

CONFLICT MANAGEMENT

DIALOGUE BETWEEN CUSTOMER AND SUPPLIERS

Philipp Huber, Michael Schneider & Appiah-Bonna Emmanuel Twumasi

□ CONTENTS

- **Relate topic to the session readings**
- **Results/Answers to the assignment.**

- ✓ **What is an implementation proposal?**
- **HANDSHAKING WITH IMPLEMENTATION PROPOSALS:
NEGOTIATING REQUIREMENTS UNDERSTANDING**
- **COMPARISON OF REQUIREMENTS HAND-OFF, ANALYSIS, AND
NEGOTIATION: CASE STUDY**

- ✓ **What are the benefits of using them?**

RELATION TO TOPIC SESSION

 [Grünbacher 2005]
Requirements Negotiation

Requirements Negotiations
approaches and fundamentals

 [Carlshamre 2001]
An Industrial Survey of Require-
ments Interdependencies ...

 [Robinson 2003],
Requirements
Interaction Management

Requirements Interactions
and its Management

Handshaking
Process
Measure-
ments

 [Fricker 2010a]

 [Fricker 2010b]

Dialogue between
Customer and
Supplier

traditional

Customer – SW-Supplier –
Relationships in RE

Conflict Management in RE

HANDSHAKING WITH IMPLEMENTATION PROPOSALS: NEGOTIATING REQUIREMENTS UNDERSTANDING

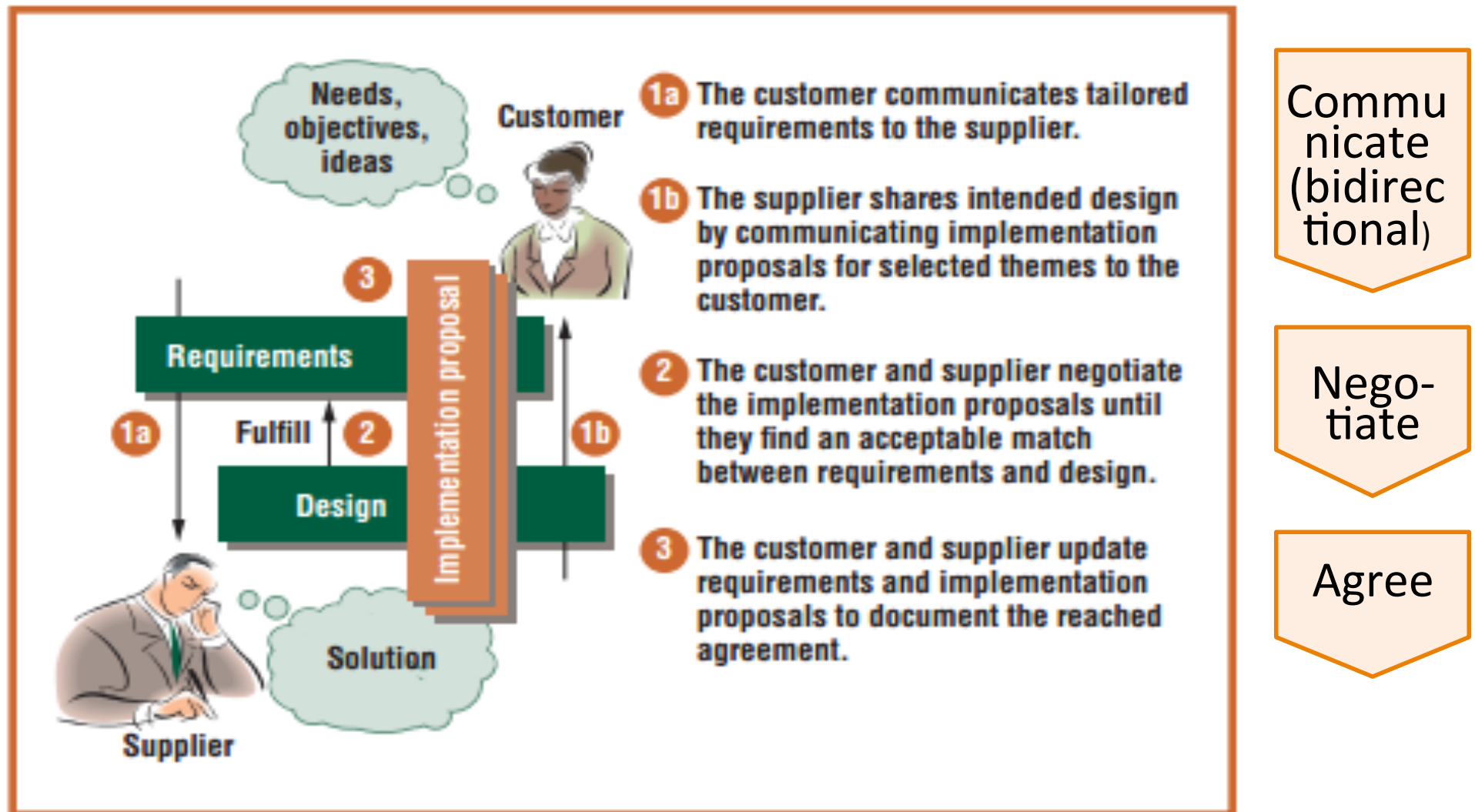


Figure 2. Handshaking process. An implementation proposal describes

HANDSHAKING WITH IMPLEMENTATION PROPOSALS: NEGOTIATING REQUIREMENTS UNDERSTANDING

- ❑ Supports communication by
 - Providing form for recording architecture decisions
- ❑ Document requirements understanding by
 - providing traceability between customer requirements and
 - supplier decision for a given them
- ❑ A basic implementation proposal Contains three (3) attributes that
 - Relate the design to the requirements
- ❑ Several attributes can extend the basic template to support
 - effective requirements negotiation
 - Project planning

HANDSHAKING WITH IMPLEMENTATION PROPOSALS: NEGOTIATING REQUIREMENTS UNDERSTANDING

Table 1

Implementation proposal template description

Attribute group	Attribute	Description
Basic attributes	Title	The theme addressed by the implementation proposal—a product feature, an important solution part or subsystem, or a development increment.
	Requirements	The requirements addressed by the implementation proposal. What does the proposed design imply for the customer?
	Design	The design proposed to address the requirements. What parts and functionality of the solution must be created or modified? What structure, style, and rules will be followed? What technologies will be used? What are the interfaces?
Negotiation support	Assumptions	Interpretation of the requirements in terms of preconditions that make the design meaningful.
	Impact	Impact of the design for the customer, supplier, and other stakeholders in terms of advantages, limitations, and risks.
	Dismissed alternatives	Alternative designs to address the requirements. How was each design investigated, and why was each alternative dismissed?
	Open issues	Actions required by the customer to progress with the negotiations—for example, confirm the proposal or provide more information.
Planning support	Scope	Parts of the solution that the design affects.
	Necessary activities	Activities needed to realize the design—the inputs for effort estimation and project planning.
	Effort estimate	Estimated effort to realize the design with arguments for why the supplier believes the estimate is correct.

IMPLEMENTATION PROPOSAL CONT'D

□ In contrast to goal and system modelling approaches

- It doesn't enforce any special formalism
- It author specifies the design on a case-by-case basis to be most efficient
- Practitioners use the same template for
 - For sketching a proposal on a whiteboard, presenting slides
 - Defining the section of an implementation proposal document
- Handshaking negotiations are effective when the supplier has expertise in the implementation proposal's theme

HANDSHAKING WITH IMPLEMENTATION PROPOSALS: NEGOTIATING REQUIREMENTS UNDERSTANDING

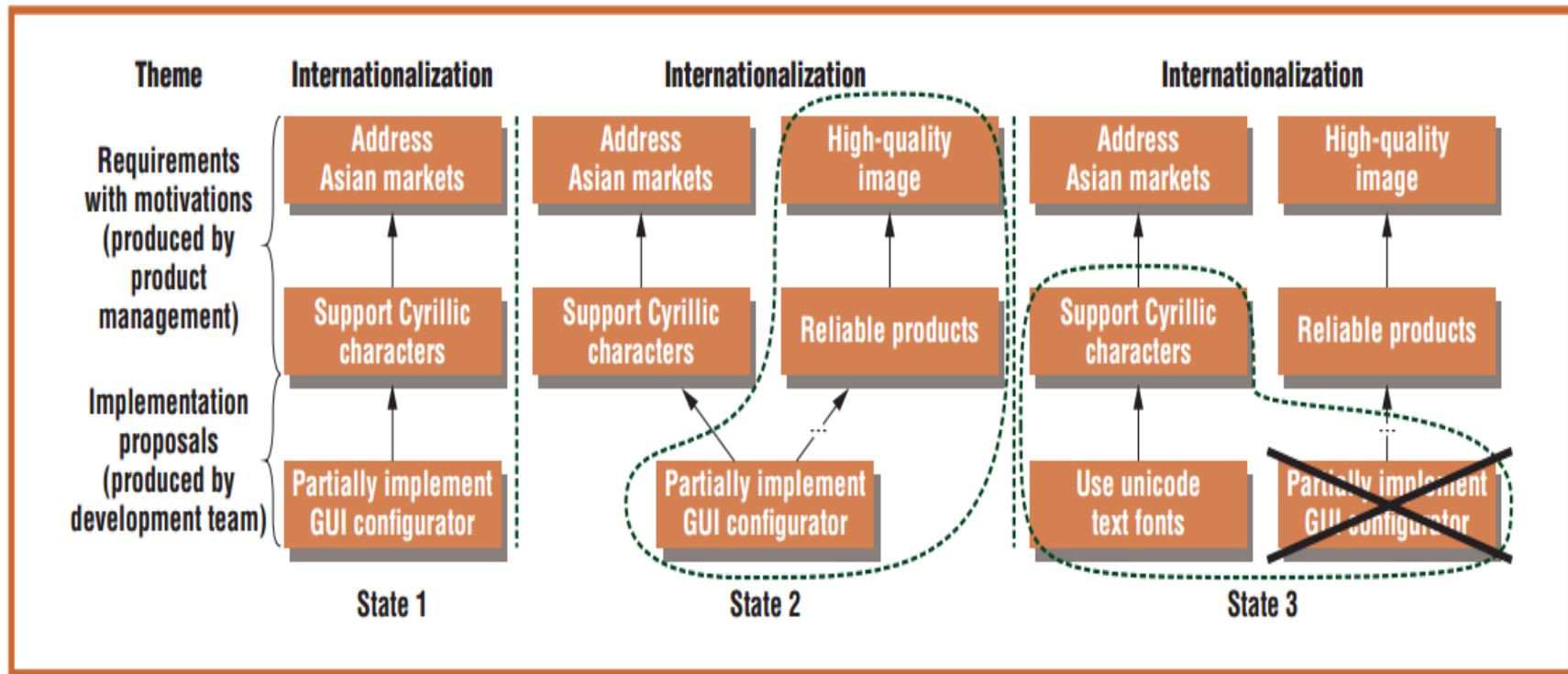


Figure 3. Implementation proposal evolution. Requirements and design changes resemble a goal-contribution tree that evolves as a result of handshaking negotiations. The dotted lines highlight the changes between two states.

IMPLEMENTATION PROPOSAL CONT'D

❑ Lessons learned

❑ Using handshaking with implementation proposal

- Reveals the strengths and limits of handshaking that companies should consider when adopting and further developing the process

❑ Strengths

- Improved requirements
- Allowed detailed requirements engineering to be delegated to development teams
- Improved identification, analysis and selection of variants
- Promoted win-win negotiations
- Helps development organizations achieve deep requirements understanding and prepare for projects
- Increased the amount and quality of decision-making information
- Encouraged development organizations

IMPLEMENTATION PROPOSAL CONT'D

□ Limitations

- Quality control issues
- Development teams must have experience in the kind of problem and solutions it is proposing
- Cannot improve specification quality and to achieve general requirements undesirability
- Needs additional mechanisms to resolve customer conflicts
- One-theme focus of implementation proposals don't directly support scope negotiations

□ Impact on Distributed Development

- Requires more elaborate communication than smaller-located projects

□ Impact on project planning

- Improves project planning accuracy
- Improves estimation accuracy
- Enhances negotiations of project scope

COMPARISON OF REQUIREMENTS HAND-OFF, ANALYSIS, AND NEGOTIATION: CASE STUDY

❑ Provides method selection support by

- Comparing the relative effects of requirements hand-off, analysis, and negotiation on requirements and design volatility and
- On a solution architect's requirement understanding

❑ Described case in which these effects were

- Measured
- Facilitated by expressing early-phase requirements with goal models
- Late-phase requirements with a solution oriented system specification
- Traceability between these requirements with implementation proposals

❑ The case shows that

- Three (3) practices can be regarded as steps in win-win negotiation process
 - Hand-off correspond to product management positioning
 - Analysis to product development positioning
 - Negotiation to position alignment

COMPARISON OF REQUIREMENTS HAND-OFF, ANALYSIS, AND NEGOTIATION: CASE STUDY CONT'D

- ❑ A formalization of early-and late-phase requirements and traces is needed to
 - Measure the effects of requirements hand-off Analysis
 - Negotiation on requirements and design volatility and
 - On requirements understanding in repeatable manner
- ❑ Use of Requirements abstraction model (RAM) (Early-Phase Requirement)
 - Ensures requirements are sufficiently atomized
 - Means and ends are not confounded
 - Allowing observing volatility of comparable requirements
- ❑ ADORA (Late-phase requirements)
 - A system specification language
 - Ensures specification consistency
- ❑ Implementation proposals are constructed by
 - Referring to RAM-based requirements and to ADORA model fragments

MODELS FOR PROPOSAL IMPLEMENTATION

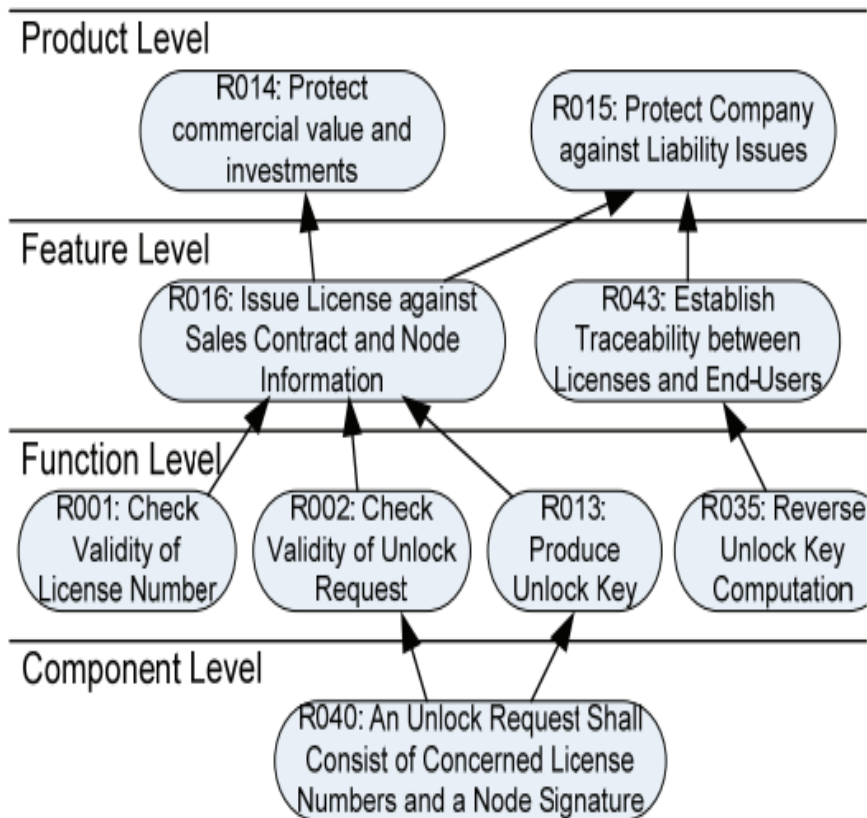


Figure 1. RAM-based early-phase requirements.

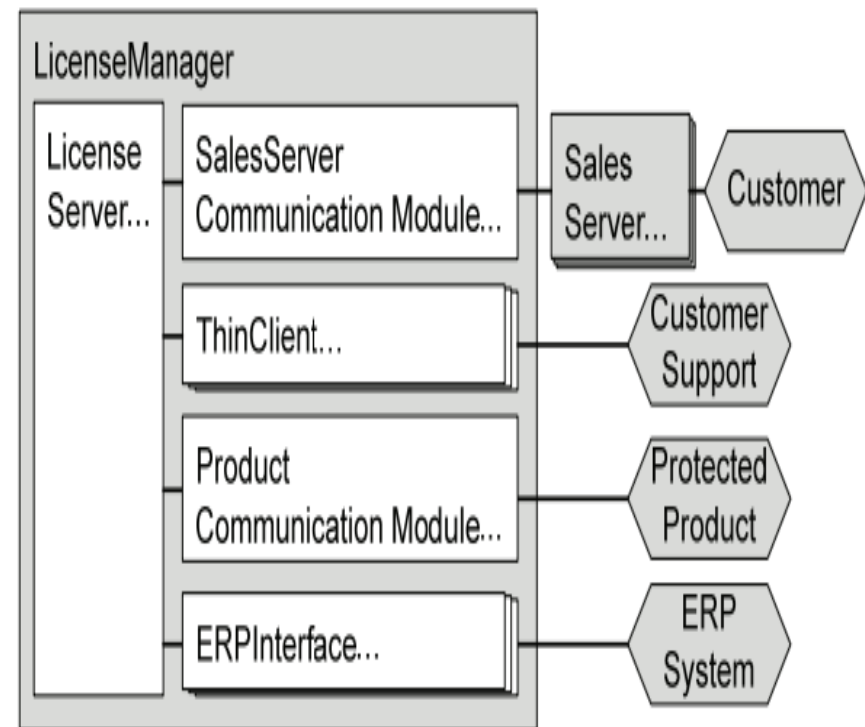


Figure 2. High-level system specification with ADORA.

IMPLEMENTATION PROPOSALS

□ Supports requirements communication by

- Capturing tentative or decided agreements between product management and development given themes
- Is created for negotiation theme & captures coarse grained requirements and design
- Enhanced by documenting and planning concerns
- Negotiated one theme after the other until sufficient coverage is achieved
- Leads to win-win decisions and a trusted customer-supplier relationship

□ Basic structure, negotiation support and attribute

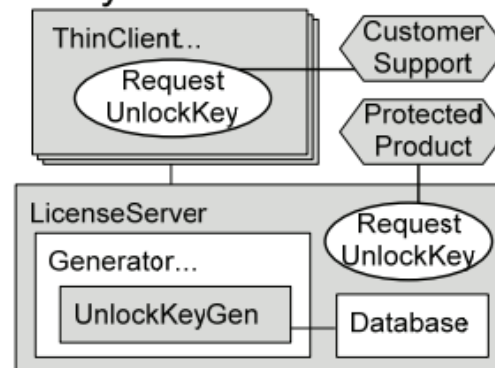
- Document how given design proposed by a development team contributes to given requirements
- Balances richness and flexibility
- Describes functionality, parts and data an architect has proposed
- Assumptions states condition under which design is meaningful
- Support concerns with additional specific attribute
- Allows observing how requirements are aligned with design

EARLY-TO LATE-PHASE REQUIREMENTS TRACEABILITY

Handling of Unlock-Keys

Fulfilled Requirements

[R013] Produce Unlock Key.
[R023] Protect Product with Licence Administrator.
[R035] Reverse Unlock Key Computation.



Tags: Database: Stores generated Unlock Keys.

Figure 3. *Handling of UnlockKeys* implementation proposal (simplified).

Thin Client

Fulfilled Requirements

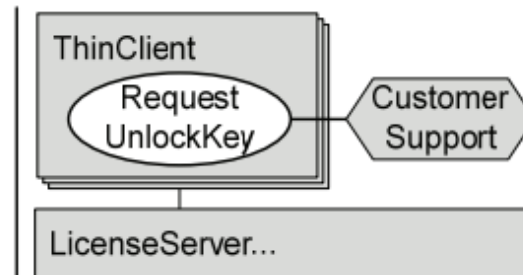
-

Assumptions

Customer Support interface is adapted to local customs.

Impact

ThinClient customizable.
More effort.



Tags: Client-Server Architecture.

Figure 4. Implementation proposal based on assumptions and impact.

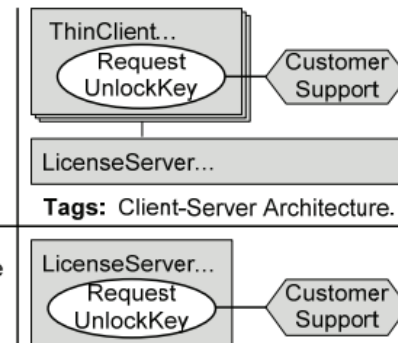
Thin Client

Fulfilled Requirements

[R059] Customizable interface.

Dismissed Designs

Reason for dismissal:
License Manager shall be adapted to local customs



Tags: Client-Server Architecture.

Figure 5. Implementation proposal with preferred and dismissed designs.

TABLE I. MAPPING OF DESIGN DECISION TYPES TO ADORA CONCEPTS.

Existence	
Functionality	Scenario, State
Parts	Object, Object Set, Element of Environment (Actor)
Data	Signal, Annotation for Model Element
Structure	
Relationships	Nesting, Association, Scenario Relationships, State Transition
Architectural Style	Annotation (Tag) for Set of Model Elements
Design Pattern	Annotation (Tag) for Set of Model Elements
Properties	
Design Rule	Annotation (Tag) for Model Element
Technology Use	Annotation (Tag) for Model Element
Texture	
Interface	Annotation (Tag) for Model Element
Metaphor	Annotation (Tag) for Model Element

TABLE II. DESIGN FROM FIGURE 2 EXPRESSED WITH DESIGN DECISIONS.

Existence	
Parts	- LicenseManager, Sales Server, License Server, SalesServer Communication Module, ThinClients, Product Communication Module, ERPInterfaces; - Customer, Customer Support, Protected Product ERP System.
Structure	
Relationships	- License Server part of License Manager, ThinClient part of LicenseManager, etc.; - License Server connected to ThinClient, ThinClient connected to Customer Support, etc.

REQUIREMENTS COMMUNICATION CASE: PLANNING

❑ Case study conducted to

- explore the relative effects of requirements hand-off
- Analysis and
- Negotiation

❑ To answer questions some research related questions concerning implementation proposal with solutions

TABLE III. CASE STUDY PHASES AND TREATMENTS.

Phase	Treatment
1. Positioning 1 (PO1)	Product manager (PM) prepares requirements
2. Hand-off (HO)	PM hands requirements off to architect
3. Positioning 2 (PO2)	Architect analyzes requirements and system
4. Negotiation (NE)	Both negotiate requirements and design
5. Confirmation (CO)	Both document negotiation results

TABLE IV. MEASUREMENTS.

Measurement	Scale	Levels
Q1a: Degree of Influence of Requirements Presentation on Design		
Design volatility in given phase	Fraction of changed design decisions	0%: treatment without effect 100%: treatment dominant
Q1b: Degree of Influence of Design Presentation on Requirements		
Requirements volatility in given phase	Fraction of changed requirements	0%: treatment without effect 100%: treatment dominant
Q2: Correlation of Traceability with Perceived Requirements Understanding		
Architect's perceived ability to develop accepted solution (Exec-Ability)	Rating 0% - 100%	0%: no knowledge 60%: able to develop solution 100%: perfect understanding
Coverage of requirements by design (R-Cov)	Fraction of requirements used to justify design	0%: no coverage 100%: complete coverage

REQUIREMENTS COMMUNICATION CASE: OPERATION

Discusses

- Positioning
- Hand-off
- Positioning 2
- Negotiation
- Confirmation
- Finalization

TABLE V. EVOLVING NUMBER OF REQUIREMENTS (*: REQUIREMENTS AFFECTED BY LOWER-LEVEL REQUIREMENT CHANGES IN PHASE NE).

Abstraction Level	All Requirements		Requirements Addressed by IPs	
	R-Post-PO1	R-Post-NE	IP-Post-PO2	IP-Post-NE
Product-Level: Business goals	8	8	*6	*7
Feature-Level: Product goals	16	30	5+*1	22+*2
Function-Level: Usage of solution	23	41	4	30
Component-Level: Ideas for solution design	4	7	0	4
Total	51	86	11	65

TABLE VI. ARCHITECT'S EFFORT AND PERCEIVED ABILITY TO EXECUTE.

Phase	Invested Effort (hours)	Perceived Ability to Execute (Exec-Ability)
PO1	0h	0%
HO	1h	20%
PO2	64h	55%
NE	2h	65%
CO	4h	70%

REQUIREMENTS COMMUNICATION CASE: ANALYSIS AND INTERPRETATION

□ Case provides insights to

- Collaboration of product manager in customer role and architecture in the supplier role

□ It describes

- Reciprocal influence of requirements and design knowledge
- The parties effort profiles
- Effect of hand-off analysis
- Negotiation on architects requirements understanding

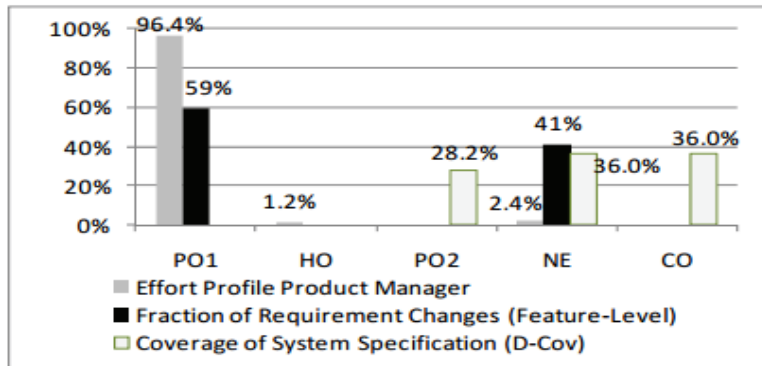


Figure 7. Effect of treatments on product manager's concerns.

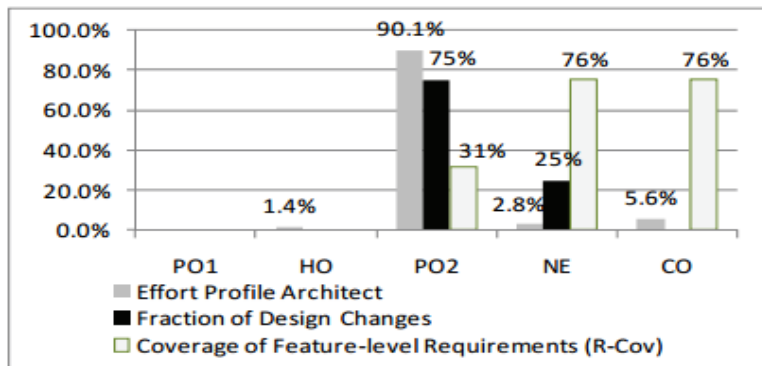


Figure 8. Effect of treatments on architect's concerns.

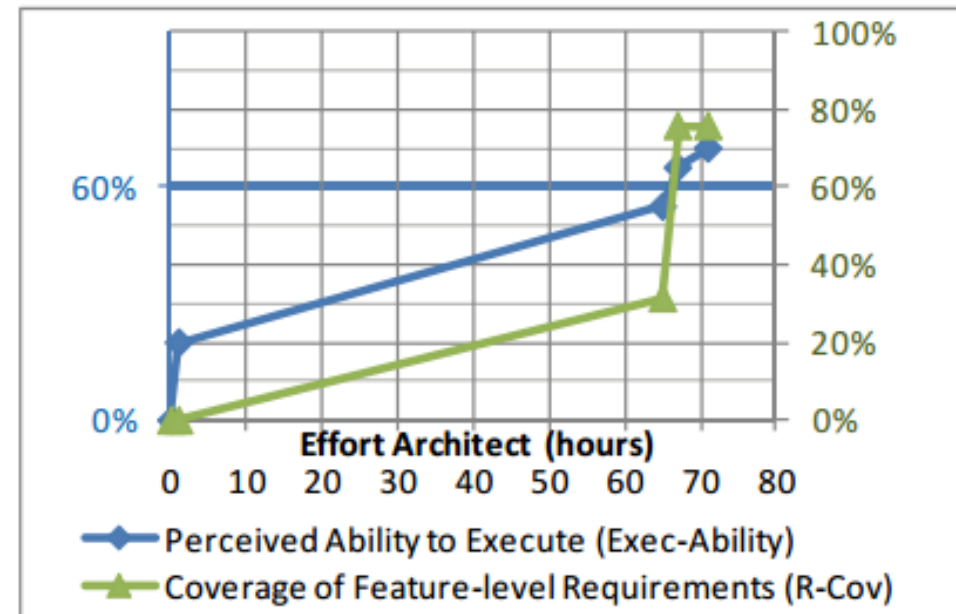


Figure 9. Exec-Ability (60%: good-enough) and R-Cov evolution.

DISCUSSION

❑ Contributions

- It enabled independent analysis work, but lead to clearly insufficient requirements understanding
- It led to almost good-enough requirements understanding

❑ Related work

- Traceability: reduces the discontinuity of information
- Co-Evolution of Requirements an Design: Delivery of accepted software requires intertwining requirements and design
- Qualitative Assurance: Only a measured quality can be managed

❑ Limitations

- Study conducted in a semi-industrial environment
- Greater architect experience encourages persuasion
- Design is often formulated pragmatically and not within a single predetermined specification

BENEFITS OF USING THEM

- ❑ Better identification of and focus on requirements that are urgent to be specified and negotiated
- ❑ Early collaboration between Product Management (user view) and development (IT view) and therefore:
 - include IT opportunities
 - ensure accurate level to specify requirements specification.
- ❑ Better involvement of SW development/architects:
 - motivation
 - build-up better user understanding and required skills for long-term collaboration
- **improved requirements (better quality with less efforts)**
- **decreased defect-related costs by about 40 percent.**

Discussion point 1:

Throw one away

F. Brooks said in «The mythical man month» about products:

Plan to throw one away; you will, anyhow.

- Have you experienced this phenomena?
- Could have Implementation Proposals negotiated with Product Managers been of help in this situation?

Discussion point 2: Participation

In our company, we sometimes used the following tactics:

If a project run late, we requested something simple (lit. anything: a simple Excel file sufficed) from the customer and had a lot of time to catch up until the customer provided us with the artefact.

Reviewing implementation proposals needs more time, effort and responsibility:

In your experience: Is the customer willing to do it in a timely manner?