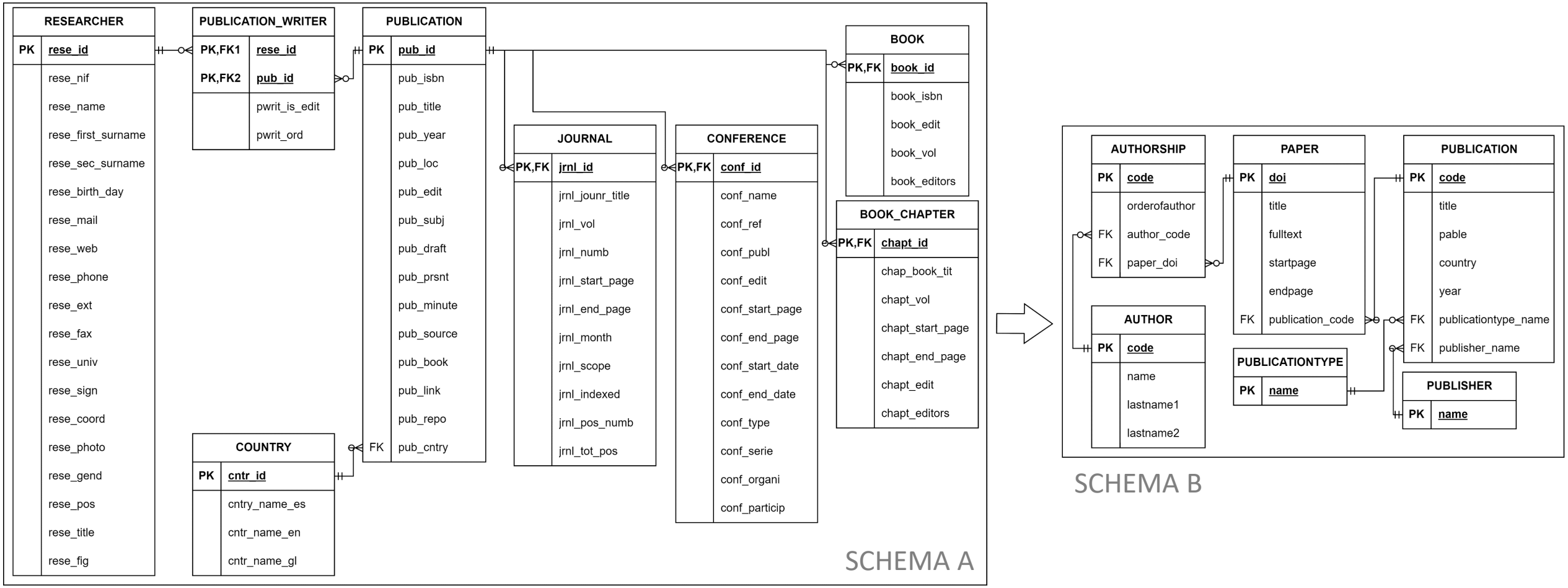
DSL for Data Migration

USABILITY EVALUATION 2024

GOAL: MIGRATE DATA FROM SCHEMA A TO SCHEMA B



DEFINE THE MIGRATION PRODUCT

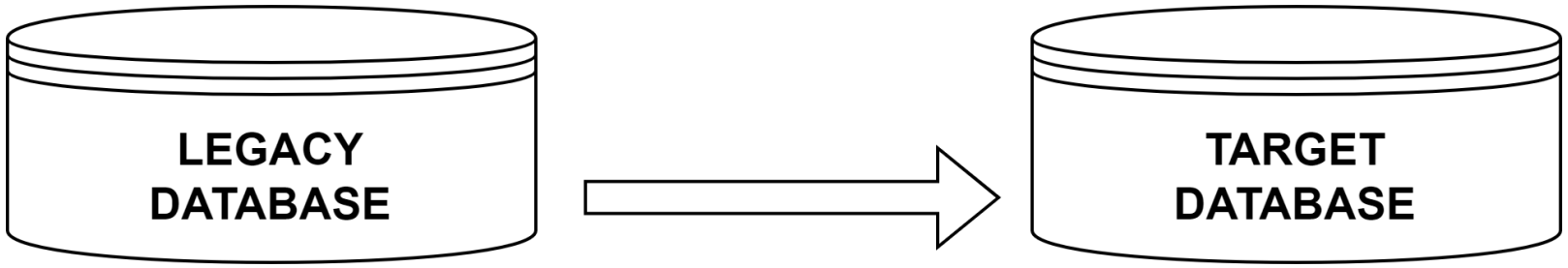
1. DEFINE PRODUCT IN THE DSL:

- `CREATE PRODUCT lbdMigration;`

Defines an object in JavaScript called “lbdMigration” which will store:

- Connection details
- Schemas
- Entities
  - Name
  - Columns
  - Mappings
- Relationships

CONNECTING THE DATABASES



1. SPECIFY CONNECTION DATA:

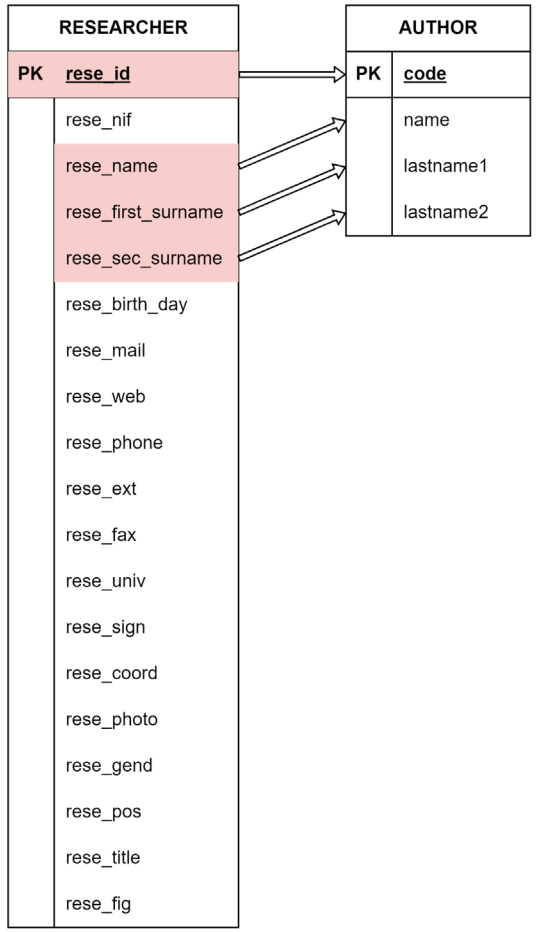
```
CREATE CONNECTION FROM (dbname dsl_models, host chronos.lbd.org.es, port 5432,
  user postgres, pwd postgres, schema legacy);

CREATE CONNECTION TO (dbname dsl_models, host chronos.lbd.org.es, port 5432,
  user postgres, pwd postgres, schema target);
```

CONNECTING THE DATABASES

2. SQL CODE FROM DSL TO STABLISH A CONNECTION ON POSTGRESQL:

```
CREATE EXTENSION IF NOT EXISTS postgres_fdw;

CREATE SERVER dsl_models_database_server FOREIGN DATA WRAPPER postgres_fdw
 OPTIONS (host 'chronos.lbd.org.es', dbname 'dsl_models', port '5432');

CREATE USER MAPPING FOR CURRENT_USER SERVER dsl_models_database_server OPTIONS
 (user 'postgres', password 'postgres');

CREATE SCHEMA legacy;

IMPORT FOREIGN SCHEMA legacy FROM SERVER dsl_models_database_server INTO legacy;

CREATE SCHEMA IF NOT EXISTS target AUTHORIZATION postgres;

CREATE SCHEMA IF NOT EXISTS aux AUTHORIZATION postgres;
```

MAPPING FROM LEGACY TABLE TO TARGET TABLE



1. DEFINE MAPPING IN DSL:

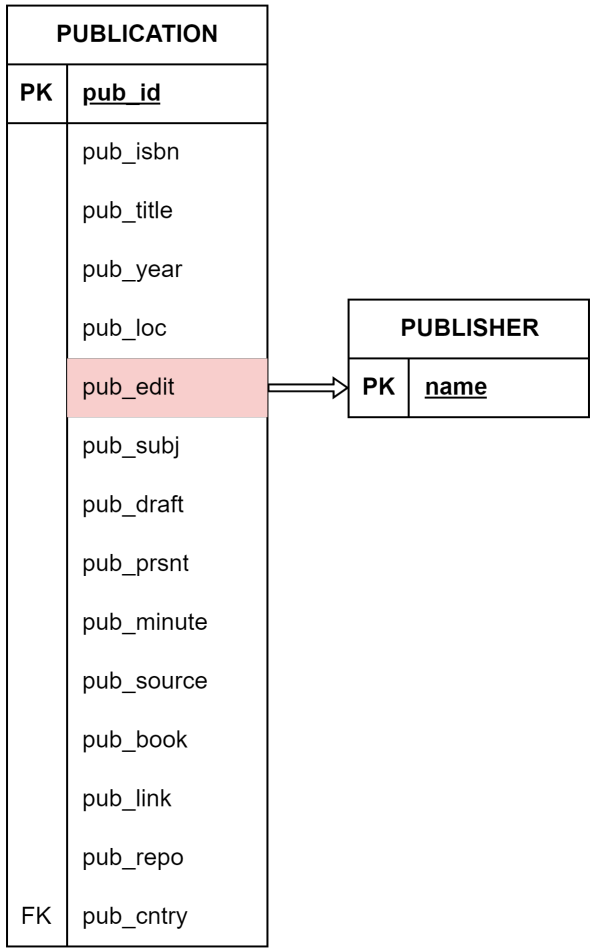
```
MAP researcher TO author (
    rese_id TO code,
    rese_name TO name,
    rese_first_surname TO lastname1,
    rese_sec_surname TO lastname2
);
```

PK(rese_id) = PK(code)

2. SQL CODE GENERATED:

```
INSERT INTO target.author(code,name,lastname1,lastname2)
    SELECT rese_id,rese_name,rese_first_surname,rese_sec_surname
FROM legacy.researcher;
```

MAPPING WITH SQL OPERATION



1. DEFINE MAPPING IN DSL:

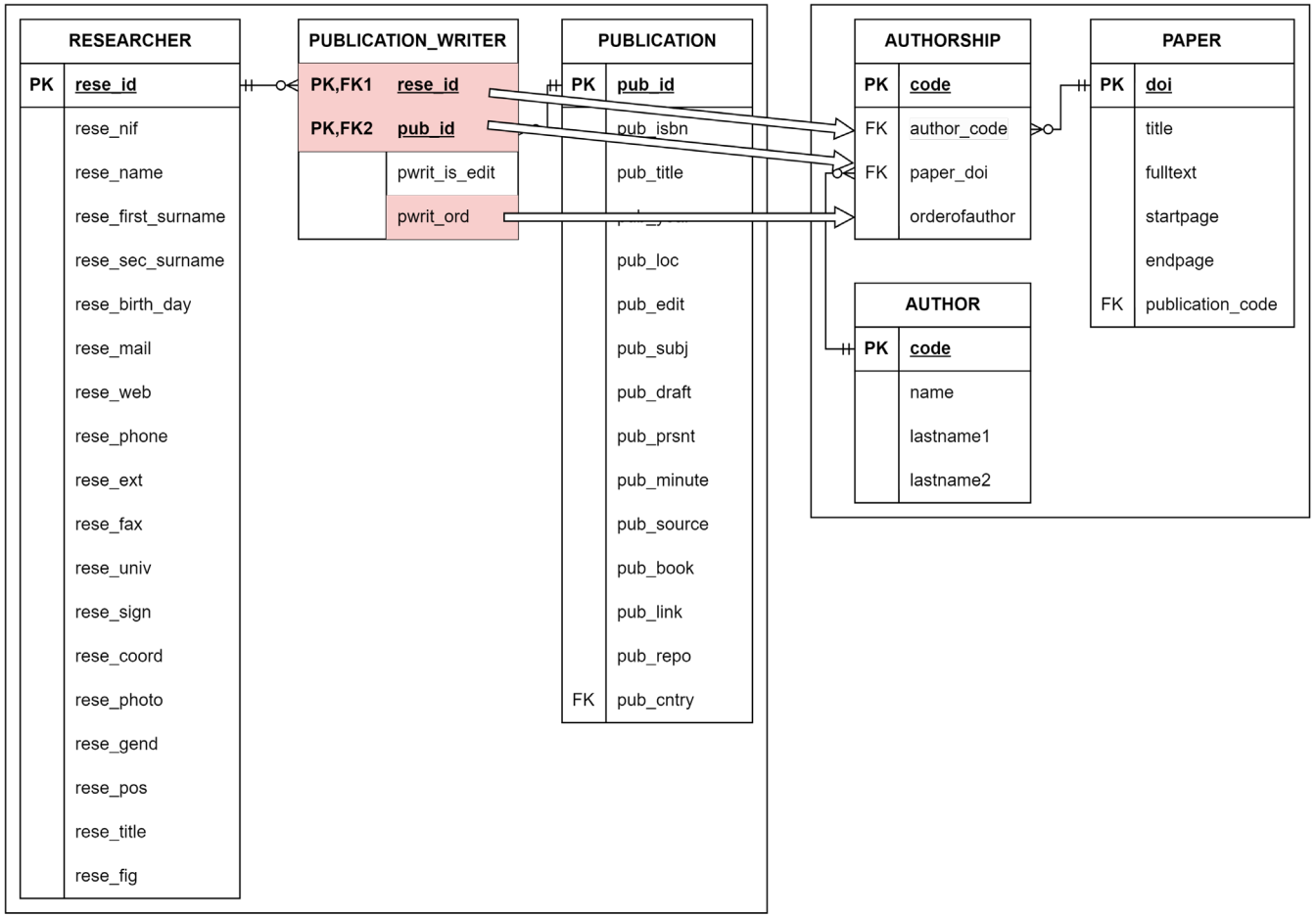
PURE SQL STATEMENT

```
MAP publication TO publisher (
    SQL: "distinct pub_edit" TO name
);
```

2. SQL CODE GENERATED:

```
INSERT INTO target.publisher(name)
    SELECT distinct pub_edit
FROM legacy.publication;
```

MAPPING INTERMEDIATE TABLE



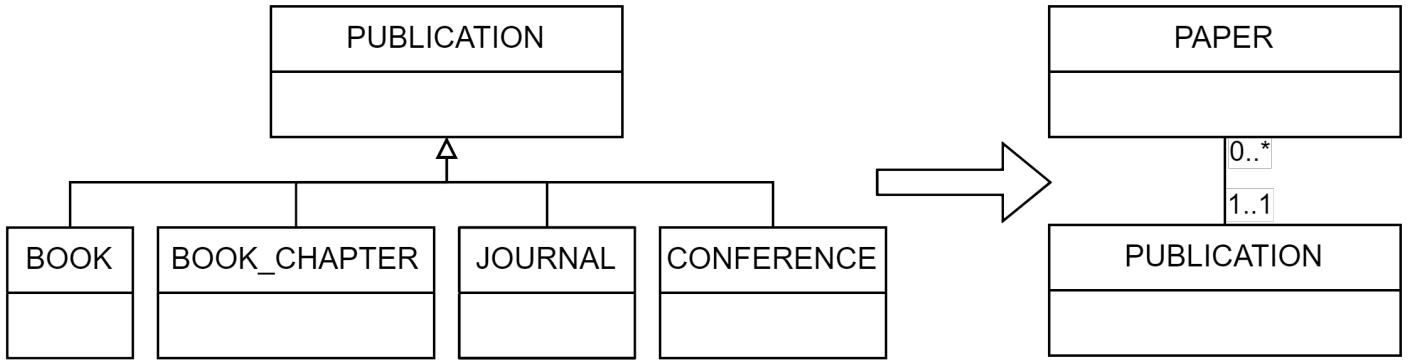
1. DEFINE MAPPING IN DSL:

```
MAP publication_writer TO authorship (
    pub_id TO paper_doi,
    rese_id TO author_code,
    pwrit_ord TO orderofauthor
);
```

2. SQL CODE GENERATED:

```
INSERT INTO target.authorship (paper_doi,
    author_code, orderofauthor)
    SELECT pub_id, rese_id, pwrit_ord
FROM legacy.publication_writer;
```

MAPPING HIERARCHY INTO SINGLE TABLE

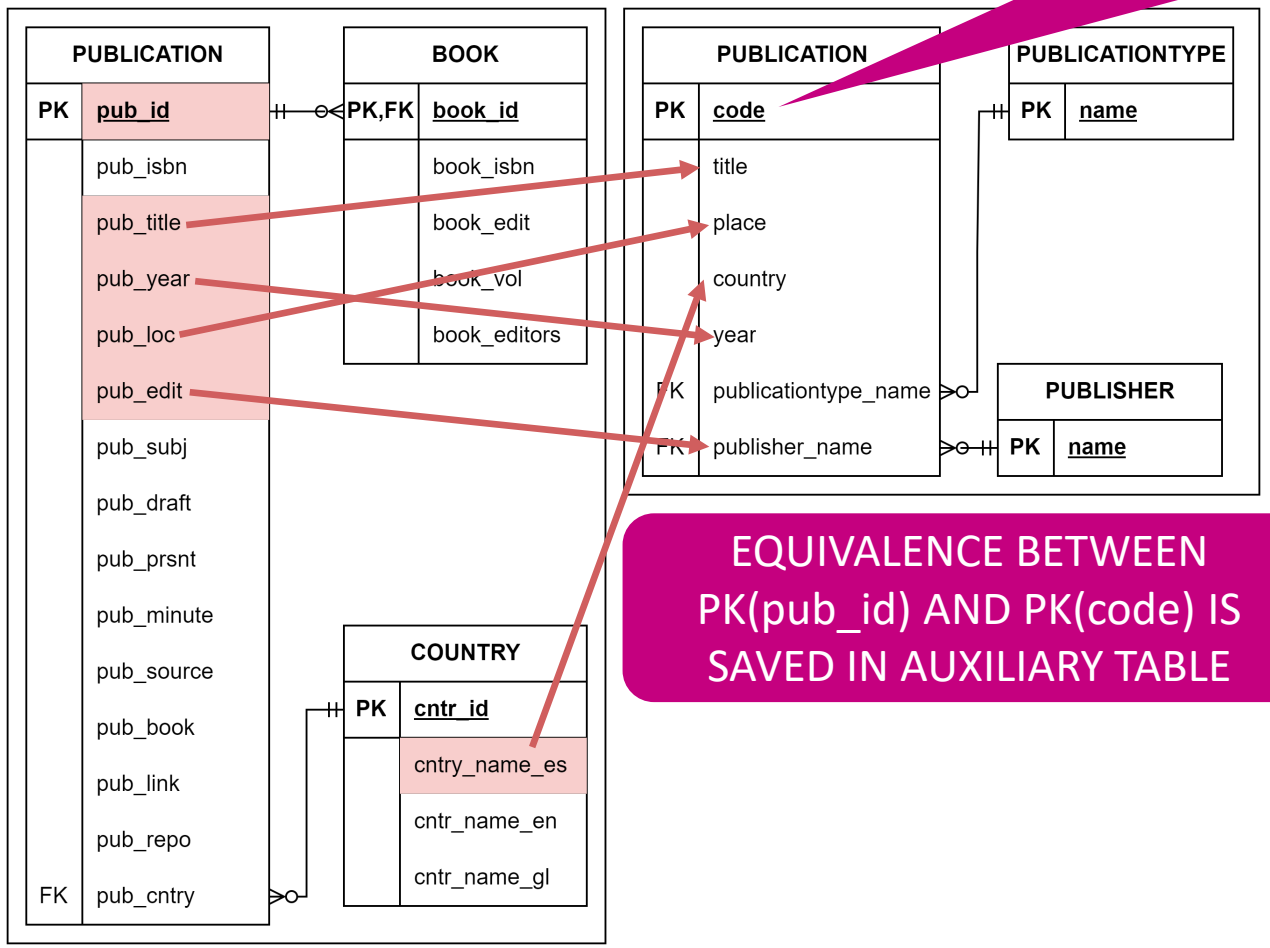


El esquema legacy obligaba a crear una nueva tupla por cada publicación (paper) incluso aunque fuera en un congreso o revista en el que ya se había publicado previamente, obligando a duplicar información.

Queremos dividir esta herencia para tener los papers en una tabla y las publicaciones (revistas, congresos, libros) en otra.

MAP 2 TABLES AND STORE PK REFERENCE

PK(pub_id) != PK(code)
PK(code) = new generated value



EQUIVALENCE BETWEEN PK(pub_id) AND PK(code) IS SAVED IN AUXILIARY TABLE

1. DEFINE MAPPING IN DSL:

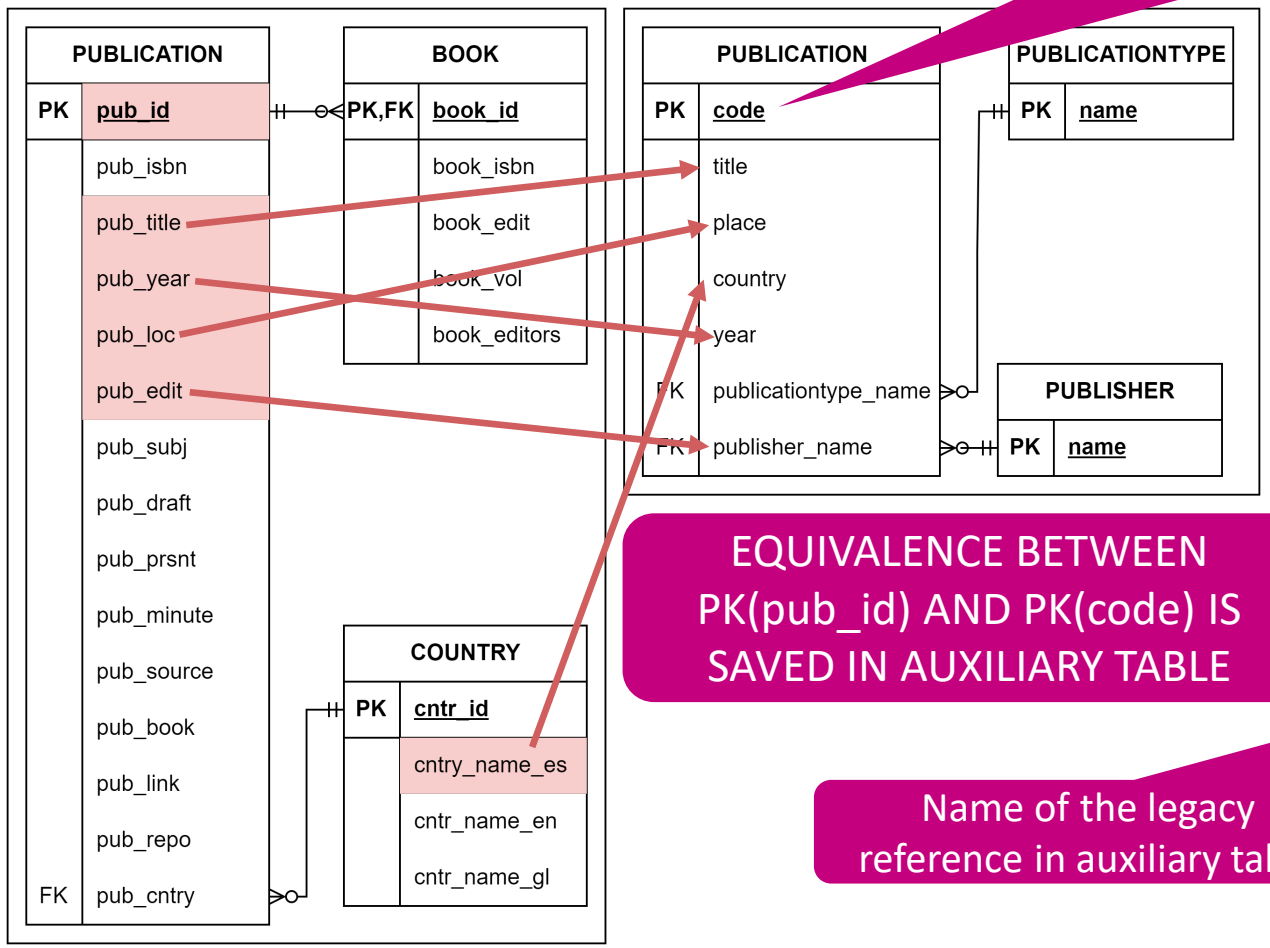
```
MAP publication, country TO publication (
    pub_title TO title,
    pub_loc TO place,
    pub_year TO year,
    'LIBRO' TO publicationtype_name,
    pub_edit TO publisher_name,
    cntry_name_es TO country,
    SAVE RELATION publication.pub_id AS
id_publication int EQUALS publication.code int
 ) WHERE (pub_cntry=cntry_id);
```

MAP LITERAL TO ATTRIBUTE

JOIN CONDITION FOR PUBLICATION AND COUNTRY

MAP 2 TABLES AND STORE PK REFERENCE

PK(pub_id) != PK(code)
PK(code) = new generated value



EQUIVALENCE BETWEEN PK(pub_id) AND PK(code) IS SAVED IN AUXILIARY TABLE

1. DEFINE MAPPING IN DSL:

```
MAP publication, country TO publication (
    pub_title TO title,
    pub_loc TO place,
    pub_year TO year,
    'LIBRO' TO publicationtype_name,
    pub_edit TO publisher_name,
    cntry_name_es TO country,
    SAVE RELATION publication.pub_id AS
id_publication int EQUALS publication.code int
    ) WHERE (pub_cntry=cntry_id);
```

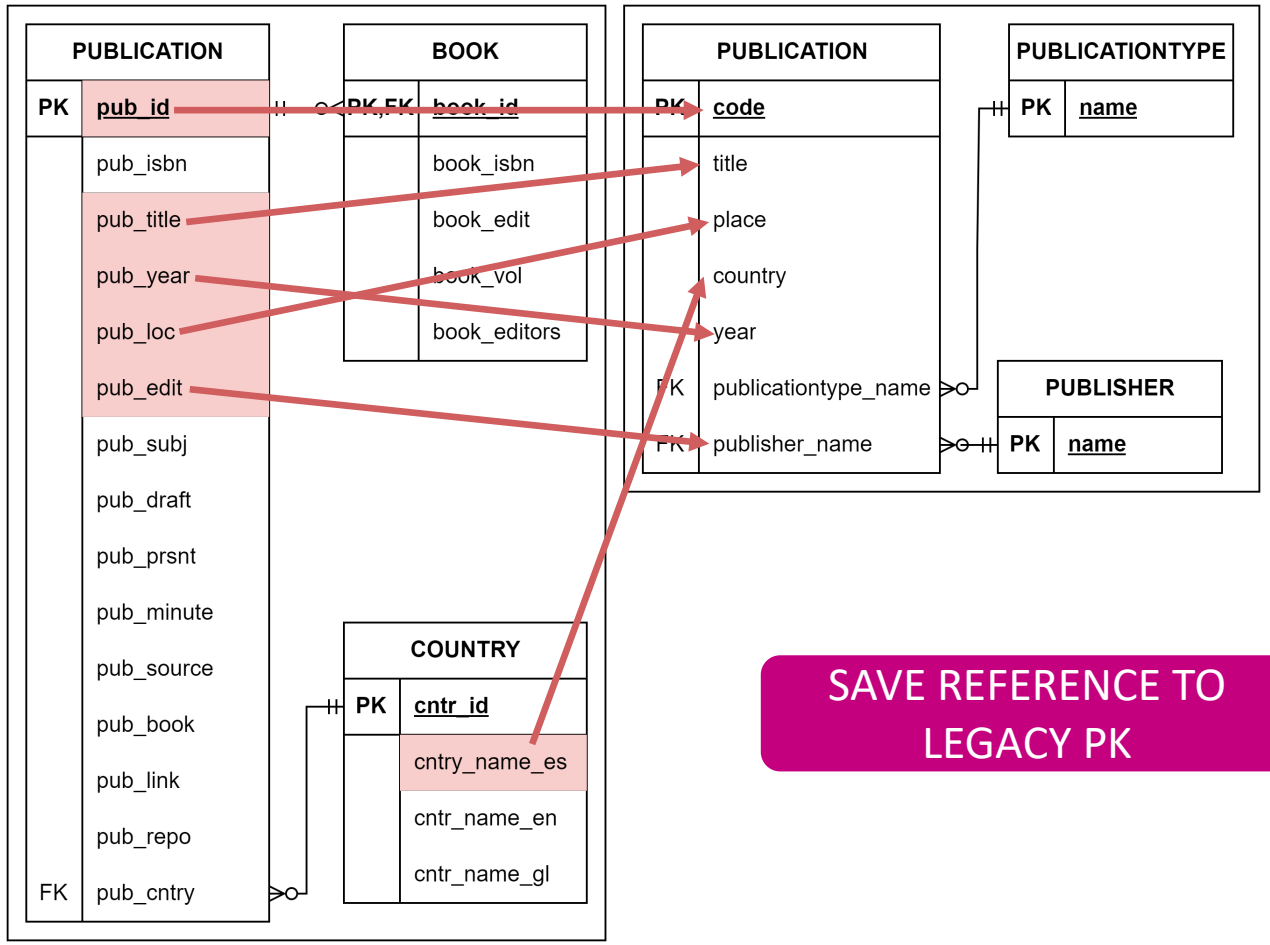
Name of the auxiliary table

Legacy PK to save

New PK to save

Name of the legacy reference in auxiliary table

MAP 2 TABLES AND STORE PK REFERENCE



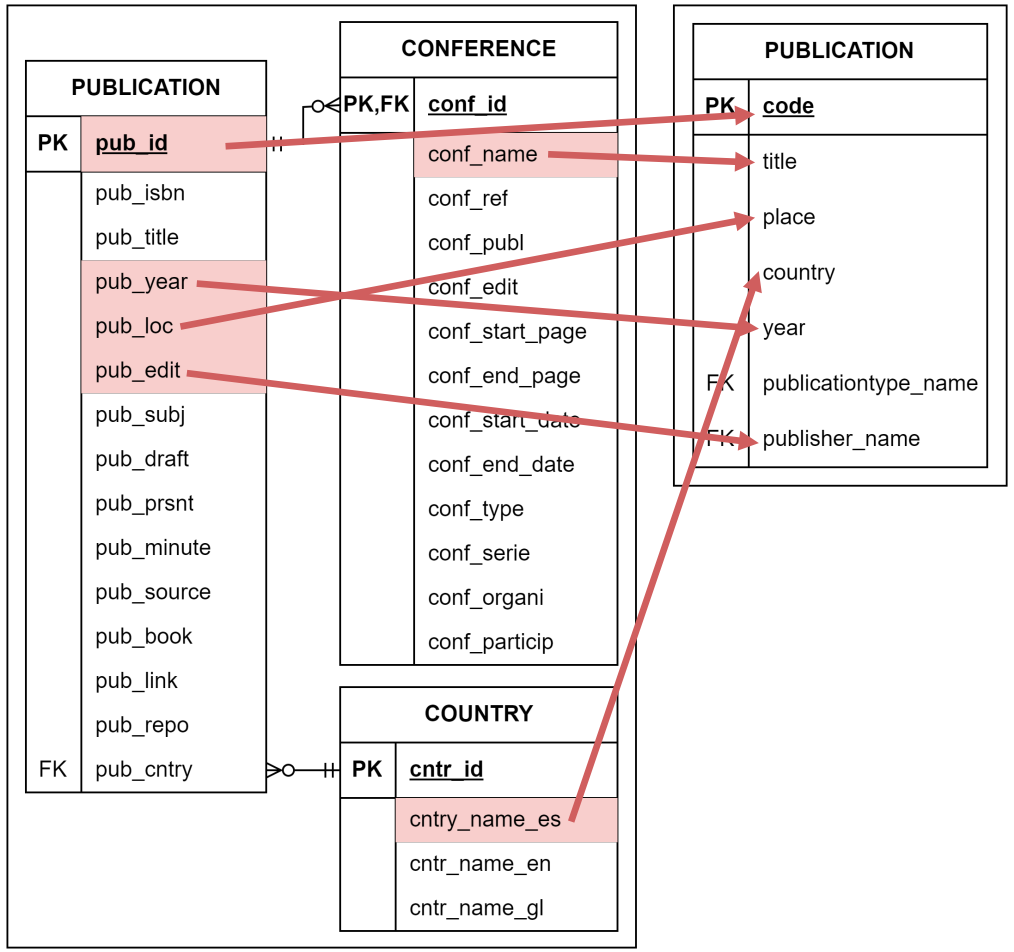
SAVE REFERENCE TO LEGACY PK

1. SQL CODE GENERATED:

```
ALTER TABLE target.publication ADD id_publication int;
CREATE TABLE IF NOT EXISTS aux.publication(
    publication_code int,
    id_publication int
);
INSERT INTO target.publication(title, place, year,
   publicationtype_name, publisher_name, country,
   id_publication)
    SELECT pub_title, pub_loc, pub_year, 'LIBRO',
   pub_edit, cntry_name_es, pub_id
FROM legacy.publication, legacy.book, legacy.country
   WHERE pub_id=book_id AND pub_cntry=cntry_id;
INSERT INTO aux.publication(publication_code,
   id_publication)
    SELECT code, id_publication
FROM target.publication;
ALTER TABLE public.publication DROP id_publication;
```

CREATE AUXILIAR TABLE FOR PUBLICATION

MAP 3 TABLES AND STORE PK REFERENCE

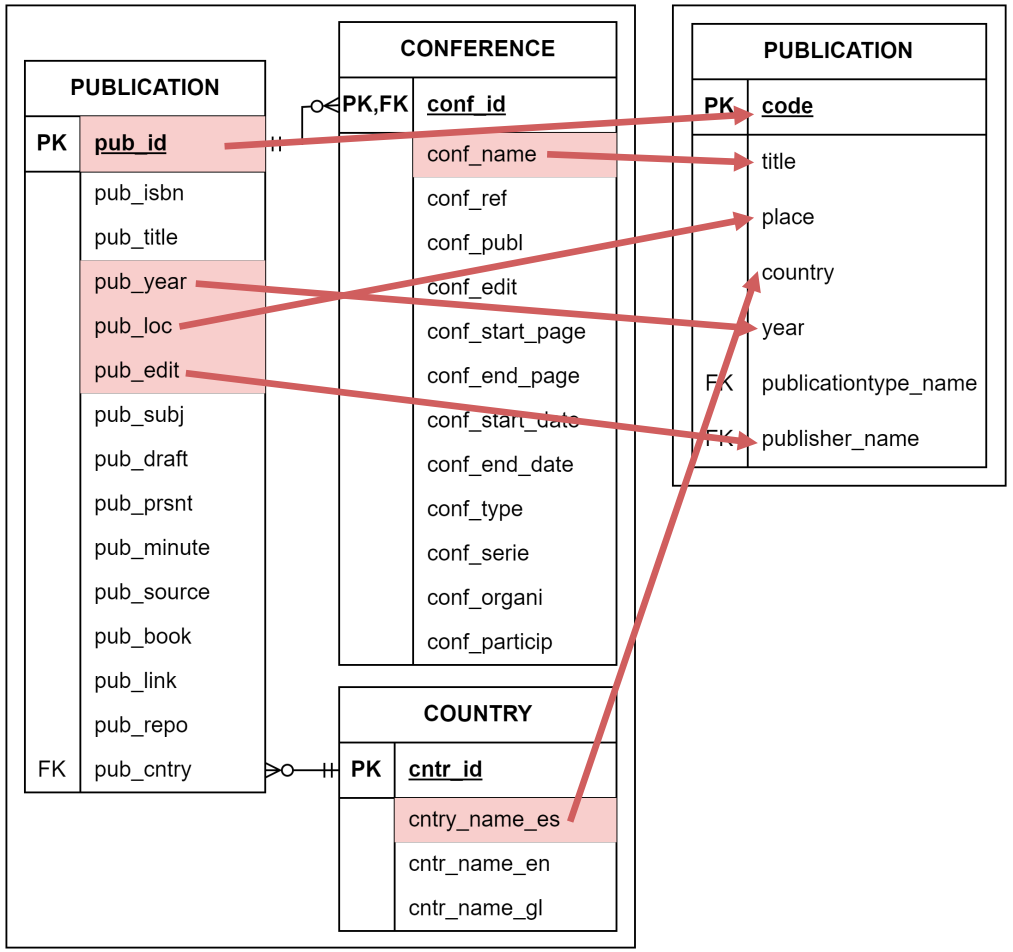


1. DEFINE MAPPING IN DSL:

```
MAP publication, conference, country TO publication
   (conf_name TO title,
    pub_loc TO place,
    pub_year TO year,
    'CONGRESO' TO publicationtype_name,
    pub_edit TO publisher_name,
    cntry_name_es TO country,
    SAVE RELATION publication.pub_id AS id_publication int
   EQUALS publication.code int
) WHERE (pub_id=conf_id AND pub_cntry=cntry_id);
```

2 JOIN CONDITIONS FOR 3 TABLES

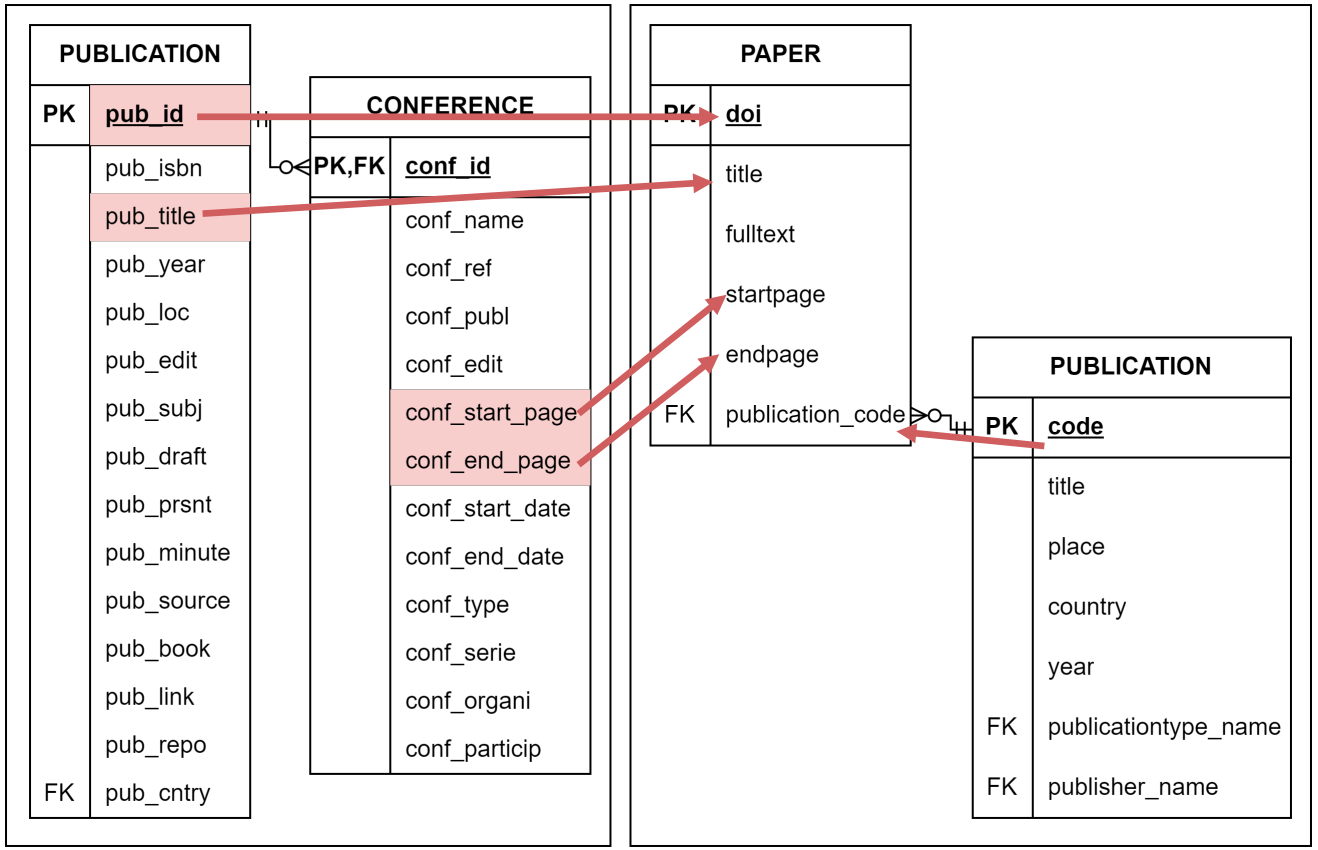
MAP FROM 3 TABLES AND STORE REFERENCE



2. SQL CODE GENERATED:

```
ALTER TABLE target.publication ADD id_publication int;
CREATE TABLE IF NOT EXISTS aux.publication(
    publication_code int,
    id_publication int
);
INSERT INTO target.publication (title, place, year,
publicationtype_name, publisher_name, country, id_publication)
    SELECT conf_name, pub_loc, pub_year, 'CONGRESO', pub_edit,
cntry_name_es, pub_id
FROM legacy.publication, legacy.conference, legacy.country
WHERE pub_id=jrnl_id AND pub_cntry=cntry_id;
INSERT INTO aux.publication(publication_code, id_publication)
    SELECT code, id_publication
FROM target.publication;
ALTER TABLE public.publication DROP id_publication;
```

MAP AND RETRIEVE STORED REFERENCE

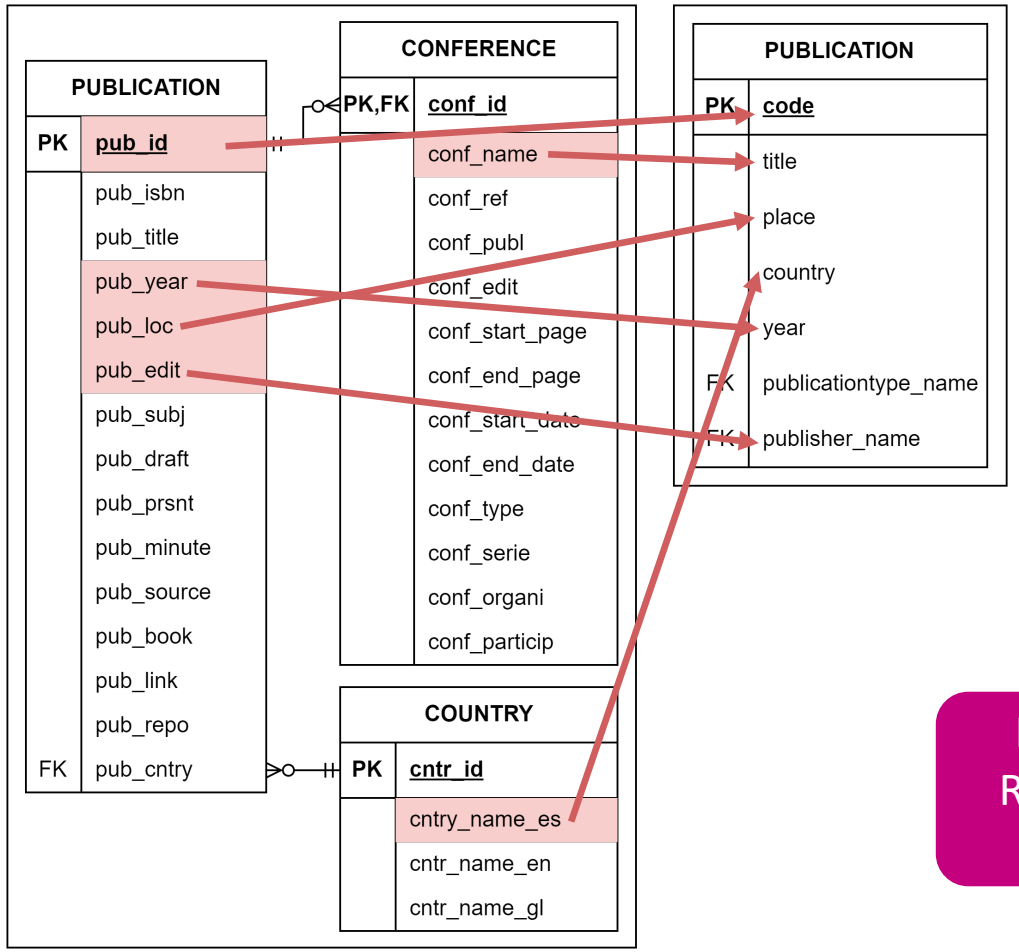


1. DEFINE MAPPING IN DSL:

```
MAP publication, conference TO paper (
    pub_title TO title,
    pub_id TO doi,
    conf_start_page TO startpage,
    conf_end_page TO endpage
) WHERE (pub_id=conf_id)
GET publication_code FROM publication.code WHEN
   id_publication=pub_id;
```

SAME NAME DEFINED IN THE “SAVE RELATION” STATEMENT

MAPPING HIERARCHY INTO SINGLE TABLE



2. SQL CODE GENERATED:

```
INSERT INTO target.paper(title, doi, startpage, endpage)
    SELECT pub_title, pub_id, conf_start_page, conf_end_page
FROM legacy.publication, legacy.conference
WHERE pub_id=jrnl_id;

UPDATE target.paper SET publication_code = (
    SELECT publication_code FROM aux.publication t
      WHERE t.id_publication = conference.pub_id);
```

RETRIEVE SAVED REFERENCE FROM AUXILIAR TABLE

TASKS TO COMPLETE

TASK 1:

Provided the reference migration and the SQL code, complete the SQL definition required to:

Populate the target table “Paper” with all the papers corresponding to the legacy tables “Journal”, “Conference”, “Book”, and “Book Chapter”.

TASK 2:

Provided the reference migration and the DSL code, please complete the DSL definition required to:

Populate the target table “Paper” with all the papers corresponding to the legacy tables “Journal”, “Conference”, “Book”, and “Book Chapter”.