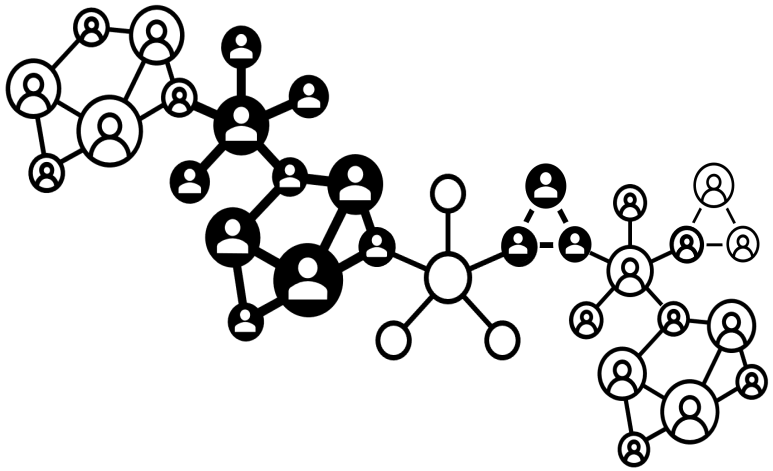
Foundational Tools

Data Competencies as a Path to Career Development and Organizational Planning

A case study in the benefit of developing data assets

April 10, 2025



Introduction

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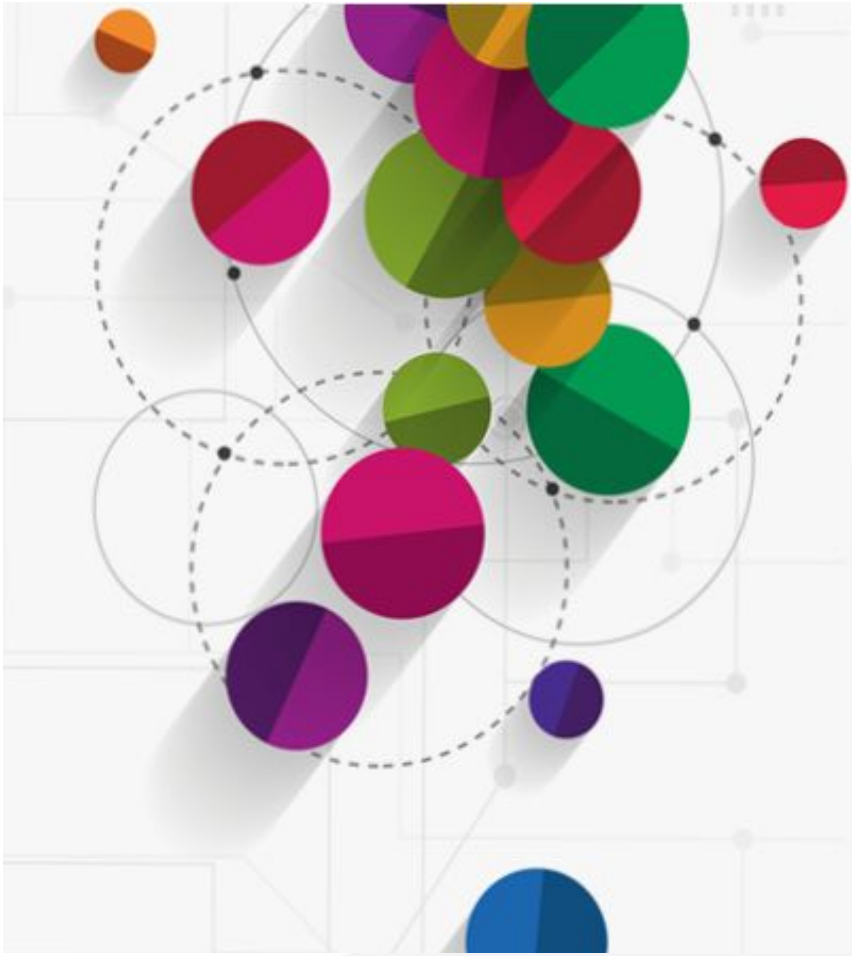
Senior Analyst for data literacy
Department of Fisheries and Oceans (DFO);

Involved in the Government of Canada Data Community (GCDC) and Community of Practice on Data and Information (CPDI);

Supported the development of the Government of Canada Data Competency Framework.

Purpose of Presentation

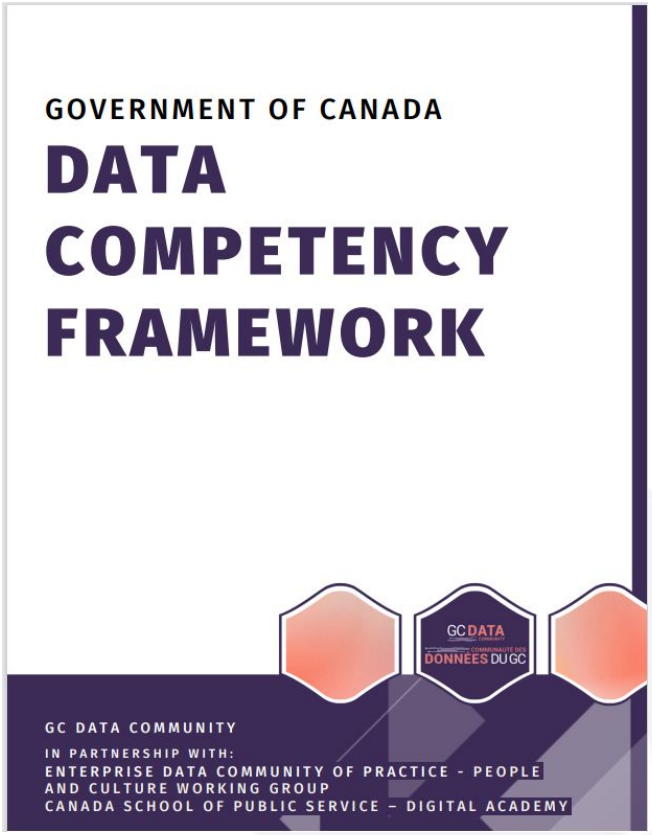
- Outline progress on developing Government of Canada (GC) Data Competencies;
- Use data assets in support of domain expertise to examine the completeness of data governance materials;
- Impact of linking GC Data Competency data asset to other data assets to support data literacy and organizational planning.



The GC Data Competency Framework

Purpose:

- Support the development a data literate workforce to modernize and deliver value to the public;
- Provide common definitions and understanding for data competencies;
- Provide a model to guide data literacy efforts, for all federal public servants working with and using data.



Published March 31, 2023

The GC Data Framework

1. Data Concepts & Culture		
1.1 Data, Digital and Organizational Awareness	1.2 Data Ethics and Privacy	1.3 Evidence-Informed Decision Making

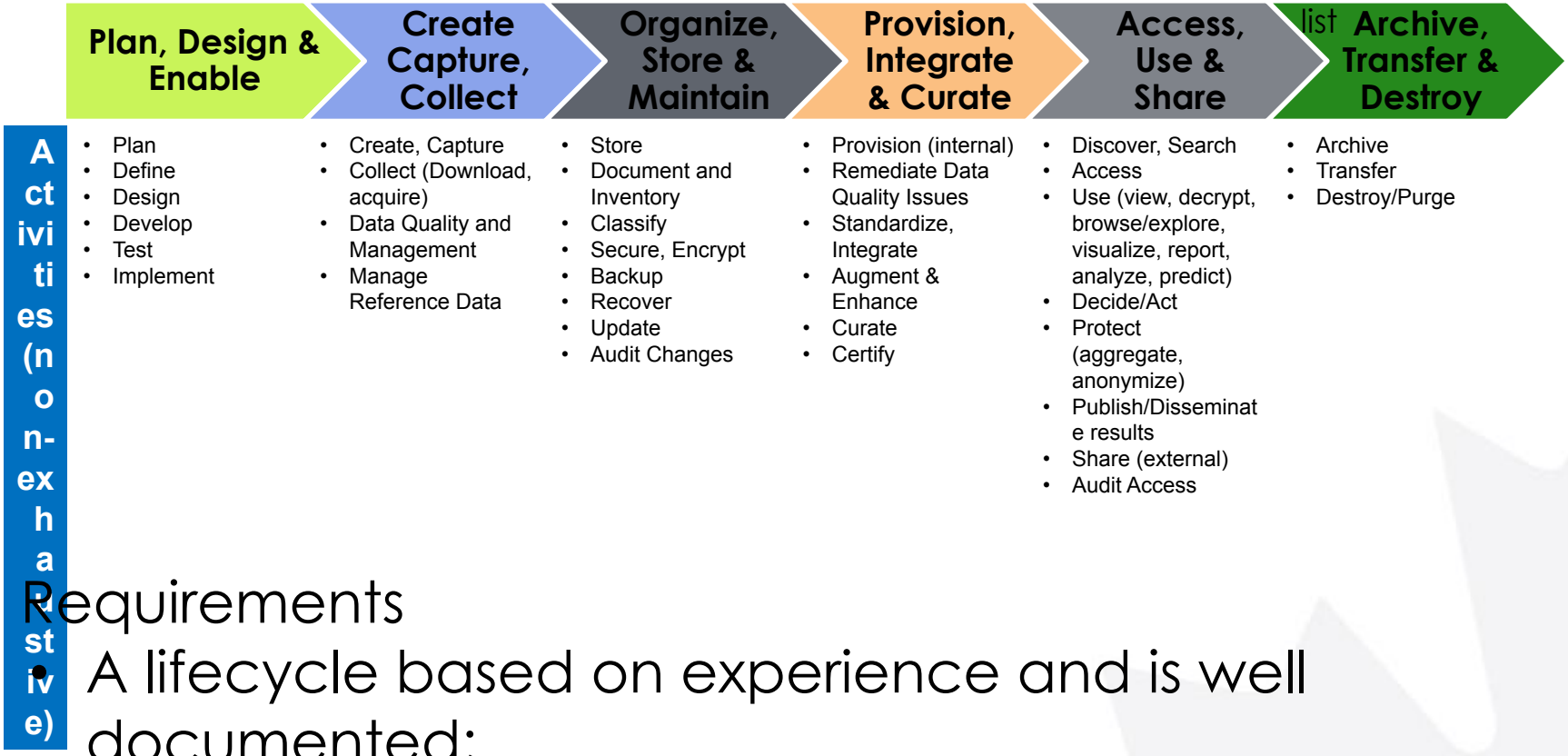
2. Data Governance, Collection & Stewardship			
2.1 Data Governance, Stewardship and Standards	2.2 Data Collection	2.3 Data Quality, Value and Trust	2.4 Access, Security and Interoperability

3. Analytics & Evaluation			
3.1 Asking Questions and Problem Framing	3.2 Data Analytics and Science	3.3 Storytelling and Visualization	3.4 Evaluating Outcomes

4. Data Systems & Architecture	
4.1 Enterprise Data Architecture	4.2 Data Systems

What's in a lifecycle

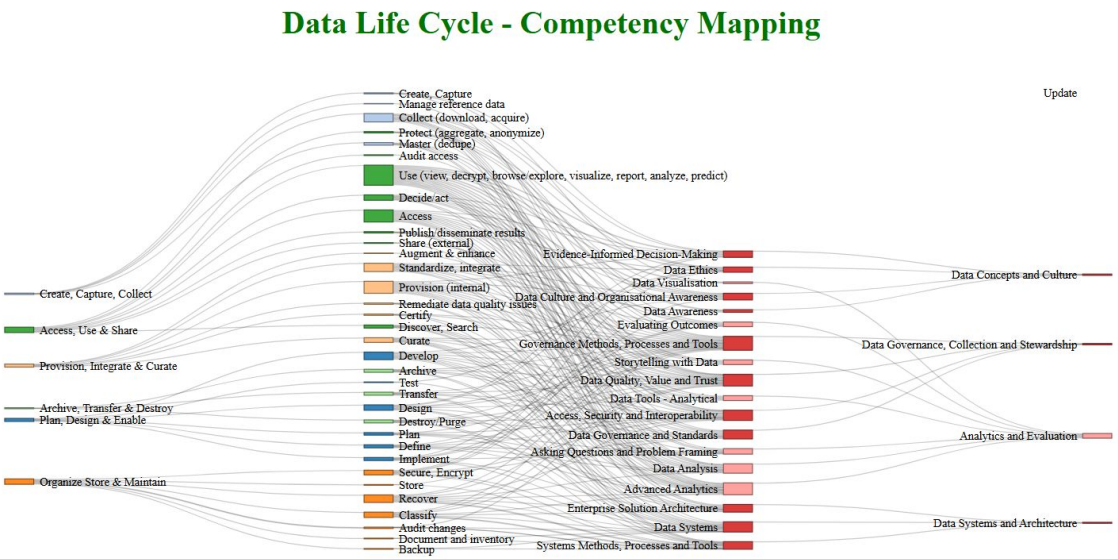
*Non-exhaustive list



Requirements

- A lifecycle based on experience and is well documented;
- A detailed list of Data Activities.

The start of the journey - Connecting Competencies to Data Lifecycle



Build Support

- Proof of Concept - connect the competencies to a data lifecycle;
- Build support and relationships;
- Recruit other data practitioners.

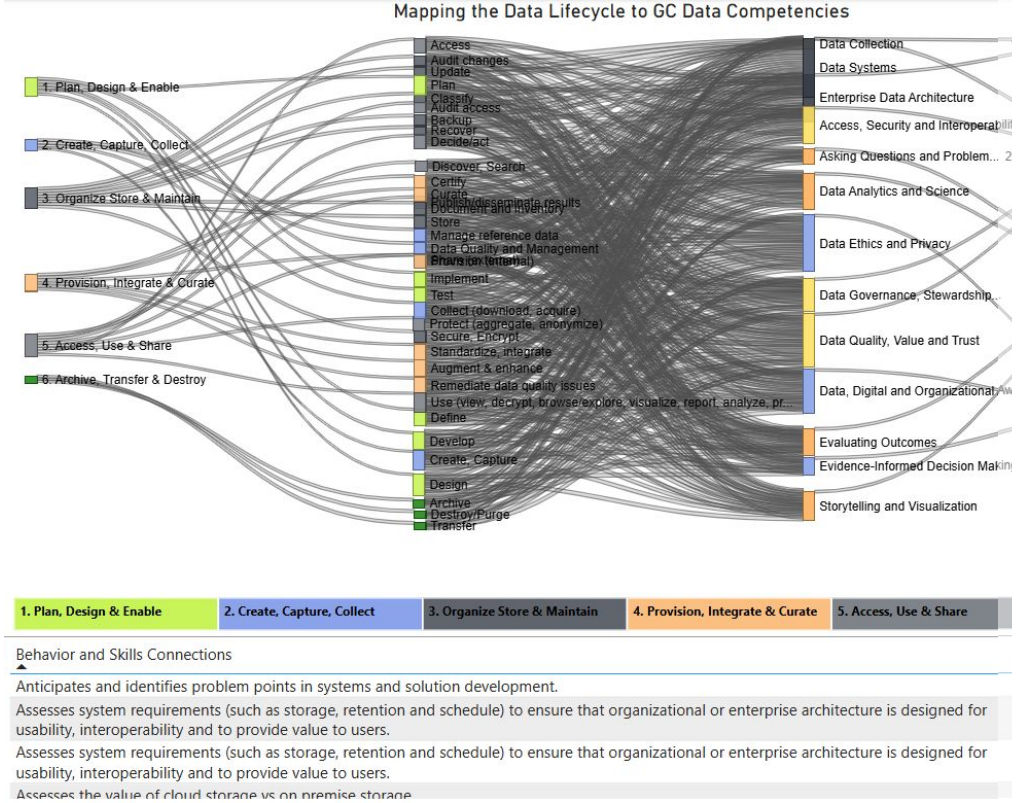
Building the Asset

	A	B	C	D	E	F	G	H	I
1	Row	From	To	Level	Competencies/Lifecycle	Behavior and Skills Connections	Phase	Category	Langu
167	166	Data Systems	4. Data Systems and Architecture	Advanced	Data Competencies Framework	NA	4. Provision, Integrate & Cu	4. Data Systems and Architecture	EN
168	167	Access	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	5. Access, Use & Share	1. Data Concepts and Culture	EN
169	168	Use (view, decrypt, browse/explore, visualize,	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	5. Access, Use & Share	1. Data Concepts and Culture	EN
170	169	Protect (aggregate, anonymize)	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	5. Access, Use & Share	1. Data Concepts and Culture	EN
171	170	Publish/disseminate results	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	5. Access, Use & Share	1. Data Concepts and Culture	EN
172	171	Share (external)	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	5. Access, Use & Share	1. Data Concepts and Culture	EN
173	172	Audit access	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	5. Access, Use & Share	1. Data Concepts and Culture	EN
174	173	Archive	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	6. Archive, Transfer & Destr	1. Data Concepts and Culture	EN
175	174	Transfer	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	6. Archive, Transfer & Destr	1. Data Concepts and Culture	EN
176	175	Destroy/Purge	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	6. Archive, Transfer & Destr	1. Data Concepts and Culture	EN
177	176	Create, Capture	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	2. Create, Capture, Collect	1. Data Concepts and Culture	EN
178	177	Collect (download, acquire)	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	2. Create, Capture, Collect	1. Data Concepts and Culture	EN
179	178	Manage reference data	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	2. Create, Capture, Collect	1. Data Concepts and Culture	EN
180	179	Store	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	3. Organize Store & Mainta	1. Data Concepts and Culture	EN
3481	3480	Stocker	Systèmes de données	intermédiaires	Cadre de compétences en matièr	S'assurer que la conception des systèmes est conforme aux	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3482	3481	Stocker	Systèmes de données	intermédiaires	Cadre de compétences en matièr	Développer des canalisations de données de bout en bout	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3483	3482	Stocker	Architecture des données intégrées	intermédiaires	Cadre de compétences en matièr	Prendre en compte les besoins architecturaux de l'organisa	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3484	3483	Stocker	Architecture des données intégrées	intermédiaires	Cadre de compétences en matièr	Évaluer les exigences du système (telles que le stockage, la	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3485	3484	Stocker	Architecture des données intégrées	avancés	Cadre de compétences en matièr	Concevoir, mettre en œuvre ou surveiller les systèmes qui p	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3486	3485	Stocker	Architecture des données intégrées	avancés	Cadre de compétences en matièr	Anticiper et préciser les points problématiques dans le dév	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3487	3486	Stocker	Architecture des données intégrées	avancés	Cadre de compétences en matièr	Fournir des conseils techniques à la direction et aux autres	3. Organiser, ranger et entr	4. Systèmes de données et architecture	FR
3488	3487	Stocker	Gouvernance, intendance et normes	fondamentaux	Cadre de compétences en matièr	Connaître la gouvernance et la souveraineté des données, r	3. Organiser, ranger et entr	2. Gouvernance, collecte et intendance c	FR
3489	3488	Transférer	Gouvernance, intendance et normes	fondamentaux	Cadre de compétences en matièr	Connaître la gouvernance et la souveraineté des données, r	6. Archiver, transférer et dé	2. Gouvernance, collecte et intendance c	FR
3490	3489	Planifier	Connaissances des données, du numérique	fondamentaux	Cadre de compétences en matièr	Connaître les termes normes, politiques, documents et com	1. Planifier, définir et facili	1. Concepts et culture des données	FR
3491	3490	Plan	Data, Digital and Organizational Awareness	Foundational	Data Competencies Framework	Aware of key data and digital standards, policies, documen	1. Plan, Design & Enable	1. Data Concepts and Culture	EN
3492	3491	Plan	Data Analytics and Science	Foundational	Data Competencies Framework	Aware of the Directive on Automated Decision-Making and A	1. Plan, Design & Enable	3. Analytics and Evaluation	EN
3493	3492	Planifier	Data Analytics and Science	Foundational	Data Competencies Framework	Connaître la Directive sur la prise de décision automatisée	1. Planifier, définir et facili	3. Analyse et évaluation	FR
3494	3493	Use (view, decrypt, browse/explore, visualize,	Data Analytics and Science	Foundational	Data Competencies Framework	Aware of the Directive on Automated Decision-Making and A	5. Access, Use & Share	3. Analytics and Evaluation	EN
3495	3494	Utiliser (visualiser, décrypter, parcourir/explor	Data Analytics and Science	Foundational	Data Competencies Framework	Connaître la Directive sur la prise de décision automatisée	5. Accéder, utiliser et parta	3. Analyse et évaluation	FR

1063 unique behaviour to activity connections
(not including duplication for bilingualism and additional links to lifecycle phases and competency categories)

- Work with other data practitioners;
- Iterate, validate, review, test;
- Ongoing support from various government departments.

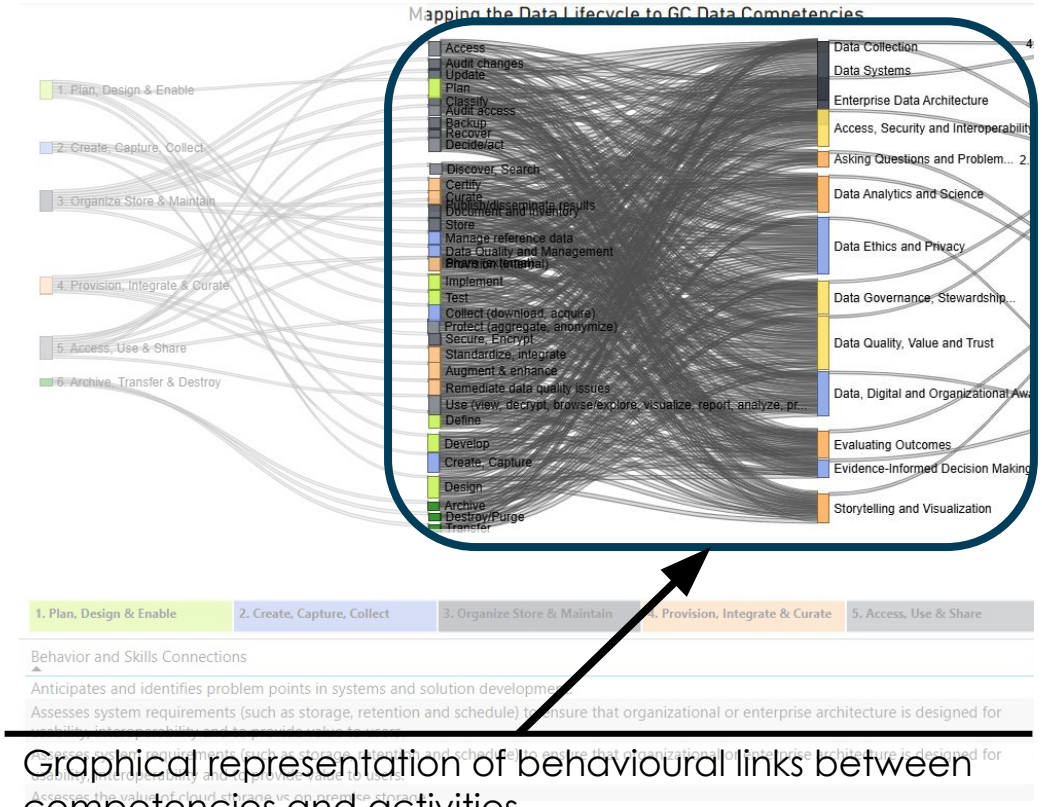
Connecting Competencies to Data Lifecycle



1. Plan, Design & Enable	2. Create, Capture, Collect	3. Organize Store & Maintain	4. Provision, Integrate & Curate	5. Access, Use & Share
Behavior and Skills Connections				
Anticipates and identifies problem points in systems and solution development.				
Assesses system requirements (such as storage, retention and schedule) to ensure that organizational or enterprise architecture is designed for usability, interoperability and to provide value to users.				
Assesses system requirements (such as storage, retention and schedule) to ensure that organizational or enterprise architecture is designed for usability, interoperability and to provide value to users.				
Assesses the value of cloud storage vs on premise storage				

- Visualizing a more complete data asset;
- Does it pass the smell test;
- Shared with CPDI as a data asset and as a standard example for developing these kinds of data assets.

Connecting Competencies to Data Lifecycle

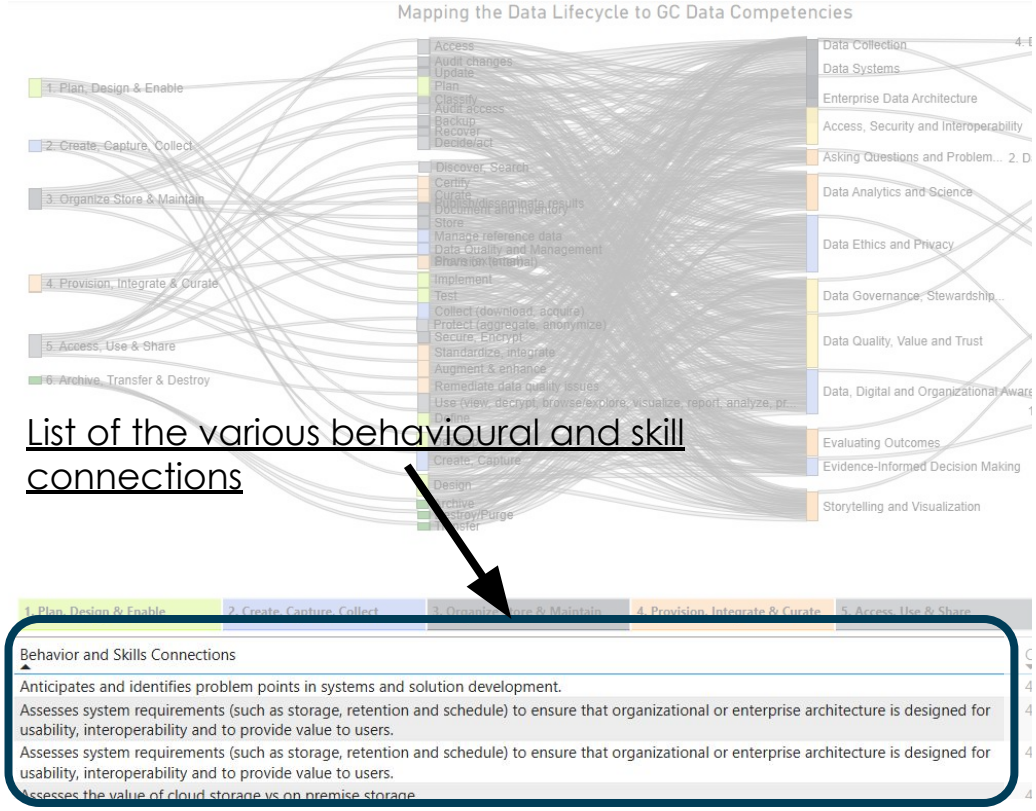


Graphical representation of behavioural links between competencies and activities

Result:

- Competencies are applicable to a variety of data activities across the data lifecycle; and
- Able to identify at a macro level the competencies that apply to each activity.

Connecting Competencies to Data Lifecycle



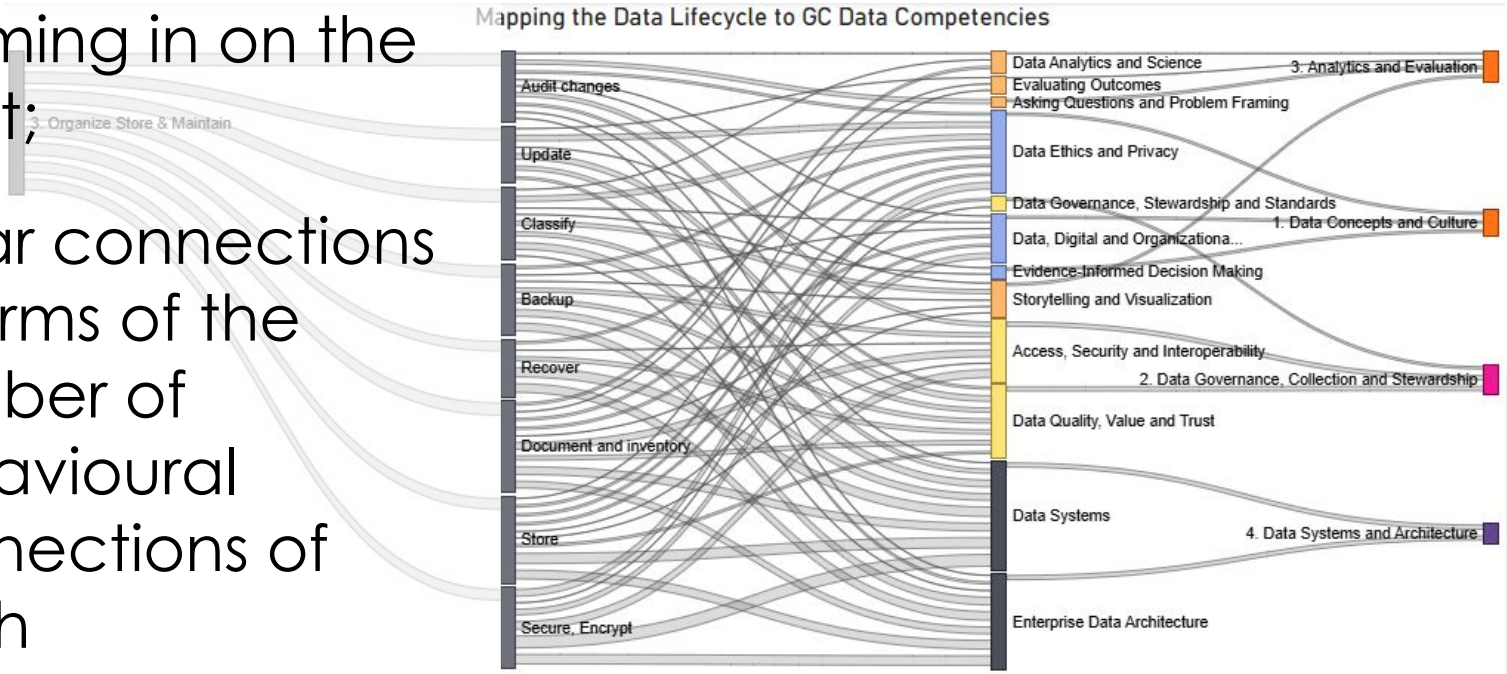
List of the various behavioural and skill connections

Result:

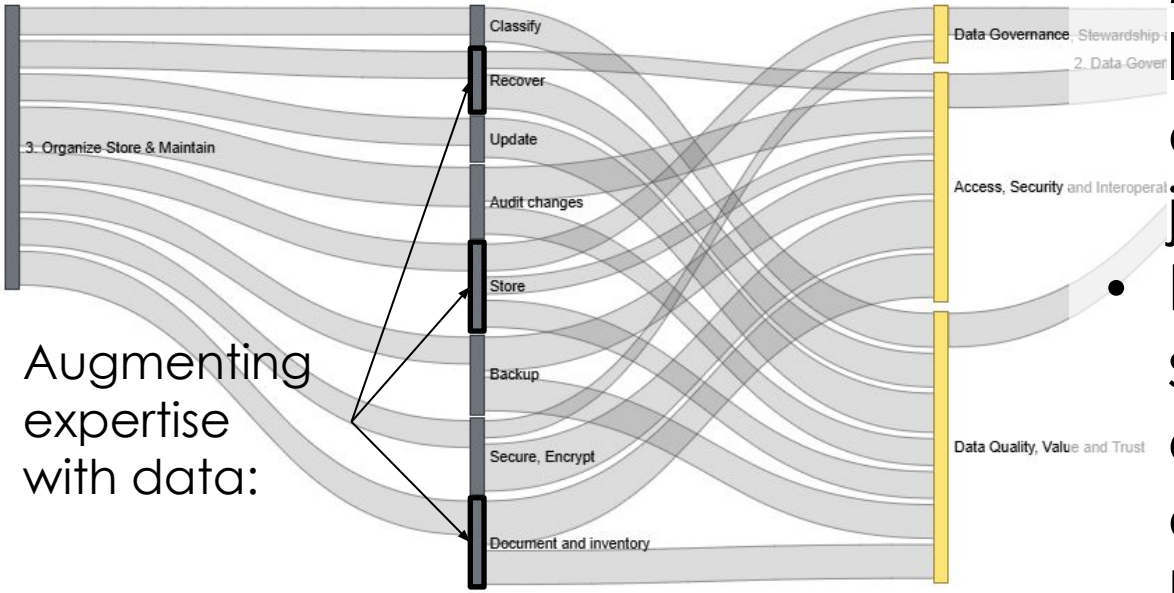
- Drill into the specific behaviours and skills that support specific activities; and
- There is a many to many relationship of behaviours and skills to data activities.

Connecting Competencies to Data Lifecycle

- Clarity come by zooming in on the asset;
- Clear connections in terms of the number of behavioural connections of each competency to each activity.



Connecting Competencies to Data Lifecycle



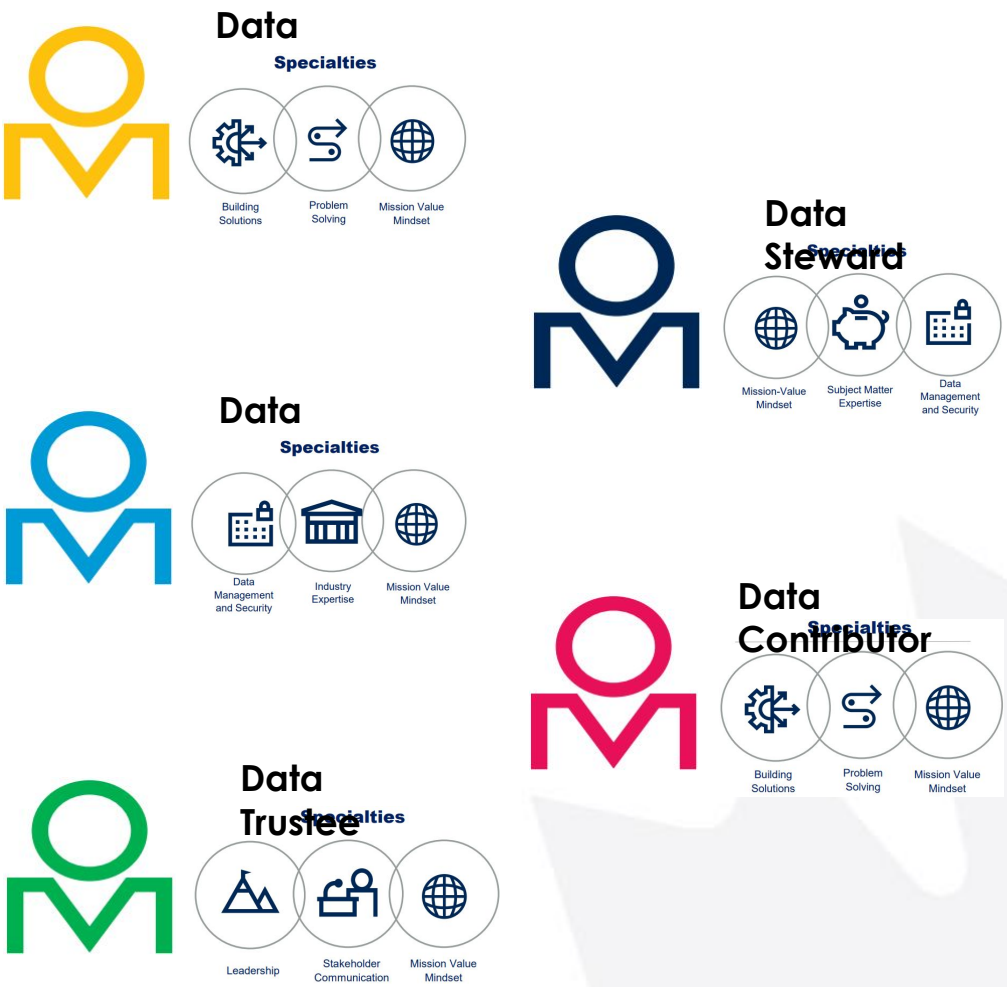
Augmenting expertise with data:

Behavior and Skills Connections	Category
Awareness with policies, directives and regulations relating to data security and storage.	2. Data G
Is familiar with the data quality framework and the different dimensions through which one can evaluate quality (ex: metadata definitions, standards, interpretability, coherence, relevance, accessibility, timeliness).	2. Data G
Reviews data to ensure validity, accuracy, and completeness.	2. Data G
Understands the negative impact of poorly managed data on organizational operations and decision-making.	2. Data G

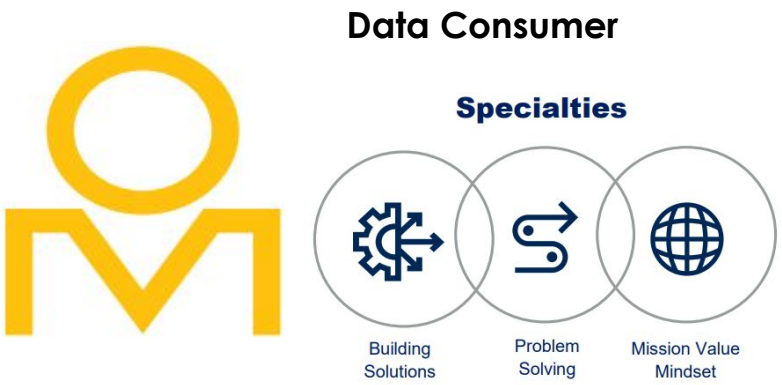
- Many of the data lifecycle activities align to specific jobs or roles;
- Helps verify specific related competencies and subsequent behaviours and skills needed to undertake those activities.

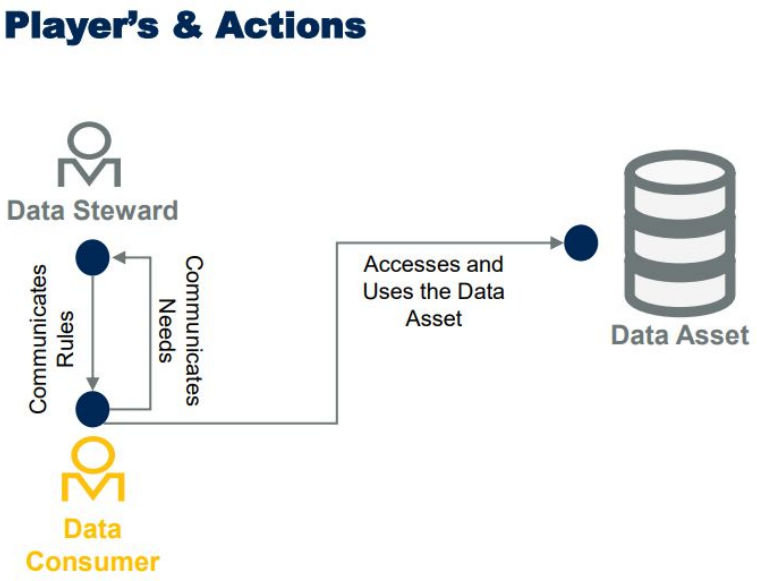
Data Roles

- Five Data Roles, based on specialization and expertise;
- Clear division of roles and responsibilities;
- Develop clarity of actions vis-à-vis other data roles and data assets.



Data Roles





- Ensure their data usage complies with departmental and government policies, processes and data sharing agreements including the ethical use of data;
- Ensure usage of data is appropriate and valid with respect to achieving departmental objectives, including in the support of decision-making, reporting and performance evaluation;
- Report on data quality issues and fitness for purpose to the Data Steward as needed;
- Communicate data usage needs to Data Stewards; and
- Consume data from appropriate sources.

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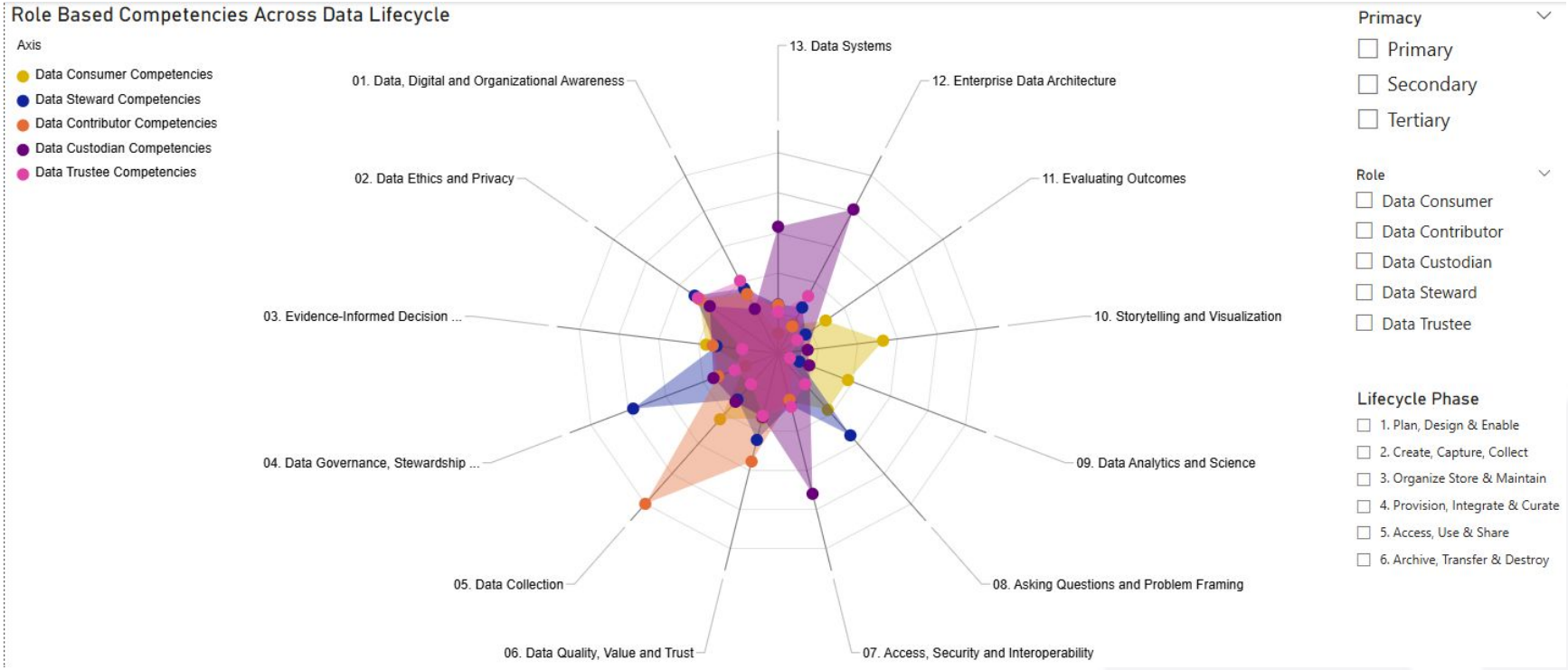
Competencies to Data Roles



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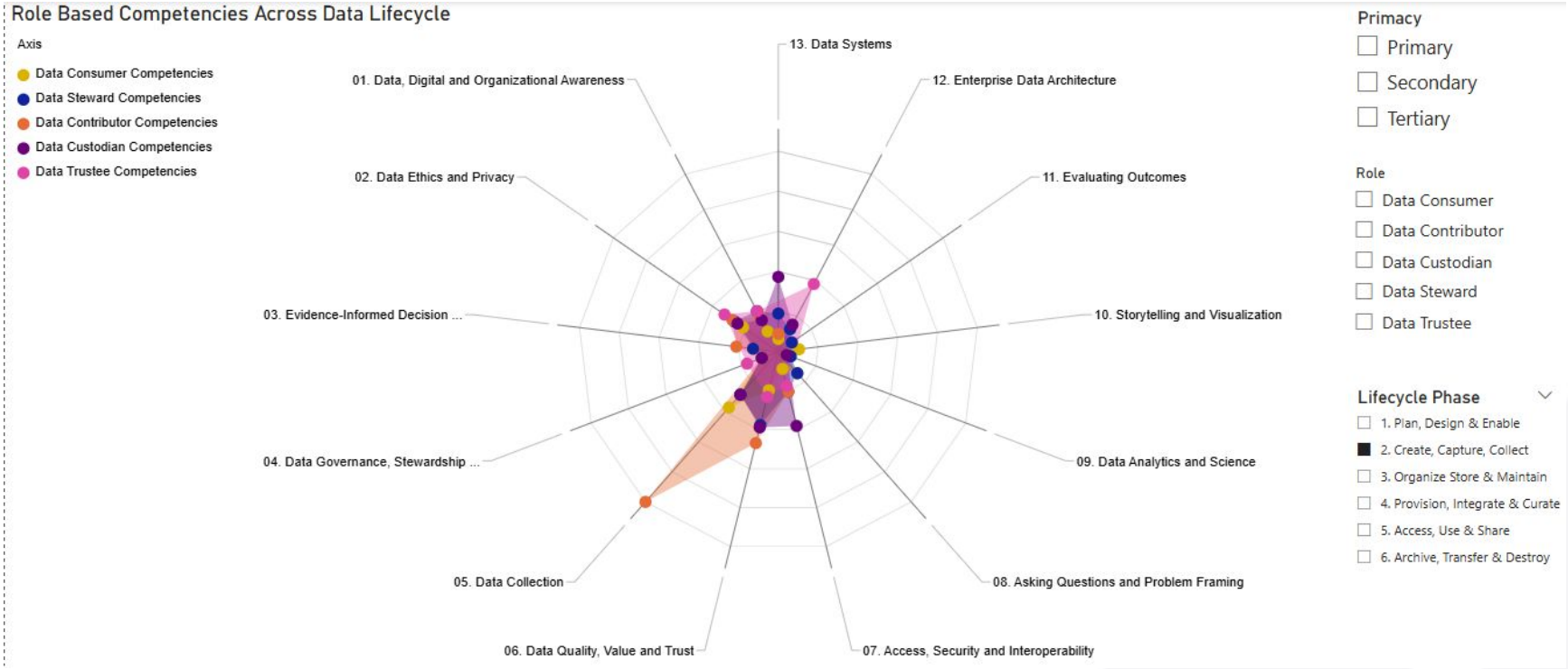
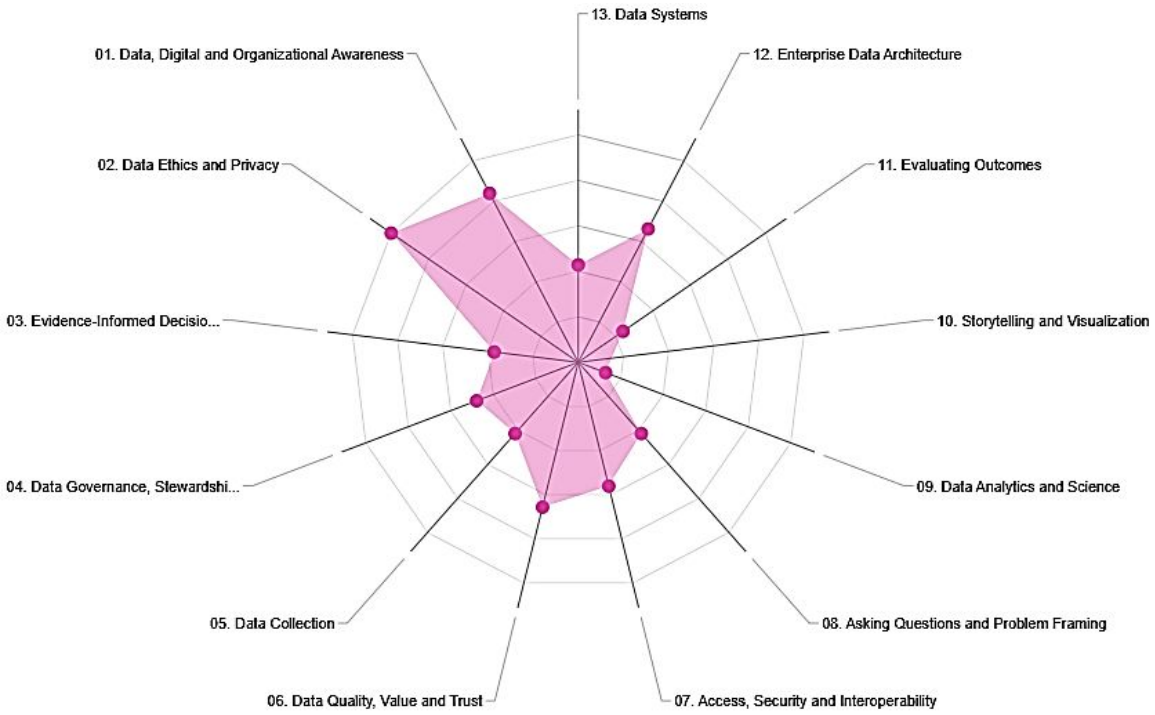
Competencies to Data Roles – Data Lifecycle



Applicable competencies for each role change throughout the data lifecycle, helping demonstrate primary roles for each phase.

Competencies to Data Roles – Data Trustee



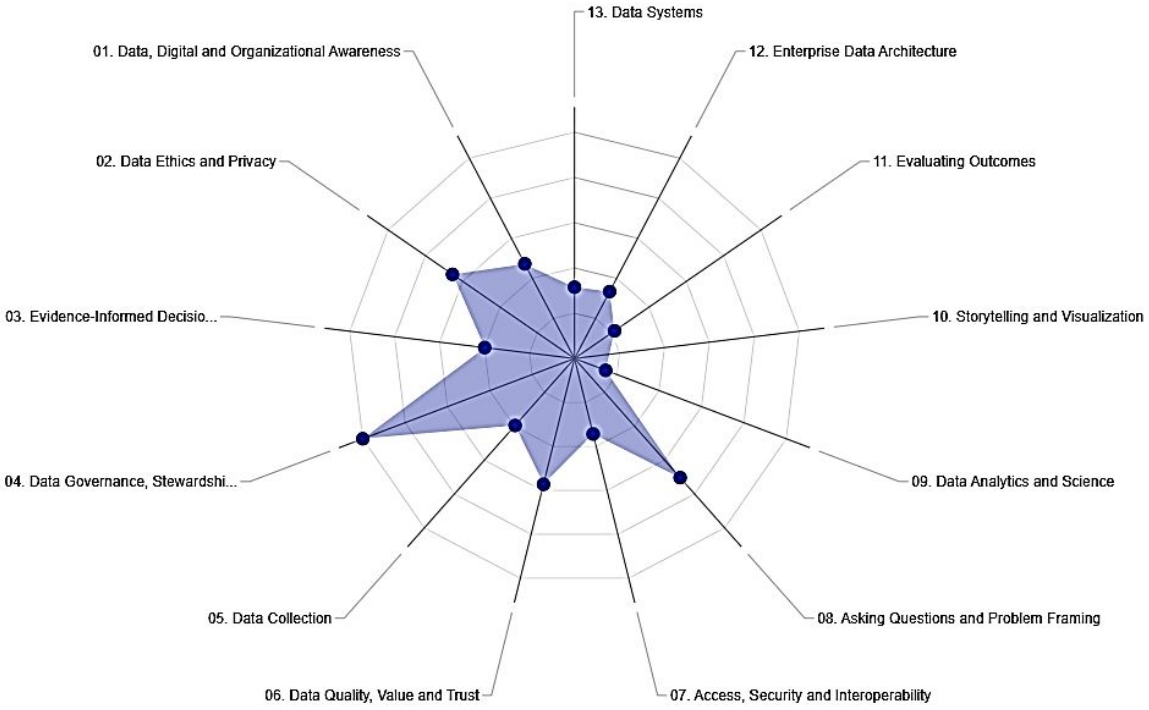
Competency focus:

- Data Ethics, Privacy;
- Foundational and Directional.

Lesson learned about definitions:

- Has a leadership role above and beyond specific data lifecycle activities.

Competencies to Data Roles – Data Steward



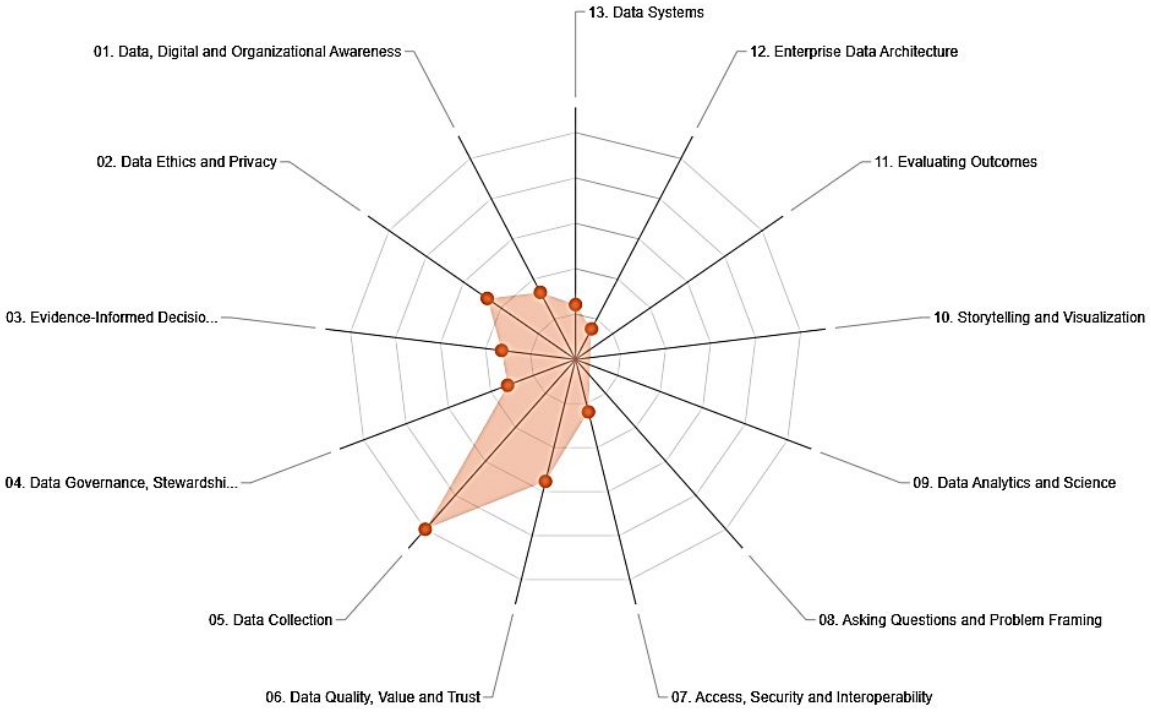
Competency focus:

- Data Governance, Stewardship, ethics, and problem framing.

Lesson learned about definitions:

- Improved clarity related to Data Quality, Value and Trust and Data Digital and Organizational Awareness.

Competencies to Data Roles – Data Contributor



Competency focus:

- Collecting and acquiring data.

Lesson learned about definitions:

- Improved clarity related to Data, Digital and Organizational Awareness and Ethics and Privacy.

Competencies to Data Roles – Data Custodian

Competency focus:

- Data systems, Architecture, and Access.

Lesson learned about definitions:

- Improved clarity related to Data Systems and Data, Digital and Organizational Awareness.

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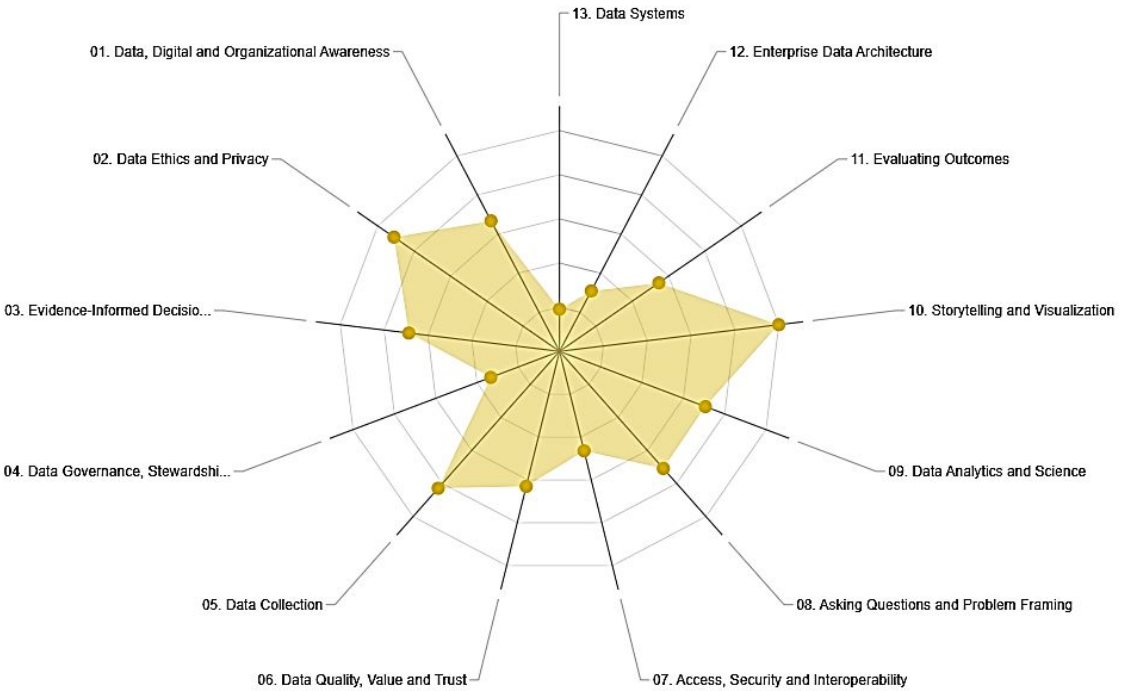
Competencies to Data Roles – Data Consumer



Competency focus:

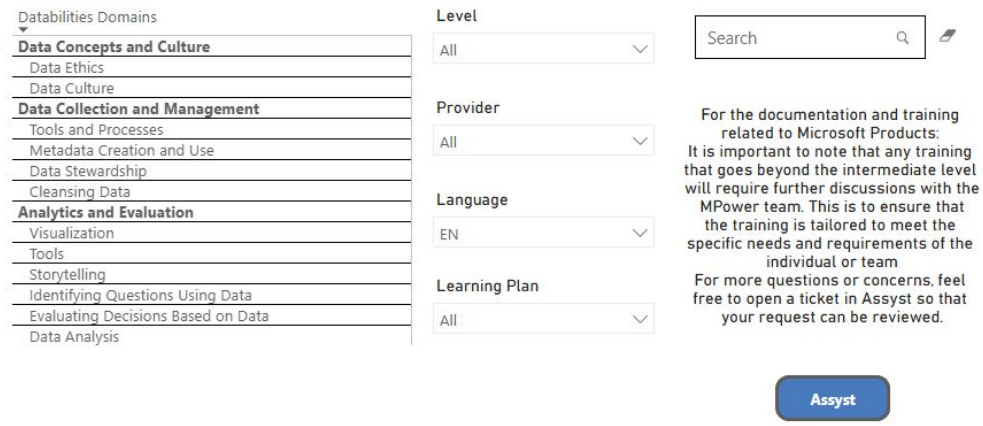
- Using data through analysis, framing questions and telling stories.

Lesson learned about definitions:

- Improved clarity evidence informed decisions, analysis, and evaluation.

Connected Work – Training

Training	Training Description	Cost	Level	Provider
A Self-Directed Guide to Understanding Data	This online self-paced course presents a series of activities designed to introduce data concepts and terminology and explore the characteristics of data-driven organizations. Participants will reflect on their personal and organizational data challenges and strategies and discuss changing expectations of Canadians for open government data.	Free	Foundational	CSPS
Analysis 101, part 1: Making an analytical plan	Analysis 101, part 1: Making an analytical plan - This video is intended for learners who want to acquire a basic understanding of analysis. No previous knowledge is required.	Free	Foundational	Stat Can
Analysis 101, part 2: Implementing the analytical plan	Analysis 101, part 2: Implementing the analytical plan - Now that we've learned how to plan an analytical project, we'll discuss best practices for implementing your plan. Please watch "Analysis 101, part 1" before you start.	Free	Foundational	Stat Can
Analysis 101, part 3: Sharing	Analysis 101, part 3: Sharing your findings - Now that we've learned	Free	Foundational	Stat Can



- Integrating with other data assets to:
  - Improve access to training;
  - Develop role-based training paths;
  - Identify training gaps;
  - Develop or acquire needed training modules.

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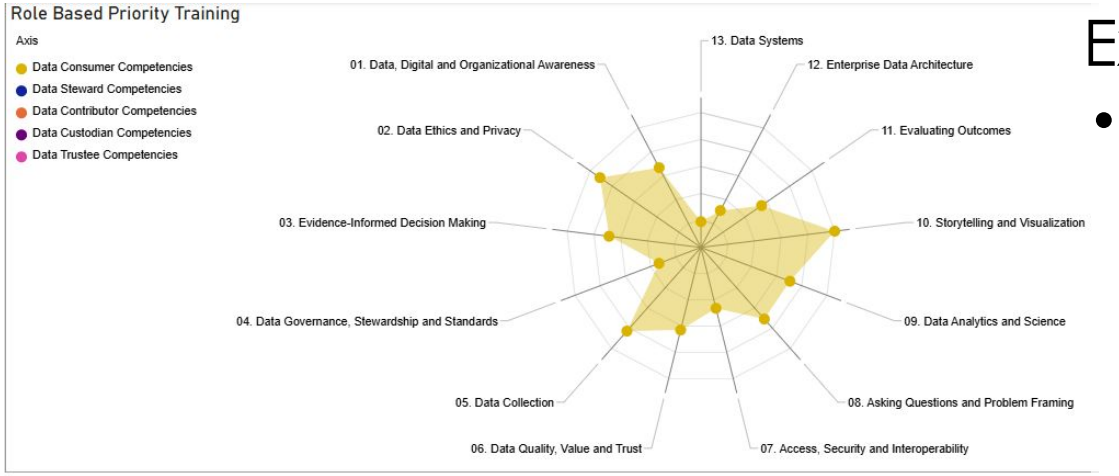
Connected Work – Training



Recommended Introductory Training

Training Title	Provider
A Self-Directed Guide to Understanding Data	CSPS
Data ethics part 1: An introduction	Stat Can
Data ethics part 2: Ethical reviews	Stat Can
Data quality in six dimensions	Stat Can
Data Stewardship: An introduction	Stat Can
Data Stewardship: An introduction to data standards and metadata	Stat Can
Discover Artificial Intelligence	CSPS
Ethical Considerations in Artificial	CSPS

Recommended Intermediate Training

Training Title	Provider
Charts (Microsoft)	Microsoft
Data quality toolkit	Stat Can
Framework for Responsible Machine Learning Processes at Statistics Canada	Stat Can
Machine learning: An introduction	Stat Can
Reaching Efficient Solutions with Computational Thinking	CSPS

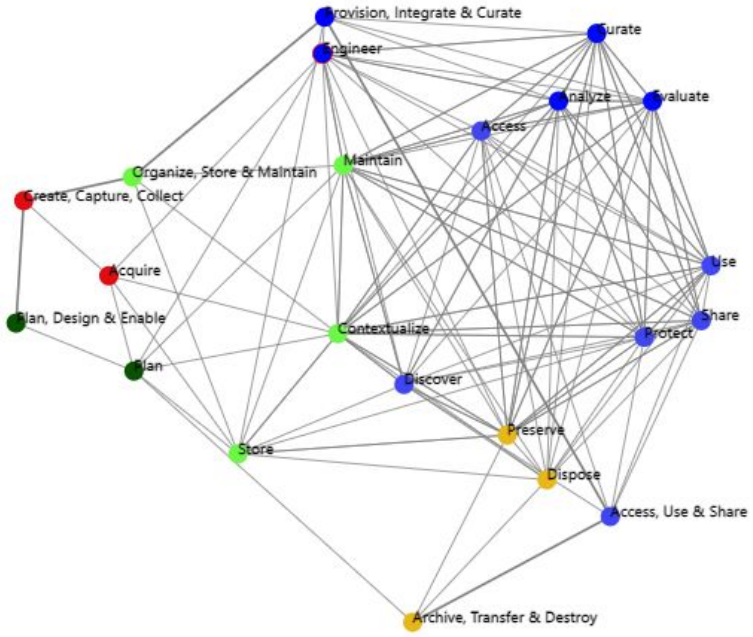
Recommended Advanced Traini

Training Title

Expected outcomes:

- Role-based training plans that include priority and recommended training;
- Support self-service access; and
- Better allocate limited resources.

Connected Work – Data and information lifecycle

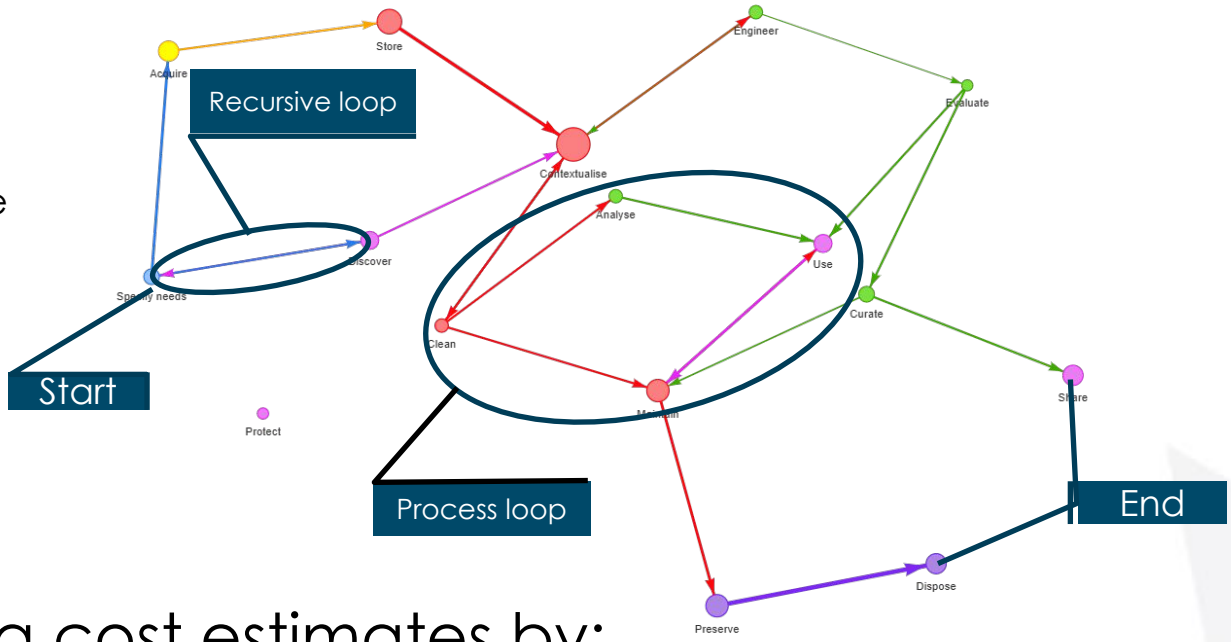


kirbyjf.shinyapps.io/User_Generated_Lifecycle2/

- Common data and information lexicon;
- Dynamic data and information lifecycles for planning;
- Linking to competency assets (Data Competency Framework, Machine Learning Competency framework, and the Digital Competency Framework).

Connected Work – Planning and Data Costing

Data and Information Lifecycle – Public Data Asset



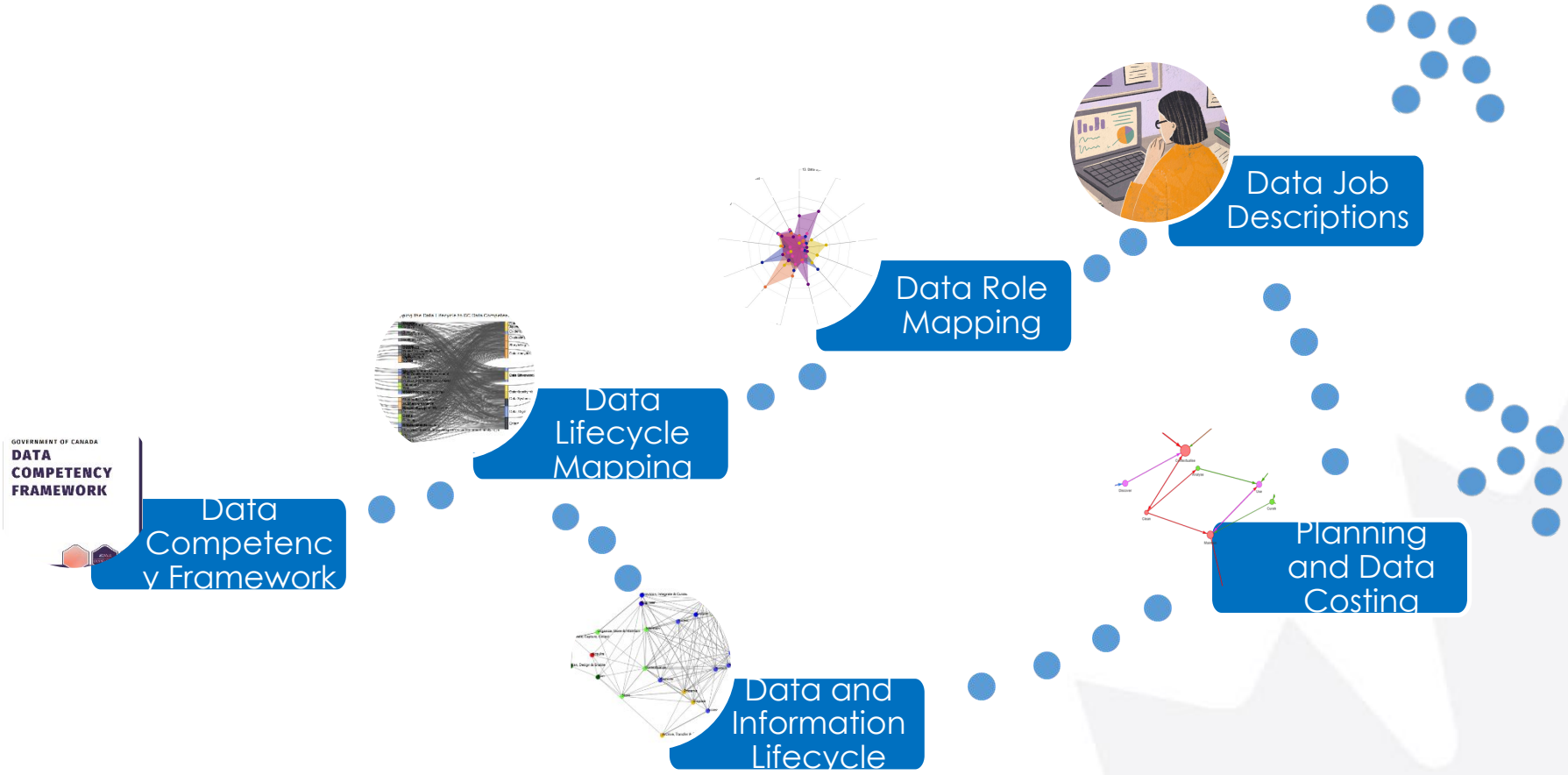
Improve data cost estimates by:

- Tracking activities and level of effort for data assets;
- Identifying recursive process;
- Identifying control end-states for data assets.

Connected Work – Job Descriptions

- Hiring is often a difficult and time-consuming task with much of the work done by people who are not domain experts;
- Linking job descriptions to GC Data Competencies supports the development of recruitment for individual jobs and larger recruitment campaigns;
- Allowing for the development of data jobs with a common lexicon that reflect expected competencies, the educational background, and work experience requirements needed to accomplish;
- Facilitating integration of data competency to jobs not traditionally associated with data, supporting organizational data maturity.

Questions?


GOVERNMENT OF CANADA
DATA COMPETENCY FRAMEWORK
Data Competenc y Framework
Data Lifecycle Mapping
Data Role Mapping
Data Job Descriptions
Planning and Data Costing
Data and Information Lifecycle

Contact us…

Office of the Chief Data Steward / Bureau de l'Intendant principal des données

Strategic Policy
Politique stratégique

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