# DATA MODEL 'BV3D' FROM ERP DATABASE (update of 14/04/24 with Software development specifications - Phase 1)

Overview: The scope

To unleash the potential of a Graph database to analyze business data coming from ERP's database (relational DB). Once the data are extracted from ERP System and uploaded in Graph database go to use graph applications to inquiry data in a way not available in ERP's applications.
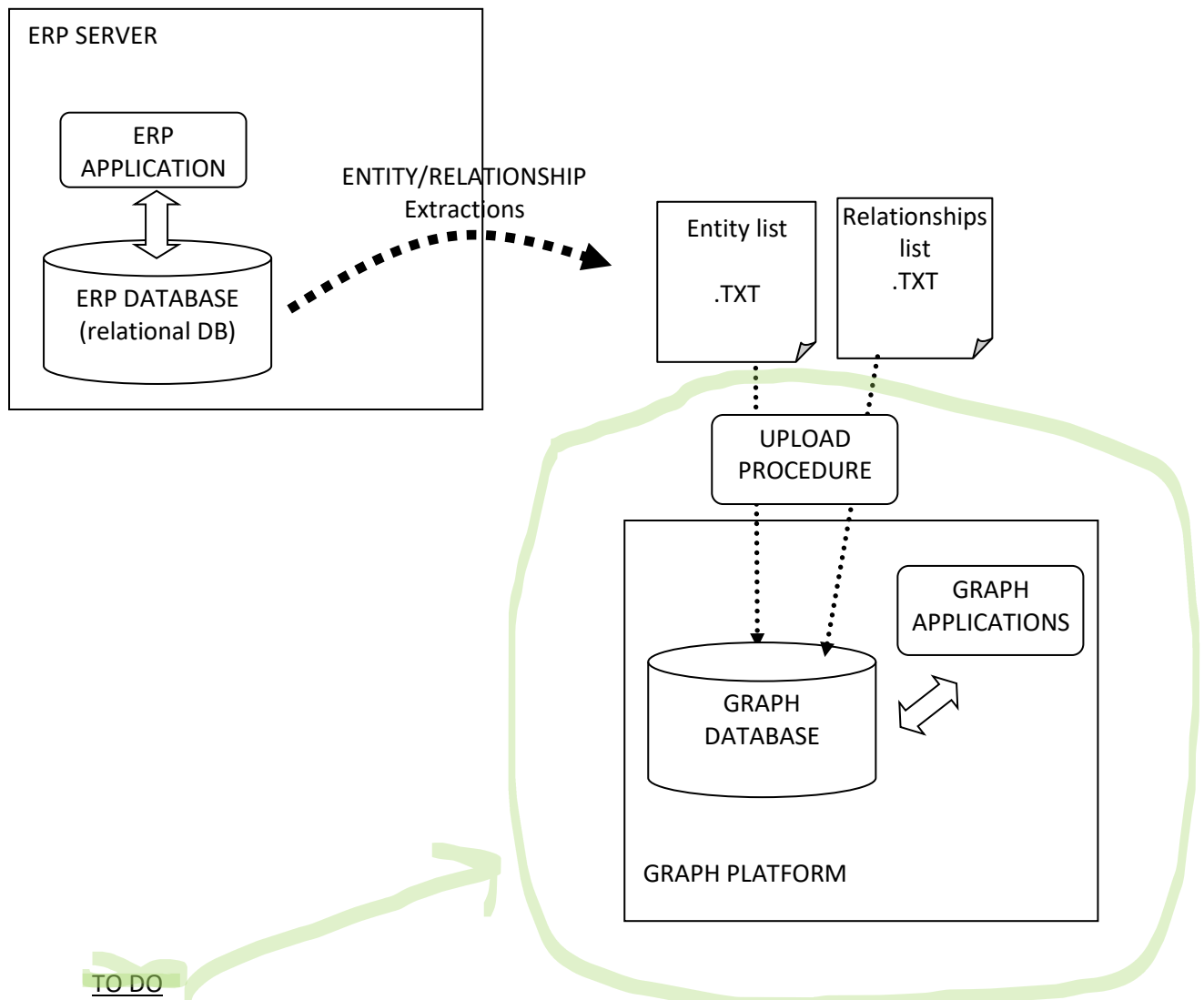
TO DO

1) To Identify a graph platform (opensource , better);
2) To develop procedures to import/upload data from tables coming from ERP Systems;
3) To define and develop graph applications callable by api to Inquiry data.

GRAPH DATA MODEL (Nodes-edges schema)
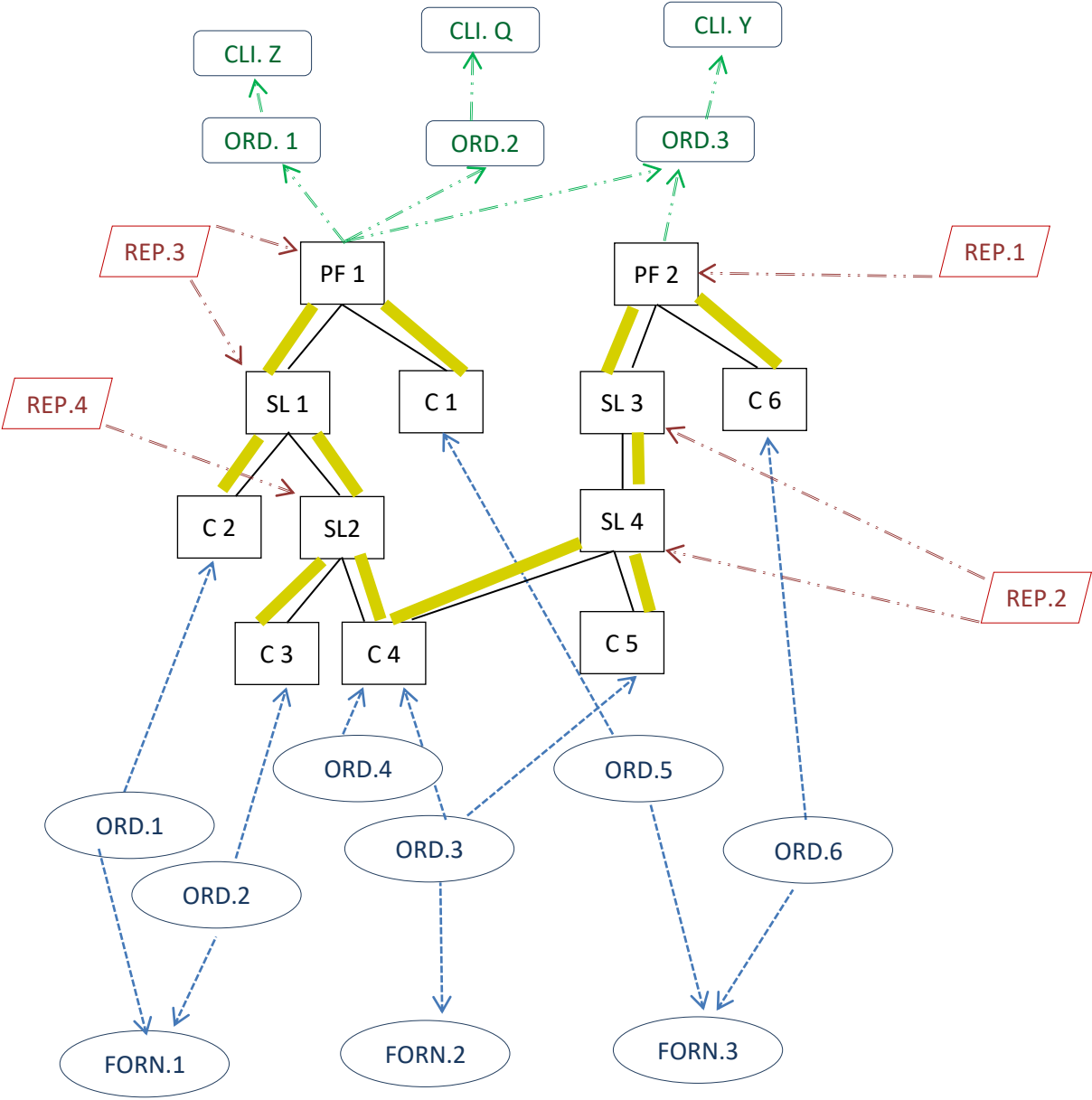
ENTITY (NODES)

Entity	Exemple	Attributes_from ERP	Elaboration in the graph platform	Attributes to calculate
Part Number	C3, PF1, SL2…	Description Unit Cost Qty in warehouse (stock) Date of update for stock	TBD	TBD
Supplier code	FORN.1,FORN.3…	Name Nationality Class		
Customer code	CLI.Q,CLI.Y…	Name Class		
Production center	REP.1, REP.2, REP.3	Description		
Customers Orders	ORD.1,ORD.2,ORD.3	Priority		
Suppliers Order	N° 2345			

RELATIONSHIP (EDGES)

Relationship					
Entity 'from'	Entity 'to'	Relationship	Attributes_from ERP	Elaboration in the graph platform	Attributes to calculate
Part Number	Part Number	Compone	Bill of Materia coefficient; Info of branch (ie. Work Order); Validity date from; Validity date to	TBD	TBD
Part Number	Part Number	Needed for	Quantity ; Date for need		
Part Number	Customer Order	Loaded into	Order Quantity; Delivered Quantity Quantity to deliver Delivery date requested Total Order Amount Order amount to deliver		
Customer Order	Customer code	Issued by	Issue date		
Part Number	Ord. Forn	Loaded into	Order Quantity; Delivered Quantity Quantity to deliver Delivery date requested Total Order Amount Order amount to deliver		
Production center	Part Number	Produce	Qty to produce Production Schedule date		
Supplier order	Supplier code	Issued to	Issue date		

Software development specifications (Phase 1)

Step 0 : Extraction data from ERP (ERP development)

An application developed in the ERP SYSTEM will provide extraction data that will be loaded in Graph database.

NOTE: In the Phase 1 , the data will be provided manually in TXT file.

The extraction process will produce in replace tables for ENTITY and for LINK where , for each **ENTITY** and each **LINK** data structures are defined in the table of graph configuration, **GRAPH_CONFIG** (see **GRAPH_CONFIG** table below with examples for attributes for ENTITY and LINK):

Example list of entities:

ENTITY 'PART NUMBER' (table PART_NUMBER)

ENTITY TYPE	ICON (.png)	KEY REF.	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	ATTRIBUTE 5	ATTRIBUTE 6	….	ATTRIBUTE 20
PART_NUMBER	Prod.png	5A0023452	COMPRESSOR	FAM_AC	FINISH_P	MAKE	PC	134		
PART_NUMBER	Prod.png	900340021	ALLUMINIUM TUBE	AL_TU	RAW_MAT	BUY	MT	10000		
……										

ENTITY 'SUPPLIERS' (table SUPPLIERS)

ENTITY TYPE	ICON (.png)	KEY REF.	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	ATTRIBUTE 5	ATTRIBUTE 6	….	ATTRIBUTE 20
SUPPLIER	Supp.png	0034	TYCO SRL	ITALY	-	-	-	-		-
SUPPLIER	Supp.png	1254	MARELLI SPA	ITALY	-	-	-	-		-
…..										

ENTITY 'CUSTOMERS' (table CUSTOMERS)

ENTITY TYPE	ICON (.png)	KEY REF.	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	ATTRIBUTE 5	ATTRIBUTE 6	….	ATTRIBUTE 20
CUSTOMER	Cust.png	C834	STELLANTIS	FRANCE	FIRSTCLASS	-	-	-		-
….										

ENTITY 'SUPPLIER ORDERS' (table SUPPLIER_ORDERS)

ENTITY TYPE	ICON (.png)	KEY REF.	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	ATTRIBUTE 5	ATTRIBUTE 6	….	ATTRIBUTE 20
SUPP_ORD	Order.png	200341-04	CLOSED ORDER	VALID						
…..										

ENTITY 'CUSTOMER ORDERS' (table CUSTOMER_ORDERS)

ENTITY TYPE	ICON (.png)	KEY REF.	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	ATTRIBUTE 5	ATTRIBUTE 6	....	ATTRIBUTE 20
CUST_ORD	Order.png	400023-01	PROGRAM ORDER	VALID						
.....										

Example list of links:

LINK 'BOM' (table BOM)

LINK TYPE	DESIGNATION	TYPE ENTITY FROM	TYPE ENTITY TO	COLOR	KEY REF. FROM	KEY REF. TO	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	....	ATTRIBUTE 20
BOM	COMPOSED BY	PART_ NUMBER	PART_ NUMBER	BROWN	50070923	90023003	01/01/2021	30/03/2025	1			
BOM	COMPOSED BY	PART_ NUMBER	PART_ NUMBER	BROWN	060004533	50070923	03/01/2023	28/04/2026	2,5			
BOM	COMPOSED BY	.....	.....									

LINK 'PURCHASE ORDERING' (table PURCH_ORDERING)

LINK TYPE	DESIGNATION	TYPE ENTITY FROM	TYPE ENTITY TO	COLOR	KEY REF. FROM	KEY REF. TO	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	....	ATTRIBUTE 20
PURCH_ORDERING	HAS	SUPP_ORD	PART_ NUMBER	VIOLET	200341-04	90023003	KG	3.000	3.000	23/04/2024	...	-
PURCH_ORDERING	HAS	SUPP_ORD	PART_ NUMBER	VIOLET	200341-01	90023001	KG	3.000	2.300	21/05/2024	...	-
PURCH_ORDERING	HAS	.....	.....									

LINK 'PURCHASE SUPPLYING' (table PURCH_SUPPLYING)

LINK TYPE	DESIGNATION	TYPE ENTITY FROM	TYPE ENTITY TO	COLOR	KEY REF. FROM	KEY REF. TO	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	....	ATTRIBUTE 20
PURCH_SUPPLYING	ISSUE TO	SUPP_ORD	SUPPLIER	VIOLET	10/01/2024							
PURCH_SUPPLYING	ISSUE TO	....	.....									

LINK 'SELLING ORDERING' (table SELL_ORDERING)

LINK TYPE	DESIGNATION	TYPE ENTITY FROM	TYPE ENTITY TO	COLOR	KEY REF. FROM	KEY REF. TO	ATTRIBUTE 1	ATTRIBUTE 2	ATTRIBUTE 3	ATTRIBUTE 4	....	ATTRIBUTE 20
SELL_ORDERING	HAS	CUST_ORD	PART_ NUMBER	GREEN	400023-01	060004533	29/05/2024	600	300			-
SELL_DELIVERING	DELIVER TO	CUST_ORD	CUSTOMER	GREEN	30/12/2023							

Where ATTRIUBUTE 1..20 for each ENTITY and each LINK are defined in the table **GRAPH_CONFIG:**

GRAPH_CONFIG

ENTITY (E) LINK (L)	TYPE (= Data Table from ERP)	ATTRIBUTE REF.	ATTRIBUTE NAME	ATTRIBUTE FORMAT
E	PART_NUMBER	1	DESIGNATION	CHAR
		2	FAMILY CODE	CHAR
		3	COMMODITY CLASS	CHAR
		4	PROCUREMENT TYPE	CHAR
		5	UNIT MISURE	CHAR
		6	QTY IN STOCK	REAL
		7	UNIT COST	REAL
		....	....	....
	SUPPLIER	1	NAME	CHAR
		2	NATIONALITY	CHAR
		3	CLASS	CHAR
		...	...	...
	CUSTOMER	1	NAME	CHAR
		2	NATIONALITY	CHAR
		3	CLASS	CHAR
		...	....	...
	SUPP_ORD	1	TYPE OF ORDER	CHAR
		2	STATUS	CHAR
		...	....	...
	CUST_ORD	1	TYPE OF ORDER	CHAR
		2	STATUS	CHAR
		....	....	....
	Other entities	....	....	....
L	BOM	1	VALIDITY DATE FROM	DATE
		2	VALIDITY DATE TO	DATE
		3	QUANTITY	REAL
		....	.....	....
	PURCH_ORDERING	1	PURCHASE UNIT MISURE	CHAR
		2	QUANTITY IN ORDER	REAL
		3	QUANTITY TO RECEIVE	REAL
		4	DUE DATE TO RECEIVE	DATE
		5	PRICE	REAL
		....	....	....
	SELL_ORDERING	1	DUE DATE TO DELIVER	DATE
		2	QUANTITY IN ORDER	REAL
		3	QUANTITY TO DELIVER	REAL
		4	PRICE	REAL

		....	....		....
	PURCH_SUPPLYING	1	ISSUE DATE		DATE
		...	....		....
	SELL_DELIVERING	1	ISSUE DATE		DATE
		...	....		....
	Other links	....	....		....

The **GRAPH_CONFIG table will be managed in GRAPH solution .**

Step 1 : Configuration of EDGEINTELLIGENCE

In the EDGEINTELLIGENCE solution the first step is to configure ENTITY and LINKS at the base of the graph visualization (first option of the application)

In the new application a screen for configuration systems will be someway like follow:

In the screen CONFIGURATION you can to define and insert the list of Entities with attributes and the list of links with attributes.

Step 2 : Upload Data in EDGEINTELLIGENCE

In the EDGEINTELLIGENCE solution the second step (but iterative if it is needed) is to upload data tables for ENTITY and LINKS (second option of the application) and also for icons in .png format to visualize entities in the graph

In the new application a screen for load data will be someway like follow:

With LOAD button the user can select a local file TXT to upload, with the window for search file.

NOTE: In the Phase 2 of development of EDGEINTELLIGENCE will be implement the following automatic data loading : 'Base' flow 'Incremental' flow

Step 3 : Visualize Data in EDGEINTELLIGENCE GRAPH

In the EDGEINTELLIGENCE , after step 1 and 2 the business user can Visualize data in graph visualization.
In the VISUALIZE screen the user can compose, choice by choise, the elements (entity and links) to show in the graph

In the new application a screen for visualize data will be someway like follow (at the beginning ,when no selection) :

In the screen the user can select and check the box for ENTITY and LINK.

When the User selects Entity and/or Link :

1) In the central panel (the graph panel) is built the graph with the entity and link selected;
2) A corresponding list.check-box appears in the 'FILTERING bu ATTRIBUTES' in order to allow the user to select the attributes on which he/she is going to filter.

In the example the user selects the entity PART_NUMBER and the link BOM.

NOTE: *To define the limit of number of Entity and Link a user can select.*

In order to set the attributes oh which the user is going to filter, in the screen above when clicking on the Entity or link in the 'Filtering by Attribute' a dropdown-check box box appear to select on eor more attributes to filter:

EDGEINTELLIGENCE
GRAPH PLATFORM
VISUALIZE

FILTERING
By
ATTRIBUTE

PART_NUMBER

BOM

CODE
DESIGNATION
FAMILY CODE   V
COMMODITY CL.
UNIT MISURE
QTY IN STOCK

ENTITY

PART_NUMBER V
SUPPLIER
CUSTOMER
SUPP_ORD
CUST_ORD

LINK

BOM   V
PURCH_ORD.
SELL_ORDIER.
PURCH_SUPP.
SELL_DELIV.

FILTER SELECTION

VALIDITY DATE FROM

FAMILY CODE

Alcohol Consumption
Reproductive Diseases
Mental Depression
Paclitaxel
Latrio

Apply Filter

Once an attribute is selected, in the FILTER SELECTION panel the user can search one or more value of the attribute. Then with APPLY/CALCEL FILTER buttom the filter will affect the visualization of the Graph and the attributes selected will be display in the bottom of the screen.

Software development specifications (Phase 2)

The scope of the the second phase will be the implementation of ANALIZE option (in add to VISUALIZE of the first phase). Specification will be define after the release of phase 1.