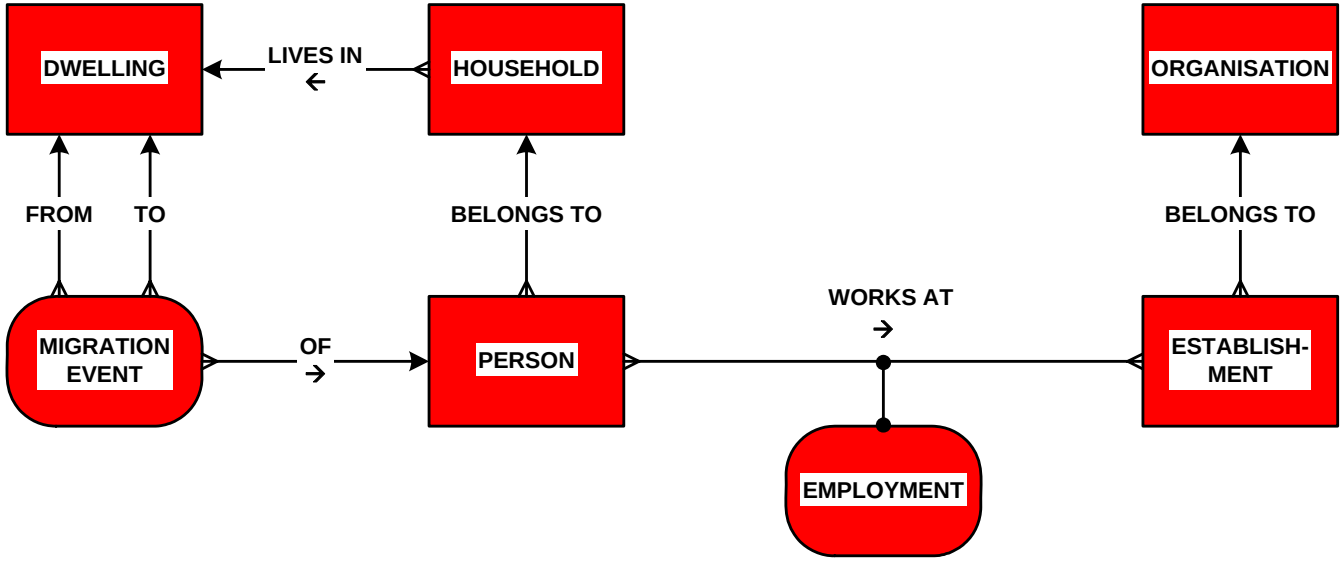
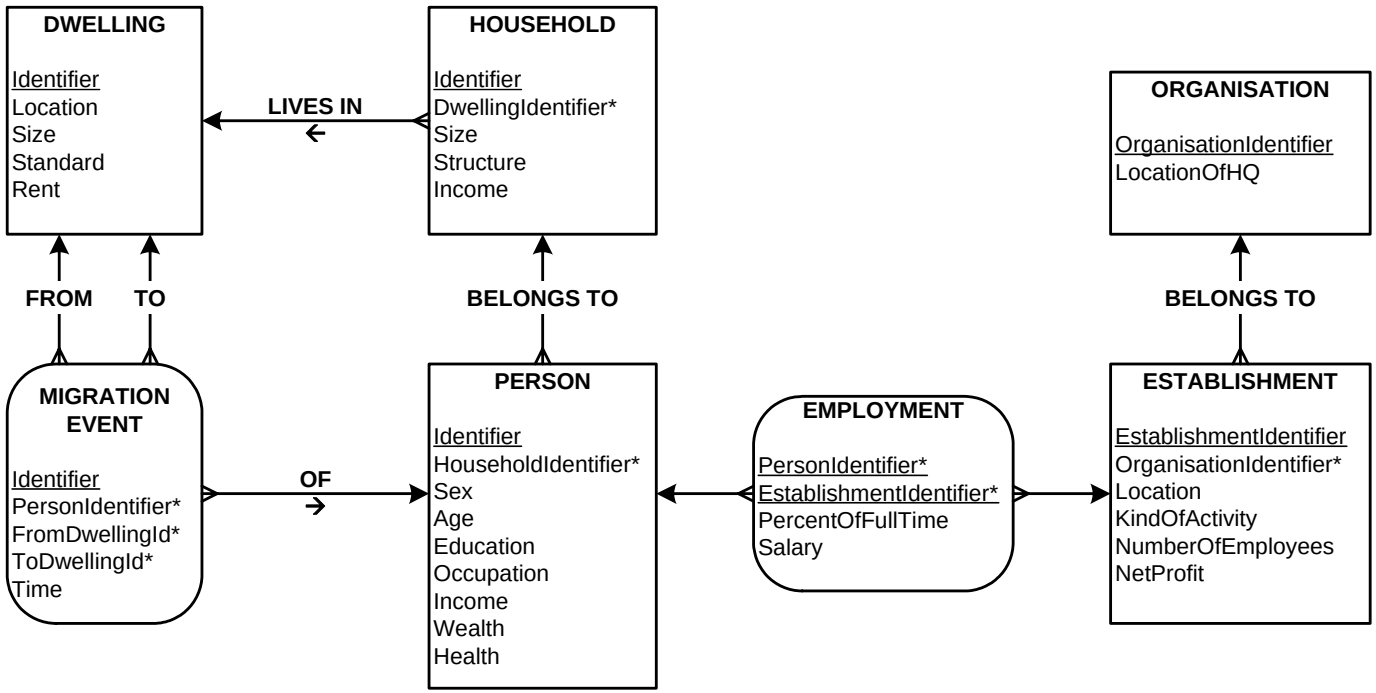
Statistical databases in theory and practice
Part II: Data models

Bo Sundgren

2010



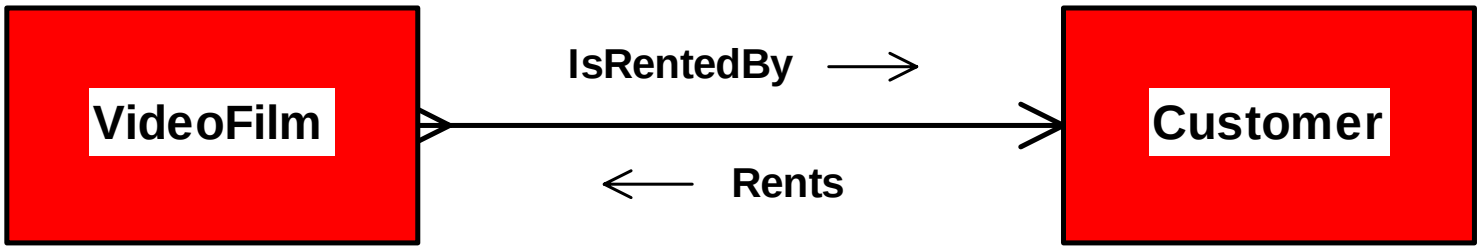


Conceptual data model and relational data model in normalised form

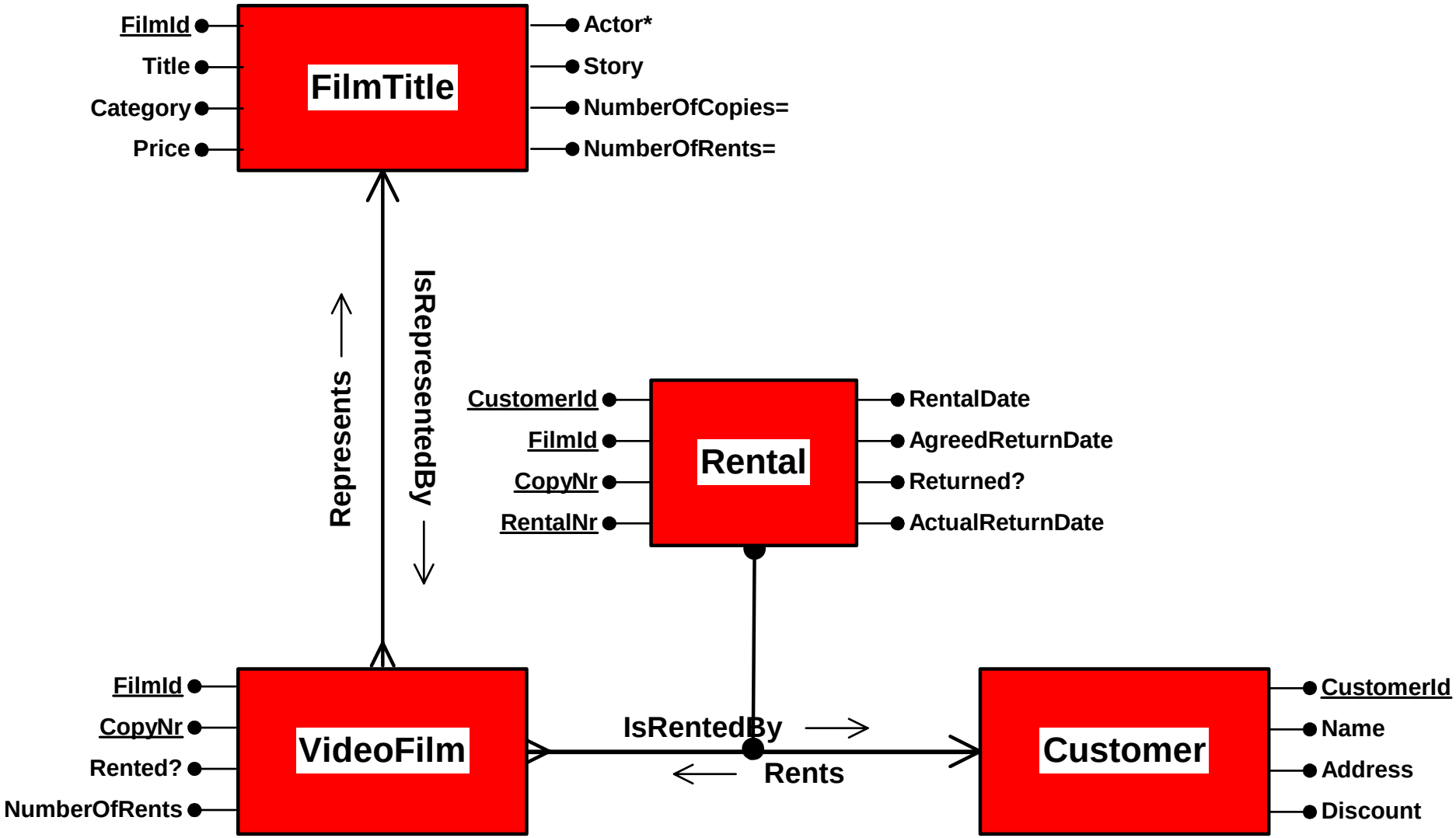
Conceptual modelling

- Define concepts and relations between them
- Conceptual models and data models
- Visualise models graphically

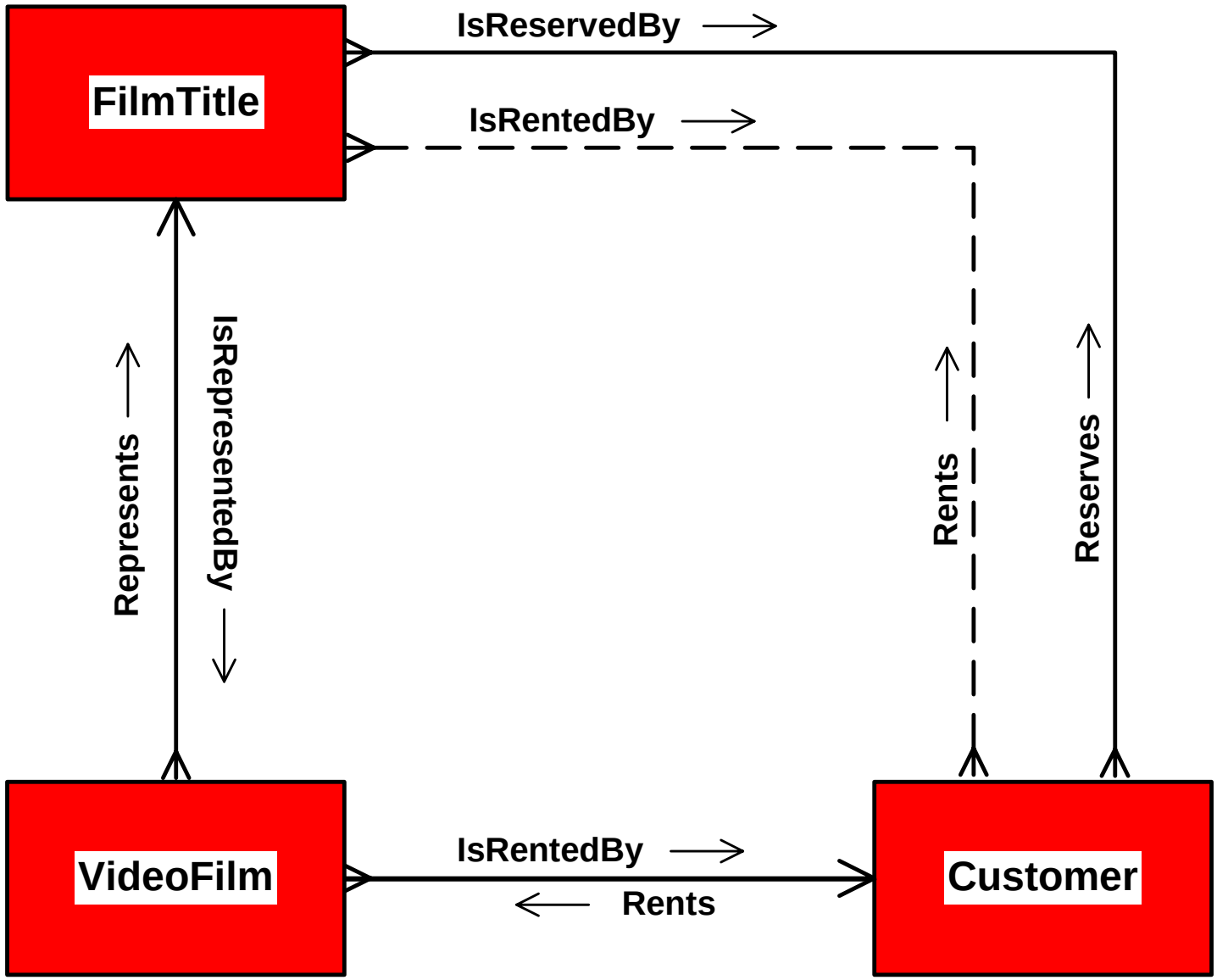
Rent-A-Video: first object graph



Rent-A-Video: elaborated object graph

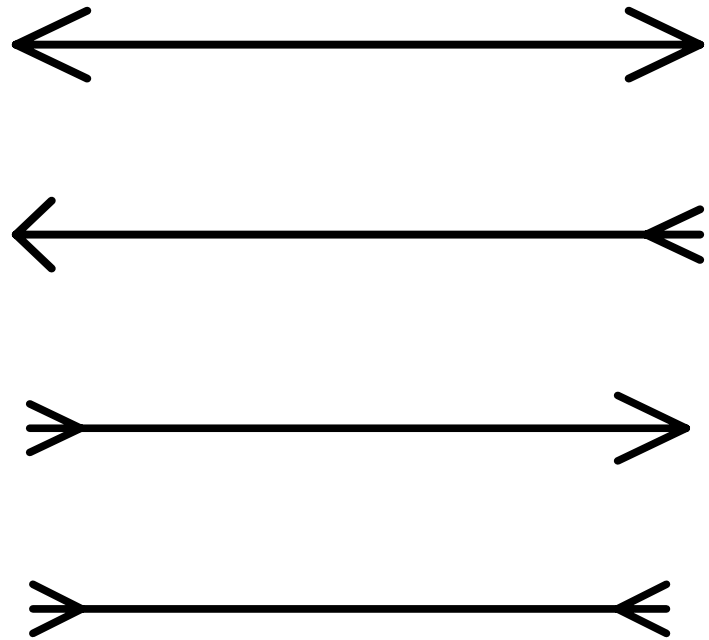


Rent-A-Video: further aspects



Relations between two object types

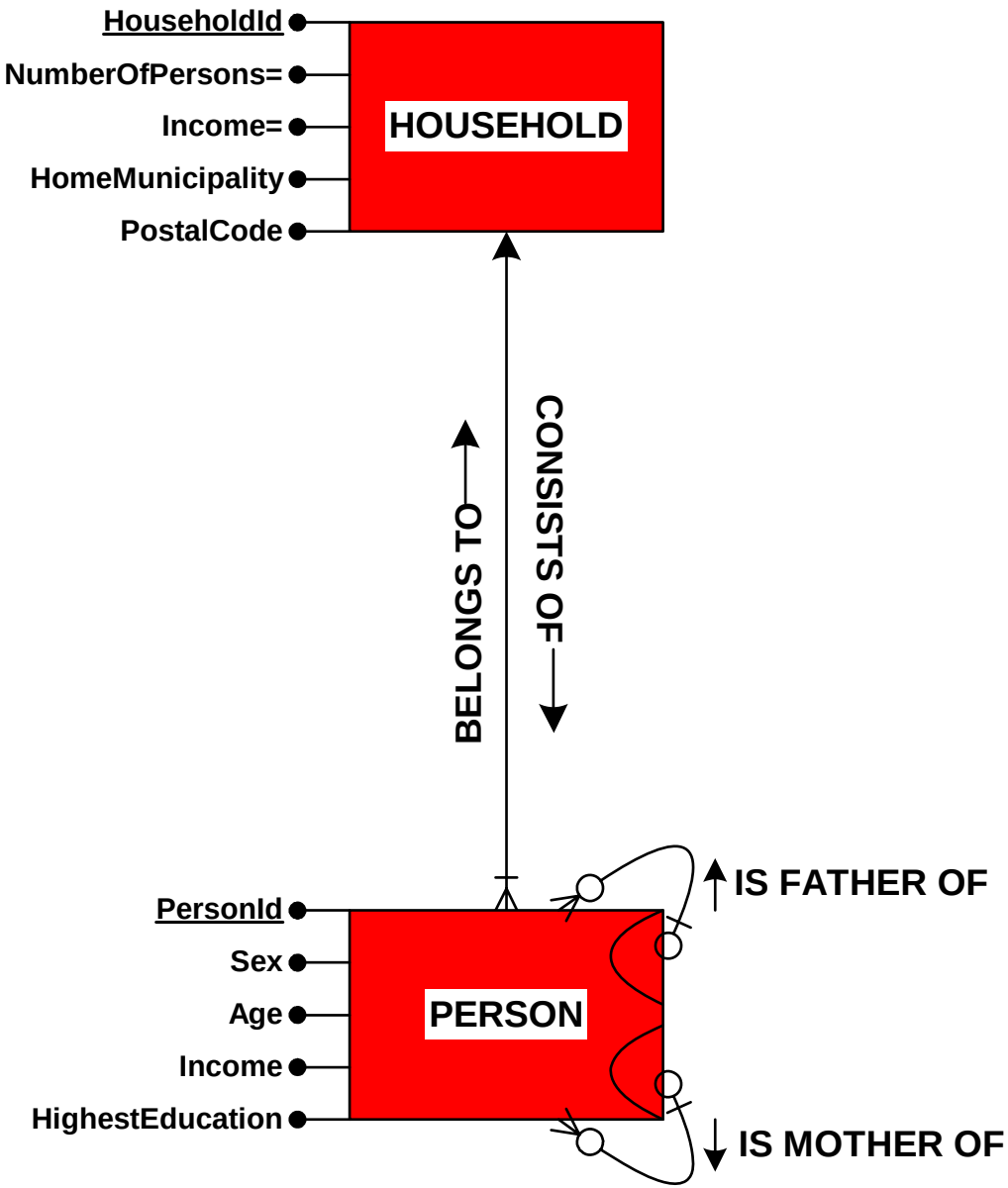
- one-to-one, symbolised by “arrow-to-arrow”
- one-to-many, symbolised by “arrow-to-fork”
- many-to-one, symbolised by “fork-to-arrow”
- many-to-many, symbolised by “fork-to-fork”



Note: The relation is usually ***not*** a ***flow*** relation!

(But you should tell what kind of relation it is.)

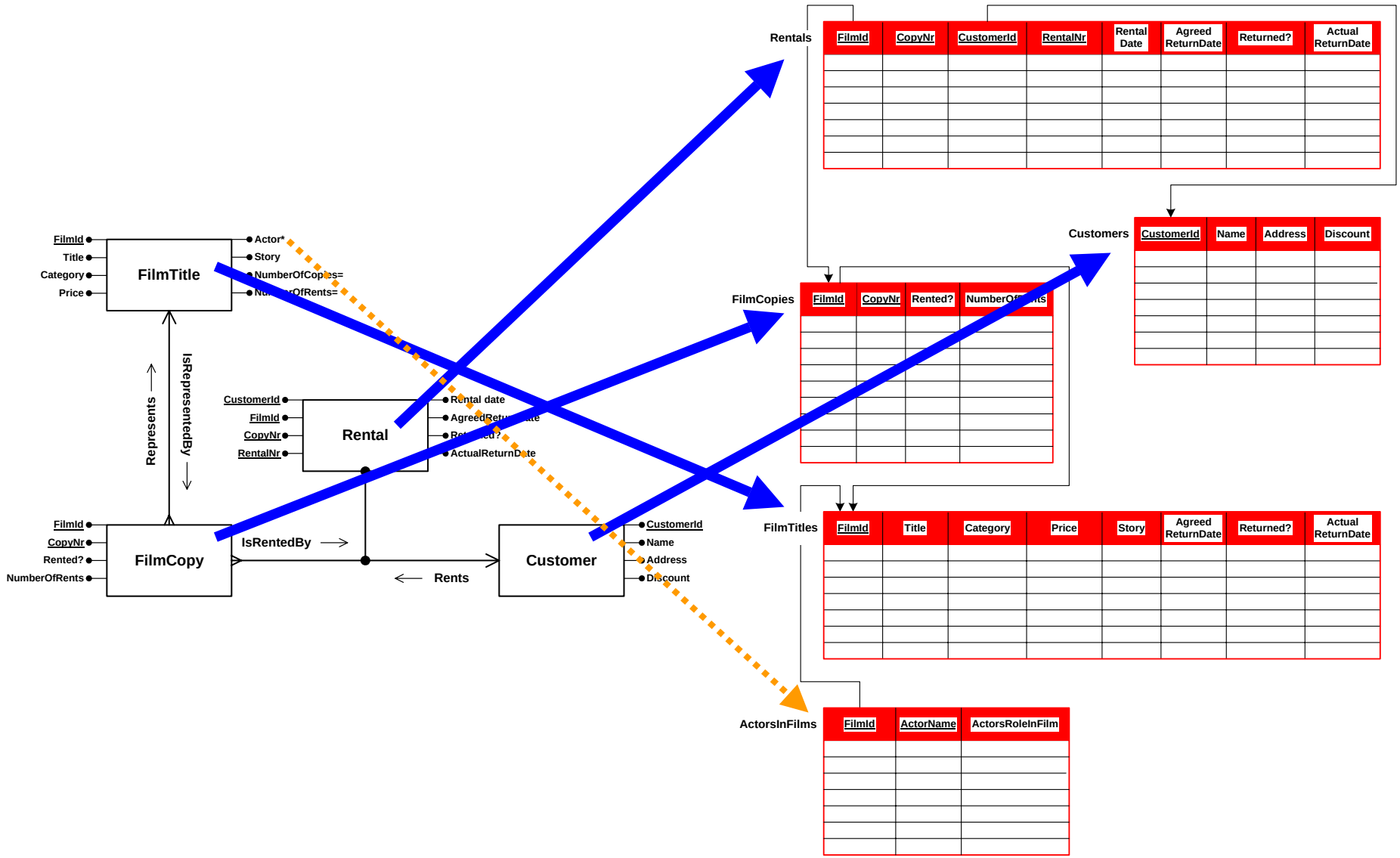
Object graphs: another example

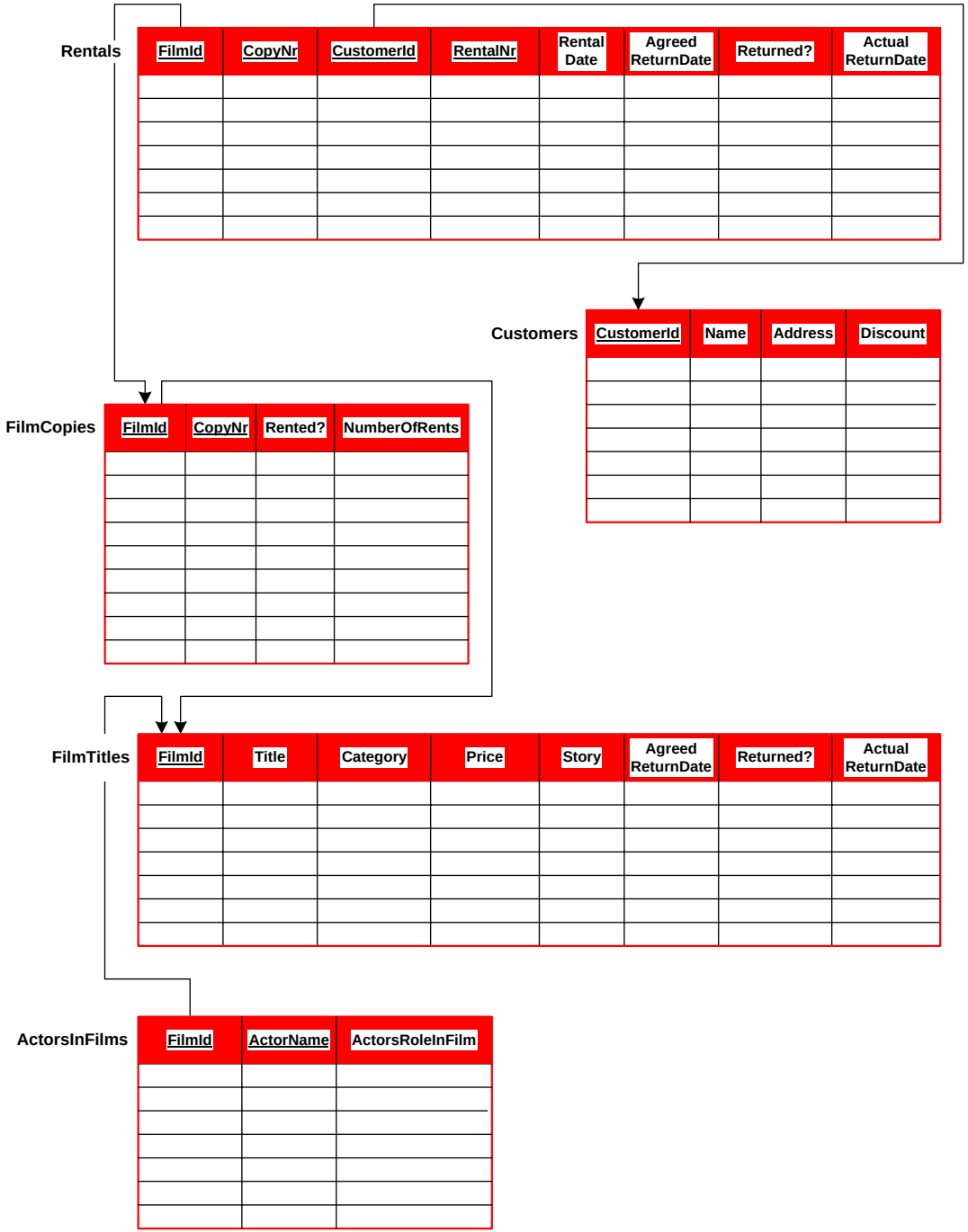


Different roles of concept modelling

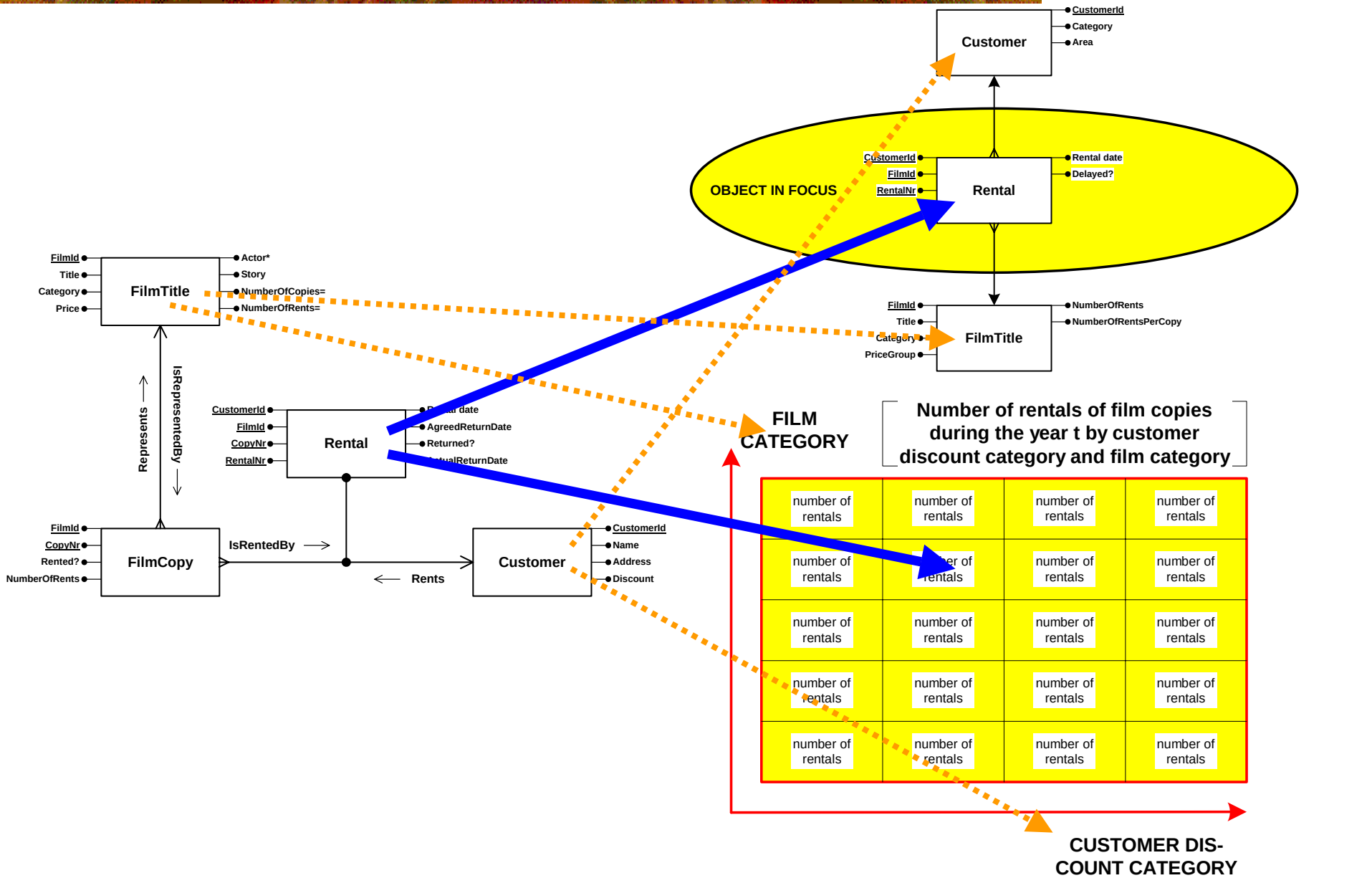
- Clarifying a small number of related concepts
- Information model for an application
  - defining meaning
  - basis for data design
- Corporate information model
  - for more efficient communication between people
  - basis for system integration

Concept model ---> Data model

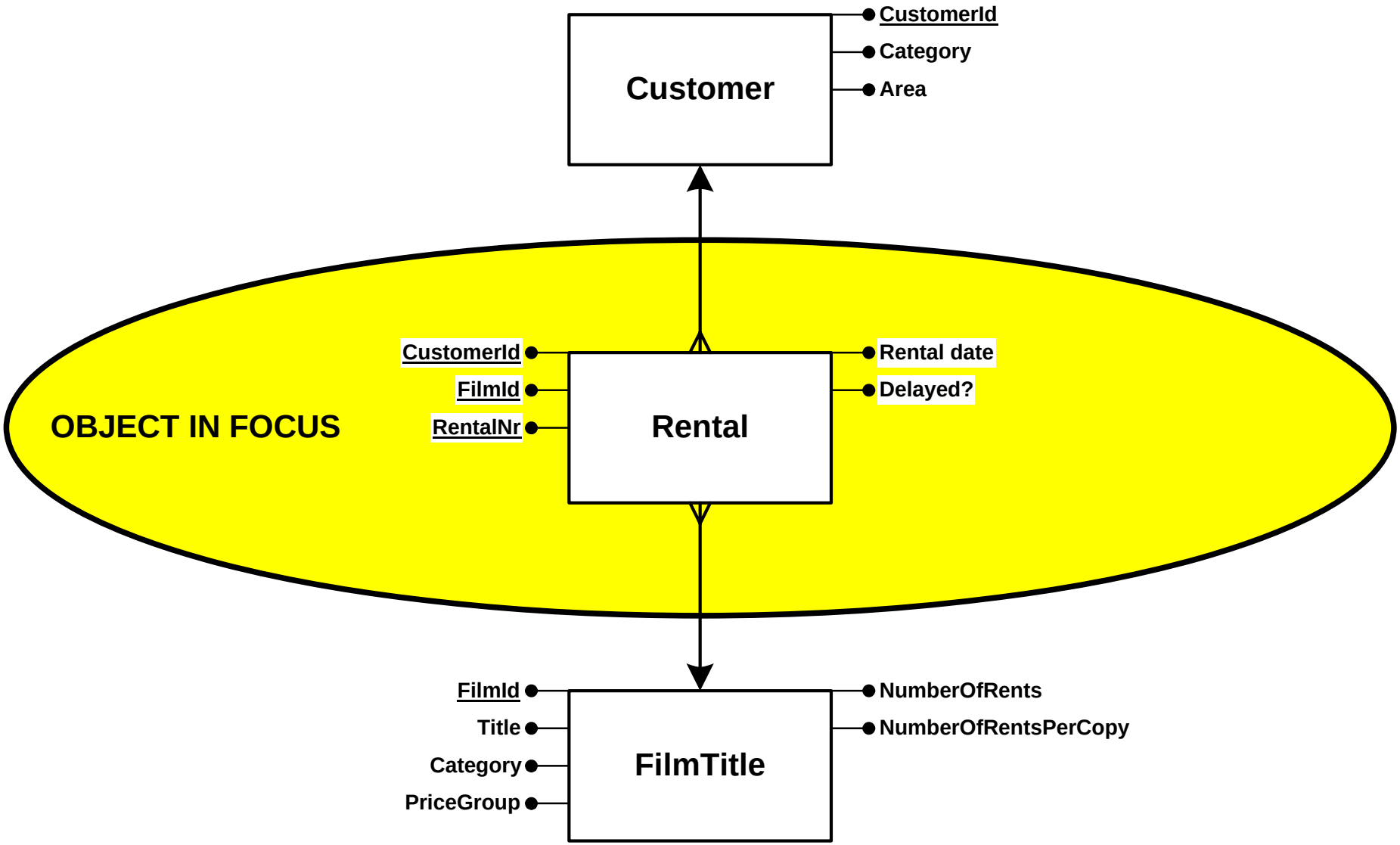



Rentals
FilmId
CopyNr
CustomerId
RentalNr
Rental Date
Agreed ReturnDate
Returned?
Actual ReturnDate
Customers
CustomerId
Name
Address
Discount
FilmCopies
FilmId
CopyNr
Rented?
NumberOfRents
FilmTitles
FilmId
Title
Category
Price
Story
Agreed ReturnDate
Returned?
Actual ReturnDate
ActorsInFilms
FilmId
ActorName
ActorsRoleInFilm

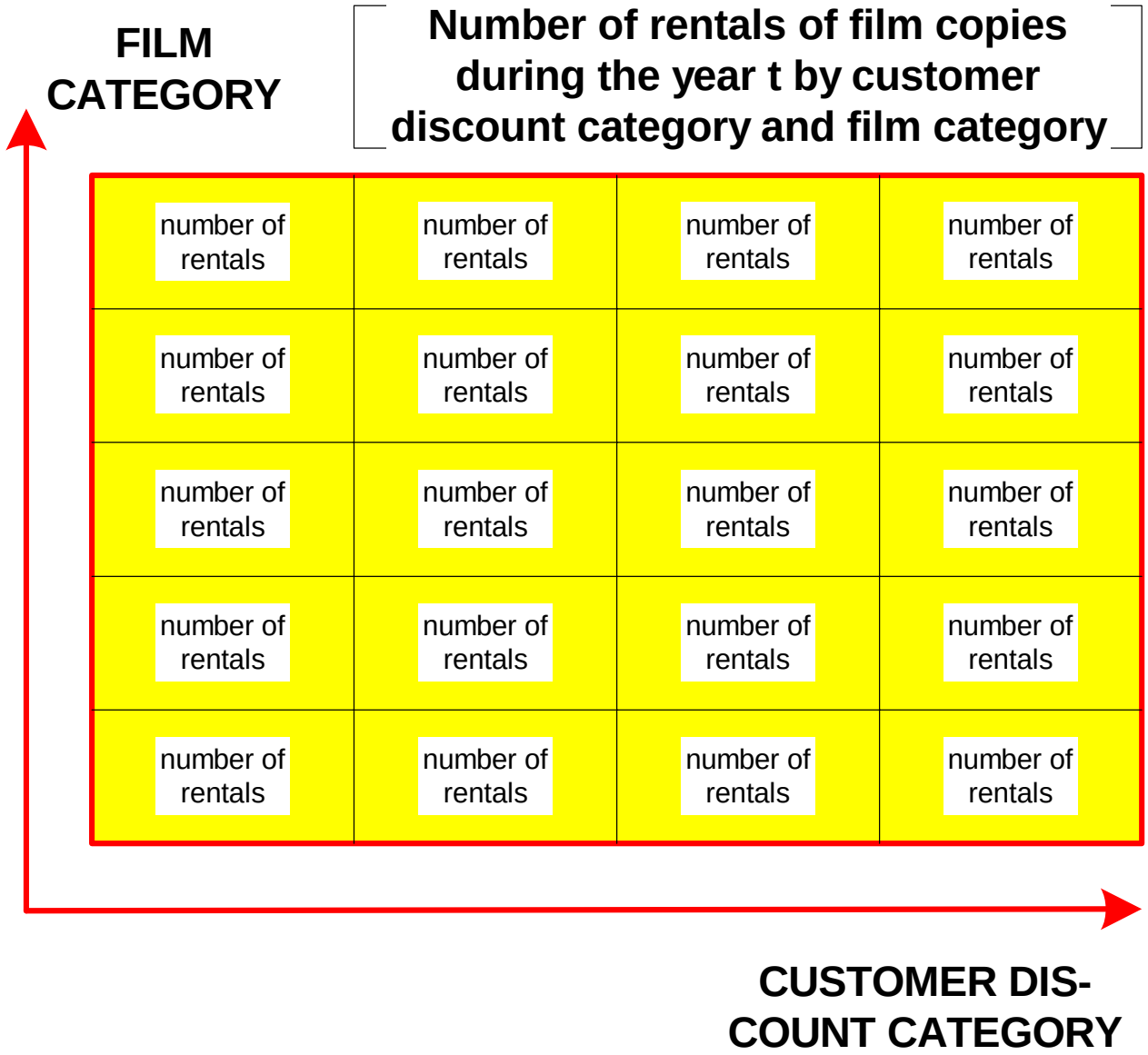
Conceptual model ---> Star/cube model



Star model for Data Warehouse



Multidimensional model (cube model)



Part II: Extra material

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Concept modelling: Exercises

- B2B
  - The customers of companies are companies
  - Companies have employees (persons)
- B2C
  - The customers of companies are consumers (persons)
  - Companies have employees (persons)
- B2B+B2C
  - The customers of companies are companies or consumers (persons)
  - Companies have employees (persons)

➢ *Hint: There are two basic object types, COMPANY and PERSON in all three examples*

Illustrate the following three examples by:

- basic object graphs (micro-level)
- relational data models (micro-level)
- multidimensional cubes (hypercubes)
- star models
- relational data models (macro-level)