Meat business company (I)

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Contents

```r
# The connection to the database server (postgreSql 15) is carried out using the following code format

# Dependences and libraries:

install.packages("RPostgres")
install.packages("DBI")
install.packages("sf")
library(DBI)
library(RPostgres)
library(sf)

dvr <- RPostgres::Postgres()
db <- 'meat_bus_I'  ##Nombre de la BBDD
host_db <- 'localhost'
db_port <- '5432'
db_user <- 'postgres'  ##Your User
db_password <- 'postgres' ##your password

# 3.0 Conexión
con <- dbConnect(dvr, dbname = db, host=host_db, port=db_port,
                 user=db_user, password=db_password)
```

Introduction

The meat company Candidez Carnica SL, which has a factory where it manufactures packs of cooked ham for a well-known distribution chain, has asked us for a database to manage its packs for a well-known distribution chain, asked us for a database to manage the hourly records of its factory workers and the the time records of its factory workers and the units manufactured of its assorted products to know the productivity of the company's shifts.

Let's start by creating a database for the client, specifically for each of its components

Database design

Database creation

Note that in Postgres, databases are created from the GUI. This would be the code we would use in another database management system.

```sql
CREATE DATABASE meat_bus_I
  ENCODING 'UTF8'
  LC_COLLATE = 'es_ES.UTF-8'
  LC_CTYPE = 'es_ES.UTF-8'
  TEMPLATE = template0;
```

Schema

```
-- DROP SCHEMA IF EXISTS erp;
```

```
-- CREATE SCHEMA erp;
```

Verifying the creation of the scheme:

```
SELECT schema_name
FROM information_schema.schemata
WHERE schema_name = 'erp';
```

Table 1: 1 records

schema_name
erp

Create table tb_category

```
 /* CREATE TABLE erp.tb_category  (
    category_id             INT NOT NULL,
    category_name               CHARACTER(30) NOT NULL,
    category_extra_price            INT NOT NULL,
    CONSTRAINT pk_category PRIMARY KEY (category_id),
    CONSTRAINT u_category_name  UNIQUE (category_name)
  );*/
```

Create table tb_employee

```
/* CREATE TABLE erp.tb_employee  (
    employee_id             INT NOT NULL,
    employee_name               CHARACTER(20) NOT NULL,
    employee_surname            CHARACTER VARYING(50) NOT NULL,
    category_id                 INT NOT NULL,
    employee_hiredate           DATE NOT NULL,
    employee_birthdate          DATE NOT NULL,
    employee_gender         CHARACTER(10) NOT NULL DEFAULT 'Hombre',
    employee_boss               INT,
    employee_shift          CHARACTER(1),
    CONSTRAINT pk_employee PRIMARY KEY (employee_id),
    CONSTRAINT fk_employee FOREIGN KEY (employee_boss) REFERENCES erp.tb_employee (employee_id),
    CONSTRAINT fk_category FOREIGN KEY (category_id) REFERENCES erp.tb_category (category_id)
  ); */
```

Create table tb_terminals

```
/* CREATE TABLE erp.tb_terminals  (
    terminal_id             CHARACTER(3) NOT NULL,
    terminal_name               CHARACTER VARYING(20) NOT NULL,
    CONSTRAINT pk_terminals PRIMARY KEY (terminal_id)
  ); */
```

Create table tb_sign_employees

```
/* CREATE TABLE erp.tb_sign_employees  (
    sign_id                 INT NOT NULL,
    employee_id             INT NOT NULL,
    sign_term_in                CHARACTER(3) NOT NULL,
    sign_data_in                TIMESTAMP NOT NULL,
    sign_term_out               CHARACTER(3) NOT NULL,
    sign_data_out               TIMESTAMP NOT NULL,
        sign_time_minutes           INT NOT NULL,
    CONSTRAINT pk_sign_employees PRIMARY KEY (sign_id),
    CONSTRAINT fk_employees FOREIGN KEY (employee_id) REFERENCES erp.tb_employee (employee_id),
    CONSTRAINT fk_terminals_in FOREIGN KEY (sign_term_in) REFERENCES erp.tb_terminals (terminal_id),
    CONSTRAINT fk_terminals_out FOREIGN KEY (sign_term_out) REFERENCES erp.tb_terminals (terminal_id)
   );*/
```

Create table tb_products

```
/* CREATE TABLE erp.tb_products  (
    products_id             CHARACTER(5) NOT NULL,
    products_name               CHARACTER VARYING(50) NOT NULL,
    products_size               INT NOT NULL,
     products_cost              NUMERIC(12,2),
     CONSTRAINT pk_products PRIMARY KEY (products_id)
   );       */
```

Create table tb_production_cab

```
/*CREATE TABLE erp.tb_production_cab  (
    production_cab_id           INT NOT NULL,
    production_date         date NOT NULL,
    production_shift            CHARACTER(1) NOT NULL,
     CONSTRAINT pk_production_cab PRIMARY KEY (production_cab_id)
   );*/
```

Create table tb_production_lin

```
/*CREATE TABLE erp.tb_production_lin  (
    production_lin_id           INT NOT NULL,
    production_cab_id           INT NOT NULL,
    products_id             CHARACTER(5) NOT NULL,
    production_lin_quantity     INT NOT NULL,
     CONSTRAINT pk_production_lin PRIMARY KEY (production_lin_id),
    CONSTRAINT fk_production_cab FOREIGN KEY (production_cab_id) REFERENCES erp.tb_production_cab (produ
    CONSTRAINT fk_products FOREIGN KEY (products_id) REFERENCES erp.tb_products (products_id)
   );       */
```

Checking if the tables have been created:

```
SELECT table_name
FROM information_schema.tables
WHERE table_schema = 'erp';
```

Table 2: 8 records

table_name
tb_sign_employees
tb_production_cab
tb_production_lin
tb_products
tb_employee
tb_terminals
tb_category
employee_not_shift

Data entry

We enter the data we have collected from the client, but we do it directly from the database manager `pgadmin`, since from R we will have difficulties to enter multiple lines.

```
SET datestyle = YMD;        -- Year-month-day date format;

SET search_path TO erp;     -- We indicate the path;

-----------------------------------------------------------------------------------------------
--
-- Data tb_category;
--
-----------------------------------------------------------------------------------------------

INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (1,'Director Produc
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (2,'Resp. Mantenimi
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (3,'Resp. Producció
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (4,'Resp. Turno Man
```

```
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (5,'Resp. Turno Prod
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (6,'Operario Manteni
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (7,'Operario Produc
INSERT INTO erp.tb_category (category_id,category_name,category_extra_price) VALUES (8,'Técnico Laborato

-------------------------------------------------------------------------------------------------------
--
-- Data tb_employee;
--
-------------------------------------------------------------------------------------------------------

INSERT INTO erp.tb_employee (employee_id,employee_name,employee_surname,category_id,employee_hiredate,e
INSERT INTO erp.tb_employee (employee_id,employee_name,employee_surname,category_id,employee_hiredate,e
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-------------------------------------------------------------------------------------------------------
--
-- Data tb_terminals;
--
-------------------------------------------------------------------------------------------------------

INSERT INTO erp.tb_terminals(terminal_id,terminal_name) VALUES ('EP','Entrada Principal');
INSERT INTO erp.tb_terminals(terminal_id,terminal_name) VALUES ('EV','Entrada Vestidores');
INSERT INTO erp.tb_terminals(terminal_id,terminal_name) VALUES ('EF1','Entrada Fàbrica 1');
INSERT INTO erp.tb_terminals(terminal_id,terminal_name) VALUES ('EF2','Entrada Fàbrica 2');

-------------------------------------------------------------------------------------------------------
--
-- Data tb_sign_employees;
--
-------------------------------------------------------------------------------------------------------
```

```sql
INSERT INTO erp.tb_sign_employees(sign_id,employee_id,sign_term_in,sign_data_in,sign_term_out,sign_data
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INSERT INTO erp.tb_sign_employees(sign_id,employee_id,sign_term_in,sign_data_in,sign_term_out,sign_data
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INSERT INTO erp.tb_sign_employees(sign_id,employee_id,sign_term_in,sign_data_in,sign_term_out,sign_data
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INSERT INTO erp.tb_sign_employees(sign_id,employee_id,sign_term_in,sign_data_in,sign_term_out,sign_data
INSERT INTO erp.tb_sign_employees(sign_id,employee_id,sign_term_in,sign_data_in,sign_term_out,sign_data
INSERT INTO erp.tb_sign_employees(sign_id,employee_id,sign_term_in,sign_data_in,sign_term_out,sign_data

-----------------------------------------------------------------------------------------------
--
-- Data tb_products;
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INSERT INTO erp.tb_products(products_id,products_name,products_size,products_cost) VALUES ('JCE55','Jam
INSERT INTO erp.tb_products(products_id,products_name,products_size,products_cost) VALUES ('JCE25','Jam
INSERT INTO erp.tb_products(products_id,products_name,products_size,products_cost) VALUES ('JCL20','Jam
INSERT INTO erp.tb_products(products_id,products_name,products_size,products_cost) VALUES ('JCN10','Jam
INSERT INTO erp.tb_products(products_id,products_name,products_size,products_cost) VALUES ('JCN25','Jam
INSERT INTO erp.tb_products(products_id,products_name,products_size,products_cost) VALUES ('JCS20','Jam

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--
-- Data tb_production_cab;
--
------------------------------------------------------------------------------------------------

INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (1,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (2,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (3,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (4,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (5,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (6,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (7,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (8,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (9,to_date
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (10,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (11,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (12,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (13,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (14,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (15,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (16,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (17,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (18,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (19,to_dat
INSERT INTO erp.tb_production_cab(production_cab_id,production_date,production_shift) VALUES (20,to_dat

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--
-- Data tb_production_lin;
--
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INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
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INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
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INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
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INSERT INTO erp.tb_production_lin(production_lin_id,production_cab_id,products_id,production_lin_quanti
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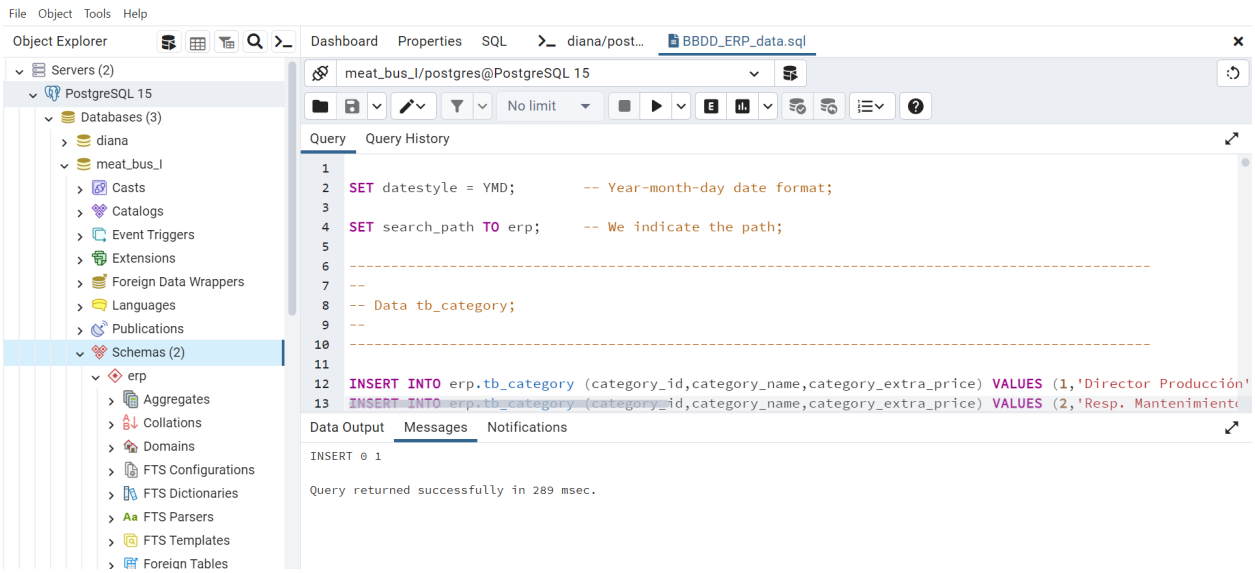

Test database queries

We will check the data by performing different queries to the database:

Query a:

```
SELECT te.employee_name,te.employee_surname,te.employee_hiredate,te.employee_birthdate
FROM erp.tb_employee te
WHERE te.employee_gender = 'Hombre' AND
te.employee_name LIKE 'A%'
ORDER BY te.employee_birthdate DESC;
```

Table 3: 3 records

employee_name	employee_surname	employee_hiredate	employee_birthdate
ADRIAN	MONTERO	2022-11-23	1993-07-06
ALVARO	VARGAS	2017-06-24	1993-03-02
ANDRES	CARMONA	2017-09-24	1990-01-25

Query b:

```
SELECT te.employee_name,te.employee_surname,ts.sign_data_in,tr.terminal_name
FROM erp.tb_employee te,erp.tb_sign_employees ts,erp.tb_terminals tr
WHERE ts.employee_id=te.employee_id AND
ts.sign_term_in = tr.terminal_id AND
ts.sign_data_in between TO_TIMESTAMP('28-02-2023 05:00:00','DD/MM/YYYY hh24:mi:ss') AND
TO_TIMESTAMP('28-02-2023 05:59:00','DD/MM/YYYY hh24:mi:ss') AND
terminal_id IN ('EP','EV');
```

Table 4: 4 records

employee_name	employee_surname	sign_data_in	terminal_name
ANDRES	CARMONA	2023-02-28 05:55:00	Entrada Principal
RAMON	MORA	2023-02-28 05:59:00	Entrada Principal
ALVARO	VARGAS	2023-02-28 05:50:00	Entrada Vestidores
JOSE MANUEL	CAMPOS	2023-02-28 05:58:00	Entrada Principal

Query c:

```
SELECT tp.products_id,products_name,production_shift,
(products_size*production_lin_quantity)/1000 "Kg Fabricados"
FROM erp.tb_products tp, erp.tb_production_cab tc, erp.tb_production_lin tl
WHERE tc.production_cab_id=tl.production_cab_id AND
tl.products_id=tp.products_id AND
tc.production_date=TO_DATE('27/02/2023','DD/MM/YYYY') AND
tp.products_id IN('JCE25','JCS20','JCN25')
ORDER BY tp.products_id
```

Table 5: 6 records

products_id	products_name	production_shift	Kg Fabricados
JCE25	Jamón cocido extra finas lonchas 250gr	M	201
JCE25	Jamón cocido extra finas lonchas 250gr	T	290
JCN25	Jamón cocido natural 250gr	M	328
JCN25	Jamón cocido natural 250gr	T	216
JCS20	Jamón cocido bajo en Sal 200gr	M	282
JCS20	Jamón cocido bajo en Sal 200gr	T	193

Query d:

```
SELECT tl.products_id AS "Product Code",
pr.products_name AS "Product Name",
ROUND(avg((tl.production_lin_quantity*products_size)/1000),2) AS "Average kg/day",
MAX (ROUND((tl.production_lin_quantity*products_size)/1000,2)) AS "MAX kg/day",
MIN(ROUND((tl.production_lin_quantity*products_size)/1000,2)) AS "MIN kg/day"
FROM erp.tb_production_cab tp, erp.tb_production_lin tl, erp.tb_products pr
WHERE tp.production_cab_id = tl.production_cab_id AND
pr.products_id=tl.products_id AND
tp.production_shift='M'
GROUP BY tl.products_id,pr.products_name
ORDER BY "Average kg/day" DESC;
```

Table 6: 6 records

Product Code	Product Name	Average kg/day	MAX kg/day	MIN kg/day
JCE55	Jamón cocido extra finas lonchas 550gr	561.0	745	453
JCN25	Jamón cocido natural 250gr	310.8	360	228
JCE25	Jamón cocido extra finas lonchas 250gr	265.3	364	201
JCL20	Jamón cocido finas lonchas light 200gr	232.0	286	181
JCS20	Jamón cocido bajo en Sal 200gr	181.7	285	0
JCN10	Jamón cocido natural 100gr	126.0	145	93

Query e:

```
SELECT employee_name,employee_surname,ROUND(AVG(sign_time_minutes)) AS media_minutos
FROM erp.tb_sign_employees ts, erp.tb_employee te, erp.tb_category tc
WHERE ts.employee_id=te.employee_id AND
te.category_id=tc.category_id AND
tc.category_name='Operario Producción' AND
te.employee_shift='M'
GROUP BY employee_name,employee_surname
HAVING AVG(sign_time_minutes)>
(SELECT AVG(sign_time_minutes)
FROM erp.tb_sign_employees ts, erp.tb_employee te, erp.tb_category tc
WHERE ts.employee_id=te.employee_id AND
te.category_id=tc.category_id AND
tc.category_name='Operario Producción')
ORDER BY AVG(sign_time_minutes) ASC;
```

Table 7: 4 records

employee_name	employee_surname	media_minutos
ALVARO	VARGAS	489
JOSE MANUEL	CAMPOS	491
ISABEL	MOYA	497
RAFAEL	REYES	500

Examples of regular operations with relational databases

Inserting

```
/* insert into erp.tb_employee (employee_id,employee_name,employee_surname,category_id,employee_hiredat
```

Validating:

```
SELECT * FROM erp.tb_employee WHERE employee_id in (26);
```

Table 8: 1 records

employee_id	employee_name	employee_surname	category_id	employee_hire_date	employee_birth_date	employee_gender	employee_boss	employee_shift
26	CARLOS	ALONSO	7	2023-03-13	1973-03-05	Hombre	6	M

Querying and updating

Querying:

```
SELECT products_cost FROM erp.tb_products
```

Table 9: 7 records

products_cost
3.03
1.51
1.01
0.66
1.54
1.09
NA

Updating:

```
/*UPDATE erp.tb_products
SET  products_cost = products_cost + products_cost *0.05;*/
```

Validating:

```
SELECT products_cost FROM erp.tb_products
```

Table 10: 7 records

products_cost
3.03
1.51
1.01
0.66
1.54
1.09
NA

Adding variables:

```
/* ALTER TABLE erp.tb_products
ADD COLUMN products_pvp NUMERIC(12,2);*/
```

Updating:

```
/* UPDATE erp.tb_products
SET  products_pvp = products_cost + products_cost *0.1;*/
```

Validating:

```
SELECT products_cost,products_pvp FROM erp.tb_products
```

Table 11: 7 records

products_cost	products_pvp
3.03	3.33
1.51	1.66
1.01	1.11
0.66	0.73
1.54	1.69
1.09	1.20
NA	NA

Creating views

Employees without shifts in the schedule:

```
CREATE OR REPLACE VIEW erp.employee_not_shift AS
SELECT *
    FROM erp.tb_employee
    WHERE employee_shift IS NULL
    WITH CHECK OPTION;
```

Validating:

```
SELECT * FROM erp.employee_not_shift
```

Table 12: 5 records

employee_id	employee_name	employee_surname	category_id	employee_hire_date	employee_birth_date	employee_gender	employee_boss	employee_shift
1	CARLOS	CABRERA	1	2000-01-29	1967-08-02	Hombre	NA	NA
2	ENRIQUE	FERRER	2	2002-03-28	1973-12-24	Hombre	1	NA
3	FERNANDO	NIETO	3	1996-11-11	1951-04-18	Hombre	1	NA
25	RAUL	SANTIAGO	8	2020-08-24	1990-11-13	Hombre	9	NA
28	PEPE	MORRAL	7	2023-03-13	2001-05-13	Hombre	7	NA

The WITH CHECK OPTION clause in a PostgreSQL view serves an important purpose. This clause is used to ensure that rows can only be inserted, updated, or deleted through the view if the resulting rows meet the filter condition specified in the view.

Checking view restrictions

Wrong insertion method:

```
{/*{sql connection= con} insert into erp.employee_not_shift (employee_id,employee_name,employee_surname
,employee_birthdate,employee_gender,Employee_boss,employee_shift) VALUES (28,'PEPE','MORRAL',7,to_date(
```

Correct insertion method:

```
/*insert into erp.employee_not_shift (employee_id,employee_name,employee_surname,category_id,employee_hi
```

Alter table:

```
/*ALTER TABLE erp.tb_products
ADD CONSTRAINT ck_products_id CHECK
((products_id LIKE 'JC___' AND products_name LIKE 'Jamón cocido%')
 OR (products_id LIKE 'PC___' AND products_name LIKE 'Pavo cocido%'));*/
```

This ck_products_id constraint ensures that rows are only allowed to be inserted or updated in the erp.tb_products table if they meet the specified conditions. In this case, the constraint ensures that the values of products_id and products_name comply with the patterns set for products of type "Jamon cocido" and "Pavo cocido".

Checking constrains

```
-- Insert sin error
/*insert into erp.tb_products(products_id,products_name,products_size) VALUES ('JCE30','Jamón cocido ex
```

```
-- Insert con error
/*insert into erp.tb_products(products_id,products_name,products_size) VALUES ('JA25','Jamón cocido ext
```

Adding users

```
CREATE USER registerered WITH LOGIN PASSWORD '1234';                              -- new user
```

```
GRANT USAGE ON SCHEMA erp TO registerered;
```

```
GRANT SELECT,INSERT,UPDATE ON erp.tb_employee TO registerered;                    -- granting SELECT,INS
```

```
GRANT SELECT ON erp.tb_terminals,erp.tb_category TO registerered;    -- single permissions
```

Conclusions

And at this point, we end this first part where the most common assumptions and steps in the creation of a new database for a corporate client are collected.

This was a real proposal based on a real client whose data has been anonymised.