

Introduction to Data Modeling

INTRODUCTION TO DATA MODELING IN SNOWFLAKE



Nuno Rocha
Director of Engineering

Your instructors

Nuno Rocha

Director of Engineering



Margarita Torres

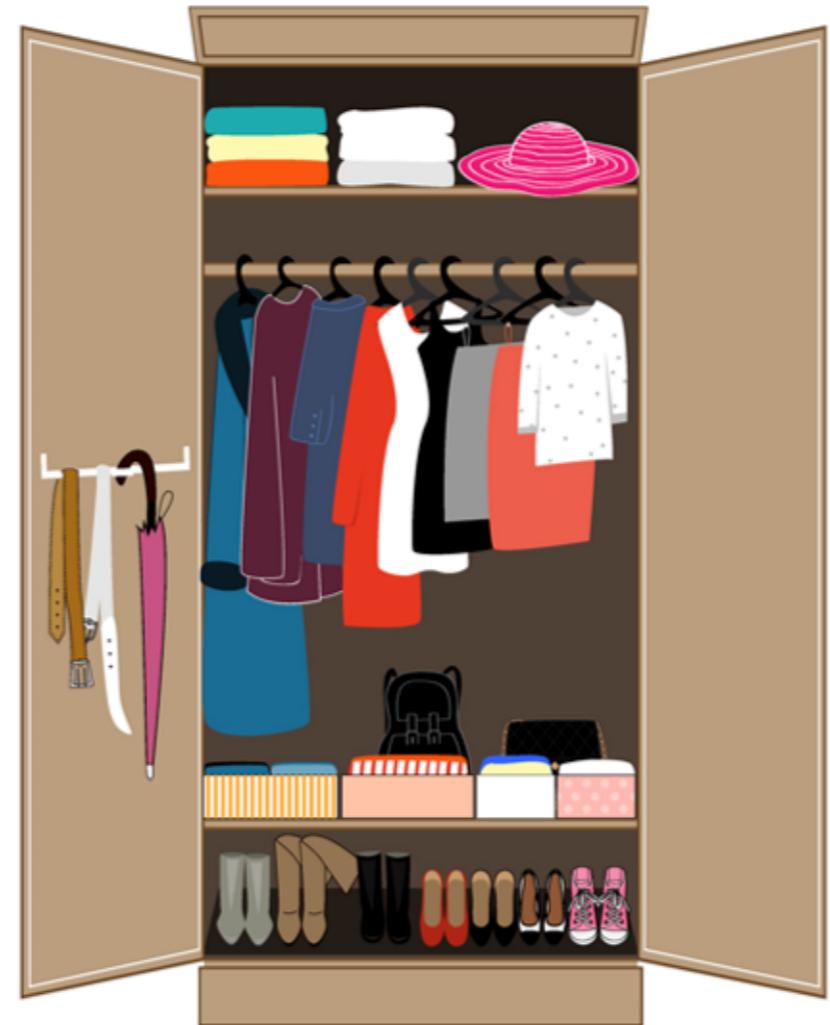
Senior Data Engineer



What is data modeling?



What is data modeling? (1)



What is data modeling? (2)



Components of data modeling



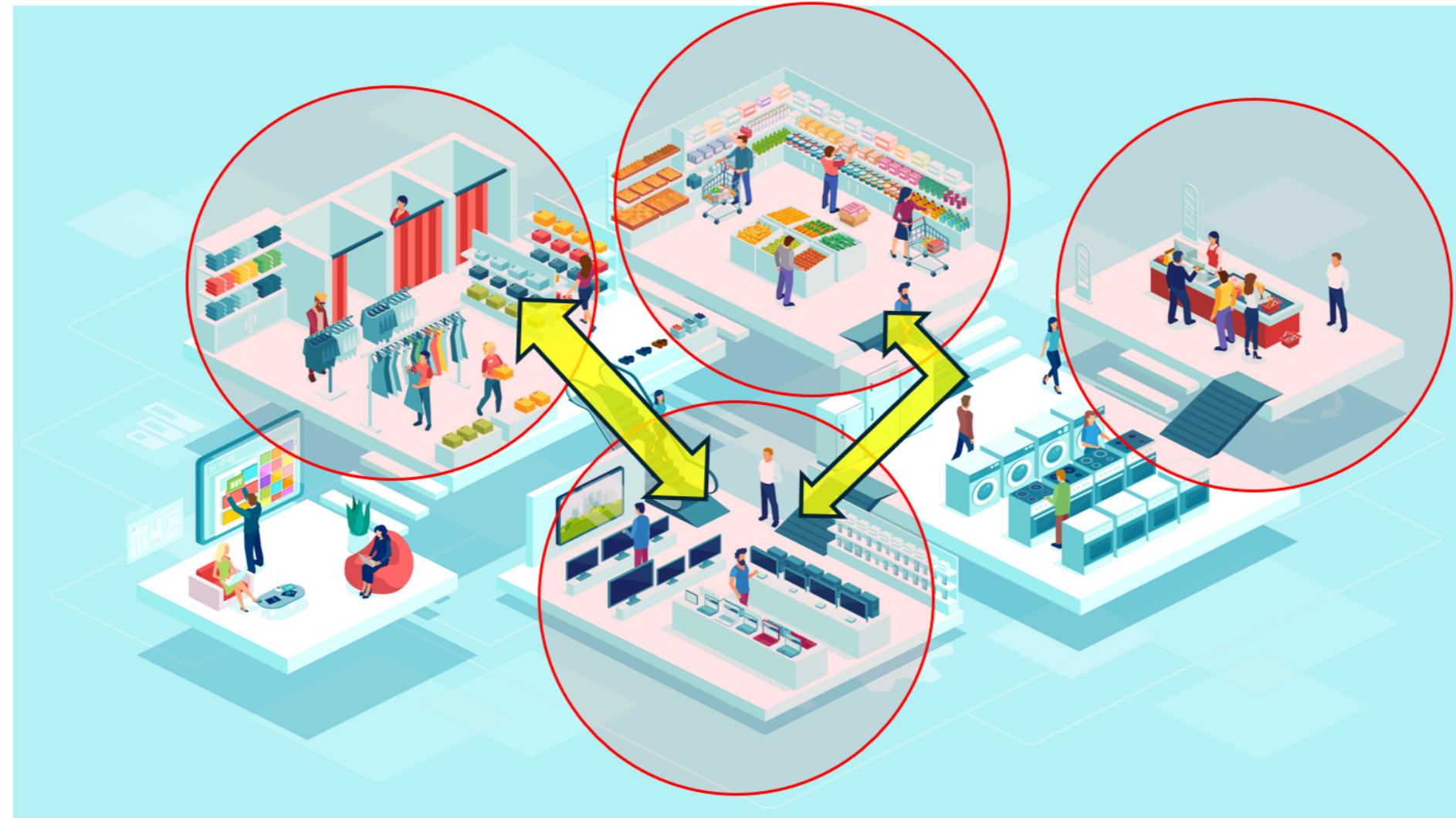
Components of data modeling (1)



Components of data modeling (2)



Components of data modeling (3)



Describing entities

Entity: Object or concept represented in a data model



Describing entities (1)

DESC TABLE : SQL command to display a table's structure

DESC TABLE groceries;

name	type	kind	null?	default	primary key	unique key	check expression	comment	policy name
productid	DECIMAL(10,2)	column	N	null	Y	N	null	null	null
productname	VARCHAR(255)	column	N	null	N	N	null	null	null
category	VARCHAR(255)	column	Y	null	N	N	null	null	null
price	DECIMAL(10,2)	column	N	0	N	N	null	null	null
quantityavailable	DECIMAL(10,2)	column	N	0	N	N	null	null	null
suppliername	VARCHAR(255)	column	Y	null	N	N	null	null	null
expirationdate	TIMESTAMP_NTZ(9)	column	Y	null	N	N	null	null	null

Describing entities (2)

Attribute: Characteristics of an entity

name	type	kind	null?	default	primary key	unique key	check expression	comment	policy	name
productid	DECIMAL(10,2)	column	N	null	Y	N	null	null	null	null
productname	VARCHAR(255)	column	N	null	N	N	null	null	null	null
category	VARCHAR(255)	column	Y	null	N	N	null	null	null	null
price	DECIMAL(10,2)	column	N	0	N	N	null	null	null	null
quantityavailable	DECIMAL(10,2)	column	N	0	N	N	null	null	null	null
suppliername	VARCHAR(255)	column	Y	null	N	N	null	null	null	null
expirationdate	TIMESTAMP_NTZ(9)	column	Y	null	N	N	null	null	null	null

Another industry

E-Commerce online retail

invoiceno	stockcode	description	quantity	invoicedate	unitprice	customerid	country
545218	22386	JUMBO BAG PINK POLKADOT	10	2/28/11 5:01 PM	1.95	17462	United Kingdom
545218	21933	PINK VINTAGE PAISLEY PICNIC BAG	5	2/28/11 5:01 PM	2.95	17462	United Kingdom
545214	22796	PHOTO FRAME 3 CLASSIC HANGING	2	2/28/11 4:39 PM	9.95	17165	United Kingdom
545214	22699	ROSES REGENCY TEACUP AND SAUCER	6	2/28/11 4:39 PM	2.95	17165	United Kingdom
545214	22151	PLACE SETTING WHITE HEART	24	2/28/11 4:39 PM	0.42	17165	United Kingdom
545213	22321	BIRD DECORATION RED RETROSPOT	12	2/28/11 4:36 PM	0.85	16518	United Kingdom
545213	22148	EASTER CRAFT 4 CHICKS	12	2/28/11 4:36 PM	1.95	16518	United Kingdom
545213	21880	RED RETROSPOT TAPE	12	2/28/11 4:36 PM	0.65	16518	United Kingdom
545191	20725	LUNCH BAG RED RETROSPOT	10	2/28/11 3:39 PM	1.65	12811	Portugal
545191	22662	LUNCH BAG DOLLY GIRL DESIGN	10	2/28/11 3:39 PM	1.65	12811	Portugal

Terminology and functions overview

- **Data model:** A representation that outlines the organization and storage of data
- **Entity:** Object or concept represented in a data model
- **Attribute:** Characteristics of an entity
- **Relationship:** Connections between entities
- **DESC TABLE** : SQL command to display a table's structure

```
DESC TABLE table_name;
```

Let's practice!

INTRODUCTION TO DATA MODELING IN SNOWFLAKE

Exploring Conceptual and Logical Data Models

INTRODUCTION TO DATA MODELING IN SNOWFLAKE

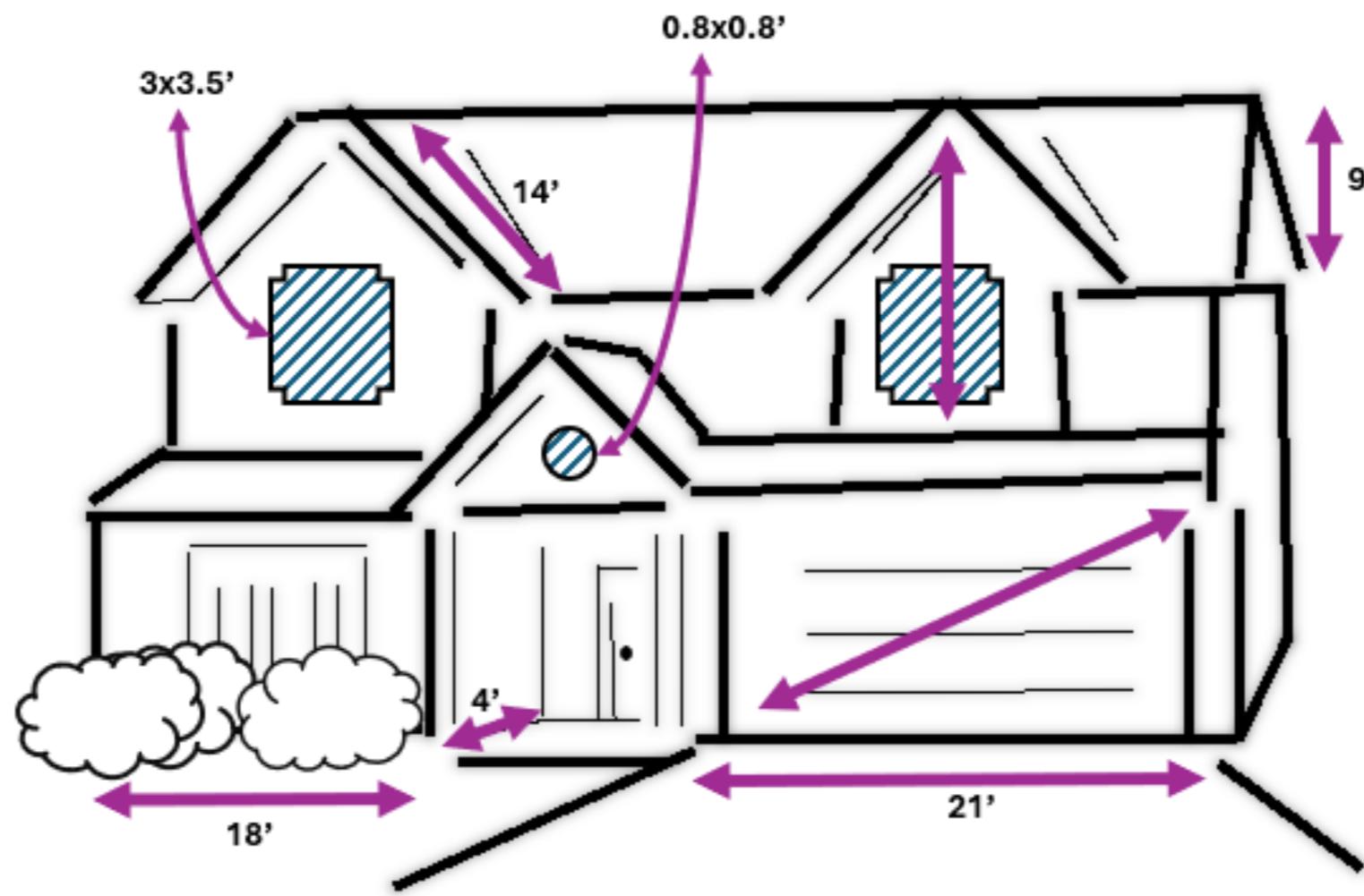


Nuno Rocha
Director of Engineering

What is a conceptual model?

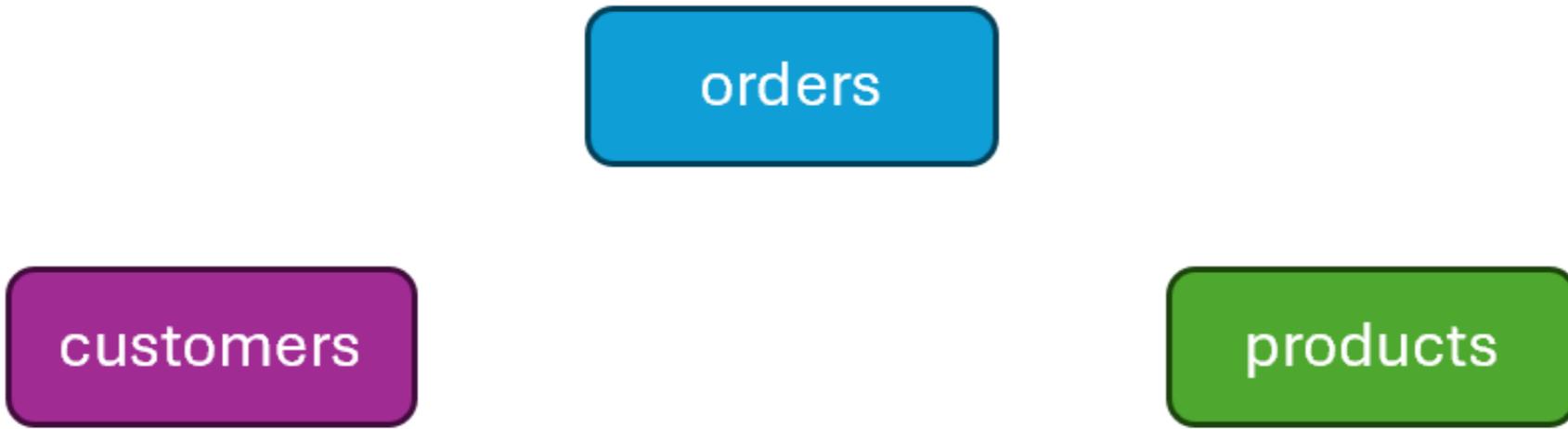


What is a logical data model?



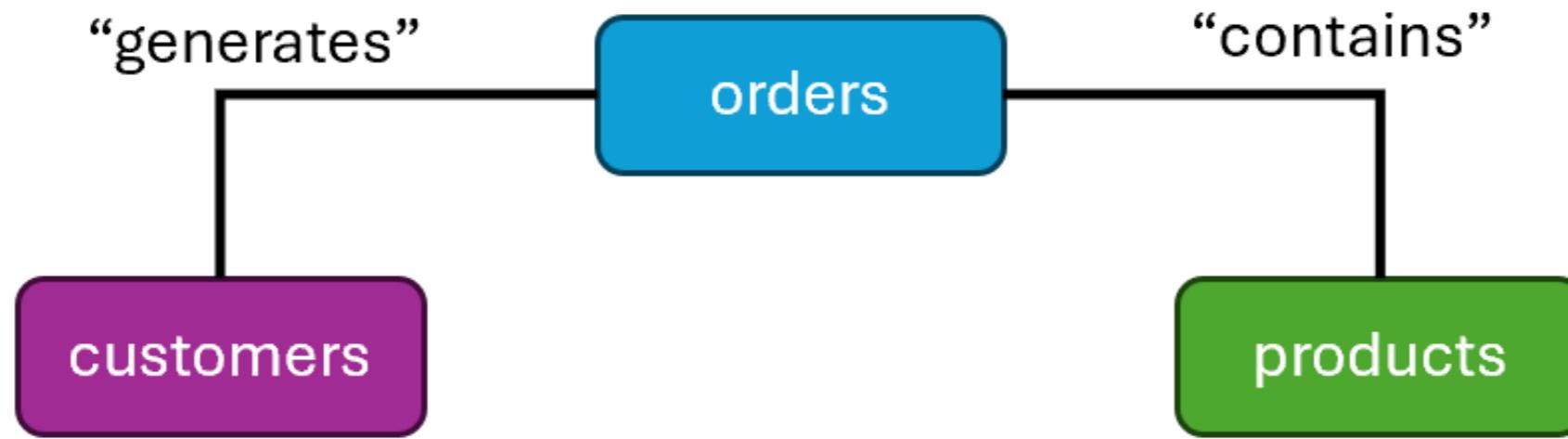
Applying the conceptual model

Conceptual model: High-level overview of main data entities



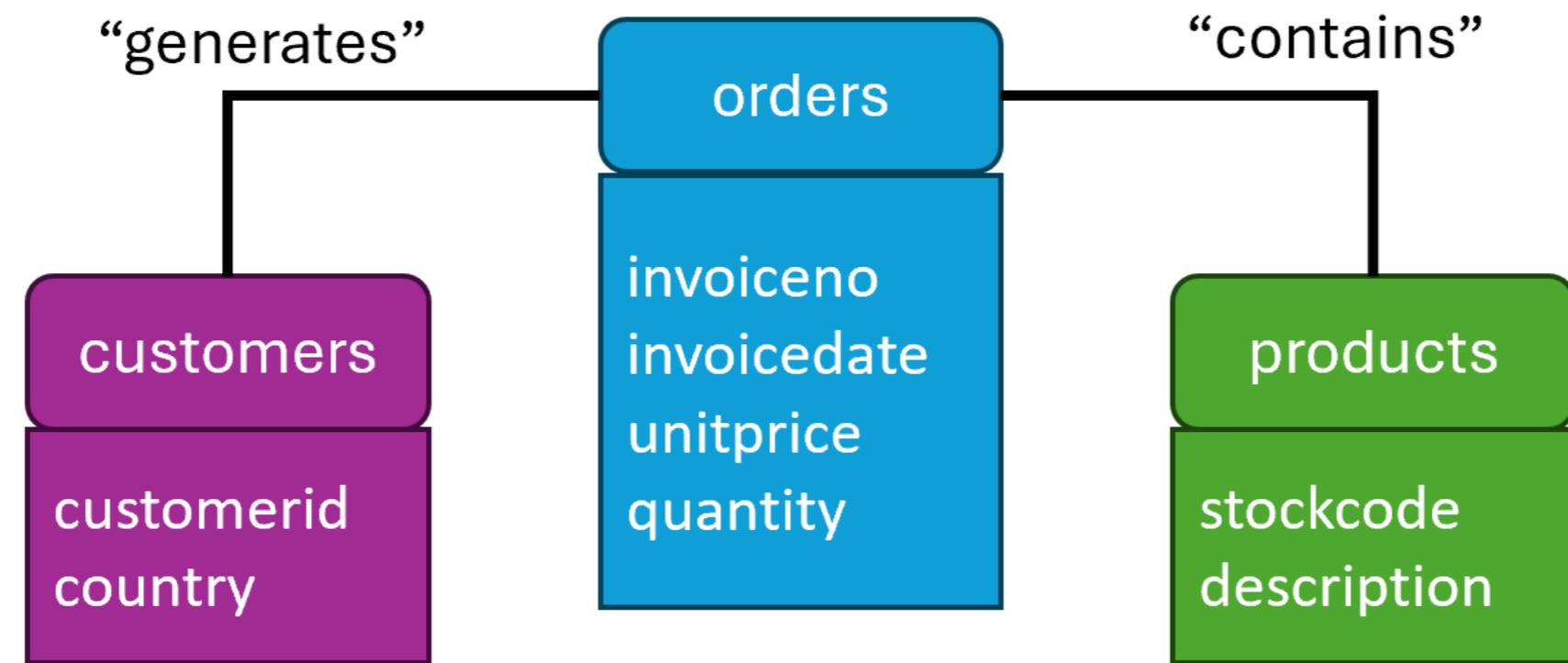
Applying the conceptual model (1)

Conceptual model: High-level overview of main data entities



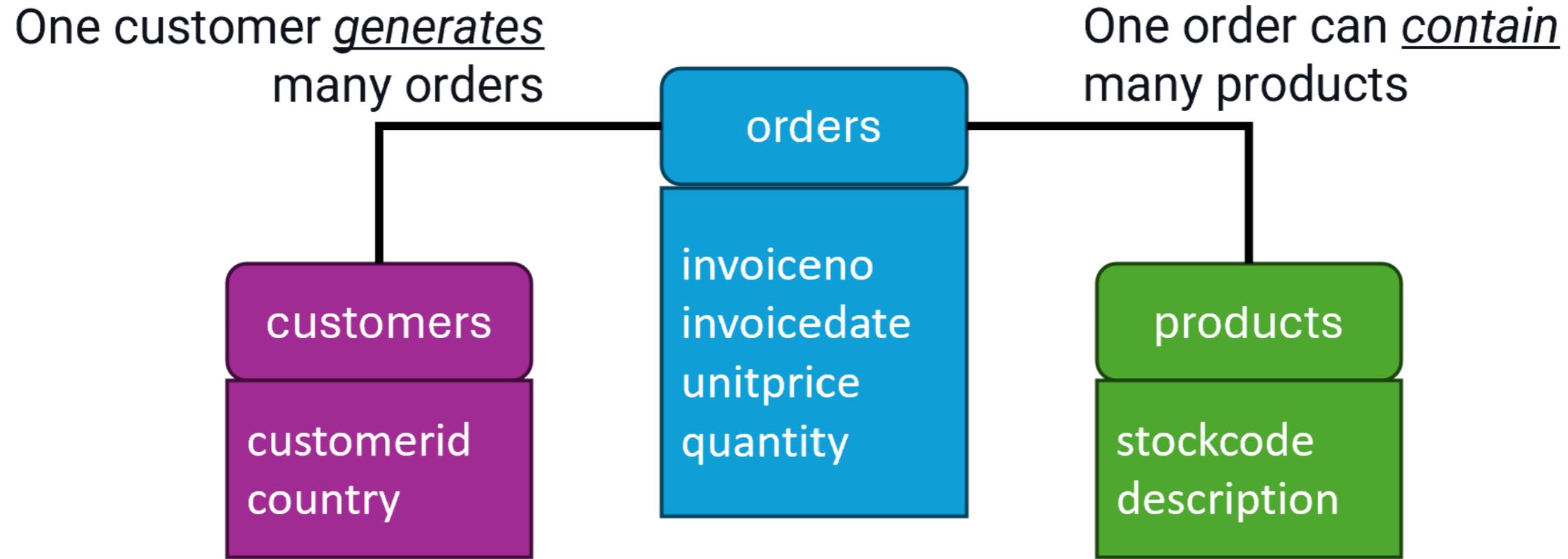
Applying the logical model

Logical model: Detailed entities with attributes definition and their relationship



Applying the logical model (1)

Relationship cardinality: Number of times entities are associated to each other



Implementing the logical model

SELECT FROM : SQL command to fetch columns from a table

```
SELECT *  
FROM ecommerceonlineretail;
```

invoiceno	stockcode	description	quantity	invoicedate	unitprice	customerid	country
545218	22386	JUMBO BAG PINK POLKADOT	10	2/28/11 5:01 PM	1.95	17462	United Kingdom
545218	21933	PINK VINTAGE PAISLEY PICNIC BAG	5	2/28/11 5:01 PM	2.95	17462	United Kingdom
545214	22796	PHOTO FRAME 3 CLASSIC HANGING	2	2/28/11 4:39 PM	9.95	17165	United Kingdom
545214	22699	ROSES REGENCY TEACUP AND SAUCER	6	2/28/11 4:39 PM	2.95	17165	United Kingdom
545214	22151	PLACE SETTING WHITE HEART	24	2/28/11 4:39 PM	0.42	17165	United Kingdom
545213	22321	BIRD DECORATION RED RETROSPOT	12	2/28/11 4:36 PM	0.85	16518	United Kingdom
545213	22148	EASTER CRAFT 4 CHICKS	12	2/28/11 4:36 PM	1.95	16518	United Kingdom
545213	21880	RED RETROSPOT TAPE	12	2/28/11 4:36 PM	0.65	16518	United Kingdom
545191	20725	LUNCH BAG RED RETROSPOT	10	2/28/11 3:39 PM	1.65	12811	Portugal
545191	22662	LUNCH BAG DOLLY GIRL DESIGN	10	2/28/11 3:39 PM	1.65	12811	Portugal

Implementing the logical model (1)

```
DESC TABLE ecommerceonlineretail;
```

name	type	kind	null?	default	primary key	unique key	check expression	comment	policy name
invoiceno	VARCHAR(10)	column	N	null	Y	N	null	null	null
stockcode	VARCHAR(255)	column	N	null	N	N	null	null	null
description	VARCHAR(255)	column	Y	null	N	N	null	null	null
quantity	NUMBER(38,0)	column	Y	0	N	N	null	null	null
invoicedate	TIMESTAMP_NTZ(9)	column	Y	null	N	N	null	null	null
unitprice	NUMBER(10,2)	column	Y	null	N	N	null	null	null
customerid	NUMBER(38,0)	column	N	0	N	N	null	null	null
country	VARCHAR(255)	column	Y	null	N	N	null	null	null

Implementing the logical model (2)

CREATE TABLE : SQL command to define a new table structure

```
CREATE OR REPLACE TABLE customers (
    customerid NUMBER(38,0),
    country VARCHAR(255)
);
```

Terminology and functions overview

- **Conceptual model:** High-level overview of main data entities
- **Logical model:** Detailed entities with attribute definitions and their relationship
- **Relationship cardinality:** Number of times entities are associated with each other
- **SELECT FROM :** SQL command to fetch columns from a table
- **CREATE OR REPLACE TABLE :** SQL command to create or replace a table structure

```
SELECT * FROM table_name;  
CREATE OR REPLACE TABLE table_name (  
    column_name column_datatype,  
    another_column column_datatype  
);
```

Let's practice!

INTRODUCTION TO DATA MODELING IN SNOWFLAKE

Exploring Physical Data Models

INTRODUCTION TO DATA MODELING IN SNOWFLAKE

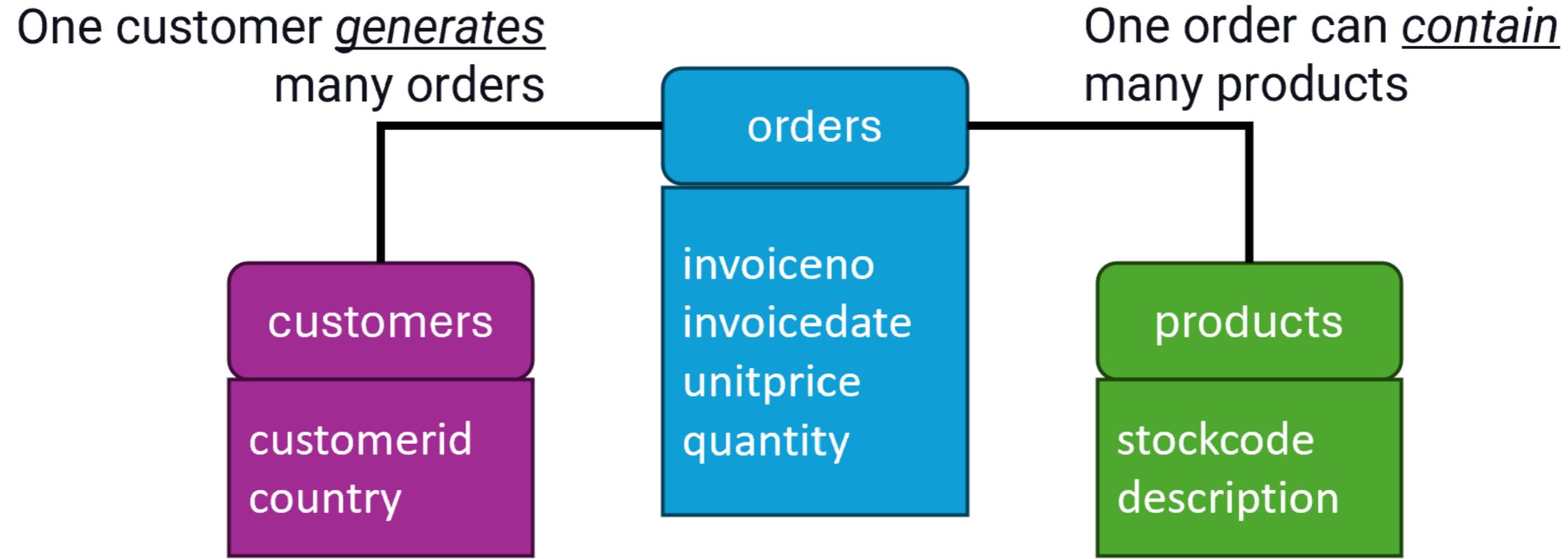


Nuno Rocha
Director of Engineering

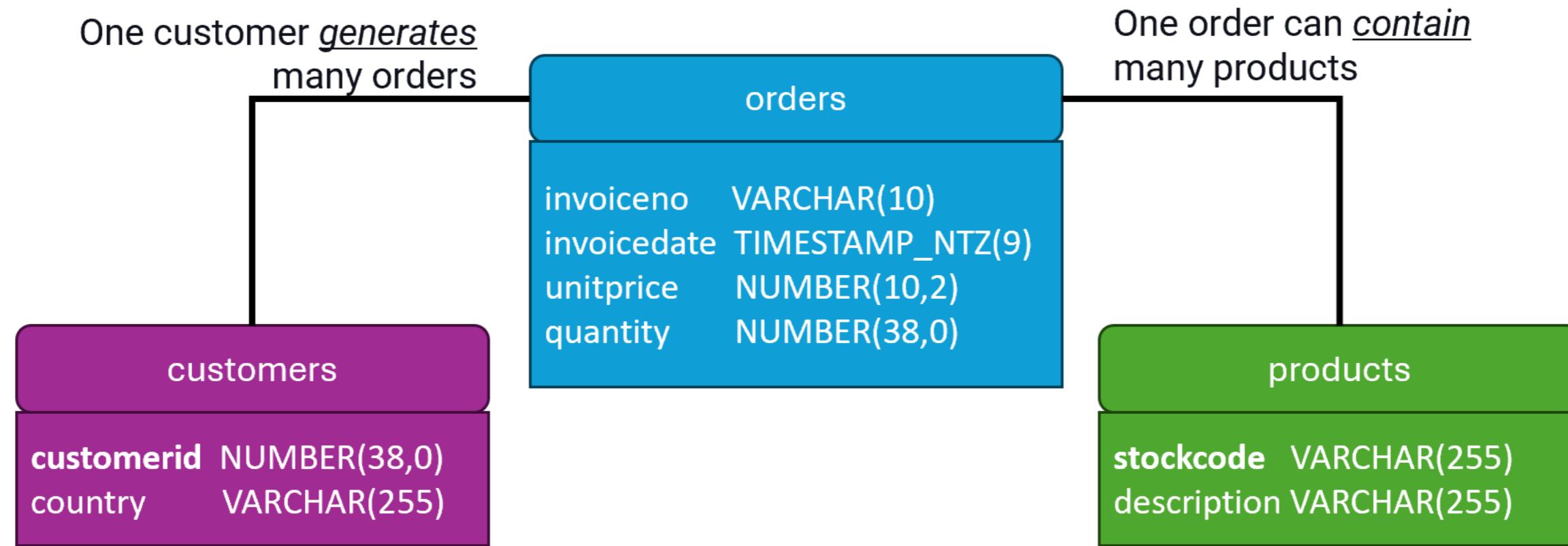
The role of the physical model



The physical model's details

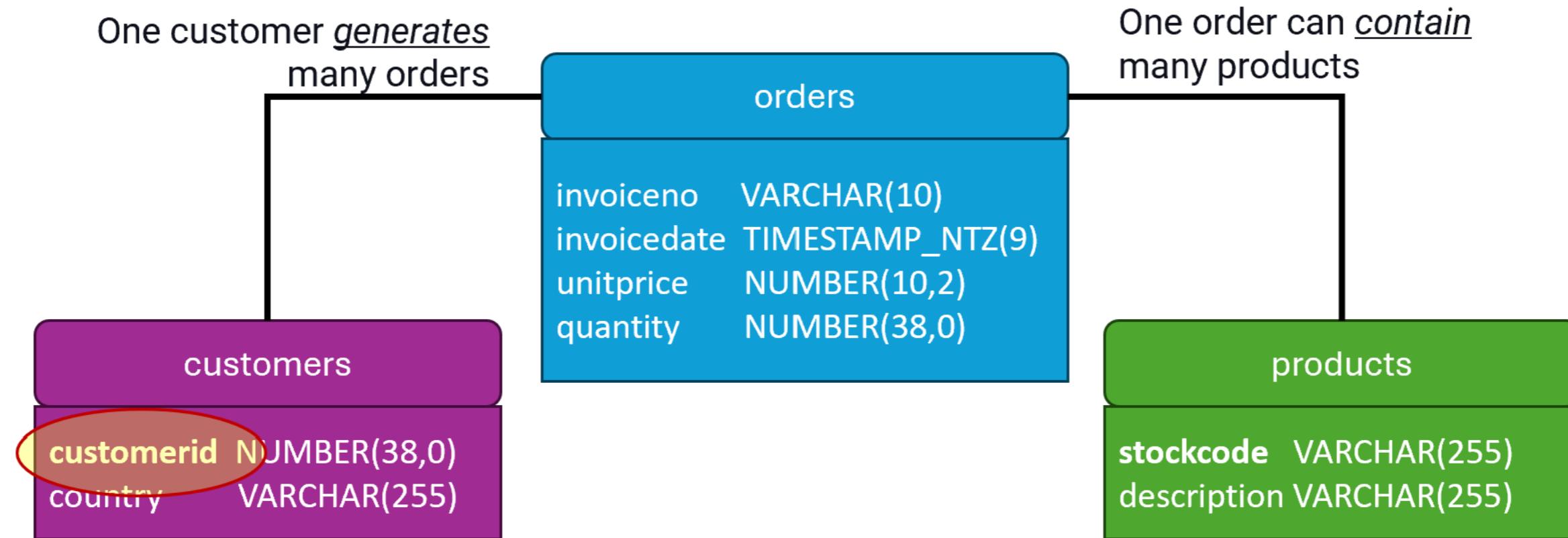


The physical model's details (1)



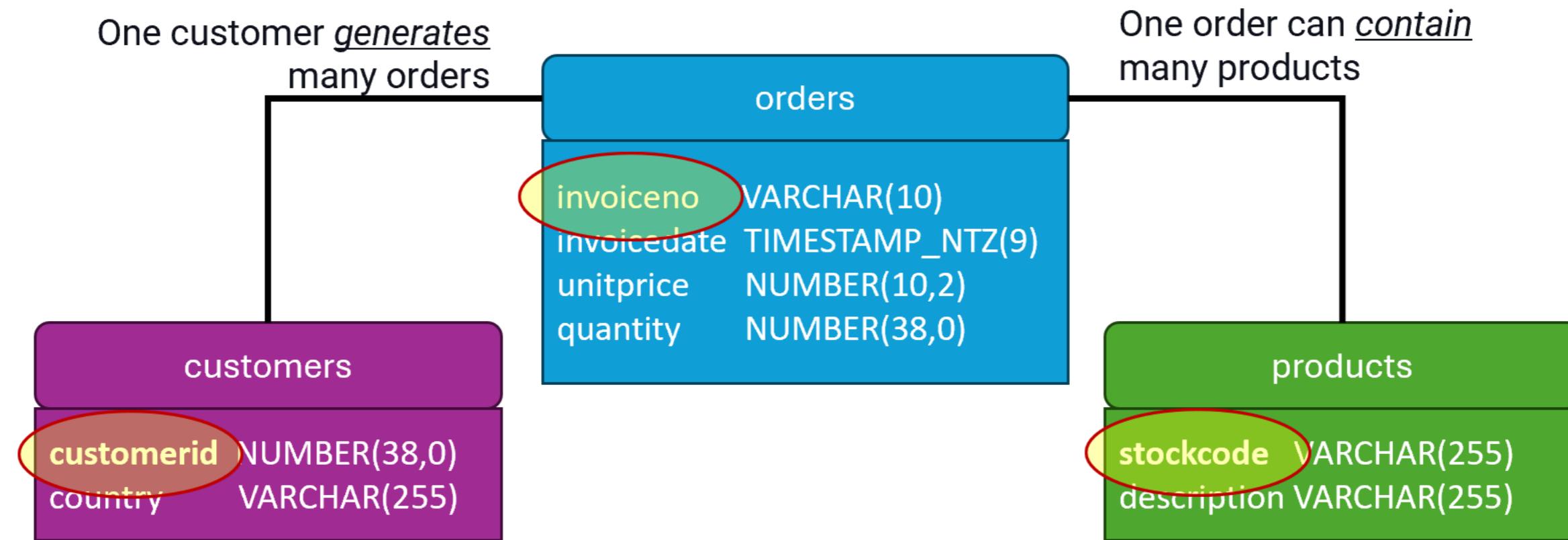
Establishing primary keys

Primary key (PK): Ensures every record in a table has a unique identifier



Establishing primary keys (1)

Primary key (PK): Ensures every record in a table has a unique identifier



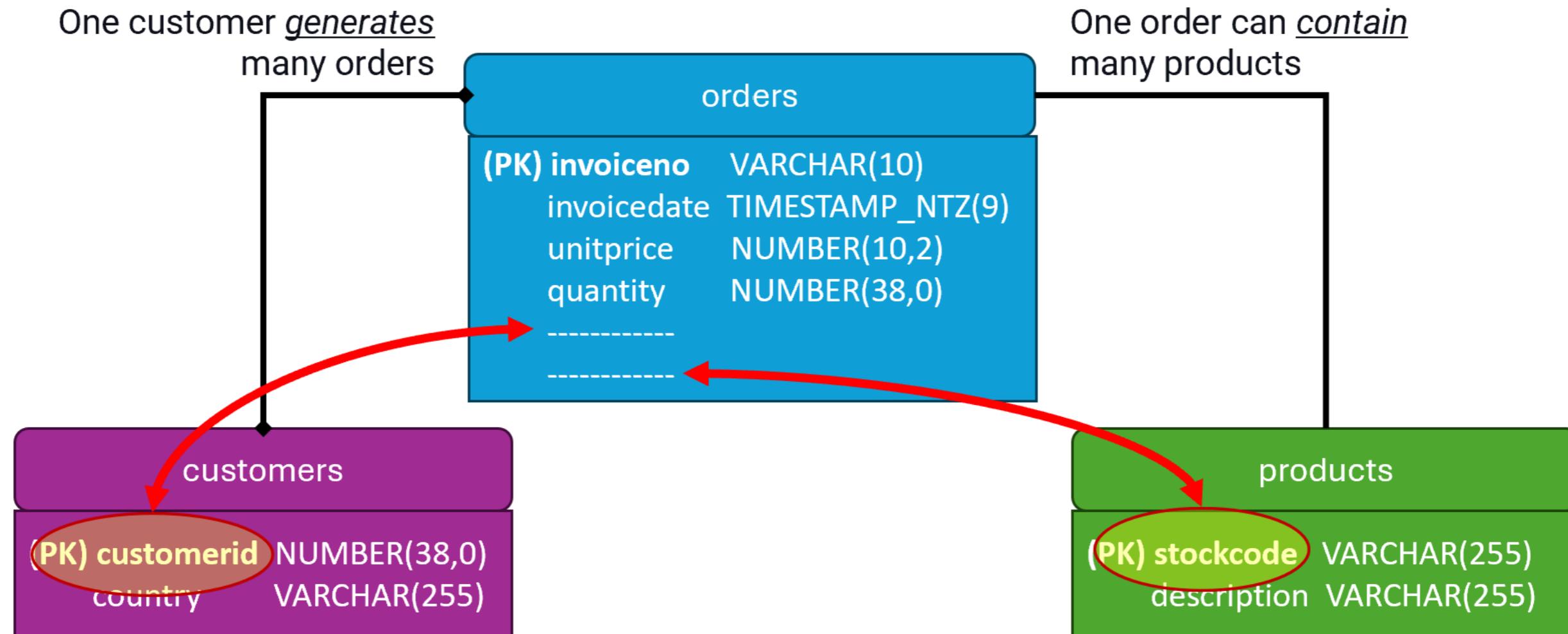
Creating Primary Keys

PRIMARY KEY : SQL clause to define a column as the unique identifier

```
CREATE OR REPLACE TABLE products (
    stockcode VARCHAR(255) PRIMARY KEY,
    description VARCHAR(255)
);
```

Establishing foreign keys

Foreign Key (FK): Connects records in different tables to keep the data related

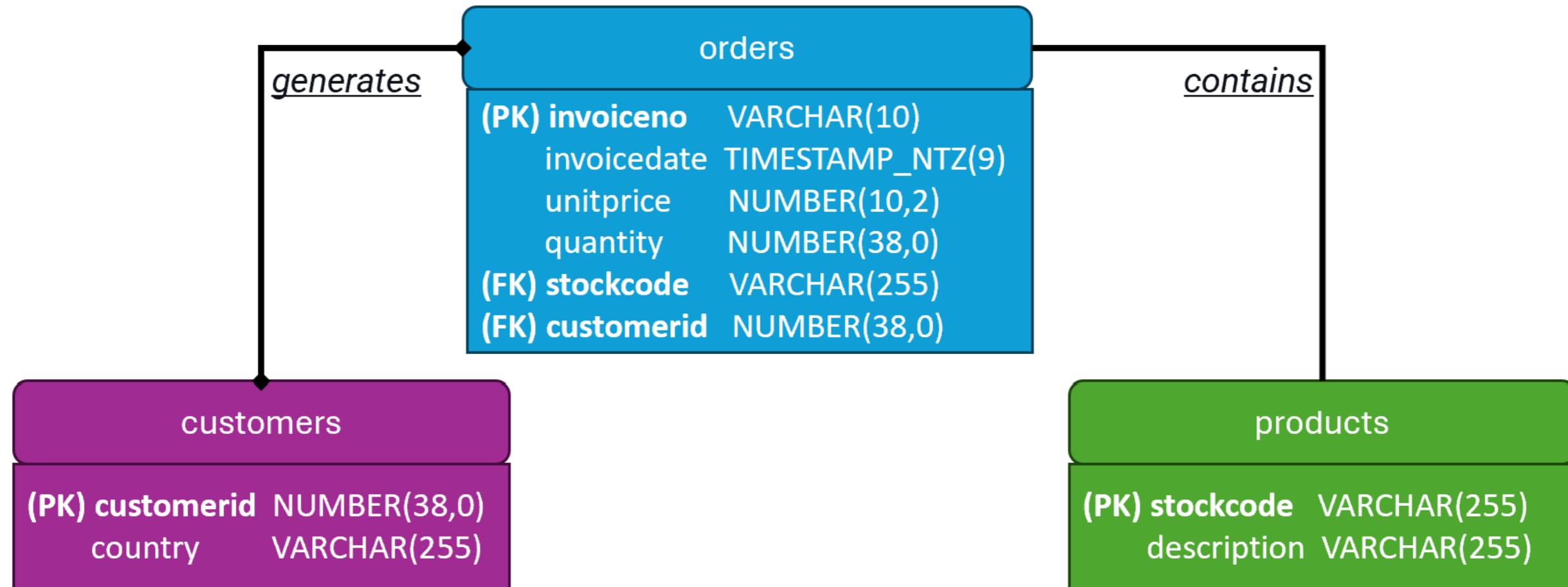


Creating foreign keys

FOREIGN KEY () REFERENCES () : SQL clause to define a column that references the primary key of another table

```
CREATE OR REPLACE TABLE orders (
    invoiceno INT,
    customerid INT,
    invoicedate DATE,
    unitprice DECIMAL(10, 2),
    quantity INT,
    stockcode VARCHAR(255),
    FOREIGN KEY (stockcode) REFERENCES products(stockcode)
);
```

Finalizing the physical data model



Terminology and functions overview

- **Physical data model:** Defines how data is stored and accessed, including table structures, data types, and primary and foreign keys
- **PRIMARY KEY :** SQL clause to define a column as the unique identifier
- **FOREIGN KEY (...) REFERENCES (...):** SQL clause to create a link between two tables

```
CREATE OR REPLACE TABLE table_name (
    unique_column column_datatype PRIMARY KEY,
    other_columns column_datatype,
    foreign_column column_datatype,
    FOREIGN KEY (foreign_column) REFERENCES foreign_table(PK_from_foreign_table)
);
```

Let's practice!

INTRODUCTION TO DATA MODELING IN SNOWFLAKE