

## Statement of Intent 2017–21

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REANNZ

THIS STATEMENT OF INTENT IS SUBMITTED BY THE BOARD OF DIRECTORS OF RESEARCH AND EDUCATION ADVANCED NETWORK NEW ZEALAND LIMITED (REANNZ), PURSUANT TO THE CROWN ENTITIES ACT 2004. IT SETS OUT THE STRATEGIC DIRECTION FOR REANNZ FOR THE PERIOD 1 JULY 2017 TO 30 JUNE 2021.



JIM DONOVAN  
CHAIR



ROSS PEAT  
DEPUTY CHAIR

30 JUNE 2017



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# 2017

## Introduction

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Data drives modern economies. While goods, manufacturing and finance were the hallmarks of the global economy in the 20th century, the 21st century is being defined by global flows of data and information.<sup>1</sup> Communities that share and convert data into knowledge will thrive.

REANNZ is New Zealand's Crown-owned, high-performance network solutions provider. We're part of a worldwide network of research and education infrastructure that supports the global flow of data and information between researchers, educators and innovators; connecting them at speed to the tools, people, applications and resources they need to be successful in their fields, wherever they may be.

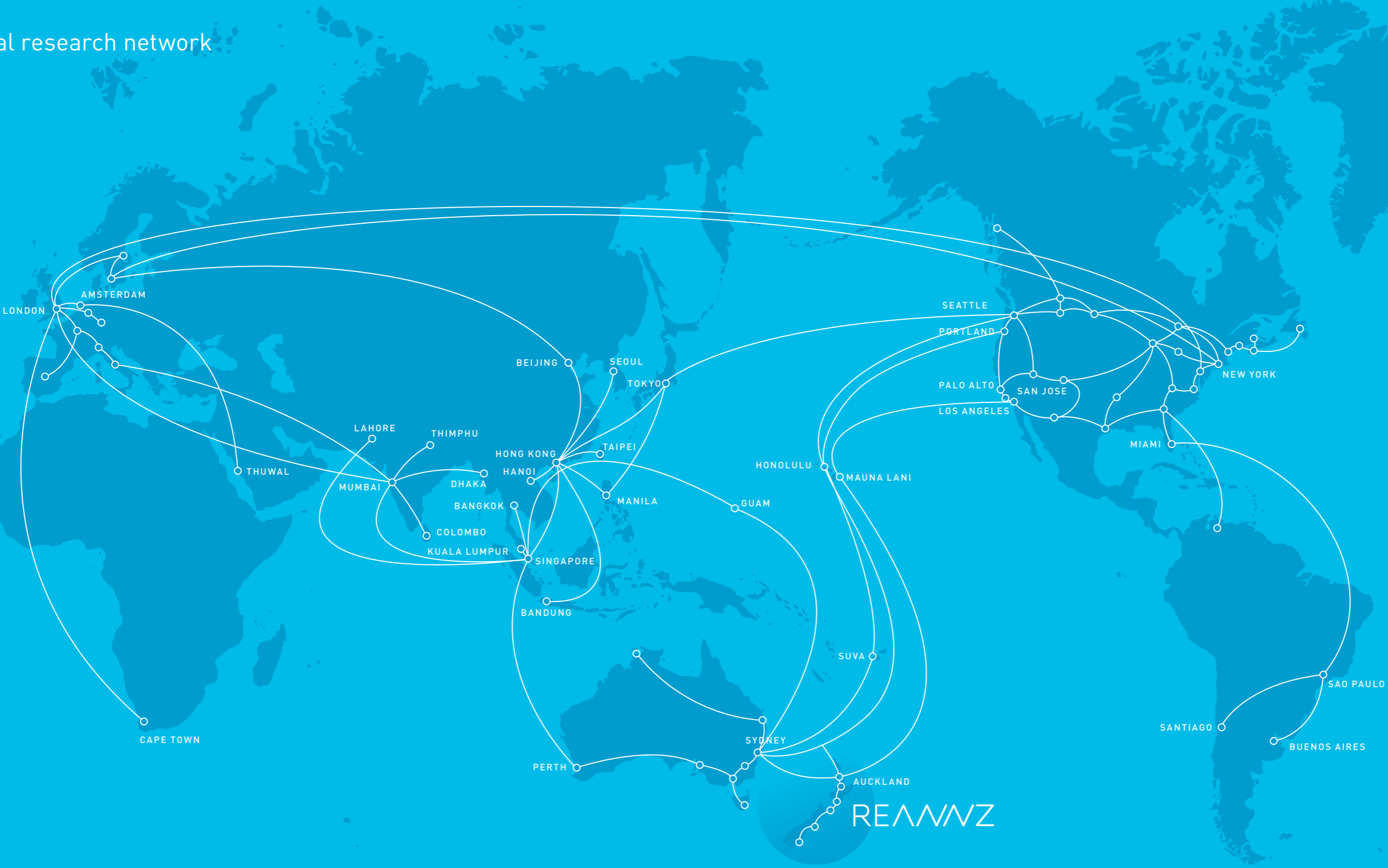
When our people have access to the network infrastructure required to pursue and achieve excellence, this creates a ripple effect, attracting more funding, more talent, greater international collaboration and new breakthroughs. This positive cycle delivers benefits for all New Zealanders through improved educational, social, economic and environmental outcomes.

Access to this infrastructure also provides a platform on which transformational change can take place. It creates opportunities to disrupt the way education is delivered, to revolutionise research methods, to improve scientific outcomes and to increase productivity in unprecedented ways.

A national research and education network (NREN) is essential to the success of a digital nation. High-performance connectivity is a pre-requisite for competition in a world where success requires access to resources on a global scale. New Zealanders need not be constrained by their physical location on the planet. With the local and global infrastructure in place we now need to encourage and inspire New Zealanders to grow their ambitions and to take advantage.

<sup>1</sup> Digital Globalisation: The New Era of Global Flows, McKinsey Global Institute, March 2016

2 Global research network



## 4 About REANNZ

REANNZ is the high-performance network organisation serving the unique needs of New Zealand's research, education and innovation communities.

Our vision is a dynamic, productive and globally interconnected research, education and innovation ecosystem that ensures our nation's prosperity and wellbeing. In the service of that vision, our mission is to allow our members to thrive in a data-intensive and digitally-enhanced world through the provision of tailored technology solutions and high-performance network services.

Our members include New Zealand's Universities, Crown Research Institutes, Wānanga, ITPs (Institutes of Technology and Polytechnics) and other entities in the research, education and innovation community.<sup>2</sup> By supporting these members, our impact extends beyond our members to the collaborative research initiatives in which our members participate. These include the National Science Challenges, Centres of Research Excellence and the collaborations by recipients of Marsden Funds, Health Research Council grants and MBIE contestable funding.

At the heart of REANNZ is our advanced research and education network, which connects members to each other and to their international peers with high-capacity, high-quality broadband, designed to meet the exacting requirements of 21st century science, education and innovation. REANNZ also provides tools that facilitate collaboration between institutions, specialised services that enhance our members' ability to use our network, and products and services that enhance the effectiveness and efficiency of our members' businesses.

Globally, research and education networks are "closed systems". A limited number of participants contribute to and utilise a long-term infrastructure base. The specific needs of this small customer base require us to manage our infrastructure for optimal performance, supporting the high-end requirements of New Zealand's researchers, as well as the needs of teaching, learning and innovation.

Our network is deliberately architected and managed to deliver optimal, high-performance for our users. This means:

- The network backbone is managed to accommodate large and unpredictable bursts in traffic, from the most demanding of scientific applications. As a result, the network is not congested, allowing all users to gain benefits from high-capacity and high-speed network performance;
- We focus on transfer performance; this means managing network equipment to ensure there is no packet loss (which can arise from congestion or poorly configured network equipment), and minimal latency and jitter (the time taken for a packet of data to get from one point to another and the consistency of that experience). This is essential for both transfer speed and for transfer quality (getting everything there fast, and complete);
- Our network is highly-reliable, designed to be resilient and highly-available;
- We are part of a global partnership of over 117 national research and education networks (NRENs) that have the same commitment to high-performance; allowing our users to collaborate with their peers worldwide and ensuring their connectivity experience is seamless from source to destination;
- We work closely with our members to help ensure that high-performance is possible from their front door, by managing their access connections and devices, and tuning them for maximum performance;
- We look to provide tailored services that meet the unique needs of research, education and innovation users and their communities. These are services that are not available, or are cost-prohibitive, in the open market;
- We invest in talent, so we can provide our members with quality advice, expertise and technology leadership.

<sup>2</sup> See [reannz.co.nz/membership](http://reannz.co.nz/membership) for a complete list of our members.

REANNZ  
NETWORK

WEATHERMAP.  
[REANNZ.CO.NZ](http://REANNZ.CO.NZ)  
FOR A LIVE VIEW  
OF THE TRAFFIC  
ACROSS THE  
NETWORK.

HAWAIIKI CABLE  
DUE 2018

## 6 Our operating environment

REANNZ meets the specialist needs of innovation, research and academia, as well as teaching and learning. We partner with our members to deliver solutions that add value by:

- leveraging the investment made in our high-performance network infrastructure;
- developing customised services where there is a unique need with a solution not available in the market;
- procuring third party services where we can add value through aggregated pricing, better terms, interoperability and support;
- creating communal resources that can leverage or create an economy of scale for New Zealand.

REANNZ and our members operate in a very dynamic environment, with change being driven by Government objectives and priorities, the ongoing impact of technology adoption and global competition.

Key influences on our operating environment include:

### Sustainable business model development

REANNZ has been funded through a mix of member fees and Crown contributions from the company's inception. REANNZ has been working with stakeholders to agree a sustainable business model, to ensure our core network services model remains relevant for the future national and international

research, education, internet and enterprise needs of our members and the science and research policy goals of Government.

In June 2017 the Hon Paul Goldsmith, Minister of Science and Innovation, confirmed that REANNZ would receive an investment of up to \$3m a year that is strategic, targeted and science-focused. The investment will focus on the purchase of the specialist services and activities that enable data-intensive research and high-performance science applications, and that are not readily available or cost-effective through other telecommunications service providers. The funding will come out of the Strategic Science Investment Fund (SSIF).

REANNZ will now be working with our membership and stakeholders to identify and agree how our business model and fee structures should be updated, to ensure that the remaining funding required for sustainability can be met. This Statement of Intent may be superseded during the term depending on the outcome of these discussions.

### Strategic Science Investment Fund and Research Infrastructure Policy

The National Statement of Science Investment (NSSI) was released in October 2015, and the associated Strategic Science Investment Fund - Investment Plan (Investment Plan) was released in October 2016. These documents outline Government's policy and investment frameworks as well as key priorities for research infrastructure investment.

The Investment Plan also signals some new priority investment areas including an advanced genomics research capability, a platform that delivers national research capability in big data and analytics and an intention to create a research infrastructure roadmap.

Government science policies also signal the desire for New Zealand to partner and co-invest with other nations to provide access to infrastructure and capability that would otherwise be out of New Zealand's reach.

As a key enabler of access to other research infrastructure and science platforms, it is crucial that REANNZ's role and value are recognised in future policy frameworks, including the infrastructure roadmap.

### Global research and education networks

REANNZ is part of a global partnership of NRENs, who all share their dedicated, high-performance capacity with each other to create a specialised, worldwide data and collaboration platform for research and education.

The most tangible benefit from this partnership is the free transit of New Zealand's traffic from the edge of our network in Sydney or Los Angeles to any other research or education destination on the globe.

Our contribution to the development of a global network architecture framework and associated principles is important for New Zealand's continued access to this global platform. As it continues to evolve, and NRENs form new alliances, REANNZ must retain its seat at the table to ensure that decisions do not disadvantage New Zealand's access, reach or participation in global research and education. We must adapt to and influence changing policy and technology settings in this global community.

### Cloud resources and 'as a service' offerings

Cloud applications and 'as a service' offerings (aaS) have been possible for some time. Our members are now developing and executing on strategies that fully leverage these opportunities.

For New Zealand institutions, the greatest barrier to most cloud application oraaS offerings is access to cost-effective international bandwidth. The global cloud giants locate their data centres in the world's more populous regions, with Sydney being the closest content hub for New Zealand. We see increasing demand for services served out of Sydney by Amazon, Microsoft and Google. These services are both research-focused (such as compute, research data storage, visualisation,

artificial intelligence) and education-focused (education tools and applications) — all of which will continue to drive demand for high-performance international connectivity.

In New Zealand, our members are also leveraging major datacentre andaaS providers. We see increasing volumes of data (both research and institutional in nature) that was previously stored on premise now travelling to-and-fro across the REANNZ network to reach these providers.

Cost-effective access to these providers will be crucial for our members to remain competitive with their international counterparts.

### Member investment in on-campus data capability

Successful use of our national infrastructure requires the capability inside our membership to collect, store and move their data. Data storage capability, constrained network paths from this storage to the REANNZ network, and under developed capability in data transfer tools and applications has created a barrier to the types of work that a high-performance research network enables.

We have seen the benefits that a focus on remedying those issues can bring, with the University of Otago's investment in campus network upgrades, storage and the implementation of a Science DMZ, allowing them to undertake types of research activity, such as the use of offshore genomics facilities, that were previously impossible.

As a result, we've seen significant growth in the traffic patterns from the University of Otago.

Investment in on-campus infrastructure and capability is required in order to achieve the step change needed for modern research and education. As a country we need to continue to drive for this change. REANNZ has a role to play in providing advice to our members, and will also prepare our network for the potential explosion in network traffic that the release of this demand would create.

### Cyber security

There is a growing awareness of cyber security risks throughout our membership, and a growing central Government response to these potential threats.

Government security agencies and the Government's own cyber security programme, including New Zealand's Cyber Security Strategy and the National Plan to address cyber-crime, anticipate legislative reform and increasing levels of support from the Government Communications Security Bureau to Government agencies (including REANNZ members) to manage advanced threats and an increased awareness programme.

As a result of these changes, REANNZ members are likely to take more action and some, especially smaller organisations, are looking for specialist support to help manage cyber risk. REANNZ needs to be remain responsive to these needs, and make the most of opportunities to deliver system-wide support to cyber security initiatives.

### The Internet of Things

The "Internet of Things" is the network of devices, buildings, vehicles and other items that are embedded with sensors that enable the collection and exchange of data.

There is already an explosion of data in this area from things such as:

- health related data from wearable consumer devices such as Fitbits;
- environmental data from home monitoring systems and vehicle computer systems;
- location and tracking data from cell phone use;
- earthquake data from sensor networks;
- city planning and agricultural images and video from drone imaging, and;
- traffic data from location-enabled smartphones and road sensors.

The collection of this data creates huge opportunities for new research and teaching methodologies, using large sample sizes and the ability to

combine multiple datasets to find common themes and draw new insights. The ability to collect, store and analyse multiple datasets as well as adapt and replicate models as more data becomes available will be crucial. There is every reason to expect this explosion of consumer data will have a major impact on research.

REANNZ HAS SET OUT FIVE STRATEGIC OBJECTIVES FOR ACHIEVING OUR VISION.

## 8 Our strategy

### Vision

A dynamic, productive and globally connected research, education and innovation ecosystem for the prosperity of New Zealand.

### Mission

To enable New Zealand's research, education and innovation sectors to thrive in a data-intensive and digitally-enhanced world through the provision of tailored technology solutions and high-performance network services.

### Strategic objectives

#### Tailored services for research and education

REANNZ exists to meet the needs of innovation, research and academia, and teaching and learning. We will continue to partner with our members to deliver solutions that add value to them where we can develop customised services, add value through aggregated pricing, create community resources that leverage our economy of scale or leverage the investment they have already made in our high-performance network infrastructure.

#### A rich and interconnected research and education ecosystem

Increased membership and improved access to major resources increases the value of the network as a whole (the network effect) and helps foster a productive research and education community. Our members can interact more effectively with each other, have access to the tools and resources they need to be successful, and participate in global research and education programmes.

#### Deep understanding of our membership

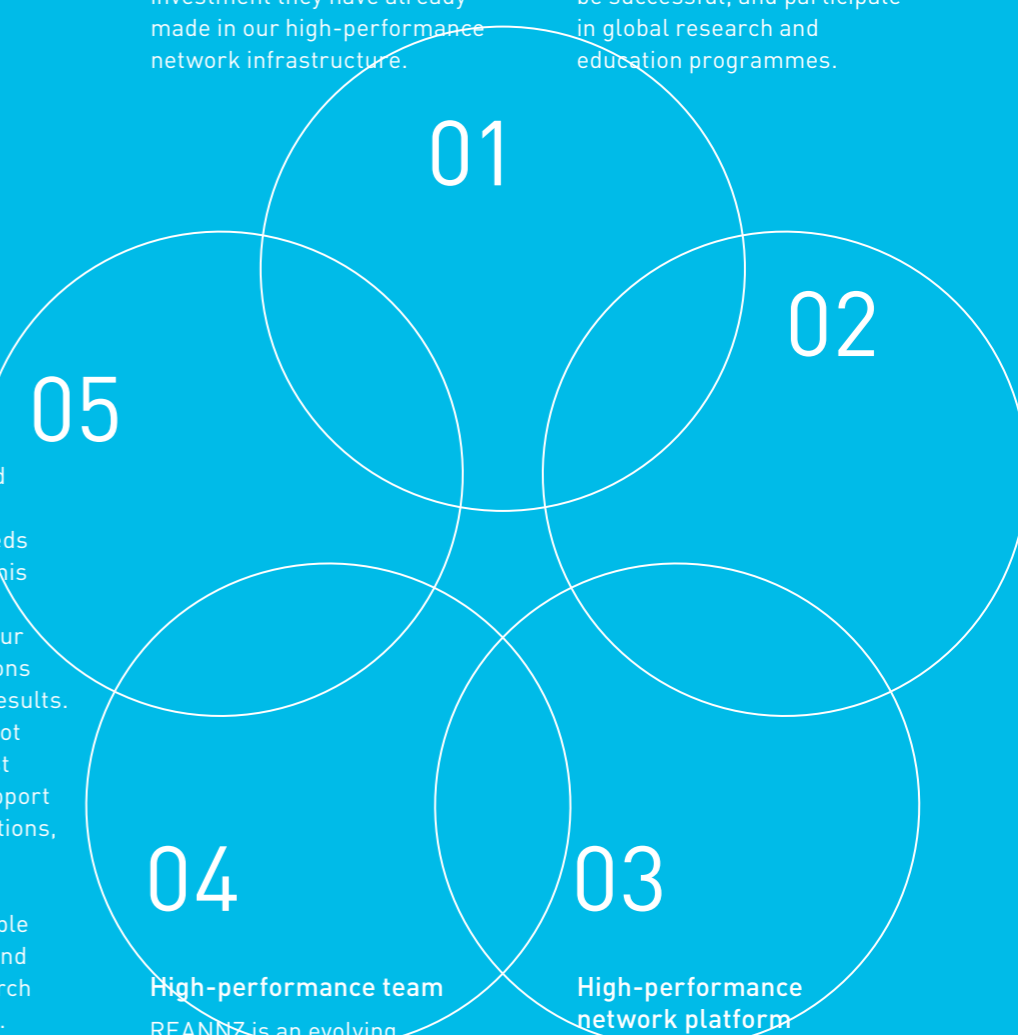
We are a member focused organisation, specialising in meeting the unique needs of our community. To do this effectively, we must have close relationships with our members, to tailor solutions and support for optimal results. Our work delivers value not only through the specialist network services that support users at individual institutions, but also through the communities of practice we foster by bringing people together across sectors and disciplines to solve research and education challenges.

#### High-performance team

REANNZ is an evolving organisation, diversifying our services and continuing to deepen our relationships with our members. An organisation that is high-performing delivers better results for our stakeholders, will innovate more rapidly and will attract and retain the talent needed to be successful.

#### High-performance network platform

Our network platform must remain high-performing — reliable, accurate, uncongested and able to manage the demands of often bursty research and science traffic. Keeping the unique features of the network high-performing requires constant planning, care and maintenance. It also requires REANNZ to remain expert in emerging technology trends, particularly the activities of the global research and education network community of which we are a part.



## 10 Our performance framework

At the highest level, our strategic intention is to contribute to the Government's vision for a growing economy that delivers greater prosperity for all New Zealanders. An essential part of this vision is a "highly dynamic science system that enriches New Zealand, making a more visible, measurable contribution to our productivity and wellbeing through excellent science" (National Statement of Science Investment).

REANNZ contributes to these overall Government aims through the capability we provide to research and education system participants, enabling them to collaborate and undertake data-intensive work that would otherwise be impossible, or highly inefficient.



### Output

The advanced research and education network and supporting services

#### Quality measures

National network availability

> 99.90%

International network availability

> 99.90%

Packet delivery

> 99.99999%

#### Quantity measures

Number of connected sites increase

New service offerings increase

#### Timeliness measures

>80% members consider any issues resolved in a timely manner

#### Cost-effectiveness measures

Membership base is maintained

### Impact

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

#### Impact measures

Total traffic flows increase 30% YoY

> 80% users consider the REANNZ network essential or valuable to their work

Collaboration between science, education and innovation is enhanced

#### Impact measures

Total international traffic volumes increase 30% YoY

National traffic volumes increase 30% YoY

Users have access to services, content and tools they need

#### Impact measures

Subscriptions to services increase

### Outcomes

#### Sector outcomes

Grow the New Zealand economy to deliver greater prosperity and opportunity for all New Zealanders

#### REANNZ outcomes

A dynamic, productive and globally connected research, education and innovation ecosystem for the prosperity of New Zealand

#### Outcome measures

Maintain position in top 500 Universities per GDP in the OECD Science, Technology & Industry Outlook

New Zealand maintains its ranking for "university-industry collaboration in R&D" in the WEF global competitiveness index

Maintain New Zealand ranking for "capacity for innovation" in the WEF global competitiveness index

## Organisational health and capability

11

### Structure

REANNZ is governed by a Board of Directors, appointed by its shareholding Ministers following agreement by Cabinet. REANNZ currently has five appointed directors.

The Board appoints the Chief Executive, who is responsible for the day-to-day operations of REANNZ.

The engineering team is responsible for the day-to-day operational management of the REANNZ network, service delivery, implementation and technical support for services, management of network supply contracts, network security and supporting members end-to-end network performance and technology roadmaps, standards and planning.

The engagement team is responsible for catalysing a network-enabled community of researchers, educators and innovative institutions in New Zealand with the capabilities to take full advantage of the opportunities advanced network connectivity provides. They are focused on engaging with our members to identify ways in which REANNZ can help members perform their work more effectively.

Our product team is responsible for product development and management, ensuring all REANNZ's products are capable of supporting the unique needs of our members and can keep ahead of their demand.

The software and systems team is responsible for maintaining and developing the infrastructure that provides visibility of the network for internal and external stakeholders, and the platforms that help ensure our business is well managed and efficient.

The corporate and finance team provides financial, legal, HR, communications and marketing, administrative, and commercial support to ensure our staff and the company can operate effectively and professionally.

THIS DIAGRAM SHOWS OUR OUTPUTS, IMPACTS AND OUTCOMES, ALONGSIDE THE PERFORMANCE INDICATORS THAT HELP US TO UNDERSTAND HOW WE ARE WORKING TOWARD THEM.

## 12 Capability

### Our people

As a small organisation, REANNZ is heavily dependent upon its human resources. The highly-specialised nature of REANNZ's work means these resources are scarce.

#### Leadership, accountability and culture

REANNZ has a small and dynamic team, with fewer than 30 staff. Our culture is built upon our platinum rule: 'treat others as they would like to be treated'. We encourage all staff to lead by example, supporting others to behave in a way that is consistent with our culture and the values that we believe are crucial to our success. These values include putting the community first, integrity, responsiveness, taking action, personal responsibility and continual innovation.

#### 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 give a short presentation to REANNZ staff, allowing all staff to participate in the recruitment process and have a say in the appointment of their 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

We are committed to ensuring we attract, retain and motivate high-performing people. We continue 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. We offer flexible working hours by agreement and invest in the right tools and systems to make work easier from any location.

#### Harassment and bullying prevention

REANNZ has a published policy on harassment and bullying and 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 offers a flexible working environment where staff are able to manage their work responsibilities around other personal commitments.

### Our assets

Our major asset is our network. We have asset management plans, accompanied by technology roadmaps and future demand assessments that outline our approach to ensuring we maximise the value of our investments. Proactive network maintenance and monitoring programmes ensure that we manage the qualities and features of our network services.

Part of maintaining our network is regularly refreshing our network hardware and software as it nears the end of its useful life. Over the next four years REANNZ will be investing in new international capacity, and we expect to upgrade our national network capacity regularly to support continuing growth in use.

We expect significant capital investment will be required in our national network around 2022/23, when our current national network infrastructure agreement expires, and our optical networking assets reach the end of their expected useful life.

