COURSEWARE

METADATA MANAGEMENT

BASED ON CDMP

Van Haren PUBLISHING

MICHEL DEKKER

Metadata Management
Based on CDMP

Colophon

Title:	Metadata Management
Subtitle:	Based on CDMP
Authors:	Michel Dekker
Publisher:	Van Haren Publishing, ‘s-Hertogenbosch
ISBN Hard Copy:	978 94 018 1375 4
Edition:	First edition, first print, October, 2025
Design:	Van Haren Publishing, ‘s-Hertogenbosch

For further information about Van Haren Publishing please e-mail us at: info@vanharen.net or visit our website: www.vanharen.net

Publisher about the Courseware

The Courseware was created by experts from the industry who served as the author(s) for this publication. The input for the material is based on existing publications and the experience and expertise of the author(s). The material has been revised by trainers who also have experience working with the material. Close attention was also paid to the key learning points to ensure what needs to be mastered.

The objective of the courseware is to provide maximum support to the trainer and to the student, during his or her training. The material has a modular structure and according to the author(s) has the highest success rate should the student opt for examination. The Courseware is also accredited for this reason, wherever applicable.

In order to satisfy the requirements for accreditation the material must meet certain quality standards. The structure, the use of certain terms, diagrams and references are all part of this accreditation. Additionally, the material must be made available to each student in order to obtain full accreditation. To optimally support the trainer and the participant of the training assignments, practice exams and results are provided with the material.

Direct reference to advised literature is also regularly covered in the sheets so that students can find additional information concerning a particular topic. The decision to leave out notes pages from the Courseware was to encourage students to take notes throughout the material. Although the courseware is complete, the possibility that the trainer deviates from the structure of the sheets or chooses to not refer to all the sheets or commands does exist. The student always has the possibility to cover these topics and go through them on their own time. It is recommended to follow the structure of the courseware and publications for maximum exam preparation.

The courseware and the recommended literature are the perfect combination to learn and understand the theory.

-- Van Haren Publishing

Other publications BY Van Haren Publishing

Van Haren Publishing (VHP) specializes in titles on Best Practices, methods, frameworks and standards within four domains:
- IT Management
- Architecture (Enterprise and IT)
- Business Management and
- Project Management

Van Haren Publishing is publishing on behalf of leading organizations and companies: Agile Consortium, World Commerce and Contracting, IAOP, IPMA World, KNVI, PMI-NL, NLAIC and The Open Group.

Van Haren Publishing is part of the Van Haren Group and additional to the book publishing also provides the following services: accredited training materials and e-learning through Van Haren Learning Solutions, as well as independent professional certification via examination through Van Haren Certify.

Topics are (per domain):

IT Management	IT Service Management	FitSM, ISM®, ISO/IEC20000, IT4IT®, ITIL®, VerISM®, SAF, TRIM, XLA®
	Data Management	Data literacy, Data visualization, DMBOK
	IT Asset Management	HAM, ITAM, SAM
	IT Security Management	BIO, ISO/IEC27001, NIS2
	Test Management	CTAP
	Application Management	ASL
	Other	eCF, IT-CMF, Scrum
Project Management	Project Management	Half Double, ICB, ISO/IEC21500, P3.express, PM2, PMBOK Guide, Praxis, PRINCE2
	Agile	Agile, Agile PM
	Other	PMO
Business Management	Operations Management	Lean, Lean Six Sigma, OBM, OMC, RASCI
	Contract Management	CATS CM, CATS RVM, IACCM World
	Business Information Management	BiSL, DID
	Artificial Intelligence	AI, Generative AI
	Outsourcing	OPBOK
Enterprise Architecture	Enterprise Architecture	BIAN, TOGAF
	Modeling	ArchiMate, BPMN
	Software Architecture	ISAQB
	Other	Open Agile Architecture

For the latest information on VHP publications, visit our website: www.vanharen.net.

Table of Content

	-- Slide Number	-- Page Number
Self-Reflection		6
Introduction	(11)	13
Essential Concepts	(34)	25
Activities	(48)	32
Tools & Techniques	(53)	34
Implementation guidelines	(59)	36
Exam Preparation	(61)	37

Self-Reflection of understanding Diagram

'What you do not measure, you cannot control.'' – Tom Peters

Fill in this diagram to self-evaluate your understanding of the material. This is an evaluation of how well you know the material and how well you understand it. In order to pass the exam successfully you should be aiming to reach the higher end of Level 3. If you really want to become a pro, then you should be aiming for Level 4. Your overall level of understanding will naturally follow the learning curve. So, it's important to keep track of where you are at each point of the training and address any areas of difficulty.

Based on where you are within the Self-Reflection of Understanding diagram you can evaluate the progress of your own training.

Level of Understanding	Before Training (Pre-knowledge)	Training Part 1 (1st Half)	raining Part 2 (2nd Half)	After studying / reading the book	After exercises and the Practice exam
Level 4 I can explain the content and apply it .					
Level 3 I get it! I am right where I am supposed to be.					Ready for the exam!
Level 2 I almost have it but could use more practice.					
Level 1 I am learning but don't quite get it yet.					

(Self-Reflection of Understanding Diagram)

Write down the problem areas that you are still having difficulty with so that you can consolidate them yourself, or with your trainer. After you have had a look at these, then you should evaluate to see if you now have a better understanding of where you actually are on the learning curve.

Troubleshooting

Problem areas:	*Topic:*
Part 1	
Part 2	
You have gone through the book and studied.	
You have answered the questions and done the practice exam.	

Effective Data Foundation

Not-for-profit collective, which enables **professionals** to **leverage data** to make **sustainable business decisions**

 2

Effective Data Foundation

DATA

Analysis / Literacy / Management / Visualization

 3

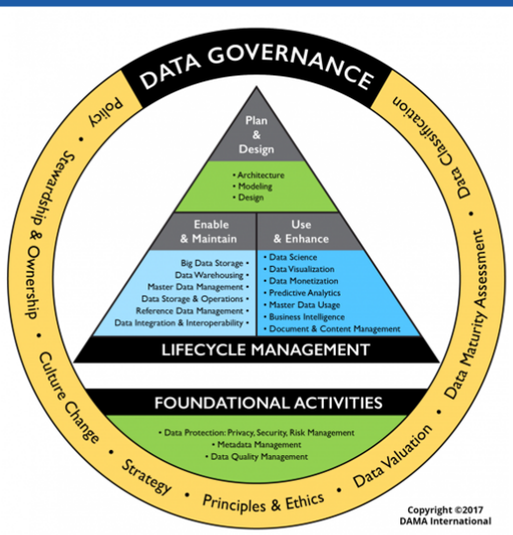
 5

Data Management

Data management is about ***people***, ***processes***, *and* ***technology***, *in that order.*

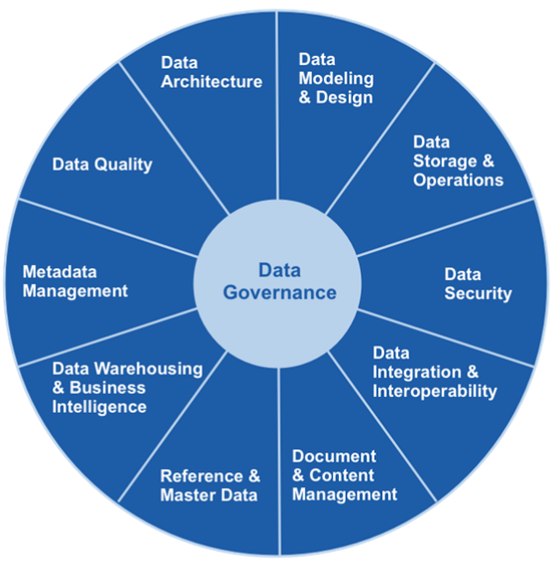
Source: unknown

DAMA Wheel



Source: Dama.org

DAMA Wheel



Source: Dama.org © Van Haren Publishing 8

Certification

ASSOCIATE	PRACTITIONER	MASTER	FELLOW
CDMP Associate	CDMP Practitioner	CDMP Master	CDMP Fellow
Membership: Central	Membership: Central	Membership: Central	Membership: Central
Industry experience: 6 months > 5 years	Industry experience: 2 years - 10 years	Industry experience: Minimum 10 years^	Industry experience: 25 years plus
Requirements: 60% pass Data Management Fundamentals exam	Requirements: 70% pass in Data Management Fundamentals exam and 70% pass in 2 specialist exams	Requirements: 80% pass in Data Management Fundamentals exam and 80% pass in 2 specialist exams	Requirements: Globally recognised & respected thought leadership; Significant contribution to Data Management profession; CDMP Master; Contribution to CDMP & DMBOK; By nomination

Source: Dama.org © Van Haren Publishing 9

Training Agenda

- Introduction
- Essential concepts
- Activities
- Tools & Techniques
- Implementation
- Governance

 10

What is Data?

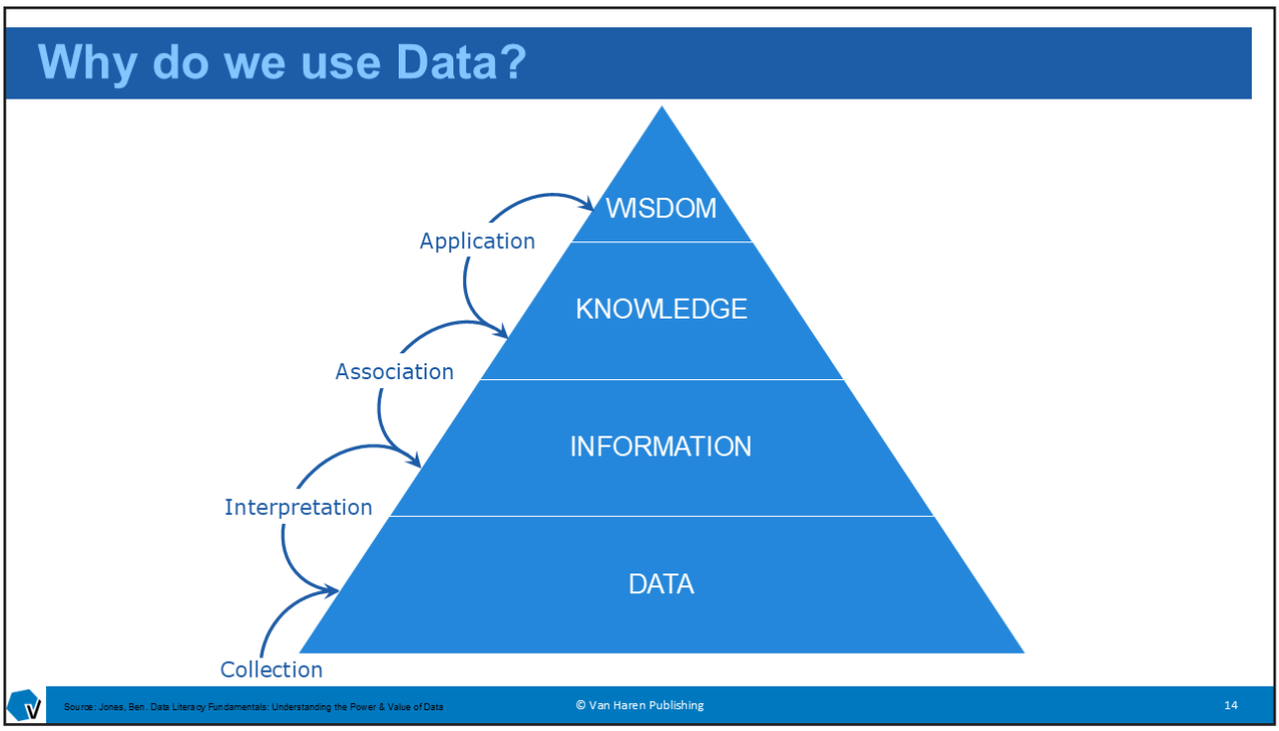
 11

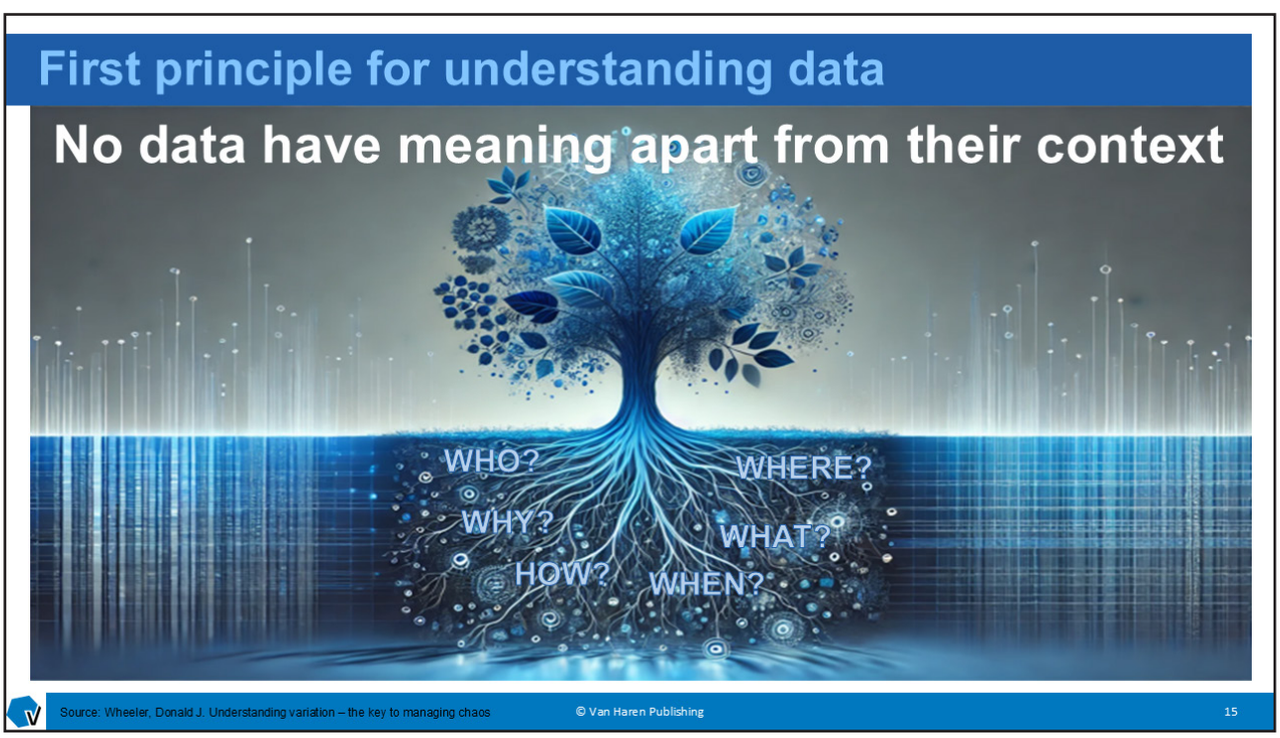
Data & Reality

What is Data?

Describes a ***quality*** *or* ***quantity*** *of some* ***object*** *or* ***event****.*

Source: unknown


Why do we use Data?
WISDOM
KNOWLEDGE
INFORMATION
DATA
Application
Association
Interpretation
Collection
Source: Jones, Ben. Data Literacy Fundamentals: Understanding the Power & Value of Data
© Van Haren Publishing
14


First principle for understanding data
No data have meaning apart from their context
WHO?
WHERE?
WHY?
WHAT?
HOW?
WHEN?
Source: Wheeler, Donald J. Understanding variation – the key to managing chaos
© Van Haren Publishing
15

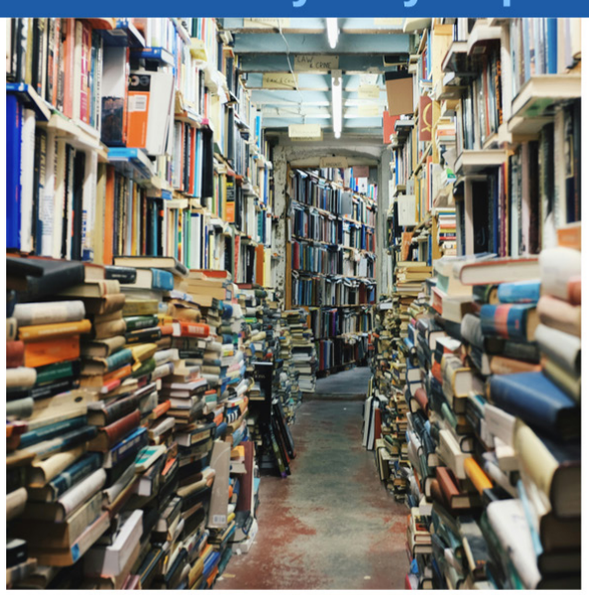
Second principle for understanding data

While **every data set** contains **noise**,
some data sets may contain **signals**.

Therefor, before you can **detect a signal**
within any given data set,
you must **first filter out the noise**.

Source: Wheeler, Donald J. Understanding variation – the key to managing chaos

Which library do you prefer?



Definition Metadata Management

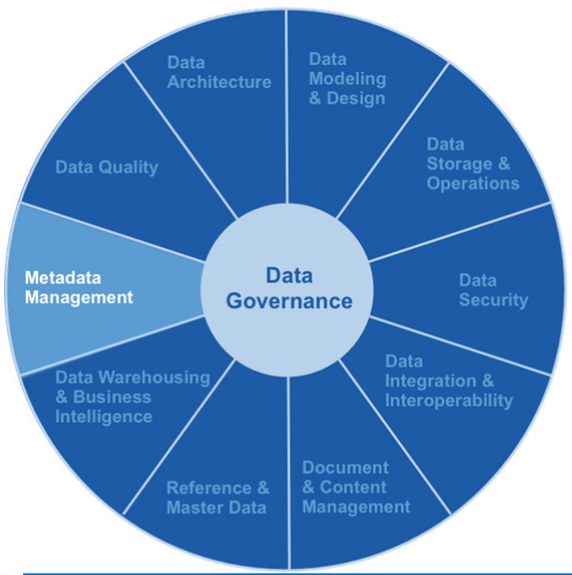
Planning, Implementation, and control activities that contributes to the ability to **process**, **maintain**, **integrate**, **secure**, **audit** and **govern** other **data**

 18

Relations with other knowledge areas

 19

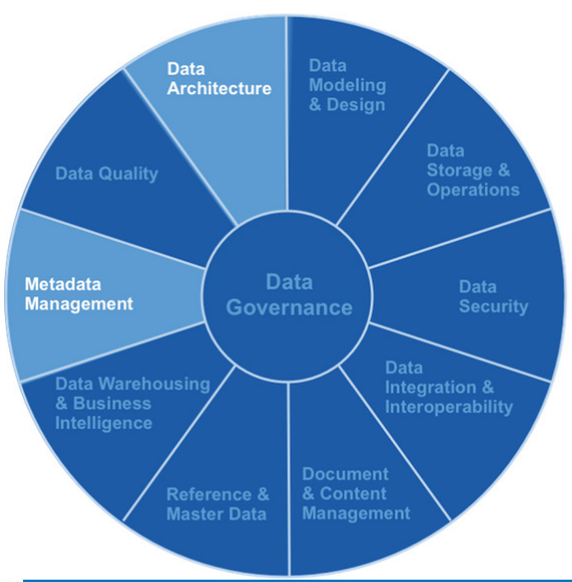
Relation with Data Governance



"what, where, how" vs. "why, who, when"

Metadata as foundation

Relation with Data Architecture

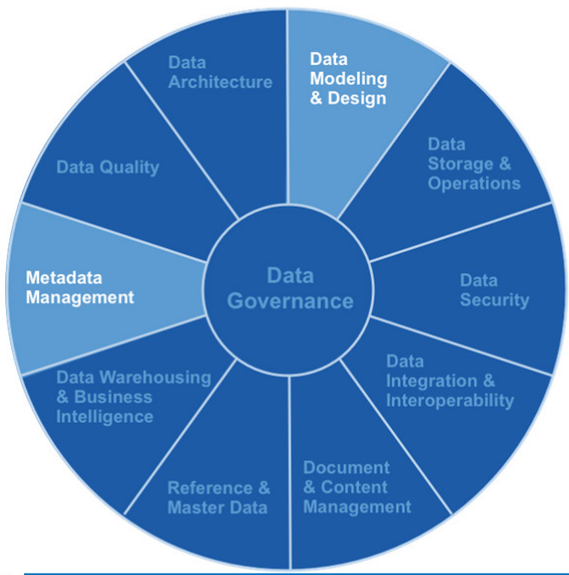


Metadata as building block for architecture

Metadata enhances clarity

Architecture shapes metadata

Relation with Data Modeling & Design



Metadata as input

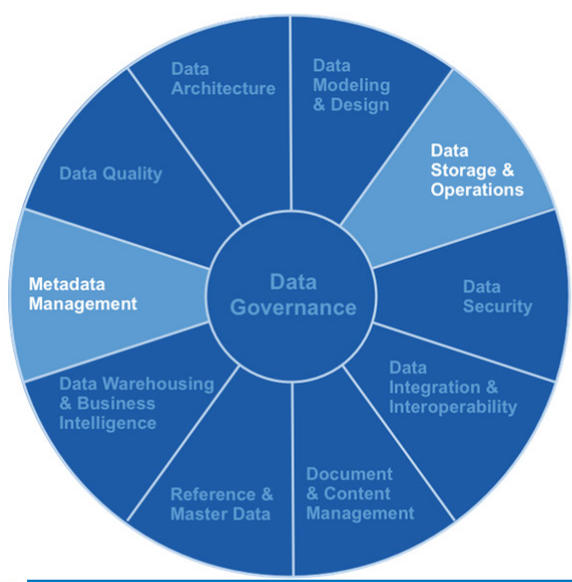
Metadata as output

Consistency & reusability

Data Model validation

 22

Relation with Data Storage & Operations



Support for efficient storage

Enhances data retrieval

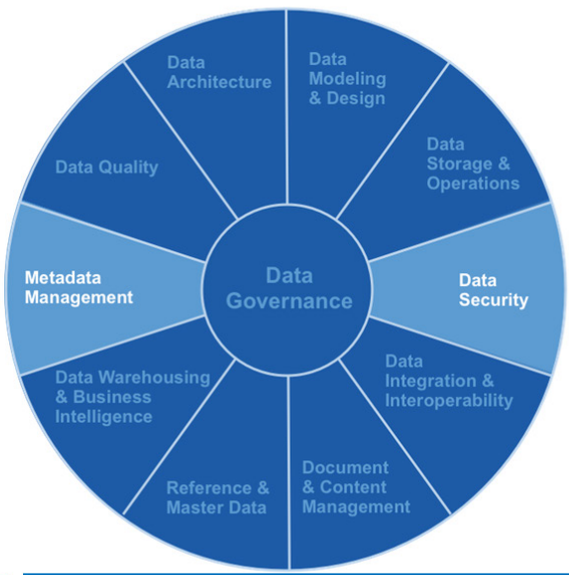
Ensures operational effectiveness

Enables security

Facilitates scalability and integration

 23

Relation with Data Security



Defines security attributes

Enables security enforcement

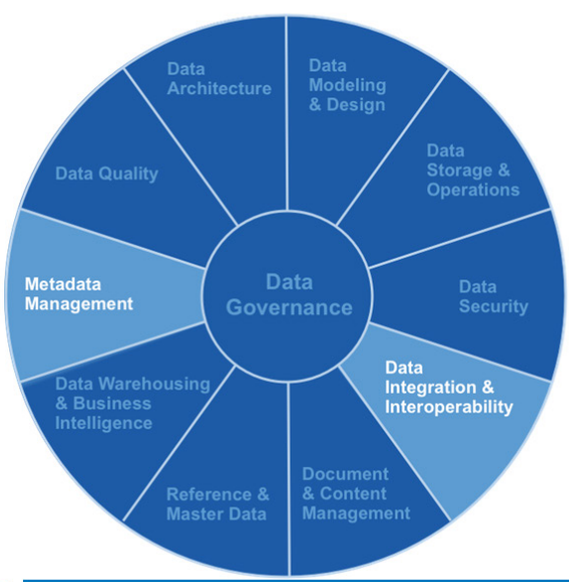
Supports risk assessment and mitigation

Enhances regulatory compliance

Improves security operations

 24

Relation with Data Integration & Interoperability



Facilitates data integration

Supports interoperability

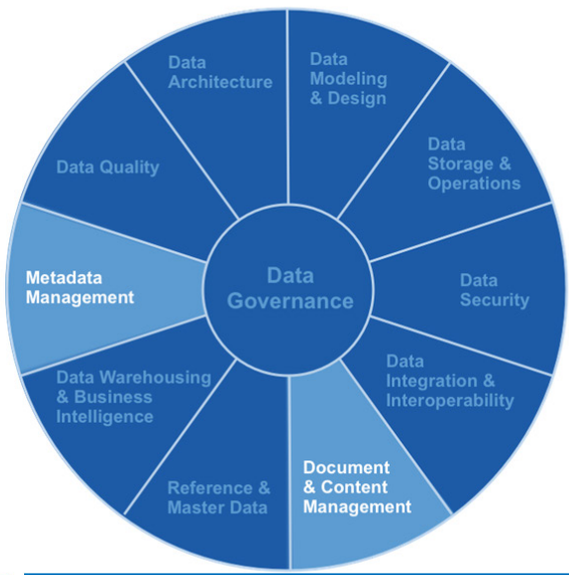
Enables data consistency and quality

Enhancing automation and scalability

Support data governance & compliance

 25

Relation with Document & Content Management



Enables content organization

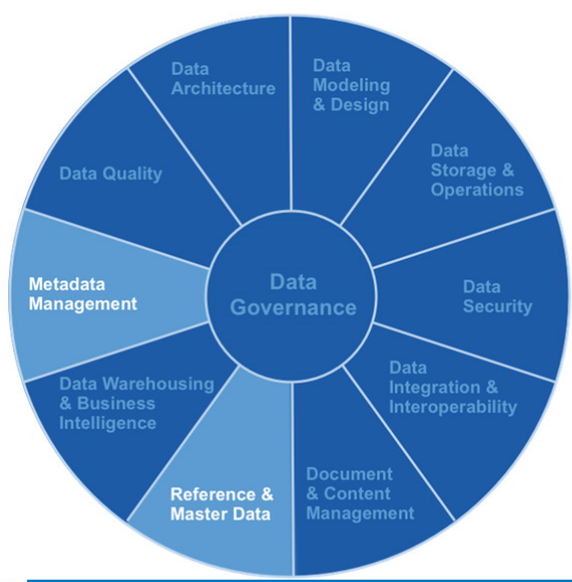
Improves search and retrieval

Facilitates workflow and collaboration

Supports compliance and governance

Enhances content reusability

Relation with Reference & Master Data



Provides context

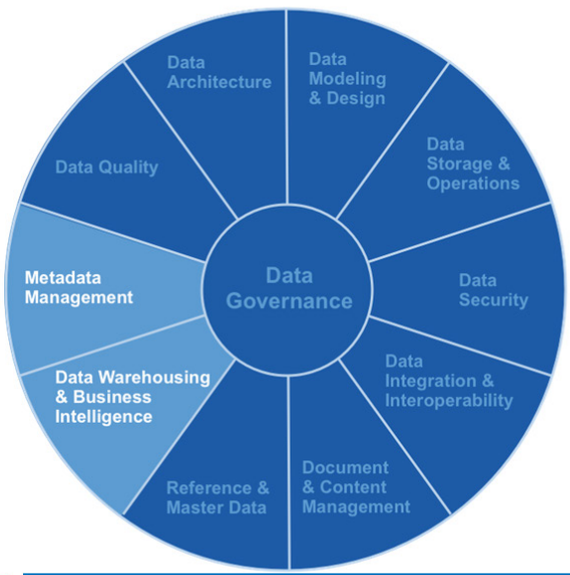
Supports data governance

Enables integration

Enhances data quality

Enables effective usage

Relation with Data Warehousing & Business Intelligence



Foundation of Data Warehousing

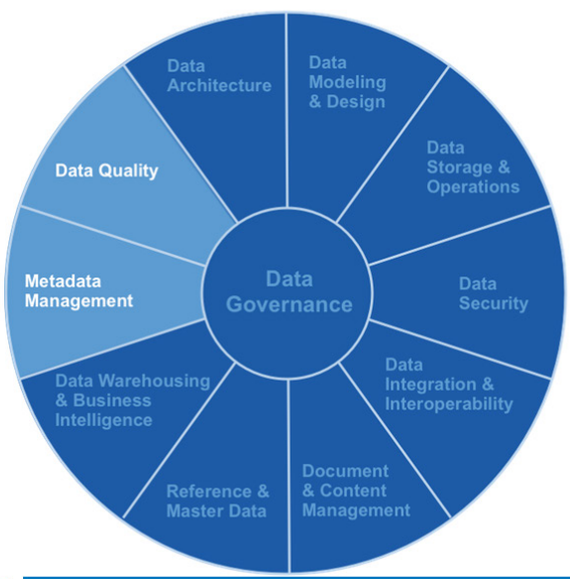
Provides meaning to BI

Ensures data quality and consistency

Enables efficiency

Supports enhances use cases

Relation with Data Quality



Defines DQ dimensions

Supports DQ measurement

Enables DQ improvement

Enhances DQ governance

Prevent DQ issues

Business Drivers

- ✓ Increase **confidence** in data
- ✓ Enhance **strategic value**
- ✓ Improve **operational efficiency**
- ✓ **Prevent use** of outdated data
- ✓ **Reduce** research **time**
- ✓ Foster **better communication**
- ✓ **Risk mitigation**
- ✓ Accelerate **time-to-market**
- ✓ Support **training and documentation**
- ✓ Facilitate **regulatory compliance**

 30

Poorly managed Metadata leads to

- ✗ **Redundant** data and processes
- ✗ **Replicated** and redundant metadata **storage**
- ✗ **Inconsistent definitions** and data **misuse**
- ✗ **Competing** and **conflicting** sources which reduce the **confidence** and **trust** in **data**
- ✗ **Doubts** about the **reliability** of (meta) **data**

 31

Goals

- Document and manage **organizational knowledge**
- Collect and **integrate** Metadata from diverse sources
- Ensure Metadata **quality**, **consistency**, **currency**, and **security**
- Provide **standard ways** to make Metadata accessible
- Establish or enforce the **use of** technical Metadata **standards**

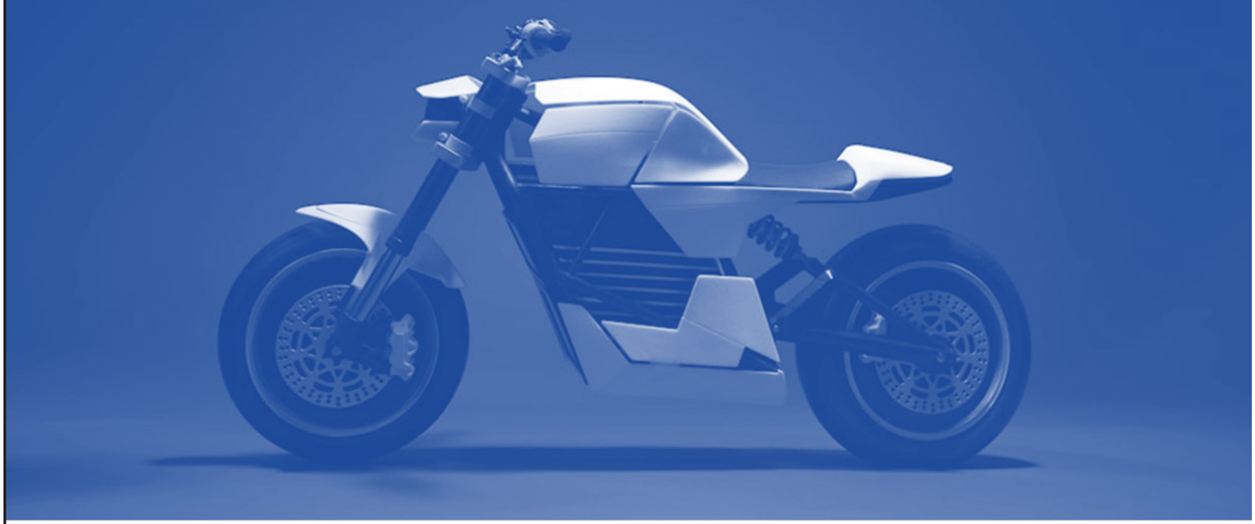
 32

Principles

- **Organizational commitment**
- **Access**
- **Strategy**
- **Quality**
- **Enterprise perspective**
- **Audit**
- **Socialization**
- **Improvement**

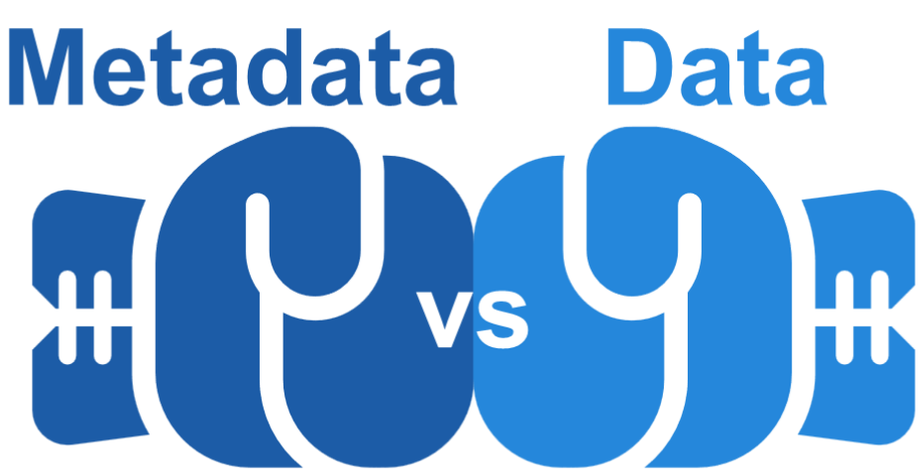
 33

Essential Concepts



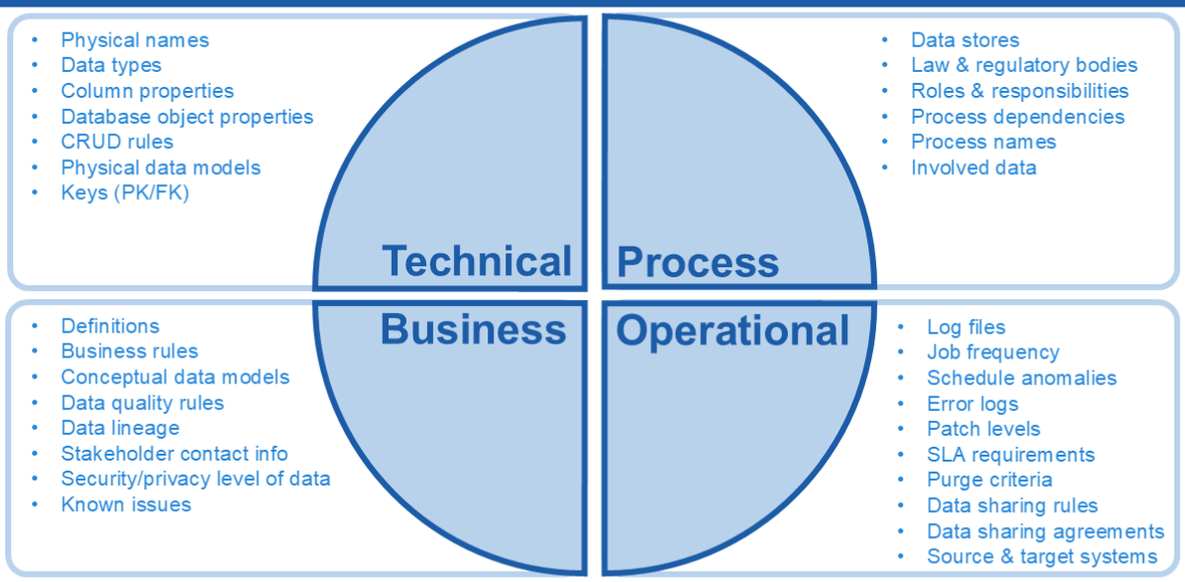
 34

Metadata vs. Data



 35

Types of Metadata



 36

ISO / IEC 11179 Metadata Registry Standard

Purpose

- ✓ To create a structured approach for metadata management that enhances **data interoperability, reusability, and quality**.
- ✓ It standardizes the representation of metadata in a registry, ensuring **consistency in defining and describing data elements**

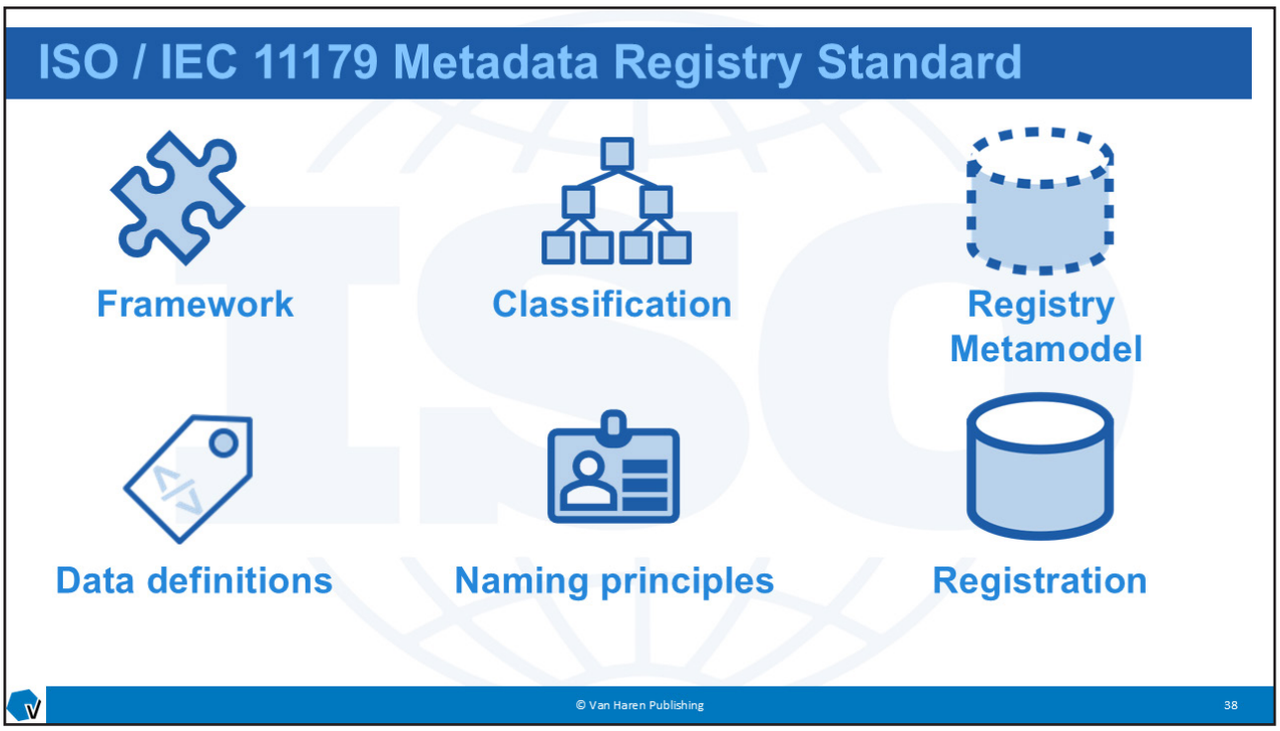
Key components

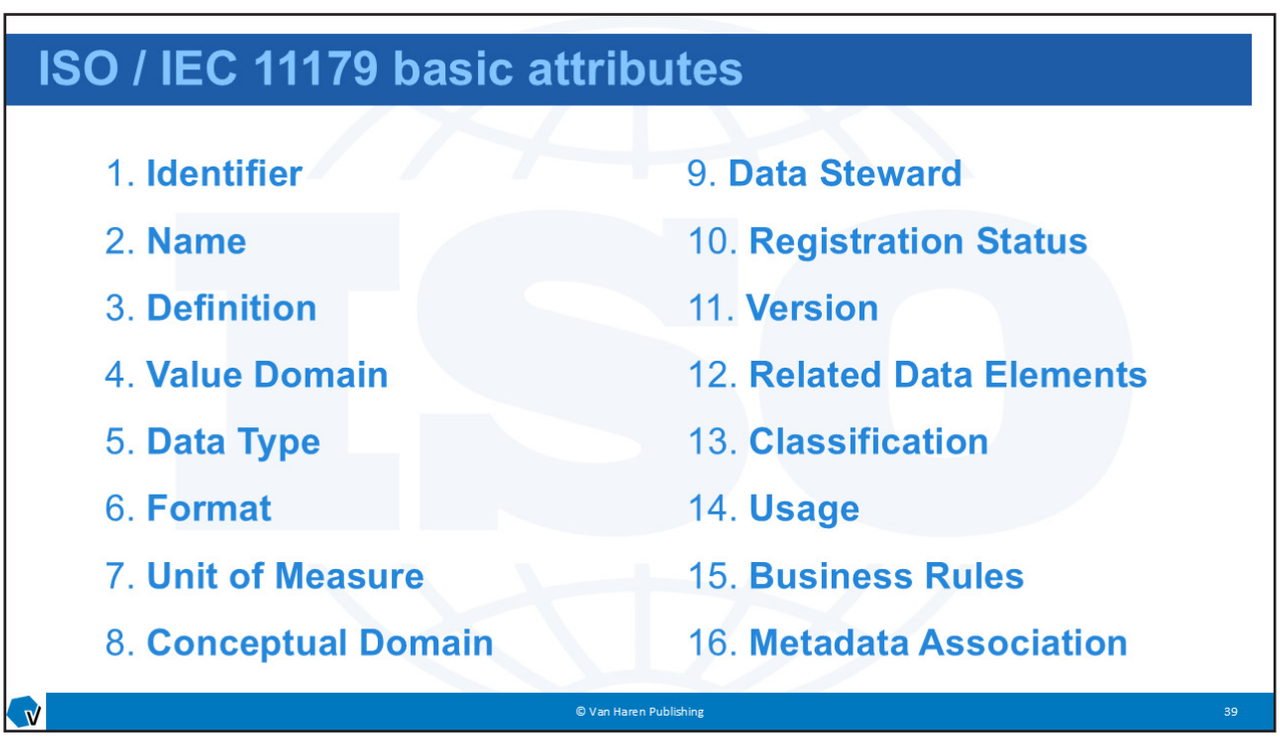
- ✓ Focuses on metadata for **data elements**, which are the smallest units of data. (e.g., a column in a database, a field in a form)
- ✓ Addresses both the semantic (**meaning**) and structural (**format**) aspects of metadata.

Scope

- ✓ Used in contexts where data needs to be **shared or integrated**, such as government agencies, healthcare, finance, and cross-organizational collaborations.

 37


ISO / IEC 11179 Metadata Registry Standard
Framework
Classification
Registry Metamodel
Data definitions
Naming principles
Registration
© Van Haren Publishing
38


ISO / IEC 11179 basic attributes
1. Identifier
2. Name
3. Definition
4. Value Domain
5. Data Type
6. Format
7. Unit of Measure
8. Conceptual Domain
9. Data Steward
10. Registration Status
11. Version
12. Related Data Elements
13. Classification
14. Usage
15. Business Rules
16. Metadata Association
© Van Haren Publishing
39

ISO / IEC 11179 basic attributes

Attribute	Definition	Purpose
Identifier	A unique identifier assigned to the data element within the metadata registry.	Ensures the data element can be uniquely referenced across systems and contexts.
Name	The official name of the data element, typically following established naming conventions.	Provides a meaningful, standardized label for the data element.
Definition	A clear, unambiguous description of what the data element represents.	Ensures users understand the meaning and intent of the data element.
Value Domain	Specifies the set of valid values or permissible range of the data element.	Ensures the data element adheres to specific constraints, like enumerated values or numeric ranges.
Data Type	The type of data the element holds, such as string, integer, or date.	Ensures proper data storage and manipulation.
Format	Specifies how the data should be presented or structured.	Ensures consistency in data representation across systems.
Unit of Measure	The unit associated with the data element, applicable for quantitative data.	Provides clarity and context for numeric values.
Conceptual Domain	The broader conceptual meaning or classification of the data element.	Links the data element to an abstract idea or category for better organization and reuse.

ISO / IEC 11179 basic attributes

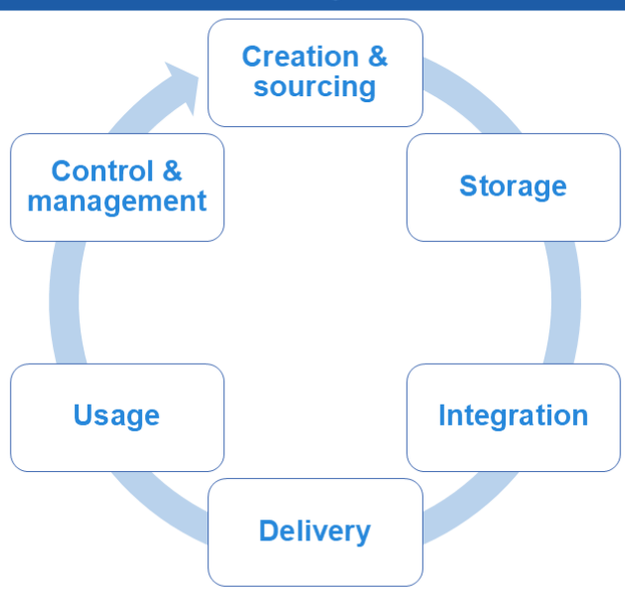
Attribute	Definition	Purpose
Conceptual Domain	The broader conceptual meaning or classification of the data element.	Links the data element to an abstract idea or category for better organization and reuse.
Data Steward	Identifies the individual or organization responsible for maintaining and managing the data element.	Ensures accountability and governance.
Registration Status	Indicates the lifecycle stage of the data element within the registry.	Tracks whether the data element is draft, standardized, or retired.
Version	Specifies the version of the data element, tracking changes and updates over time.	Maintains a history of modifications for governance and traceability.
Related Data Elements	Lists other data elements that are related to this one, such as hierarchies or associations.	Provides context for how the data element fits within larger data models or processes.
Classification	Specifies the category or grouping to which the data element belongs.	Supports organization and discoverability in the metadata registry.
Usage	Describes how and where the data element is used within processes, systems, or applications.	Provides context for its operational relevance.
Business Rules	Specifies any rules or conditions that apply to the data element in business contexts.	Ensures data is used and processed in alignment with organizational policies.
Metadata Association	Links the data element to additional metadata such as data lineage, transformation rules, or data quality metrics.	Provides a richer context for how the data element interacts with other elements and processes.

Sources of metadata

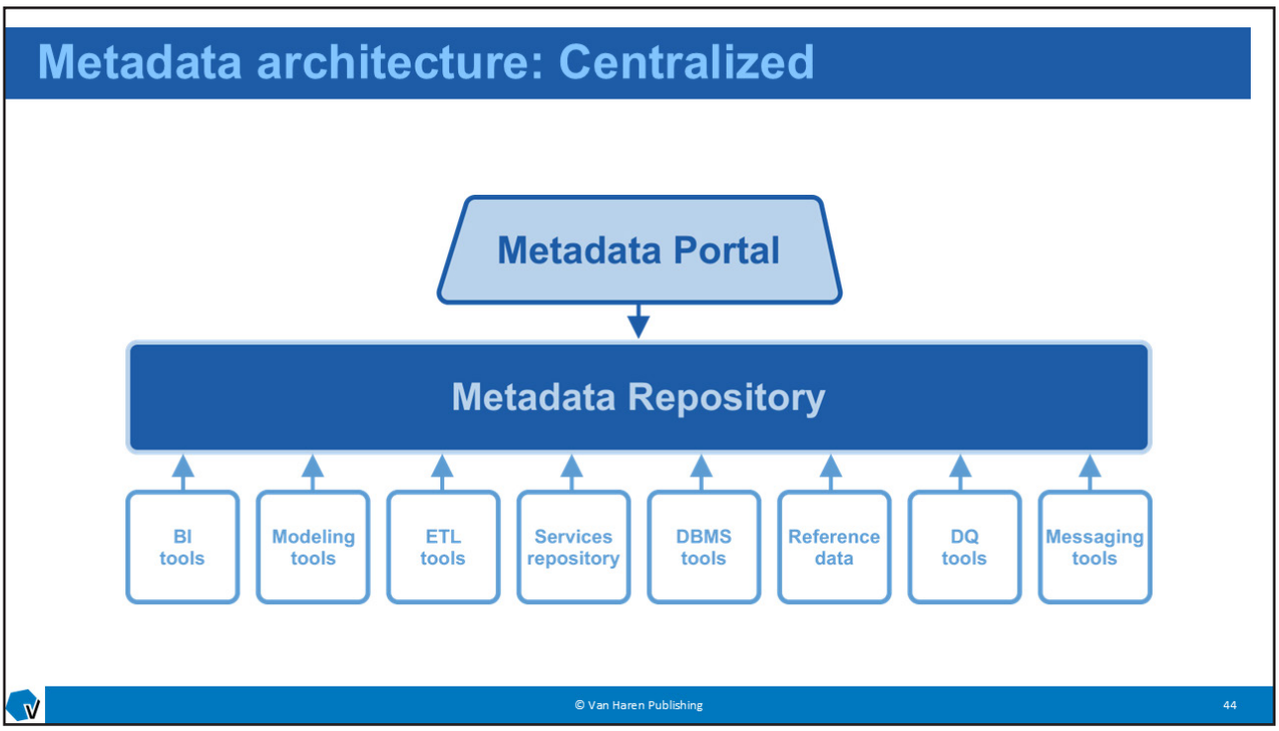
- Application metadata repositories
- Business glossary
- BI tools
- Configuration management tools
- Data dictionary
- Data integration tools
- Database management and system catalogs
- Data mapping management tools
- Data quality tools/ dashboards
- Directories and catalogs
- Event messaging tools
- Modelling tools and repositories
- Reference data repositories
- Service registries
- Others…

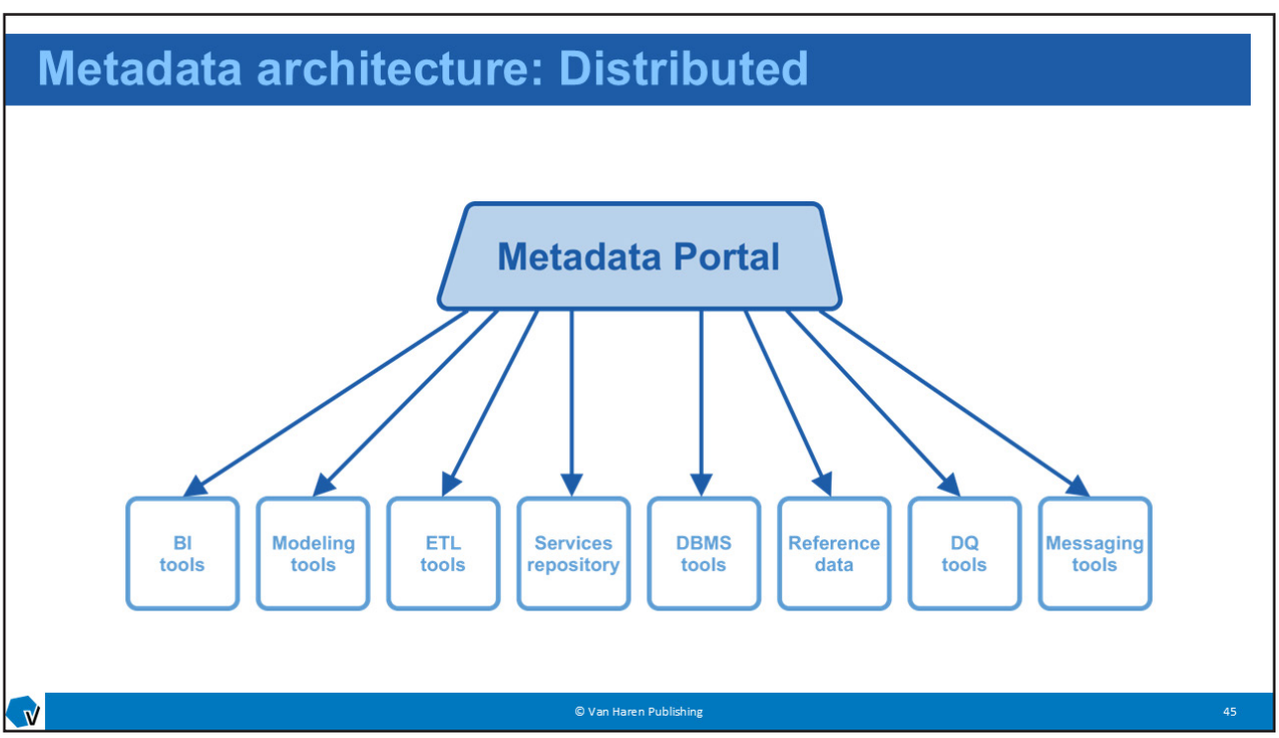
 42

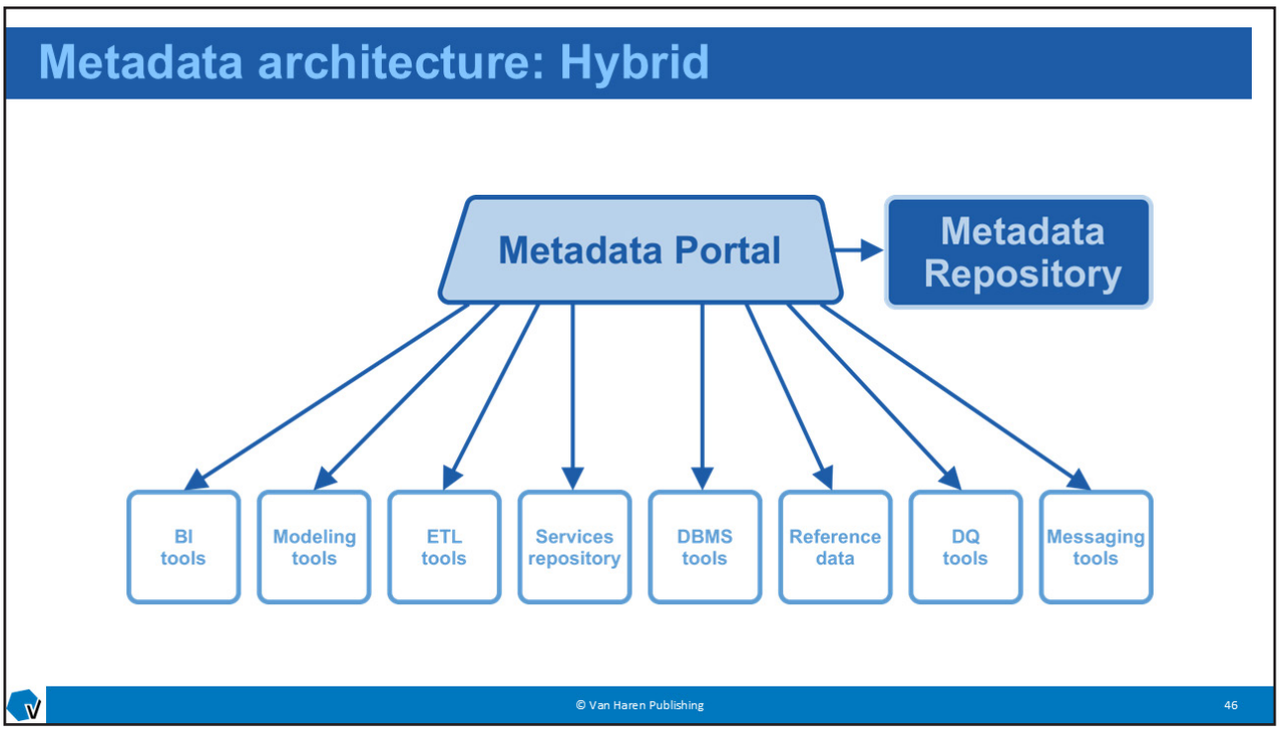
Metadata architecture: lifecycle

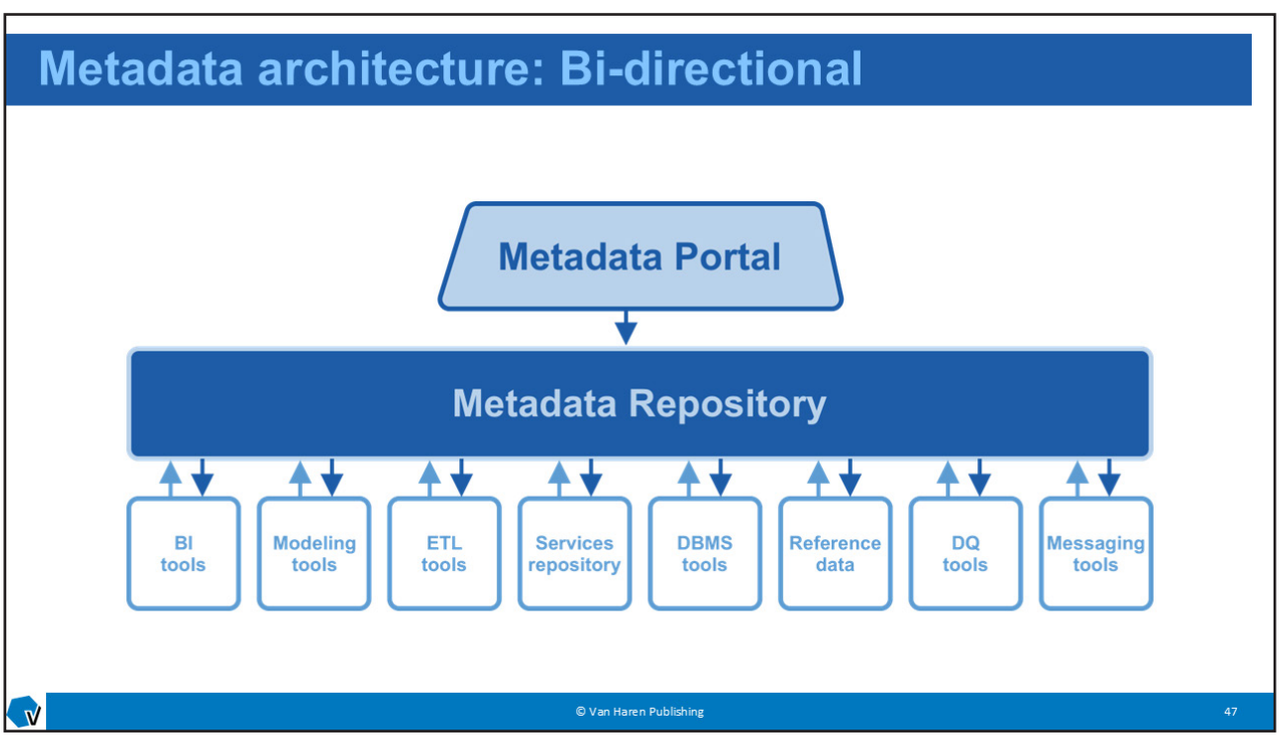


 43

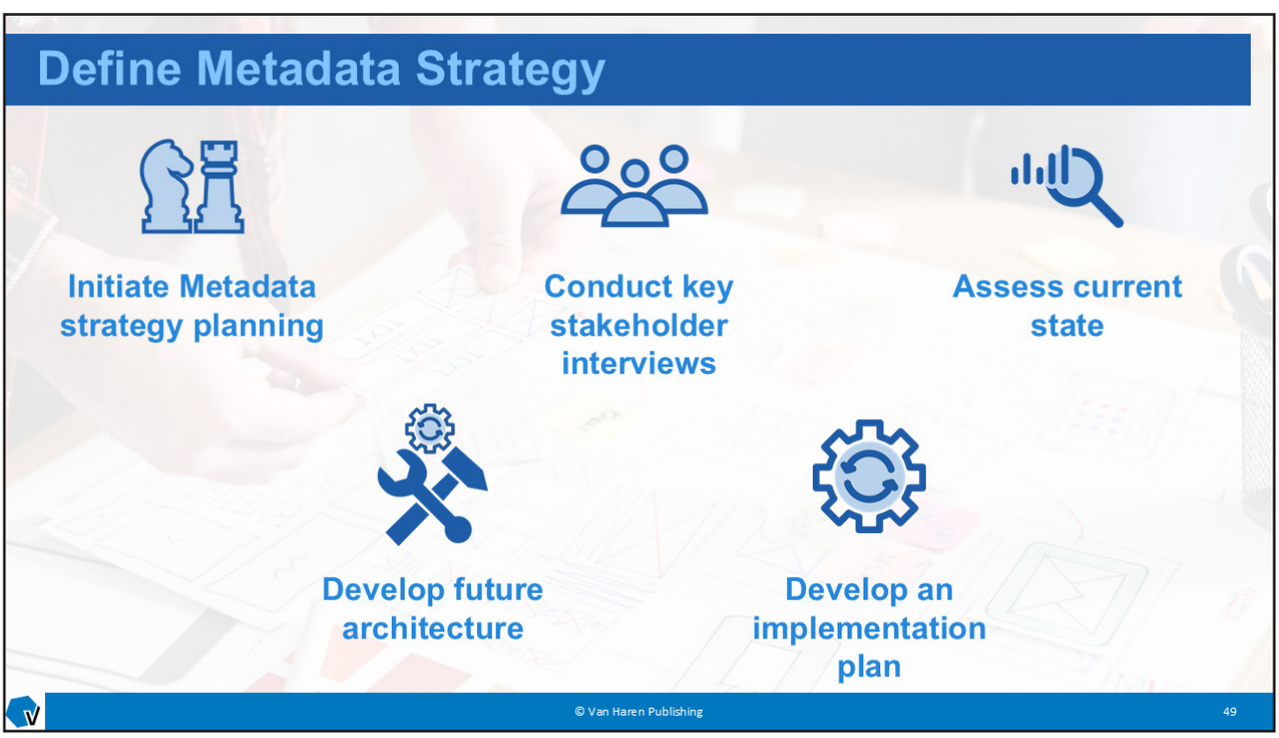

Metadata architecture: Centralized
Metadata Portal
Metadata Repository
BI tools
Modeling tools
ETL tools
Services repository
DBMS tools
Reference data
DQ tools
Messaging tools
© Van Haren Publishing
44


Metadata architecture: Distributed
Metadata Portal
BI tools
Modeling tools
ETL tools
Services repository
DBMS tools
Reference data
DQ tools
Messaging tools
© Van Haren Publishing
45


Metadata architecture: Hybrid
Metadata Portal
Metadata Repository
BI tools
Modeling tools
ETL tools
Services repository
DBMS tools
Reference data
DQ tools
Messaging tools
© Van Haren Publishing
46


Metadata architecture: Bi-directional
Metadata Portal
Metadata Repository
BI tools
Modeling tools
ETL tools
Services repository
DBMS tools
Reference data
DQ tools
Messaging tools
© Van Haren Publishing
47


Activities
© Van Haren Publishing
48


Define Metadata Strategy
Initiate Metadata strategy planning
Conduct key stakeholder interviews
Assess current state
Develop future architecture
Develop an implementation plan
© Van Haren Publishing
49

Understand Metadata requirements

- ✓ What metadata is needed and at what level?
- ✓ Volatility
- ✓ Synchronization
- ✓ History
- ✓ Access rights
- ✓ Structure
- ✓ Integration
- ✓ Maintenance
- ✓ Management
- ✓ Quality
- ✓ Security

 51

Manage Metadata stores

Control

Quality control

Metadata management

Training

 52

Tools

It is essential to have good tools, but it is also essential that the ***tools should be used in the right way.***

Wallace D. Wattles, American writer

 53

Tools

Colibra
Data Intelligence

Informatica
Metadata Manager

Alation

Talend
Data Catalog

SAP
Information Steward

IBM InfoSphere
Information
Governance Catalog

Azure
Data Catalog

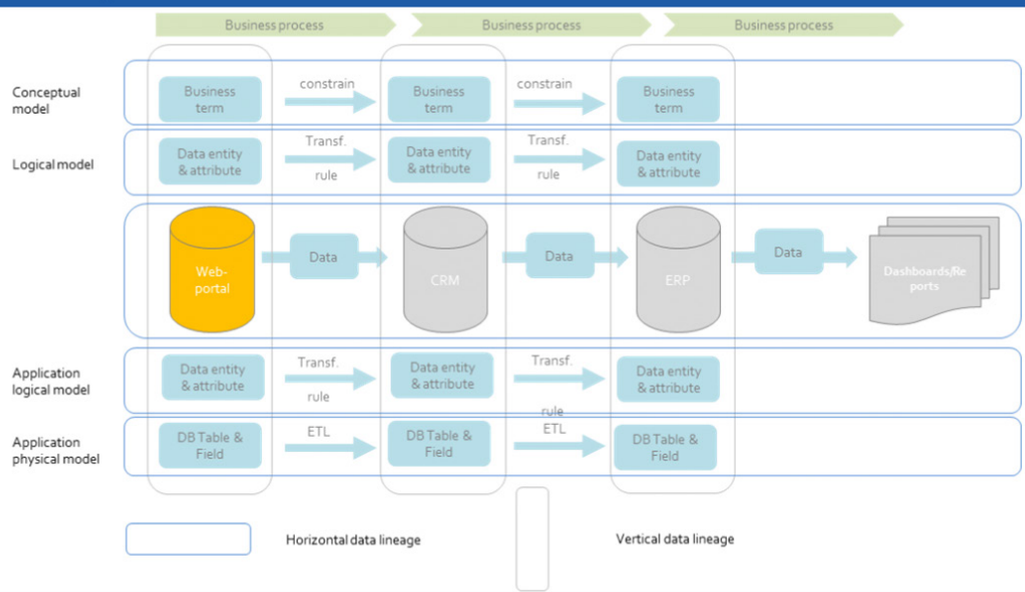
Apache Atlas

Data.world

erwin
Data Intelligence

 54

Techniques



Source: https://datacrossroads.nl/2019/03/20/data-lineage-104/

Lineage

As Implemented Lineage

VS.

As Designed Lineage