The BI Architecture of a Luxury Fashion company

Elvira Bruno

Internship report presented as partial requirement for obtaining the Master's degree in Information Management

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THE BI ARCHITECTURE OF A LUXURY FASHION COMPANY

by

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Internship report presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Knowledge Management and Business Intelligence

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1. INTRODUCTION

In this paper will be explained what Business Intelligence means, what are the practices linked to it and the advantages obtained, translated into insights requested by the end users and the ones they didn't know it was possible to have access.

The second chapter will describe the basic concepts related to the BI field, like an introduction of what is a Database, which is the basis for every business intelligence system. Ending with a brief presentation of BI platform, used for the creation of reports and dashboards, which make data a real information not only for the analysts but especially for end-users.

While the third chapter exposes the organization and the consultant company in which the BI task was developed and following in the fourth chapter there will be an overview of the technologies and tools used.

Then a chapter will describe the AGILE methodology, that is the procedure adopted by the organization in order to manage and monitor the entire process of development of the different tasks requested by the end-users.

Finally, the sixth chapter will explain the task subject of this thesis, the tables and the integration developed during the internship held at the organization.

2. BUSINESS INTELLIGENCE SYSTEM

This chapter introduces to an explanation of what is Business Intelligence and how it helps organizations to have success in an increasingly competitive market.

Finally, a brief introduction of the basic concepts related to this field, starting from a definition of a database to the different outputs of a BI system.

2.1. BUSINESS INTELLIGENCE

Business Intelligence is defined as "knowledge gained about a business through the use of various hardware/software technologies, which enable organizations to turn data into information" (Data Management Review, s.d.)

Since a rapid and efficient respond to the market condition and a product differentiation are the main priorities for the majority of the CEOs, in the past two decades Business Intelligence (hereafter referred as BI) has become the main investment for all the organizations that wanted to be successful.

A BI system is a collection of models, methodologies, processes, people and tools that aim to the regular and organized harvesting of organization data.

Facilitating a systematic integration and aggregation of structured and unstructured large amount of data, it contributes in the growing knowledge of new insights and analysis solutions for several and always advanced requests by the end users.

Since these techniques have become necessities for organizations, the BI market has revenues that have reached $18 billion, expected to increase even more by the end of 2020 (Gartner, 2017), especially thanks to Business Analytics and Big Data management that have contributed to the growth of BI software markets. (Bernhard Wieder, 2015)

But, be that as it may, not all the businesses have been able to take advantages by BI implementations, studies showed that almost the 80% of these projects failed to generate benefits at all or at least the profits expected (Gartner, 2015).

Keeping in mind the key priorities already listed, a BI system, used in a proper way, enables **efficiency**, minimizing the cost of selling or servicing the customer, **effectiveness**, allowing real-time access to customer information and **differentiation**, empowering a proactively manage opportunity and risk.

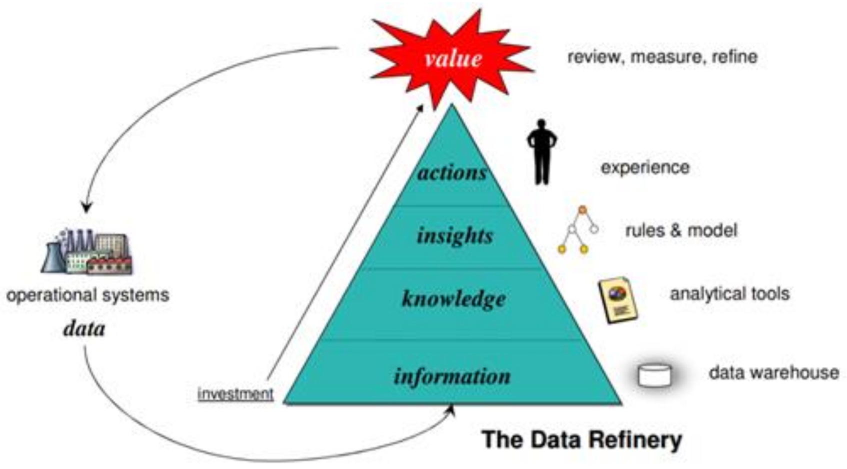


Figure 2.1 – The Data Refinery (IBM)

2.2. Basic Concepts

It is essential to define what are the organizational basis to this major step, starting with an explanation of what is a database to the creation of an actual BI system.

2.2.1. Database

A **Database** (hereafter referred as DB) is a collection of information easily accessible, manageable and upgradable, that makes less difficult to its users to find the main information, thanks to its organization in a tabular format and a smart use of indexing.

Data contained in a DB represent essential knowledge of the organization customers, it offers ACID (atomicity, consistency, isolation and durability) compliance to guarantee data coherence, through a DBMS, database management systems, a software that allows users to define, manipulate , retrieve and manage data.

Among the most famous there are IBM's Information Management System and CA's Integrated Management System.

DB can be distinguished according to their type of content or their organizational approach, based on the first classification there are bibliographic, full text, numeric or images. While the second one classifies them in several other kinds such as *relational database*, *distributed database, cloud database* or *NoSQL database.*

Relational databases are composed by a set of tables, each one of them has at least one column, also called attribute, questioned through a Structured Query Language.

This kind of DB are easy to extend, and data addition can be done without modifying existing applications. In the 1970s it was developed a type of database management software called RDBMS, Relational Database Management System, like Microsoft SQL Server or Oracle Database, in order to manage these specific DBs.

Distributed Databases are divided in several physical locations and they can be *homogeneous* when the hardware, the operating systems and the database applications used for all the places where it is localized are the same, or heterogeneous vice-versa.

A Cloud DB is characterized by a virtualized environment, providing benefits such as the possibility to pay for storage capacity or bandwidth on a per-use basis, while for Big Data performances issues a NoSql database, useful for large sets of data, is preferred.

2.2.2. Data Warehouse

That being said, it is necessary to distinguish a Database and a Data Warehouse, starting from its definition a **Data Warehouse** (hereafter referred as DWH) is a "*technology that aggregates structured data from one or more sources so that it can be compared and analyzed for greater business intelligence*". (Informatica, s.d.).

DBs differentiate from DWH in two aspects, first, they differentiate for their purpose, the DB has to be a container of real-time data, while the DWH is designed, on the basis of OLAP systems, to aggregate data for analytical reasons.

The second difference is based on their use, on the DB is possible to make subsequent analyses based on a snapshot of data in the current situation. While the added value of a DWH is the high-quality level of analyses, since data are already collected in a way that facilitate them, helped by the possibility to integrate BI and Analytics platforms.

In order to develop a DWH, two main approaches can be followed, by *levels* or by *areas,* the first method gives an overall view of the issues but has more cons than this simple advantage.

It gives complexity to the work progress management, since it makes difficult the synchronization of problems between the different workgroups that work in parallels, which is a typical situation in a DWH development.

Also, it requires long period before having a deliverable, this translate in a poor visibility of the project and lack of feedbacks for a lot of time from the end user.

While the second approach, by areas, even if has a limited vision till its implementation, lead to an easier managing of its work progress and less workgroups are required, with little interferences between them.

The final output is delivered relatively quickly and the great advantage is the ability to test the direction of the development every little time, being able to modify it.

2.2.3. Enterprise Data Warehouse

An Enterprise Data Warehouse – hereafter EDW – is a unified DB that refer to a single organization and specifically collects all the business information, making it accessible across the firm. It gives a cooperative approach to organize and represent data, through a classification based on a specific business division (sales, inventory, etc…).

Its main characteristic is that data are always available for analyzing and planning purposes, imposing a standard treatment to all of them, and the presence of a Metabase, which is a document containing all the business requirements, including data dictionary, institutional reporting layout design and technical information of the Business.

2.2.4. Business Intelligence platforms

BI platforms empower firms to build BI applications implementing capabilities of analysis, information delivery and platform integration. (Gartner, s.d.)

Some examples of most known BI platforms are Microstrategy, Power BI, Tableau, Qlik View and others showed in the following image (Figure 2.2) that represents the Magic Quadrant for Analytics and Business Intelligence Platform (Gartner, 2019), a classification made by Gartner of the best tools used for this purpose.

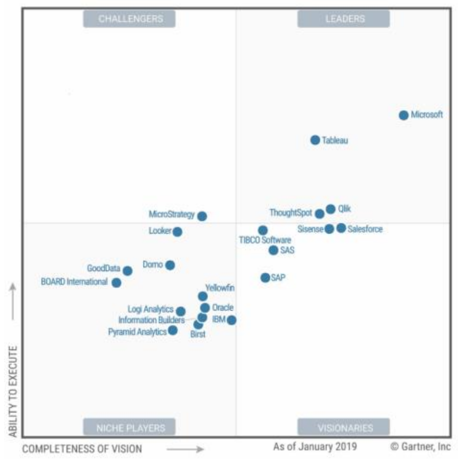


Figure 2.2 – Magic quadrant for Analytics and Business Intelligence Platform

The outputs of these platforms are **dashboards** and **reports**, that are customizable tools which bring several advantages like a cloud accessibility, since are shareable with all the users that have a key role in the decision-making process, enhancing collaboration and communication.

Also, they improve the focus and the alignment on the relevant business information through the creation of **KPIs** – Key Performance Indicators – which represent a measurable value that evaluate the ability of a firm to achieve a key business objective.

KPIs vary depending on the industry or a department that is intended to analyze, but commonly they regard Marketing, Sales or Financial fields, even if there isn't a limit of possible application areas.

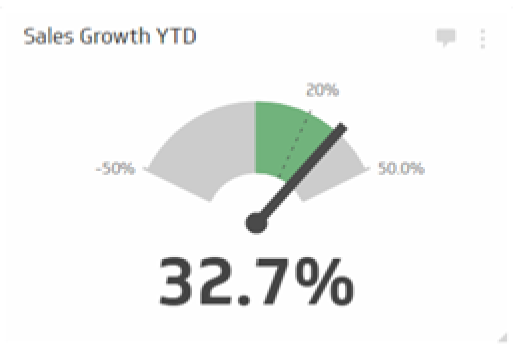


Figure 2.3 – Example of a Sales KPI

3. ORGANIZATIONS

The following chapter contain an introduction of the SDG Group company, how it operates worldwide, not only in the Business Intelligence field, and an overview of the company owner of the DWH in which SDG's developments have been carried out, exposing how the team on-site works.

3.1. SDG GROUP

SDG group is operating, over the last 25 years, as an international management consulting firm focused on the practices of Business Analytics, Corporate performance management and Business intelligence.

The experience and professionality leaded the firm to develop an own innovative Management intelligence practice allowing different approaches to an improved requirements management, which brought the company to be listed by Gartner in the 2018 and 2019 Market Guide for Data and Analytics Service Providers, a list containing the top 40 representative Business and Analytics consulting companies in the world. (Gartner, 2018)

The business structure is a function-process matrix structure, which means that it operates on different process divisions, classified as: Public services and utilities division, Industrial and consumer, Financial services, Public and Healthcare and Fashion and Luxury process divisions.

It is also divided in function division, in this case classified as: Predictive and streaming analysis, Visual and search analytics, Marketing and Business Intelligence transformation divisions.

3.2. KERING

Kering is one of the largest holding company in the fashion and luxury goods market, founded in the 1963 by François Pinault, today run by his son François-Henri Pinault.

Since its establishment the company has continued to develop and grow up to become a *pure player* in its sector, it is the owner of several international luxury brands, some of the most well-known are: Bottega Veneta, Brioni, Saint Laurent, Gucci, Balenciaga and Alexander McQueen.

This thesis will be focused on the Kering supply chain and its decision support system, SCDM2.0, which covers the orders management, from their creation to their shipment.

Before explaining the implementation of the task, it is necessary to describe how the BI team works and how the customer requests are managed to successful fulfill their needs.

3.2.1. Delivery Team

The Delivery Team is an inside unit which work is focused on a prompt response to all, mostly minor, end user requests within existing bigger projects, making analyses on complications to regular flows or adding new useful features.

It is composed by two teams, the Front-End team (hereafter FE) , focused not only on the simple creation of any possible new metrics, but mostly on the arrangement of the report builders, used by the client, in order to make them capable to create their own report, with all the possible combination of metrics and information about their data.

While the Back-End team (hereafter BE) job is centralized on the setting-up of the new facts, dimensions or more frequently new attributes, that make possible the creation of new insights.

These two teams operate in close collaboration, since their works must result from both a BE and FE analyses to reach the customer expectations.

Usually a task, that is a request that comes from a client need, start with a presentation of the requirements and a consequent first analysis, made by both the teams, about the dimension and the fact tables that will be involved, and the time effort required to completely fulfill the request.

After this first step the analysis will be presented to the Data Architects, who ensure that the implementation is conform to the EDW standards.

Only after their approval the task can reach the third step of *development* in the *Quality Assurance environment* (hereafter QA).

The QA environment is where a developer tests the upgraded procedures against data, hardware, and software that 'closely simulate the Production environment' (Oracle, Development, Test, QA and Production Environment, 2010).

How it is understandable from its definition, in this phase comes the real implementation, which is tested not only regarding the data results, but also in timing terms, especially when the task refers to the addition of new transformations on data, which results in more time consumed by the flow.

Subsequently the tests, the next process is to implement the new developments in the production environment, where the flows concrete bring data to the end users.

3.2.2. SCDM2.0

SCDM2.0, which stands for Supply Chain Data Mart, is a complex BI project whose objective is to provide a reliable and complete decision tool that gives management an end-to-end vision of the supply chain process, from order acquisition to its end, including the production process.

It is divided in four project waves: *order management, Kering Group Operations KPI, End-to-end delivery, customer-oriented production,* and a new one, *leather goods manufacturing,* that is at its early stages.

As suggested from its name, the focus of this project is the Kering supply chain, which is the alignment of all the business units within the organization, ensuring their cooperation to achieve key business goals. It can be analyzed by six decisive factors:

- Sustainability, ability to reduce social and environmental impacts;
- Efficiency, in terms of cost-optimization;
- Flexibility, which is the ability of the supply chain to be reorganized in order to satisfy new evolutions of the demand customers;
- Velocity, the rapidity to provide final outputs to the client;
- Reliability, specifically during the shipping process, is the ability to succeed in all the necessary steps, starting from the right product, to the perfect condition for its shipment, to the correct final client;
- Stock optimization refer to its efficiency in the raw and final product management.

The framework of reference is the **Supply Chain Operations Reference (SCOR)**, a model that links business processes, performance metrics, practices and people skills into a unified structure. It gives several advantages such as improvement on business agility, inventory turns and overall operational performances, but also accelerate business process effectiveness and system implementations, giving support to organizational learning goals (Apics, s.d.).

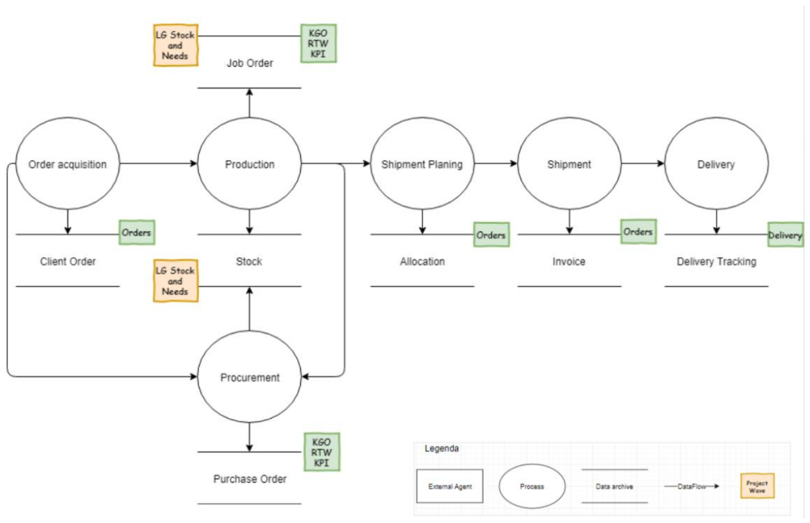


Figure 3.1 – Kering SCDM2.0

4. IT TOOLS

In this chapter there will be described the source system, the Data Base Management System (DBMS) and the business intelligence tools used by the company. After the first explanation will be presented the main rules which refer all the developer teams.

4.1. STEALTH – AS/400

Stealth is an integrated technologic platform which manage all the production activities, retail sales and channel distributions within a luxury and fashion organization.

It is based on Application System 400 (AS/400), which includes DB2/400 RDBMS and support for security and multiple users. Since the company is the owner of several brands, the management system is dived into libraries, each one for every brand owned. Hence, to access at the different libraries is necessary to specify the name **ST3DB**, which stands for the Stealth platform, then a letter, **P** or **F** indicates if it is a custom library (P) or a standard library (F), then three characters used to recall the specific company (i.e. GUC for Guccio Gucci, or LOG for logistic, etc…)

Moreover, a table can be stored in more than one library, hence the ETL process of extraction will loop on the same table throughout all the libraries the table is contained.

4.2. ORACLE EXADATA

Oracle Exadata is a database machine designed by Oracle to enhance database functionalities. It is a composite database server machine that adopts Oracle database software, it is defined as the fastest database, able to deliver higher performance and capacity at lower costs than other platforms, even in huge data warehouse. (Gartner, 2015)

The goal is reached shifting database algorithms and intelligence into storage and networking rather than traditional processing layers**.** (Oracle Corporation, 2017).

It supports several databases systems such as OLTP (Online Transaction Processing) and OLAP (Online Analytical Processing).

4.2.1. OLTP and OLAP

There are several systems which support the business activities, in the field of Business Intelligence, and from this point of view it is possible to simplify and schematize the different software, dividing them into 2 categories: *operational or transactional* system, used for operating and management activities, and *analysis* system, which help strategic and decision-making activities.

OLTP systems, record, change and show real-time data according to the several Business Units. In this kind of systems data are distributed across multiple tables for speed and simplicity of loading and updating reasons.

The information is inserted and modified only once, avoiding redundancies, even if the queries are complex, there aren't any particular problems, since they are rarely modified, and it is done only from expert developers.

Due to its nature of support system for daily executive operations, an OLTP system is characterized by a massive use of transactions, that are operations in sequence viewed as a single set, executed as a single block, which is successfully executed or failed in its entirely, an example is a booking system for an hotel chain, in which queries are quickly processed and usually return few records.

While **OLAP** system don't work on recent data, but rather on a wider timeframe. They are updated from operational data periodically and they continually grow since they keep historical data.

This kind of systems is used to analyze data from different perspectives, or dimensions, hence they are also called Multidimensional Systems.

Each dimension harvests the criteria on the basis of which data will be used, then the dimension is shown in a cubic structure, which intersection identifies one or more measures.

Data stored in these systems come from OLTP systems and they are used to plan, solve problems and support decisions.

4.3. ORACLE SQL DEVELOPER

Oracle SQL Developer is an integrated development environment which uses the domain-specific language **SQL**, that lead to an easier development and management of Oracle Database, through the use of worksheet for running queries and scripts, it allows an entire end-to-end development of PL/SQL applications. (Umamageswaran and Goindi, 2017)

It enhances productivity and simplifies database development tasks, even connecting with third-party that are not Oracle databases.

4.4. ORACLE DATA INTEGRATOR 11G

Oracle Data Integrator (hereafter ODI) is a data integration software based on an exclusive ELT (*Extract, Load and Transform*) architecture, providing a graphical environment to create, manage and maintaining data transformation and integration processes in business intelligence systems.

The main advantages of ODI are:

- A *simpler and more powerful architecture*, rather than an ETL Server located between the source and the target servers, the E-LT architecture uses both of them to perform complex transformations.

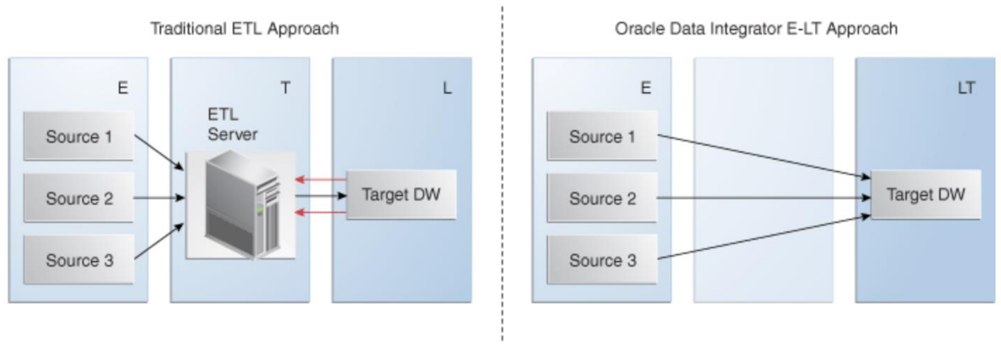


Figure 4.1 – Traditional ETL vs ODI E-LT

- *Wider connectivity*, supporting all the RDBMSs and Data Warehousing platforms.
- *Better performances,* capable to execute data transformations exploiting a set-based level, through the use of indexes, giving higher performances.
- *Data quality antiviral,* it does a preventive check on data, to prevent the insertion of faulty data in the target application.
- *Faster development and maintenance,* thanks to the declarative rules driven approach.
- *Platform independence.*
- *Cost reduction,* through the elimination of the ETL server and engine, enables not only a cutting of software acquisition costs but also the costs for their maintenance.

ODI comprises several components, such as:

- **Repository** is the central component of ODI architecture, capable to stores IT infrastructure, metadata, projects and scenarios information. Its architecture is designed to allow several separated environments that exchange metadata and scenarios **(**such as development and production environments). It is composed of a Master Repository, that stores information about security, topology, versioned and archived objects; And one or more Work Repositories, that assemble developed objects and collect information for Models, including schema definitions, datastores, metadata, columns definition, data quality constraints, but also Projects information, regarding business rules, packages, procedures, etc… and finally details on Scenario execution and scheduling information;
- a web application, **Lightweight Designer**, that aim to view and edit objects in the repository through a web browser;
- **ODI Public Web Services**, which allow users to leverage ODI features in a Service-oriented architecture.

In the following paragraphs will be explained in details, the objects used by a ODI user to develop and maintain data flows.

4.4.1. ODI Metadata

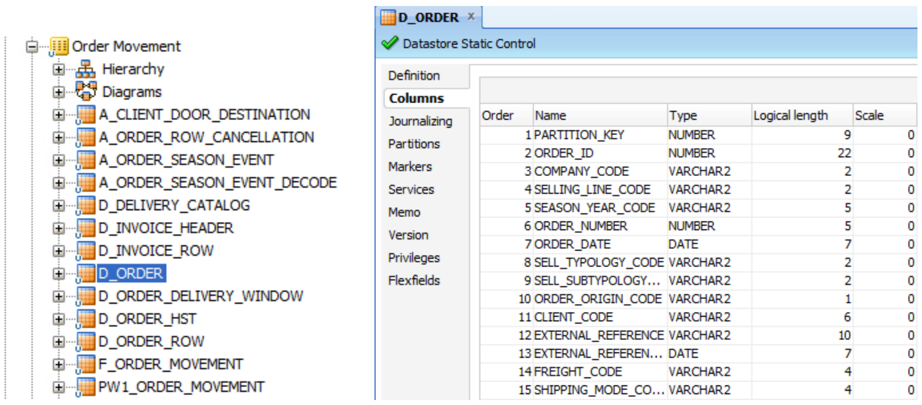
A Metadata is a description of data itself, its purpose, how it is used, and the systems used to manage it, including data model definitions, data transformation descriptions, process and flow information, business intelligence description or any other meaningful information about it. (Oracle , 2012)

It is not related only to DWH or BI, but also to other organization architectures like business, application, data and technology.

Metadata are the center in the ODI architecture, contained in a comprehensive metadata repository, easily accessible, an SDK – Software Development Kit. This repository includes all the domains used in data integration, which are **security information**, that refer to users and relative access privileges within the ODI platform, **topology information**, list of technologies, definition of servers, schemas, contexts and languages.

There are also **data models**, including descriptions of schemas, datastore structures, cross references and so on, **integration projects**, containing declarative and transformation rules, mappings, packages, folders, knowledge modules, etc…, finally there is also an **execution** domain, with information about load plans, scenarios, scheduling information and logs.

A key process, regarding this repository, is the **reverse engineering**, that loads in it metadata from data storage, like DB, or even files.



- Order Movement
  - Hierarchy
  - Diagrams
  - A_CLIENT_DOOR_DESTINATION
  - A_ORDER_ROW_CANCELLATION
  - A_ORDER_SEASON_EVENT
  - A_ORDER_SEASON_EVENT_DECODE
  - D_DELIVERY_CATALOG
  - D_INVOICE_HEADER
  - D_INVOICE_ROW
  - D_ORDER
  - D_ORDER_DELIVERY_WINDOW
  - D_ORDER_HST
  - D_ORDER_ROW
  - F_ORDER_MOVEMENT
  - PW1_ORDER_MOVEMENT

D_ORDER

Datastore Static Control

Definition | **Columns** | Journalizing | Partitions | Markers | Services | Memo | Version | Privileges | Flexfields

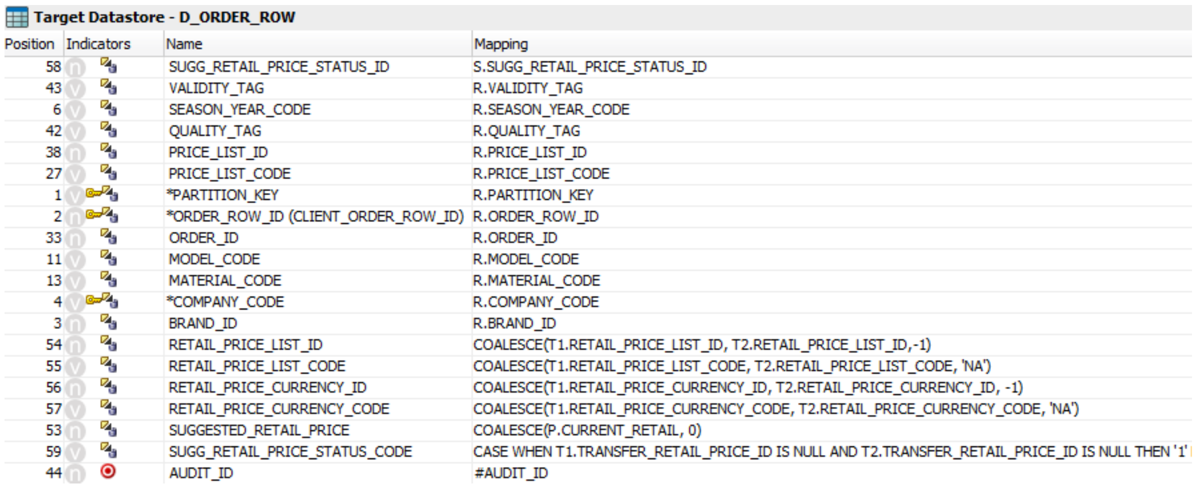
Order	Name	Type	Logical length	Scale
1	PARTITION_KEY	NUMBER	9	0
2	ORDER_ID	NUMBER	22	0
3	COMPANY_CODE	VARCHAR2	2	0
4	SELLING_LINE_CODE	VARCHAR2	2	0
5	SEASON_YEAR_CODE	VARCHAR2	5	0
6	ORDER_NUMBER	NUMBER	5	0
7	ORDER_DATE	DATE	7	0
8	SELL_TYPOLOGY_CODE	VARCHAR2	2	0
9	SELL_SUBTYPOLOGY...	VARCHAR2	2	0
10	ORDER_ORIGIN_CODE	VARCHAR2	1	0
11	CLIENT_CODE	VARCHAR2	6	0
12	EXTERNAL_REFERENCE	VARCHAR2	10	0
13	EXTERNAL_REFEREN...	DATE	7	0
14	FREIGHT_CODE	VARCHAR2	4	0
15	SHIPPING_MODE_CO...	VARCHAR2	4	0

Figure 4.2 – Examples of ODI Metadata

4.4.2. ODI Interface

An ODI interface is an object that loads into a specific target datastore, data coming from one or more source table, based on requested rules, which can be translated as transformation tools, such as:

- Mapping, executed by a relational database server at run-time, is a transformation made up for attribute valorization coming from the source datastore to the target.

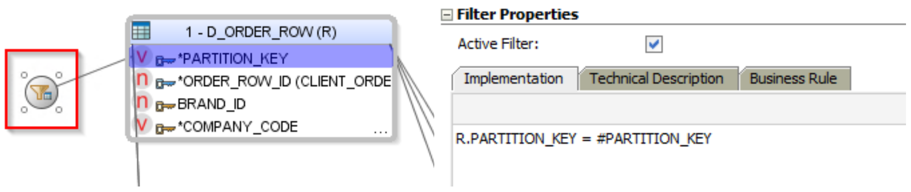


Target Datastore - D_ORDER_ROW

Position	Indicators	Name	Mapping
58	n	SUGG_RETAIL_PRICE_STATUS_ID	S.SUGG_RETAIL_PRICE_STATUS_ID
43	v	VALIDITY_TAG	R.VALIDITY_TAG
6	v	SEASON_YEAR_CODE	R.SEASON_YEAR_CODE
42	v	QUALITY_TAG	R.QUALITY_TAG
38	n	PRICE_LIST_ID	R.PRICE_LIST_ID
27	v	PRICE_LIST_CODE	R.PRICE_LIST_CODE
1	v	*PARTITION_KEY	R.PARTITION_KEY
2	n	*ORDER_ROW_ID (CLIENT_ORDER_ROW_ID)	R.ORDER_ROW_ID
33	n	ORDER_ID	R.ORDER_ID
11	v	MODEL_CODE	R.MODEL_CODE
13	v	MATERIAL_CODE	R.MATERIAL_CODE
4	v	*COMPANY_CODE	R.COMPANY_CODE
3	n	BRAND_ID	R.BRAND_ID
54	n	RETAIL_PRICE_LIST_ID	COALESCE(T1.RETAIL_PRICE_LIST_ID, T2.RETAIL_PRICE_LIST_ID,-1)
55	v	RETAIL_PRICE_LIST_CODE	COALESCE(T1.RETAIL_PRICE_LIST_CODE, T2.RETAIL_PRICE_LIST_CODE, 'NA')
56	n	RETAIL_PRICE_CURRENCY_ID	COALESCE(T1.RETAIL_PRICE_CURRENCY_ID, T2.RETAIL_PRICE_CURRENCY_ID, -1)
57	v	RETAIL_PRICE_CURRENCY_CODE	COALESCE(T1.RETAIL_PRICE_CURRENCY_CODE, T2.RETAIL_PRICE_CURRENCY_CODE, 'NA')
53	n	SUGGESTED_RETAIL_PRICE	COALESCE(P.CURRENT_RETAIL, 0)
59	v	SUGG_RETAIL_PRICE_STATUS_CODE	CASE WHEN T1.TRANSFER_RETAIL_PRICE_ID IS NULL AND T2.TRANSFER_RETAIL_PRICE_ID IS NULL THEN '1'
44	n	AUDIT_ID	#AUDIT_ID

Figure 4.3 – Example of Mapping

- Filter, it’s a SQL clause applied on the source. Used to reduce the group of data for a specific attribute valorization that is or is not required on the target.



1 - D_ORDER_ROW (R)

V	*PARTITION_KEY
n	*ORDER_ROW_ID (CLIENT_ORDE
n	BRAND_ID
V	*COMPANY_CODE

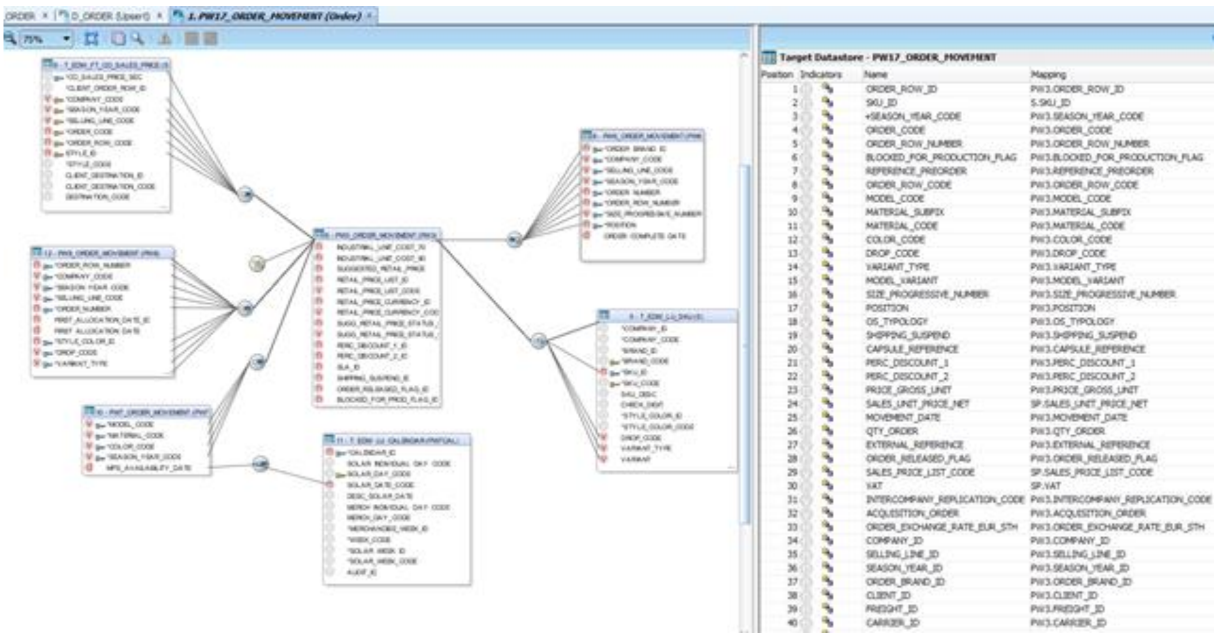
Filter Properties

Active Filter: ✓

R.PARTITION_KEY = #PARTITION_KEY

Figure 4.4 – Example of Filters

- Join, implemented as a SQL clause, it is used to combine data through different tables. There are different kinds of join, depending on the resulted data that is wanted to obtain: *cross-join, inner join, left outer join, right outer join and full outer join.*

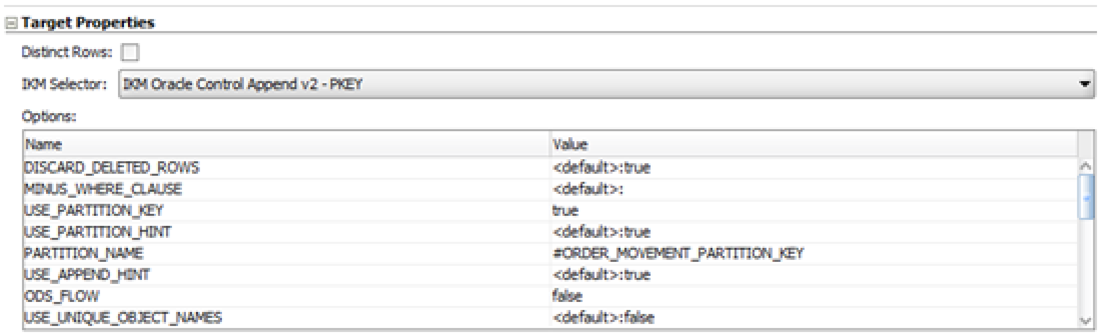


Target Datastore - PW17_ORDER_MOVEMENT

Position	Name	Mapping
1	ORDER_ROW_ID	PW3.ORDER_ROW_ID
2	SKU_ID	S.SKU_ID
3	+SEASON_YEAR_CODE	PW3.SEASON_YEAR_CODE
4	ORDER_CODE	PW3.ORDER_CODE
5	ORDER_ROW_NUMBER	PW3.ORDER_ROW_NUMBER
6	BLOCKED_FOR_PRODUCTION_FLAG	PW3.BLOCKED_FOR_PRODUCTION_FLAG
7	REFERENCE_PREORDER	PW3.REFERENCE_PREORDER
8	ORDER_ROW_CODE	PW3.ORDER_ROW_CODE
9	MODEL_CODE	PW3.MODEL_CODE
10	MATERIAL_SUBFIX	PW3.MATERIAL_SUBFIX
11	MATERIAL_CODE	PW3.MATERIAL_CODE
12	COLOR_CODE	PW3.COLOR_CODE
13	DROP_CODE	PW3.DROP_CODE
14	VARIANT_TYPE	PW3.VARIANT_TYPE
15	MODEL_VARIANT	PW3.MODEL_VARIANT
16	SIZE_PROGRESSIVE_NUMBER	PW3.SIZE_PROGRESSIVE_NUMBER
17	POSITION	PW3.POSITION
18	OS_TYPOLOGY	PW3.OS_TYPOLOGY
19	SHIPPING_SUSPEND	PW3.SHIPPING_SUSPEND
20	CAPSULE_REFERENCE	PW3.CAPSULE_REFERENCE
21	PERC_DISCOUNT_1	PW3.PERC_DISCOUNT_1
22	PERC_DISCOUNT_2	PW3.PERC_DISCOUNT_2
23	PRICE_GROSS_UNIT	PW3.PRICE_GROSS_UNIT
24	SALES_UNIT_PRICE_NET	SP.SALES_UNIT_PRICE_NET
25	MOVEMENT_DATE	PW3.MOVEMENT_DATE
26	QTY_ORDER	PW3.QTY_ORDER
27	EXTERNAL_REFERENCE	PW3.EXTERNAL_REFERENCE
28	ORDER_RELEASED_FLAG	PW3.ORDER_RELEASED_FLAG
29	SALES_PRICE_LIST_CODE	SP.SALES_PRICE_LIST_CODE
30	VAT	SP.VAT
31	INTERCOMPANY_REPLICATION_CODE	PW3.INTERCOMPANY_REPLICATION_CODE
32	ACQUISITION_ORDER	PW3.ACQUISITION_ORDER
33	ORDER_EXCHANGE_RATE_EUR_STH	PW3.ORDER_EXCHANGE_RATE_EUR_STH
34	COMPANY_ID	PW3.COMPANY_ID
35	SELLING_LINE_ID	PW3.SELLING_LINE_ID
36	SEASON_YEAR_ID	PW3.SEASON_YEAR_ID
37	ORDER_BRAND_ID	PW3.ORDER_BRAND_ID
38	CLIENT_ID	PW3.CLIENT_ID
39	FREIGHT_ID	PW3.FREIGHT_ID
40	CARRIER_ID	PW3.CARRIER_ID

Figure 4.5 – Example of an ODI interface

- Declarative rules are transformed into knowledge modules, that are codes templates containing the sequence of commands that the interface has to perform, these modules vary depending on the role of the interface, such as loading, integration, checking or journalizing.



Target Properties

Distinct Rows: ☐

IKM Selector: IKM Oracle Control Append v2 - PKEY

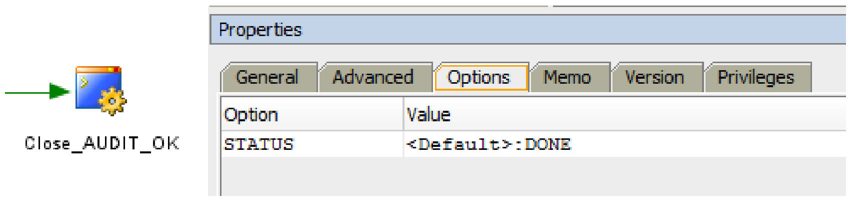
Options:

Name	Value
DISCARD_DELETED_ROWS	<default>:true
MINUS_WHERE_CLAUSE	<default>:
USE_PARTITION_KEY	true
USE_PARTITION_HINT	<default>:true
PARTITION_NAME	#ORDER_MOVEMENT_PARTITION_KEY
USE_APPEND_HINT	<default>:true
ODS_FLOW	false
USE_UNIQUE_OBJECT_NAMES	<default>:false

Figure 4.6 – Example of Knowledge Module

4.4.3. ODI Procedures

An ODI procedure is a set of commands, used to group actions that cannot be performed within an interface framework. Executable in a package, it is a reusable object, composed of command lines trying to make as generic as possible.



Option	Value
STATUS	<Default>:DONE

Figure 4.7 – Example of ODI Procedure

4.4.4. ODI Variables

An ODI Variable is an object that stores a single value, that can be a string, number, date and so on.

A variable can be a **set** variable, when is a pre-defined static value, or **declared**, when the value is a parameter passed when running a scenario.

It can be a **refresh** variable, as the name suggest, its value change depending on the execution of a statement, or **evaluate**, used to evaluate an expression and branch the execution sequence in a package.

Figure 4.8 – Example of a Refresh ODI Variable

4.4.5. ODI Packages

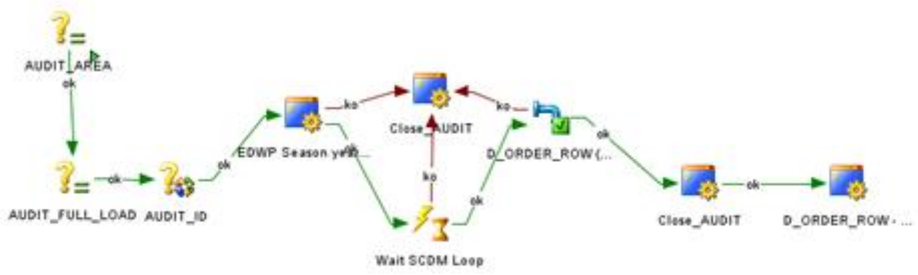


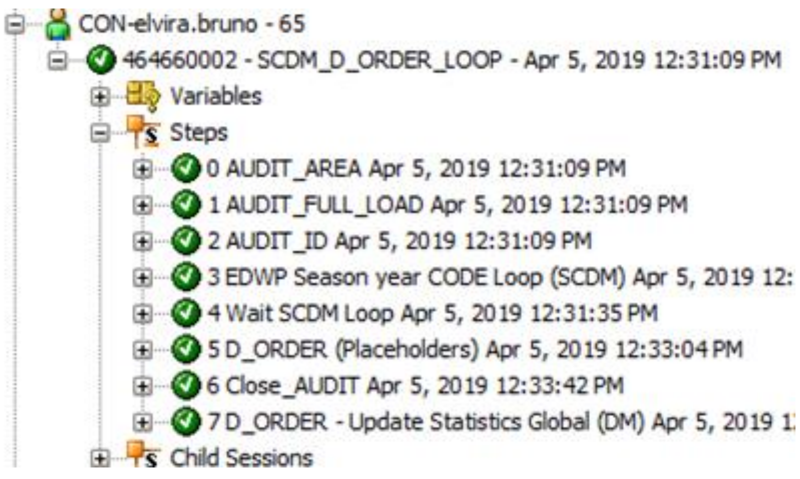
Figure 4.9 – Example of an ODI Package

An ODI package is the main object used to organize the complete flow path, which determines the where and how data will be extracted, loaded, transformed and integrated into the target datastore.

The path is composed by one or several steps, which can be any of the objects previously defined, and each one of them can ends in a successfully or failure way.

The package can be executed through the generation of a *scenario*, that contain the translated XML file for each step of the package, once it is generated, if the package is modified, it will receive the changes only by a regeneration.

Finally, the execution of a scenario can be monitored, step by step, thanks to the ODI Operator Navigator.



```
CON-elvira.bruno - 65
  464660002 - SCDM_D_ORDER_LOOP - Apr 5, 2019 12:31:09 PM
    Variables
    Steps
      0 AUDIT_AREA Apr 5, 2019 12:31:09 PM
      1 AUDIT_FULL_LOAD Apr 5, 2019 12:31:09 PM
      2 AUDIT_ID Apr 5, 2019 12:31:09 PM
      3 EDWP Season year CODE Loop (SCDM) Apr 5, 2019 12:
      4 Wait SCDM Loop Apr 5, 2019 12:31:35 PM
      5 D_ORDER (Placeholders) Apr 5, 2019 12:33:04 PM
      6 Close_AUDIT Apr 5, 2019 12:33:42 PM
      7 D_ORDER - Update Statistics Global (DM) Apr 5, 2019 1:
    Child Sessions
```

Figure 4.10 – Example of scenario execution

4.5. MICROSTRATEGY

Microstrategy is a software, developed by MicroStrategy Incorporated company, used to analyze internal and external data in order to help the decision-making process.

It uses business intelligence and predictive analytics to search through and perform analytics on big data from a variety of sources, like data warehouse, excel files and so on, making able business stakeholders to transform it into action-driving insights, with intuitive and powerful tools capable to prepare, visualize and map organization data and share it with anyone interested.

Kering offers, through this software, preconstructed *prompt* reports, which contains all the major details that users request, giving them the possibility to customize the prompts, to satisfy the always changing questions about their company.

4.6. KERING EDW STANDARDS

In this paragraph will be given an overview of the logical and physical architecture of the Enterprise Data Warehouse, defining each layer with its name conventions and guidelines, to follow when new tables are created or modified, in order to work in an aligned environment.

4.6.1. Data warehouse Architecture

The Kering Data Warehouse architecture is divided in different layers, as shown in the following image that gives an overall graphical representation, each one of them represents a step of the data extraction, transformation and loading path.

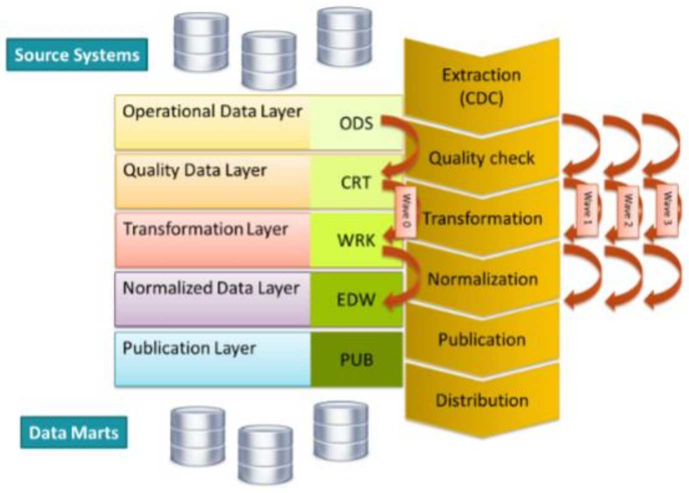


Figure 4.11 – Kering Data Warehouse architecture

Some fundamental points to keep in mind in this architecture are:

- Each layer reads data either from the previous one or from other tables of the same layer.
- Each table, in the Operational layer, is loaded only once from its source system, without any transformation applied to its data.
- Processes should only access the certified entity needed in the Normalized Layer and eventually the Publication Layer, avoiding any direct access to the original one in the Operational Layer.

4.6.2. Operational Layer

This layer implements the exchange between the Source System and the Data Warehouse. Tables are loaded in a one to one scale with the original source system, except for some technical attributes (PARTITION_KEY, AUDIT_ID and so on). Column names are modified in accordance with a shared business dictionary.

Regarding the loading process, historical data is kept, and physical deletions should not be performed, besides small number of cases, and replaced by logical ones.

Tables are named with the original name, preceded by the name of the source system where the data came from in this way: *SourceSystem_FormerTableName.*

Furthermore, entities may be partitioned in order to allow parallel processing or to reflect the physical segregation in the source environment.

A new attribute added in this layer, over the original attributes, which deserve a particular mention, is the **AUDIT_ID**, it traces the Audit process that created or modified a certain record (it can be split into two different fields, if there is the need to keep both date of first creation of the record and date of last modification).

Eventually it has great importance in the following layers, to make possible some processes based on its value.

4.6.3. Quality Layer

This layer implements the quality process, checking constraints that must be verified in order to *certify* a record to the next level, providing specific procedures which allow a full implementation of a real quality process, in particular all the constraints must be defined on a “certification table” created in this schema (QLT).

Input data from the Operational Layer, that pass the checking process is moved eventually into an output table in the quality schema (CRT), while the other that violate one or several constraints are moved or copied into an Error table, depending on the constraint severity level, *ERROR* when the constraint is very strong, which means that all the records violating it cannot be promoted to the Normalized Layer, and *WARNING* when the constraint is weak, which means that records violating it are still promoted but are tagged with a specific value.

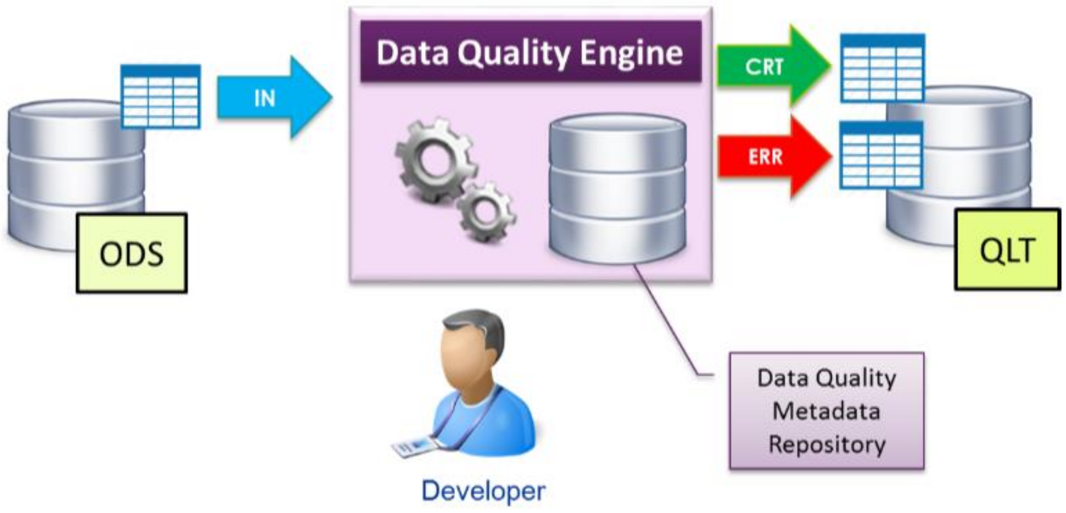


Figure 4.12 – Process in the Quality Layer

The "final" table reflects the original structure plus possible new attributes in order to provide all necessary new information, coming from joins with other tables.

They must preserve the maximum detail level or eventually increasing it if needed for rule checking reasons.

For each table loaded from the Operational Layer two tables will be created with the following naming: CRT_*Entity* and ERR_*Entity,* the first one contains all the records, which are ready to be loaded into the Normalized layer, while the second table, automatically created by ODI Knowledge Module, has the ones that are discarded with the relative reasons.

The quality constraints that can be defined belong to the following categories:

- **Primary** or **Alternate keys**, checking that records are not duplicated for primary key, which is an attribute or a combination of them, that identify in a unique way a record.
- **Foreign key**, a reference constraint with tables in the Normalized Layer, specified through a direct reference (column to column) or through more complex expressions involving functions or one or many columns.
- **Check constraints**, also known as business constraints, based on functional or business driven conditions, that need to be verified by each record.

- **Mandatory fields**, meaning that a certain field must be valorized and cannot have a null value.

4.6.4. EDWT Layer

In the Transformation Layer is performed the functional transformation process, hence data coming from Operational Layer, after being certified by the quality process is transformed into third normal form, made homogeneous and integrated into the Normalized Layer data model.

The process may involve one or more steps, which may generate temporary tables. These tables should be created in a dedicated schema and should never be referenced from outside, nor they could be reused by other processes. While in case of simple transformations they must be performed directly to the target table in the Normalized Layer.

The name used by these work tables, used to support integration process in the DWH, except for suitably justified exceptions, will be as the following example: WKn_*Entity,* where n is a numeric incremental value (from 0 to N) corresponding to the number of work tables created.

Work tables are always populated in truncate/insert mode and no historical data is kept, all functional transformations are implemented in order to guarantee that records achieved the characteristics needed to be loaded into the Normalized layer.

4.6.5. EDWN Layer

The Normalized layer stores the consistent, integrated and certified version of data with the maximum level of details.

Normalization is the process of minimizing **redundancy** from a relation or set of relations, which can cause insertion, deletion or upgrade of anomalies. Normal forms are used for this purpose and they are divided in 3 main different types:

- **1st Normal form**

A relation is in first normal form if it does not contain any composite or multi-valued attribute, meaning that each attribute in that relation is a single value.

The following table is not normalized in the first form, since the attribute PRODUCT of the first record has more than a single value. While in the second table has been decomposed into a first normal form

Date	Product	Customer Name	Customer City
01 Jan	Ananas, Banana	James	Spring Valley
18 Apr	Edible Oil	Mario	Florence

Table 4.1 – First Normal Form example

Date	Product	Customer Name	Customer City
01 Jan	Ananas	James	Spring Valley
01 Jan	Banana	James	Spring Valley
18 Apr	Edible Oil	Mario	Florence

Table 4.2 – First Normal Form example

- **2nd Normal form**

A table is in second normal form if and only if it is in First Normal Form and every non-prime attribute of the table is dependent on the whole of a candidate key.

In other words, the candidate primary key in the previous example could be the combination of the attributes DATE, PRODUCT and CUSTOMER NAME, but not the CUSTOMER CITY that is a non-prime attribute.

The latter is only dependent by the attribute CUSTOMER NAME and not also from the others, this means that it doesn't respect the second normal form, hence in order to bring this table to the 2nd normal form, It is necessary to break this table in the following way.

Date	Product	Customer Name
01 Jan	Ananas, Banana	James
18 Apr	Edible Oil	Mario

Table 4.3 – Second Normal Form example

Customer Name	Customer City
James	Spring Valley
Mario	Florence

Table 4.4 – Second Normal Form example

- **3rd Normal Form**

Finally, the third normal form requires that every non-prime attribute of the table must be directly dependent on every key of the table.

For example, supposing that to the previous table, with customer name and customer city attributes, is added the zip code field, this will be a non-prime attribute, dependent on the whole of the key (Customer name), but in this case customer city is only *transitively* dependent on Customer name through the Zip code attribute, hence the table doesn't respect the third normal form.

A new table, in order to respect this last normal form could be divided in the following way:

Customer Name	Zip Code
James	122-344
Mario	50144

Table 4.5 – Third Normal Form example

Zip Code	Customer City
122-344	Spring Valley
50144	Florence

Table 4.6 – Third Normal Form example

In this case, the EDWN layer should be designed with a functional prospective and should contain all the relevant information that has to be stored in the *3rd normal form,* the pros of this choice is a greater flexibility, the ability to answer to more business questions. It typically requires less storage and it is easier to modify, even if is more complex to maintain and requires more joins between tables.

It contains only certified and consolidated data which belongs to one of the following categories:

- **Dimension** tables, used both for domain tables, which stores abstract entities, such as *types* or finite-values domain, and real entities tables, which refer to real entities, such as Store, Sale Assistants and so on; They should be named as follow: D_*DomainorEntityName*
- **Fact** tables, used to store "generic transaction" information. Specifically, they represent collection of *facts* regarding organization processes, containing a set of measures, such as numeric attributes describing the performance of the behavior of a company process, like sales or stocks. Their naming must reflect what is modeled in the table, making its fact and granularity intuitive, in this way: F_*MetricName_Granularity,* where the Metric name is the name of the fact being measured, i.e. *F_SALE,* and the Granularity is not mandatory and should be discussed with the Data Warehouse Manager.
- **Associate** tables, used to store relations among dimension tables, similar to fact tables, differentiate from them since they do not contain quantitative measures. However, there are some exceptions, for example it may be necessary to calculate an aggregate measure that depends on a set of rows and not on the row itself, i.e. A_SALE_SA_DEPT table stores the information about the number of different product categories sold by a Sale Assistant in a single ticket.

The naming form to follow in this case is: A_*AssociationName* or A_*DimensionA*_*DimensionB*.

4.6.6. EDWP Layer

The Publication layer stores data “ready to be consumed” by the final user, either directly or after being distributed to the various data marts.

Information are organized in *dimensional manner*, which is the closer representation to the business user point of view. A common bus of dimension tables is shared among all the star schema, meaning that the EDWP layer is a Constellation of Star Schemas.

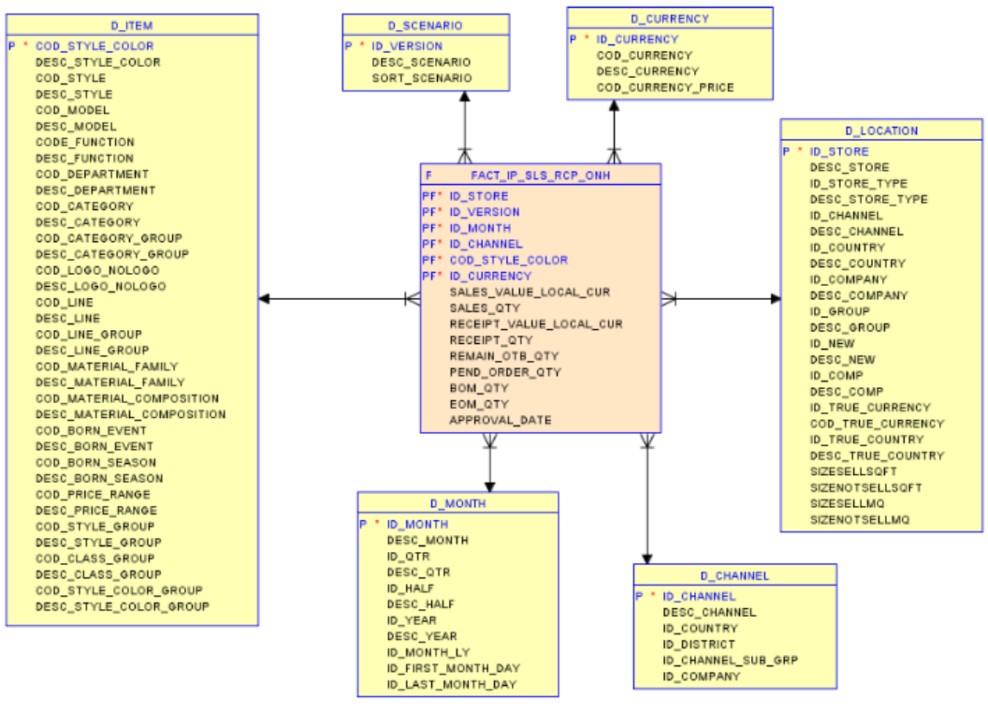


Figure 4.13 – Example of Star Schema

Quality and Validity tags (and eventually other fields) added in the previous layers can be used to decide if a record can be published or not into a certain fact table. Publishing rules are imposed, defined in a high-level language and then used to control a rule engine used to filter out records. For example, a same input record can be published into a certain star schema and at the same time discarded from another one, depending on the business area of interest.

These rules are implementable using ODI with a PL-SQL function ***publication_filter***, that uses the flow name and the fields as input, and returns a SQL expression.

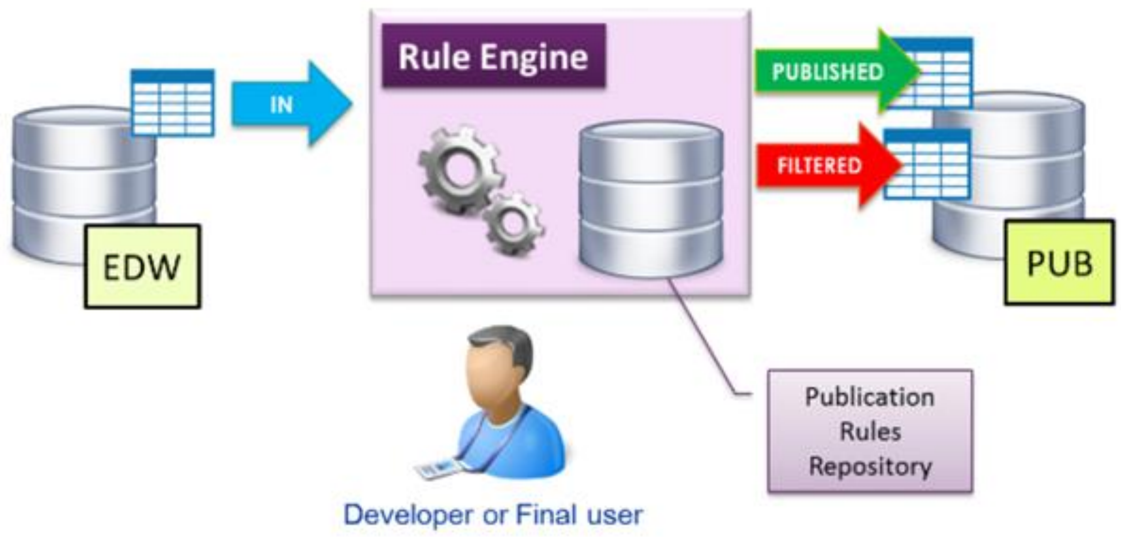


Figure 4.14 – EDWP Layer

4.6.7. Data Mart

Finally, the last process is called *distribution process,* where data is simply distributed from the Publication Layer to the different Data Marts.

A **Data Mart** is a subject oriented archive that stores data and uses the retrieved set of information to assist and support the requirements involved within a particular business function or enterprise department.

The table structures in these two layers are identical, meaning that no transformations are allowed, it is a mere copy of data from one layer to the marts

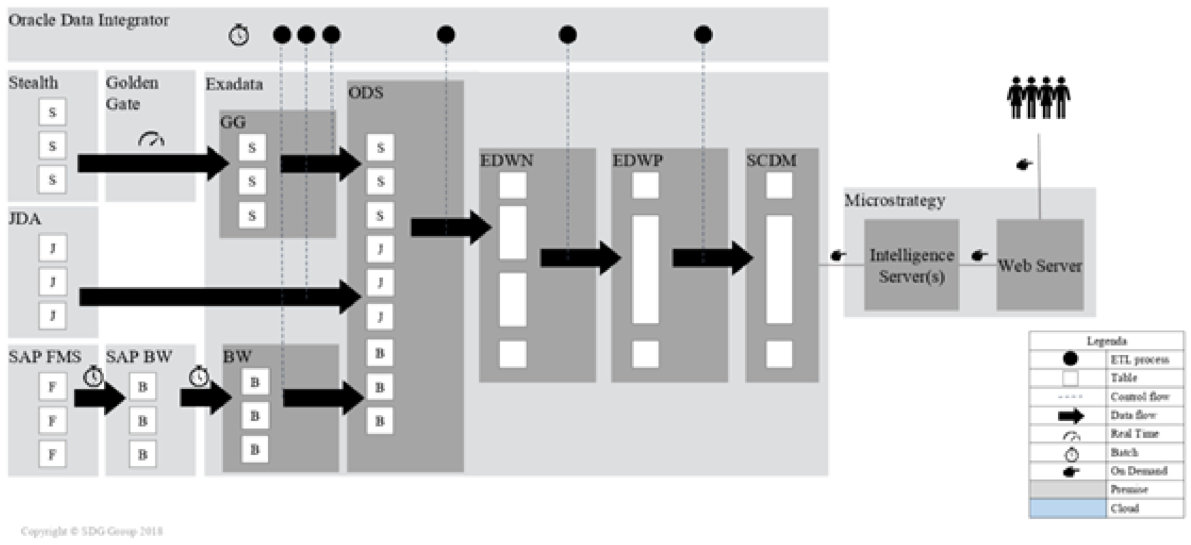


Figure 4.15 – Kering DWH Architecture, main components and data flows

5. METHODOLOGY

This chapter describes the Agile methodology, used for the SCDM2.0 project, the context in which it was used, the principles adopted, and the software used to manage it.

5.1. AGILE METHODOLOGY

The AGILE methodology, developed by APMG International, is an alternative project management, typically used in BI software development. Among all its advantages, plays an important role the help given to teams to respond to unpredictability through incremental and iterative work cadences, called *waves*.

It leads not only to a great reduction of development costs and time, but also to a balance between standards, rigor and visibility required for good project management and fast-pace, change and empowerment.

It is based on **8 principles:**

- *Focus on the business needs,* means that first thing first is necessary to understand and document them, then create a valid business case easy to understand and set a Minimum Usable Subset to deliver, ensuring that it contains the most important requirements.
- *Deliver on time,* make it possible through the timebox action of the work in manageable chunks of time and focusing on business priorities using MoSCow method.
- *Collaborate*, involving the right stakeholders, at the right time, throughout the project, encouraging the involvement of the business representatives and finally building a one-team culture.
- *Never compromise quality,* meaning that is necessary to set the level of quality, before the development begin, setting continuous tests on all the stages, and finally design and documenting appropriately.
- *Built incrementally from firm foundations,* carrying-out appropriate analyses, formally re-assess priorities and informally re-assess ongoing project viability with each delivered increment.

- *Develop iteratively*, taking out feedbacks from each iteration with the business, embracing change, since the right solution will not evolve without it, useful also to encourage creativity, experimentation and learning.
- *Communicate continuously and clearly,* encouraging informal, face-to-face communication at all levels, demonstrate the evolving solution early and often, using visual communication practices such as Modelling and Prototyping, keeping honesty and transparency in all communications.
- *Demonstrate control,* making plans and progress visible to all, measuring progress through focus on delivery of products rather than completed activities, evaluating continuously project viability based on the business objectives.

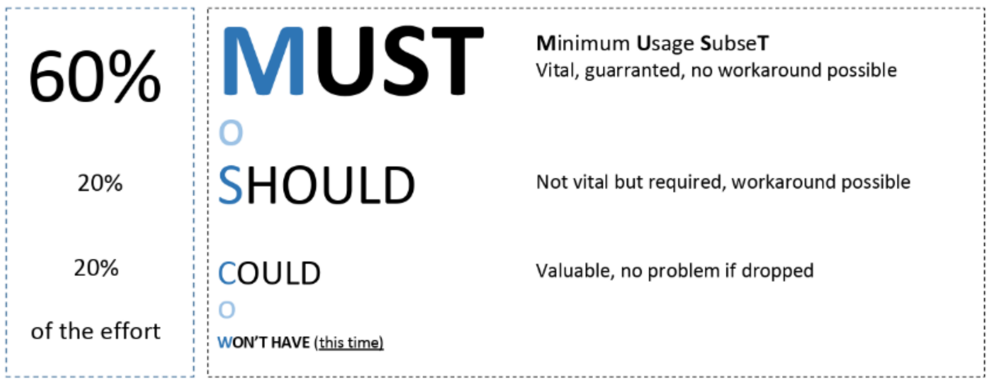
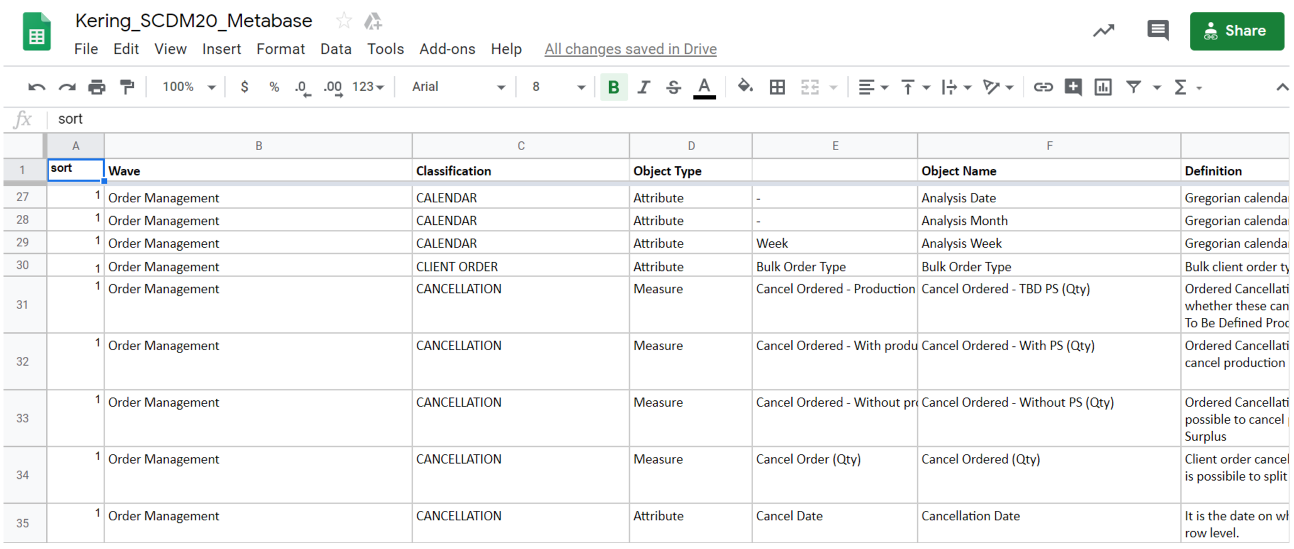

60%
20%
20%
of the effort
MUST
O
SHOULD
COULD
O
WON'T HAVE (this time)
Minimum Usage SubseT
Vital, guarranted, no workaround possible
Not vital but required, workaround possible
Valuable, no problem if dropped

Figure 5.1 – MoSCow method

In this case the approach has been divided in different steps:

1. Definition of a metabase, which is a document that contain all the business requirements, including a data dictionary, the institutional reporting layout design and all the technical information of the Business;
   The metabase contains all the detailed requirements for an EDW project based on the business requests and a preliminary result from source data profiling. It allows to retrieve any kind of information of project requirements, after the user acceptation, a clear source and target table mapping and technical consideration useful for ETL and report developers.


Kering_SCDM20_Metabase
File Edit View Insert Format Data Tools Add-ons Help
All changes saved in Drive
Share
100% $ % .0 .00 123 Arial 8
sort

	A	B	C	D	E	F	
1	sort	Wave	Classification	Object Type		Object Name	Definition
27	1	Order Management	CALENDAR	Attribute	-	Analysis Date	Gregorian calenda
28	1	Order Management	CALENDAR	Attribute	-	Analysis Month	Gregorian calenda
29	1	Order Management	CALENDAR	Attribute	Week	Analysis Week	Gregorian calenda
30	1	Order Management	CLIENT ORDER	Attribute	Bulk Order Type	Bulk Order Type	Bulk client order ty
31	1	Order Management	CANCELLATION	Measure	Cancel Ordered - Production	Cancel Ordered - TBD PS (Qty)	Ordered Cancellati whether these can To Be Defined Proc
32	1	Order Management	CANCELLATION	Measure	Cancel Ordered - With produ	Cancel Ordered - With PS (Qty)	Ordered Cancellati cancel production
33	1	Order Management	CANCELLATION	Measure	Cancel Ordered - Without pr	Cancel Ordered - Without PS (Qty)	Ordered Cancellati possible to cancel Surplus
34	1	Order Management	CANCELLATION	Measure	Cancel Order (Qty)	Cancel Ordered (Qty)	Client order cancel is possibile to split
35	1	Order Management	CANCELLATION	Attribute	Cancel Date	Cancellation Date	It is the date on wl row level.

Figure 5.2 – Example of the Kering SCDM2.0 Metabase

2. Data warehouse and Business Intelligence implementation, including all the logical data model design and the ETL implementation;

3. Training, in which developers will be trained, also through the providing of the documentation;

4. Reporting, in which are created the reports from business requirements and delivered;

5. Testing, which include test and data validations, performance test, security implementation and report publishing.

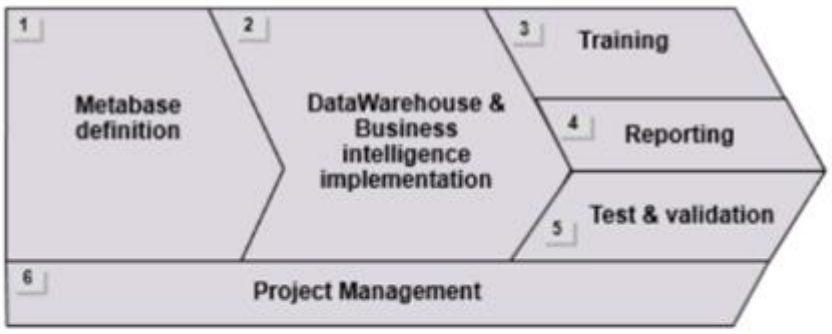


Figure 5.3 – Project approach

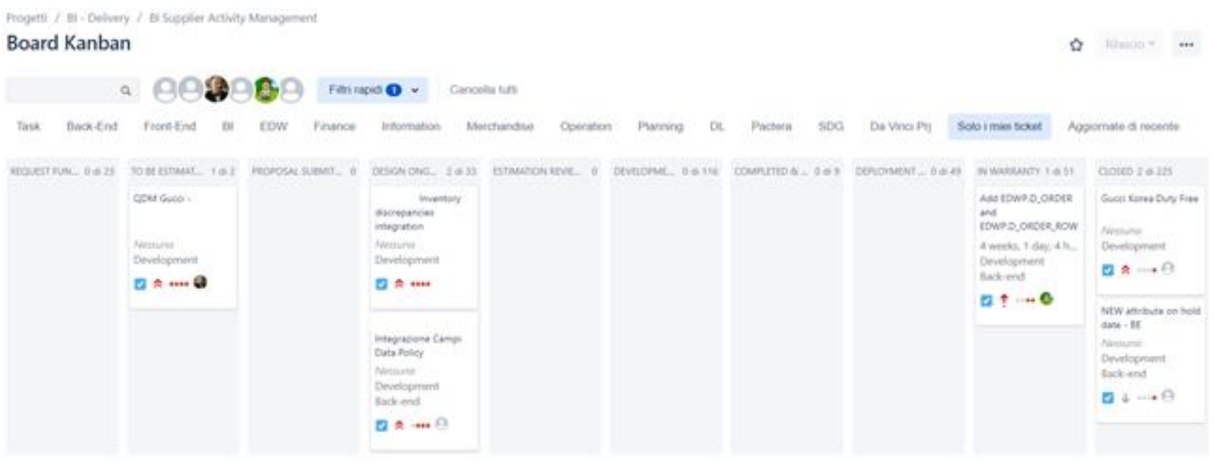
5.2. Jira Software

Jira is a proprietary issue tracking software used to capture any kind of *unit* of work, which could refer to an issue, a bug, a project, a task and so on.

It operates within a predefined workflow, which typically represents processes accomplished by an organization and that is a set of statuses, which are the states of an issue at a specific point in the workflow, and transitions, that are links between statuses which enables the issue to change from one to another through its lifecycle.

The single objects and the workflow can be predefined or customized for specific requirements, whether they must be simpler or more complex. (Atlassian, s.d.) For example, in Kering, it is used a Kanban board, one of the most effective way to visualize a workflow which enables the team to gain control over what is to be done or on working at a certain time. This type of board allows a definition of different roles, distinguished also for parts of project, which corresponds more or less privileges to modify it. (Kanbanize, s.d.)

The great advantages come from the possibility from each user, working on a project, to identify only issues assigned to him, or to an emphasized collaboration, allowed by the use of mentioning comments shared at the same time with all the team members, so they can be on the same page throughout the project.


Progetti / BI - Delivery / BI Supplier Activity Management

Board Kanban

Filtri rapidi 1 Cancella tutti

Task Back-End Front-End BI EDW Finance Information Merchandise Operation Planning DL Pactera SDG Da Vinci Prj Solo i miei ticket Aggiornate di recente

REQUEST FUN... 0 di 23

TO BE ESTIMAT... 1 di 2
- QDM Gucci - / Nessuno / Development

PROPOSAL SUBMIT... 0

DESIGN ONG... 2 di 33
- Inventory discrepancies integration / Nessuno / Development
- Integrazione Campi Data Policy / Nessuno / Development / Back-end

ESTIMATION REVIE... 0

DEVELOPME... 0 di 116

COMPLETED & ... 0 di 9

DEPLOYMENT ... 0 di 49

IN WARRANTY 1 di 51
- Add EDWP.D_ORDER and EDWP.D_ORDER_ROW / 4 weeks, 1 day, 4 h... / Development / Back-end

CLOSED 2 di 225
- Gucci Korea Duty Free / Nessuno / Development
- NEW attribute on hold date - BE / Nessuno / Development / Back-end

Figure 5.4 – Kering Jira Board Kanban

6. PROJECT

This chapter is dedicated to the explanation of one of the tasks developed by the Delivery Team in the SCDM2.0 project specifically for the order management flow.

In order to proceed with the task resolution, it is necessary to describe the fact and dimension tables that have been modified.

6.1. ORDER MANAGEMENT

The order management flow focuses on the integration of the F_ORDER_MOVEMENT table, which is the fact table that includes, as its name says, all the movements related to the orders from their placement to their invoicing.

The two main dimension tables, that load data into this fact table are the D_ORDER and the D_ORDER_ROW. The first one contains the information about the client order header while the second one has the details for each row.

Another fact table, that load data into the F_ORDER_MOVEMENT, is the F_ORDER which has information about the quantity of each product ordered.

The three tables have different granularities, the D_ORDER is the table with the highest granularity:

D_ORDER
COMPANY_CODE
SELLING_LINE_CODE
SEASON_YEAR_CODE
ORDER_NUMBER

Table 6.1 – D_ORDER Granularity

While the D_ORDER_ROW granularity is:

D_ORDER_ROW
COMPANY_CODE
SELLING_LINE_CODE
SEASON_YEAR_CODE
ORDER_NUMBER
ORDER_ROW_NUMBER

Table 6.2 – D_ORDER_ROW Granularity

Finally, the one of the F_ORDER is:

F_ORDER
COMPANY_CODE
SELLING_LINE_CODE
SEASON_YEAR_CODE
ORDER_NUMBER
ORDER_ROW_NUMBER
SIZE_PROGRESSIVE_NUMBER
POSITION
MOVEMENT_DATE

The F_ORDER_MOVEMENT table was requested in order to have more insights into orders and their invoices, hence their shipments. An example of measures explicable using this table is the average time that a certain kind of product takes from its ordering process to its shipment.

For the task topic of the next chapter, the request was to add a detail of a suggested retail price used for a specific client, using the relative currency. Such as the total amount, quantity ordered multiplied for the retail price used for that client, in Chinese Yuan, if the user who control this measure wants it.

6.2. TASK BD-1266

The main goal of the task was focused on the fulfilment for the request of adding several new metrics based on two new attributes Transfer Price and Suggested Retail Price to the already existing table D_ORDER_ROW.

In order to create the new metrics requested, it was necessary to add the following attributes to the D_ORDER_ROW table.

New Attribute Name	***Datatype***
SUGGESTED_RETAIL_PRICE	NUMBER(23,0)
RETAIL_PRICE_LIST_ID	NUMBER(12,0)
RETAIL_PRICE_LIST_CODE	VARCHAR2(4 CHAR)
RETAIL_PRICE_CURRENCY_ID	NUMBER(6,0)
RETAIL_PRICE_CURRENCY_CODE	VARCHAR2(4 CHAR)
SUGG_RETAIL_PRICE_STATUS_ID	NUMBER(5,0)
SUGG_RETAIL_PRICE_STATUS_CODE	VARCHAR2(4 CHAR)

Table 6.3 – New attributes to D_ORDER_ROW table

The process made up in order to add these attributes follow a series of steps, first, it was created an associative table named A_TRANSFER_RETAIL_PRICE, which links the client information with the sales price and the relative currency.

Data for this table were stored in a source table T_STG_WK0_TTB_TABLES, also called *table of tables*, which contain all the lookup information related to the orders retrieved directly from STEALTH.

In order to obtain the information requested for the associative table, it was necessary to filter the table of tables by attribute PROCEDURE_CODE = 45, TABLE_CODE = 'RELC' and TRIM(NULL_RECORD_FLAG) is NULL.

The last filter is used to consider only the valid records, because the not valid ones have the attribute NULL_RECORD_FLAG valorized to N.

Figure 6.1 shows the first steps explained so far and, moreover, the remaining path followed.

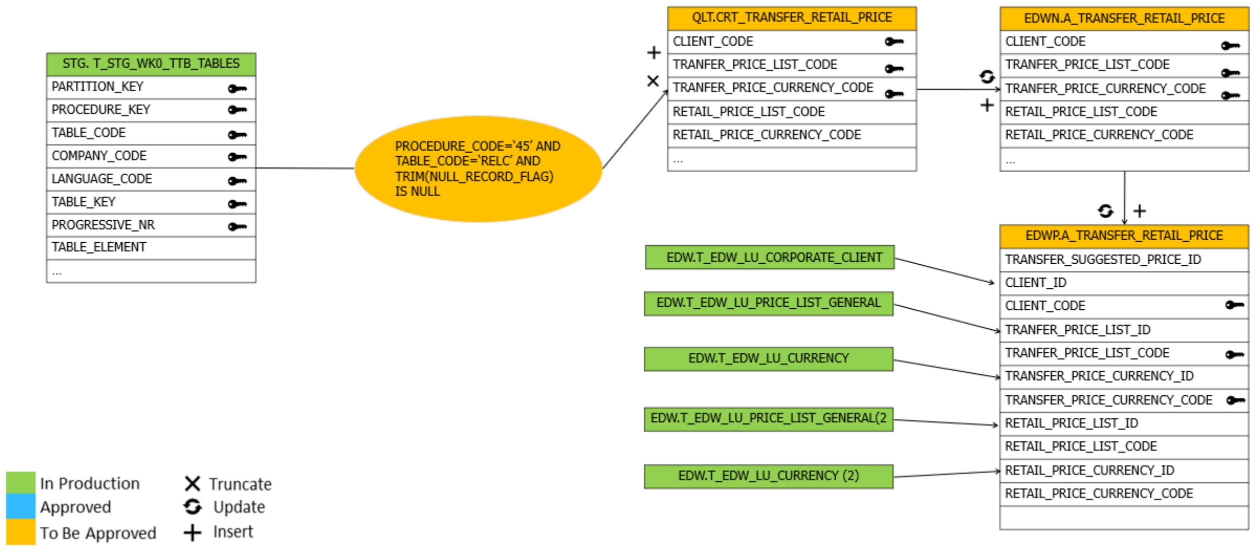

STG. T_STG_WK0_TTB_TABLES
PARTITION_KEY
PROCEDURE_KEY
TABLE_CODE
COMPANY_CODE
LANGUAGE_CODE
TABLE_KEY
PROGRESSIVE_NR
TABLE_ELEMENT
...
PROCEDURE_CODE='45' AND TABLE_CODE='RELC' AND TRIM(NULL_RECORD_FLAG) IS NULL
QLT.CRT_TRANSFER_RETAIL_PRICE
CLIENT_CODE
TRANFER_PRICE_LIST_CODE
TRANFER_PRICE_CURRENCY_CODE
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_CODE
...
EDWN.A_TRANSFER_RETAIL_PRICE
CLIENT_CODE
TRANFER_PRICE_LIST_CODE
TRANFER_PRICE_CURRENCY_CODE
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_CODE
...
EDWP.A_TRANSFER_RETAIL_PRICE
TRANSFER_SUGGESTED_PRICE_ID
CLIENT_ID
CLIENT_CODE
TRANFER_PRICE_LIST_ID
TRANFER_PRICE_LIST_CODE
TRANSFER_PRICE_CURRENCY_ID
TRANSFER_PRICE_CURRENCY_CODE
RETAIL_PRICE_LIST_ID
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_ID
RETAIL_PRICE_CURRENCY_CODE
EDW.T_EDW_LU_CORPORATE_CLIENT
EDW.T_EDW_LU_PRICE_LIST_GENERAL
EDW.T_EDW_LU_CURRENCY
EDW.T_EDW_LU_PRICE_LIST_GENERAL(2
EDW.T_EDW_LU_CURRENCY (2)
In Production
Approved
To Be Approved
Truncate
Update
Insert

Figure 6.1 – Creation process of the table A_TRANSFER_RETAIL_PRICE

As shown in the image the table was created in the QLT, EDWN and EDWP layers, based on the standards rules. This process is translated into two ODI packages, named: DWH_QLT_EDWN_TRANSFER_RETAIL_PRICE and DWH_EDWP_TRANSFER_RETAIL_PRICE. This because the tables for the QLT and the EDWN layers have a different AUDIT_AREA from the EDWP table.

6.2.1. DWH_QLT_EDWN_TRANSFER_RETAIL_PRICE

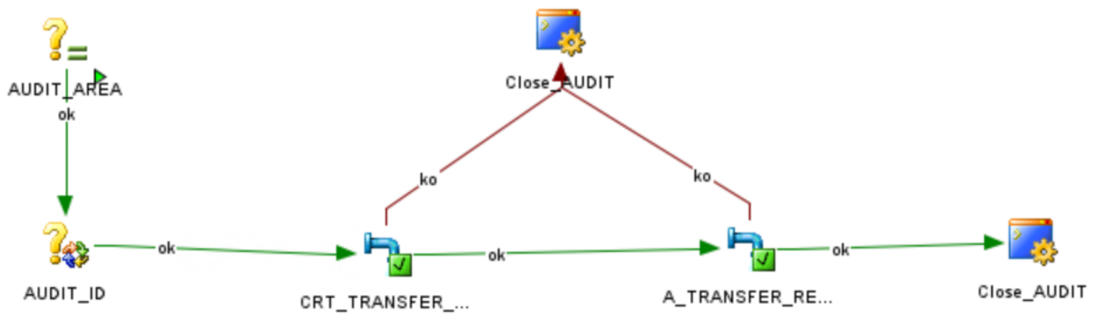
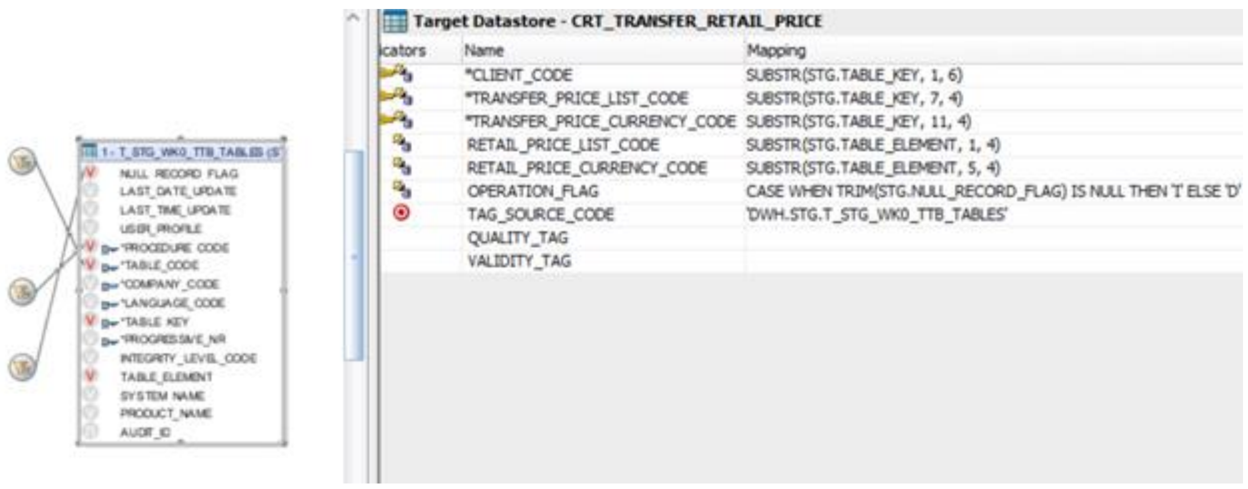


Figure 6.2 – DWH_QLT_EDWN_TRANSFER_RETAIL_PRICE ODI package

The flow above is used to carry data into the QLT layer and EDWN layer. The steps executed are the following:

1. Get the variable AUDIT_AREA in set
   -"EDWN_TRANS_RET_PRI";
2. Get the variable AUDIT_ID in refresh, meaning that each time the package is executed a new AUDIT_ID value is generated, which identify each process executed;
3. Execution of the interface CRT_TRANSFER_RETAIL_PRICE (QLT) TR-INS;
4. Execution of the interface A_TRANSFER_RETAIL_PRICE (EDWN) UPSERT;
5. Procedure Close_AUDIT in 'ERROR' status if there is a problem in one of the two interfaces;
6. Procedure Close_AUDIT in 'DONE' status if the flow ends correctly.

The following image shows the new interface **CRT_TRANSFER_RETAIL_PRICE (QLT) TR-INS** created, in which the table of the Quality layer is populated from the source table, present in the Staging layer based on specifics constraints.



1 - T_STG_WK0_TTB_TABLES (S

NULL_RECORD_FLAG
LAST_DATE_UPDATE
LAST_TIME_UPDATE
USER_PROFILE
*PROCEDURE_CODE
*TABLE_CODE
*COMPANY_CODE
*LANGUAGE_CODE
*TABLE_KEY
*PROGRESSIVE_NR
INTEGRITY_LEVEL_CODE
TABLE_ELEMENT
SYSTEM_NAME
PRODUCT_NAME
AUDIT_ID

Target Datastore - CRT_TRANSFER_RETAIL_PRICE

icators	Name	Mapping
	*CLIENT_CODE	SUBSTR(STG.TABLE_KEY, 1, 6)
	*TRANSFER_PRICE_LIST_CODE	SUBSTR(STG.TABLE_KEY, 7, 4)
	*TRANSFER_PRICE_CURRENCY_CODE	SUBSTR(STG.TABLE_KEY, 11, 4)
	RETAIL_PRICE_LIST_CODE	SUBSTR(STG.TABLE_ELEMENT, 1, 4)
	RETAIL_PRICE_CURRENCY_CODE	SUBSTR(STG.TABLE_ELEMENT, 5, 4)
	OPERATION_FLAG	CASE WHEN TRIM(STG.NULL_RECORD_FLAG) IS NULL THEN 'I' ELSE 'D'
	TAG_SOURCE_CODE	'DWH.STG.T_STG_WK0_TTB_TABLES'
	QUALITY_TAG	
	VALIDITY_TAG	

Figure 6.3 – CRT_TRANSFER_RETAIL_PRICE (QLT) TR-INS

The source table is the STG.T_STG_WK0_TTB_TABLES, it is not partitioned, and its primary key is composed by the attributes: PROCEDURE_CODE, TABLE_CODE, COMPANY_CODE, LANGUAGE_CODE, TABLE_KEY and PROGRESSIVE_NR.

The target object, in this interface, is the CRT_TRANSFER_RETAIL_PRICE table, created in the quality layer. The integration strategy applied is the **Control-Append** procedure, this means that the table is truncated, emptied of all its data, every time the package is executed and then populated again with the same, or possible new, data.

Its primary key is composed by the attributes:

- CLIENT_CODE
- TRANSFER_PRICE_LIST_CODE
- TRASNFER_PRICE_LIST_CURRENCY

which represent the business rule requested in order to add the new attributes Suggested_Retail_Price and related to the D_ORDER_ROW table.

As it was said, data integrated in the quality layer passes through a certification process, after which data can be loaded in the next layers.

This process is composed by a certain number of constraints with different severities, in this case all of them check the values of 4 attributes of the table which have to be listed in other lookup tables in order to be accepted.

- FK_RETAIL_PRICE_CURRENCY_CODE, this constraint is requested in order to take only attribute RETAIL_PRICE_CURRENCY_CODE which value has to be compliant with the lookup table T_EDW_LU_CURRENCY. The expression to test this requirement is:

  UPPER(TRIM(CRT.RETAIL_PRICE_CURRENCY_CODE)) = TRIM(C.CURRENCY_SHORT_DESC)

  where CRT is the alias used to recall the table CRT_TRANSFER_RETAIL_PRICE, while the C, used to recall the table T_EDW_LU_CURRENCY. The constraint has a WARNING severity, this means that the record will be loaded but the Quality Tag attribute will have the WARNING Value and it will be also collected in the ERROR table.

The Oracle/PLSQL UPPER function is used to returns strings with all the letters in uppercase.

- FK_RETAIL_PRICE_LIST_CODE, this constraint is requested in order to take only attribute RETAIL_PRICE_LIST_CODE which value has to be compliant with the lookup table T_EDW_LU_PRICE_LIST_GENERAL. The expression to test this requirement is:

  UPPER(TRIM(CRT.RETAIL_PRICE_LIST_CODE)) = TRIM(P.PRICE_LIST_CODE)

  where the P is used to recall the table T_EDW_LU_PRICE_LIST_GENERAL. The constraint has a WARNING severity, this means that the record will be loaded but the Quality Tag attribute will have the WARNING Value and it will be also collected in the ERROR table.

- FK_TRANSFER_PRICE_CURRENCY_CODE, this constraint is requested in order to take only attribute TRANSFER_PRICE_CURRENCY_CODE which value has to be compliant with the lookup table T_EDW_LU_PRICE_LIST_GENERAL. The expression to test this requirement is:

  UPPER(TRIM(CRT.TRANSFER_PRICE_CURRENCY_CODE)) = TRIM(C.CURRENCY_SHORT_CODE)

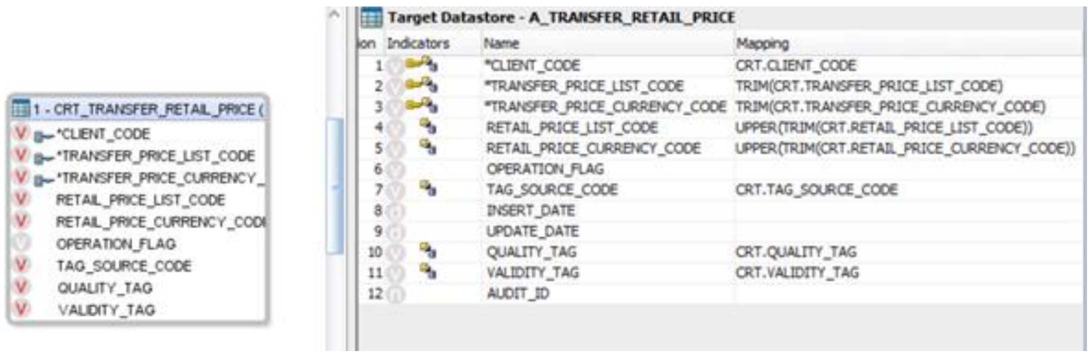
  The alias are the same used in the FK_RETAIL_PRICE_CURRENCY_CODE constraint, but in this case it has an ERROR severity, because the attribute represents the primary key, hence it cannot be accepted with a wrong value, this means that the record will not pass the check and it will be only collected in the ERROR table.

- FK_TRANSFER_PRICE_LIST_CODE, this constraint is requested in order to take only attribute TRANSFER_PRICE_LIST_CODE which value has to be compliant with the lookup table T_EDW_LU_CURRENCY. The expression to test this requirement is:

  UPPER(TRIM(CRT.TRANSFER_PRICE_LIST_CODE)) = TRIM(P.PRICE_LIST_CODE)

  The alias are the same used in the FK_RETAIL_PRICE_LIST_CODE constraint, but in this case it has an ERROR severity, because also in this case the attribute represents the primary key, hence it cannot be accepted with a wrong value, this means that the record will not pass the check and it will be only collected in the ERROR table.

While the second interface **A_TRANSFER_RETAIL_PRICE (EDWN) UPSERT** has a simple mapping one to one from the CRT table to the one created in the EDWN layer as shown in the following image:



1 - CRT_TRANSFER_RETAIL_PRICE (

- *CLIENT_CODE
- *TRANSFER_PRICE_LIST_CODE
- *TRANSFER_PRICE_CURRENCY_
- RETAIL_PRICE_LIST_CODE
- RETAIL_PRICE_CURRENCY_COD
- OPERATION_FLAG
- TAG_SOURCE_CODE
- QUALITY_TAG
- VALIDITY_TAG

Target Datastore - A_TRANSFER_RETAIL_PRICE

ion	Indicators	Name	Mapping
1		*CLIENT_CODE	CRT.CLIENT_CODE
2		*TRANSFER_PRICE_LIST_CODE	TRIM(CRT.TRANSFER_PRICE_LIST_CODE)
3		*TRANSFER_PRICE_CURRENCY_CODE	TRIM(CRT.TRANSFER_PRICE_CURRENCY_CODE)
4		RETAIL_PRICE_LIST_CODE	UPPER(TRIM(CRT.RETAIL_PRICE_LIST_CODE))
5		RETAIL_PRICE_CURRENCY_CODE	UPPER(TRIM(CRT.RETAIL_PRICE_CURRENCY_CODE))
6		OPERATION_FLAG	
7		TAG_SOURCE_CODE	CRT.TAG_SOURCE_CODE
8		INSERT_DATE	
9		UPDATE_DATE	
10		QUALITY_TAG	CRT.QUALITY_TAG
11		VALIDITY_TAG	CRT.VALIDITY_TAG
12		AUDIT_ID	

Figure 6.4 – A_TRANSFER_RETAIL_PRICE (EDWN) Upsert – ODI Interface

The target table has the same primary key of the source table, no constraints are checked in this interface while the integration strategy used is an Insert-Update, this means that each time the package is executed records can be inserted or the ones already loaded can be updated.

6.2.2. DWH_EDWP_TRANSFER_RETAIL_PRICE

The next step is the creation of a new package, in which data will be loaded in the EDWP layer and a new parametric table will be integrated in the EDWP and in the SCDM layer, the latter is the name also used to refer to the Data Mart.

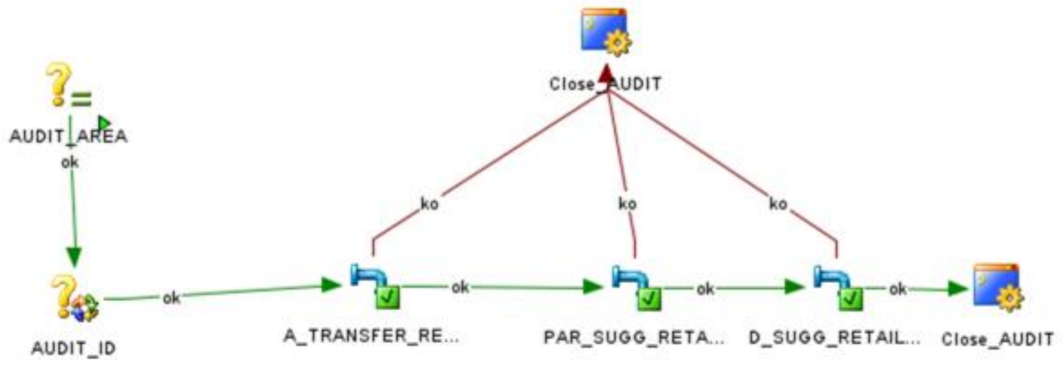
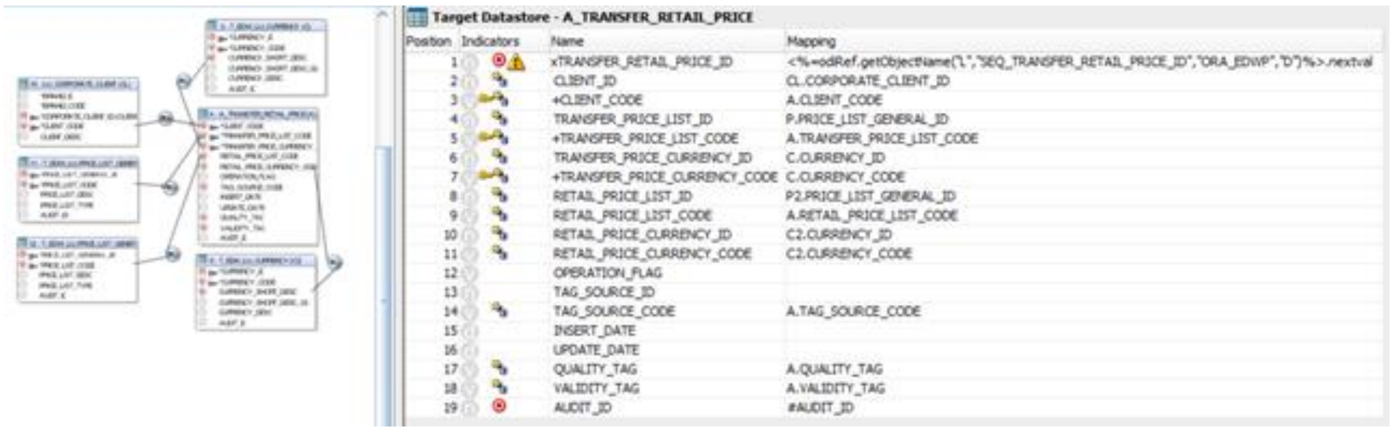


Figure 6.5 – DWH_EDWP_TRASNFER_RETAIL_PRICE ODI package

The steps executed are the following:

1. Get the variable AUDIT_AREA in set
   -“EDWP_TRANS_RET_PRI”;
2. Get the variable AUDIT_ID in refresh;
3. Execution of the interface A_TRANSFER_RETAIL_PRICE (EDWP) UPSERT;
4. Execution of the interface PAR_SUGG_RETAIL_PRICE_STATUS (CFG-EDWP);
5. Execution of the interface D_SUGG_RETAIL_PRICE_STATUS (EDWP-SCDM);
6. Procedure Close_AUDIT in ‘ERROR’ status if there is a problem in one of the three interfaces;
7. Procedure Close_AUDIT in ‘DONE’ status if the flow ends correctly.

In the interface **A_TRANSFER_RETAIL_PRICE (EDWP) Upsert**, data are loaded one to one, in addition are added the IDs attributes, which refer to the codes already existing in the EDWN table, obtained by the joins with the lookup tables, T_EDW_LU_CURRENCY, T_EDW_LU_PRICE_LIST_GENERAL and T_EDW_LU_CORPORATE_CLIENT as shown in the following image:



Target Datastore - A_TRANSFER_RETAIL_PRICE

Position	Indicators	Name	Mapping
1		xTRANSFER_RETAIL_PRICE_ID	<%=odiRef.getObjectName("L","SEQ_TRANSFER_RETAIL_PRICE_ID","ORA_EDWP","D")%>.nextval
2		CLIENT_ID	CL.CORPORATE_CLIENT_ID
3		+CLIENT_CODE	A.CLIENT_CODE
4		TRANSFER_PRICE_LIST_ID	P.PRICE_LIST_GENERAL_ID
5		+TRANSFER_PRICE_LIST_CODE	A.TRANSFER_PRICE_LIST_CODE
6		TRANSFER_PRICE_CURRENCY_ID	C.CURRENCY_ID
7		+TRANSFER_PRICE_CURRENCY_CODE	C.CURRENCY_CODE
8		RETAIL_PRICE_LIST_ID	P2.PRICE_LIST_GENERAL_ID
9		RETAIL_PRICE_LIST_CODE	A.RETAIL_PRICE_LIST_CODE
10		RETAIL_PRICE_CURRENCY_ID	C2.CURRENCY_ID
11		RETAIL_PRICE_CURRENCY_CODE	C2.CURRENCY_CODE
12		OPERATION_FLAG	
13		TAG_SOURCE_ID	
14		TAG_SOURCE_CODE	A.TAG_SOURCE_CODE
15		INSERT_DATE	
16		UPDATE_DATE	
17		QUALITY_TAG	A.QUALITY_TAG
18		VALIDITY_TAG	A.VALIDITY_TAG
19		AUDIT_ID	#AUDIT_ID

Figure 6.6 – A_TRANSFER_RETAIL_PRICE (EDWP) Upsert ODI Interface

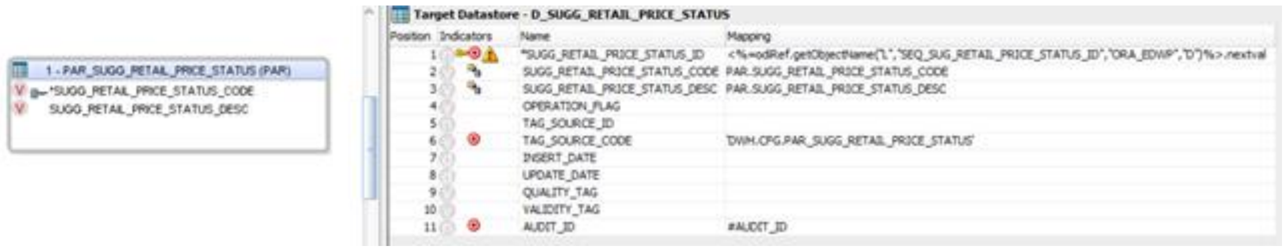
The alias used in the joins are: T, for the A_TRANSFER_RETAIL_PRICE table, CL for the table T_EDW_LU_CORPORATE_CLIENT, P and P2 for the table T_EDW_LU_PRICE_LIST_GENERAL, C and C2 for the table T_EDW_LU_CURRENCY. The reason why there are two aliases for the lookup tables is because it is necessary to make a join for each one of the different attributes, in this way:

- CLIENT_ID, is derived from the join with the lookup table T_EDW_LU_CORPORATE_CLIENT, with the clause: T.CLIENT_CODE = CL.CLIENT_CODE;
- TRANSFER_PRICE_LIST_ID, is derived from the join with the lookup table T_EDW_LU_PRICE_LIST_GENERAL, with the clause: T.TRANSFER_PRICE_LIST_CODE = P.PRICE_LIST_CODE;
- TRANSFER_PRICE_CURRENCY_ID, is derived from the join with the lookup table T_EDW_LU_CURRENCY, with the clause: T.TRANSFER_PRICE_CURRENCY_CODE = C.CURRENCY_SHORT_DESC;
- RETAIL_PRICE_LIST_ID, is derived from the join with the lookup table T_EDW_LU_PRICE_LIST_GENERAL, with the clause: T.RETAIL_PRICE_LIST_CODE = P2.PRICE_LIST_CODE;
- RETAIL_PRICE_CURRENCY_ID, is derived from the join with the lookup table T_EDW_LU_CURRENCY, with the clause: T.RETAIL_PRICE_CURRENCY_CODE = C2.CURRENCY_SHORT_DESC;

Another attribute TRANSFER_RETAIL_PRICE_ID is added using the *nextval* function, which create a number sequence in order to give a unique identifier number to each record of the table.

After the execution of this interface the A_TRANSFER_RETAIL_PRICE is loaded in the EDWP layer, hence it is ready to be used in the next processes.

The other two interfaces **PAR_SUGG_RETAIL_PRICE_STATUS (CFG-EDWP)** and **D_SUGG_RETAIL_PRICE_STATUS (EDWP-SCDM)** present in the package are used to populate a parametric table D_SUGG_RETAIL_PRICE_STATUS, which is populated by predetermined values, and as suggested by the name, it populates the attributes SUGG_RETAIL_PRICE_STATUS_ID and CODE, which indicates if a record has the Retail_Price attributes and/or the Suggested retail price valued.


1 - PAR_SUGG_RETAIL_PRICE_STATUS (PAR)
*SUGG_RETAIL_PRICE_STATUS_CODE
SUGG_RETAIL_PRICE_STATUS_DESC

Target Datastore - D_SUGG_RETAIL_PRICE_STATUS

Position	Name	Mapping
1	*SUGG_RETAIL_PRICE_STATUS_ID	<%=odiRef.getObjectName("L","SEQ_SUG_RETAIL_PRICE_STATUS_ID","ORA_EDWP","D")%>.nextval
2	SUGG_RETAIL_PRICE_STATUS_CODE	PAR.SUGG_RETAIL_PRICE_STATUS_CODE
3	SUGG_RETAIL_PRICE_STATUS_DESC	PAR.SUGG_RETAIL_PRICE_STATUS_DESC
4	OPERATION_FLAG	
5	TAG_SOURCE_ID	
6	TAG_SOURCE_CODE	'DWH.CFG.PAR_SUGG_RETAIL_PRICE_STATUS'
7	INSERT_DATE	
8	UPDATE_DATE	
9	QUALITY_TAG	
10	VALIDITY_TAG	
11	AUDIT_ID	#AUDIT_ID

Figure 6.7 – PAR_SUGG_RETAIL_PRICE_STATUS (CFG-EDWP) interface

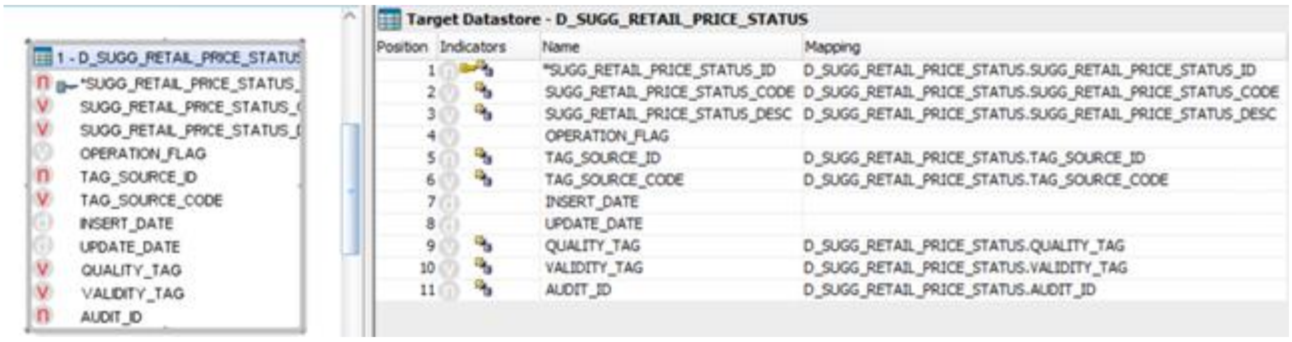
In the interface showed by the image, the source table is the PAR_SUGG_RETAIL_PRICE_STATUS, which has as primary key the SUGG_RETAIL_PRICE_STATUS_CODE field, and is populated in the following way:

SUGG_RETAIL_PRICE_STATUS_CODE	SUGG_RETAIL_PRICE_STATUS_DESC
0	Valid Price
1	Missing Rule
2	Missing Price

Table 6.4 – Values for the parametric D_SUGG_RETAIL_PRICE_STATUS

Besides the mandatory fields, a new attribute added in the target table is the SUGG_RETAIL_PRICE_STATUS_ID, valued in the same way of the TRANSFER_RETAIL_PRICE_ID attribute.

The other interface, **D_SUGG_RETAIL_PRICE_STATUS (EDWP-SCDM)**, is used to populate one to one the data into the data mart layer, as shown in the following image:


1 - D_SUGG_RETAIL_PRICE_STATUS
*SUGG_RETAIL_PRICE_STATUS_
SUGG_RETAIL_PRICE_STATUS_
SUGG_RETAIL_PRICE_STATUS_
OPERATION_FLAG
TAG_SOURCE_ID
TAG_SOURCE_CODE
INSERT_DATE
UPDATE_DATE
QUALITY_TAG
VALIDITY_TAG
AUDIT_ID

Target Datastore - D_SUGG_RETAIL_PRICE_STATUS

Position	Name	Mapping
1	*SUGG_RETAIL_PRICE_STATUS_ID	D_SUGG_RETAIL_PRICE_STATUS.SUGG_RETAIL_PRICE_STATUS_ID
2	SUGG_RETAIL_PRICE_STATUS_CODE	D_SUGG_RETAIL_PRICE_STATUS.SUGG_RETAIL_PRICE_STATUS_CODE
3	SUGG_RETAIL_PRICE_STATUS_DESC	D_SUGG_RETAIL_PRICE_STATUS.SUGG_RETAIL_PRICE_STATUS_DESC
4	OPERATION_FLAG	
5	TAG_SOURCE_ID	D_SUGG_RETAIL_PRICE_STATUS.TAG_SOURCE_ID
6	TAG_SOURCE_CODE	D_SUGG_RETAIL_PRICE_STATUS.TAG_SOURCE_CODE
7	INSERT_DATE	
8	UPDATE_DATE	
9	QUALITY_TAG	D_SUGG_RETAIL_PRICE_STATUS.QUALITY_TAG
10	VALIDITY_TAG	D_SUGG_RETAIL_PRICE_STATUS.VALIDITY_TAG
11	AUDIT_ID	D_SUGG_RETAIL_PRICE_STATUS.AUDIT_ID

Figure 6.8 – D_SUGG_RETAIL_PRICE_STATUS (EDWP – SCDM) interface

6.2.3. DWH_EDWP_D_ORDER_ROW

In this package, already existing, the interface D_ORDER_ROW (Upsert) was modified and a new interface D_ORDER_ROW (Sugg_Retail_Price_Status) was added.

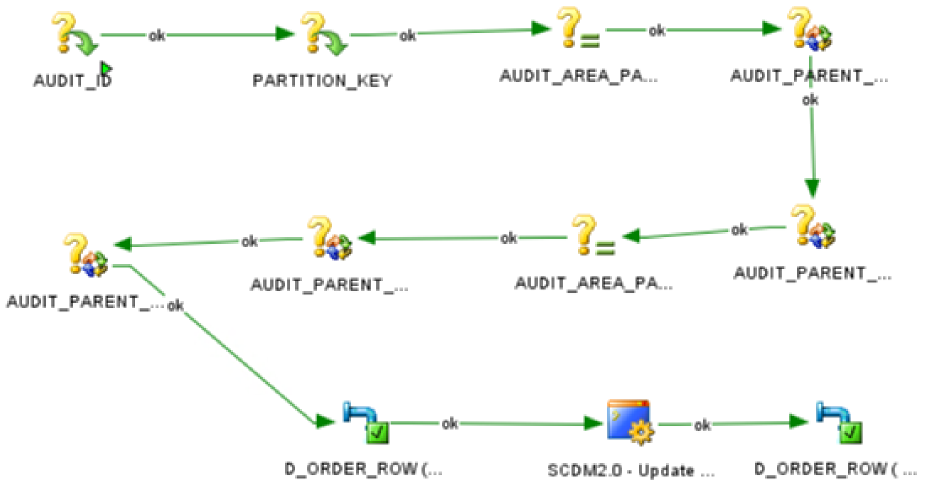
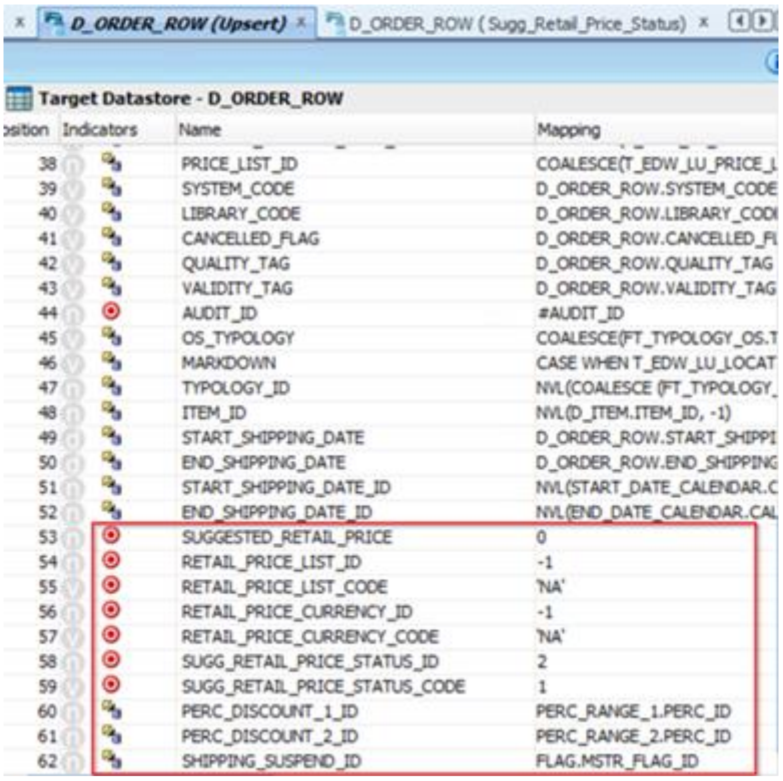


Figure 6.9 – DWH_EDWP_D_ORDER_ROW ODI Package

The interface D_ORDER_ROW (Upsert) was modified in order to valorize the new attributes with default values, plus other attributes added for policy reasons.



Target Datastore - D_ORDER_ROW

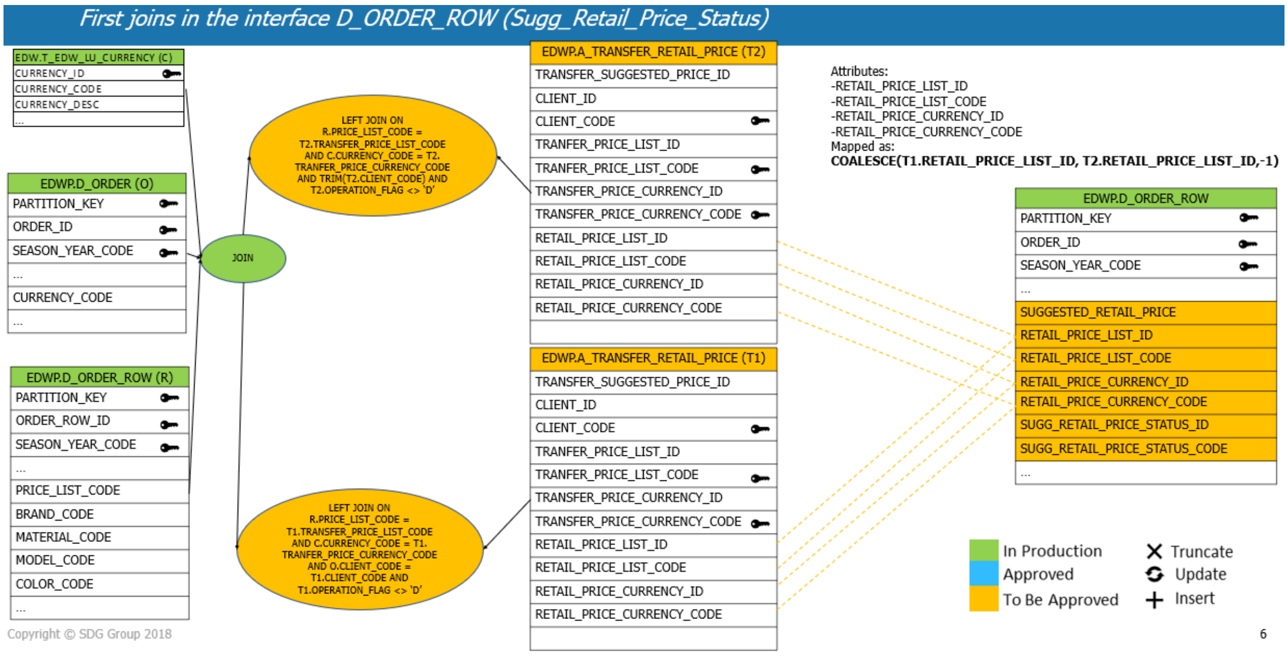
osition	Indicators	Name	Mapping
38	▨	PRICE_LIST_ID	COALESCE(T_EDW_LU_PRICE_L
39	▨	SYSTEM_CODE	D_ORDER_ROW.SYSTEM_CODE
40	▨	LIBRARY_CODE	D_ORDER_ROW.LIBRARY_COD
41	▨	CANCELLED_FLAG	D_ORDER_ROW.CANCELLED_FL
42	▨	QUALITY_TAG	D_ORDER_ROW.QUALITY_TAG
43	▨	VALIDITY_TAG	D_ORDER_ROW.VALIDITY_TAG
44	◉	AUDIT_ID	#AUDIT_ID
45	▨	OS_TYPOLOGY	COALESCE(FT_TYPOLOGY_OS.T
46	▨	MARKDOWN	CASE WHEN T_EDW_LU_LOCAT
47	▨	TYPOLOGY_ID	NVL(COALESCE (FT_TYPOLOGY_
48	▨	ITEM_ID	NVL(D_ITEM.ITEM_ID, -1)
49	▨	START_SHIPPING_DATE	D_ORDER_ROW.START_SHIPPI
50	▨	END_SHIPPING_DATE	D_ORDER_ROW.END_SHIPPING
51	▨	START_SHIPPING_DATE_ID	NVL(START_DATE_CALENDAR.C
52	▨	END_SHIPPING_DATE_ID	NVL(END_DATE_CALENDAR.CAL
53	◉	SUGGESTED_RETAIL_PRICE	0
54	◉	RETAIL_PRICE_LIST_ID	-1
55	◉	RETAIL_PRICE_LIST_CODE	'NA'
56	◉	RETAIL_PRICE_CURRENCY_ID	-1
57	◉	RETAIL_PRICE_CURRENCY_CODE	'NA'
58	◉	SUGG_RETAIL_PRICE_STATUS_ID	2
59	◉	SUGG_RETAIL_PRICE_STATUS_CODE	1
60	▨	PERC_DISCOUNT_1_ID	PERC_RANGE_1.PERC_ID
61	▨	PERC_DISCOUNT_2_ID	PERC_RANGE_2.PERC_ID
62	▨	SHIPPING_SUSPEND_ID	FLAG.MSTR_FLAG_ID

Figure 6.10 – D_ORDER_ROW (Upsert)

In this interface, the data flow loaded is called "delta" since using the AUDIT_ID attribute and the Audit variables calculated in the package DWH_EDWP_D_ORDER_ROW, every time it is executed, the process takes only new records inserted or the ones have been updated from the last executions.

In this way, it is supposed that the records will not join the associative table, hence for this reason the new attributes will have default values and the SUGG_RETAIL_PRICE_STATUS_CODE is equal to 1, that stands for "Missing Rule" status. Only if, in the next interface, they join the associative rules the attributes will be updated with the correct values.

After this interface, in the new one D_ORDER_ROW (Sugg_Retail_Price_Status) new attributes are valorized following the business rules requested in this way:



First joins in the interface D_ORDER_ROW (Sugg_Retail_Price_Status)
EDW.T_EDW_LU_CURRENCY (C)
CURRENCY_ID
CURRENCY_CODE
CURRENCY_DESC
...
EDWP.D_ORDER (O)
PARTITION_KEY
ORDER_ID
SEASON_YEAR_CODE
...
CURRENCY_CODE
...
EDWP.D_ORDER_ROW (R)
PARTITION_KEY
ORDER_ROW_ID
SEASON_YEAR_CODE
...
PRICE_LIST_CODE
BRAND_CODE
MATERIAL_CODE
MODEL_CODE
COLOR_CODE
...
JOIN
LEFT JOIN ON R.PRICE_LIST_CODE = T2.TRANSFER_PRICE_LIST_CODE AND C.CURRENCY_CODE = T2. TRANFER_PRICE_CURRENCY_CODE AND TRIM(T2.CLIENT_CODE) AND T2.OPERATION_FLAG <> 'D'
LEFT JOIN ON R.PRICE_LIST_CODE = T1.TRANSFER_PRICE_LIST_CODE AND C.CURRENCY_CODE = T1. TRANFER_PRICE_CURRENCY_CODE AND O.CLIENT_CODE = T1.CLIENT_CODE AND T1.OPERATION_FLAG <> 'D'
EDWP.A_TRANSFER_RETAIL_PRICE (T2)
TRANSFER_SUGGESTED_PRICE_ID
CLIENT_ID
CLIENT_CODE
TRANFER_PRICE_LIST_ID
TRANFER_PRICE_LIST_CODE
TRANSFER_PRICE_CURRENCY_ID
TRANSFER_PRICE_CURRENCY_CODE
RETAIL_PRICE_LIST_ID
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_ID
RETAIL_PRICE_CURRENCY_CODE
EDWP.A_TRANSFER_RETAIL_PRICE (T1)
TRANSFER_SUGGESTED_PRICE_ID
CLIENT_ID
CLIENT_CODE
TRANFER_PRICE_LIST_ID
TRANFER_PRICE_LIST_CODE
TRANSFER_PRICE_CURRENCY_ID
TRANSFER_PRICE_CURRENCY_CODE
RETAIL_PRICE_LIST_ID
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_ID
RETAIL_PRICE_CURRENCY_CODE
Attributes:
-RETAIL_PRICE_LIST_ID
-RETAIL_PRICE_LIST_CODE
-RETAIL_PRICE_CURRENCY_ID
-RETAIL_PRICE_CURRENCY_CODE
Mapped as:
COALESCE(T1.RETAIL_PRICE_LIST_ID, T2.RETAIL_PRICE_LIST_ID,-1)
EDWP.D_ORDER_ROW
PARTITION_KEY
ORDER_ID
SEASON_YEAR_CODE
...
SUGGESTED_RETAIL_PRICE
RETAIL_PRICE_LIST_ID
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_ID
RETAIL_PRICE_CURRENCY_CODE
SUGG_RETAIL_PRICE_STATUS_ID
SUGG_RETAIL_PRICE_STATUS_CODE
...
In Production
Approved
To Be Approved
Truncate
Update
Insert
Copyright © SDG Group 2018
6

Figure 6.11 – D_ORDER_ROW (Sugg_Retail_Price_Status) interface

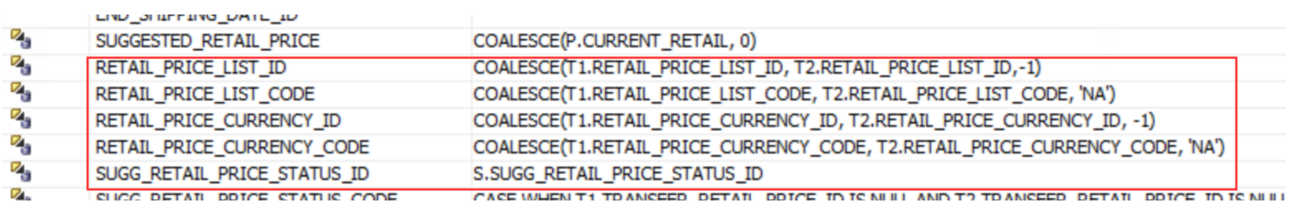
As it shown in the image, in the interface the tables D_ORDER_ROW, D_ORDER and T_EDW_LU_CURRENCY are joined since the three attributes requested by the rule are contained in the three different tables:

- CLIENT_CODE, in the D_ORDER table
- PRICE_LIST_CODE, in the D_ORDER_ROW table
- CURRENCY_CODE, in the T_EDW_LU_CURRENCY

Then they are joined twice with the same table, since users requested that the rule respected the join with the three attributes together or also, only with the PRICE_LIST_CODE and CURRENCY_CODE.

The different approach will not be distinguished in status terms, hence only the mapping for the attributes RETAIL_PRICE_LIST_ID and CODE and RETAIL_PRICE_CURRENCY_ID and CODE will have a COALESCE function, used to take the right value if the record close for the first join or the second or with a default value, in case of it doesn't respect neither of them.

The following image represents the mapping, in the D_ORDER_ROW (Sugg_Retail_Price_Status) interface, only for the records valorized by the joins mentioned.

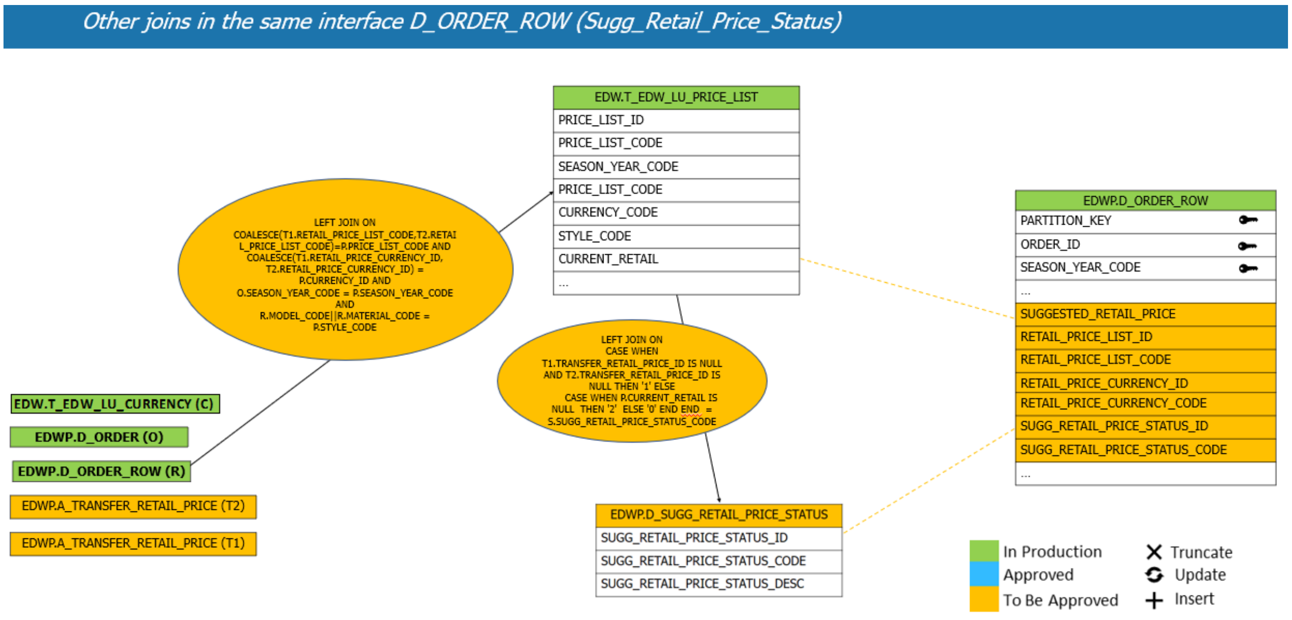


SUGGESTED_RETAIL_PRICE	COALESCE(P.CURRENT_RETAIL, 0)
RETAIL_PRICE_LIST_ID	COALESCE(T1.RETAIL_PRICE_LIST_ID, T2.RETAIL_PRICE_LIST_ID,-1)
RETAIL_PRICE_LIST_CODE	COALESCE(T1.RETAIL_PRICE_LIST_CODE, T2.RETAIL_PRICE_LIST_CODE, 'NA')
RETAIL_PRICE_CURRENCY_ID	COALESCE(T1.RETAIL_PRICE_CURRENCY_ID, T2.RETAIL_PRICE_CURRENCY_ID, -1)
RETAIL_PRICE_CURRENCY_CODE	COALESCE(T1.RETAIL_PRICE_CURRENCY_CODE, T2.RETAIL_PRICE_CURRENCY_CODE, 'NA')
SUGG_RETAIL_PRICE_STATUS_ID	S.SUGG_RETAIL_PRICE_STATUS_ID

Figure 6.12 – Mapping new attributes in D_ORDER_ROW (Sugg_Retail_Price_Status) interface

The Oracle/PLSQL function *COLESCE*, returns the first non-null expression from the one listed in the parenthesis, for example in this case, the first attribute to take is the one derived from the join which respect the first rule – a record that close for Client_Code, Transfer_Price_Currency_Code and Transfer_Price_List_Code – if this one is null, or in other words, the record does not respect the first rule, the coalesce function tries to take the same attribute that came from the other join, which respects the second rule – a record that close only for Transfer_Price_List_Code and Transfer_Price_Currency_Code. Finally, if both of them have a null value, the function gives to the attribute with the default value, '-1' for the ID fields and 'NA' for the code ones.

The other joins occurring in the same interface are used to valorize the Suggested_Retail_Price and the Status field related to it, as showed in the following image.



Other joins in the same interface D_ORDER_ROW (Sugg_Retail_Price_Status)
EDW.T_EDW_LU_PRICE_LIST
PRICE_LIST_ID
PRICE_LIST_CODE
SEASON_YEAR_CODE
PRICE_LIST_CODE
CURRENCY_CODE
STYLE_CODE
CURRENT_RETAIL
...
LEFT JOIN ON COALESCE(T1.RETAIL_PRICE_LIST_CODE,T2.RETAIL_PRICE_LIST_CODE)=P.PRICE_LIST_CODE AND COALESCE(T1.RETAIL_PRICE_CURRENCY_ID, T2.RETAIL_PRICE_CURRENCY_ID) = P.CURRENCY_ID AND O.SEASON_YEAR_CODE = P.SEASON_YEAR_CODE AND R.MODEL_CODE||R.MATERIAL_CODE = P.STYLE_CODE
LEFT JOIN ON CASE WHEN T1.TRANSFER_RETAIL_PRICE_ID IS NULL AND T2.TRANSFER_RETAIL_PRICE_ID IS NULL THEN '1' ELSE CASE WHEN P.CURRENT_RETAIL IS NULL THEN '2' ELSE '0' END END = S.SUGG_RETAIL_PRICE_STATUS_CODE
EDWP.D_ORDER_ROW
PARTITION_KEY
ORDER_ID
SEASON_YEAR_CODE
...
SUGGESTED_RETAIL_PRICE
RETAIL_PRICE_LIST_ID
RETAIL_PRICE_LIST_CODE
RETAIL_PRICE_CURRENCY_ID
RETAIL_PRICE_CURRENCY_CODE
SUGG_RETAIL_PRICE_STATUS_ID
SUGG_RETAIL_PRICE_STATUS_CODE
...
EDW.T_EDW_LU_CURRENCY (C)
EDWP.D_ORDER (O)
EDWP.D_ORDER_ROW (R)
EDWP.A_TRANSFER_RETAIL_PRICE (T2)
EDWP.A_TRANSFER_RETAIL_PRICE (T1)
EDWP.D_SUGG_RETAIL_PRICE_STATUS
SUGG_RETAIL_PRICE_STATUS_ID
SUGG_RETAIL_PRICE_STATUS_CODE
SUGG_RETAIL_PRICE_STATUS_DESC
In Production
Approved
To Be Approved
Truncate
Update
Insert

Figure 6.13 – D_ORDER_ROW (Sugg_Retail_Price_Status) interface

Once the table has the RETAIL_PRICE_LIST and RETAIL_PRICE_CURRENCY attributes it can be joined with the table, of the EDW layer, T_EDW_LU_PRICE_LIST, in order to obtain the CURRENT_RETAIL attribute that will be the SUGGESTED_RETAIL_PRICE in the target table.

The join clause will be as follow:

COALESCE (T1.RETAIL_PRICE_LIST_CODE, T2.RETAIL_PRICE_LIST_ CODE) = R.PRICE_LIST_CODE AND COALESCE (T1.RETAIL_PRICE_CURRENCY_ID, T2.RETAIL_PRICE_CURRENCY_ID) = R.CURRENCY_ID AND O.SEASON_YEAR_CODE = R.SEASON_YEAR_CODE AND R.MODEL_CODE||R.MATERIAL_CODE = R.STYLE_CODE

Finally, the table D_SUGG_RETAIL_PRICE_STATUS is left joined for the SUGG_RETAIL_PRICE_STATUS_CODE, since the attribute is not present in the previous tables, but depends from a business rule requested by the user.

The join clause is a bit different from the others seen so far, hence when the D_ORDER_ROW doesn't join for neither the two clauses with the A_TRANSFER_RETAIL_PRICE table then the correspondent code is '1', which stands for "Missing Rule". While if it joins with one of them but it doesn't with the T_EDW_LU_PRICE_LIST table or it does and the attribute CURRENT_RETAIL attribute is null, the code will be '2', which stands for "Missing Price". Finally, if all the join works and the attributes are all valorized then the code will be '0' which stands for "Valid Price" situation. This rule is translated in PL/SQL language as:

CASE WHEN T1.TRANSFER_RETAIL_PRICE_ID IS NULL T2.TRANSFER_RETAIL_PRICE_ID IS NULL THEN '1' ELSE CASE WHEN R.CURRENT_RETAIL IS NULL THEN '2' ELSE '0' END END

These metrics are already used, but in this case the request referred to the use of the attribute Suggested Retail Price, leading the end user to have insight to the value based on the final price which will be used by the retail stores.

From the D_ORDER_ROW table these new attributes will be added to a work table PW1_ORDER_MOVEMENT which is used to populate the final table F_ORDER_MOVEMENT, with an Exchange Partition procedure.

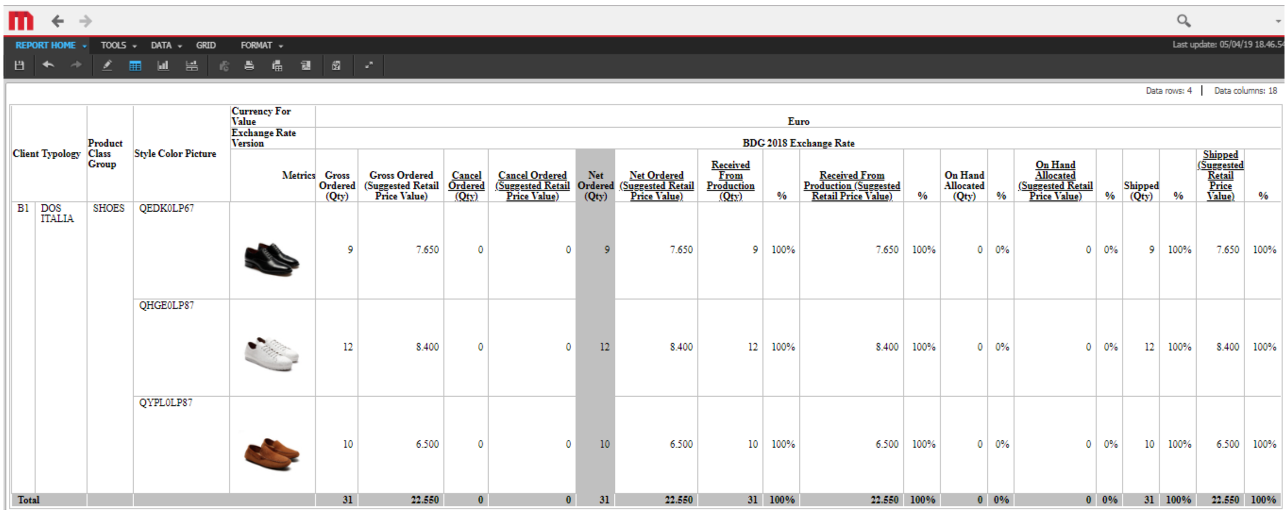
The Exchange partition procedure is useful to get data quickly in or out of a partitioned table. It facilitates high speed data loading of new, incremental data into an existing partitioned table. (Oracle, Database VLDB and Partitioning Guide, s.d.)

This practice is used specifically for tables with a consistent number of data which is modified daily.

7. CONCLUSIONS

In conclusion all the attributes have been added to the F_ORDER_MOVEMENT table on the Supply Chain Data Mart, together with the integration of the new dimension and associative tables. This task ends with a representation of the Microstrategy report, developed by the FE team, as shown in the Figure 7.1.

From this point of view, it is easier to understand the real use of the new information included to the fact table.



Last update: 05/04/19 18.46.54

Data rows: 4 | Data columns: 18

				Currency For Value	Euro																	
				Exchange Rate Version	BDG 2018 Exchange Rate																	
Client Typology		Product Class Group	Style Color	Picture Metrics	Gross Ordered (Qty)	Gross Ordered (Suggested Retail Price Value)	Cancel Ordered (Qty)	Cancel Ordered (Suggested Retail Price Value)	Net Ordered (Qty)	Net Ordered (Suggested Retail Price Value)	Received From Production (Qty)	%	Received From Production (Suggested Retail Price Value)	%	On Hand Allocated (Qty)	%	On Hand Allocated (Suggested Retail Price Value)	%	Shipped (Qty)	%	Shipped (Suggested Retail Price Value)	%
B1	DOS ITALIA	SHOES	QEDK0LP67		9	7.650	0	0	9	7.650	9	100%	7.650	100%	0	0%	0	0%	9	100%	7.650	100%
			QHGE0LP87		12	8.400	0	0	12	8.400	12	100%	8.400	100%	0	0%	0	0%	12	100%	8.400	100%
			QYPL0LP87		10	6.500	0	0	10	6.500	10	100%	6.500	100%	0	0%	0	0%	10	100%	6.500	100%
Total					31	22.550	0	0	31	22.550	31	100%	22.550	100%	0	0%	0	0%	31	100%	22.550	100%

Figure 7.1 – Microstrategy Report

The SUGGESTED_RETAIL_PRICE attribute was used to calculate the value for each one of the measures used in the report. As requested by the user it gives information of Gross ordered or Net ordered values using the retail price specific for that client.

This is only an example of report demanded but based on the available data requests may be several with more or less importance.

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9. APPENDIX

9.1. EDWP.D_ORDER_ROW

```
CREATE TABLE "EDWP"."D_ORDER_ROW"
   ( "PARTITION_KEY" VARCHAR2(5 CHAR) NOT NULL ENABLE,
     "ORDER_ROW_ID" NUMBER(22,0) NOT NULL ENABLE,
     "BRAND_ID" NUMBER(3,0),
     "COMPANY_CODE" VARCHAR2(2 CHAR) NOT NULL ENABLE,
     "SELLING_LINE_CODE" VARCHAR2(2 CHAR),
     "SEASON_YEAR_CODE" VARCHAR2(5 CHAR),
     "ORDER_NUMBER" NUMBER(5,0),
     "ORDER_ROW_NUMBER" NUMBER(3,0),
     "ORDER_ROW_CODE" VARCHAR2(21 CHAR),
     "COMBINATION_CODE" NUMBER(3,0),
     "MODEL_CODE" VARCHAR2(6 CHAR),
     "MATERIAL_SUBFIX" VARCHAR2(6 CHAR),
     "MATERIAL_CODE" VARCHAR2(5 CHAR),
     "COLOR_CODE" VARCHAR2(5 CHAR),
     "MEASURE" NUMBER(3,0),
     "DROP_CODE" VARCHAR2(2 CHAR),
     "VARIANT_TYPE" VARCHAR2(1 CHAR),
     "MODEL_VARIANT" VARCHAR2(6 CHAR),
     "MANAGMENT_MEASURE_CODE" VARCHAR2(2 CHAR),
     "START_DELIVERY_DATE" DATE,
     "END_DELIVERY_DATE" DATE,
     "CONFIRMED_DELIVERY_DATE" DATE,
     "PLANNED_DELIVERY_DATE" DATE,
     "CAPSULE_REFERENCE" VARCHAR2(20 BYTE),
     "ACQUISITION_ORDER" VARCHAR2(200 BYTE),
     "SHIPPING_SUSPEND" VARCHAR2(1 CHAR),
     "PRICE_LIST_CODE" VARCHAR2(4 CHAR),
     "PERC_DISCOUNT_1" NUMBER(4,2),
     "PERC_DISCOUNT_2" NUMBER(4,2),
     "PRICE_GROSS_UNIT" NUMBER(13,2),
     "DOOR_CODE" VARCHAR2(2 CHAR),
     "PRODUCT_NOTE" VARCHAR2(1000 CHAR),
     "ORDER_ID" NUMBER(22,0),
     "CLIENT_DOOR_ID" NUMBER(9,0),
     "START_DELIVERY_DAY_ID" NUMBER(9,0),
     "END_DELIVERY_DAY_ID" NUMBER(9,0),
     "PLANNED_DELIVERY_DATE_ID" NUMBER(9,0),
     "PRICE_LIST_ID" NUMBER(9,0),
     "SYSTEM_CODE" VARCHAR2(40 BYTE),
     "LIBRARY_CODE" VARCHAR2(40 BYTE),
     "CANCELLED_FLAG" VARCHAR2(1 CHAR),
     "QUALITY_TAG" VARCHAR2(4000 BYTE),
     "VALIDITY_TAG" VARCHAR2(4000 BYTE),
     "AUDIT_ID" NUMBER(12,0),
     "OS_TYPOLOGY" VARCHAR2(5 CHAR),
     "MARKDOWN" VARCHAR2(5 CHAR),
     "TYPOLOGY_ID" NUMBER(4,0),
     "ITEM_ID" NUMBER,
     "START_SHIPPING_DATE" DATE,
     "END_SHIPPING_DATE" DATE,
     "START_SHIPPING_DATE_ID" NUMBER(9,0),
     "END_SHIPPING_DATE_ID" NUMBER(9,0),
     "SUGGESTED_RETAIL_PRICE" NUMBER(23,6),
     "RETAIL_PRICE_LIST_ID" NUMBER(12,0),
     "RETAIL_PRICE_LIST_CODE" VARCHAR2(4 CHAR),
     "RETAIL_PRICE_CURRENCY_ID" NUMBER(6,0),
     "RETAIL_PRICE_CURRENCY_CODE" VARCHAR2(4 CHAR),
     "SUGG_RETAIL_PRICE_STATUS_ID" NUMBER(5,0),
     "SUGG_RETAIL_PRICE_STATUS_CODE" VARCHAR2(4 CHAR),
     "PERC_DISCOUNT_1_ID" NUMBER(9,0),
     "PERC_DISCOUNT_2_ID" NUMBER(9,0),
     "SHIPPING_SUSPEND_ID" NUMBER,
      CONSTRAINT "D_ORDER_ROW_PK" PRIMARY KEY ("PARTITION_KEY", 
"ORDER_ROW_ID", "COMPANY_CODE")
```

9.2. EDWP.D_ORDER

```
CREATE TABLE "EDWP"."D_ORDER" 
   ( "PARTITION_KEY" NUMBER(9,0), 
     "ORDER_ID" NUMBER(22,0), 
     "COMPANY_CODE" VARCHAR2(2 CHAR), 
     "SELLING_LINE_CODE" VARCHAR2(2 CHAR), 
     "SEASON_YEAR_CODE" VARCHAR2(5 CHAR), 
     "ORDER_NUMBER" NUMBER(5,0), 
     "ORDER_DATE" DATE, 
     "SELL_TYPOLOGY_CODE" VARCHAR2(2 CHAR), 
     "SELL_SUBTYPOLOGY_CODE" VARCHAR2(2 CHAR), 
     "ORDER_ORIGIN_CODE" VARCHAR2(1 CHAR), 
     "CLIENT_CODE" VARCHAR2(6 CHAR), 
     "EXTERNAL_REFERENCE" VARCHAR2(10 CHAR), 
     "EXTERNAL_REFERENCE_DATE" DATE, 
     "FREIGHT_CODE" VARCHAR2(4 CHAR), 
     "SHIPPING_MODE_CODE" VARCHAR2(4 CHAR), 
     "CARRIER_CODE" VARCHAR2(4 CHAR), 
     "INVOICE_TO_CLIENT_CODE" VARCHAR2(6 CHAR), 
     "CLIENT_DESTINATION_CODE" VARCHAR2(6 CHAR), 
     "DESTINATION_CODE" VARCHAR2(2 CHAR), 
     "CURRENCY_CODE" VARCHAR2(4 CHAR), 
     "BLOCKED_FOR_PRODUCTION_FLAG" VARCHAR2(1 CHAR), 
     "ALLOCATION_SUSP_REASON_CODE" VARCHAR2(2 CHAR), 
     "ALLOCATION_SUSP_REASON_DATE" DATE, 
     "SHIPPING_SUSP_REASON_CODE" VARCHAR2(2 CHAR), 
     "SHIPPING_SUSP_REASON_DATE" DATE, 
     "PAYMENT_CODE" VARCHAR2(3 CHAR), 
     "PAYMENT_DATE" DATE, 
     "PREFERRED_DELIVERY_DATE" VARCHAR2(2 CHAR), 
     "AMT_FINANCIAL_DISCOUNT" NUMBER(2,0), 
     "COMMERCIAL_PRIORITY_CODE" VARCHAR2(2 CHAR), 
     "DELIVERY_PRIORITY_CODE" VARCHAR2(4 CHAR), 
     "EVENT_CODE" VARCHAR2(4 CHAR), 
     "PRODUCTION_COMPANY_CODE" VARCHAR2(4 CHAR), 
     "INTERCOMPANY_REPLICATION_CODE" VARCHAR2(4 CHAR), 
     "LOGISTIC_CYCLE_CODE" VARCHAR2(4 CHAR), 
     "DISTRIBUTION_COMPANY_CODE" VARCHAR2(4 CHAR), 
     "SPECIAL_REQUEST_CODE" VARCHAR2(1 CHAR), 
     "ORDER_RELEASE_DATE" DATE, 
     "REFERENCE_PREORDER" VARCHAR2(50 CHAR), 
     "PRODUCT_ORIENTATION_CODE" VARCHAR2(30 CHAR), 
     "ORDER_CODE" VARCHAR2(21 BYTE), 
     "EXCHANGE_RATE_EUR_STEALTH" NUMBER(38,20), 
     "ORDER_RELEASED_FLAG" NUMBER(1,0), 
     "COMPANY_ID" NUMBER(3,0), 
     "SELLING_LINE_ID" NUMBER(12,0), 
     "SEASON_YEAR_ID" NUMBER(9,0), 
     "BRAND_ID" NUMBER(3,0), 
     "CLIENT_ID" NUMBER(9,0), 
     "FREIGHT_ID" NUMBER(5,0), 
     "CARRIER_ID" NUMBER(12,0), 
     "CLIENT_DESTINATION_ID" NUMBER(9,0), 
     "CURRENCY_ID" NUMBER(6,0), 
     "PAYMENT_ID" NUMBER(9,0), 
     "COMMERCIAL_PRIORITY_ID" NUMBER(5,0),
     "DELIVERY_PRIORITY_ID" NUMBER(5,0),
     "PRODUCTION_COMPANY_ID" NUMBER(3,0),
     "DISTRIBUTION_COMPANY_ID" NUMBER(3,0),
     "SEASON_EVENT_ID" NUMBER(9,0),
     "INVOICE_TO_CLIENT_ID" NUMBER(9,0),
     "EXTERNAL_REFERENCE_DATE_ID" NUMBER(9,0),
     "ORDER_DATE_ID" NUMBER(9,0),
     "SPECIAL_REQUEST_ID" NUMBER(3,0),
     "LOGISTIC_CYCLE_ID" NUMBER(6,0),
     "ORDER_RELEASE_DATE_ID" NUMBER(9,0),
     "SELL_SUBTYPOLOGY_ID" NUMBER(3,0),
     "SHIPPING_SUSP_REASON_ID" NUMBER(9,0),
     "CANCELLED_FLAG" VARCHAR2(1 CHAR),
     "SYSTEM_CODE" VARCHAR2(40 BYTE),
     "LIBRARY_CODE" VARCHAR2(40 BYTE),
     "AUDIT_ID" NUMBER(12,0),
     "QUALITY_TAG" VARCHAR2(4000 BYTE),
     "VALIDITY_TAG" VARCHAR2(4000 BYTE),
     "OS_TYPOLOGY" VARCHAR2(5 CHAR),
     "AGENT_ID" NUMBER(9,0),
     "AGENT_CODE" VARCHAR2(6 CHAR),
     "REQUEST_DATE" DATE,
     "REQUEST_DATE_ID" NUMBER(9,0),
     "SLA_DAY" VARCHAR2(2 CHAR),
     "SHIPPING_SUSP_REASON_DATE_ID" NUMBER(9,0),
     "SLA_ID" NUMBER(5,0),
     "ORDER_RELEASED_FLAG_ID" NUMBER,
     "BLOCKED_FOR_PROD_FLAG_ID" NUMBER,
      CONSTRAINT "D_ORDER_PK" PRIMARY KEY ("PARTITION_KEY", "ORDER_ID",
"SEASON_YEAR_CODE")
```

9.3. EDWP.F_ORDER_MOVEMENT

```
CREATE TABLE “EDWP”.F_ORDER_MOVEMENT"
   ( "PARTITION_KEY" VARCHAR2(5 CHAR),
     "ORDER_ROW_ID" NUMBER(22,0),
     "SKU_ID" NUMBER(12,0),
     "MOVEMENT_REASON_ID" NUMBER(2,0),
     "ORDER_CANCEL_REASON" NUMBER(3,0),
     "SEASON_YEAR_CODE" VARCHAR2(5 CHAR),
     "MOVEMENT_ID" NUMBER(38,0),
     "ORDER_NUMBER" VARCHAR2(21 BYTE),
     "ORDER_ROW_NUMBER" NUMBER(3,0),
     "EXCHANGE_RATE_EUR_STEALTH" NUMBER(38,20),
     "BLOCKED_FOR_PRODUCTION_FLAG" CHAR(1 BYTE),
     "REFERENCE_PREORDER" VARCHAR2(180 BYTE),
     "ORDER_ROW_CODE" VARCHAR2(21 CHAR),
     "MODEL_CODE" VARCHAR2(24 BYTE),
     "MATERIAL_SUBFIX" VARCHAR2(24 BYTE),
     "MATERIAL_CODE" VARCHAR2(20 BYTE),
     "COLOR_CODE" VARCHAR2(20 BYTE),
     "DROP_CODE" VARCHAR2(8 BYTE),
     "VARIANT_TYPE" VARCHAR2(4 BYTE),
     "MODEL_VARIANT" VARCHAR2(24 BYTE),
     "SIZE_PROGRESSIVE_NUMBER" NUMBER(3,0),
     "POSITION" NUMBER(5,0),
     "OS_TYPOLOGY" VARCHAR2(5 BYTE),
     "SHIPPING_SUSPENDED" CHAR(1 BYTE),
     "CAPSULE_REFERENCE" VARCHAR2(50 BYTE),
     "PERC_DISCOUNT_ORDER_1" NUMBER(4,2),
     "PERC_DISCOUNT_ORDER_2" NUMBER(4,2),
     "PERC_DISCOUNT_INVOICE_1" NUMBER(21,7),
     "PERC_DISCOUNT_INVOICE_2" NUMBER(21,7),
     "PRICE_GROSS_UNIT" NUMBER(21,7),
     "PRICE_UNIT_SALE" NUMBER(18,5),
     "MOVEMENT_DATE" DATE,
     "QTY_NET_ORDER" NUMBER(20,3),
     "QTY_CANCEL_ORDER" NUMBER(5,0),
     "PRODUCTION_SURPLUS" VARCHAR2(2 BYTE),
     "EXTERNAL_REFERENCE" VARCHAR2(40 BYTE),
     "ORDER_RELEASED_FLAG" NUMBER(1,0),
     "SALES_PRICE_LIST_CODE" VARCHAR2(16 BYTE),
     "RATE_VAT" NUMBER(18,5),
     "INTERCOMPANY_REPLICATION_CODE" VARCHAR2(4 BYTE),
     "ACQUISITION_ORDER" VARCHAR2(200 BYTE),
     "ORDER_EXCHANGE_RATE_EUR_STH" NUMBER(7,3),
     "COMPANY_ID" NUMBER(3,0),
     "SELLING_LINE_ID" NUMBER(12,0),
     "CO_SELLING_LINE_ID" NUMBER(12,0),
     "SEASON_YEAR_ID" NUMBER(9,0),
     "ORDER_BRAND_ID" NUMBER(3,0),
     "INVOICE_BRAND_ID" NUMBER(3,0),
     "CLIENT_ID" NUMBER(9,0),
     "FREIGHT_ID" NUMBER(5,0),
     "CARRIER_ID" NUMBER(12,0),
     "ORDER_CLIENT_DESTINATION_ID" NUMBER(9,0),
     "CURRENCY_ID" NUMBER(6,0),
     "PAYMENT_ID" NUMBER(9,0),
     "COMMERCIAL_PRIORITY_ID" NUMBER(5,0),
     "DELIVERY_PRIORITY_ID" NUMBER(5,0),
     "PRODUCTION_COMPANY_ID" NUMBER(3,0),
     "DISTRIBUTION_COMPANY_ID" NUMBER(3,0),
     "SEASON_EVENT_ID" NUMBER(9,0),
     "INVOICE_TO_CLIENT_ID" NUMBER(9,0),
     "EXTERNAL_REFERENCE_DATE_ID" NUMBER(9,0),
     "ORDER_DATE_ID" NUMBER(9,0),
     "SPECIAL_REQUEST_ID" NUMBER(3,0),
     "LOGISTIC_CYCLE_ID" NUMBER(6,0),
     "CLIENT_DOOR_ID" NUMBER(9,0),
     "PRICE_LIST_ID" NUMBER(12,0),
     "START_DELIVERY_DAY_ID" NUMBER(9,0),
     "END_DELIVERY_DAY_ID" NUMBER(9,0),
     "MOVEMENT_DATE_ID" NUMBER(9,0),
     "SALES_CURRENCY_ID" NUMBER(9,0),
     "ORDER_RELEASE_DATE_ID" NUMBER(9,0),
     "ORDER_ID" NUMBER(22,0),
     "INVOICE_ROW_ID" NUMBER(22,0),
     "INVOICE_ID" NUMBER(22,0),
     "INVOICE_COMPETENCE_DATE_ID" NUMBER(9,0),
     "INVOICE_CODE" VARCHAR2(5 BYTE),
     "INVOICE_INDEX_CODE" VARCHAR2(1 BYTE),
     "INVOICE_ROW_CODE" VARCHAR2(3 BYTE),
     "INVOICE_YEAR_CODE" VARCHAR2(4 BYTE),
     "REASON_INVOICE_ID" NUMBER(9,0),
     "PAYMENT_TYPE_ID" NUMBER(9,0),
     "WAREHOUSE_ID" NUMBER(5,0),
     "SHIPMENT_ORDER_ID" NUMBER(9,0),
     "WAREHOUSE_DOCUMENT_INDEX" VARCHAR2(1 BYTE),
     "WAREHOUSE_DOCUMENT_NUMBER" NUMBER(5,0),
     "WAREHOUSE_DOCUMENT_ROW_NUMBER" NUMBER(3,0),
     "WAREHOUSE_DOCUMENT_YEAR_CODE" VARCHAR2(4 BYTE),
     "PAYMENT_EFFECT_DATE_ID" NUMBER(9,0),
     "INVOICE_TYPE_ID" NUMBER(3,0),
     "INVOICE_ROW_TYPE" VARCHAR2(24 BYTE),
     "QTY_INVOICE" NUMBER(21,7),
     "VAT_ID" NUMBER(6,0),
     "INVOICE_INDEX_ID" NUMBER(2,0),
     "INVOICE_RECEIVED_DATE_ID" NUMBER(9,0),
     "MPS_AVAILABILITY_DATE_ID" NUMBER(9,0),
     "OPERATION_TIME" NUMBER(15,8),
     "PRODUCT_NOTE" VARCHAR2(1000 BYTE),
     "FLAG_PRICE_NOT_FOUND" NUMBER(1,0),
     "END_DELIVERY_DATE" DATE,
     "INVOICE_NUMBER" VARCHAR2(15 BYTE),
     "INVOICE_ROW_NUMBER" VARCHAR2(19 BYTE),
     "ORDER_DATE" DATE,
     "FIRST_ALLOCATION_DATE_ID" NUMBER(9,0),
     "FIRST_ALLOCATION_DATE" DATE,
     "INVOICE_COMPETENCE_DATE" DATE,
     "CO_FREIGHT_ID" NUMBER(5,0),
     "SO_CLIENT_DESTINATION_ID" NUMBER(9,0),
     "ORDER_COMPLETE_DATE" DATE,
     "MPS_AVAILABILITY_DATE" DATE,
     "INVOICE_COMPANY_ID" NUMBER(3,0),
     "QTY_INVOICE_ORIGINAL" NUMBER(21,7),
     "INVOICE_CLIENT_ID" NUMBER(9,0),
     "AMT_INVOICE_NET" NUMBER(21,7),
     "AMT_INVOICE_GROSS" NUMBER(21,7),
     "PLANNED_DELIVERY_DATE_ID" NUMBER(9,0),
     "INVOICE_CURRENCY_ID" NUMBER(6,0),
     "AUDIT_ID" NUMBER(12,0),
     "INVOICE_CLIENT_DESTINATION_ID" NUMBER(9,0),
     "MARKDOWN" VARCHAR2(5 CHAR),
     "TYPOLOGY_ID" NUMBER(4,0),
     "INVOICE_SELL_SUBTYPOLOGY_ID" NUMBER(3,0),
     "INVOICE_SEASON_YEAR_ID" NUMBER(9,0),
     "INVOICE_ROW_WITH_NO_ORDER_FLG" NUMBER(1,0),
     "AGENT_ID" NUMBER(9,0),
     "ITEM_ID" NUMBER,
     "START_SHIPPING_DATE_ID" NUMBER(9,0),
     "END_SHIPPING_DATE_ID" NUMBER(9,0),
     "REQUEST_DATE_ID" NUMBER(9,0),
     "SLA_DAY" VARCHAR2(2 CHAR),
     "CLIENT_DESTINATION_ID" NUMBER(9,0),
     "INDUSTRIAL_UNIT_COST_70" NUMBER(15,5),
     "INDUSTRIAL_UNIT_COST_90" NUMBER(15,5),
     "SUGGESTED_RETAIL_PRICE" NUMBER(23,6),
     "RETAIL_PRICE_LIST_ID" NUMBER(12,0),
     "RETAIL_PRICE_LIST_CODE" VARCHAR2(4 CHAR),
     "RETAIL_PRICE_CURRENCY_ID" NUMBER(6,0),
     "RETAIL_PRICE_CURRENCY_CODE" VARCHAR2(4 CHAR),
     "SUGG_RETAIL_PRICE_STATUS_ID" NUMBER(5,0),
     "SUGG_RETAIL_PRICE_STATUS_CODE" VARCHAR2(4 CHAR),
     "PERC_DISCOUNT_1_ID" NUMBER(9,0),
     "PERC_DISCOUNT_2_ID" NUMBER(9,0),
     "SLA_ID" NUMBER(5,0),
     "SHIPPING_SUSPEND_ID" NUMBER,
     "ORDER_RELEASED_FLAG_ID" NUMBER,
     "BLOCKED_FOR_PROD_FLAG_ID" NUMBER
   ) SEGMENT CREATION IMMEDIATE
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
  STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
  PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "STG_ODI_DATA" ;
```

9.4. EDWP.A_TRANSAFER_RETAIL_PRICE

```
CREATE TABLE "EDWP"."A_TRANSFER_RETAIL_PRICE"
   ( "TRANSFER_RETAIL_PRICE_ID" NUMBER(5,0),
     "CLIENT_ID" NUMBER(9,0),
     "CLIENT_CODE" VARCHAR2(6 CHAR),
     "TRANSFER_PRICE_LIST_ID" NUMBER(12,0),
     "TRANSFER_PRICE_LIST_CODE" VARCHAR2(4 CHAR),
     "TRANSFER_PRICE_CURRENCY_ID" NUMBER(6,0),
     "TRANSFER_PRICE_CURRENCY_CODE" VARCHAR2(4 CHAR),
     "RETAIL_PRICE_LIST_ID" NUMBER(12,0),
     "RETAIL_PRICE_LIST_CODE" VARCHAR2(4 CHAR),
     "RETAIL_PRICE_CURRENCY_ID" NUMBER(6,0),
     "RETAIL_PRICE_CURRENCY_CODE" VARCHAR2(4 CHAR),
     "OPERATION_FLAG" VARCHAR2(1 CHAR),
     "TAG_SOURCE_ID" NUMBER(9,0),
     "TAG_SOURCE_CODE" VARCHAR2(4000 CHAR),
     "INSERT_DATE" DATE,
     "UPDATE_DATE" DATE,
     "QUALITY_TAG" VARCHAR2(4000 CHAR),
     "VALIDITY_TAG" VARCHAR2(4000 CHAR),
     "AUDIT_ID" NUMBER(12,0),
      CONSTRAINT "A_TRANSFER_RETAIL_PRICE_PK" PRIMARY KEY
("TRANSFER_RETAIL_PRICE_ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
NOLOGGING
  STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
  PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "EDWP_SUPPLYCHAIN_DATA"  ENABLE
   ) SEGMENT CREATION IMMEDIATE
  PCTFREE 0 PCTUSED 40 INITRANS 1 MAXTRANS 255
 COMPRESS FOR QUERY HIGH NOLOGGING
  STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
  PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "EDWP_SUPPLYCHAIN_DATA" ;
```

9.5. EDW.T_EDW_LU_CURRENCY

```
CREATE TABLE "EDW"."T_EDW_LU_CURRENCY"
   ( "CURRENCY_ID" NUMBER(6,0) NOT NULL ENABLE,
     "CURRENCY_CODE" VARCHAR2(4 BYTE) NOT NULL ENABLE,
     "CURRENCY_SHORT_DESC" VARCHAR2(4 BYTE),
     "CURRENCY_SHORT_DESC_02" VARCHAR2(4 BYTE),
     "CURRENCY_DESC" VARCHAR2(30 BYTE),
     "AUDIT_ID" NUMBER(12,0),
      CONSTRAINT "T_EDW_LU_CURRENCY_PK" PRIMARY KEY ("CURRENCY_ID")
  USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
  STORAGE(INITIAL 163840 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
  PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "EDW_DATA"  ENABLE
   ) SEGMENT CREATION IMMEDIATE
  PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255
 NOCOMPRESS LOGGING
  STORAGE(INITIAL 163840 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
  PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1
  BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
  TABLESPACE "EDW_DATA" ;
```

9.6. EDW.T_EDW_LU_PRICE_LIST

```
  CREATE TABLE "EDW"."T_EDW_LU_PRICE_LIST"
   ( "PRICE_LIST_ID" NUMBER(12,0) NOT NULL ENABLE,
     "PRICE_LIST_CODE" VARCHAR2(4 BYTE) NOT NULL ENABLE,
     "BRAND_ID" NUMBER(3,0),
     "BRAND_CODE" VARCHAR2(5 BYTE) NOT NULL ENABLE,
     "SEASON_YEAR_ID" NUMBER(9,0),
     "SEASON_YEAR_CODE" VARCHAR2(5 BYTE) NOT NULL ENABLE,
     "SALES_LINE_CODE" VARCHAR2(2 BYTE) NOT NULL ENABLE,
     "MARKET_CODE" VARCHAR2(4 BYTE) NOT NULL ENABLE,
     "CURRENCY_ID" NUMBER(6,0),
     "CURRENCY_CODE" VARCHAR2(4 BYTE) NOT NULL ENABLE,
     "STYLE_ID" NUMBER(12,0),
     "STYLE_CODE" VARCHAR2(20 BYTE) NOT NULL ENABLE,
     "CURRENT_RETAIL" NUMBER(23,6),
     "REF_EXCHANGE_RATE" NUMBER(10,6),
     "AUDIT_ID" NUMBER(12,0),
      CONSTRAINT "T_EDW_LU_PRICE_LIST_PK" PRIMARY KEY ("PRICE_LIST_ID")
```

9.7. EDWP.D_SUGG_RETAIL_PRICE_STATUS

```
CREATE TABLE "EDWP"."D_SUGG_RETAIL_PRICE_STATUS"
   ( "SUGG_RETAIL_PRICE_STATUS_ID" NUMBER(3,0),
     "SUGG_RETAIL_PRICE_STATUS_CODE" VARCHAR2(10 CHAR),
     "SUGG_RETAIL_PRICE_STATUS_DESC" VARCHAR2(50 CHAR),
     "OPERATION_FLAG" VARCHAR2(1 CHAR),
     "TAG_SOURCE_ID" NUMBER(9,0),
     "TAG_SOURCE_CODE" VARCHAR2(4000 CHAR),
     "INSERT_DATE" DATE,
     "UPDATE_DATE" DATE,
     "QUALITY_TAG" VARCHAR2(4000 CHAR),
     "VALIDITY_TAG" VARCHAR2(4000 CHAR),
     "AUDIT_ID" NUMBER(12,0),
      CONSTRAINT "D_SUG_RETAIL_PRICE_STATUS_PK" PRIMARY KEY
("SUGG_RETAIL_PRICE_STATUS_ID")
```