

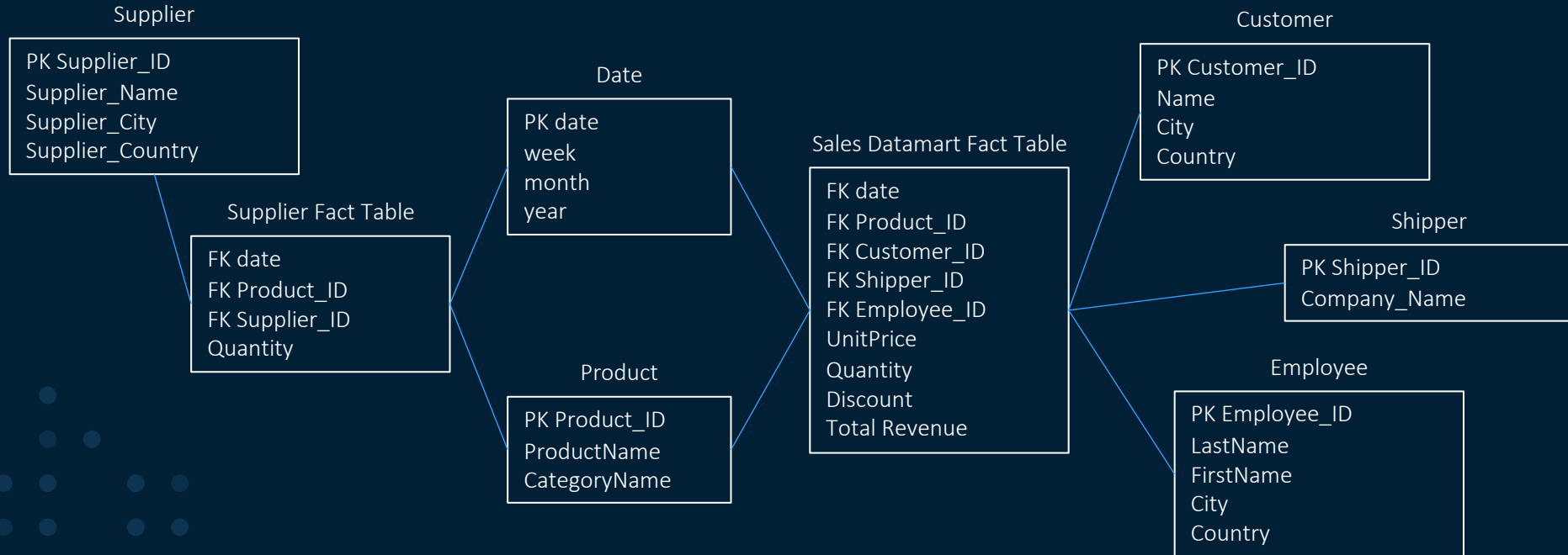


Data Warehouse Design and Queries

International Foods Logical Data Model



Data Warehouse Design



Data Warehouse Implementation

Define Tables

1) In a new SQLite database, define and create the dimension tables.
Paste screenshots of your DDL SQL statements on the following pages.

Dimension Table Definitions

Product table

Product

PK Product_ID
ProductName
CategoryName

```
1 CREATE TABLE inter_foods_data_warehouse.product (  
2     Product_ID      INT PRIMARY KEY,  
3     ProductName     VARCHAR(255),  
4     CategoryName    VARCHAR(100)  
5 );
```

<

Dimension Table Definitions

Customer table

Customer


PK Customer_ID

Name

City

Country

```
1 CREATE TABLE inter_foods_data_warehouse.customer (  
2     Customer_ID    VARCHAR(50) PRIMARY KEY,  
3     Name           VARCHAR (255),  
4     City           VARCHAR (150) ,  
5     Country        VARCHAR (150)  
6 );
```

inter_foo	Table name: customer		<input type="checkbox"/> WITHOUT ROWID							
	Name	Data type	Primary Key	Foreign Key	Unique	Check	Not NULL	Collate	Generated	
1	Customer_ID	VARCHAR (50)								NULL
2	Name	VARCHAR (255)								NULL
3	City	VARCHAR (150)								NULL
4	Country	VARCHAR (150)								NULL


Dimension Table Definitions

Shipper table

Shipper

PK Shipper_ID
Company_Name

```
inter_foo
1 CREATE TABLE inter_foods_data_warehouse.shipper(
2     Shipper_ID INT PRIMARY KEY,
3     Company_Name VARCHAR (150)
4 );
```

inter_foo										
Table name: shipper										
<input type="checkbox"/> WITHOUT ROWID										
	Name	Data type	Primary Key	Foreign Key	Unique	Check	Not NULL	Collate	Generated	
1	Shipper_ID	INT								NULL
2	Company_Name	VARCHAR (150)								NULL


Dimension Table Definitions

Employee

PK Employee_ID
LastName
FirstName
City
Country

Employee table

```
1 CREATE TABLE inter_foods_data_warehouse.employee (  
2     Employee_ID INT PRIMARY KEY,  
3     LastName VARCHAR(255),  
4     FirstName VARCHAR(255),  
5     City VARCHAR(150),  
6     Country VARCHAR(150)  
7 );|
```

inter_foo: Table name: employee <input type="checkbox"/> WITHOUT ROWID										
	Name	Data type	Primary Key	Foreign Key	Unique	Check	Not NULL	Collate	Generated	
1	Employee_ID	INT								NULL
2	LastName	VARCHAR ...								NULL
3	FirstName	VARCHAR ...								NULL
4	City	VARCHAR ...								NULL
5	Country	VARCHAR ...								NULL

Supplier Fact Table

```
1 CREATE TABLE inter_foods_data_warehouse.supplier_fact (
2     date            VARCHAR(12),
3     Product_ID      INT ,
4     Supplier_ID      INT ,
5     Quantity         INT
6
7 );
```

[illegible]

Fact Table Definitions

Sales Datamart Fact Table

```
1 CREATE TABLE inter_foods_data_warehouse.sales_datamart_fact(  
2     date                VARCHAR (12),  
3     Product_ID          INT ,  
4     Customer_ID         VARCHAR (255),  
5     Shipper_ID          INT,  
6     Employee_ID         INT,  
7     UnitPrice           DECIMAL,  
8     Quantity            INT,  
9     Discount            DOUBLE,  
10    Total_revenue       DECIMAL  
11 );  
12
```

inter_foo

Table name: sales_datamart_fact

☐ WITHOUT ROWID

	Name	Data type	Primary Key	Foreign Key	Unique	Check	Not NULL	Collate	Generated	
1	date	VARCHAR (12)								NULL
2	Product_ID	INT								NULL
3	Customer_ID	VARCHAR (255)								NULL
4	Shipper_ID	INT								NULL
5	Employee_ID	INT								NULL
6	UnitPrice	DECIMAL								NULL
7	Quantity	INT								NULL
8	Discount	DOUBLE								NULL
9	Total_revenue	DECIMAL								NULL

Data Warehouse Implementation

2) Write INSERT INTO SQL commands to populate the tables in your data warehouse. Paste screenshots of your SQL statements and resulting table contents onto the following page (one page per table)

2A) Data Warehouse Implementation

Date Dimension

```
1 INSERT INTO inter_foods_data_warehouse.date(  
2     date,  
3     week,  
4     month,  
5     year  
6 )  
7     SELECT DISTINCT date(OrderDate),  
8                     strftime('%W', OrderDate),  
9                     strftime('%m', OrderDate),  
10                    strftime('%Y', OrderDate)  
11 FROM International_Foods.Orders
```

	date	week	month	year	
1	2012-07-04	27	7	2012	
2	2012-07-05	27	7	2012	
3	2012-07-08	27	7	2012	
4	2012-07-09	28	7	2012	
5	2012-07-10	28	7	2012	
6	2012-07-11	28	7	2012	
7	2012-07-12	28	7	2012	
8	2012-07-15	28	7	2012	
9	2012-07-16	29	7	2012	
10	2012-07-17	29	7	2012	
11	2012-07-18	29	7	2012	

2B) Data Warehouse Implementation

Supplier Dimension

```
1 INSERT INTO inter_foods_data_warehouse.supplier(  
2     Supplier_ID,  
3     Supplier_Name,  
4     Supplier_City,  
5     Supplier_Country  
6 )  
7     SELECT Id,  
8     CompanyName,  
9     City,  
10    Country  
11 FROM International_Foods.Supplier
```

Filter data					
Total rows loaded: 29					
	Supplier_ID	Supplier_Name	Supplier_City	Supplier_Country	
1	1	Exotic Liquids	London	UK	
2	2	New Orleans Cajun Delights	New Orleans	USA	
3	3	Grandma Kelly's Homestead	Ann Arbor	USA	
4	4	Tokyo Traders	Tokyo	Japan	
5	5	Cooperativa de Quesos 'Las Cabras'	Oviedo	Spain	
6	6	Mayumi's	Osaka	Japan	
7	7	Pavlova,Ltd.	Melbourne	Australia	
8	8	Specialty Biscuits,Ltd.	Manchester	UK	
9	9	PB Knäckebröd AB	Göteborg	Sweden	
10	10	Refrescos Americanas LTDA	Sao Paulo	Brazil	
11	11	Heli Süßwaren GmbH & Co.KG	Berlin	Germany	

2C) Data Warehouse Implementation

Product Dimension

```
1 INSERT INTO inter_foods_data_warehouse.product (  
2     Product_ID,  
3     ProductName,  
4     CategoryName  
5 )  
6     SELECT p.Id,  
7           p.ProductName,  
8           c.CategoryName  
9     FROM International_Foods.Product as p  
10    LEFT JOIN  
11    International_Foods.Category as c ON p.CategoryId = c.Id
```

	Product_ID	ProductName	CategoryName	
1	1	Chai	Beverages	
2	2	Chang	Beverages	
3	3	Aniseed Syrup	Condiments	
4	4	Chef Anton's Cajun Seasoning	Condiments	
5	5	Chef Anton's Gumbo Mix	Condiments	
6	6	Grandma's Boysenberry Spread	Condiments	
7	7	Uncle Bob's Organic Dried Pears	Produce	
8	8	Northwoods Cranberry Sauce	Condiments	
9	9	Mishi Kobe Niku	Meat/Poultry	
10	10	Ikura	Seafood	
11	11	Queso Cabrales	Dairy Products	
12	12	Queso Manchego La Pastora	Dairy Products	

2D) Data Warehouse Implementation

Customer Dimension

```
Query
1 INSERT INTO inter_foods_data_warehouse.customer (
2                                     Customer_ID,
3                                     Name,
4                                     City,
5                                     Country
6                                 )
7   SELECT Id,
8          CompanyName,
9          City,
10         Country
11 FROM International_Foods.Customer
```

	Customer_ID	Name	City	Country
1	ALFKI	Alfreds Futterkiste	Berlin	Germany
2	ANATR	Ana Trujillo Emparedados y helados	México D.F.	Mexico
3	ANTON	Antonio Moreno Taquería	México D.F.	Mexico
4	AROUT	Around the Horn	London	UK
5	BERGS	Berglunds snabbköp	Luleå	Sweden
6	BLAUS	Blauer See Delikatessen	Mannheim	Germany
7	BLONP	Blondesddsl père et fils	Strasbourg	France
8	BOLID	Bólido Comidas preparadas	Madrid	Spain
9	BONAP	Bon app	Marseille	France
10	BOTTM	Bottom-Dollar Markets	Tsawassen	Canada
11	BSBEV	B's Beverages	London	UK
12	CACTU	Cactus Comidas para llevar	Buenos Aires	Argentina

2E) Data Warehouse Implementation

Shipper Dimension

```
1 INSERT INTO inter_foods_data_warehouse.shipper(  
2                                     Shipper_ID,  
3                                     Company_Name  
4                                )  
5                                SELECT Id,  
6                                CompanyName  
7                                FROM International_Foods.Shipper
```

	Shipper_ID	Company_Name
1	1	Speedy Express
2	2	United Package
3	3	Federal Shipping

2F) Data Warehouse Implementation

Employee Dimension

```
1 INSERT INTO inter_foods_data_warehouse.employee(  
2     Employee_ID,  
3     LastName,  
4     FirstName,  
5     City,  
6     Country  
7 )  
8     SELECT Id,  
9         LastName,  
10        FirstName,  
11        City,  
12        Country  
13     FROM International_Foods.Employee  
14
```

	Employee_ID	LastName	FirstName	City	Country
1	1	Davolio	Nancy	Seattle	USA
2	2	Fuller	Andrew	Tacoma	USA
3	3	Leverling	Janet	Kirkland	USA
4	4	Peacock	Margaret	Redmond	USA
5	5	Buchanan	Steven	London	UK
6	6	Suyama	Michael	London	UK
7	7	King	Robert	London	UK
8	8	Callahan	Laura	Seattle	USA
9	9	Dodsworth	Anne	London	UK

2G) Data Warehouse Implementation

Supplier Fact Table

```
INSERT INTO inter_foods_data_warehouse.supplier_fact(  
    date,  
    Product_ID,  
    Supplier_ID,  
    Quantity  
)  
SELECT date(o.OrderDate),  
    p.Id,  
    s.Id,  
    od.Quantity  
FROM International_Foods.OrderDetail as od  
LEFT JOIN International_Foods.Product as p  
ON od.ProductId = p.Id  
LEFT JOIN International_Foods.Orders as o  
ON od.OrderId = o.Id  
LEFT JOIN International_Foods.Supplier as s  
ON p.SupplierId = s.Id;
```

	date	Product_ID	Supplier_ID	Quantity
1	2012-07-04	11	5	12
2	2012-07-04	42	20	10
3	2012-07-04	72	14	5
4	2012-07-05	14	6	9
5	2012-07-05	51	24	40
6	2012-07-08	41	19	10
7	2012-07-08	51	24	35
8	2012-07-08	65	2	15
9	2012-07-08	22	9	6
10	2012-07-08	57	26	15

2H) Data Warehouse Implementation

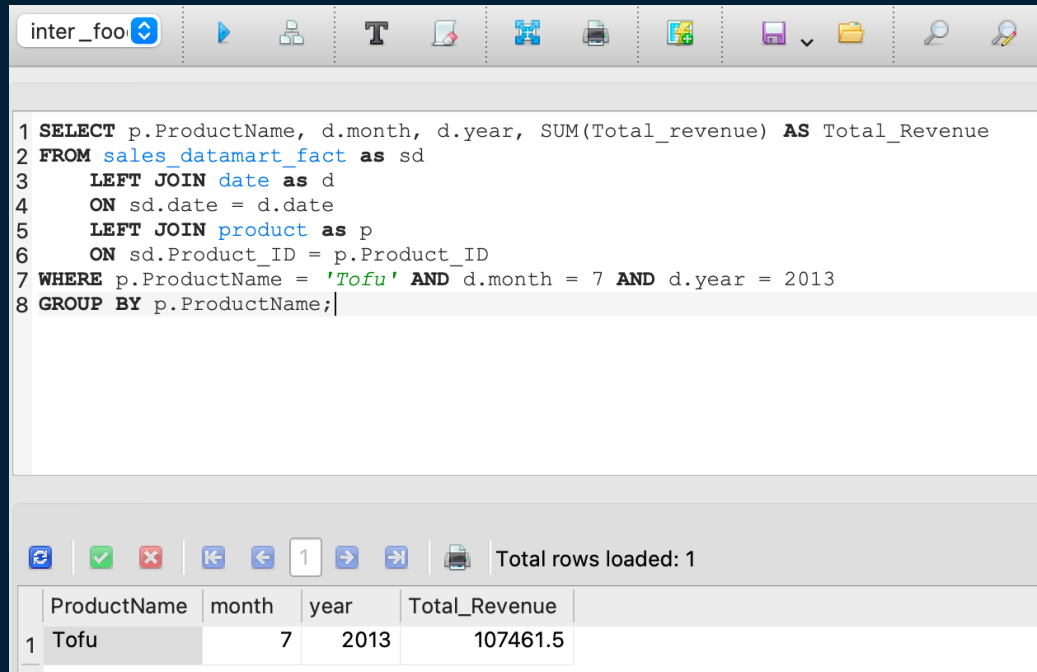
Sales Fact Table

```
INSERT INTO inter_foods_data_warehouse.sales_datamart_fact (
    date,
    Product_ID,
    Customer_ID,
    Shipper_ID,
    Employee_ID,
    UnitPrice,
    Quantity,
    Discount,
    Total_revenue
)
SELECT date(o.OrderDate),
       p.Id,
       c.Id,
       s.Id,
       e.Id,
       od.UnitPrice,
       od.Quantity,
       od.Discount,
       od.Quantity * od.UnitPrice * (1 - od.Discount)
FROM International_Foods.OrderDetail as od
LEFT JOIN International_Foods.Product as p
ON od.ProductId = p.Id
LEFT JOIN International_Foods.Orders as o
ON od.OrderId = o.Id
LEFT JOIN International_Foods.Shipper as s
ON o.ShipVia = s.Id
LEFT JOIN International_Foods.Customer as c
ON o.CustomerId = c.Id
LEFT JOIN International_Foods.Employee as e
ON o.EmployeeId = e.Id;
```

Filter data											Total rows loaded: 621883
	date	Product	Customer	Shipper	Employee	UnitPrice	Quantity	Discount	Total_revenue		
1	2012-07-04	11 VINET		3	5	14	12	0	168		
2	2012-07-04	42 VINET		3	5	9.8	10	0	98		
3	2012-07-04	72 VINET		3	5	34.8	5	0	174		
4	2012-07-05	14 TOMSP		1	6	18.6	9	0	167.4		
5	2012-07-05	51 TOMSP		1	6	42.4	40	0	1696		
6	2012-07-08	41 HANAR		2	4	7.7	10	0	77		
7	2012-07-08	51 HANAR		2	4	42.4	35	0.15	1261.3999999999999		
8	2012-07-08	65 HANAR		2	4	16.8	15	0.15	214.2		
9	2012-07-08	22 VICTE		1	3	16.8	6	0.05	95.76		
10	2012-07-08	57 VICTE		1	3	15.6	15	0.05	222.29999999999998		
11	2012-07-08	65 VICTE		1	3	16.8	30	0	336		

Data Warehouse Queries

3A) Paste below a screenshot showing your query and its results that answers the following business question: *What was the total revenue for Tofu during July, 2013?*



The screenshot shows a SQL query editor window with a toolbar at the top containing icons for running queries, saving, and other functions. The query text is as follows:

```
1 SELECT p.ProductName, d.month, d.year, SUM(Total_revenue) AS Total_Revenue
2 FROM sales_datamart_fact as sd
3     LEFT JOIN date as d
4         ON sd.date = d.date
5     LEFT JOIN product as p
6         ON sd.Product_ID = p.Product_ID
7 WHERE p.ProductName = 'Tofu' AND d.month = 7 AND d.year = 2013
8 GROUP BY p.ProductName;
```

Below the query editor, there is a status bar showing navigation icons, a line number '1', and the text 'Total rows loaded: 1'. At the bottom, a table displays the results of the query:

	ProductName	month	year	Total_Revenue
1	Tofu	7	2013	107461.5

Data Warehouse Queries

3B) Paste below a screenshot showing your query and its results that answers the following business question: What was the average sales of Ipoh Coffee by day of the week during 2014?

```
1 SELECT s.Day_of_week, AVG(s.Average_sales) AS Average_sales_w, s.ProductName
2 FROM
3 (
4 SELECT strftime('%w', d.Date) AS Day_of_week, d.Week, AVG(Total_revenue) AS Average_sales, p.ProductName
5 FROM sales_datamart_fact as sd
6     LEFT JOIN date as d
7     ON sd.date = d.date
8     LEFT JOIN product as p
9     ON sd.Product_ID = p.Product_ID
10 WHERE p.ProductName = 'Ipoh Coffee' AND d.year = 2014
11 GROUP BY Day_of_week, d.Week
12 ) AS s
13 GROUP BY s.Day_of_week
14 ;
```

Total rows loaded: 7

	Day_of_week	Average_sales_w	ProductName
1	0	1172.2922217739522	Ipoh Coffee
2	1	1133.5451007326008	Ipoh Coffee
3	2	1215.9683732933731	Ipoh Coffee
4	3	1151.7136812872657	Ipoh Coffee
5	4	1095.1044774669776	Ipoh Coffee
6	5	1190.5372962507574	Ipoh Coffee
7	6	1176.3870609782375	Ipoh Coffee