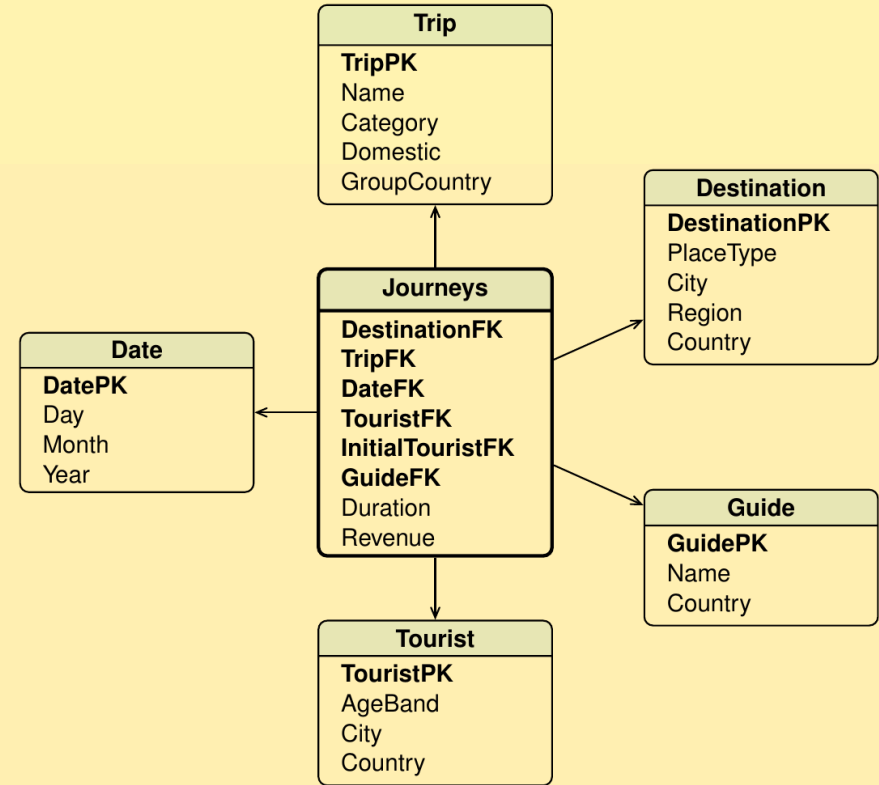


DFM SCHEMA

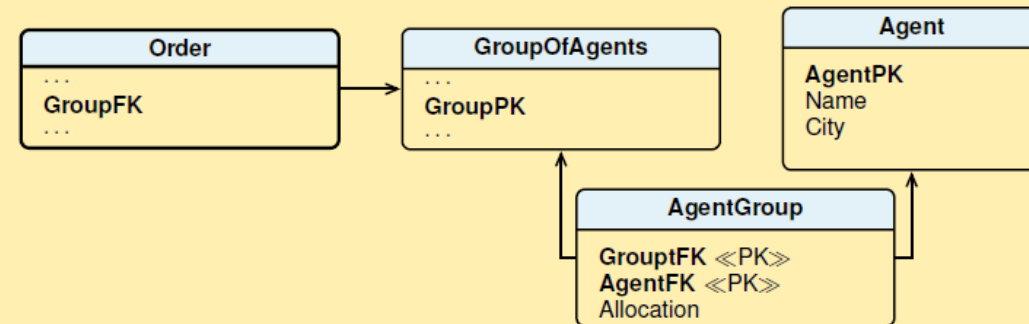
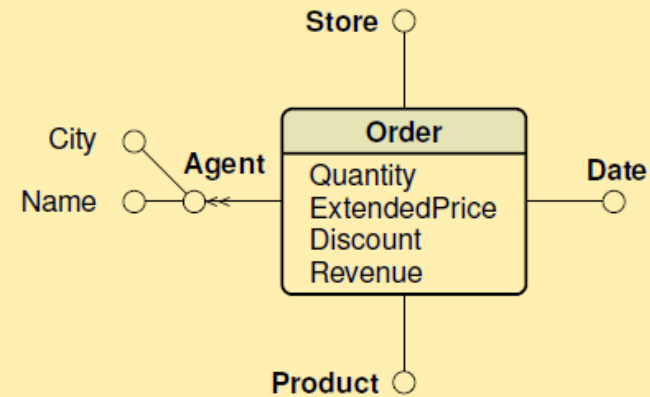


STAR SCHEMA

9. Revise design: a trip can stop at one or **more** destinations.

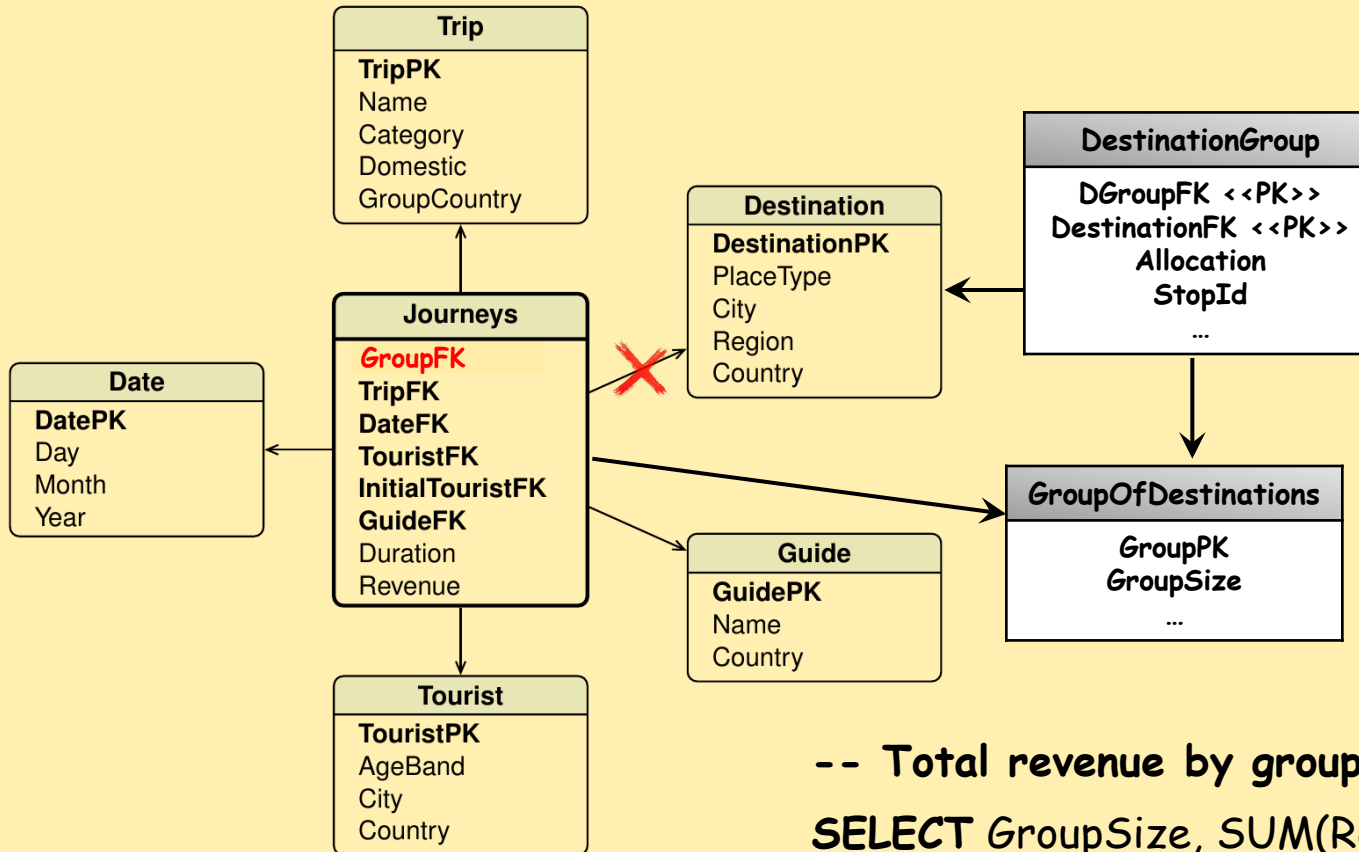
1. Total number of tourists and average trip duration for **(i.e., including)** Florence, **by** age band

4. Average trip revenue for tourists of a trip category level 1 in Tuscany, **by** type of destinations, and **by** year.



(c) A bridge table

SQL QUERIES ON (MODIFIED) STAR SCHEMA

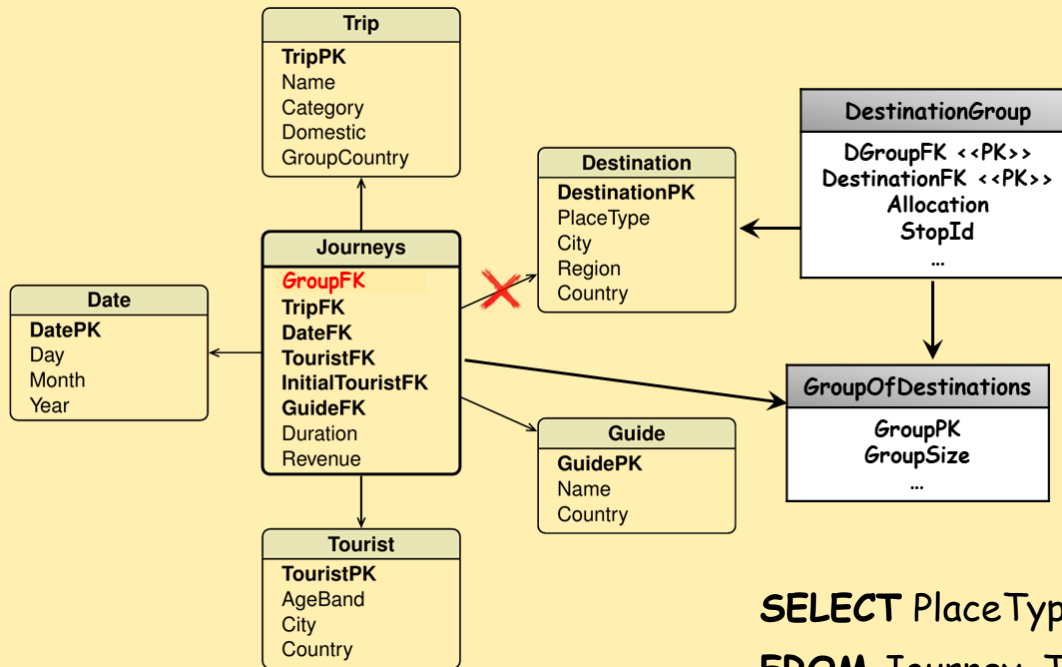


-- Total revenue by group size (number of destinations)

```

SELECT GroupSize, SUM(Revenue)
FROM Journey, GroupOfDestinations
WHERE GroupFK = GroupPK
GROUP BY GroupSize
    
```

4. Average trip revenue for tourists of a trip category level 1 in Tuscany, by type of destinations, and by year.



```

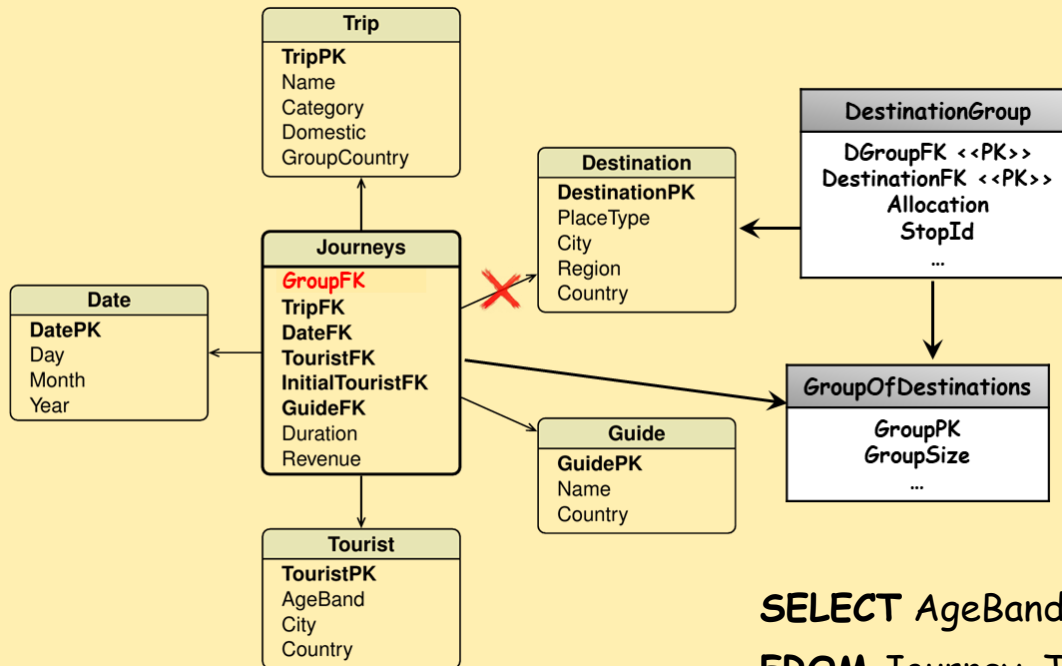
SELECT PlaceType, Year, AVG(Revenue* Allocation)
FROM Journey, Trip, Date, GroupOfDestinations,
        DestinationGroup, Destination
WHERE GroupFK = GroupPK AND DGroupFK = GroupPK AND
        DestinationFK = DestinationPK AND DateFK = DatePK AND
        TripFK = TripPK AND Category = 'level 1' AND Region = 'Tuscany'
GROUP BY PlaceType, Year
    
```

SQL QUERIES ON (MODIFIED) STAR SCHEMA



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1. Total number of tourists and average trip duration for (i.e., including) Florence, by age band



```
SELECT AgeBand, COUNT(DISTINCT InitialTouristFK), AVG(Duration)
FROM Journey, Tourist
WHERE TouristFK = TouristPK AND GroupFK IN (
    SELECT DISTINCT DGroupFK
    FROM DestinationGroup, Destination
    WHERE DestinationFK = DestinationPK AND City = 'Florence')
GROUP BY AgeBand
```

DATA WAREHOUSING FOR CRM (CUSTOMER RELATIONSHIP MANAGEMENT)



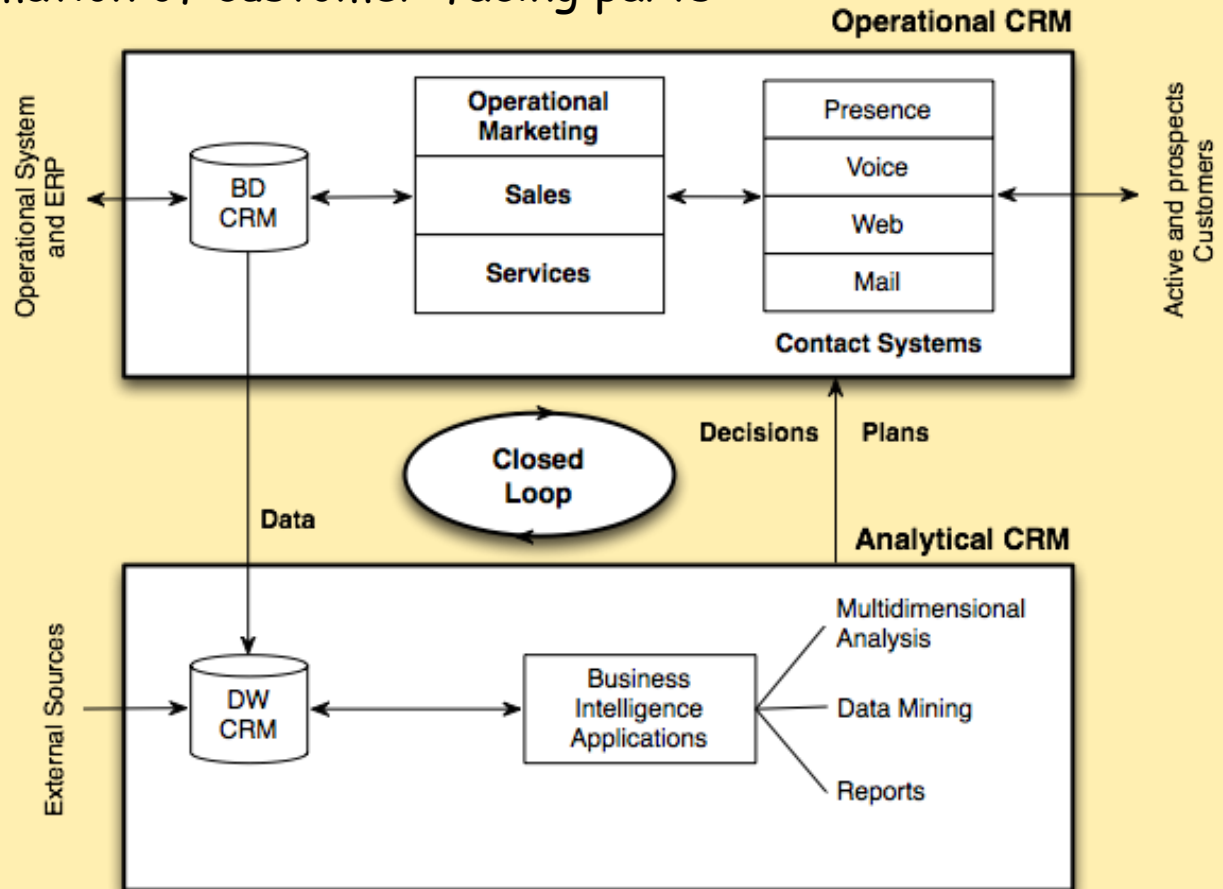
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CRM is a **business strategy** that aims at the creation and consolidation of **profitable relationships** with **specific customers** by offering superior value and satisfaction.

A starter DW model will be only presented for typical CRM analysis

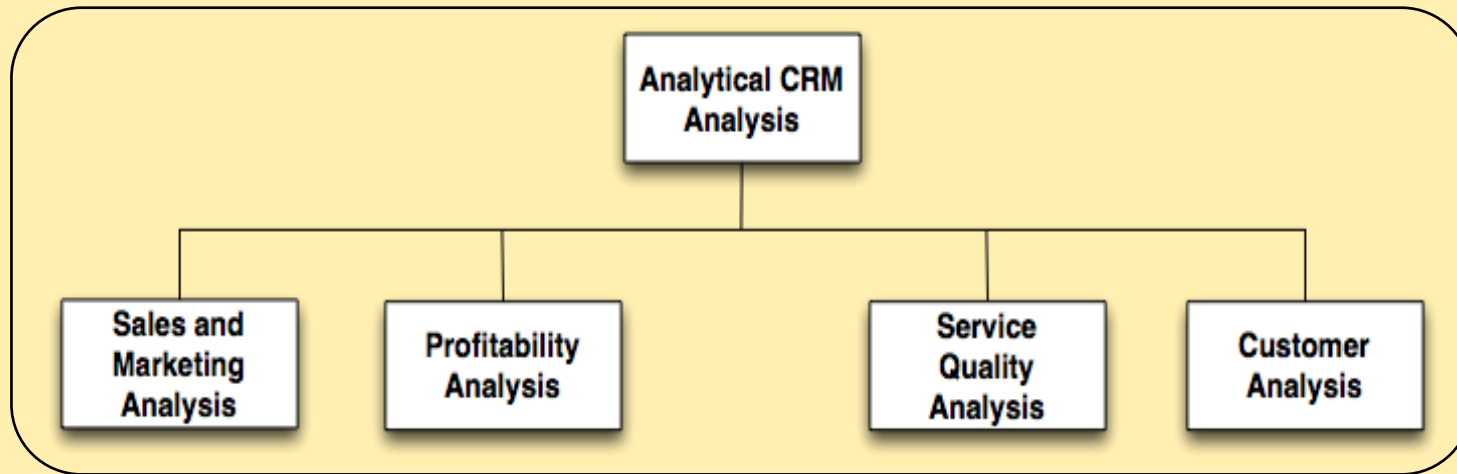
CRM FRAMEWORK: MAIN COMPONENTS

Operational CRM focus on automation of customer-facing parts:
Marketing, Sales, Services



Analytical CRM supports decision making by providing useful information extracted by the analysis of data collected by **Operational CRM**, and properly organized in a data warehouse based on the needs of decision makers.

A CRM taxonomy consists of CRM analysis categories, their business questions, and KPIs for the business questions.



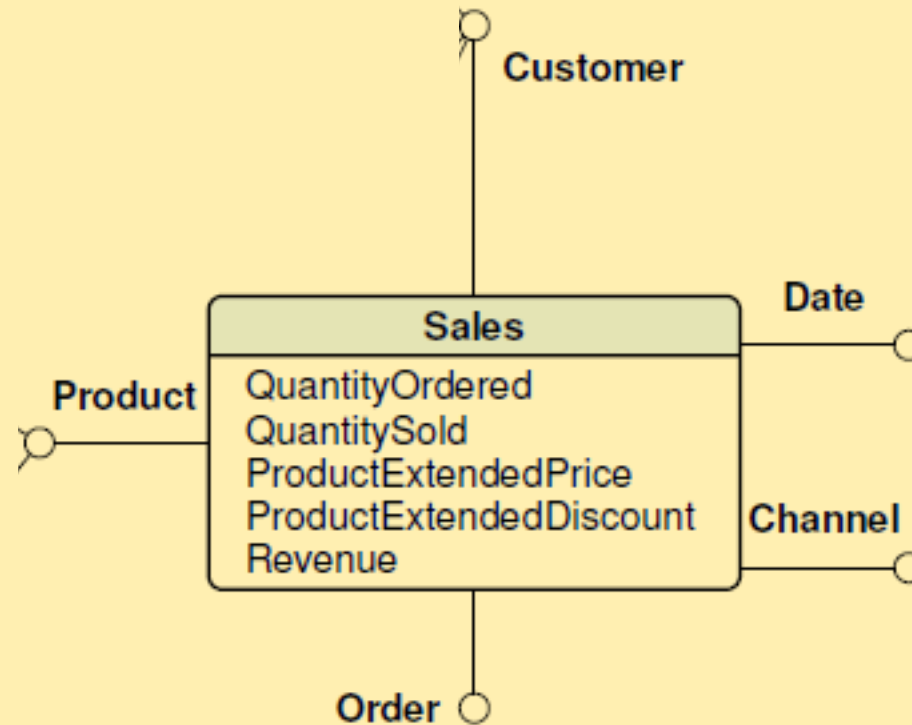
- Sales
- Market
- Channel
- Promo Campaign

- Customer
- Product
- Market
- Campaign
- Channel

- Product return
- Order fulfillment

- Customer segmentation
- Customer retention
- Customer satisfaction
- Customer attrition

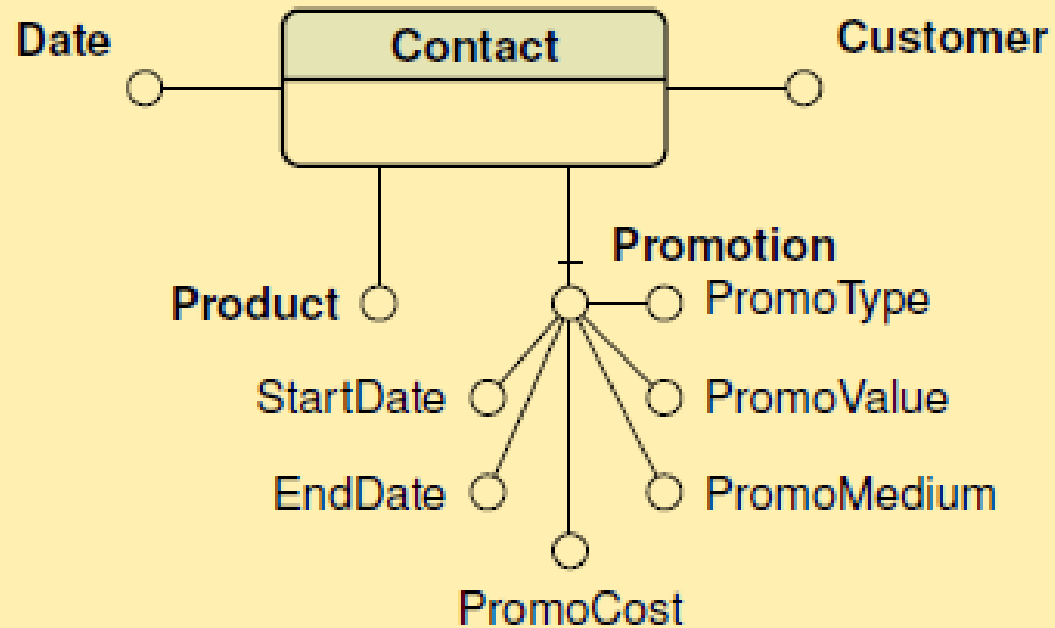
A DW FOR ANALYTICAL CRM: SALES ANALYSIS



A DW FOR ANALYTICAL CRM: MARKETING ANALYSIS



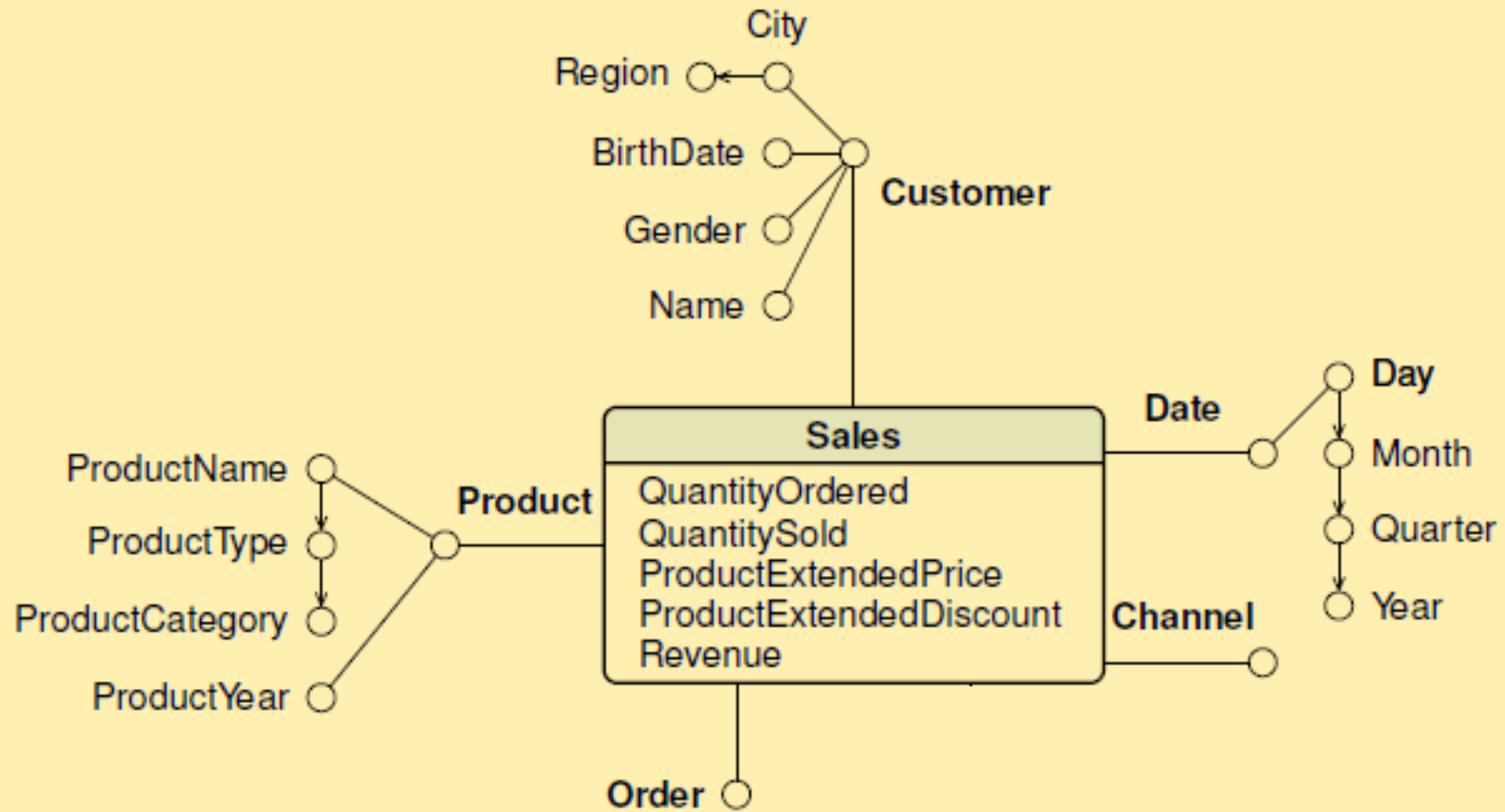
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A DW FOR ANALYTICAL CRM: SALES AND MARKETING ANALYSIS



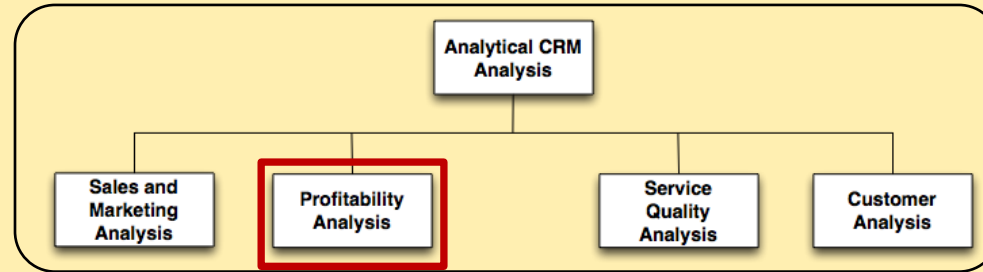
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A DW FOR ANALYTICAL CRM: PROFITABILITY ANALYSIS



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The profitability analyses deal with identifying the **best members** of business dimensions in terms of the **total margin** that exceeds some threshold.

We must consider the costs that the business associates with products.

Product cost,
Marketing cost,
Nonconformance cost.

A DW FOR ANALYTICAL CRM: PROFITABILITY ANALYSIS



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Products Profitability Year 2010

Product	Revenue (€)	Product Cost (€)	Returns Value (€)	Returns Cost (€)	Promotion Cost (€)	Total Cost (€)	Margin (€)	Margin% (%)
P1	41 093	39 000	1 650	248	4 800	44 048	-4 605	-12
P2	4 674	3 830	84	14	0	3 844	746	16
P3	240 125	181 542	4 367	888	6 200	188 630	47 128	20
...

Total Cost = Product Cost + Returns Cost + Promotion Cost

Margin = Revenue - Returns Value - Total Cost

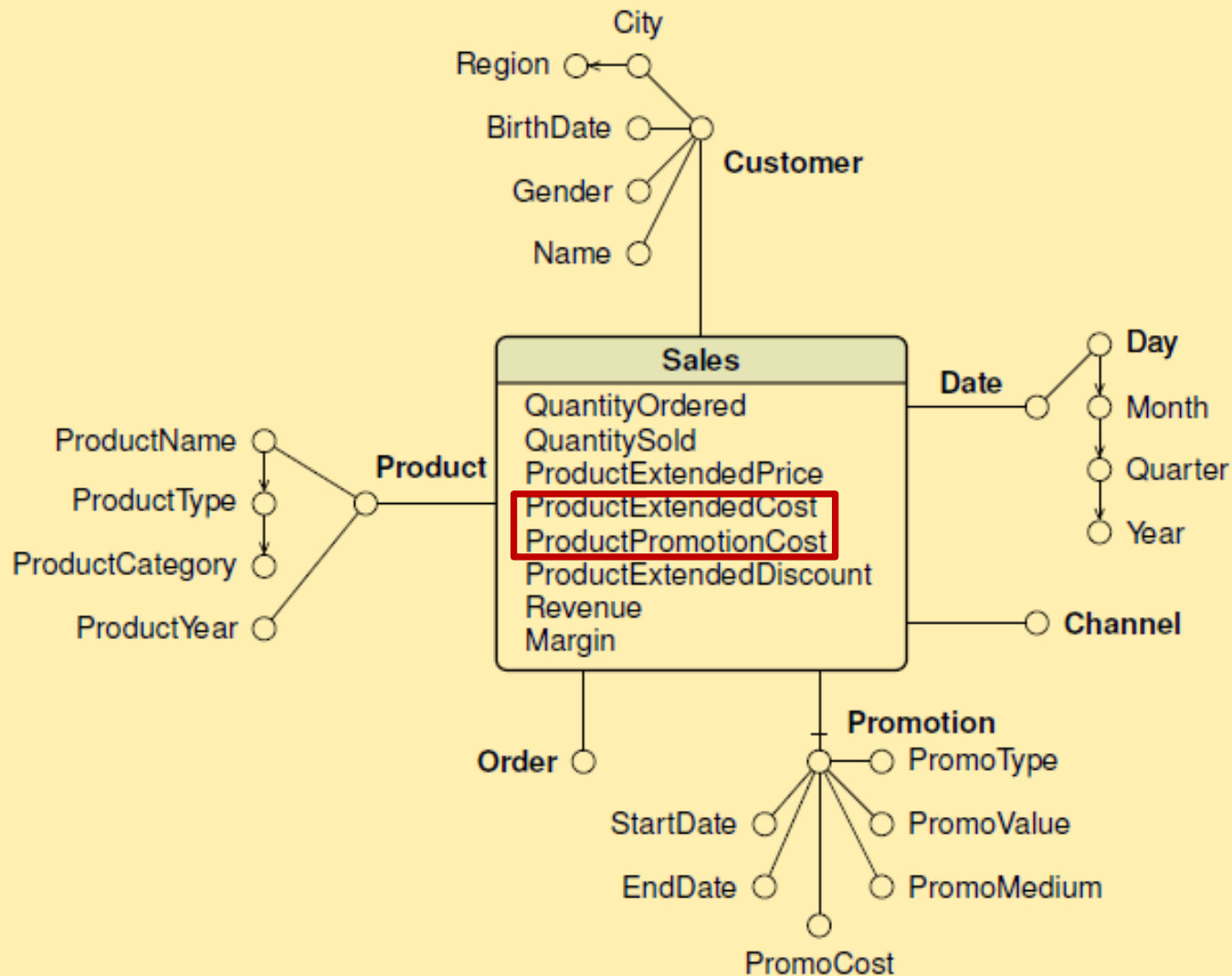
Margin % = Margin / (Revenue - Returns Value)

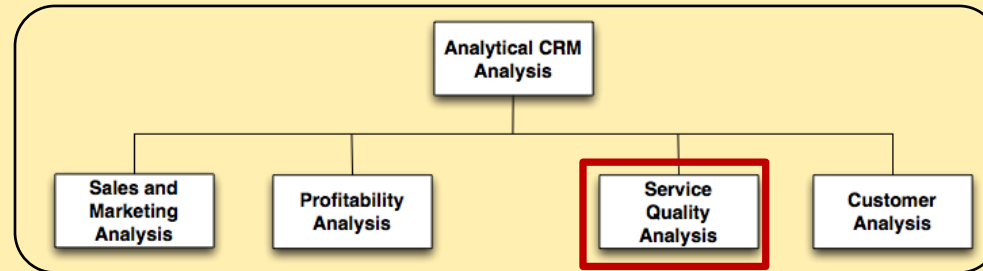
A DW FOR ANALYTICAL CRM: PROFITABILITY ANALYSIS



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Let us review the data mart design to consider also the **Promotion cost**.





The **customer service analysis** allows an organization to analyze the **conformance of a product or service** to customers expectation.

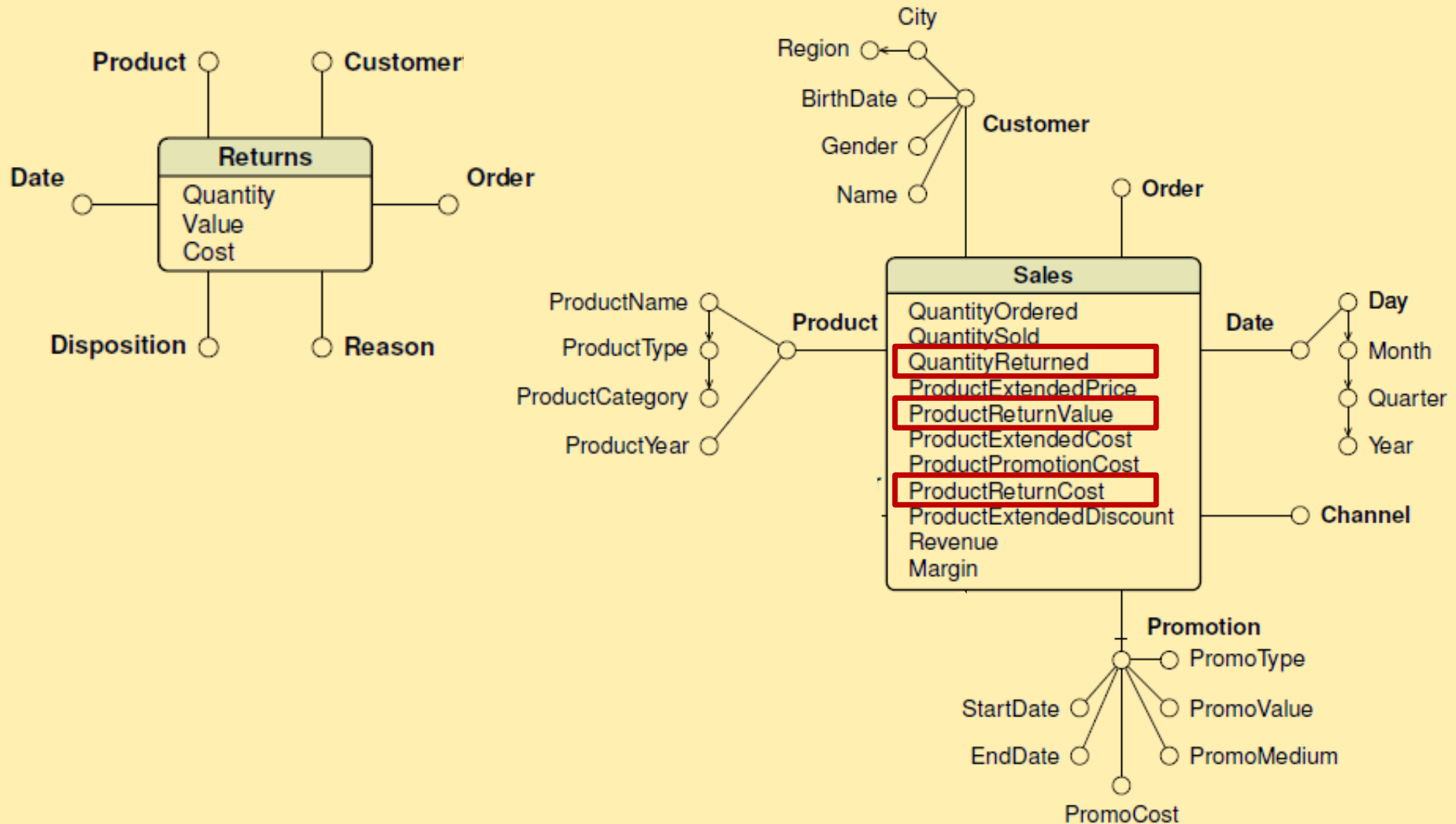
In particular, we will consider

- **product return analysis**, with returns described by **Reason** (late delivery, product other, product damaged, etc.), and by **Disposition** (replacement, credit, refund, repair)
- **product delivery performance analysis**, also known as **order fulfillment analysis**, to investigate the company's ability to deliver product and services on time.

A DW FOR ANALYTICAL CRM: RETURN ANALYSIS



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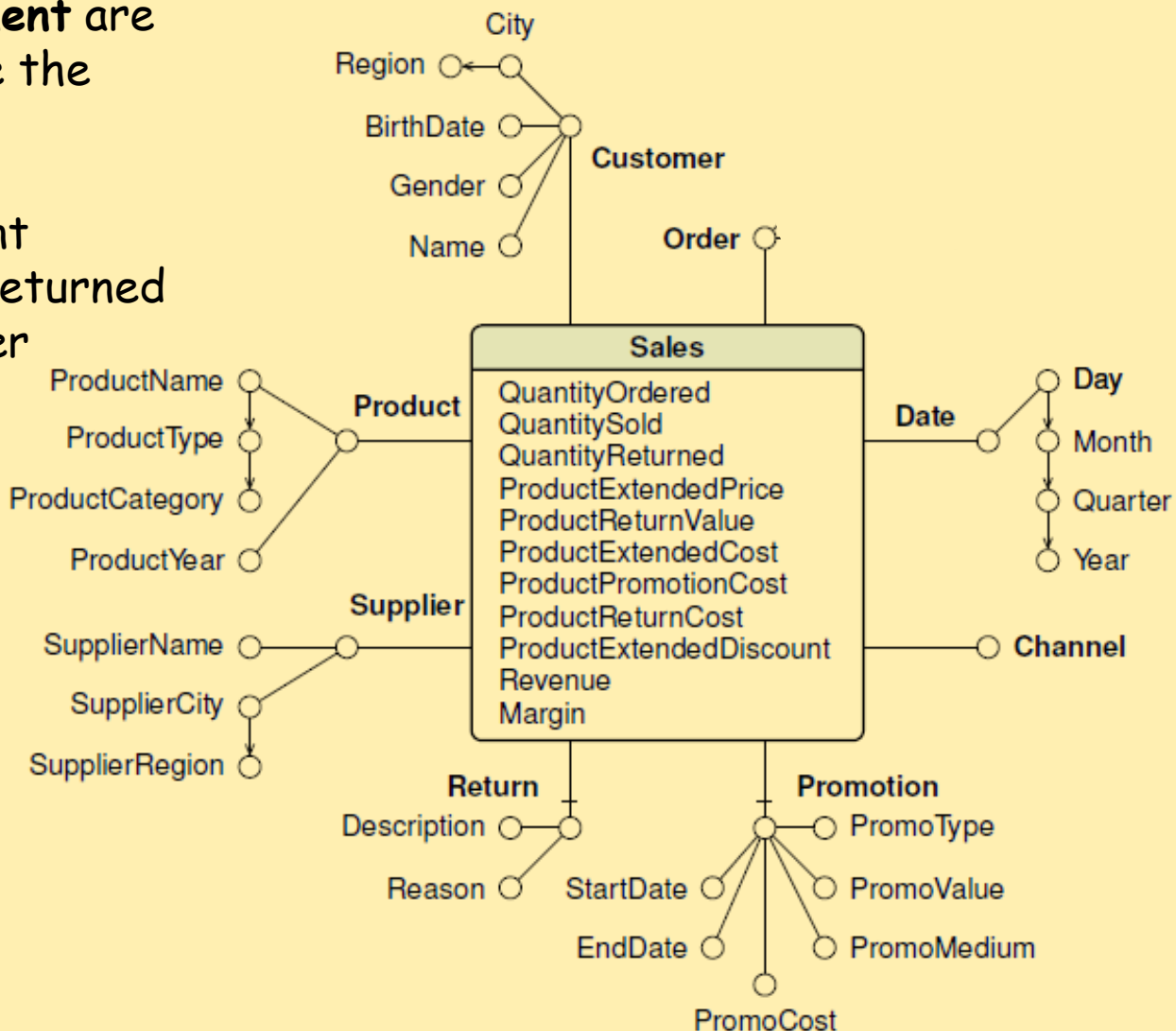
A DW FOR ANALYTICAL CRM: ORDER FULFILLMENT ANALYSIS



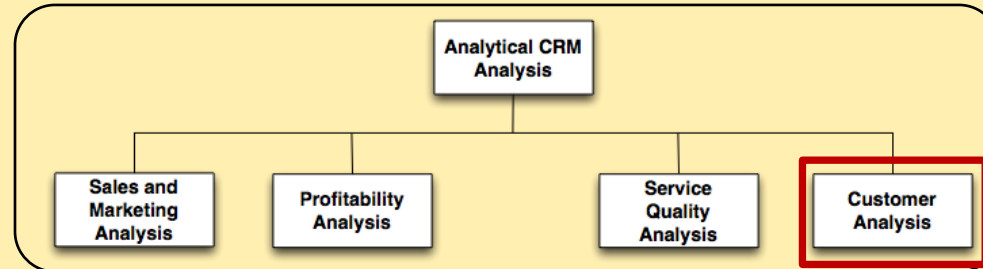
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The full and timely orders fulfillment are other important aspects to improve the competitiveness of companies.

The analysis of the order fulfillment process, as well as the analysis of returned products, can highlight any customer dissatisfaction.



Can OnTime be also a measure?



The **customer analysis** is the very important part of Analytical CRM because it provides insight into an organization's customer base, by the following fundamental analysis:

- **Customer segmentation analysis** (Demographic, Customer behavior, Customer lifetime value)
- **Customer retention analysis**
- **Customer attrition (or churn) analysis**
- **Customer satisfaction analysis**

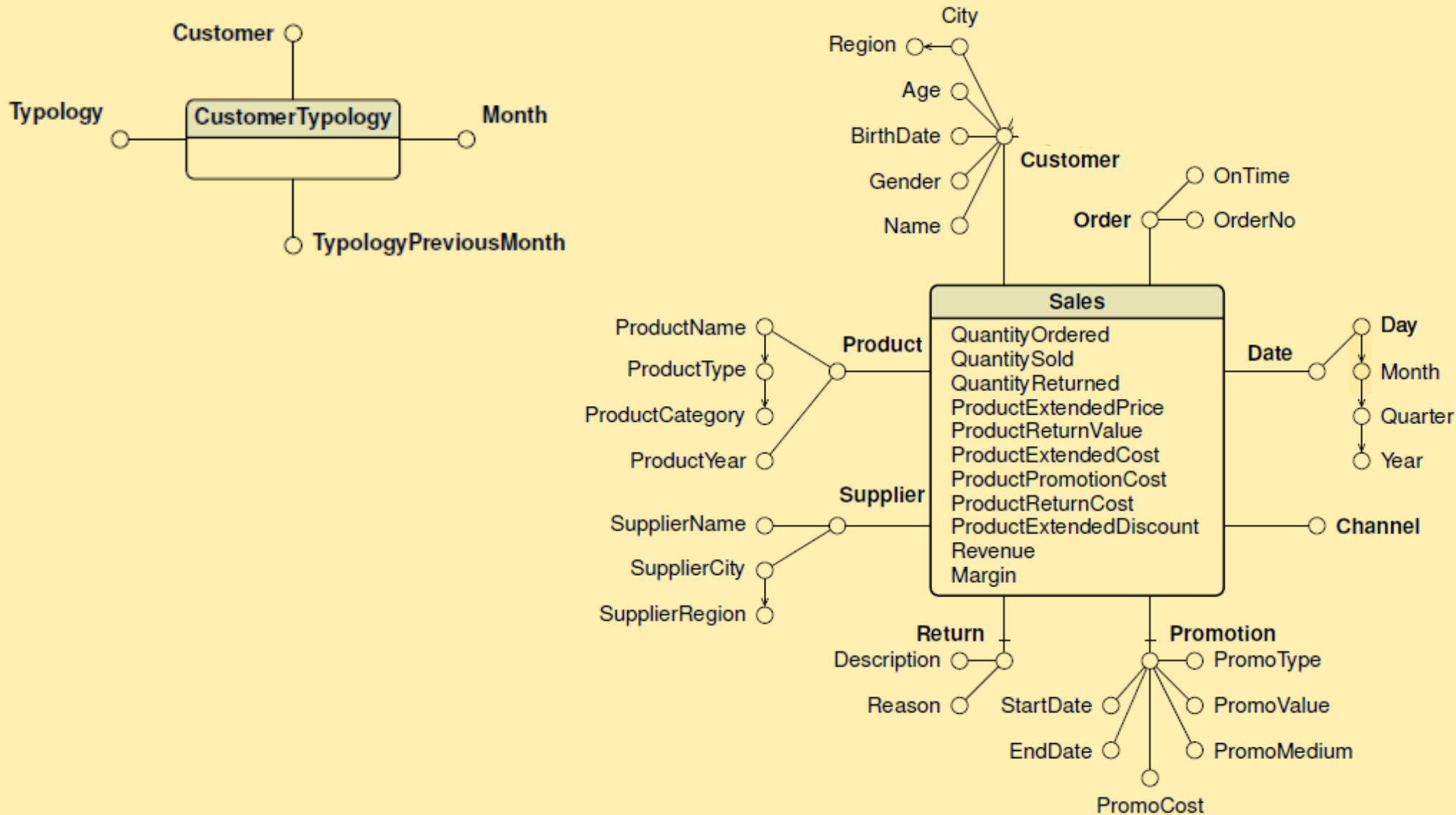
A DW FOR ANALYTICAL CRM: CUSTOMER TYPOLOGY in a given month

- New:** with at least an order last month and no order in the past.
- Constant:** with at least two orders per month for three months in the last four months.
- Occasional:** with at least one order in the last four months, but not as for typology **Constant** or **New**.
- Inactive:** with no order in the last four months, and not **Constant** in the last 12 months
- Churn risk:** with no order in the last four months after being **Constant** at least once in the last 12 months.

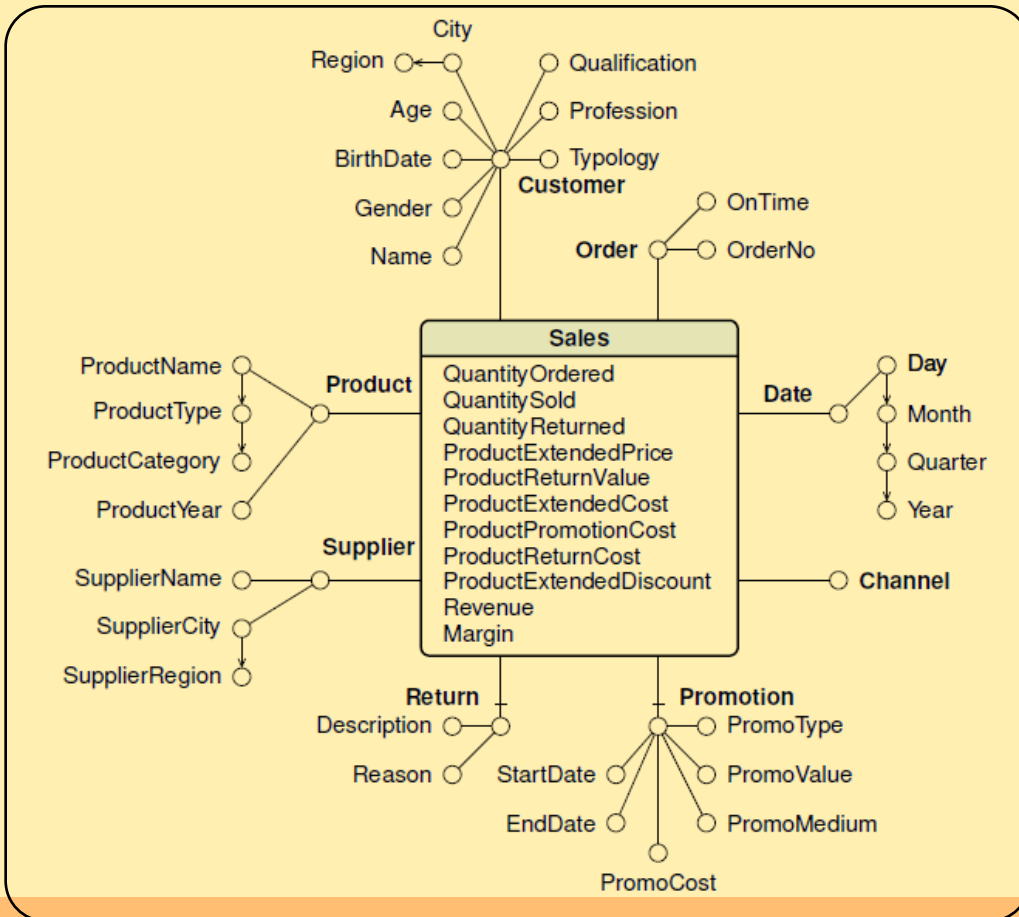
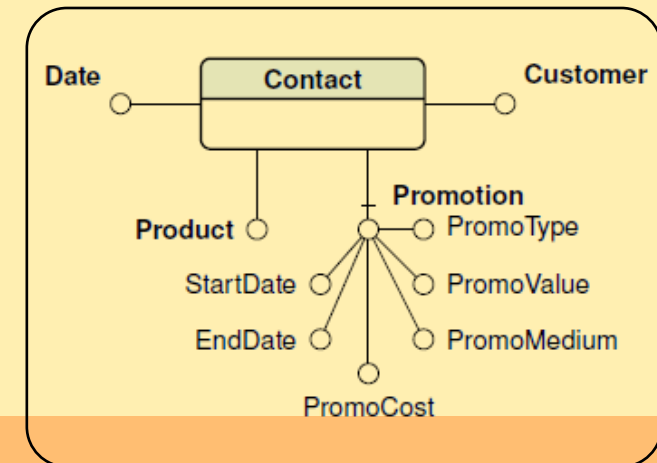
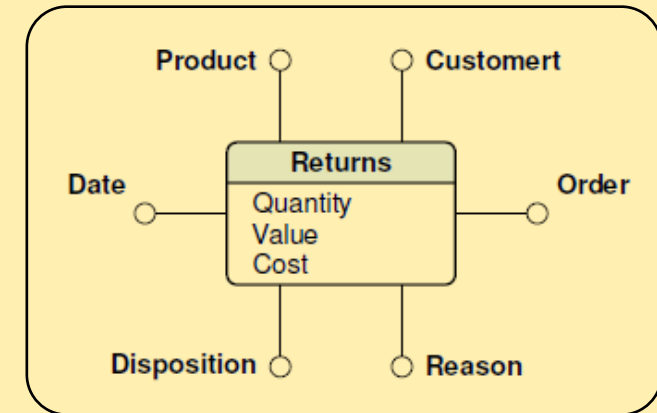
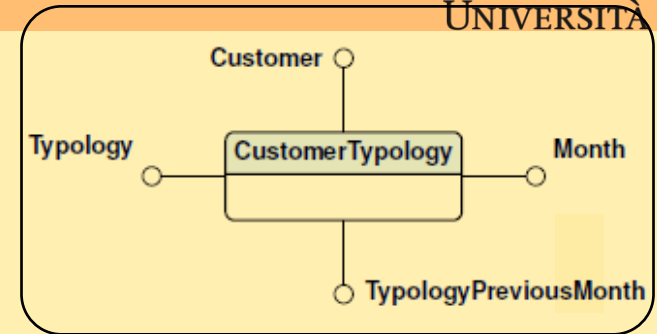
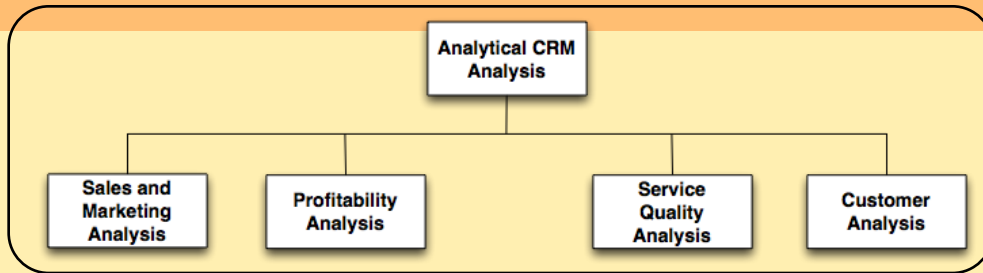
A DW FOR ANALYTICAL CRM: CUSTOMER ANALYSIS



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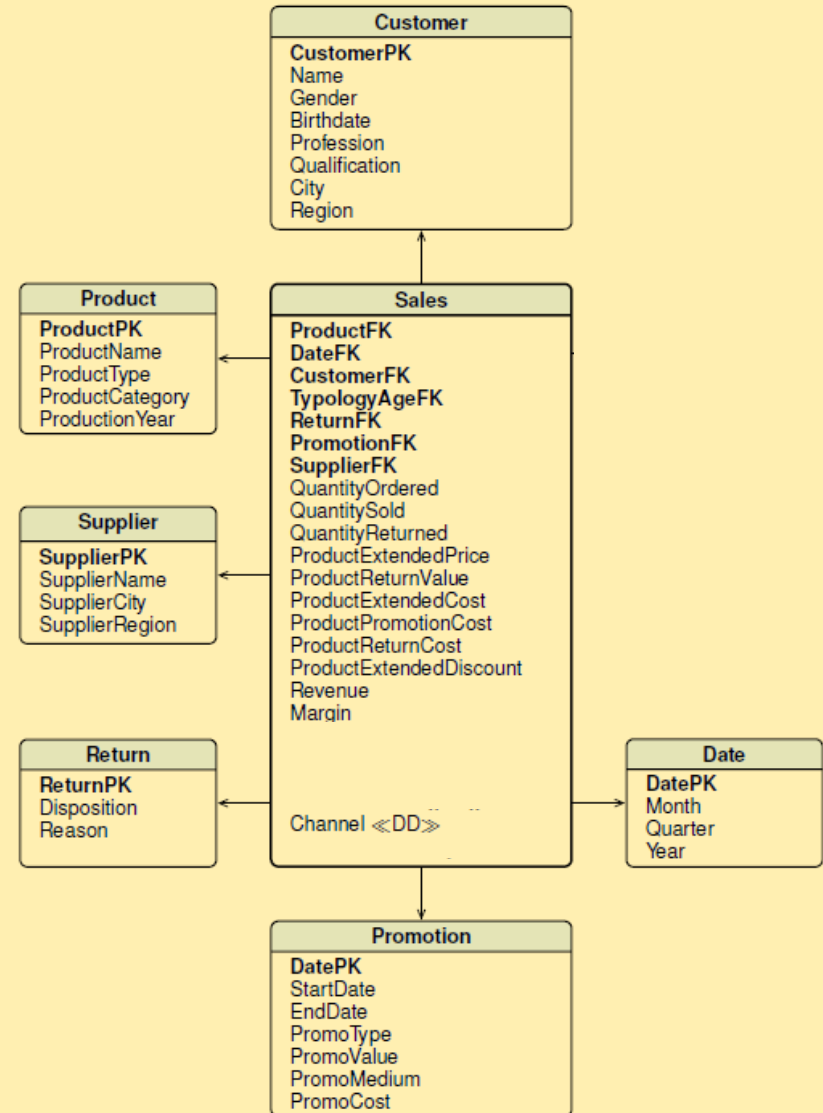
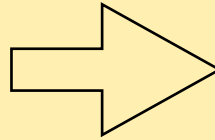
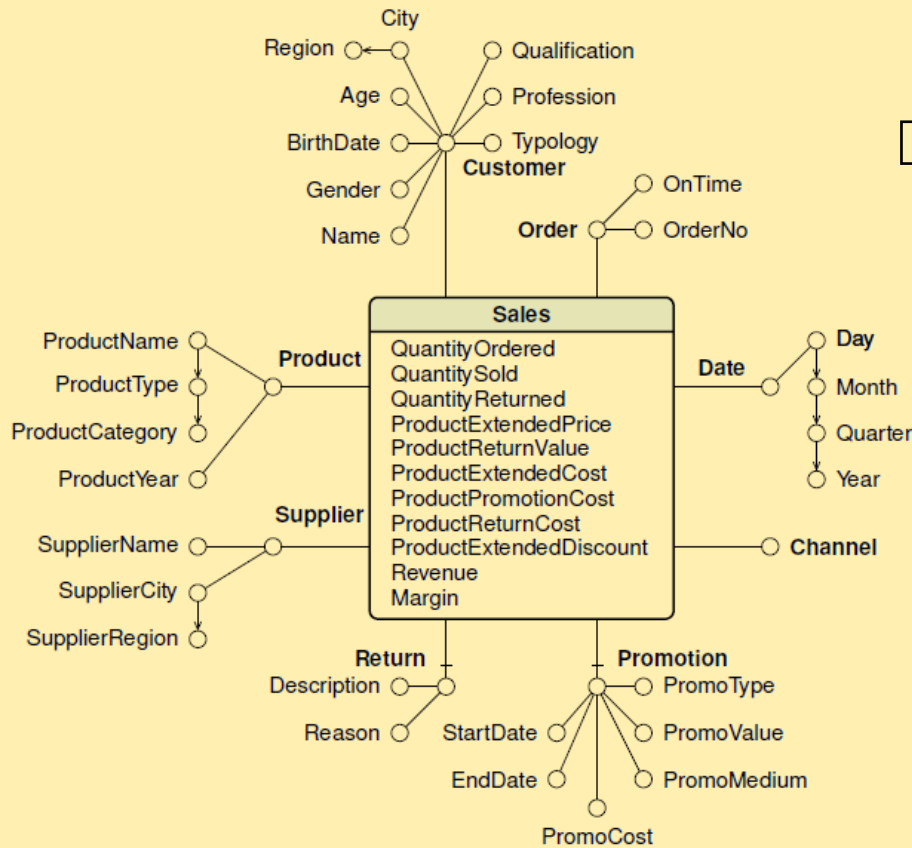
A STARTER DW FOR ANALYTICAL CRM



SALES LOGICAL SCHEMA



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Changes in Customer data.

(Type 1): Qualification, Profession.

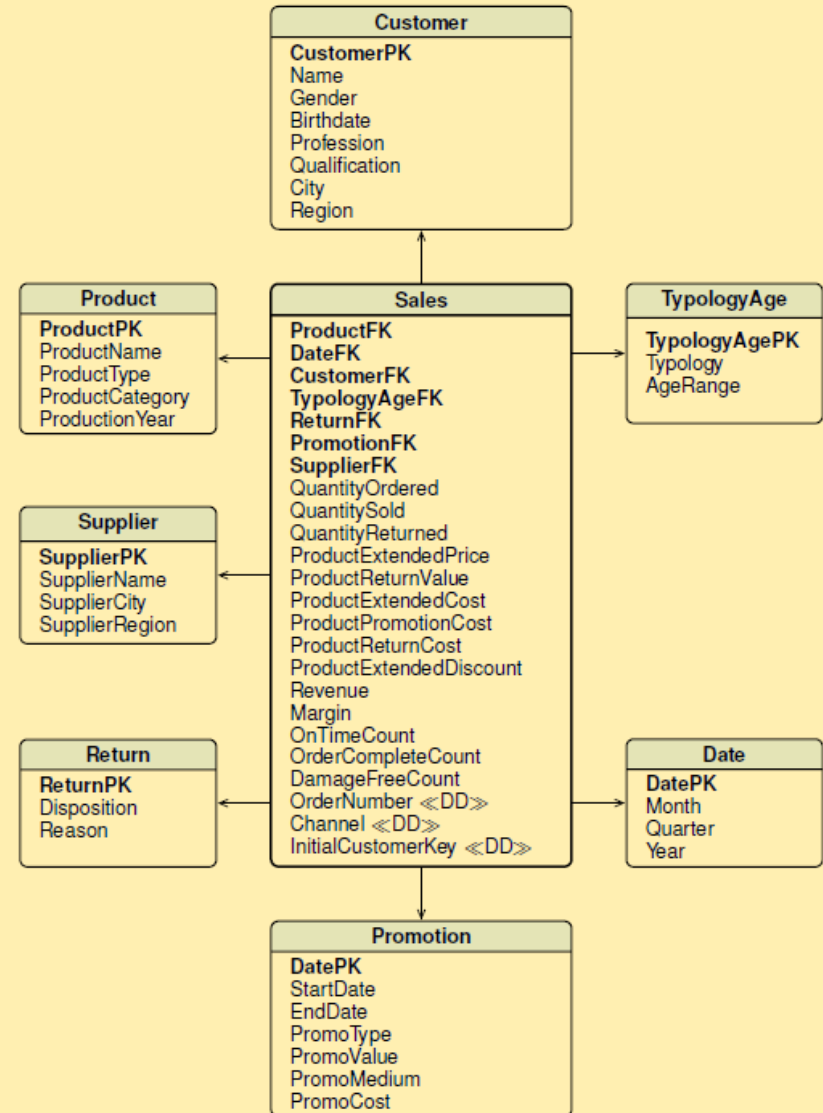
(Type 2): City, Region.

(Type 4): Age, Typology

EXERCISE

- Write a SQL query that returns all new customers (needed to assign typology 'New')
- **New:** with at least an order last month and no order in the past.

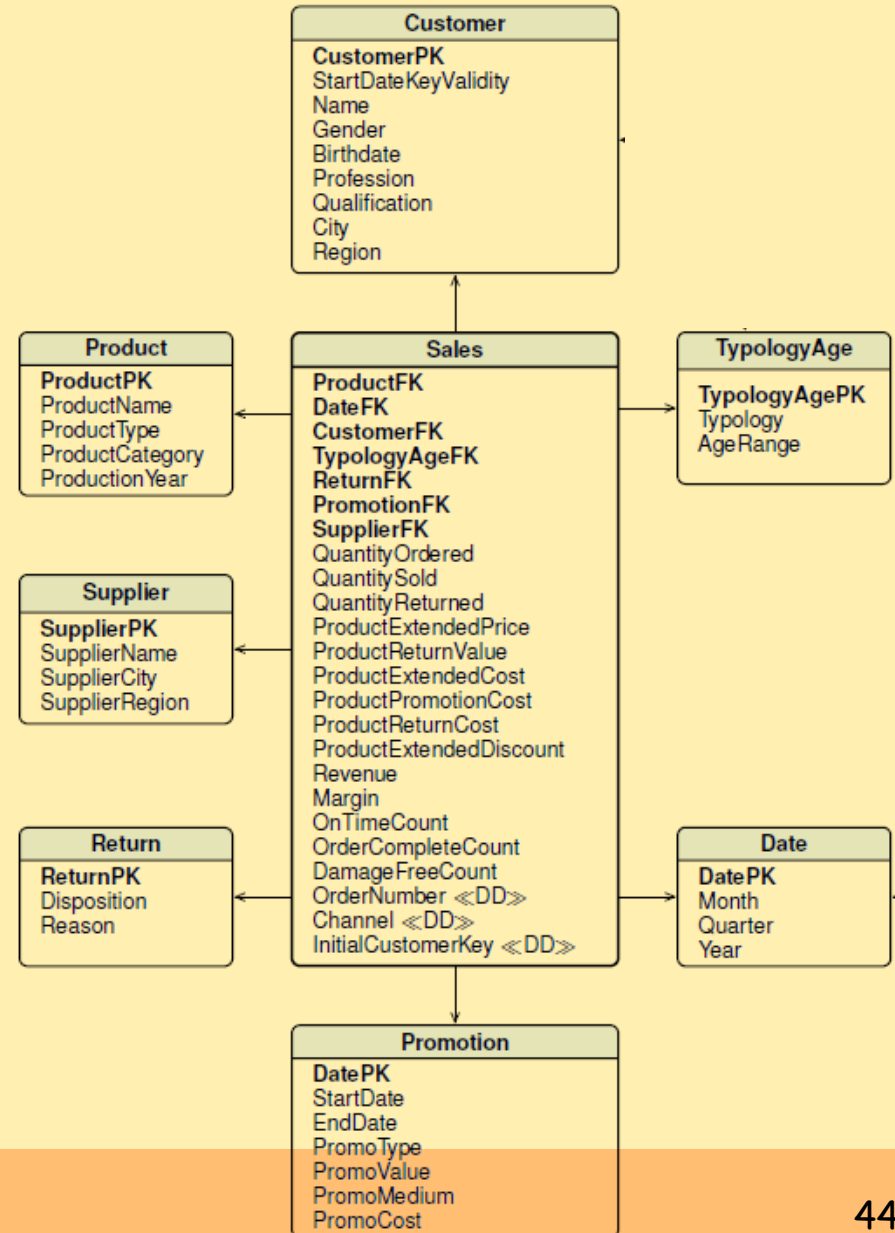
```
SELECT CustomerFK
FROM Sales, Date
WHERE DateFK = DatePK
GROUP BY CustomerFK
HAVING MIN(Month) = lastMonth
-- assuming months in the format YYYYMM
```



EXERCISE AT HOME



- Write a SQL query that returns all constant customers at last month
- **Constant:** with at least two orders per month for at least three months in the last four months.



Tools to support datawarehouse modeling

- Common case:
 - Initial DW design on paper&pencil DFM
 - Relational schema is derived and maintained
 - DFM schema remains unmaintained/undocumented 😱
- Best practice:
 - Use software tools to design, transform, and maintain
 - Enterprise Data Modeling

Tools to support datawarehouse modeling



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- INDYCO

- DFM design + Generation of SQL for creating relational schema
- License: <https://www.iconsulting.biz/indyco/educational/>



HOME

FEATURES

LISTEN & LEARN

TEAM

SUPPORT



PRICING ↕

ITALIANO

The Google Maps™
of your data

- + Navigate the Data Model
- + Understand your Data Glossary
- + Search for Data Meaning
- + Live Documentation for Your BI Front End
- + Use Different Visualizations

Make sense of your business through
conceptual modeling

- + Reverse Engineer Your Data Warehouse
- + Design the Conceptual Model
- + Validate your Design
- + Data Enrichment
- + Generate Documentation
- + Generate Scripts