

Daten Virtualisierung

als Enabler für Data Governance, Self-Service und AI

Data Excellence Konferenz 2025

Wien, 2025-04-10

Drei. Macht's einfach.



1. Who are we?
2. Before & After Data Virtualization
3.  Areas of Improvement
(with Informatica)
4.  Things for the future
(with Denodo & AVDM)
5.  Things we learned



Who are we?



CKHH - CK Hutchison Holdings Ltd.



**Drei:
Everything from
a single source.**



Mobile



Internet



Fixed-line



TV



Business
Solutions



Wholesale

Drei Business: Ideal Solutions for corporate customers.



Telephony.

Individual tariffs for small, medium and large enterprises incl. Mobile Device Management.



Internet.

Mobile and fixed line-solutions support efficient work in the office and on the go.



Interconnection.

The connection of individual enterprise locations enables efficient and secure cooperation; campus networks for enterprise locations.



Digital Solutions

M2M/ IoT solutions for new business areas, Digital Signage, **Data Analytics**.

Drei Business: Ideal Solutions for corporate customers.



IT-Services.

Drei Support of IT-Infrastructure; Cloud and Enterprise Filesharing



Comprehensive solutions

E-Card-Connection and complete individual solutions, e.g. for pharmacies and medical doctors.



Consultation.

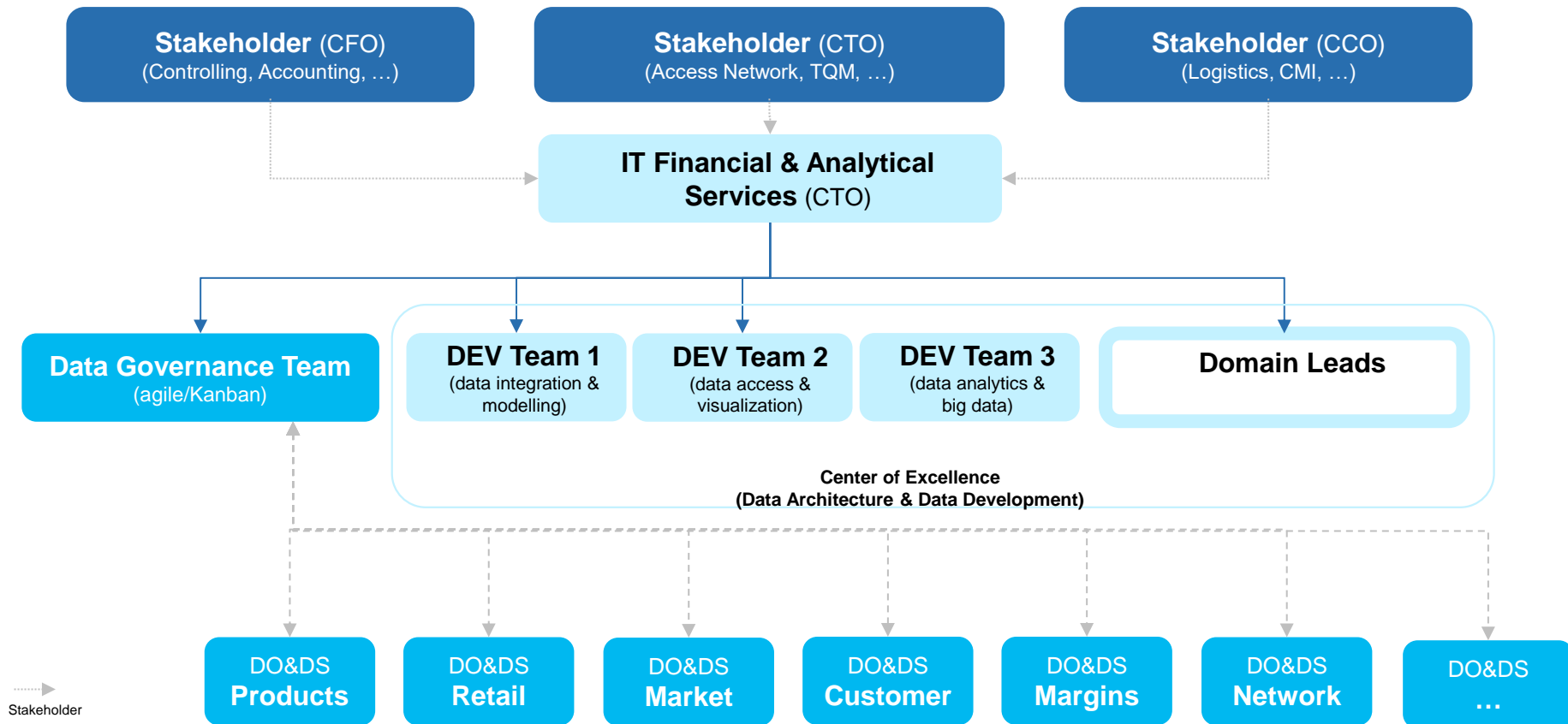
Individual consultation from the first SIM-Card.



Customer-service.

Competent, friendly, flexible and in proximity.

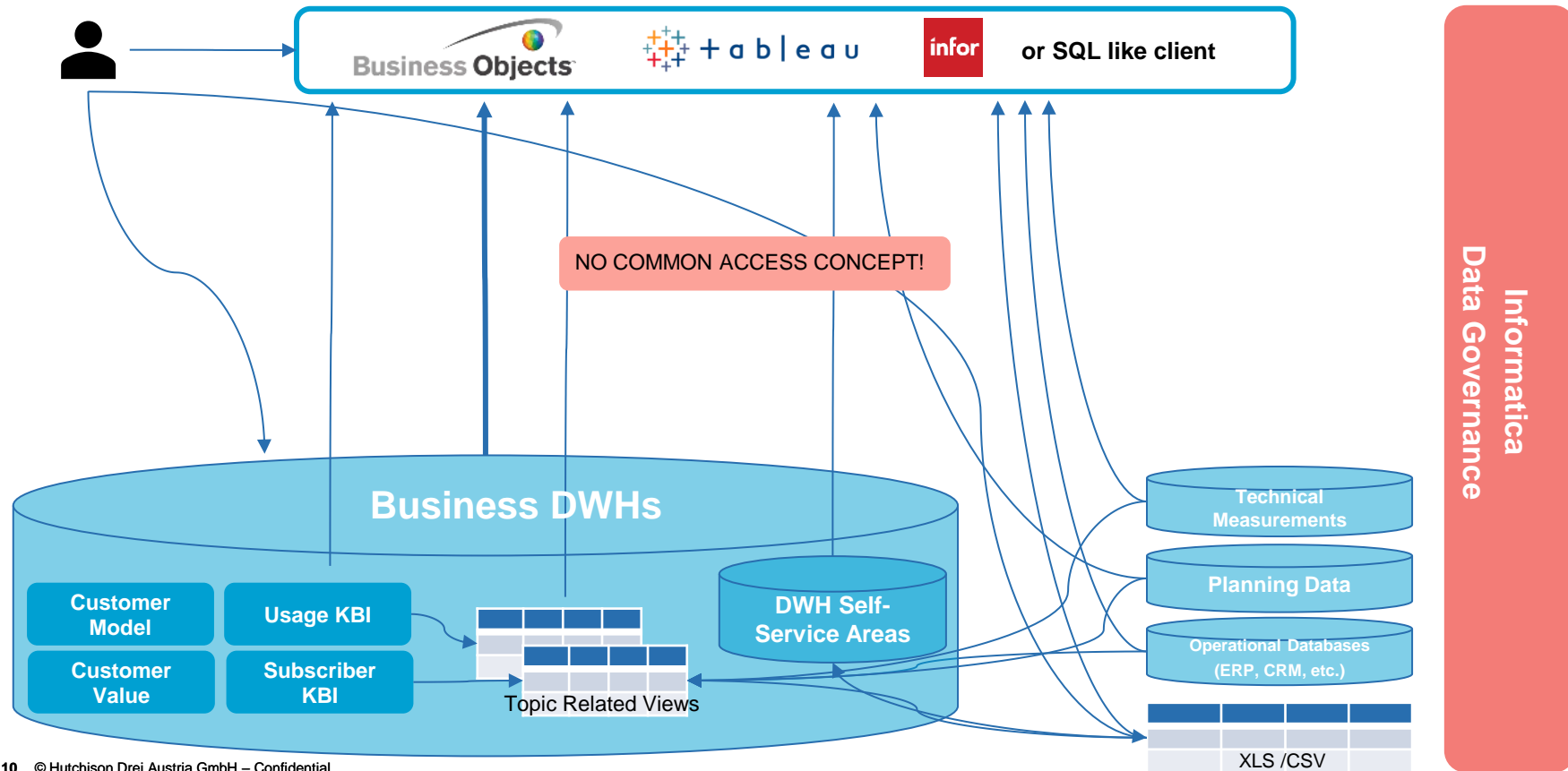
Organizational embedding for data analytics.



Before & After Data Virtualization



Before (2021): Data access handled individually



Virtual Data Access Layer: Why ?



Faster time to
access our data



Reducing data
replication



Support Data
Governance



Centralized **control**
of data query
executions

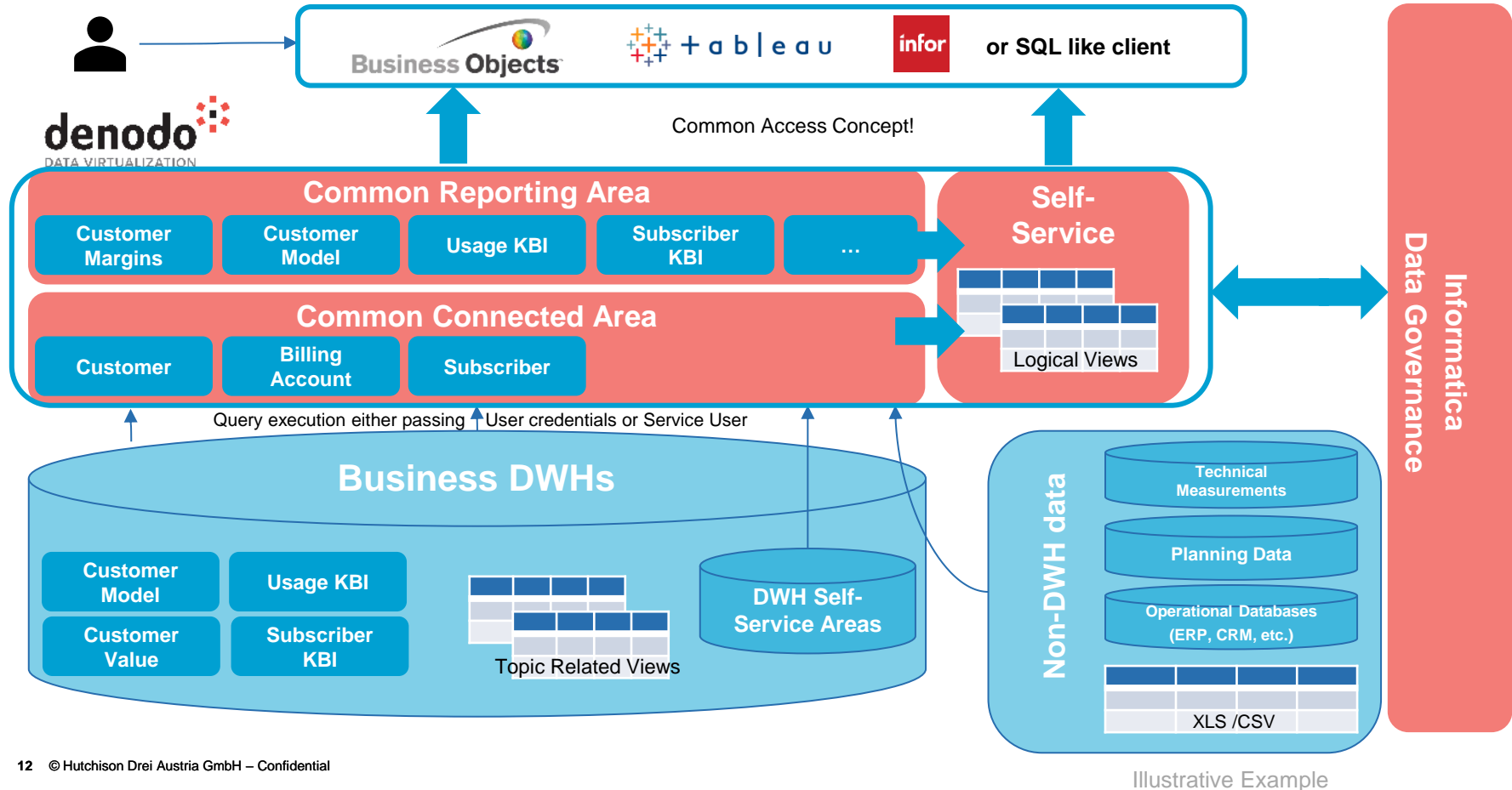


Meet **security**,
Privacy &
Audit requirements



Enables to **access**
and understand
new data sources

Now: Centralized Access to Data



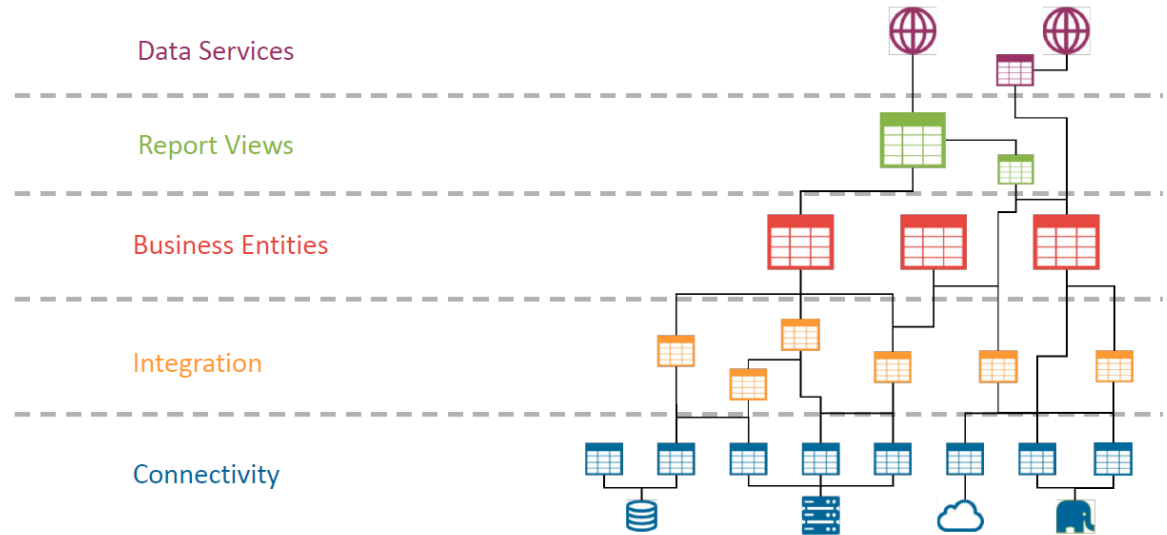


Areas of Improvement



1 - Improve central data & report development

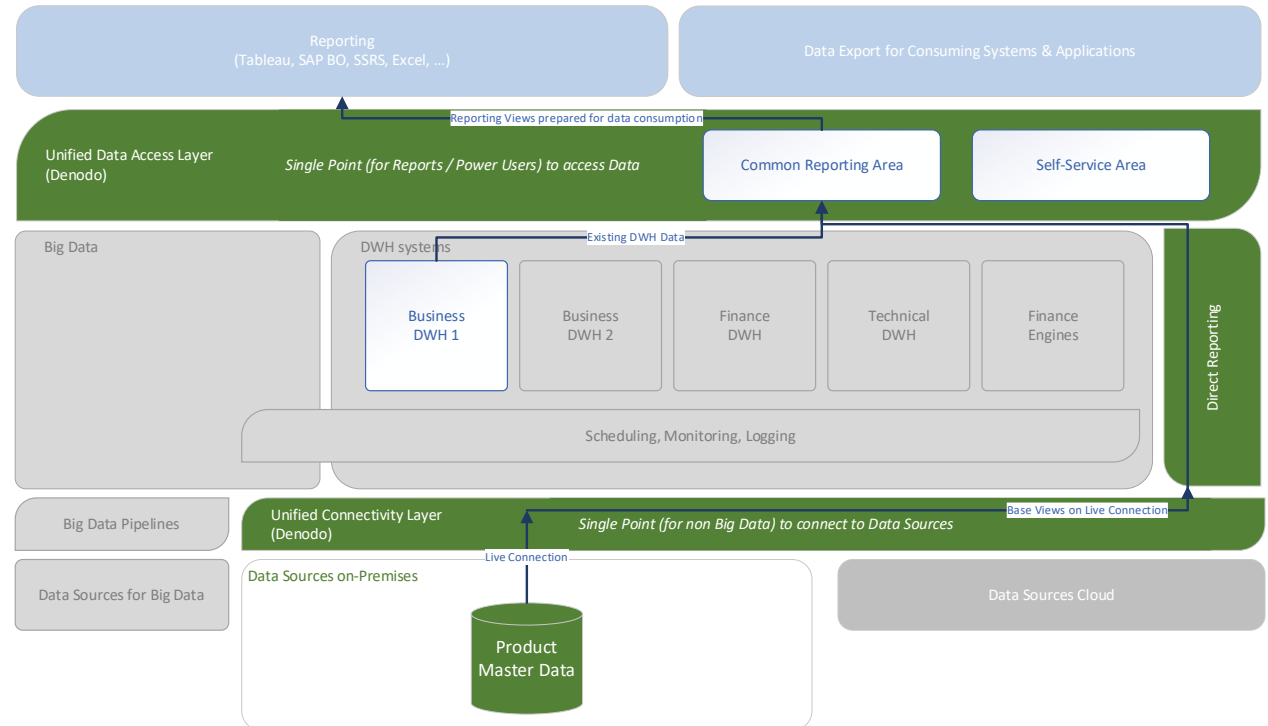
- **Repository** of data sources
 - Re-usability once connected
- **Layered Data Architecture**
 - From Source to Consumption
- **Last mile transformation** to match data consumption / reporting tool needs
- **Rapid prototyping** with interface views



1 - Improve central data & report development

“New tool in our toolbox”

- Mix **DWH & Live Data**
- Improve **File Integration**
- Improve **combination of different data sources**
- Use Virtualization on “**both ends**”
- Slowly **remove direct access to DWH**



1 - Improve central data & report development

The screenshot displays the Denodo Design Studio interface. The top navigation bar includes 'denodo DESIGN STUDIO' and menu items: File, Administration, Tools, Help, and user profile. Below the navigation bar, a tab bar shows 'Welcome', 'VQL Shell', and two database connection tabs: 'corporate_bi.ds.sharepoint_pig...' and 'corporate_bi.bv.sharepoint_dri...'. The left sidebar contains an 'Explorer' panel with a search bar and a list of data sources. Two groups of data sources are highlighted with blue boxes: 'common_connected_area' and 'common_reporting_area' in the first group, and 'selfservice_access_network', 'selfservice_controlling', 'selfservice_it_ops', 'selfservice_logistics', 'selfservice_market_intelligence', and 'selfservice_technical_quality_man...' in the second group. The main workspace area is titled 'Welcome to Design Studio, bloedolu' and shows the 'Environment Pre-production'. It features a 'Quick access' section with three columns: 'Integrate' (with options like 'Connect to a data source', 'Create a derived view', etc.), 'Manage' (with options like 'Replicate data', 'Import an external data model', etc.), and 'Deliver' (with options like 'Publish views as a REST web service', 'Open GraphQL service', etc.). Below this is a 'What's new' section stating 'You are connected to Virtual DataPort Server 9.1.1' and a 'Learn & explore' section with four cards: 'Tutorials', 'Expert Trails', 'Training', and 'Administration guide'.

denodo DESIGN STUDIO

File Administration Tools Help

Welcome VQL Shell corporate_bi.ds.sharepoint_pig... corporate_bi.bv.sharepoint_dri... 7

Explorer

Search

admin
combine
common
common_connected_area
common_reporting_area
corporate_bi
data_owner_area
datagov
datagov_automation
ea_pilot
poc
psft
revenue_assurance
selfservice_access_network
selfservice_controlling
selfservice_it_ops
selfservice_logistics
selfservice_market_intelligence
selfservice_technical_quality_man...
sv

Welcome to Design Studio, bloedolu

Environment Pre-production

Quick access

Integrate
Integrate disparate data in any location, format, or latency.
[Connect to a data source](#)
[Create a derived view](#)
[Create a summary view](#)
[Create a VQL stored procedure](#)
[Create a Kafka listener](#)

Manage
Manage related data into views with universal semantic model.
[Replicate data \(create remote table\)](#)
[Import an external data model](#)
[Open the Resource Manager](#)

Deliver
Deliver data products.
[Publish views as a REST web service](#)
[Open GraphQL service](#)
[Open OData service](#)
[Open RESTful web service](#)
[Copy URL to connect to Virtual DataPort \(JDBC\)](#)

What's new
You are connected to Virtual DataPort Server 9.1.1
[Check what's new](#)

Learn & explore

Tutorials
Step-by-step tutorials cover a series of topics about Denodo Platform.

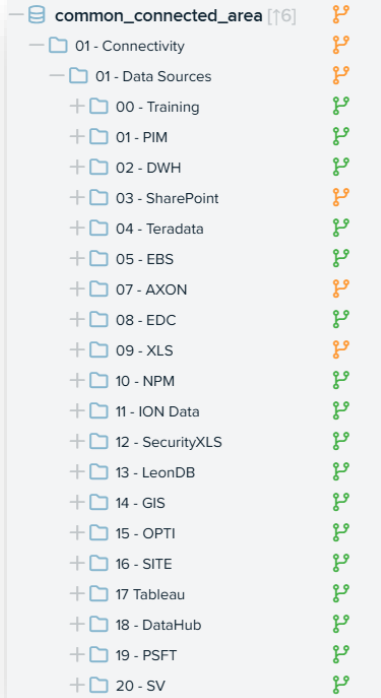
Expert Trails
The Expert Trails guide the path for anyone interested in self-paced learning.

Training
Become an expert in the Denodo Platform.

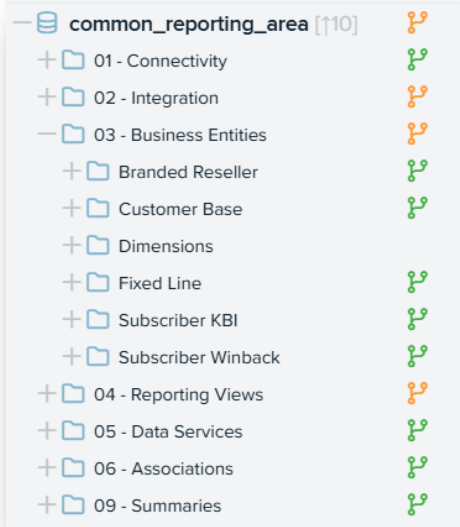
Administration guide
Documentation of Virtual DataPort.

1 - Improve central data & report development

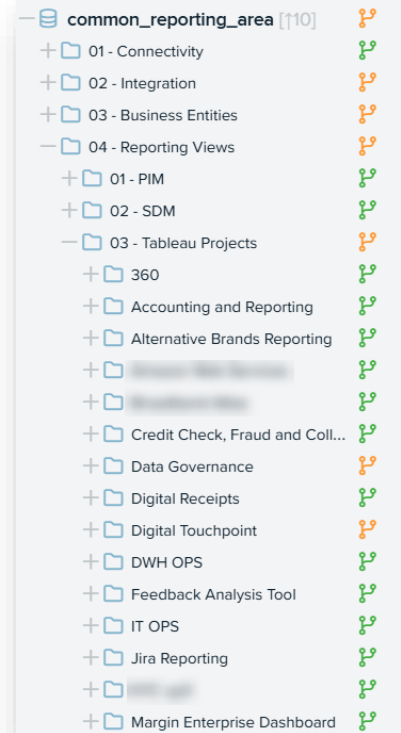
Repository of data sources



Layered data architecture

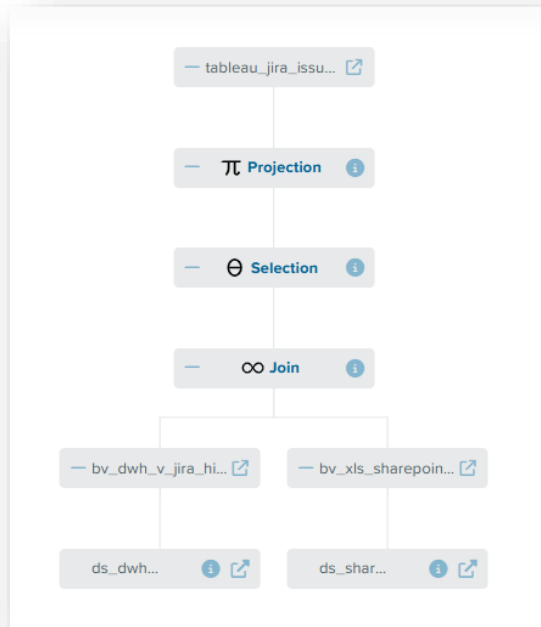


Last mile transformation



1 - Improve central data & report development

Transparent data lineage & execution trace



1 - Improve central data & report development

Central (and cascading) definition of object & column descriptions

SUMMARY EDIT OPTIONS VQL

Query Used By Data Lineage Tree View Associations Create Publish Export Drop ?

Database common_reporting_area View name tableau_wr_topups
View type Derived Cache status Off
Owner saadatma Last modifier saadatma
Creation Jan 21, 2025, 1:01 PM Last modification Mar 12, 2025, 8:41 PM

Folder /04 - reporting views/03 - tableau projects/weekly reporting

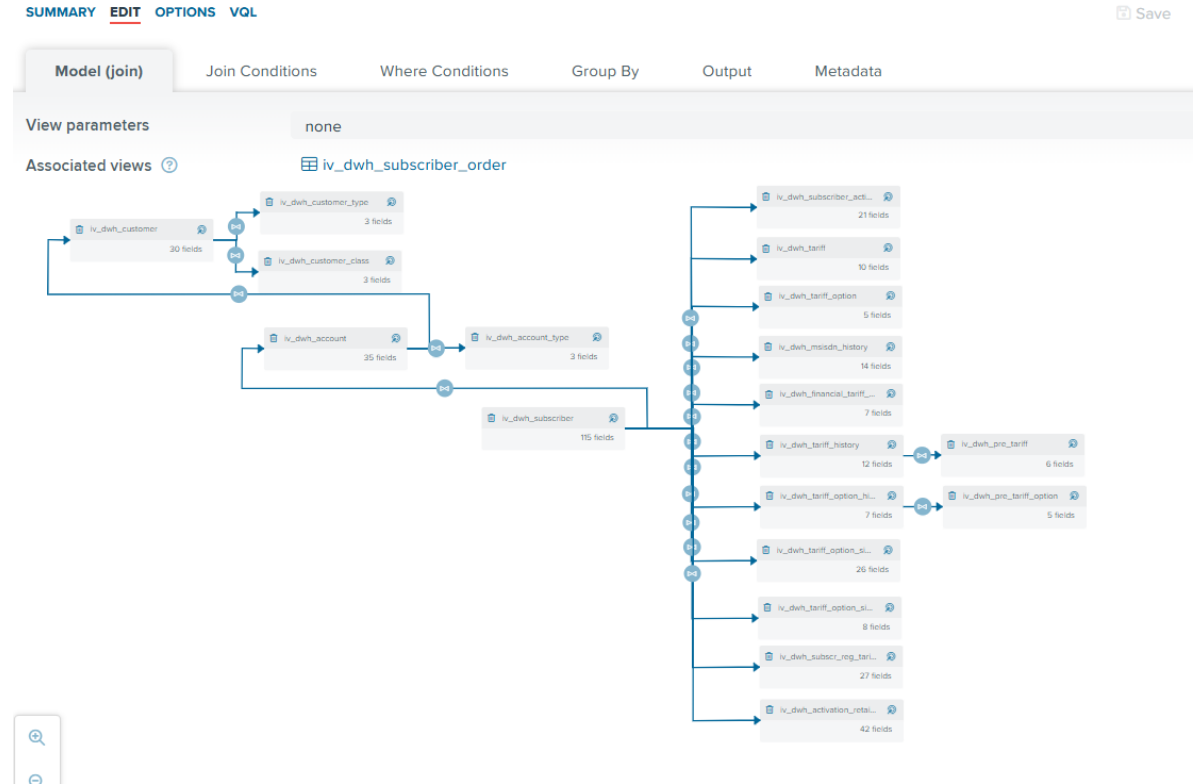
Description The report is showing the development of the topups revenue, subscriber count and topups amount on weekly base as well as on average weekly per month and per year categorized by financial group of Prepaid data and voice.

Schema

PK	Field name	Field type	Description
	<input type="text" value="Q"/>		<input type="text" value="Q"/>
	financial_tariff_group	text	Contains only Prepaid handset and data.
	source_id_descr	text	Contains only Drei, eety, Lidle.
	event_date_month	timestamp	
	monthly_amount	decimal	Monthly gross revenue of all topups.Used in the visualization to calculate t...
	monthly_cnt_subscriber	decimal	Monthly count of subscribers who made topups. Used in the visualization t...
	monthly_cnt_topups	decimal	Monthly count of topups done by subscribers. Used in the visualization to c...
	weekly_amount	decimal	Weekly gross revenue of all topups.
	weekly_cnt_subscriber	decimal	Weekly count of subscribers who made topups.
	weekly_cnt_topups	decimal	Weekly count of topups done by subscribers.
	yearly_amount	decimal	Yearly gross revenue of all top-ups. Used in the visualization to calculate th...
	yearly_cnt_subscriber	decimal	Yearly count of subscribers who made topups. Used in the visualization to ...
	yearly_cnt_topups	decimal	Yearly count of topups done by subscribers. Used in the visualization to cal...

1 - Improve central data & report development

Low-code options for building objects



1 - Improve central data & report development

- SQL-like syntax
- Improve **File Integration**
- Improve **combination of different data sources**

SUMMARY EDIT OPTIONS VQL

VQL options

☐ Export dependencies ☐ Include view statistics

☒ Drop elements before creating them ☐ Replace existing elements ☐ Do not replace existing elements

```
1 # Generated with Denodo Platform 9.1.1.
2
3 DROP VIEW IF EXISTS tableau_dt_cs_contacts CASCADE;
4
5 CREATE VIEW tableau_dt_cs_contacts
6   FOLDER = '/04 - reporting views/03 - tableau projects/digital touchpoint'(
7     date(description = 'Date when interaction with a customer occurred.'),
8     item_type(description = 'Type of interaction (call, written item, ...)'),
9     channel(description = 'Channel through which the interaction happened (email, letter,...)'),
10    customer_class(description = 'Customer class (Consumer, SE, Internal, ...)', sourcetypeid = '12'),
11    number_of_contacts(description = 'Number of interactions')
12  ) AS
13  SELECT common_connected_area.bv_xls_cs_contacts.date AS date,
14         CASE WHEN (common_connected_area.bv_xls_cs_contacts.itemtype = 'schriftliche Kundenanfrage') THEN
15           'Written Inquiries'
16         ELSE
17           common_connected_area.bv_xls_cs_contacts.itemtype
18         END AS item_type,
19         common_connected_area.bv_xls_cs_contacts.kanal AS channel,
20         CASE WHEN (common_connected_area.bv_xls_cs_contacts.segment <> 'Consumer') THEN
21           upper(common_connected_area.bv_xls_cs_contacts.segment)
22         ELSE
23           'Consumer'
24         END AS customer_class,
25         common_connected_area.bv_xls_cs_contacts.cnt AS number_of_contacts
26  FROM common_connected_area.bv_xls_cs_contacts
27  WHERE date >= trunc(addyear(CURRENT_DATE (), - 2), 'YEAR');
28
29 ALTER VIEW tableau_dt_cs_contacts
30   LAYOUT (bv_xls_cs_contacts = [199, 80, 200, 200]);
31
32
```

1 - Improve central data & report development

Rapid prototyping with interface views

SUMMARY EDIT VQL

Definition **Implementation** Metadata

Specify the fields that define the schema of the interface view.
Drag a view to the workspace to use as a starting point.

View name stock_h3a

☐ Enable compound types

<input type="checkbox"/> Field name	Field type
<input type="checkbox"/> timestamp	timestamp
<input type="checkbox"/> organization_code	text
<input type="checkbox"/> subinventory	text
<input type="checkbox"/> item_number	text
<input type="checkbox"/> quantity	decimal
<input type="checkbox"/> demand_class	text

	Description

Options New Field Restore Fields Remove

1 - Improve central data & report development

Rapid prototyping with interface views

SUMMARY EDIT VQL

Save Clear Changes Query Edited Drop

Definition

Implementation

Metadata

Implementation Expression

be_available_stock

Q

timestamp

timestamp

organization_code

text

subinventory

text

item_number

text

quantity

decimal

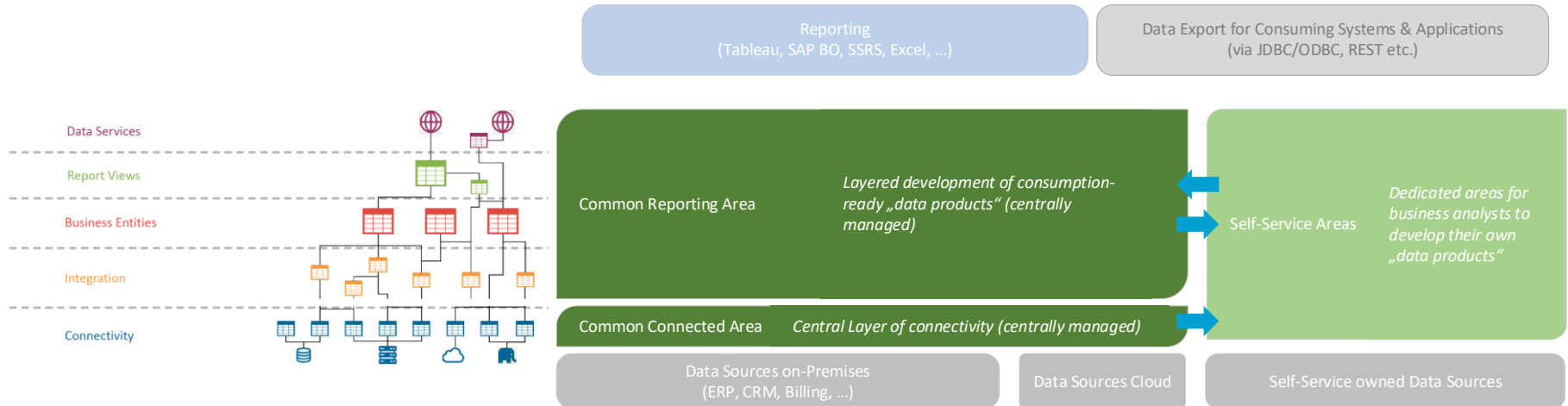
demand_class

text

Definition Field Name	Definition Field Type	Implementation Expression
Q		
timestamp	timestamp	timestamp
organization_code	text	organization_code
subinventory	text	subinventory
item_number	text	item_number
quantity	decimal	quantity
demand_class	text	demand_class

1 - Improve central data & report development

- Summary of translating our central & self-service development to the layer architecture

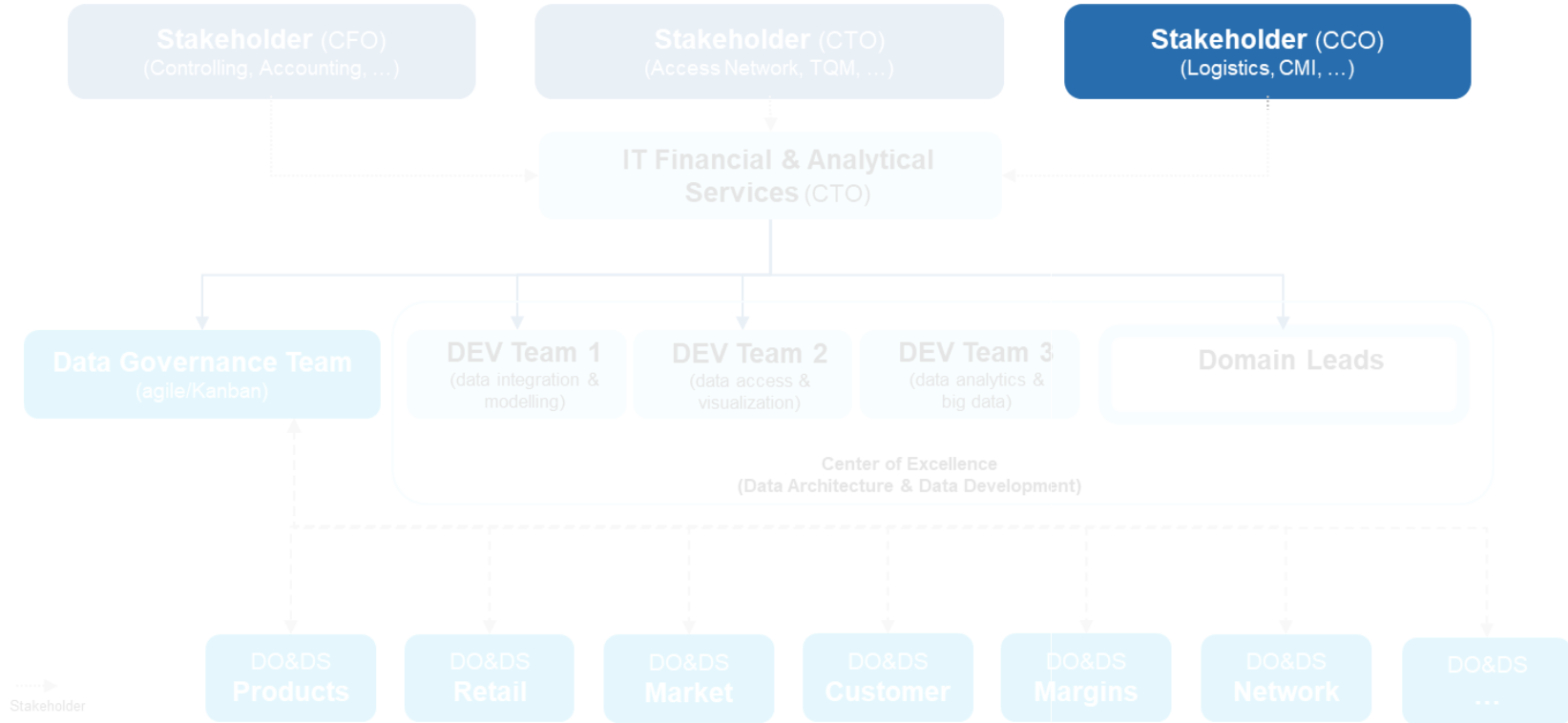


2 - Improve Self-Service

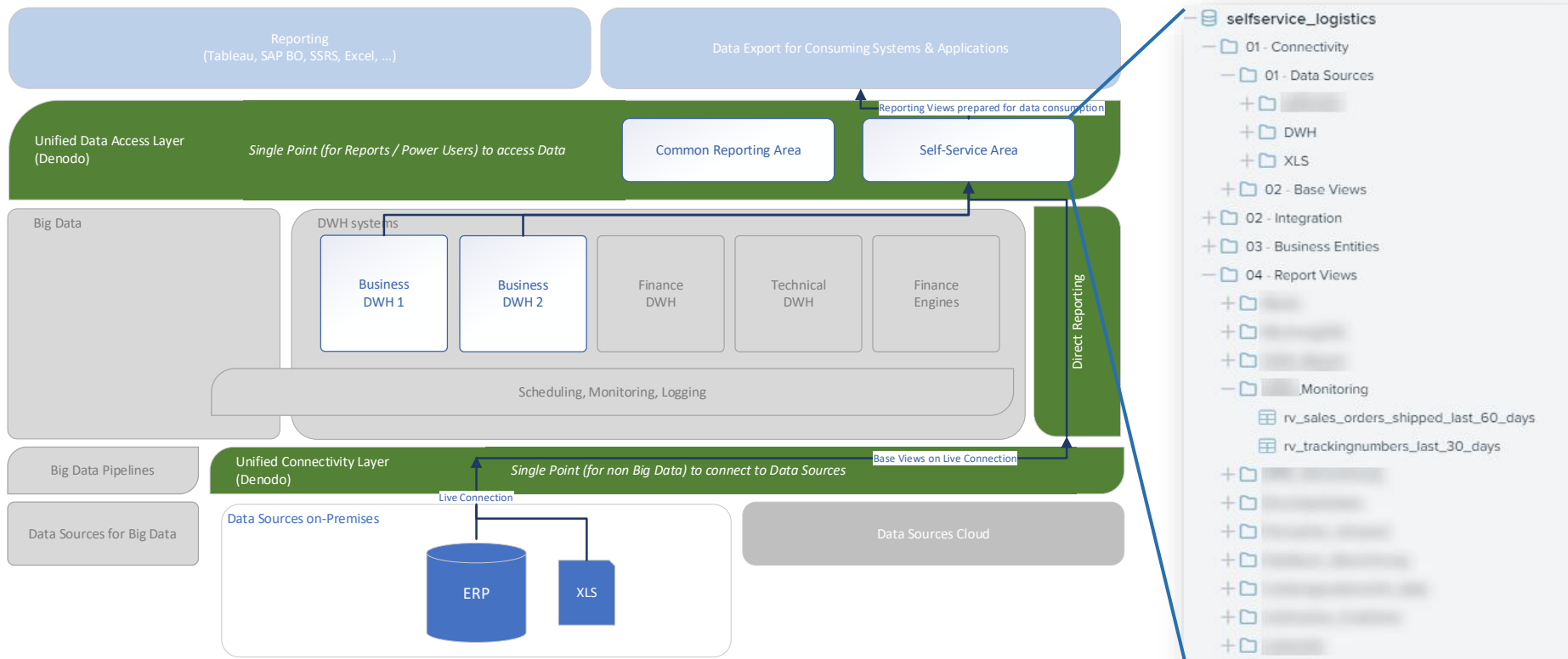
- Offer platform to connect to a **central repository of data sources**
 - If infrastructure changes are needed, this is a one-time effort (e.g. Cluster, Database or Network changes)
- Move away from combining sources in reporting tools
 - or exporting data excerpts only to combine it in tools users have “control over” (e.g. Excel, Access etc.)
- Prepare once – use with **whatever interface** most convenient
 - REST, ODBC, JDBC etc.
- **Empower friendly (power) users** to build their own data products
 - While getting best practices & architecture support from a central team



2 - Improve Self-Service



2 - Improve Self-Service



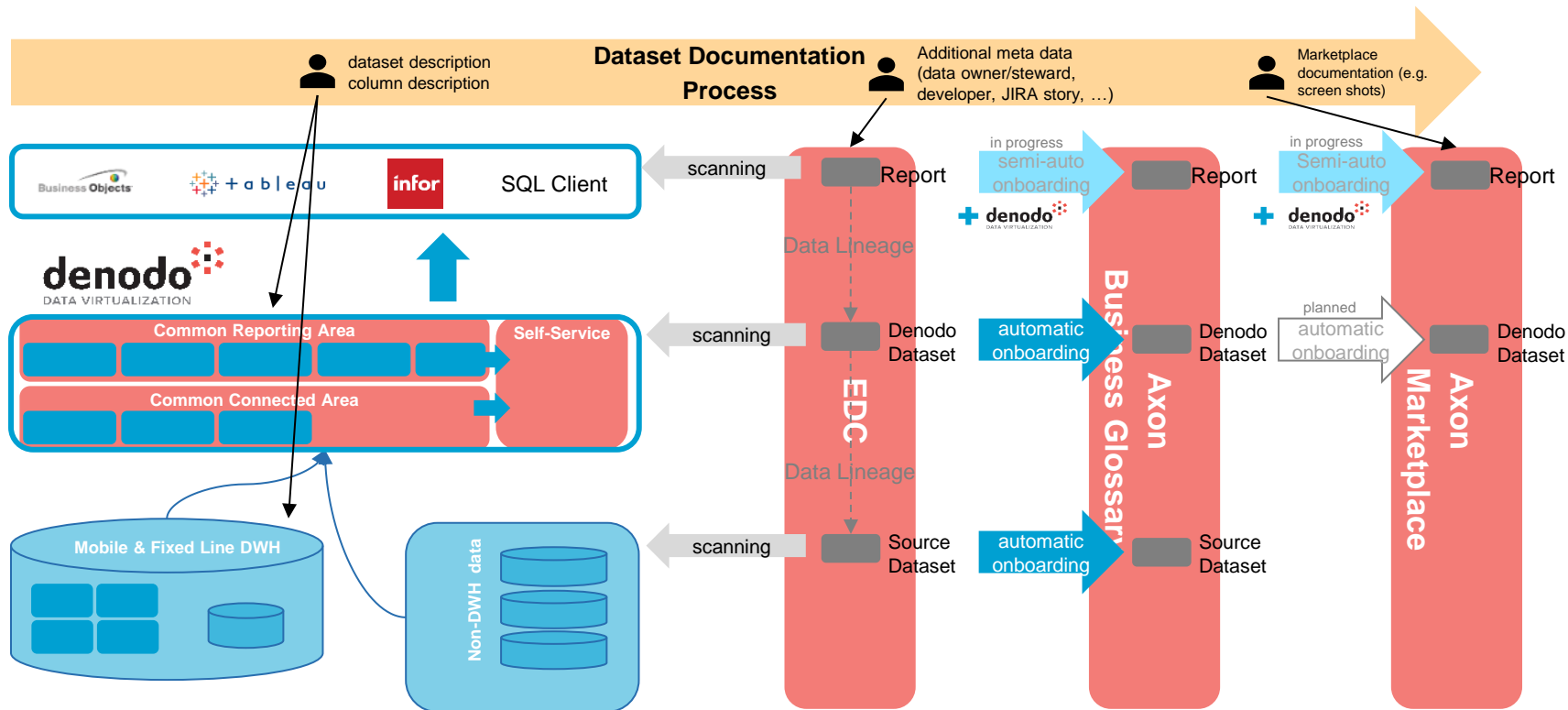
3 - Improve Data Governance

- Slowly **reducing** the amount / need for **shadow reporting**
 - “Just give me the data, I will continue in Excel”
- **Involve** more data analysts in the **data governance processes**
 - Data assignment, Data description, Data access
- Improve **data lineage information** & **metadata** descriptions
 - Including Denodo information in our Enterprise Data Catalog (and vice versa)
 - Making use of inheriting descriptions from source to report views



3 - Improve Data Governance

Data Virtualization and Data Governance **integrated under one architecture**

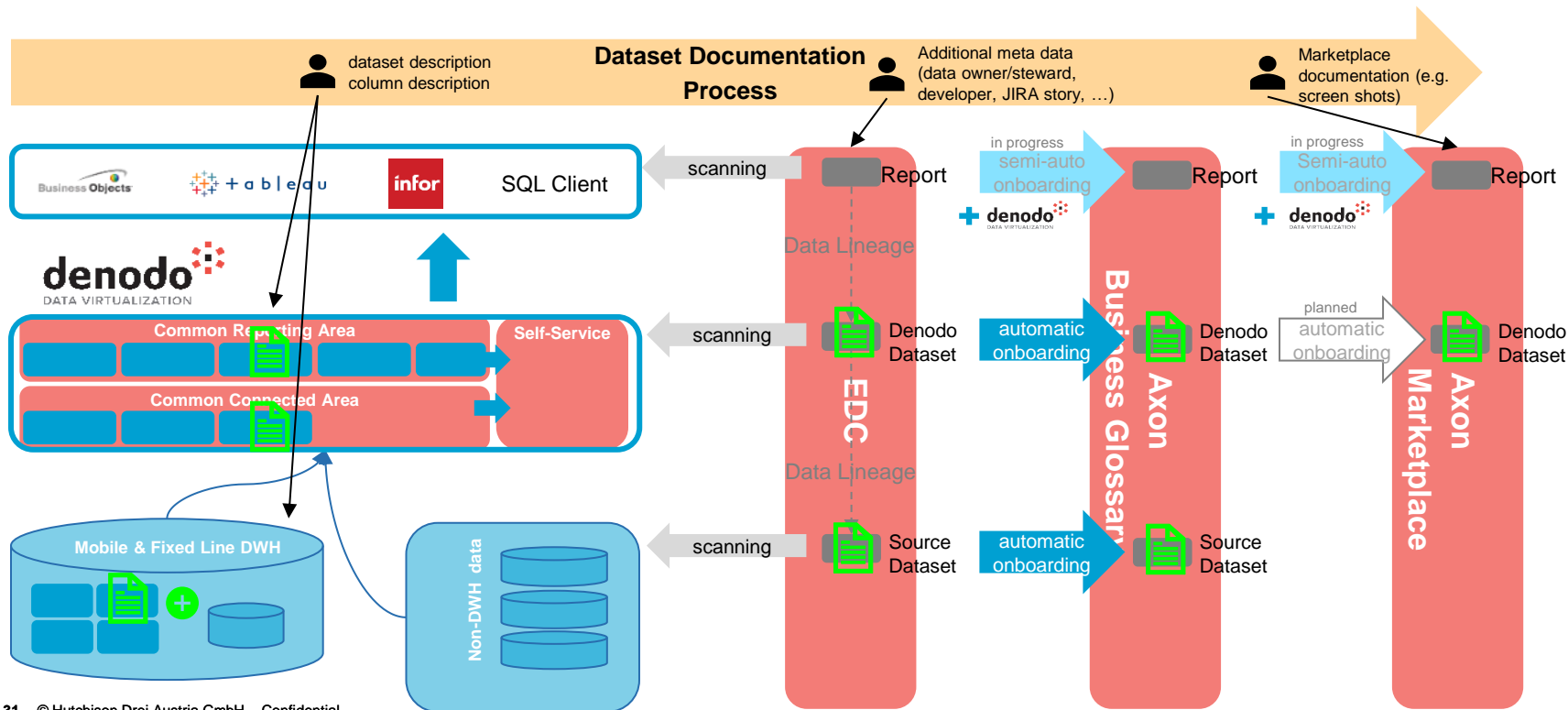


3 - Improve Data Governance

- Documentation of datasets is crucial to our Data Governance guidelines (knowledge management)
- No dataset leaves the “factory” without being documented (dataset & column description)
- **Challenge:**
 - Documentation to be available not only in source system, but wherever and from whomever (meta) data are consumed (DWH, Denodo, Enterprise Data Catalog, Business Glossary, Data Marketplace)
 - How to ensure documentation of datasets coming from source system not obliged for Data Governance standards?
 - How to ensure non-DWH developers in the business areas to document their

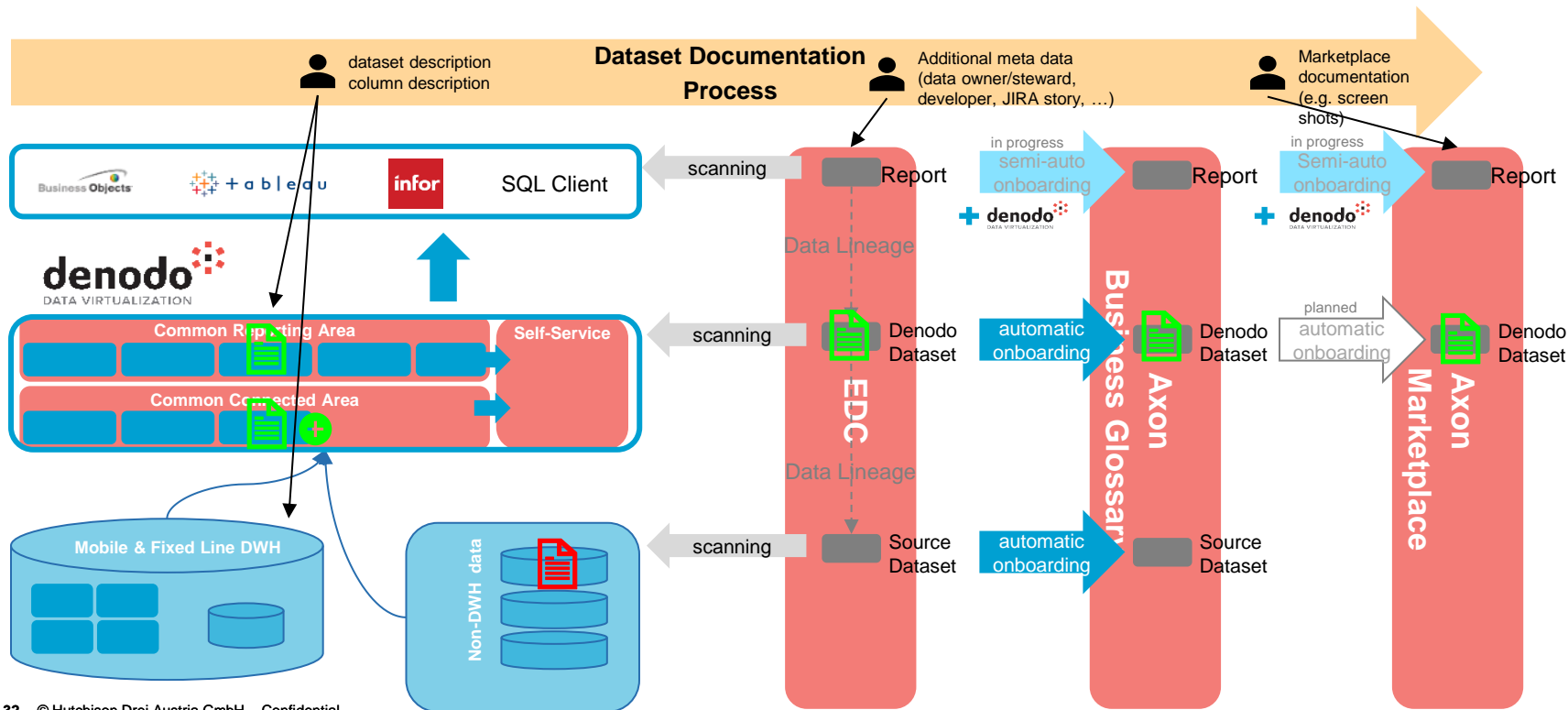
3 - Improve Data Governance

Dataset and column descriptions **automatically available on all levels and applications.**



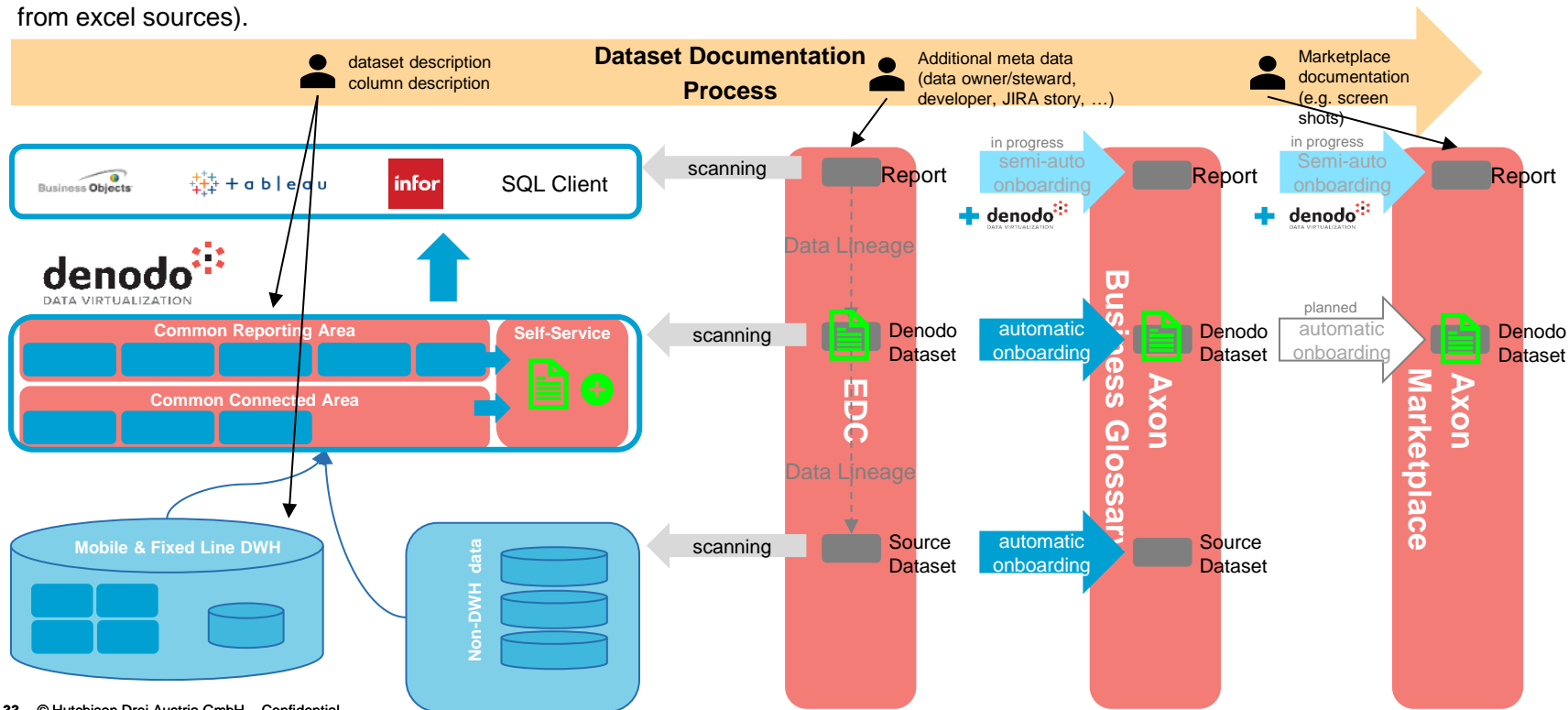
3 - Improve Data Governance

Denodo provides the possibility to **document datasets from sources not included under Data Governance guidelines**.



3 - Improve Data Governance

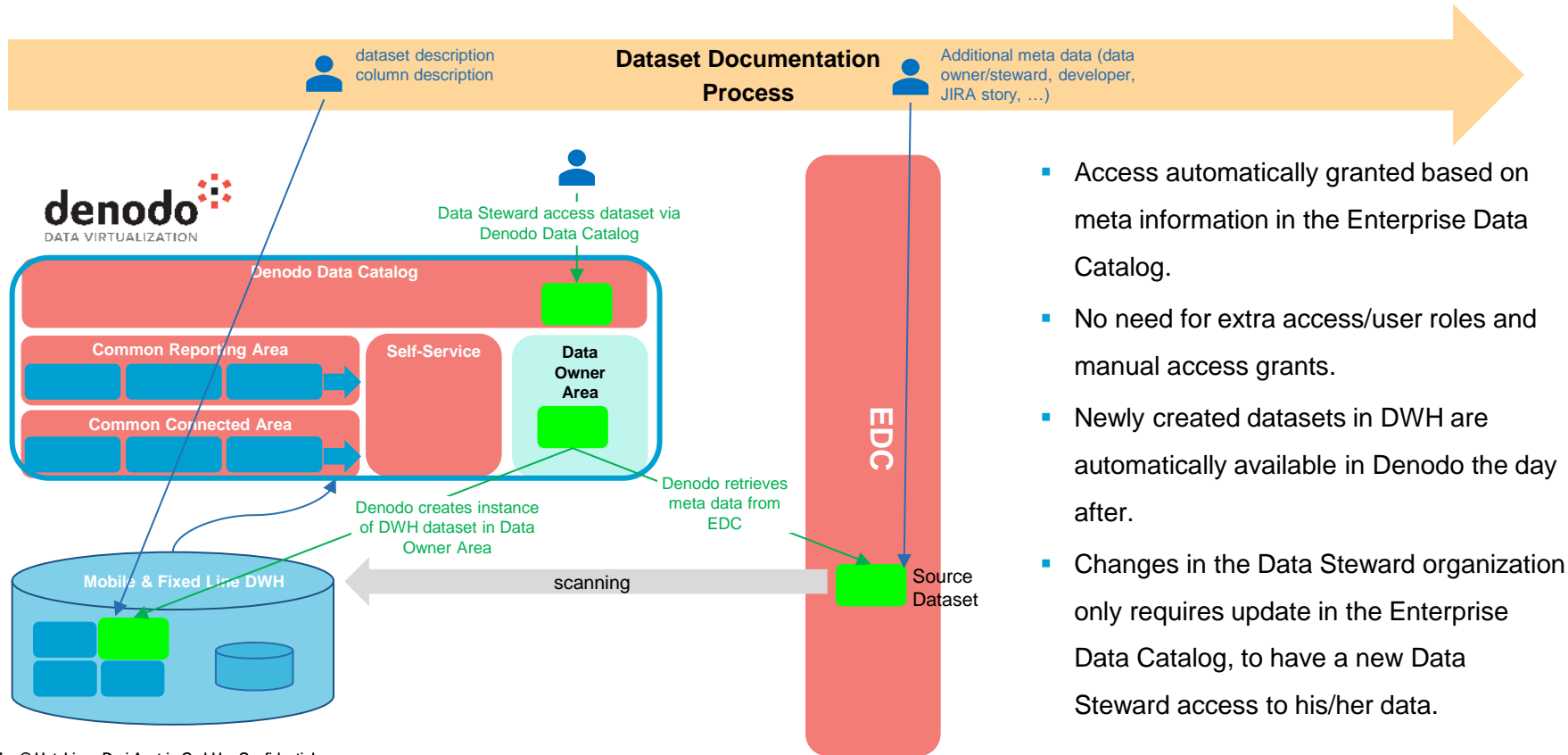
Denodo enables also **non-DWH developers in Self-Service area** to document their **dataset creations** and even **manual data inputs** (e.g. from excel sources).



3 - Improve Data Governance

- Every data steward obviously needs access to the data they are responsible for (= subject area)
- **Challenge:**
 - 22 subject areas, 17 data owner, 17 data stewards, 22 data stewards
 - > 2,000 reporting views currently assigned to subject areas
 - Goal: Highly automated/low maintenance solution
 - User friendly possibility to consume data, even for employees who are not heavy data consumer

3 - Improve Data Governance



3 - Improve Data Governance

Assignment of **data owner** & **data steward** (= ownership/subject area) to a data set

The screenshot displays the Informatica Enterprise Data Catalog interface for a data asset named 'V_SALESPPOINT_PRODUCT_STOCK'. The interface is divided into several sections:

- Description:** No description found. Click the 'p' icon to add a description for this asset.
- Source Description:** Fact object for reporting on history of products on stocks by salespoints.
- Technical Remarks:** No details found. Click the 'p' icon to add details to this section.
- VVZ:** No details found. Click the 'p' icon to add details to this section.
- Sample Columns:** A table with columns: Name, Business Title, Description, Data Domains. Rows include: SALES_POINT_DID, STOCK_TYPE_DID, PRODUCT_DID, EDW_VALID_FROM_DATE, EDW_VALID_TO_DATE.
- Reviews:** A section for user reviews with a text input field and a 'Submit' button.
- People:** A list of roles and their assignments: Data Champions (not assigned), Data Developer (Sandeep Jangra), Data Owner (Sandeep Jangra), Data Steward (Sandeep Jangra), Followers (Sandeep Jangra), Report Owner (not assigned), Subject Matter Experts (not assigned).
- Business Terms:** A section for business terms, including 'Business Subject Area' and 'Logistics Data' (highlighted with a green circle).
- Custom Attributes:** A section for custom attributes, including 'Approval Required' (true), 'Organization Unit' (HoD SCM & Sales Support), 'Reference Ticket' (EA-14760), 'Requesters' (not assigned), 'Technical Subject Area' (WINCASH).

The interface also includes a sidebar with navigation options like Home, Search Results, and V_SALESPPOINT_P_.

3 - Improve Data Governance

Data Steward's **access automatically granted** in Denodo to newly created datasets in DWH

The screenshot displays the Denodo Data Catalog interface. On the left, a sidebar shows a hierarchical tree of databases and datasets. The 'logistics data' dataset is highlighted with a green circle. The main panel shows the schema for the 'bv_dwh_v_salespoint_product_stock' dataset. The schema is displayed in a table with columns: PK, Field name, Type, Field description, and Nullable. The table lists various fields including sales_point_did, stock_type_did, product_did, edw_valid_from_date, edw_valid_to_date, quantity_on_stock, quantity_reserved, and quantity_ordered, each with its corresponding data type and description.

Database

- data_owner_area
 - 01 - Connectivity
 - 02 - base views
 - 01 - dwh
 - campaign and lead management
 - carrier service data
 - change management master data
 - commissioning data
 - customer information
 - customer invoicing data
 - customer masterdata
 - customer service data
 - customer traffic usage data
 - customer value data
 - handsets data
 - logistics data**
 - margin data
 - market data
 - mvno data
 - network data - ran
 - non subject area
 - product data
 - retailer and retail data
 - revenue assurance
 - software development lifecycle data (sdic)
 - supplier data
 - tariff data
 - logistics_tmp

bv_dwh_v_salespoint_product_stock

Summary Schema Query Relationships Data lineage

Additional columns ?

PK	Field name	Type	Field description	Nullable
	Q	Q	Q	Q
	sales_point_did	text	Reference key to Salespoint hierarchy: (EDW/V_DIM_SALESPOINT_HIERARCHY)	✓
	stock_type_did	text	Reference key to stock types dimension (V_DIM_STOCK_TYPE)	✓
	product_did	text	Reference key to products dimension (V_DIM_PRODUCT)	✓
	edw_valid_from_date	timestamp	Start of validity period of record's values of stock levels	✓
	edw_valid_to_date	timestamp	Start of validity period of record's values of stock levels	✓
	quantity_on_stock	decimal	Actual number of products on stock	✓
	quantity_reserved	decimal	Number of products reserved (i.e. unavailable for sale)	✓
	quantity_ordered	decimal	Number of products ordered (i.e. to be available on stock at future date)	✓

3 - Improve Data Governance

User friendly consumption of data for Data Stewards in the Denodo Data Catalog

The screenshot displays the Denodo Data Catalog interface. The top navigation bar includes 'denodo DATA CATALOG', a search bar, and links for 'Search', 'Browse', 'Query', 'Help', and a user profile icon. The left sidebar shows a 'Database' tree with a search bar and a list of data sources, including 'data_owner_area', '01 - Connectivity', '02 - base views', '01 - dwh', and 'logistics_tmp'. The main content area is titled 'bv_dwh_v_salespoint_product_stock' and features tabs for 'Summary', 'Schema', 'Query', 'Relationships', and 'Data lineage'. The 'Query' tab is active, showing a 'DEFINITION' view. The 'Fields' panel on the left lists various fields, with 'stock_type_did' highlighted. The 'Output columns' panel on the right shows 'Select all' and 'sales_point_did'. The 'Filters' and 'Order by' panels are empty, with instructions to 'Define the filters by dragging fields here' and 'Define the order by dragging fields here'. A green circle highlights the 'Execute' button in the top right corner of the query editor.

denodo DATA CATALOG

Search Browse Query Help

bv_dwh_v_salespoint_product_stock

Summary Schema Query Relationships Data lineage

DEFINITION RESULTS

Fields

- Select all
- sales_point_did
- stock_type_did
- product_did
- edw_valid_from_date
- edw_valid_to_date
- quantity_on_stock
- quantity_reserved
- quantity_ordered
- NUMBER_OF_RECORDS

Output columns

- Select all
- sales_point_did

Filters

Order by

Execute Export Cancel VQL Save

DATA CONSUMERS



ETL Developer



Data Engineer



Citizen Integrator



Data Scientist



Data Analyst



Business Users

Intelligent Data Management Cloud™

DISCOVER &
UNDERSTAND



DATA
CATALOG

ACCESS &
INTEGRATE



DATA INTEGRATION &
ENGINEERING

CONNECT &
AUTOMATE



API & APP
INTEGRATION

CLEANSE &
TRUST



DATA QUALITY &
OBSERVABILITY

MASTER &
RELATE



MDM & 360
APPLICATIONS

GOVERN &
PROTECT



GOVERNANCE,
ACCESS & PRIVACY

SHARE &
DEMOCRATIZE



DATA
MARKETPLACE

CLAIRE™

AI-Powered Metadata Intelligence & Automation

Connectivity

Metadata System of Record

DATA SOURCES



SaaS Apps
Sources

+



Mainframe



Applications



Databases

On-premises
Sources

+



IoT



Machine Data



Logs

Real-time /
Streaming Sources

Intelligent Data Management Cloud™



Data Governance & Catalog

Understand and Govern

Govern both data and AI models to help ensure trust



Data Marketplace

Share and Democratize

Package data assets & AI models for consumption



Data Quality & Observability

Cleanse and Trust

Identify, resolve anomalies & issues to grow data pipelines



Data Access Management

Protect and Comply

Secure and share data responsibly for proper use

ONE Metadata Repository

Data Governance

CAPABILITIES

Business-focused Information Consumption and Management

- Intuitive Relationship Visualizations of governance artifacts and the associated business impact to effectively manage and operate governance programs
- Multi-Language for Global rollouts with support for 6 languages
- Customizable and Personalized Dashboards
- Customizable experience by persona
- Multi-hop graph-based searches to browse and navigate complex relationships

Collaboration

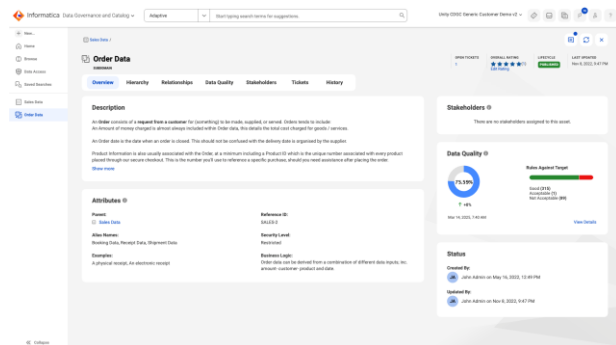
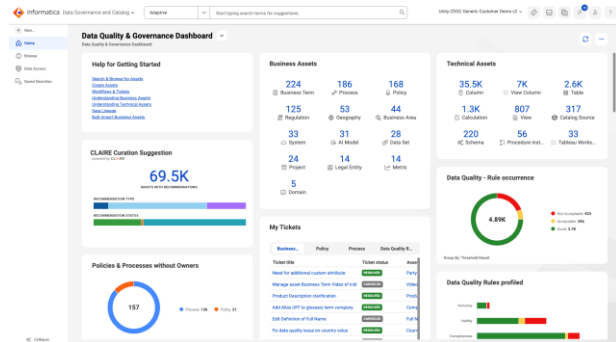
- Crowd-sourced knowledge for continuous feedback, ratings, certifications
- Governance and Technical Asset Ratings to increase trust and confidence
- Discussion Threads for informal interactions/clarifications
- Workflows and Ticket management for structured interactions

Automation and Integrations to accelerate business insights

- Quality overlays for Business and Technical Lineage to improve understanding and accelerate Quality Coverage
- Data Quality Self Service using NLP-based Rule generation

CLAIRE®

- Intelligent Glossary Associations to effectively enrich scanned assets with business context
- Centralized dashboard to review and manage CLAIRE generated Glossary Associations and Classifications
- Data Quality Automation to assess sources against enterprise standards



Data Catalog

CAPABILITIES

Advanced Scanners and Curation

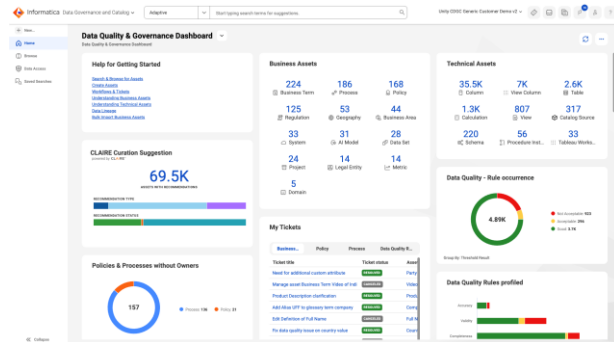
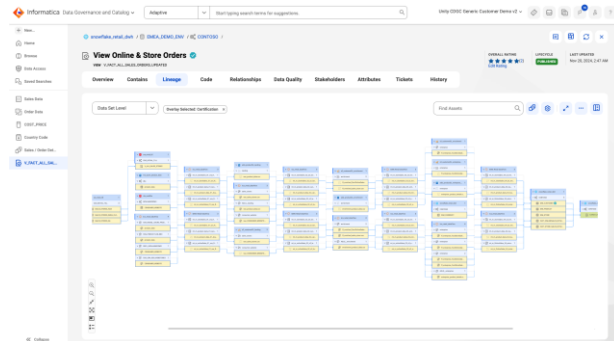
- Broadest metadata coverage across all key ecosystems: Snowflake, Microsoft, AWS, Google, SAP, Oracle and Salesforce/Tableau and more
- Advanced Scanning capabilities include extracting data lineage from Stored Procedure Scanning, Python Code Scanning, and Embedded SQL in Data Pipelines
- Bring your own metadata with extendable Custom Scanner Framework
- Bulk Curation to eliminate human task and accelerate data labeling and glossary association outcomes
- High-granularity Sensitive Data Classification for visibility, tracking and reporting

CLAIRE®

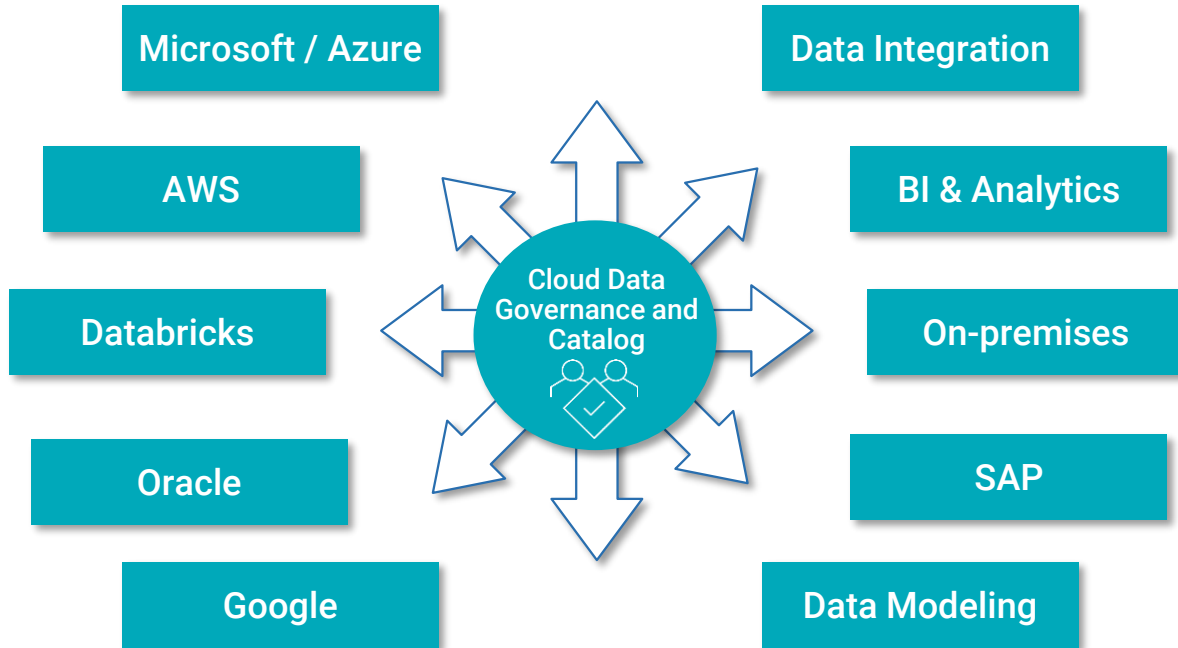
- 225+ Pre-built based Data Elements like national IDs, dates, locations, names
- Classification builder to create custom classifications
- CLAIRE generated classifications
- Aggregate elements into entities to classify and discover business entities

Lineage

- Automated Column-Level Lineage. views with business overlays including Data Quality, Policies, Glossaries, and Processes
- Advanced lineage scanning including parsing transformations hidden in SQL code, ETL/ELT code, Python Code, BI Tools and more
- Detailed Impact Analysis reports for both upstream and downstream changes



Broad & Deep Metadata Connectivity



Advanced capabilities

- Automated extraction of granular metadata on Table and Column level from complex enterprise systems
- Advanced parsing of source code from multi-vendor sources
- Dynamic code support and proper parameters values tracking based on custom catalog tables and operational metadata for selected catalog sources
- Incremental metadata scan support for selected catalog sources
- Metadata extraction from other catalogs
- Serverless metadata scans for selected sources
- Automated metadata synchronization from selected IDMC services with the catalog
- Rule-based and automated inferred lineage

Metadata Scanners Coverage

Area	Support
AWS	AWS S3 Redshift AWS RDS (Oracle, MS SQL Server, PostgreSQL and MySQL) DynamoDB+ AWS Glue Athena
Microsoft	Azure SQL DB Azure Synapse Azure ADLS Gen 2 Azure Blob Azure Data Factory OneDrive SharePoint Cosmos DB+ PowerBI SSAS SSRS Fabric Data Warehouse Fabric Lakehouse Fabric OneLake
Google	Google BigQuery Google Cloud Storage Google Looker
Oracle	Oracle ADB Oracle Cloud Object Storage Oracle Golden Gate OBIEE Oracle Data Integrator
Catalogs	Microsoft Purview Apache Atlas Databricks Unity Catalog AWS Glue
DW	Snowflake DW Databricks Delta Lake Apache Hive/HDFS SingleStore+
On-Premises	Oracle Microsoft SQL Server IBM DB2 z/OS IBM DB2 LUW MySQL Teradata PostgreSQL JDBC IBM Netezza+ MongoDB Kafka Local/Shared Filesystem SFTP Windows Share/CIFS Sybase ASE+ Sybase IQ+ MariaDB MySQL Apache Cassandra+
SAP	SAP BW SAP BW/4HANA SAP ECC SAP S/4HANA SAP HANA DB SAP Analytics Cloud SAP Datasphere SAP SuccessFactors
Applications	Salesforce Marketo+ Dynamics CRM+ Workday+ Informatica MDM B360 Informatica R360 NetSuite+
BI & Analytics	Tableau Microsoft PowerBI Microsoft SSRS Qlik View Qlik Sense Qlik Sense Cloud Databricks Notebooks IBM Cognos Google Looker Microsoft SSAS Tibco Spotfire MicroStrategy SAP BO OBIEE Microsoft Azure Analysis Services Tableau Cloud
Data Integration	Informatica Cloud Data Integration Informatica PowerCenter Microsoft SSIS Talend DI Microsoft Azure Data Factory IBM DataStage dbt Microsoft Azure Synapse Analytics Informatica Developer
Data Modelling Tools	erwin Data Modeler SAP Power Designer IDERA ER/Studio Data Architect
Accelerators	SAS Base Libraries (Accelerator) SAS Base Programs (Accelerator) IBM Mainframe JCL (Accelerator)

IDMC Advantages: Multiple drivers for added value...



Designed for
Modern Data
Architectures

- Data Fabric
- Data Mesh
- Role-based UX



CLAIRE®-
powered Data
Management

- AI-Automated
- Copilot
- GPT Search



Scale Up
Your Digital
Business

- Consumption / IPU's
- Volume/Performance
- Integrated Tools



Cost Efficient,
Unified
Approach

- AI-enabled performance
- No CapEx
- Low OpEx



Empower
Data
Consumers

- Data Democratization
- Access Management
- Last-Mile Delivery

3

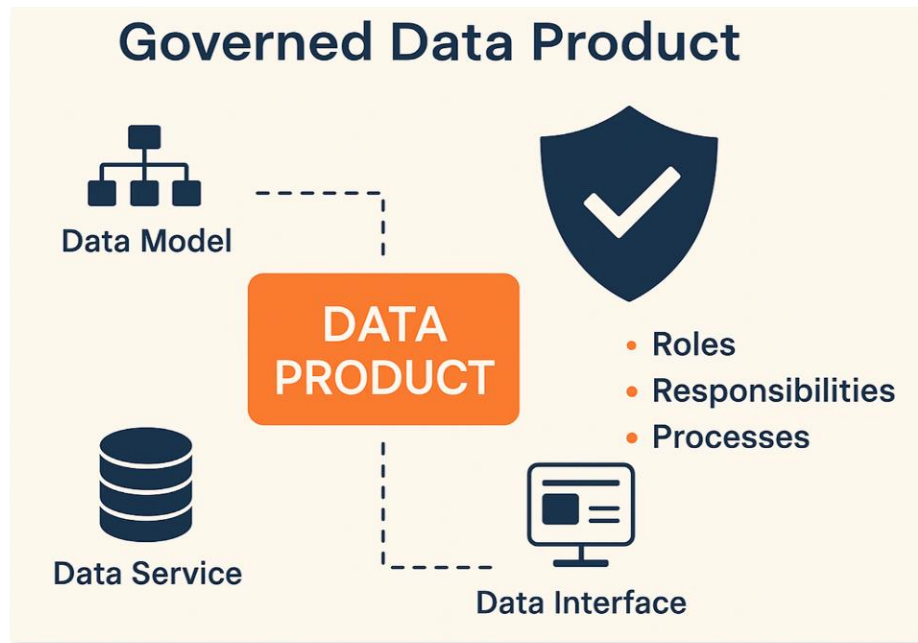
Things for the future



Data Product principles

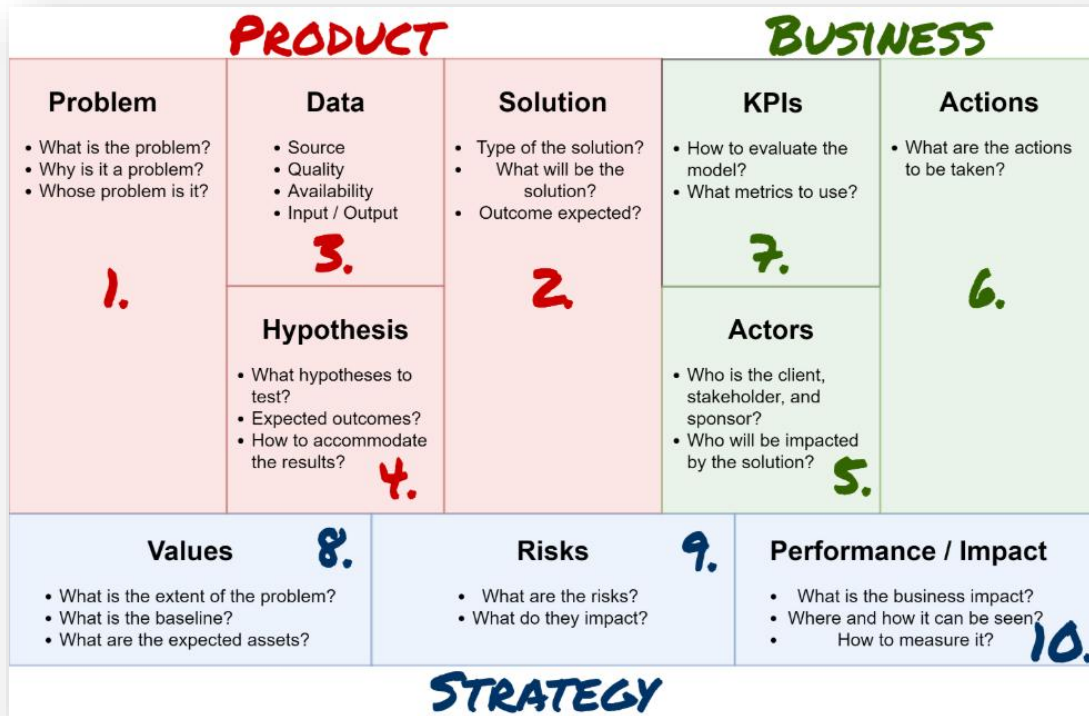


- A dashboard is not a Data Product
- Data Governance applies on all elements
- A data management platform is the foundation for data products
- No Data Products without a managed product lifecycle



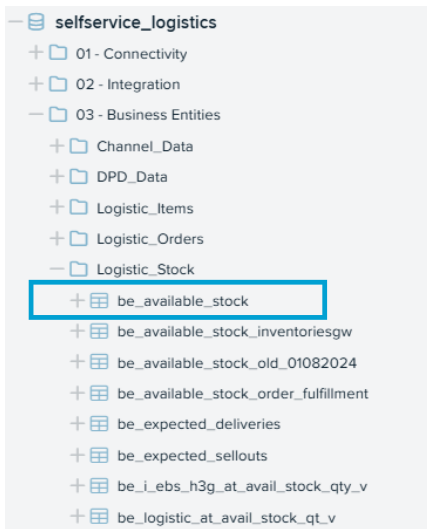
Data Product Concept (End-to-End)

- Step 1: Definition
 - Using Data Product Canvas



Data Product Concept (End-to-End)

- Step 2: Technical Build-Up (decentrally and in responsibility of Data Product Team)



SUMMARY EDIT OPTIONS VQL

VQL options

☐ Export dependencies ☐ Include view statistics

☒ Drop elements before creating them ☐ Replace existing elements ☐ Do not replace existing elements

```
1  # Generated with Denodo Platform 9.1.1.
2
3  DROP VIEW IF EXISTS be_available_stock CASCADE;
4
5  CREATE VIEW be_available_stock
6  FOLDER = '/03 - business entities/logistic_stock' AS
7  WITH live_stock AS (
8      SELECT creation_date AS timestamp,
9             organization_code,
10            subinventory_code AS subinventory,
11            item AS item_number,
12            quantity,
13            quantity_type AS demand_class
14      FROM i_ebs_h3g_at_avail_stock_qty_v
15  ),
16  dwh_stock AS (
17      SELECT date_id AS timestamp,
18             organization_code,
19            subinventory,
20            item AS item_number,
21            quantity,
22            quantity_type AS demand_class
23      FROM bv_logistic_at_avail_stock_qty_v
24      WHERE (
25          date_id = (SELECT max(date_id) AS max FROM bv_logistic_at_avail_stock_qty_v)
26          AND subinventory not in('FERTIG', 'DOM-FERTIG')
27      )
28  )
29  SELECT *
30  FROM live_stock
31  SQL UNION ALL
32  SELECT *
33  FROM dwh_stock;
34
35
```

Data Product Concept (End-to-End)

■ Step 3: Interface Definition (centrally)

SUMMARY EDIT VQL

Save Clear Changes Query Edited Drop ?

Definition Implementation Metadata

Specify the fields that define the schema of the interface view.
Drag a view to the workspace to use as a starting point.

View name stock_h3a

☐ Enable compound types

Options New Field Restore Fields Remove

Field name	Field type	Description
<input type="checkbox"/> timestamp	timestamp	
<input type="checkbox"/> organization_code	text	
<input type="checkbox"/> subinventory	text	
<input type="checkbox"/> item_number	text	
<input type="checkbox"/> quantity	decimal	
<input type="checkbox"/> demand_class	text	

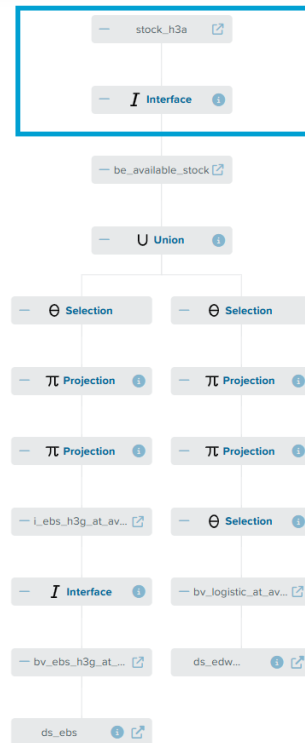
SUMMARY EDIT VQL

Save Clear Changes Query Edited Drop

Definition Implementation Metadata

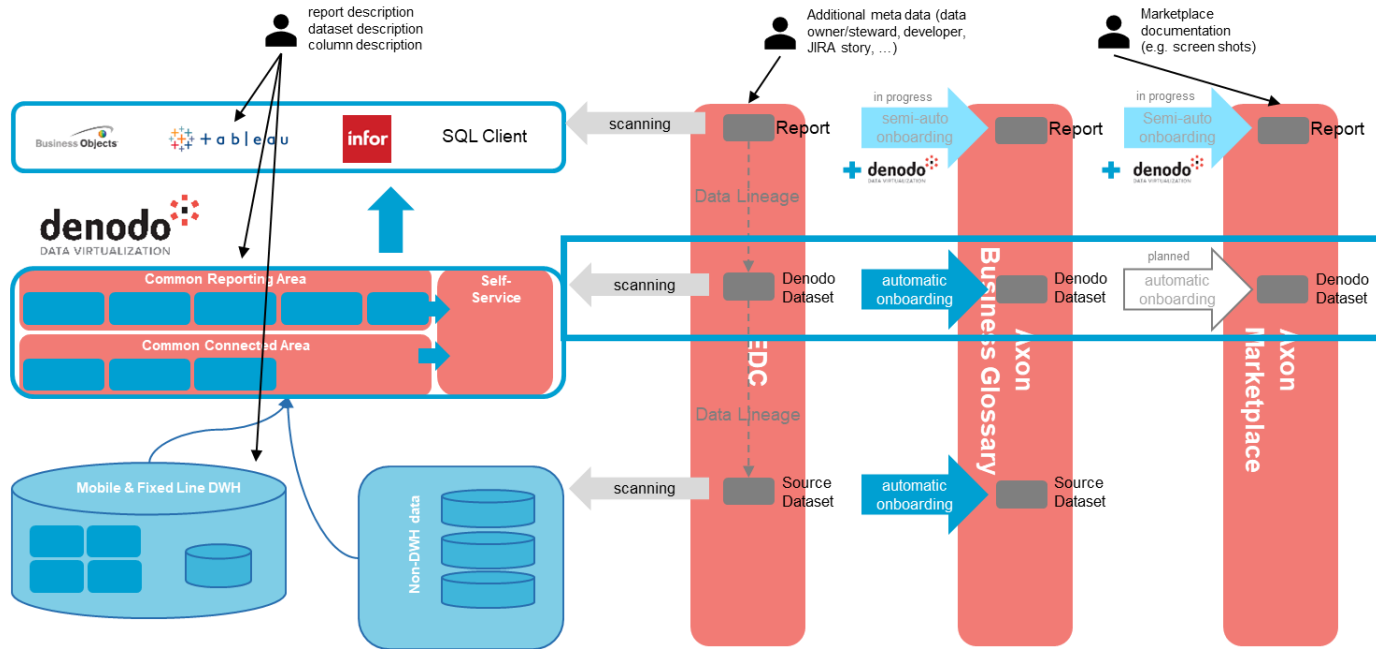
Implementation Expression

Definition Field Name	Definition Field Type	Implementation Expression
timestamp	timestamp	timestamp
organization_code	text	organization_code
subinventory	text	subinventory
item_number	text	item_number
quantity	decimal	quantity
demand_class	text	demand_class

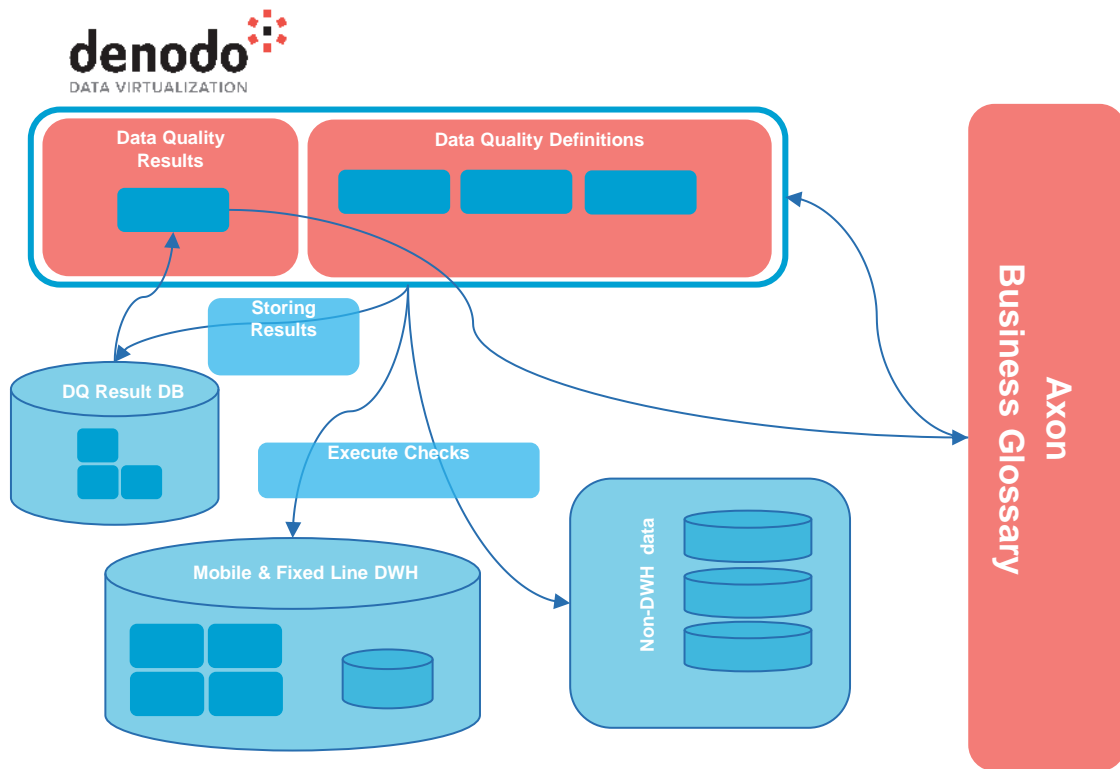


Data Product Concept (End-to-End)

- Step 4: Integrate in Data Governance process incl. Onboarding in Data Marketplace



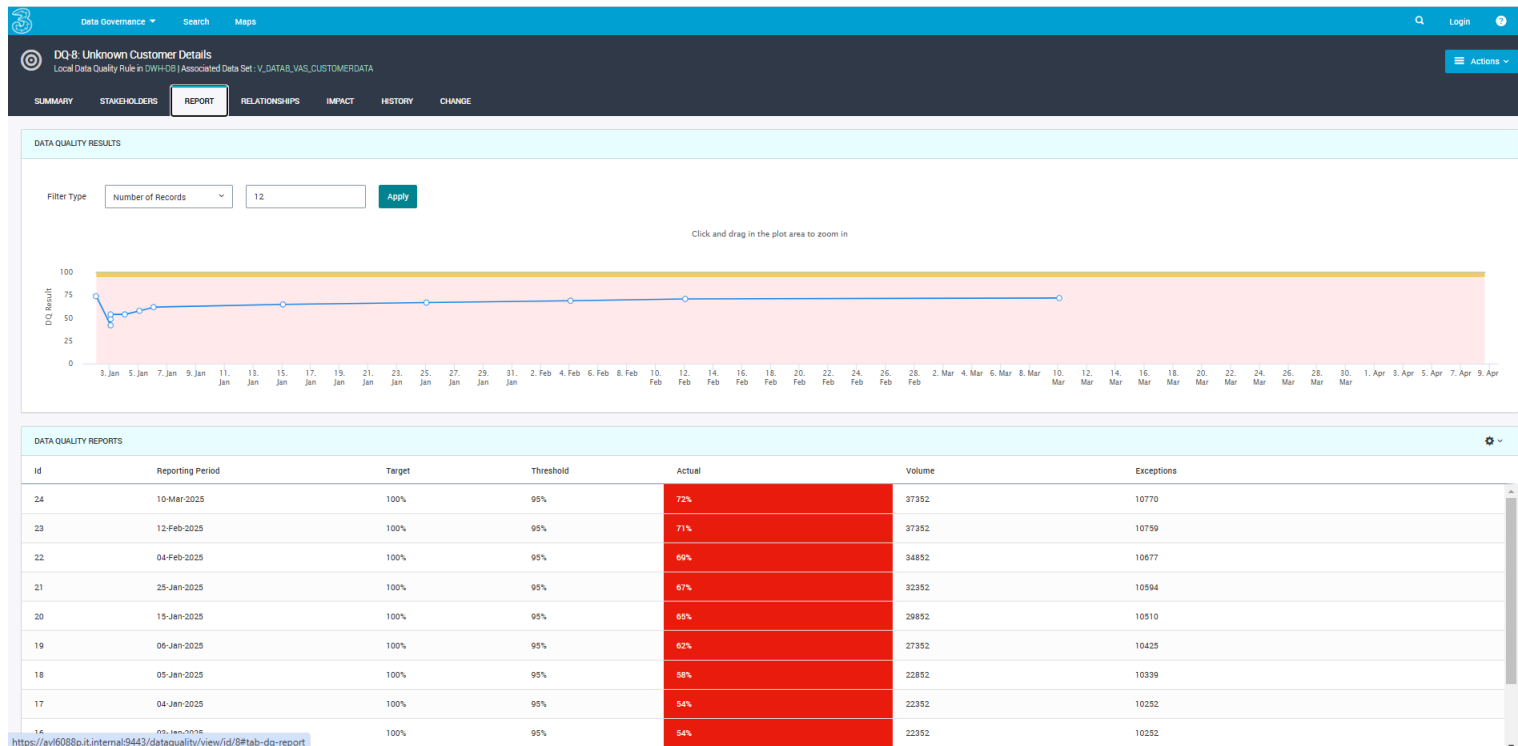
Data Quality Concept with Axon & Denodo



- Data Quality Rules on Data Sets defined in Axon
 - Incl. roles (Data Provider, Steward etc.)
- Availability of History & Reporting
- Definitions are pulled in Denodo and executed against the defined source
- Results are stored in a dedicated DB and shared back to Axon

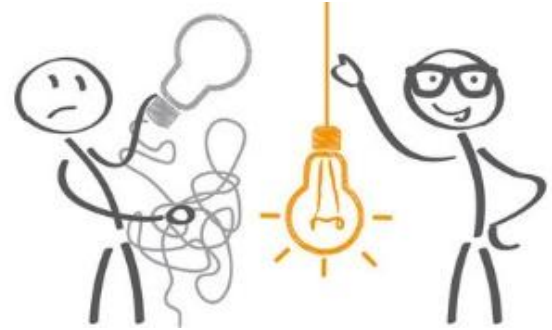
Data Quality Concept with Axon & Denodo

Denodo feeds the results of the data quality checks back to Axon, where it can be discovered by stakeholders.



UDAL What's Next ?.

- **1 - Improve processes & automation**
 - Development Process (creation of objects, CI/CD pipeline etc.)
 - Self-Service (creation of roles & permissions, descriptions etc.)
 - Training for specific roles & users
- **2 - Widen the scope to include Big Data**
 - Results for Reporting based on Big Data Use Cases
 - Providing input for Data Engineers (Denodo as a Source)
 - Use Big Data cluster for MPP
- **3 - To everyone's surprise... AI**
 - What can AI do for Denodo
 - As a support for developing & interacting with Denodo (specifically for Self-Service)
 - ad-hoc queries on the most used KPIs using standard dimensional information
 - What can Denodo do for AI
 - As part of our enterprise wide AI initiatives around integrating enterprise data into AI services





Zentrale Datenbereitstellung für KI mit Denodo

Denodo Assistant und AI SDK



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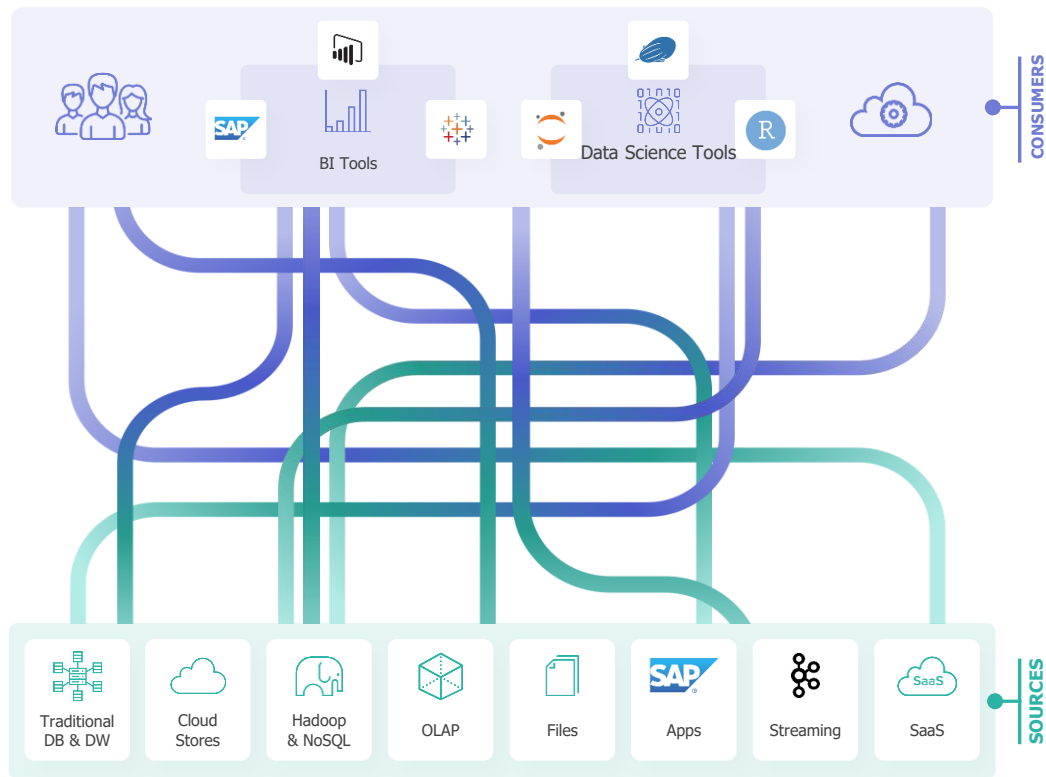
10. April 2025



Distributed Data Landscape

Point-to-point data integration approaches are challenging:

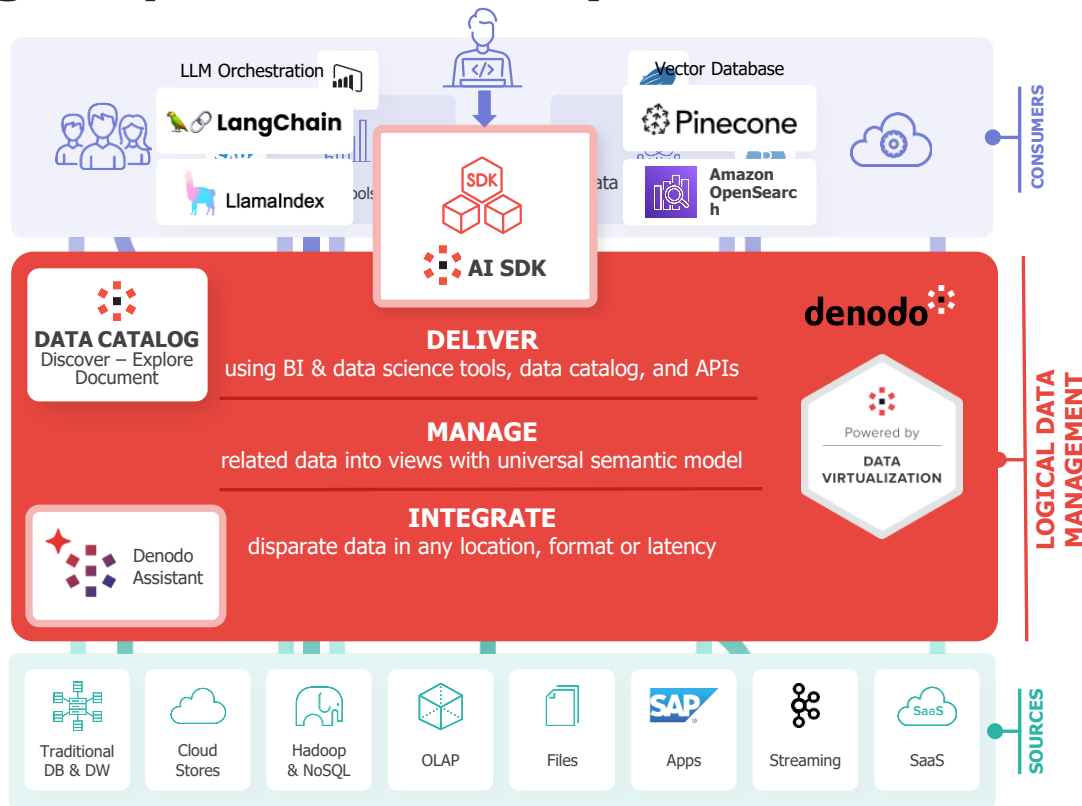
- Extracting and moving data increases latency and cost, and decreases quality
- Every project solves data access and integration in a different way
- Solutions are tightly coupled to data sources, impacting flexibility and agility



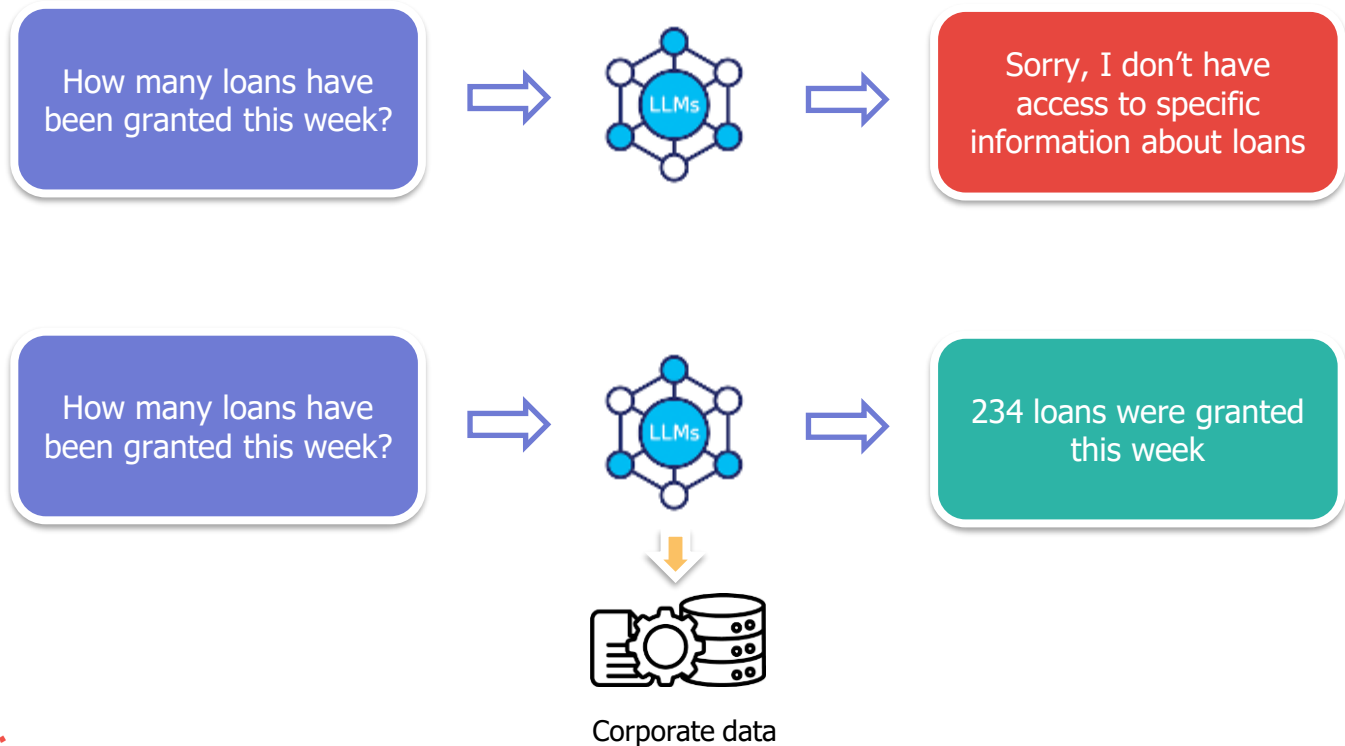
Denodo Platform: One logical platform for all your data

The Denodo Platform offers:

- Semantic Layer
- Centralized Data Governance
- Data Security and Masking
- Self-Service for Business Users
- Denodo Assistant for Recommendations and assisted Queries
- AI SDK enables development of Intelligent Applications and Chatbots



AI and dynamic data

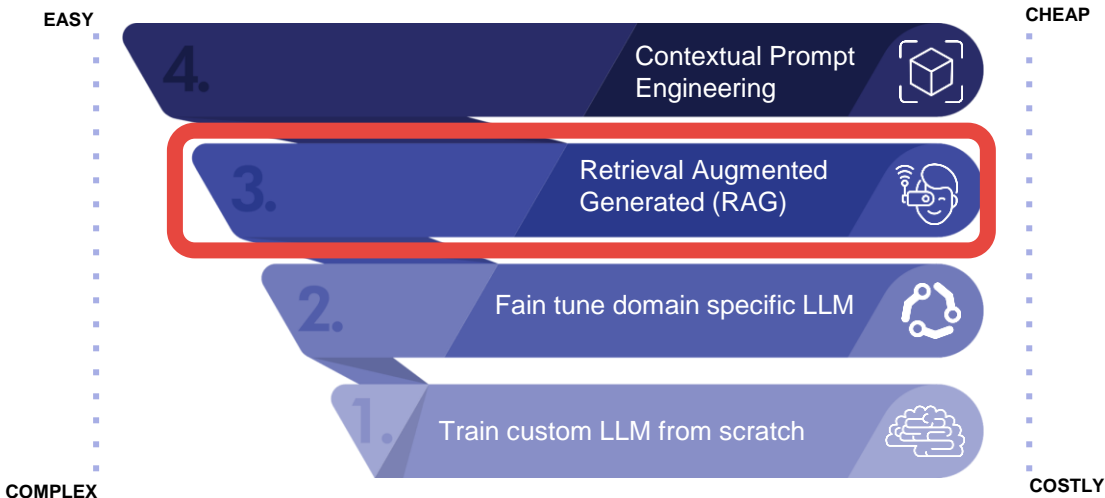


RAG – Retrieval-Augmented Generation

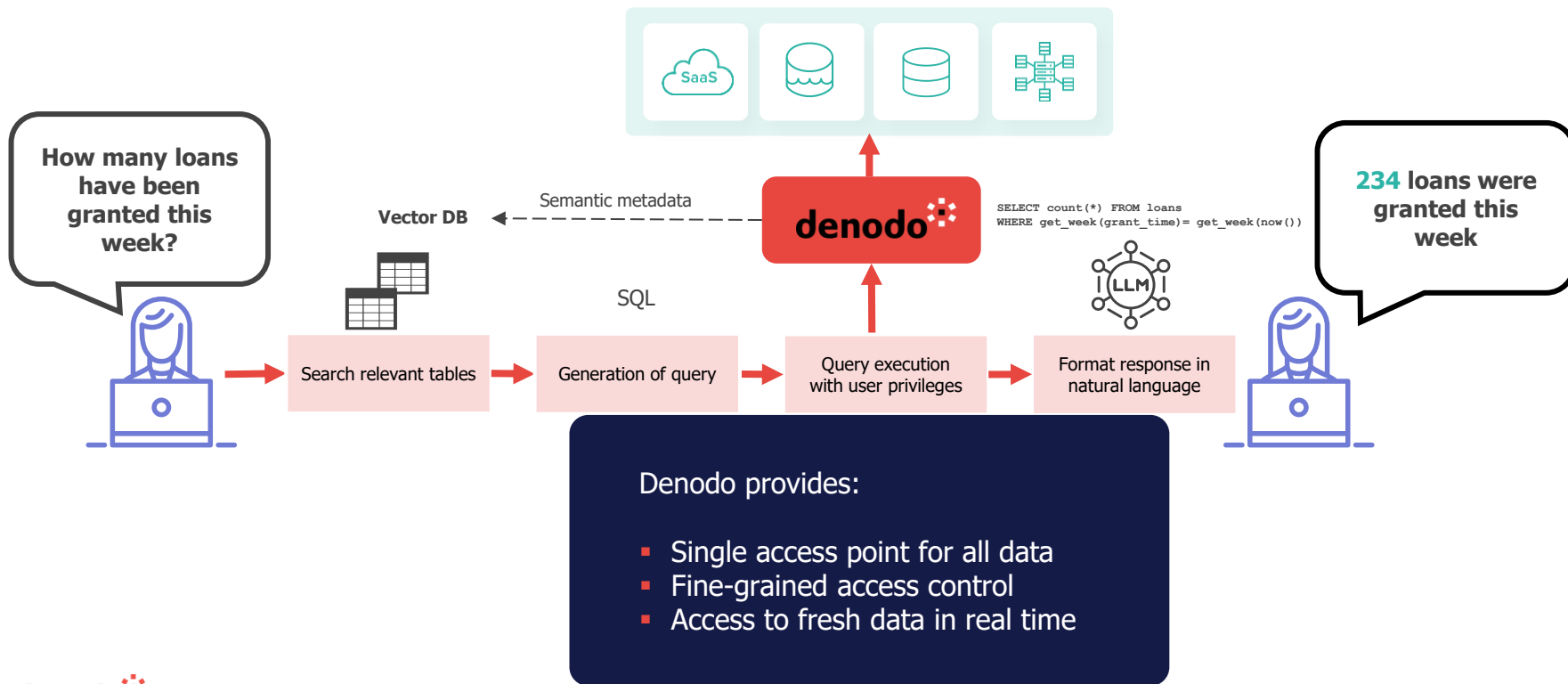
RAG is the standard for building Smart Apps with GenAI, grounded in facts using enterprise data.

WHY RAG?

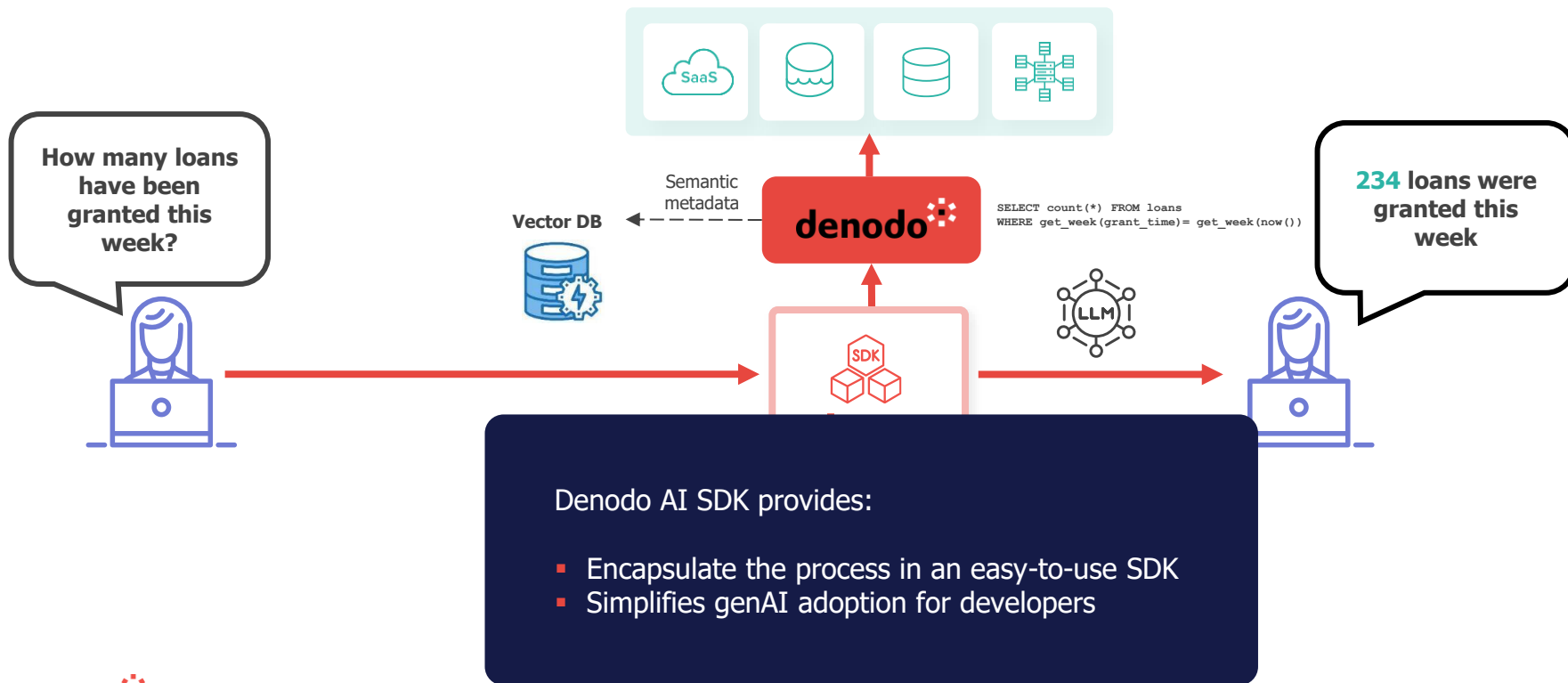
- **Enhances AI Accuracy:**
 - access to real-time enterprise data
 - reduces hallucinations
 - precise, trustworthy outputs
- **Contextual Intelligence:**
 - domain-specific knowledge
 - smarter user interactions
- **Scalable Innovation:**
 - supports diverse applications
 - accelerates GenAI-driven initiatives



What are the steps to retrieve trustworthy answers?



Denodo is uniquely equipped



3

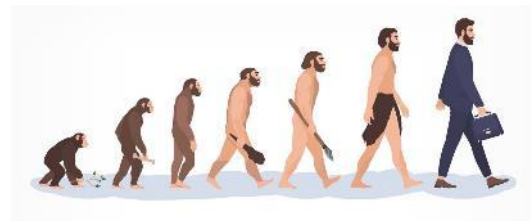
Things we learned



Lessons learned

■ 1 - Evolution – not revolution

- Take your time & “let the use cases come to you”
- “You don’t have to change everything now, but look what it can do for you!”



■ 2 - Find Influencers

- Invest time in early adopters and be open about the (non existing) processes
- “If Mike* thinks it can help us, it’s probably not bad!”



■ 3 - Don’t mention Denodo


- Most users don’t care about new tools or concepts, they want to have something that can help them in their daily tasks



*his name was not really Mike

Data Virtualization benefits:

Why we will steadily increase the usage of Denodo

- Data virtualization can **hide technical complexity** regarding access to data
(like storage-point, storage-structure, API's, query language and storing technology)
 - Enable access to different data-sources in **one logical access-point**
 - Possibility to do some **format changes and aggregation** of the data on the fly
 - Possibility to **combine query-result-sets** across multiple source system
 - ***Reduce DWH-systems workload** by replicating data only when necessary, therefore also reducing (future) data-storage requirements*
 - Possibility to offer direct or **“live” reporting** on the data sources when required
 - Possibility to **publish result-sets** as View or also as Rest **services**
- 
- Provide technical framework for a data mesh and increase transparency of and responsibility for data products***

Thank you.

Macht's einfach.

