To establish relationships between the tables, we need to define the relationships based on the foreign keys and primary keys. Here are the relationships for our tables:

**One-to-One Relationships:**

No explicit one-to-one relationships are defined in our current schema.

**One-to-Many Relationships:**

**countries** (one) to **customers** (many):

Add **country\_id** as a foreign key in the customers table.

**channels** (one) to **costs** (many):

Add **channel\_id** as a foreign key in the costs table.

**channels** (one) to **sales** (many):

Add **channel\_id** as a foreign key in the sales table.

**promotions** (one) to costs (many):

Add **promo\_id** as a foreign key in the costs table.

**promotions** (one) to **sales** (many):

Add **promo\_id** as a foreign key in the sales table.

**products** (one) to **costs** (many):

Add **prod\_id** as a foreign key in the costs table.

**products** (one) to **sales** (many):

Add **prod\_id** as a foreign key in the sales table.

**times** (one) to **costs** (many):

Add **time\_id** as a foreign key in the costs table.

**times** (one) to **sales** (many):

Add **time\_id** as a foreign key in the sales table.

**Many-to-Many Relationships:**

No explicit many-to-many relationships are defined in our current schema.

Table channels {

  channel\_id integer [pk, not null]

  channel\_desc varchar(20)

  channel\_class varchar(20)

  channel\_class\_id integer

  channel\_total varchar(13)

  channel\_total\_id integer

}

Table costs {

  prod\_id integer [ref: > products.prod\_id]

  time\_id date [ref: > times.time\_id]

  promo\_id integer [ref: > promotions.promo\_id]

  channel\_id integer [ref: > channels.channel\_id]

  unit\_cost numeric

}

Table countries {

  country\_id integer [pk, not null]

  country\_iso\_code character(2)

  country\_name varchar(40)

  country\_subregion varchar(30)

  country\_subregion\_id integer

  country\_region varchar(20)

  country\_region\_id integer

  country\_total varchar(11)

  country\_total\_id integer

  country\_name\_hist varchar(40)

}

Table customers {

  cust\_id integer [pk, not null]

  cust\_first\_name varchar(11)

  cust\_last\_name varchar(40)

  cust\_gender character(1)

  cust\_year\_of\_birth smallint

  cust\_marital\_status varchar(20)

  cust\_street\_addres varchar(40)

  cust\_postal\_code varchar(10)

  cust\_city varchar(30)

  cust\_city\_id integer

  cust\_state\_province varchar(40)

  cust\_state\_province\_id integer

  country\_id integer [ref: > countries.country\_id]

  cust\_main\_phone\_number varchar(25)

  cust\_income\_level varchar(30)

  cust\_credit\_limit integer

  cust\_email varchar(30)

  cust\_total varchar(14)

  cust\_total\_id integer

  cust\_src\_id integer

  cust\_eff\_from timestamp

  cust\_eff\_to timestamp

  cust\_valid varchar(1)

}

Table products {

  prod\_id integer [pk, not null]

  prod\_name varchar(50)

  prod\_desc varchar(4000)

  prod\_subcategory varchar(50)

  prod\_subcategory\_id integer

  prod\_subcategory\_desc varchar(2000)

  prod\_category varchar(50)

  prod\_category\_id integer

  prod\_category\_desc varchar(2000)

  prod\_weight\_class smallint

  prod\_unit\_of\_measure varchar(20)

  prod\_pack\_size varchar(30)

  supplier\_id integer

  prod\_status varchar(20)

  prod\_list\_price numeric(8)

  prod\_min\_price numeric(8)

  prod\_total varchar(13)

  prod\_total\_id integer

  prod\_src\_id integer

  prod\_eff\_from timestamp

  prod\_eff\_to timestamp

  prod\_valid varchar(1)

}

Table promotions {

  promo\_id integer [pk, not null]

  promo\_name varchar(30)

  promo\_subcategory varchar(30)

  promo\_subcategory\_id integer

  promo\_category varchar(30)

  promo\_category\_id integer

  promo\_cost numeric

  promo\_begin\_date timestamp

  promo\_end\_date timestamp

  promo\_total varchar(30)

  promo\_total\_id integer

}

Table sales {

  prod\_id integer [ref: > products.prod\_id]

  cust\_id integer [ref: > customers.cust\_id]

  time\_id date [ref: > times.time\_id]

  channel\_id integer [ref: > channels.channel\_id]

  promo\_id integer [ref: > promotions.promo\_id]

  quantity\_sold numeric(10)

  amount\_sold numeric

}

Table supplementary\_demographics {

  cust\_id integer [pk, not null, ref: > customers.cust\_id]

  education varchar(21)

  occupation varchar(21)

  household\_size varchar(21)

  yrs\_residence integer

  affinity\_card bigint

  bulk\_pack\_diskette bigint

  flat\_panel\_monitor bigint

  home\_theater\_package bigint

  bookkeeping\_application bigint

  printer\_supplies bigint

  y\_box\_games bigint

  os\_doc\_set\_kanji bigint

  comments varchar(4000)

}

Table times {

  time\_id date [pk, not null]

  day\_name varchar(9)

  day\_number\_in\_week smallint

  day\_number\_in\_month smallint

  calendar\_week\_number smallint

  fiscal\_week\_number smallint

  week\_ending\_day date

  week\_ending\_day\_id integer

  calendar\_month\_number smallint

  fiscal\_month\_number smallint

  calendar\_month\_desc varchar(8)

  calendar\_month\_id integer

  fiscal\_month\_desc varchar(8)

  fiscal\_month\_id integer

  days\_in\_cal\_month integer

  days\_in\_fis\_month integer

  end\_of\_cal\_month date

  end\_of\_fis\_month date

  calendar\_month\_name varchar(9)

  fiscal\_month\_name varchar(9)

}