



DIAMOND-PATH FRAMEWORK

Introduction to Service Science

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Outline



- Introduction
 - Presentation aims
 - Motivation
- Service Systems Reference Model
 - Organization
 - Predictive behaviour
- Universal modelling
 - Meta-modelling
 - Context-specific classification
- See – Recognize – Organize – Do
- Reflexion
 - Usability
 - Follow-up Efforts



Presentation Aims

- ▶ Introduce Diamond-Path Framework as is
 - ▶ Initiate a discourse on usefulness
 - ▶ Show current follow-up efforts, state-of-the-art
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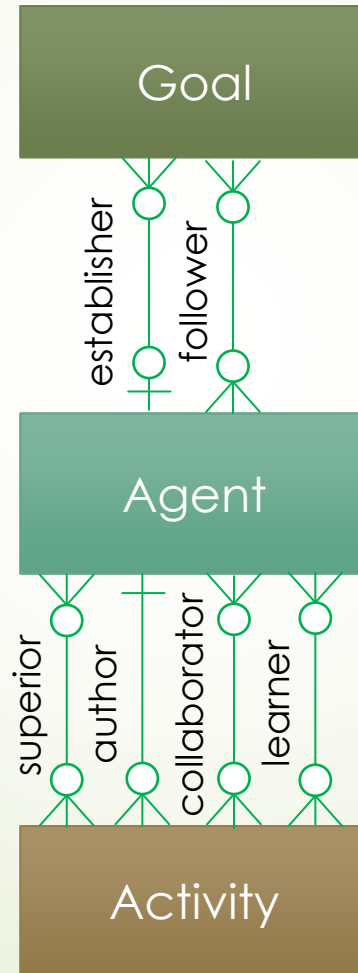
Diamond-Path Framework

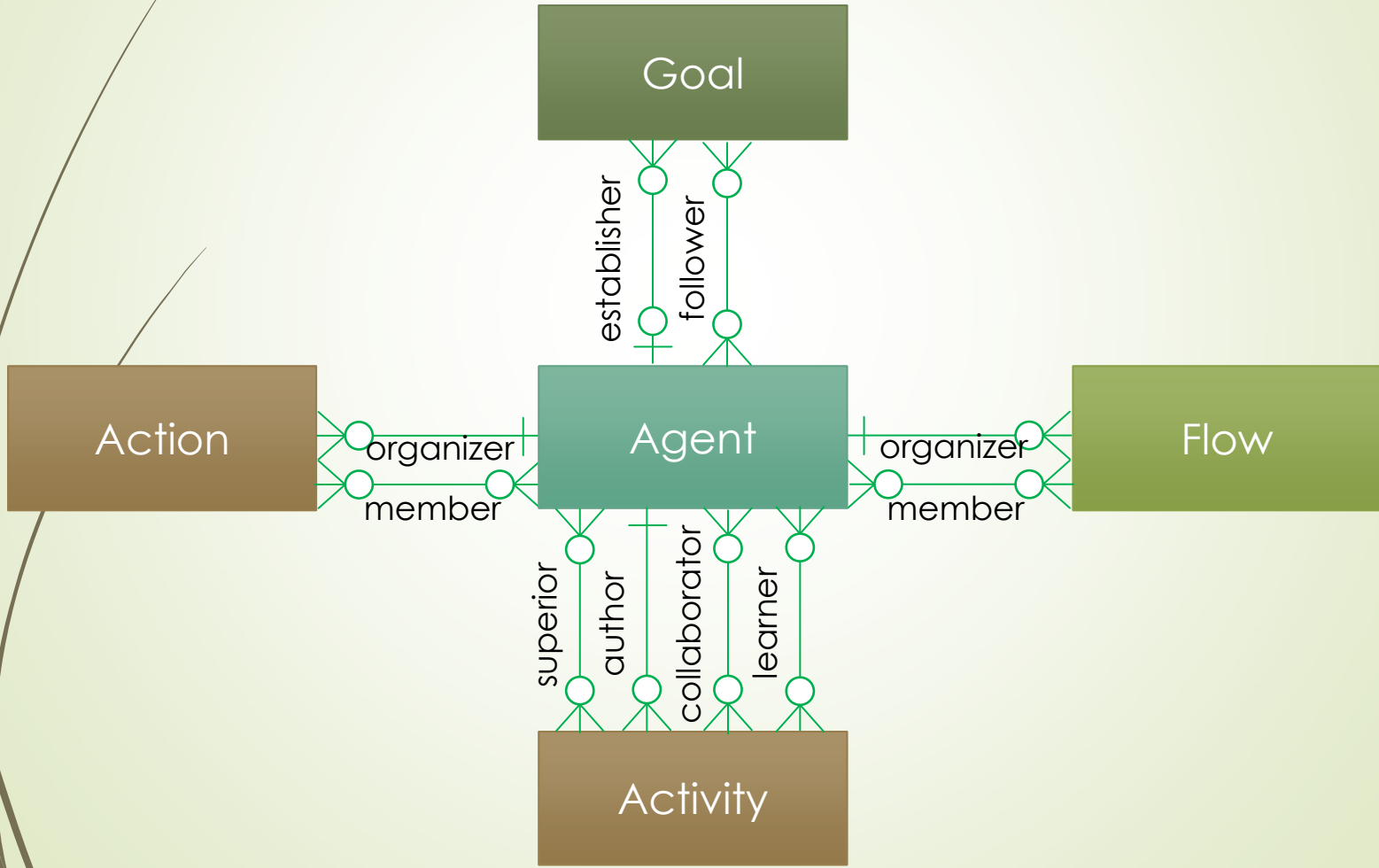
What is it?

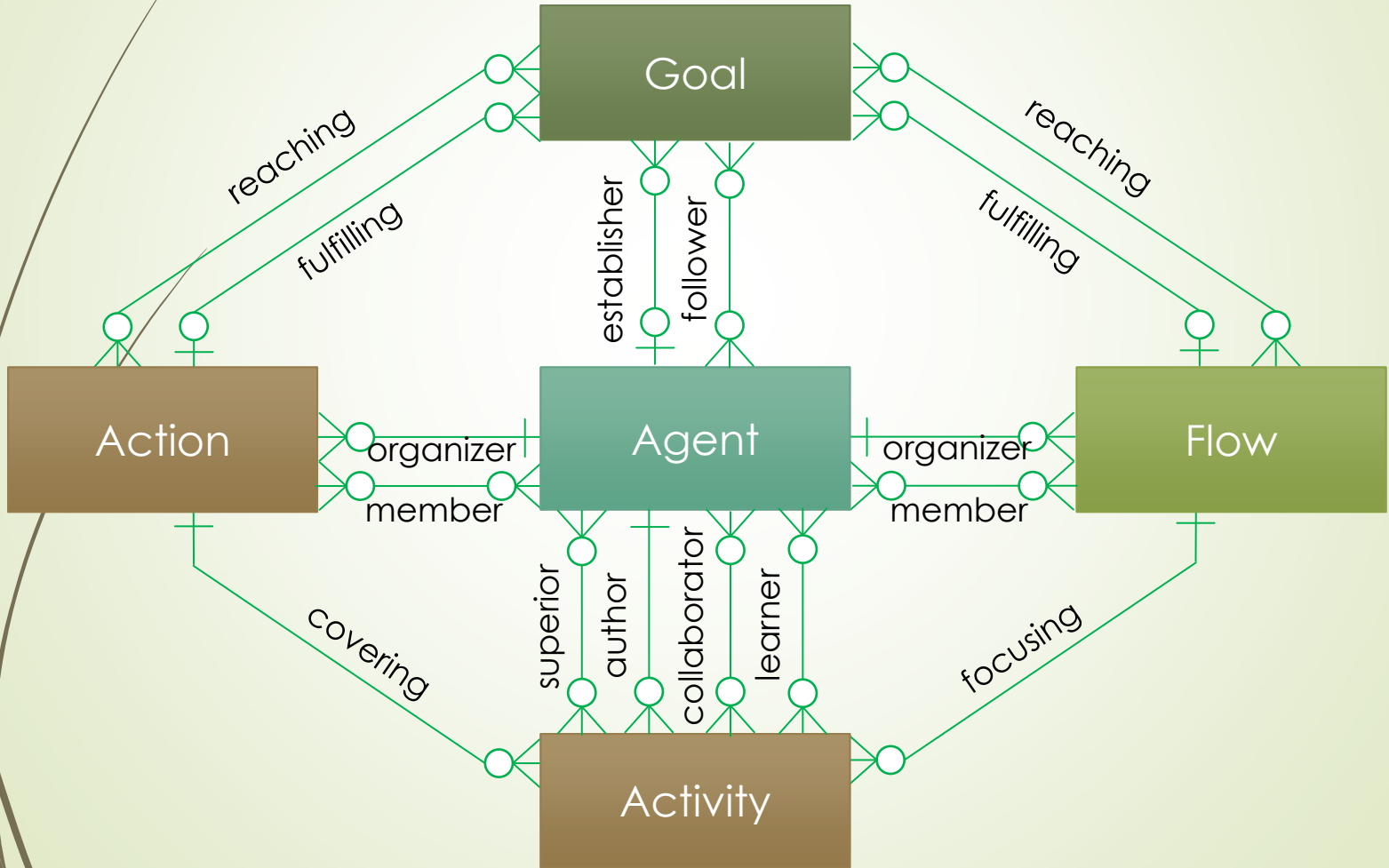
- ▶ Paradigm aimed to help understand and act in a service-system environment
- ▶ Theoretical concept
- ▶ 4 diamond-shaped models

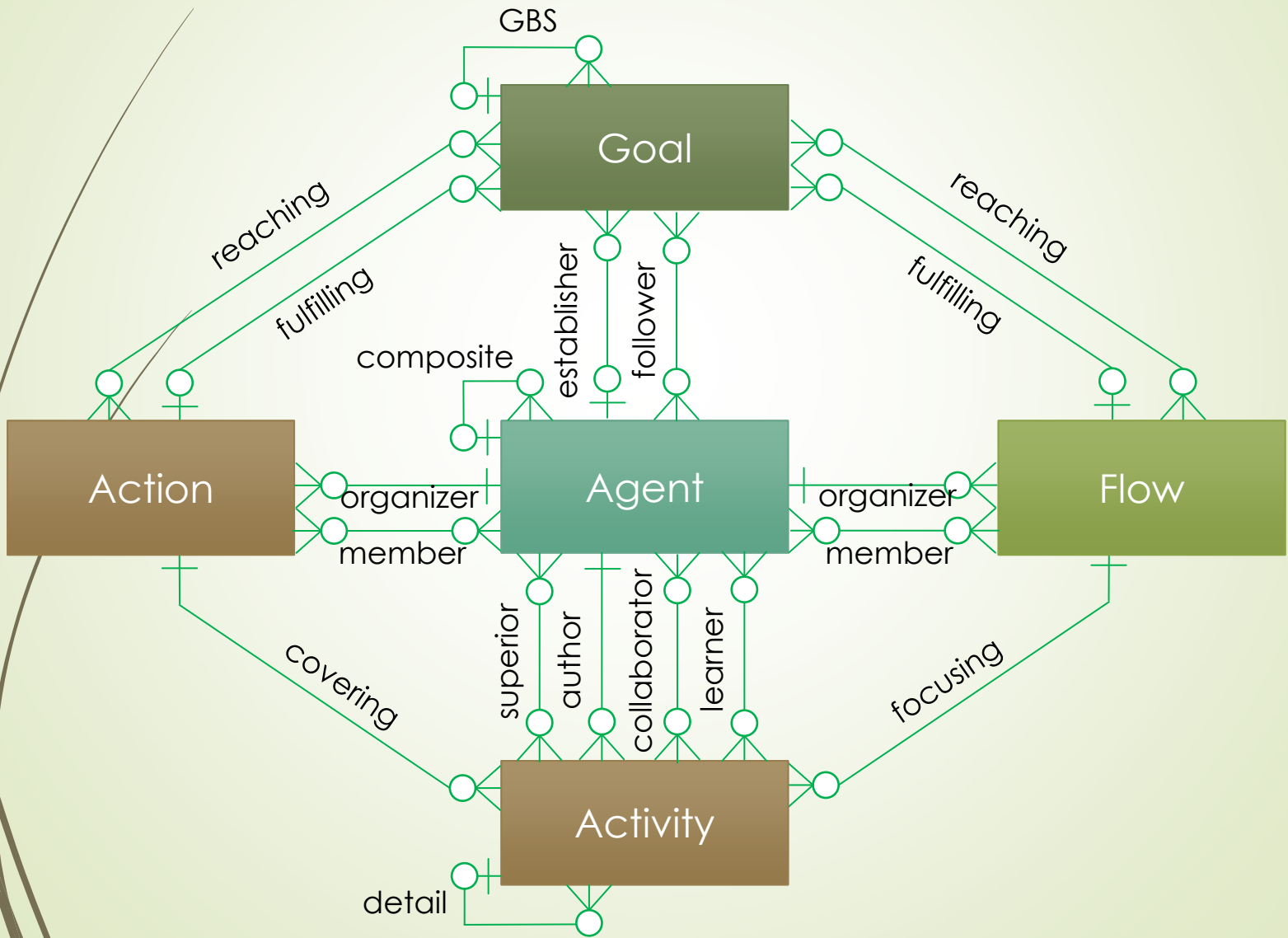


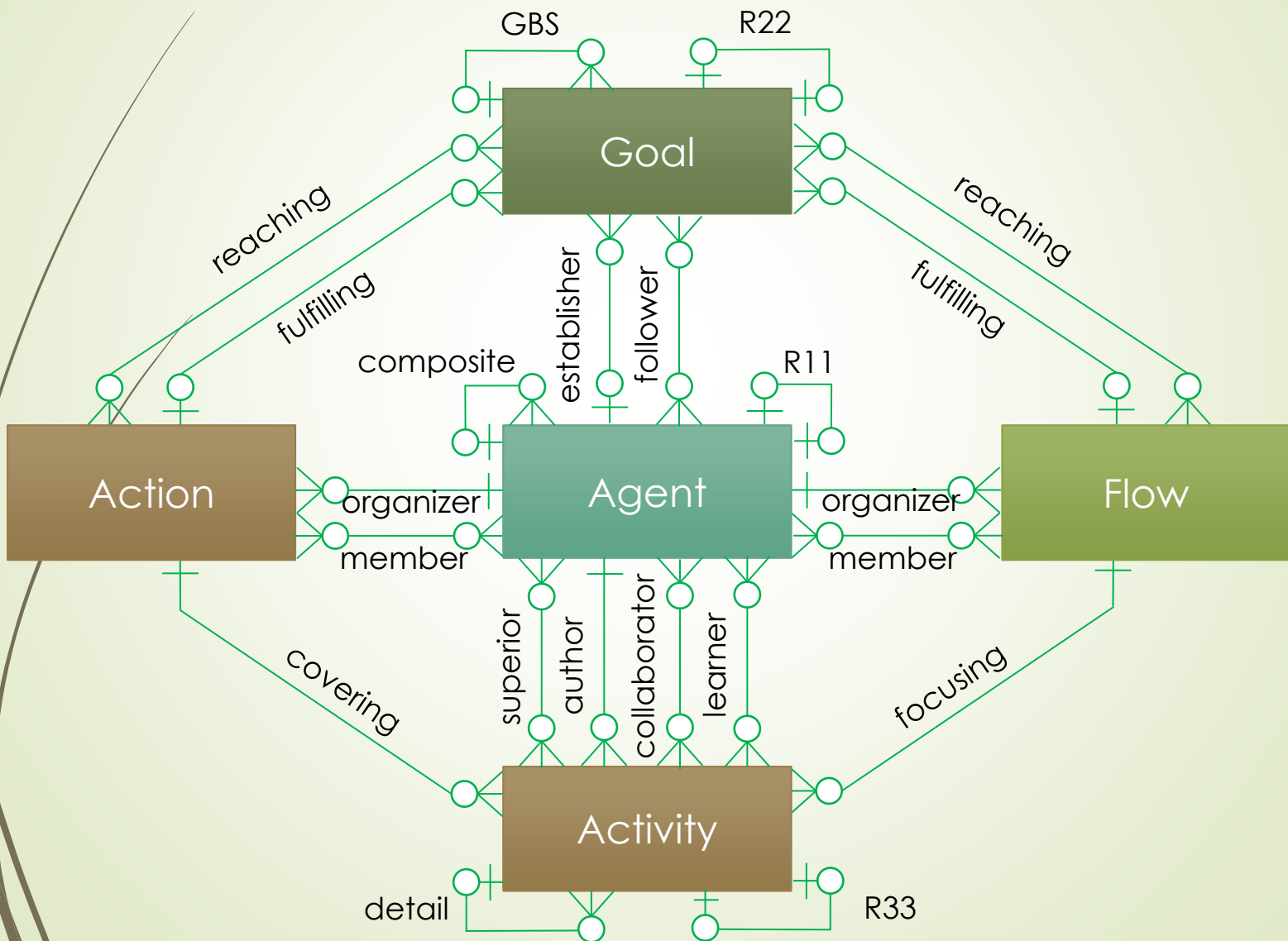
Diamond of Agent-Team Organization

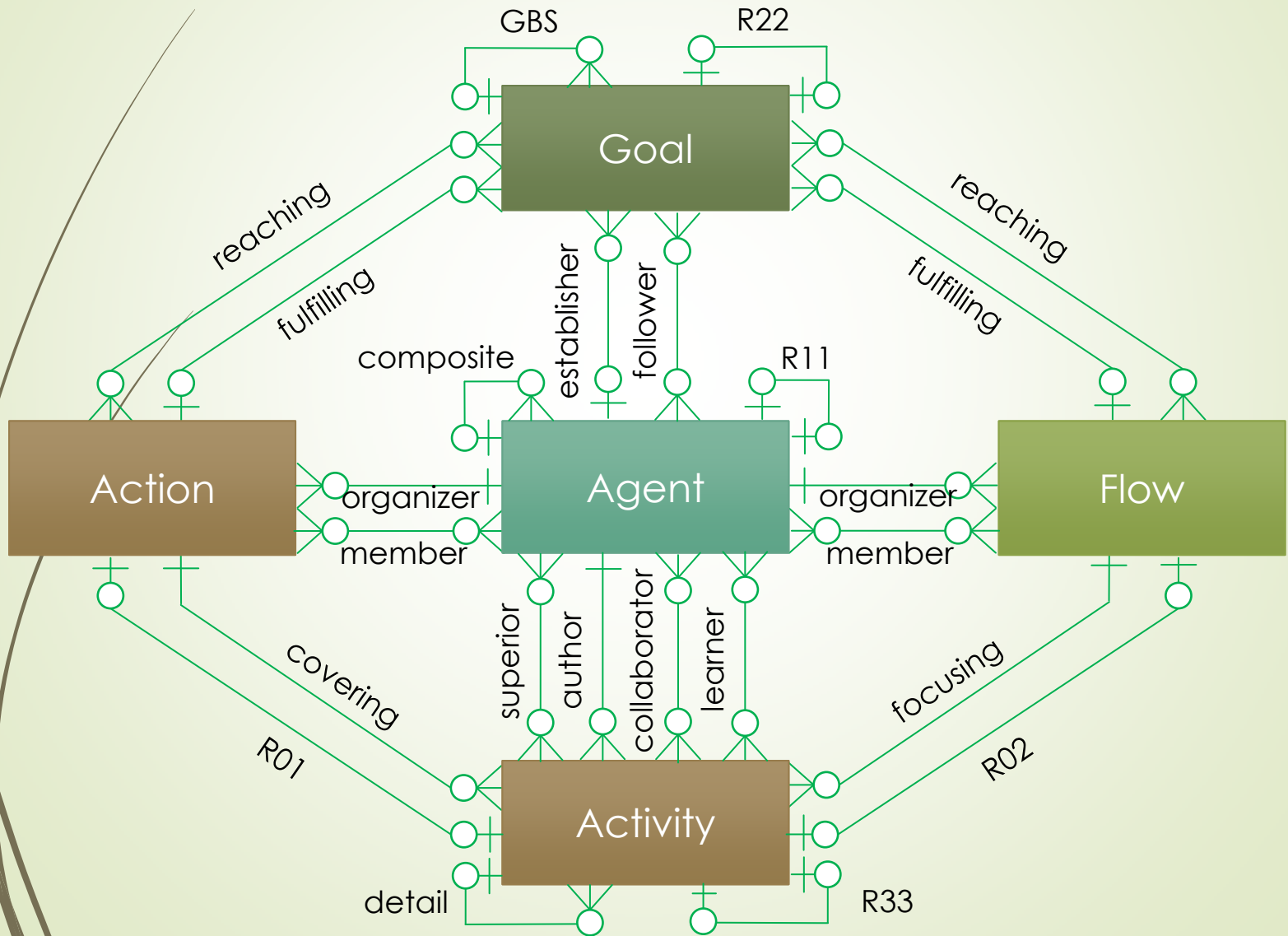








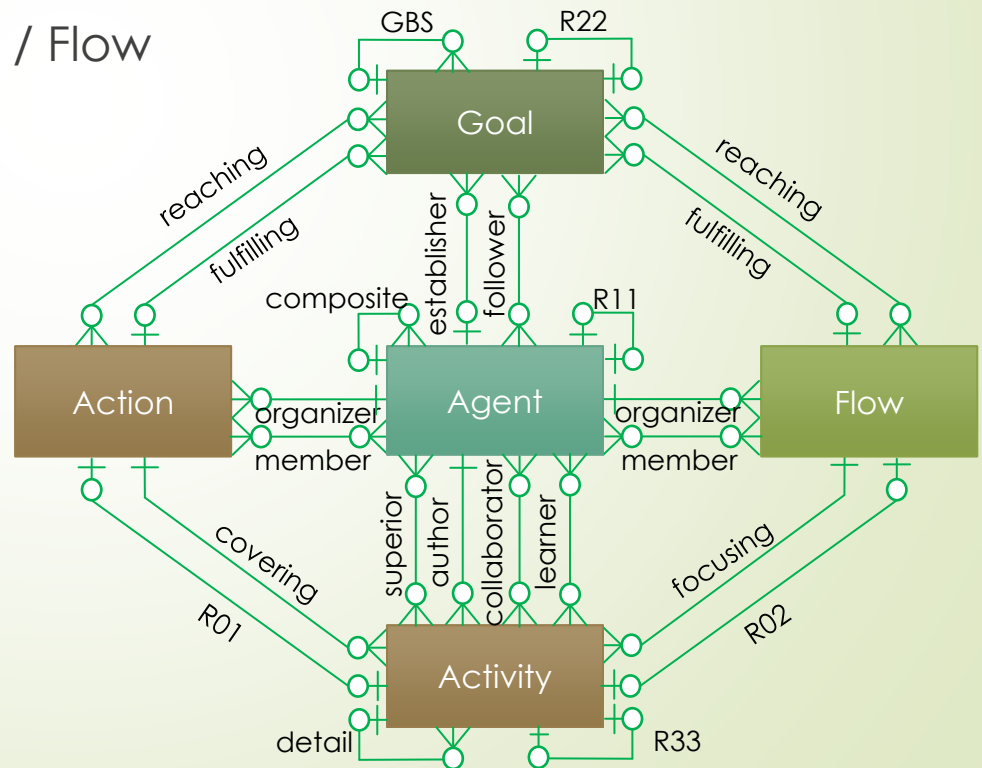


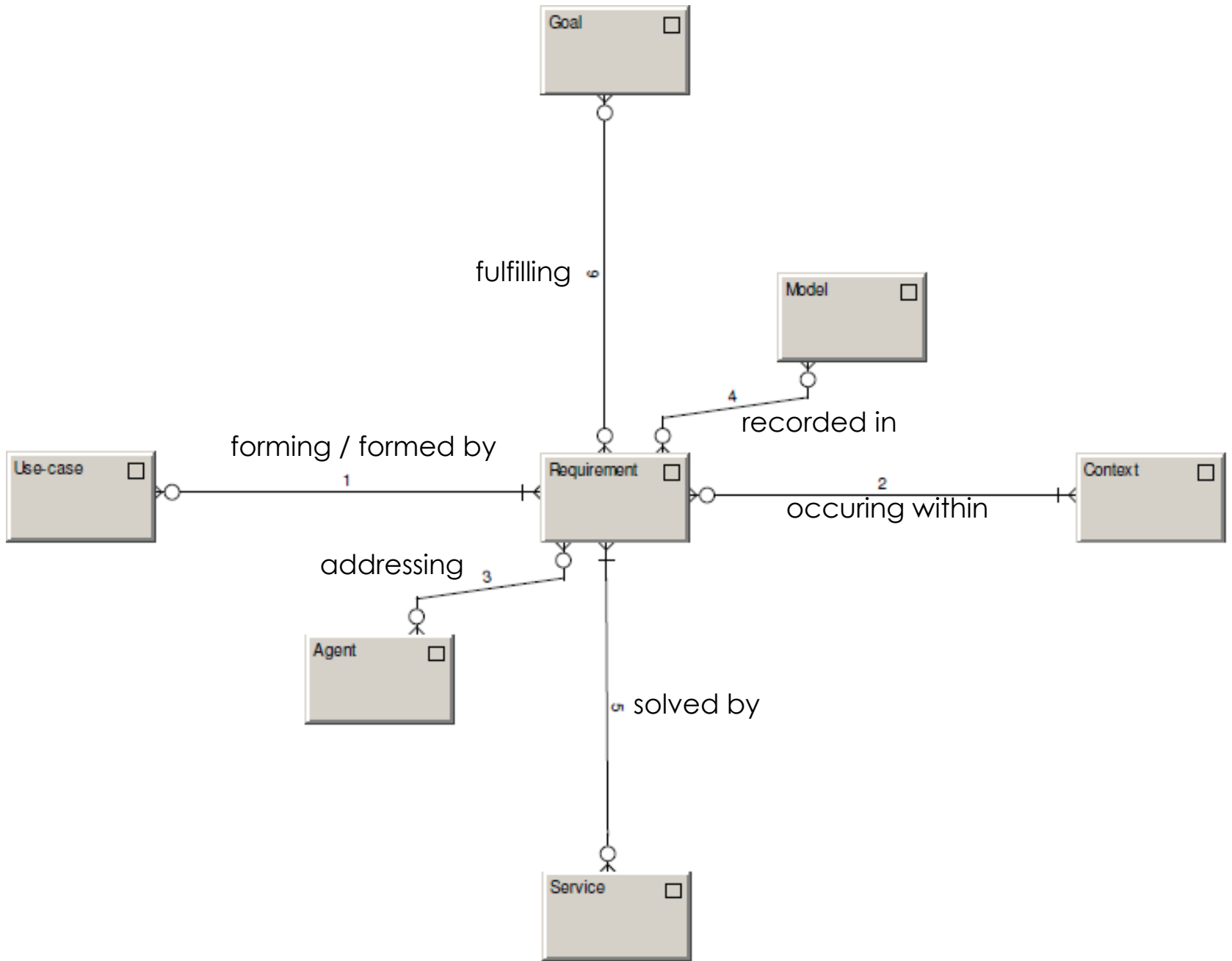


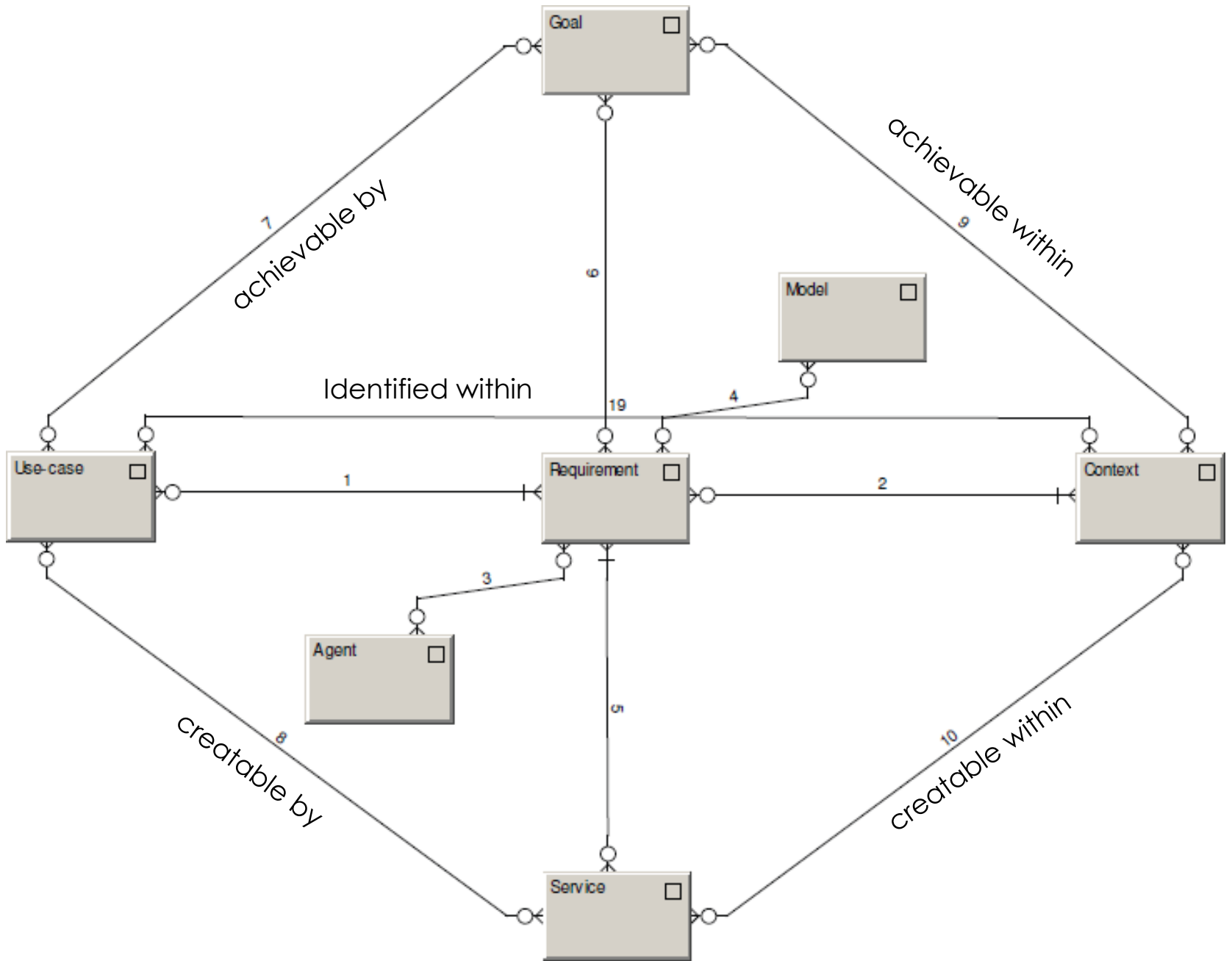
Diamond of Organization

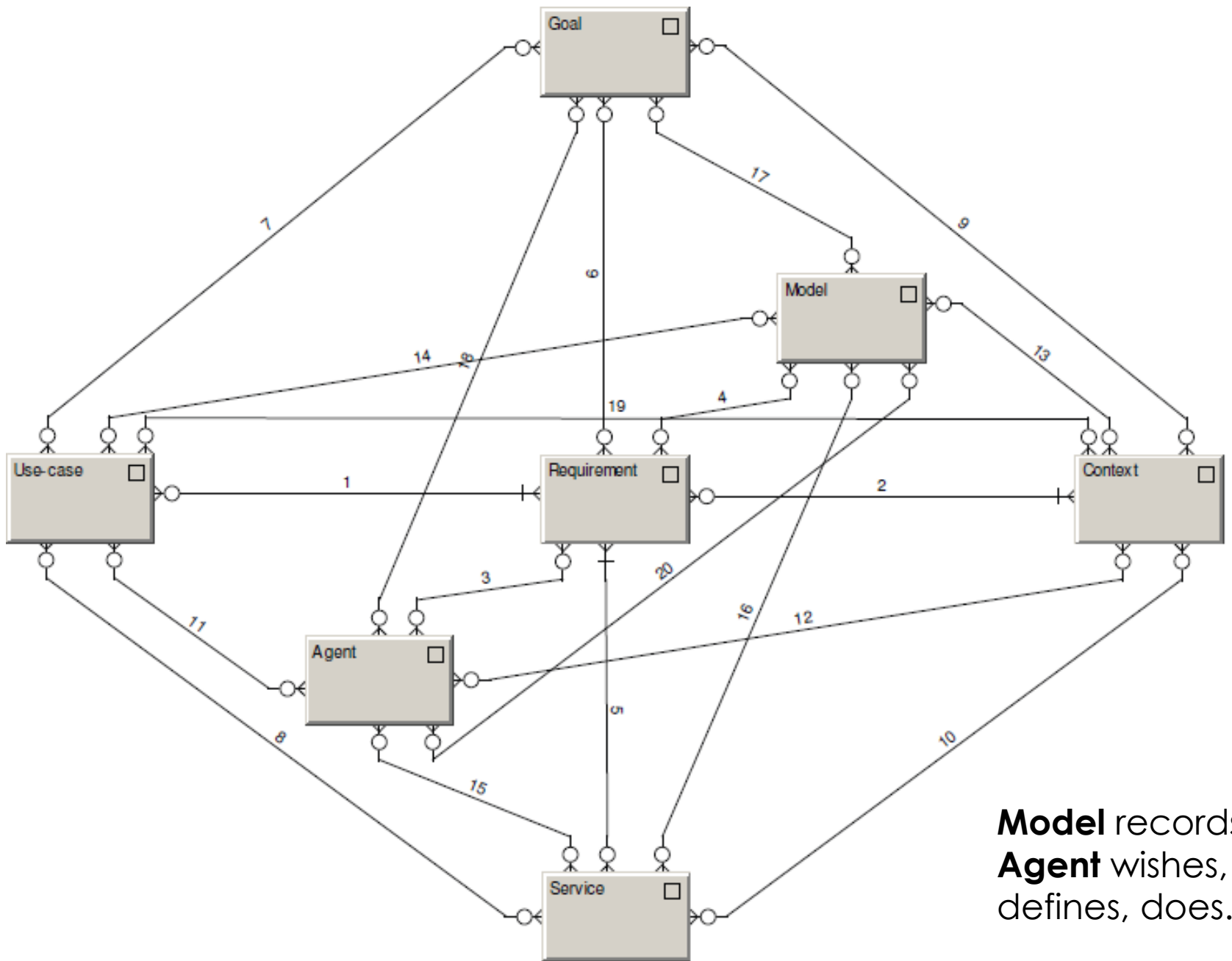
Summary

- Matrix-based organization: Action vs. Flow
- Activity vs. Action / Flow
- R-edges

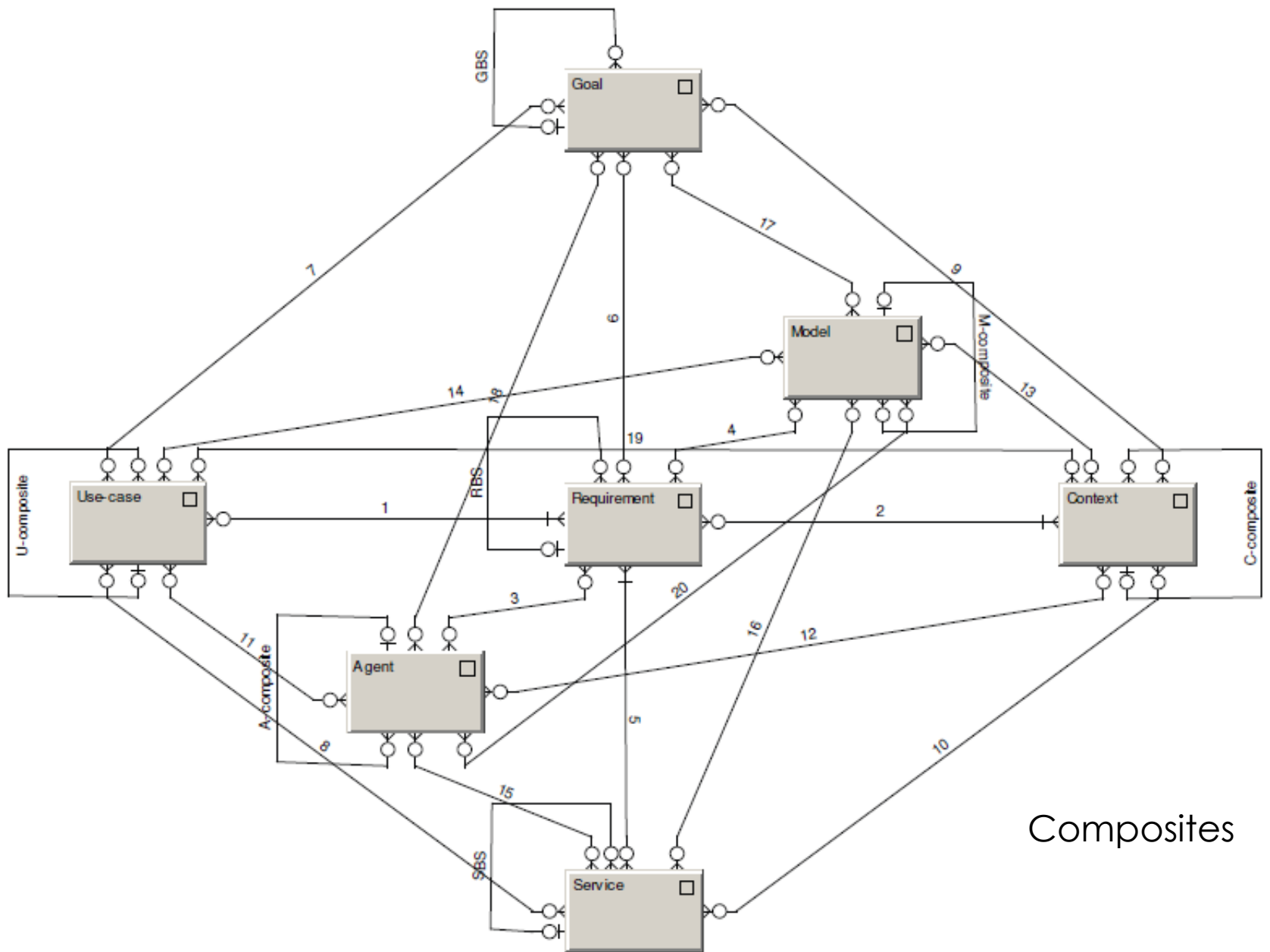




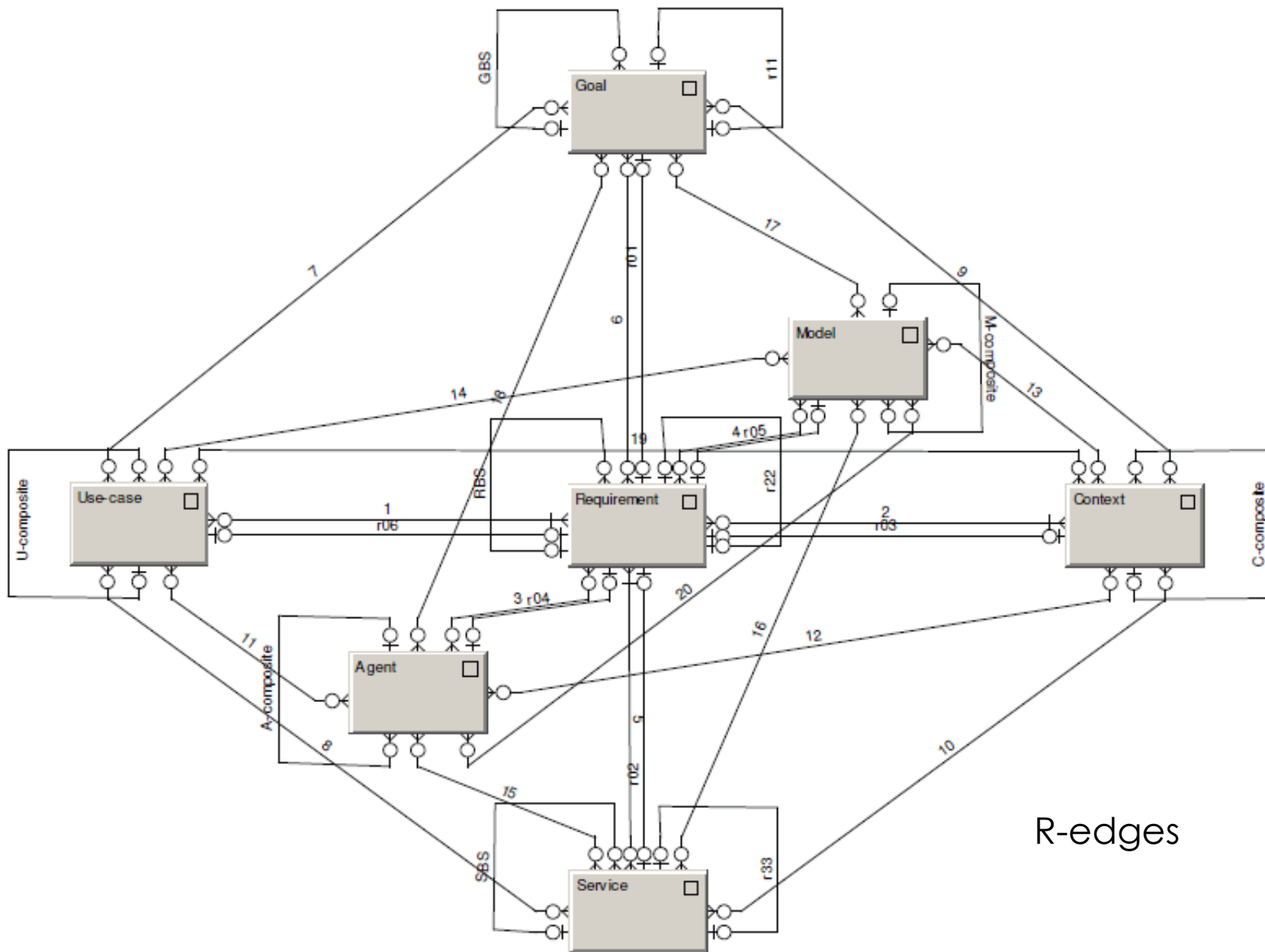




Model records.
Agent wishes,
 defines, does.



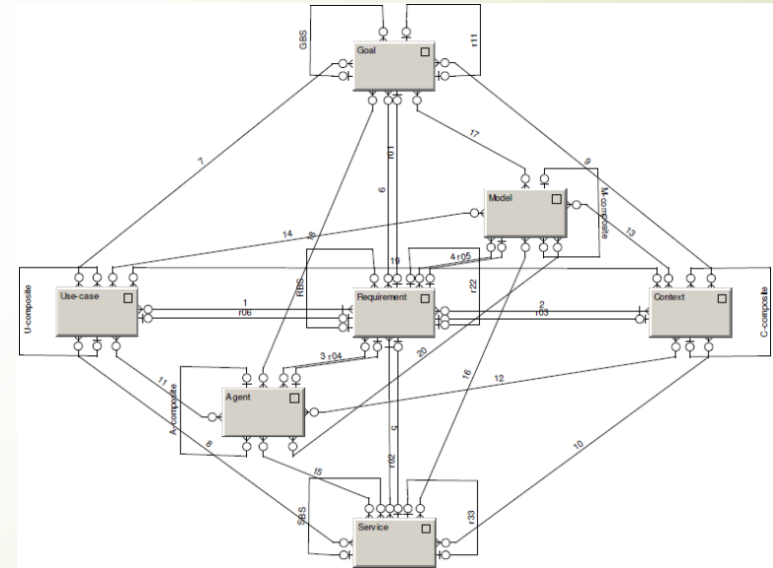
Composites



R-edges

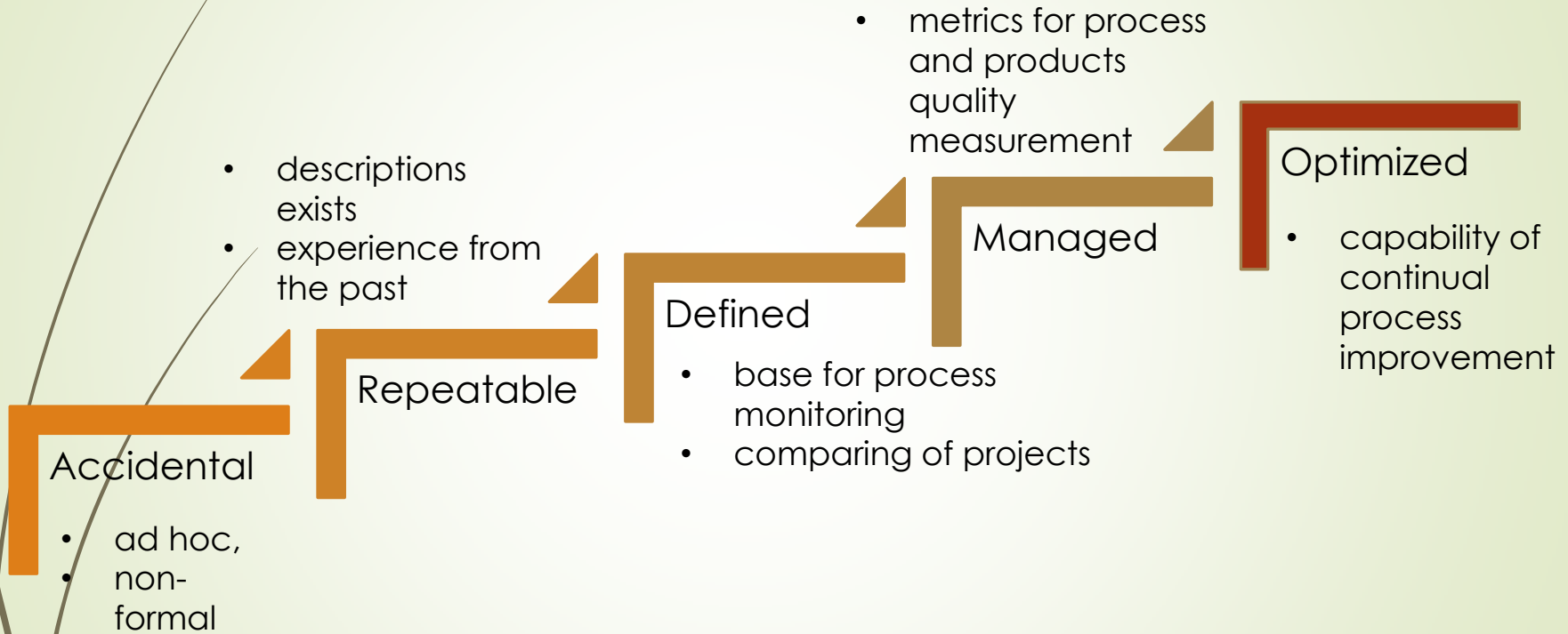
Diamond of Predictive Behaviour

- Depicts the motivation of agents to DO
- Everything can be seen as a requirement
- Forming and being formed by behavioral patterns
- Models as a system memory



Universal modelling

CMM



How long does it take for regular ISs to adjust in order to support newly optimized processes?



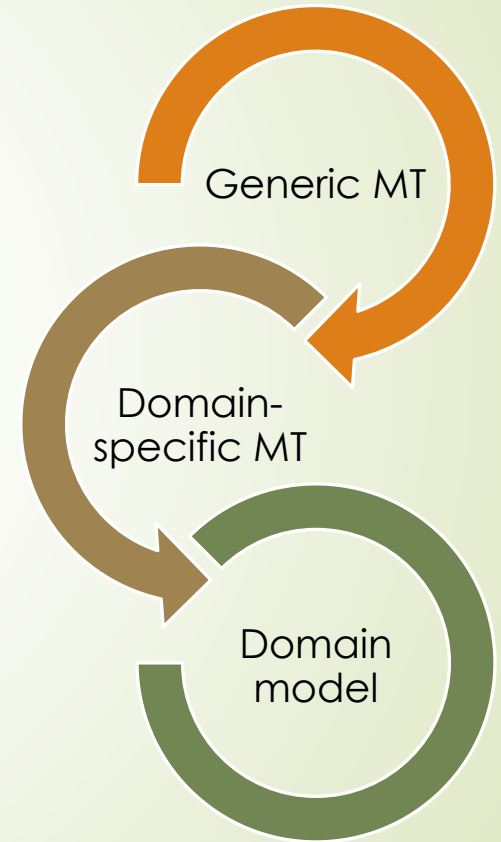
Current Modelling Tools

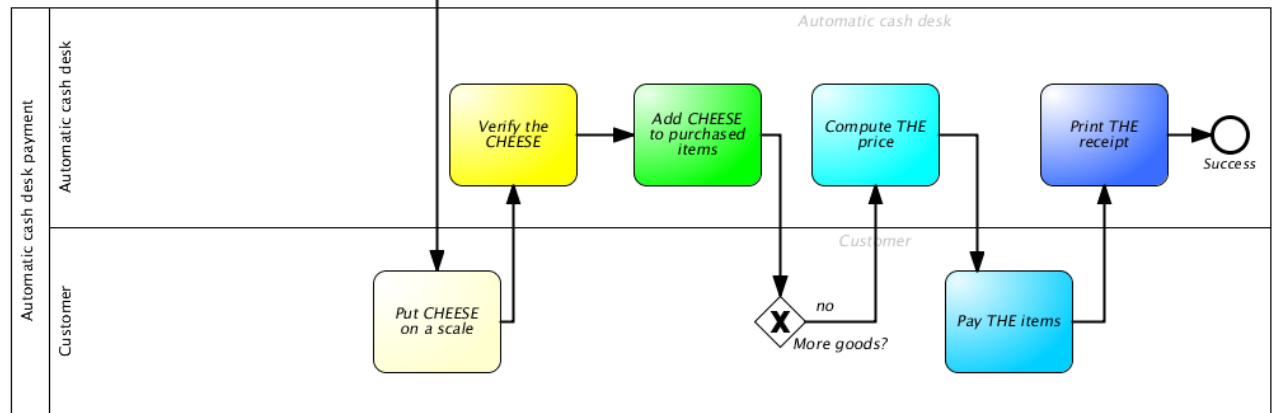
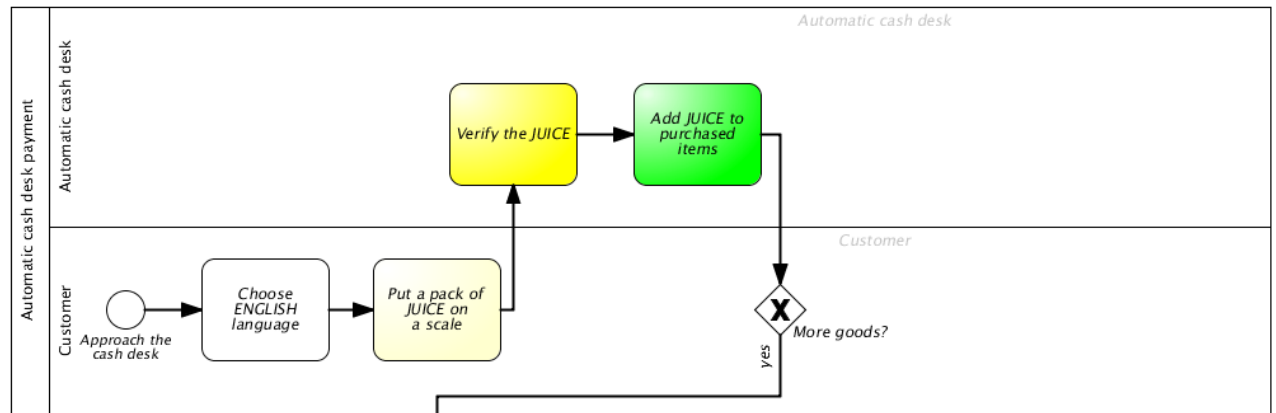
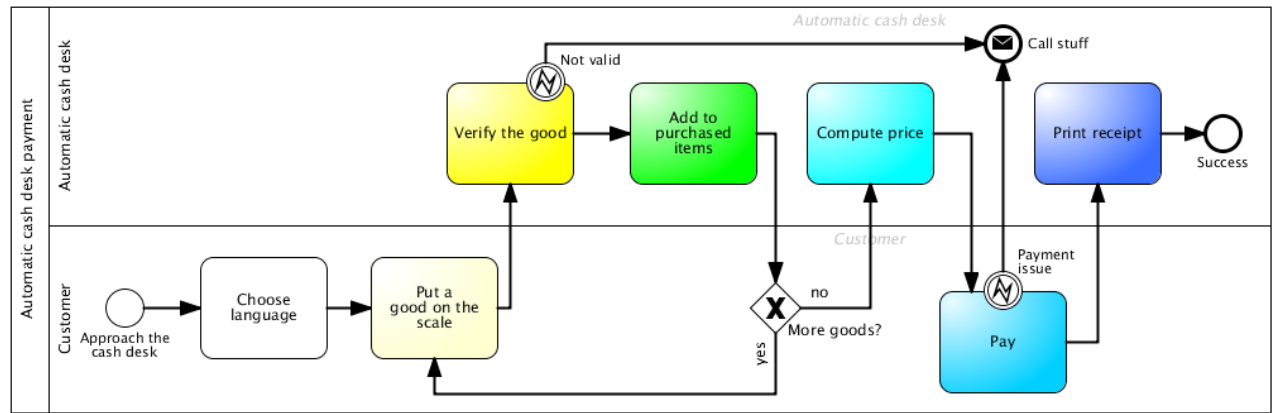


1. Current CASE tools, BPMT, PMT, ... allow to record only such objects and relationships, which had their creators in **minds** in the time when they were developing the tool.
2. Objects and relationships, we focus on when modeling various aspects of business, are **continually changing**.
3. Problem of effective communication within any IT project lies nearly always **on boundaries of capability** of a given modeling tool (... thus the model doesn't represent the reality appropriately)
4. Except of some isolated cases, there are only **few ways to extend** used MT by constructs which are needed for current specific requirements.
5. A problem arises in **integration** of some partial views into one common view.

Meta-modelling

- ▶ Ability to develop and adjust domain-specific modelling tools
- ▶ Helps to construct the domain in terms comprehensible to domain experts
- ▶ Hierarchy of modelling tools







How do we model reality in our heads?

We identify...



Object -s

...we find interesting





Then, we find...

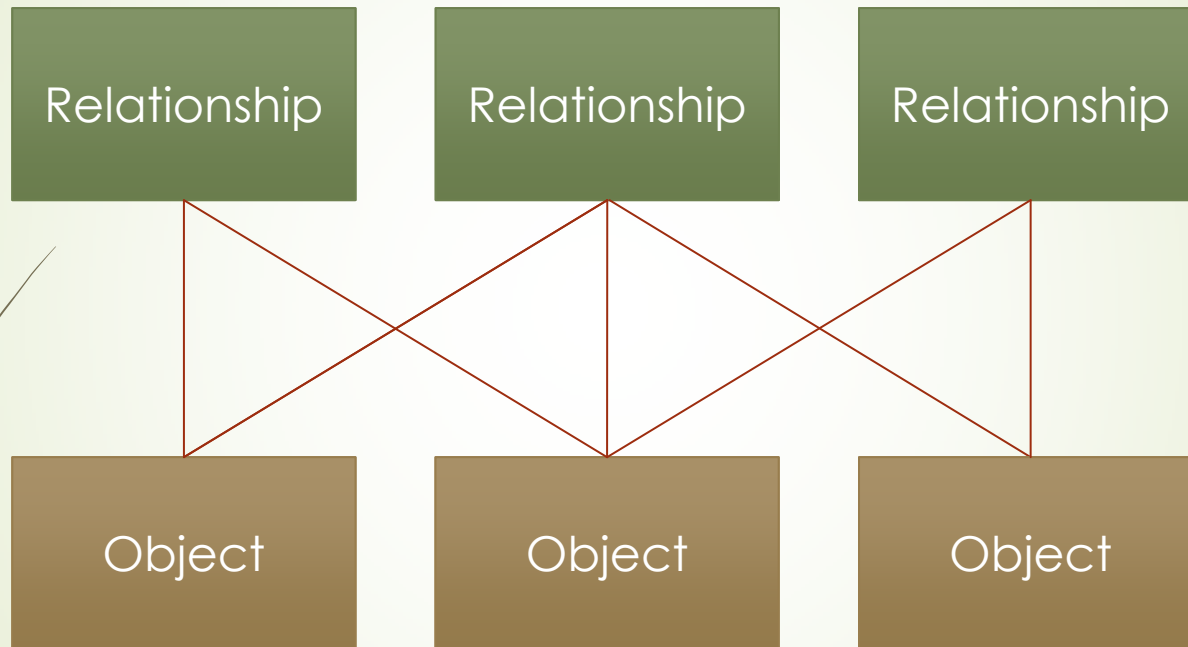
Relationship -s

...between our...

Object -s

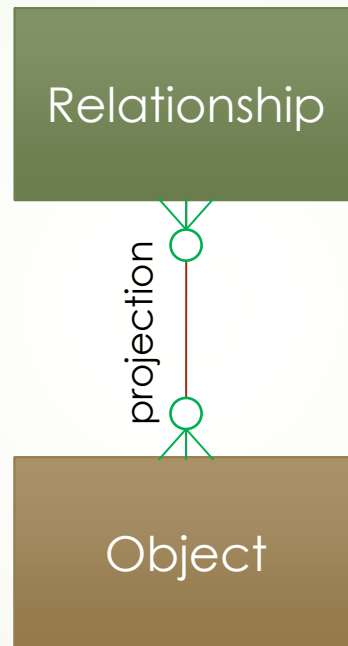


Each **relationship** can connect multiple objects...



...and each object can be present in multiple connections.

Each **relationship** can connect multiple objects...



...and each object can be present in multiple connections.



Which objects do we find interesting for modelling?

Relationship

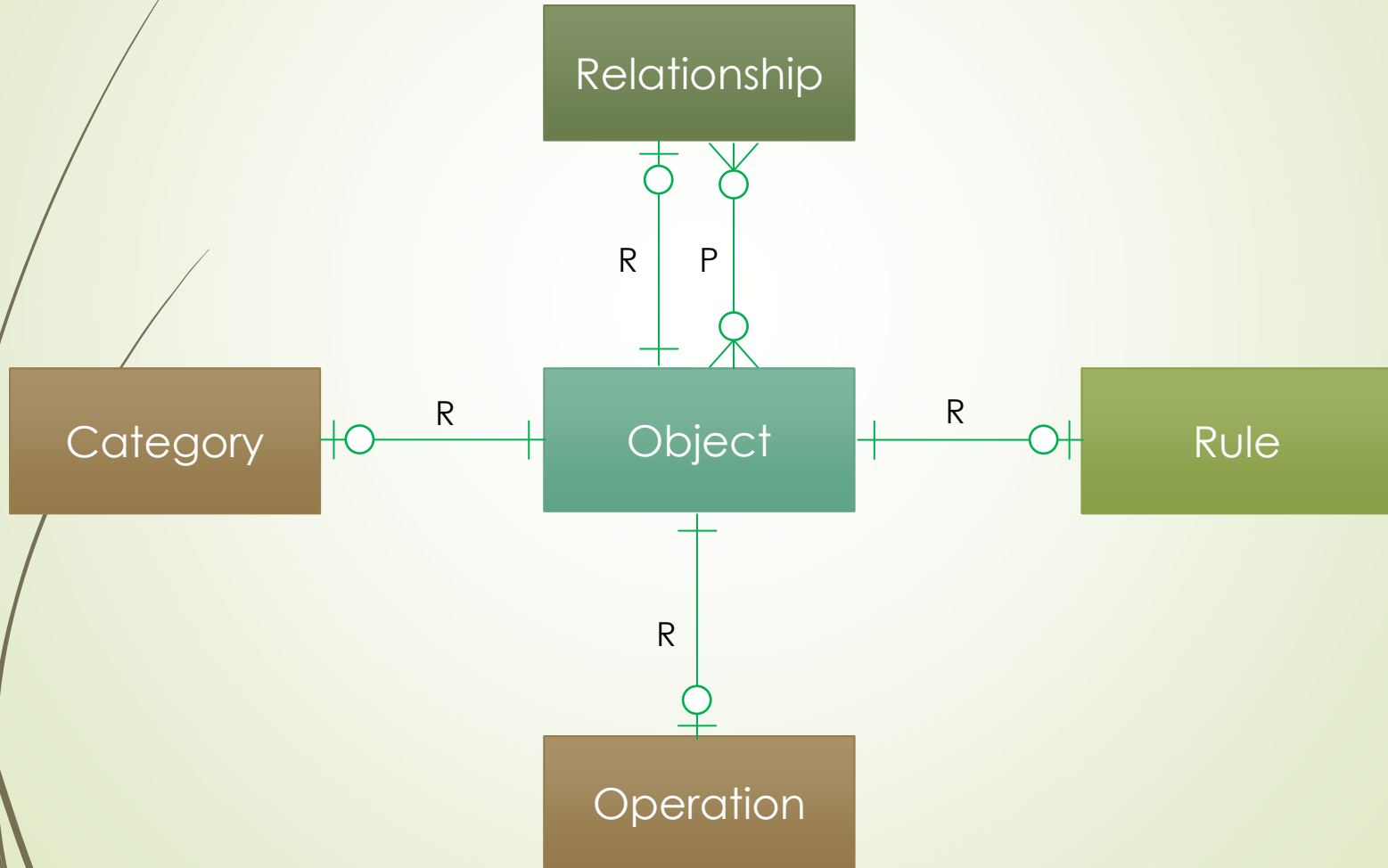


Category

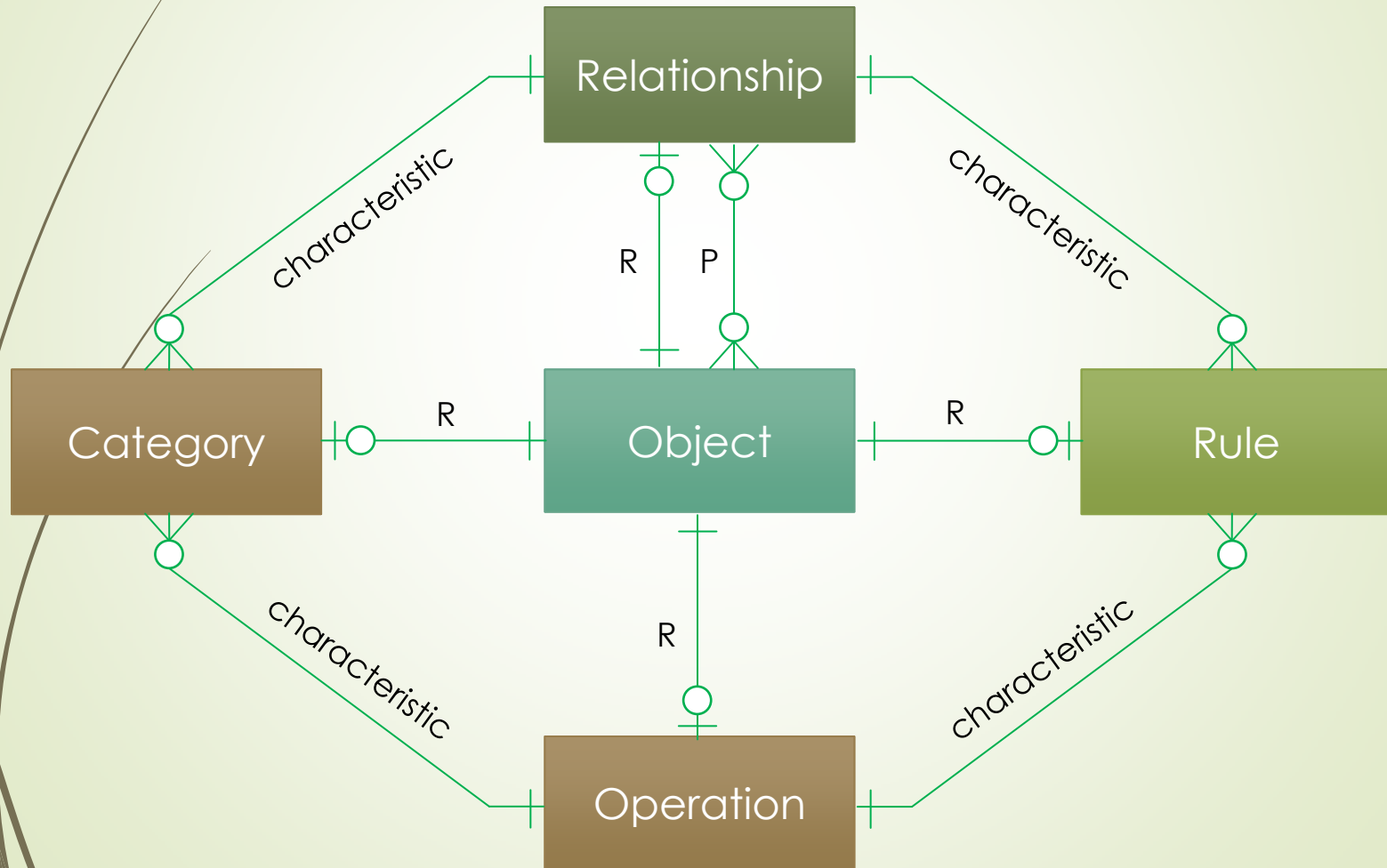
Rule

Operation

MENTION – USE duality

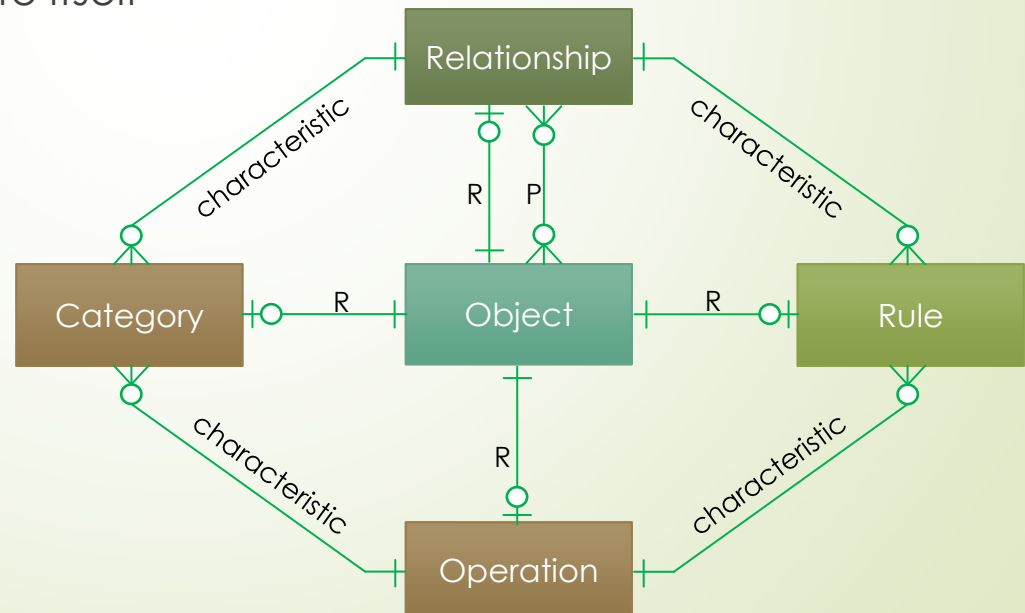


Diamond of Attention Focussing

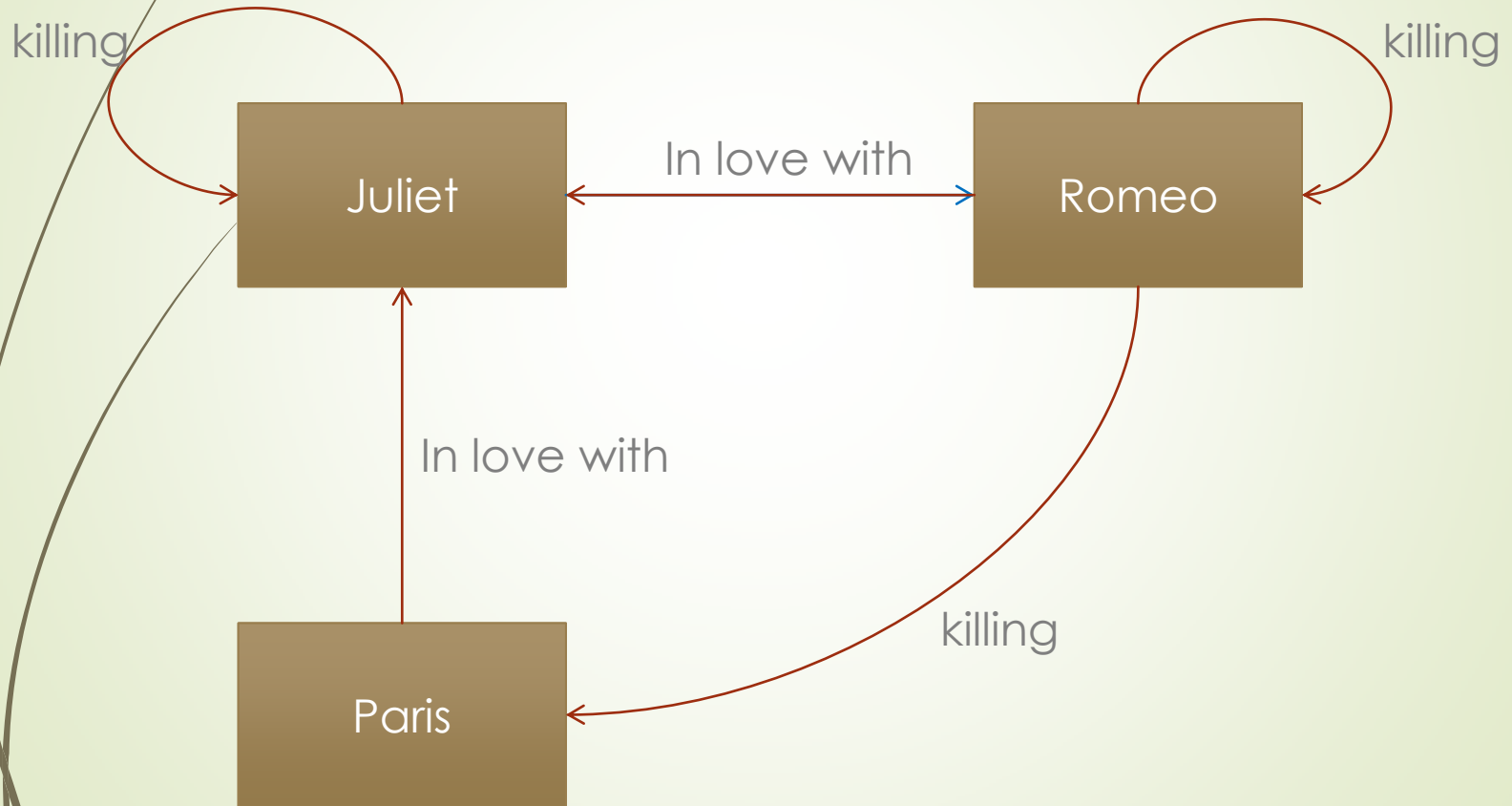


Diamond of Attention Focussing

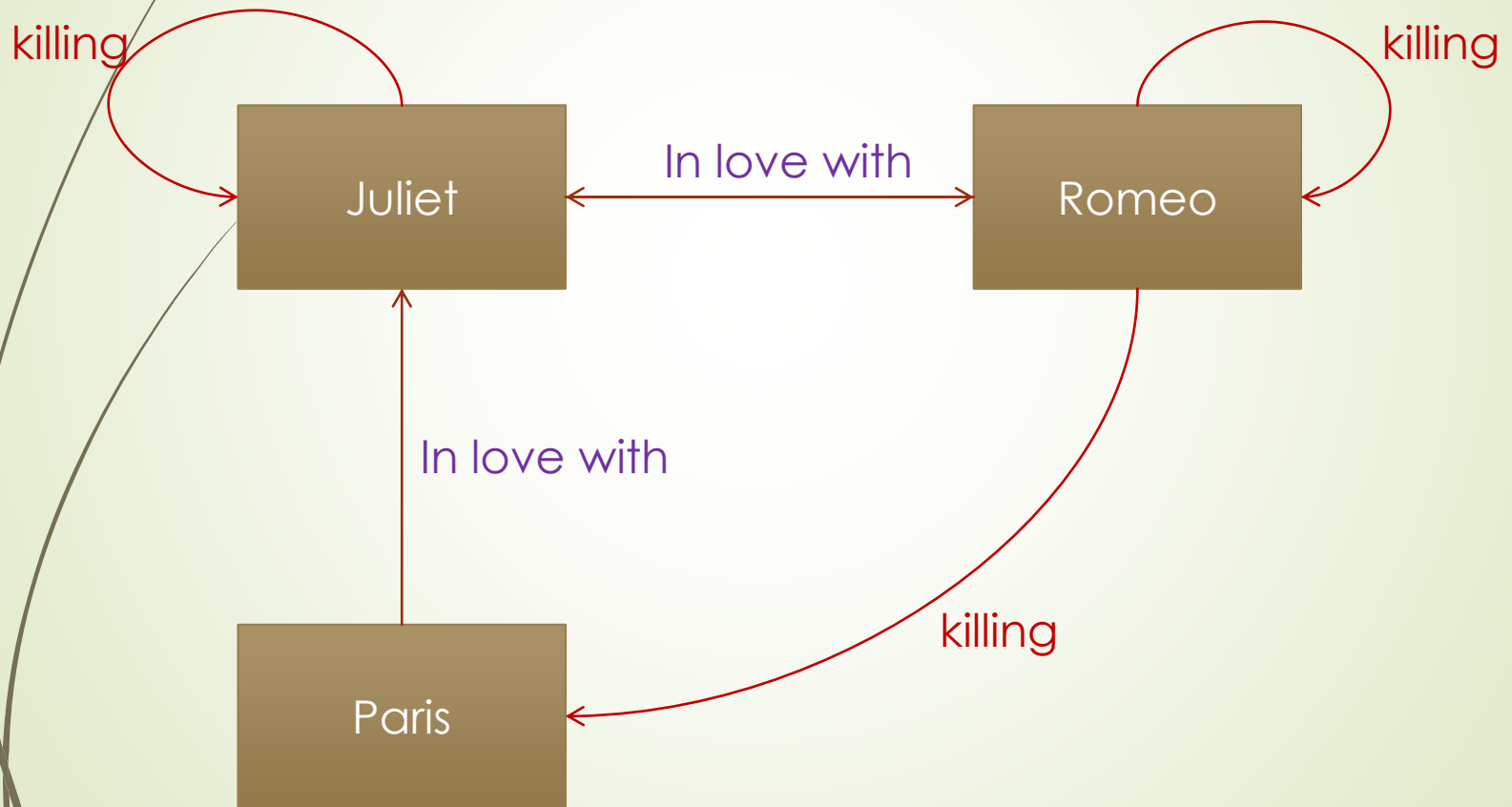
- Objects and relationships between them
- Mention-use duality
 - Modelling a modelling tool
 - Referring to itself



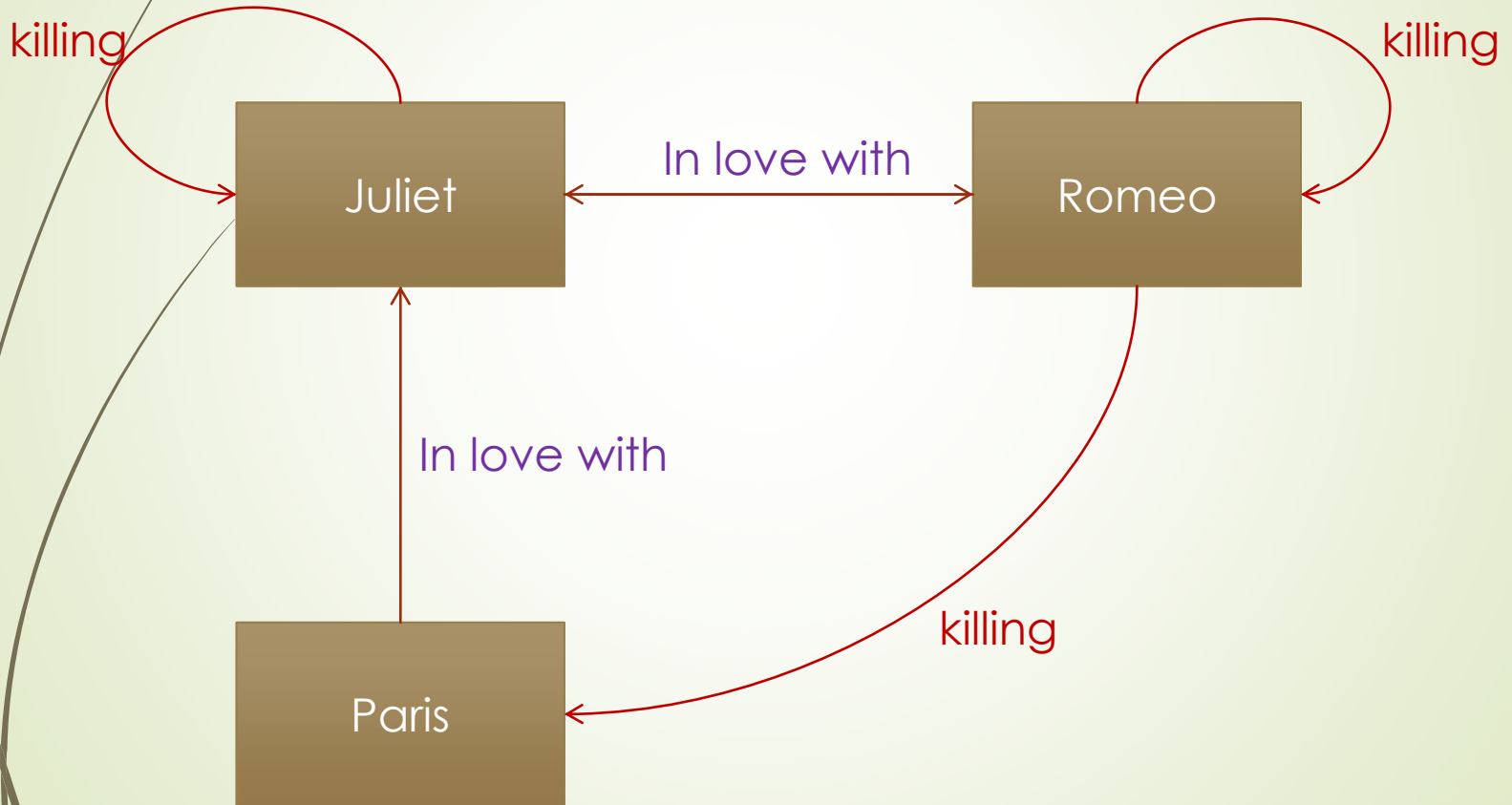
Classification example



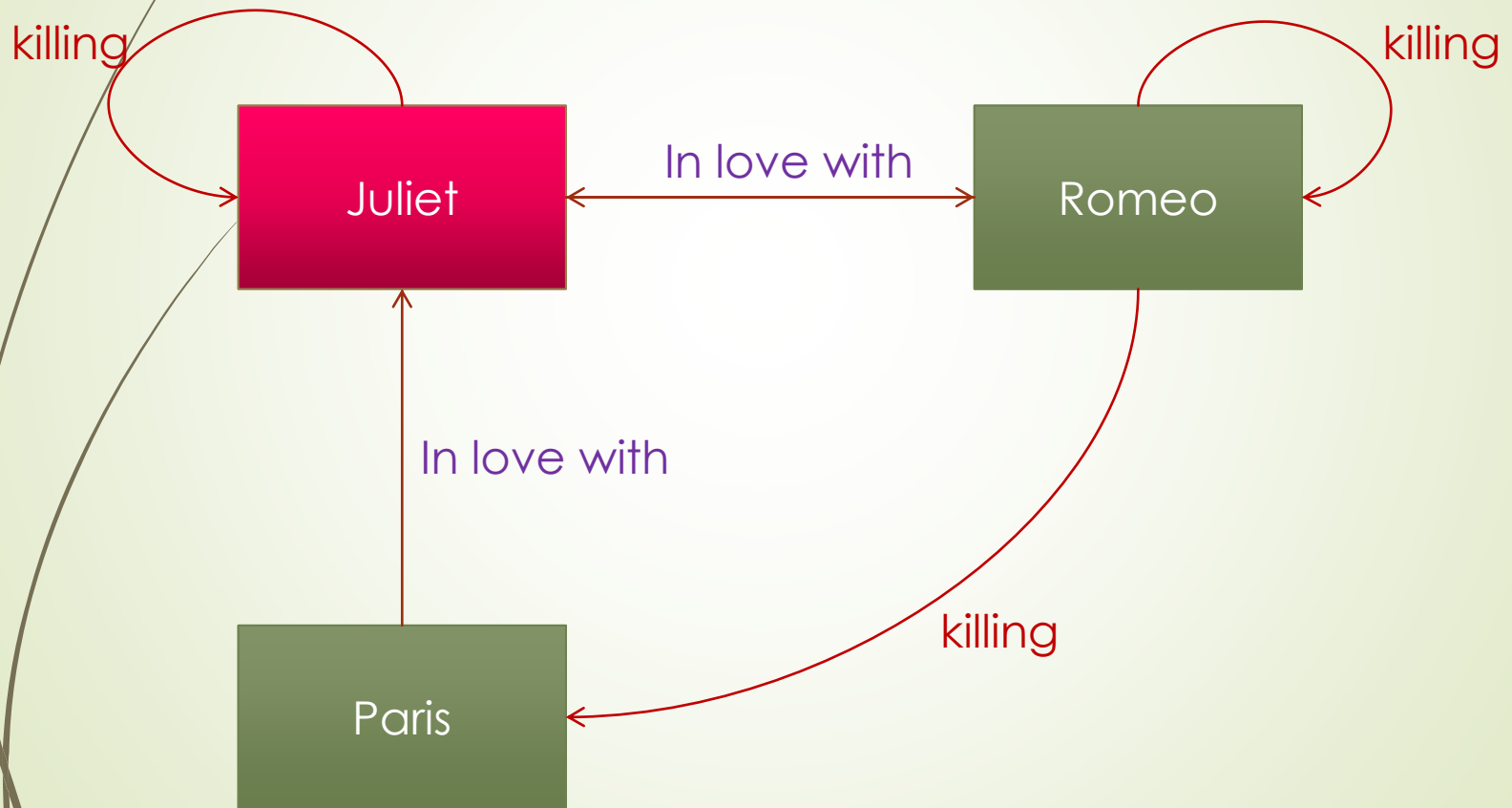
We can see that some connections are somehow similar – they belong to the same **category**:



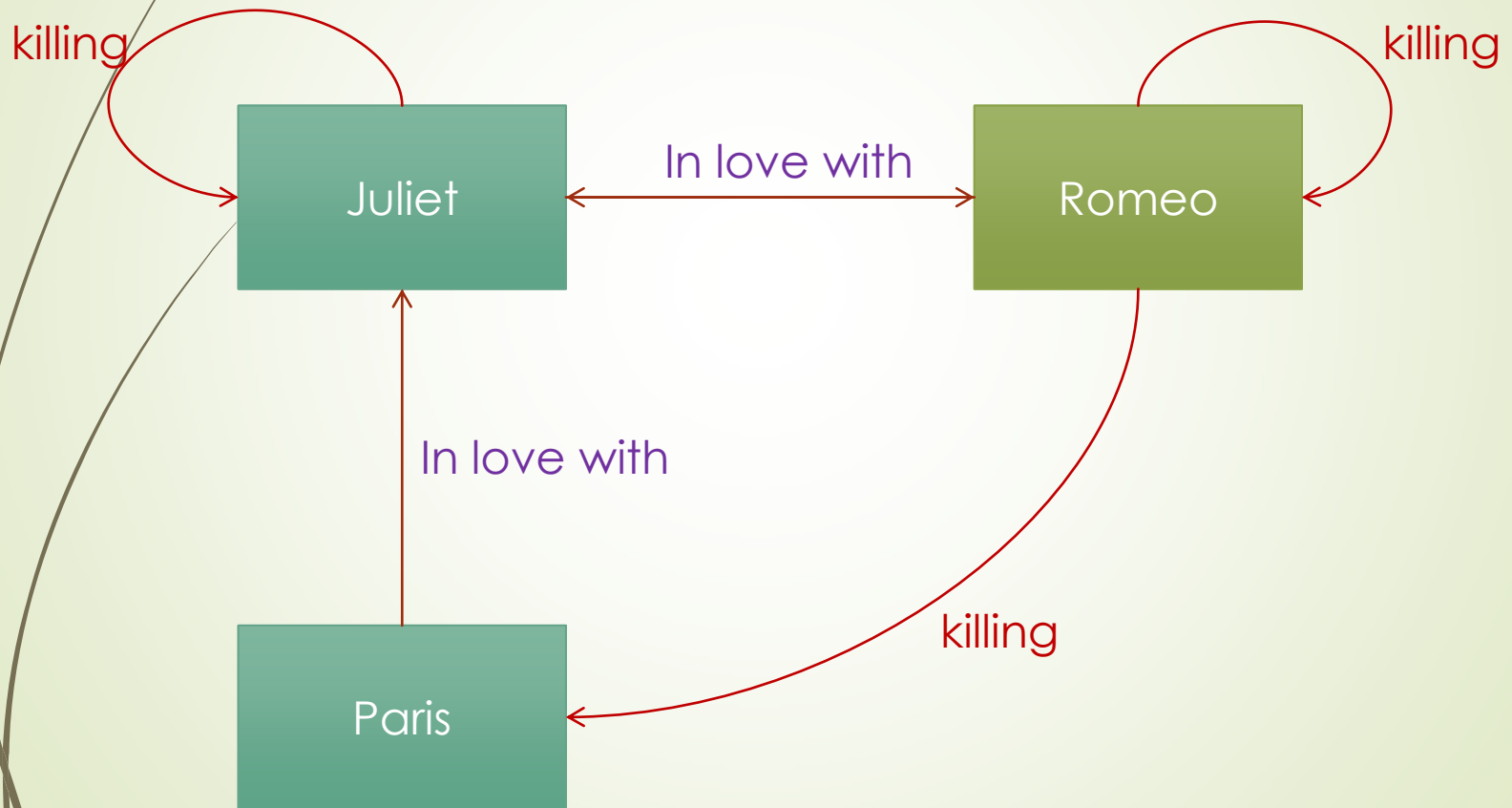
It's possible to classify everything we see in the diagram. But how to classify our objects?



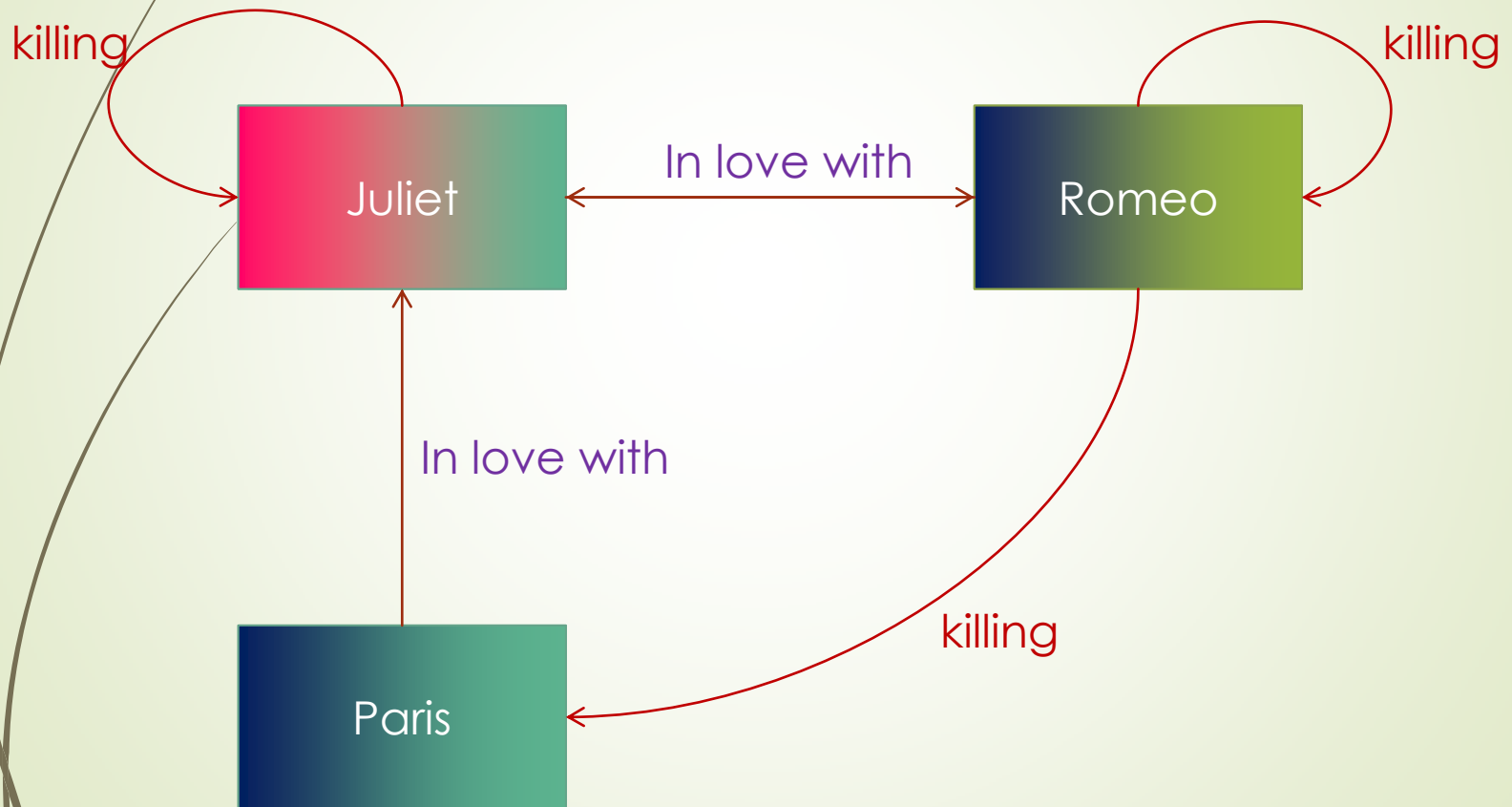
We could certainly divide the objects to men and women:



But won't it be more useful to show, which character belongs to the house of Montague and which one to the house of Capulet?



It probably depends on a context – a mental model we want to build. Sometimes, both categorizations may be useful:



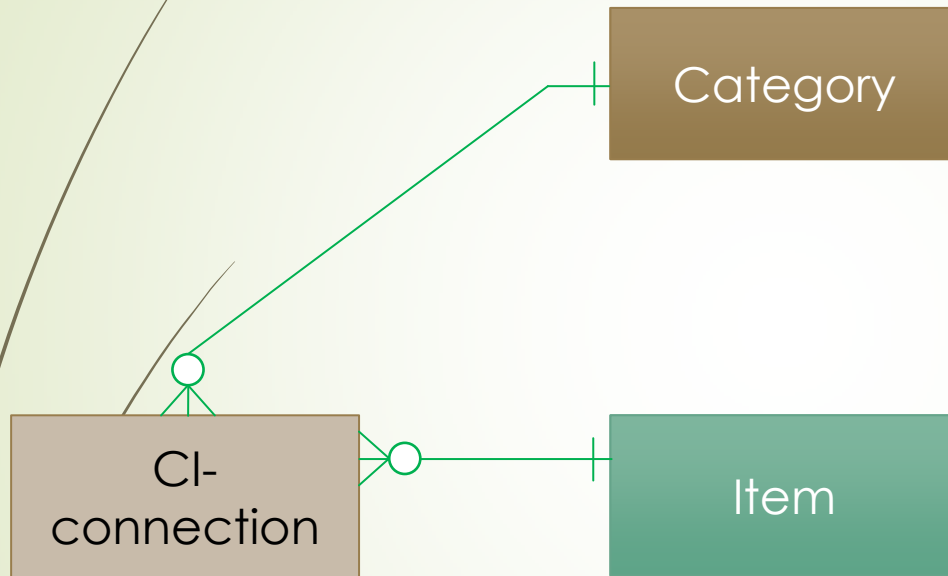
Classifications are blurred

Good or bad?



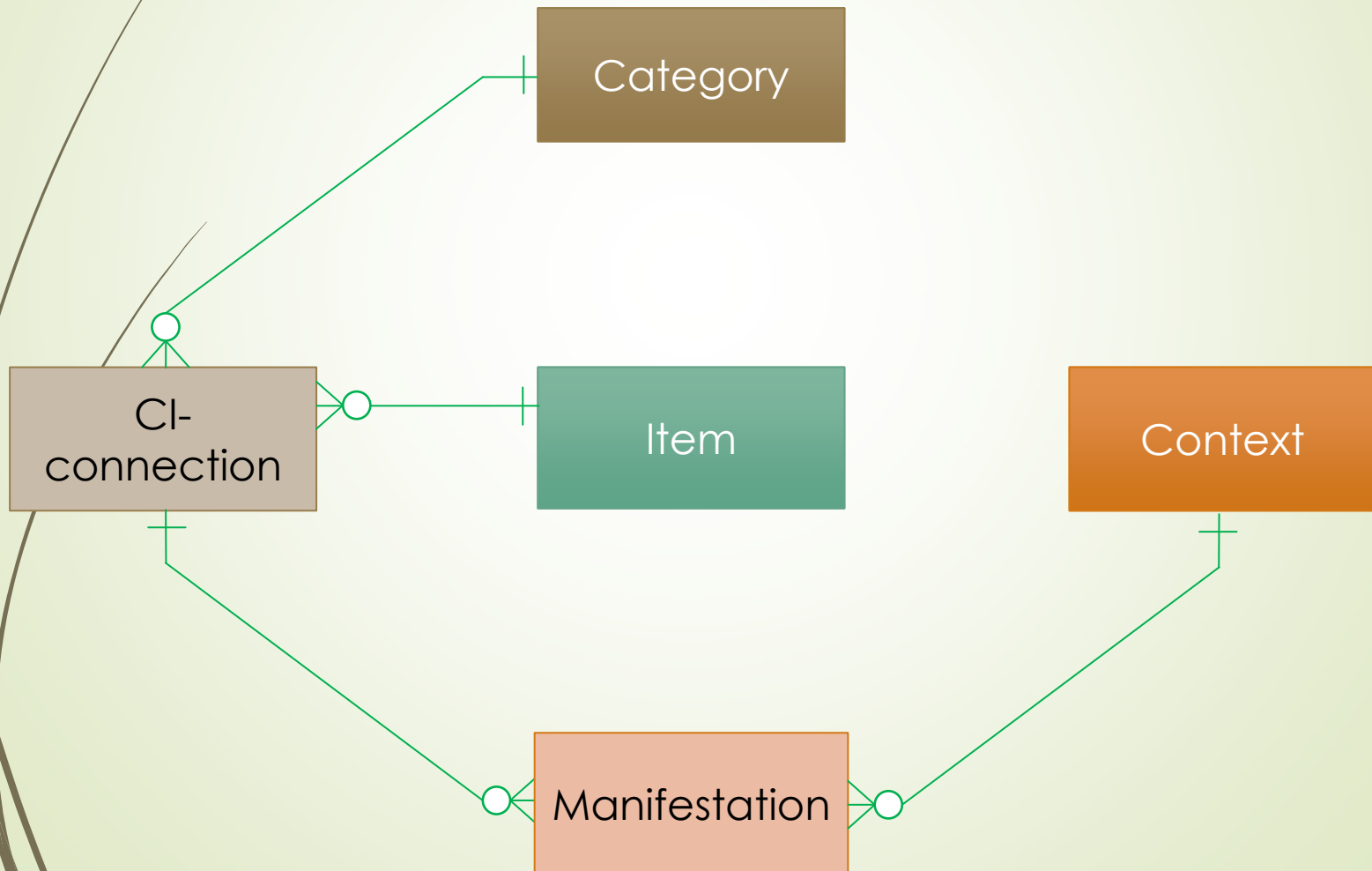
Certainty

- Items (= objects as such, not their constructs) belongs to a category with a given certainty



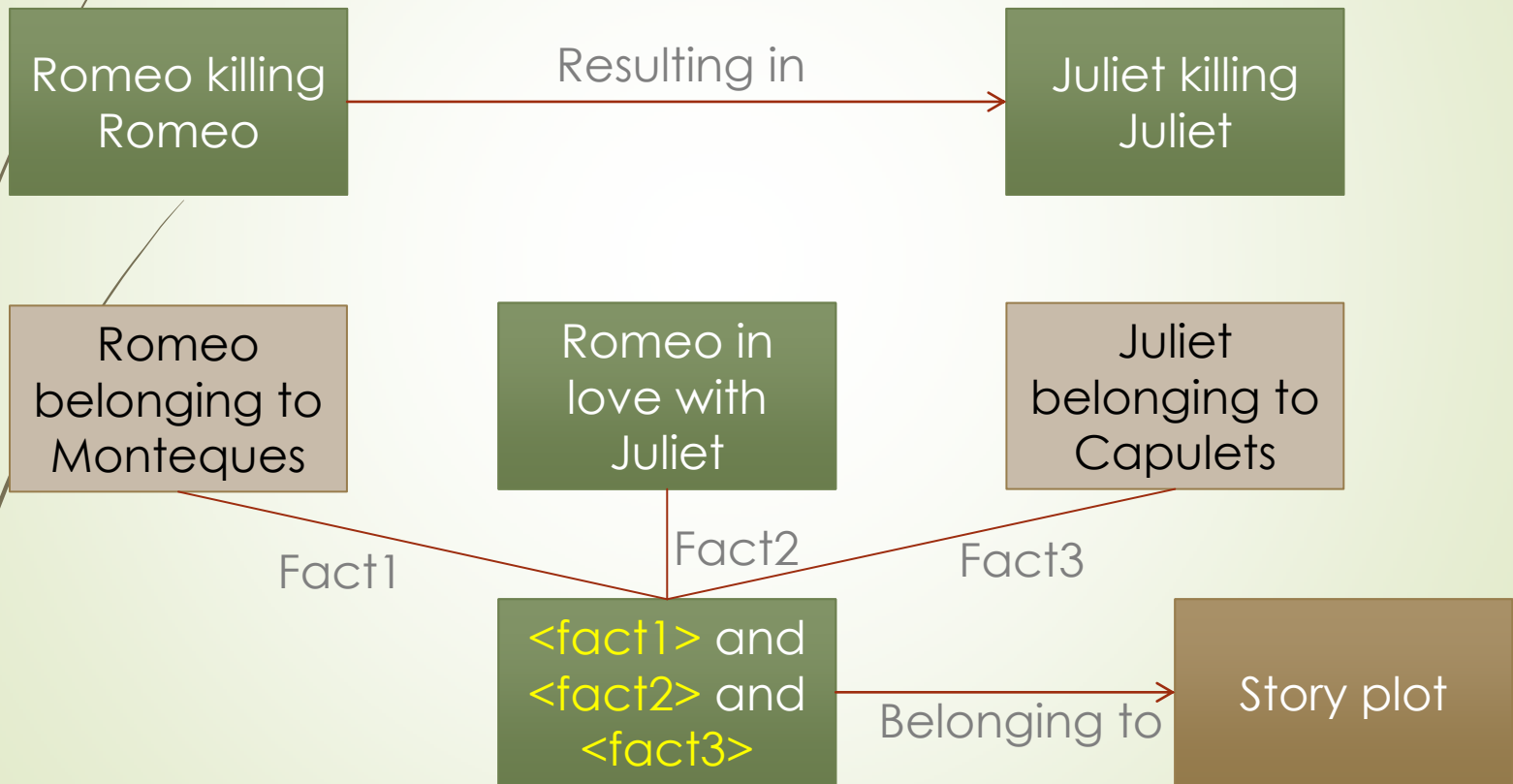
Attention

- ▶ The fact is manifested with a certain attention in a given context

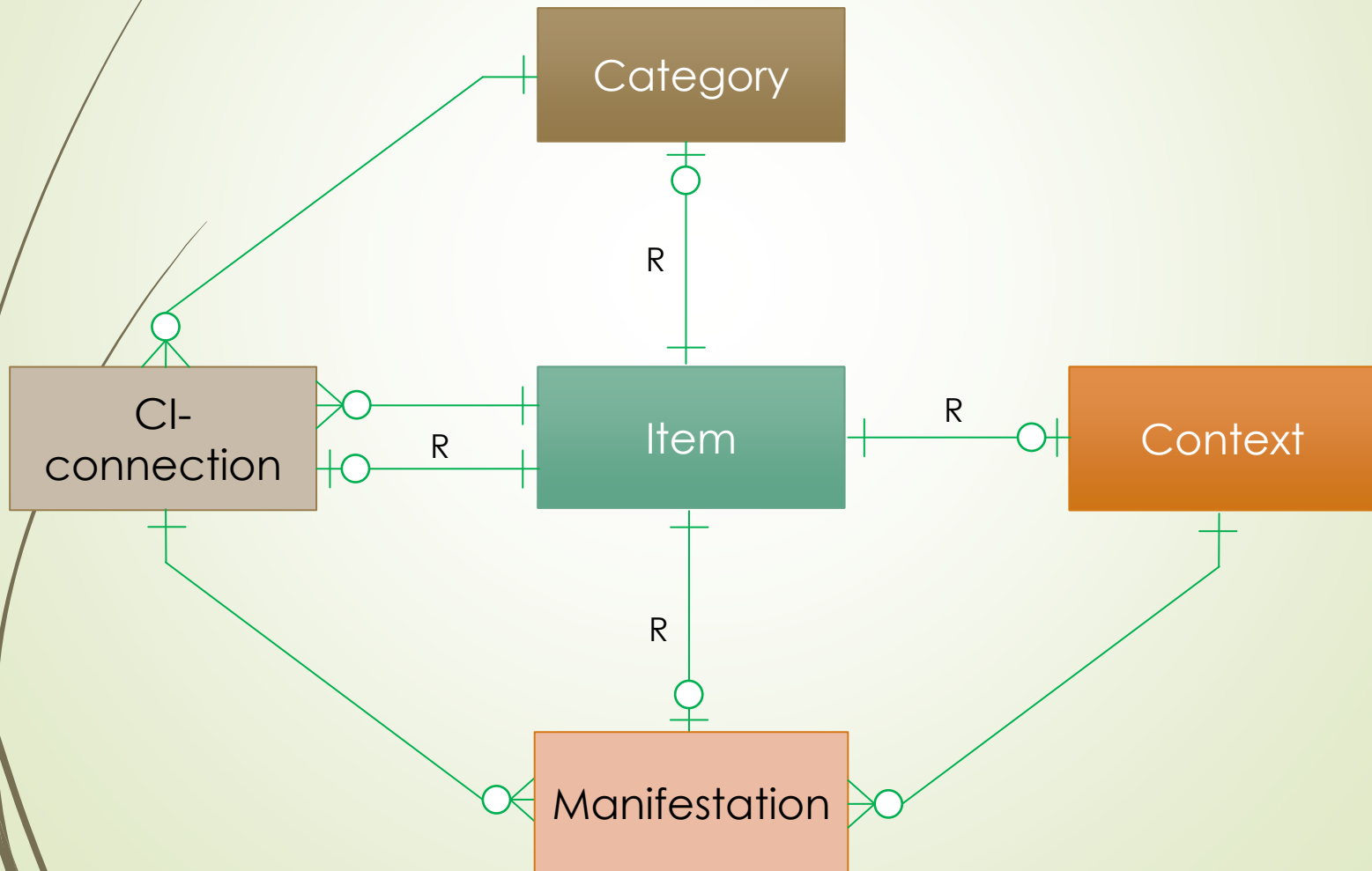


R-edges

- ▶ In some cases, it might be also useful to mention non-trivial concepts – contexts, categories, classifications or manifestations

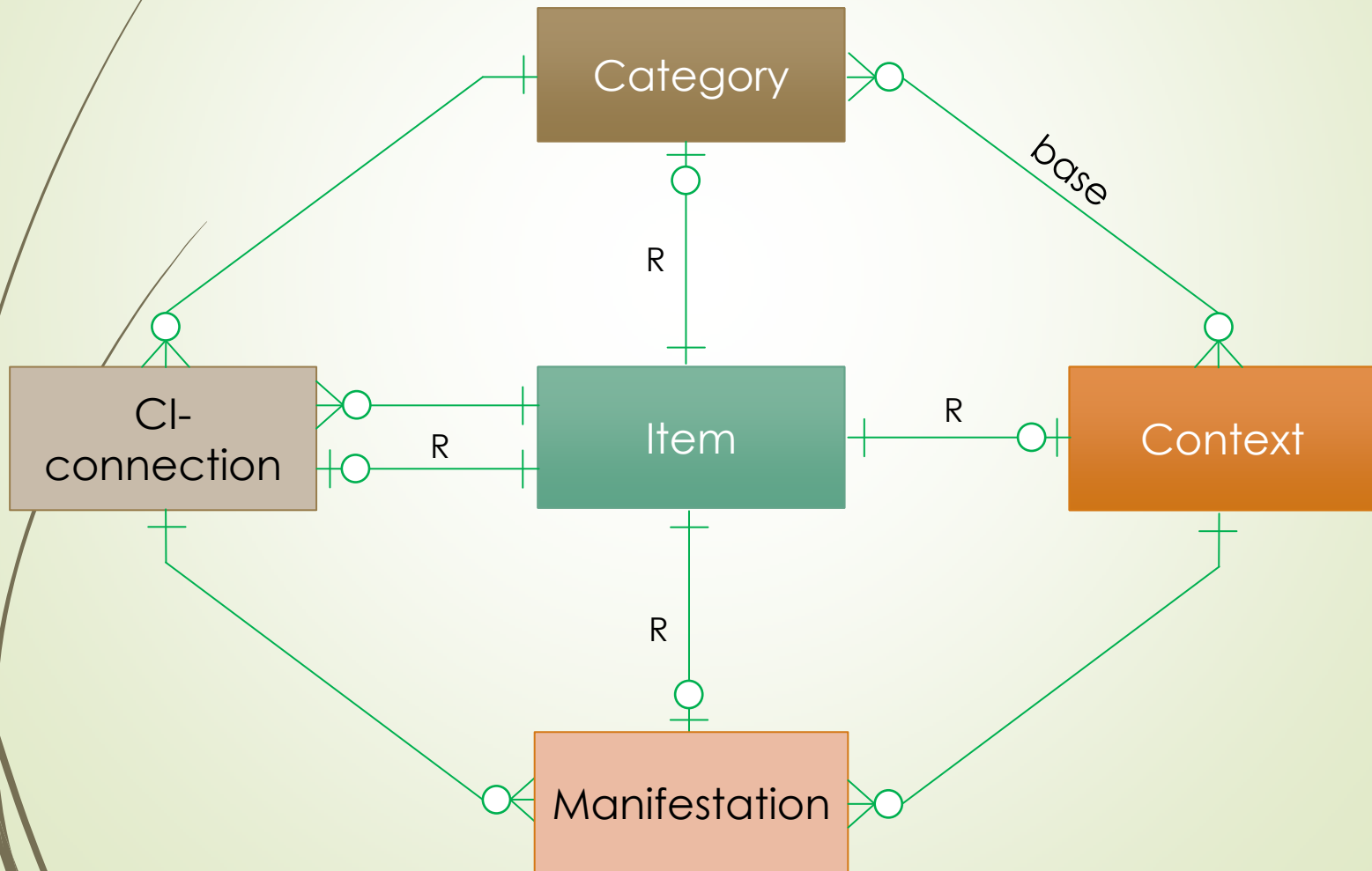


R-edges

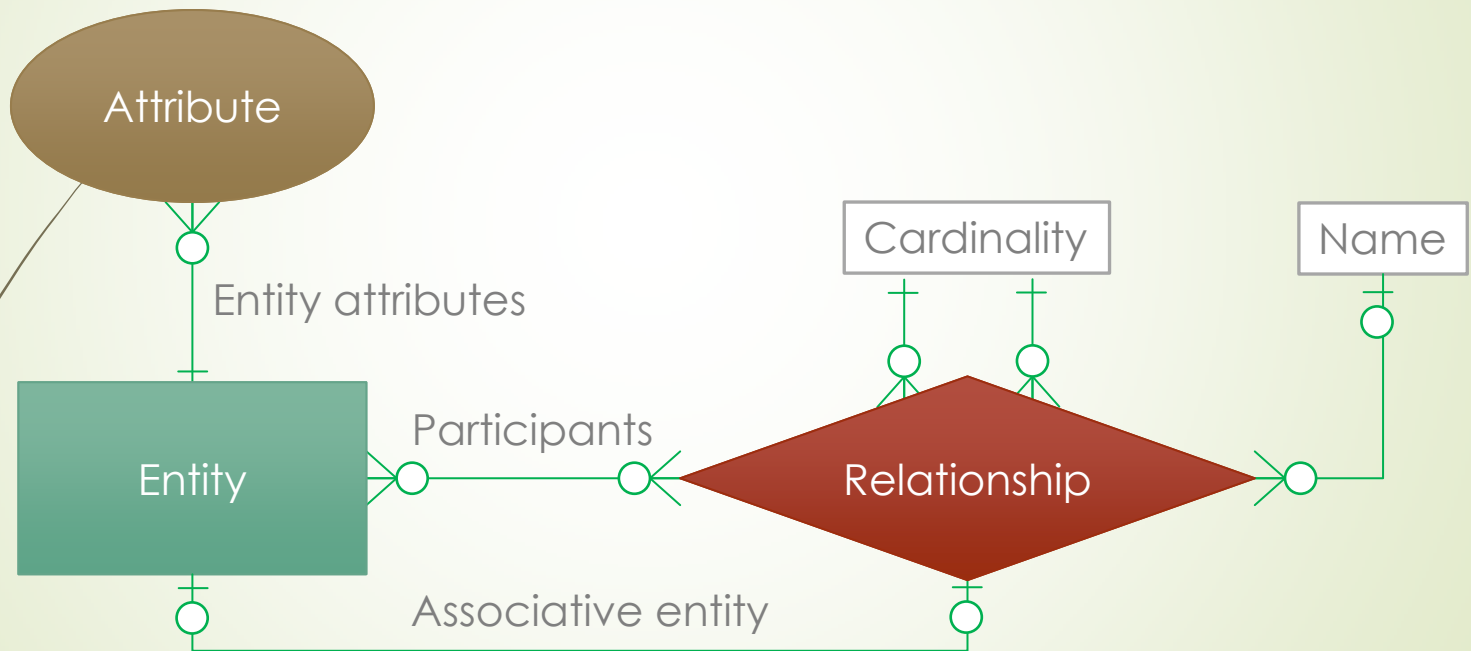


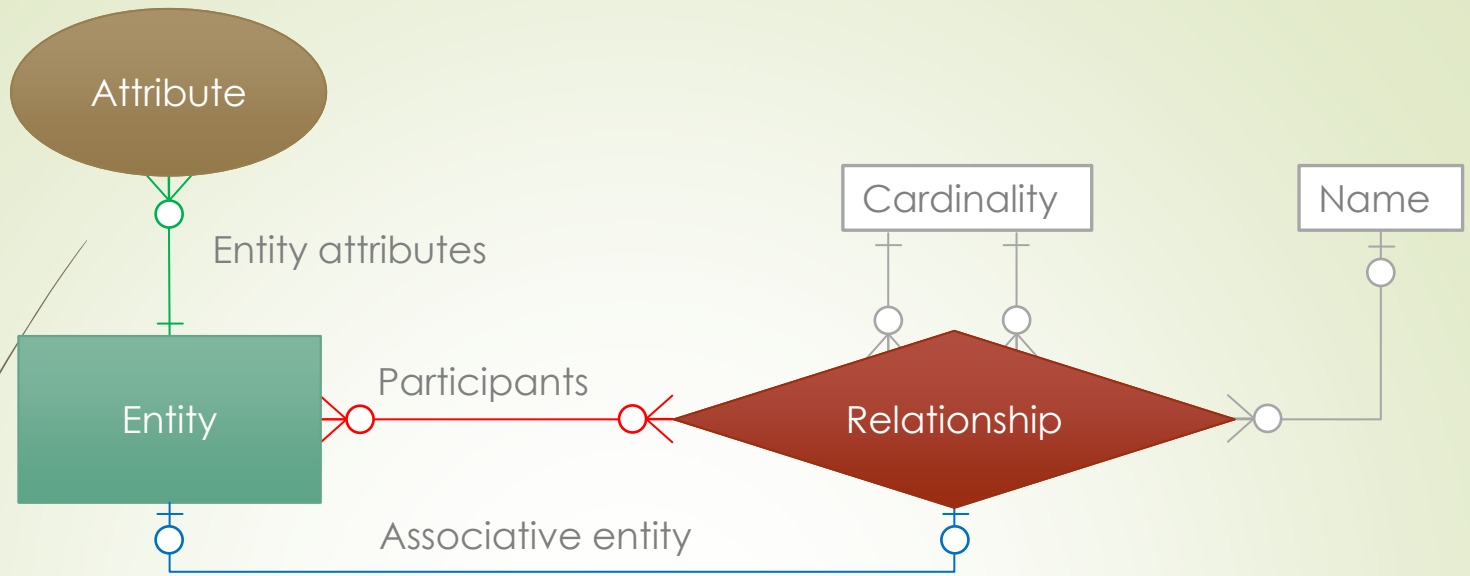
Context base

- Context serves as a model. The base edge defines the set of categories to classify its items to

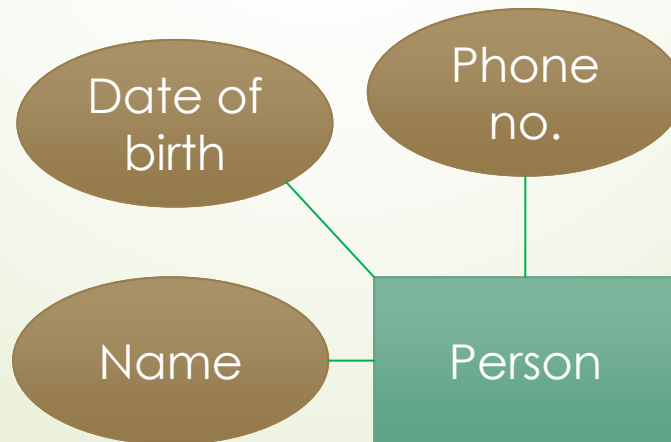


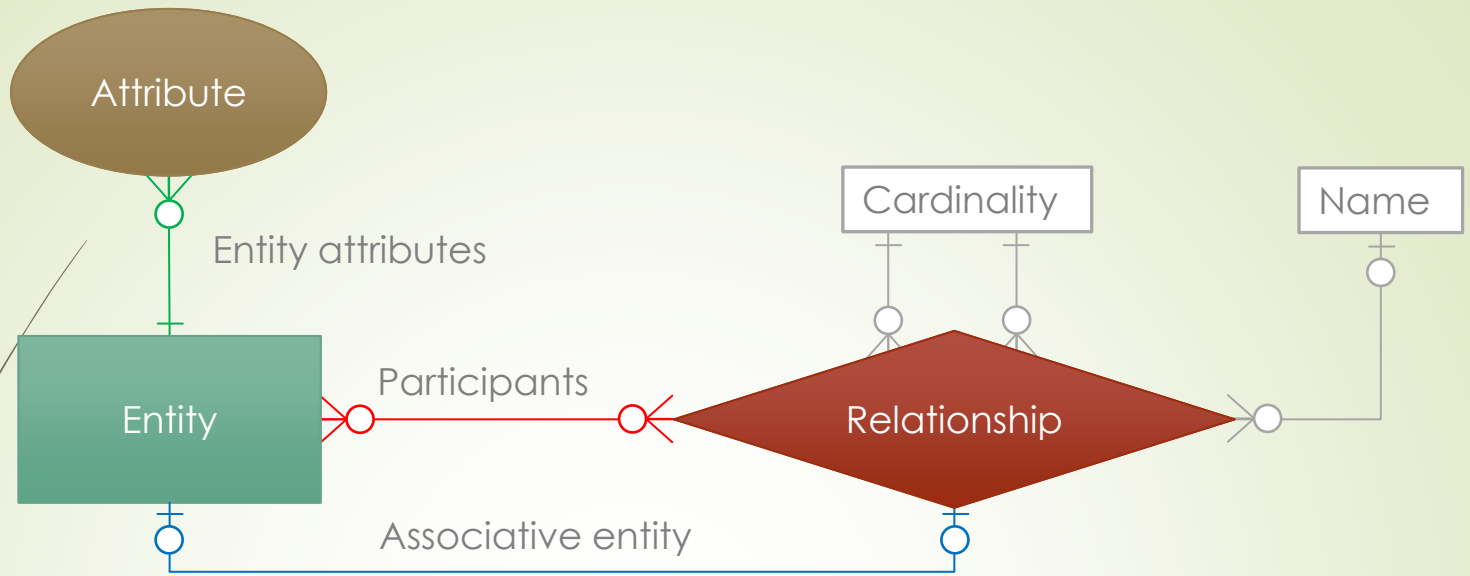
Example modelling tool: ERD



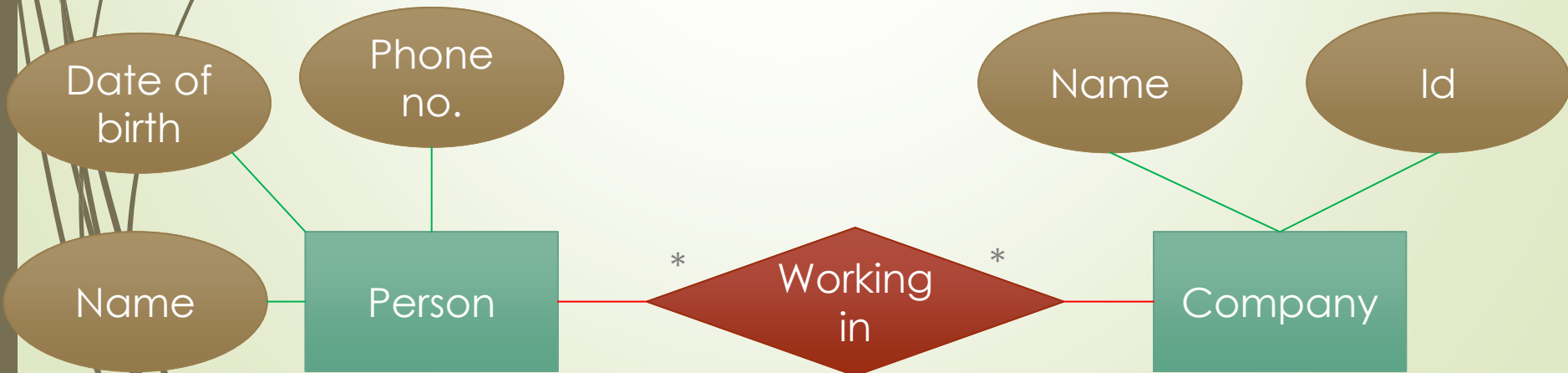


Forms category base for:





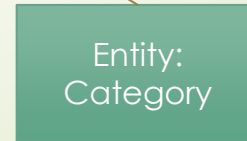
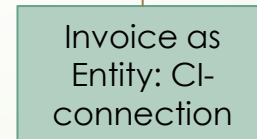
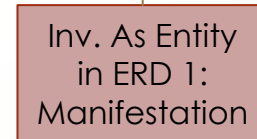
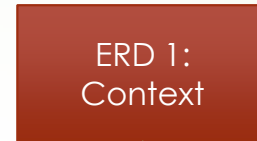
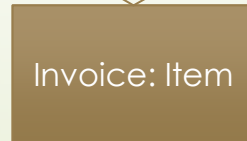
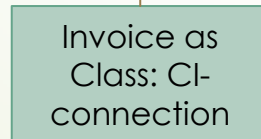
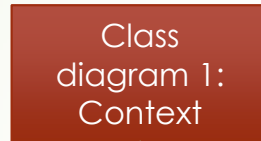
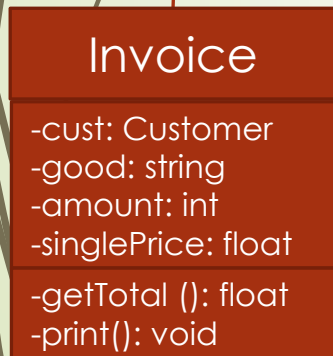
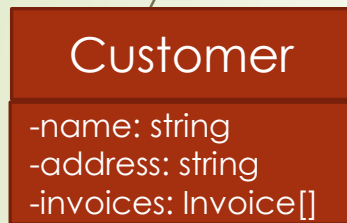
Here is a little more complex example of a model created in modelling tool above.



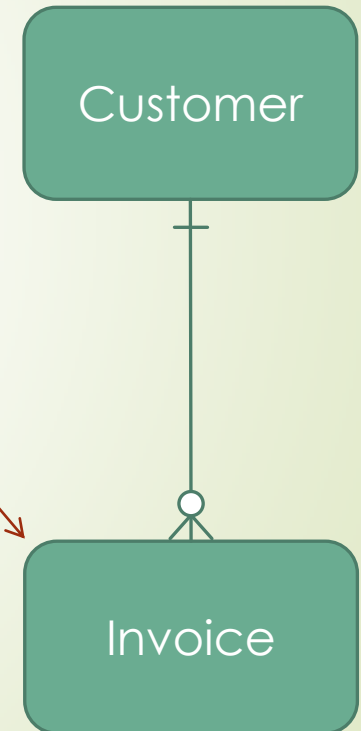
Interconnected models

- ▶ The same object classified to different categories, manifested in different context

Class diagram 1



ERD 1



Diamond-Path Framework Overview

See

Recognize

Organize

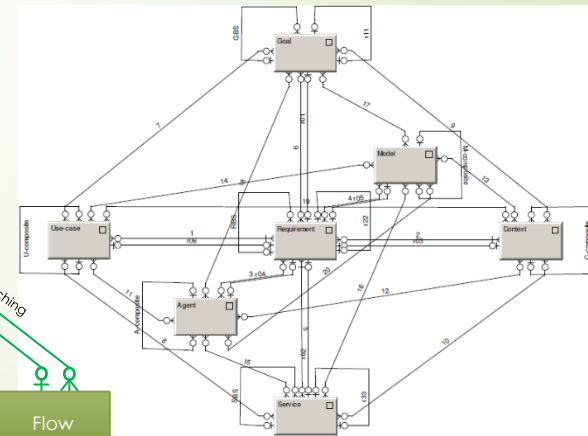
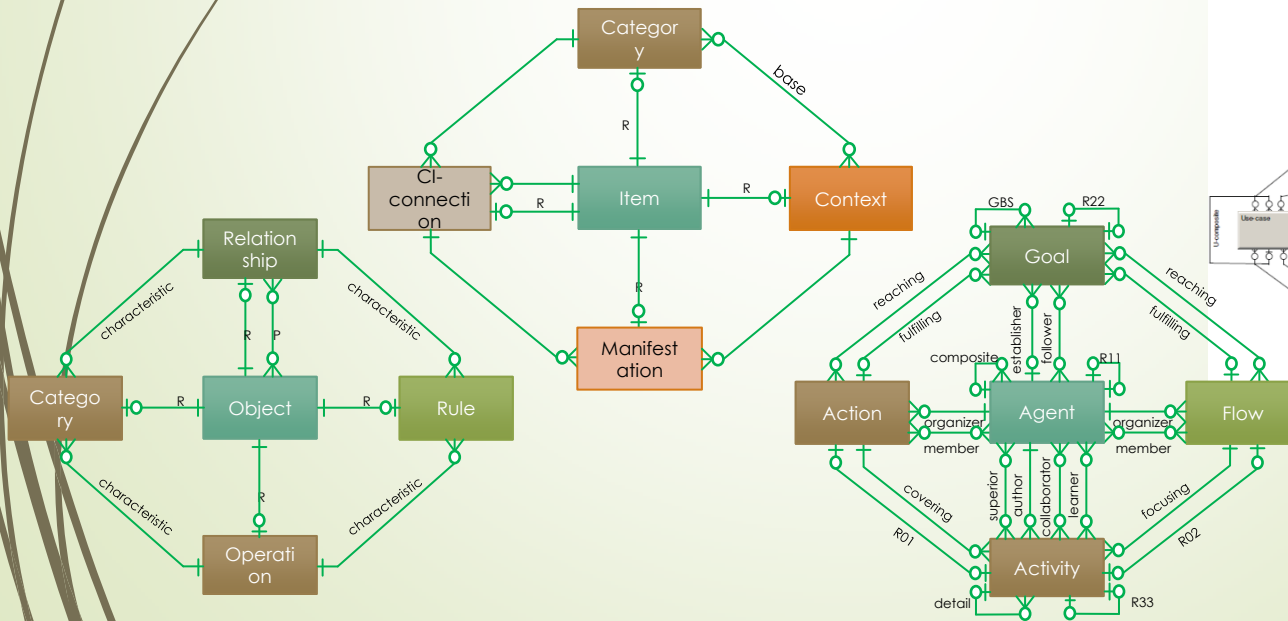
Do

Attention Focussing

Cognitive Elements

Agent-Team Organization

Predictive Behaviour





Reflection



- Do you find it interesting?
- And useful?
- Why has it remained a pure theoretical concept?
- Is it too complex?



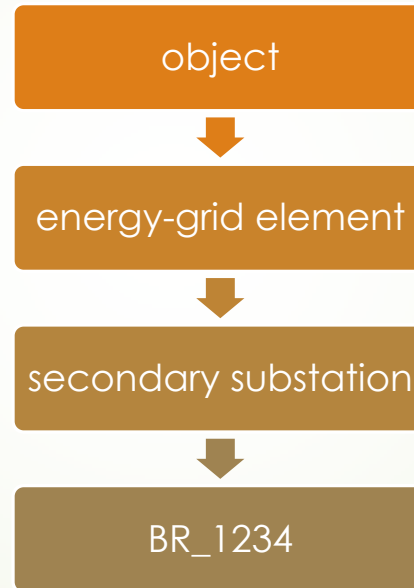
Follow-up Efforts

- Several academical works, none has made it to the business practice

- ...with one exception

GridMind

- ▶ Simulation environment designed to benchmark technological solutions of future-energy grids
- ▶ Combines objects on various levels of abstraction



- ▶ Comprises a number of mental contexts: distribution network, communication network, information scope, devices, technical processes, ...
- ▶ Very complex, difficult environment – worth systematical thinking