

Digital Research Infrastructure Roadmap

Prof. Mark Easton
ADVC Research Infrastructure

—
What's next...



Acknowledgement of Country

RMIT University acknowledges the people of the Woi wurrung and Boon wurrung language groups of the eastern Kulin Nation on whose unceded lands we conduct the business of the University.

RMIT University respectfully acknowledges their Ancestors and Elders, past and present.

RMIT also acknowledges the Traditional Custodians and their Ancestors of the lands and waters across Australia where we conduct our business.

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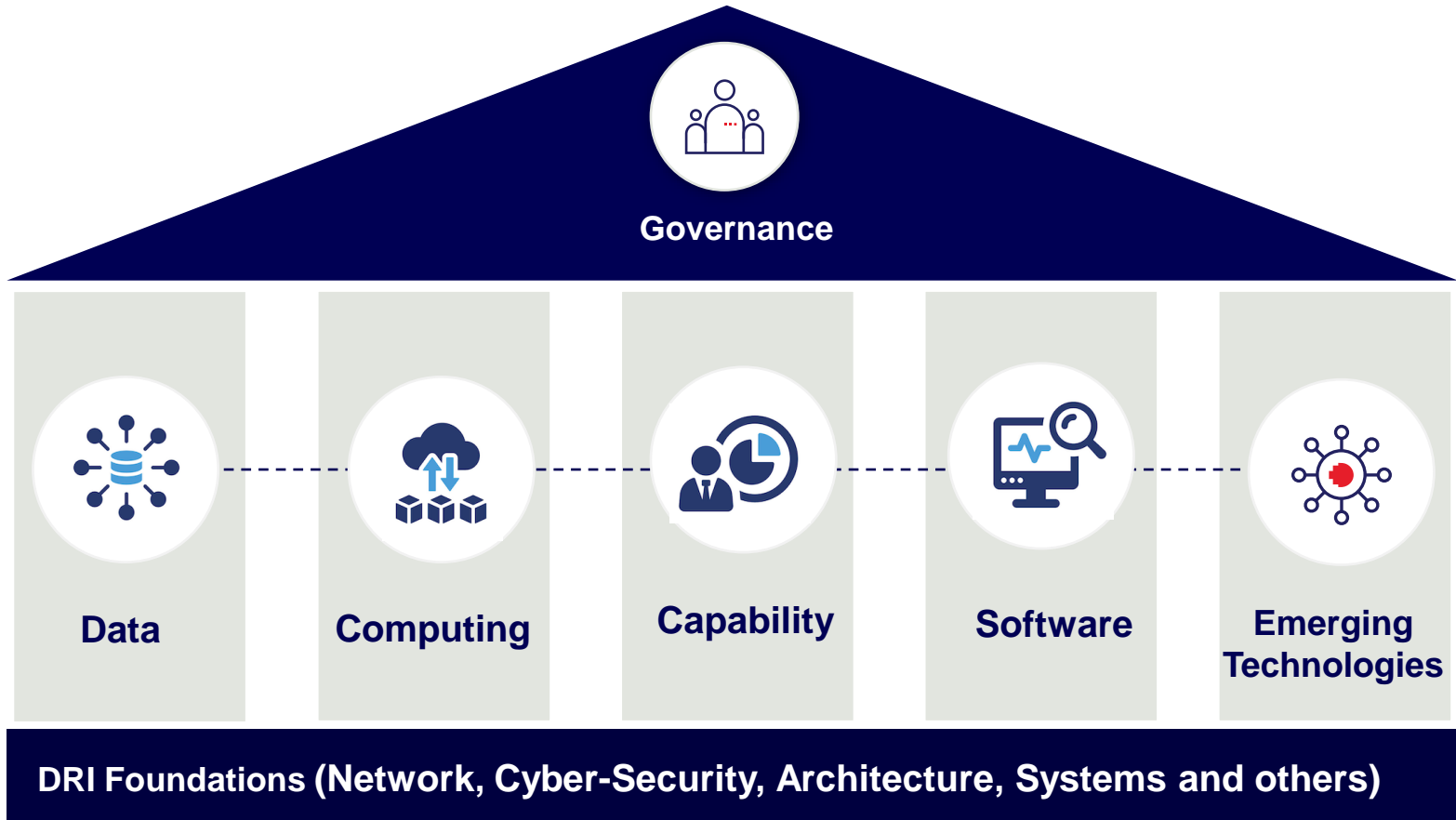
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DRI Roadmap at a glance



DRI Pillars



Data: Ensures secure, scalable, and compliant data storage solutions that promote research excellence and data sharing.



Computing: Provides robust and scalable computing resources, including personal desktop/laptop, through on-premise servers to cloud and high-performance computing to accelerate research discovery.



Capability Uplift: Empowers researchers with essential digital skills through comprehensive training and support programs.



Software: Maintains essential software and platforms to enhance research productivity and streamline software acquisition and use.



Emerging Technologies: Proactively explores and adopts cutting-edge technologies like AI, IoT and quantum computing to stay at the forefront of research innovation.



RMIT DRI Now

Lack of capacity, coordination and consistency



Data

Unmanaged



Computing

Disconnected



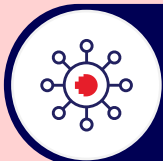
Capability

Unstructured and
Inconsistent



Software

Fragmented



Emerging Technologies

Minimal Integration



RMIT DRI Future

Ecosystem and position RMIT as a national leader



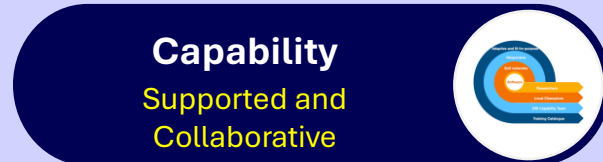
Data

Managed



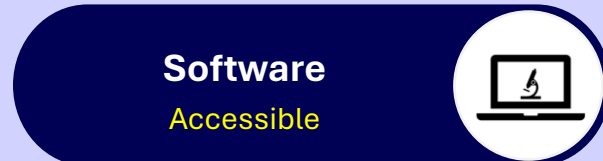
Computing

Hybrid and Scalable



Capability

Supported and
Collaborative



Software

Accessible



Emerging Technologies

Adoption Leaders

National Digital Research Infrastructure Strategy

Released
5th August

Vision

User-centric design must lie at the heart of Australia's NDRI system.

Australian researchers, from all disciplines, should have access to cutting-edge, sovereign NDRI capabilities to continue delivering world-class research and innovation.

Outcome 1

UNDERPINNED BY TRAINING FRAMEWORKS FOR RESEARCHERS AND NRI WORKFORCE

Supporting researchers and NRI workforce to enhance the quality of their research.

Without a strong NRI workforce, research will not reach its full potential.

Government and NRI providers should work with researchers and staff to address short-term and long-term workforce training opportunities.

Capability

Outcome 2

RESPONSIVE TO TECHNOLOGICAL AND SOCIETAL SHIFTS

Emerging Technologies

Outcome 3

CONSISTENT IN ITS STANDARDS FOR DATA COLLECTION, CURATION AND ACCESS

Opportunity:

Ensuring Australia's growing volume of research data is as FAIR as possible will offer benefits to researchers.

Increasing the volume of research data are not FAIR compliant.

Approach:

A sector-wide data management framework that supports FAIR/CARE compliance nationally.

Data

Outcome 4

INTEGRATED ACROSS LEVELS OF COMPUTING AND DATA INFRASTRUCTURE

Opportunity:

A sector-wide data management framework that supports FAIR/CARE compliance nationally.

Research expansion may be limited by inefficient data management.

Pursuing different data management approaches to support shared data.

Compute and Data

Outcome 5

CYBERSECURE, PARTICULARLY FOR NATIONAL-SCALE DATA AND COMPUTING

Enforcing cybersecurity standards for NDRI systems and sensitive data sources.

Cybersecurity standards are not consistent across NDRI systems.

NDRI providers should support assessment and implementation of cybersecurity standards, underpinned by system-wide trust and identity solutions.

Foundations

Outcome 6

MAXIMISED BY OPENLY AVAILABLE RESEARCH SOFTWARE TOOLS

Opportunity:

Supporting the development of software tools that enhance NDRI capabilities and efficiency in research conduct.

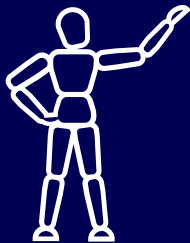
Software tools are important, yet their development is not well supported.

Research tools should be recognised with equal importance to NDRI computing, data and networking capabilities.

Software

Implementation

An independent NDRI Working Group will develop an NDRI Investment Plan to implement the NDRI Strategy. The NDRI Investment Plan will be underpinned by stakeholder engagement and guided by the NRI Advisory Group. The Investment Plan will be funded, implemented, and monitored through NCRIS.



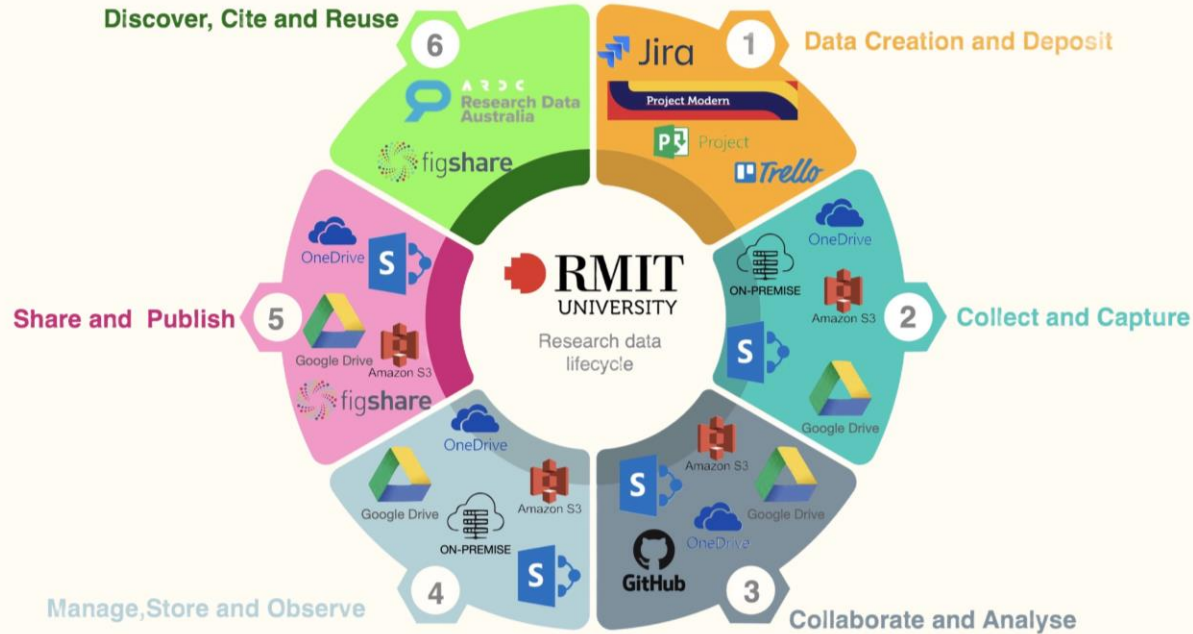
Key recommendations

1. Implement a Safe Research Sandbox/Fumehood Environment
2. Develop a Data Management Ecosystem
3. Hybrid Data Storage Solution
4. Define a Base Level of Personal Computer Policy
5. Establish an Internal Research Cloud
6. Develop a Multi-Cloud Ecosystem
7. Implement Institutional Access Schemes
8. Create a Software Catalogue
9. Develop a Comprehensive Training Program
10. Foster communities of Practice and Local Champions
11. Establish a Digital Research Infrastructure Unit



Data

OUR **SOLUTION HYPOTHESIS*** IS ...

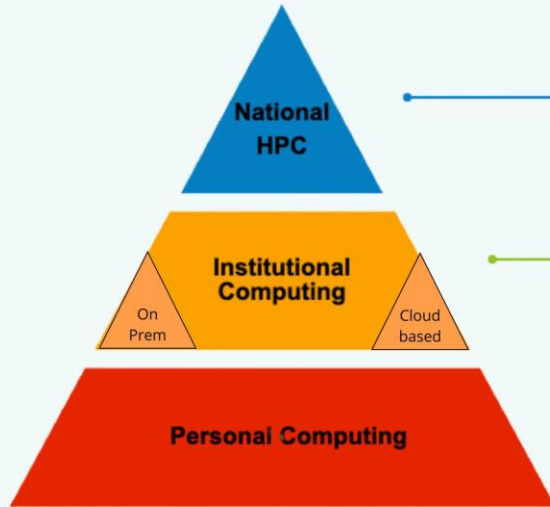


*A high-level outline that describes what the proposed solution would look like. It represents an **ideal yet feasible** solution. Whilst this is a digital infrastructure project, it can include aspects of **People** (Resources, Skills), **Process** (Workflows, Policies) and **Technology** (Including Tools, Equipment and Physical Infrastructure).



Computing

OUR SOLUTION HYPOTHESIS* IS ...



NCI (Pawsey & Others)

1. Sustain, augment & plan for growth HPC resources to meet demand (incl. NCI Partner share).
2. Provide better technical support to optimise HPC utilisation, including awareness of existing support provided by external facilities.
3. Increase visibility and transparency in resource allocation to all stakeholders.
4. Demonstrate the value of investment.

RACE and On-premises HPC

1. Safeguard sustainability of existing on-premises research compute and research technical support (i.e. RACE) and plan for growth.
2. Enhance visibility through on-premise server cataloguing.
3. Optimise on-premises server utilisations and leverage bursting to the cloud to overcome computing constraints.
4. Catalogue research use cases across on-premise and cloud platforms for enhanced efficiency.
5. Prioritise training, technical consultations, and expert services to maximum scientific return.

Laptop, Desktop, Tablet and Smartphone

1. Allocate sufficiently powerful computers to academics and HDR students for daily activities.
2. Empower staff and students with necessary permissions for research computing.

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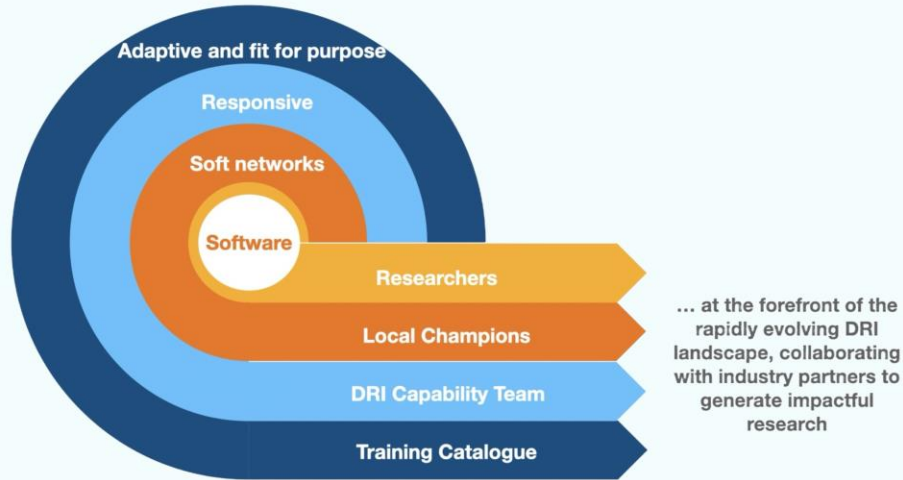
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Capability Uplift

OUR SOLUTION HYPOTHESIS* IS ...

A layered approach where centralized resources are complimented by a DRI capability team and soft networks of local DRI champions. The outer layer is the **DRI training catalogue** consisting of DIY on-demand modules, off-the-shelf training services and bespoke / customized training for particular cohorts. The DRI capability team are **responsive to researcher needs**, updating the catalogue to ensure it is flexible, fit for purpose and promoted across RMIT research communities. The inner layer consists of DRI **local champions** who are academics that facilitate **soft networks** of expertise and advice tuned to specific discipline and research group needs. The champions and DRI team regularly interact to ensure centralized resources are **adaptive and fit for purpose**.

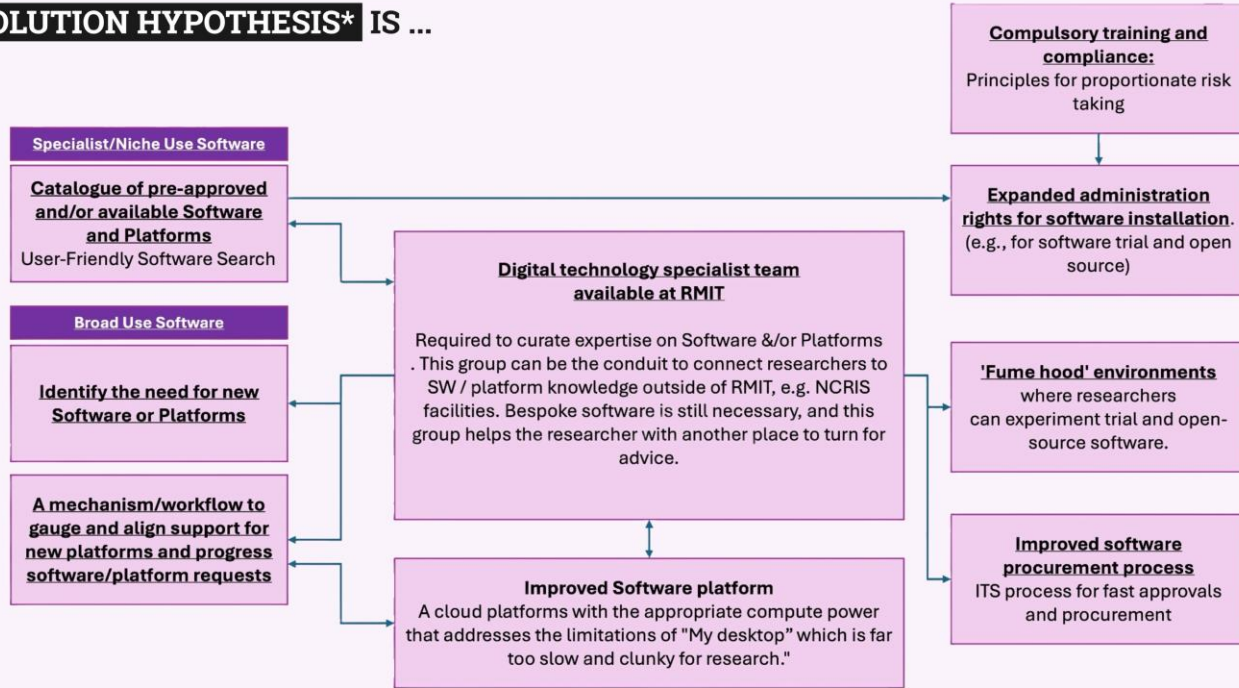


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Software and Platforms

OUR SOLUTION HYPOTHESIS* IS ...

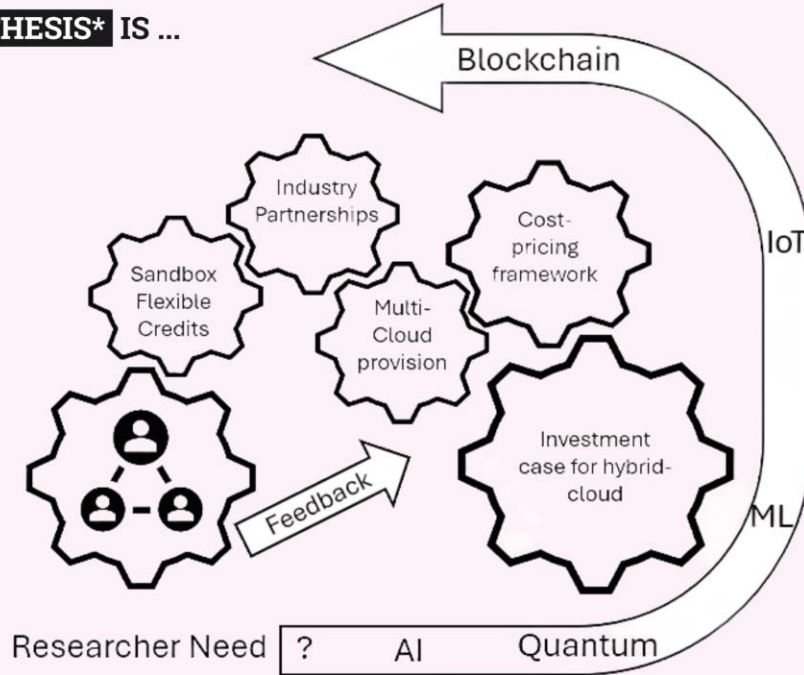


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Emerging Technologies

OUR **SOLUTION HYPOTHESIS*** IS ...



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Benefits to RMIT



Increased research quality, impact and collaboration

Consolidated digital expertise to lift research quality and innovation across the whole university

Improved research data solutions for the whole data lifecycle

Uplift of digital skills through relevant and effective training offerings



Transparent access and sustainable resourcing

One-stop-shop for researchers needing support for digital tools and training

Collaborative research culture through common platforms across the whole university

Sustainable, strategic resource allocation and deployment based on need



Improved safety and compliance

Protocols for the different data requirements from public sharing to highly secure

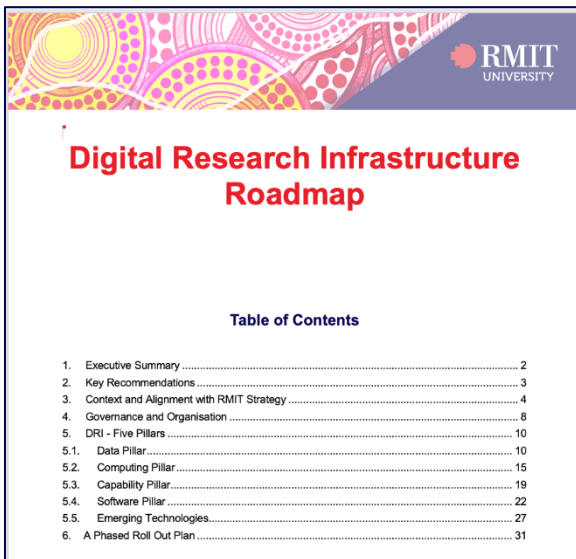
Providing effective risk management protocols for digital research with higher risk profiles



Current state of Roadmap

Two versions:

- Pillar Document
- Full Roadmap version (35+ pages)



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DIGITAL RESEARCH INFRASTRUCTURE

DRI ROADMAP :

EXECUTIVE SUMMARY

1 OF 2

WHY DRI? WHY NOW?

Digital Research Infrastructure provides the digital tools for research in an age where digitalisation and artificial intelligence has become ubiquitous. It spans from the pocket computers that are our phones to national supercomputer facilities, and data that is generated, analysed and shared or stored. At RMIT digital or cyber is being used in research centres names, but all centres are using digital tools. Investments in Digital Infrastructure are known to be associated with large multipliers with research income indicating how critical they are. It is also important that RMIT is compliant with data management principles related to research.

Now is the time to address RMIT's digital research infrastructure. RMIT currently does not have a co-ordinated approach to the provision of digital infrastructure. For example, many universities have made substantial investments into on-premise compute and data storage, which RMIT has not. With the advent of cloud services there is the opportunity to leap frog into the realm of the latest digital technologies. Investments into digital research infrastructure will lift the research output across the whole university with all three colleges increasingly relying on digital tools for their research. Furthermore, at a national level the national collaborative research infrastructure scheme (NCRIS) has a \$400M investment into digital infrastructure over the next four years, hence it is important for RMIT to have a roadmap in place to guide engagement with NCRIS.

WHAT IS IN SCOPE? WHAT IS NOT?

IN SCOPE

Digital Infrastructure tools for research such as computer hardware and software, the data lifecycle, training and capability and new technologies

OUT OF SCOPE

The equipment connected to digital technologies, the RMIT enterprise systems or teaching and learning (although there is opportunity to build off investments into other systems)

WHO FOR? OUR KEY USER GROUP ARE ...

- Researchers across the University, i.e. all Colleges and Schools,
- Digital Research and Computational Specialists
- Research Users of digital tools
- Higher Degree Research students and Early Career Researchers
- Research Leaders wanting to increase efficiency and impact
- ITS - providing a place for discussion and collaboration
- Library supporting data tool
- Executive Leaders

THE 5 PILLARS OF OUR DRI ARE ...

- PILLAR 1** **Data**
Ensures secure, scalable, and compliant data storage solutions that promote research excellence and data sharing.
- PILLAR 2** **Computing**
Provides robust and scalable computing resources, including personal desktop/laptop, through on-premise servers to cloud and high performance computing, to accelerate research discovery.
- PILLAR 3** **Capability Uplift**
Empowers researchers with essential digital skills through comprehensive training and support programs.
- PILLAR 4** **Software**
Manages essential software and platforms to enhance research productivity and streamline software acquisition and use.
- PILLAR 5** **Emerging Technology**
Proactively explores and adopts cutting-edge technologies like AI and quantum computing to stay at the forefront of research innovation.

ORGANISATIONAL BENEFITS

The overarching strategic and operational benefits of the proposed DRI include...

Increased research quality, impact and collaboration

- Consolidated digital expertise to lift research quality and innovation across the whole university
- Improved research data solutions for the whole data lifecycle
- Uplift of digital skills through relevant and effective training offerings
- Improved collaboration within and beyond the institution
- New technology adoption that is timely, flexible and secure
- Attraction and retention of top researchers

Transparent access and sustainable resourcing

- One-stop-shop for researchers needing support for digital tools and training
- Collaborative research culture through common platforms across the whole university
- Sustainable, strategic resource allocation and deployment based on need

Improved safety and compliance for the research risk profile

- Recognition that research involves risk taking
- Protocols for the different data requirements from public sharing to highly secure
- Providing effective risk management protocols for digital research with higher risk profiles
- Improved access to digital research infrastructure by researchers



- Establishment of the **DRI Unit**.
- Secure longer-term **cost-effective agreements with computing providers**.
- Develop the **internal research cloud cluster prototype**.
- Launch an **internal SharePoint** and **bot-assisted DRI** offering.
- Create a **software catalogue and procurement procedure**.
- Make the **training catalogue** available.
- Develop a **costing and pricing model**.
- Establish institutional **Merit schemes**.
- Develop a safe research **sandbox prototype**.
- Create a strategy for the rollout of the **data management plan**.

- Achieve the **DRI Unit's full capacity** (new positions).
- Implement **DRI induction training** and **risk management** procedures.
- Provide **structured data management** to research groups.
- Conduct high-risk research group **fumehood trials**.
- Realign software use to **cloud-ready platforms**.
- Establish a **multi-cloud environment**.
- Operationalise **internal cloud cluster**.
- Ensure timely delivery of **key services**.
- Integrate **AI tools** into research disciplines.
- Expand **cyber-physical systems** use.



2027

- Transition the **Internal cloud** to BAU.
- Provide staff with **data management** options.
- Expand **multi-cloud offering**.
- Promote safe **AI tool usage**.
- Transition **digital fumehoods** to BAU.
- Expand **cyber-physical systems** for data extraction, and remote equipment use.



2026



2025

