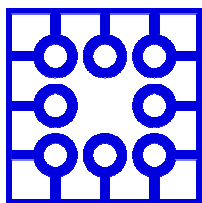


**M U N I
F I**



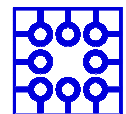
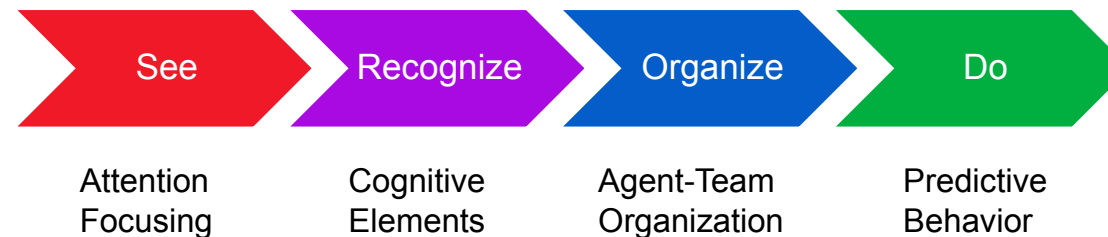
Laboratoř
servisních
systémů

Diamond Do



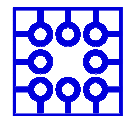
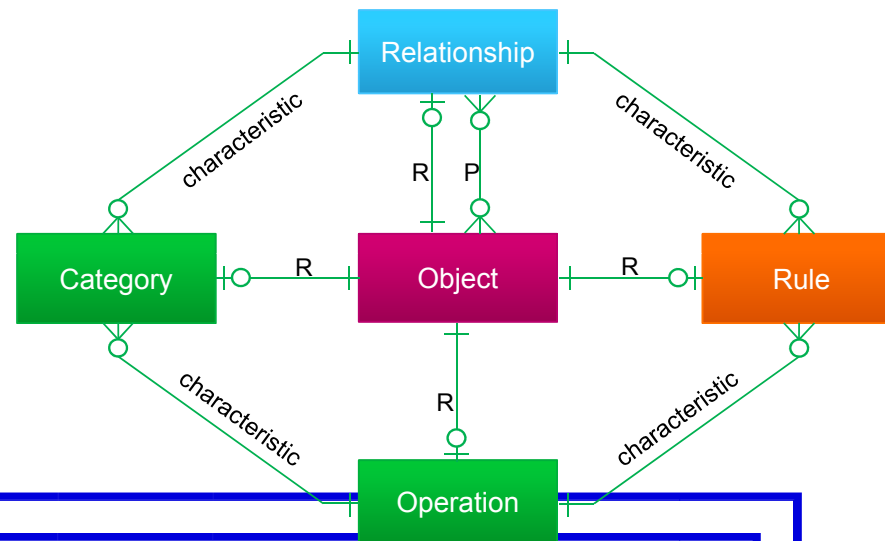
Diamond-Path Framework

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



Diamond of Attention Focussing

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



Diamond of Cognitive Elements

Working within the context

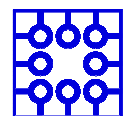
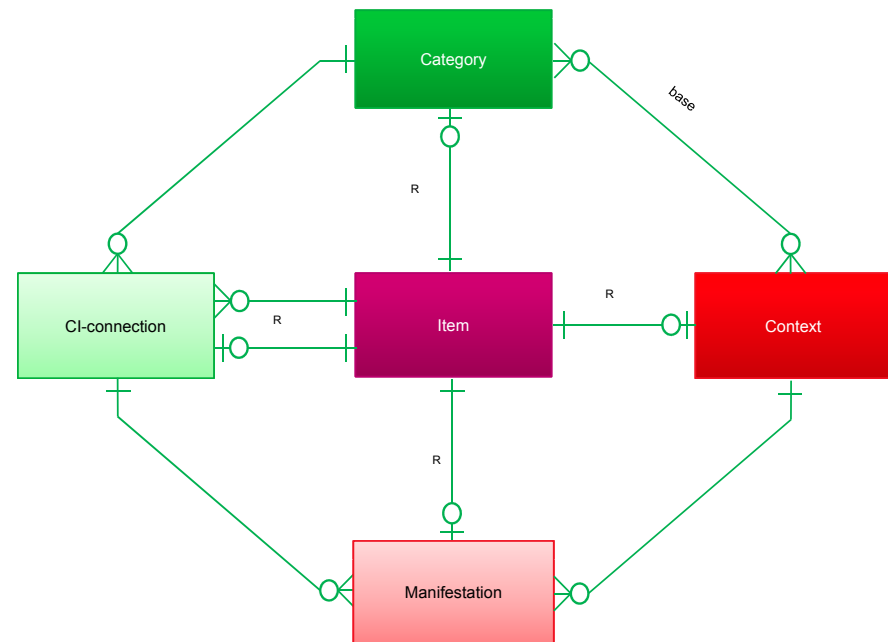
- Each item can appear in more contexts
- Category can exist in more contexts (and vice versa)

Given level of certainty

- The level of certainty depends on the expertise of agents
- It is never 100%

Mention-use duality

- The only use of R-edges



Diamond of Agent – Team Organization

Action vs. Flow

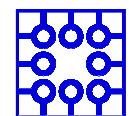
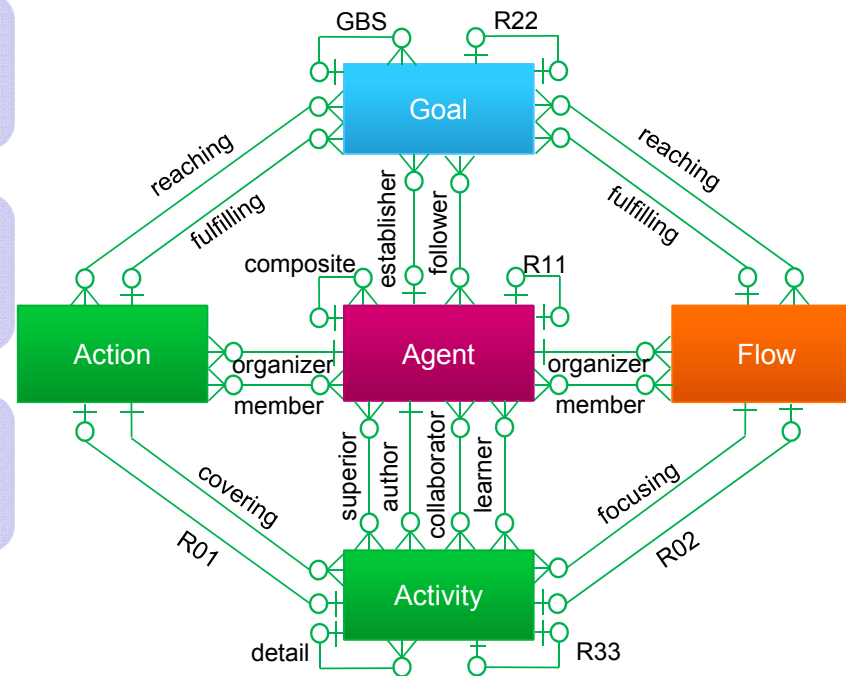
- Are stable during whole service lifecycle
- Change means the change of the context

Agent Behavior

- It is based on the GBS
- Goals are created in the different contexts (environments, like school, home, work)

R-edge

- Represents the contextuality
- Goal, Agent and Activity can appear in the different context
- Action and Flow can be Activity in other context (and vice versa)



Analysis of the Agent

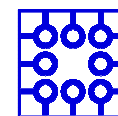
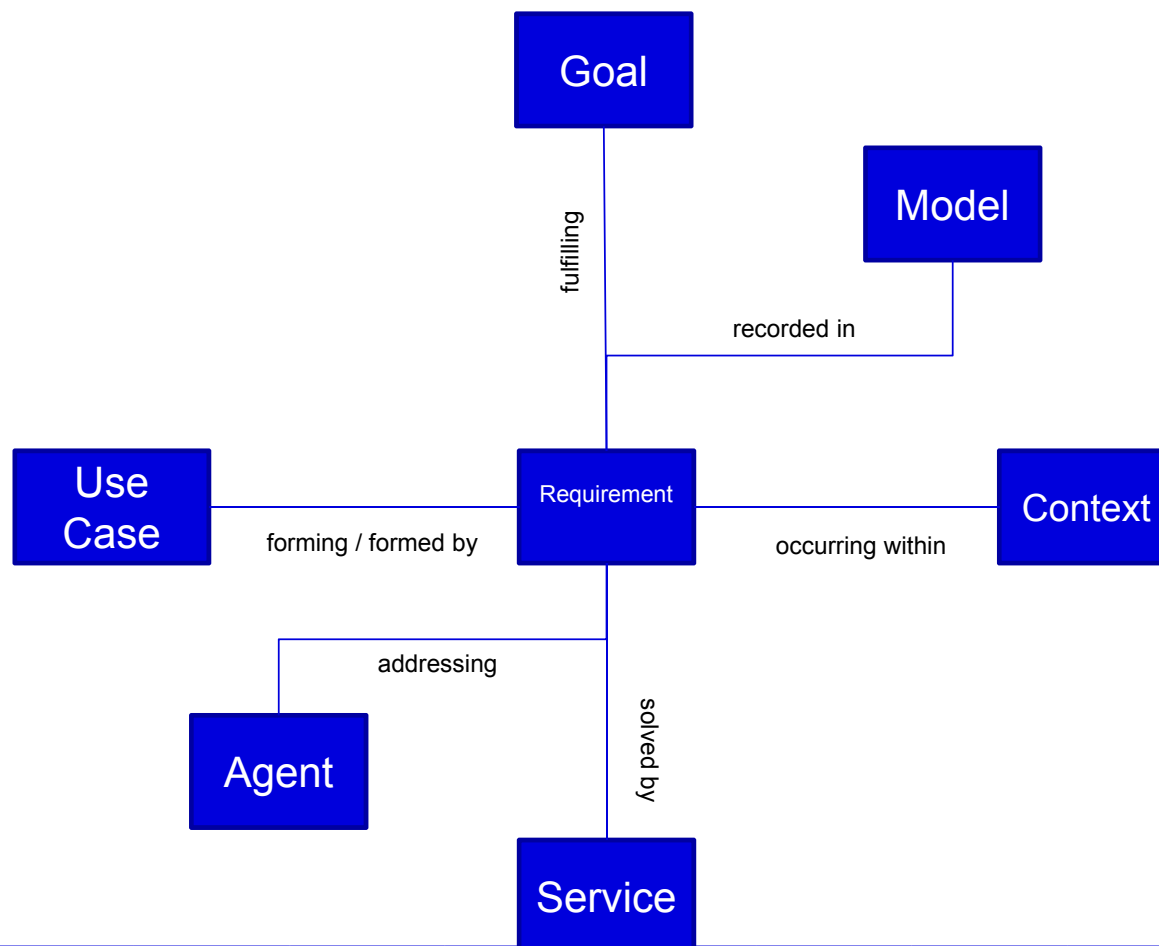
What can be centred in the agent role?

Agent has requirements

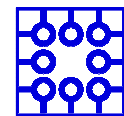
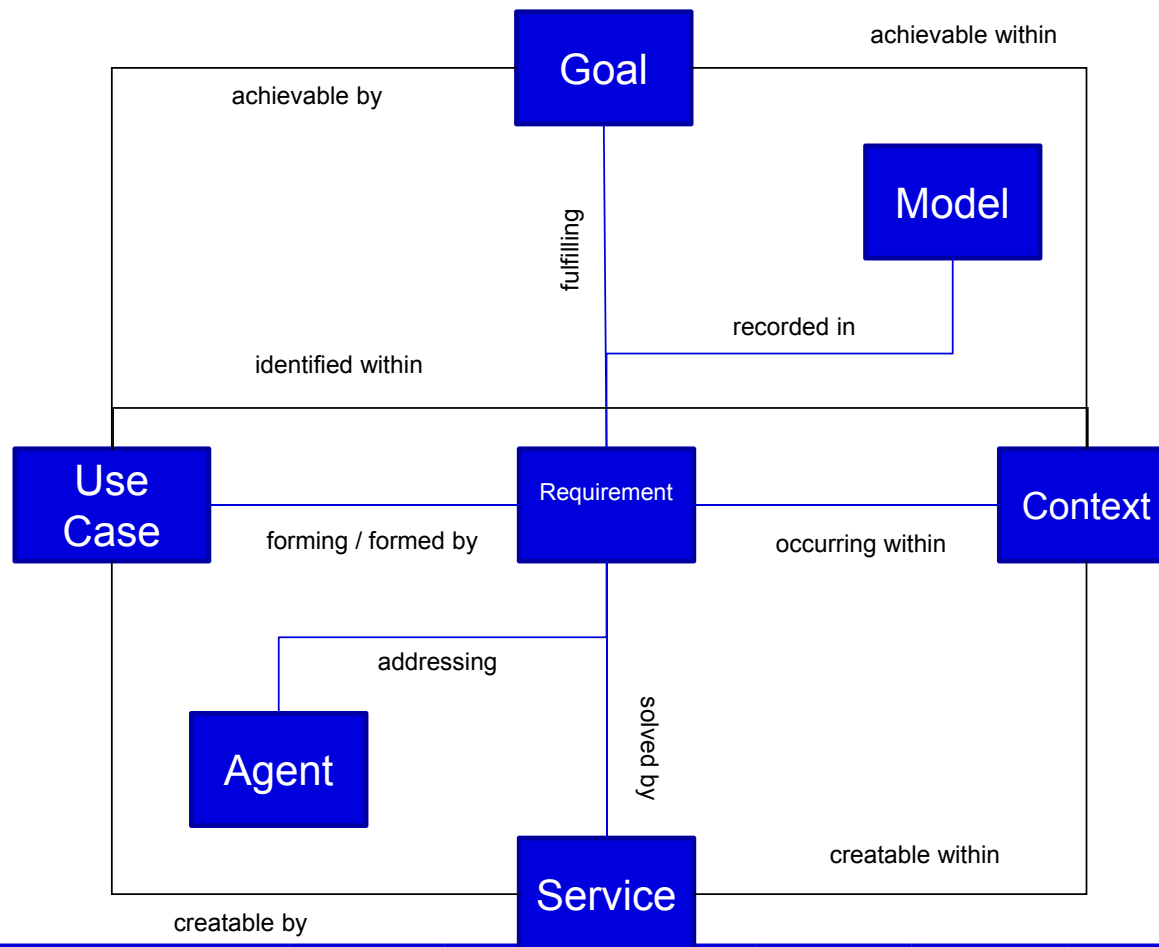
Requirements can be modelled



What is related to requirements?

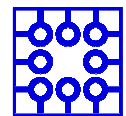


What is related to requirements?

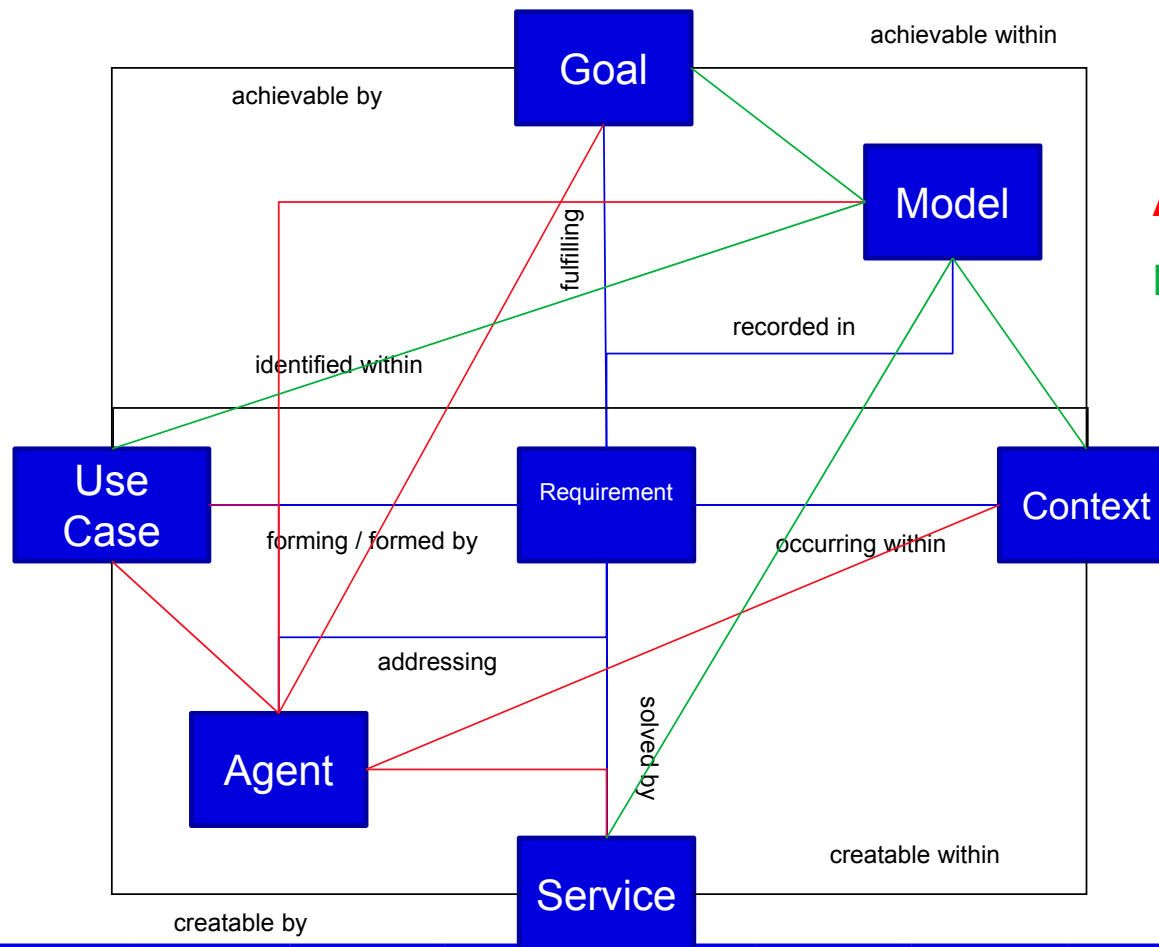


rent a car like rent a bike, pick up the car along the road and go, any time, anywhere

- Requirement: we want to solve the transportation issues
- Agent: the city or municipality, citizens, tourists
- Model: which type of transportation at which time for which group of people
- goal: drive green! car sharing! reduce traffic jam and arrange the transportation better
- Use case: Smart transportation projects, Car sharing projects
- Service: real-time car booking service, service centre, reg. services etc.
- Context: Smart City

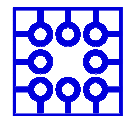


Two special containers

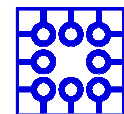
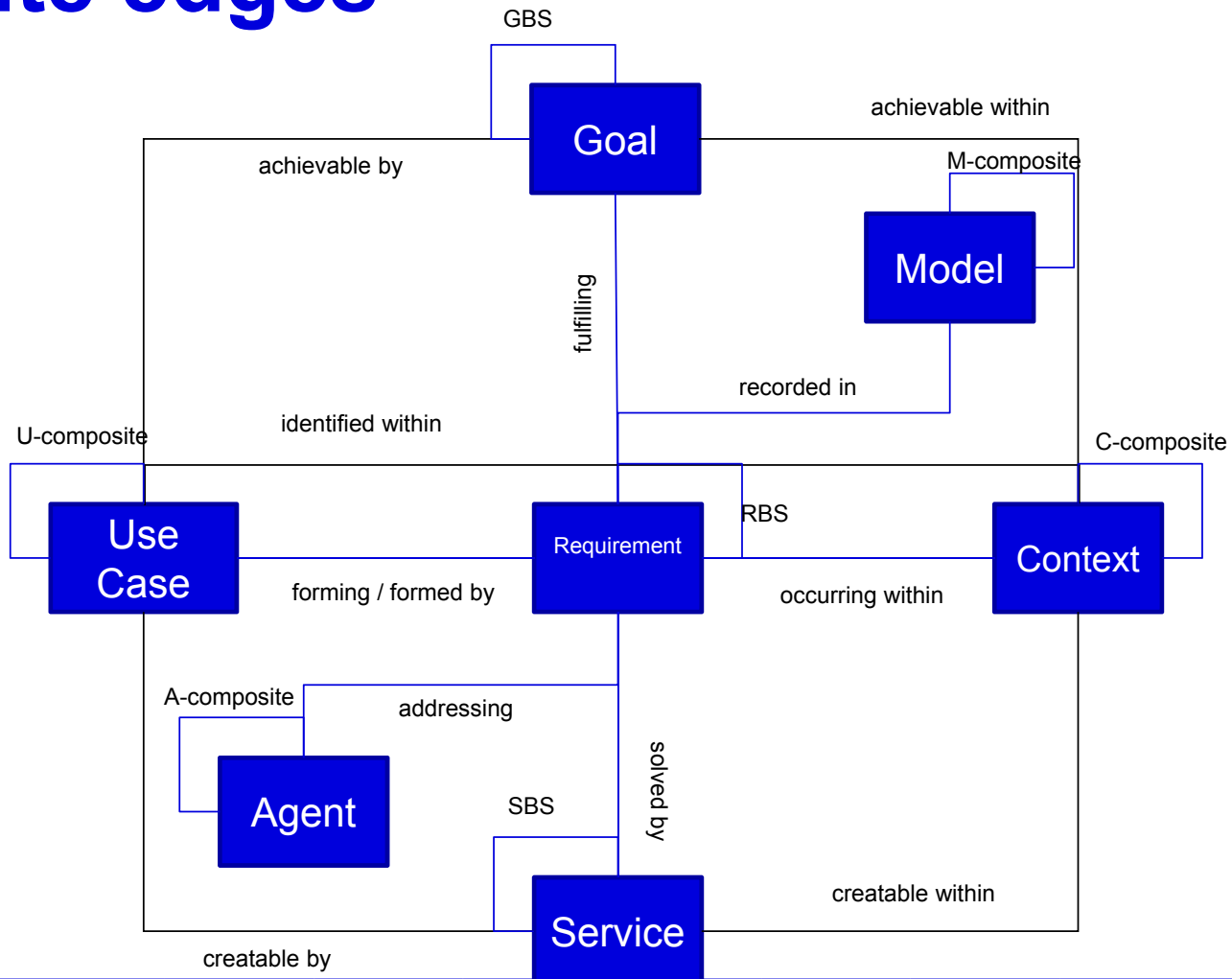


Agent wishes, defines, does.

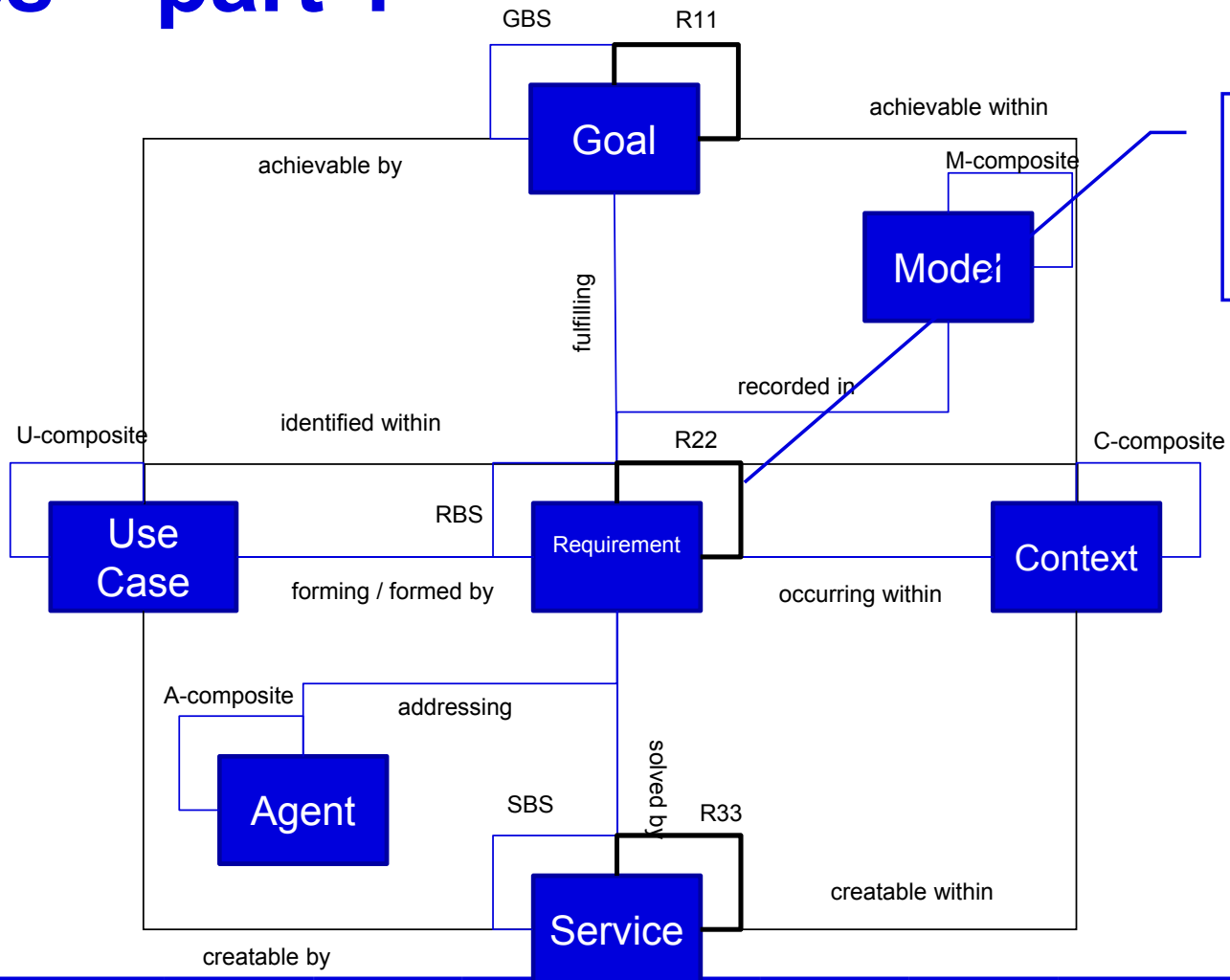
Model records.



Composite edges

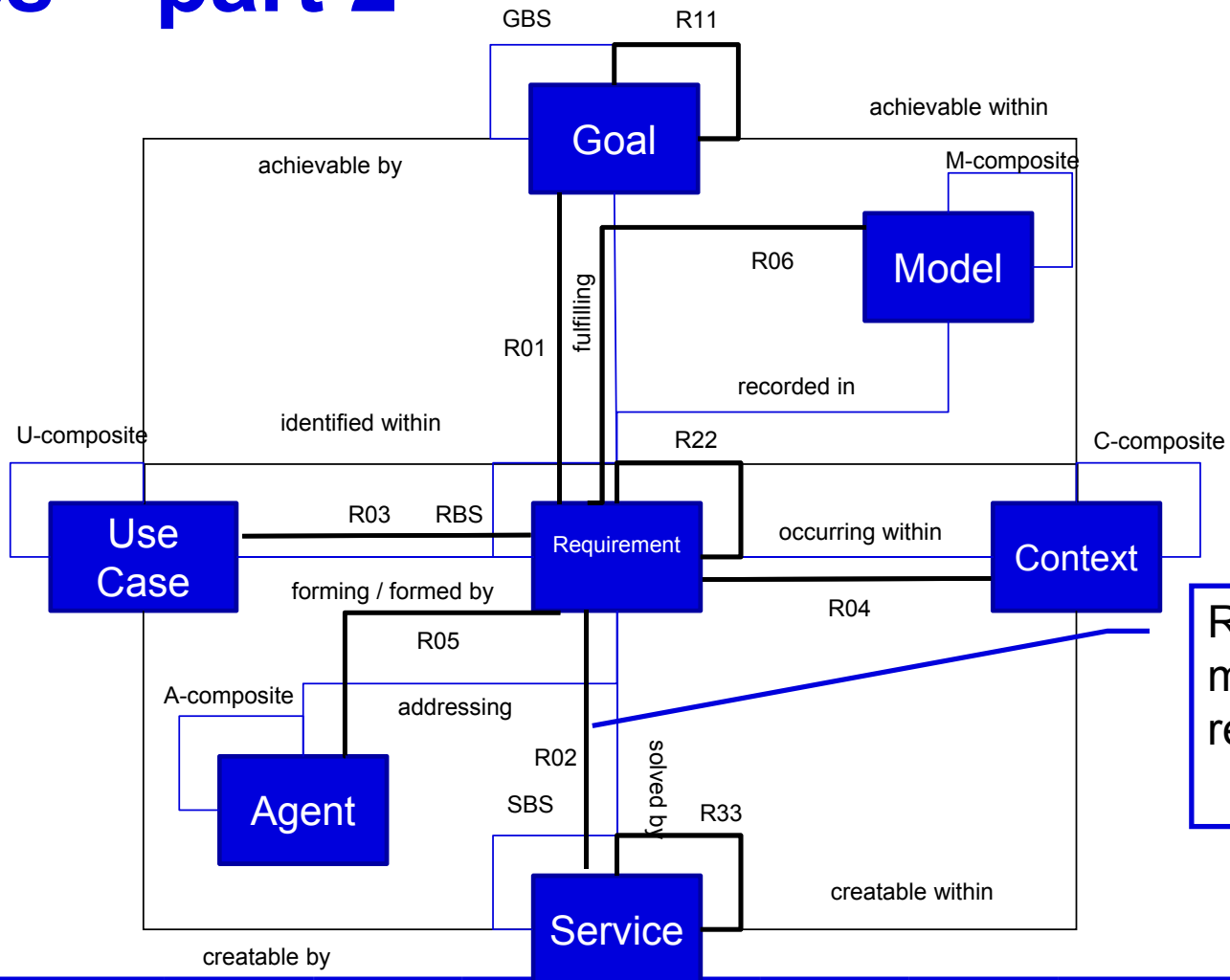


R – edges – part 1

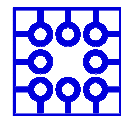


Rnn edges represent interconnection to another context (a new DO diamond)

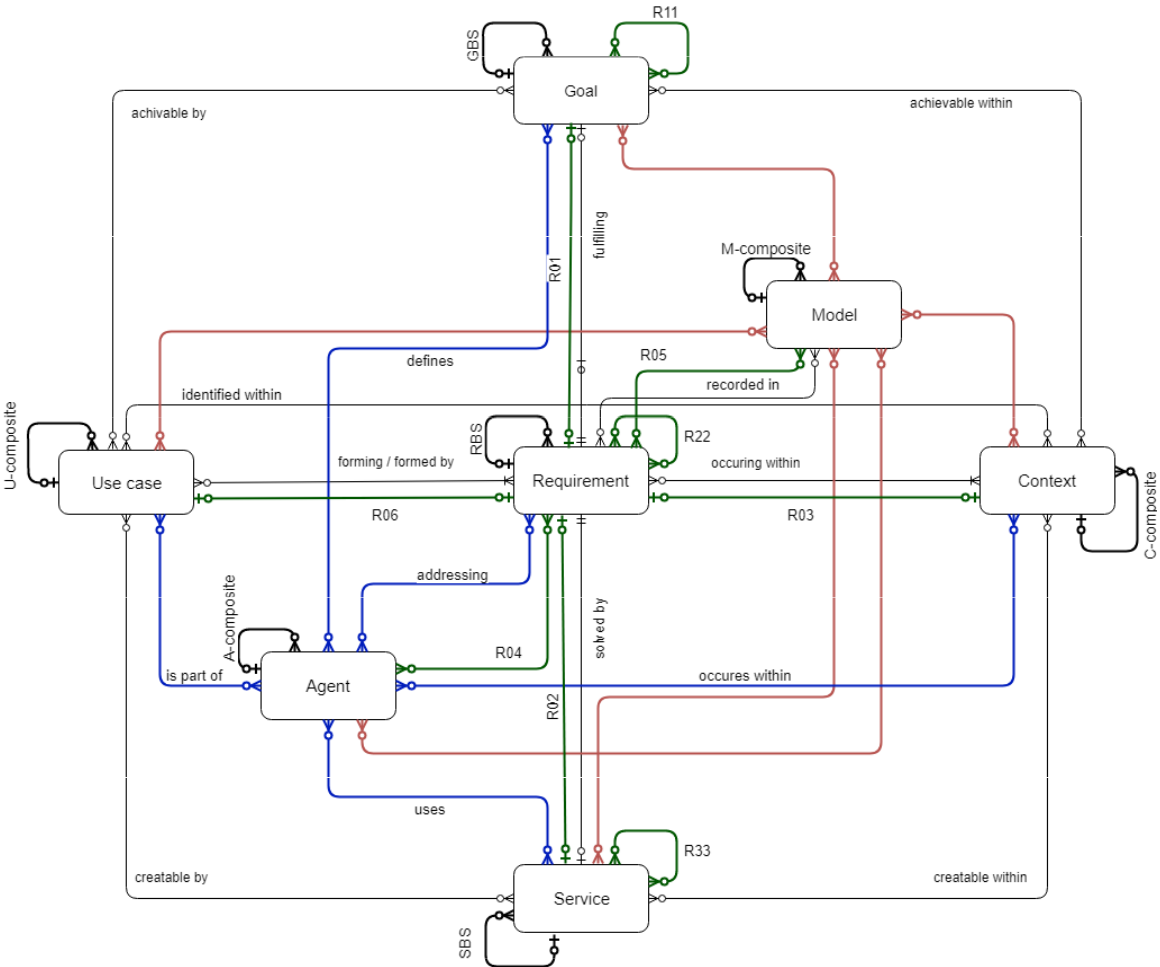
R – edges – part 2



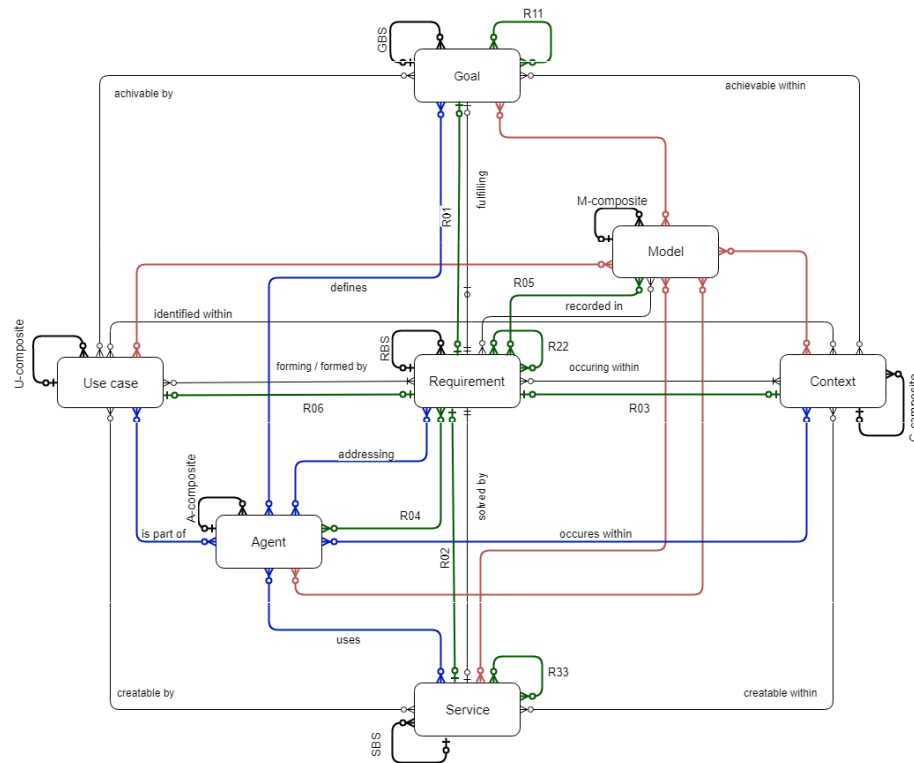
R0n enables to create
move the object to
requirement cotainer



Do diamond – nicer



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

Context of the service

Context	Requirement					
Healthy run of the citizen	To find optimal road					
Race of the moto bikers	To find optimal road					
Emergency service	To find optimal road					

What are the principles?

Principle of service definition - vertical

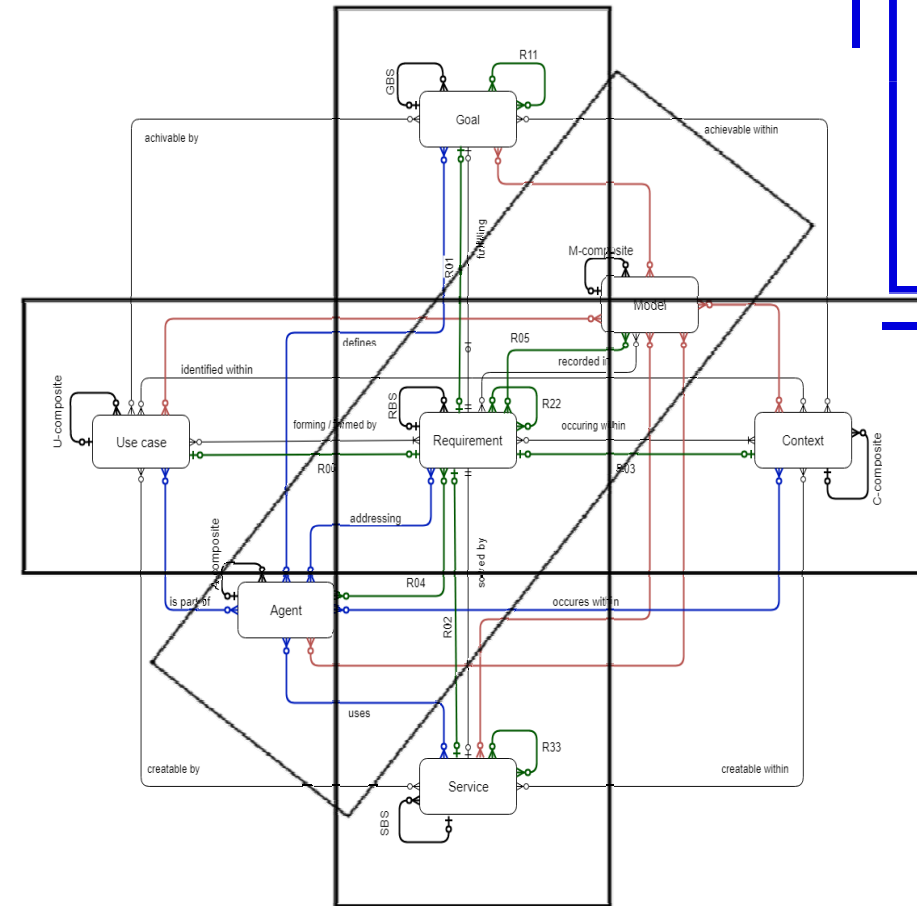
- Service is not the most important element.
- The Requirement is the key to build a successful service environment
- The goals are the basement for the set of requirements

Principle of context understanding – horizontal

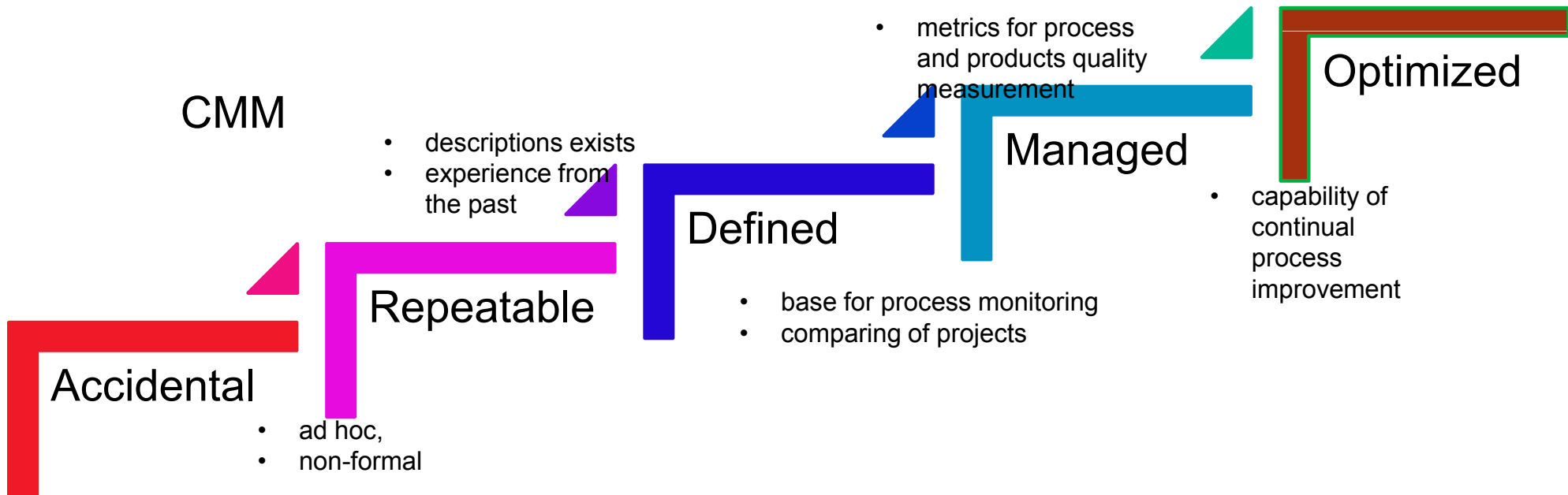
- Context is the part of the model, not the externality
- Use case is identified within the context (finding similar solutions)
- Requirement is forming and is formed by Use cases

Principle of completeness – z-axis

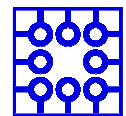
- Agents identification must be done in the relations with other elements
- Model must involve all other elements including itself



Universal modelling



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



Current Modelling Tools

Current CASE tools, BPMT, PMT, ... allow to record only such objects and relationships which had their creators in mind at the time when they were developing the tool.

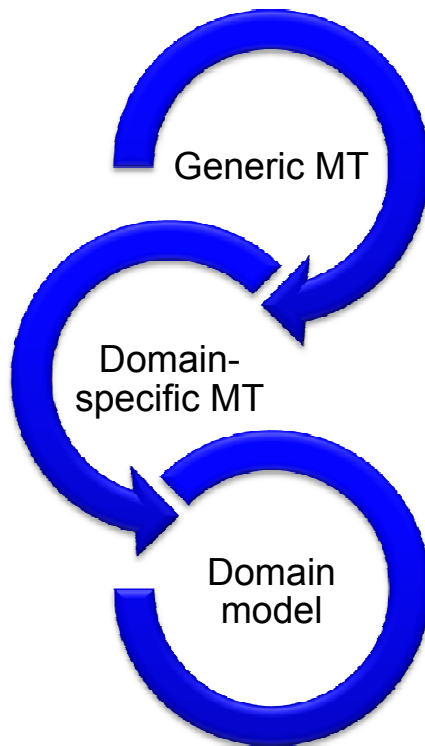
Objects and relationships, which we focus on when modelling various aspects of business, are continually changing.

Problem of effective communication within any IT project lies nearly always on the boundaries of capability of a given modeling tool (... thus, the model doesn't represent reality appropriately)

Except for some isolated cases, there are only a few ways to extend the used MT by constructs which are needed for current specific requirements.

A problem arises in integrating some partial views into one common view.

Meta-modelling



Ability to develop and adjust domain-specific modelling tools

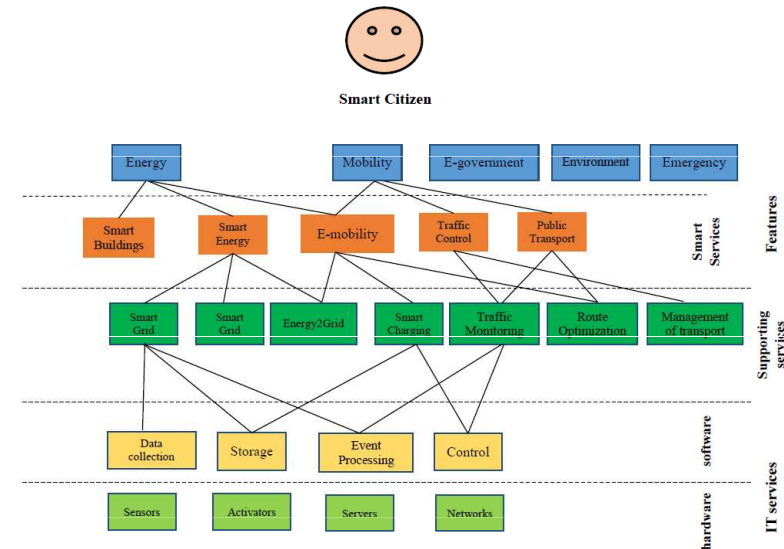
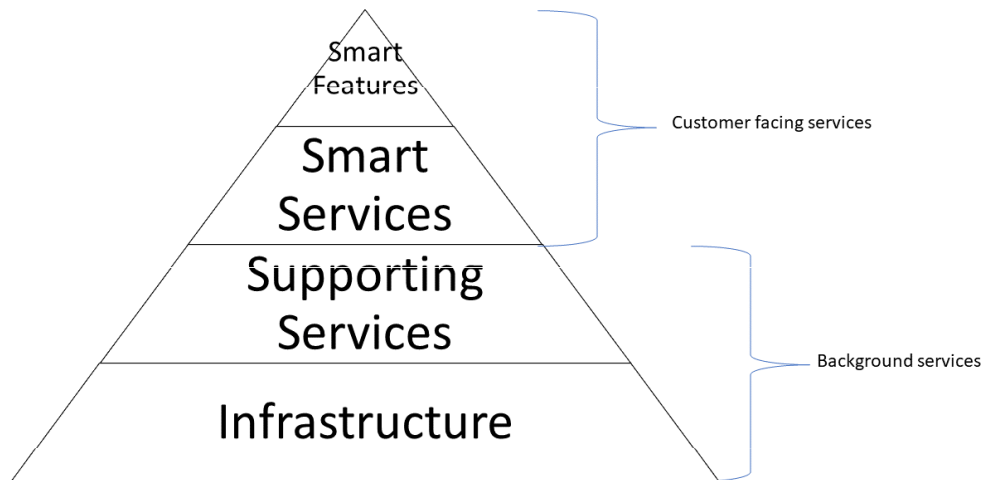
Helps to construct the domain in terms comprehensible to domain experts

Hierarchy of modelling tools

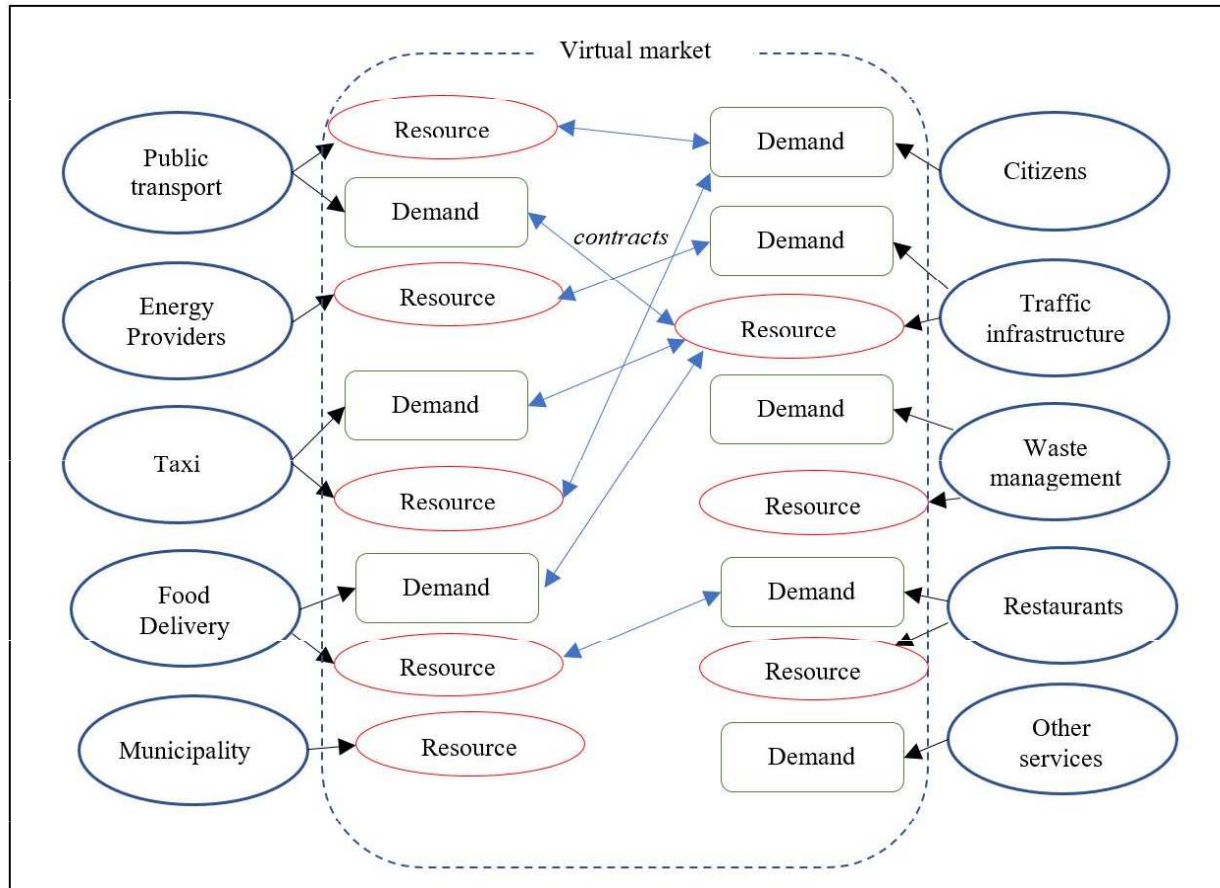
4DocMod – usage in Smart City Models

4DocMod helps to understand the position of each service in the structure of Services

Also, it can analyse the value chain of each Smart Service



Multi Agent Technology (MAT)



MAT - features

Describe the behaviour and motivation on the virtual market

Each agent has own resources and demand resources of the others to provide/use different Services



MAT – Smart City model

Defines several agents to participate on Smart City development

- Government agencies
- Private organizations, including technology companies and startups
- Citizens are the main stakeholders and end-users of the technologies and services implemented
- Non-governmental organizations

Merging 4DocMod and MAT

- Using service science and system approach to merge

4DocMod

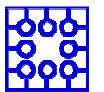
- Recognize contexts
- Define value chain
- Detect overlaps

MAT

- Focuses on agents and their behavior
- Can be used separately in each context
- In case of change we just need to add new model

Example – Google maps

To find optimal road from Salerno to Ravello



Conclusion

Each modelling tool has its strengths and weaknesses

To understand the problem and to be able to develop new Services we need to explore new ways

The solution is in combining the tools to be able to cover all aspects of the problem (multicontextuality and specific issues)

Service Science matters

