

Improving Requirements Specifications in Model-Driven Development Processes

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The Challenge

- Understanding the purpose and goals (the “WHYs”) of a **software system** in an **organization** is necessary for its successful design
 - Why the system is needed?
 - What are the expectations of each stakeholder wrt to the system?
- Better alignment of organization needs with software functionality
- Choosing the best software **design alternative** for all stakeholders
- Limited support for requirements management in MDD:
 - Organizational context not considered
 - Lack of support for **Non-Functional Requirements (NFRs)**

The Challenge

Improving Requirements Specifications in MDD processes

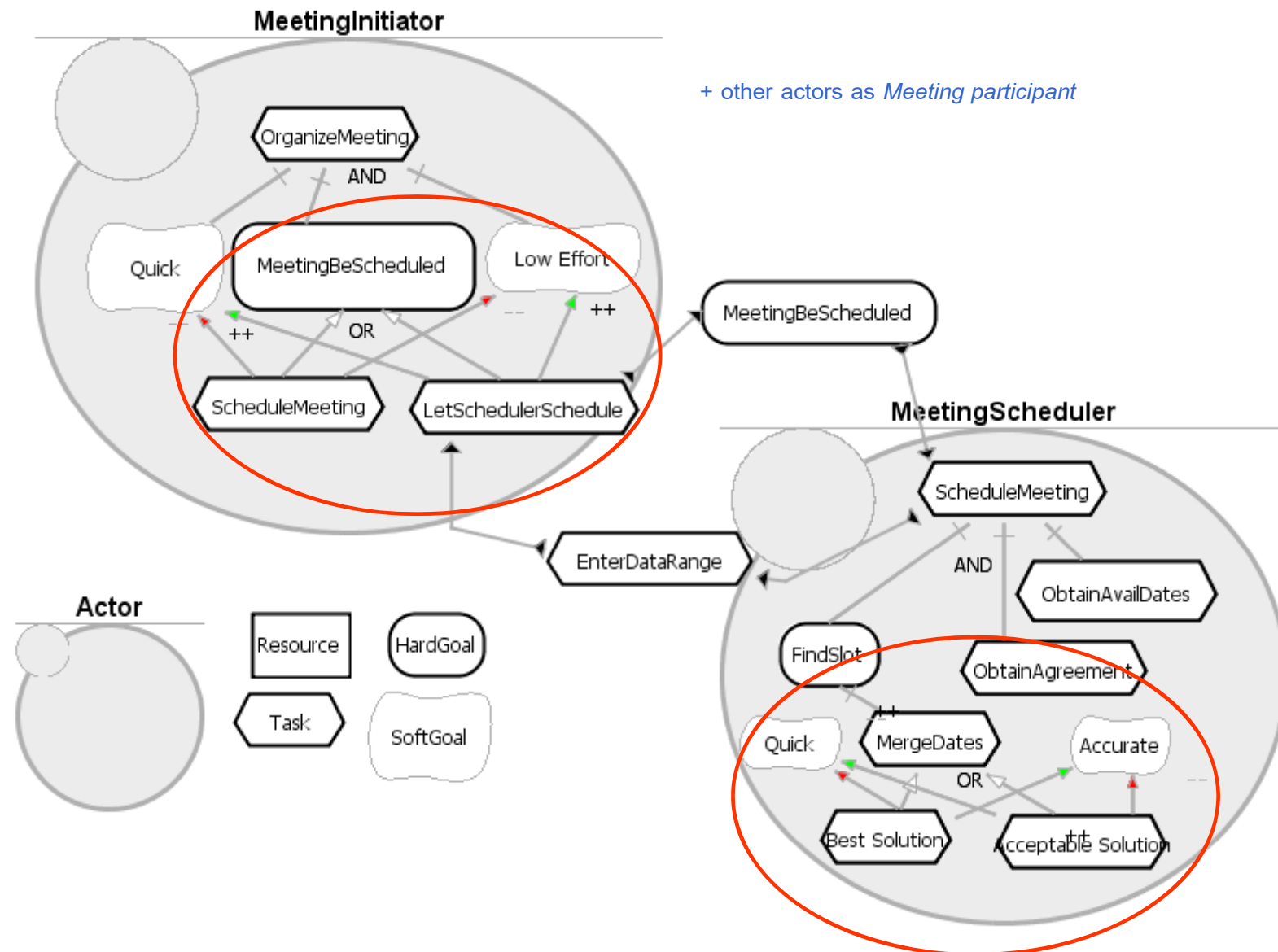


Benefits

1. Improve stakeholder's satisfaction with the system (their goals have been taken into account when designing the system) → More perceived **quality**
2. Extend the adoption of MDD processes?

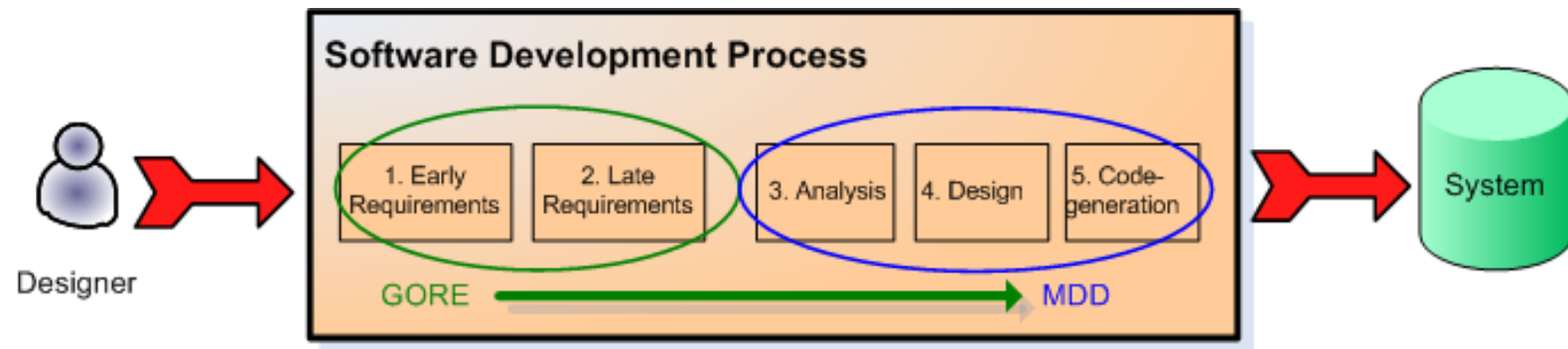
A solution?

- The RE community has largely addressed the importance of goals (functional and non-functional) in the RE process
- Beliefs and goals have been integrated into requirements acquisition framework → GORE
- Advantages of GORE:
 - Higher level view of the system
 - Facilitate communication with stakeholders
 - Ability to consider alternative solutions that fulfill the goals
 - Early verification and validation of the requirements



A solution?

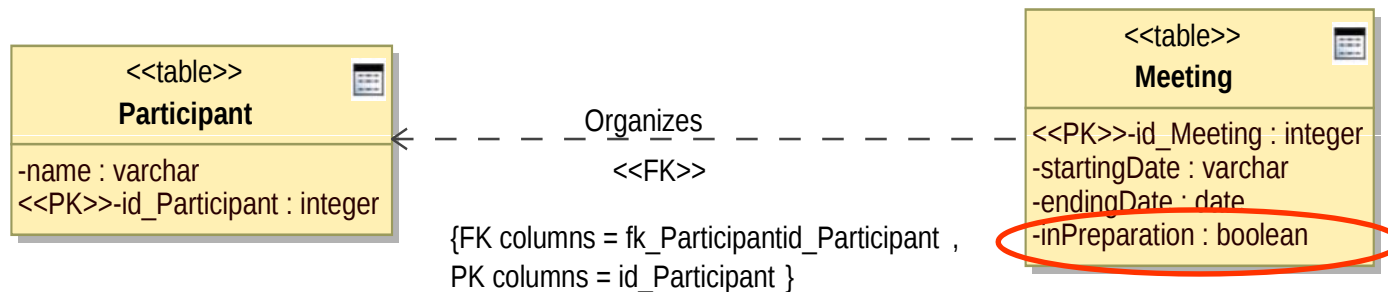
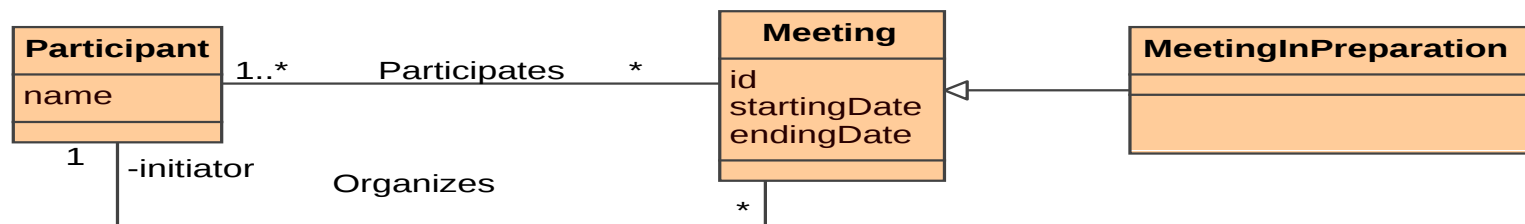
- Use of GORE methods to cover the gap in MDD approaches



- Early requirements: Goals of the stakeholders are analyzed
- Late requirements: A set of goals is delegated to the system

Influence of Goals in all phases

- Difference wrt previous approaches
- Functional goals must be “realized” by the static and dynamic models. Non-functional drive the selection of possible alternatives



Open Research Problems

- Development of a common meta-modelling framework
- Partial generation of static and dynamic UML models from goal models
- Representation of Non-functional requirements
- Traceability links between the business models and the design models -> Justify each subset of the system
- Incremental model synchronization and consistency analysis between the models
- Adjust software processes to the reality of the development team

Open Research Problems

- Use of NFRs in goal models for:
 - Selecting domain patterns in analysis models:
 - E.g. *price* as a Real or as a more complex structure that permits different currencies (Internationalization?)
 - NFR-based Model transformations:
 - Transformations are not deterministic. Each alternative implies different contributions to the NFRs. We could automate the process by selecting the alternative that better match the specified NFRs

Conclusions and further work

- We have identified the limitations of MDD methods to understand the needs and goals of the organization
- Adopt GORE techniques to improve user satisfaction with the system
- As future work we would like to:
 - Address previous challenges
 - Determine the kind of systems and/or domains and/or organizations that can benefit the most from this proposal