DATA GOVERNANCE AND MASTER DATA MANAGEMENT CONFERENCE EUROPE

11 - 14 March 2024 |London, UK

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Best Practices of MDM Implementations

Master Data Management and Data Governance Conference Europe,
11-14 March 2024, London

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Zoran Novaković, Data Governance Director

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Journey for today

1. DG and Master Data Management
2. Architecture and implementation approaches
3. MDM Business goals implementation styles
4. Steps to implement MDM
5. Case study

A few words about us

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Introduce yourself

- Name
- Company
- Current position
- Experience with MDM
- What are your expectations from this workshop?

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FEW DEFINITIONS

Data Governance and Master Data Management

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Data Governance as a methodology for defining:

- DG organization – governance team, steering committee, data stewards
- standards and policies for governing data
- implementation and enforcement procedures

The **primary goals** of Data Governance are to ensure **data quality**, **security**, **compliance**, and **effective management** while promoting a *data-centric culture* within the organization

- ***MDM in the service of achieving DG goals***

MASTER DATA MANAGEMENT

Master data management (MDM) is a technology-enabled discipline in which business and IT work together to ensure the uniformity, accuracy, stewardship, semantic consistency and accountability of the enterprise's official shared master data assets. Master data is the consistent and uniform set of identifiers and extended attributes that describes the core entities of the enterprise including customers, prospects, citizens, suppliers, sites, hierarchies and chart of accounts.

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MASTER DATA

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Master Data is a critical company asset used by multiple businesses, functions and users across one or many systems.

Data most critical to a company's **operations** and **analytics.**

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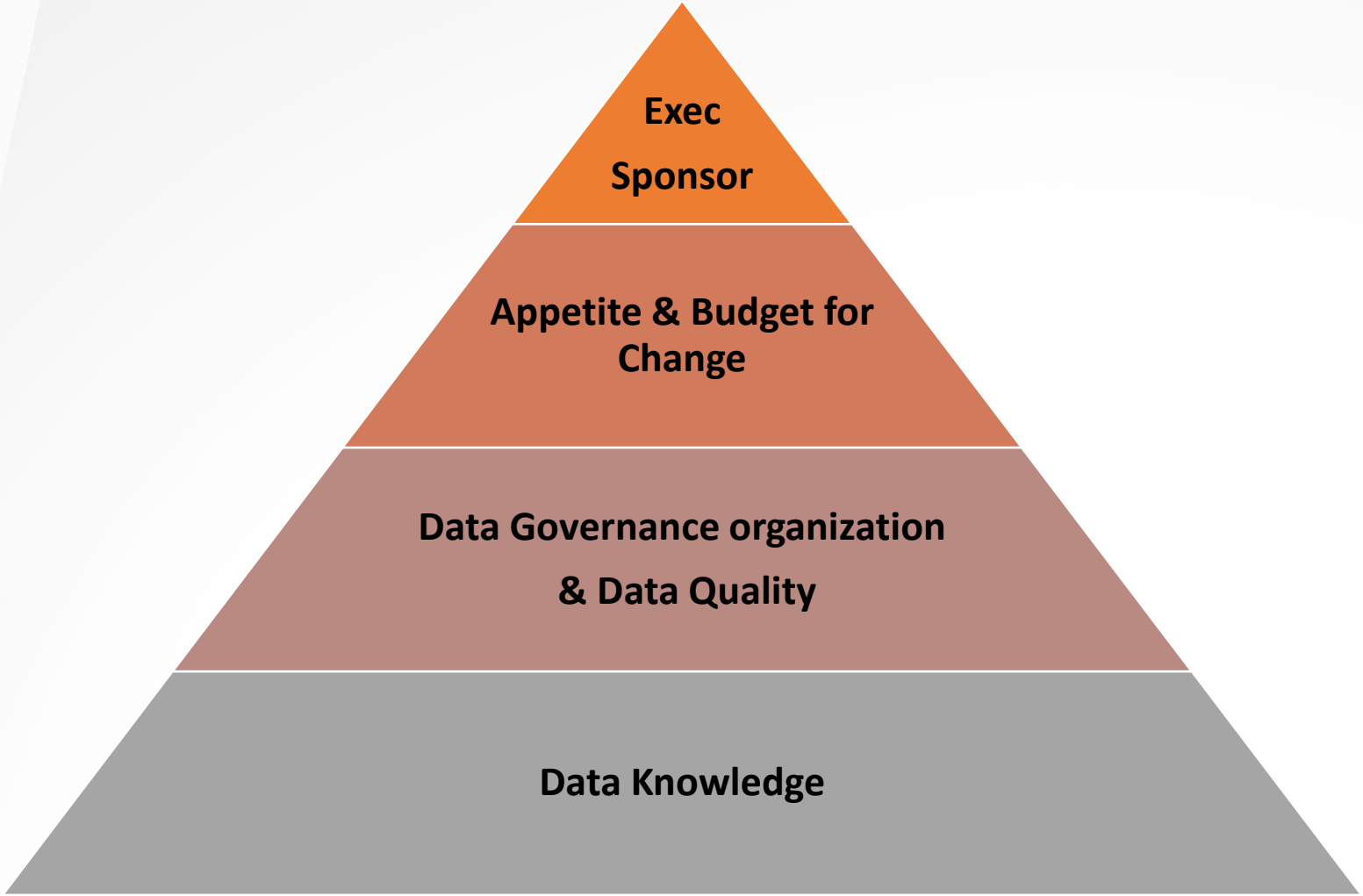
WHAT IS NEEDED TO MAKE MDM HAPPEN?

What is needed to make MDM happen?



DG WITHOUT MDM?

MDM WITHOUT DG?

Successful MDM implementation

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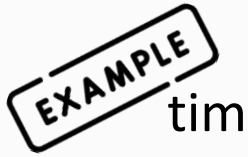
Data Governance Organization

- Defined responsibilities for key domains
- who, what, when and where



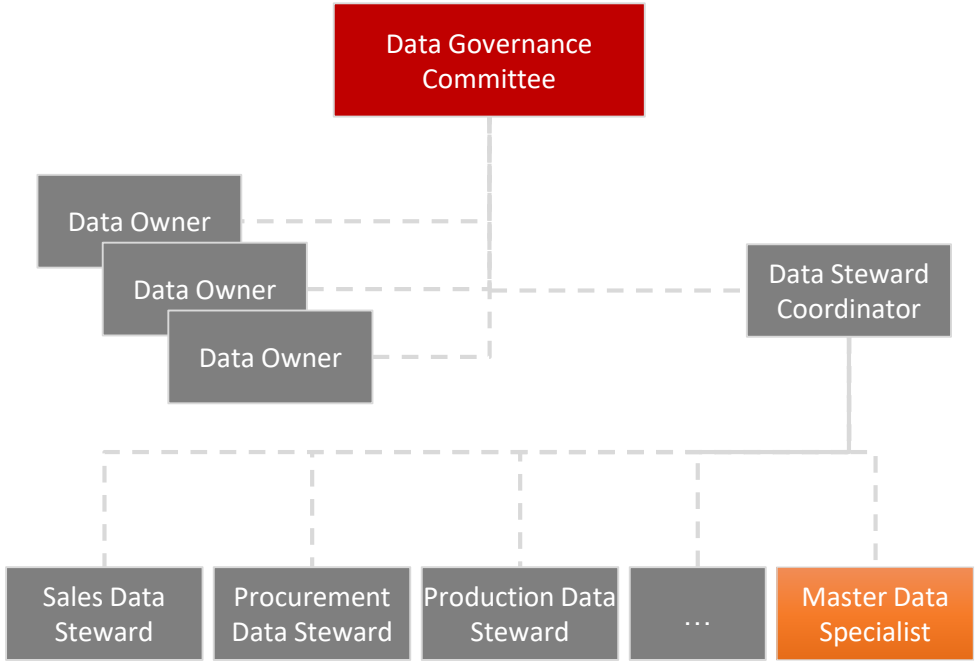
unclear responsibilities, which leads to the product not being created in ERP on time - causes product production to be delayed

Data Quality

- since Master Data is the heart of the business, quality is must
- do you trust your data?

the same product in different systems has different dimensions defined - causes problems with transportation

DG Organization



Data Governance Committee - ***Strategic***

- Process Owners, IT & Head of MDM
- Approving MDM Policy, Standards, Initiatives, Projects

Data Owner - ***Tactical***

- Responsible for Data Domain (e.g., Products, Materials, Customer...)
- Decision power, responsibility for Data Quality rules
- Reviews Data Quality KPIs

Data Steward Coordinator - ***Tactical***

- Contact in the functional area (SBU,SDU)
- Responsible for coordination of Master Data topics

Data Steward - ***Operational***

- Contact in the functional area, Subject Matter Expert
- Applying Master Data Procedures & Standards in every Function

Master Data Specialist - ***Operational***

- Executes standardized Master Data tasks
- Technical and methodological capabilities
- Part of Master Data Dedicated Team

Data Quality

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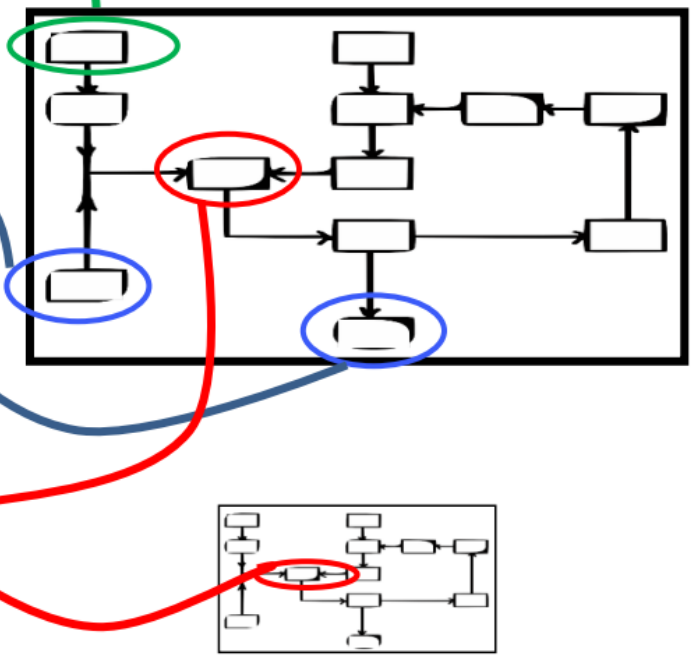
CONTROL

Data Entry Standardization:
Drop-down list of valid ISO country codes

Control Values:
Gross Weight >= Net Weight

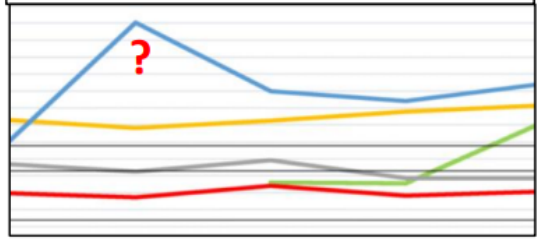
Dual Processing:
Result Process1 = Result Process2



ASSURANCE

Summary Monitoring

"Suspicion" Reports

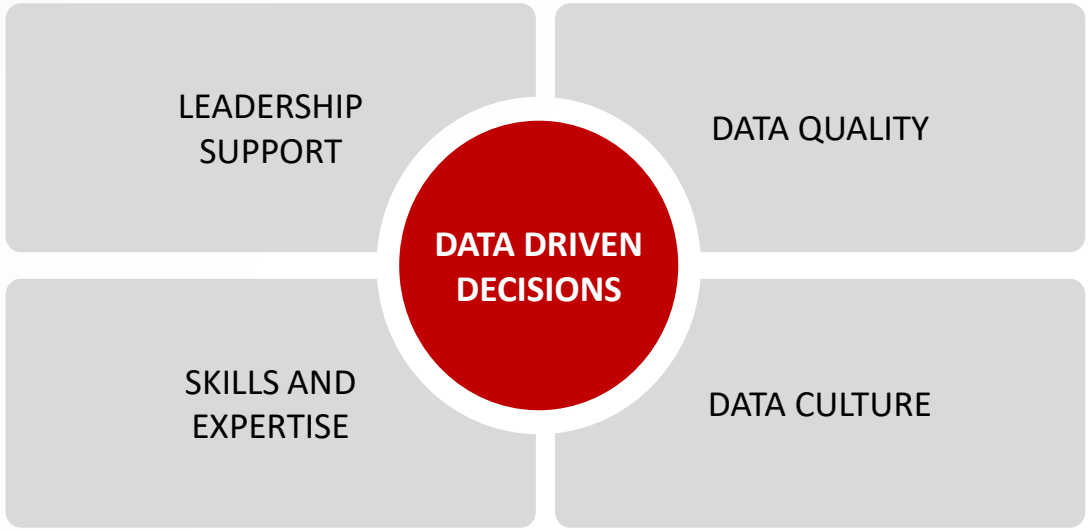


LET'S GET BACK TO

MDM

MDM as a discipline

- Relies on the principles of **Data Governance**
- **The goal** is to create a trusted and authoritative view of company's data
- **DG and MDM** have become critical to successful business practices



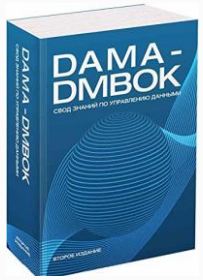
MDM as a technology

MDM solutions **automate** how business-critical data is **governed**, **managed**, and **shared** throughout applications used by lines of business, brands, departments, and organizations.

MDM applies:

- data integration,
- reconciliation,
- enrichment,
- quality,
- and governance to create master records.

Business Drivers



MEETING ORGANIZATIONAL DATA REQUIREMENTS

Multiple areas within an organization need **access to the same data sets**, with the confidence that the data sets are **complete**, **current**, and **consistent**.
Master Data often form the basis of these data.

MANAGING DATA QUALITY

Data inconsistencies, quality issues, and gaps, lead to **incorrect decisions** or **lost opportunities**; Master Data Management reduces these risks by enabling a consistent representation of the entities critical to the organization.

MANAGING THE COSTS OF DATA INTEGRATION

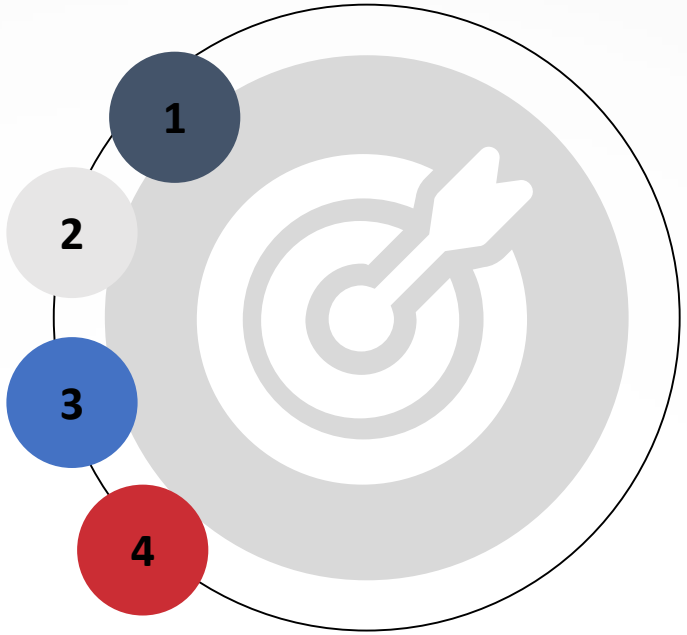
The cost of **integrating new data sources** into an already complex environment **are higher in the absence of Master Data**, which reduces variation in how critical entities are defined and identified.

REDUCING RISK

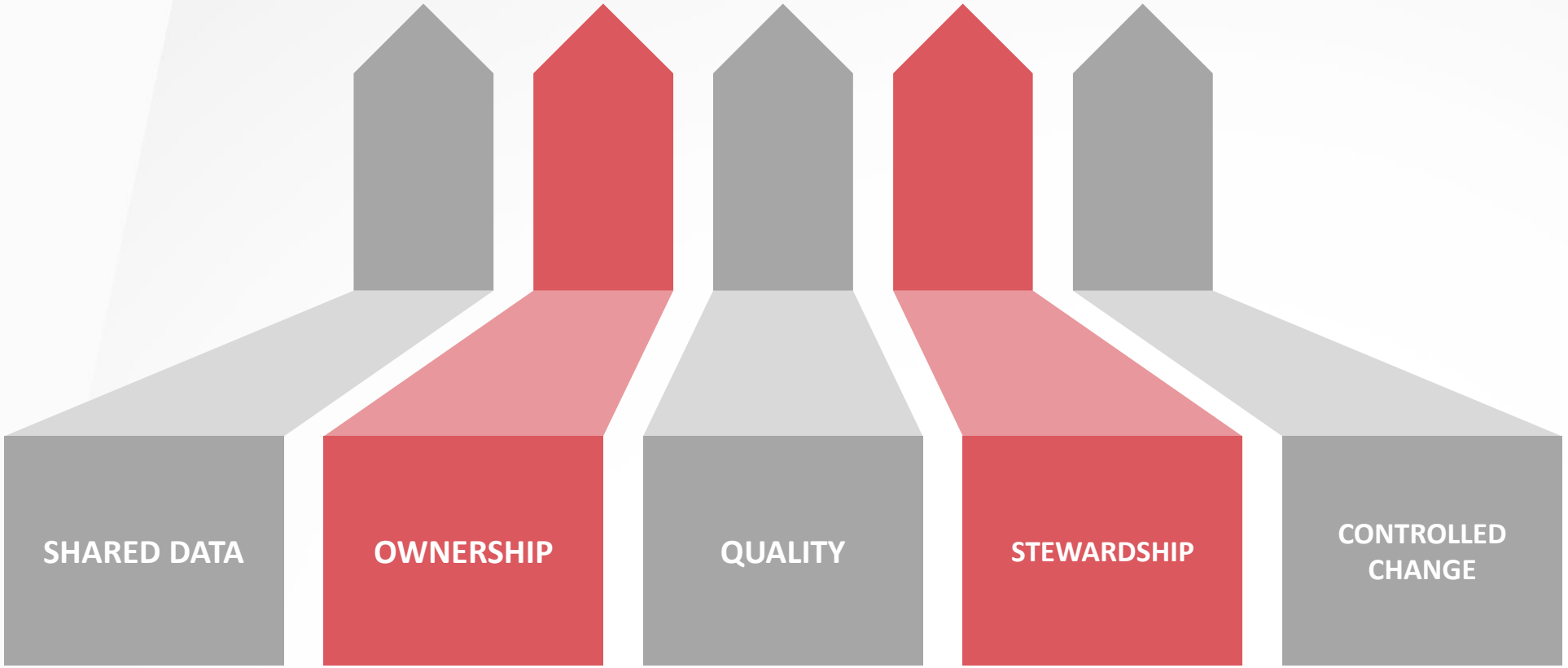
Master Data can enable **simplification of data sharing architecture** to **reduce costs** and **risk** associated with a complex environment.

Goals

- **Complete, consistent, current, authoritative** Master Data across organizational processes
- Enabling Master Data to be **shared across enterprise** functions and applications
- **Lowering the cost**
- **Reducing the complexity** of data usage and integration through standards, **common data models**, and integration patterns



Principles



IMPLEMENTATION APPROACHES

ARCHITECTURE

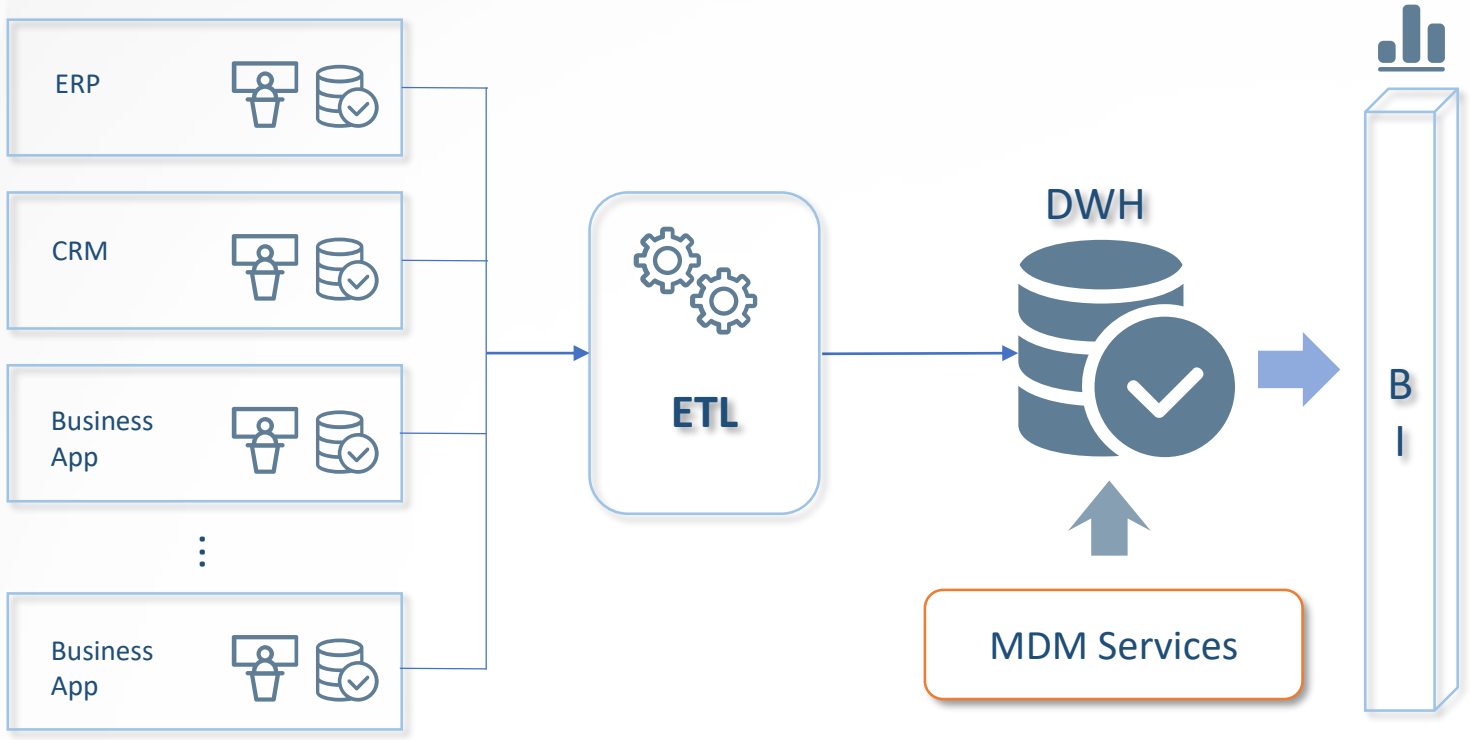
MDM Types

1. **Analytical MDM**: address BI
2. **Operational MDM**: address business operations
3. **Enterprise MDM**: address both BI and operations

Deciding which approach to implement is dependent on the business case.

Analytical MDM

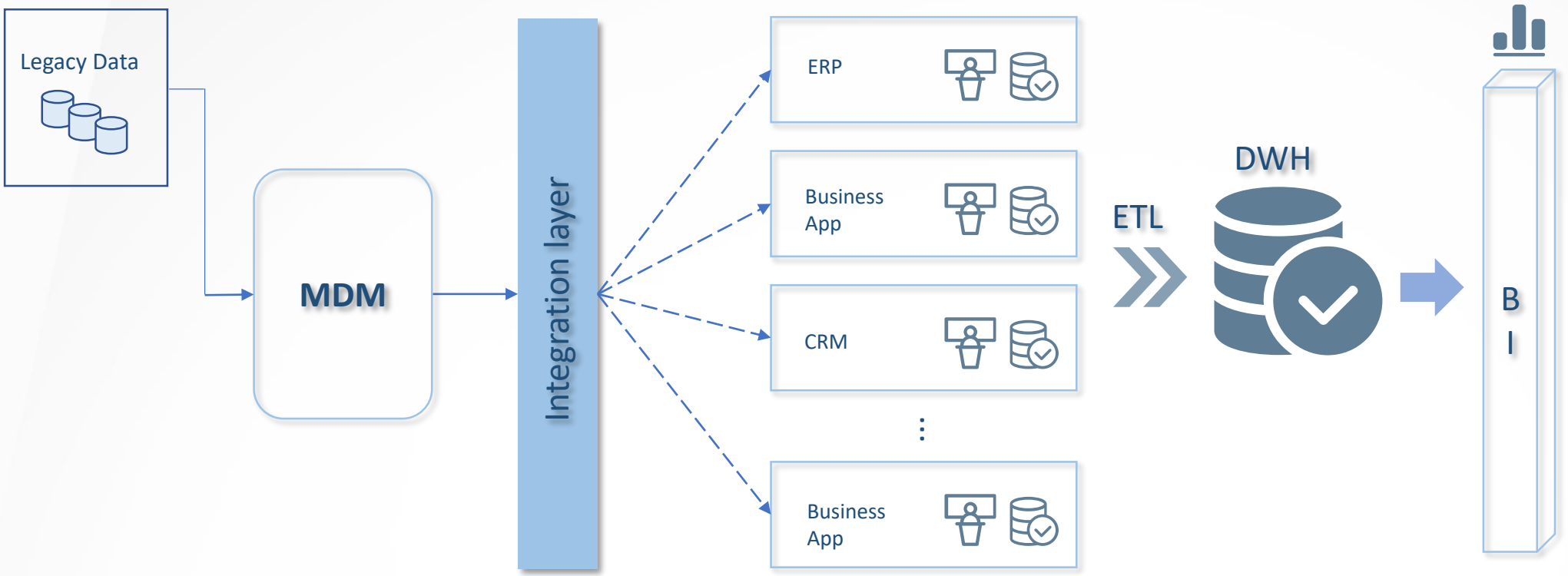
- The most commonly adopted MDM approach.
- Focused on providing clean, coordinated data for reporting and decision-support systems.



Operational MDM

- **Targets operational systems** and data
- **Opportunity to consolidate** many (all) disparate operational data systems across the company → aim to become a true system of reference
- Business process integration
- Massive infrastructure change
- Likely be **deployed in phases**
  - system by system
  - in portions of data (by data domains)
- **Date integration** component of MDM is **complex** → companies have a hard homework in **finding the best method for consolidating legacy data**
  - not only technical issue, it is also a business issue

MDM as a Central Repository

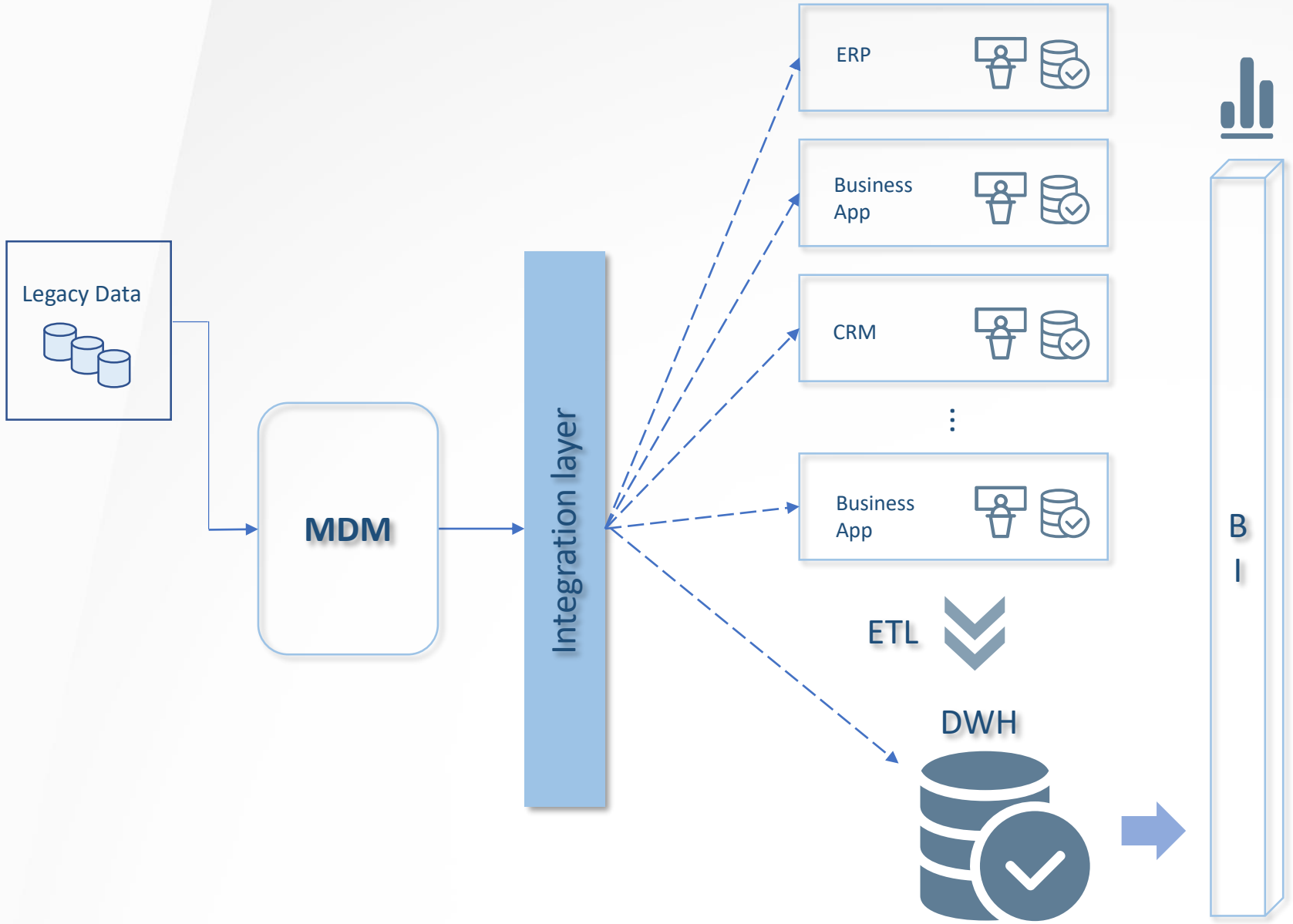


Enterprise MDM

- A combination of both operational and analytical MDMs
- It can be implemented by combining the architectures previously discussed.

- Data should be cleaner, standardized, and already consolidated.

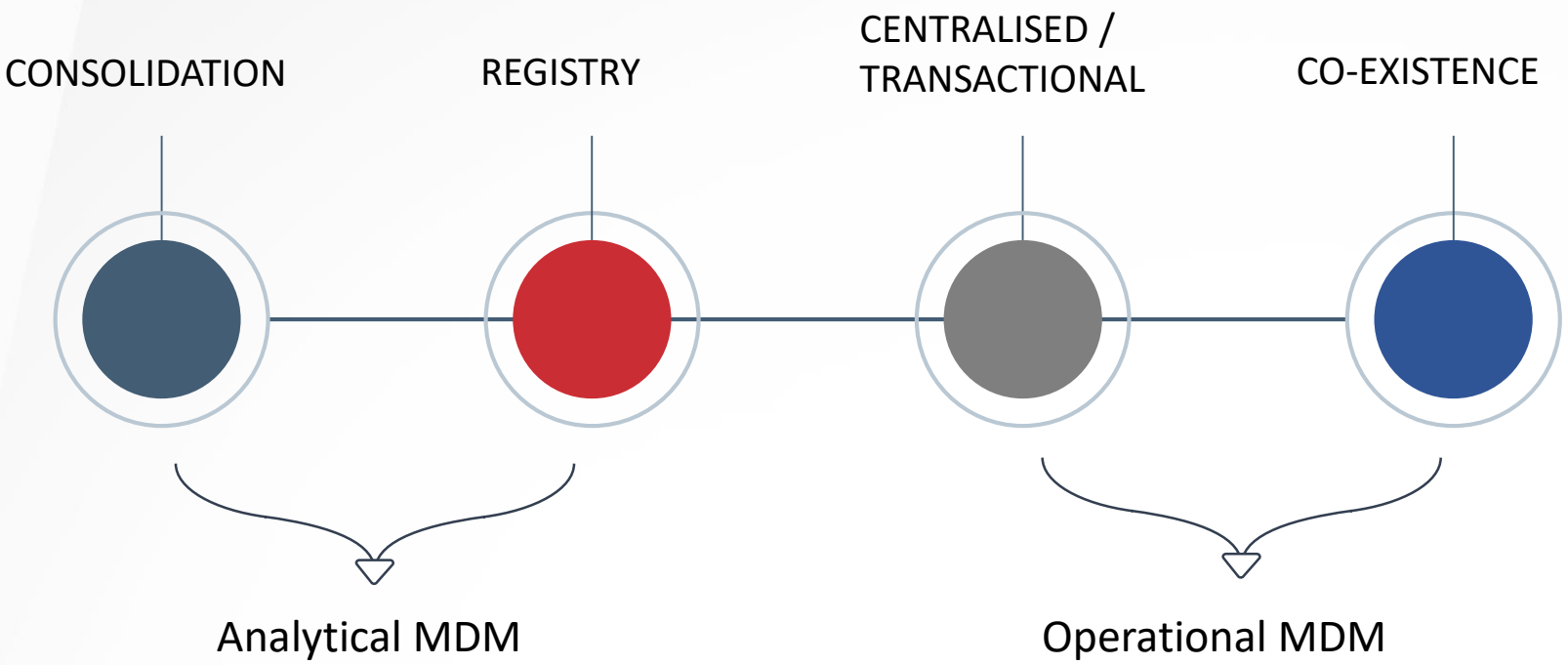
Enterprise MDM



IMPLEMENTATION

STYLES

Implementation styles

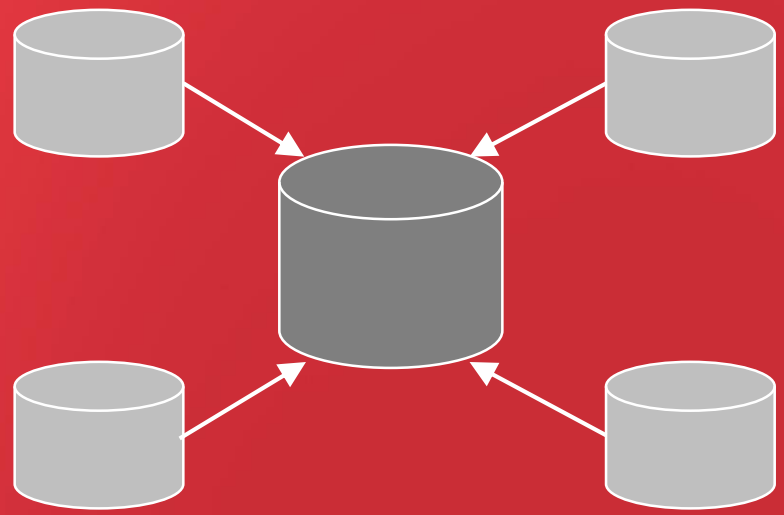


Consolidation

The master data is generally **consolidated from multiple sources** in the hub to create a single version of truth (the golden record).

- Used for reporting and reference.
- Any updates made to the master data are applied to the original sources.

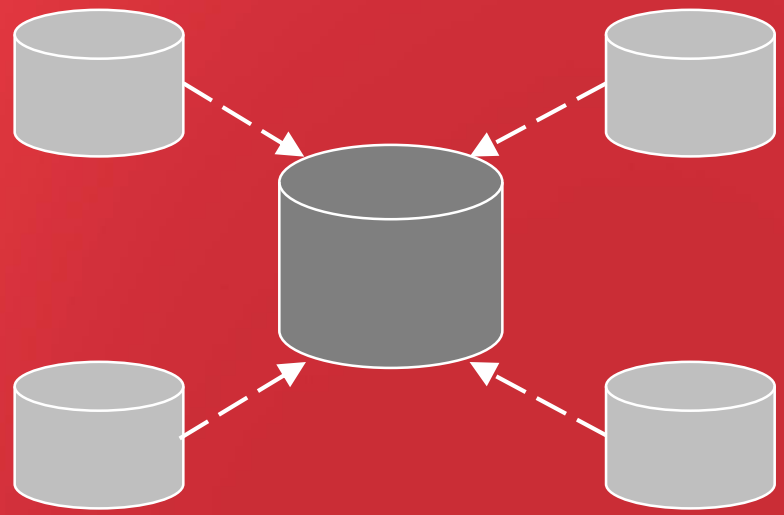
- No attempt to clean up source data.
- Suitable for any industry.



Registry

MDM hub **maintains only the minimum set of information necessary to identify data** related to an entity and locate it at the many original data sources.

- The hub maintains identity information and source system keys.
- **All other data relative** to a given entity **is kept at their sources** and it's not duplicate in the MDM hub.
- It is simply a **system of reference**. The hub does not directly update the data sources.

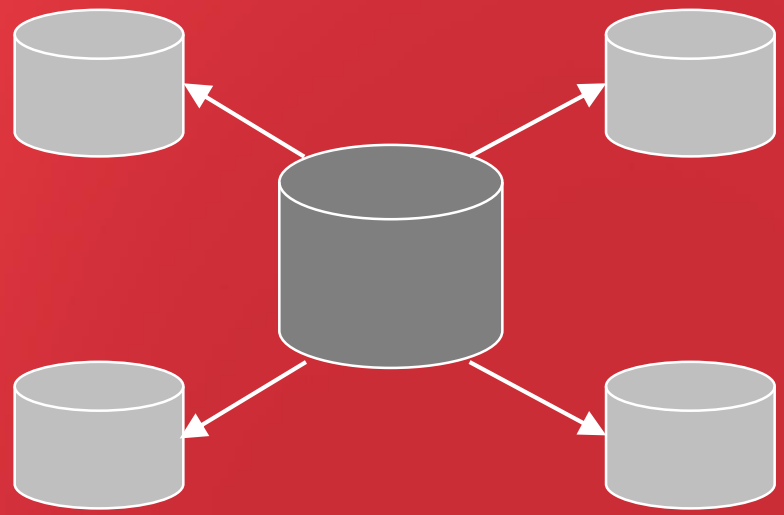


Centralised/Transactional

The hub becomes a **centralised single source of truth**, and it is used to publish master attributes to other application systems.

- MDM hub **physically stores all attributes of an entity.**

- This style is highly intrusive and typically the most expensive and time consuming to implement.



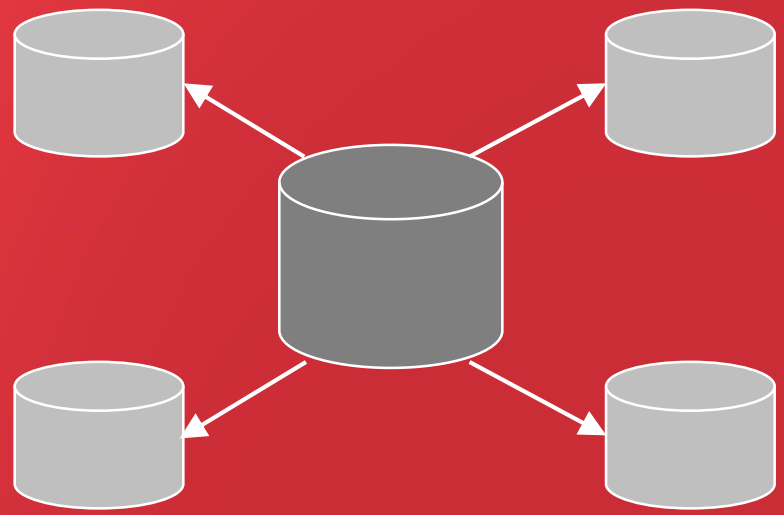
Centralised/Transactional

Challenges:

- **Architecture** - require massive changes to existing applications in order to access data from the hub instead of data that is maintained locally.
- **Data Model** – need to satisfy all consumers of the master data in the hub. A data model that encompasses all attributes needed by all applications or agree on a single model that can support very specific applications.

Advantages:

- **Data maintenance** - Data is created and maintained in a single location, which increases the ability to prevent potential data issues.
- **Data stewardship** – simpler, as there is a single location to manage information related to a domain and its entities.

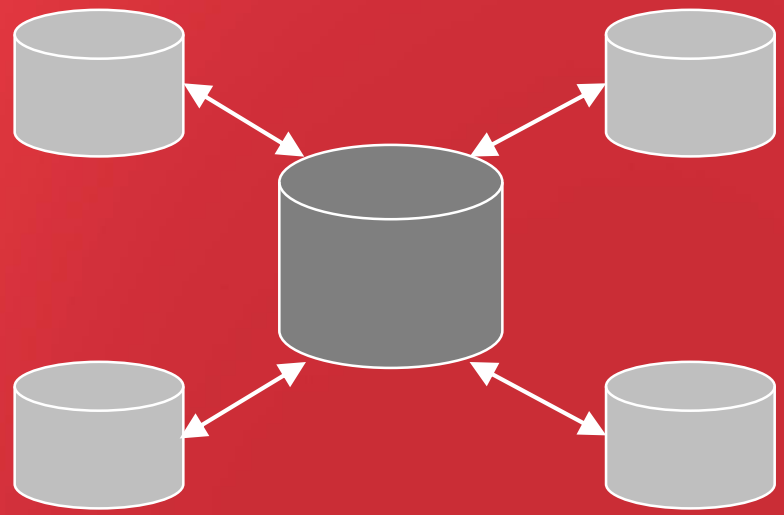


Co-existence

Master data is **stored in the central MDM system** and **updated in its source systems.**

- Allows you to construct a golden record in the same way as the Consolidation style.

- Master data changes can happen in the MDM, as well as in the application systems.
- All attributes of the master data model must be consistent and cleansed before uploading them into the Master Data Management system.



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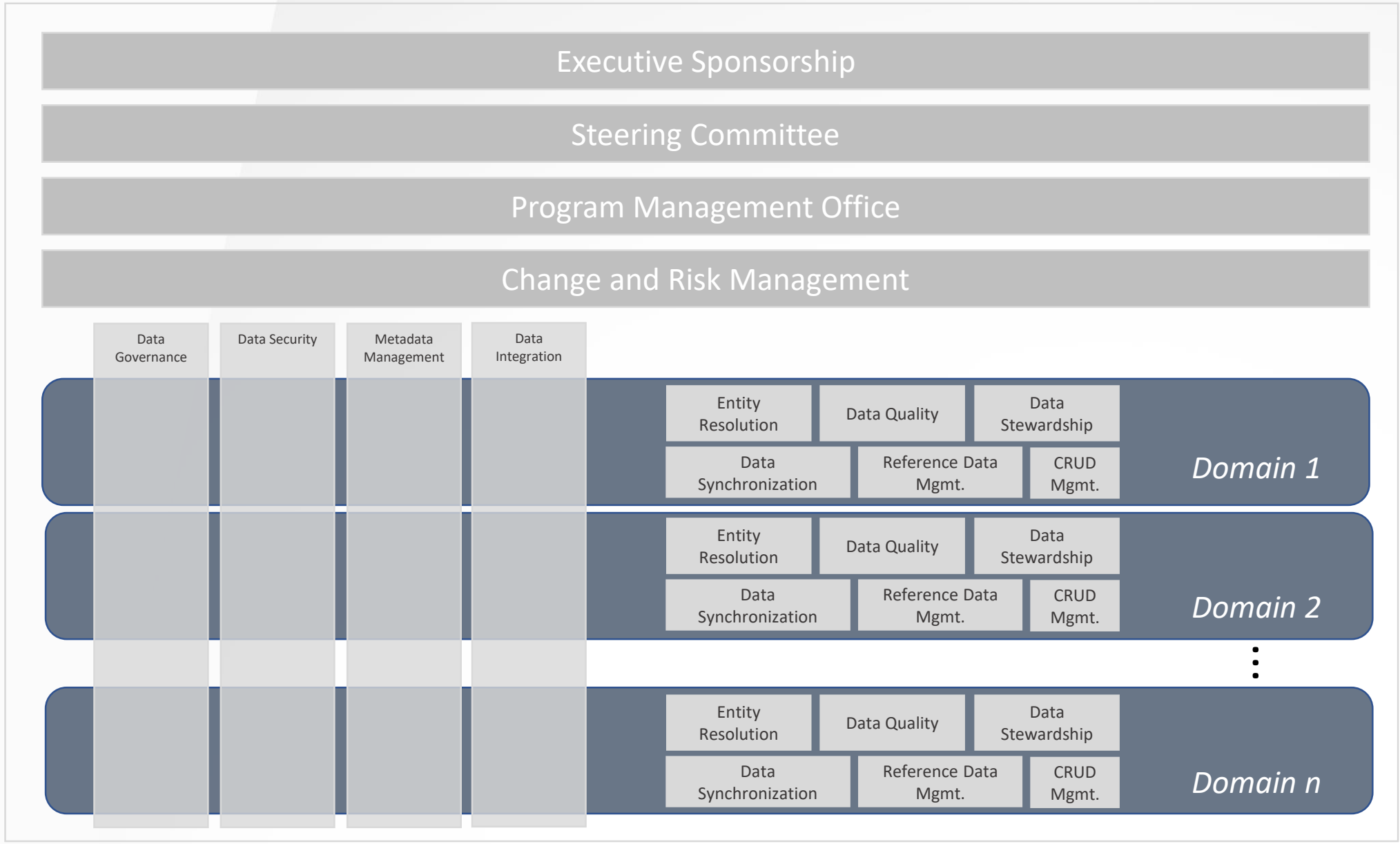
MULTIDOMAIN

MDM

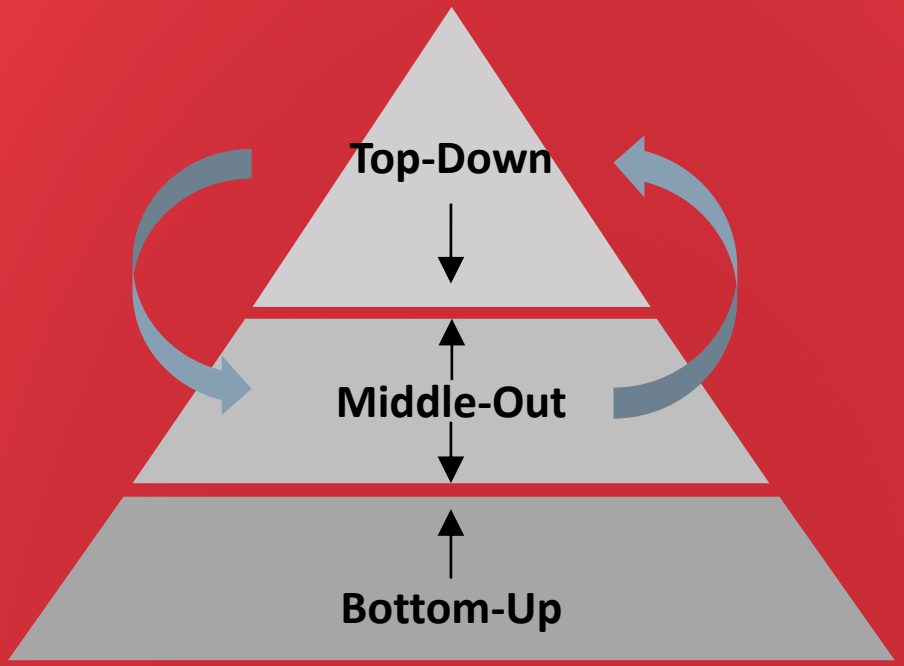
Multi-domain MDM – How and where to start



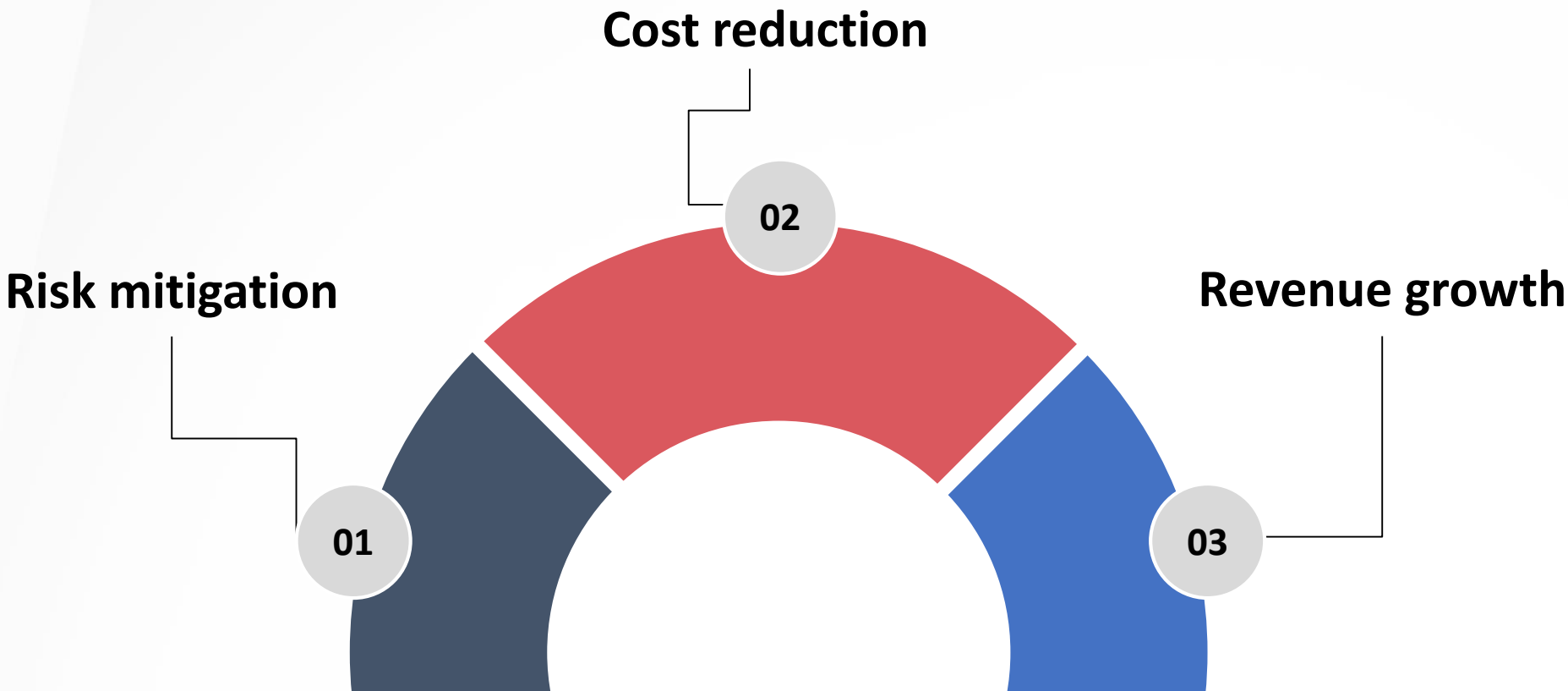
Multi-domain MDM – How and where to start

There are too many factors that will differ from one company to another or within a company from one domain to another for one-size-fits-all approach.

A top-down approach is the ideal scenario.



3 main reasons for MDM implementation



Which MDM to choose?

Operational (Enterprise) MDM

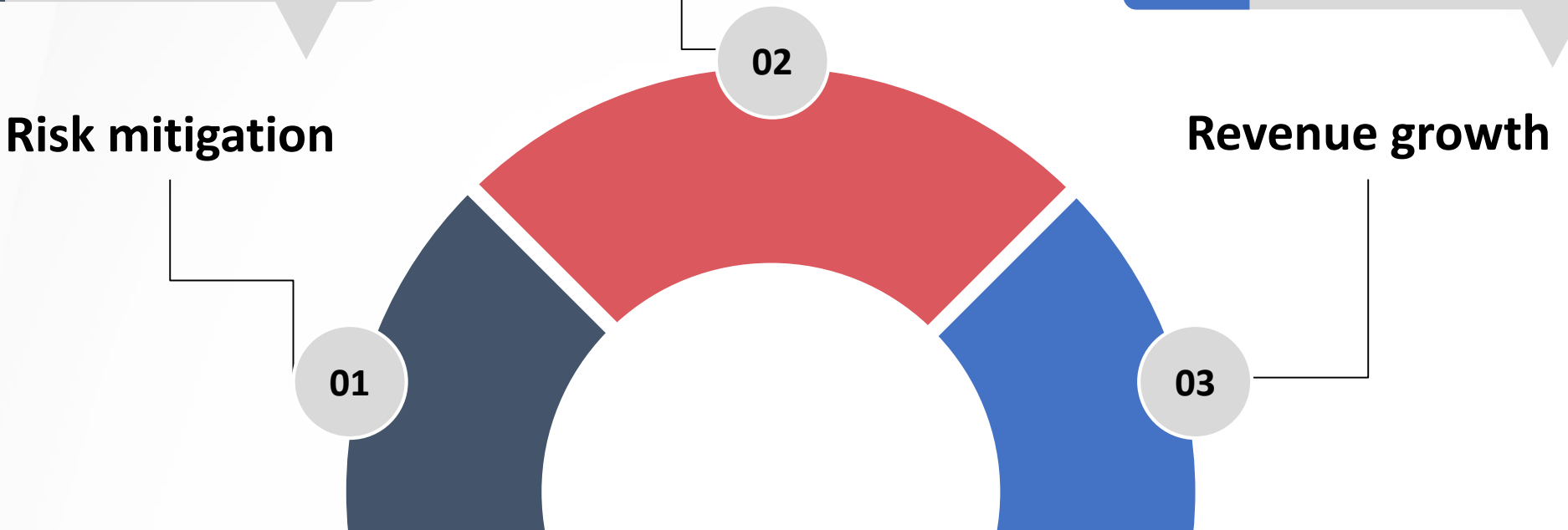
The majority of costs are related to operations (maybe operational MDM is sufficient). Inconsistent and incorrect data may also have a huge cost impact – maybe analytical MDM is a solution for that.

Operational MDM

Control over data because they must be regulated to minimize risk and increase compliance.

Analytical MDM

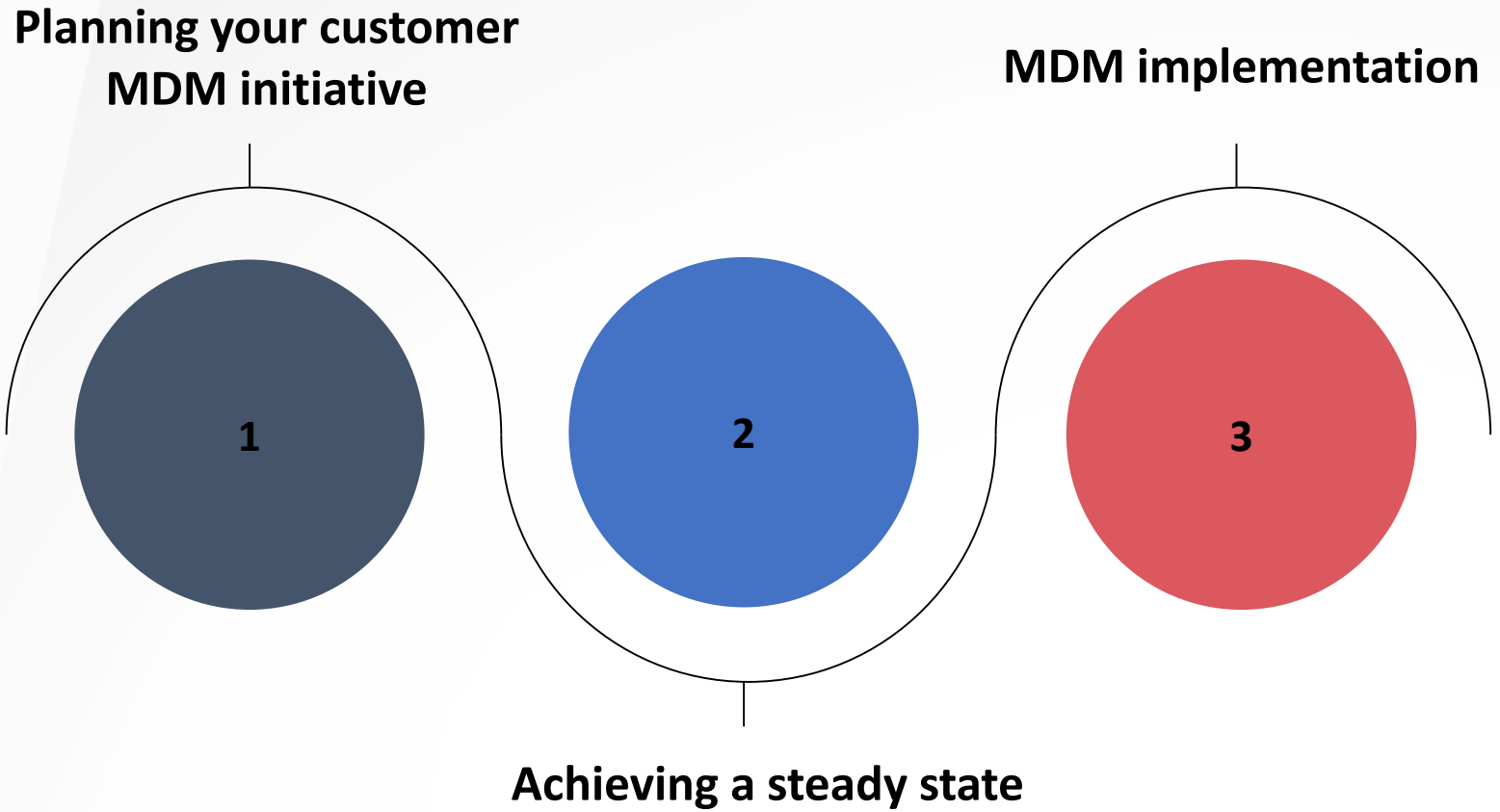
Revenue growth is mostly related to better strategic decisions. Analytical MDM only should suffice in most cases.



STEPS TO IMPLEMENT

MDM

Steps to implement MDM



WHERE TO START?

Prerequisites

- [x] **Data Governance Organization**
- [x] **Data Quality**

It is not necessary to be done before the MDM project starts, but it is necessary to be in scope and part of the MDM journey.

Data Governance can live without MDM, but MDM cannot live without Data Governance.

First steps

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DATA GOVERNANCE

MATURITY ASSESSMENT

DG Maturity Assessment

1. Assess

Maturity assessment to establish a starting point for DG implementation or refinement.

2. Define/refine

Definition of data strategy and roadmap (long-term goals and vision), DG organization (roles and responsibilities), and DG program (short-term project and goals).

3. Implement

DG program implementation based on the goals defined in the program.

4. Track

Metrics tracking and reviews to determine the success of DG implementation or refinement.

The success of DG implementation depends on assuring the appropriate executive level support.

DG Maturity Assessment values

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1. **Initial level of DG maturity** (where do you currently stand related to Data Governance)

2. **Roadmap** (delivered by PI after the workshops) can propose:
   - What are DM domain(s) you should concentrate on (the ones on level 1 in two out of three aspects) in implementation
   - What are critical functions and processes in Data management you can start with in order to enable DG program in full potential
   - Underlying technology for DG

* DG MA lasts approximately 1-2 month

Data Quality as part of DG MA

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Data Quality Management

- Implementing data quality management processes, data validation, and data cleansing procedures to maintain high-quality data. Establish DQ reporting process to ensure Data Stewards are aware of level of data quality they manage, but also to be able to track issue resolution from data perspective.

Organization and Roles

- Assigning data quality roles ensures that there are dedicated individuals responsible for data profiling, validation, and cleansing. This leads to improved data accuracy, consistency, and reliability, making data-driven decision-making more effective.

Data Quality Tools

- Using tool and constantly assessing data quality, monitoring data issues, and performing data cleansing activities.

Master Data Quality Management

- Setting up data quality monitoring and cleansing processes within the MDM platform to ensure data accuracy and reliability.

Where is your organization?

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	People	Process	Technology
Metadata Management	3 - Performing	2 - Emerging	3 - Performing
Data Stewardship	2 - Emerging	2 - Emerging	2 - Emerging
Master Data Management	2 - Emerging	2 - Emerging	2 - Emerging
Data Privacy Management	3 - Performing	3 - Performing	3 - Performing
Data Security Management	3 - Performing	3 - Performing	2 - Emerging
Data Policy Management	3 - Performing	2 - Emerging	3 - Performing
Data Strategy	2 - Emerging	1 – Initiating	1 - Initiating
Organization and Roles	3 - Performing	3 - Performing	2 - Emerging

TM Forum Maturity Model scale

1 - Initiating 2 - Emerging 3 - Performing 4 - Advancing 5- Leading

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MDM PROJECT

ROADMAP

MDM Project Roadmap

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MDM Project Roadmap

- to **identify and engage** with data domain stakeholders
- to **understand expertise and skills** across the data domain (business & tech)
- to start to create a **community of interest across the data domain**
- to **understand the scope and scale** of the data domain
  - what are the most important data objects and attributes?
  - who are the primary data creators, modifiers and consumers?
  - where is data stored, created and manipulated?
  - what are the current data volumes?
- to highlight **current issues** and problems with the data
- to identify **future opportunities** that better data may enable
- to gather any documentation or other artefacts (policies, procedures, processes, models, ...) used to document data

MDM Project Roadmap

- **creating a stakeholder matrix**
  - grow and maintain the matrix as the audit and Governance role develops
  - include senior executives, middle management & representatives of front line roles (Both business & IT)
- **group workshops**
  - to meet your people
  - to understand business processes
  - to understand your architecture and ecosystem
  - to understand data
- **record the findings and create**
  - a consolidated Data issues/opportunities matrix
  - a business glossary with data definitions for the data domain

MDM Project Roadmap

- **defining MD processes**
  - defining workflows and performers
- **defining Data Model**
  - essential component of MDM
  - attributes, relationship and hierarchies of master data
  - identifying and resolving data conflicts and duplicates, unique identifiers
- **defining Security**
  - who will see what and where

Result is ***Design document*** needed for the start of Development phase

HOW TO CHOOSE

DOMAIN?

Defining and Prioritizing Master Data

The most commonly targeted data domains where MDM initiatives are focused:

- ***Customer***
- ***Product***
- ***Locations***
- ***Finance***
- ***Employee***

Begin the MDM focus in **one domain area**, and then expand to more domains with implementation of a multi-domain program model.

Customer or Product will be the starting point for most of the companies.

Prioritizing Domains

MDM business case and investment decisions should be driving the overall MDM strategy based on priorities that are typically associated with:

- **risk mitigation**,
- **revenue growth**,
- **cost reduction**,
- or **business efficiency**.

There can be many ***strategic***, ***operational***, and ***technical reasons*** that influence domain implementation order.

Factors that determine what domains need MDM

Business value

- A critical factor when deciding what domains need to have MDM. A reason why most companies start with Customer is that it is unquestionable how valuable it is to have accurate customer information.

Volume

- Directly related to the need for MDM automation.

Volatility

- If data doesn't change, it is unlikely to need MDM automation.
- Even some attribute of MDM record is not expected to change, other attributes associated with the MDM record are.

Reusability

- The more a domain is used across the company, the higher the probability there is a benefit from an MDM hub.

Complexity

- The complexity of the attributes and data associated to a domain are directly related to the benefits of MDM.
- Great example is Product domain – within a company Products can get very complex, with a large number of taxonomies and other related properties.

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WHERE IS MASTER DATA

IN MY DATA?

Identifying Master Data

The concept of master data and how this data is identified and managed needs to be consistent across a company's systems and processes.

- **Master data**: Data representing key data entities critical to a company operations and analytics because of how it interacts and provides context to transactional data
- **Transactional data**: Data associated with or resulting from specific business transactions
- **Reference data**: Data typically represented by code set values used to classify or categorize other types of data, such as master data and transactional data
- **Metadata**: Descriptive information about data entities and elements such as the definition, type, structure, lineage, usage, changes, ...

Identifying Sources of Master Data

Production company ERP

Product name: Chocolate 100g
Gross weight: 101g
Net weight: 100g
Product code: 100569422

Distribution company 1 ERP

Product name: Chocolate 70% 100g
Gross weight: 101g
Net weight: 100g
Product code: 1005

Distribution company 2 ERP

Product name: Chocolate 70% 100g
Gross weight: 100g
Net weight: 100g
Product code: 1227977

MDM

Product name: Chocolate 100g
Gross weight: 101g
Net weight: 100g
Group Product code: 100100001

WHO DESIGN

PROCESSES?

Business Process Design

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Understand the current business processes so that the workflow designs can mimic the process.

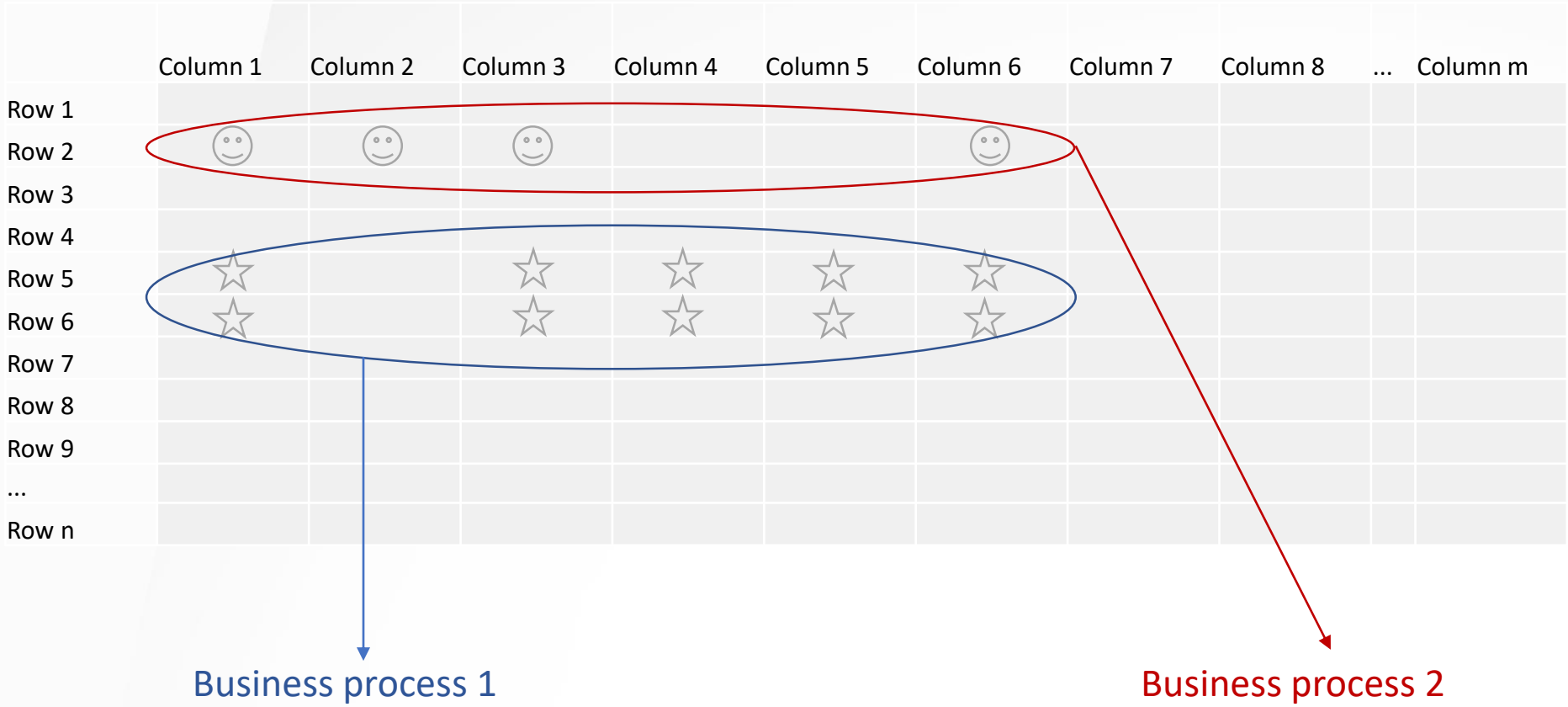
Understand the data structure and relationships so that the containers, including Catalogs and Hierarchies, can be designed accordingly.

- **Item creation**
- **Item modification**
- **Item status change**

Business Process specify:

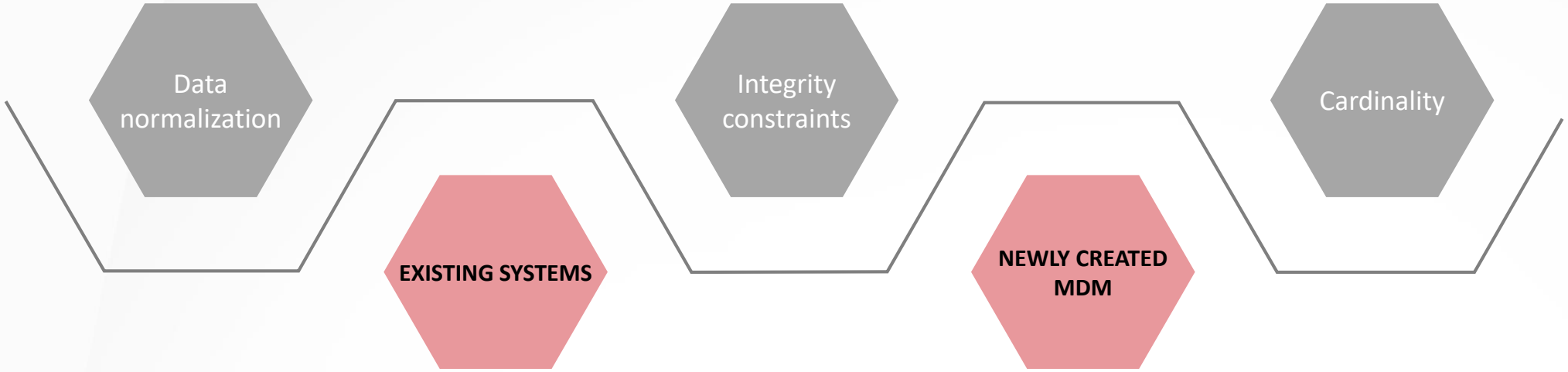
- who has right to create/update certain attribute?
- which attribute can be updated in which process step?
- who is responsible to approve changes?

Business Processes across data



Data Model & Metadata

It is impossible to create a universal data model that will reflect every company's business requirements.



Common Data Model is at the heart of MDM solution.
It defines data, its characteristics, attributes and relationships with other data within particular domain.

Data Model definition

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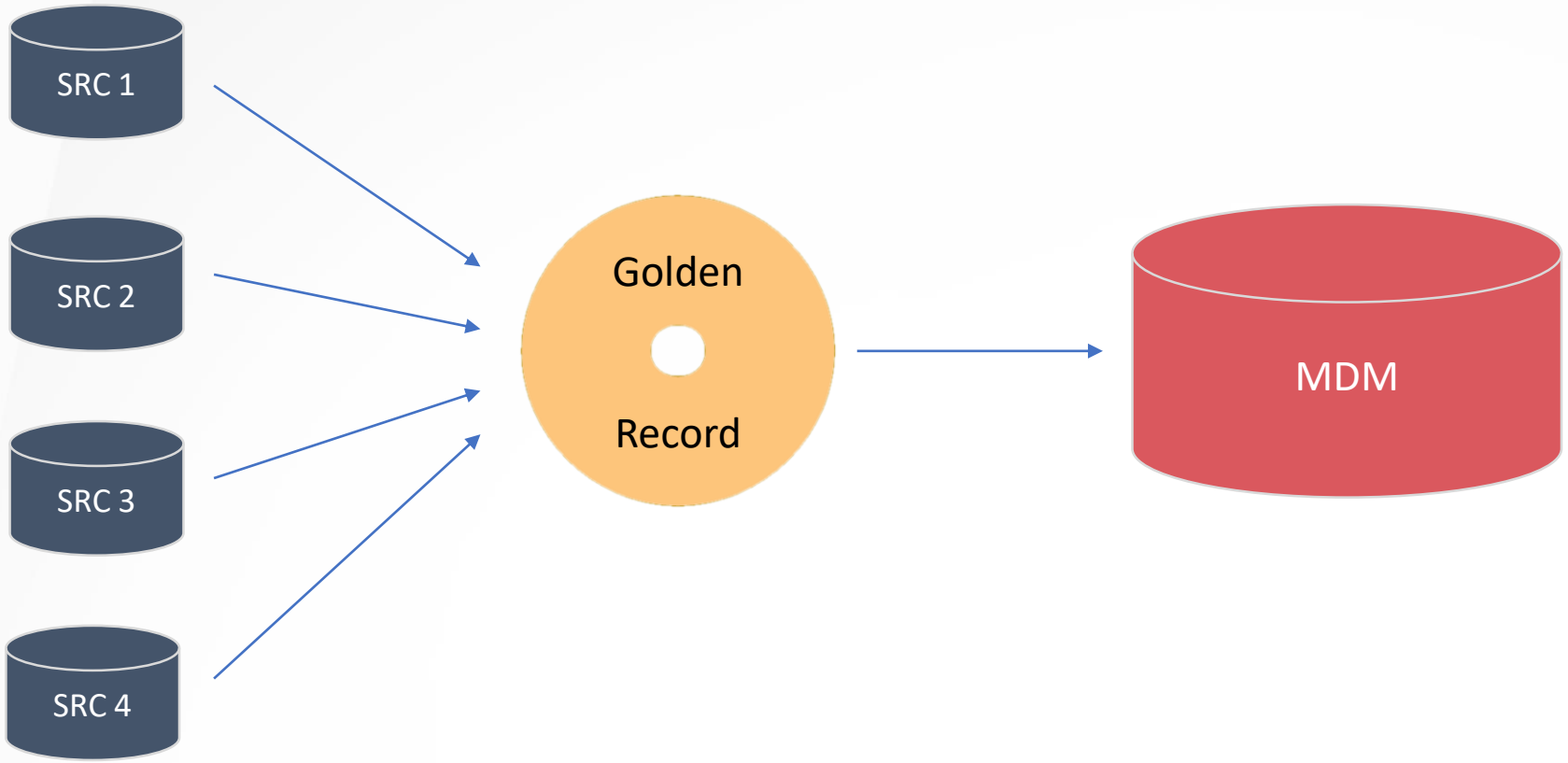
DATA INTEGRATION

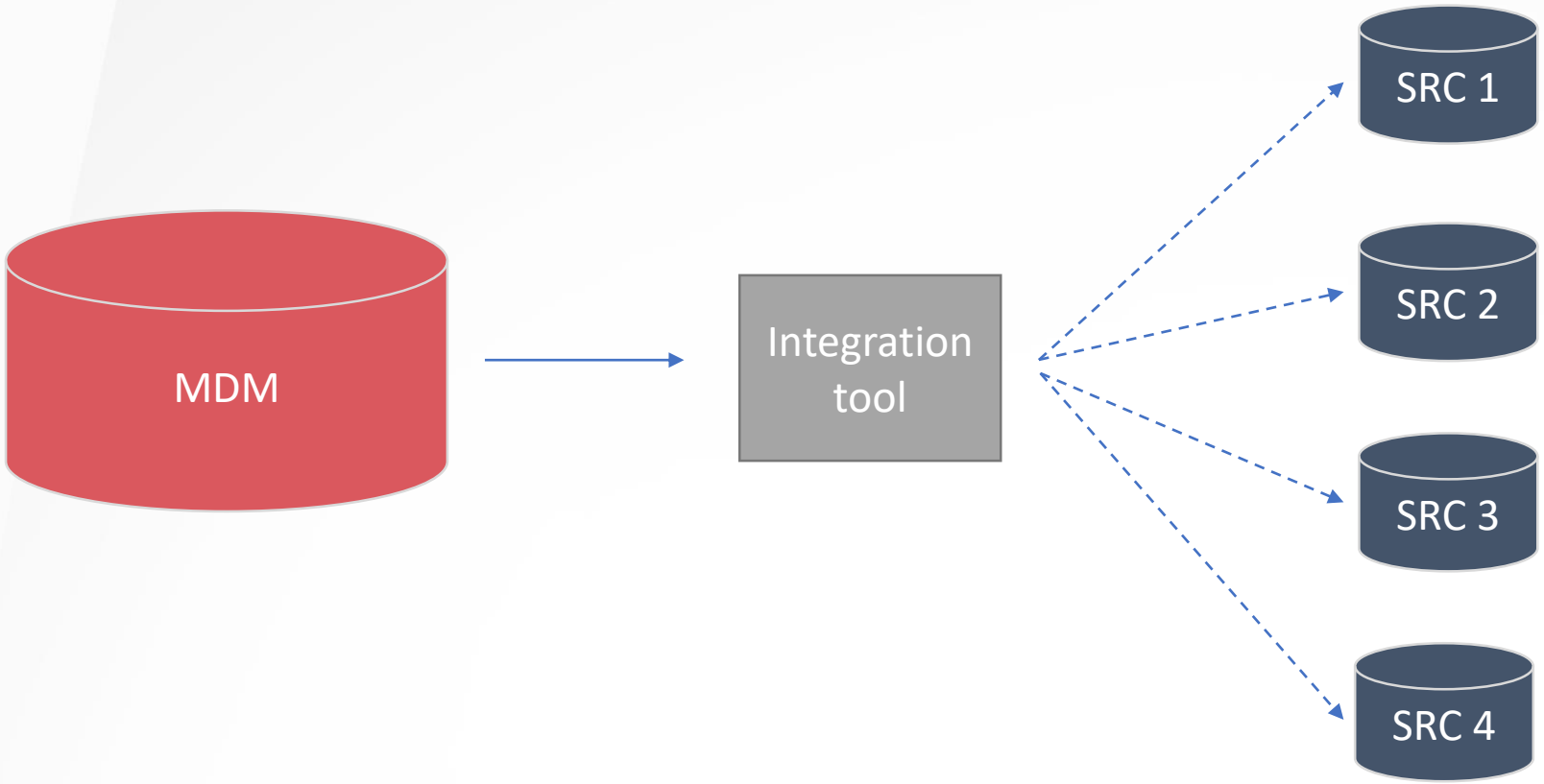
Attribute Name	SRC1 Technical Field	SRC2 Technical Field	SRC1 Data Type	SRC2 Data Type	MDM Data Type	Lookup table	Default Value	Validation Rule	SRC1 Required	SRC2 Required
Unit of Measure	Tbl1.att1		CHAR 12		CHAR 12	LKP_Unit_of_ Measure			Y	
Gross Weight	Tbl2.att2	Table1.attribute2	DECIMAL(13,3)	DECIMAL(12,5)	DECIMAL (13,5)				Y	Y
Net Weight	Tbl2.att1	Table1.attribute3	DECIMAL(13,3)	DECIMAL(12,5)	DECIMAL (13,5)			Net weight < Gross weight.	Y	Y
Weight Unit	Tbl3.att3	Table1.attribute4	CHAR 12	CHAR 15	CHAR 15	LKP_Unit_of_ Measure	KG		Y	Y
GTIN	Tbl4.att4	Table1.attribute5	CHAR 14	CHAR 14	CHAR 14				Y	Y

Data Integration – from source to MDM

Initial Load – The purpose of the Initial load is to place all the existing Material data from the ERP systems (or business apps) to the MDM tool (transactional style). Data is consolidated into a Golden Record.



Data Integration – from MDM to source



Security – Users and Roles

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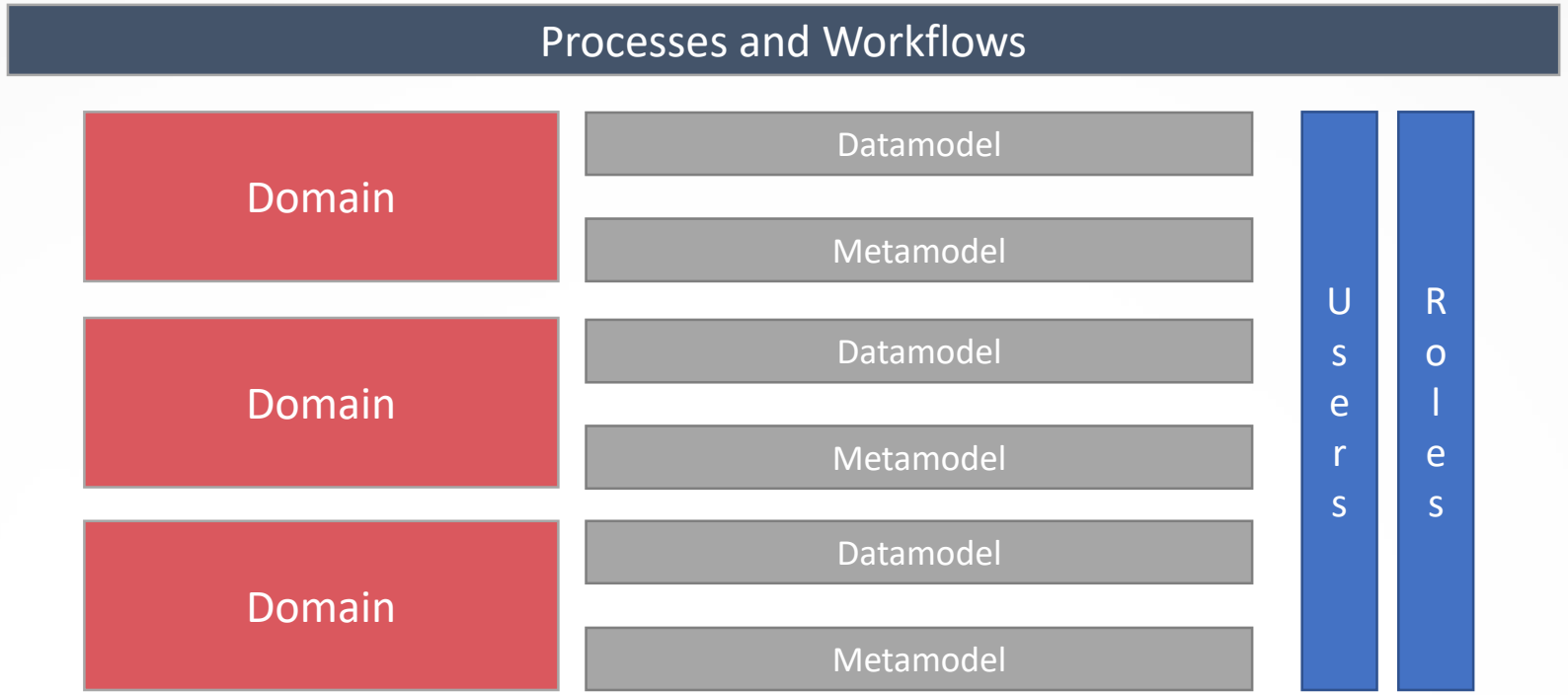
Who? Where? What? How?

Master Data Specialist

- MDM Process Management
- Lead Data Quality
- Analysis and KPIs
- Governance Engagement
- Point of Contact (Data Stewards, IT)

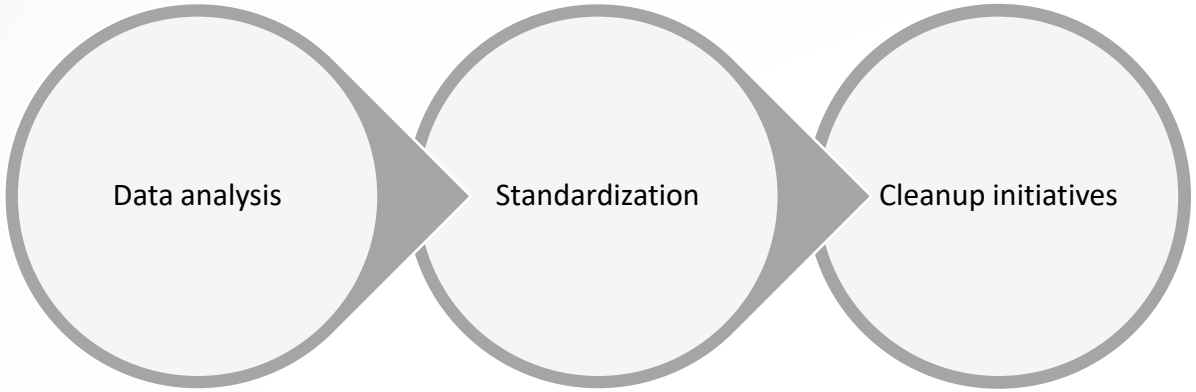
Data Stewards

- Subject matter experts
- Manage local MDM initiatives
- Enforces policies and standards
- Data quality control
- Raise issues, help resolve them



Security – Users and Roles

Data stewards not only become **subject matter experts** who have sufficient tools, skills, and responsibilities to manage the domain's master data across domains, but also **work with specific functions** to **assist with many types of:**



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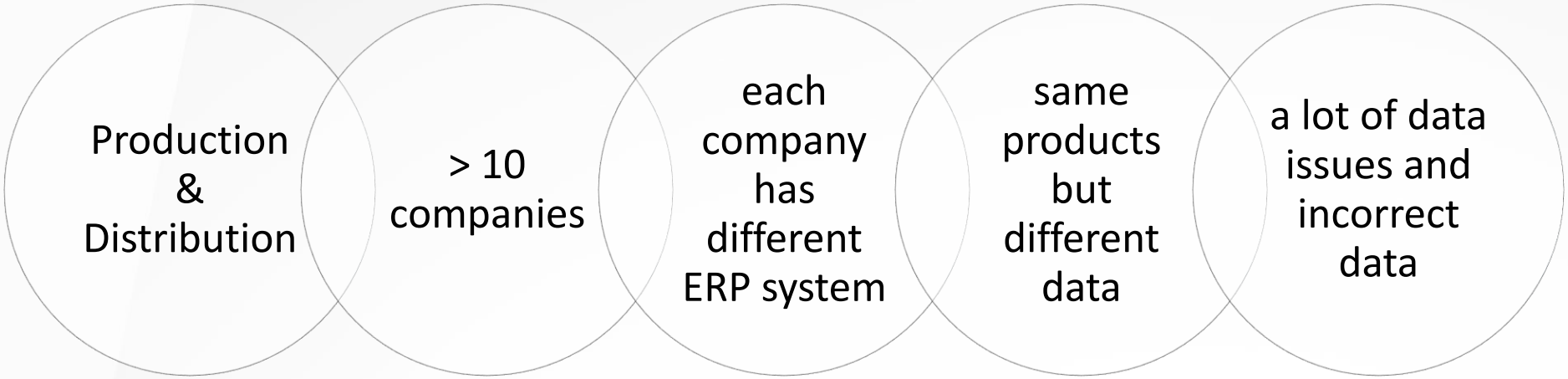
FMCG

USE CASE

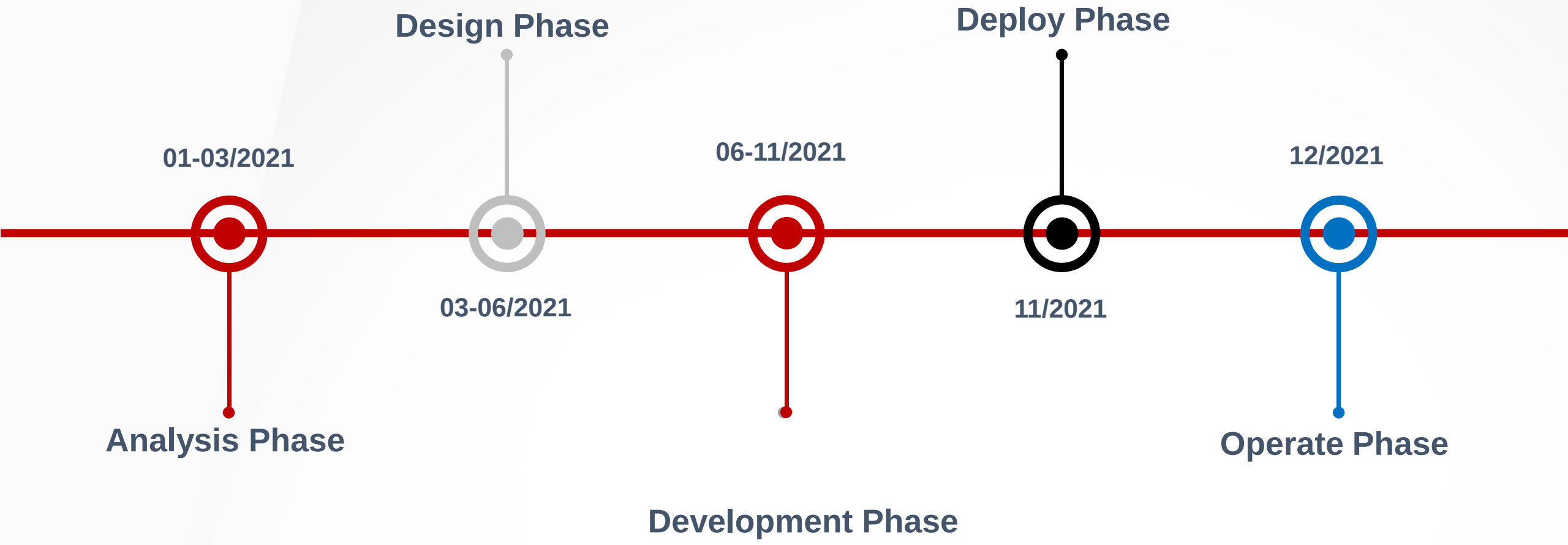
FMCG Use case – our experience



Their goals

- centralized system for Master Data
- increased Data Quality
- reduce unnecessary repetitive data population/product creation in different systems

Initial Project Timeline



Step 1: DG Maturity Assessment

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Proposal of activities for improvement of DG:

- Create DG Strategy and DG program
- Review and extend DG framework
- Leverage technology to enable easier adoption and provide more transparency around data
  - Start implementation of DQ processes
  - Start implementation of MDM tool

	People	Process	Technology
Metadata Management	3 - Performing	2 - Emerging	3 - Performing
Data Stewardship	2 - Emerging	2 - Emerging	2 - Emerging
Master Data Management	2 - Emerging	2 - Emerging	2 - Emerging
Data Privacy Management	3 - Performing	3 - Performing	3 - Performing
Data Security Management	3 - Performing	3 - Performing	2 - Emerging
Data Policy Management	3 - Performing	2 - Emerging	3 - Performing
Data Strategy	2 - Emerging	2 - Emerging	2 - Emerging
Organization and Roles	3 - Performing	3 - Performing	2 - Emerging

Step 2: Planning a scope, prioritizing domains

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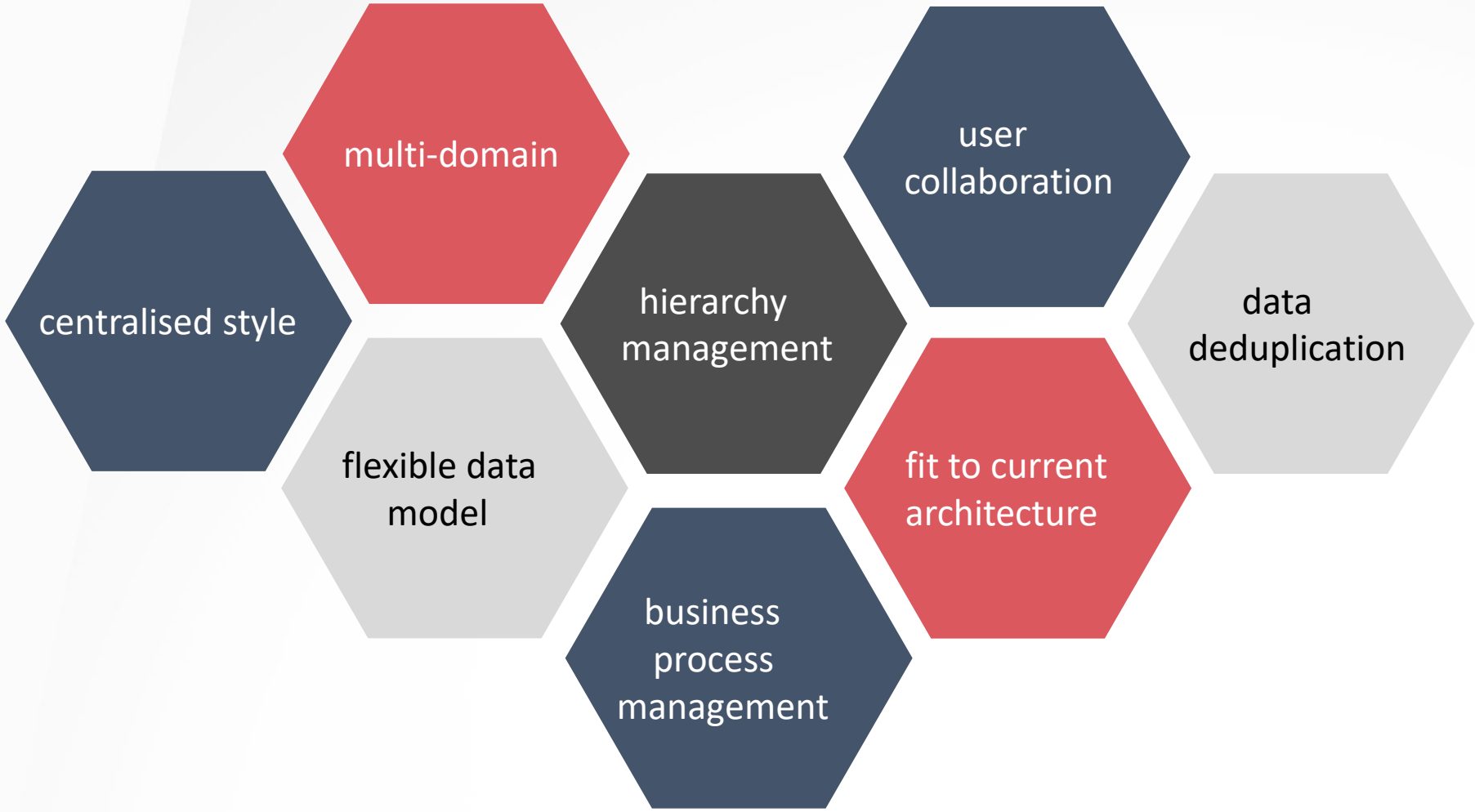
Client has a goal to implement an MDM tool that supports multiple domains, **centralizing** all Master data.

At this moment, decision for **Operative MDM** has been made.

Which of these domains has the biggest impact?

- ***Customer***
- ***Product***
- ***Suppliers***
- ***Finance***
- ***Employee***

Step 3: Choosing a Tool - Factors



Step 4: Analysis phase

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The goal of the phase is to determine **MDM requirements in detail** and familiarize the organization with the proposed solution.

Deliverables:

- Business Requirements
- Non-functional requirements
- Business Processes for Create, Update, Retire and Cleanse Materials
- Business Use Cases
- MDM Blueprint
- Infrastructure Assessment
- Risks and assumptions

Step 5: Design

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The goal of this phase is to **translate the project requirements into a solution design** using the business function components and to install and configure IPM in Development environment

1. **Business Process Design**

   Understand the current business processes so that the workflow designs can mimic the process. Also, understand the data structure and relationships so that the containers, including Catalogs and Hierarchies, can be designed accordingly.

2. **Data Model Design**

   Based on the analysis in the previous step, add/edit data model objects to fit the requirements and business logic.

3. **Business Rules Design**

   Analyse business rules to be implemented in the system based on the required business logic. This can be part of data model design since rules can be treated as data model objects and are associated with different other data model objects such as attributes/specs and containers at different levels.

4. **Solution Design**

   Design the workflows and collaboration areas based on the previous steps. Design sequences and import/export jobs for various actions such as importing data from upstream systems or publishing to various endpoints in the client's ecosystem.

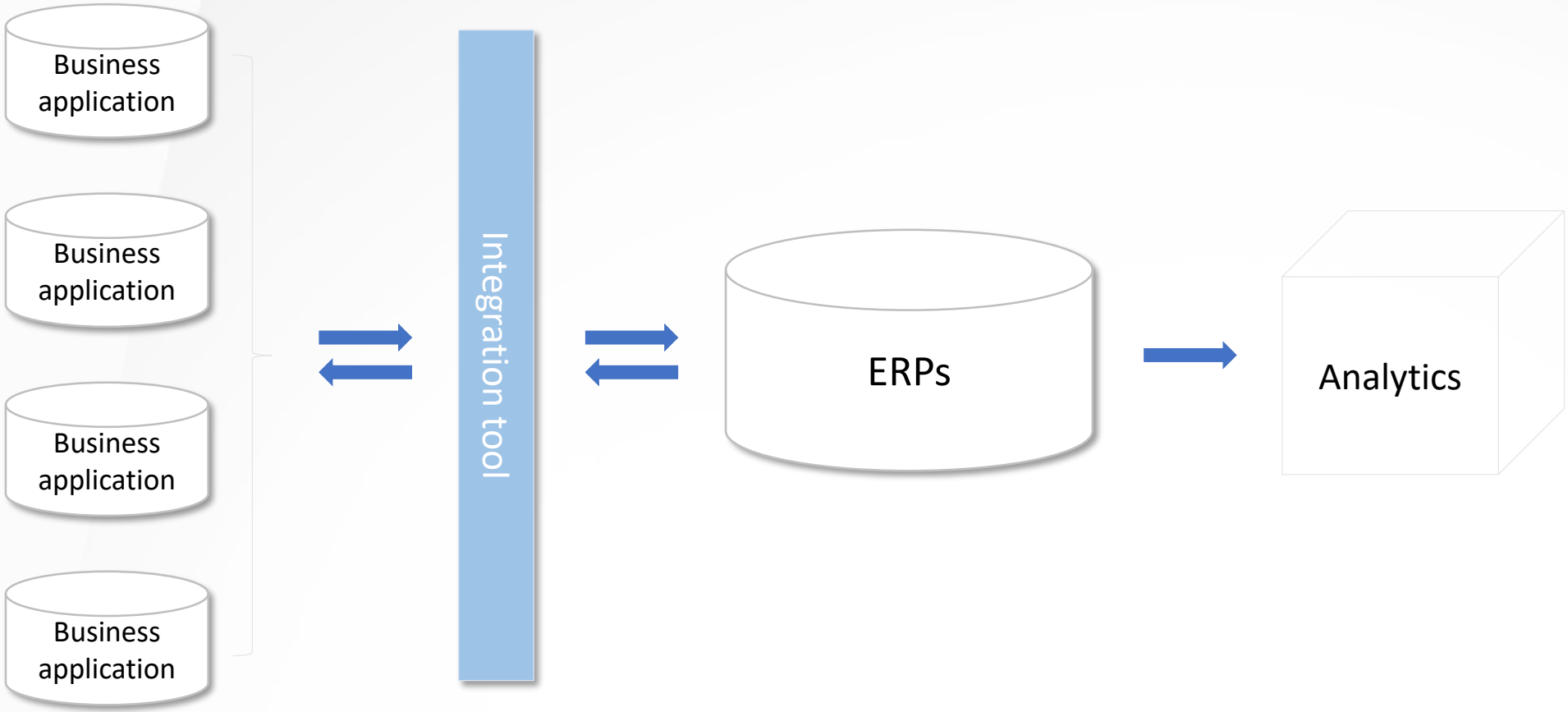
5. **Security Design**

   Design who has rights and responsibilities for what in the system (Catalog, Workflows, Administration, ...).

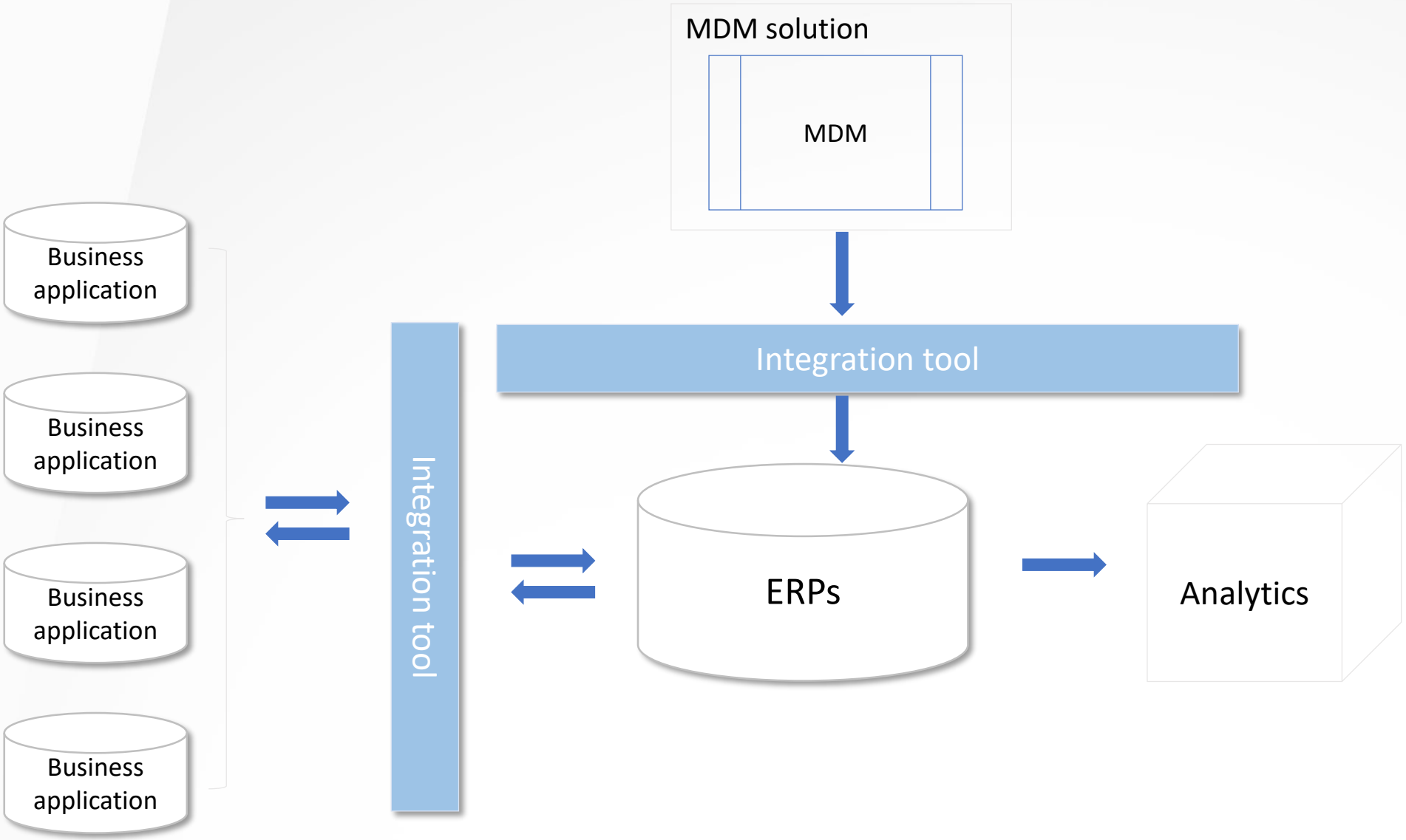
6. **Environment set-up and integration**

   Design the connections with other enterprise applications/solutions in the ecosystem. It will also include deciding the cycles and schedules for the jobs that need to be performed during the regular lifecycle of the data.

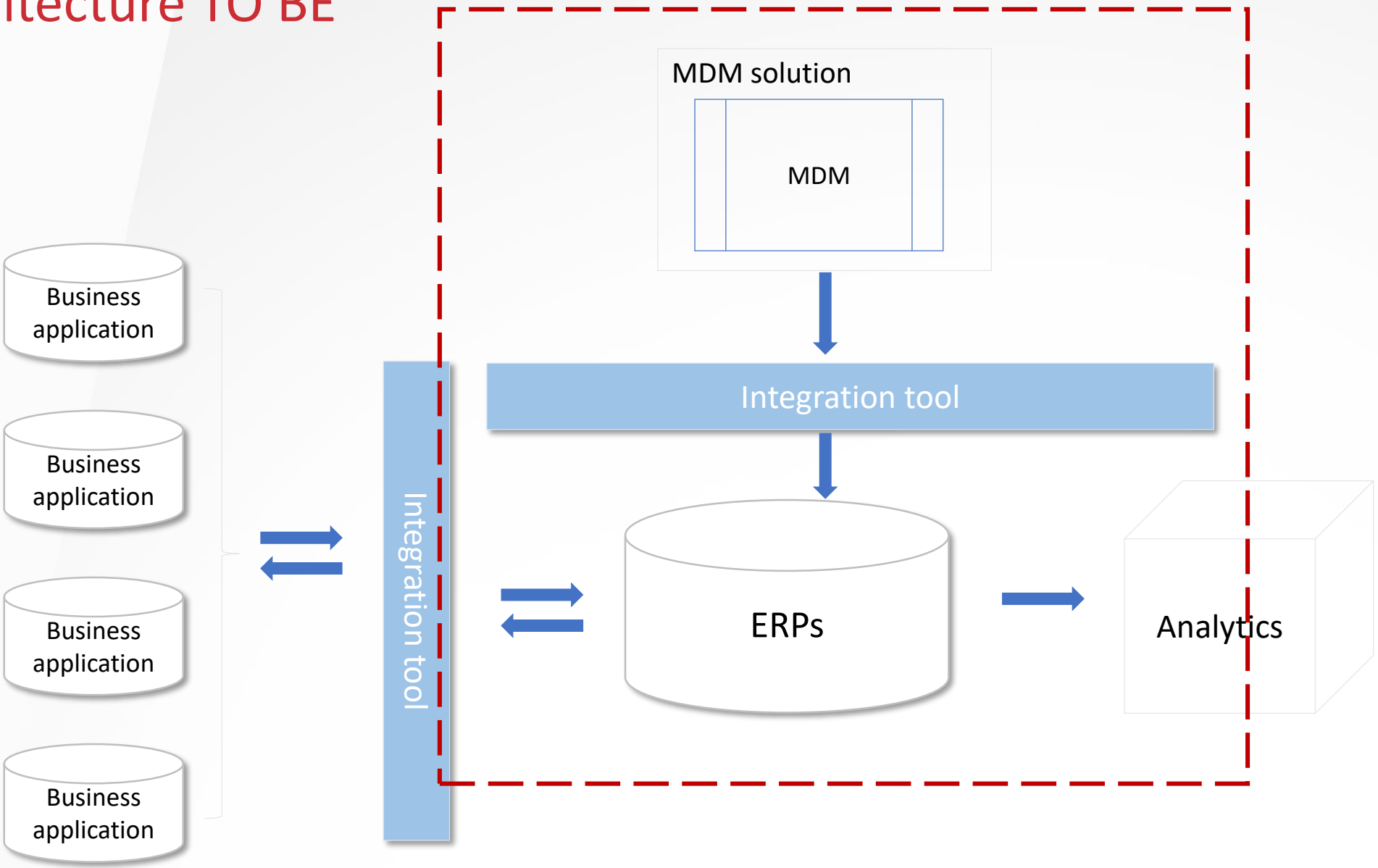
Architecture AS IS

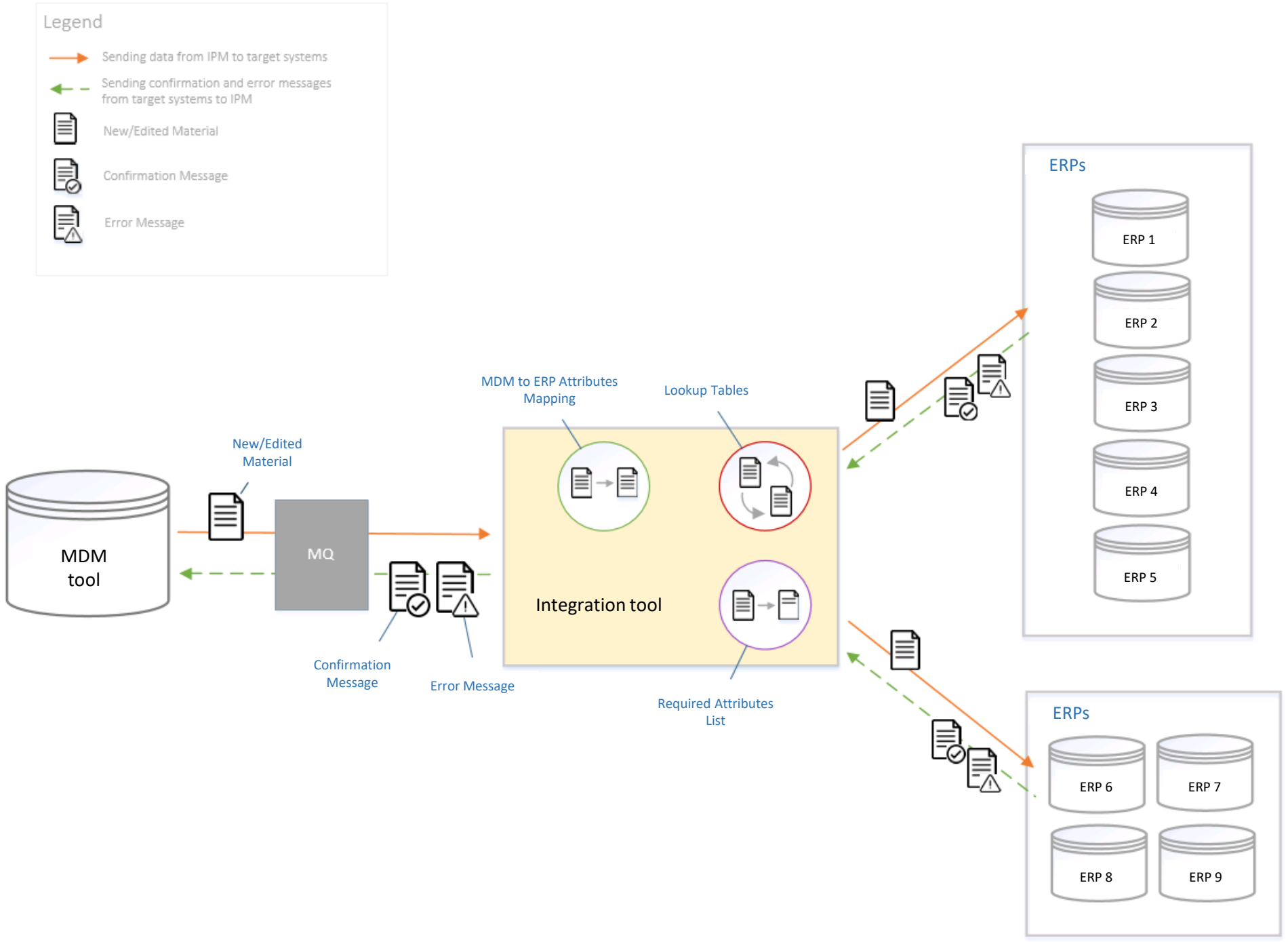


Architecture TO BE



Architecture TO BE





Step 6: Development

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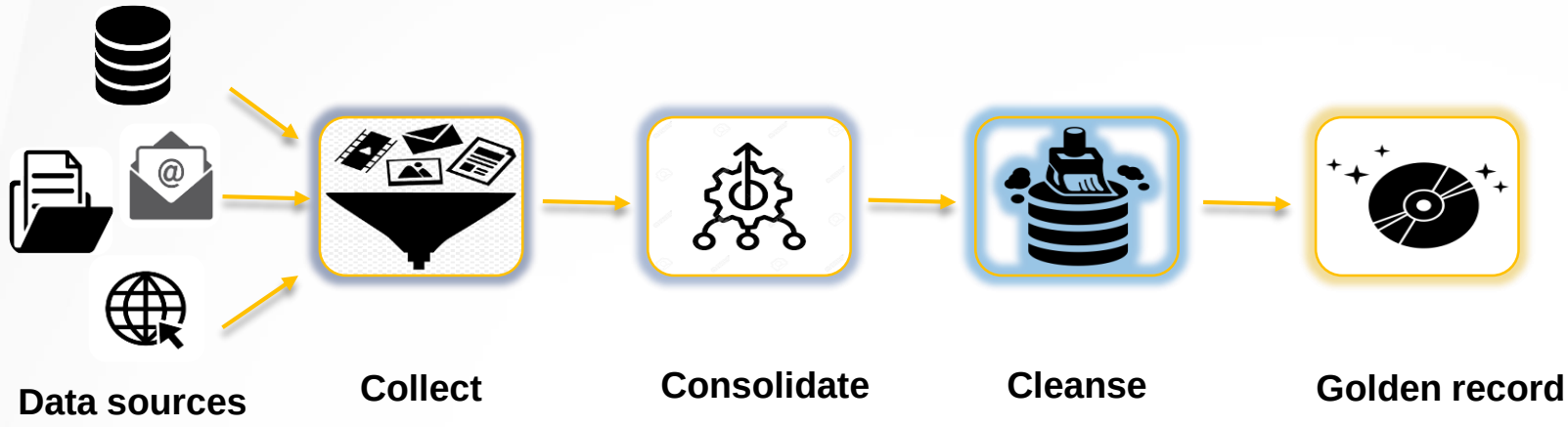
1. **Installation** (done during the design phase)
2. **Catalog and Hierarchies** creation
3. **Data Model** creation
4. **User & Roles** Creation
5. **Workflow** creation
6. **Integration** with other applications

In parallel... hard work was in progress

In parallel... Source data has been collected, consolidated, analysed, and cleansed → in order to prepare a **Golden Records.**



Step 7: Deploy

Training: This includes in-house hands-on training with delivery of documentation as well as manuals which describe how the end-users can use the application.

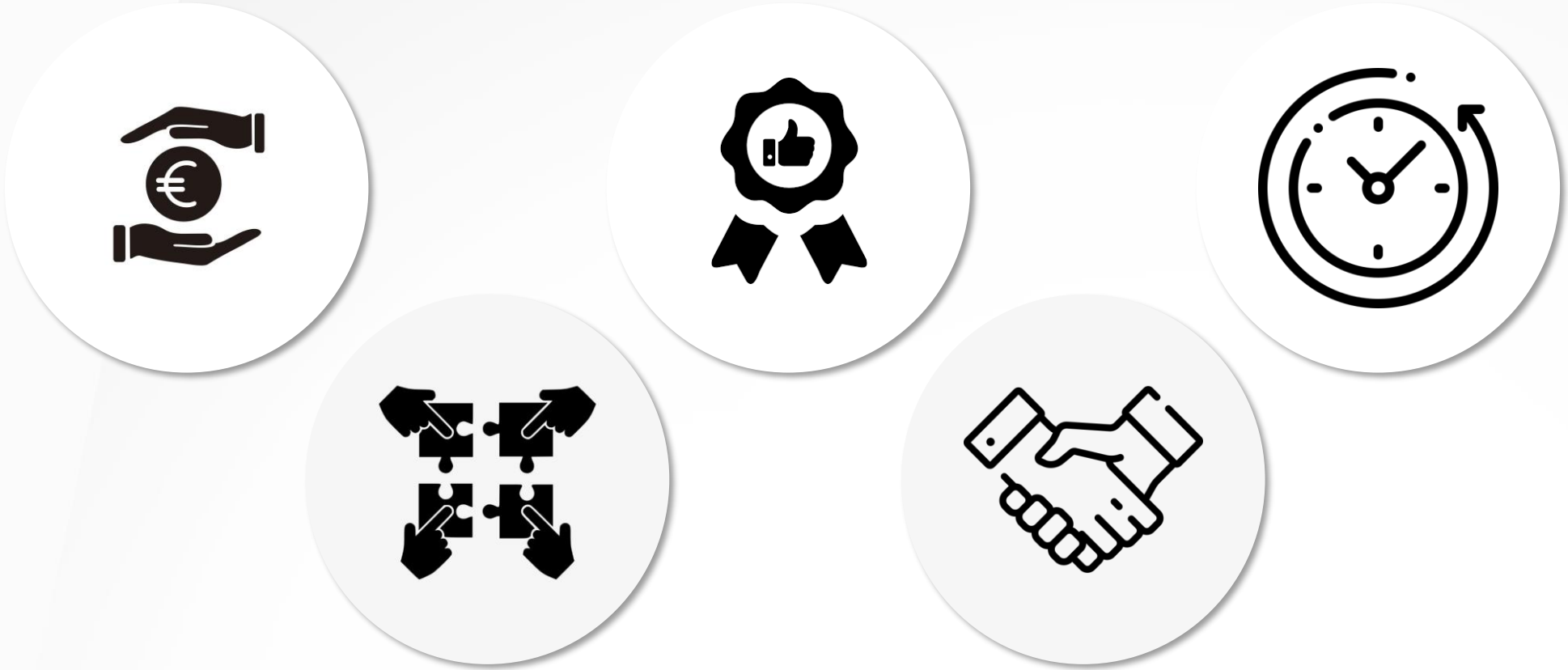
Production environment set-up and deployment: this includes also deployment of development solution to production environment.

Project Closeout

2 years later...

- MDM is up and running (0 hours downtime)
- 150+ data stewards using it for day-to-day work
- change management is successfully done company-wise
- started working on the next domain

FMCG Use case – achievements



FMCG Use case - Master Data challenges

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- **Complex IT landscape**
  - many different Business applications and ERPs which operate with MD
  - complex cross-system collaboration

- **Master Data identification**
  - multiple master data entry for the same item has the potential for inconsistent master data in each of the systems

- **Redundancies and low data quality**
  - no recognition of duplicates between systems or within systems thus resulting in unaligned master data knowledge and usage
  - same items with different master data

- **Different data model within each source system** (ERPs, Business applications)

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THANKS

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Q&A

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