ACT Government
Transport Canberra and City Services

Framework Summary

Enterprise Data Management Framework Summary

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1.0 What is Enterprise Data Management?

The Enterprise Data Management Framework (EDM) enables TCCS to develop sustainable, dynamic and robust data management practices to help achieve its strategic vision of *'making Canberra attractive, safe and easy to move around'.* EDM helps to manage data as a strategic asset that would help TCCS achieve its business objectives and empower TCCS to be a data driven organisation.

By implementing an EDM framework we can improve the usability, regulatory compliance and trustworthiness of our data assets. This will lay the foundations for TCCS to use data more effectively and for the directorate to harness reliable and high-quality data to make data driven decisions and develop evidence-based policies.

This document summarises key components of the EDM Framework.

2.0 Why implement EDM?

2.1 Current data management practices

The Directorate's current data management practices need to have an enterprise level oversight. Some of the main issues with TCCS's current methods are:

- Data entry and management processes are often manual and not automated
- Collected data is often kept by business units in silos and stored in excel spreadsheets or standalone operational systems
- Data is often shared without sufficient access controls
- Multiple tools are utilised across business units which can lead to inconsistent reports
- Knowledge about datasets is often held by sole individuals within business units

These issues can results in:

- Data inconsistencies
- Unreliable metrics
- Increased regulatory risks
- Loss of business knowledge

This approach to data management results in wasted hours of labour locating and cleaning datasets. Trust in the reliability of TCCS's data is also eroded and regulatory and policy risks are increased due to the incompleteness of data available for strategic decisions making.

2.2 Increase usability

Good data is the foundation for analytics. An effective data management framework is needed for TCCS to extract the most value from its datasets. To use data effectively to meet TCCS' strategic goals, the data must be both accessible and useful.

This requires TCCS data to be standardised and stored in a consistent way which is and both secure and accessible to all TCCS business units. This will provide improved usability by:

- Having a central point of contact and streamline business analytics where multiple data sources are involved
- Having consistency across datasets and data processes leading to higher quality data
- Improving reliability of business insights and evidence-based policy

- Business process improvements to increase efficiency and productivity by reducing lost time searching for data or capturing data
- Assisting data users in understanding the context of the data they use

2.3 Improve regulatory compliance

All TCCS employees are subject to legislative, regulatory and privacy obligations which impact how the Directorate stores, accesses, regulates, uses and collects personal information. Sharing sensitive personal information which may be contained in datasets may constitute a breach of legislative requirements under Information Privacy Act 2014 (ACT), Workplace Privacy Act 2011 (ACT), Public Interest Disclosure Act 2012 (ACT) or Public Sector Management Act 1994 (Cth).

Presently, the Directorate has no enterprise wide mechanism for monitoring regulatory, legislative and privacy compliance. Furthermore, the risk of breaching our legislative and regulatory obligations is exacerbated by datasets often being shared through emails. This creates multiple copies of a dataset making compliance difficult to track. Consequently, for TCCS to be confident in our regulatory compliance an effective system for monitoring, controlling and recording who has access to different aspects of our data assets is vital.

2.4 Increase trust

In order for TCCS to confidently make data-based policies and decisions, the Directorate must be able to trust the reliability of the data. Without an enterprise wide governance structure in place:

- Data is shared without record
- It is difficult to track the source and end use of every dataset
- There is no data quality assessment framework in place to quantify the reliability of a dataset

Without being able to determine sources, uses and the reliability of datasets, it is extremely difficult to foster trust in TCCS's datasets.

By implementing an EDM scheme, the Directorate will be able to increase trust in the validity of TCCS data by being able to perform quality assurance and quality control checks. This will have significant benefits within the business context and result in more accurate evidence-based decisions leading to greater trust in subsequent policies. Improved evidence-based decision making will ensure that the intended outcomes of policies are reached, leading to improved social outcomes for the public.

3.0 How do we implement EDM?

3.1 Guiding principles

The guiding principles underpin how TCCS' EDM program should be constructed, implemented and reviewed, and are as follows:

3.1.1 Data centric

TCCS recognises that data is central to all directorate activities and is vital to effective service delivery.

We will:

- Treat data as a valuable asset
- Champion evidence-based policy and service delivery
- Use data as a tool for maintaining business continuity, generating insights and informing decision making processes

3.1.2 People focused

TCCS recognises that data's value is in how it interacts with people.

We will:

- Collaborate with TCCS employees and seek to understand their specific data needs
- Be responsive, open and understanding to different perspectives
- Strive to become a learning organisation that ingrains knowledge transfer
- Engage with the data community to teach, learn, share, ask and listen
- View data literacy as a vital skill

3.1.3 Data smart by design

TCCS recognises the need to be data smart in our EDM design to ensure our data architecture is effective and pre-empts future needs.

We will:

- Capture data correctly the first time
- Store data and metadata in a format which is non-proprietary and machine readable
- Embrace consistency in data collection to ensure data is accessible, measurable and usable
- Consider governance, appropriateness and security requirements in our design

3.1.4 Agile

TCCS recognises that agility drives value and that quick responses are needed for emerging data management challenges.

We will:

- Welcome change as a driver for improvement
- Embrace practical and flexible governance strategies that will help with data integration
- Balance durability, scalability and flexibility
- Value continuous improvement, innovation and evolution

3.1.5 Accessible

TCCS acknowledges that data must be appropriately discoverable and shareable within a controlled environment.

We will:

- Seek to understand the context of data and create appropriate data dictionaries to inform data use
- Communicate data management practices in an understandable manner to all Directorate employees
- Educate employees about data ethics, governance, security and respect for clients when handling data
- Produce data in appropriate and machine-readable formats

3.1.6 Secure

TCCS understands that data must be protected against misuse and corruption in order to maintain trust in our datasets.

We will:

- Embed understandings of legislative, regulatory and industry obligations for collecting, using and sharing data
- Determine suitable controls and permissions
- Classify and determine privacy and security requirements of datasets

3.2 Trust

To produce excellent services for the Canberra community, the Directorate must be able to trust their datasets so that areas of improvement can be identified, and confident data driven decisions and policies can be made. Implementation of best data practices endows trust on our data assets. EDM governs how TCCS interacts with data to provide assurances on the quality of and trustworthiness of our data.

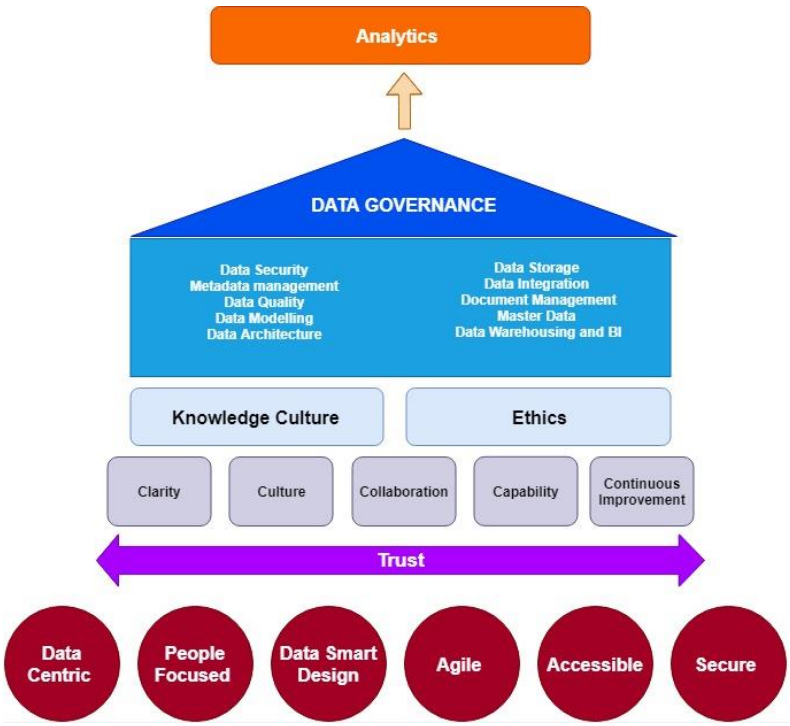
We will build this trust by:

- Applying consistent and standardised data practices to maintain security, integrity and auditability of our data
- Continually seek and welcome data quality improvements
- Understanding and managing how data moves through our organisation
- Utilising business subject matter experts to contextualise and enrich information about data assets
- Documenting corporate knowledge on business data assets
- Providing assurances that our data management practices are compliant with relevant legislation, policy and strategies for the directorate.

3.3 Enabling capabilities

In order to create a receptive business landscape for EDM, TCCS needs to possess the following capabilities:

- **Clarity** – A clear, testable and measurable vision which aligns with the directorate's business goals is vital. It must be supported by a flexible but durable business structure and managed using strategic governance.
- **Culture** – People should be empowered to grow and innovate in an environment which encourages open communication and information sharing and supports an agile workforce.
- **Collaboration** – Effective communication with stakeholders, unified communication tools and shared understanding of terminology are essential for creating an integrated and collaborative workforce.
- **Capability** – A durable and flexible platform supported by unified views, a single source of truth, a service delivery focus and a commitment to user centric design which can easily accommodate different user needs is necessary for creating a data capable organisation.
- **Continuous improvement** – Disruptive insights and data driven transformations should be welcomed.



3.4 Culture

People are central to successfully implementing EDM and utilising its results. Data Management practices are to be embedded in our data culture. Furthermore, encouraging people to improve and develop their data literacy and data management skills aligns with the TCCS People Strategy's commitment to creating pathways for employees to grow.

3.4.1 Knowledge culture

We believe that information, knowledge and data are intertwined. We use business context to turn our data into information which is usable and accessible by all employees. Empowering our people to use these insights will aid us in making better decisions.
By committing to keeping data at the centre of our culture, we will become an organisation that values data literacy as an important skill. To achieve this and improve employees' confidence using data the Directorate will

- Provide data literacy and data management training to help all employees harness the value of data
- Support employees as they grow their data knowledge
- Facilitate knowledge sharing among employees
- Welcome questions and feedback from employees to ensure we meet their needs
- Implement technology to capture important organisational knowledge and make it accessible to all employees.

3.4.2 Ethics

We are committed to managing our data ethically. Our data often represents the Canberra community or if used to make decisions that directly affect their lives. This means our data has inherent ethical obligations and we must embody the values of respect, excellence, integrity, safety, innovation, collaboration and excellence to produce the best service for the ACT. Consequently, if our data analytics is not conducted ethically, insights may be misused, or internal biases amplified leading to compromised service delivery. Legal repercussions may also arise if data is used outside its original purpose. This can lead to a loss of reputation and a lack of trust from the public in our ability to serve them. Therefore, embedding an understanding of data ethics through training and sharing knowledge is vital for making us a positive data centric organisation.

3.5 Data governance

Data Governance concerns the policies and processes used for organising and managing the effective creation, use, access, integrity and security of TCCS data. An effective data governance structure addresses:

- **Data security** – Protecting the security of confidential data, the privacy of customers and the ensuring appropriate use and access is vital for maintaining public trust and working efficiency.
- **Metadata management** – Metadata helps gauge data quality, facilitate understanding and communicate context and record data lineage. As a result, metadata must be managed carefully and forms a cornerstone of data governance.
- **Data quality** – Data quality focuses on ensuring that TCCS' data is complete, accurate, clean, accessible and ready for us to analyse and share with business users.

- **Data modelling** - Data modelling focuses on creating models which help TCCS understand its datasets and their relationships with services, stakeholders, customers and employees.
- **Data architecture** - Data architecture concerns the flow of data, specifically the rules, policies and standards used to define how data is collected, stored, managed and integrated into TCCS' business processes.
- **Data storage** – Data must be stored in a manner which manages availability of data and maintains data integrity throughout the entire data lifecycle.
- **Data integration** - Data integration focuses on the movement and consolidation of datasets in a way which supports business activities and provides datasets in a secure and appropriate format.
- **Document management** – Document management involves planning, implementation and control activities for lifecycle management of data regardless of its form. It aims to facilitate compliance with legal obligations, records management regulations and ensure effective storage, retrieval and use of information.
- **Master data** – Master data is data which is shared across multiple business areas within TCCS. Managing master data focuses on enabling the sharing of information easily across the Directorate and providing an authoritative source for reconciled and quality-controlled master data.
- **Data warehousing and business intelligence** – Data warehousing and business intelligence focuses on the processes used to support data driven decision making and employees engaged in reporting, query and analysis.

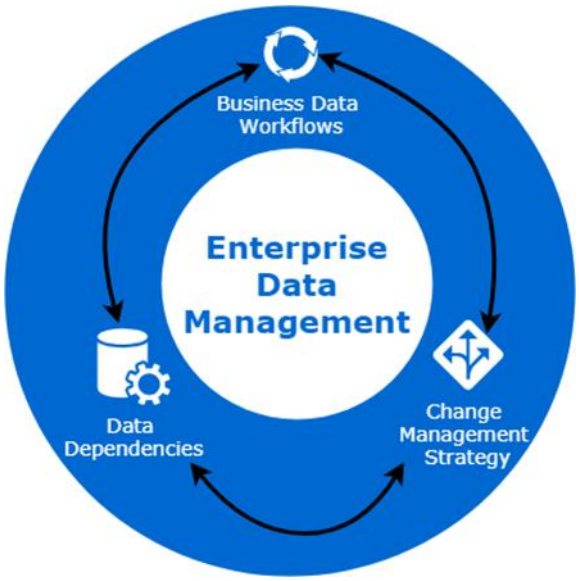
3.6 Analytics

Maturity and evolution of analytics depends on a strong EDM foundation. New capabilities discovered by mature data analytics will build upon and improve existing capabilities within TCCS to improve service delivery to Canberrans. However, to realise these insights, business context and a foundation of good quality of data is necessary.

EDM provides the vehicle for producing good quality and standardised data. By standardising how we collect and use data, we will be able to draw links between different data assets from disparate systems. This in turn will improve our ability to make evidence-based decisions and data centric policy. The stronger our data foundations, the more relevant and useful insights we can draw from to help achieve our strategic objectives. Additionally, with better data we can undertake advanced analytics to solve complex wicked problems by discovering deeper insights, make recommendations and predict future outcomes.

3.7 Data discovery

Data is currently stored in segmented, disconnected systems. These systems are owned by multiple stakeholders who have limited visibility of each other's data assets. To implement an EDM framework, a process of mapping the infrastructure and cataloguing the data of all stakeholders is required. This will enable stakeholder requirements of the EDM framework to be understood in the following three key areas:



Throughout the implementation of the EDM framework all aspects should be considered and implemented from the client/stakeholder perspective to achieve organisation wide support for the program. This is especially important due to the large number of stakeholders within TCCS. A data discovery engine will provide ability to find the right data, access that data at the right time in order to provide good insights for decision making.

3.8 Data inventory

Aggregation of data in a single platform provides consistency in the implementation of data standards and policies. It also makes it easier to comply with legislation and regulations by providing strong governance around the datasets. The Whole of Government data lake platform will be utilised as the platform for data management related activities. The data lake platform provides:

- Improved database structure flexibility
- Affordable and easily increased storage capacity
- Improved access control structures which are needed for EDM principles
- Distributed computing infrastructure which provides vast computing power and an improved ability to perform data analysis at scale
- Alignment with Office of the Chief Digital Officer (OCDO) and the Whole of Government Digital Strategy
- Cataloguing of our datasets and easy to integrate with Whole of Government data management tools

The Whole of Government platform makes it easier for each directorate to share data thus maximising the value of the data assets held across directorates. This also leads to better collaboration among directorates to solve complex business problems and integrate service delivery.

3.9 Data management

EDM principles are comprised of both initial implementation and ongoing maintenance aspects:

Initial implementation	Ongoing
Integrate following components into EDM presentation layer: • Develop a business glossary • Define data owner, steward and custodian roles • Record business system information • Define stakeholder access levels and controls • Define operations performed on data such as personal information masking • Include data workflows • Assess data quality	**Empower everyone to self-administer data management:** • Monitor operations such as data cleansing to enable data quality assurance • Implement review and assessment procedures to enable data quality control • Implement mitigation strategies as identified by quality assessment • Update business glossary, metadata, roles

The implementation phase of the EDM framework is a strategic program and required a dedicated team to coordinate with business units through both the implementation and ongoing support phases. Establishing a governance structure and governing the implementation processes is indispensable for overseeing this program to realise all the business benefits. They would offer help and support to business stakeholders to manage their data assets, provide guidance on best practice, and focus on our efforts on business-critical data assets.

3.10 Reporting and data science

Once the EDM is operational, enhanced reporting and data science activities can be performed. TCCS already uses analytics and reporting tools such as PowerBI, however, the EDM framework will dramatically improve the capability of reporting within TCCS. The EDM framework will also improve the ability for data science projects to solve business problems. To ensure trusted and transparent outcomes, the EDM framework will incorporate the following:

Dashboard Reporting Framework	Data Science Framework
• Understand business context • Determine relevant metrics/KPIs • Identify relevant datasets from EDM • Document calculation methodology	• Define business process • Identify relevant datasets from EDM • Evaluate casual factors • Perform predictive analysis

3.11 Roadmap

TCCS is in the early stages of the first milestone for 'Establishing the Framework' (refer to **Appendix A** for 'EDM Program Plan') and has commenced development of:

- The Data Quality and Risk Management framework, and
- The Metadata Management framework

The next steps for the implementation of this framework include:

- Approval of the strategy, and
- Detailed development of the program

Appendix A

EDM Program Plan

Vision:	***Empower the organisation to innovate***
Mission:	***'Implementation of EDM to provide well governed, trusted quality data for decision making To the right people, right time, right format - in a privacy centric way'***

Program streams	**Establishing Framework**	**Measuring Business Outcomes**	**Analytics Capabilities**	**Change Management**
Milestone 1	**EDM components**	**Accountability**	**Tools / software**	**Importance of data governance**
Components	Data Quality Metadata Data Standards & policy Security Modelling	KPI's what success looks like Evaluation Tracking progress	Data Governance Tool Data Catalogs	Awareness Data Maturity Program Roadmap
Milestone 2	**Data governance process**	**Business impacts**	**Methodology**	**Business outcome**
Components	Data steward program Structures Roles and responsibilities	Business outcomes Risks	Design Thinking Agile Methodology Best Practices Software Engineering	Data Driven
Milestone 3	**Standard operating procedures**	**Risk management audit**	**Business intelligence**	**Business process enhancement**
Components	BAU process Reporting Auditing	Compliance Sharing	Data Science Hypothesis testing Dashboard Experimenting - implement and test	Data As Usual (DAU)
Supporting activities	Data Governance Structure DAWG > ITDISC > DMSC (SME) > (TCCS) > (ACT Gov)	Data Stewardship Training	Training tools Methodologies	Data Literacy Modules Data Leadership Hub
Stakeholders	COO Business Units	Executive Sponsor GAMS Business Units	Business Units Chief Information Office	CIO Business Units