

Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The [2021 Roadmap](#) used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical - Data-Intensive Geoscience: Nationally coordinated HPC and large GPU clusters will handle the massive datasets required for advanced exploration and real-time predictive modeling. Scalable Collaboration: Centralized AI-ready HPC can pool data from government, academia, and industry, ensuring breakthroughs in resource mapping and processing efficiency.

Q22.

Food and Beverage

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical for Food and Beverage: Real-Time Analytics: High-performance, AI-focused computing can fuse multiple data sources (soil, weather, satellite) for near-instant crop management insights. Scalable R&D: A national AI HPC platform supports researchers, SMEs, and agritech companies to collaborate on new food technologies, boosting productivity and sustainability.

Q23.

Medical Products

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical in Medical Products: Big Data Integration: National AI HPC can securely host and process massive biological and clinical data at scale, indispensable for rapid discoveries. Cutting-Edge Diagnostics: With robust HPC, AI models can analyse medical images and multi-omics data in real time, improving early detection and therapeutic outcomes.

Q24.

Defence

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical in Defence: Secure Sovereign Capability: A national AI HPC infrastructure ensures sensitive defense data and modeling remain onshore and under Australian control. High-Speed AI Processing: Large-scale GPU clusters can handle data-rich, mission-critical analytics with the speed required for modern defense operations.

Q25.

Recycling and Clean Energy

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical in Recycling and Clean Energy: Complex System Modeling: National HPC capacity is essential to simulate entire energy networks, from battery technologies to grid management. Accelerated R&D: AI HPC infrastructure allows rapid iteration on materials and recycling processes, driving innovation in green solutions.

Q26.

Space

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical in Space related technologies: High-Throughput Computation: AI HPC ensures near real-time processing of massive data streams, essential for timely decision-making in space missions. Collaborative Research: A shared, powerful HPC backbone lets Australia's space agencies, industry, and universities co-develop AI insights at scale.

Q27.

Environment and Climate

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical in Environment and Climate: Exascale Modeling Needs: Next-generation climate simulations require HPC specifically tailored for massive AI-driven data ingestion and forecasting. Disaster Preparedness: National AI HPC can run real-time models integrating satellite, drone, and IoT data for early warning systems.

Q28.

Frontier Technologies and Modern Manufacturing

The main feedback point is we need additional AI DataCentres. Why AI HPC Is Critical in Modern Manufacturing: Integration of Emerging Hardware: AI HPC resources can leverage next-gen accelerators (GPUs, quantum) to train advanced models faster. Industry 4.0 Collaboration: A nationwide AI HPC backbone can fuel seamless data-sharing among manufacturers, startups, and researchers, supercharging modern manufacturing breakthroughs.

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.

Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

How AI HPC can play a role: AI-Optimized HPC Clusters: National-scale GPU/accelerator-rich facilities enabling near-real-time simulation of electricity grids, hydrogen supply chains, and manufacturing decarbonization. Unified “Green Data” Platform: Large, secure, and interoperable data repositories to integrate energy usage, climate models, and industrial datasets for better AI insights. High-Speed Networking & Cloud Connectivity: To share data rapidly between research teams, industry partners, and policy-makers, ensuring timely AI-driven decisions. Potentially Outdated Infrastructure Traditional CPU-heavy supercomputers without sufficient GPU/accelerator capacity will struggle to handle the complexity and real-time needs of Australia’s net zero transition strategies.

Q31.

Supporting healthy and thriving communities

How AI HPC can play a role in supporting healthy and thriving communities: Federated AI HPC Platforms: Secure, privacy-compliant HPC resources to handle large, sensitive health data across multiple jurisdictions. Real-Time Analytics Frameworks: Quick AI-driven insights for public health responses, requiring robust cloud-HPC interoperability. Interdisciplinary Collaboration Hubs: Virtual labs uniting researchers, healthcare providers, and social services, all leveraging AI HPC.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

AI HPC’s role in Aboriginal and Torres Strait Islanders knowledge systems: Culturally Secure Data Platforms: National HPC resources with governance frameworks that respect and protect Indigenous data sovereignty. AI-Assisted Language Tools: Adequate GPU compute to train natural language processing (NLP) models for under-resourced Indigenous languages. Accessible HPC Interfaces: User-friendly portals and training programs to ensure Indigenous researchers and communities can directly leverage AI HPC.

Q33.

Protecting and restoring Australia’s environment

AI HPC in protecting and restoring Australia’s environment: Exascale Climate & Biodiversity Modeling: Powerful HPC systems with extensive GPU partitions for real-time simulation of complex environmental systems. Nationwide Environmental Data Repositories: Interoperable AI-ready data lakes bridging government, academia, NGOs, and industry. High-Bandwidth Remote Sensing Pipelines: Seamless ingestion and processing of massive remote sensing datasets (satellite, lidar, UAV).

Q34.

Building a secure and resilient nation

AI HPC is critical in a secure and resilient Australia: Sovereign AI HPC Facilities: Secure, onshore supercomputing centers with strict data governance for defense and critical national security operations. Resilience Modeling Platforms: AI HPC to run complex, multi-factor simulations (e.g., pandemic, cyber, climate) supporting integrated emergency responses. Cross-Agency Interoperability: Shared HPC and data protocols enabling seamless collaboration among defence, intelligence, and emergency agencies.

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.

If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

Proposed National Infrastructure Capability: A Dedicated AI-Optimized Supercomputing Network 1. The Need Australia's existing high-performance computing (HPC) systems—such as NCI's Gadi and Pawsey's Setonix—are world-class for traditional computational science. However, AI research and large-scale data analytics are expanding at such a rapid pace that these facilities will soon be insufficient to meet national demands. Complex domains (e.g., genomics, climate modeling, energy systems, defence analytics, advanced manufacturing) increasingly require AI-specific infrastructure featuring dense GPU/accelerator capacity and specialized data pipelines. Global competitors (e.g., the US, EU, China) are investing heavily in AI-focused supercomputers and moving toward exascale compute. Without a major national-level upgrade—tailored to AI and data-intensive workloads—Australian researchers and industry risk losing competitiveness, and the nation's sovereignty over critical technological capabilities could be compromised. 2. Proposed Infrastructure Capability We propose establishing a National AI-Optimized Supercomputing Network—a coordinated set of HPC facilities across Australia, specifically geared toward AI. This network would: Scale Up GPU/Accelerator Resources Provide a large, shared pool of next-generation GPU or specialized AI accelerators (e.g., H100/200 GPUs, TPUs, FPGAs) capable of training complex machine learning models, handling extensive simulation data, and performing near-real-time analytics. Integrate Secure Data and Compute Ensure end-to-end security and data sovereignty by locating infrastructure onshore, with advanced governance frameworks for sensitive data in areas such as health, defence, and Indigenous knowledge systems. Adopt a Modular, Distributed Architecture Link existing HPC sites (NCI, Pawsey, CSIRO clusters) and new specialized nodes, enabling flexible expansion and resilience. This modular design would also facilitate synergy with emerging technologies (quantum accelerators, neuromorphic chips) in the future. Support Collaborative Tools and Training Provide user-friendly AI development platforms, robust data-sharing protocols, and HPC training programs, so that both academia and industry can effectively use these high-end resources. 3. Medium-Term Goals Accelerate Research & Innovation (2–3 Years): Enable large-scale AI initiatives—for instance, national language models, advanced climate projections, or multiomics-based personalized medicine—that currently exceed domestic compute capacity. Nurture cross-disciplinary collaborations via uniform data standards and HPC services. Position Australia as a Global AI Leader (3–5 Years): Host exascale-class or near-exascale compute specifically tuned for machine learning and data analytics, ensuring Australian researchers keep pace with international best. Attract top AI talent globally by offering unique computational capabilities, thereby stimulating the local innovation ecosystem. Secure Sovereign Capability (5+ Years): Safeguard national security interests and critical infrastructure by reducing reliance on foreign cloud providers for advanced AI training. Provide consistent upgrade paths to remain at the forefront of HPC technology. 4. Impacted Research Communities Health & Medical: Genomics, drug discovery, imaging, and personalized healthcare. Environment & Climate: High-resolution climate modeling, disaster prediction, biodiversity genomics. Energy & Resources: Mineral exploration, renewable integration, net-zero transition modeling. Defence & National Security: Secure data processing, autonomous systems, threat intelligence. Manufacturing & Industry: Robotics, generative design, supply-chain optimization. Social Sciences & Humanities: Language preservation, large-scale data analysis of cultural and social dynamics. 5. Timeframe for Establishment Immediate Planning (Within 12 Months): Finalize design parameters, governance models, and funding structure in coordination with existing HPC centers and stakeholders. Phased Deployment (2–5 Years): Incrementally expand HPC nodes, add specialized GPU/accelerator clusters, and implement secure data exchange frameworks. Continuous Upgrades (5+ Years): Plan for exascale or post-exascale expansions to maintain global competitiveness.

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the [2021 Roadmap](#) related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

☐ Yes

☒ No

Q38.

3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

This question was not displayed to the respondent.

Q39.

3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

This question was not displayed to the respondent.

Q40.

3.4 If you answered no, please indicate your (one or more) primary reasons:

☒ I did not know about it

☐ Other facilities suit my needs better

☐ I would like to, but cannot get access due to geographical location

☐ I would like to, but believed that access was only available to academic researchers

☐ I am not aware of any capability that meets my needs

☐ Other (please specify)

Q41.

Part 4: Other comments

4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.