

ARDC Nectar Research Cloud - eResearch NZ

Development of new services for the Nectar
Research Cloud

February 2022

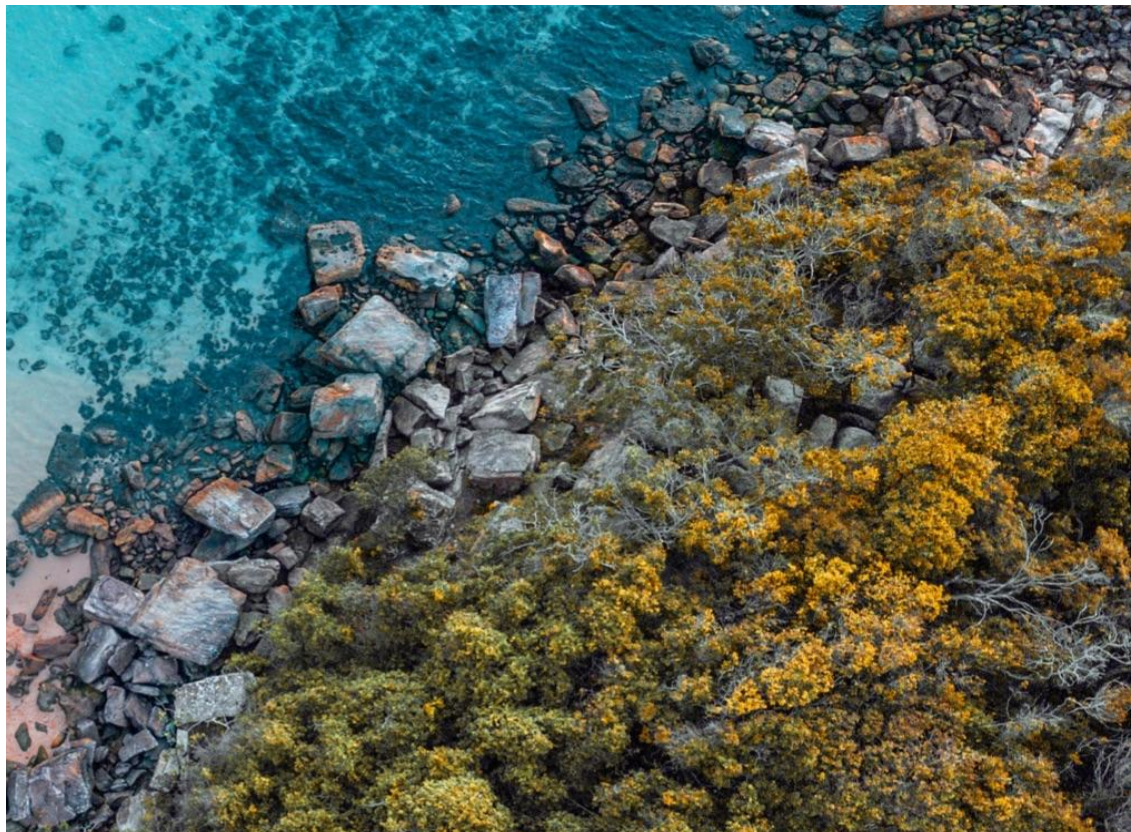
PRESENTED BY

Carmel Walsh
Paul Coddington
Jo Morris



ACKNOWLEDGEMENT OF COUNTRY

We acknowledge and
celebrate the First Australians
on whose traditional lands we
meet, and we pay our respect
to their elders past, present
and emerging.



ARDC STRATEGY



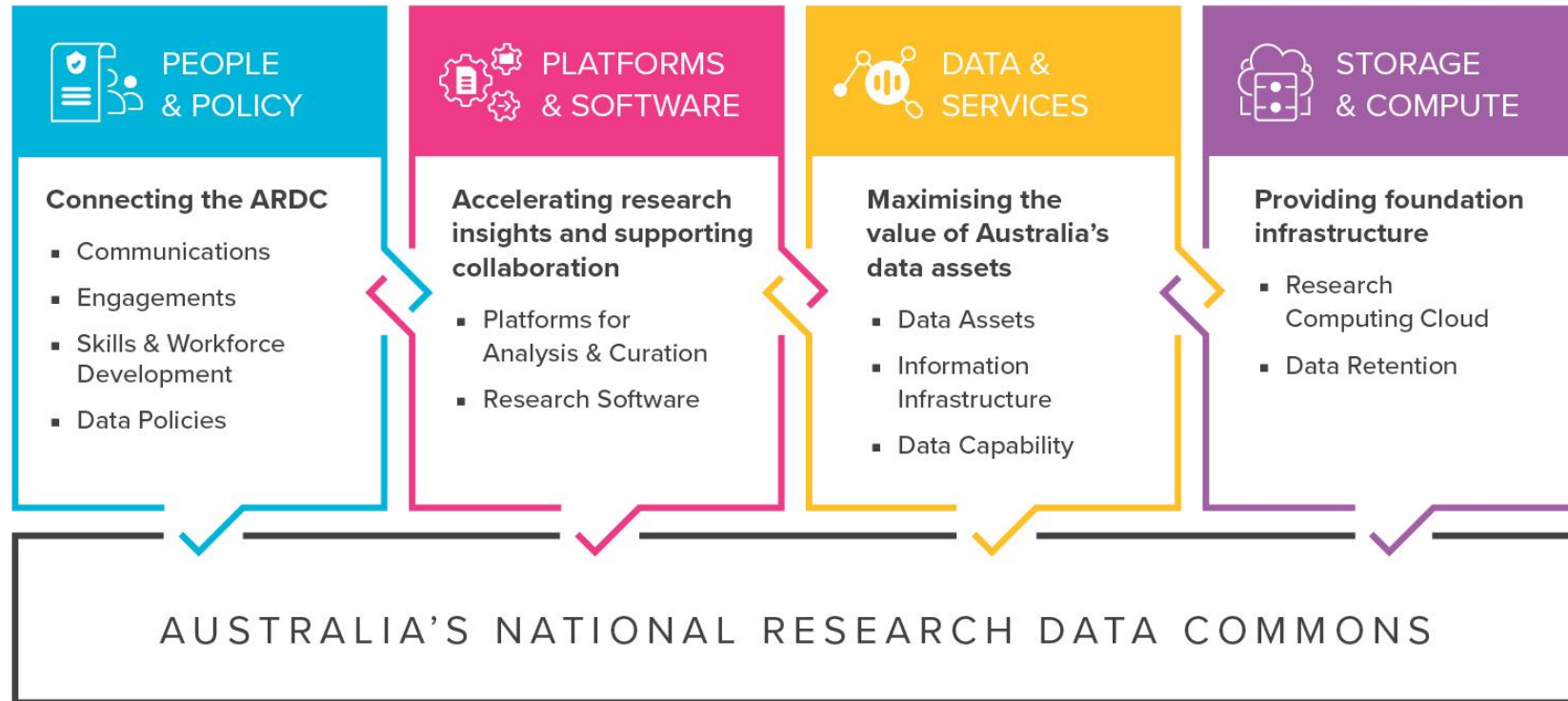
PURPOSE

To provide Australian researchers with competitive advantage through data.

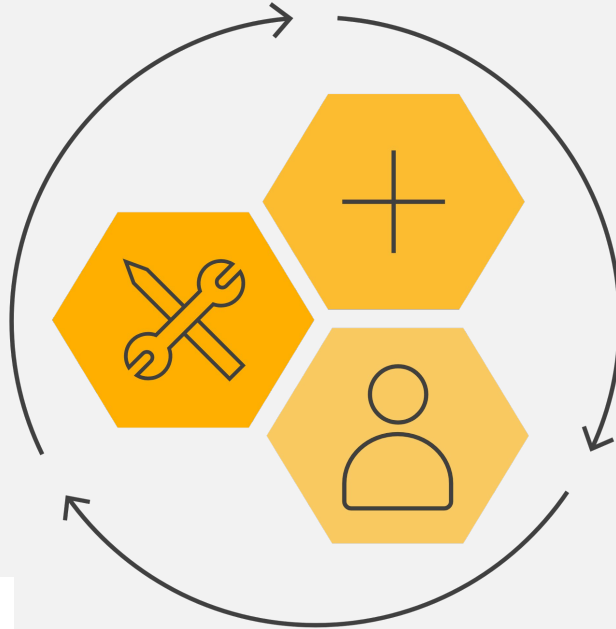


MISSION

To accelerate research and innovation by driving excellence in the creation, analysis and retention of high-quality data assets.



**Increased Capacity =
Increased Demand =
Increased Opportunity**



DRIVER FOR NEW SERVICES

New Demand (Service Design Mindset)

- > empathise, define, ideate, prototype & test
- > prioritise platforms then scale to national provision

User Feedback - Adapt the Platform

- > develop national services
- > adapt OpenStack for sensitive data
- > enable bursting

Innovate at scale - Expand skill sets

- > build on knowledge of Core Services team
- > leverage skills across Federation
- > bring in new skills to evolve expertise and support

NEW DEMAND: INVEST IN LEADING EDGE TECHNOLOGY

2019 Platforms Projects



Australian Characterisation Commons at Scale

Australian Imaging Service (AIS)

Australian Scalable Drone Cloud (ASDC)

Australian Transport Research Cloud (ATRC)

Biocommons - Galaxy Australia

EcoCommons

Environments to accelerate machine-learning based discovery



Investment in high-end infrastructure and services:

- > GPUs for machine learning and image processing
- > large memory machines
- > new skill sets, training, multi-compute
- > containers and orchestration (Kubernetes on Nectar)

NEW DEMAND: INVEST IN LEADING EDGE TECHNOLOGY

2020 Platforms Projects



Australian Digital Observatory

Australian Electrophysiology Data Analytics Platform (AEDAPT)

Biosecurity Commons - Managing our Pests and Diseases

Global Multi-Resolution Topography for Australian coastal and ocean models

Open EcoAcoustics: A Platform to Manage EcoAcoustic Data

Scalable Governance of FAIR Sensitive Research Data (SeRP)

Scientific workflow system for environmental health impact assessments

Transforming Australian aquatic ecosystem monitoring using AI



Big data analytics, sensitive data & integration:

- > data analytics platforms and software (Jupyter/VDI)
- > Openstack regions for sensitive data
- > new skill-sets & national standards (ARCOS)

ENHANCE NATIONAL PROVISION



Which Nectar Services will EcoCommons Use?



Virtual Machines

- > Application nodes and job workers
- > RAM optimised instances



Volumes

- > Application data
- > Scratch space for worker machines



Object Store

- > Datasets and modelling outputs
- > User data



Additional Infrastructure services

- > Kubernetes clusters using Nectar's Magnum service
- > GPUs & large memory machines
- > JupyterHub and Virtual Desktop

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2012-2022
CELEBRATING
10 YEARS

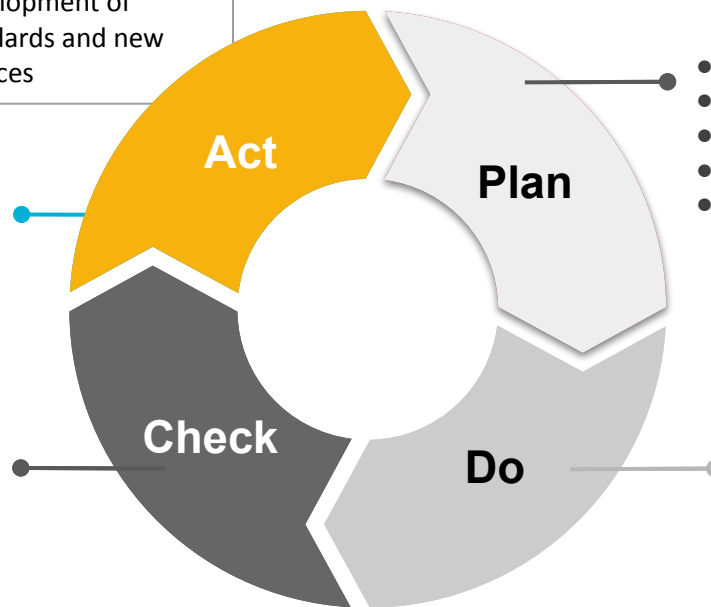


Continual Service Improvement Framework

| | | | |
|----------------------|------------------------------|--|---|
| Users | Distributed Helpdesk (DHD) | User Forums (2 p.a) | Surveys |
| Nodes | Committees (Tech & Steering) | Tech & Op Workshops | User engagement |
| Core Services | OpenStack expertise | Tech & Op Workshops ¼ Planning meetings | Development of standards and new services |

- New standards/processes
- 6 monthly Release Cycles
- Trial new Openstack tech
- Review metrics
- Training program

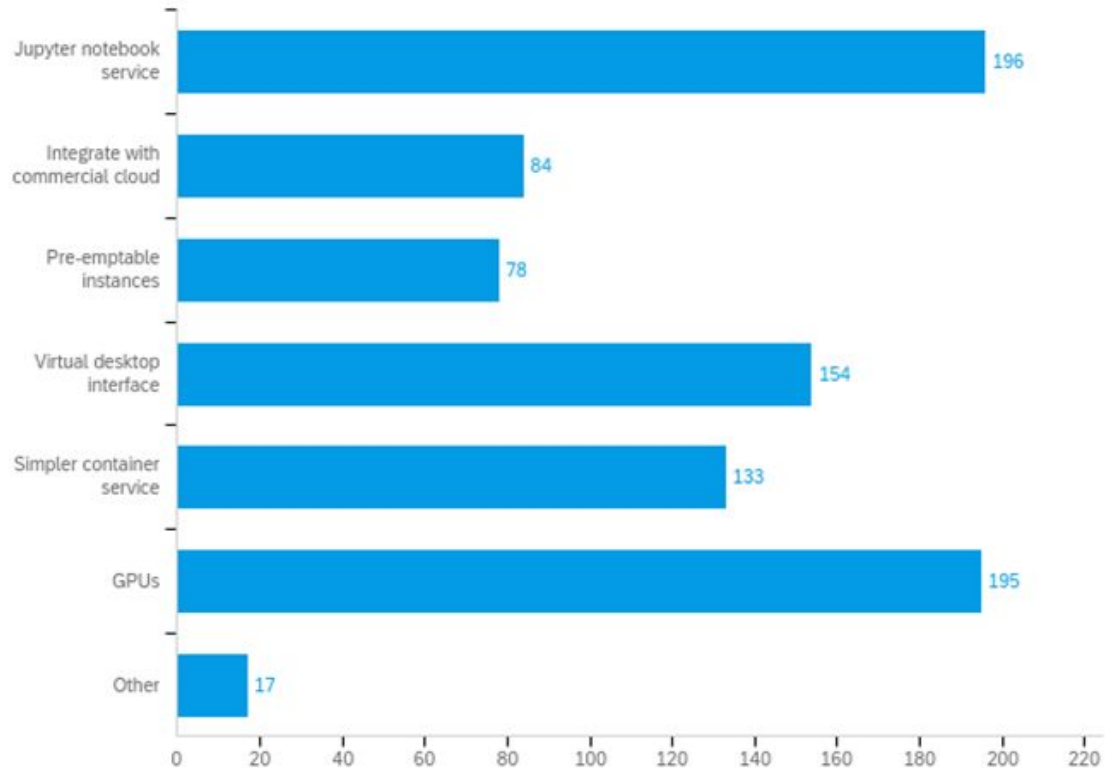
- Support desk
- Quarterly User Forums
- Annual User Survey
- Training feedback survey
- Training & skills gaps



2020 ARDC Nectar User Survey

Annual User survey was sent to 3,050 active users with 348 responses.

We asked users which new services they would be interested in using on ARDC Nectar and this reflected the trend towards leading-edge services.



INNOVATION AT SCALE - NECTAR RESEARCH CLOUD

INNOVATION

INVESTMENT

NATIONAL SERVICE

*Adapt technology for
research computing*

*Define & develop
infrastructure and skills*

*Service Design
& Provision*



IMPLEMENTING NEW SERVICES

NEW SERVICES

- ❖ GPUs
- ❖ Large Memory Machines
- ❖ Virtual Desktop Interface
- ❖ Jupyter and R Studio
- ❖ Handling sensitive data
- ❖ Burst /elastic compute
- ❖ Pre-emptible instances

INVEST IN LEADING EDGE
INFRASTRUCTURE

SCALE NATIONALLY

- ❖ Expand from Nodes to national service
- ❖ UI/UX design of new services
- ❖ Reduce technical barrier to use
- ❖ New OpenStack regions

EXPAND & LEVERAGE
FEDERATION

SUSTAINABLE SERVICES

- ❖ Usage-based allocation
- ❖ National services supported by ARDC
- ❖ Increased efficiency and easy of use
- ❖ Open source software

ADAPT THE PLATFORM

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National GPU Service

- Expand from Node /Platform specific to national
- Develop reservation system
- Trial & test with users

Usage-based Quota

- Change from max limits
- Enables bursting/ elastic compute
- Optimise use with spot instances
- Requires usage (SU) data collection
- Dashboard reporting on usage

Sensitive Data Service

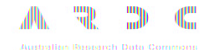
- New OpenStack regions with custom policies and roles
- New architecture to meet additional security requirements
- Node-managed region

Container Registry

- Piloting a national service
- ARCOS project to promote and support use of containers and Kubernetes

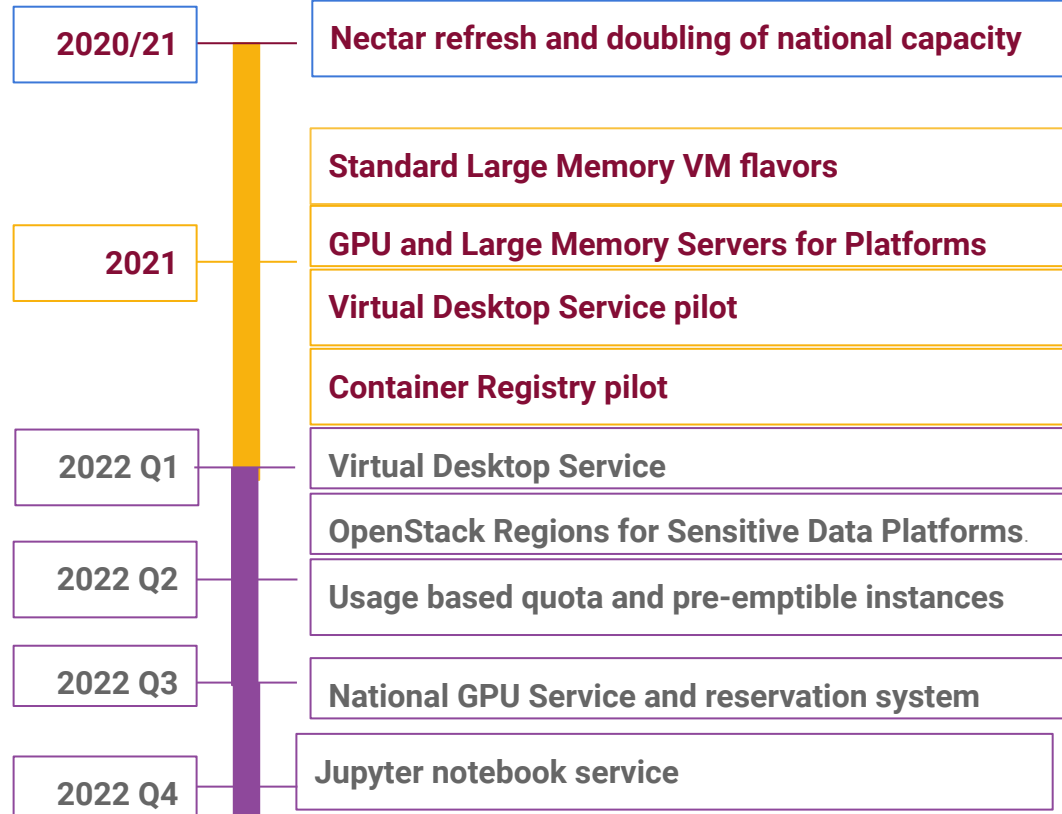
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Timeline

- > GPUs
- > Large Memory Machines
- > Burst capability/elastic compute
- > Virtual Desktop Interface
- > Jupyter and R Studio
- > Containers and Kubernetes
- > Handling sensitive data
- > Improved cybersecurity for research computing



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contact@ardc.edu.au



+61 3 9902 0585



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