



# CRAMS

Cloud Resource Allocation Management System

Samitha Amarapathy  
Stephen Dart  
Kerri Wait

Monash eResearch Centre

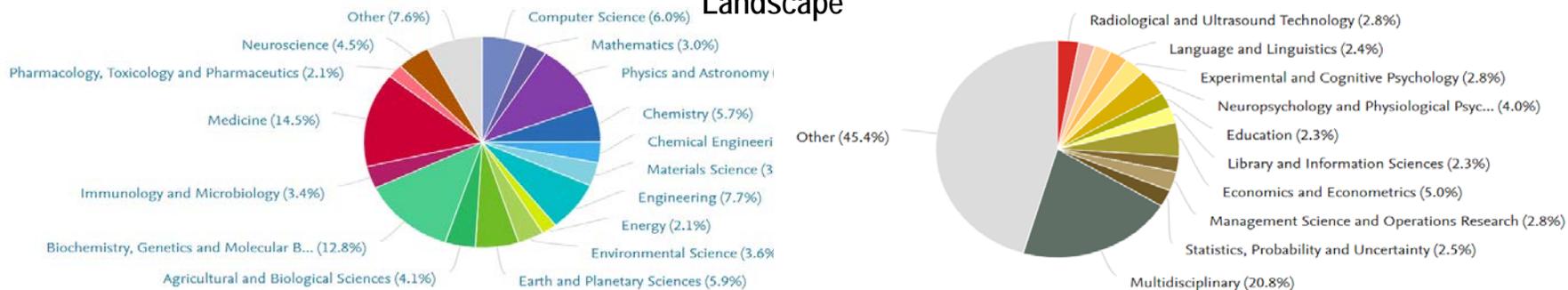


# Overview

- ❖ **CRAMS** enables **researchers/users** to request cloud resources across
  - Research Data Storage
  - High Performance Computing Platform ( MASSIVE, MonArch and CVL)
  - Research Computing Cloud and Virtual Desktop Infrastructure.
- ❖ **CRAMS** manages :
  - Allocation and Instantiation of Cloud Resources
  - Report Resource Utilisation via Dashboard
  - Contacts and Project Membership
  - User Accounts (HPC)
  - Administrative and Management Reports
- ❖ **CRAMS** forming a rich metadata registry over the time.
- ❖ **CRAMS** in it's transformation driven agenda, is becoming a key cloud resource management tool in Monash eResearch ecosystem

# Current Monash eResearch Landscape

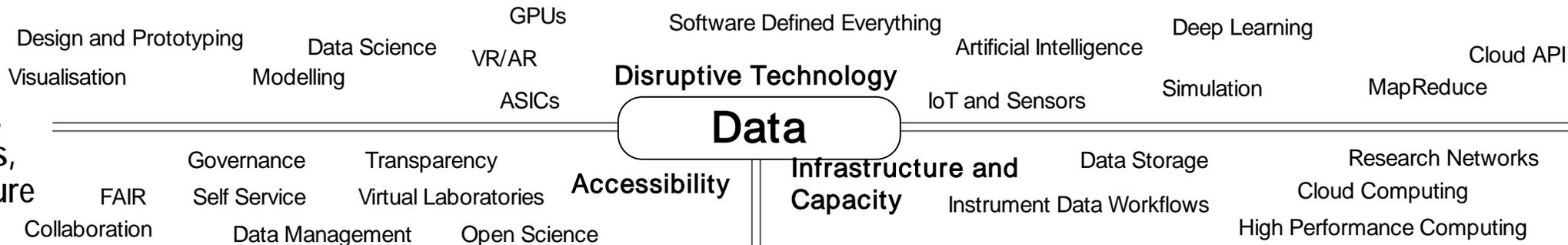
## Disciplines



## Monash eResearch Projects



## Data Tools, Techniques, Infrastructure



## Contributors and Partners

<p><b>NCRIS</b> National Research Infrastructure for Australia</p> <p><b>BIOPLATFORMS AUSTRALIA</b></p> <p><b>AuScope</b></p> <p><b>MICROSCOPY AUSTRALIA</b></p> <p><b>ANSTO</b></p> <p><b>National Imaging Facility</b></p>	<p><b>Gov and NCRIS</b></p> <p><b>ardc</b> australian research data commons</p> <p><b>PAWSEY</b> supercomputing centre</p> <p><b>NCI AUSTRALIA</b></p> <p><b>aarnet</b> Australia's Academic and Research Network</p> <p><b>VicNode</b></p> <p><b>CSIRO</b></p> <p><b>ANFF</b></p>	<p><b>AI and Compute</b></p> <p><b>NVIDIA</b></p>	<p><b>Hardware</b></p> <p><b>Mellanox TECHNOLOGIES</b></p> <p><b>DELL EMC</b></p>	<p><b>Middleware</b></p> <p><b>openstack.</b></p> <p><b>THE LINUX FOUNDATION</b></p> <p><b>redhat.</b></p> <p><b>cumulus</b></p> <p><b>ceph</b></p>	<p><b>Cloud</b></p> <p><b>Azure</b></p> <p><b>amazon web services</b></p> <p><b>Google Cloud Platform</b></p> <p><b>rackspace.</b></p>
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# CRAMS “ Flavours”

**Data dashboard** - CRAMS offering for Research data storage allocation management and reporting. Replaced both the manual and paper-based user request form and the VicNode Reporting System for Monash.

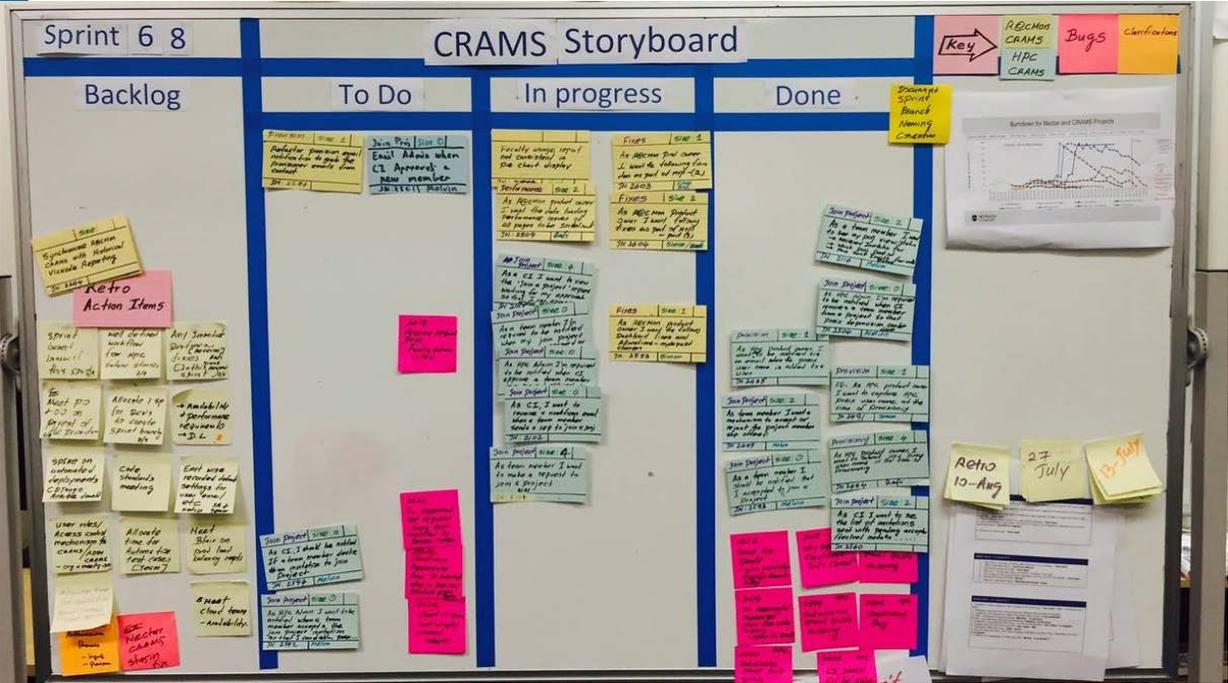
**HPC dashboard** - CRAMS offering for high performance computing (MASSIVE, MonArch and CVL) allocation management and reporting. Will be replacing google application form and karaage based allocation management mechanism.

**Cloud dashboard** - CRAMS offering for compute cloud (Nectar) resource usage reporting.

Our journey : Scrum based continuous delivery within SAFe Agile framework

Restful API enables “CRAMS Clients” / “tenants” to implement their own version of user interface suit to specific needs.

CRAMS is AAF enabled



# Data-dashboard

- **Research data storage @ Monash**

- Shared infrastructure obscures individual project allocation usage across multiple domains
- Users repeatedly “du” their storage causing unnecessary load on infrastructure
- Single portal for each contact to get their project specific usage across all storage types daily
- One stop allocation requests and provisioning recorded as storage transactions history

- **Scale of operation as at 16/10/2018**

- **608 projects** registered, **764 storage allocations**
- **9.3PB data holdings**, **11.6PB storage allocated**,
- 5 storage product types, daily usage update
- **373 user contacts**, **136 active users**,

# Data-dashboard

- **Research impact /benefit to research community**
  - Allocation request form process stimulates discussion about appropriate usage
  - Meaningful project description and FOR code classification
  - Data lifetime, access protocol, data sensitivity, cost reporting to faculty
  - Archive storage formats that are content appropriate and recalled from tape quickly
  
- **Complements other research activities**
  - Supports Store.Monash, MyTardis, MASSIVE
  - Supports instrument operators

# Data Dashboard - Collection View for contacts



Data Dashboard - Research Cloud Monash

Select view

Collection Custodian Dashboard

Collection View

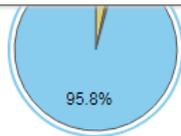
Select a project

RDS Scratch Demo

RDS Scratch Demo

Aggregated Total  
51 TB

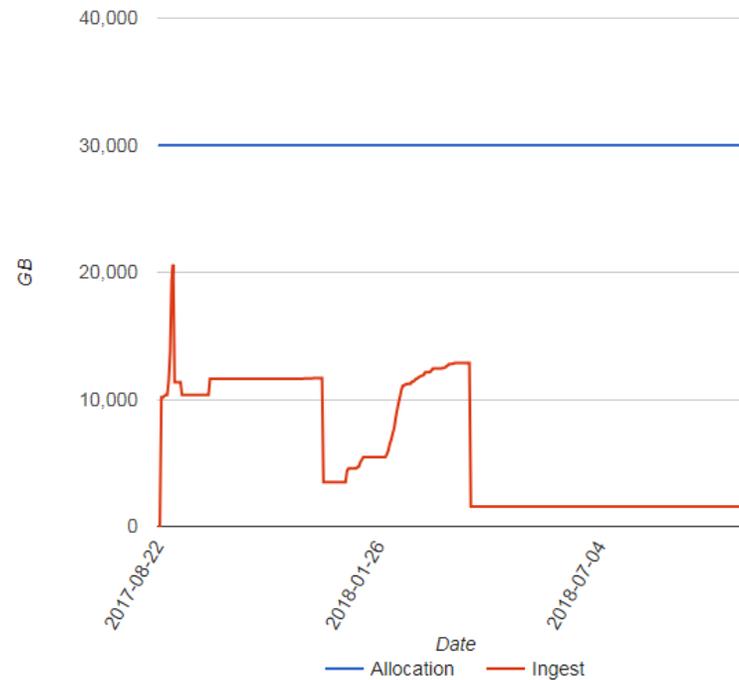
Used (Disk):	2 TB
HSM (Tape):	0.463 TB
Available:	48 TB



Used: 2 TB

## Ingestion History

RDS vicnode scratch - Market-File



Download CSV

- Collection View menu
  - Defaults to first project dashboard charts
  - Pie charts reveal near-line storage usage
  - History button reveals basic history graph
  - History download as CSV for user specific analysis
- Allocations menu
  - New Requests starts a new project form dialog
  - My Requests allows for amendment, extension or change of project custodian or contacts

# Data dashboard -Demo

**Live Demo**

# HPC Dashboard

Some High Performance Computing numbers...

**580 Projects  
system (M3)**

**1200 Users**

**4,120 CPUs (M3)**

**3 PB Lustre file**

## **HPC dashboard:**

- CRAMS offering for high performance computing (MASSIVE, MonARCH and CVL) allocation management and reporting.
- Enables:
  - Users to request new allocations/extensions to existing allocations
  - Users to manage project membership and metadata
  - Partners and administrators to manage the project lifecycle

# HPC Dashboard - User View

Monash High Performance  
Computing Services

[Support ticket](#)

[Log out](#)

ingest\_test

Allocations

Allocations

New requests

My requests

Join project

Software agreements

HPC user account

Name	Status	Resources	Funding	Actions
Monash Bioinformatics data analysis projects	Submitted	Project space <b>Primary</b> (Backed Up): 500 GB Project space <b>Scratch</b> (Not Backed Up): 3000 GB 10000 CPU core hours	MASSIVE	<a href="#">Edit</a>   <a href="#">History</a>
Brain and Mental Health Lab (BMH)	Provisioned	Project space <b>Primary</b> (Backed Up): 5500 GB Project space <b>Scratch</b> (Not Backed Up): 46000 GB 10000 CPU core hours	MASSIVE	<a href="#">Amend/Extend allocation</a>   <a href="#">Membership</a>   <a href="#">History</a>
Learning Deep Semantics for Automatic Translation between Human Languages	Approved	Project space <b>Primary</b> (Backed Up): 1024 GB Project space <b>Scratch</b> (Not Backed Up): 3072 GB 10000 CPU core hours	MASSIVE	<a href="#">History</a>

- Request status unlocks user actions
  - Submitted
  - Approved
  - Provisioned
- Users can also request access to licensed software
- Password reset and username selection handled in the HPC user account module

# HPC Dashboard

Live Demo

# Cloud Dashboard

## Some Cloud Computing Numbers...

**200+ Projects**

**5800 Instances**

**11,000 VCPUs**

**45,000 GB RAM**

**500+ Users**

## Cloud Dashboard :

- CRAMS offering for compute cloud (Nectar) resource usage reporting.
- Enables users to monitor their project resource allocations vs usage.
- Admin and management reports | Unified view for capacity management.

# Cloud Dashboard- Resource Allocations Vs Usage



# What's Next

- Production deployment of HPC Dashboard and Cloud Dashboard.
- Consolidated “eResearch Dashboard “
- Capture more and more metadata.
- Integrations with key research related systems.
- CRAMS for virtual desktop infrastructure allocations
- Automated provisioning
- More user /management reporting

# It's a Collaborative Effort @ Monash eResearch

In Our **Agile** Journey .....People played different roles and it's **fun**..!!!

## “Builders” / Research Dev Ops

**Simon Yu**, Senior Software Specialist  
**Rafi Feroze**, Senior Analyst Programmer  
**Melvin Luong**, Application Developer

## “Product Owners”

**David Lam**, Senior Project Manager  
**Stephen Dart**, Research Storage Manager  
**Kerri Wait**, HPC Consultant

## Project Lead/ Scrum Master

**Samitha Amarapathy**, Senior Project Manager

## Vision Makers/ “CRAMS Custodians”

**Dr Steve Quenette**, Deputy Director  
**Dr Wojtek Goscinski**, Associate Director

## Quality Assurance

**George Vidalis**, Senior Business Analyst  
**Nouran Khattab**, Test Analyst

**And Research Data Storage, HPC and Cloud Team.....**

Thank You