



# DATA GOVERNANCE AND MASTER DATA MANAGEMENT CONFERENCE EUROPE

11 - 14 March 2024 | London, UK

***\*Please score and comment on this session and speaker  
in the event mobile app\****



# Establishing a Business Case for Metadata Management

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## 3-hour Workshop



# Where Are You Now?



1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_



# Where Do You Want to Be?

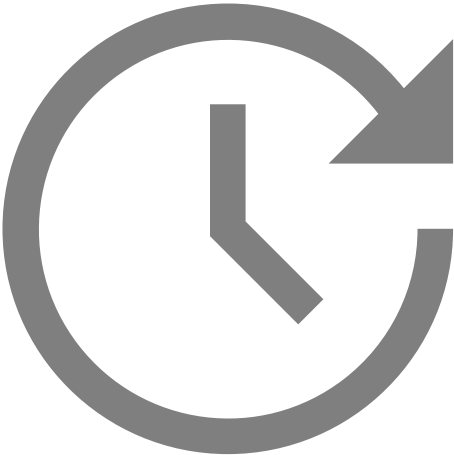


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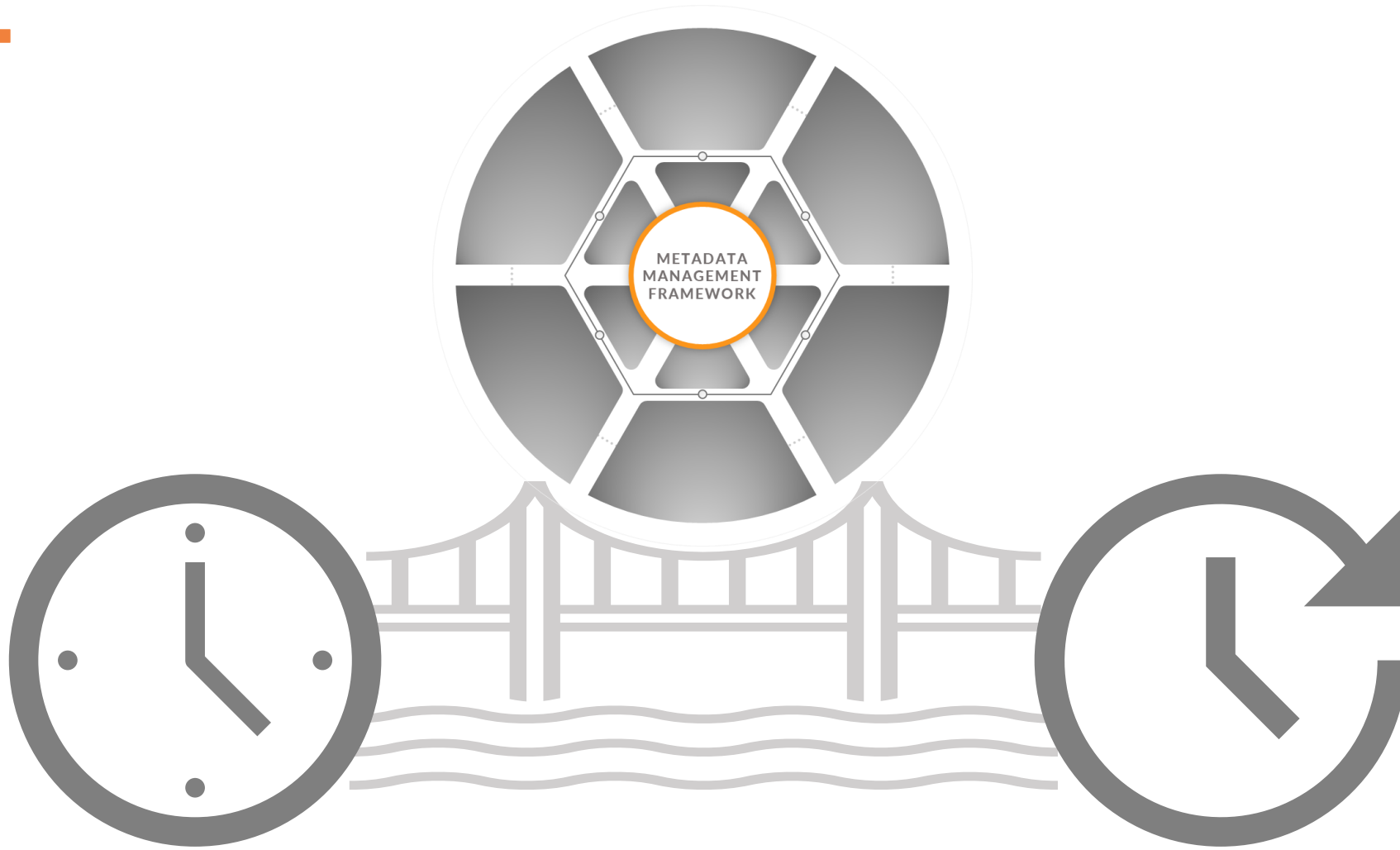
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3 \_\_\_\_\_

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# How Are You Going to Get There?



# Why..

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is it SO  
important?

is it NOW?



# A Few Words about Me...



CIVIL ENGINEER  
**ACTIVE** **BLOGGER**  
INTERNATIONAL BANKS

**CONSULTANT**

DATA MANAGEMENT FOR GLOBAL COMPANIES

**OWNER DATA CROSSROADS**

**IMPLEMENTATION OF DATA MANAGEMENT**

11 YEARS OF HANDS-ON EXPERIENCE

FINANCE & BUSINESS CONTROL

ERP IMPLEMENTATION

**MANAGEMENT CONSULTANCY**

**DATA MANAGEMENT MATURITY ASSESSMENT (REVIEWS)**

**DATA LINEAGE**

DATA AND INFORMATION VALUE CHAIN

**4 BOOKS**

3 WHITEPAPERS

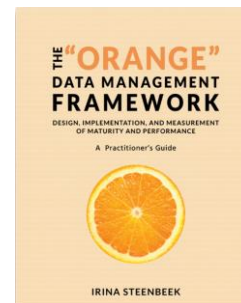
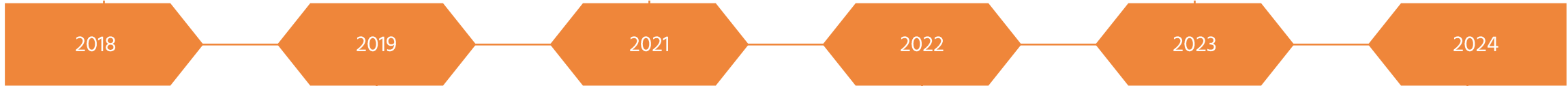
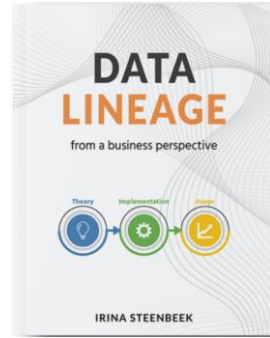
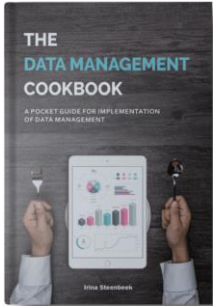
**50 ARTICLES**

SPEAKER AT INTERNATIONAL CONFERENCES

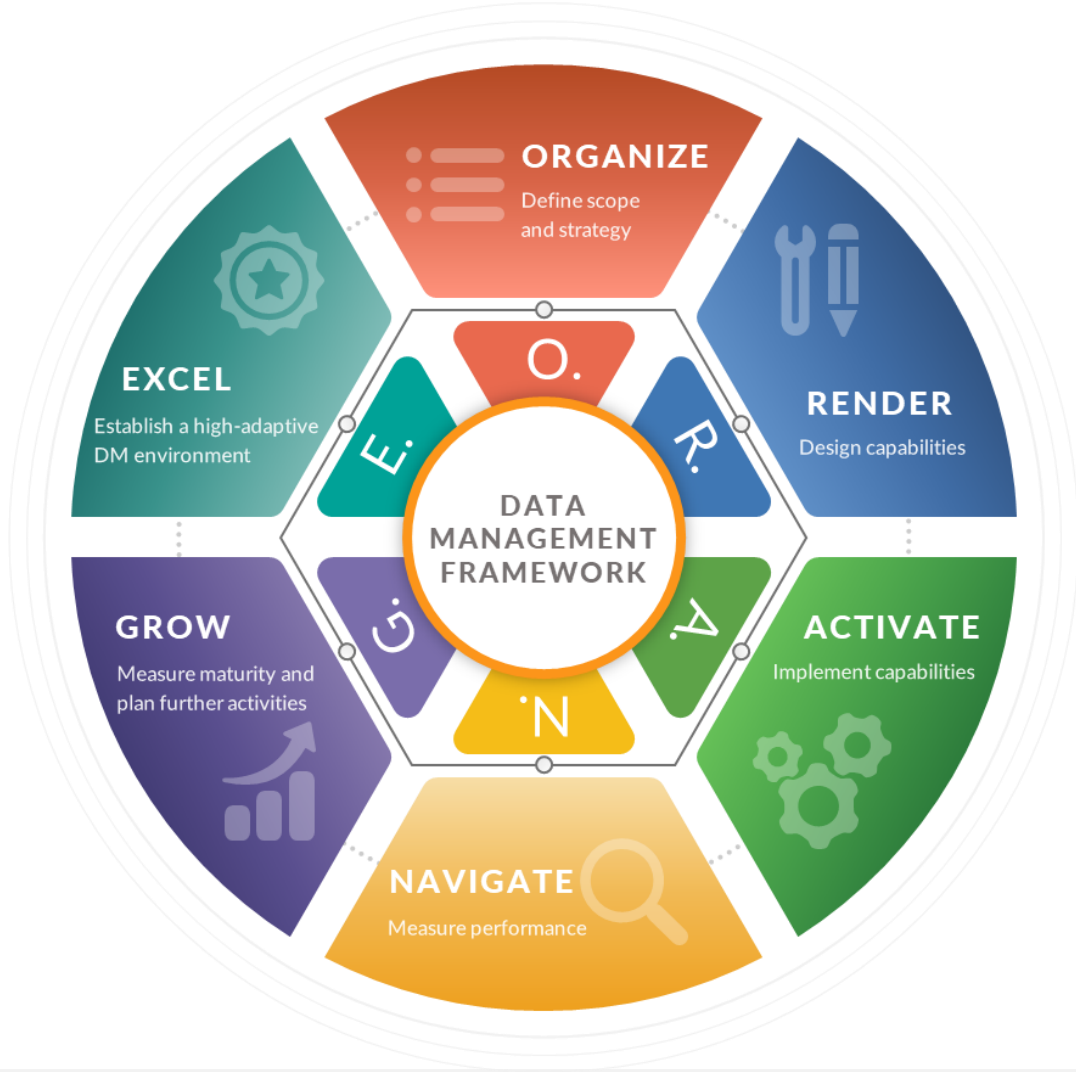


# I've Shared my Experience in Several Books and Courses:

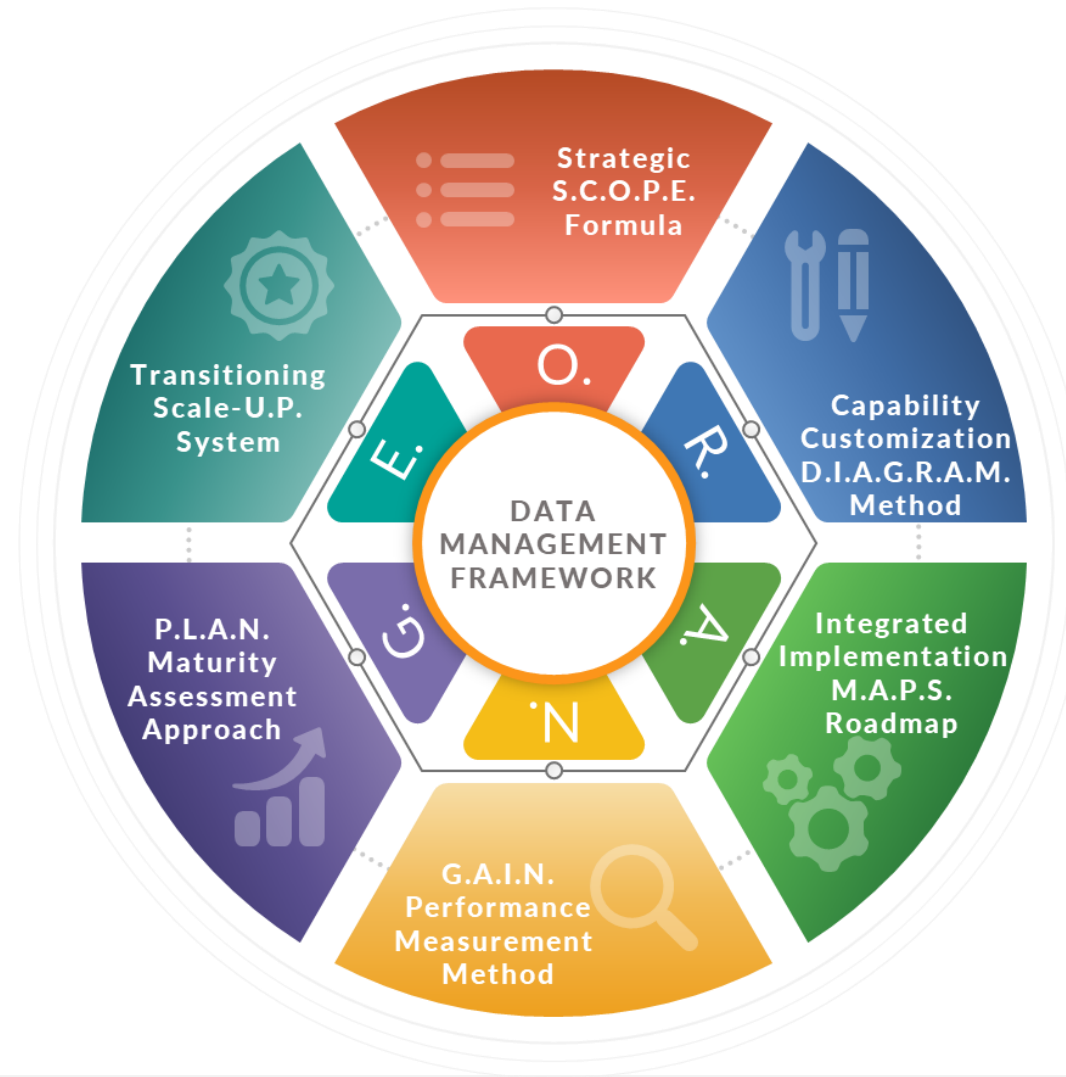
available at 



# The O.R.A.N.G.E. Data Management Framework Assists in Setting Up a Metadata Business Case



# This Framework Consists of Multiple Models and Methods



# Please, Present Yourself...

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- Name
- Company
- Current position
- Knowledge and/or experience with this subject
- Three key expectations from this workshop
- A business case: own or standard
- How did you get information about this training?



# A Business Case for Metadata Management Should Include the Following:

- 1 Key Concepts and Terminology
- 2 Business Drivers
- 3 Sponsors and Stakeholders
- 4 Scope of an Initiative
- 5 (Meta) Data M./G. Framework
- 6 Situational Analysis
- 7 Implementation Approach & IT Tools
- 8 Initiative Roadmap
- 9 Established Program/Project/BaU

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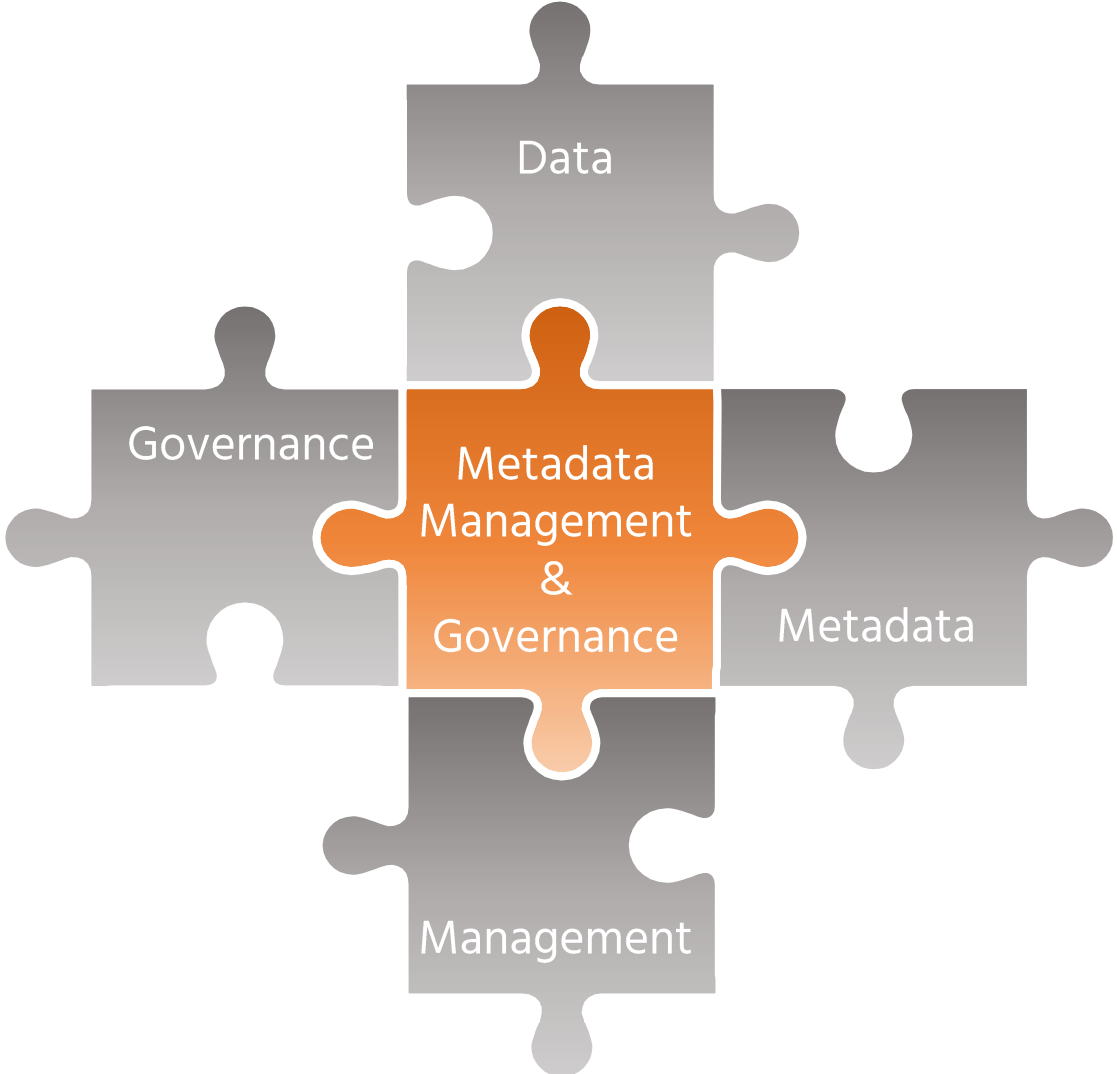
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# Schedule

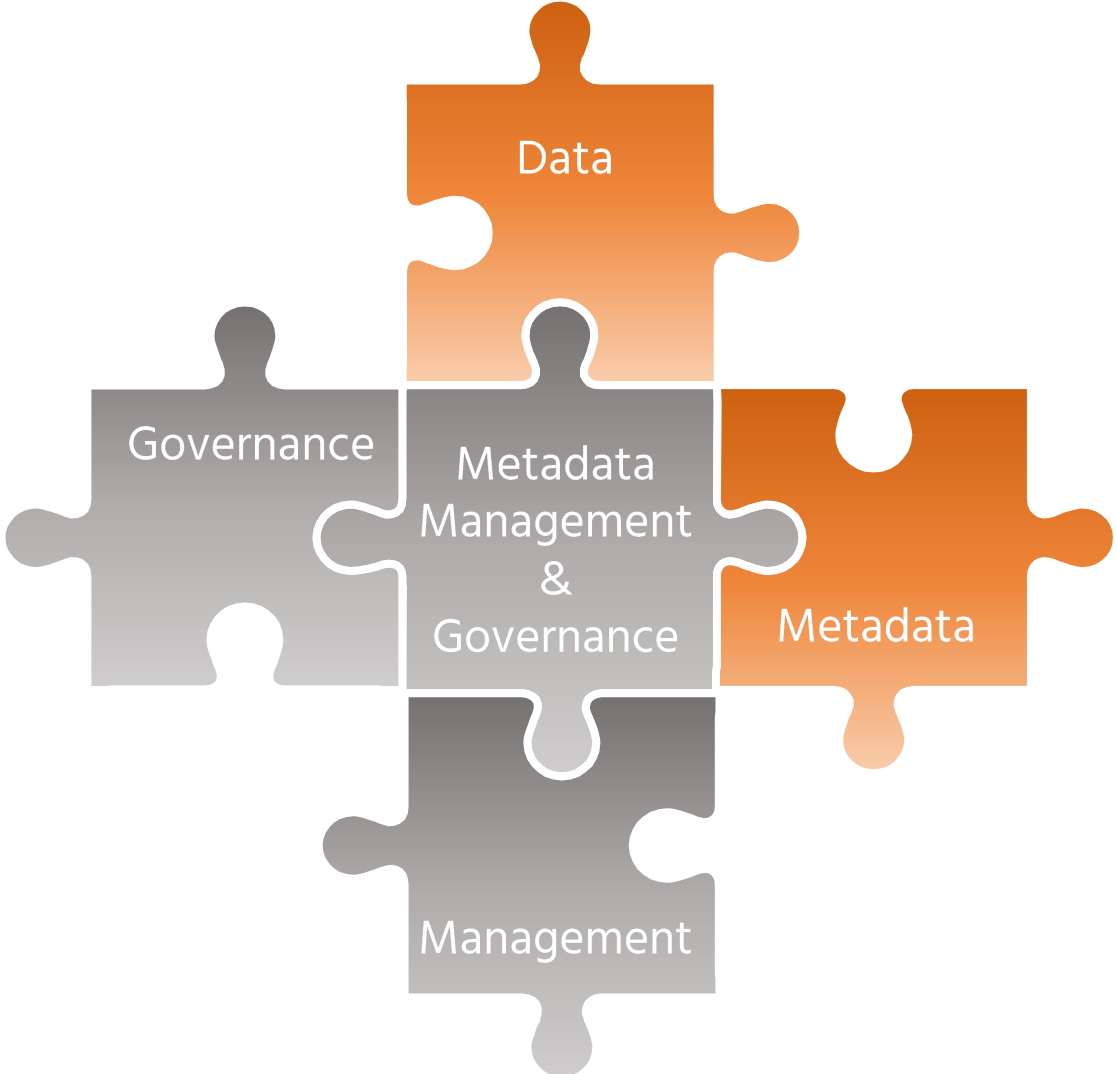
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	Templates	198-203		



# To Be on the Same Page, We Need to Align Terminology



# To Be on the Same Page, We Need to Align Terminology



## DEFINITION

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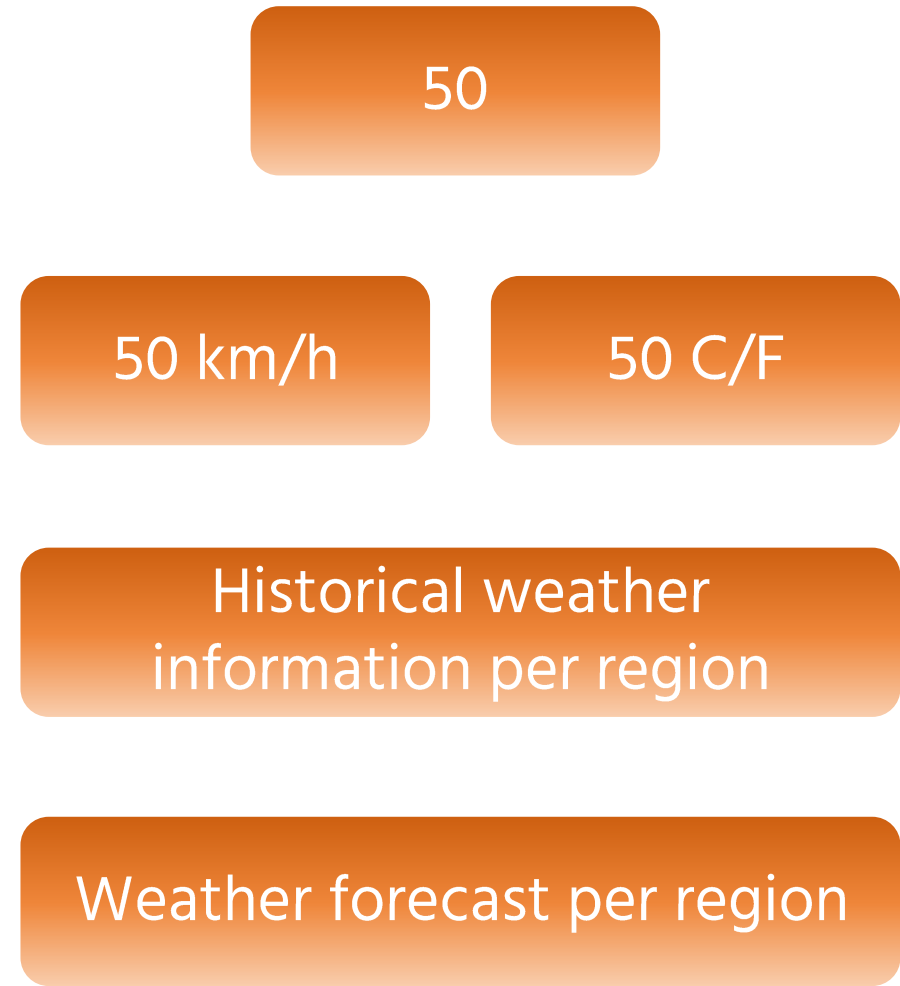
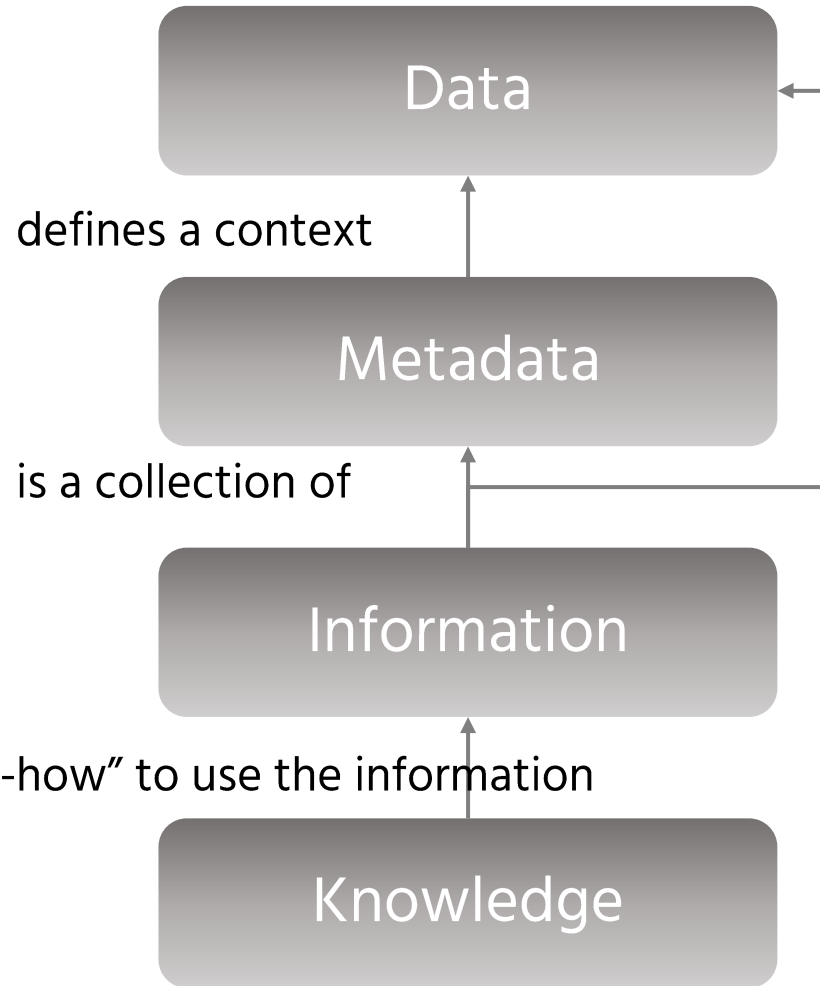
# Data

THE PHYSICAL OR ELECTRONIC REPRESENTATION OF SIGNALS “IN A MANNER SUITABLE FOR COMMUNICATION, INTERPRETATION, OR PROCESSING BY HUMAN BEINGS OR BY AUTOMATIC MEANS”

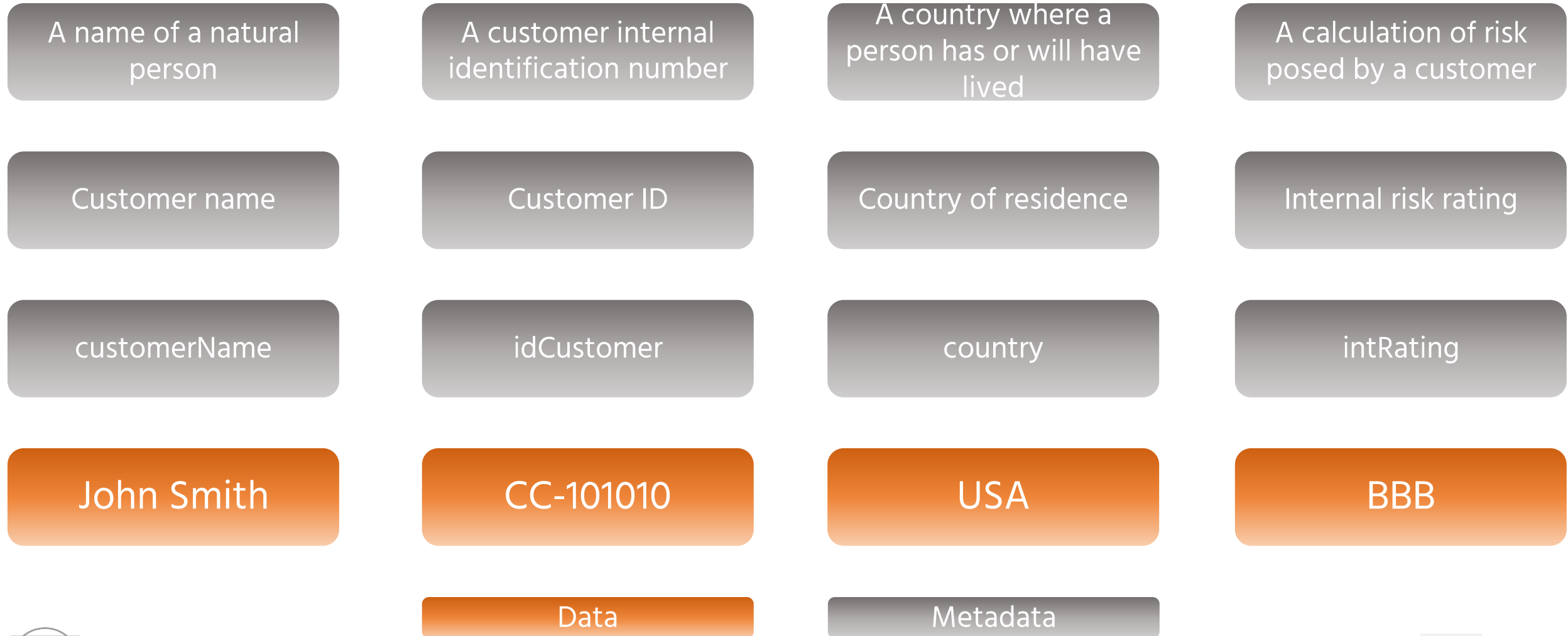
Source: United Nations Statistical Commission and Economic Commission for Europe. Terminology on Statistical Metadata. United Nations. Geneva, 2000., <https://unece.org/fileadmin/DAM/stats/publications/53metadaterminology.pdf>, p.8. Accessed 16 Feb.2021.



# Data, Metadata, Information, and Knowledge Are All Subjects of Data Management



# Metadata Defines the Context for Data



DEFINITION

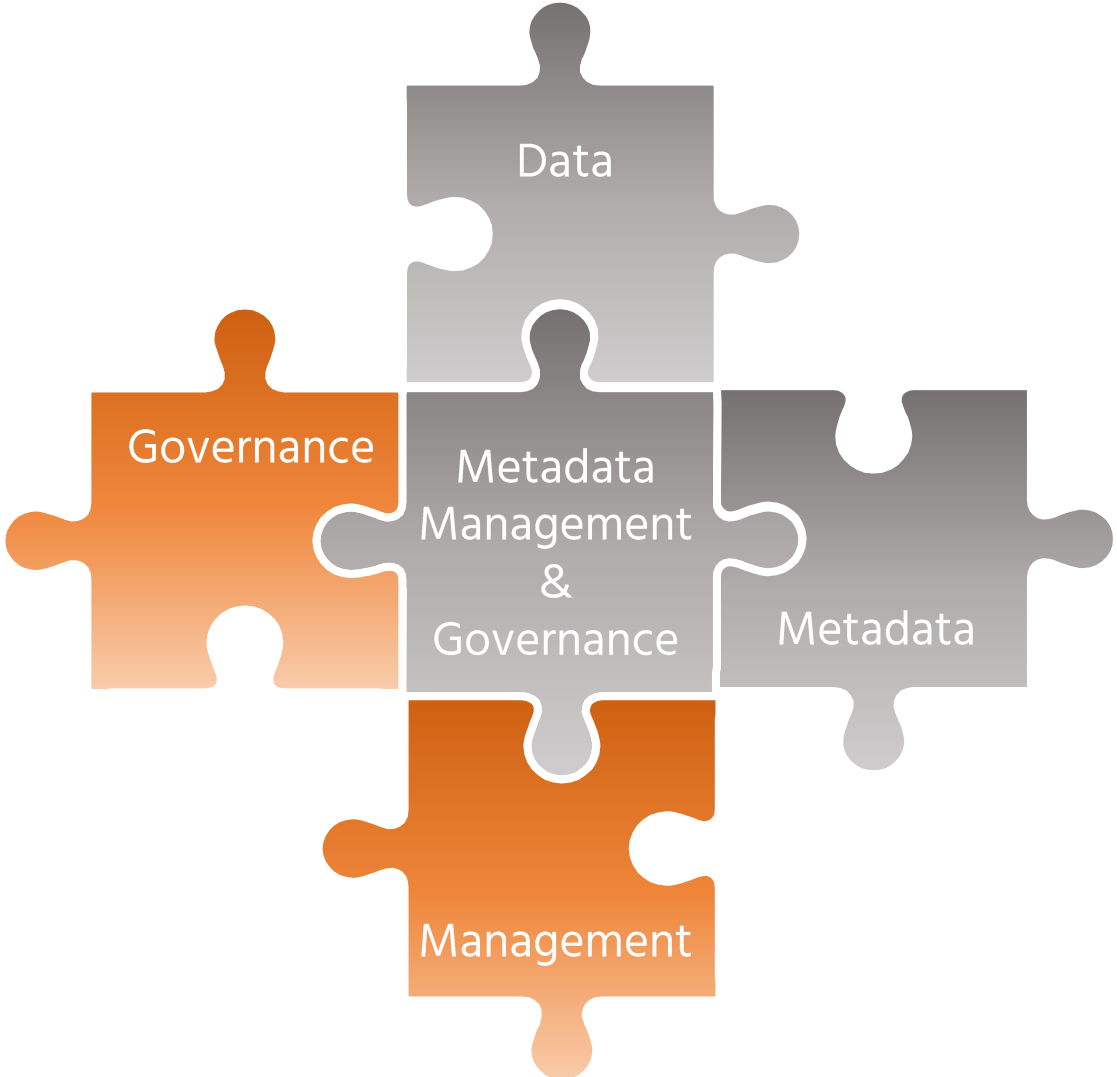
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# Metadata

DATA THAT DEFINES AND DESCRIBES OTHER DATA IN A PARTICULAR CONTEXT



# To Be on the Same Page, We Need to Align Our Language

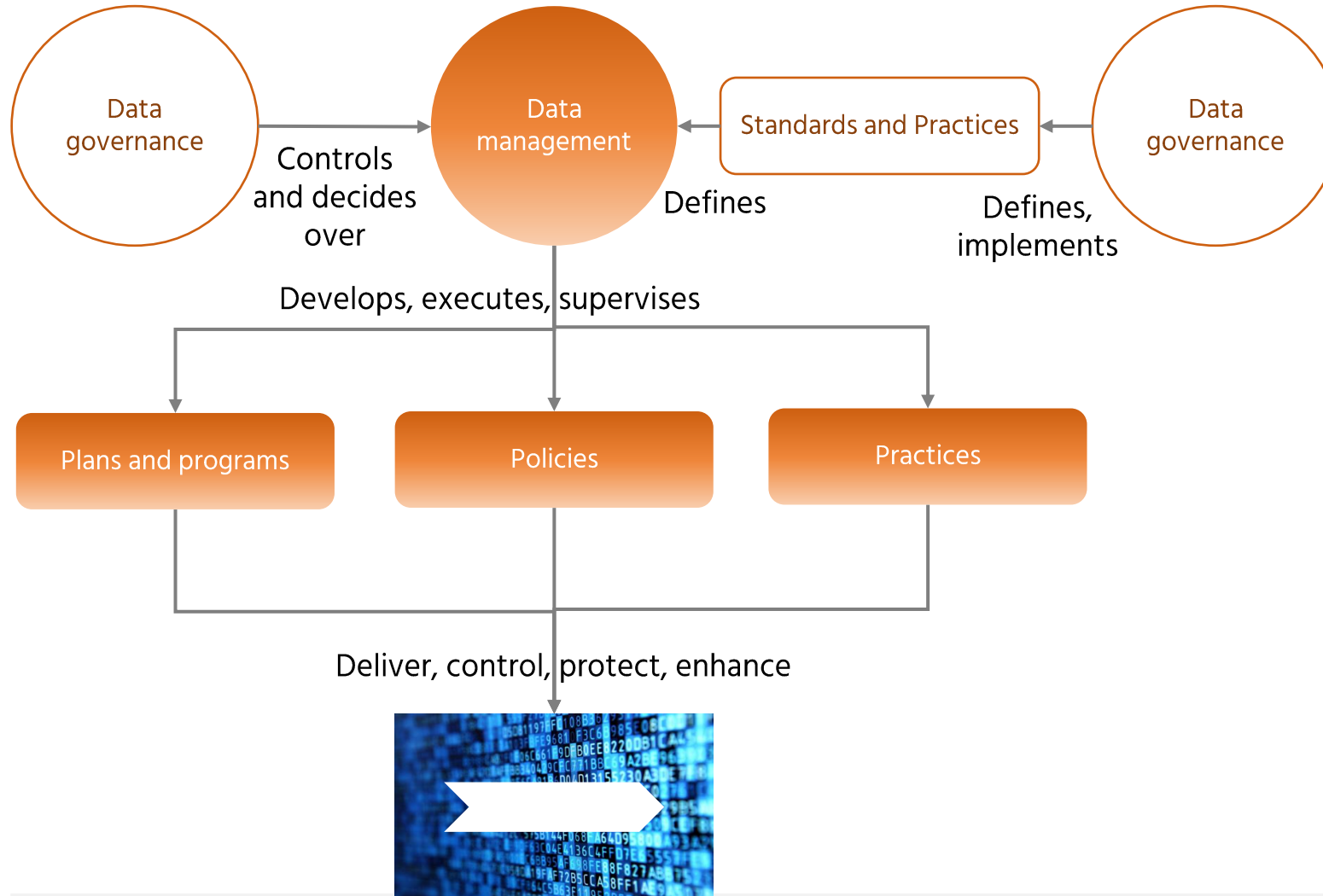


# Let's Look at the DAMA-DMBOK2 and DCAM Definitions

## DAMA-DMBOK2

**Data governance** is the exercise of authority, control, and shared-decision making (planning, monitoring, and enforcement) over the management of data assets

**Data management** is the development, execution, and supervision of plans, policies, programs, and practices that deliver, control, protect, and enhance the value of data and information assets throughout their lifecycles



## DCAM

**Data governance** function is the function that defines and implements the standards, controls and best practices of the data management initiative in alignment with strategy.

**Data management** is the development, execution and supervision of plans, policies, programs and practices which deliver control and protection, and enhance the value of data and information assets throughout their lifecycles.



# Data Governance **Governs Data Management**, NOT DATA

Data governance



I decide how you can decide, and then control how you do it

Data management



I decide how and when I will deliver, control, protect, and enhance data



DEFINITION

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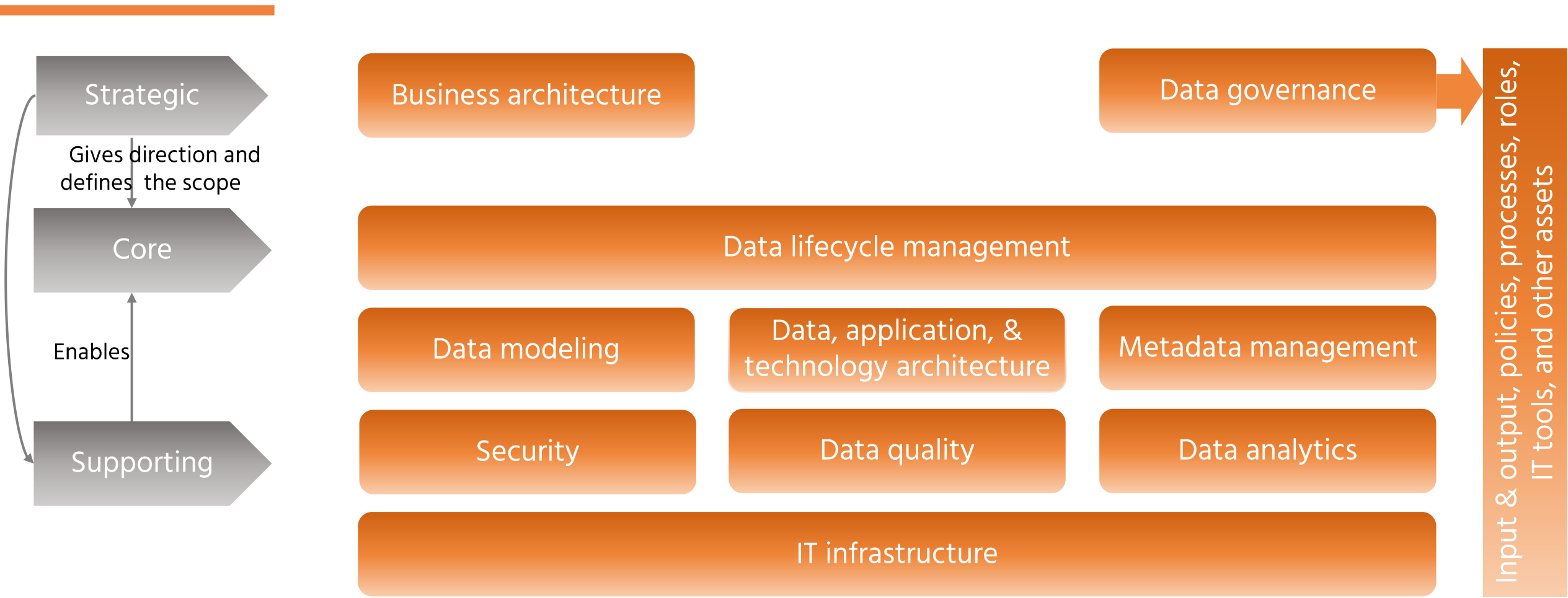
## Data Management Capability

A COMPANY'S ABILITY TO SAFEGUARD DATA ASSETS AND DELIVER VALUE FROM THEM



# Data Management Consists of Multiple (Sub)-Capabilities

Data Governance is One of Them



## DEFINITION

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# DM (Data) Governance Capability

A COMPANY'S ABILITY TO DESIGN A DATA MANAGEMENT FUNCTION, COORDINATE AND CONTROL ITS IMPLEMENTATION AND PERFORMANCE



## DEFINITION

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# Metadata Management

“PLANNING, IMPLEMENTATION, AND CONTROL ACTIVITIES TO ENABLE ACCESS TO HIGH QUALITY, INTEGRATED METADATA.”

Source: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.419.



# Please, Note for Yourself, Which Terminology You Use in Your Company

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Data

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Metadata

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Data Management

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Data Governance

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# A Business Case for Metadata Management Should Include the Following:



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# Business Benefits is the Core Reason for Establishing a Metadata Business Case



# Data Management Professionals Have Quite Different Views on Metadata Management



## DEFINITION

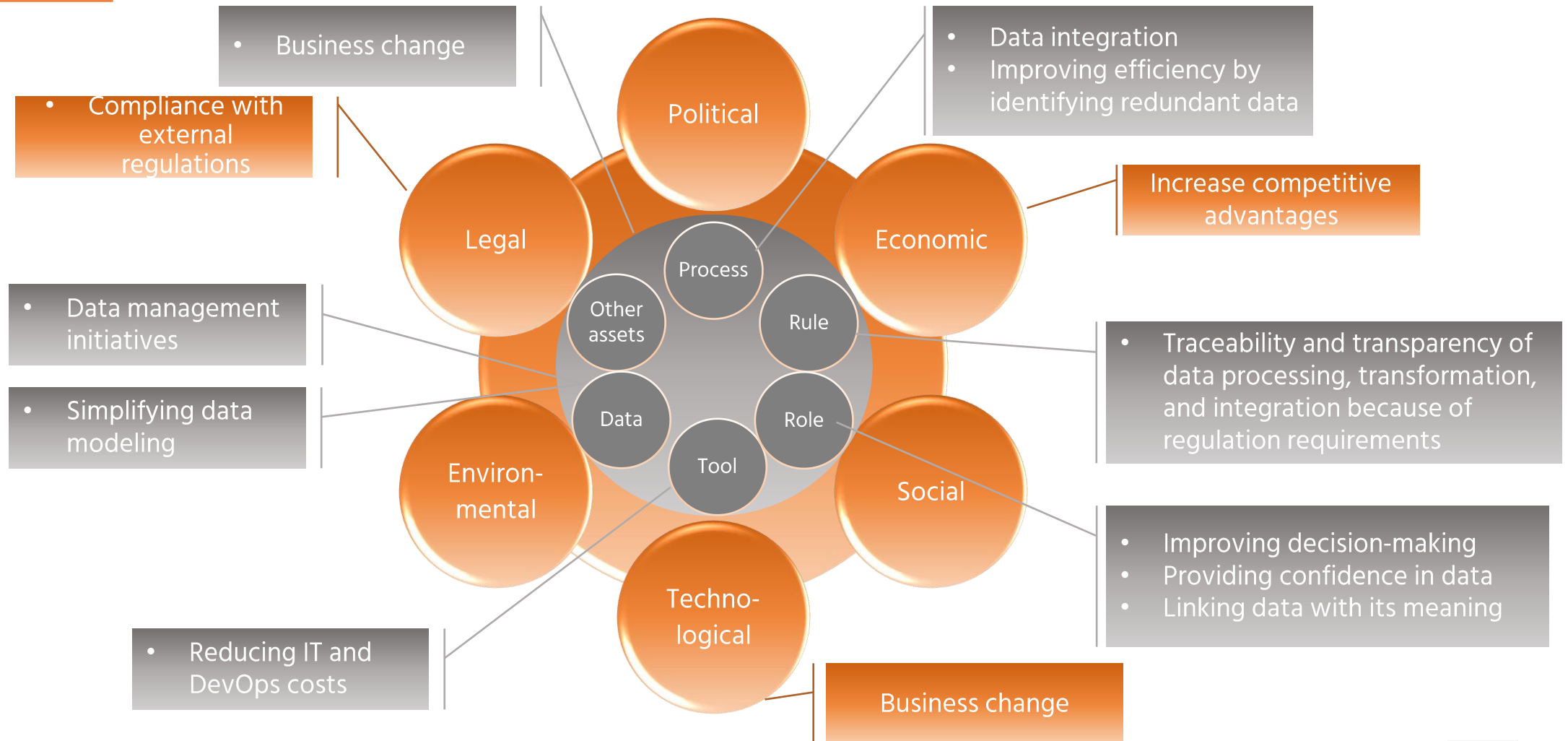
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# Business Driver

- A COMPONENT OF THE INTERNAL OR EXTERNAL BUSINESS ENVIRONMENT THAT:
- ENSURES SUSTAINABLE SUCCESS AND GROWTH IN THE MAIN AREAS OF BUSINESS FOR WHICH THE BUSINESS WAS DESIGNED, AND
  - AFFECTS A COMPANY'S EARNINGS OR THE PRICE OF ITS STOCK

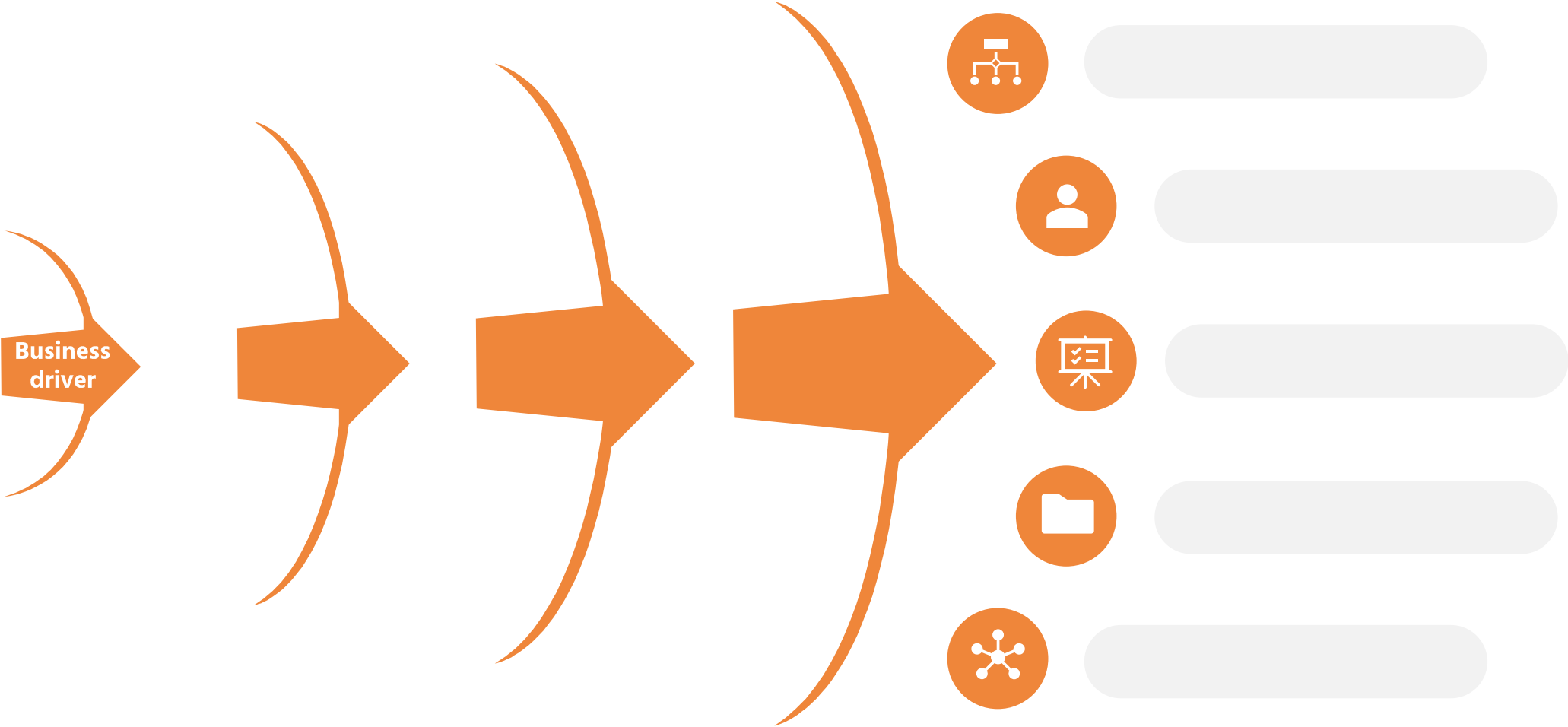


# Various External and Internal Business Factors Motivate a Company to Start a (Meta)data-Related Initiative



# Any Data-Related Initiative Starts with The Most Significant Business Reasons

Compliance with regulations  
Enhancing decision-making



# Let's Summarize the Most Common Business and (Meta)data Management Drivers

Tip: A company should limit its ambition to 1-2 drivers to make a DM initiative feasible



Implement business change



Improve decision-making



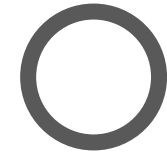
Comply with regulations



Improve customer experience and competitive advantage



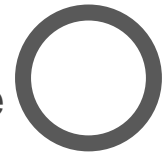
Integrate data of different formats and from multiple sources



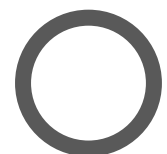
Ensure transparency and traceability of data movements and transformations



Reduce IT and DevOps costs by optimizing data architecture landscapes



Migration projects and optimization of data pipelines



# We Will Use the Example of a Made-Up Company XYZ across the Course

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- XYZ Company develops software products and provides accompanying consulting services for the implementation of their software
- XYZ has two software product lines:
  - Product line Y focuses on the needs of corporate customers (“Corporate market segment”)
  - Product line Y serves the needs of individuals, including sole proprietors (“Retail market segment”)
- The head office of XYZ company is located in a country within the EU. The company has several subsidiaries in other EU countries and in the US.



# XYZ Company, Example: Business Driver Prioritization

Business driver	Benefits: 0 (low) – 10 (high)							Total score
	Increase revenue	Reduce cost	Reduce risk	Improve process	Business continuity	Improve efficiency	Protect reputation	
<b>Compliance</b> with GDPR and PII (personal data)	2	8	10	10	10	10	5	<b>55</b>
Compliance with SOX regulation (reporting)	2	8	10	10	10	10	5	<b>55</b>
<b>Enhance decision-making</b> (Customer management)	2	5	8	10	10	10	10	<b>55</b>
Digital transformation (Finance reporting)	1	7	8	10	8	10	5	49
Staff skills upgrade	1	5	8	5	5	8	2	34
Movement to cloud	0	6	2	5	5	5	2	25

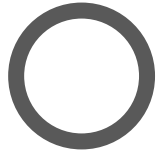


# Exercise 1: Note the Business and Data Management Reasons for a Data Initiative in Your Company



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# A Business Case for Metadata Management Should Include the Following:



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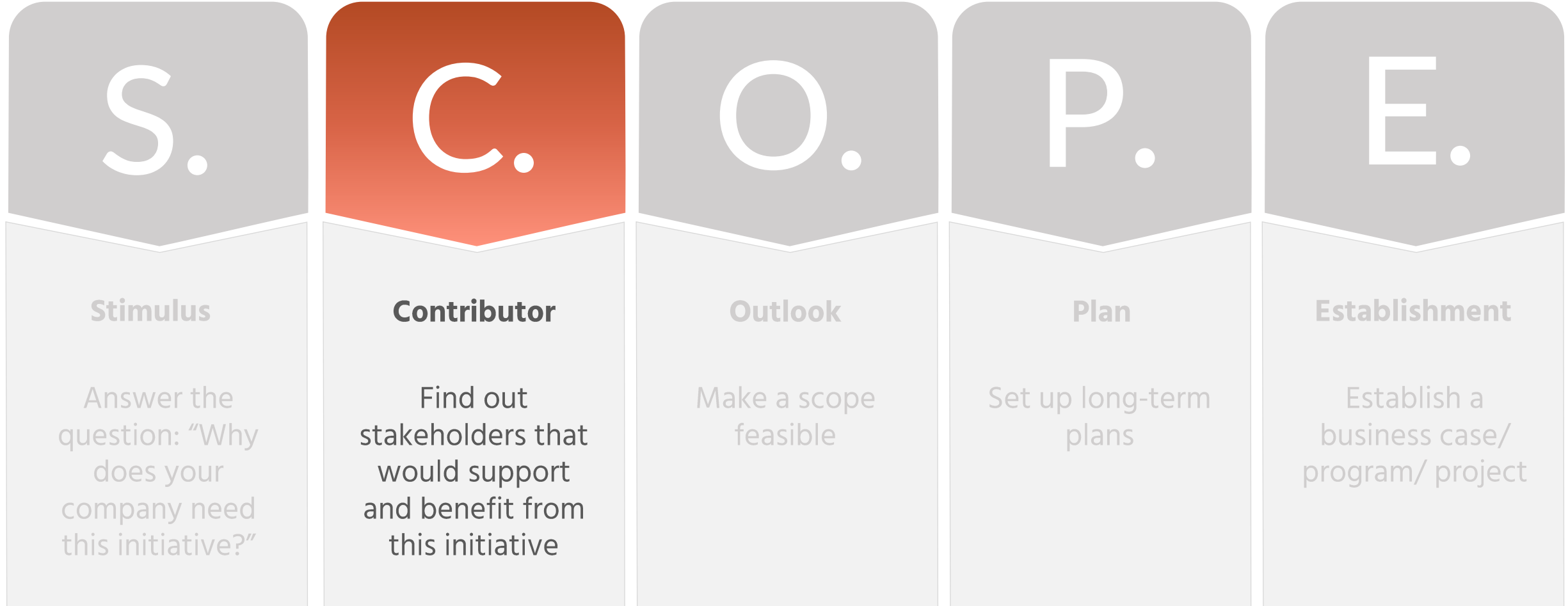


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# Business Drivers Define an Initiative's Sponsors and Stakeholders



## DEFINITION

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# Business Stakeholder

AN INDIVIDUAL OR A GROUP OF INDIVIDUALS WITH PARTICULAR CONCERNS AND INTERESTS IN A BUSINESS

Each stakeholder has its concern, the level of involvement, and the level of impact/influence



## DEFINITION

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# Sponsor

A BUSINESS STAKEHOLDER OR A GROUP OF STAKEHOLDERS THAT SUPPORT, PROMOTE, AND FUND A BUSINESS INITIATIVE

A company's leadership team should become a sponsor for strategic data management initiatives



# Various Stakeholder Groups Have Different Needs, Benefits, and Roles in a Metadata Management Initiative

WHY do they need it?



WHAT should they do?



HOW should they do it?



Strategic

- A company's leadership team: CEO, CFO, CIO

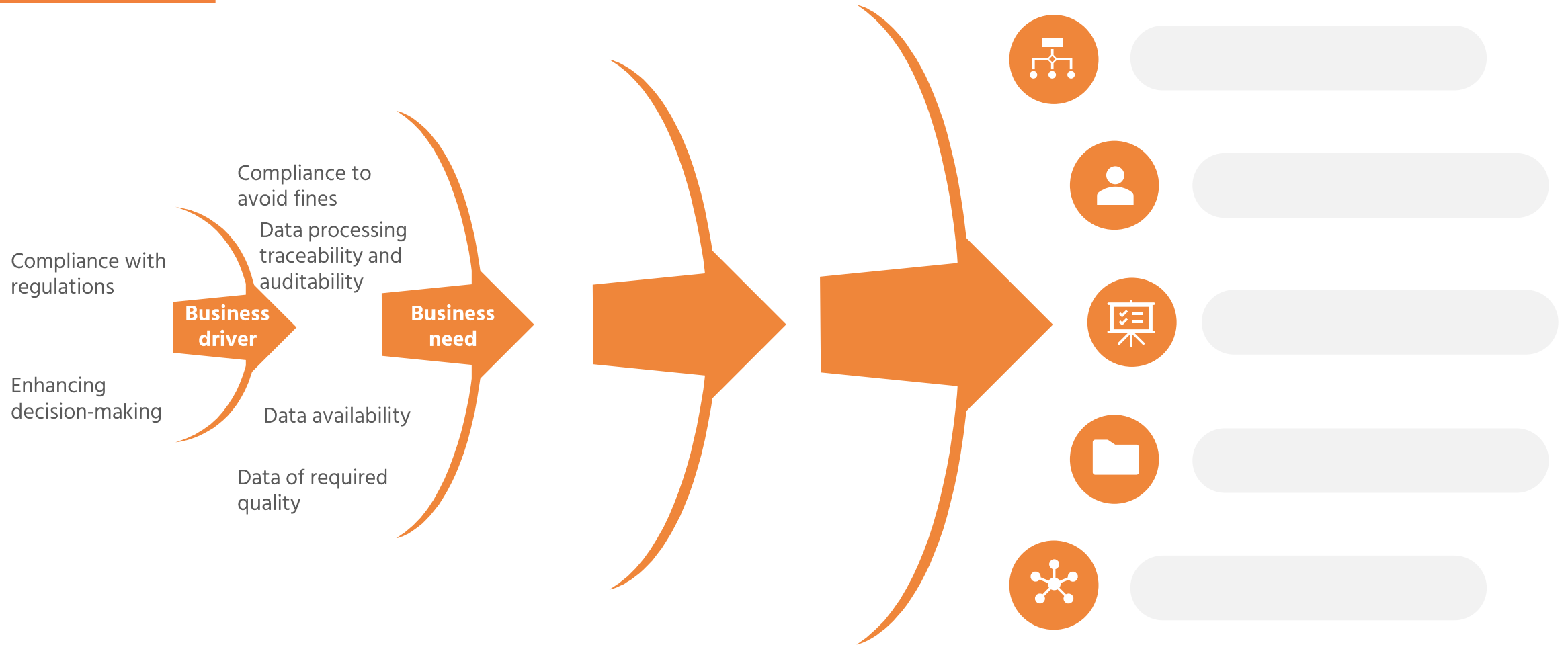
Tactical

- Middle management: Heads of business lines, units, and departments; CDO

Operational

- Business subject matter experts
- Data management and IT professionals

# Business Drivers Must Be Translated into the Business Needs of Each Stakeholder Group

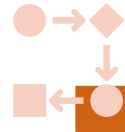


# A Company's Leadership Team Must Act as a Sponsor of Every Strategic Data-Related Initiative



## Needs

- Comply with regulations to avoid fines
- Decrease IT-related costs
- Reliable data for strategic decision-making
- Business optimization



## Initiatives

- Compliance-related initiatives (GDPR, PERDARR, IFRS17, SOX)
- IT projects (Replacement of legacy software; Movement to Cloud)
- AI and ML initiatives, Customer-360
- Digital transformation



## Benefits

- Reduce operational risks and avoid potential fines
- Reduce IT operational and maintenance costs

# Company XYZ, Example: Stakeholder Map

Stakeholder group	Stakeholder position	Business driver 1 (Compliance)			Business driver 2 (Finance reporting)		
		Concerns	Level of influence (Low, High)	Level of involvement (Low, High)	Concerns	Level of influence (Low, High)	Level of involvement (Low, High)
Leadership team	Chief Executive Officer	Comply with regulations	H	L	Correct info for decision-making	H	L
	Chief Commercial Officer	Reputation with customers	H	L	Correct info for decision-making	H	H
	Chief Information Officer	Comply with regulations	H	H	IT costs reduction	H	H
	Chief Product Officer	Comply with regulations	H	L	No serious concerns	H	L
	Chief Financial Officer	Comply with regulations	H	L	Correct info for decision-making	H	H



# Exercise 2: Note the Key Sponsors and Stakeholders of Your Initiative

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1. Use Template 2: Stakeholder Map
2. Indicate key sponsors and stakeholders and their concerns
3. Assess the level of their influence and involvement
4. Present results

Time: 10 minutes



# A Business Case for Metadata Management Should Include the Following:



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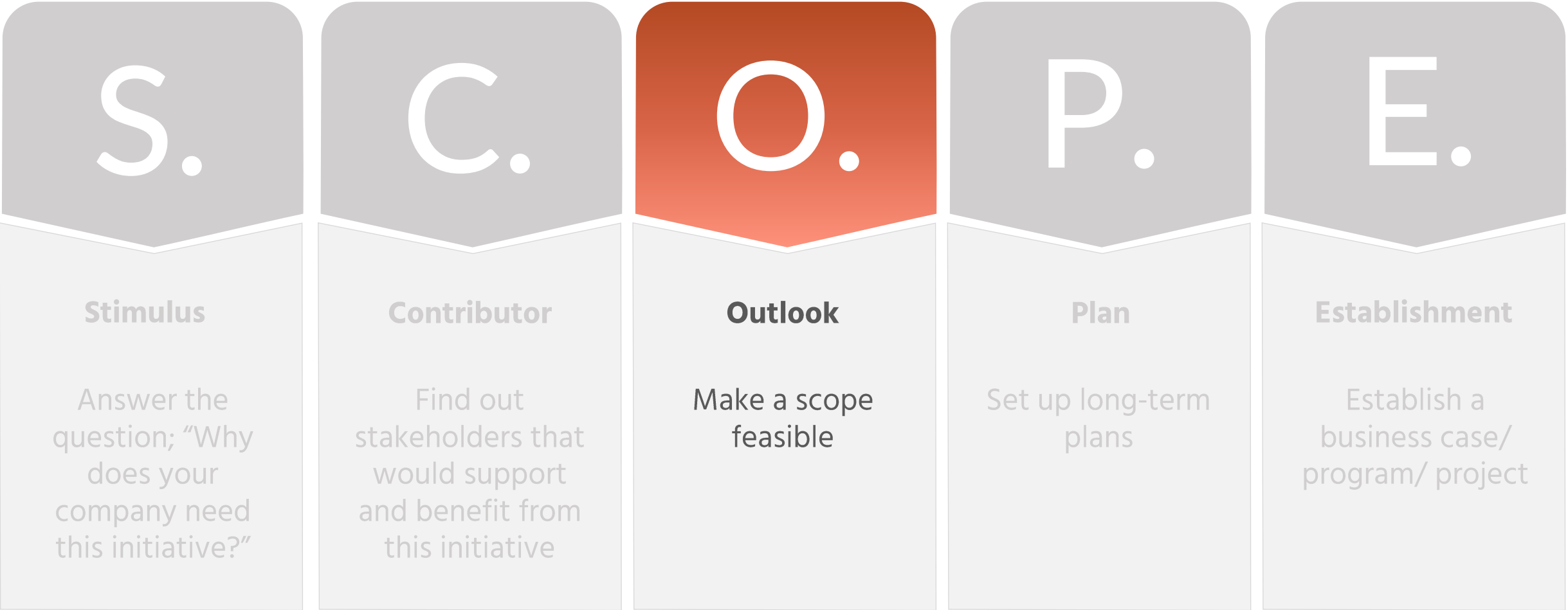


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# A Feasible Scope is a Key Factor of a (Meta)Data Initiative Success:



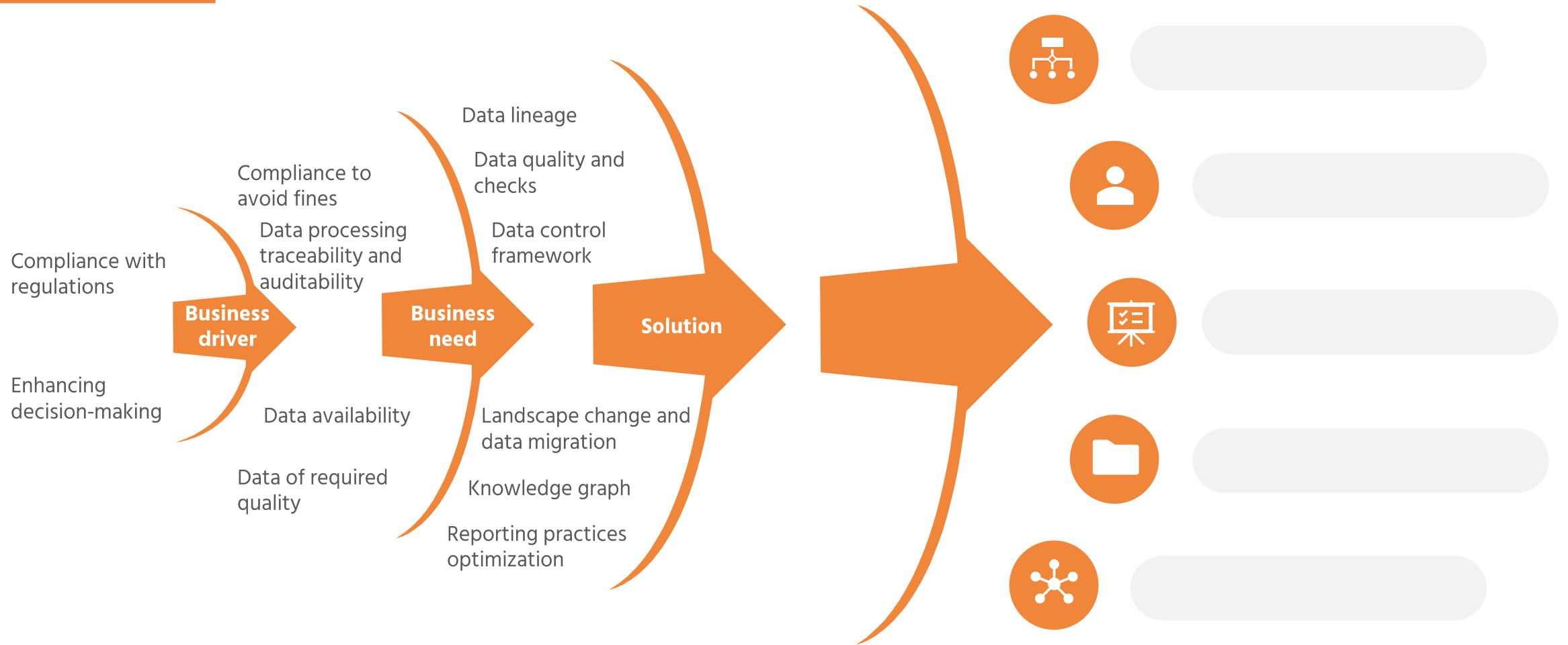
# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum



# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum



# Business Needs Must Be Detailed into Possible Solutions



# XYZ Company, Example: A Metadata Initiative Solutions

Solution	Business driver 1: Compliance	Business driver 2: Enhanced Decision-Making	Scope (Yes/No)
Data lineage	[Greyed out]	[Greyed out]	Yes
Data quality capability			Yes
Application landscape change and migration			Maybe
Optimization of reporting practices			Yes
Knowledge graph			No
Data observability			Maybe



# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum

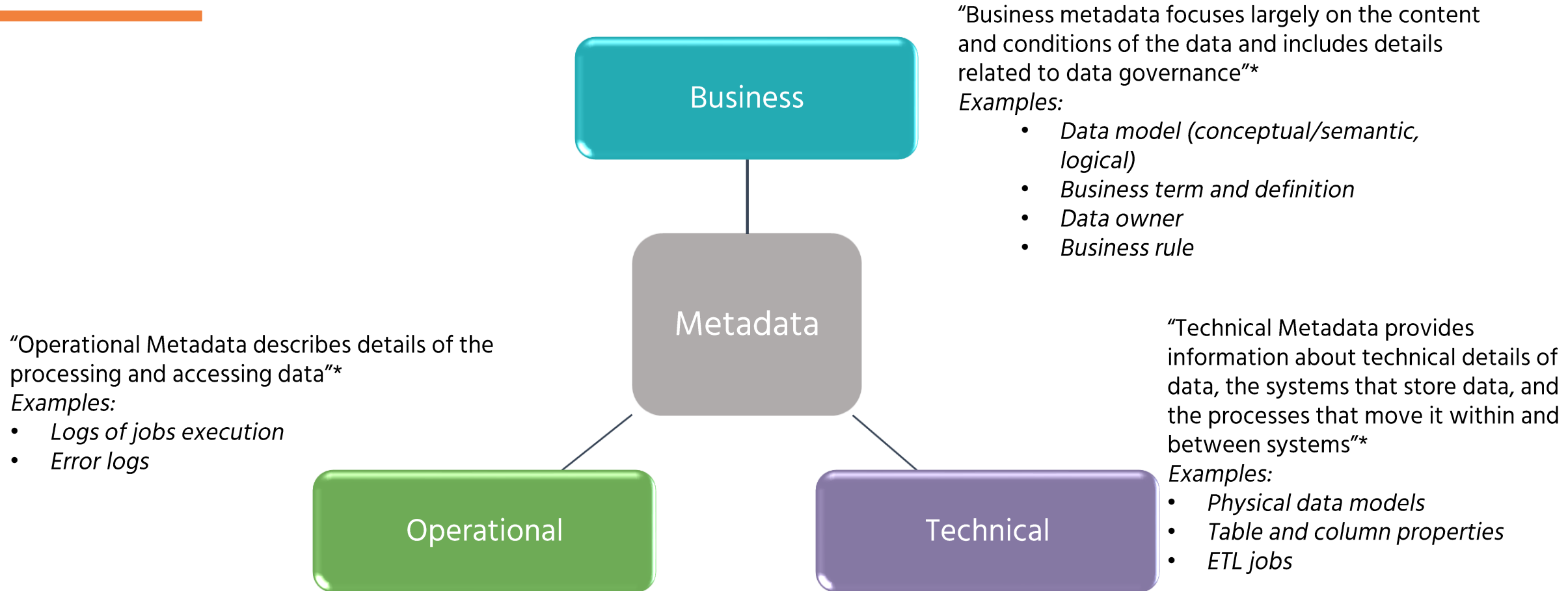


# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum



# Metadata Can Be of Various Types

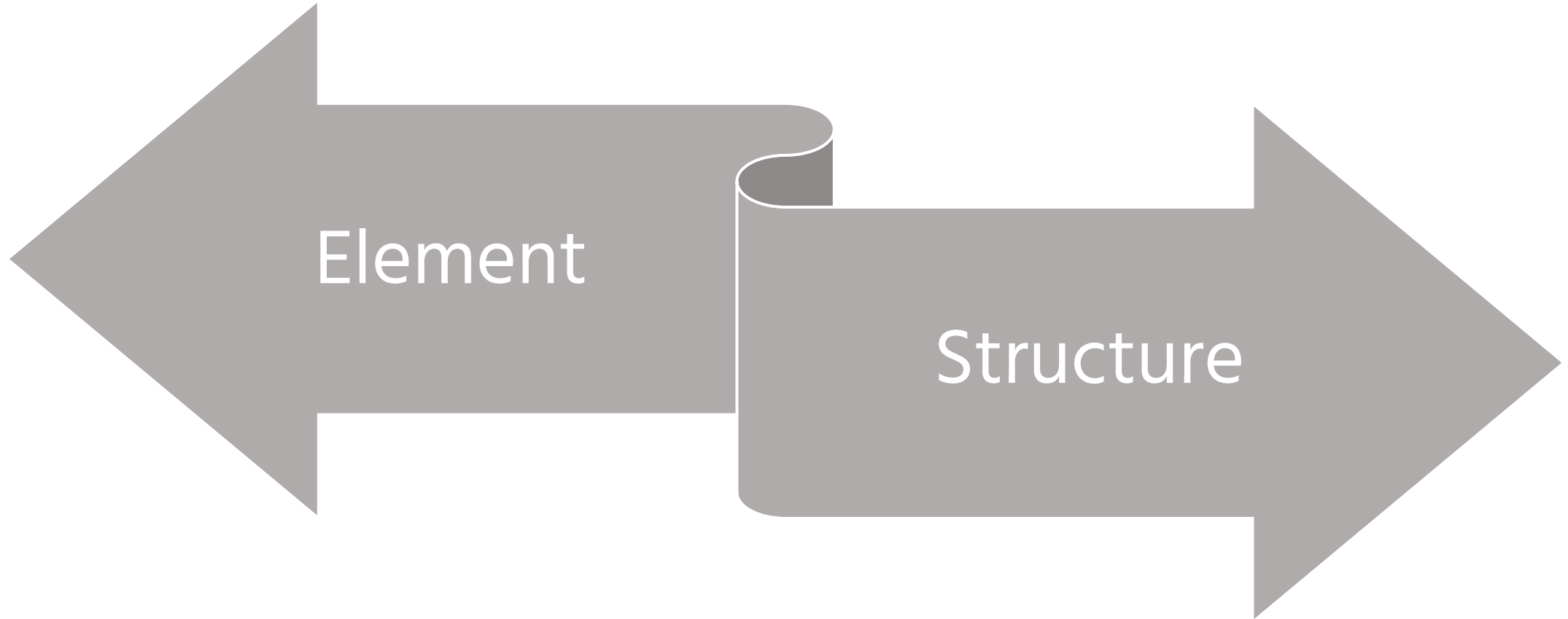
The scope of a metadata initiative can be much broader than thought



\*Source: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.423.

# Metadata Has Different Levels of Complexity

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# Business Metadata Consists of the Following Elements and Structures:

## Elements

- ❖ Definitions and descriptions of data sets, tables, and columns
- ❖ Data owner, user, steward
- ❖ Security or privacy level of data
- ❖ Data issue
- ❖ Data usage
- ❖ Information about the system of records and/or golden sources for data elements

## Structures

- ▲ Business and transformation rules, calculations, derivations
- ▲ Data quality rules
- ▲ Data models (conceptual and logical)
- ▲ Data quality measurement results
- ▲ Schedules to update data
- ▲ Data provenance and data lineage
- ▲ Valid value constraints

Source: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.423.



# Technical Metadata Consists of the Following Elements and Structures:

## Elements

- ❖ Physical names of a database and column
- ❖ Database object and column properties
- ❖ Assess permissions
- ❖ File format schema definitions
- ❖ Program and application names and descriptions
- ❖ Data access rights, groups, roles

## Structures

- ▲ Data CRUD (create, replace, update, and delete) rules
- ▲ Physical data models, including data table names, keys, and indexes
- ▲ ETL jobs details
- ▲ Source-to-target mapping documentation
- ▲ Data lineage documentation, including upstream and downstream change impact documentation
- ▲ Recovery and back up rules
- ▲ Content update cycle job schedules and dependencies

Source: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.423.



# Operational Metadata Consists of the Following Elements and Structures:

## Elements

- ❖ Technical roles and responsibilities
- ❖ Data archiving and retention requirements

## Structures

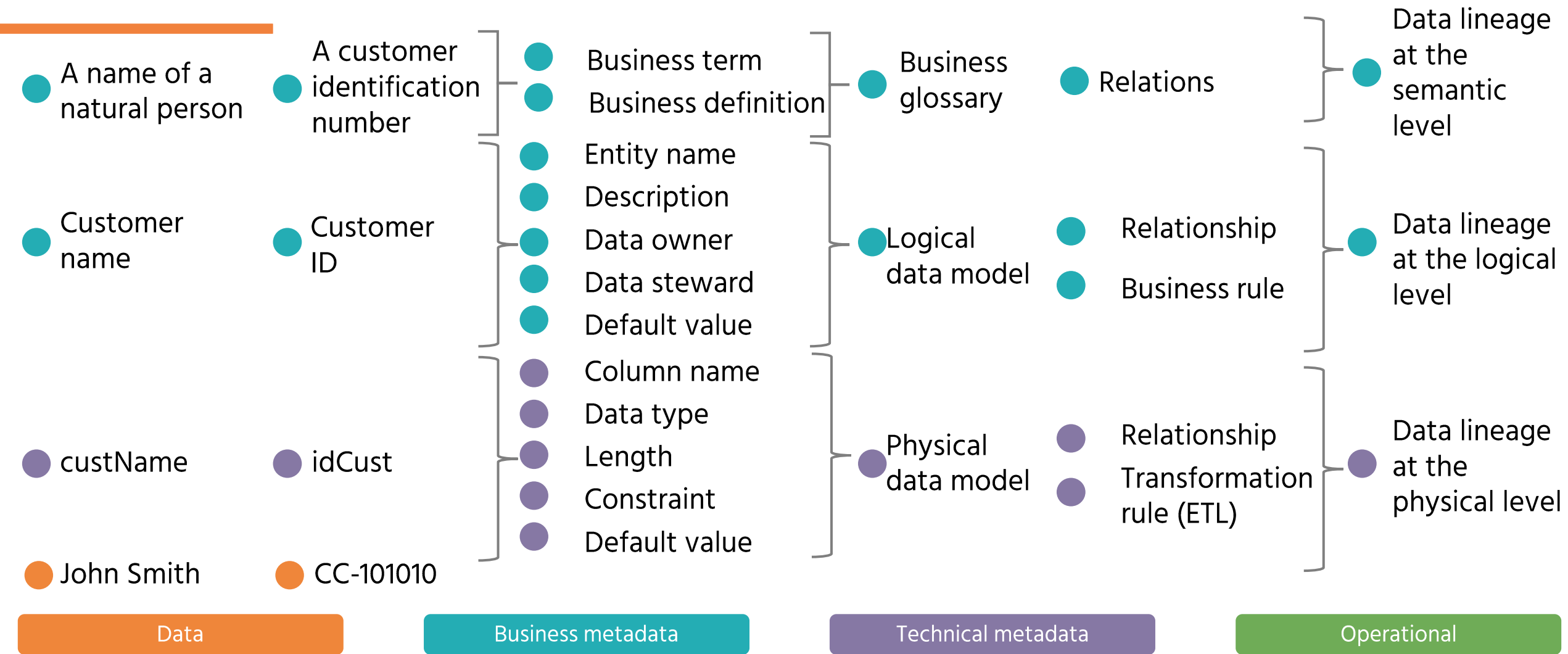
- ▲ Logs of jobs execution for batch programs
- ▲ History of extracts and results
- ▲ Schedule anomalies
- ▲ Results of audit, balance, control measurement
- ▲ Error logs
- ▲ Reports and query access patterns, frequency, and execution time
- ▲ SLA and Data sharing agreements
- ▲ Backup, retention, disaster recovery provisions

Source: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.423.



# Metadata Elements Assemble into Metadata Structures

Example: Data lineage



# Metadata Elements Assemble into Metadata Structures

Example: Data quality



Data

Business metadata

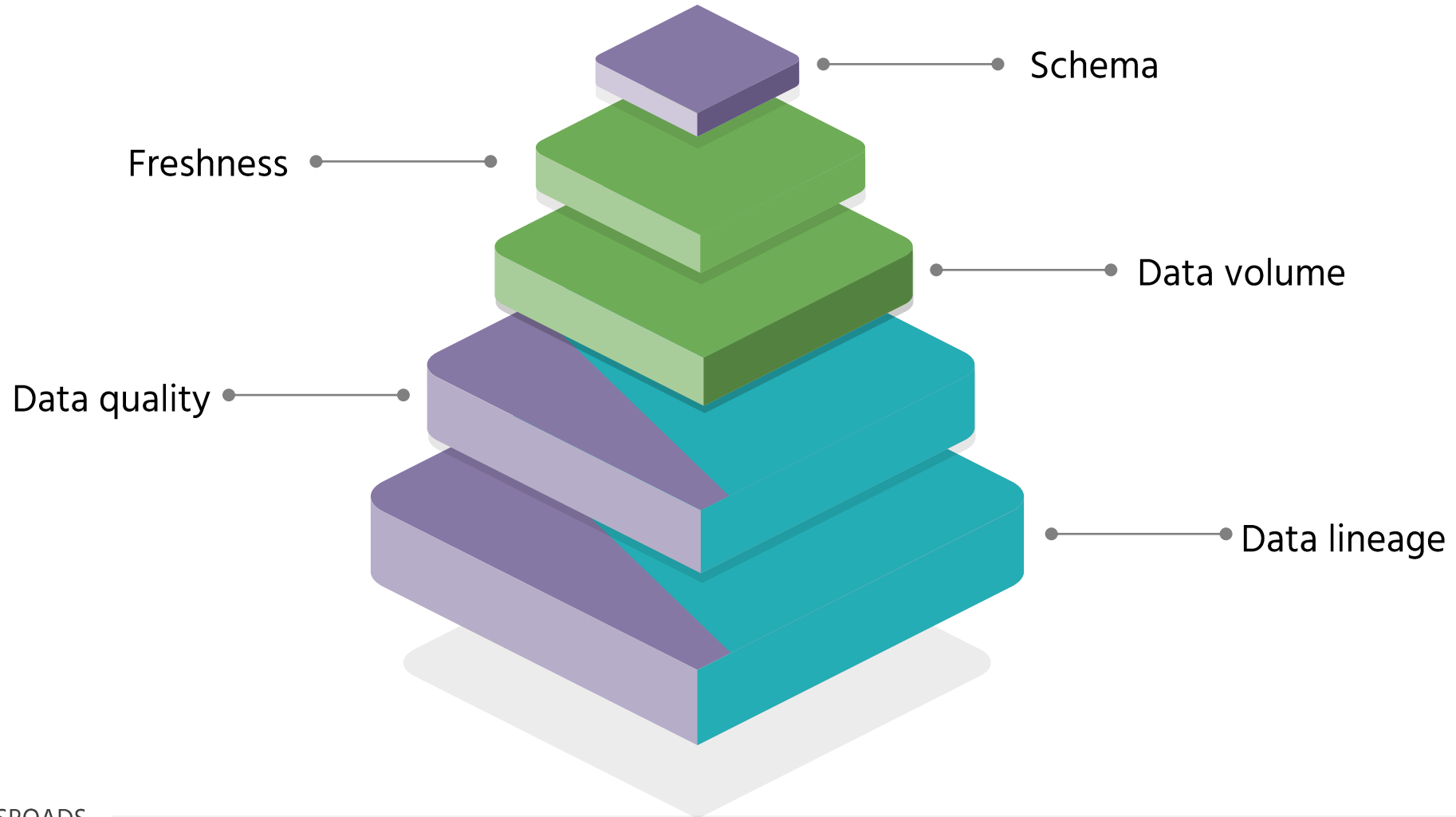
Technical metadata

Operational

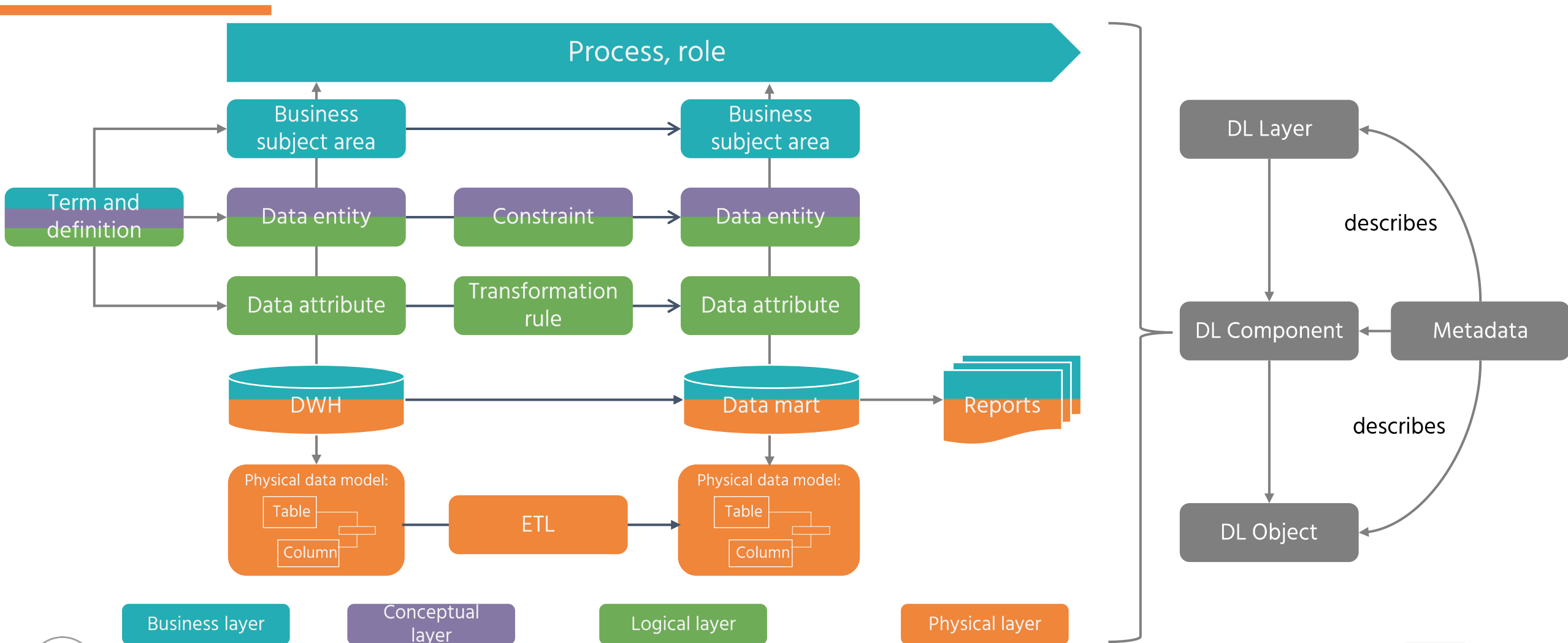


# Metadata Structures Assemble into Other Metadata Structures

Example: Data observability



# The Metamodel of Data Lineage (DL) Serves as a Basis for the Metamodel of Metadata



# Company XYZ: Business Metadata for Different Solutions

Metadata type	Metadata examples	Data lineage	Data quality	Data observability
Business metadata	Data owner, user, steward	[Shaded]		[Shaded]
	IT asset-related metadata (name, vendor)			
	Data entity and attribute names and properties			
	Business term and definition			
	Security & privacy level			
	Data issue		[Shaded]	
	Data usage	[Shaded]		
	Business names of technical metadata	[Shaded]		
	Business rules	[Shaded]	[Shaded]	
	DQ measurement results		[Shaded]	



# Company XYZ: Technical Metadata for Different Solutions

Metadata type	Metadata examples	Data lineage	Data quality	Data observability
Technical metadata	Physical data models and DB schemas: names and properties			
	Application and data access levels and permissions			
	IT-asset technical characteristics			
	Data access rights, groups, roles			
	Job details			
	Job schedules			
	Recovery and back-up rules			



# Company XYZ: Operational Metadata for Different Solutions

Metadata type	Metadata examples	Data lineage	Data quality	Data observability
Operational metadata	Data archiving and retention requirements			
	Logs of jobs execution for batch programs			
	History of extracts and results			
	Schedule anomalies			
	Results of audit, balance, control measurement			
	Error logs			
	Backup, retention, disaster recovery provisions			



# Exercise 3: List (Meta)data for DM Initiatives in Your Company

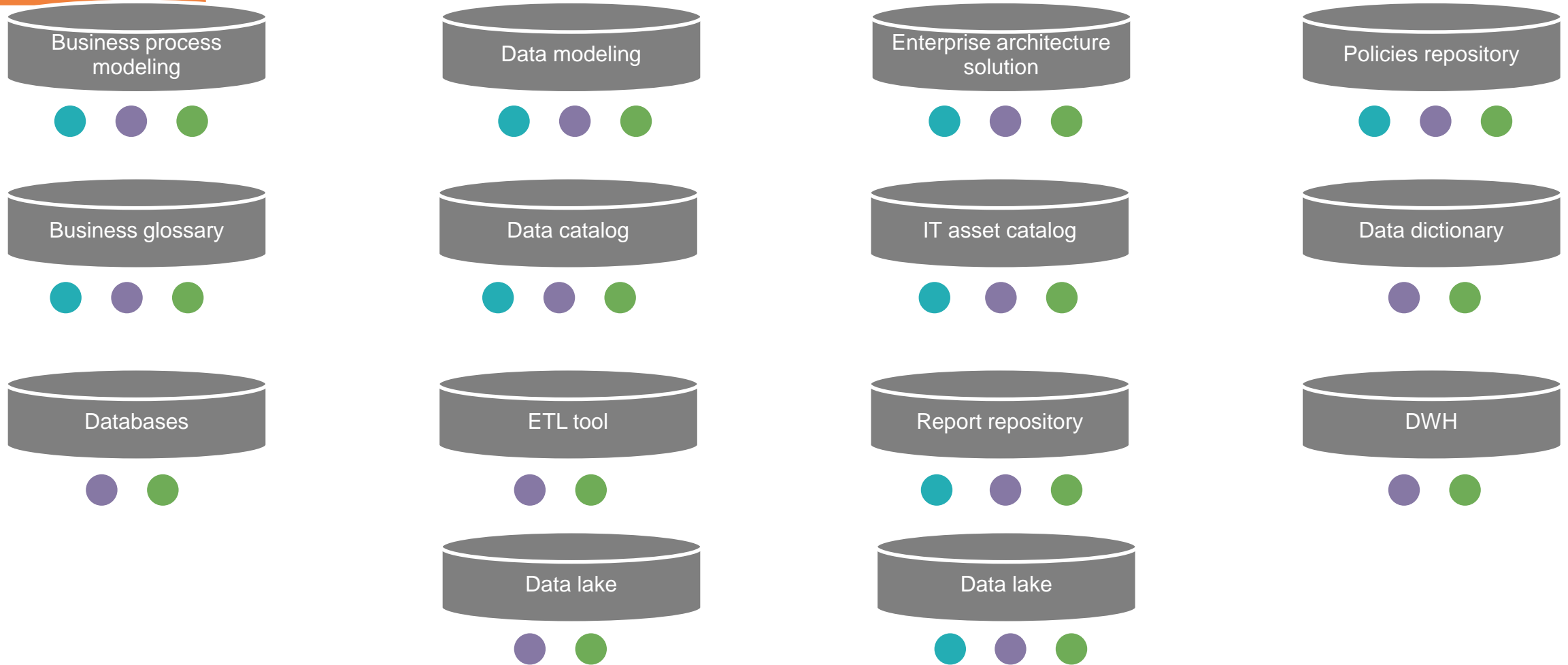
---

1. Use Template 3: Analysis of Required Metadata
2. Indicate your company's needs in metadata and possible solutions
3. Present results

Time: 10 minutes



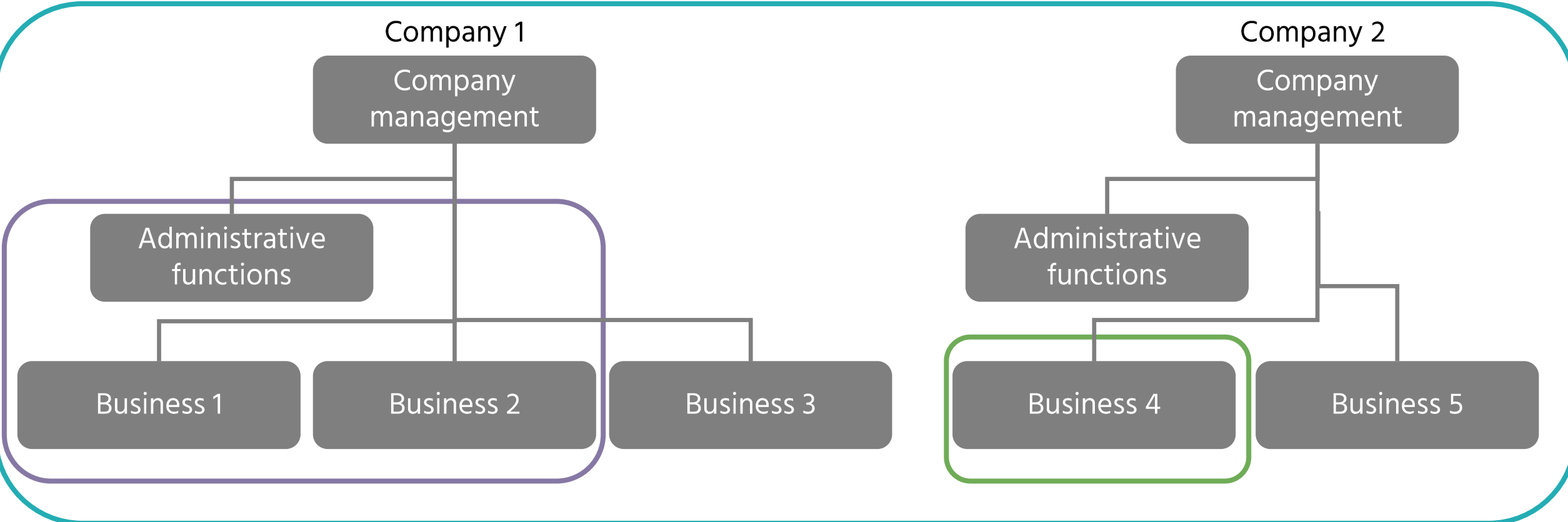
# Different Applications Produce, Consume, and Share Metadata



# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum



# A Metadata Management Initiative Can Cover Various “Enterprise” Scopes



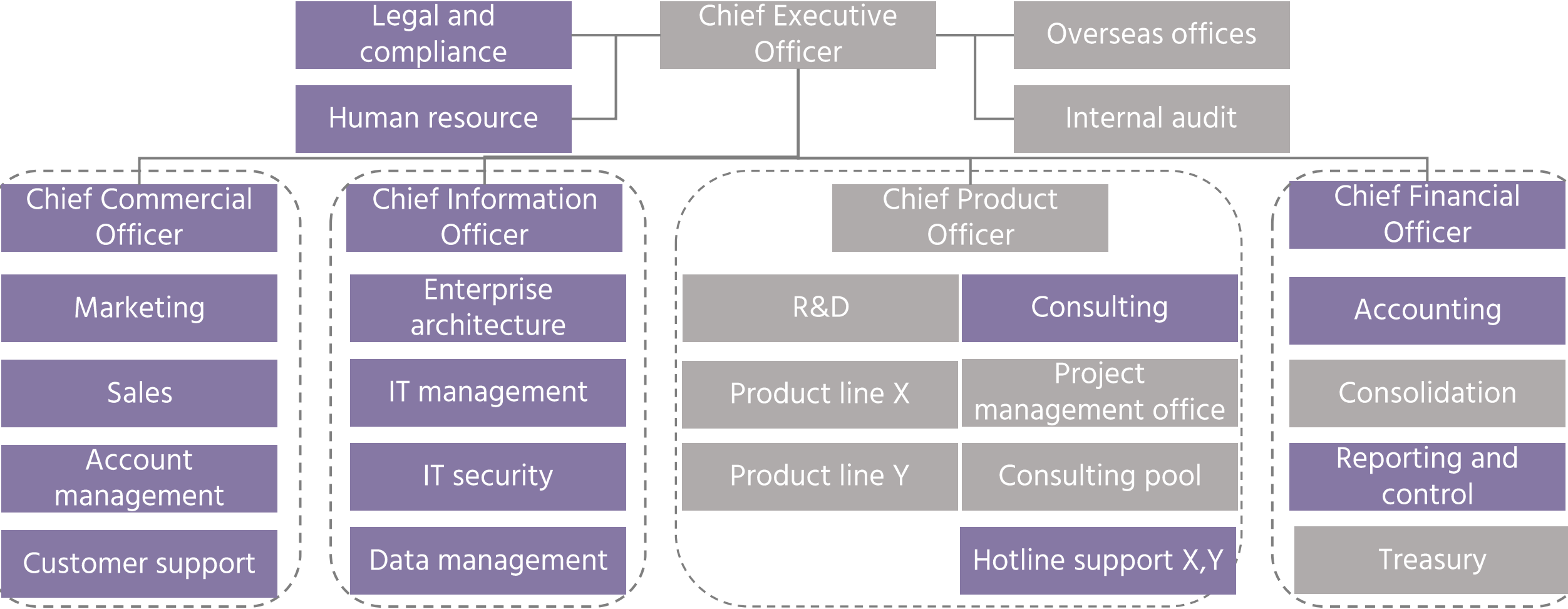
Option 1

Option 2

Option 3



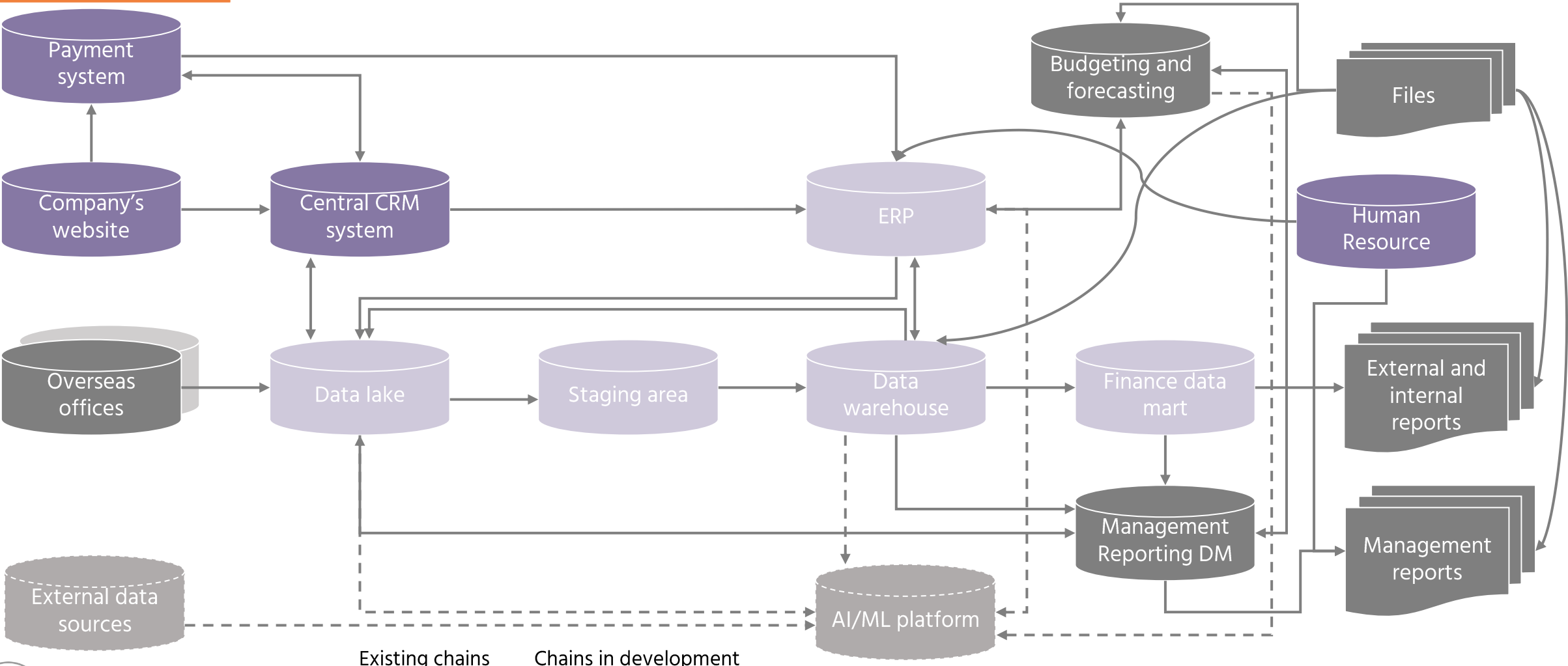
# XYZ Company, Example: The “Enterprise” Scope (Compliance Driver)



# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum



# XYZ Company: Applications that Process Personal Data (Business Driver 1)



# XYZ Company, Example: A Metadata Initiative Scope

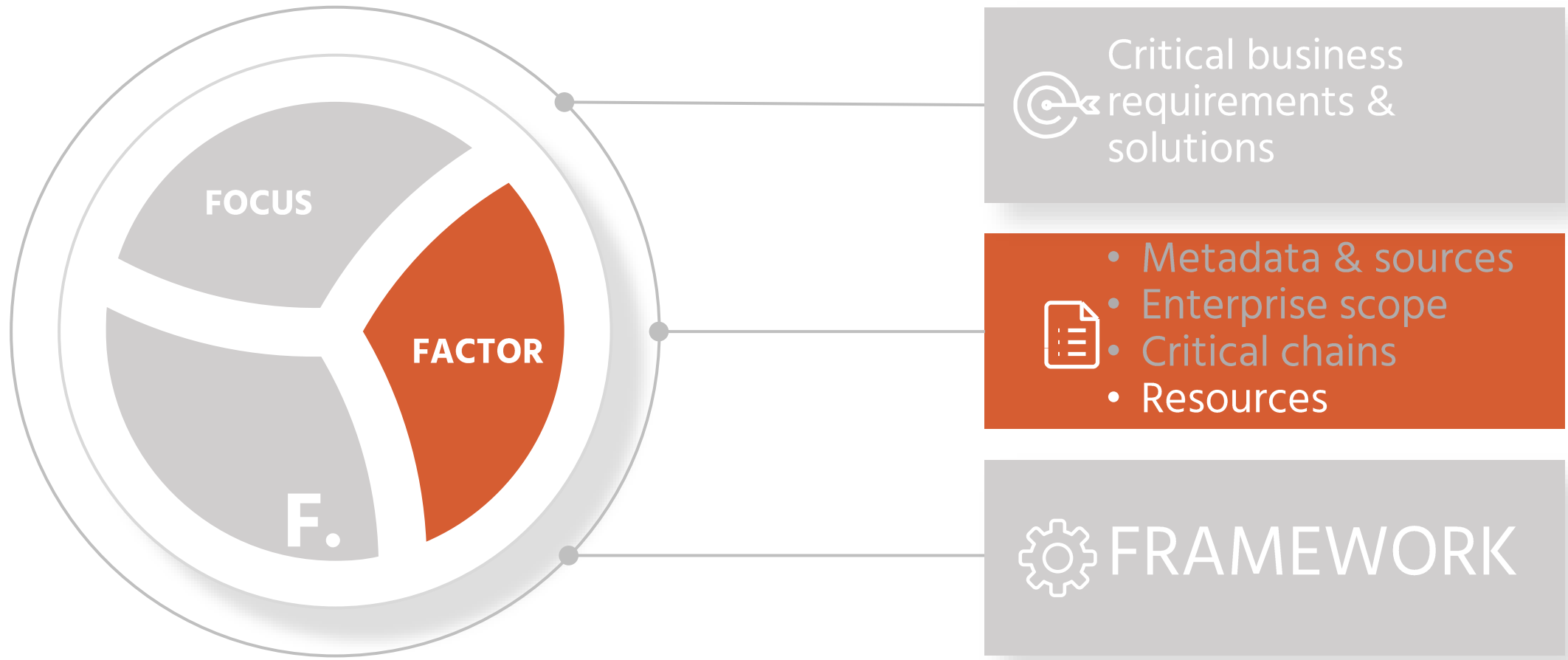
Factor	Business driver 1: Compliance	Business driver 2: Enhance decision-making	Scope (Yes/No)
Enterprise scope:			
Marketing, sales, account management, customer support	[Shaded]		Yes
Information Technology department		[Shaded]	Yes
Product departments			Yes
Financial departments		[Shaded]	Yes
Critical data	Personal data sets	Financial data sets	Yes
Data chains (IT assets):			
Source applications with personal data	[Shaded]		Yes
Source applications with financial data		[Shaded]	Yes
Lake, DWH, ERP	[Shaded]	[Shaded]	Yes

# Company XYZ: Metadata From Different Solutions

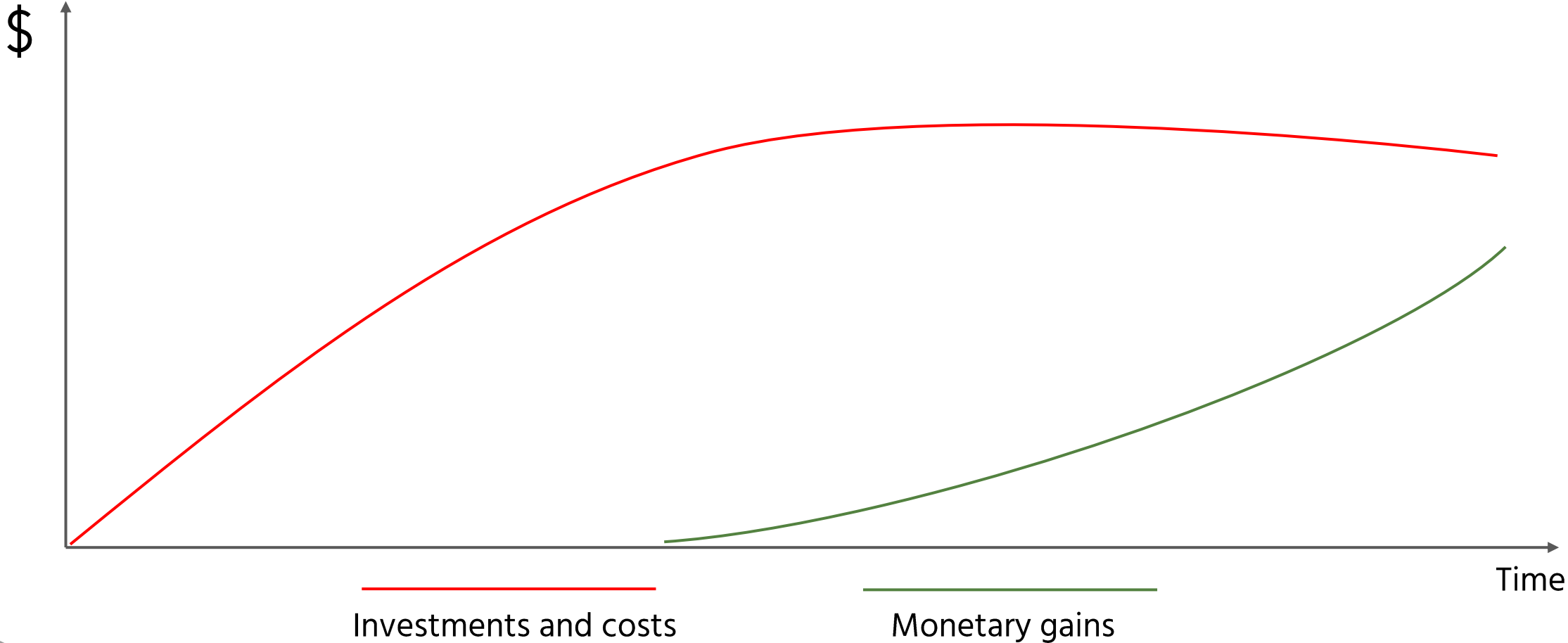
Metadata type	Metadata examples	Company web-site	Payment system	Central CRM System
Technical metadata	Physical data models and DB schemas: names and properties			
	Data access levels and permissions			
	Data access rights, groups, roles			
	Job details			
	Job schedules			
Operational metadata	Logs of jobs execution for batch programs			
	History of extracts and results			
	Schedule anomalies			
	Error logs			



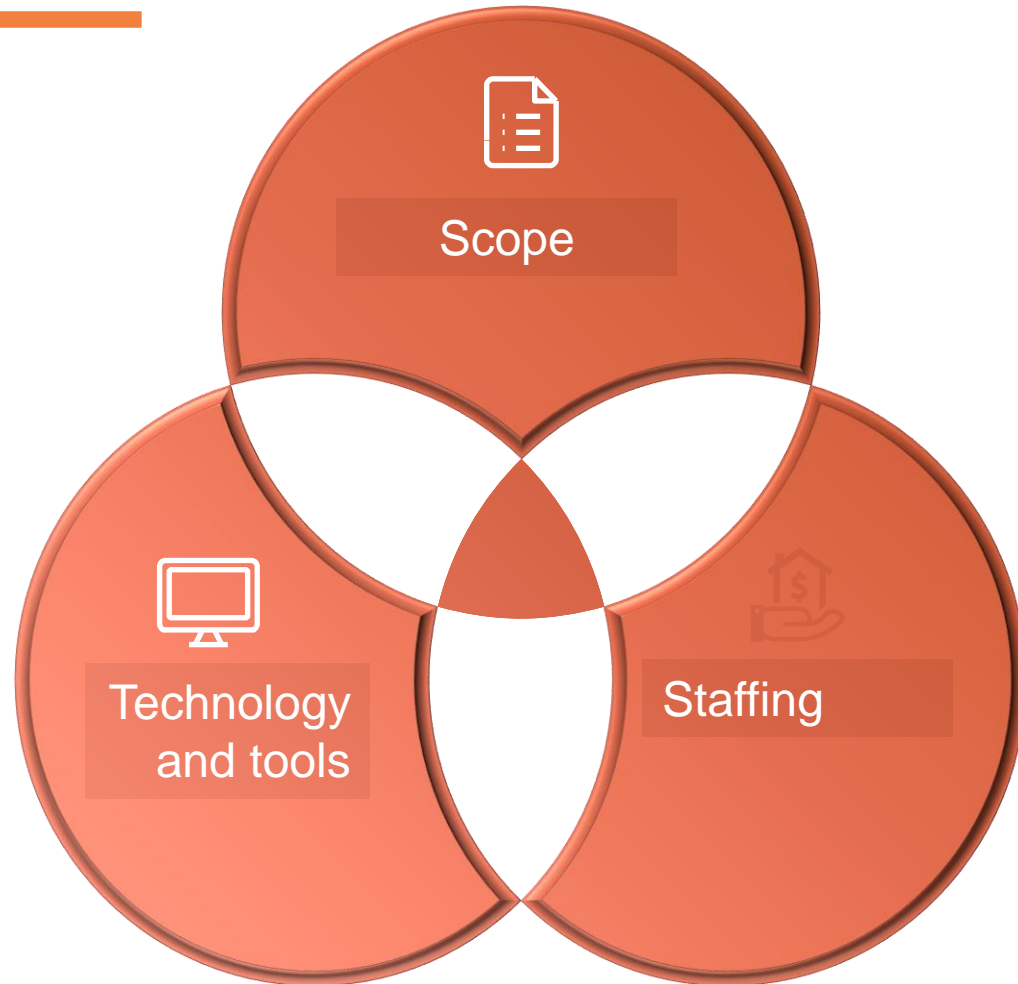
# 3-F. Feasibility Formula Limits the Scope to a Realizable Minimum



# A Company Starts Receiving Monetary Gains after Some Period of Initial Investments



# Several Key Factors Define the Required Resources



Scope

- Enterprise scope
- Metadata sources
- Critical chains

Staff

- Internal vs External

Tools

- Data, application, and technology architecture

# Can You Calculate the ROI of the Foundation for a Restaurant Building?

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# Exercise 4: Draft the Scope of a DM Initiative

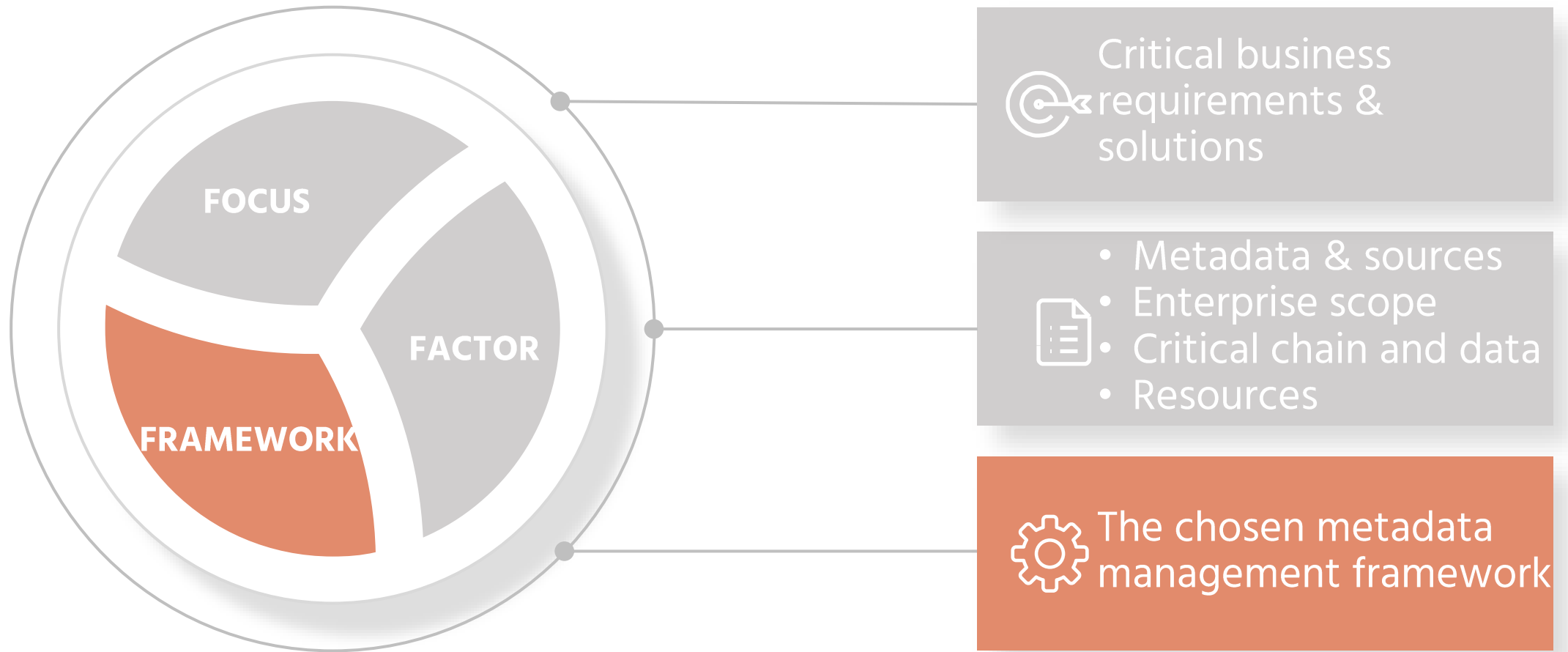
---

1. Use Template 4: Scope of a Data Management Initiative
2. Draft the scope of an initiative considering different factors
3. Present results

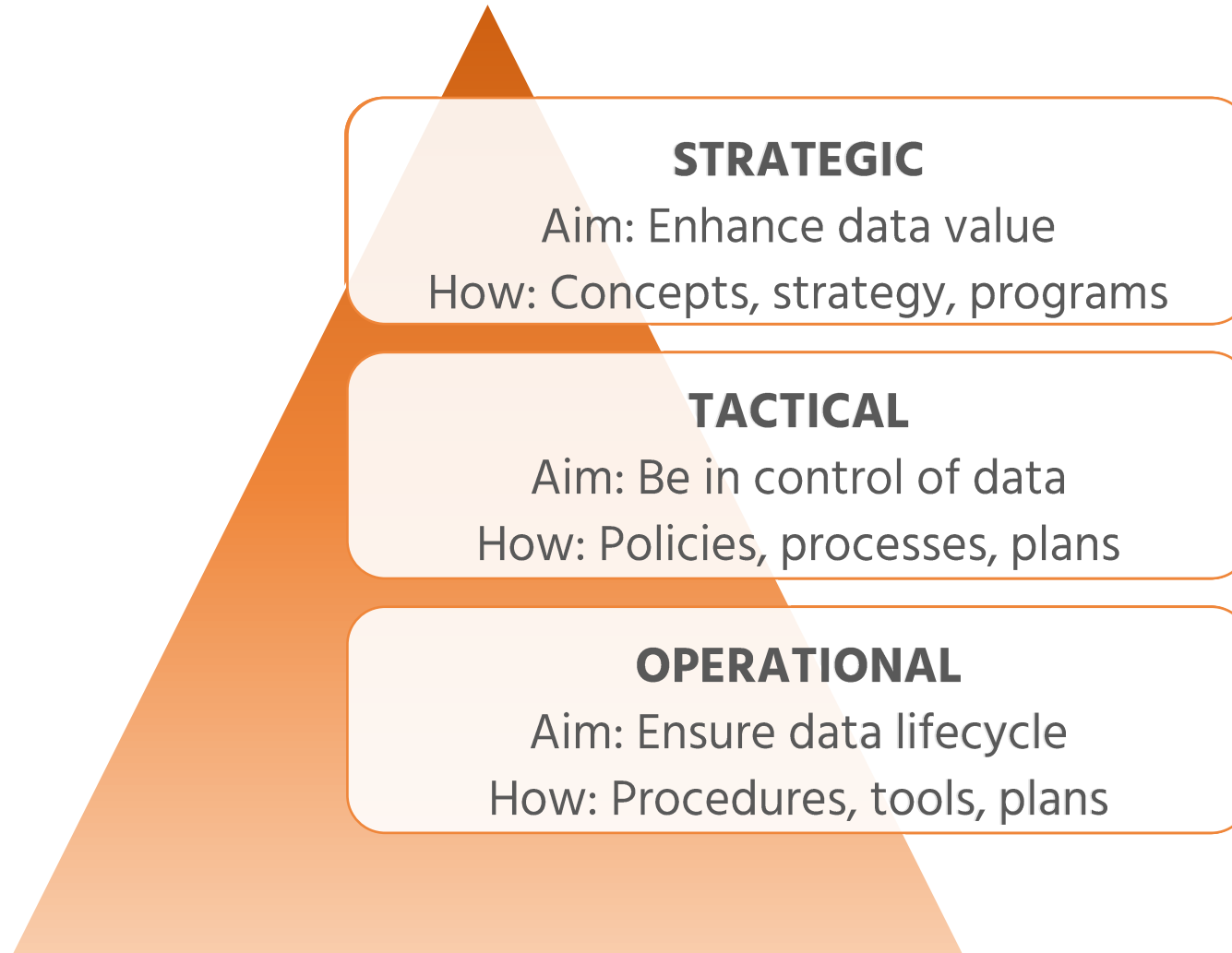
Time: 10 minutes



# 3-F Feasibility Formula Limits the Scope to a Realizable Minimum



# The Definition of Data Management Depends on the Organizational Level



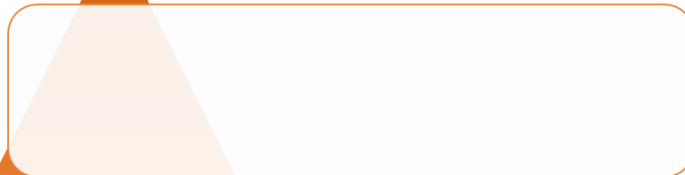
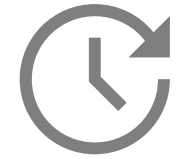
# Moving from the “Ad-Hoc” to “Business Function” Means the Implementation of Metadata Management at All Organizational Levels



Ad-Hoc



Business  
Function



**OPERATIONAL**  
Aim: Ensure data lifecycle  
How: Procedures, tools, plans

**STRATEGIC**  
Aim: Enhance data value  
How: Concepts, strategy, programs

**TACTICAL**  
Aim: Be in control of data  
How: Policies, processes, plans

**OPERATIONAL**  
Aim: Ensure data lifecycle  
How: Procedures, tools, plans

# Data Governance and a Framework Assists in Transforming (Meta)Data Management Capability into a Business Function



## DEFINITION

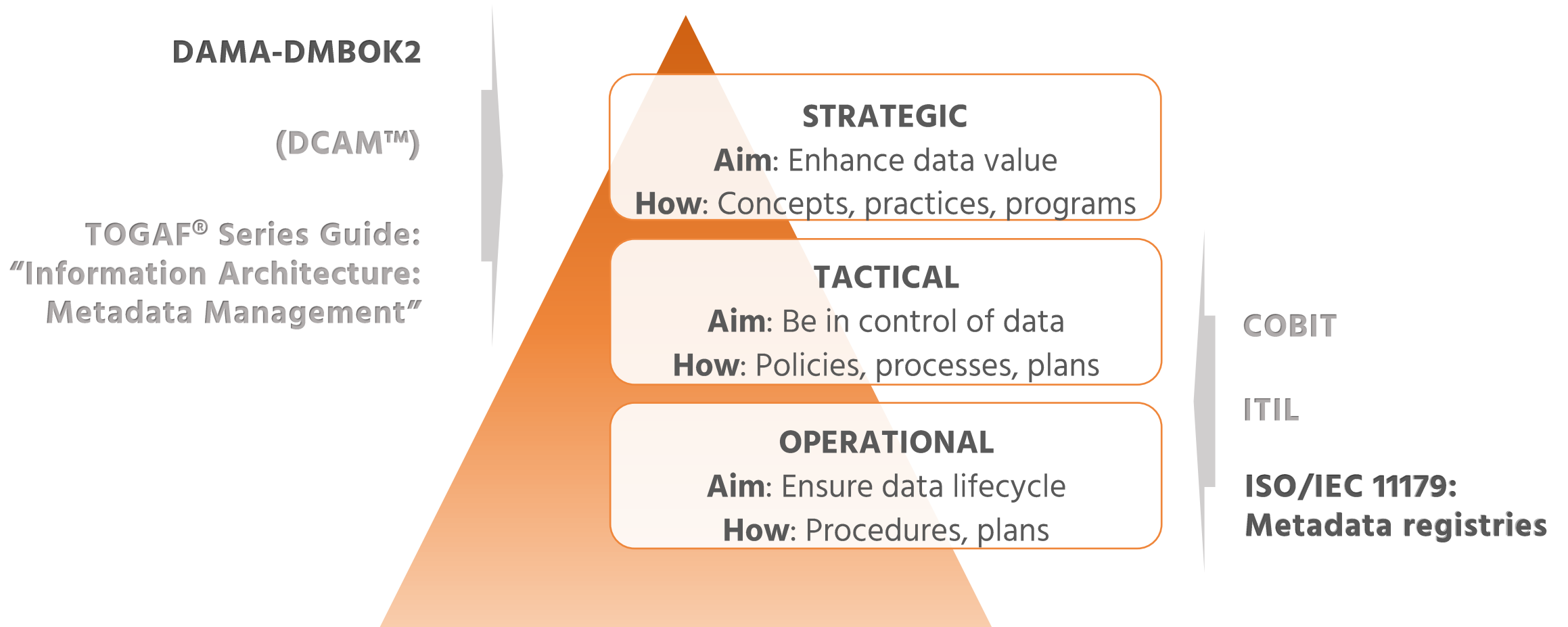
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# (Meta)Data Management Framework (DMF)

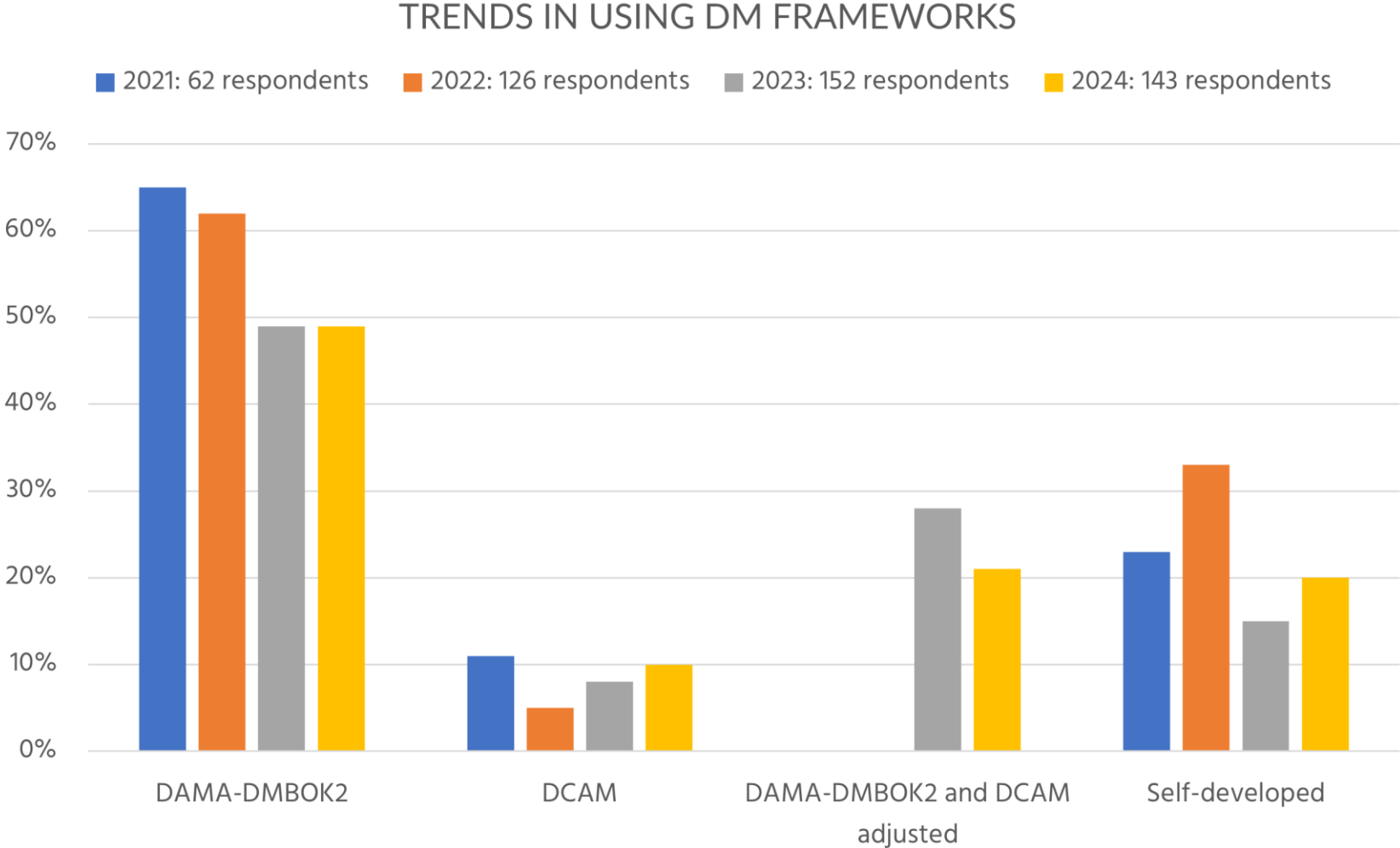
A COLLECTION OF INTERRELATED COMPONENTS (METHODS AND MODELS) THAT SHAPE (META)DATA MANAGEMENT CAPABILITY INTO A BUSINESS FUNCTION



# Leading DM Frameworks Are Applicable at Various Organizational Levels, but Not All of Them Cover Metadata Management



# Trends Show the Increasing Number of Self-Developed or Adjusted Frameworks



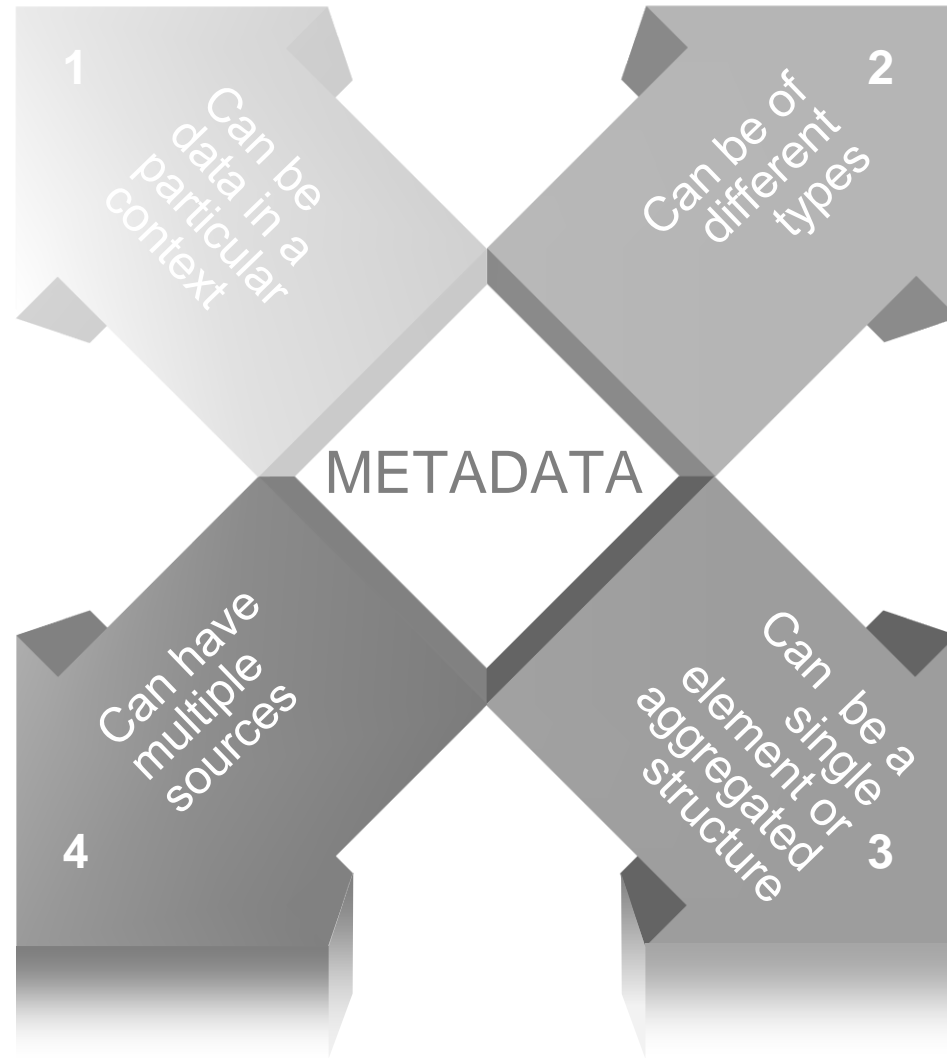
# Group Discussion

---

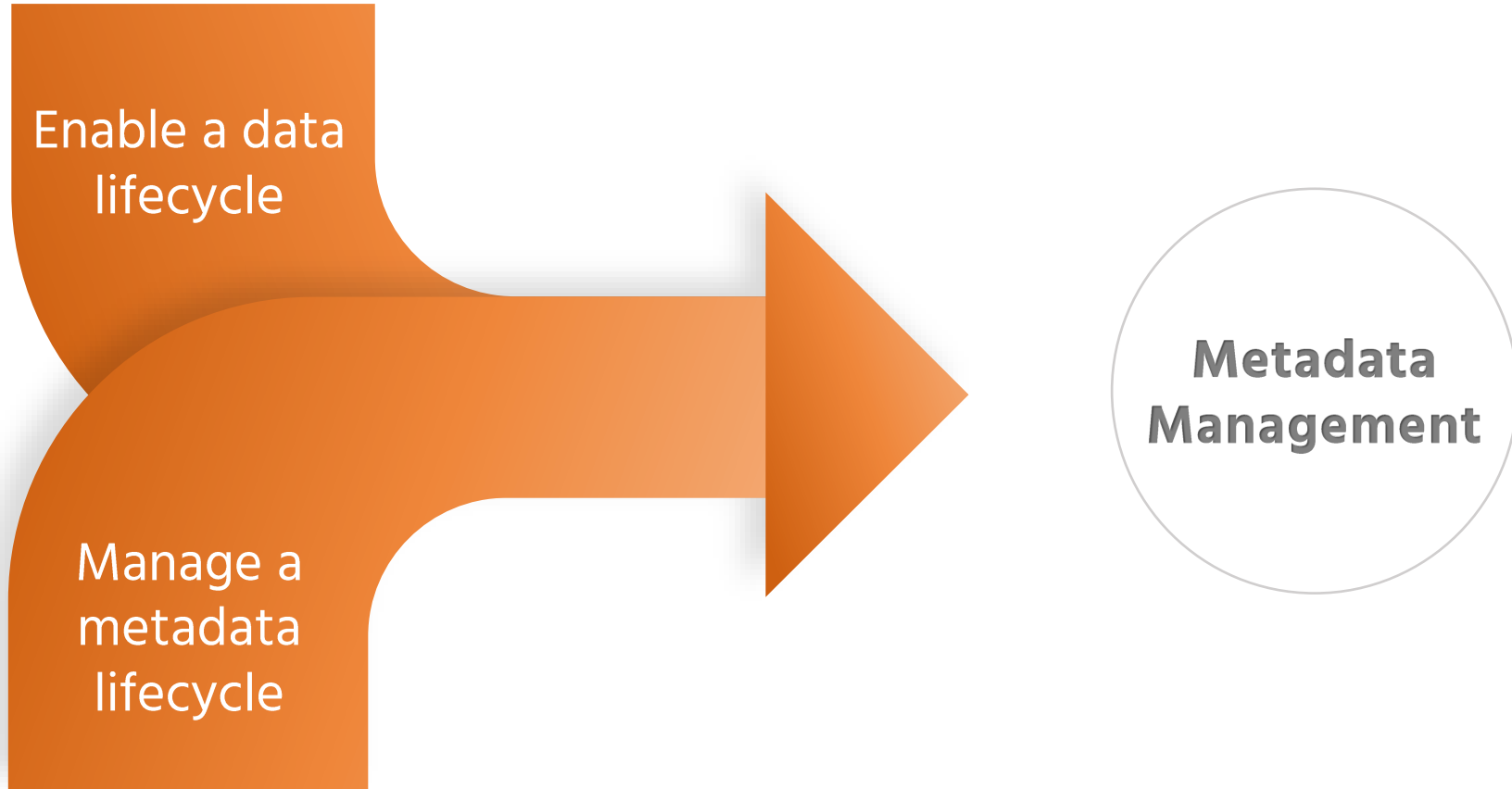
Describe your experience in implementing various data management frameworks



# We Identified 4 Core Challenges Associated with Metadata



# Metadata Management Has Two Core Goals



# Providers of Leading Metadata Management Tools Allowed to Demonstrate Some Functionalities of Their Solutions

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# Metadata Management Has Two Core Goals

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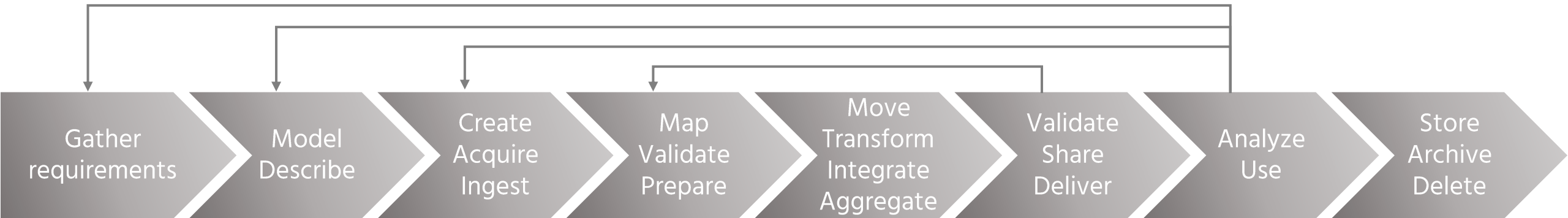


Enable a data  
lifecycle

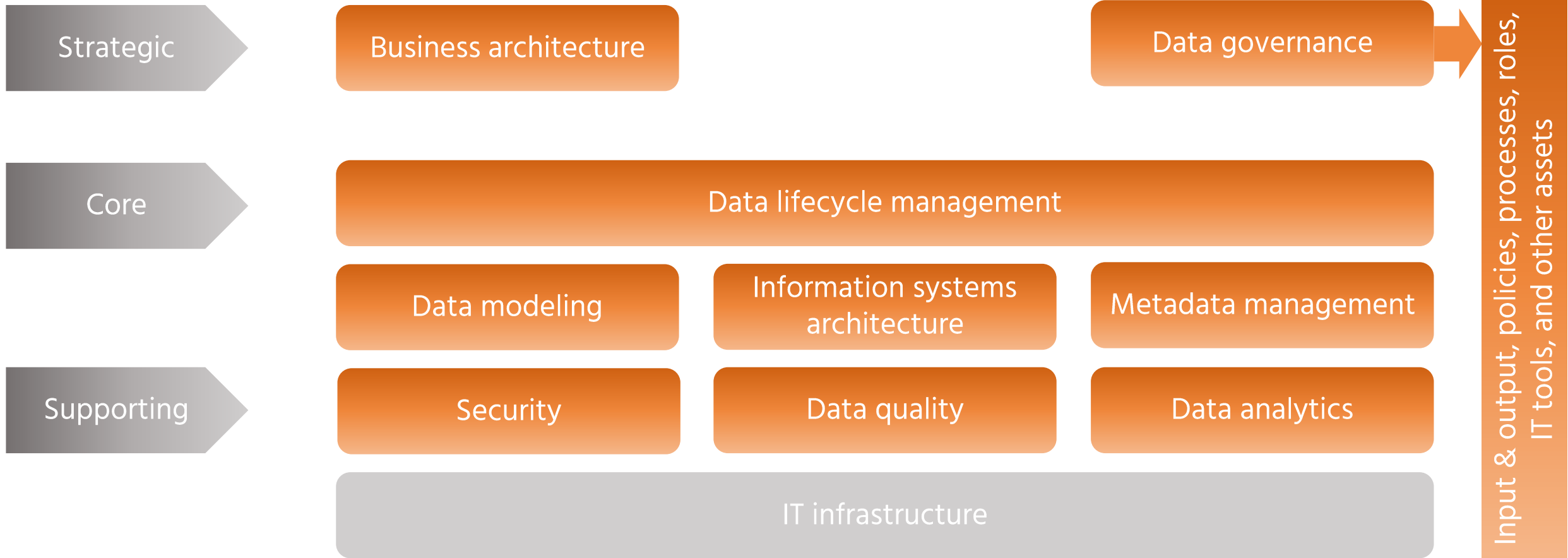


**Metadata  
Management**

# Let's Define Our Approach to Describing a Data Lifecycle



# Various Data Management Capabilities Produce Metadata to Enable the Data Lifecycle



# Metadata Management Solutions Integrate Multiple DM Capabilities

erwin Data Intelligence Discover Assets

Hello **Kartik Sridhar**, How can we help you?

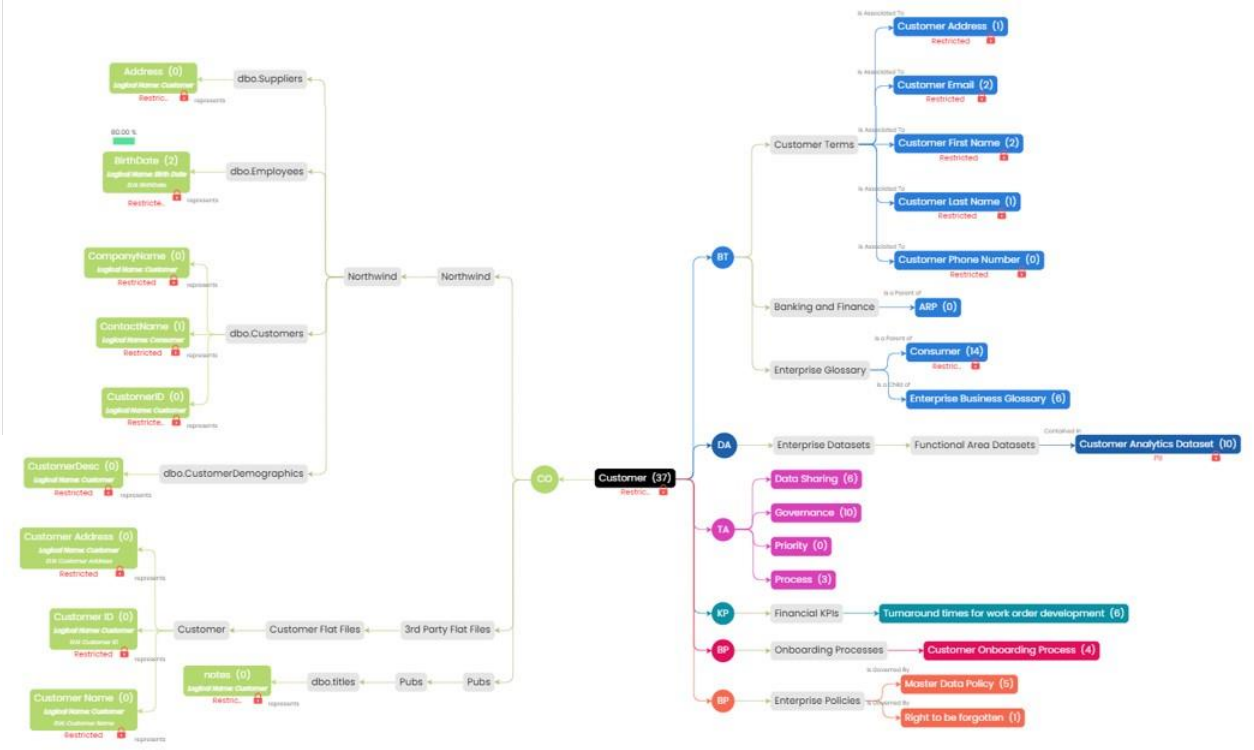
Search for an asset or browse the Asset repository to find what you are looking for

All

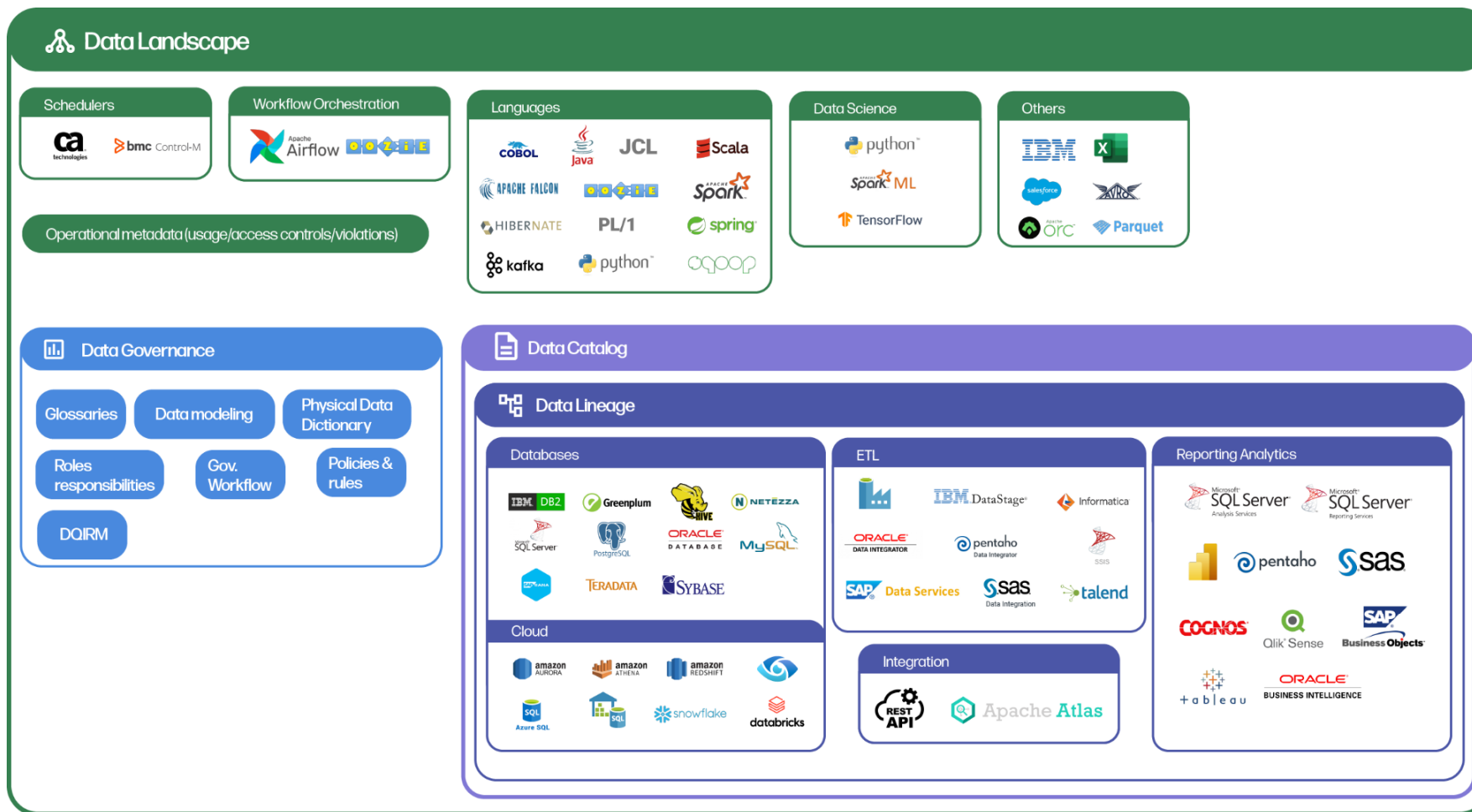
Browse by Asset Repository

- Systems (2)
- Environments (4)
- Tables (433)
- Columns (13195)
- Mappings (2)
- Business Terms (24)
- Business Policies (12)
- KPIs (5)
- Business Processes (6)
- Compliance Reports (36)
- Datasets (37)
- AI Models (9)

Browse by Asset Ratings	Browse My Favorite Assets	Browse By Tags	Browse by Custom Views
4 to 5 Star: 7	Datasets: 5	Compliance: 37	Gold Rated Datasets
3 to 5 Star: 7	AI Models: 4	GDPR: 37	Classified Datasets
2 to 5 Star: 7		Privacy: 37	Rated Datasets



# Metadata Management Solutions Integrate Multiple DM Capabilities



Meta data analytics

## DEFINITION

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# Business Architecture

“A REPRESENTATION OF HOLISTIC, MULTI-DIMENSIONAL BUSINESS VIEWS OF: CAPABILITIES, END-TO-END VALUE DELIVERY, INFORMATION, AND ORGANIZATIONAL STRUCTURE; AND THE RELATIONSHIPS AMONG THESE BUSINESS VIEWS AND STRATEGIES, PRODUCTS, POLICIES, PROCESSES, INITIATIVES, AND STAKEHOLDERS.”

SOURCE: “TOGAF® Standard — Introduction - Definitions.” *Business Architecture*, [pubs.opengroup.org/togaf-standard/introduction/chap04.html#tag\\_04\\_27](https://pubs.opengroup.org/togaf-standard/introduction/chap04.html#tag_04_27). Accessed 3 Aug. 2022.



# Business Architecture Enables Several Data Lifecycle Steps and Produces The Following Metadata



Business architecture

Business metadata

- Data domains

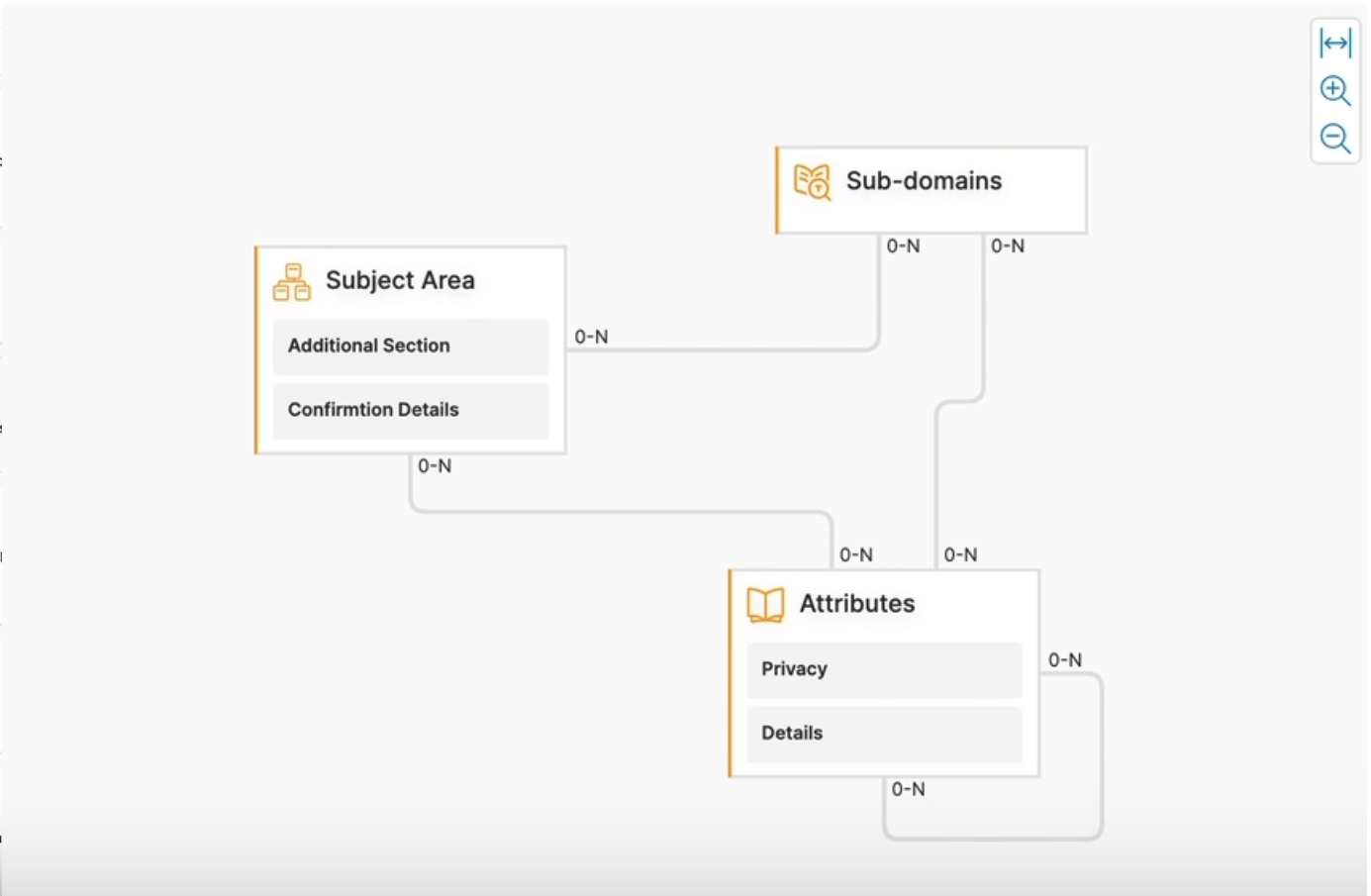
Technical metadata

Operational metadata

# Metadata Solutions Allow for Defining Business Subject Areas/Domains and Data Domains



The screenshot shows the 'zeenea explorer' interface. At the top, there's a search bar with 'All Items' selected and a search icon. Below the search bar, there are 'ACTIVE FILTERS (1)' and a list of filters: 'Item Type: Subject area', 'Clear filters', 'Item Type' (with checkboxes for Dataset, Visualization, Data Process, Attributes, and Sub-domains), 'Contact' (with a checkbox for Amir Hamza), and 'IHT Classification' (with a checkbox for Confidential). The main content area displays a list of subject areas, each with a title, description, and IHT Classification. The subject areas listed are: Equipment, Follow-up, Incident Tracker (highlighted with a mouse cursor), Insurance, Product Categories, and Service.



## DEFINITION

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# DM (Data) Governance Capability

A COMPANY'S ABILITY TO DESIGN A DATA MANAGEMENT FUNCTION, COORDINATE AND CONTROL ITS IMPLEMENTATION AND PERFORMANCE



# Data Governance Enables the Whole Data Lifecycle and Produces The Following Metadata



## Data governance

### Business metadata

- Data owner, user, steward
- DSA and SLA agreements
- Regulations
- Security levels
- Data usage

### Technical metadata

### Operational metadata

# Data Governance Functionalities Include Data-Related Policies





The screenshot displays a software interface with three main sections:

- Data Quality Controls Database:** A list of controls including 'DQ Controls' (36 total) and 'Completeness Check' (7.01). Controls are numbered and categorized, such as '1.01 UI Drop down lists', '1.02 4 Eyes Checks', etc.
- Business Product Taxonomy:** A central area with a tree structure showing categories like 'Documentary Source', 'Introduction', 'Definition', 'Objectives', 'Scope and initial considerations', and 'Risk data aggregation capabilities'.
- Document Viewer:** Displays the document 'BCBS 239 - Principles for effective risk data aggregation and risk reporting'. The current view is 'Principle 3 - Accuracy and Integrity', which includes the following text:

36. A bank should aggregate risk data in a way that is accurate and reliable.

  - (a) Controls surrounding risk data should be as robust as those applicable to accounting data.
  - (b) Where a bank relies on manual processes and desktop applications (eg spreadsheets, databases) and has specific risk units that use these applications for software development, it should have effective mitigants in place (eg end-user computing policies and procedures) and other effective controls that are consistently applied across the bank's processes.
  - (c) Risk data should be reconciled with bank's sources, including accounting data where appropriate, to ensure that the risk data is accurate.
  - (d) A bank should strive towards a single authoritative source for risk data per each type of risk.
  - (e) A bank's risk personnel should have sufficient access to risk data to ensure they can appropriately aggregate, validate and reconcile the data to risk reports.

# Data Governance Functionalities Allow for Maintaining and Linking Multiple Policies

 <p><b>dq-policies</b>        AdventureW... &gt; Ban... &gt; I.</p>	<p>Data quality policies</p>
 <p><b>Availability</b>        Glo... &gt; Sh... &gt; Reportin...        DAMA DQ Assessment</p>	<p>The degree to which data can be consulted or retrieved by data consumers or a process.</p>
 <p><b>GDPR - Accuracy</b>        Retail ... &gt; Inventory ... &gt; ( )        GDPR - Article 5 Regulation</p>	<p>The data you collect or store should be accurate and up to date. Holding inaccurate data on any individual ...</p>
 <p><b>Retail Policy</b>        Retail ... &gt; Inventory ... &gt; ( )</p>	<p>Set of policies and rules defined in Retail sector</p>

# Data Governance Functionalities Include Data Management Roles Linked to:

## BCBS 239 Principles

The screenshot displays the Solidatus interface with several key components:

- Left Panel (Roles and Responsibilities):** Lists various roles such as Data Owners, Data Stewards, and Chief Data Officer, each with associated personnel names and status indicators (e.g., Permanent, Resigned).
- Center Panel (Document Viewer):** Shows BCBS 239 - Principles for effective risk data aggregation. Principle 34 is highlighted: "Roles and responsibilities should be established as they relate to the ownership and quality of risk data and information for both the business and IT functions. The owners (business and IT functions), in partnership with Source System On Prem, Landing Area Systems, and Data Lake..."
- Right Panel (Data Lineage):** A complex network diagram showing data flow from Source System Cloud through Landing Area Systems (e.g., LADM, Infinity, MIDB) to Data Lake (e.g., SED, Euclid, Euclid US). Each node lists specific data elements and their associated roles.
- Bottom Right Panel (Reference Model Panel):** Provides a detailed view of a specific data element, "Euclid", showing its properties (Employment: Temporary, Status, Contact Phone, Email Address, Owner: Kristy Dunn), relationships to other terms, and modify options.

# Data Governance Functionalities Include Data Management Roles

The screenshot displays the 'Customer Analytics Dataset' page in the Erwin Data Governance tool. The page is organized into several sections:

- Metadata Summary:** Includes 'Data Value Score' (GOLD), 'Workflow Status' (Draft), 'Rating' (4 stars), 'Rich Media Library' (0 items), and 'Tags' (Compliance, GDPR, Privacy).
- Asset Information:** Contains 'Definition' and 'Description' sections with placeholder text.
- Additional Properties:** Includes 'Business Initiative' and 'Expected Insights' sections with placeholder text.
- Related Assets (Associations):** Shows 'Columns' (CreditScore, Eaddress, FirstName, LastName, LoanType, Salary) and 'Tables' (Customer Forecast Report).
- Governance Responsibilities:** Lists 'Dataset Owner' as Barbara Banning.
- Classification:** Shows a 'PII' (Personally Identifiable Information) classification with a note: 'This is a highly classified dataset and should be shared only with specific individuals subject to Approvals'.
- Audit History:** Lists 'Created By' (Administrator - Default System User), 'Created Date' (11-05-2023 08:15:34), 'Last Modified By' (Administrator - Default System User), and 'Modified Date' (19-05-2023 12:49:37).

## DEFINITION

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# Data Modeling Capability

A COMPANY'S ABILITY TO DELIVER, MAINTAIN, AND MANAGE DATA MODELS TO "[...] A) TO DEFINE AND ANALYZE DATA REQUIREMENTS, B) DESIGN LOGICAL AND PHYSICAL STRUCTURES THAT SUPPORT THESE REQUIREMENTS, AND C) DEFINE BUSINESS AND TECHNICAL META-DATA"

Source: DAMA International. The DAMA Dictionary of Data Management, Second Edition: Technics Publications, 2011, p.81.



# Data Modeling Enables the Whole Data Lifecycle and Produces The Following Metadata



## Data modeling

### Business metadata

- Business terms and definitions
- Information reg.
- Conceptual/semantic & logical models
- Owners

### Technical metadata

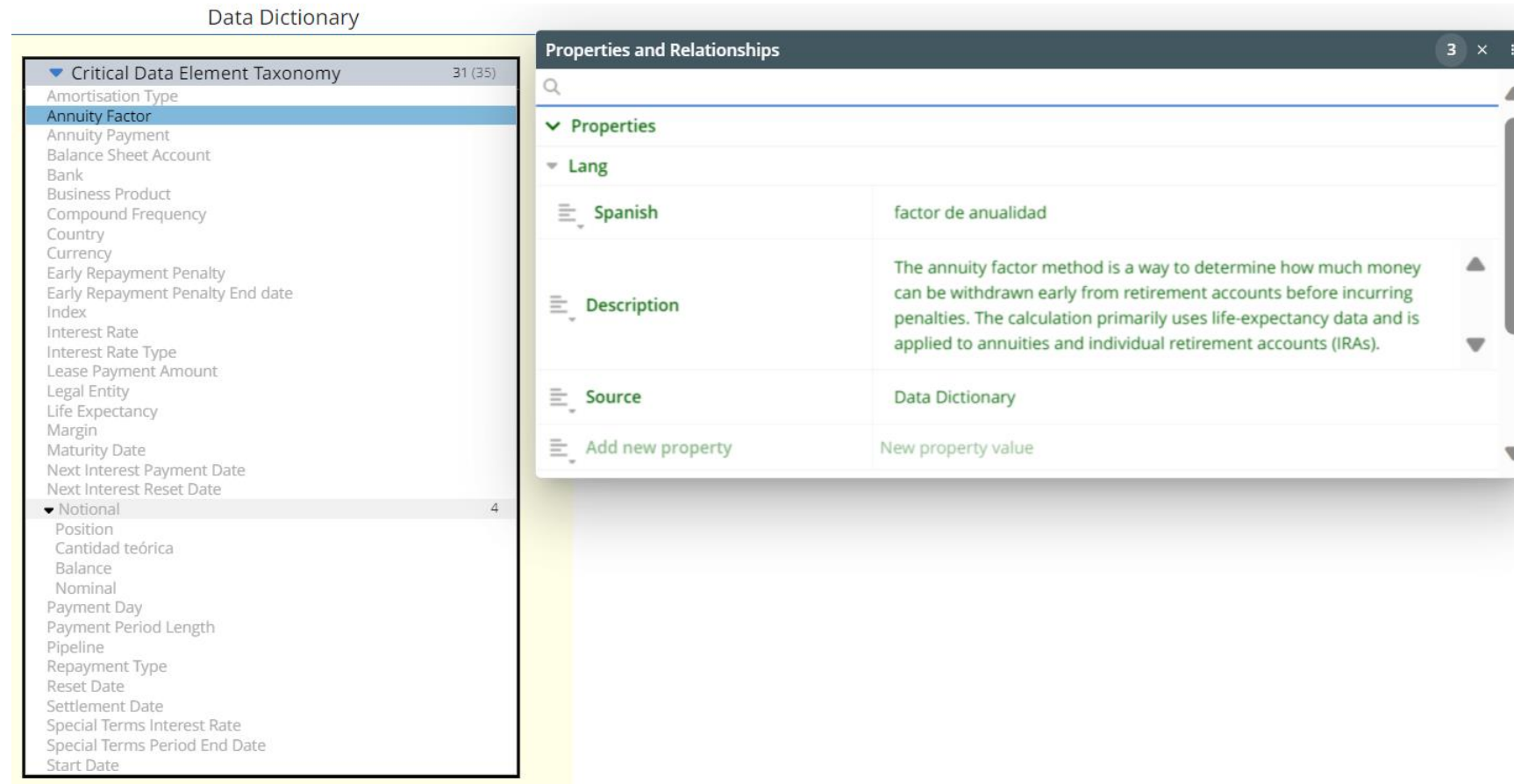
- Data requirements
- Data models
- Validation and transformation rules

### Operational metadata



# Metadata Management Solutions Provide Business Glossaries and Data Dictionaries

Data Dictionary







The screenshot displays a 'Data Dictionary' interface. On the left, a tree view shows a 'Critical Data Element Taxonomy' with 31 (35) items. The 'Annuity Factor' term is selected. On the right, a 'Properties and Relationships' panel shows details for the selected term. The panel includes a search bar, a 'Properties' section, and a table of properties.





Lang	Value
Spanish	factor de anualidad
Description	The annuity factor method is a way to determine how much money can be withdrawn early from retirement accounts before incurring penalties. The calculation primarily uses life-expectancy data and is applied to annuities and individual retirement accounts (IRAs).
Source	Data Dictionary
Add new property	New property value

# Metadata Management Solutions Should Include Multiple Glossaries and Link Them (Semantic Layer)

 [Glossary](#) | ☆☆☆☆☆ |  
**Financial Domain**



 [Glossary](#) | ☆☆☆☆☆ |  Software LE >  Software LOB >  Software Org  
**FIBO Glossary Demo**

test

 [Glossary](#) | ☆☆☆☆☆ |  Global Brokerage >  Financial Markets >  Analytics Org  
**Securities Glossary**

 [Glossary](#) | ☆☆☆☆☆ |  Credit Risk Management >  Credit Default Risk >  Loans  
**Credit\_risk\_glossary**

credit risk

 [Glossary](#) | ☆☆☆☆☆ |  Credit Risk Management >  Credit Default Risk >  Loans  
**Glossary Credit Risk**

# Metadata Solutions Include Data Dictionaries

erwin Data Intelligence Metadata Manager

Dashboard Explore

Home > 3rd Party Flat Files (SYSTEM) > Person Loan Data (v1.00) (ENVIRONMENT)

Archives Options

Data Catalog Statistics

Tables

Search

LoanPersonData

Total Primary Key Columns: 5% Total Foreign Key Columns: 5% Tables With Expanded Logical N.: 0% Columns With Expanded Logical: 0% DQ Score: 91.69% Impact Score: 26.69%

Data Dictionary Environment Details Extended Properties Data Lineage Impact Analysis Mindmap Associations Workflow Log Documents Configure Extended Properties Scheduled Jobs

Update Tags Update Sensitivity Update DG Assignments

#	Options	Table Name	Column Name	DQ Score	Impact Score	Drift Alert	Logical Column Name	Column Comments	Column Definition	Tags	Sensitive Data Indicator (Y/N)	Sensitive Data Indicator (SDI) Classification	Sensitive Data Indicator (SDI) Description
1		LoanPersonData	ID	66.66%	NA								
2		LoanPersonData	FirstName	99.26%	50.00%								
3		LoanPersonData	LastName	94.59%	45.15%								
4		LoanPersonData	Title	10.00%	24.10%								
5		LoanPersonData	Gen	100.00%	97.90%								
6		LoanPersonData	Snumber	95.16%	0.20%								
7		LoanPersonData	Eaddress	40.00%	39.50%								
8		LoanPersonData	Tnumber	71.12%	NA								
9		LoanPersonData	Mnumber	73.00%	NA								

Mapping Specification Graphical Designer Test Specification Workflow Log

[Load Employees]



# Metadata Solutions Can Demonstrate Logical & Physical Data Models

The screenshot displays the Zeenea Studio interface. On the left, the 'Catalog Design' sidebar is visible, with 'Physical & Logical Metamodel' selected and circled in red. Below this, a table lists various item types:

Name	Items	Actions
Dataset	52	[Icon]
Field	1806	[Icon]
Visualization	15	[Icon]
Data Process	40	[Icon]
Category	0	[Icon]
Application	2	[Icon]
Data Privacy Ru...	0	[Icon]
Data Product	3	[Icon]

The main area shows a complex diagram of the 'Physical & Logical Metamodel'. A red oval highlights a central part of the diagram, which includes a 'Dataset' entity with sub-properties like 'Data Expiry Date', 'Usability', 'Governance', and 'Trust'. Other entities like 'Data Process', 'Data Product', 'Application', 'Regulation', 'Domaine', and 'Field' are also shown with their respective relationships and cardinalities (e.g., 0-N, 1-1).

## DEFINITION

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# Information Systems Architecture

A DESCRIPTION OF THE STRUCTURE OF DATA AND IT ASSETS AND INTERACTION OF IT ASSETS THAT MANAGE DATA AND ENABLE KEY BUSINESS CAPABILITIES



# IS Architecture Enables Multiple Lifecycle Steps and Produces The Following Metadata



## Information Systems Architecture

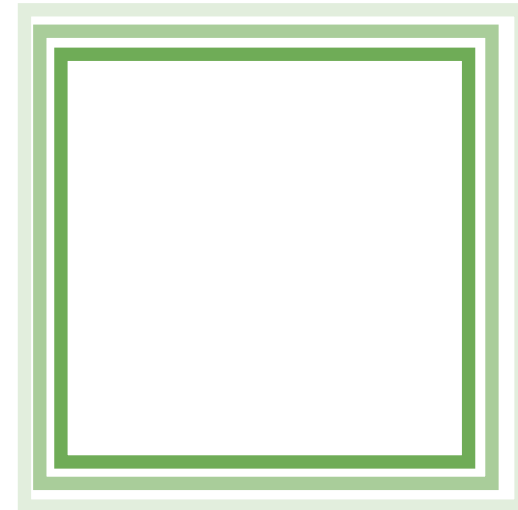
### Business metadata

- Catalogs, matrices, and flows of data and IT assets at the semantic/ logical levels

### Technical metadata

- Catalogs, matrices, and flows of data and IT assets at the physical level

### Operational metadata



# Metadata Solutions Document and Link Data Assets at Various Abstraction Levels



The screenshot shows the 'zeenea explorer' interface with a search filter for 'customers'. The left sidebar contains filters for 'Item Type', 'Data quality status', and 'Data Source'. The main area displays a list of 23 items, with the first four visible:

- Dataset customers [customers]** (Data Source: bigquery-dbt)
  - IHT Classification: Public
- Dataset customers [customers]** (Data Source: BigQuery) - Failed
  - Customers table of SuperStore Cette table contient toutes les données historiques.
  - Domaine: Finance | End user value: Good | IHT Classification: Public | Regulation: GDPR
  - SA Follow-up | SA Incident Tracker | SA Service | SA Talent
- Dataset raw\_customers [raw\_customers]** (Data Source: BigQuery)
  - all customers This is raw version of this table.
  - Domaine: Finance | End user value: Good | IHT Classification: Public | Regulation: GDPR
  - SA Follow-up | SA Incident Tracker | SA Service | SA Talent
- Dataset stg\_customers [stg\_customers]** (Data Source: BigQuery)
  - Customers table from SuperStore not cleaned
  - Domaine: Finance | End user value: Good | IHT Classification: Public | Regulation: GDPR
  - SA Follow-up | SA Incident Tracker | SA Service | SA Talent



# Metadata Solutions Enable the Creation of a Report Catalog and Backward Data Lineage Analysis



The screenshot shows the Zeenea Explorer interface for a visualization titled "Insurance Premiums in the US". The data source is "connPBI". The interface includes a sidebar with "Highlighted properties" (5), "Glossary" (8), and "People" (4). The main content area shows the "Description" (Aggregated view of insurance premiums in the US, by Owner, by Region.), "Datasets" (2), and "Properties" (13). The datasets listed are "New Contracts (Yearly, with status) [COUNT\_BY\_ORDER\_STATUS]" and "New Insurees (US only) [SELECT\_CUSTOMERS\_BY\_NAME]".

The screenshot shows the Zeenea Explorer interface for the same visualization, but with the "Lineage" view selected. It displays a data lineage diagram where two datasets, "New Contracts (Yearly, with status)" and "New Insurees (US only)", are connected to the visualization "Insurance Premiums in the US". The datasets are labeled "Ds" and the visualization is labeled "Vi".

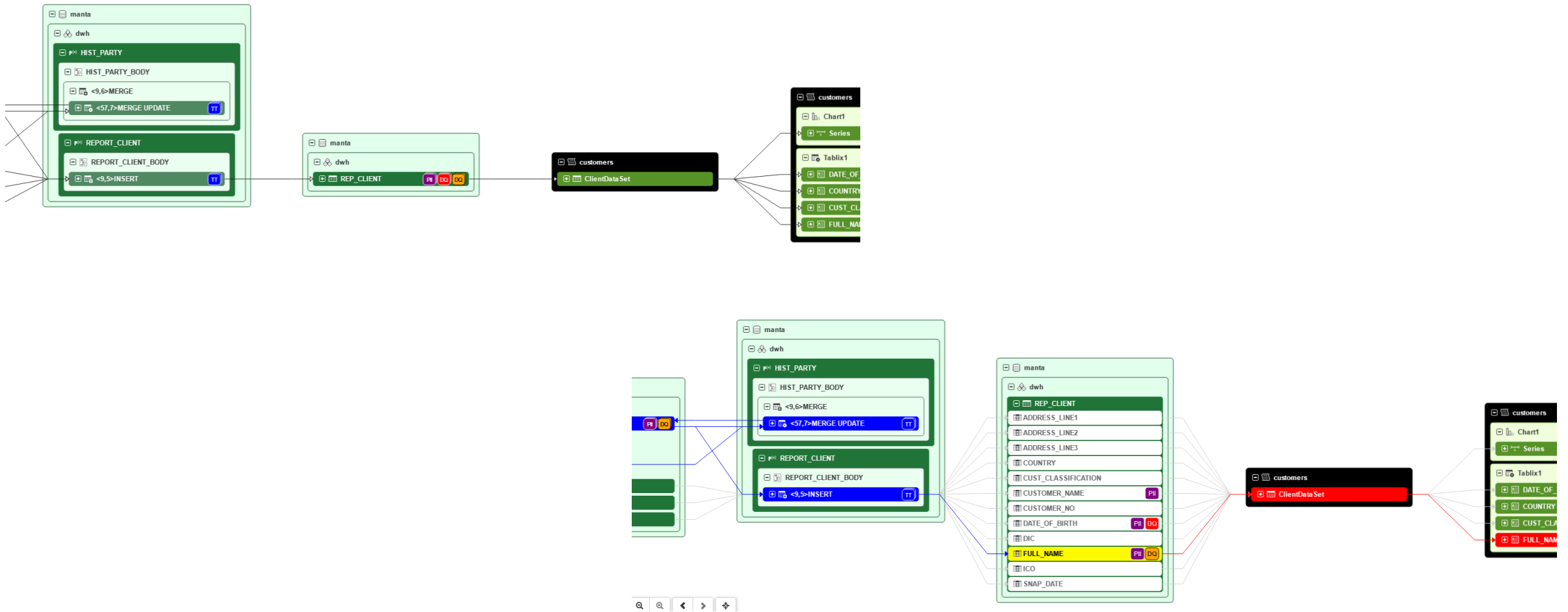


# Two Approaches to Document Data Lineage at the Physical Level Exist

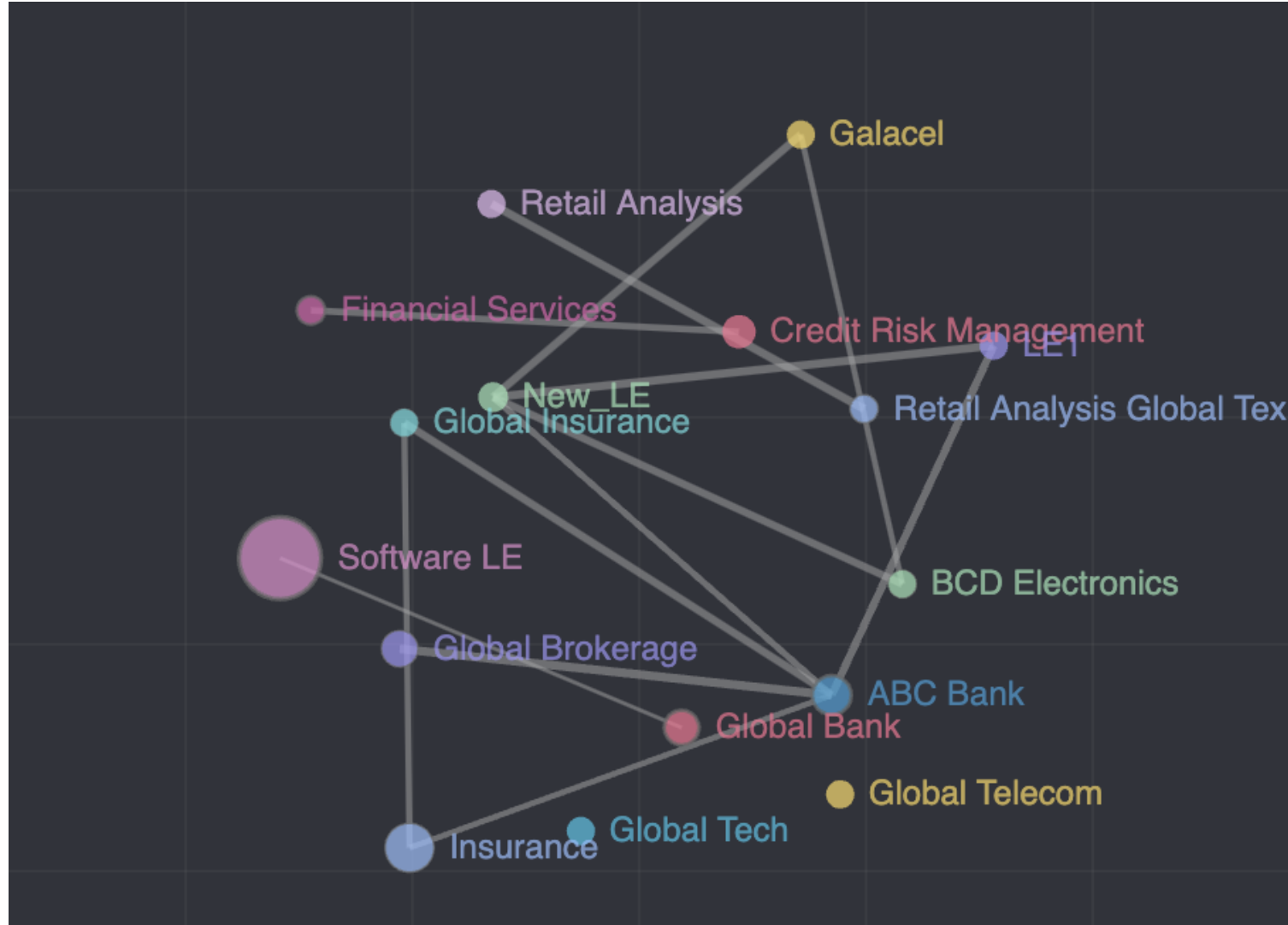
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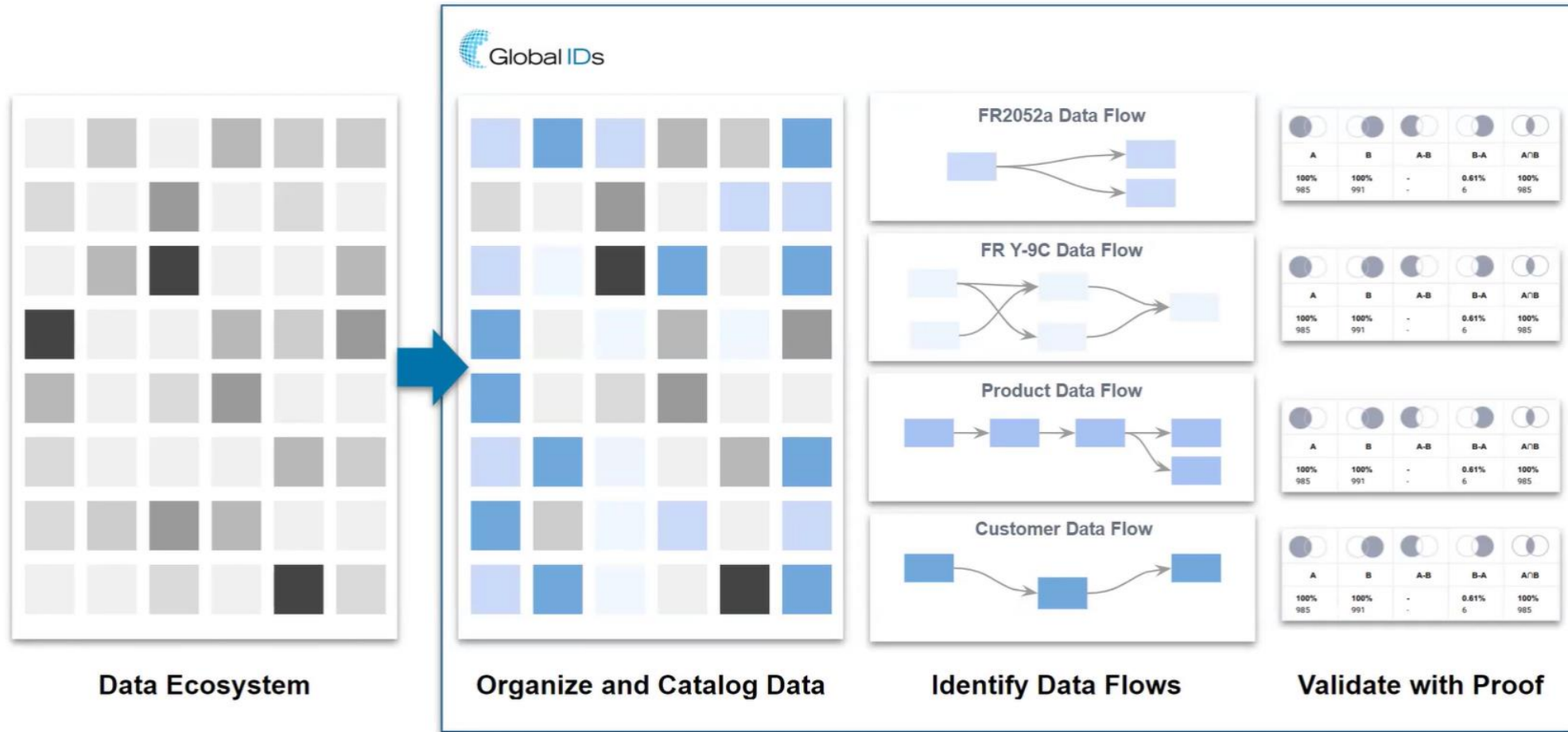
# Scanning Technical Metadata Along Data Pipelines Provides Precise Detailed Data Lineage



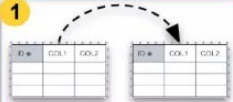






# Metadata Solutions Can Capture Data Lineage Using Two Different Manners



# Capturing Metadata for Data Lineage Purposes Can Be Enriched by Analyzing Data Sets



# Combining Metadata Scanning and Data Analytics Methodologies Ensures Complex View of Data Movements and Transformations

LINEAGE PROOFS		KNOWLEDGE		EVIDENCE		PROOF	
		ATTESTATION	CODE	COMMONALITY	OVERLAP	CODE RECONCILIATION	DATA RECONCILIATION
LINEAGE METHODS							
DATA FLOW	MANUAL MAPPING	1 					
	CODE INSPECTION (ETL + SQL)	2 					
	METADATA MAPPING	Physical	3 				
		Logical					
	Semantic						
	DATA MAPPING			4 			
DATA TRACE	IDs					5 	
	RECORDS					6 	
	TRANSFORMED RECORDS					7 	

## DEFINITION

---

# Data Quality Capability

A COMPANY'S ABILITY TO DELIVER DATA AND INFORMATION OF THE REQUIRED QUALITY AND FOR INTENDED USE



# Data Quality Enables Multiple Lifecycle Steps and Produces The Following Metadata



## Data Quality

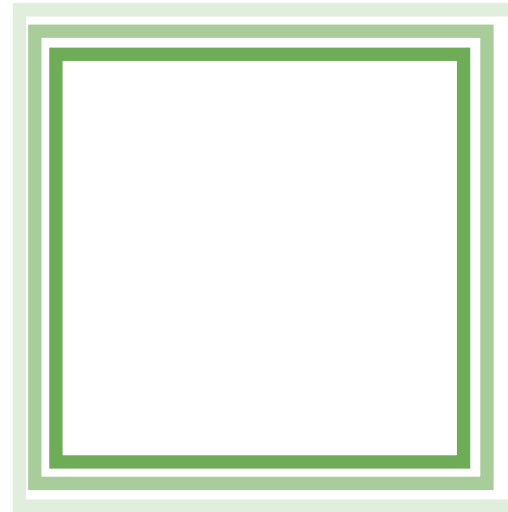
### Business metadata

- DQ requirements and rules
- Data issues
- DQ measurement results

### Technical metadata

- DQ checks

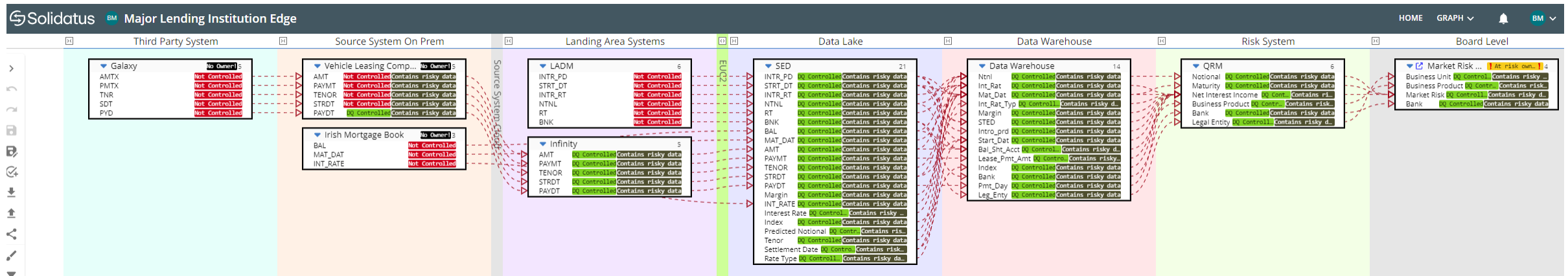
### Operational metadata



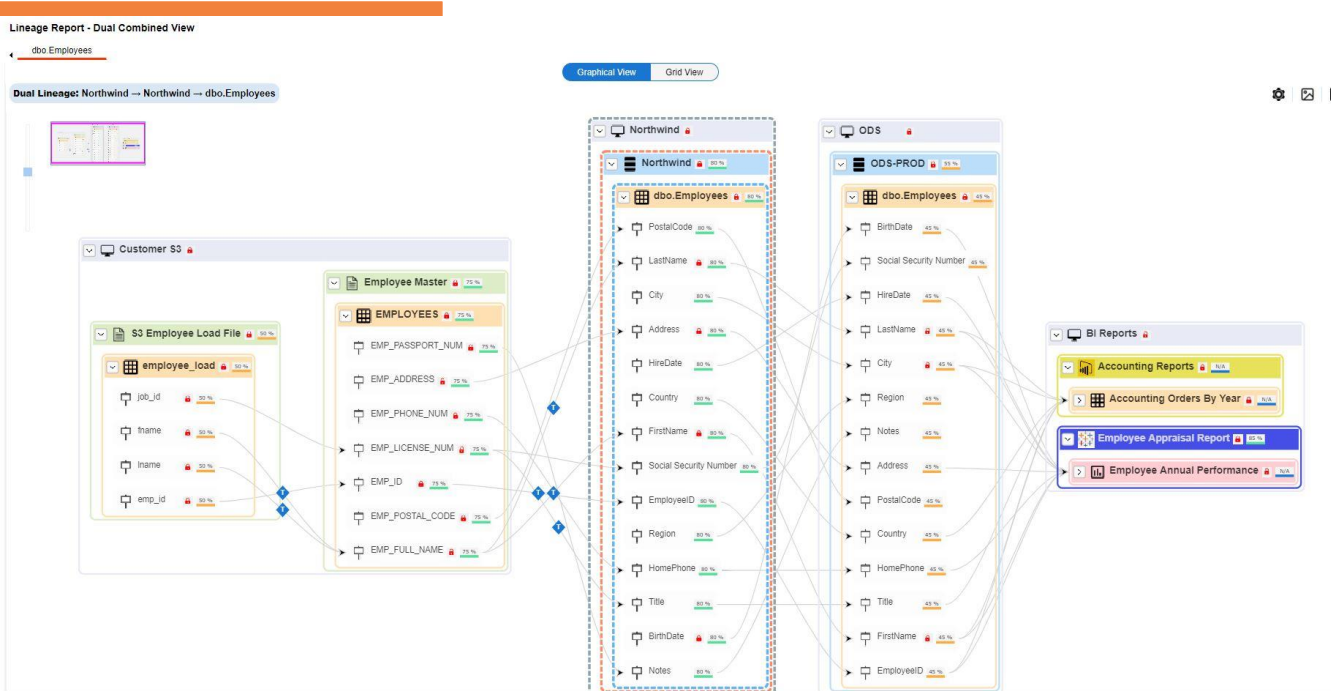
# Data Quality Can Be Measured Along Data Pipelines by Applying DQ Rules



The screenshot shows the '1.07 4 Eyes Check' rule configuration in the Solidatus interface. The rule is categorized as 'Preventative' and its purpose is 'To check the amount is correct'. The logic states: 'A 4 eyes check is carried out with a colleague to ensure the correct amount is entered.' The output is 'Email send to data entry staff with query or error'. The rule is currently 'Compliant' and has a 'Data Quality' of 'Yes' and a 'Threshold' of 'Yes'. A search filter is applied to show terms related to 'AMNT'.



# Data Quality Can Be Measured Along Data Pipelines by Applying DQ Rules



erwin Data Intelligence Metadata Manager

Dashboard > Explore > 3rd Party Flat Files > PERSON Loan Data (v1.00) Environment

Data Catalog > Statistics > Total Tables: 11 | Total Columns: 20

Summary Metrics:

- Total Primary Key Columns: 5%
- Total Foreign Key Columns: 5%
- Tables With Expanded Logical RL: 0%
- Columns With Expanded Logical: 0%
- DQ Score: 91.69%
- Impact Score: 26.69%

Table: LoanPersonData

#	Options	Table Name	Column Name	DQ Score	Impact Score	Drift Alert	Logical Column Name	Column Comments	Column Definition	Tags	Sensitive Data Indicator (v/N)	Sensitive Data Indicator (SD) Classification	Sensitive Data Indicator (SD) Description
1		LoanPersonData	ID	66.66%	N/A								
2		LoanPersonData	FirstName	99.26%	50.00%								
3		LoanPersonData	LastName	94.59%	45.15%								
4		LoanPersonData	Title	10.00%	24.10%								
5		LoanPersonData	Sex	100.00%	97.90%								
6		LoanPersonData	Spunumber	95.16%	0.20%								
7		LoanPersonData	Loaddress	40.00%	39.50%								
8		LoanPersonData	Trunumber	71.12%	N/A								
9		LoanPersonData	Mnumber	73.00%	N/A								

# Graph Technologies Enable Tracing Data Quality at the Data Instance Level

Global IDs | Lineage

CUSTOMER Data Governance Policy #1 - v1

AGE

ING

215

1 of 1

Values

- 1288770294
- Roxy
- Shea
- +86 521 585 6437
- +7 417 701 1125
- rshea16@npr.org
- 1999-03-13 00:00:00.0
- \*\*\*\*\*
- 2 6th Hill
- Wangmeng
- China
- 2023-02-08 06:55:35.0

#Good Records #Bad Records

Sellbrite ODS

Postgres SQL

pgods

public.CUSTOMER\_ODS

4984

227

1 of 1

Columns

Columns	Values
CUST_ID	1288770294
FNAME	Roxy
LNAME	Shea
PRIMARY_PHONE	+86 521 585 6437
ALTERNATE_PHONE	+7 417 701 1125
EMAIL	rshea16
DATE_OF_BIRTH	1999-03-13 00:00:00.0
GOVERNMENT_ID	*****
STREET_ADDRESS	2 6th Hill
CITY	Wangmeng
STATE	
COUNTRY	China
ZIPCODE	
ASOF_DT	2023-02-08 07:05:35.0

Orderhive DWH

MS SQL Server

msdwh

dbo.CUST\_REF\_DWH

4986

225

1 of 1

Columns

Columns	Values
CUSTOMER_IDENTIFIER	1288770294
FIRSTNAME	Roxy
LASTNAME	Shea
PHONE1	+86 521 585 6437
PHONE2	+7 417 701 1125
EMAIL	rshea16
DATE_OF_BIRTH	1999-03-13 00:00:00.0
GOVERNMENT_ID	*****
STREET_ADDRESS	2 6th Hill
CUST_CITY	Wangmeng
STATE	
COUNTRY	China
POSTAL_CODE	
ASOF_DT	2023-02-08 07:15:35.0

Skub

De

Exception

Exception

1 of 1

Columns

Columns	Values
GCNO	
GIVENNA	
SURNAME	
CONTACT	
CONTACT	
EMAIL	
DATE_OF	
GOVERN	
ADDRESS	
CITY	
STATE	
COUNTRY	
POSTCOD	
FINI NAM	
ASOF_DT	

VR



## DEFINITION

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# Data Security

A COMPANY'S ABILITY TO MANAGE "SECURITY POLICIES AND PROCEDURES TO PROVIDE PROPER AUTHENTICATION, AUTHORIZATION, ACCESS, AND AUDITING OF DATA [...]" AND IT ASSETS

SOURCE: DAMA International. DAMA-DMBOK: Data Management Body of Knowledge, Second Edition. Bradley Beach, N.J.: Technics Publications, 2017, p.219.



# Data Security Enables Multiple Lifecycle Steps and Produces The Following Metadata



## Data Security

### Business metadata

- Security and privacy levels

### Technical metadata

- Data access rights, groups, roles
- Data CRUD rules

### Operational metadata

- Results of audit, balance, control measurement

# Metadata Solutions Support Defining Data Privacy Levels



The screenshot displays the Zeenea Studio interface. On the left, there is a navigation menu with options like DASHBOARD, CATALOG, and Item Lifecycle Event. The main area shows a search for 'Assets' with 10 results. The results are filtered by 'Type: Dataset' and 'Connection: connSyn'. The results list includes:

- Channel [Channel]**: Connection: connSyn, IHT Classification: Public, Source Layer: PRD, Last updated: Sep 14, 2023.
- Communication [Communication]**: Connection: connSyn, IHT Classification: Public, Source Layer: PRD, Last updated: Sep 14, 2023.
- Customer [Customer]**: Connection: connSyn, IHT Classification: Public, Source Layer: PRD, Last updated: Sep 19, 2023.
- Document [Document]**: Connection: connSyn, IHT Classification: Public, Source Layer: PRD, Last updated: Sep 14, 2023.
- Employee [Employee]**: Connection: connSyn, IHT Classification: Public, Source Layer: PRD, Last updated: Sep 14, 2023.

The 'Employee [Employee]' item is selected, and its details are shown in a side panel. The details include:

- Employee [Employee]**: Connection: connSyn, Last updated: Sep 22, 2023, 20 linked Items.
- CURATOR**: AM Anastasia Montout.
- CONTACT**: No contact assigned for now.
- GLOSSARY ITEMS (0)**: Search for Glossary Items.
- DESCRIPTION**: An individual who is hired to provide services to a company on a regular basis in exchange for compensation.
- SOURCE DESCRIPTION**: An individual who is hired to provide services to a company on a regular basis in exchange for compensation.



# Metadata Solutions Support Data Sensitivity Analysis Along a Data Chain

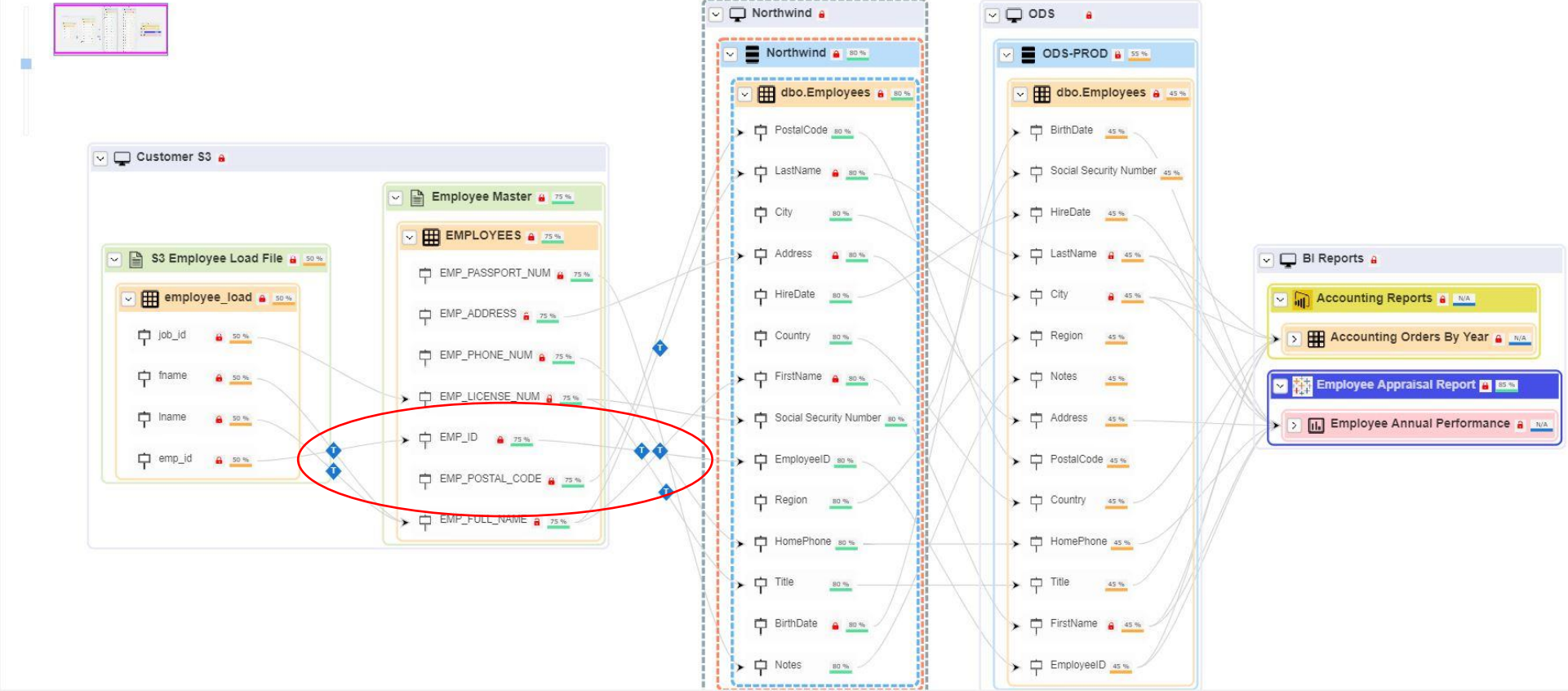


Lineage Report - Dual Combined View

dbo.Employees

Graphical View Grid View

Dual Lineage: Northwind → Northwind → dbo.Employees



# Metadata Solutions Should Ensure Access Control

The screenshot displays a metadata mapping interface. On the left, a rule named 'rul\_NamesCheck.dr\_cust\_no' is shown with a scale icon and 'Mapped' status. It is linked to a data element 'Loans > Credit Default Risk > Credit Risk M... ent' via a double-headed arrow. The data element is associated with 'Rules\_Credit' and 'Mapped'. On the right, a data element 'Customer\_Risk\_Assessment' is shown with a folder icon and 'Mapped' status. It is linked to the same data element 'Loans > Credit Default Risk > Credit Risk M... ent' via a double-headed arrow. The data element is associated with 'CUSTOMER\_RISK\_ASSESSMENT' and 'Mapped'. Both data elements are associated with the user 'sridhar' and the timestamp '2023-08-28 02:57:58'. The mapping is labeled 'Item mapped: CUST\_NO'.

## DEFINITION

---

# Data Analytics

A COMPANY'S ABILITY TO ENHANCE BUSINESS DECISION-MAKING AT VARIOUS ORGANIZATIONAL LEVELS BY PROVIDING INSIGHTS FROM DATA AND INFORMATION USING MULTIPLE DATA ANALYTICS METHODOLOGIES

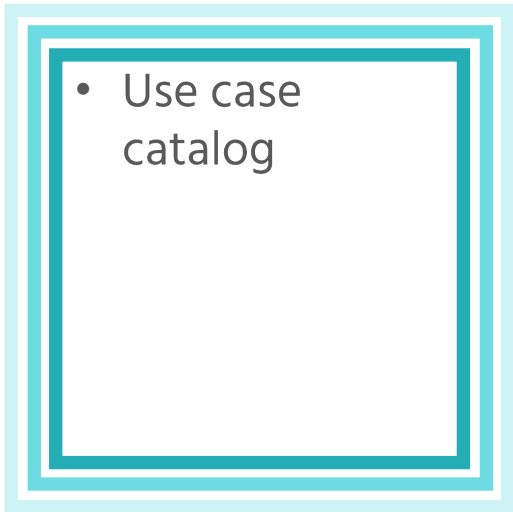


# Data Analytics Enables the Data Lifecycle and Produces The Following Metadata

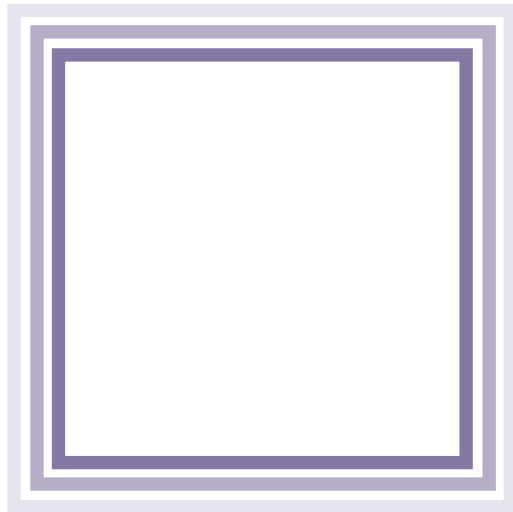


Data analytics

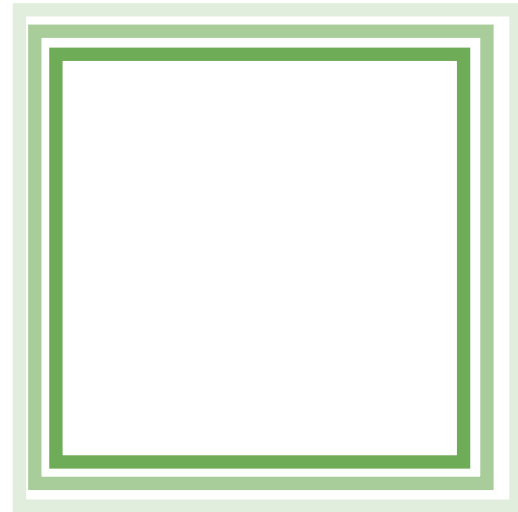
Business metadata



Technical metadata



Operational metadata



## DEFINITION

---

# Data Lifecycle Management

A COMPANY'S ABILITY TO PLAN, DESIGN, IMPLEMENT, COORDINATE, AND CONTROL PERFORMANCE OF DATA LIFECYCLE-RELATED PROCESSES



# Data Lifecycle Management Enables Multiple Data Lifecycle Steps and Produces The Following Metadata



## Data lifecycle management

### Business metadata

- Schedules for data updates

### Technical metadata

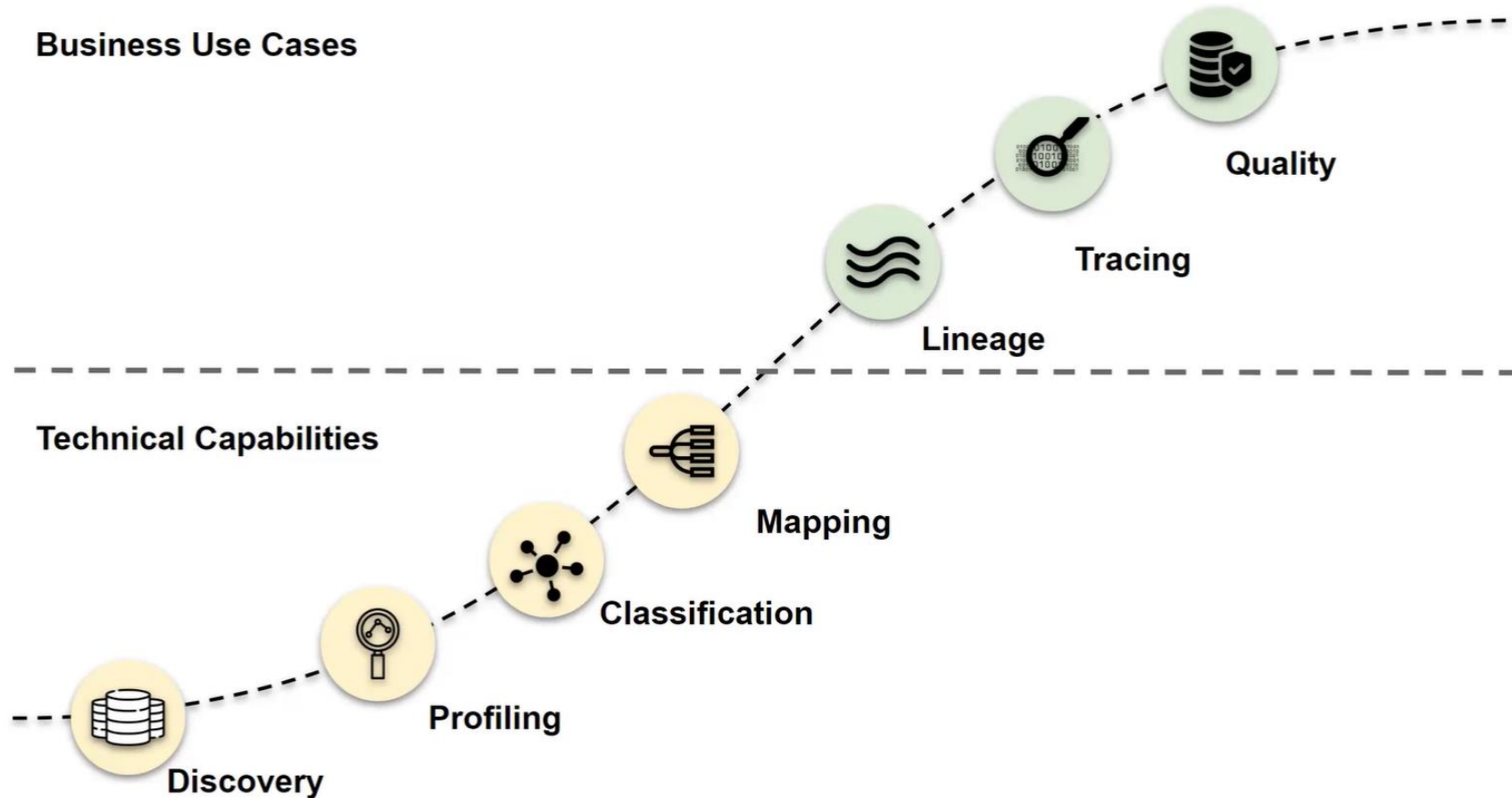
- Recovery and back up rules
- Content update cycle
- Orchestration

### Operational metadata

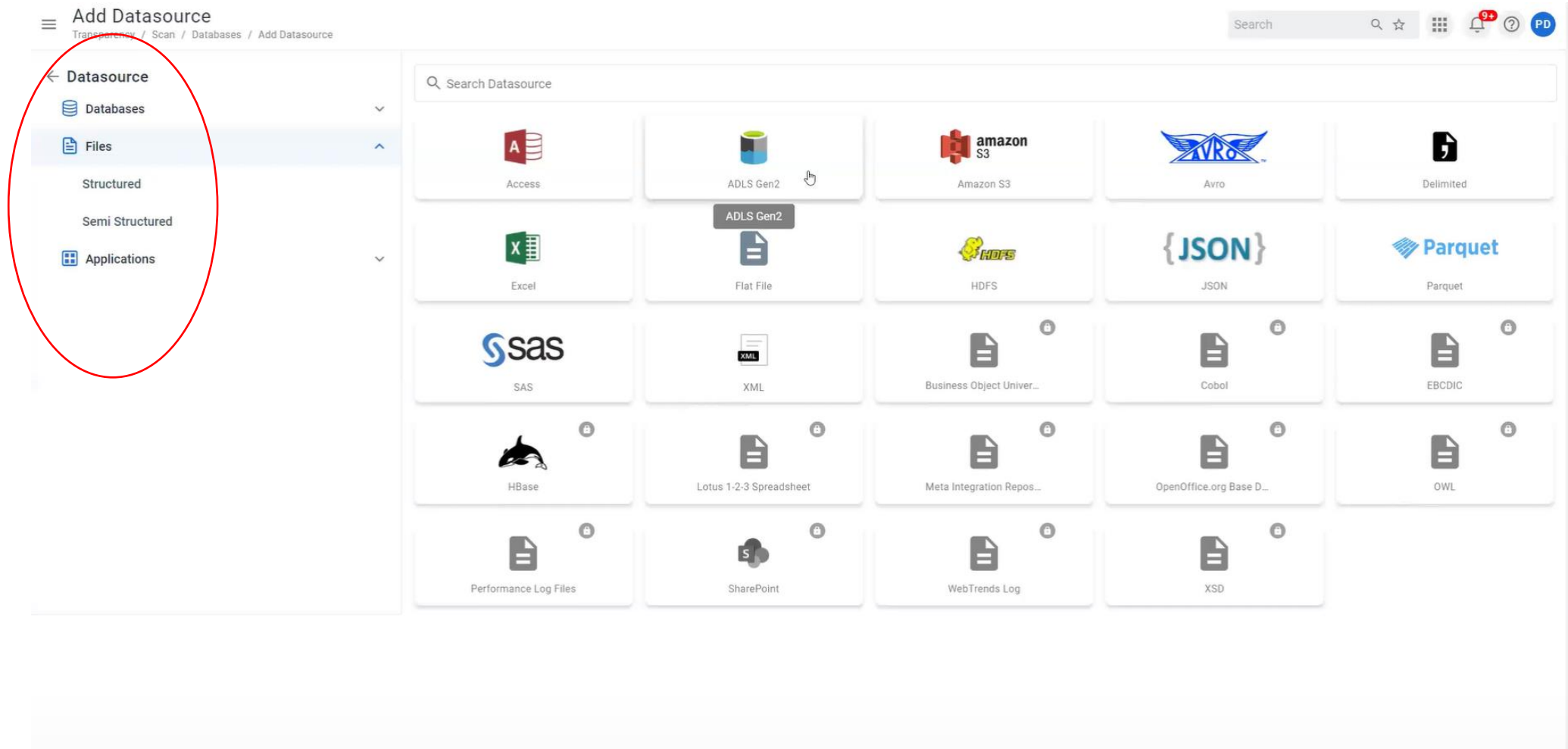
- Execution logs
- Error logs
- Backup, retention, disaster recovery provisions

# Metadata Solutions Several Core Steps of a Data Lifecycle

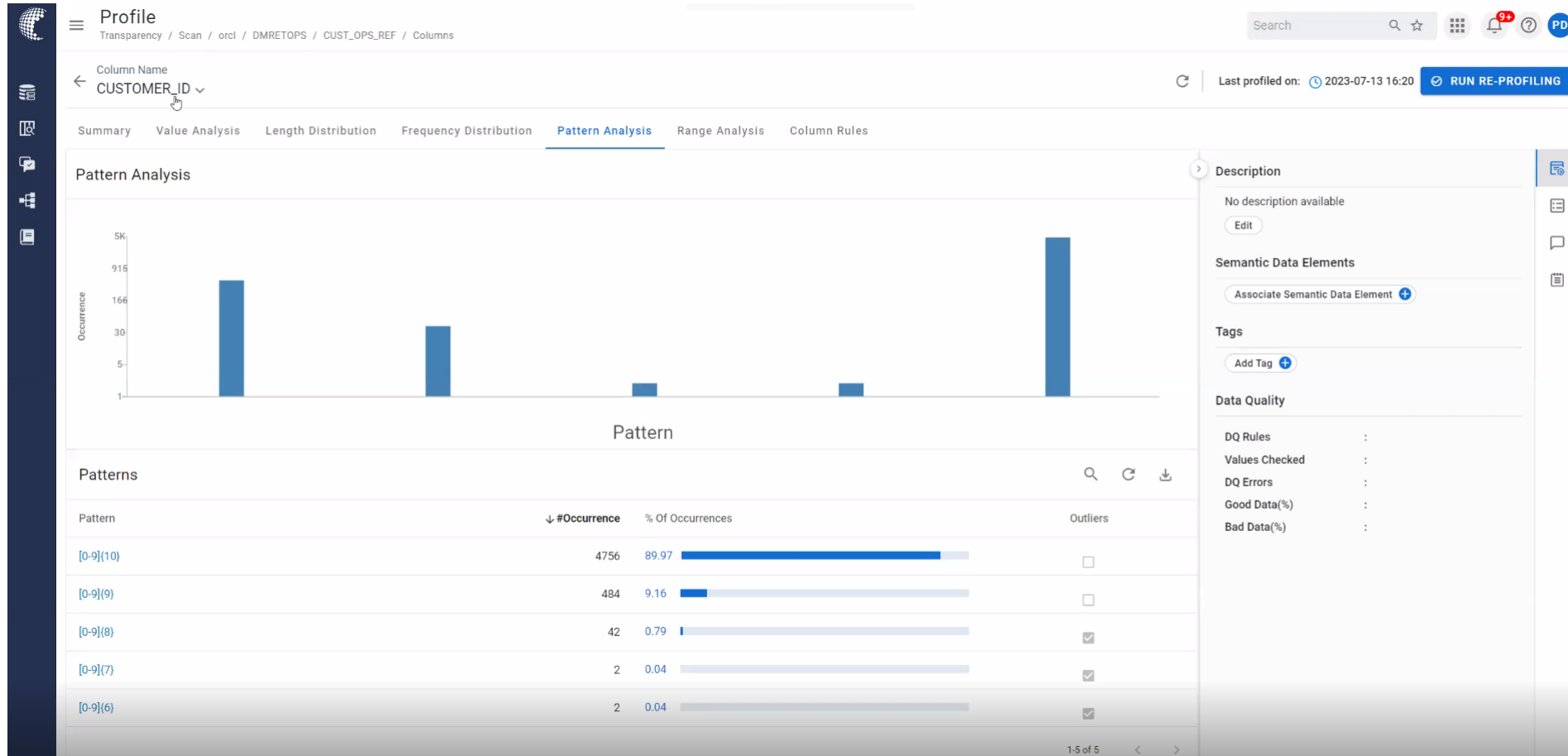
## Business Data Flow Methodology (contd.)



# Metadata Solutions Provide Multiple Scanners for Data Discovery for Various Applications, Languages, and Data Types

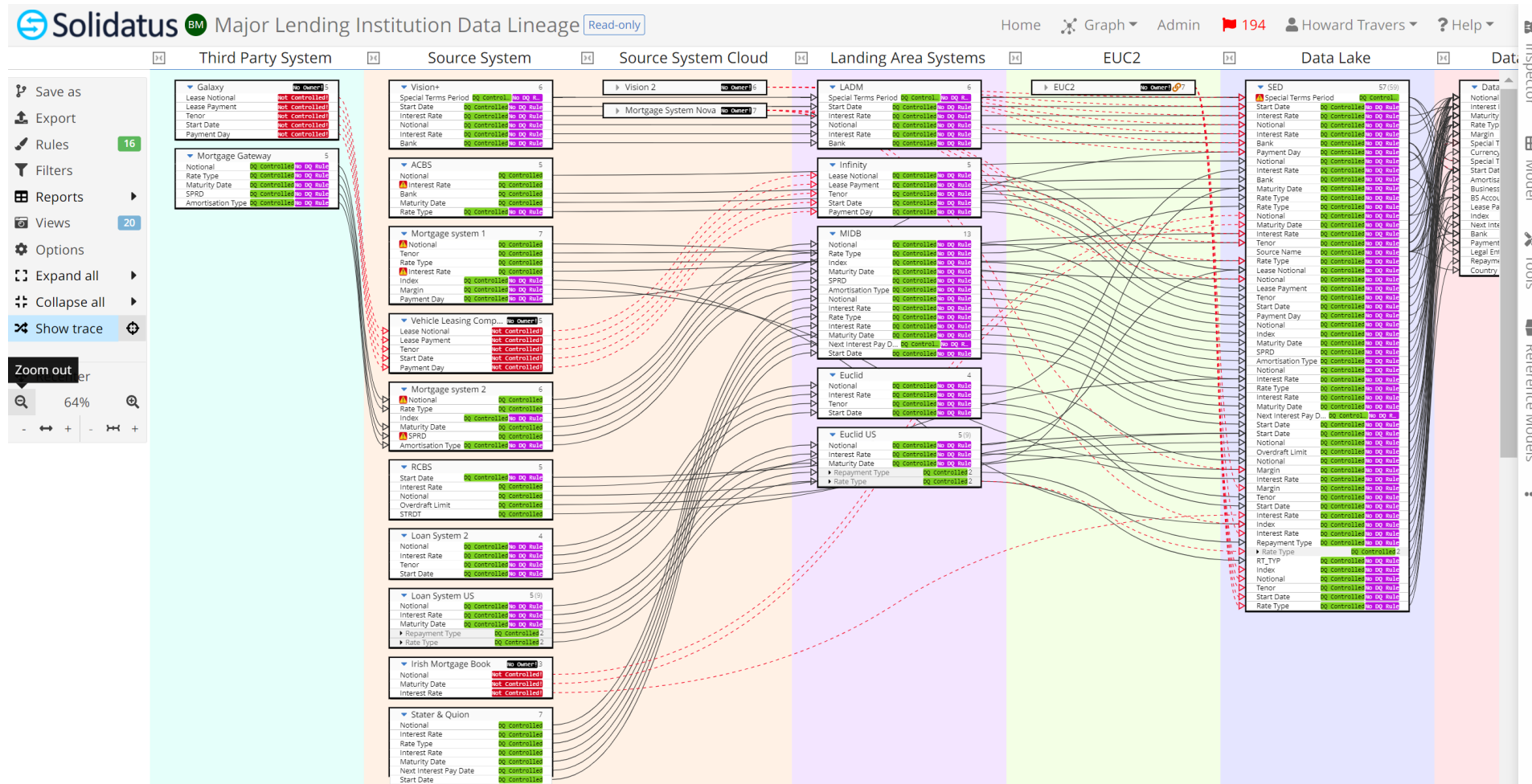


# Data Profiling Allow for Detecting Data Patterns and Anomalies

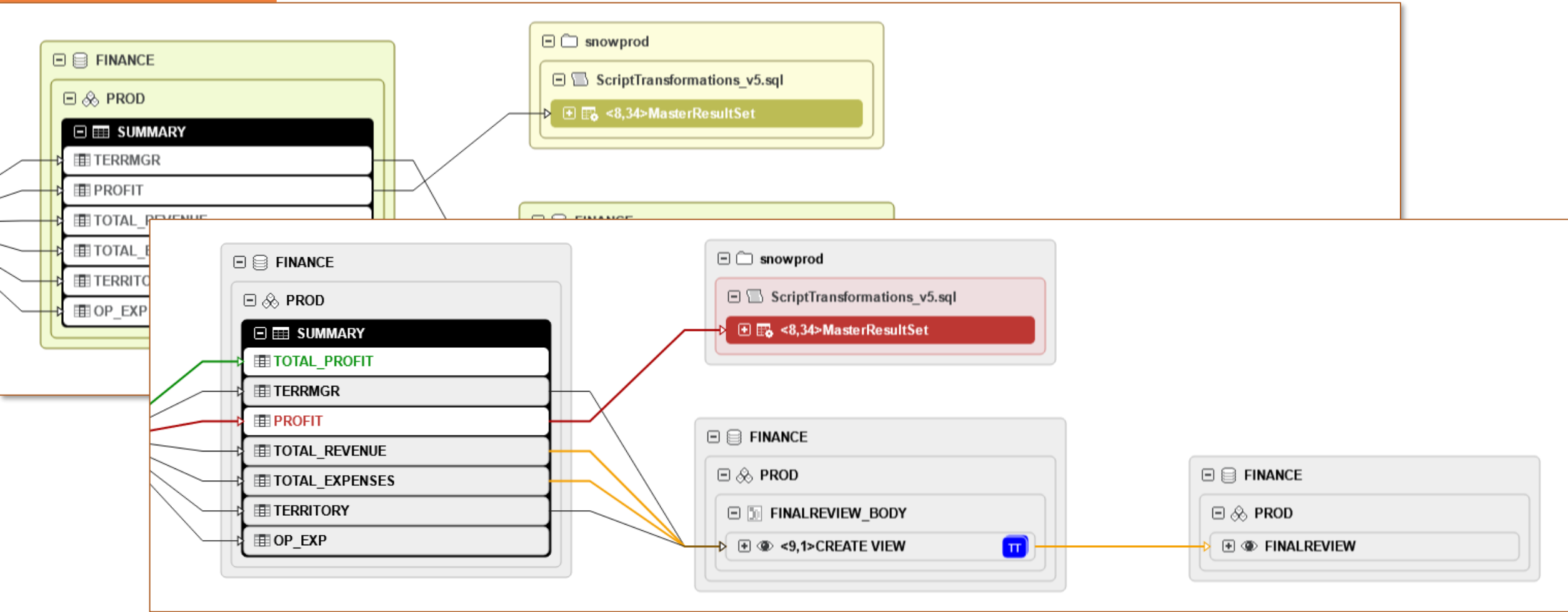




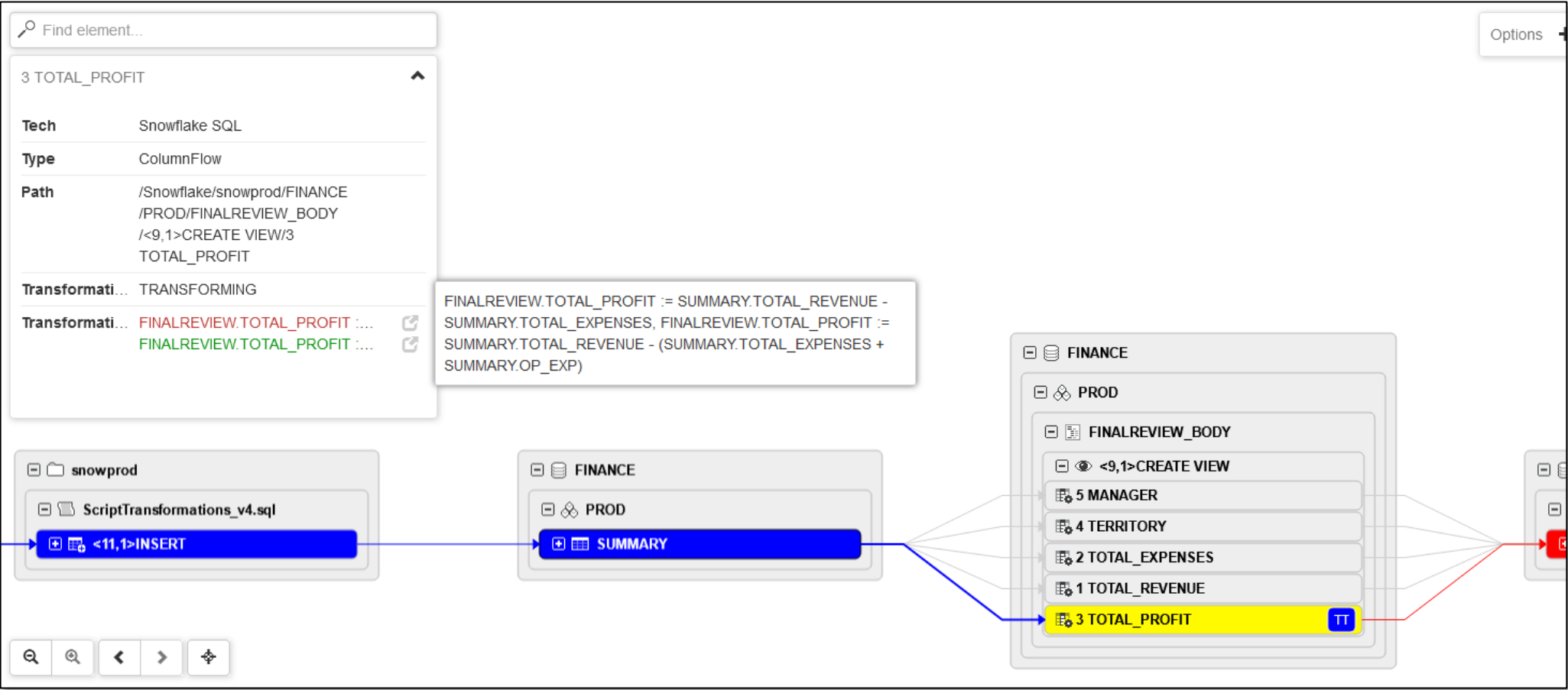
# Data Lineage Should Assist in Tracing Links between Metadata Objects in two Directions



# Metadata Solutions Should Provide Versioning Control for Schema Changes



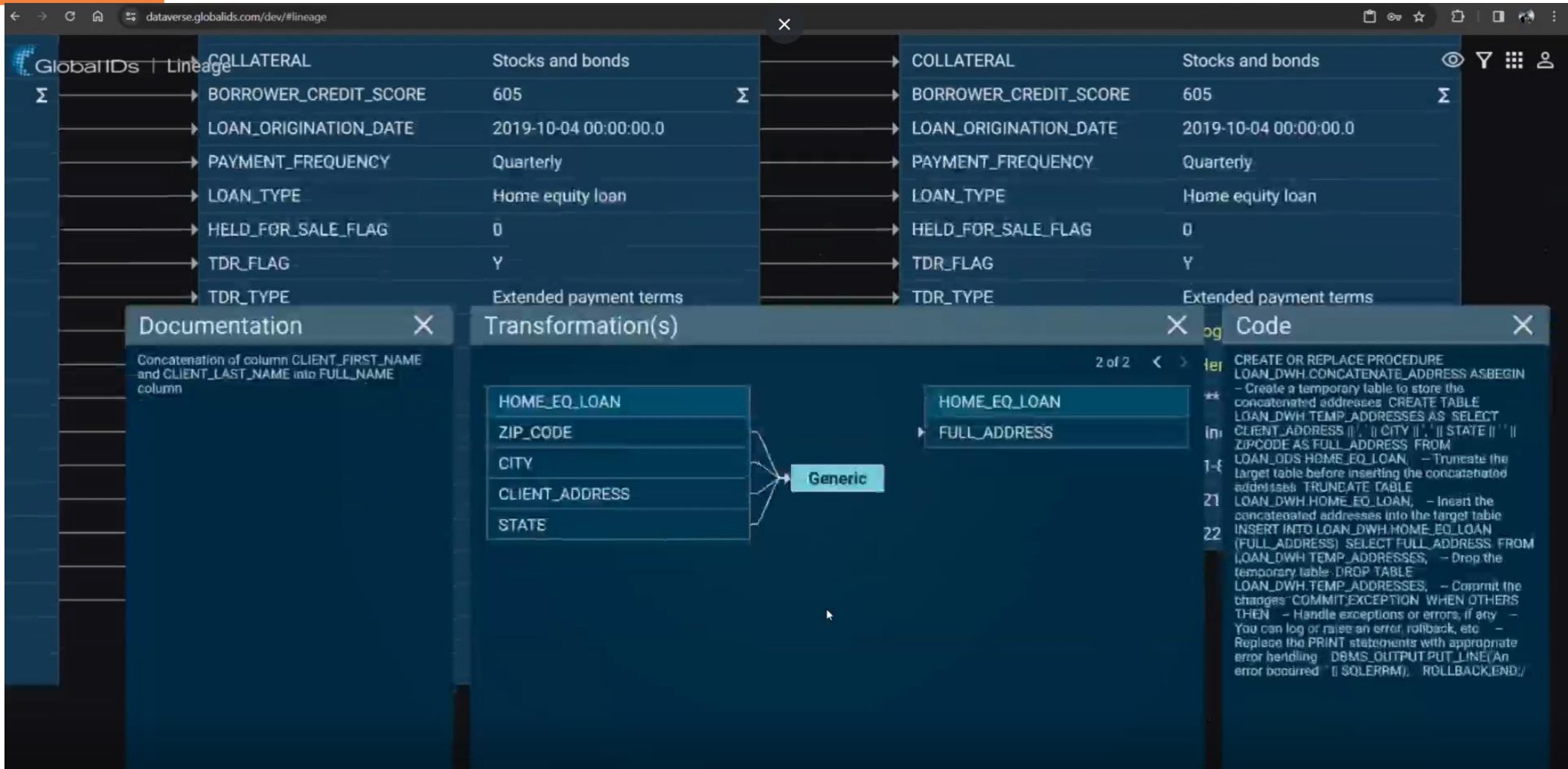
# A Solution Should Provide Versioning Control for Business Rule Changes



Source: [manta.io](http://manta.io)



# Business Rules Should Be Translated from a Business to Technical Language

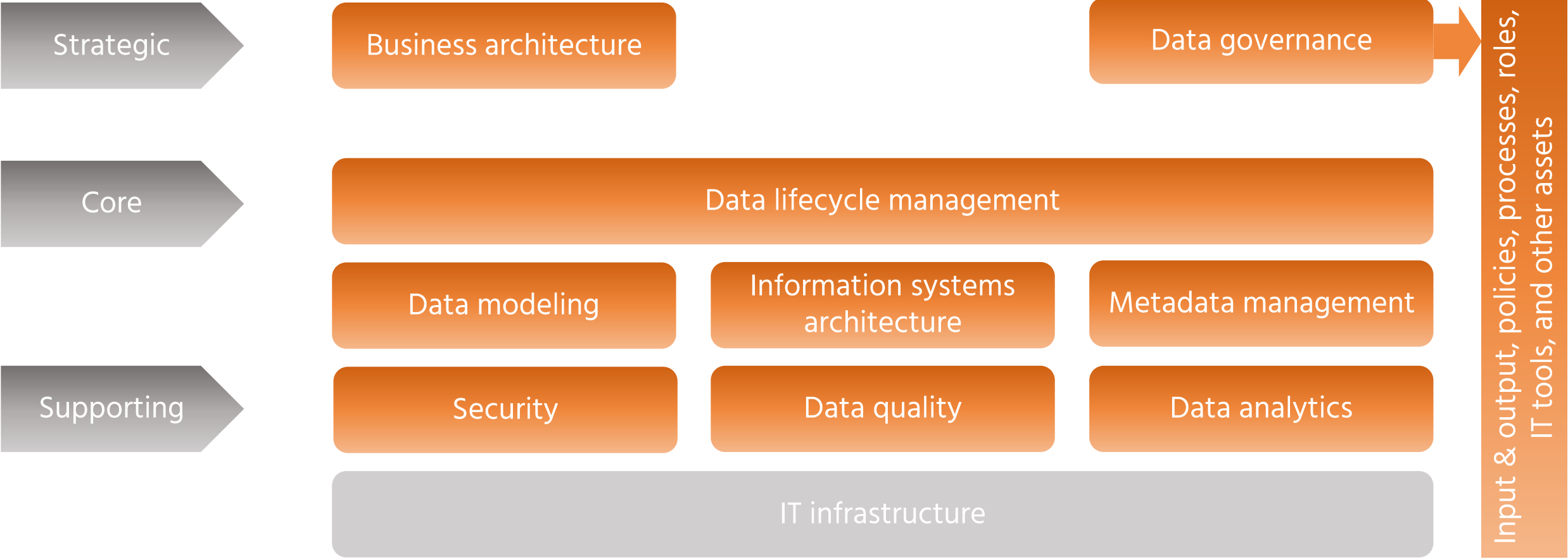


The screenshot displays the Global IDs interface with several panels:

- Lineage:** Shows data flow from source to target. Both source and target tables have columns: COLLATERAL (Stocks and bonds), BORROWER\_CREDIT\_SCORE (605), LOAN\_ORIGINATION\_DATE (2019-10-04 00:00:00.0), PAYMENT\_FREQUENCY (Quarterly), LOAN\_TYPE (Home equity loan), HELD\_FOR\_SALE\_FLAG (0), TDR\_FLAG (Y), and TDR\_TYPE (Extended payment terms).
- Documentation:** Contains the text: "Concatenation of column CLIENT\_FIRST\_NAME and CLIENT\_LAST\_NAME into FULL\_NAME column".
- Transformation(s):** A diagram showing a 'Generic' transformation block receiving input from a table with columns: HOME\_EQ\_LOAN, ZIP\_CODE, CITY, CLIENT\_ADDRESS, and STATE.
- Code:** Contains the following SQL procedure:

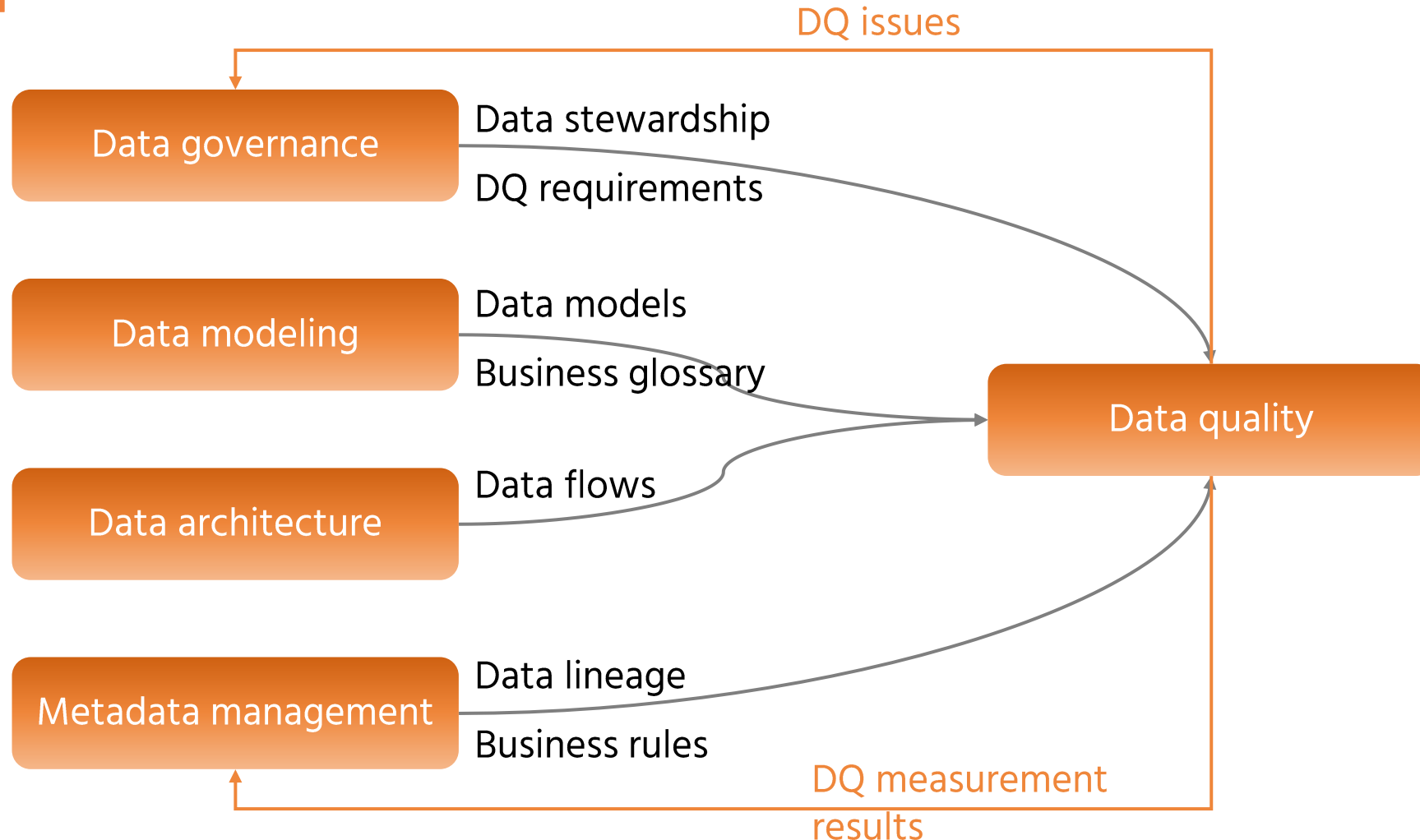
```
CREATE OR REPLACE PROCEDURE
LOAN_DWH.CONCATENATE_ADDRESSES AS BEGIN
-- Create a temporary table to store the
concatenated addresses. CREATE TABLE
LOAN_DWH TEMP_ADDRESSES AS SELECT
CLIENT_ADDRESS || ', ' || CITY || ', ' || STATE || ' ' ||
ZIP_CODE AS FULL_ADDRESS FROM
LOAN_ODS.HOME_EQ_LOAN; -- Truncate the
target table before inserting the concatenated
addresses. TRUNCATE TABLE
LOAN_DWH.HOME_EQ_LOAN; -- Insert the
concatenated addresses into the target table
INSERT INTO LOAN_DWH.HOME_EQ_LOAN
(FULL_ADDRESS) SELECT FULL_ADDRESS FROM
LOAN_DWH TEMP_ADDRESSES; -- Drop the
temporary table. DROP TABLE
LOAN_DWH TEMP_ADDRESSES; -- Commit the
changes. COMMIT; EXCEPTION WHEN OTHERS
THEN -- Handle exceptions or errors, if any. --
You can log or raise an error, rollback, etc. --
Replace the PRINT statements with appropriate
error handling. DBMS_OUTPUT.PUT_LINE('An
error occurred ' || SQLERRM); ROLLBACK; END;
```

# Various Data Management Capabilities Not Only Produce, but Also Consume and Exchange Metadata



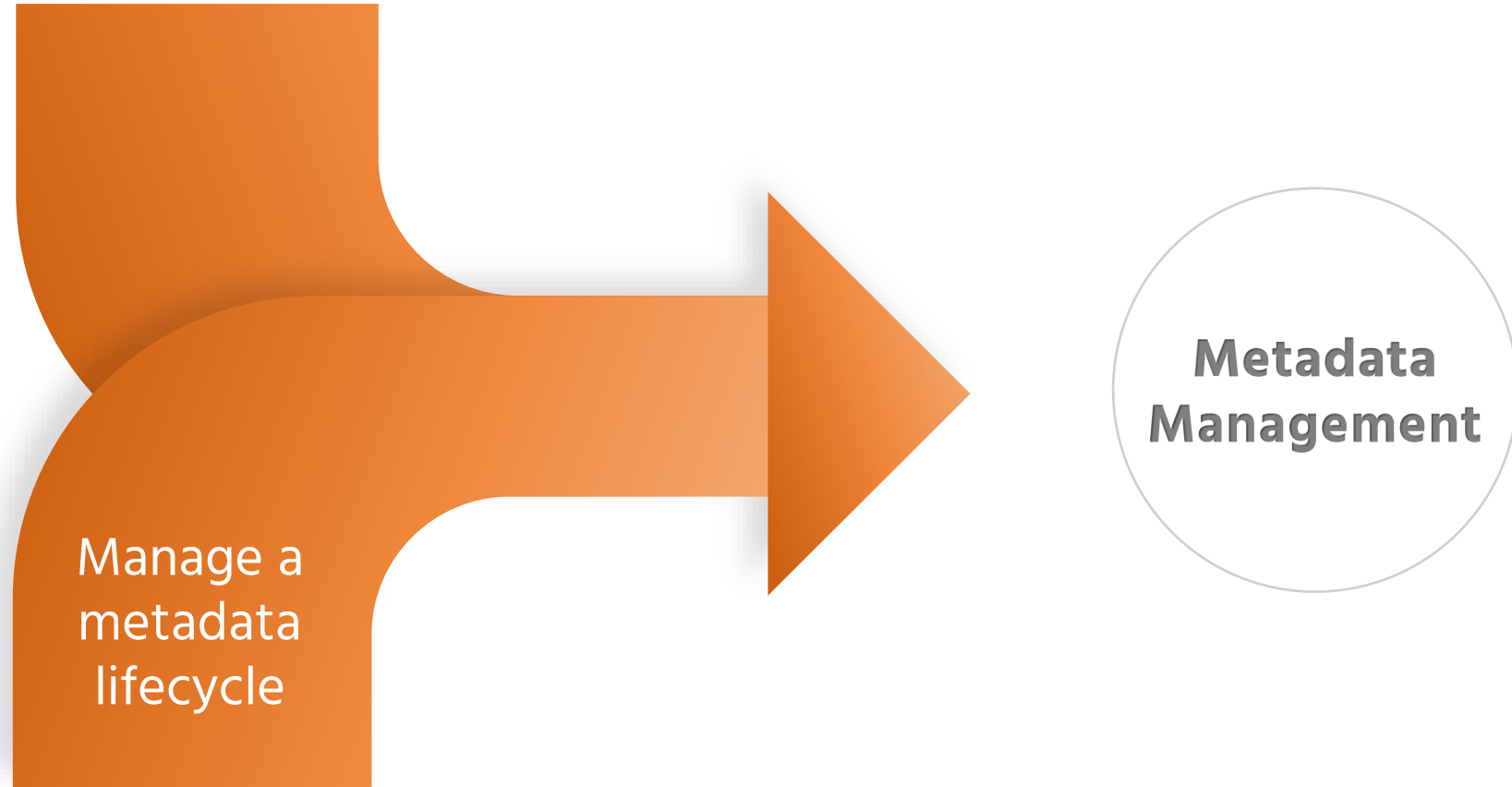
# Various Data Management Capabilities Not Only Produce, but Also Consume and Exchange Metadata

Example: Data Quality

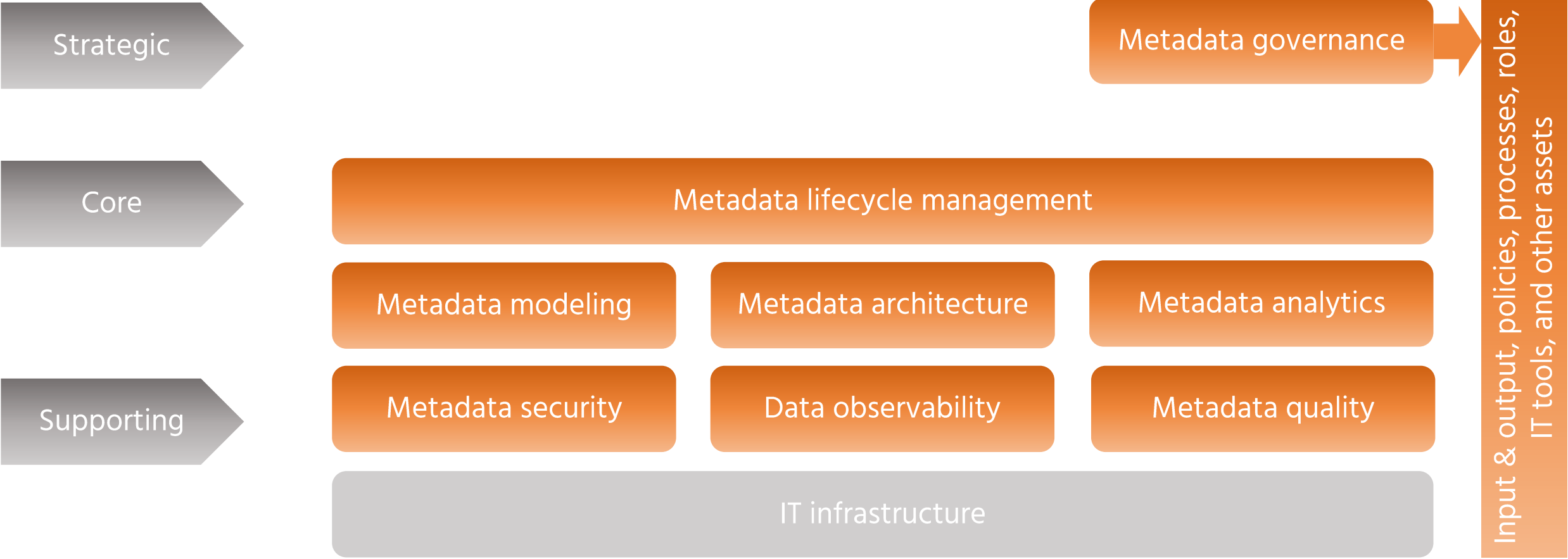


# Metadata Management Has Two Core Goals

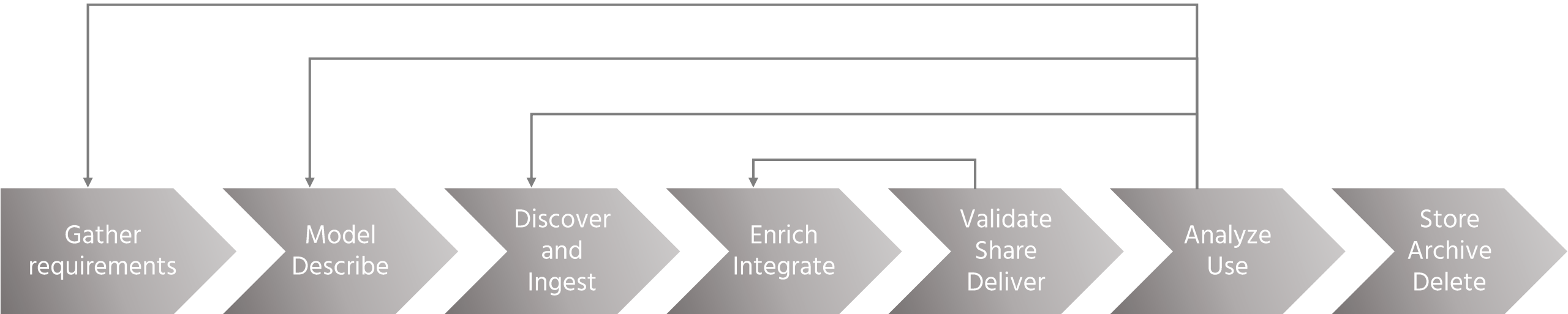
---



# Various Metadata Management Capabilities Manage Metadata and Its Lifecycle



# Let's Define Our Approach to Describing a Metadata Lifecycle



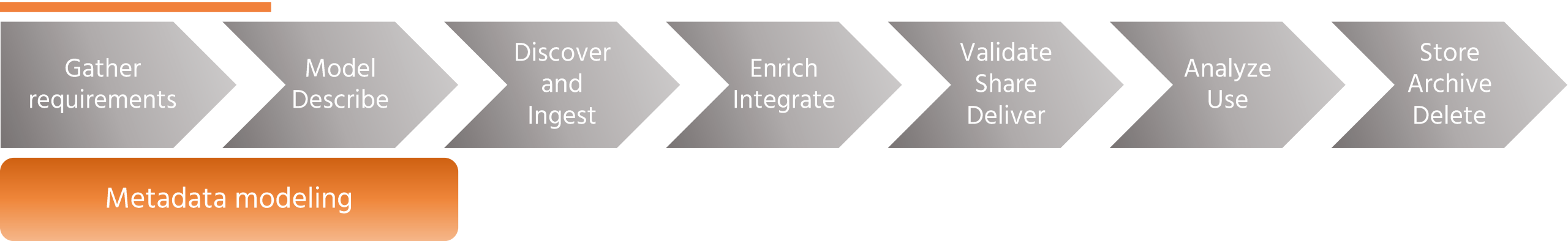
DEFINITION

# Metadata Modeling

A COMPANY'S ABILITY TO DELIVER, MAINTAIN, AND MANAGE METADATA MODELS



# Metadata Modeling Enables the Metadata Lifecycle and Produces The Following Metadata



## Business metadata

- Metamodel of metadata at the semantic / logical levels

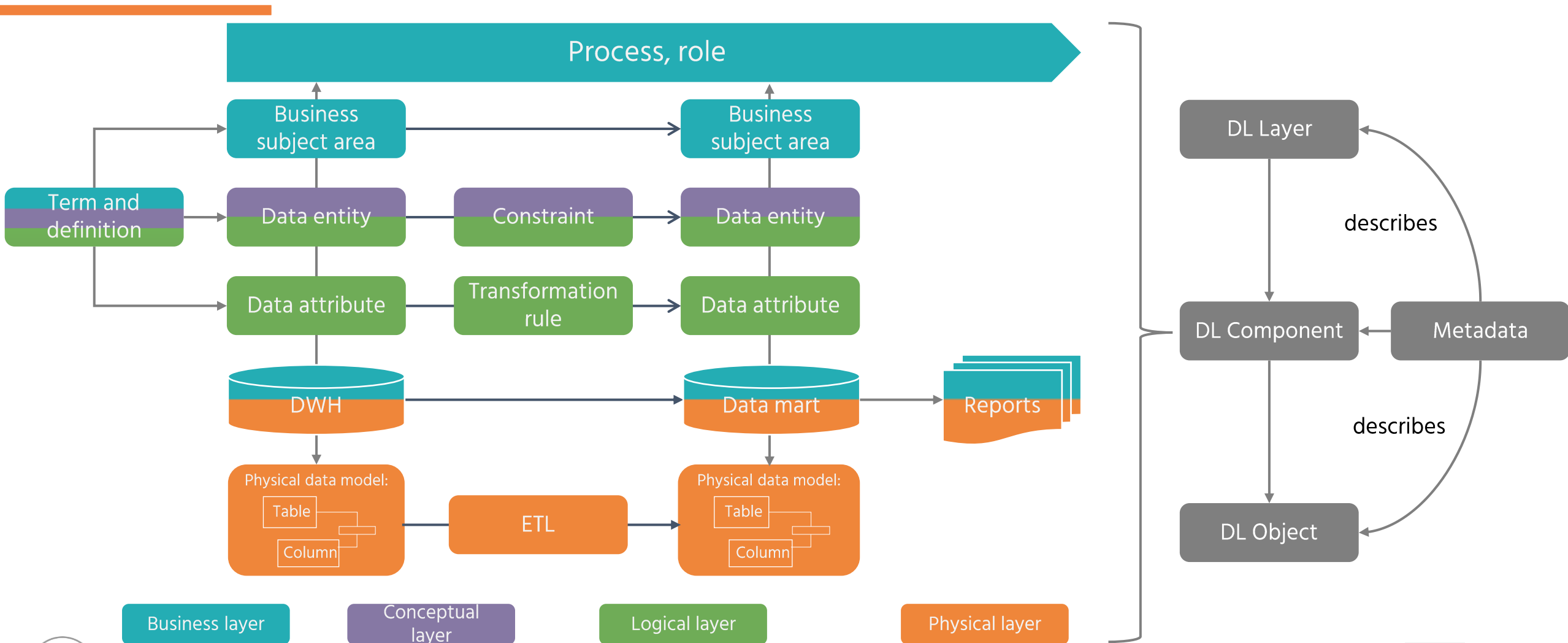
## Technical metadata

- Metamodel of metadata at the physical level

## Operational metadata

- Metamodel of operational metadata

# The Metamodel of Data Lineage (DL) Serves as a Basis for the Metamodel of Metadata



DEFINITION

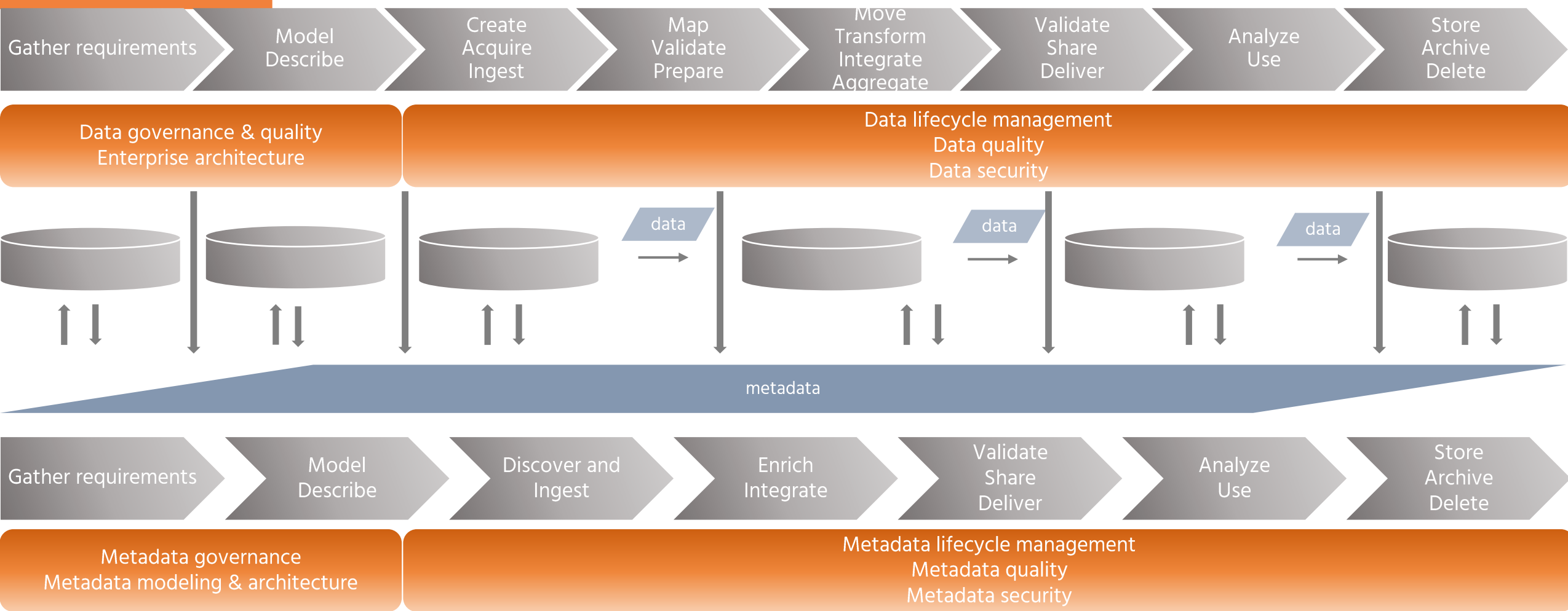
---

# Metadata Architecture

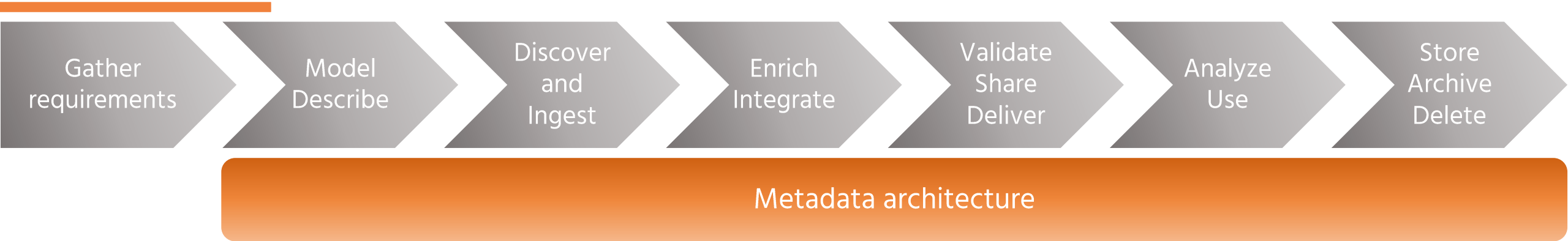
A DESCRIPTION OF THE STRUCTURE OF METADATA AND IT ASSETS AND INTERACTION OF IT ASSETS THAT MANAGE METADATA AND ENABLE KEY DATA MANAGEMENT CAPABILITIES



# Managing Data and Metadata Lifecycles Together Delivers Synergy Effect



# Metadata Architecture Enables the Metadata Lifecycle and Produces The Following Metadata



## Business metadata

- Catalogs, matrices, and flows of metadata and IT assets at the semantic/ logical levels

## Technical metadata

- Catalogs, matrices, and flows of metadata and IT assets at the physical levels

## Operational metadata

## DEFINITION

---

# Passive Metadata Management

A COMPANY'S ABILITY AUTOMATICALLY COLLECT, INGEST, AND STORE METADATA AS DATA PROCESSES OCCUR WITHOUT ACTIVE (REAL-TIME) INTERVENTION



## DEFINITION

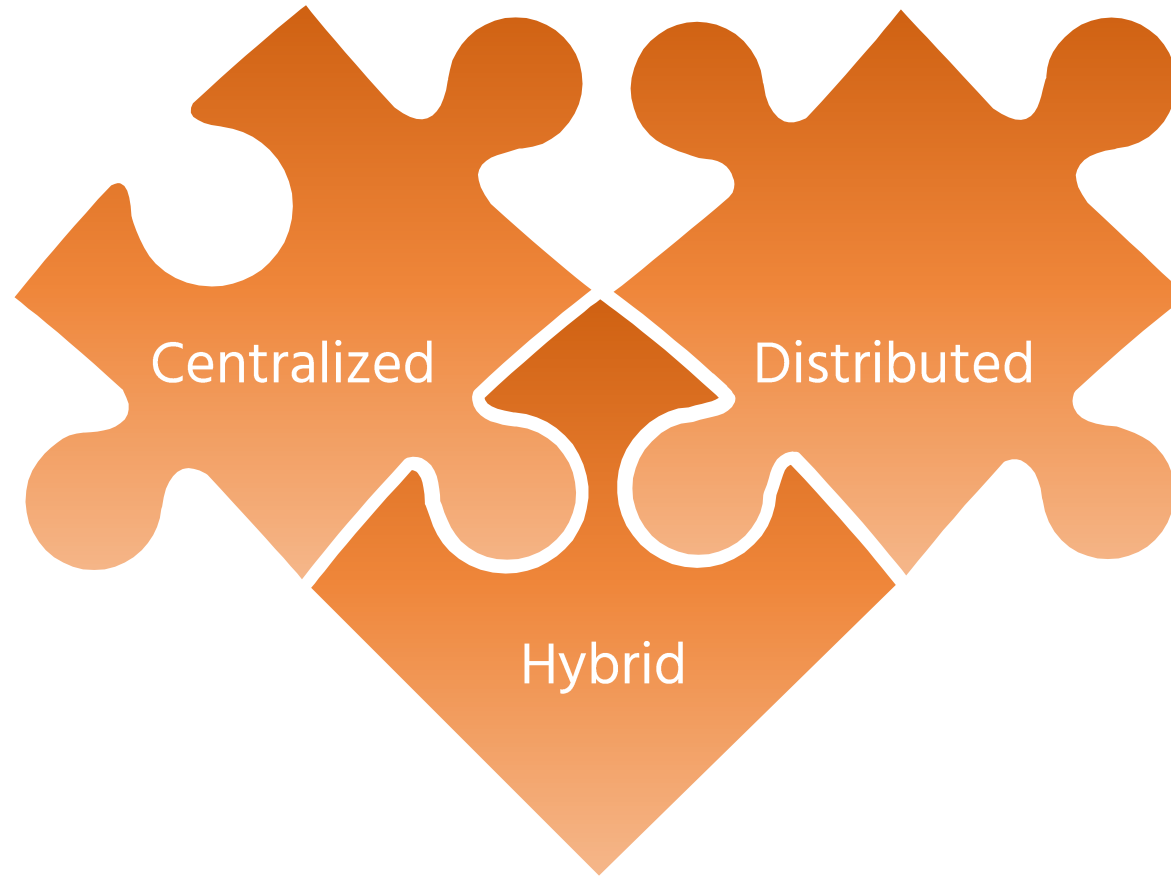
---

# Active Metadata Management

A COMPANY'S ABILITY AUTOMATICALLY COLLECT, INGEST, AND STORE METADATA AS DATA PROCESSES OCCUR IN REAL-TIME INTERACTION



# The Ability to Manage Metadata “Actively” or “Passively” Depends on Metadata Architecture






# Metadata Solutions Should Support Near-Real Metadata Update Functionalities

5 New Notifications

## CustomerData




This source finished successfully.

 ABC Bank >  Retail Banking >  Analytics Org  
2024-02-06 04:11:44

Success

## CustomerDataBase

This source finished successfully.

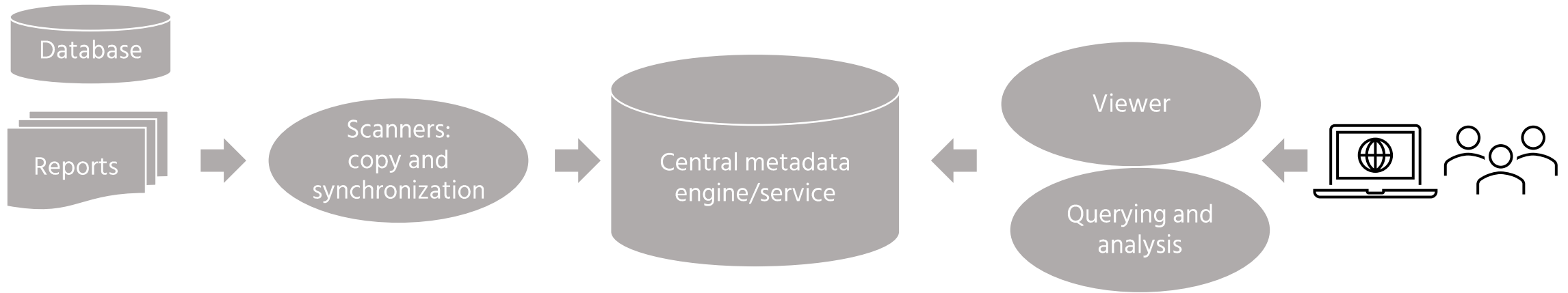
 ABC Bank >  Retail Banking >  Analytics Org  
2024-02-06 04:03:34

Success

# Metadata Solutions Should Notify Users on Changes in Metadata

The screenshot displays the Orion Governance Changelog interface. On the left, a sidebar contains filters for 'Date range' (Start Date: 29/12/2023, End Date: 05/01/2024), 'Show impacted reports' (checked), and 'Event type' (Create, Delete, Update, Process started, Process finished, Mappings, Unmappings). The main content area shows a change on Thursday, 4 January, 2024: '(Column) EXTRA\_FIELD created' in the 'Store\_Inventory\_System\_DB2' database. The user 'Ed Grossman' performed this action at 16:18:20. A 'SEE IMPACT' button is visible. Below this, the 'Impact: EXTRA\_FIELD' section shows '1 report impacted': 'RetailSalesAnalysisReport.twb Workbook'. The impacted report's location is 'Org1 > lob3 > 1' and 'Retail\_Sales\_Analysis > TABLEAUSERVER > RetailWeeklySales'. On the right, a '88 New Notifications' panel lists several events: 'TABLEAUSERVER' (Asset child added, Added), 'etgtest\_tableau' (System updated, Updated), 'Store Inventory System\_DB2' (This source finished successfully, Success), 'TABLEAUSERVER' (Asset child impacted, Impacted), and 'etgtest\_pg1' (This source finished successfully, Success). A 'View More' button is at the bottom of the notifications panel.

# Centralized Metadata Systems Architecture Has Advantages and Disadvantages



Efficient access to metadata



Independence from source systems



Ability to capture additional metadata



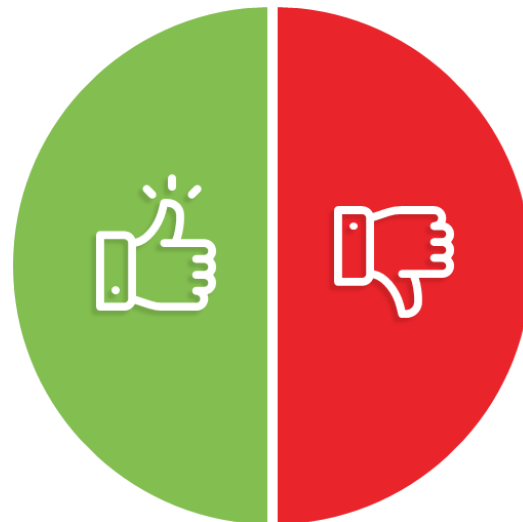
Enhanced performance



Not much infrastructure required



One team



Complex implementation and maintenance



Reduced metadata quality



Metadata freshness

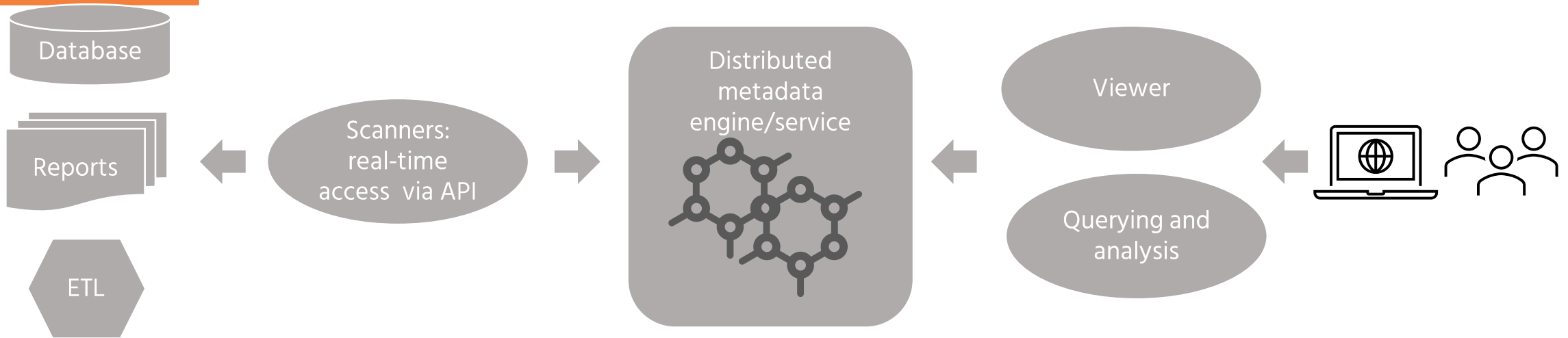


Metadata pipeline fragility



“Passive” metadata management

# Distributed Metadata Systems Architecture Has Advantages and Disadvantages



Efficient access to metadata



Increased productivity



Good metadata quality



Programmatic use cases enabled



Dependent on source systems availability



Inability to capture additional metadata



No change log

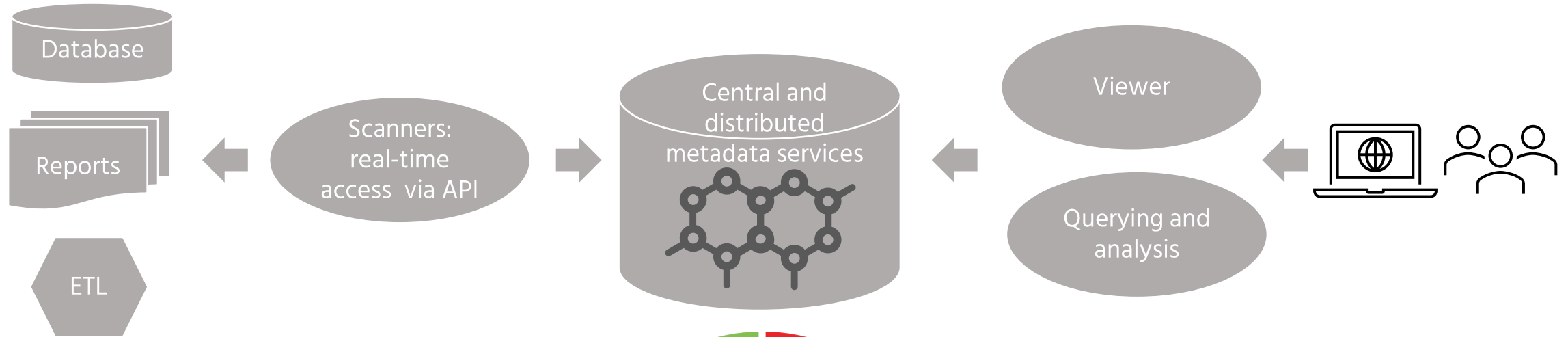


Problems with centralized teams



“Active” metadata management

# Hybrid Metadata Systems Architecture Has Advantages and Disadvantages



Efficient access to metadata



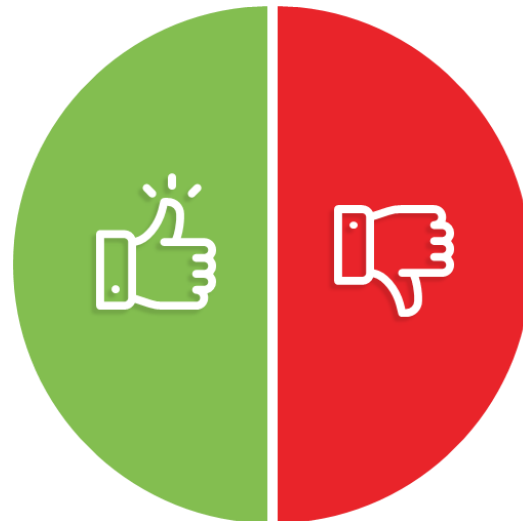
Increased productivity



Good metadata quality



Enhanced performance

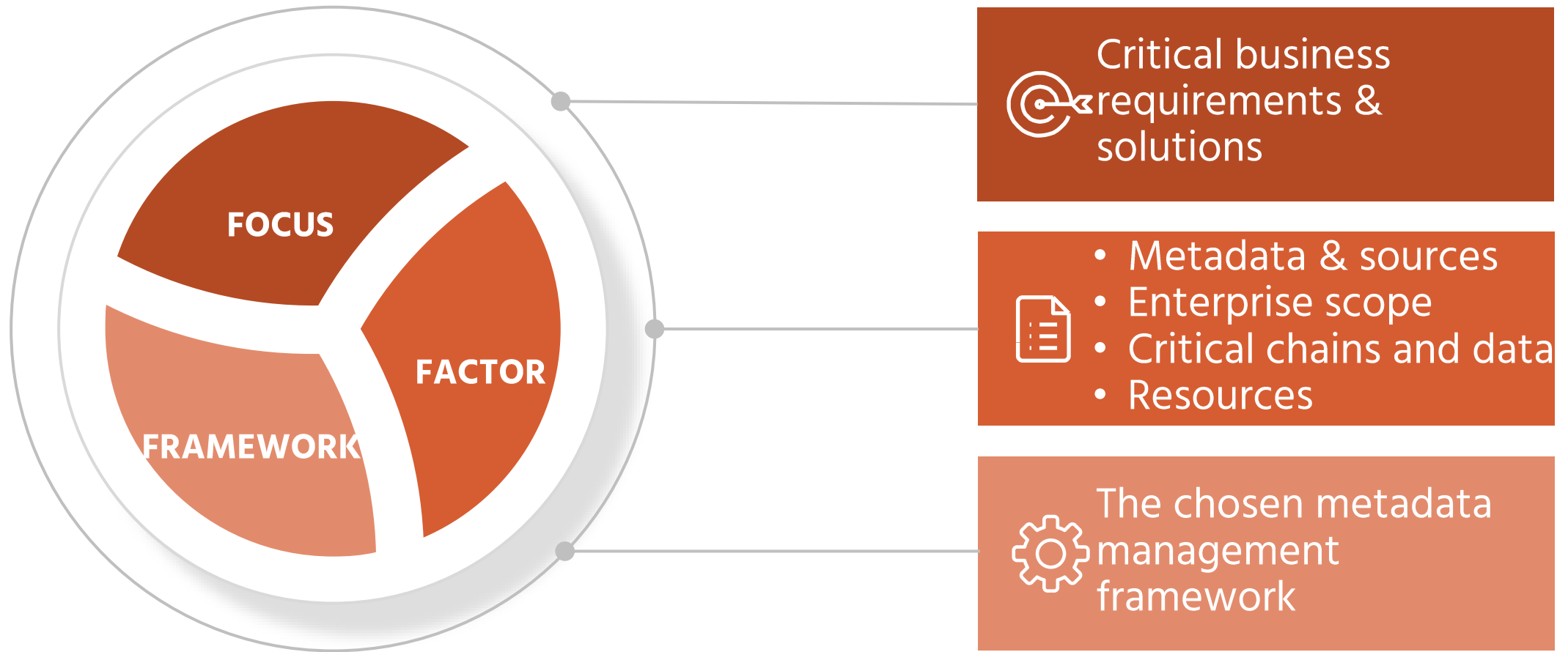


Dependent on source systems availability



“Passive” and “active” metadata management

# 3-F. Feasibility Formula Limits the Scope to a Realizable Minimum



# A Business Case for Metadata Management Should Include the Following:



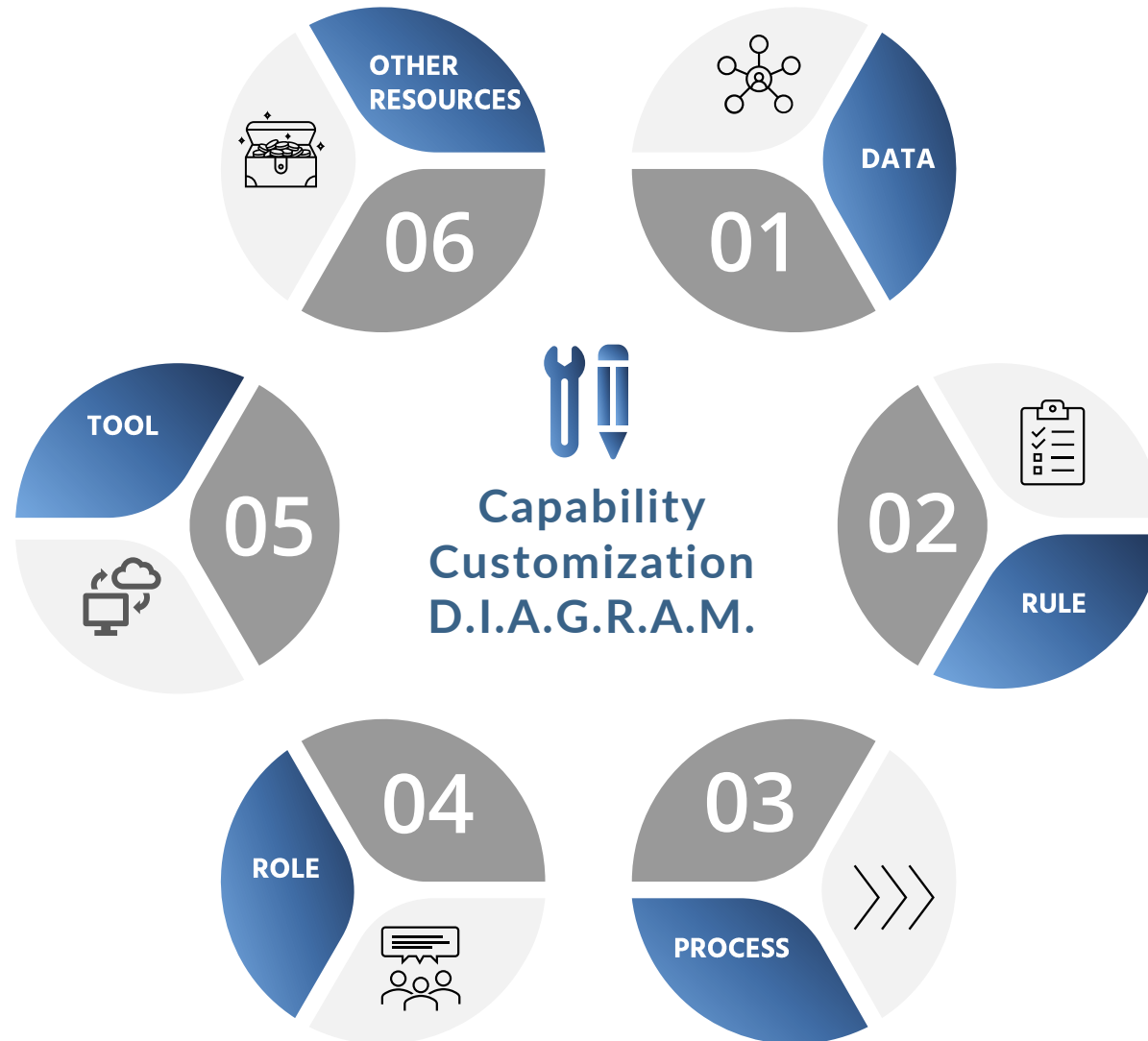
- 1** ✓ **Key Concepts and Terminology**  
The O.R.A.N.G.E. Terminology
- 2** ✓ **Business Drivers**  
Strategic S.C.O.P.E. Formula
- 3** ✓ **Sponsors and Stakeholders**  
Strategic S.C.O.P.E. Formula
- 4** ✓ **Scope of an Initiative**  
Strategic S.C.O.P.E. Formula
- 5** ✓ **(Meta) Data M./G. Framework**  
Capability Customization D.I.A.G.R.A.M.
- 6** **Situational Analysis**
- 7** **Implementation Approach & IT Tools**
- 8** **Initiative Roadmap**
- 9** **Established Program/Project/BaU**

# Schedule

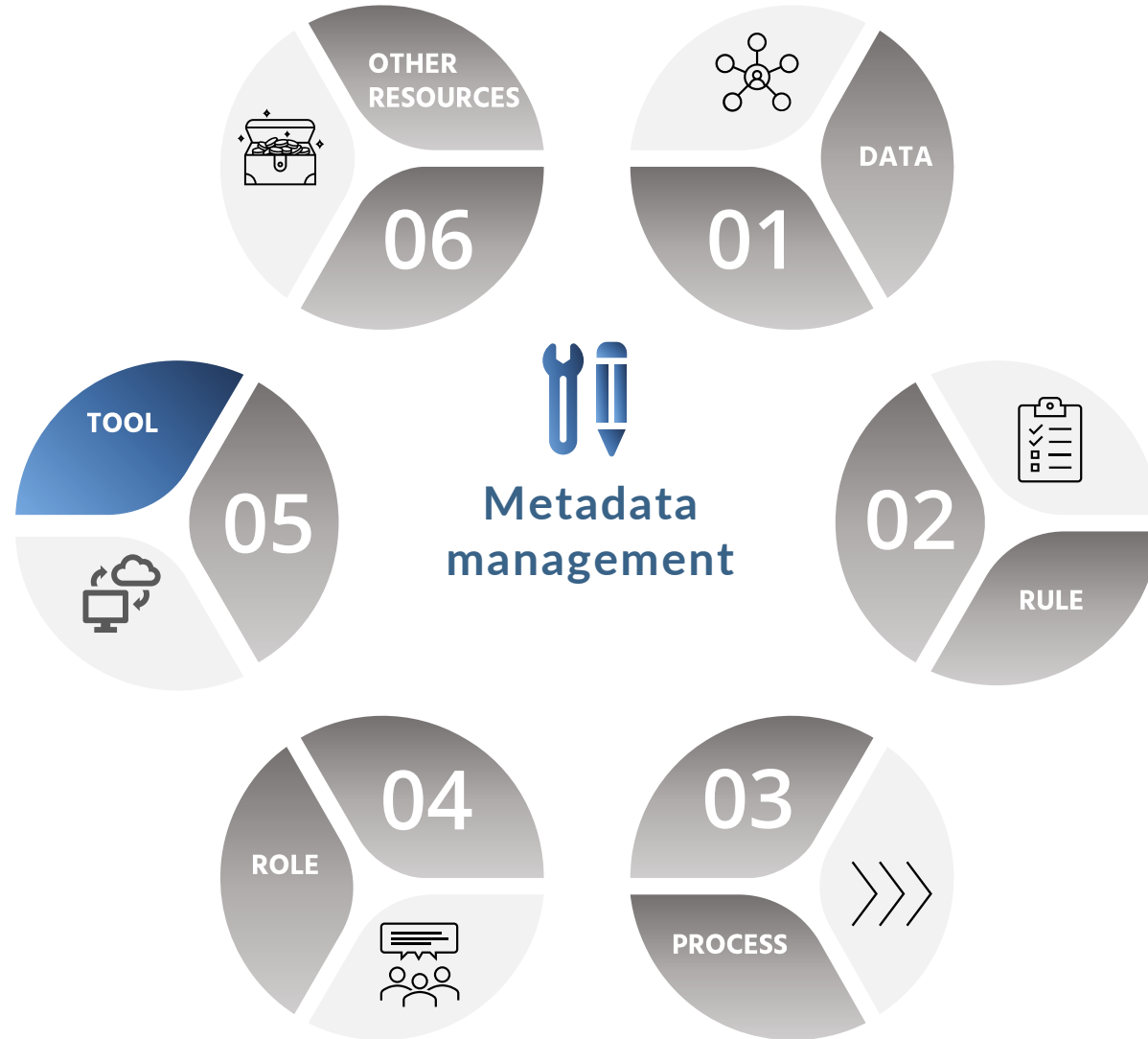
Time, CET	Topic	Presentation slides	Exercise	Templates
14.00-14.15	Introduction	1-11		
14.15-14.30	Key concepts and terminology	12-28		
14.30-14.45	Define business drivers	29-39	Exercise 1	Template 1
14.45-15.00	Identify sponsors and stakeholders	40-49	Exercise 2	Template 2
15.00-16.45	Scope an initiative (including break)	50-166	Exercises 3,4	Templates 3,4
16.45-16.50	Define the (meta)data management framework	167-171		
16.50-16.55	Perform a situational analysis	172-177	Exercise 5	Template 5
16.55-17.00	Develop an implementation approach	178-187		
17.00-17.10	Draft the initiative roadmap	188-193		
17.10-17.15	Establish a program/project/BaU processes	194-197		
	Template	198-203		



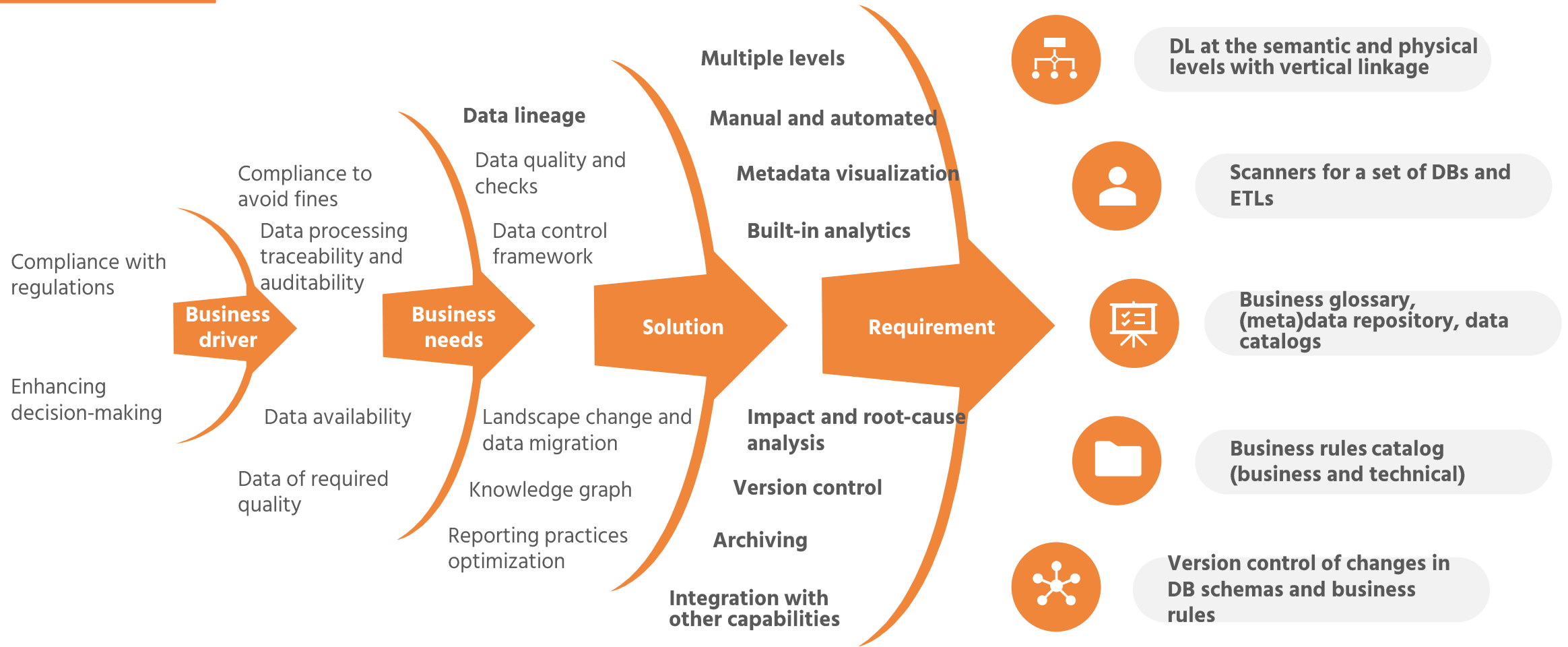
# Each (Meta)data Management Capability Consists of Six Components



# Each (Meta)data Management Capability Consists of Six Components



# Solutions Must Be Translated into Requirements and IT Tools Functionalities



# A Business Case for Metadata Management Should Include the Following:



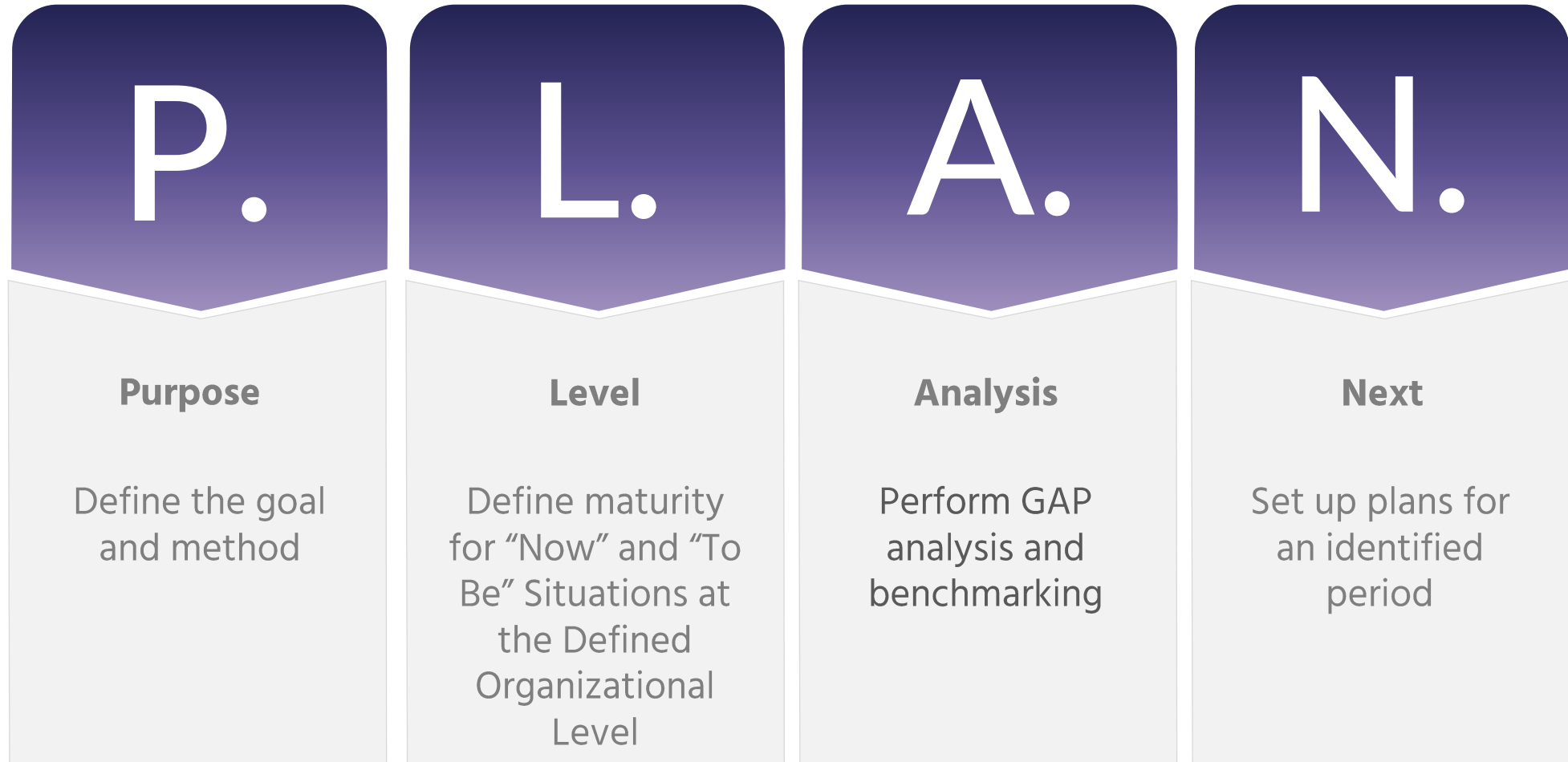
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- 8** **Initiative Roadmap**
- 9** **Established Program/Project/BaU**

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	Template	198-203		



# Measuring Maturity is a Tool to Define Plans for Further Development:



# XYZ Company, Example: Data Management Preliminary Maturity Assessment

Capability	Current maturity level	Currently performed by	Targeted period	Desired maturity level	To be performed by
Business architecture	Ad-hoc	NA	1 year	Coordinated	Data governance
Data governance	Emerged	NA	1 year	Coordinated	Enterprise architecture
Data modeling	Emerged	IT department	1 year	Optimized	Enterprise architecture
Information systems architecture	Coordinated	IT department	1 year	Optimized	Enterprise architecture
Data security	Optimized	IT department	1 year	Optimized	IT department
Data quality	Emerged	NA	1 year	Coordinated	Enterprise architecture
Data analytics	Coordinated	Enterprise architecture	1 year	Optimized	Enterprise architecture
Data lifecycle management	Optimized	IT department	1 year	Optimized	EA and IT

Ad-hoc

Emerged

Coordinated

Established

Optimized



# XYZ Company, Example: Metadata Management Preliminary Maturity Assessment

Capability	Current maturity level	Currently performed by	Targeted period	Desired maturity level	To be performed by
Metadata governance	Ad-hoc	NA	1 year	Coordinated	Enterprise architecture
Metadata modeling	Ad-hoc	IT department	1 year	Coordinated	Enterprise architecture
Metadata architecture	Emerging	IT department	1 year	Established	Enterprise architecture
Metadata security	Coordinated	IT department	1 year	Established	IT department
Metadata quality	Emerging	NA	1 year	Coordinated	Enterprise architecture
Metadata analytics	Coordinated	IT department	1 year	Established	Enterprise architecture
Metadata lifecycle management	Coordinated	IT department	1 year	Optimized	EA and IT

Ad-hoc

Emerging

Coordinated

Established

Optimized



# Exercise 5: Perform a Preliminary Maturity Assessment

---

1. Use Template 5: A Capability Preliminary Maturity Assessment
2. Assess the current and target maturity levels of required data and metadata capabilities
3. Present results

Time: 10 minutes



# A Business Case for Metadata Management Should Include the Following:



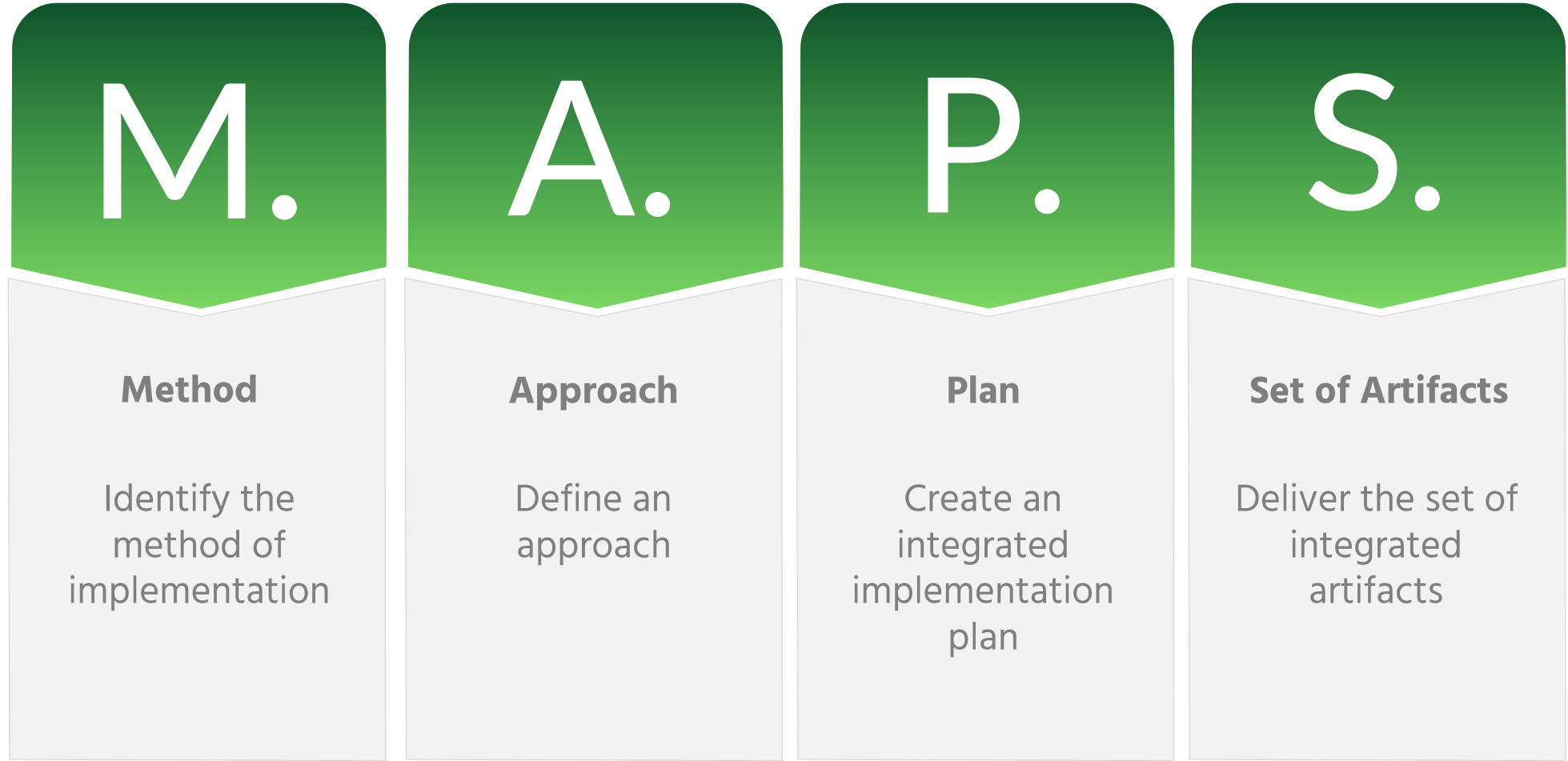
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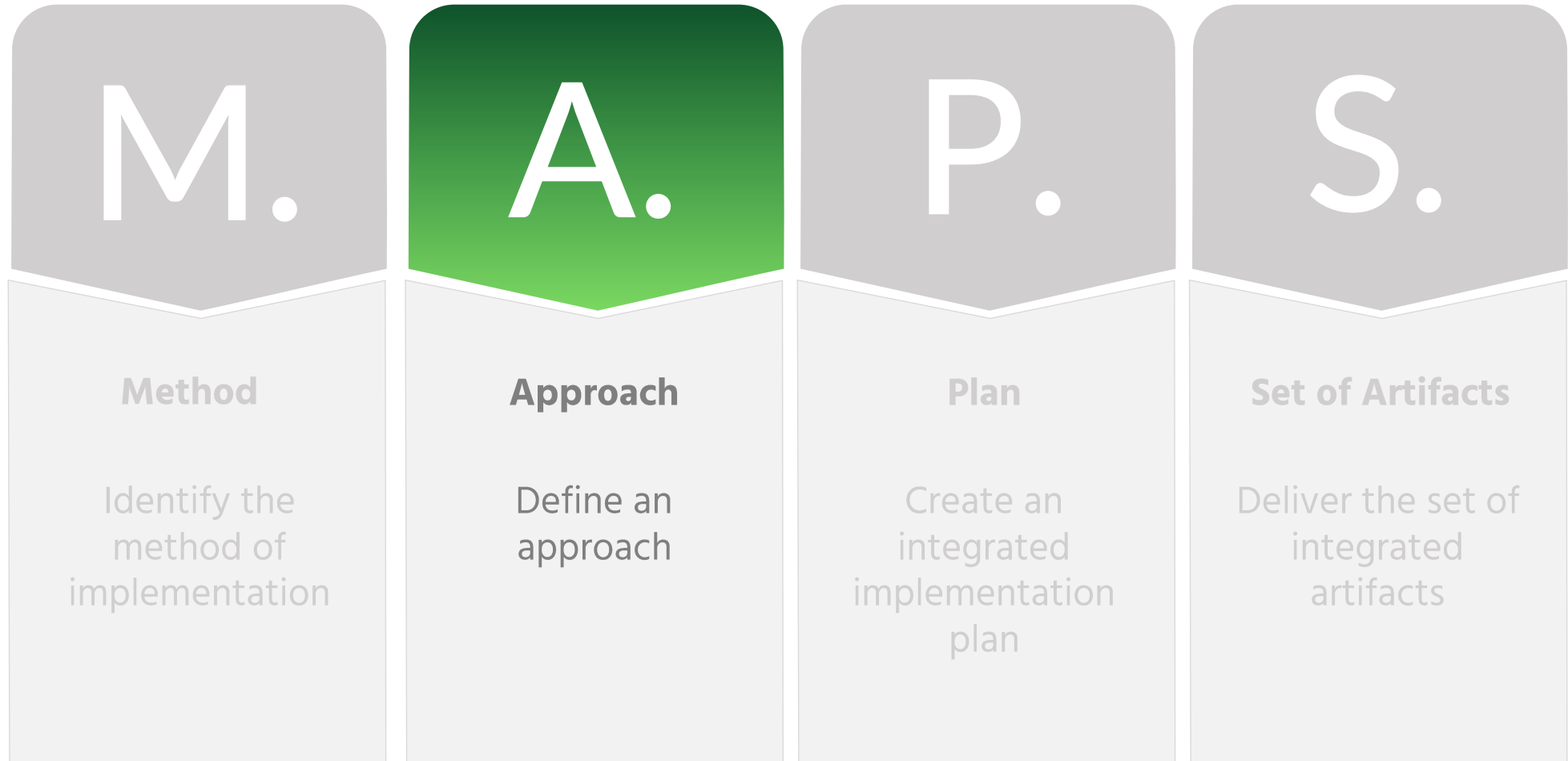
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# Any (Meta)Data Initiative Requires a Roadmap and Integrated Implementation Plan



# Any (Meta)Data Initiative Requires an Integrated Implementation Plan:



# A Centralized Approach Has Its Advantages and Disadvantages

## Central DM function

- Standardized approach, incl. policies, models, tools
- Control function

## Local DM functions

- Implementation

Resource optimization



(Meta)data artifacts produced at different parts of an organization can be easily linked



Time-consuming



Dependencies on a vendor

# A Decentralized Approach Has Its Advantages and Disadvantages

## Central DM function

- Advisory and observer role

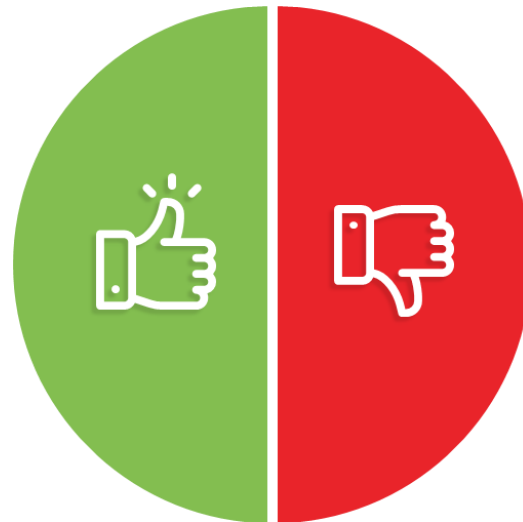
## Local DM functions

- Local approach, incl. policies, models, tools
- Implementation

Shorter time delivery



(Reduced dependency on a vendor



Lack on a complete overview of metadata artifacts across the organization

# A Hybrid Approach Has Its Advantages and Disadvantages

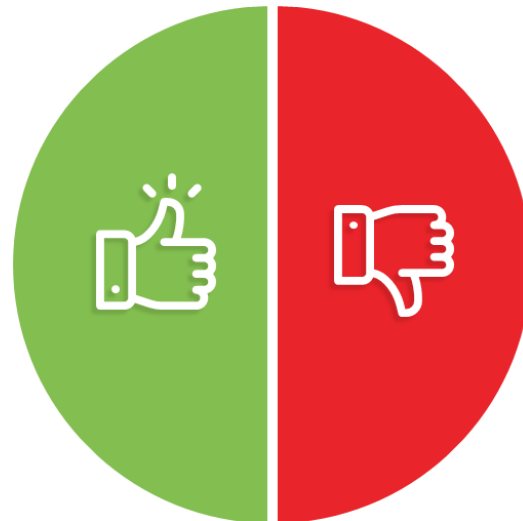
## Central DM function

- Policies and standards
- Coordination role

## Local DM functions

- Local approach, incl. solutions and implementations

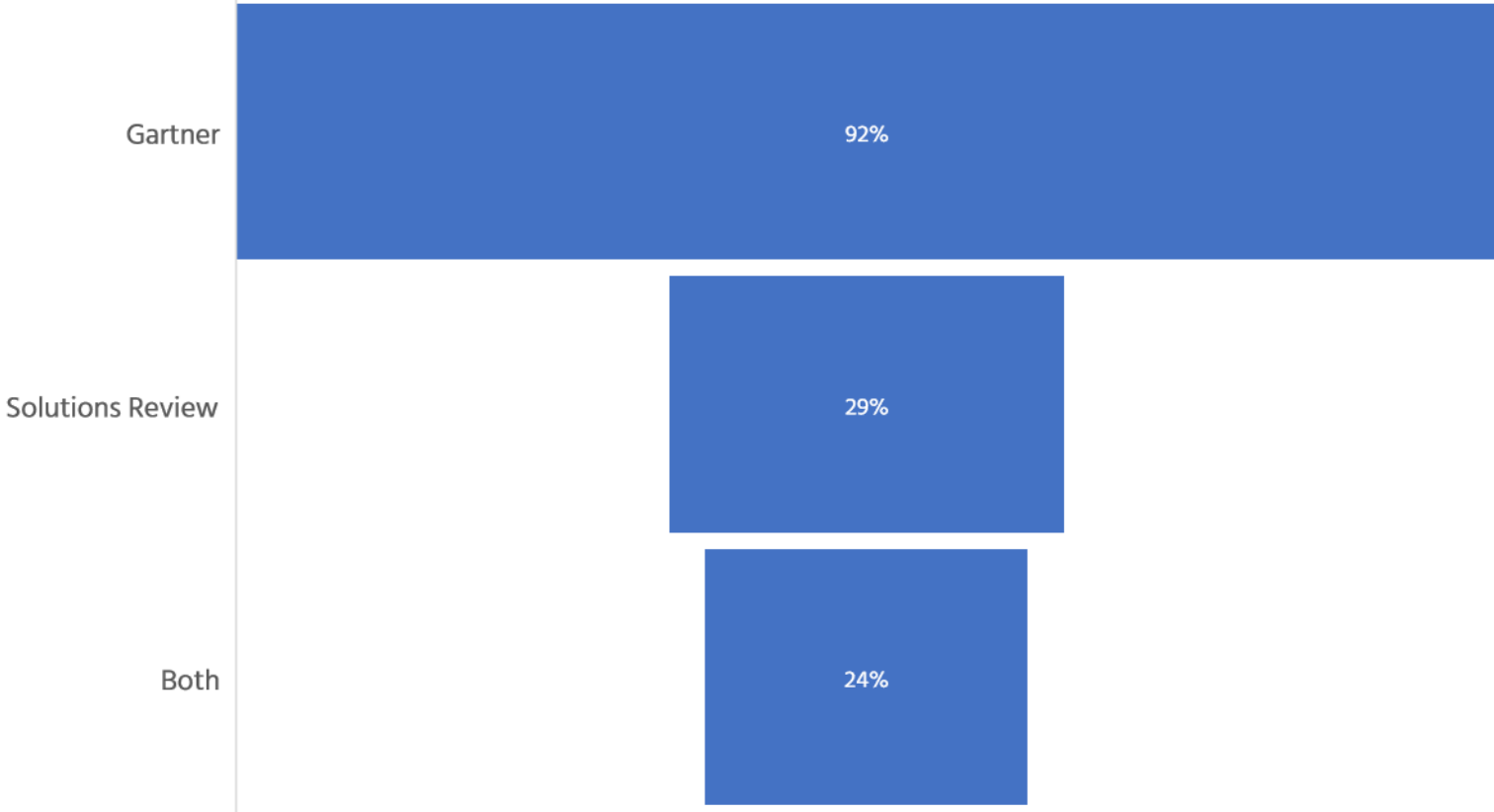
Case-by-case analysis



Case-by-case analysis

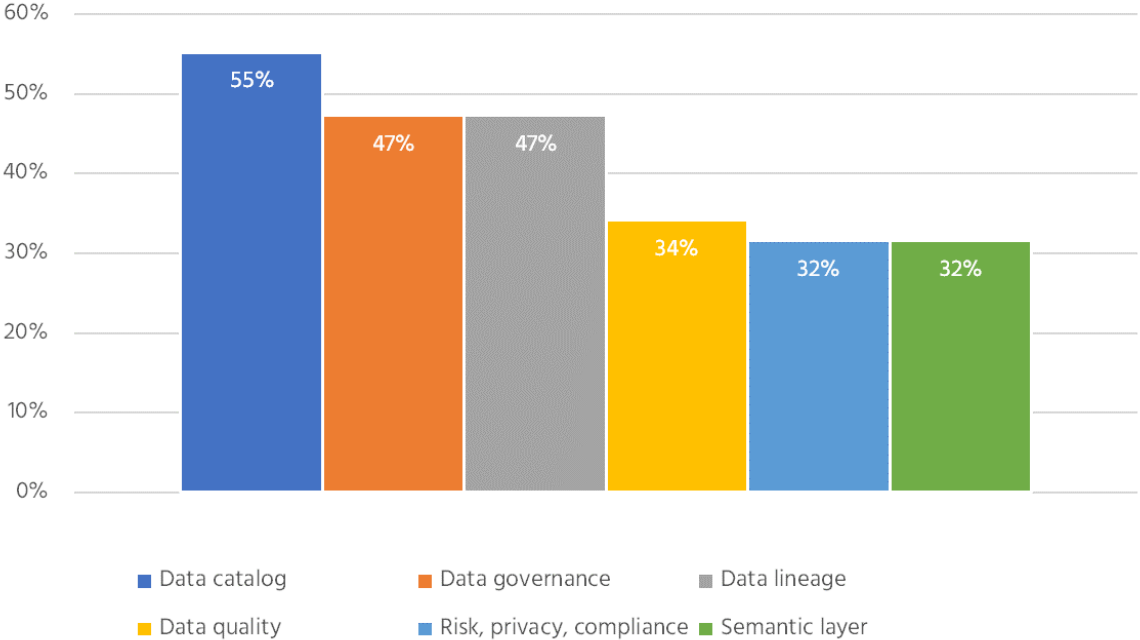
# The Analysis of Metadata Management Tools in 2024 Included 38 Solutions

METADATA SOLUTIONS RECOMMENDED BY A SOURCE

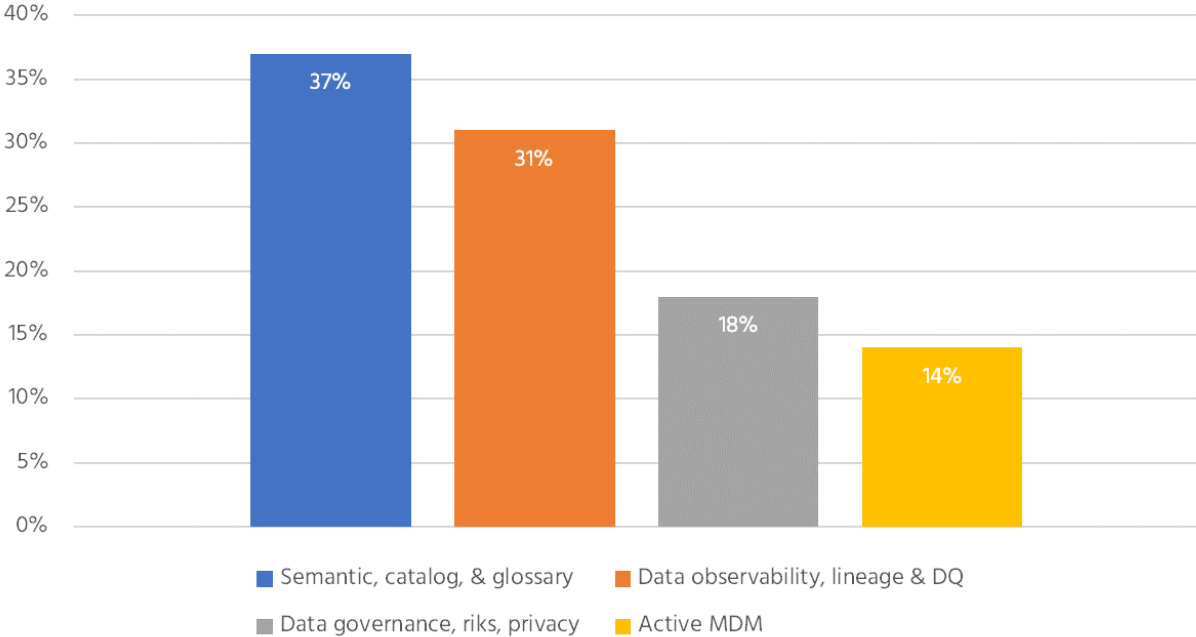


# 38 Solutions Offered 42 Different Functionalities, from Which the Most Common and Demanded Are:

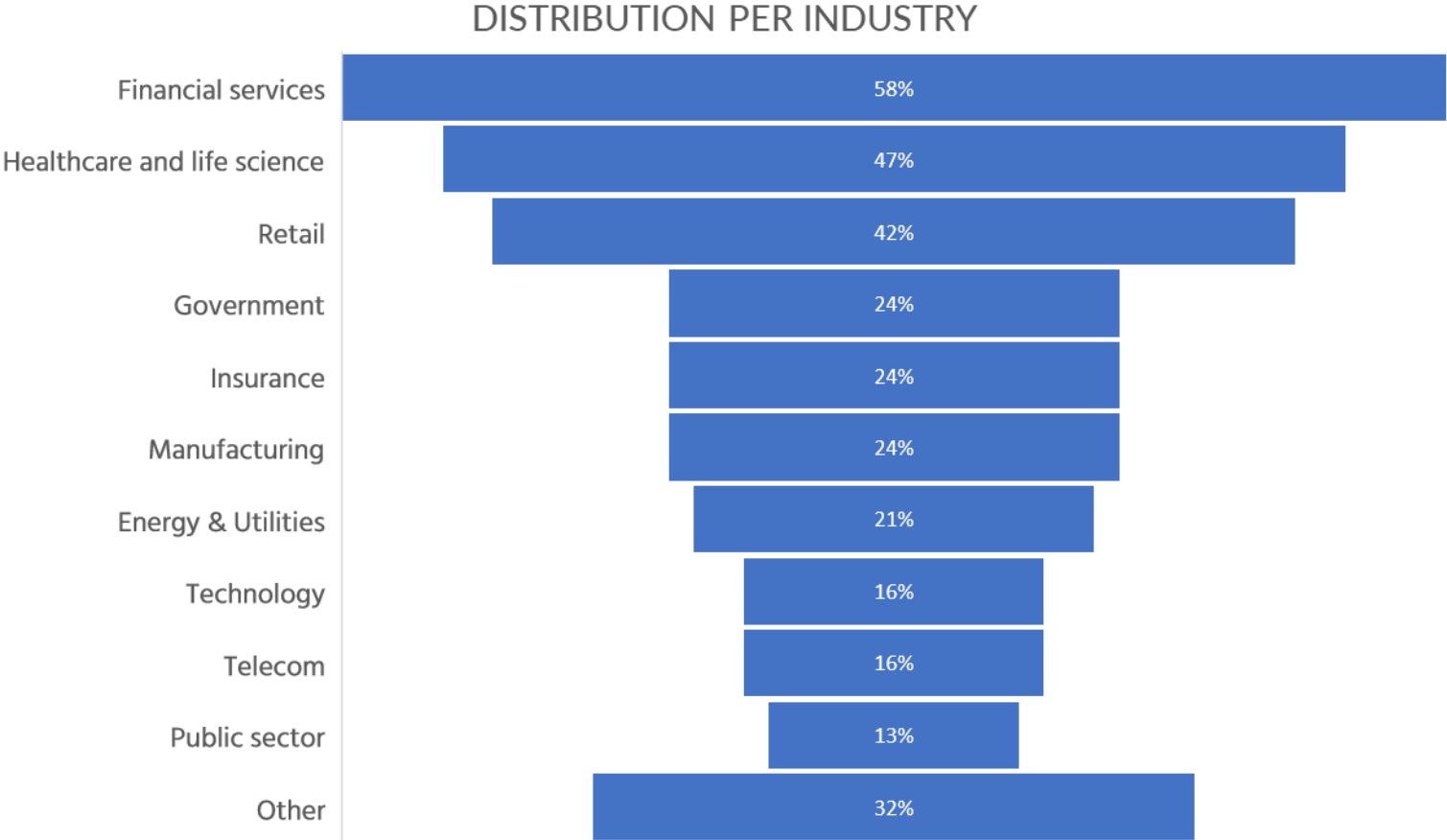
THE MOST COMMON FUNCTIONALITIES



THE MOST REQUIRED FUNCTIONALITIES



# The Following Industries Implement Metadata Solutions



# A Business Case for Metadata Management Should Include the Following:



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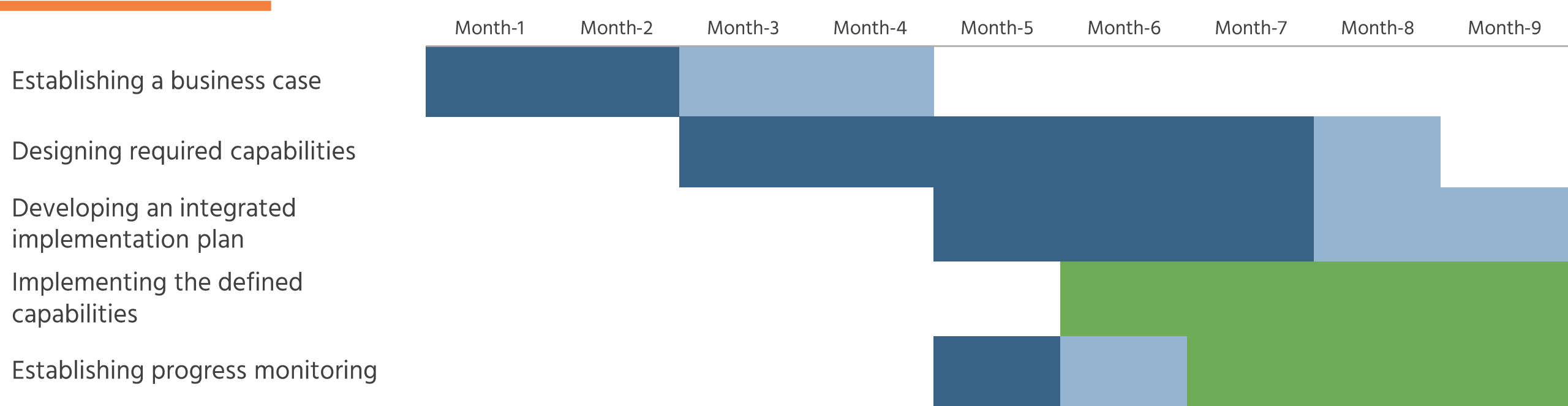
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	Templates	198+203		



# A Feasible Scope is a Key Factor of a (Meta)Data Initiative Success



# A Business Case for Metadata Management Must Include Design and Implementation Phases



Design: minimum duration

Design: maximum duration

Implementation



# XYZ Company, Example: Detailed Implementation Plan

Capability	Action and deliverable	1	2	3	4	5	6	7	8	9	Accountable	Responsible		
Data governance	1. Map required data management capabilities, processes, deliverables, and roles	█										CDO	CDO Office	
ISA	2. Document and analyze reports	█										Business DS	DM stewards	
Data modeling	3. Identify information requirements	█										Business DS	DM stewards	
Data modeling	4. Identify critical reports and information elements			█								Business DS	DM stewards	
Metadata management	5. Define the scope of metadata to document	█										CDO	DM stewards	
Data modeling	6. Design a business glossary		█									Business DS	DM stewards	
Business modeling	7. Design business models		█									Chief Architect	DM stewards	
Business modeling	8. Document business processes		█									Business DS	Business DS	
Data modeling	9. Design data models			█									Chief Architect	DM stewards
ISA	10. Document data and application flows			█								Chief Architect	DM and Technical stewards	
Metadata management	11. Document data lineage					█						CDO	Technical stewards	



# XYZ Company, Example: Detailed Implementation Plan

Capability	Action and deliverable	1	2	3	4	5	6	7	8	9	Accountable	Responsible
Data modeling	12. Define data requirements										CDO	DM and Technical stewards
DQ	13. Gather information and data quality requirements										CDO	Business and DM Stewards
DQ	14. Perform data profiling and analysis										CDO	DM and Business Data Stewards
DQ	15. Identify and resolve data quality issues										Business Data Stewards	Business Data and DM Stewards
DQ	16. Build data quality checks and controls											



# A Business Case for Metadata Management Should Include the Following:



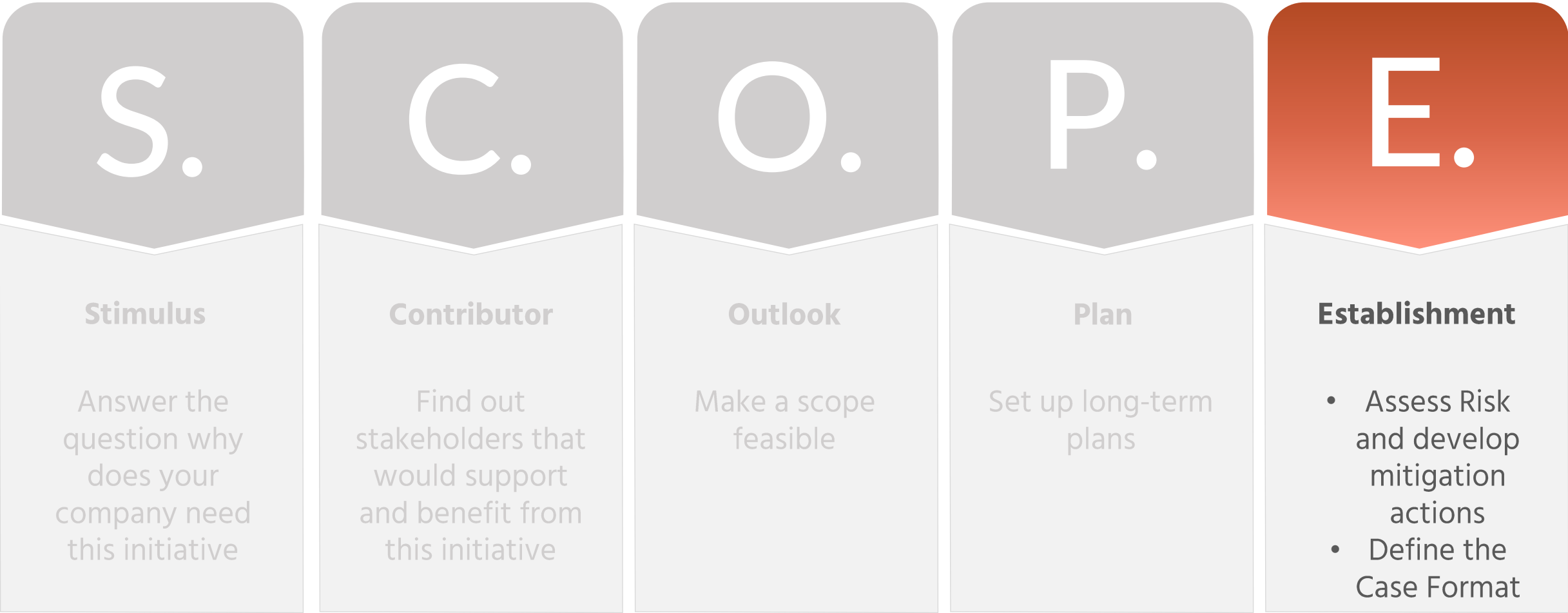
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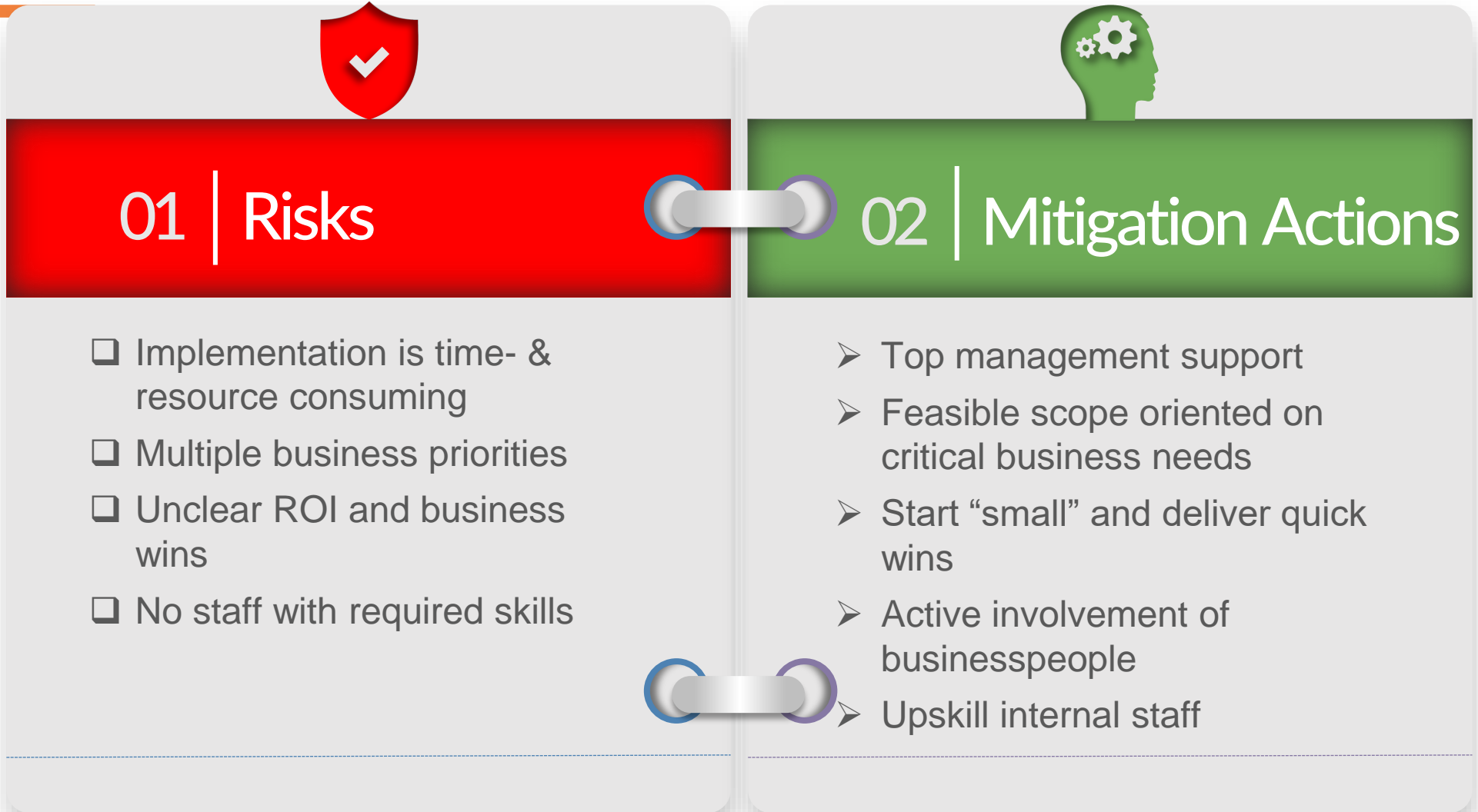
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# A Feasible Scope is a Key Factor of a (Meta)Data Initiative Success:



# Analyze Your Company's Risk Factors and Turn the Mitigation of these Risks into Success Factors



# Templates

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## List

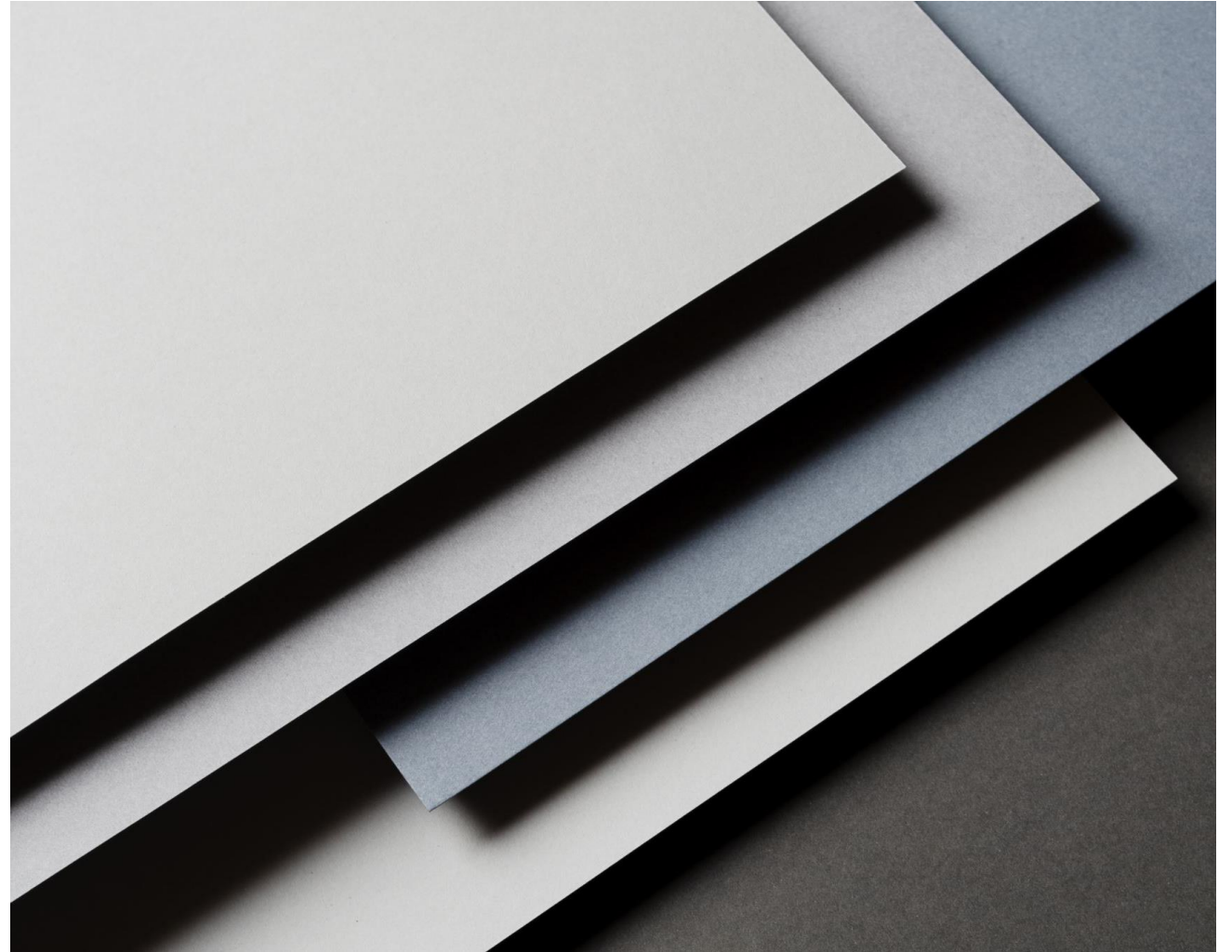
Template 1: Business Driver Prioritization

Template 2: Stakeholder Map

Template 3: Analysis of Required Metadata

Template 4: Scope of a DM Initiative

Template 5: A Capability Maturity Assessment



# Template 1: Business Driver Prioritization

Business driver	Benefits: 0 (low) – 10 (high)							Total score
	Increase revenue	Reduce cost	Reduce risk	Improve process	Business continuity	Improve efficiency	Protect reputation	



# Template 2: Stakeholder Map

Stakeholder group	Stakeholder position	Business driver 1			Business driver 2		
		Concerns	Level of influence (Low, High)	Level of involvement (Low, High)	Concerns	Level of influence (Low, High)	Level of involvement (Low, High)





# Template 4: Scope of a Data Management Initiative

Factor	Business driver 1: Compliance	Business driver 2: Enhance decision-making	Scope (Yes/No)
Enterprise scope:			
Critical data			
Data chains (IT assets)			No



# Template 5: A Capability Maturity Assessment

Capability	Current maturity level	Currently performed by	Targeted period	Desired maturity level	To be performed by
Business architecture					
Data governance					
Data modeling					
Information systems architecture					
Data security					
Data quality					
Data analytics					
Data lifecycle management					
Metadata architecture					
Metadata modeling					
Data lineage					

Ad-hoc

Emerged

Coordinated

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Optimized





# THANK YOU!

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Do you have any questions?  
Get in touch with us at

**DATACROSSROADS.NL**

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Or let's connect on LinkedIn:

[www.linkedin.com/in/irina-steenbeek](http://www.linkedin.com/in/irina-steenbeek)



# DATA GOVERNANCE AND MASTER DATA MANAGEMENT CONFERENCE EUROPE

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