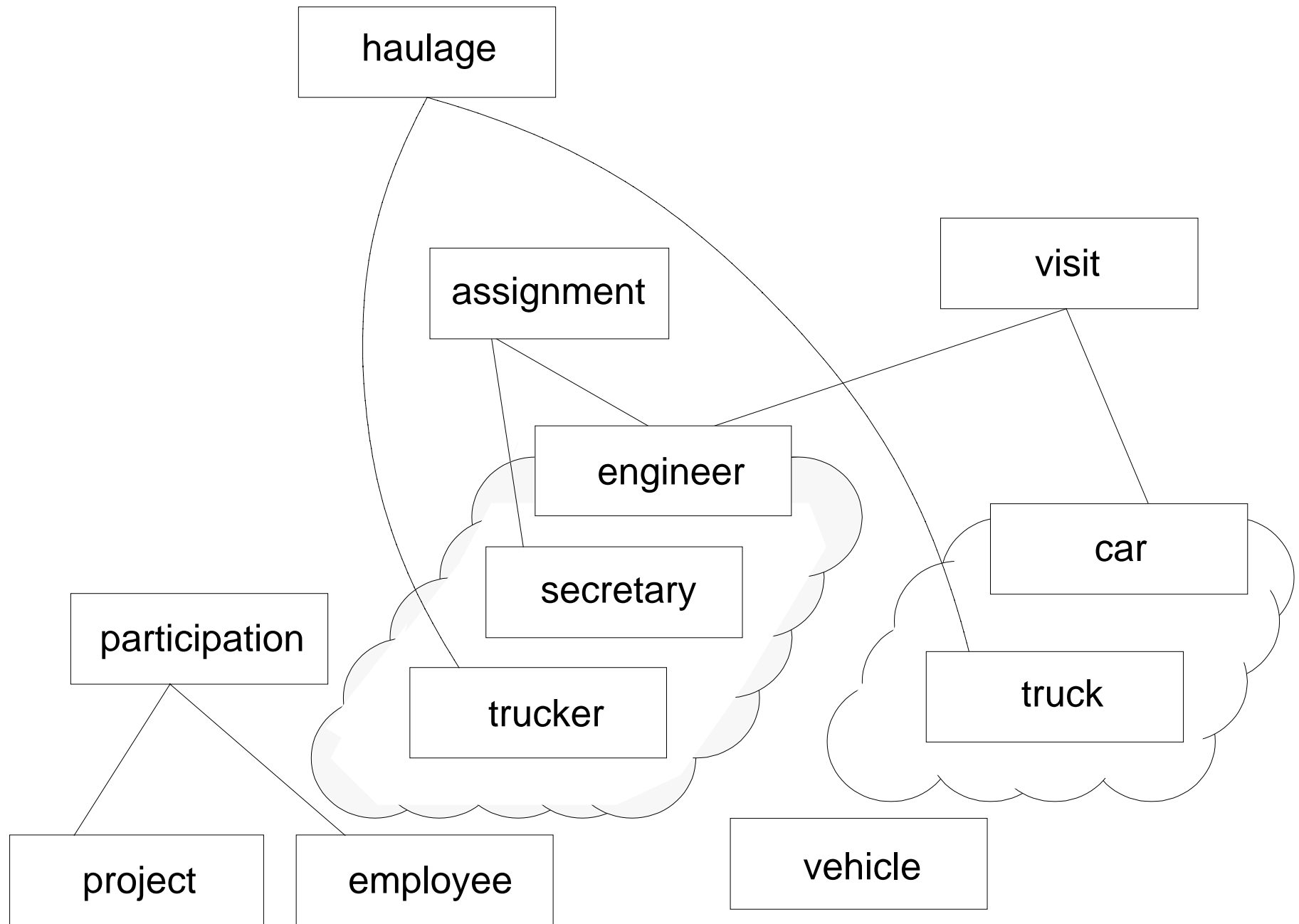# Modern approaches: an overview

- **SEMANTIC HIERARCHY MODEL** (Smith & Smith 1977)
  abstractions: classification, aggregation, generalization; no data manipulation.

- EXTENDED RELATIONAL APPROACH (Codd 1979)
  theoretic extensions to the basic relational approach to capture more meaning.

- SEMANTIC NETWORKS (Brachman 1979)
  artificial intelligence: generalizations and inheritance play a dominant role.

- ENHANCED ENTITY-RELATIONSHIP APPROACH (> 1985)
  extensions to the original model proposed by Chen (1976).

- FUNCTIONAL DATA MODEL (Shipman 1981)
  model based on functions, with an emphasis on inheritance.

- ACTIVE/PASSIVE COMPONENT MODELING (Brodie 1982)
  abstractions: classification, aggregation, generalization, association; integrity control by procedures instead of structures.

- OBJECT ORIENTED incl. object modeling technique (Rumbaugh 1991)
  concepts: method, encapsulation, inheritance, polymorphism.

- SEMANTIC DATA MODELING (ter Bekke 1992)
  abstractions: classification, aggregation, generalization and object relativity, includes a complete data manipulation language.
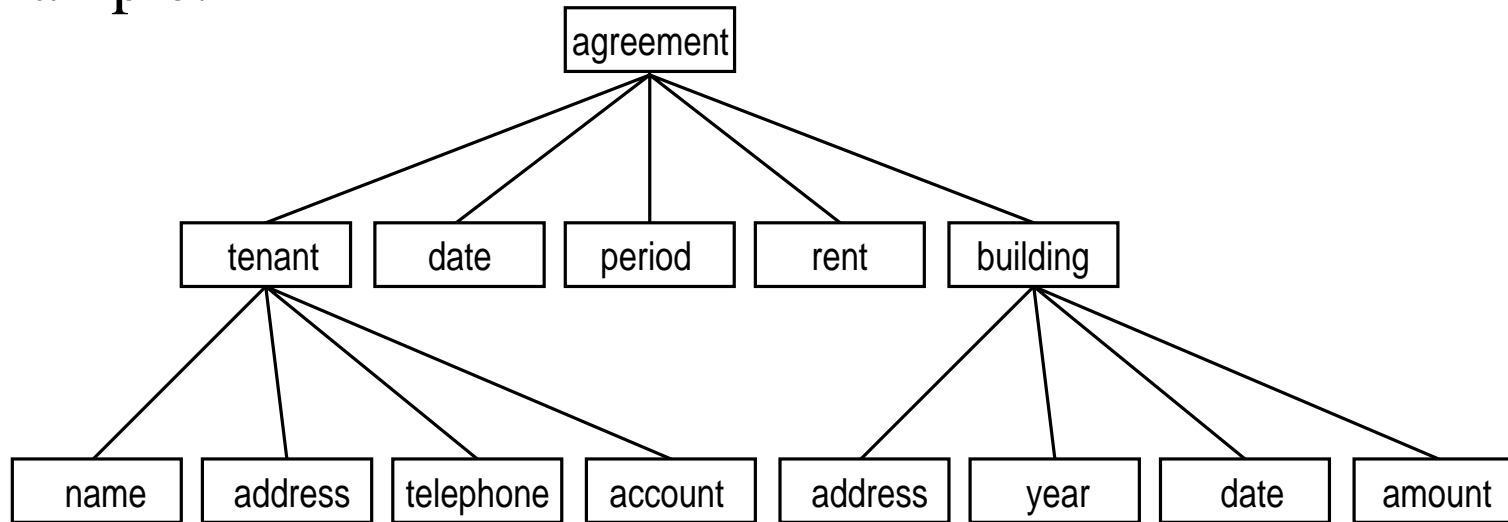
Example: Semantic Hierarchy Model

haulage

visit

assignment

engineer

secretary

car

participation

trucker

truck

project

employee

vehicle

AGGREGATION:
The collection of certain types into a new type.
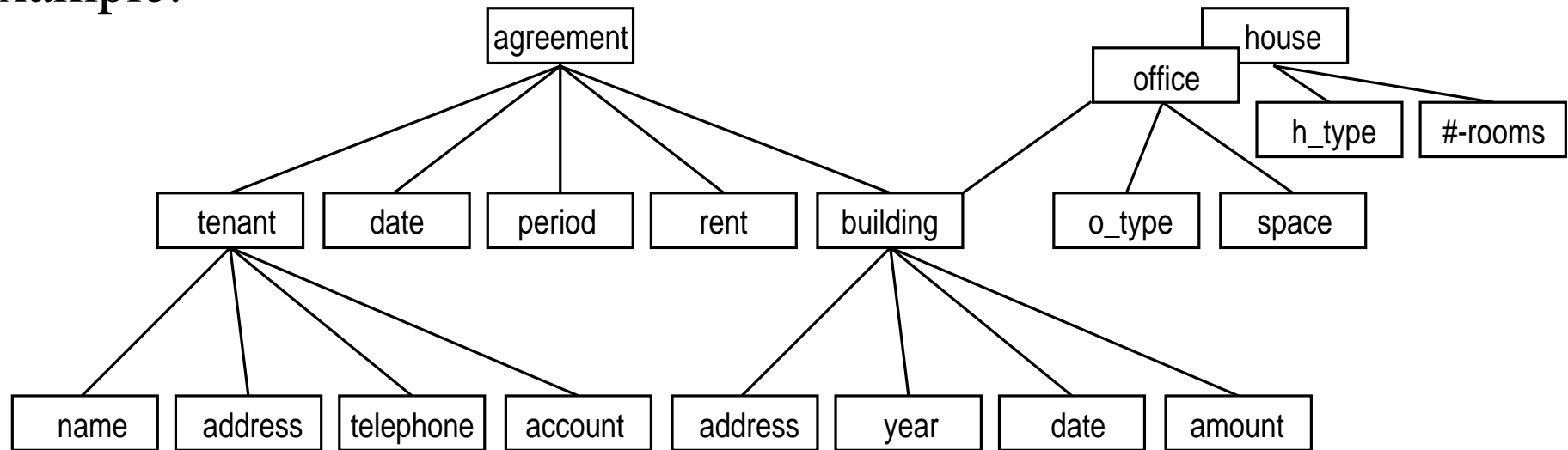
Example:

VIEW INDEPENDENCE:
- tenant can be considered as a type but also as an attribute.
- building is an attribute, but can later be considered as a type.
- building is a type, it can also be considered as a generalization.

RELATED TO THE VERB **"TO HAVE"**

GENERALIZATION:

The intersection of types from different types.

Example:

PROPERTY:

•   inheritance of attributes.

RELATED TO THE VERB "TO BE"

TYPE DEFINITIONS

- ## AGGREGATION

  type tenant   = name, address, telephone, account.
  type agreement = tenant, building, date, period, rent.

- ## GENERALIZATION

  type building   = address, year, date, amount.
  type house   = [building], house type, number of rooms.
  type office   = [building], office type, space.