

Introduction

NCI is Australia's national facility dedicated to supporting the high-performance computing and data (HPCD) research needs of Australia's researchers. We provide an extraordinary range of high-performance computational capabilities for Australian research—combining state-of-the-art supercomputing and pre-exascale data infrastructures with a nationally unique critical mass of skills and expertise.

NCI's **core value proposition** is that as a national facility—constructed by pooling resources from government, government agencies, and universities— we can deliver superior performance and integrate our services to enable capabilities that would otherwise not be possible. Our value proposition hinges on three key components:

- By developing a collaborative national HPCD solution across many application domains and leveraging government investments, Australia can **increase the capability available to all research domains** and accelerate innovation with consequent growth of Australia's economy and high-tech job market.
- **Economies of scale** to build national capability. NCI delivers HPCD solutions for national research, government, health and technology sectors that would—if separately addressed— cost more and deliver less than a national solution.
- In the current geopolitical and commercial-political contexts, there are genuine imperatives to have nationally significant, **sovereign data and computing capabilities** managed efficiently and securely on national platforms.

Preparing NCI and Australia for the future

NCI's 2021 business strategy aimed to ensure that Australia has a globally competitive HPC and HPCD capability that empowers Australian researchers to produce more high-impact discoveries and innovations.

NCI's business model has been proven by our success as a stable, long-term collaboration. Together with judicious forward planning, NCI efficiently operates and manages an inherently capital-intensive facility that continues to evolve with the rapidly changing technologies that researchers need. NCI continues to deliver on its Strategic Plan through developing more predictable revenue streams and seeking longer-term funding arrangements as part of its proactive business development and diversification of the research communities we support.

Technology at scale is increasing the complexity of what needs to be delivered to the research community. Our delivery models are therefore focused on combining high performance and cloud computing, massive datasets, fast file systems, collaborative services and training in order to deliver the complex range of infrastructure and services that researcher need. To achieve this, NCI is partnering with appropriate external organisations to guide and lead the sector, and work cooperatively to enhance our collective services.

NCI's user community is growing, both in number and in diversity of research domains. New disciplines such as health and genomics are moving towards the HPCD realm with different usage profiles. The modes of utilisation are also changing for disciplines with a long history of HPC use. Larger national datasets, advanced analytics, high-throughput computing and data processing at extreme scales all present unprecedented opportunities for insight—the race is now to derive national impact from the opportunities. In response to these changes, NCI is supporting growth in existing computational research strengths in Australia, while working to accommodate new disciplines. By carrying out community consultations and needs analyses, NCI continues to adapt its services to enable and empower new research domains alongside more traditional user communities. Importantly, this is being achieved without compromising NCI's commitment to and engagement with our established major collaborators, ensuring that the benefits of new services are available to all researchers.

Business Priorities for 2021

To deliver on our strategy, NCI must provide outstanding service, build in greater workforce resilience, and evolve our sustainable business and service delivery model. Our five business priorities for 2021 are to:

- Provide robust, responsive services
- Build personnel depth for enhanced resiliency
- Expand Cloud development and implementation
- Improving our training, education and outreach
- Review our business model to enhance future business development

Prioritised Actions for 2021

Provide robust, responsive services

Demand for NCI's data services is growing continually. To continue our excellent service availability levels, we must continue to invest in the underpinning infrastructure. The focus for 2021 has been on data storage and services.

- Storage refresh—NCI is expanding our high-performance filesystems again in 2021 through the replacement and expansion of an older filesystem and addition of a new major filesystem.
- We continue to support national research datasets and services, as they are strategically significant national assets that must be made both readily available and relevant to researchers. NCI has begun a process for upscaling of power supply and backup resiliency for its data centre.

Build personnel depth for enhanced resiliency

NCI's strength is in our expert staff. To be resilient in a competitive labour market, we must increase the depth of our teams and examine how to position the organisation for growth and improved research support.

- Additional staff – in 2021 NCI is seeking six additional staff to grow our core teams and expand the support we can provide to researchers, as well as recruiting five new mid-level management Associate Directors and one new senior level Deputy Director, who will join Allan Williams and Dr Ben Evans at the Deputy Director level.
- Realignment of teams – NCI is modifying team arrangements as necessary to improve structural alignment with key activities and deliverables.

Expand Cloud development and implementation

NCI's users are demanding new modes of service, which requires a significant intensification of effort on Cloud implementation.

- NCI is implementing an Open OnDemand service to provide a simplified interface, with new platform capabilities that will robustly enable and enhance access to our HPC and data capabilities for researchers. Our Cloud is a critical supporting capability that provides an interface to our HPC and data services, as opposed to the IaaS clouds offered by commercial providers.
- Development and implementation of digital environments and services focuses on uplift of targeted communities, including Climate and Weather, Geophysics, Geospatial, Optical Astronomy, and Genomics (for example, a new Galaxy Pulsar node in collaboration with the Australian BioCommons).

Improved training, skills uplift and outreach

In response to user feedback, NCI is expanding our training options through improved outreach to research communities.

- User community survey – NCI has run our biennial user satisfaction survey to help identify areas for improvement and glean insights into our communities' training needs
- Developing and expanding NCI training and documentation. NCI has undertaken consultations with our user community to inform development and progressive implementation of a revised and extended training program, to help researchers enhance their use of NCI systems, increase speed of innovation and reduce time to discovery.
- NCI is delivering a comprehensive suite of entry level HPCD skills uplift courses to our user cohort starting in Q4 of 2021 in partnership with Intersect Australia.
- NCI is providing logistical and HPC support for a major collaborative graduate education initiative from our computational materials science user community, running in Q3&Q4 of 2021 for a national cohort of PhD students and ECRs.

Business development and business model review

NCI is increasing engagement and expanding the range and depth of service delivery to our established user communities, while also exploring potential new business models.

- NCI continues to integrate Cloud, HPC and storage services under a common business framework, and implement automated accounting and reporting for resource allocation to support users to balance their use of HPC, data analytics and services, and storage to optimise outcomes for their projects.
- Business development—NCI is increasing business development activity and boosting our ability to analyse business intelligence for the benefit of our user communities.
- National genomics infrastructure—NCI is examining the potential for upscaling our service capabilities to address a growing national need for genomics data and analysis capabilities, as well as the benefits that upscaling could offer existing user communities.

2022 and Beyond

NCI continues to innovate and develop the services that Australian researchers need to be internationally competitive. NCI continually seeks new ways to support Australian researchers and therefore welcomes the opportunity to engage and discuss with individual researchers or their communities of practice to support their ambition, innovation in meeting their emerging needs.