

# Containers and Kubernetes in Australian Research: Building a Community for the Future



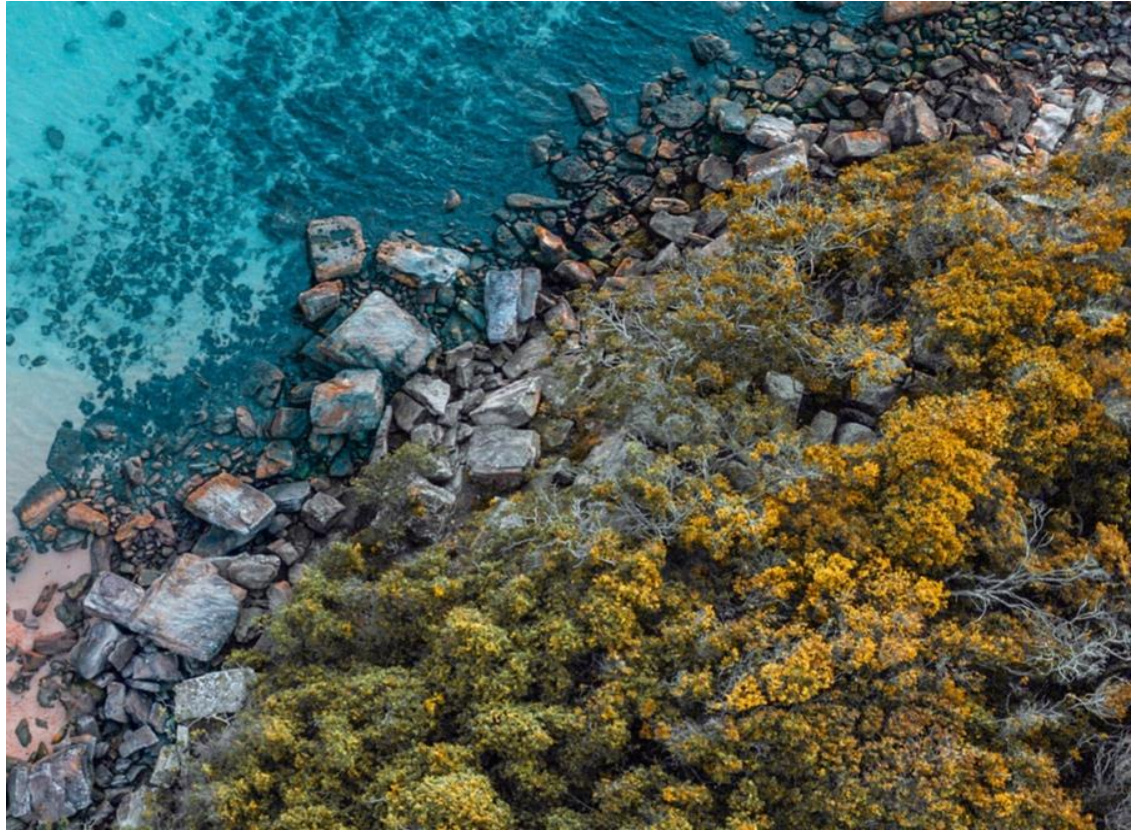
29 Oct 2024

BoF CHAIRED &  
PRESENTED BY

Dr Aleem Uddin

# 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.



# AGENDA

- **Part I**
  - ARCOS Community overview
    - Activities Highlights
  - Shaping the future
- **Part II**
  - Champions program - spreading awareness about containers among researchers
- **Short talk**
  - A case study from UQ - Dr Mark Andrei

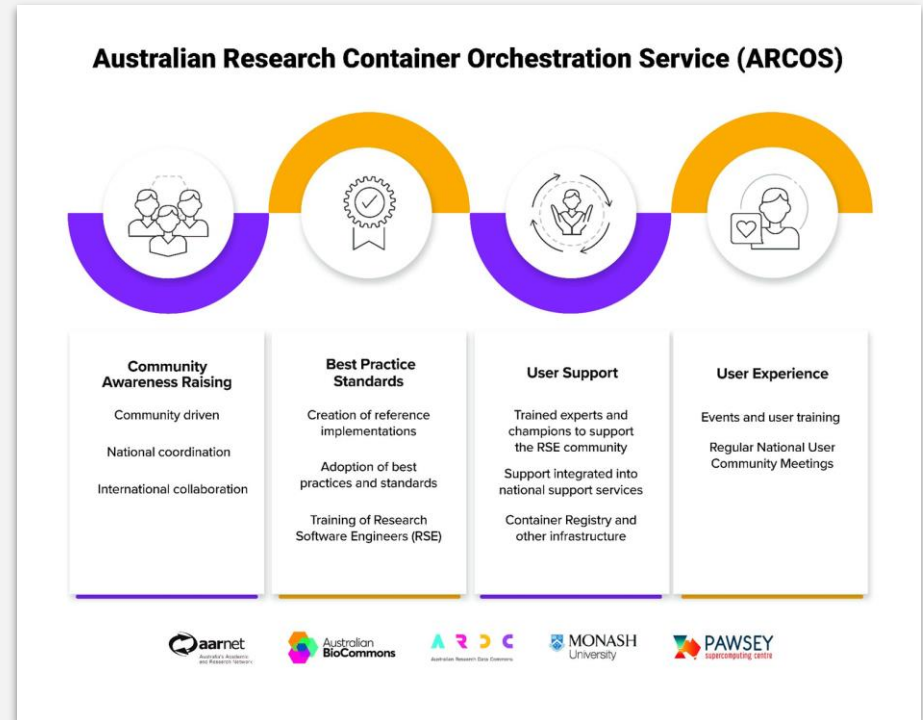
# ARCOS Community Overview

Launched at the national Kubernetes workshop at the Pawsey Supercomputing Centre on 11 March 2020.

**Addressing opportunities** – reproducibility, portability, distribution, lower infra complexity and realise research platforms

**Purpose:** ARCOS is a community, driven by various national institutions with the aim of establishing a national Kubernetes service and promoting use of containers in research.

**The infographic (Goals and activities)** based on community consultation at eRA conference in 2020.



# ARCOS Activities Highlights

## Example Case Studies

Service Mesh Anatomy - Ping Chen (ARDC)

Kubernetes batch execution with Nextflow - Rob Cosgrove (Biosecurity)

Containers @ Pawsey - Dr Sarah Beecroft

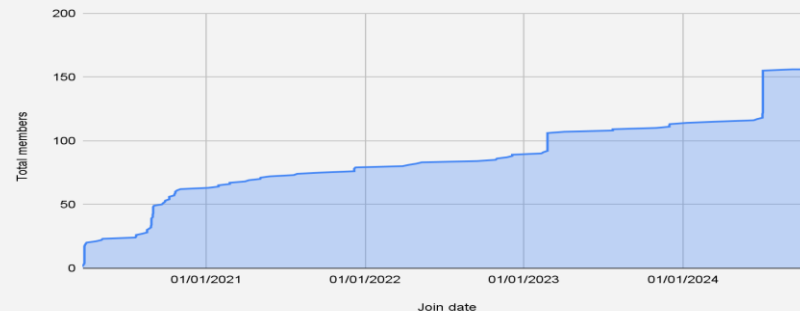
## ARCOS 2025

Batch scheduling on K8s

Champions program

Establishing Managed Kubernetes Service

Total members vs Join date



Membership growth graph

**Skills upgrade** - EO'ed participants offered Linux Foundation vouchers to get K8s training and certification

104 Certification vouchers - 22 Organisations

104 Registered and started the training course

6 Certified Kubernetes Administrators (CKA)

3 Certified Kubernetes Application Developer (CKAD)

Self Paced Training ongoing for the rest of the participants

# What next

- Technology adoption view - Information Systems Research with great interest.
  - Seeking experts opinion
- Since the formation ARCOS achieved multiple documents, document it, for other to reuse the approach?
- Provide broader outreach to case studies / projects and the community
- Return to the community members in the form of authorship

Idea of ARCOS paper 2 !

# A bit more on the ARCOS Paper

- Title: Adoption of Containers in Research Sector: a Community-driven Approach
- The community and its approach
- The method (Qualitative approach)
  - Case studies: (eg. Neurodesk, Eco-Commons, Bio-commons, Pawsey...)
  - Structured interviews
- The measure: The outcomes since formation
- Acknowledgements: Steven Manos for suggesting the idea & participants

## Part 2

# ARCOS Champions



# ARCOS Champions program

- Referred to as ambassadors, fellows, or something else, are often the key to successfully empowering and supporting emergent leaders in a community
- The main theme is - **How can we raise awareness about the use of containers for reproducible research? (intended audience being researchers and academics)**
- Through through this session I want to assess the possibility of running a Champions / Ambassador program and what actions are required to build a successful program.
- Making a Case !



## Creating a Community Champions Program



# Initial assessment of champions program

- "That sounds like a good idea - could help in raising awareness"
- "Researchers have seemingly been widely been concerned about reproducibility, but lack the assistance/infrastructure for OCI container use (i.e. Podman or Docker on HPCs)"
- "Valuable for raising awareness on containers for computational efficiency."
- "Could be good depending on the details"

# Initial priorities for migration

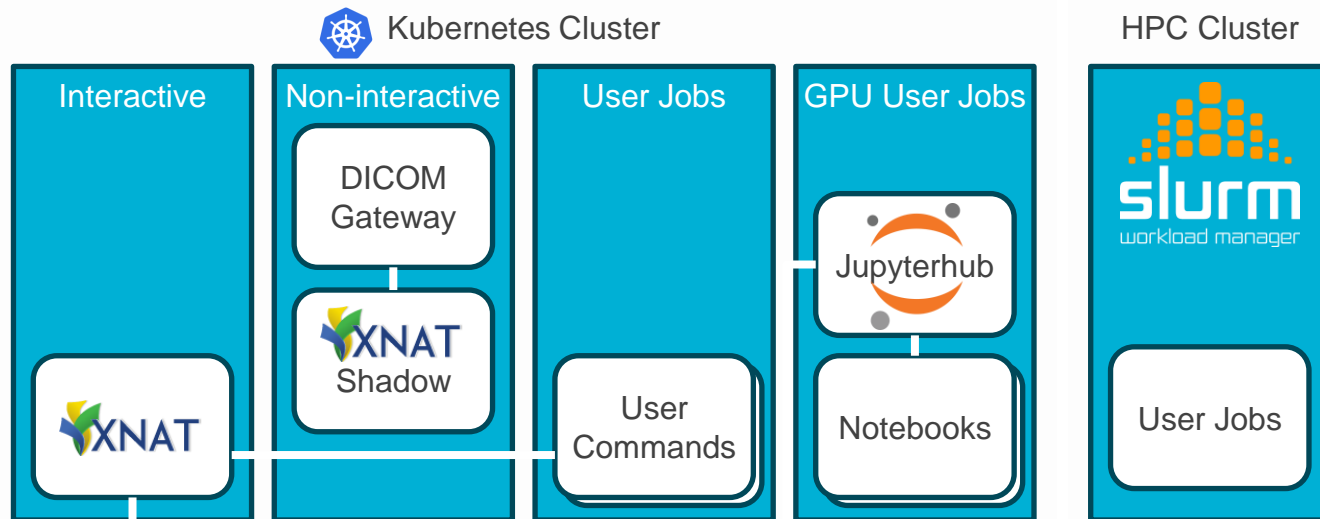
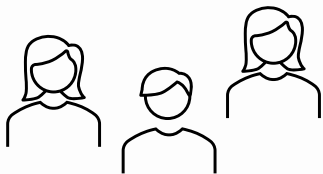
- To Containers Orchestration Service
- eResearch application services
- Seamless research data access
- Interactive, batch, user-demand workloads
- Project lifecycle support
- Infrastructure services
- Backup
- Logging
- Monitoring
- Notifications
- Standard platform



# Data Access and Workload Distribution

- Using Scheduling Constraints

Researchers/Collaborators  
and Clinical Sites



R • • Research  
• D • Data  
• M • Manager

Researcher Data Collections

# Future work

- And priorities
- CI/CD
- Vault
- Cluster autoscaling
- Nectar Magnum
- COE as a Service
- vGPU
- Network policies
  - Nectar Swift
- Object store encryption, versioning





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