Technology

Bringing a big boost to Australia's supercomputing power

National Computational Infrastructure

Australia's premier high-performance computing facility turns to Lenovo ThinkSystem servers, powered by 3rd and 4th Gen Intel® Xeon® Scalable processors, to bring researchers a 7x performance increase.

Powered by

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Who is the National Computational Infrastructure?

The National Computational Infrastructure (NCI) is Australia's leading high-performance data, storage and computing organization, providing expert services to benefit all domains of science, government, and industry.

NCI counts the Bureau of Meteorology, CSIRO, Geoscience Australia, the Australian National University and the University of New South Wales among its main collaborators. The organization also has agreements with dozens of Australian universities, ARC Centres of Excellence, and medical research groups, covering the full spectrum of scientific disciplines.

NCI AUSTRALIA

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The Challenge

More than 6,000 users across Australia rely on NCI's high-performance computing (HPC) and data services. Its facilities support research in diverse fields, helping scientists to model climate change, predict and manage natural disasters, advance cancer treatments and research, and probe the deepest mysteries of the universe.

To keep advancing this critical research, NCI is always striving to enhance its HPC capabilities. With the organization's existing supercomputing cluster in high demand and researchers' need for HPC resources continuing to grow, NCI found itself in search of more compute power, memory, and storage. The time had come to put new supercomputing technologies in place.

“The fast pace of scientific research means that demand for computing resources continually outstrips what we can provide. That was especially true with our previous supercomputer. Since first deploying it in 2012, we had pushed the system to the limits of its performance and capacity. Our 2019 upgrade was long overdue and brought major improvements to the research community.”

Allan Williams
Deputy Director (Innovative Compute Environments),
National Computational Infrastructure

A long-awaited upgrade

Working with a constellation of partners, including Lenovo and Fujitsu as key hardware providers, NCI officially launched its all-new supercomputer in November 2019: Gadi. Its name means “to search for” in the language of the Ngunnawal people, the traditional owners of the Canberra region.

Housed at The Australian National University in Canberra and operated by NCI, Gadi was a major step forward in research computing power. The system contains more than 250,000 CPU cores, 930 TB of memory, and 640 GPUs.

Hardware

Lenovo ThinkSystem SD650 V2 with 3rd Gen Intel® Xeon® Scalable processors
Lenovo ThinkSystem SD650 V3 with 4th Gen Intel® Xeon® Scalable processors
Lenovo Neptune® Direct Water Cooling
Mellanox HDR InfiniBand

Software

Rocky Linux 8

Services

Lenovo Premier Support

Cool solution

Gadi takes advantage of Lenovo Neptune® Direct Water Cooling (DWC) technology, which provides the ultimate in data center cooling efficiency and performance. With Neptune DWC, NCI was able to deploy an extremely dense HPC system that requires no cold-water chillers—saving floorspace, energy, and costs.

NCI continues to extend and enhance Gadi to meet the ever-growing needs of its research community. In 2023, the organization undertook a major expansion of the platform's CPU resources, adding hundreds of Lenovo ThinkSystem SD650 V3 server nodes featuring 4th Gen Intel® Xeon® Scalable processors.

“When we first added our new Lenovo servers with 4th Gen Intel Xeon Scalable processors, we let users run very large jobs across the whole cluster to test its limits. This was a rare opportunity to experience supercomputing at its peak, and our researchers really appreciated it. Now that we’ve settled into regular day-to-day use, users have been very positive about Gadi’s increased performance and continued stability.”

Allan Williams
Deputy Director (Innovative Compute Environments),
National Computational Infrastructure

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Results

On its debut, Gadi claimed the 24th spot in the TOP500 global supercomputer ranking, making it the fastest supercomputer in the southern hemisphere at the time.

With a peak performance of more than 10 Petaflops, the supercomputer brings researchers a 7-times increase in computational power compared to its predecessor. This massive performance boost enables researchers to run larger, more complex workloads and perform their work faster.

Gadi has already played a pivotal role in accelerating the national response to major events such as the COVID-19 pandemic and the summer bushfires of 2019-2020. NCI continues to work with partners including Lenovo to upgrade this critical computing infrastructure, ensuring that researchers have access to the cutting-edge HPC resources needed to power scientific progress.

- >10 Petaflops peak performance
- 7x uplift in compute power
- 24th in 2019 TOP500 list

“The support we’ve received from Lenovo throughout this process has been phenomenal. Everyone has been very friendly and keen to assist—from top management to our local engineers. And when we’ve asked for extra resources or assistance, Lenovo has always been ready to give us what we need to minimize disruption and keep research moving.”

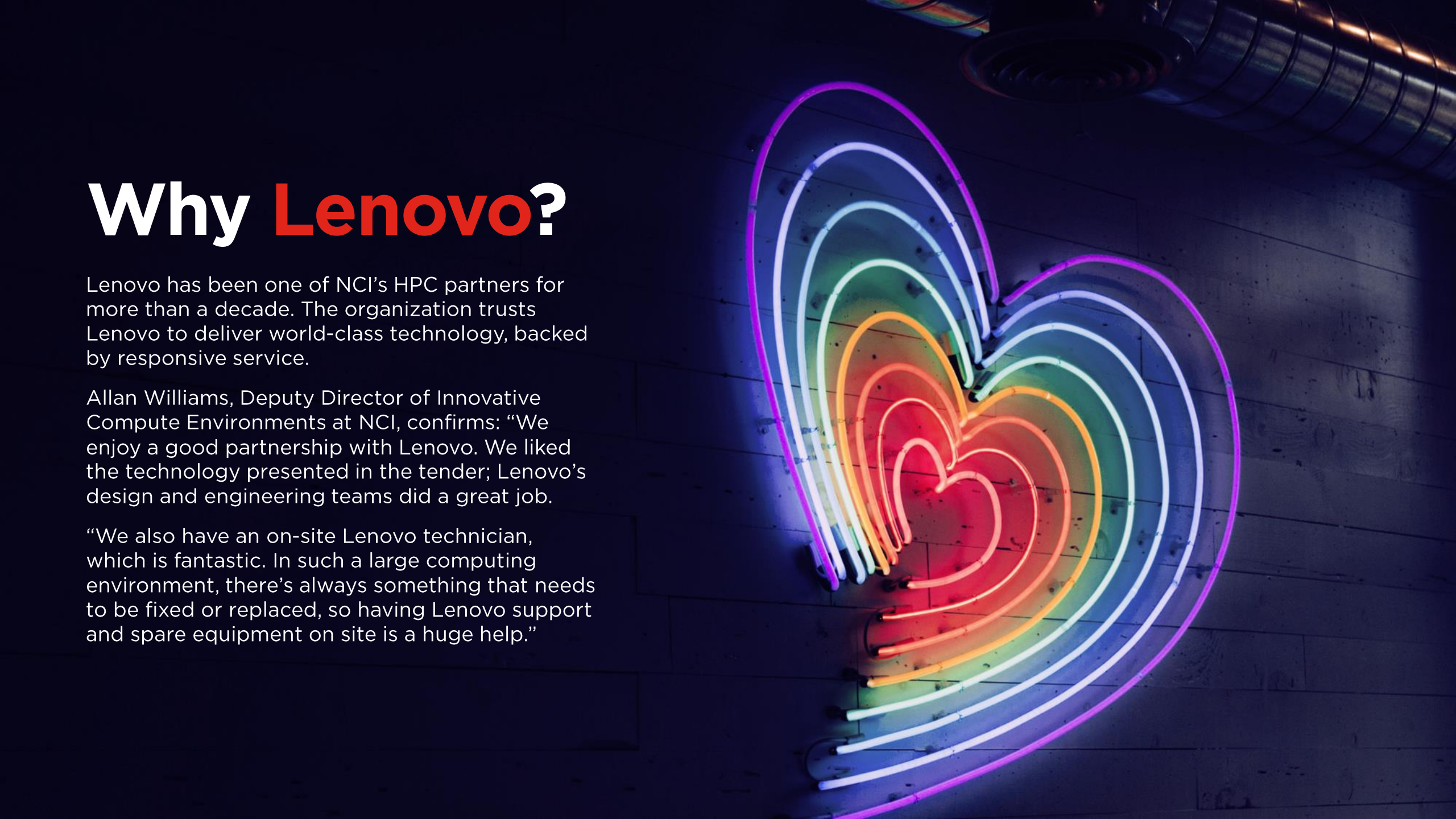
Allan Williams
Deputy Director (Innovative Compute Environments),
National Computational Infrastructure

Why Lenovo?

Lenovo has been one of NCI's HPC partners for more than a decade. The organization trusts Lenovo to deliver world-class technology, backed by responsive service.

Allan Williams, Deputy Director of Innovative Compute Environments at NCI, confirms: "We enjoy a good partnership with Lenovo. We liked the technology presented in the tender; Lenovo's design and engineering teams did a great job.

"We also have an on-site Lenovo technician, which is fantastic. In such a large computing environment, there's always something that needs to be fixed or replaced, so having Lenovo support and spare equipment on site is a huge help."



How can research centers deliver high-performance computing efficiently?

Lenovo ThinkSystem servers powered by 3rd and 4th Gen Intel® Xeon® Scalable processors pack extreme performance into a dense, easy-to-cool package.

Explore Lenovo HPC Solutions

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