

Conflict Management with Goal Oriented Requirements Engineering

Requirements Engineering II - HS 2015

Agenda

- Why conflict management is needed
- What is KAOS?
- Structure of KAOS
- Iterative Goal Elaboration
- AllSale Premium Club Case Study
- Conclusion

Why conflict management is needed

- Clients are unable to formulate requirements precisely
- Analysis have limited environmental knowledge of the system
- Requirements acquisition is elaborated and expressed in a “rich” language
- “Between 40% and 60% of requirements documents involve conflicts”
- “Roughly 20% of the requirements are responsible for 75% of the interdependencies.”
- “System quality involved greatest conflict”

What is KAOS?

- KAOS stands for “Knowledge Acquisition in autOmated Specification”
- Multiparadigm specification language and goal directed elaboration method
- Consists of:
 - eliciting and refining goals
 - identifying objects and operations
 - deriving requirements on objects and operations
 - assigning requirements and operations to agents

Structure of KAOS

Two parts

- Semi-formal goal structuring model
- Formal definitions for each entity in (linear) temporal logic

Goal elaboration approach

- Define high level goals & objects
- Define agents and actions they are capable of

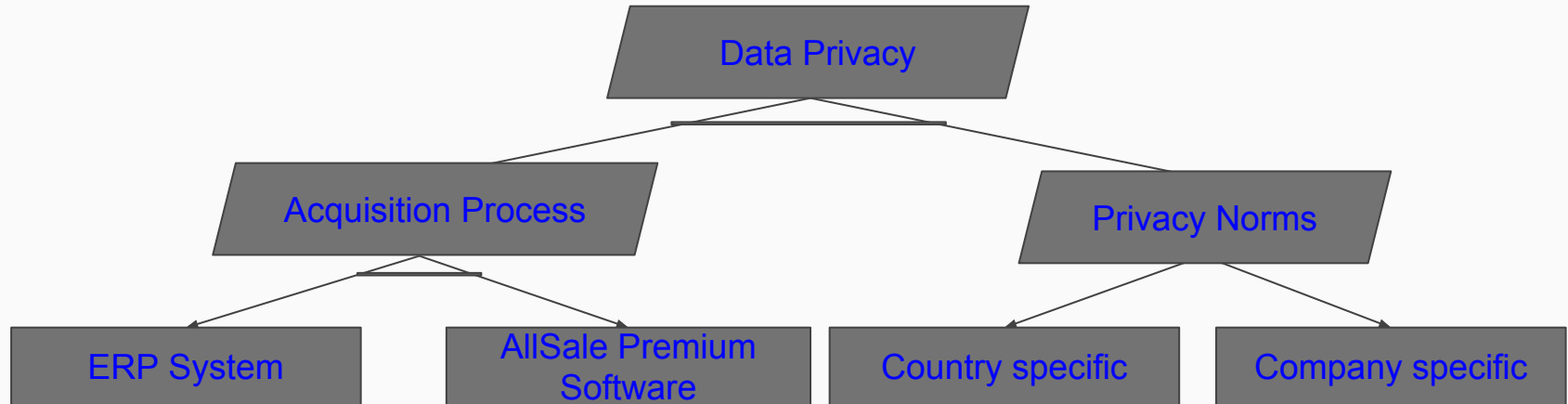
Iterative Goal Elaboration

- Refine goals using AND/OR decomposition
- Identify obstacles to goals, and goal conflicts
- Operationalize goals into constraints
- Refine & formalize definitions of objects & actions
- Refinement ends when every subgoal is realizable by assigned agent

AllSale Premium Club Goals

- Data Privacy
- Quality of software
- Meet the deadlines
- Employee satisfaction
- Customers satisfaction
- Optimize supply chain management
- Improve relationship Customer/Store

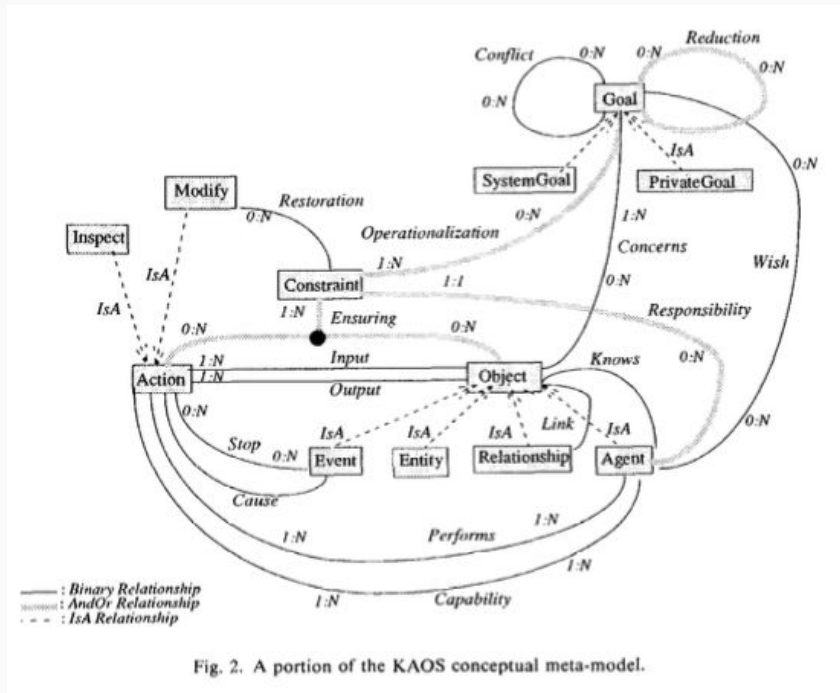
Goal Structure Model



Description of meta-model

ERP System

- Domain independent abstractions
- Meta-concepts (“Agent”, “Action” and “Relationship”)
- Meta-relationship (“Performs”, “Input”, “Link”, “IsA”)
- Meta-attributes (e.g. “Load of Agent”, “PostCondition of Action”)
- Meta-constraints



Formal definition

Goal Achieve[PrivateDataAcquired]

Concerns Customer, AllSale Premium

Refines DataPrivacy

RefinedTo DataSent

InformalDef *The AllSale Premium should acquire customer private data.*

FormalDef $\forall c: \text{Customer}, a: \text{Allsale Premium}$

$\text{Sent}(c.\text{PrivateData}, a) \wedge \text{Logged}(c)$

$\Rightarrow \text{acquiredData}(c.\text{PrivateData})$

Conclusion

- Requirements acquisition needs richer abstractions than the traditional specification formalisms, e.g. state based or algebraic ones
- KAOS model appears to be rather complex
- Formal specification is hard to understand
- What? Why? How? - not always easy to define

Thank you for your attention!

References

- Dardenne, A., A. van Lamsweerde, S. Fickas (1993). Goal Directed Requirements Acquisition. *Science of Computer Programming* 20, 1 2 (Apr. 1993). 3 50.
- van Lamsweerde, A., R. Darimont, E. Letier (1998). Managing Conflicts in Goal Driven Requirements Engineering. *IEEE Transactions on Software Engineering* 24, 11 (Nov. 1998). 908 926.
- Carlshamre, P., K. Sandahl, M. Lindvall, B. Regnell, J. Natt och Dag (2001). An Industrial Survey of Requirements Interdependencies in Software Product Release Planning. *5th IEEE International Symposium on Requirements Engineering (RE 01)*. 84 92.