

Lesson and Learned from a Requirements Elicitation for Conference Support System

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Abstract

A specification of a system should be refined so as to meet stakeholders' requirements as much as possible, because the first specification does not satisfy all stakeholders in general. We have explored a procedure to solve such a problem through an experience for specifying Web Based Conference Support System. We reports the implication from the experience.

Key Words: Requirements Engineering, Specification Refinement, Behavioral Specification, Non-Functional Requirements.

1. Introduction

A task for eliciting system requirements is very difficult. One of the reason is that it is not so easy for stakeholders of the system to state clearly what they want [1]. Only representing a current task or an intended system would not give no hints for them to call their requirements in their mind. On the other hand, showing changes of their tasks will give them hints for recognizing what they want and what they never want. Especially, from the viewpoints of system's non-functionalities [2], they may easily state their desire. For example, response time goes worse, usability goes up, confidentiality is lost and so on. For eliciting system requirements, we can use several kind of methods or tools [3], [4], [5], [6]. However, each of them has its merits and demerits. In this paper, we report our exploration for finding new possibilities to elicit system requirements using non-functional requirements and sequence diagrams. Based on the experience, we discuss what kinds of procedures are necessary for our requirements processes.

The rest of this paper is organized as follows. In Section2, we introduce a part of our experiences for eliciting

the system requirements. In Section3, we review our experience and discuss what kind of procedure is necessary for this kind of requirements elicitation.

2. Overview of Our Requirements Process

In this section, we present our experiences for solving a problem. The problem is for building a web based system, which supports a program chair in a technical conference such as JCKBSE. The problem is based on a problem of Requirements Engineering Working Group, SIGSE of IPSJ [7]. This problem only includes both general goals, developing a system for supporting a program chair of the technical conference, and a description of ordinary and traditional work of the chair.

We develop an *initial specification* from this problem. In Figure1, we show a part of the initial specification written in sequence diagram.

Using initial specification as a start point, we will refine the diagram stepwise. We show two different sequences of refinements as shown in Figure2, one is a sequence A, B, C, D in §2.1 and another is X, Y in §2.2.

For clarifying the value of each refinement, we use a table as shown in Table1. By this table, we can review non-functional requirements of each kind of stakeholders.

2.1 Task for gathering abstracts

2.1.1 Refinement A: Evaluation by a contributor

In the first refinement, we let a contributor evaluate our initial specification in Figure1. Our contributor complained that he could not quickly know whether his abstract was received successfully or not, because he was impatient and worrier. His dissatisfaction can be represented by an evaluation table shown in Table1.

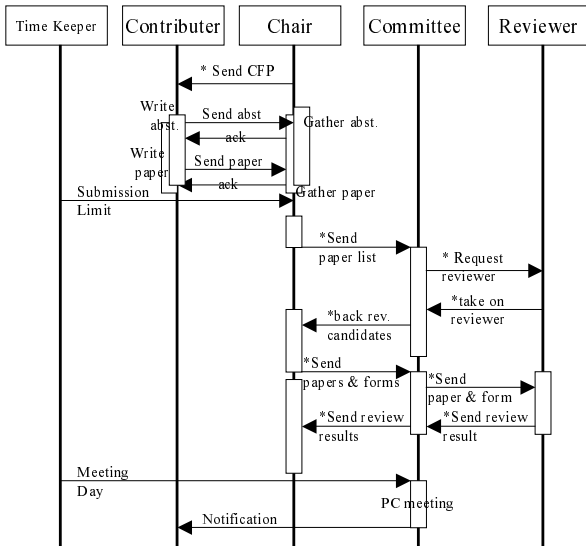


Figure 1. Sequence diagram of initial specification

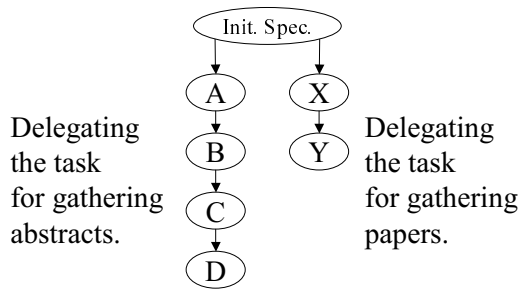


Figure 2. Two sequences of refinements

We refine initial specification to a new one as shown in Figure3 so that a computer system instead of a chair gathers abstracts. Then dissatisfaction of the contributor in Table1 can be canceled as shown in Table2, because the system can work around the clock and contributors can receive the receipt for their abstracts immediately.

Because this refinement can give good or bad influences to the other stakeholders, we explore such influences with our stakeholders. We can find new satisfaction of a chair so that he can become free from the task for gathering abstracts manually. This new satisfaction is filled in Table2, which is also marked by oval. Even though this new satisfaction of a chair can be found without the refinement shown in Figure3, we can prevent our oversight with this refinement.

Table 1. Evaluating init. specification by a contributor

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.				
Time	1	-	Can not know whether my abst was received or not	
Ease				
+	0			
-	1	1		

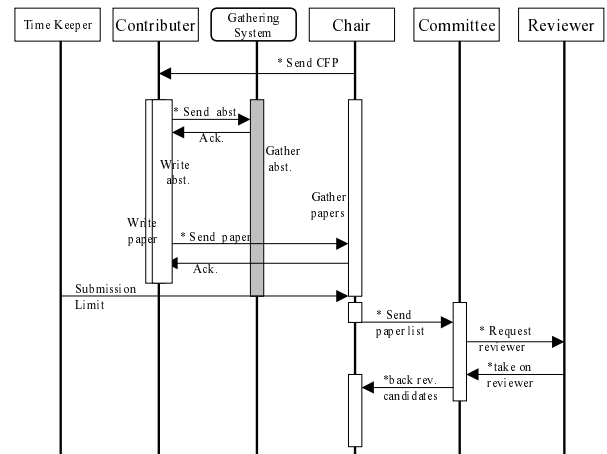


Figure 3. Refined Specification A

2.1.2 Refinement B: Evaluation by a chair

We let a chair evaluate the specification A in Figure3 moreover. Our chair find that the task for making the list of abstracts is also tiresome. His dissatisfaction can be represented by an evaluation shown in Table3. Though he can find this fact in the initial specification in Figure1 of course, first refinement A in Figure3, a delegation of a task for gathering abstracts, would contribute to find his dissatisfaction in Table3 as an analogy.

According to his dissatisfaction above, we refine the specification A in Figure3 so as to delegate the task to a system mentioned by our chair. New refined specification B is shown in Figure4, and his dissatisfaction can be canceled as shown in Table4.

Again, we show this new specification B in Figure4 to other stakeholders. Then a member of committee can find that members can get more accurate list of abstracts because it is generated not manually but automatically. The specification B in Figure4 is increased its value by finding this

Table 2. Exploring other evaluations in specification A

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.				
Time	1 - Can not know whether my abst. was received or not.			
Ease	A +	A + Free from the task for gathering abstract		
	2	1		
	0	0		

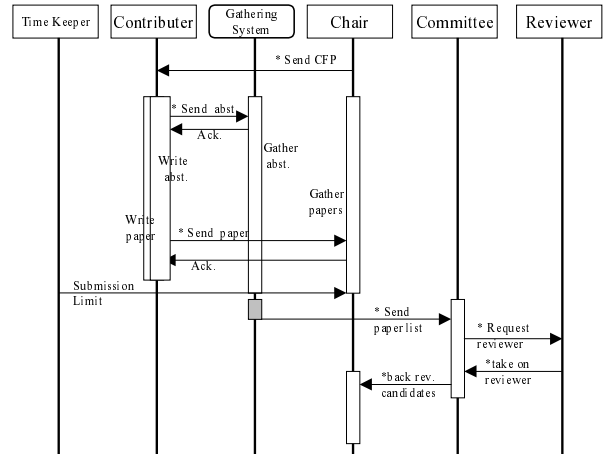


Figure 4. Refined Specification B

Table 3. Evaluating specification A by a chair

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.				
Time	1 - Can not know whether my abst. was received or not.			
Ease	A +	A + Free from the task for gathering abstract A - Tiresome to make abst. list		
	2	1		
	1	0		

Table 4. Exploring other evaluations in specification B

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.			B + Get accurate list.	
Time	1 - Can not know whether my abst. was received or not.			
Ease	A +	A + Free from the task for gathering abstract A - Tiresome to make abst. list B +		
	3	1		
	0	0		

fact, therefore our proposing system is also fit to our stakeholders.

2.1.3 Refinement C: Evaluation by a committee member

We let a committee member evaluate our specification B in Figure4. Our committee member pays attention to his task in the figure, which does not have been changed since initial specification. Because the member plans to ask his fellows to review several papers, he want to know what kind and how many papers should he process as soon as possible. If he can know it, he can ask his fellows to schedule their review task beforehand. His hope, in other words his dissatisfaction to the specification in Figure4, can be represented as shown in Table5, ‘B-: Not enough time to find reviewers’.

According to this dissatisfaction, we refine the specification B to specification C in Figure5, where committee members directly receive abstracts from a system.

When a contributor looks at this new specification C in

Figure5, he complains us that his idea in his abstract can be leaked to the others before the deadline of a submission. Though our committee members and their fellows would be enough trustworthy to glance over the abstracts of course, we should remove such worry of contributors as much as possible. Because we have several solutions to remove it and because the decision for selecting a solution depends on the other situations, what we do now is to record the worry itself. We record it as a dissatisfaction of contributors about confidentiality as shown in Table6.

Table 5. Evaluating specification B by a committee member

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.			B +	Get accurate list.
Time	I - Can not know whether my abst. was received or not.		B -	Not enough time to find reviewers.
Ease	A +	A + Free from the task for gathering abstract		
		A - Tiresome to make abst. list		
		B +		
+	3	1	1	1
-	1	0	0	1

2.1.4 Refinement D: Evaluation by a Contributor again

As mentioned above, a contributor is already aware of a disadvantage for him as shown in Table6. We propose a refined specification shown in Figure6, where a filter system is introduced, so as to cancel his dissatisfaction. The role of filter system is both to prevent abstracts from a leak of idea and to give a hint to select suitable reviewer for the paper.

As a result, no dissatisfaction is remained and no new dissatisfaction is discovered as shown in Table7. However, it would be difficult to realize the filter system above, therefore this refinement is not desirable for software developers, who are also stakeholders of this system, with respect to the cost requirements. Here we do not mind this point because of the example’s simplicity.

2.2 Task for gathering papers

Back to initial specification in Figure1, we explore another possibility of specification refinement.

2.2.1 Refinement X: Evaluaton by a chair again

Now we focus on the submission of papers. We let a chair evaluate our initial specification in Figure1 again. Once our chair has tasted the ease of a system to gather abstracts, he asks our system to gather papers as well. We can represent his request above in in Table8.

We refine initial specification to a specification X in Figure7 so as to meet the evaluation in Table8.

A contributor remembers that an introduction of a system contribute to decrease a time to get a response from a

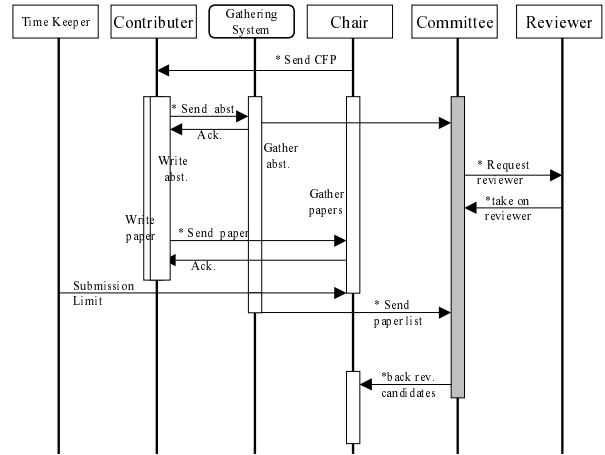


Figure 5. Refined Specification C

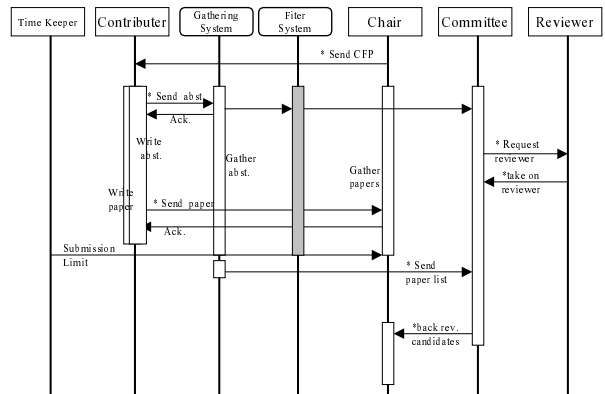


Figure 6. Refined Specification D

receiver as explored in §2.1.1. Therefore the contributor can point out that a refined specification X is also contribute for his own desire. These evaluations are represented in Table9.

2.2.2 Refinement Y: Evaluation by a contributor

We let a contributor evaluate a specification X moreover, and the contributor remember that his paper was returned from a chair of another conference because of a format error in his electric submission. For example, PDF documents with Japanese fonts are not received by a chair of an international conference because most of all except in Japan can not view or print such documents. Therefore, the contributor fills up his dissatisfaction as shown in Table10 because gathering systems do not always check the format of submitted papers.

To cancel the dissatisfaction above, we introduce a format checker in our system as shown in Figure8.

The refinement in Figure8 lets us remember another ad-

Table 6. Exploring other evaluations in specification C

	Contributer	Chair	Committee	Reviewer
Conf.	C - Leak his original idea to the others			
Avail.				
Acc.			B + Get accurate list	
Time	I - Can not know whether my abst. was received or not. A +		B - Not enough time to find reviewers C +	C + Schedule his review task in advance.
Ease		A + Free from the task for gathering abstract A - Tiresome to make abst. list B +		
+	4	1	1	1
-	1	1	0	0

Table 7. Result of Evaluation of D

	Contributer	Chair	Committee	Reviewer
Conf.	C - Leak his original idea to the D +			
Avail.				
Acc.			B + Get accurate list	
Time	I - Can not know whether my abst. was received or not. A +		B - Not enough time to find reviewers C +	C + Schedule his review task in advance.
Ease		A + Free from the task for gathering abstract A - Tiresome to make abst. list B +		
+	4	1	1	1
-	0	0	0	0

vantage of gathering system with format checker, that a chair or others should check the format of electric submission before. Therefore, refinements in specification X and Y give another fruit for a chair as shown in Table11.

2.3 Merge two resulting Specifications

Up to here, we show two different sequences of refinements, one is a sequence A, B, C, D and another is X, Y as shown in Figure2. As a result of refinements A, B, C, D, we have refined specification as shown in Figure6 with its evaluation in Table7. As a result of refinements X, Y, we also have refined specification as shown in Figure8 with its evaluation in Table11. Now we can explore how to merge these refine specifications safety. By comparing two sequence di-

Table 8. Evaluating init. specification by a chair

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.				
Time				
Ease		I - Tiresome to gather papers manually.		
+	0			
-	1	1		

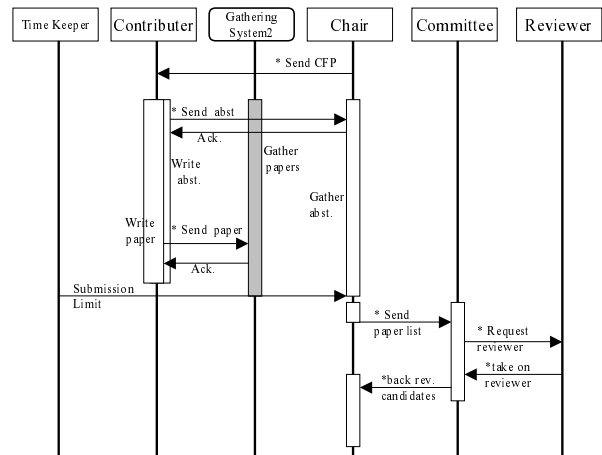


Figure 7. Refined Specification X

agrams in Figure6 and 8, we found that we should check the following points at least.

- A message in the initial sequence diagram is modified in different way or not.
- A message modified or added in the other side of a specification gives influences to another specification.

Informally, the pair of refined specifications D and Y seems to pass at the two checks above.

3. Implication and Discussion

From the results of our experiences, non-functional requirements seems to be effective for elicit stakeholders' requirements without an omission. The tabular form of evaluation also seems to be useful for early stage of requirements elicitation. We should formalize the procedure to merge a refined specifications which are refined in different way. We are now designing a method for supporting this kind of process.

Table 9. Exploring other evaluations in specification X

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.				
Acc.				
Time	X + Know quickly whether my paper was received or not			
Ease		I - Tiresome to gather papers manually. X +		
+	2	1		
-	0	0		

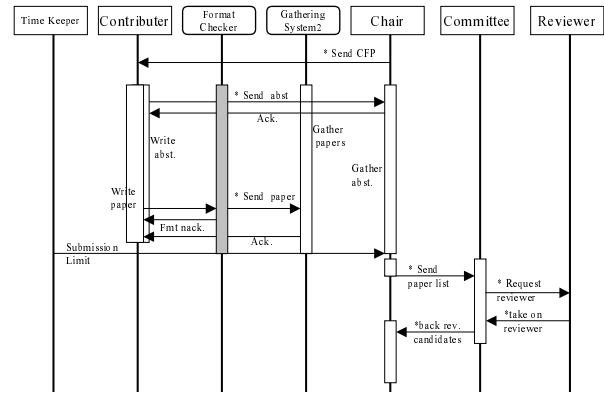


Figure 8. Refined Specification Y

Table 10. Evaluating specification X by a contributor

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.	X - Can not know the validity of my paper format immediately.			
Acc.				
Time	X + Know quickly whether my paper was received or not			
Ease		I - Tiresome to gather papers manually. X +		
+	2	1		
-	1	0		

Table 11. Resulting Evaluation of Y

	Contributer	Chair	Committee	Reviewer
Conf.				
Avail.	X - Can not know the validity of my paper format immediately. Y +			
Acc.				
Time	X + Know quickly whether my paper was received or not			
Ease		I - Tiresome to gather papers manually. X + Y + Free from file format check		
+	4	2		
-	0	0		

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