## ANU DATA, INFORMATION MANAGEMENT AND INTEGRATION STRATEGY

2023-2026

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## **Executive summary**

#### **Our present**

Our University is poised to deliver a significant transformation in the scale and quality of its digital services and experiences.

At the same time, the data and information assets that underpin these digital services, and the data and information management capabilities that will be foundational for delivery of the Digital Master Plan, are not yet ready to meet the challenge, with direct impacts on student experience and operational performance, and introducing reputational and financial risks.

Our data and information assets are frequently inaccurate, out of date, created from data lineages that are not understood, and used in ways that are not appropriate as we lack communicated definitions that can help people choose the right data.

Progress has been made in the management and use of data over the preceding decade, however given the risks to our transformation and criticality of succeeding in this generational revitalisation of our digital ecosystem, action is urgently required in capability, awareness and culture.

We do not underestimate the significant effort required from all our people, but we need to act now.

#### **Our future**

Our Digital Master Plan provides an opportunity to transform the way in which we create, share and use our information and data. We will use the momentum of this transformation to build critical capabilities in data governance, quality management, integration, and analytics to support an Al-enhanced future.

We will support our teams to grow the management and custodianship of data, delivering shifts in experience and outcome across our student, learning and teaching, research, engagement and corporate communities. We will enable a single view of student, a federated data ecosystem that enables sharing and reuse, enhanced data security and privacy to protect the University's reputation and critical assets and make our data discoverable to those that need it, when they need it, and in ways that empower our community to be data-enabled and our processes to be data-driven.

Interactions with our digital services will be personalised to our needs and individual circumstances, our preferences, and to the context in which we find ourselves. Our practices will be based on the ethical collection, use and destruction of information, and will involve informed consent, and the information we collect will serve to benefit individuals and the common good.

To deliver these outcomes, we will enhance the value of our data estate to ensure that it supports and accelerates our future success in a rapidly-changing sector, and we will fund and resource our data teams appropriate to the challenge.

Our transition will be carried out in a series of repeatable iterations, to build momentum and confidence, and increasing pace as we proceed. Together we are creating a data-powered foundation for the coming century.



## ANU information, data & integration strategy

#### **Our Purpose**

To serve society through transformational research and education

#### **Our Data Enabled Future**

Our services are data-driven, personalised, ethically delivered, and serve to enhance connection across communities, between services, and through seamless digital technologies

#### **Data Driven**

- Trusted data
- Accessible while secure
- Automation & Al

#### Connected

- Connected communities
- Connected services
- Connected data & technology

#### Personalised

- Individual circumstances
- Preferences
- Context-specific

#### **Ethical**

- Collected to be used
- Consent
- Common & personal good

#### **How We Will Get There**

We will invest in our People, Capability, and Platforms, and change through Iteration



#### **People & Culture**

- Data resourcing levels
- Stewardship
- Data literacy
- Supported teams



#### **Mature Capabilities**

- Information management & data governance
- Integration
- Data quality management
- Security and privacy



#### **Modern Platforms**

- Integration events, streaming, lakehouse
- Analytics & Al
- Content management & discovery



#### **Iterative Change**

- Coordinated
- Prioritised manageable slices
- Iterate & accelerate



# The University will deliver a new paradigm for managing our data and information estate

We will **define the business priorities** for Insight, Information and Data and **iteratively deliver** to these priorities, to build momentum and confidence, increasing pace as we go.

We will redefine our data as an asset – through communication, building a data-literate culture, developing a bias for action and improvement, through assigning clear accountabilities for increasing data asset value, and through measuring progress with clear KPIs. These changes in focus will affect all of us.

We will get the value and outcomes we need from our data, by **building the capabilities**, skills, platforms, information asset quality, integrations, and by **properly resourcing a data function**, that will deliver those outcomes.

We will **implement University data stewardship**, **governance policies** and **management mechanisms** including assignment of roles and responsibilities across our ANU digital landscape, and we will collectively be **guided by the data principles** that set the guardrails between which we travel.

We will transition from thinking about and investing in systems primarily, to a model of **managing the governance and control of data** on an equal and distinct footing to the systems that provide access to that data.

We will **provide key data services for our community** and ensure that the necessary data supports are present to power our emerging digital services.

We will ensure that security and privacy is at the core of our data offerings

We will address **data quality**, including completeness, consistency, and usability, and iteratively **build the value in our data and information assets**.

We will **implement a transition plan** that is actionable, tangible and pragmatic, with **specialist data resourcing** commensurate with the gaps and needs.

At the same time, we will inform and **support currently running program**s, to de-risk and enhance their effectiveness.





## Our people have shared that...

"We have key data gaps that are only found in distributed spreadsheets e.g. I can tell you who convenes a course but I can't tell you who taught it... sometimes the same, sometimes not"

"Projects and business units run in silos, trying to take data from one system to another but data models do not line up"

"We have trouble managing even basic corporate data. For example, I would like to know who my staff are but there is no definitive source"

"Integration happens for projects system by system - not holistically"

"There is reuse by cut/paste, sometimes with modification, and 'swivel chair' integration"

"The default is to say no to data sharing and access, which comes from a place of fear, rather than 'yes, with controls'"





## We've made progress to now

Our teams are working hard to manage the data and information we hold in stewardship, and to make it available to others.

#### **Reporting - Corporate**

We have achieved a level of maturity in the way in which we manage the information assets required for government reporting, with key processes documented and accountabilities identified. Local variation in processes and information assets exists in some areas.

#### Operational Database Design-Corporate

We have an established Database Administration team to manage corporate database in support of the University's operations.

#### Documents & Records Management

- Corporate

We have defined and documented our processes for documents and business records over their lifecycles. Our people have the required skills to perform their roles.

#### **Information Design**

- Research

Our Researchers are, in general, competent in designing information assets and in effectively and consistently communicating existence of their information assets. They tend to have good processes in place to ensure high quality of data and information.

#### Data Warehousing & Big Data Design - Corporate

Our team have strong capabilities in data warehousing. Processes are established, documented and managed to the required standards despite some manual overhead on the team, the condition of the information assets is considered to be good.

## Information Security & Privacy Management

- Corporate

We have identified and documented key processes for managing information security and privacy.

We have also assigned accountabilities to mitigate identified information risks.

#### Web Content Management - Learning & Teaching

Our academic community has a level of proficiency and is accountable for ensuring that key processes are documented, and that learning and teaching content is managed to the required standards.

#### Data Mining & Analysis - Research

Our researchers have data analysis as a core competency, and in many cases have substantial analytic skills that are applied to research data.





## Our community have universal data & information challenges

Sharing from our community has identified a suite of recurring challenges, that impact experience and outcomes for people and the University.

#### **Single View of Students**

- Our Students are required to repeatedly enter the same information into administration and management systems, due to the disconnect between our colleges, schools and corporate functions.
- Our Academic and Professional staff's ability to support students effectively is impacted by duplication, inconsistencies and incomplete student data.
- Our Professional Staffissue repeated requests for students to provide sensitive information (e.g. disability details), as information is not shared between key systems.

#### Data Sharing in a Federated Ecosystem

- Our Professional and Academic Staff have difficulty in monitoring and tracking operational performance due to a lack of visibility and limited access to information between schools, colleges and corporate functions.
- Our Professional and Academic Staff struggle with increased workloads due to data that they manage in spreadsheets and isolated systems.
- Our people, especially our Researchers, experience obstacles with collaboration and data sharing, caused by limited access to modern storage platforms and common tools.
- Our poor information about people and their roles does not allow us to easily enable role-based access to data

#### Fulfilment of Data and Information Management Obligation

- Our Professional and Academic staff struggle with balancing their normal workloads alongside the fulfilment of their data management obligations related to legislation, security and privacy policies, in the absence of simple supporting processes and tools.
- We have variable levels of data and digital literacy across the university. Many of Our Professional and Academic staff struggle to fulfil their data and information management obligations.

#### **Data and Information Navigation & Discovery**

- Search currently does not allow data asset discovery impacting all University communities.
- Our users find alternate ways to create and share data/information, and the workarounds performed are mainly manual and siloed, impacting all University communities.
- Our users have limited knowledge and trust in what data/information is available, impacting all University communities.
- Our people are often using incorrectly sourced data for their processes, due to a lack of standard definitions for common datasets.

#### **Data & Information Traceability**

- Our users frequently do not trust the University's data, or trust that they have the most accurate and current information.
- Our data teams are currently spending significant time matching and cleansing data that has been impacted by operational changes that have been poorly communicated. Impacts also arise from an inability to see where data has originated from and what changes may have been made to it en route.
- With an inability to confirm the lineage of our data, we face risks related to data retention and compliance.



## We have gaps in both capability and platforms that are driving our issues

We have University-wide challenges across key Enterprise Information Management capabilities, and the technology platforms that support them.

#### **Capability and Practice**

- Information Strategy change has been based on systems with little awareness and prioritisation of data assets. This has been paired with underinvestment in data planning and information management has degraded our information and data estate.
- Information Governance while improving, our implementation is impaired by resource constraints, a need for greater communication and cultural shifts, and agreed data definitions.
- Information Security & Privacy Management data access and availability challenges are causing duplication and informal data sharing workarounds, and degrading ease of use, in addition to variable levels of cybersecurity literacy.
- Data Management our practices are degrading data access, availability, quality, management of the data lifecycle and traceability.
- Data Integration & Interoperability Design data and information silos and gaps are impacting outcomes across Research, Learning & Teaching, and Corporate. Our community are falling back to manually duplicating and moving data, and have universal difficulties in locating, matching and cleansing.
- Capacity data teams are under-resourced to deliver services appropriate to need.

#### **Data Management Technologies**

- We have a proliferation of small tools and underutilisation of integrated data management platforms
- We lack a modern data management platform with cloud-native and hybrid capabilities, spanning integration, discovery, quality management and analytics.
- A number of cybersecurity technologies are planned to resolve gaps in our threat landscape, but are yet to be implemented at scale.
- New data storage forms are missing including a variety of nonrelational and cloud-native options.
- We have a proliferation of data access technologies, that cannot leverage common services including for security and data quality.
- Technology alone will not solve this, we do not have sufficient capacity in our data management teams to get the best from our existing and planned technology investments.



## Our data challenges are creating unacceptable risks to the University

We consulted with the University community, who identified the following data domains as focus areas given their risk profile and impact.



#### Student

#### Observations

 Our Student data is disconnected and duplicated across the lifecycle, stored in a myriad of systems and applications – including spreadsheets

#### **Impacts**

- Negative student experiences across all stages of their journey
- Inability to provide timely/targeted services
- Negative staff and educator experience

#### Risks

- Cost / outcome impacts for running programs incl. CRM
- Operational performance loss through duplication of effort
- Ineffective administration processes and technology usage
- Reputation and brand impacts as students receive poor experiences
- Quality and timeliness of the Student First Program delivery may be impacted

#### Learning & Teaching

#### **Observations**

 We have difficulties accessing data and reporting, relating to student learning and outcomes

#### Impacts

- Student support and experience
- Potential revenue loss from government funding, particularly for HDR students
- Ability to plan staffing load for teaching leading to over or under resourcing
- Inability to support student learning journey due to lack of learning analytics

#### Risks

- Operational and financial performance impacts
- Reputation and brand impacts
- Legal and compliance impacts

#### Research

#### Observations

 Our processes and systems often do not provide an easy path for researchers to comply with policy while conducting research, leading to frequent divergence from policy and data management best-practice

#### Impacts

- Inconsistent individual management of sensitive and confidential data sets, reducing the ability of the University to protect and assure key information assets.
- Data is not visible outside of individual research teams.
   Valuable data sets are lost when people leave/retire.

#### Ricks

- Legal and compliance impacts.
- Reputation and brand impacts due to data breaches or misuse, including risk to future grant funding.

#### Staff

#### Observations 5 1

 Our information related to our people; staff, and educators – for positions and roles, in particular, is inconsistent, duplicated, and poorly maintained

#### Impacts

 Data access and management challenges preventing staff and educators from being able to perform dayto-day tasks often resulting in manual workarounds

#### Risks

- Legal and compliance impacts as data is incorrect or missing, or sensitive data is shared informally
- Reputation and brand impacts as student learning experiences are impacted
- Operational performance impacts as staff repeat tasks or create manual workarounds

#### Governance & Risk, Legal & Compliance

#### Observations

 We have policy gaps and policy implementation challenges related to information and data management across the University

#### Impacts

- Storage and inappropriate retention of data sets make any breaches or disclosures more impactful
- Unintentional sharing of data and information containing sensitive or personal information
- Ability to meet mandatory reporting requirements

#### Risks

- Legal and compliance issues
- Operational and financial performance impacts
- Reputation and brand damage due to data breaches or misuse

See Data, Information Management and Integration Strategy – Supporting Document Section 04 for detailed assessments.



## Our data-enabled future "We need to treat data as an asset, for the benefit of the whole University" **ANU Executive**



## Our revitalised data estate will change the game for our communities



#### Student

- Enriched data insights into ANU students have provided better-tailored offerings.
- More accurate student load predictions have led to improved planning.
- We have better provisioned our resources to students at ANU, delivering better student outcomes.
- Our breadth of data has driven equity and diversity goals through improved insights into student demographics, and better-targeted recruitment activities.
- Our 'single view of student' has improved the student experience through more accurate communication, targeted information, simplified processes, and reduction in duplicate information collected from students.



- We have easier access to assessment data, to empower educators in supporting learners.
- We have a more accurate and accessible view of each student's learning profile, to provide insights for educators and lead to an improved learning outcome.
- We have a better and more tailored learning experience, and increase student success and retention, through accurate student equity and diversity profiles.
- We have integrated survey data with the breadth of student learning data to provide insights into learning patterns that will drive more inspiring programs of study.
- We have provided data to enable new and more flexible modes of study, that deliver enhanced learning experiences.



#### Research

- We have shared data assets and infrastructure that is accessible to researchers to improve research outcomes.
- We have AI and Machine Learning capabilities that can be used to support research activities.
- We have a platform to enable collaboration on research data across the university and external research partners
- We have 'Corporate' capabilities that can be consumed by researchers to assist with managing the entire data lifecycle, for example, metadata management, master data sets, and tooling to track data linage.



## Our revitalised data estate will change the game for our communities



#### Staff

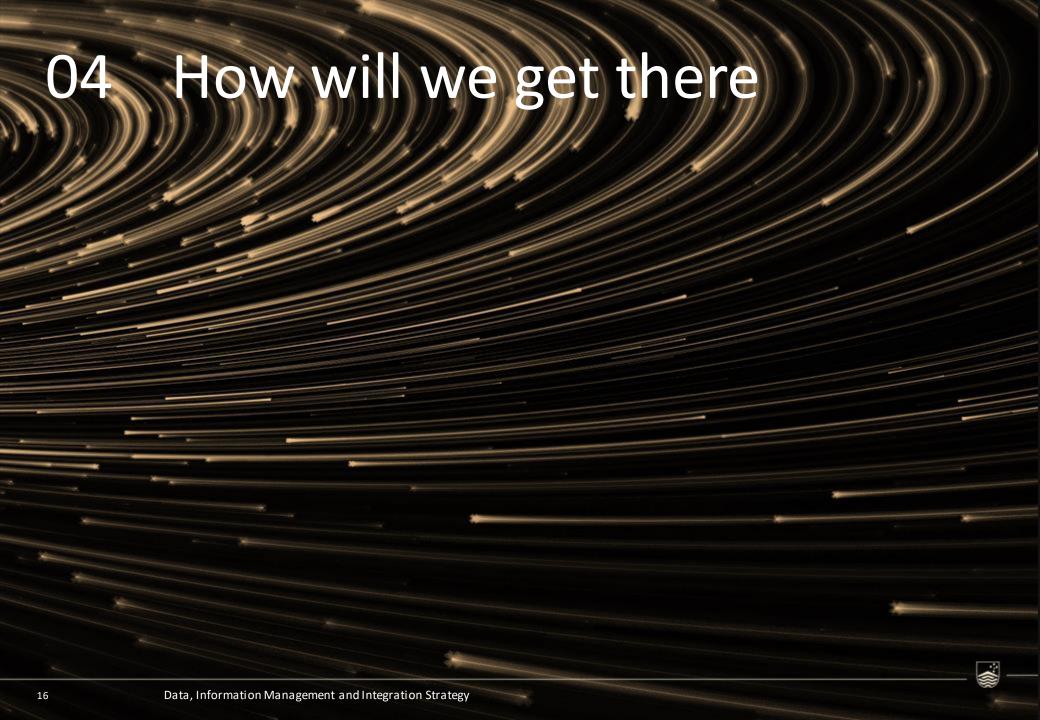
- Our improved resource management has made for a more effective workforce, helping to drive better research and teaching outcomes.
- We are better able to meet the challenges that diversity and equity groups face, through improve didentification.
- We have improved data security and ensure that accurate University role data determines the information that staff members are entitled to access.
- We have built a better workforce by providing more timely and accurate staffing profile which has increased productivity and allowed the ANU to tailor opportunities for a cademic career advancement.
- Our people have access to integrated, consistent, and user friendly tools to support data and information management activities across our data and information management lifecycles.
- Our consolidated and standardised views for analysis and reporting have reduced the need for manual sourcing, matching and collation of our data, and enable us to spend more time on deriving insights.

#### Governance & Risk, Legal & Compliance



- Our community requires less effort to meet compliance requirements, through stronger access permissions, more accurate data and clearer data lineage and traceability.
- Our University has reduced the risk of data compromise and exposure, through the communication of clear policy, increased data literacy, and provision of support to help our people do the 'right thing', easily.
- Our frame work for **data quality** has provided curated and trusted data and allow for the identification of issues that could impact the University's reputation.
- Our Unified Data Architecture has provided a centrallocation to implement security and privacy controls. We are able to tags ensitive data sets, records and fields, track data lineage and usage, and to control what is accessed by whom, and when.





## We will build our data, integration and information management capabilities

We have prioritised specific foundational data management capabilities that span the entire University, enabling Research, Le arning & Teaching, and Corporate, and that will set the University up for success. Our change program will iteratively build on these to support our communities and expand the value from our data and information assets.

#### **Our foundational capabilities**



#### Information Governance

We will support the Information Governance capability to improve understanding and adherence to policy, adoption of processes and tools enabling staff to fulfil their and the University's legal and compliance obligations.

#### The benefits of this approach

- Entire University community is aware of their obligations regarding data, particularly those dealing with sensitive data in Research, Learning and Teaching and Corporate activities.
- Defined responsibilities and accountabilities for data s tewards and custodians.
- A policy fra mework that supports the safe reuse of data.



#### Information Architecture

We will implement a corporate capability that defines and governs principles, standards, and patterns for the design of the University's information and data assets, aligned to our strategy

- For corporate activities, there will be a defined design process for data, independent of any systemit is associated with.
- Principles, standards and patterns will define the way that we work with, and handle data, to
  extract greater value and benefit from our data assets.
- Standard definitions will remove ambiguity, improve understanding, and provide clarity on our data and information assets in terms of content and intended usage



#### Information Security & Privacy Management

We will leverage the existing foundation, and uplift processes, technology, and tools to enhance compliance assessment and monitoring, in order to mitigate security and privacy risks.

- Improved management of risk for Corporate data sets, Research and PII.
- Ability to obfuscate, de-identify, anonymisation, and mask data to enable sharing in a safe and privacy preserving way.
- Enforcing retention periods, and removing or moving offline data that is no longer required to be directly
  accessible.
- Accurate role and organisational structure information to drive access management and to mitigate security and privacy risks



#### **Enterprise Search**

We will enhance the University's search toolsets to include data and information asset discovery with expanded metadata management processes and features to enable this.

- Improved collaboration across our community and expansion in interdisciplinary research and teaching.
- Empowered people with easily accessible and contextualised knowledge.
- Reduction in data duplication by enabling staff to find not just content, but also data sets, to
  access sources of truth directly and securely.

See Data, Information Management and Integration Strategy – Supporting Document Section 04 for detailed assessments.



## We will build our data, integration and information management capabilities (cont.)

#### **Our foundational capabilities**



#### **Data Integration & Interoperability Design**

We will uplift existing integration capability to improve the exchange and consumption of the University's data between sources and enhance semantic interoperability.



#### Reference & Master Data Management

We will establish a corporate capability for enterprise master and reference data synchronisation across the University, leveraging tools and technology for automation.



- Support the diverse range of data access and sharing needs within our community.
- Elimination of spreadsheets as a sharing mechanism for key data sets through direct reference from within the Unified Data Architecture.
- Ensure that the most current and accurate data is used for our processes and decisions.
- Our systems and data will be integrated and not siloed
- Accurate information to support our processes and decisions.
- Reduction in manual and error prone data entry, and reduction in duplication.
- Improved key data sets that underpin our processes and systems, including related to people, addresses, authoritative sources for Field of Research (FoR); and organisation structure data sets.



#### Metadata Management

We will build a corporate capability for metadata management, improving data discovery, data sharing, data quality management, and collaboration across our communities, including research.

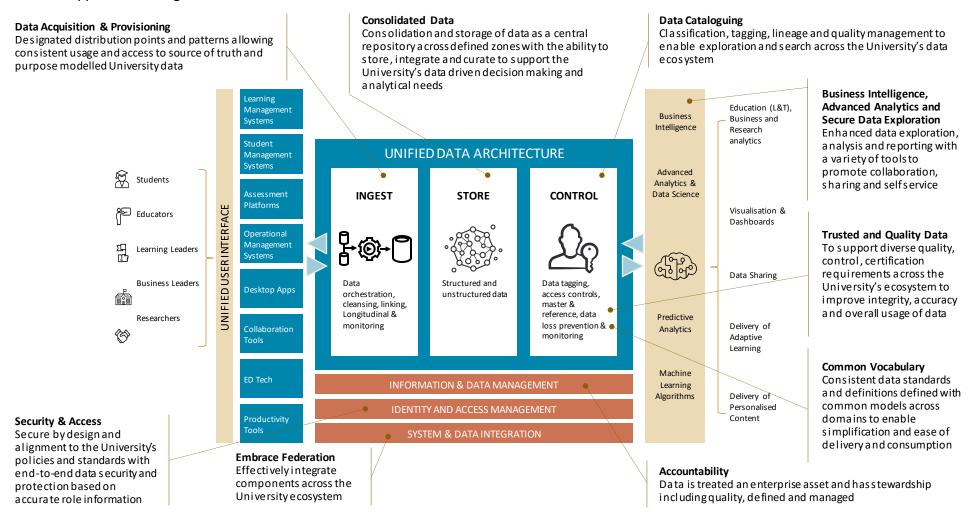
- Foundational building block for all other higher order information and data management capabilities
- Maximise the value from our data sets, particularly in the research domain.

See Data, Information Management and Integration Strategy - Supporting Document Section 04 for detailed assessments



## A Unified Data Architecture underpins our data future

We are building the Unified Data Architecture incorporating capabilities that will support the University through the digital shifts that are coming, and in support of our Digital Master Plan.



See Data, Information Management and Integration Strategy - Supporting Document Section 06 for detailed target data architecture



#### Benefits of a Unified Data Architecture

We will apply a coherent technology portfolio lens, over piecemeal solution approaches, to drive policy decisioning based on fit with broader University technology standards and strategic direction.

#### **Expanding Information, Data Management & Integration Coverage**

Standard and add-on products covering the end-toend data and information management lifecycles, with heavy focus on security and governance integrated across all services

#### Improved Supportability & Reduced Cost of Change

Improved supportability and reduced cost of change as new versions, features and functionality are released, with cloud-native and hybrid capable suites bringing simplification to version and release management

#### Increasing Product Innovation & Development

Access to constant innovation and tool suite development, through 'as a service' products that are self-updating with feature releases and capabilities, e.g. embedding of Large Language Models.

#### **Ensuring Skills Availability**

Ease of use and skills availability across an integrated and best of breed platform.

Robust graphical user interface (GUI) and intuitive product design leading to reduced reliance on complex coding, to reduce resource acquisition issues and training needs.

#### **Ensuring Product Integration & Compatibility**

Ability to support legacy applications, tools and technologies, for backward compatibility as well as forward-looking supportability as the University transforms.

#### Unlocking value from data and information assets

A unified view of enterprise data sourced from the multitude of University systems of record in a separate purpose built platform for improved access, reusability and quality to support data-driven decision making and more effective data management.



## We will fund and resource integration to unlock our data



#### We have a dependency on integration to bridge our silos

Integration is the engine that makes our data useful, and that brings it together with other sources that turn it into valued information, and ultimately knowledge. With a highly federated and structurally complex environment, the University has an enormous need to share, combine, analyse, and coordinate our information and data resources.

#### Our current deployed solutions are not ready by themselves

We have an integration platform, but the forms of integration currently supported are limited to application messaging, and do not support the broader set of integration needs that will form the underpinnings of the Digital Master Plan. These include: data virtualisation, data synchronisation, master data management, support for hybrid-cloud data environments and cloud-based Event Driven Architectures, access to Integration Platform as our Service (iPaaS) environments and features, and event streaming, in addition to traditional messaging and SOA mechanisms. This limits our ability to support modern analytic needs, coherent integration at scale, and new forms of data generation including from collaboration platforms, sensors and IoT networks that will form the basis of the Smart Campus and modern learning environments.

#### We will fund and resource integration to match the challenge

We will appropriately resource our integration capability, and ensure the right technology platforms are available to deliver the variety of integration needs that we have, at the scale that we have them. Incoming demand for access to information and data from our University community will be managed through a common process for identification, prioritisation and execution.

#### Central services will support data consumers in our college, school and corporate teams

Central data services will be provided for both integration between applications, and integration of larger datasets to enable analytics and AI. To support devolved autonomy and to empower our federated university model across colleges, schools and business units, our community will be provided with the ability to self-serve their information and data needs against these services, while at the same time, these data services will be protected by robust controls.



## A new operating model is emerging

Our target operating model will factor in the following considerations as part of its evolution

#### **Resourcing and Capacity**

Resourcing and capacity constraints have a significant influence on which roles and functions should be held internally at the University.

Uplift in Subject Matter Experts retaining IP internally complimented with specialised external resources in order to implement the strategy, is one pathway to be evaluated as part of the target operating model initiative.

#### Buy, Build or Partner?

'As a service' offerings originally focused on a cloud based subscription, however today almost all organisational capabilities, not just technology can be packaged as a service.

Consideration of what the University should buy, build or partner aligned to strategic direction and to improve operational effective ness will be key to successful implementation and shaping the University's future ways of working

#### Change & 'Business As Usual' Contention

To effect change and implement the data strategy, delineation between change and business as usual activitiess hould be considered to remove existing resource contention and priority conflicts for the University's staff.

#### **Roles and Responsibilities**

We will need clearly defined data roles (both new and existing throughout the University) as part of our new ways of working, and to support capability uplift and implementation of the strategy. Existing resourcing is not sufficient to realise the benefits of this strategy.

#### Deriving value from data and information assets

Educating the University community to treat data as an asset will be key to deriving tangible benefits.

Reducing operational costs, increasing revenue and generating income is a tangible way to demonstrate how value from data and information can be derived, monitored and measured.

#### Processes backed by automation

We can leverage next generation data cap a bilities to create streamlined and a utomated processes to overcome a number of existing challenges with data management and governance across the University.



## We are guided by our Data, Information Management & Integration Principles





## Our roadmap has 3 mutually supporting streams

#### **Our Program of Work**

Initiatives are grouped into 3 streams;

- · Data, Information Management Foundation,
- United Data Architecture Foundation and
- Organisation Transition

All 3 streams will run concurrently with interdependencies to be fully mapped as part of the detailed scoping and planning activities based on the data domain selected.

#### Repeatable and Flexible Initiative Template Structure

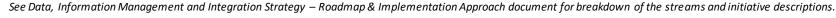
This stream and initiative template approach will be applied to valuable and manageably sized slices of the selected data domain, to enable incremental value and flexibility, while considering logical dependencies between work packages for cohesion and speed of delivery. This will also build foundational capability in Data, Information Management and Integration incrementally.

For example, when considering the student domain, an initial small 'slice' may be to focus on biographical data (or a subset of), and then to look at enrolment and program data in subsequent iterations.

Data & Information Management Foundation

Unified Data Architecture Foundation

**Organisation Transition** 

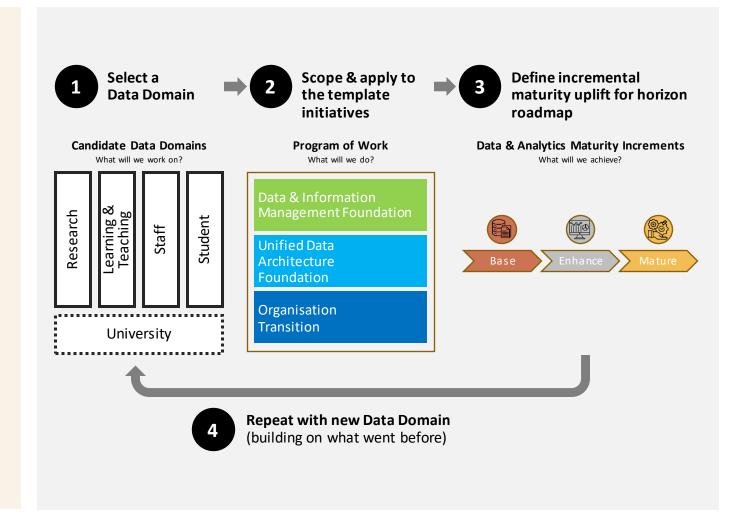




## We will implement our 3 streams incrementally

This approach enables data domains to be added or enhanced alongside capabilities, incremental value realisation and the University's strategic priorities.

Establishing a sound foundation enables the extension of existing domains, or adding new data domains and capabilities through incremental delivery.



See Data, Information Management and Integration Strategy - Roadmap & Implementation Approach document for breakdown of the streams and initiative descriptions.

