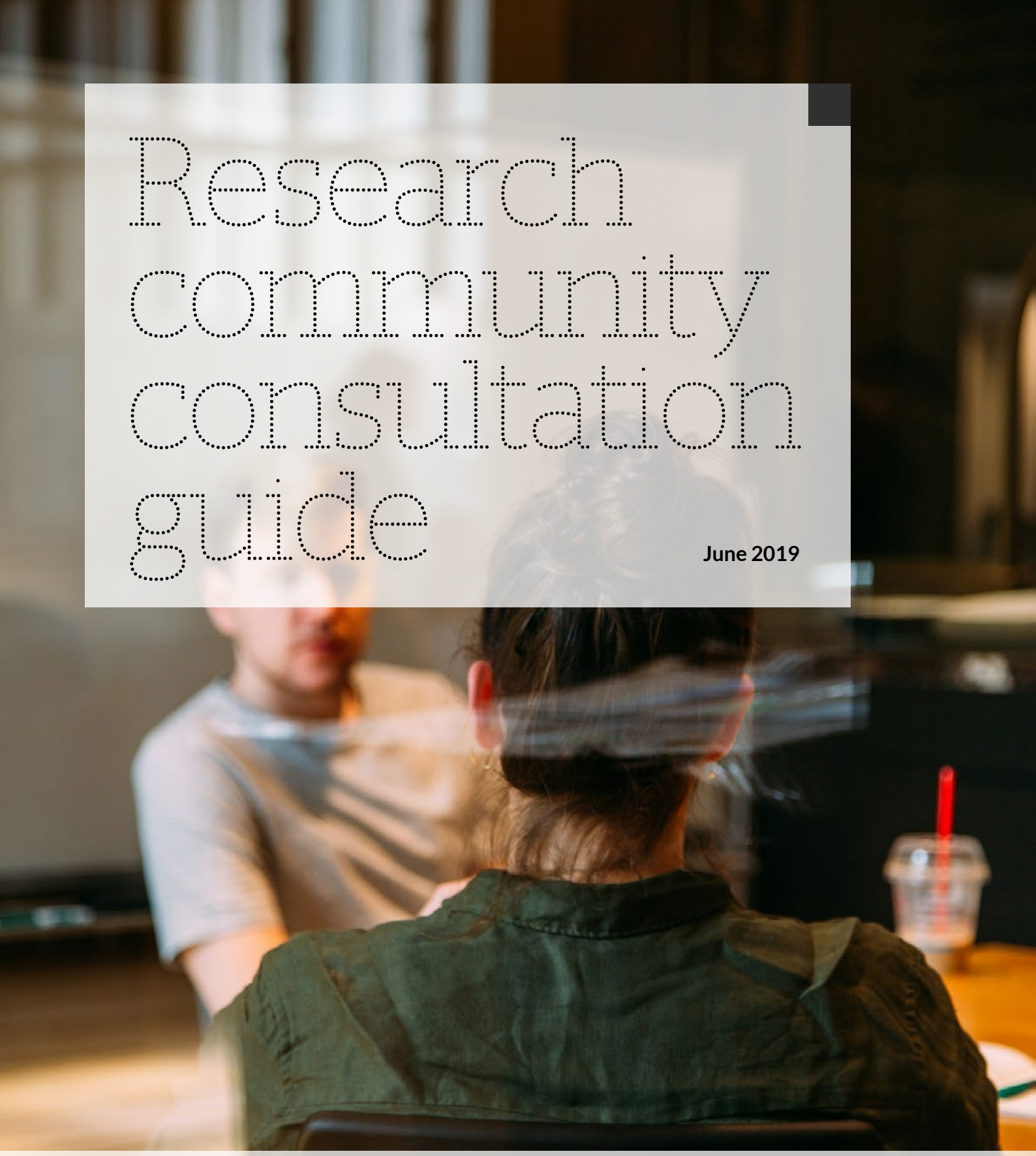

Research community consultation guide

June 2019

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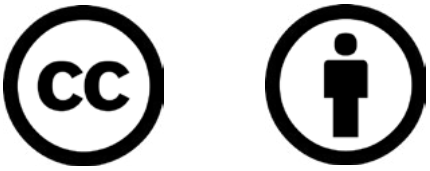

Overview

This document offers guidance on carrying out a research community consultation. It is based on consultation activities New Zealand eScience Infrastructure (NeSI) conducted in 2018. These consultations were typically 1 hour long interviews with individual research leaders in New Zealand, documenting their thoughts on advanced research computing drivers and needs in 5 to 7 years time.

A total of 27 interviews were completed with the findings informing NeSI's future strategies.

From the same source materials, NeSI is producing additional outputs to share key insights from the consultation with the New Zealand research sector.

Process

The consultation process is outlined at a high level and then in detail:

1. High level view - a high level view of the steps carried out within the consultation
2. Detailed guide - a detailed look at each step, highlighting tips and learnings

High level view

1 Identify the goals

- NeSI's primary goal was to understand research communities' future needs and the opportunities in advanced research computing within those communities in 5 to 7 years time
- Additionally, NeSI wanted to build relationships with research leaders in the New Zealand research sector

2 Compose a questionnaire

- Background research was conducted to review similar consultations led by other organisations and institutions
- A questionnaire was formed around 6 main topics
- Trial runs were done to refine the questions to fit the 1 hour length of the interview

3 Prepare background materials

- The following materials were assembled so that the researchers could prepare for their interview:
    - An introduction and summary of the consultation objectives
    - An overview of NeSI usage metrics and projects for various science disciplines, to set some context
    - A set of questions that will be asked in the 1 hour interview

4 Identify interviewees

- Ideal participants for this consultation were research leaders in New Zealand whose research field is relevant to advanced research computing
- NeSI identified representatives from science disciplines, institutions, CoREs, and NSCs, with whom NeSI had an existing strong relationship
- Recommendations were also provided by NeSI's Research Reference Group

5 Build a consultation pipeline

- A document was created to guide the process internally and track interviewees' progress through the consultation process
- The stages of this pipeline were refined as consultations progressed

6 Schedule interviews

- An e-mail was drafted to use as a template for all interview requests. It included a description of the consultation's objectives and attached the background materials mentioned above
- In addition to e-mails, NeSI requested interviews by calling researchers on the phone or by visiting their offices if they were located nearby

7 Interview

- Interviews were done in-person for many of the researchers who were based at the University of Auckland
- Zoom videoconferencing was used for other interviews
- A minimum of two people attended each interview; one to conduct the interview, and the other to take notes on the researchers' answers and feedback

8 Summarise

- After each interview, a summary was written based on the notes taken during the interview
- Individual summaries were combined and distilled into common patterns and topics

9 Share the findings

- NeSI conducted a followup process with the interviewees to share their feedback and insights as public 'thought pieces'
- The summarised results were used to inform NeSI's future strategies and identify methods for continued engagement with research communities
- The knowledge gathered can be further analysed and iterated upon for both internal use and sharing back to the broader research community

Detailed guide

1 Identify the goals

NeSI's consultation process was driven by the need to understand how the landscape of advanced research computing in New Zealand will change in the next 5 to 7 years. The high level goal was focused on understanding research communities' future needs and the opportunities in advanced research computing within those communities in 5 to 7 years time. As a first step in the process, NeSI defined the ideal outputs from the consultation activities.

What does a good output look like?

A good output would provide:

- a scan of advanced research computing needs across New Zealand's research communities, such as:
    - where data is increasing rapidly and where the need to analyse and compute data is increasing
    - where the skill gaps exist and how they relate to meeting a research community's needs
    - where the research community could benefit from community connections and support
    - how New Zealand research communities fare compared to equivalent international communities
- an overview of the different characteristics of research communities and what services and support are required to meet each community's needs
- an overview of the above findings mapped to NeSI's current service and support offerings and the priorities of the Ministry of Business, Innovation and Education (MBIE), in order to identify next steps

The consultation exercise should also result in:

- enhanced relationships and ongoing engagement between NeSI and New Zealand's research communities
- findings around research needs around topics and ideas that we were not anticipating, if any
- growth in awareness of advanced research computing benefits and needs for the research communities consulted
- understanding of how the New Zealand research ecosystem can flourish beyond the scope of NeSI

NeSI chose to use this process as a starting point for future and continuous consultation and engagement between NeSI and New Zealand's researchers. This approach meant that NeSI did not need to try and address in the short-term everything identified as challenges or opportunities. Instead, NeSI could focus on finding answers to the key questions within the specified scope at this time.

2 Compose a questionnaire

To build a clearer picture of future demand scenarios, NeSI referenced several international initiatives which adopted a similar consultation approach. Many of the other initiatives were focused on understanding shorter time frame needs and leaned towards clarifying technical requirements directly, rather than understanding the drivers (the why questions). Looking at these other initiatives helped NeSI identify some of the common topics being addressed around the world, and common languages that were used to express them.

Other studies

Compute Canada

Compute Canada have run two white papers initiatives across their research communities: https://www.computecanada.ca/research-portal/sparc2/list-of-community-white-papers/

At a high level, the solicitation asks the research communities to address the following key questions:

- What kinds of problems are you trying to solve?
- What kind of advanced research computing infrastructure is best suited to solve these problems today?
- What quantities and types of infrastructure would be needed to meet the needs of your community?

An example template is provided, which covers the following key areas:

- Current use of advanced research computing
- Future growth
- Technical details
    - Data
    - Computation
    - Software
    - Networking

WestGrid 2016 User Survey

https://www.westgrid.ca/files/WestGridUserSurveyResultsReport-Summary.pdf

WestGrid 2017 User Survey

https://www.westgrid.ca/westgrid_news/westgrid_user_survey_2017_results (included a question that asked about researchers' resource needs over the next five years)

NERSC

NERSC have run two high performance computing (HPC) requirements review processes via invitational workshops and case studies: http://www.nersc.gov/science/hpc-requirements-reviews/overview/

(continued...)

In particular, the NERSC case studies answer the following questions:

- What are the scientific objectives today and over the next 3 to 5 years?
- What process is being modeled by computation or what analysis is being performed?
- What are the computational methods of solution?
- What are the important parameters of the computational model?
- What computational algorithms and applications are important today? How will this change over the next 3 to 5 years?
- How is the computational size of the problem characterised? How will this change in the next 5 years?
- How is parallelism expressed and what limitations to increased parallelism exist?
- What are the principal computational limitations to accomplishing scientific goals today? What are the expectations over the next 3 to 5 years?
- What software and services are important to you today and will this change over the next 3 to 5 years? Are there new or additional software and services that will be needed?
- What aspects of HPC most affect your scientific productivity?

NERSC HPC Requirements Review 2017: http://www.nersc.gov/science/hpc-requirements-reviews/nersc-hpc-requirements-reviews-target-2017/

Nordic eScience Action Plan

https://www.nordforsk.org/en/news/new-plan-for-future-escience-and-einfrastructure-initiatives

A questionnaire was formed based on the goals NeSI identified and looking at what other institutions have done.

The questionnaire focused on each research community's needs for advanced research computing in 5 to 7 years' time, covering the following topics:

- **Research context and drivers**
- **Research priorities**
- **Collaboration**
- **Research capabilities**
- **Adoption of advanced research computing**
- **Support for development of key capabilities**

The full interview script is shown below:

Interview script

What is NeSI?

NeSI is an organisation dedicated to raising computing capability of researchers in NZ. We achieve this by providing a national advanced computing platform, along with related training, consultancy, and data transfer services. We are currently building our business case for our next contract phase, which we're seeking to inform through a series of interviews focusing in on the future needs of key research disciplines across New Zealand.

The scope of the interview

We are investigating what directions our NZ advanced computing platforms and environments might change and evolve across the next 5-7 years, to encourage our sector to engage in more courageous research of higher quality and relevance. Based on the research questions you might consider across that 5-7 year horizon, we want to understand the sorts of challenges you might face in harnessing the power of advanced computing and data, including new skills and capabilities your communities might need, and any change in culture essential to your success. We seek to identify what we should work on, either by developing our own capabilities and services, or through working closer together, to power-up your research.

We would like you to think of this consultation exercise as an opportunity to stop and think about what you would want to achieve in 5-7 years as a community, instead of short term problems.

Questions

Research addresses a broad range of challenges, from investigator-led research into the frontiers of knowledge, through mission-led and applied research focusing on future and current specific needs. In some cases these challenges are linked to global challenges, in some cases they are specific to our situation in New Zealand.

We would like to kick off this interview by asking you to think about how your research community will be working in 5 to 7 years' time.

Research context and drivers

What is your field of research?

Please describe the global and local context for your communities' research over the next 5-7 years. Are there any linkages you see might emerge over that time, which might have a significant influence on our progress as a nation? What are the main drivers that shape the types of research being done? (industry drivers, government support, new product development, theoretical)

Research Priorities

In a broad sense, can you describe the research priorities you and your colleagues will be working on in 5-7 years? What do you see will be the fundamental differences in the types, complexities, and scales of research problems your community will be working on in 5-7 years?

Collaboration

How much collaboration would be needed in your community both internationally and in NZ, in order to achieve your community goals in 5-7 years?

Also, what sorts of cross discipline collaboration would be needed in 5-7 years to address the problems you want to solve?

Research capabilities

We are interested to understand whether researchers in your communities will be well-positioned to solve the problems they want to solve. Does the community have a clear direction for developing its capabilities, and either way which capabilities will be essential to meet these medium to longer term needs?

Adoption of advanced research computing

We're looking to understand the relevance and importance of advanced research computing to your community in the future. In 5-7 years how prevalent do you see computational skills as being across your communities?

On that same time frame, can you foresee any other advanced digital research skills and methods which will be fundamental to achieving quality and impact in your research areas?

Support for development of key capabilities

Looking at the areas of opportunity and challenges to be faced within your research communities over the coming 5-7 years, and without placing limits on what might be possible, what are the additional or different advanced digital research capabilities NeSI might help your community with?

Tips

- Trial runs were used to refine questions and to rehearse the timing of the conversation to ensure it fit into the 1 hour length of the interview. Multiple full trial runs are recommended to refine the questionnaire, to practice taking notes, and to gain experience adapting to the varied style and pace of the different interviewees.
- After running internal trials within NeSI, a few pilot interviews were conducted with New Zealand members of NeSI's Research Reference Group. NeSI's Research Reference Group is made up of eight research community leaders with strong technical knowledge of the impact of advanced research computing as an enabler to research. As leaders of their own research communities, it was invaluable to include their voices as part of this consultation.

3 Prepare background materials

The following materials were assembled so that the researchers could prepare for their interview:

- An introduction and summary of the consultation objectives - *see the interview script above*
- An overview of NeSI usage metrics and projects for various science disciplines, to set some context
- An interview script - *see the interview script above*

Tips

- Initially, NeSI tried to generate detailed usage metrics and NeSI project information for all relevant disciplines and institutions contacted, however it quickly became apparent that this level of detail was not scalable and didn't provide much by way of insight to guide each interview. Instead, NeSI provided researchers with a simple high level summary of this information. It was much more important to reach out to all potential interview candidates as early as possible, and coordinating the interview scheduling and logistics required a significant amount of effort.

4 Identify interviewees

NeSI had existing relationships with some of the target research communities, established through connections to its Research Reference Group, Board of Directors, existing users, or from past training and engagement activities.

Representatives were selected from science disciplines, institutions, Centres of Research Excellence (CoREs), and National Science Challenges (NSCs) with whom NeSI had existing strong relationships. NeSI's Research Reference Group and Board of Directors also provided guidance on which research leaders should be approached.

NeSI created a table of potential interviewees, which helped identify the various research disciplines and institutions to include in the consultation. Below is an example of the table:

Table of community representatives

National Research Collaboration	Research Disciplines	Type	Priority	Proposed	Notes	Alternative	Key NeSI users in the community
Institution, CoRE, or NSC	*Science discipline*			*Research leaders we have reached out to initially*		*Alternative options based on relationship and recommendations*	*List of top 5 NeSI users in the Research Discipline / National Research Collaboration* ** Researcher A* ** B* ** ...*
	Astronomy	Research Discipline		Prof. A B		...	...
	Biology	Research Discipline	1	Dr C D Dr E F	Dr C and Dr E are members of an Advisory Group	Prof. K L	...
	Social Science	CoRE	1	Prof. G H	...	...	...
	Medical Health	Institution	1	Prof. I J	...		

Tips

- When compiling its interviewee list, NeSI aimed to take advantage of existing relationships and to seek expert opinions. The original list of researchers contained some gaps around certain disciplines and institutions, however, through its interview process with those preliminary contacts, NeSI acquired recommendations of other researchers who could fill those gaps. This was a helpful way to leverage existing relationships to provide connections across a broad range of research areas and expertise.

5 Build a consultation pipeline

Initially the above table of community representatives was used to track the status of the interviews. As consultations progressed, it became clear that multiple stages of communication were required to complete an interview. As a result, a consultation pipeline was built, which initially followed the steps listed below:

1. Contact the researcher
2. Schedule an interview
3. Interview the researcher
4. Summarise the interview
5. Verify the summary with the researcher, and get their permission to use the summary in public

A table was created and regularly updated to track the interviewees' status within the consultation pipeline. The stages of this pipeline were refined as consultations progressed. The table below shows a sample pipeline:

Consultation pipeline

#	Interviewee	Approached	Booked	Interviewed	Thought piece requested	Drafted	Received
1	Assoc. Prof. J	e-mailed	yes	yes	yes	yes	
...	...						
7	Dr J C ...	e-mailed, approached in person	12 noon 24th July via Zoom	yes	yes		
...	...						
29	Prof. A B ...	e-mailed 3 times	declined				

6 Schedule interviews

Interview candidates were initially contacted via email. This email provided the pre-interview materials noted in Step 3 of this document (introduction, objectives, context, interview questions, etc.), and outlined the time commitment and action required from the researcher. A sample email is below:

Sample e-mail

Hi *Name*,

My name is Jun from NeSI.

We are carrying out consultations with research communities to put together a document that describes researcher needs in NZ for the future. We would like to interview you as a research leader in your field.

We would like you to think about where your research communities aspire to be in 5-7 years, especially their opportunities and challenges at that future time, in relation to advanced digital capabilities. Understanding your future community needs will guide the direction of NeSI and position us to best help NZ's researchers. The output will be made public, and will be useful beyond the scope of NeSI, to help provide a shared vision of how the researchers view the future.

Could you suggest some days and times which might suit, and we'll do our best to make it work. The interview will take 1 hour over Zoom (or your preferred video conference technology), and will be joined by Nooriyah Lohani, our research communities adviser. ... *Some additional schedule related information ....*

You will find in the attachment the questionnaire we will be going through, along with some background data on NeSI usage.

Your input will be invaluable in building our knowledge of the community, and will provide a backbone to our ongoing relationship with the researchers.

Sincerely,

Jun Huh
NeSI

Tips

- If researchers did not respond to the initial email, a NeSI team member would call the researcher to try and schedule an interview. If no response was received through those two attempts, NeSI sourced an alternative researcher to interview instead. NeSI refrained from sending too many e-mails or calling too often, to try and be respectful of researchers' busy schedules.
- In Auckland, NeSI team members scheduled some interviews by visiting researchers during their office hours. These in-person interactions had much higher success rate than e-mails or phone calls.

7 Interview

Interviews were conducted using the interview script shown in Step 2 of The Detailed Guide. Initial interviews with researchers were conducted by and with NeSI senior team members in order to refine the interview process and provide the interviewers with reference points to customise and tailor the interview depending on the community and context encountered.

The interviews were done mostly via Zoom videoconference. There were a few exceptions where NeSI team members were able to visit the interviewees in person. The interview set up was done so that one interviewer would ask all of the questions while the other took notes. The interviewers took turns conducting the interviews and taking notes.

Tips

- Each individual interviewed had a unique style and different levels of engagement were required to get answers to the consultation questions. It was helpful to try and predict the interviewee's personality in advance and adjust the interview style accordingly.
- If an interviewee provided a very short answer, additional insights were gained by asking open-ended questions, such as "Why..?" and "How..?"
- During the interviews, it is important to clarify that the summary will be shared publicly.
- In some cases, it was tricky to keep the conversation in the '5 to 7 years in the future' context and the interviewee needed to be reminded of the context and scope of the consultation when the conversation shifted away from it.
- Showing and having genuine interest in the topic being discussed made the interviews more insightful and engaging for all parties.

8 Summarise

Notes were recorded during the interview in bullet-points. Based on these notes, interviews were summarised individually, and then returned to the interviewees for approval and confirmation that NeSI captured their thoughts accurately.

Tips

- Summarising the interviews can be time consuming. It is important to complete this step soon after the interview. In some cases, the summaries were not completed quickly enough and this required the interviewers to revisit many of the processes.
- Quotable statements are very powerful when conveying findings from the interviews. Capturing a couple of quotes that were representative of the interviewee's core values or vision provided valuable content for the summary reports.

9 Share the findings

NeSI compiled the summaries into a single slide set for internal use. The slides showed key findings from the 27 interviews, categorised into 4 topic areas. The slides were shared with NeSI's Board of Directors and used to inform NeSI's future strategies.

NeSI shared its findings publicly via 'thought pieces' based the interviews. They are conversational in tone, but retain the interview format structure. As they are completed, the thought pieces are posted on the NeSI website at https://www.nesi.org.nz/about-us/nesi-strategy/staying-connected-future-new-zealands-digital-research

This community consultation process has provided NeSI with many insights, providing the opportunity to take this work further and in many other interesting directions. Examples of future activities include:

- Interviewing more researchers and research communities
- Conducting follow-up interviews, surveys, or other types of engagement with researchers
- Build ongoing relationships with leading researchers and research communities
- Expanding the breadth of domains and institutions consulted
- Diving deeper into specific topics that NeSI wants to understand further
- Using surveys to gather more quantitative results

Summary

NeSI's 2018 community consultation was a pioneering activity for building relationships with New Zealand's research leaders and research communities. Stakeholders were very interested and supportive of bringing light to the research communities' understanding of future opportunities and needs around advanced research computing. The consultation findings also provided key insights for NeSI's future strategies and identified areas of challenges and opportunities to add to NeSI's roadmap over the next 3 to 5 years.

Ultimately, NeSI plans to evolve elements of this consultation process into a regular routine, so that it can continue to strengthen NeSI's relationship with research communities and evolve NeSI's capabilities within the New Zealand research ecosystem.

www.nesi.org.nz