated depreciation and impairment losses.
- › Office equipment, at cost less accumulated depreciation and impairment losses.
- › PoP ('Point of Presence') equipment, at cost less accumulated depreciation and impairment losses.
- › Fibre and fibre housing, at cost less accumulated depreciation and impairment losses.

Additions

The cost of an item of property, plant and equipment is only recognised as an asset when it is probable that future economic benefits or service potential associated with the item will flow to REANNZ and the cost of the item can be measured reliably.

Work in progress is recognised at cost less impairment and is not depreciated.

In most instances, an item of property, plant and equipment is initially recognised at cost. Where an asset is acquired through a non-exchange transaction, the asset will be recorded at fair value at the date of acquisition.

Costs incurred subsequent to initial acquisition are capitalised only when it is probable that future economic benefits or service potential associated with the item will flow to REANNZ and the cost of the item can be measured reliably.

The costs of servicing property, plant and equipment are recognised in the Statement of Comprehensive Revenue and Expense as they are incurred.

Disposals

Gains and losses on disposals are determined by comparing the proceeds of disposal with the carrying amount of the asset. Gains and losses on disposal are included in the Statement of Comprehensive Revenue and Expense.

Depreciation

Depreciation on property, plant and equipment (excluding work in progress) is calculated on a straight-line basis, from the time the asset is in the location and condition necessary for its intended use. This basis allocates the cost or value of the asset, less its residual value, over its estimated useful life.

The depreciation method, estimated useful lives and residual values of property, plant and equipment are reviewed annually to assess appropriateness.

The following estimated useful lives are used in the calculation of depreciation:

Leasehold improvements	6 years
Routers, switches & optical equipment	3-8 years
Information technology equipment	3 years
Office equipment	5 years
PoP equipment	8 years
Fibre and fibre housing	20 years

Leasehold improvements are depreciated based on estimated useful life or the remaining lease term, whichever is shorter.

Impairment of property, plant and equipment and intangible assets

REANNZ does not hold any cash-generating assets. Assets are considered cash-generating where their primary objective is to generate a commercial return.

Non-cash generating assets

At each reporting date, assets are reviewed by the directors to determine whether there are any events or changes in circumstances that indicate that carrying amounts may not be recoverable. An impairment loss is recognised as the amount by which the asset's carrying amount exceeds its estimated recoverable amount.

If the carrying amount of an asset exceeds its recoverable amount, the asset is impaired and the carrying amount is written down to the recoverable amount. The impairment loss is then recognised as an expense in the Statement of Comprehensive Revenue and Expense.

Where an item of property, plant or equipment has been revalued, any impairment loss is recognised against the revaluation reserve for that class of asset. Where this results in a debit balance in the revaluation reserve, the balance is recognised in the Statement of Comprehensive Revenue and Expense.

Any reversal of an impairment loss is recognised in the Statement of Comprehensive Revenue and Expense.

Impairment losses can only be reversed to the extent that the carrying amount of the asset matches the carrying amount as calculated under the cost less accumulated depreciation method.

For items of property, plant or equipment that have been re-valued, any reversal of impairment loss is credited back to the revaluation reserve. However, to the extent that an impairment loss for that class of asset was previously recognised in the Statement of Comprehensive Revenue and Expense, a reversal of impairment loss is also recognised in the Statement of Comprehensive Revenue and Expense.

Critical accounting estimates and assumptions

Estimating useful lives and residual values of property, plant and equipment:

At each balance date, the useful lives and residual values of property, plant and equipment are reviewed. Assessing the appropriateness of useful life and residual

value estimates of property, plant and equipment requires a number of factors to be considered such as the physical condition of the asset, expected period of use of the asset by REANNZ, and expected disposal proceeds from the future sale of the asset.

An incorrect estimate of the useful life or residual value will affect the depreciation expense recognised in the Statement of Comprehensive Income and Expense, and carrying amount of the asset in the Statement of Financial Position. REANNZ minimises the risk of this estimation uncertainty by:

- › Physical inspection of assets,
- › Asset replacement programmes, and
- › Review of second-hand market for similar assets.

REANNZ has not made significant changes to past assumptions concerning useful lives and residual values.

Breakdown of property, plant and equipment

Movements for each class of property, plant and equipment are as follows:

	Office equipment \$'000	ICT equipment \$'000	National PoP equipment \$'000	International PoP equipment \$'000	Leasehold improvements \$'000	Network services \$'000	Fibre and fibre housing \$'000	Total \$'000
Cost or valuation								
Balance at 1 July 2018	132	721	11,056	1,028	381	37	8,210	21,565
Balance at 30 June 2019	132	692	11,191	1,024	381	25	8,210	21,655
Additions	1	29	283	96	20	-	-	429
Sales/write-offs	(20)	(51)	(72)	-	-	-	-	(143)
Balance at 30 June 2020	113	670	11,402	1,120	401	25	8,210	21,941
Accumulated depreciation								
Balance at 1 July 2018	87	511	5,563	151	138	35	1,999	8,484
Balance at 30 June 2019	100	588	6,915	314	201	25	2,409	10,552
Depreciation expense	11	81	1,632	174	64	-	410	2,372
Disposals	(8)	(43)	(72)	-	-	-	-	(123)
Balance at 30 June 2020	103	626	8,475	488	265	25	2,819	12,801
Carrying amounts								
Balance at 1 July 2018	45	210	5,493	877	243	2	6,211	13,081
Balance at 30 June 2019	32	104	4,276	710	180	-	5,801	11,103
Balance at 30 June 2020	10	44	2,927	632	136	-	5,391	9,140

The net carrying amount of fibre held under finance leases is \$1.47M (2019: \$1.58M). There is no financing portion to the leases. Also refer to note 18.

12. Intangible assets

Accounting Policy

Software is a finite life intangible and is recorded at cost less accumulated amortisation and impairment. Amortisation is charged on a straight-line basis over the estimated useful life of the intangible asset.

Costs associated with maintaining computer software are recognised as an expense when incurred.

Staff training costs are recognised as an expense when incurred.

Costs associated with the development and maintenance of the REANNZ website are recognised as an expense when incurred.

The useful life and associated amortisation rates of major classes of intangible assets have been estimated as follows:

Illustration and software licences	3 years	33.3%
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Impairment of intangible assets

Refer to the policy for impairment of property, plant and equipment in note 11. The same approach applies to the impairment of intangible assets.

Breakdown of intangible assets	Illustration	Software	Total
	licence	\$000	
	\$000	\$000	\$000
Gross carrying amount			
Balance at 1 July 2018	9	51	60
Balance at 30 June 2019	9	2	11
Additions	-	-	-
Disposals	-	-	-
Balance at 30 June 2020	9	2	11
Accumulated amortisation			
Balance at 1 July 2018	3	50	53
Balance at 30 June 2019	6	2	8
Amortisation expense	3	-	3
Disposals	-	-	-
Impairment losses	-	-	-
Balance at 30 June 2020	9	2	11
Carrying amounts			
At 1 July 2018	6	1	7
At 30 June 2019	3	-	3
At 30 June 2020	-	-	-

There are no restrictions over the title of intangible assets, nor are any intangible assets pledged as security for liabilities.

13. Accounts payable and accrued expenses

Accounting Policy

Short-term payables are recorded at the amount payable.

Breakdown of payables and accrued expenses	2020 \$ 000	2019 \$ 000
Exchange transactions		
Creditors	1,241	1,409
Accrued expenses	53	97
Total accounts payable and accrued expenses	1,294	1,506

14. Employee entitlements

Accounting Policy

Employee benefits due to be settled within 12 months after the end of the year in which the employee provides the related service are measured based on the accrued entitlements at current rates of pay. These include salaries and wages accrued up to balance date, annual leave earned but not yet taken at balance date.

A liability and an expense are recognised for bonuses where there is a contractual obligation or where there is a past practice that has created a constructive obligation and a reliable estimate of the obligation can be made.

Breakdown of employee entitlements	2020 \$ 000	2019 \$ 000
Accrued salaries and wages	54	24
Annual leave	165	131
Total employee entitlements	219	155

It is expected that all employee entitlements will be settled within 12 months of balance date.

15. Revenue in advance

	2020 \$000	2019 \$000
Exchange transactions		
Fees received in advance	216	18
Fees invoiced but not yet received	1,718	1,099
Total revenue in advance	1,934	1,117

Revenue in advance includes membership fees billed in advance and fees for services billed in advance. All services billed in advance will be provided by REANNZ in the coming financial year. These fees are shown as revenue received in advance until the service period begins, at which time the fees will be recognised as revenue in the Statement of Comprehensive Revenue and Expense.

There was no deferred revenue at balance date (2019: \$Nil).

16. Provisions

Accounting Policy

General

Provisions are recognised for future expenditure of an uncertain amount or timing when:

- there is a present obligation (either legal or constructive) as a result of a past event;
- it is probable that an outflow of future economic benefits or service potential will be required to settle the obligation; and a reliable estimate of the obligation amount can be made.

Provisions are measured at the present value of the amount expected to be required to settle the obligation.

Restructuring

A restructuring provision is recognised when either an approved formal plan for the restructure has been announced to those affected, or implementation has been started.

Onerous contracts

A provision for onerous contracts is recognised when the expected benefits or service potential to or from a contract is lower than the unavoidable cost of meeting the contract obligations.

The provision is measured at the present value of the lower of the expected cost of terminating the contract and the net expected cost of continuing the contract.

Breakdown of provisions	2020 \$000	2019 \$000
Current		
Restructuring	89	-
Onerous contract	212	-
Total Current	301	-
Non-current		
Restructuring	-	-
Onerous contract	159	-
Total Non-current	159	-
Total Provisions	460	-

	Restructuring \$000	Onerous Lease \$000	Total \$000
Balance 1 July 2019	-	-	-
Provision added	89	371	460
Amounts used	-	-	-
Balance as at 30 June 2020	89	371	460

Restructuring provision

A formal restructuring plan for the Engagement team was announced in June 2020. The consultation period was underway at balance date. The restructuring plan and associated payments were completed in August 2020. The provision represents the estimated cost of redundancy payments resulting from the restructure.

Onerous contracts provision

REANNZ has a non-cancellable lease for office space at 22 The Terrace, Wellington. The office space is not being used due to a seismic rating of less than 34% NBS (IL2) (New Building Standards, Importance Level 2) on the building. Management deemed the risk to staff unacceptably high and alternative premises were found. The provision represents the remaining obligation for lease payments under the contract. The lease expires in March 2022.

17. Equity

Capital management

REANNZ's capital is its equity, which comprises accumulated funds and contributed capital. Equity is measured as the difference between total assets and total liabilities.

REANNZ is subject to the financial management and accountability provisions of the Crown Entities Act 2004, which impose restrictions in relation to borrowings, acquisition of securities, issuing guarantees and indemnities and the use of derivatives.

REANNZ manages its equity as a by-product of prudently managing revenues, expenses, assets, liabilities, investments, and general financial dealings to ensure REANNZ effectively achieves its objectives and purpose, whilst remaining a going concern.

Contributed capital

At 30 June 2020, share capital comprised 1,816 ordinary shares (2019: 1,816). All issued shares are fully paid and have no par value.

	2020 \$000	2019 \$000
Breakdown of equity		
Contributed capital		
Balance at 1 July	16,001	16,001
Capital contribution	-	-
Repayment of capital	-	-
Balance at 30 June	16,001	16,001
Accumulated surplus/(deficit)		
Balance at 1 July	35,751	38,279
Surplus/(deficit) for the year	(1,199)	(2,528)
Balance at 30 June	34,552	35,751
Total equity	50,553	51,752

18. Capital commitments and operating leases

i. Capital commitments

There were no capital commitments at balance date (2019: \$Nil).

ii. Operating lease commitments

Accounting Policy

An operating lease is a lease that does not transfer substantially all the risks and rewards incidental to ownership of an asset to the lessee. Lease payments under an operating lease are recognised as an expense on a straight-line basis over the lease term.

Lease incentives received are recognised in the Statement of Comprehensive Income and Expense as a reduction of rental expense over the lease term.

Where the leased items are not in use, the operating lease payments will be treated as a prepayment in the Statement of Financial Position. Once the items begin to be used in deriving revenue, these prepayments are released to the Statement of Comprehensive Revenue and Expense on a straight-line basis over the period of the remaining operating lease term.

Operating leases relate to the following activities:

- Office premises at 2-6 Gilmer Terrace, Wellington, 22 The Terrace, Wellington, and 40 Kenwyn Street, Parnell, Auckland; and
- Network PoP accommodation and associated support facilities

The future aggregate minimum lease payments payable under non-cancellable operating leases are as follows:

	2020 \$000	2019 \$000
Less than one year	631	459
Between one and two years	411	324
Between two and five years	80	270
Later than five years	-	-
Total operating lease commitments	1,122	1,053

There are no restrictions placed on REANNZ by any of its leasing arrangements.

iii. Connectivity and managed service commitments

Connectivity and managed service commitments relate to:

- Payments to suppliers for national and international connectivity services, and
- Payments to suppliers for service management of the national network.

	2020 \$000	2019 \$000
Less than one year	4,259	3,915
Between one and two years	3,682	2,559
Between two and five years	9,689	7,117
Later than five years	45,825	44,973
Total connectivity and managed service commitments	63,455	58,564

In June 2014, REANNZ entered into a 25-year lease of managed capacity with Hawaiki Submarine Cable Limited Partnership. The first condition of the lease was met on 31 March 2016, at which point the contract became non-cancellable.

The upfront cost ('initial fee') of the lease was \$19.31M paid in USD instalments as key milestones were met. The final payment was made in August 2018 at which point recognition of the initial fee over the 25-year term of the contract commenced.

REANNZ will incur additional annual connectivity charges over the 25-year lease term. These costs are reflected above and form the whole amount of the later than five years total.

iv. Finance leases

Accounting Policy

A finance lease is a lease that transfers to the lessee substantially all the risks and rewards incidental to ownership of an asset, whether or not title is eventually transferred.

At the commencement of the lease term, prepaid finance leases where REANNZ is the lessee are recognised as an asset in the Statement of Financial Position at the fair value of the leased item.

The amount recognised as an asset is depreciated over its useful life. If there is no reasonable certainty as to whether REANNZ will obtain ownership at the end of the lease term, the asset is fully depreciated over the shorter of the lease term and its useful life.

Indefeasible Rights of Use (IRUs) have been granted to REANNZ over specific fibre pairs and have been accounted for as finance leases as the risks and rewards of ownership have transferred to REANNZ. The net

carrying amount of the leased assets is \$1.47M (2019: \$1.58M).

The finance lease term is for the expected economic life of the asset and has been prepaid. As such, there are no future finance lease payments payable.

REANNZ does not hold an option to purchase the asset at the end of the lease term.

19. Contingencies

There were no contingent assets or liabilities at balance date for which disclosure is required (2019: \$Nil).

20. Related party transactions

REANNZ is a wholly owned entity of the Crown.

Related party disclosures have not been made for transactions with related parties that are within a normal supplier or client/recipient relationship with terms and conditions no more or less favourable than those that it is reasonable to expect REANNZ would have adopted in dealing with the party at arm's length in the same circumstances.

Further, transactions with other government agencies (for example, government departments and Crown entities) are not disclosed as related party transactions when they are on normal terms and conditions consistent with the normal operating arrangements between government agencies.

Gravelroad Limited, a consultancy company that REANNZ director David Skinner is also a director of, was paid \$8K (2019: \$94K) for the Acting Chief Executive services he provided during July 2019. David held the role during the search for a permanent Chief Executive. The REANNZ Board made the appointment because of his specialist network knowledge. The appointment was consistent with the terms approved by the Minister of Research, Science and Innovation.

Key management personnel compensation

The compensation of the Board of Directors and the Chief Executive Officer and senior management (the Senior Leadership Team), being the key management personnel of REANNZ, is set out below:

	2020 \$000	2019 \$000
Directors		
Remuneration	180	161
Full-time equivalent members	0.85	0.90
Senior Leadership Team		
Remuneration	1,222	1,305
Full-time equivalent members	6.21	5.19
Total key management personnel remuneration	1,402	1,466
Total full-time equivalent personnel	7.06	6.09

The full-time equivalent for Board members has been determined based on the frequency and length of Board and committee meetings, estimated time for Board members to prepare for meetings, attendance at external stakeholder meetings and advice provided to the Senior Leadership team.

There were eight directors during the year. Six directors had tenure for the full year, while two were appointed from September 2019.

An analysis of Board member remuneration is provided in note 4.

Chief Executive's remuneration

The Chief Executive was appointed in August 2019. Her total remuneration for the year was \$244,093, consisting of a salary of \$232,507 and benefits of \$11,586. Benefits include KiwiSaver and a car park allowance.

The Chief Executive's remuneration package does not include any long term incentives. Short term incentives are set at 15% of base salary plus 3% KiwiSaver. Incentive payments are granted at the discretion of the Board and are based on personal and company performance measures. No incentive was awarded for the financial year ended 30 June 2020 based on the State Services Commissioner's guidance on pay restraint in the public sector.

Employee remuneration

Remuneration and other benefits of \$100,000 per annum or more paid or payable to employees in their capacity as employees were:

	2020 Employees	2019 Employees
\$100,000 - \$109,999	4	3
\$110,000 - \$119,999	1	3
\$120,000 - \$129,999	3	5
\$130,000 - \$139,999	1	2
\$140,000 - \$149,999	1	1
\$150,000 - \$159,999	2	1
\$160,000 - \$169,999	3	2
\$180,000 - \$189,999	1	1
\$190,000 - \$199,999	1	2
\$200,000 - \$209,999	-	1
\$220,000 - \$229,999	-	2
\$240,000 - \$249,999	1	-

During the year ended 30 June 2020, REANNZ paid no compensation or other benefits to employees in relation to cessation (2019: \$46K to one employee).

21. Events after balance date

Negotiations for COVID-19 lockdown rent relief were underway at balance date for 22 The Terrace, Wellington. In September 2020, an agreement was signed with Stride Property Limited providing a 50% credit for March and April 2020 conditional on agreeing to a lease extension of six months to 1 October 2022. The amount of the rent relief is \$18K.

In August 2020 the REANNZ Board approved a Deed of Variation to the Joint Operating Agreement with Vocus (New Zealand) Limited (Vocus). REANNZ agreed to sell 75% of assets at their Whenuapai location to Vocus for \$130K plus GST. The deed was signed by Vocus in June 2020.

22. Financial instruments

Financial instrument categories

The carrying amount of financial asset and liability categories are as follows:

	2020 \$000	2019 \$000
Mandatorily measured at fair value through surplus or deficit		
Derivative financial instrument assets	251	139
Financial liabilities measured at amortised cost		
Accounts payable and accrued expenses (excluding income in advance, taxes payable and grants received subject to conditions)	1,294	1,506
Finance leases	1,470	1,580
Total financial liabilities measured at amortised cost	2,764	3,086
Financial assets measured at amortised cost		
Cash and cash equivalents	2,165	3,909
Debtors and other receivables	2,063	3,810
Investments – term deposits	21,106	16,131
Total financial assets measured at amortised cost	25,334	23,850

23. Explanation of major variances to budget

Statement of Comprehensive Revenue and Expense

Revenue

Total revenue was \$1.22M under budget. Of this amount, \$1.08M was due to aggressively budgeted growth in services revenue that did not eventuate. Membership fees were \$226K underbudget with returning University members paying fees for three quarters rather than the full year.

Interest revenue exceeded budget by \$84K despite revenue targets not being met.

Cash reserves were higher than budgeted throughout the year with network, operational and capital expenditure all lower than anticipated. Management will continue to actively minimise use of cash reserves until long term financial sustainability is more uncertain.

Network expenses

Total network expenses were \$3.14M lower than budget. Savings were obtained from:

- > \$1.06M in international connectivity costs mainly because provisions for burst capacity in the event of an outage were not required.
- > \$1.51M in national network costs driven by savings in third party services, including fibre circuits from lower levels of new services that drive incremental network costs. In addition, provisions for additional core network expenses were unused as costs were well managed without compromising network performance.
- > Depreciation was below budget derived from a capital expenditure underspend.
- > Savings in network personnel costs were due to some roles being vacant for all or part of the year.

Other costs

Overall operating expenses were under budget for the year from cost efficient procurement. Use of external consultants was minimised due to deferment or using internal resource. Legal fees associated with major international supplier contracts were also underspent as variations to existing contracts were negotiated rather than entering into new ones.

Marketing and communications costs were lower than anticipated. There were fewer member engagement events held during the year, impacted by vacancies in the Engagement team.

Personnel costs were under budget from roles budgeted for the full year but vacant for some of the year.

Travel costs were minimised with fewer domestic trips taken during the year and compounded by domestic and international travel restrictions as a result of the COVID-19 pandemic.

Foreign currency gains/(losses)

Most of the realised gains of \$315K materialised on settlement of forward foreign currency trades. There were net unrealised exchange gains of \$39K. Unrealised exchange losses on a USD denominated bank account and reversal of fair value gains on settlement of forward foreign exchange contracts were offset by fair value gains on open forward foreign exchange contracts.

Statement of Financial Position

Actual expenditure for the year was lower than budget impacting cash, investments and property, plant and equipment.

Additional international network costs for capacity and resiliency resulted in current prepaid network expenses and accounts payable variances at balance date. The additional costs were more than offset by savings in other areas.

Receivables and debtors were under budget as aggressive growth in services revenue did not materialise.

Unbudgeted provisions for an onerous lease and restructuring costs also contributed to variances at year end.

Statement of Cash Flows

Operating cash flows

Network revenue cash exceeded budget due to late payment of core membership fees billed in the previous financial year.

While cash from other revenue was below expectations, operational savings from the network and operating expenditure resulted in cash payment savings of \$5.53M to suppliers and employees.

Actual prepaid network expenses were \$394K higher than budgeted because of an additional international network prepayment for increased resiliency that was not budgeted. The payment was fully covered by other operational savings.

Investing cash flows

Minimal investment was required in national network capital expenditure as existing equipment was able to manage capacity increases. Investment in international network equipment was not budgeted as permanent international internet solution costs were not finalised at the time of budgeting. International network equipment was purchased during the year to establish a second PoP in Sydney for resiliency. Part of the underspend in national network expenditure covered this cost.

With savings in operating and capital expenditure, \$5M was available for investment in short term deposits.

24. COVID-19 Impact Statement

A robust business continuity plan enabled REANNZ to provide an essential, uninterrupted service to our members during the level 4 lockdown.

The most significant impact of the lockdown period was evident in our traffic statistics for March to May 2020.

- › International: A steep decline in traffic internationally reflected our members staff and students move from their institutions to working from home. With this, Internet use moved from REANNZ to consumer networks.
- › International NREN (National Research and Education Network): During lockdown, high-bandwidth, high volume transfers continued between our members and international research and education institutions with no decline in transfer quality.
- › National: In contrast to decreased international traffic, our traffic to major domestic consumer networks peaked around four times compared to pre-lockdown volume.

While the financial impact of COVID-19 will continue to be felt well into the next financial year, the main impact for the year ending 30 June 2020 was on operating costs.

The lockdown from March to May 2020 resulted in operational savings in all areas. Rent relief for our Auckland premises and reduced maintenance costs such as power and cleaning led to lower than expected office costs. External consultant costs were minimal as projects were deferred. Planned face to face member engagement events were postponed.

International conferences cancelled due to the COVID-19 pandemic and the inability to travel domestically resulted in a significant underspend in travel expenses for the year. Board travel costs were also reduced as all Board and Committee meetings were held online for a three month period.

Revenue was not affected during the lockdown period. There was no interruption to network or associated services during the lockdown period. No services were cancelled by members as a direct result of COVID-19 during the year.

REANNZ members as at 30 June 2020

Universities



Crown Research Institutes



Institutes of Technology, Polytechnics and Wananga



Research and Education



REANNZ