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## **SPIKE**

### **Secure Process-oriented Integrative Service Infrastructure for Networked Enterprises**

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ICT in Support of the Networked Enterprise

## **D2.2: User requirements analysis & development/test recommendations**

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## D2.2: User requirements analysis & development/test recommendations

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### Abstract:

This document aims at gathering the user requirements necessary for development of the SPIKE platform. Within this document, the individual instruments applied as well as results of applying these instruments are presented. Furthermore, each of SPIKE's application case is presented together with use cases and user requirements stemming from each of them:

- Information Hotel: Providing Intra- and Interorganisational Technical Documentation Services

- Legacy Applications
- Identity Federations

As a result, 35 functional and 24 non-functional have been identified during the user requirements analysis phase and outlined within this document. These requirements will be used for setting up trial definitions of the two trials where the SPIKE platform is to be validated against the user requirements.

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**Abbreviations and acronyms used:**

AIT	addIT Dienstleistungen GmbH & Co KG
BPM	Business Process Management
BPMS	Business Process Management Software
CEO	Chief Executive Officer
CIO	Chief Information Officer
CIT	Citec Information Oy Ab
COM/DCO M	Component Object Model / Distributed Component Object Model
CORBA	Common Object Request Broker Architecture
EU	European Union
EC	European Commission
e.g.	- exemplia gratia - for example
8D	Eight Disciplines Problem Solving
ERP	Enterprise Resource Planning
GPS	Global Positioning System
IDMS	Identity Management System
IF	Identity Federation
IFX	Infineon Technologies AG
INF	Infineon Technologies IT-Services GmbH
IT	Information Technology
ITI	IT Inkubator Ostbayern GmbH
J2EE	Java 2 platform
OEM	Original Equipment Manufacturer
PDA	Personal Digital Assistant
QDX	Quality Data Exchange
SME	Small and Middle-sized Enterprise
SOA	Service-Oriented Architecture / Source of Authorisation
SOAP	Simple Object Access Protocol
SPIKE	Secure Process-oriented Integrative Service Infrastructure for Networked Enterprises
UR	University of Regensburg
VPN	Virtual Private Network
WP	Work package

## Executive Summary

The vision of SPIKE is to implement a system for enterprises of all sizes to be used for realizing competitive advantage via forming business alliances.

The main goals of the SPIKE project can be summarized on two levels: organisational objectives and realizing scientific and technological objectives. The main organisational objective is to allow for the secure fast set-up and management of networked enterprises, whereas the main technical objective is to develop generic solutions for inter-enterprise interoperability and collaboration through reference scenarios and guidelines for their use.

In order to achieve these goals, the requirements for such a system have to be properly defined. The instruments used to gather the SPIKE requirements are market research and three application cases, which were defined by the SPIKE partners AIT, CIT and INF.

During the phase of market research, a survey was conducted and participated by 25 companies. The completed questionnaires, four interviews and a secondary market research - consisting of results from other related research projects - resulted in a bundle of requirements which should be regarded as a completion to the requirements and use cases coming from the application cases.

The application cases (AC) are: Intra- and Interorganisational Offering of Technical Documentation Services (AC 1), Integrating Legacy Systems (AC 2) and Identity Federation (AC 3). Each application case is structured into a number of use cases. These use cases are the most important method describing the dynamic functional behaviour of the SPIKE system.

In AC 1, the SPIKE system will be used to control and automate the supplier vs. client documentation management processes and related sub-processes. It is described by nine use cases: uploading and sending documents, receiving documents from supplier, verifying uploaded documents, verifying received documents near deadline, sending reminder messages to suppliers, monitoring list of blocked invoices, creating a complaint for missing documents, viewing reports about supplier – client communication, assigning users to groups according to project.

AC 2 describes the requirements how to locate services of partners, use them in a structured way and integrate them into workflows on a detailed level. AC 2 is described by eight use cases: create/maintain/delete user account for service provider, create/maintain/delete service information and configuration, track services ordered by reports, search for service required, order service, cancel contract for a service, use a contracted service, perform a contracted service.

AC 3 will allow individuals to use the same account and password they have in their company to get access to a network of a collaboration partner via the SPIKE platform. AC 3 is described by six use cases: collaboration setup, role and resource management, collaboration phase, adjust collaboration, extend/reduce collaboration, finish collaboration.

The development process will be characterized by deployment from early beginning. Therefore two trial tests will be conducted. The SPIKE system will be developed in an iterative process giving the SPIKE user partners the opportunity to modify their use cases after each trial test.

Trial 1 (Basic components), running from month 21 to month 25, will focus on the following aspects: basic platform services, basic workflow operational services, basic collaboration support.

Trial 2 (Integrated platform), running from month 31 to month 34, will consist of three building blocks:

- identity federation with the focus on implementing single-sign-on techniques,
- application integration with the focus on embracing existing applications,
- support of services with the focus on automatic locating and usage of services.

The requirements coming from all sources are listed in chapter 8, classified as "functional" or "non functional" and prioritised as "must", "medium", "low" and "future" ("future" means fulfilled after the end of the SPIKE project).

The requirement analysis specification will be updated continuously during the project lifetime. The life cycle of the SPIKE requirement analysis is shown in Figure 2-4.

## 1 Introduction

Many software organisations often bypass the requirements analysis phase of the software development life cycle process and skip directly to the implementation phase in an effort to save time and money. The results of such an approach often lead to projects not meeting the expected deadline, exceeding budget constraints and not meeting user expectations.

Therefore, when a software product has to be developed, one of the first tasks to be performed by the project team initiated by the project manager must be the analysis of the requirements. One of the main benefits of performing an extensive requirements analysis phase is to be aware of the needs of the software product to be developed, thus minimising impact due to potential goal conflicts with respect to time and money.

The requirements analysis process aims at identifying and documenting the customer's requirements for a proposed system. In most cases the client will only have a rough idea of what is needed in the proposed system. It is the analyst's job to extract the core functionality of the envisioned system, add implied requirements and regulatory requirements customers may not be aware of.

Within the SPIKE project, major emphasis is put on fulfilling the requirements as laid out by SPIKE's applications partners and consortium members addIT, Citec and Infineon. In addition to them, further potential users of the SPIKE platform have been identified to complete the picture. These are the participants of a survey conducted on user requirements and the interview partners who have been further interrogated in order to get an impression of their individual needs. The role of the analyst incorporating all requirements gathered and aligning them with the SPIKE vision is played by the consortium as a whole and especially by ITI and the development partners: the Universities of Kosice, Malaga and Regensburg and the company Intersoft.

The SPIKE requirement definition follows a strategy which consists of five steps. Goals and user groups have to be identified (steps 1 and 2) before the requirements can be gathered (step 3). Once the requirement specification is written (step 4), it needs to be validated (step 5). Chapter 2 explains these five steps with reference to the SPIKE project.

Chapter 3 describes the different instruments used to define the SPIKE requirements: use cases, questionnaire, interviews, secondary market research, workshops and round table discussions. Among these instruments the use cases are by far most important.

Chapter 4 to 7 present the results of the requirements analysis. Its structure follows the structure of the applied instruments described in chapter 3.

In chapter 4 the results of the market research are explained. It is divided into three parts: Results from the questionnaire (4.1), from the interviews (4.2) and from the secondary market research (4.3).

As described in the "Description of Work" [ANN07], the SPIKE solution will be tested within two pilot cases based on the three application cases which are documented in the chapters 5 to 7, provided by each of the three SPIKE user partners addIT, Citec and Infineon. The three application cases are as follows: intra- and inter-organisational offering of technical documentation services, user interfaces to legacy applications and identity federation.

In detail, chapter 5 focuses on the application case on intra- and inter-organisational offering of technical documentation services. The goal of this pilot is to enable close collaboration and communication between all involved partners in the documentation process.

Chapter 6 treats with the application case on a fully automated process involving portal-based user interfaces to legacy applications, whereas the application case on an identity management service that is generic enough for deployment in any business alliance setting is outlined in chapter 7.

Finally, chapter 8 gives an integration of the requirements coming from the individual sources using the methodology outlined in chapters 2 and 3.

Chapter 9 gives an overview on the two trials based on the results presented in chapters 4 to 8.

Figure 2-4 shows that the requirement specification is a living document which has to be updated continuously during the project life time. How the SPIKE consortium plans to proceed once the requirement specification is written, is explained in chapter 2.

## 2 Strategy

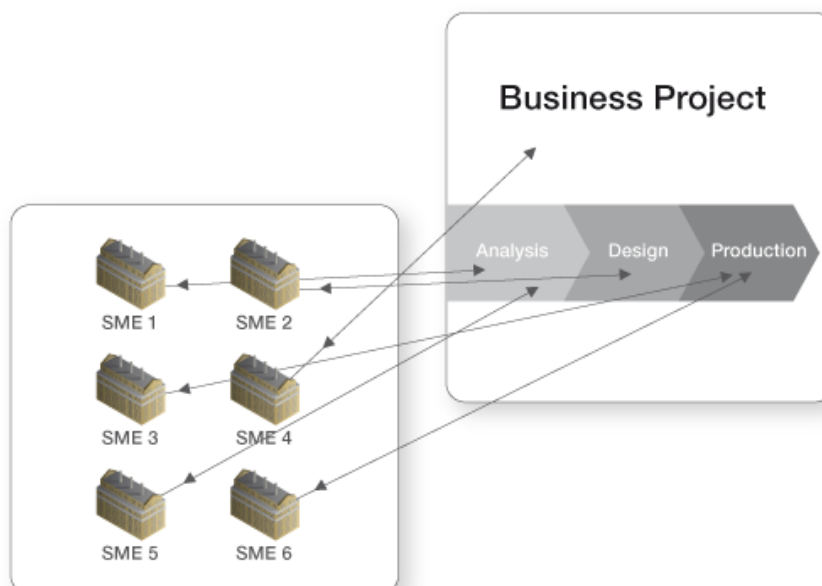
Understanding user requirements is an integral part of the initial stages of every software design and at the same time critical for the overall success of the designed system. The purpose of our requirement analysis is to obtain a thorough and detailed understanding of the business needs which we subsequently break down into discrete, clearly defined requirements. The whole process happens in close cooperation with our user partners which act as representatives of specific user groups (for example technology providers, content providers, service providers, service users which are later defined in greater detail).

This chapter provides the guidelines for the SPIKE requirements engineering process and the requirements specification life cycle which is structured in five steps:

- Analysis of vision/scope and goals
- Identifying the user groups and their roles
- Gathering requirements
- Writing a requirement specification and a use case specification
- Validating the requirements specification

### 2.1 Analysis of Project Vision/Scope and Goals

The vision of SPIKE is to research and implement a system for enterprises of all sizes to be used for realizing competitive advantages via forming business alliances. These alliances can take place along three project stages which are exemplified in Figure 2-1. Different consortium configurations can occur during each project stage.



**Figure 2-1: Example of a business project alliance**

The main goals of the SPIKE project can be summarized on two levels: organisational and scientific/technological objectives.



The organisational objectives of the project are to facilitate the secure and fast set-up and management of networked enterprises through short-term and project-based business alliances. The developed platform within the SPIKE project will:

- Enable outsourcing of parts of the value chain to business partners
- Simplify collaboration between the members of participating organisations through dynamically created and pre-defined business processes and workflows
- Achieve interoperability and integration between organisations of all sizes
- Offer generic solutions for inter-enterprise interoperability and collaboration through reference scenarios and guidelines for their use
- Have a special focus on security and trust.

With respect to the needs of SME's in particular, SPIKE will put an emphasis on pragmatism and financial feasibility of the developed solutions by building upon existing open source solutions.

The science and technology objectives of the SPIKE project include the research, development, implementation and validation of the following components:

- Semantic service bus for registering, discovering and contracting services, as well as service message routing and processing capabilities
- Semantic business process management engine, which will handle customized reference processes, ad-hoc defined workflows and distributed processes built from generic process fragments
- Semantic transformation of service messages including user context information
- Information flow control between members of the alliance, that is, service message and user context filtering according to previously specified policies
- Security infrastructure for the networked enterprise in terms of attribute management, authentication, workflow and service access control, and auditing functionality
- Repositories for processes and ontologies supporting the networked enterprise
- Portal server extension for semantic context capturing and communication
- Portal-based interfaces and tools for user-friendly administration of alliances, ad-hoc workflow modelling and process handling, service management and security as well as user administration.

To increase the project impact and to facilitate the deployment process, the technical objectives will be complemented by the development of a methodological guideline on how to operate, run and dissolve a business alliance in general – and especially with the SPIKE system.

The potential of SPIKE will be shown in pilot deployments which are described in detail in chapter 7.

After identifying the visions and goals of the SPIKE project, the user groups who will interact with the software have to be identified. The following chapter is dedicated to this step.

## **2.2 Identifying the User Groups and their Roles**

Before gathering requirements for SPIKE, which are necessary to accomplish the already presented visions and goals, the user groups and their relation to the SPIKE platform have to be

identified. This step is vitally important to find the specific needs of the targeted user groups for example in the SPIKE application cases. After defining the user groups the involved roles and responsibilities within the user groups will be identified.

### **The SPIKE platform**

Roles and responsibilities within the SPIKE platform are related to people who interact with the software and/or use the products, information in and outputs of the system. The detailed roles and responsibilities of the users and operators are described individually for each application case in chapters 5 to 7.

In the following, some general user groups have been defined and identified for the SPIKE platform [ANN07].

### **Technology Provider**

The technology provider is responsible for the application of SPIKE and related technologies. Technology providers in that respect ensure the successful design, deployment, operation, maintenance and decommissioning of hardware and SPIKE software assets.

### **Portal Administrator**

A portal administrator's obligation is to maintain basic data/functions to run the SPIKE service portal itself and to create user accounts for service providers and administer their access rights, etc. The portal administrator can also be called collaboration hoster.

### **Content Manager**

The content manager is responsible for all functionality within the SPIKE portal. A content manager works with other business areas, e.g. marketing to understand their requirements and translate them into effective and usable websites. The content provider is also responsible for the development and design of the SPIKE application site.

### **Service Provider**

The provider of a specific service provides all necessary information for the service via the service catalogue (including configuration of the service, descriptions, pricing etc.), maintains the related contracts (Access rights for Service Users for a specific service, duration for the contract etc.) and uses the reporting/auditing functionality of the SPIKE service portal to keep track of the use of his service offered. He also configures all parts of the workflow if the service provided consists of more than one step.

### **Service User**

A user of a specific service that has been ordered by a service requestor from the service provider. This service user completes the required business tasks in his responsibility and during this “workflow” (which can be a real workflow, controlled by a separate workflow engine outside of SPIKE or also just a sequence of business tasks) he eventually triggers the requested service via the SPIKE service portal.

### **Service Executor**

Depending on the individual kind of service this can be a piece of software or also a human being (or organisation) executing the requested service.

### Service Locator

The service locator tries to find a provider for a specific service from the SPIKE service portal. If he finds the required service in the service catalogue he gets in contact with the service provider, settles all business related questions/contractual issues and orders/buys the service itself. The service locator is usually the main responsible company in a consortium or at least governed by it.

The next phase in the life cycle of requirements analysis is the actual gathering of requirements.

## 2.3 Gathering Requirements

This step is concerned with what people would desire the SPIKE system to do, which demands they have, and which constraints exist that are relevant for the given case.

Within the SPIKE project's initial phase there are two main instruments for gathering user requirements: market research and application cases.

One way will be the collection of user requirement by **Market Research**. Various methods of market research are used to find out information about markets, target markets and their needs, competitors, etc. SPIKE's project team can learn a great deal about potential users of the platform, their needs and how to meet those needs.

Market research within the phase includes face to face interviews and questionnaires for targeted user groups of the SPIKE platform. These instruments are described in detail in chapter 3. Special focus in market research will be put on studying the outputs of the related EU-funded projects, because there are a lot of similar issues.

Gathering requirements and use cases from the three SPIKE **Application Cases** will focus on the needs of integrating Legacy Systems, Identity Federation and Intra- and Interorganisational Offering of Technical Documentation Services.

After collecting, the requirements have to be classified and documented. The following chapter describes both steps.

## 2.4 Documentation of Requirements

After gathering requirements, they have to be well documented with regard to all further phases of the SPIKE project.

This chapter shows the modality of the documentation used by the SPIKE partners this phase.

Before the collected requirements will be documented, they have to be ordered by special criteria and evaluated by different metrics.

The first step of this phase is to describe the ordering of the gathered requirements.

After that the methods and the used templates for the documentation process will be specified. The collected requirements of the Market Research and the application cases are textual described as well as illustrated in form of requirements templates. Additionally the user partners document their use cases using a given template.

The last step in chapter 2.4 describes relevant quality criteria.

## 2.4.1 Classes of Requirements

The SPIKE requirements are classified by functional and non-functional requirements as can be seen in chapter 8. Figure 2-2 shows an overview of different requirements.

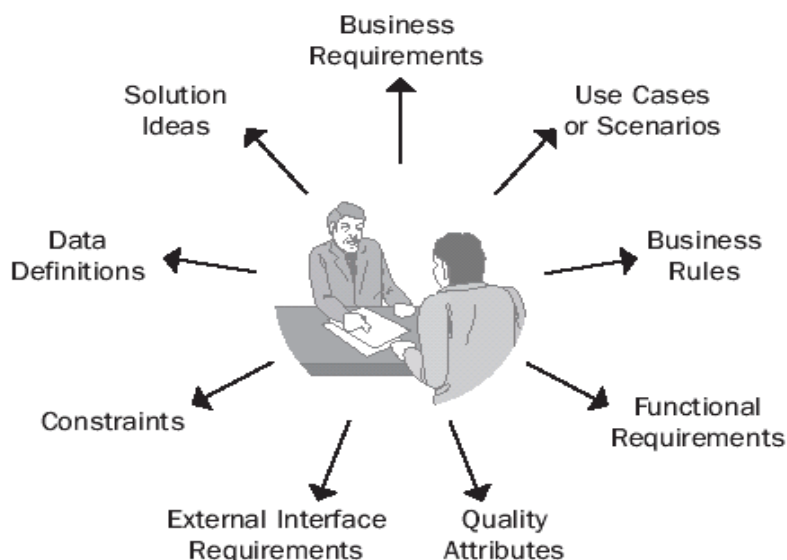


Figure 2-2: Types of requirements [WIG03]

### 2.4.1.1 Functional Requirements

Functional requirements are requirements which define those features of the product that will specifically satisfy a consumer/user need, or with which the consumer/user will directly interact.

Functional user requirements may be high-level statements of what the system should do; functional system requirements should describe the system services in detail.

For defining the SPIKE functional requirements, user requirements and system- and security requirements have been considered.

User requirements are also a kind of functional requirements. They describe user goals or tasks that the users must be able to perform with the product. [WIG03] User requirements will be acquired by various instruments. The usage of instruments will be described in chapter 3. User requirements include **Use Cases** and **Scenarios**.

### 2.4.1.1 Non-Functional Requirements

Non-functional requirements describe system qualities. Very important for the quality of a product are the aspects of performance, reliability, and system resources.

Software **Quality Attributes** are the degree to which the SPIKE software possesses a desired combination of attributes (e.g. reliability, interoperability) [IEE92]

**External Interfaces** are a description of an interface between SPIKE software and its user, another software system or a hardware device. [WIG03]

**Data Definitions** are a description of formats, data types, allowed values, or default value for a data item or the composition of a complex business data structure within SPIKE. [WIG03]

**Constraints** are a restriction that is imposed on the choices available to the SPIKE developer for the design and implementation of the SPIKE software. [WIG03]

**Business Rules** include corporate policies, industry standards, computational algorithms and government regulations. [WIG03]

**Solution Ideas** describe a specific way to interact with the system to perform some action.

## 2.4.2 SPIKE Software Requirement Specification

The SPIKE Software Requirement Specification (SRS) is a collection of both the functional and non-functional requirements for the SPIKE software product.

Requirements, once elicited, modelled and analyzed should be documented in clear, unambiguous terms. A written requirements document is critical so that its circulation is possible among all identified user groups in the SPIKE project. The quality criteria will be explained in the next chapter.

As described at the beginning of this chapter, the SPIKE user partners addIT, Citec and Infineon have used a software requirement specification (SRS) template for documenting software requirements and templates for documenting use cases and requirements (see chapter 8). In the following paragraphs, both templates are specified:

A **software requirement specification template** is a blue print of the software product and a reference for the different user groups, like the service provider, application provider and so on. It should ideally restrict itself to specifying "what" the product should do rather than "how" to do it. Ideally, it should include the following information:

- **Introduction.**
- **Overall Description** with descriptions of the applications and functions of the application case
- User Classes and their characteristics
- **External Interface Requirements** with descriptions of *user-, hardware-, software- and communication interfaces* and
- **Other Non-functional Requirements** with descriptions of performance-, safety- and security requirements as well as software quality attributes.

**External Interfaces** and **Other Non-Functional Requirements** gathered from the user partners will be listed in chapter 8.

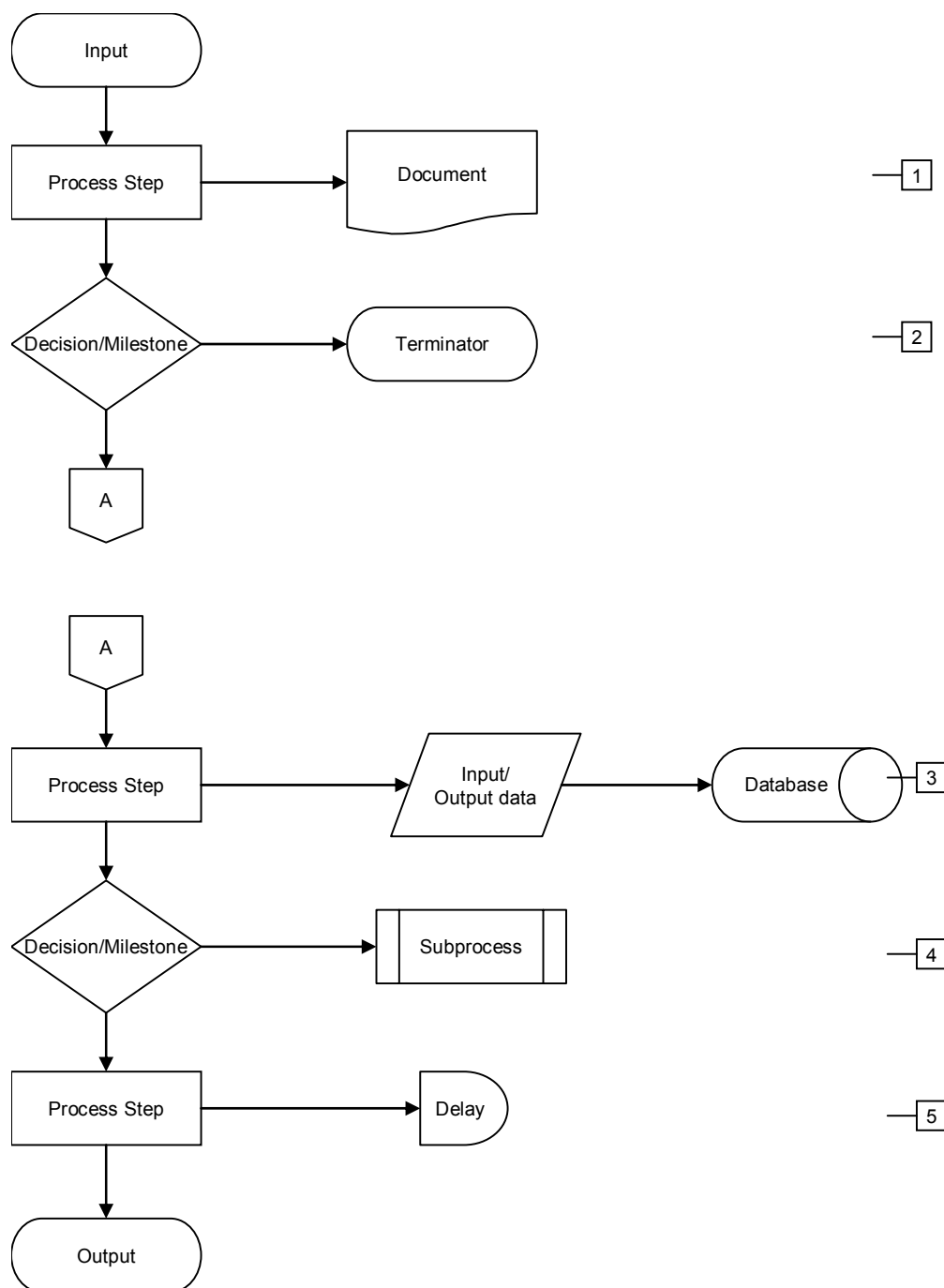
The **use case template** describes a sequence of interactions across the system boundary between one or more system actors and the system. It is a procedure by which the active actor achieves the goal of the use case.

A use case template within the SPIKE project includes the following components for describing the gathered use cases:

USE CASE#	<the name as a short active verb phrase>	
Context of Use	<a longer statement of the context is needed>	
Scope	<what is the scope of this use case>	
Level	<one of summary, primary task, sub-function>	
Primary Actor	<a role name for the primary actor, or a description>	
User group and Interest	User group	Interest
	<name of the user group>	<put here the interests of the user group>
	<name of the user group>	<put here the interests of the user group>
Preconditions	<what we expect as being the state of the world already>	
Description	Step	Action
	1	<put here the steps of the scenario from trigger to goal delivery>
	2	<...>
	3	
	1	<list of variations>

**Table 2-1: Syntax of the SPIKE use case template [COC98]**

Wherever possible and feasible for visualizing use cases, activity diagrams have been created because graphics are more precise and less ambiguous than words. Graphical depictions are a common way to include use case diagrams in the description of functional requirements for a system. The activity diagram is part of the SPIKE software requirement specification template. The meaning of each element is shown in Figure 2-3.



**Figure 2-3: SPIKE Activity Diagram**

The use case template and also the SPIKE Activity Diagram are integrated in the Software Specification Template.

Last step in the life cycle of SPIKE requirements specification process is the validation of the gathered and documented requirements.

## 2.5 Validating the Requirements Specification

Validation ensures that the requirement statements meet the original goal. That demonstrates the desired quality characteristics and will satisfy the needs of the identified user groups.

A project meeting was held on June 9<sup>th</sup> and 10<sup>th</sup> in Vaasa, Finland, which all SPIKE consortium partners attended. During that meeting the requirements were prioritised (see 2.5.1) and the quality of the requirements was checked (see chapter 2.5.2).

### 2.5.1 Priorities

The SPIKE project team ranked the requirements shown in chapter 8 according to the following prioritisation scale.

Priority	Description
<b>Must</b>	Without this requirement the concept of SPIKE will not work at all.
<b>Medium</b>	Standard case
<b>Low</b>	If there is enough time and resources the SPIKE partners should take care of this requirement.
<b>Future</b>	Requirements to be fulfilled after the end of the SPIKE project. The requirements are relevant for specific commercial use.  But developers have to have them in mind when developing the SPIKE platform.

Table 2-2: Priority scale within SPIKE

### 2.5.2 Quality Factors

The following table has been developed for the SPIKE quality check. It shows the quality criteria and the list to check the requirements. The first quality check was done during the mentioned validation meeting in Vaasa, Finland for all proposed requirements. As result of this quality check some requirements were deleted, some reworked and some consolidated.

Quality criteria	Check list item
<b>Preciseness</b>	Is the goal, or measurable value, of the use case clear?
	Is there sufficient explanation of the requirements space?
	Is it clear which user group's benefit from the use case?
	Is the dialog sequence for each course clearly written, unambiguous, and complete?



Quality criteria	Check list item
	Are all the use cases at the same level of precision?
	Are all scenarios at the same conceptual level?
	Are all the terms used in the case and the related scenarios clearly defined?
	Is the system reaction in the case of an exception clearly described?
<b>Conciseness</b>	Is the use case written at the essential level, rather than a specific scenario?
	Is the use case free of design and implementation detail?
	Is every user groups and step in the use case pertinent to performing the task?
	Are there any common action sequences that could be split into separate use cases?
	Is there any unnecessary or unused information?
<b>Completeness</b>	Is the definition of goal success specified?
	Does a textual description exist for each use case and vice versa?
	Do the pre- and post-conditions properly frame the use case?
<b>Robustness</b>	Are all known exception conditions documented?
	Is the behaviour following unrecoverable failure specified?
<b>Feasibility</b>	Is each course defined in the use case feasible?
<b>Verifiability</b>	Can test cases be generated for every use case?
<b>Validity</b>	Does the use case correctly describe what users want to be able to do with the system?
<b>Consistency</b>	Are all the exceptions described in the use case consistently described in the related scenario?

Table 2-3: Quality check [FRA05]

### 2.5.3 Lifecycle of SPIKE requirements analysis

The SPIKE user requirements analysis lifecycle is described in Figure 2-4, where the project start is shown in the bottom left corner. Use cases and market research together with requirements templates are representing the basis for writing the requirements. During workshops, the first in this cycle was held in Vaasa on June 10<sup>th</sup> and 11<sup>th</sup>, the quality of each requirement was reviewed or will be reviewed by using the above shown quality check list before they are classified.

The next step is writing the requirements specification as the initial point for writing trial outlines. The description of trial outlines and the requirements specification both is contained in Deliverable 2.2.

The trial outline and the requirements specification both have to be reviewed and developed further during the project lifetime.

Workshops with SPIKE user partners and potential other users as well as experiences from product use give input for updating the requirements specification and the trial outlines.

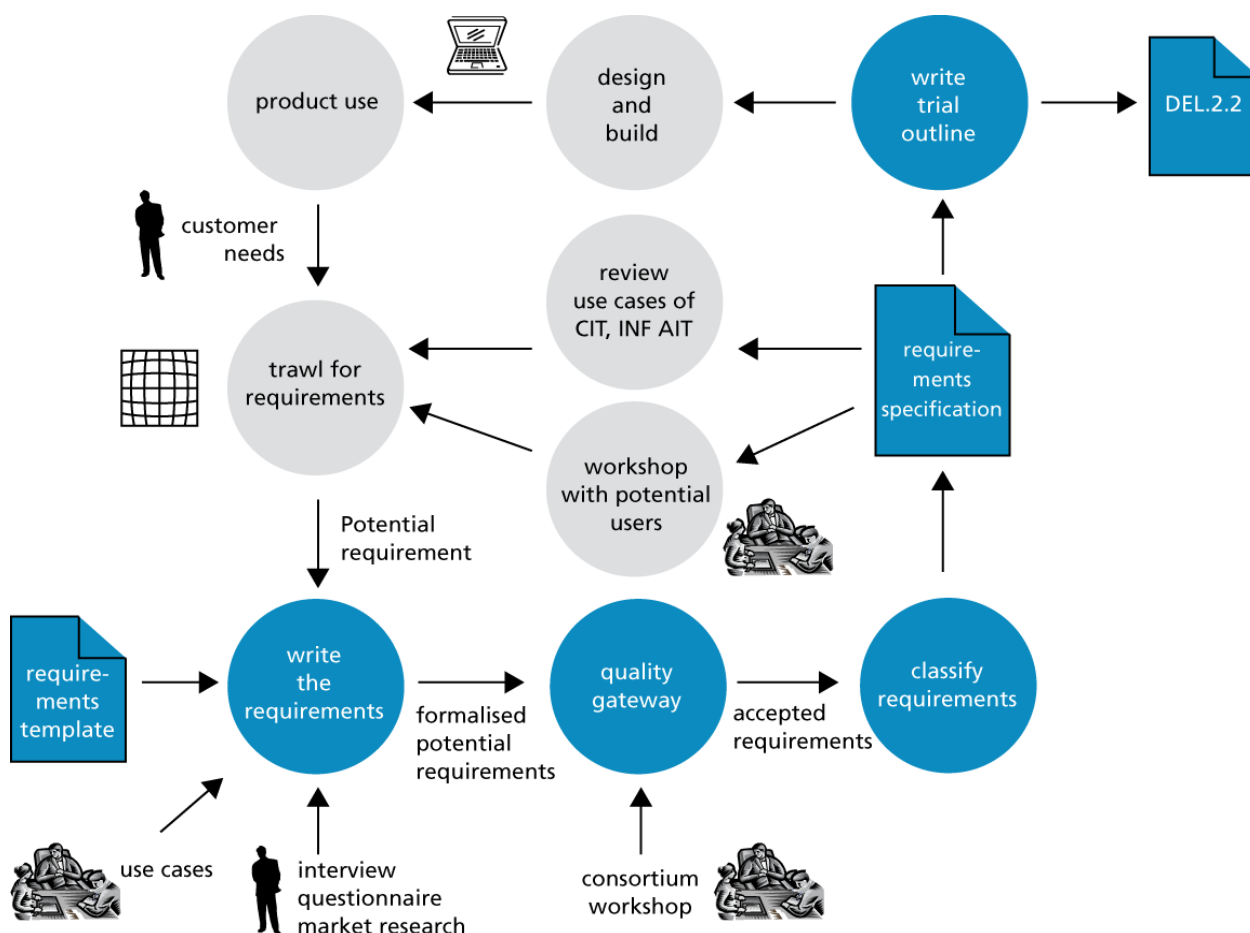


Figure 2-4: Lifecycle of SPIKE requirements analysis

The whole SPIKE requirements lifecycle can be easily understood by investigating Figure 2-4. The path toward Deliverable 2.2 is coloured blue. As can be seen from Figure 2-4, several iterations have been undertaken in order to assure that all requirements have been collected and

classified accordingly. It is also worth noting that SPIKE's user requirements are to be updated regularly, taking into account experiences made during the trial phases.

### 3 Instruments for Identifying User Needs

During the user requirements analysis phase, different instruments have been applied in order to gather SPIKE's user requirements. First of all, use cases have been employed in order to properly describe requirements imposed by the three application cases. Another instrument applied was the set up of a survey conducted among small-to-medium sized enterprises, followed by interviews in order to get an even more detailed picture of some selected participants' needs. Also, workshops and round table discussions have taken place during SPIKE's user requirements analysis phase. These instruments will be described in detail in the following sections of this document.

#### 3.1 Use Cases

The use cases imposed by the three application cases in the SPIKE project are the most important method describing the dynamic functional behaviour of the SPIKE system in the early stage of the SPIKE system development.

The SPIKE use case scenario describes how a specific task will be completed using the final system. It is written from a user's point of view and shows the task from the beginning to the end. A use case diagram displays the relationship among actors and use cases. Thus, use cases capture who (actor) does what (interaction) with the system, pursuing which purpose (goal), without dealing with system internals.

The following questions have been answered during the definition of the SPIKE use cases:

- What are the tasks in which the SPIKE software is involved?
- Does the user group need to be informed about certain occurrences in the SPIKE system?
- Will the user group need to inform the SPIKE system about sudden, external changes?
- Does the SPIKE system supply the business with the correct behaviour?
- Can all features be performed by the use cases identified?
- Which use cases will be supported and maintained via the SPIKE software?
- Which information must be modified or created within the SPIKE system?

The descriptions of the SPIKE use cases have taken into account a number of attributes. First of all, efforts were undertaken to achieve a single, discrete, complete, meaningful, and well-defined set of requirements which are of interest to a user group of the SPIKE software. Furthermore, use cases were written in an easy-to-understand structured narrative using the vocabulary of the SPIKE software domain in order to allow for a common understanding.

The template used by the SPIKE user partners for the description of use cases consists of a unique number identifying the use case and the name of each use case (USE CASE), a statement of the context (Context of Use), the scope of the individual use case (Scope) and the level of a use case. Level refers to the importance of a use case, e.g. primary task. Each use case template also contains information about the intended user groups and their respective interests as well as information on the preconditions of the use case outlined, followed by the description of the use case consisting of different steps and their appropriate actions.

For a detailed description of the use case template used for the requirement analysis, please see further chapter 2.4.2.

## **3.2 Questionnaires**

Questionnaires involve administering a set of written questions to a sample population of users and can thus help determine the needs of users, attitudes to new system ideas and current work practices.

Therefore and in order to employ a more systematic approach, a SPIKE questionnaire has been developed (for details on the questionnaire, please see section 10.6 in the annex of this document) and presented to a number of SMEs introduced by the SPIKE partners. The analysis of the questionnaire gives an overview of what has been proposed by these other companies compared to the user partners' input. These companies may act in the future as technology providers, portal administrators, content providers, service providers, service users, service executors or service requestors. For a detailed explanation of potential user groups, please see section 2.2 of this document.

The responses to the questionnaire can be summed up under the following topics:

- Portal-based services and application modules needed
- Experience with collaboration software and projects
- Security aspects
- Application of SOA and BPMS
- Organisational structure of the companies

The questionnaires have been completed by IT companies which may also act as future portal providers, by large and internationally operating companies as well as by small-sized businesses concentrating their activities on a certain region. In general, the questionnaire has addressed different kinds of companies interested in setting up alliances via the SPIKE portal solution.

It is assured that the questionnaire has been filled in only by CIOs of the larger companies addressed and by Managing Directors of the smaller IT companies. All persons asked for participation on the survey were personally known to members of the SPIKE consortium.

The questionnaire will be used, kept open for new submissions during the user requirements lifecycle and modified accordingly during the project's runtime in order to support dissemination activities and business plan development.

At a later stage of the project, when business models need to be developed, all requirements will additionally be surveyed in terms of making business with the SPIKE platform. Therefore, another questionnaire will be developed at a later point in time during SPIKE's development.

Most of the companies involved are expected to act as early adopters. They will be invited to accompany the project, e.g. by participating in regular open project meetings and workshops described in chapter 3.4 of this document.

## **3.3 Interviews**

Additionally to the questionnaires, a set of important aspects found during evaluation of the results of the survey conducted has been examined in more detail during interviews and workshops. The intention of these interviews was to provide missing explanations and

interpretations, clarify inconsistencies as well as provide important background information. For this reason, participants on the survey have been asked to give more detailed feedback on their needs during these interviews on a voluntary basis. To sum up, the interviews mentioned have been used to collect requirements from outside the consortium.

The interviews have begun with general questions – about the interview subject's role at the company – and then proceeded to detailed questions related to the interviewee's area of expertise.

The interviewer had the necessary skills to lead an interview, for example questioning techniques and interview techniques. Close-ended questions, where an answer is for example limited to be either “yes” or “no”, have been avoided. Instead, open-ended questions have been chosen, not limiting interview partners on the scope of answers. Thus, the questions asked during the interviews focused more on the how, what and why instead of pointing towards precise answers. The interviewees have been asked for potential application cases in their companies which could be supported by a collaboration platform like SPIKE.

It is also important to stress out that the interviewer had wide knowledge of the domain where the requirements analysis was made. The interviews have been conducted by the CEO of ITI with a total of four different companies.

The criteria for the selection of the interview partners stem from the answers each partner has given in the questionnaire. If the interviewee has answered at least four of the following five questions with “yes”, he has been selected for the interviews:

- Is the company the interviewee is working for experienced with short term collaboration projects?
- Would it be helpful to get access to the data or programs of the collaboration partner in these short term collaboration projects?
- Does the interviewee already use collaboration systems?
- Does the importance of SOA already play a major role in the company of the interviewee?
- Is he or she a SOA and BPM expert?

The result of the interviews can be characterised as descriptions of potential further SPIKE application cases and ideas for further SPIKE requirements which are all listed in chapter 8. The descriptions of the application cases refer to concrete and partly already established business processes in companies.

### **3.4 Workshops and Round Tables**

A round table is an informal meeting of partners with a common goal. It is a loosely structured open forum to discuss ideas and exchange opinions. Round tables are a highly effective technique to link users and developers.

A similar approach, but in a much more structured and planned fashion, is a workshop. Workshops, compared to the requirements identification methods outlined above, facilitate the difficult exchange of ideas among different people or groups within a very short time. It sets specific targets and usually involves certain predetermined activities to achieve them.

During the requirements analysis process, round tables and workshops have been held to reach consensus among the different groups of users. Different opinions potentially leading to

contradicting requirements have been clarified, providing an opportunity for the participants to exchange ideas and to form a common understanding.

The following kinds of workshops and round tables have been held or will be held respectively:

- A workshop with the SPIKE partners INF, AIT, CIT and ITI has been held to define the document templates for application cases, use cases and requirements.
- The user partners have held several round tables during the requirements definition process.
- Based on the use cases, requirements from the literature, questionnaires and the interviews as well as research performed by other parties, mainly EU-funded projects, a list of requirements has been developed. In order to classify these requirements, a workshop with all consortium partners has been organised during the SPIKE plenary meeting in Vaasa.
- For one group of stakeholders consisting of the participants in the online survey, especially those who have taken part in the interviews, a round table for quality assurance reasons is planned for project month 7. During this round table, it is planned to present excerpts from this document, providing the opportunity of a final requirements analysis quality check and also of a kick-off for a group of companies from outside the consortium which will accompany the SPIKE project for the following three years. These companies will support the consortium in fulfilling the dissemination and exploitation tasks mentioned in SPIKE's Description of Work [ANN07].

Every workshop/round table was organized and attended by a moderator and a note taker, both familiar with the subject of the round tables. For the specific goal of requirements classification we realized the following approach:

Fifty additional requirements were classified during a workshop. As it would have been very time consuming to discuss all these requirements during workshop meetings of the consortium partners, all partners have been asked individually in advance of the round table for classification according to the selected criteria. During the round table meeting, only those requirements were discussed where the assessment differed between the individual SPIKE partners.

## 4 User Requirements from the Market Research

As described in chapter 3, several methods have been employed in order to collect user requirements from the market research during the SPIKE user requirements analysis phase. In our understanding, the term “market research” consists of information gathered from different sources:

- A questionnaire has been created and a survey among potential users interested in SPIKE conducted afterwards. The results of this questionnaire are depicted in chapter 4.1.
- Participants on the survey who have signalled further interest in contributing to SPIKE development have been interviewed after the survey. The results of these interviews are described in chapter 4.2.
- Within chapter 4.3, results from research conducted by other parties such as other EU-funded projects or other research institutions are presented. Also, a brief overview on these sources is given within this chapter.

Finally, the results from the performed market research presented within this chapter are incorporated into chapter 8, which gives an overall description of the collected requirements, also incorporating the user requirements identified by SPIKE’s user partners AIT, CIT and INF.

### 4.1 Results from the User Requirements Survey

In order to support the SPIKE requirements analysis and dissemination efforts, a questionnaire has been developed as an online survey and distributed to companies potentially interested in a future use of the SPIKE platform afterwards, as already described in section 3.2 of this document. For further information about the survey, please also see the original questionnaire which has been appended to section 10.6 in the annex to this document. In this chapter, the results of the survey conducted will be presented.

In total, 25 completed surveys have been received from companies from four different countries: Austria, Germany, Slovakia and the USA. For a detailed list of participants of the survey, please see section 10.5 in the annex of this document. Generally, the survey has been completed by companies of all sizes. 17% of the participating companies have less than 10 employees, 22% have more than 500. The others are equally distributed between.

#### **The need for collaboration platforms like SPIKE**

28% of the companies have stated that the average project duration of collaboration projects lasted 4 to 6 months. 56% had an average collaboration project duration of less than two years in the past.

For 33% of the companies, it would have been helpful to have access to existing data within the collaboration partners’ IT-infrastructure or to programs of the partner. 22% of the collaboration partners needed access to the companies’ IT-infrastructure.

28% of the companies have stated that a workflow represented via web services including existing IT systems would have been helpful in former collaboration projects.

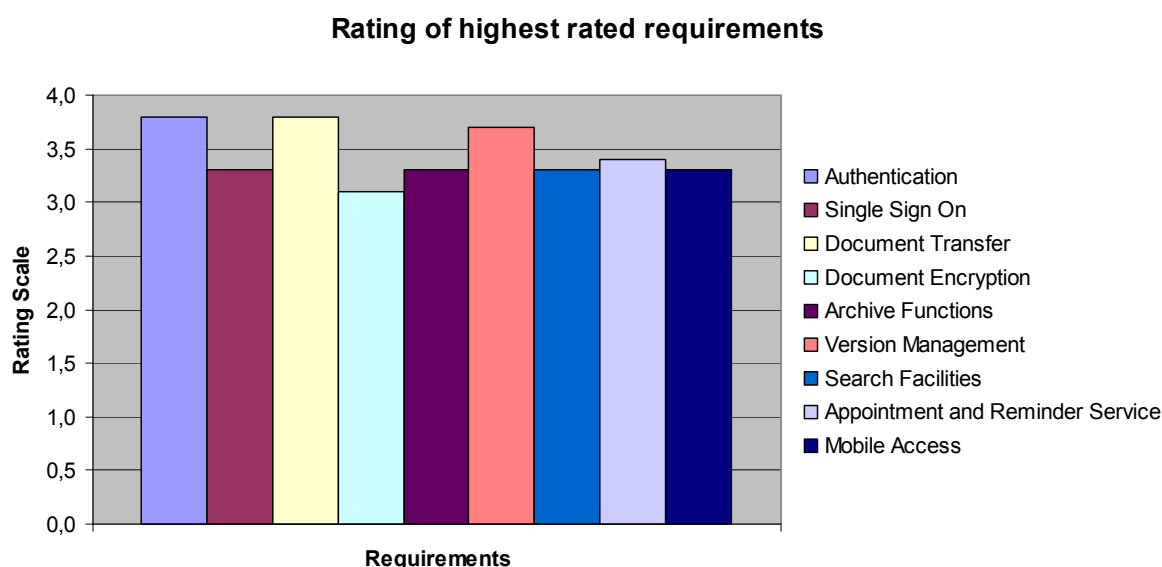
At this stage, this already shows the need for a collaboration platform for short term alliances with the possibility to have access to legacy systems and to define workflows via web services.



## Applications and requirements needed

Asked for application modules needed in a collaboration project, workflow management and document management have been rated as being extremely important. Groupware, Customer Relationship Management (CRM) and User Management applications have been described as moderately important.

Figure 4-1 shows the most important requirements for the participants in the SPIKE user requirements survey. All of them are rated between moderately (3) and extremely (4) important.

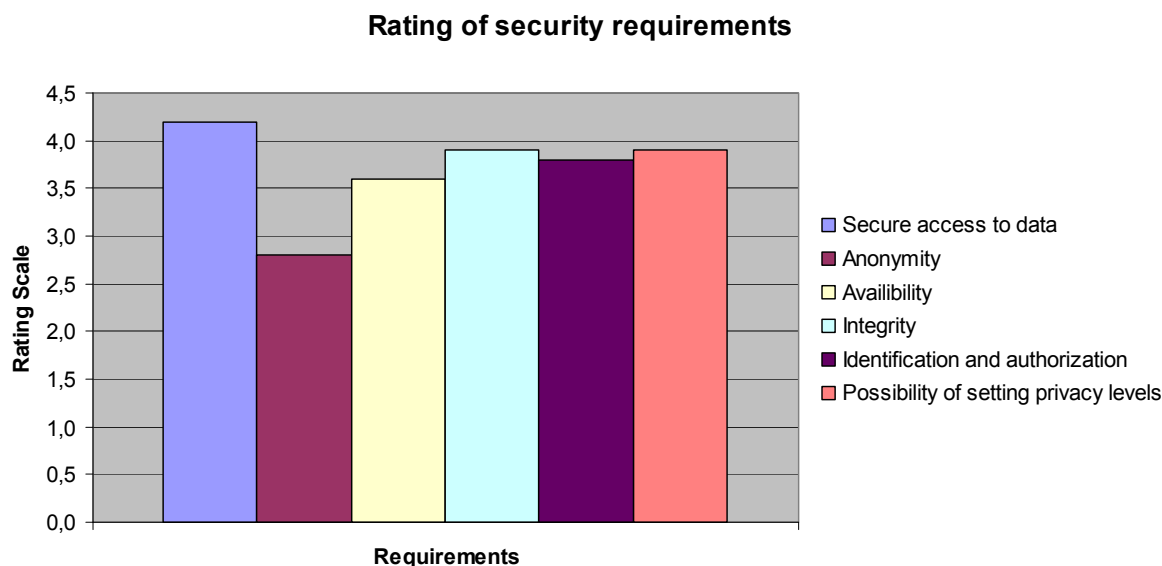


**Figure 4-1: Most important requirements as identified by SPIKE user requirements analysis survey**

## Security requirements

As can be seen in Figure 4-1, authentication has been identified as the most important requirement during the SPIKE user requirements survey. Therefore it makes sense to have a closer look at this function: 61% of the companies who participated in the survey provide a central system for authentication and authorisation, which forms the basis for more elaborated services like single-sign-on functionality. The central authentication and authorisation system is usually the Windows Domain Controller. Also, Novell eDirectory has been identified as mechanism for centralised user account management. In 83% of the companies, the authentication mechanism is password-based, in 50% partly additionally possession-based (e.g. hardware tokens), with another 17% of the participants employing authentication and authorisation based on biometric characteristics.

Additionally, the questionnaire presented a selection of security scenarios to the participants including unauthorised access to data, anonymity requirements, need for availability of the platform, data integrity, identification and authentication of communicating parties as well as privacy concerns. All of them have been rated very high between 3 (moderately useful), 4 (extremely useful) and 5 (blockbuster) except for the anonymity requirement. This outcome is also depicted in Figure 4-2.



**Figure 4-2: Security requirements from SPIKE user requirements survey**

### Service Oriented Architecture (SOA)

The SPIKE platform will embrace the service oriented architecture (SOA) software development pattern in order to allow for a flexible collaboration environment, enabling providers to quickly offer their services on the SPIKE platform and users to quickly locate and consume these services. Therefore, the survey contained a section with questions referring to service oriented architectures.

34% of the answering persons describe their knowledge of SOA as being good or very good, 33% as being basic. For 34% of the participating companies the importance of SOA is high or very high. These are the people and companies which technically would fit best to the future SPIKE platform. For them it would be easy to benefit from using SPIKE.

The survey also shows that the main intention for establishing a service oriented architecture is the gain of more flexibility (65%), cost reduction (41%) and an improvement of the quality of their offered services (52%).

As can be seen in Figure 4-3, the participants of the survey consider web services employing e.g. SOAP technology as the most important technology in respect to SOA for their own company.

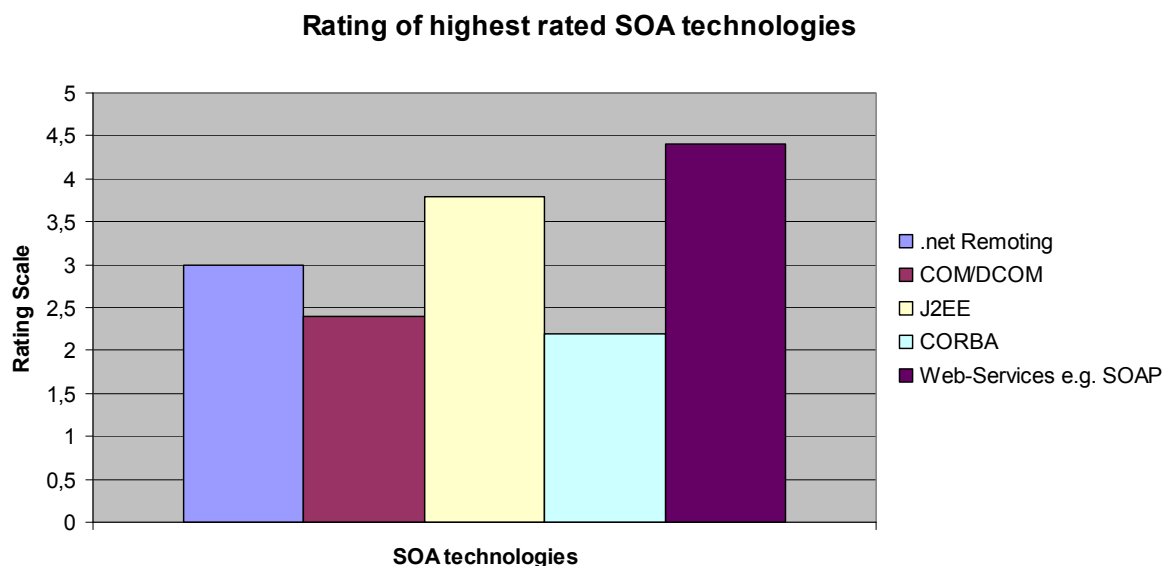


Figure 4-3: Rating of given SOA technologies

### Business Process Management Software (BPMS)

Another aspect within the SPIKE user requirements survey that has been shed light on is the domain of business process management (BPMS) functionalities. In nearly 50% of the participating companies, BPMS is used. Among those already using BPMS functionalities, 44% do so within the management department, 22% in Production and Logistic, 22% in the IT department, 11% in Sales and Marketing and 11% in Finance and Controlling and. In average, the domain knowledge on BPMS among the participants of the survey appeared to be rather low with only 22% of the participants rating their knowledge on BPMS as good or very good.

To sum up all different aspects covered by the SPIKE user requirements survey, the answers have provided very valuable input for the requirements analysis to the SPIKE consortium. In addition to the survey conducted, interviews have been held with four companies which delivered very interesting results with further input. The results of these interviews are further explained within the next section.

## 4.2 Results from Interviews

The answers in the questionnaire show that the knowledge of SOA and BPM in the selected non IT-SME's companies is up to now not very good, although they are interested to get more information. The selected IT-companies are partially already experienced with SOA architectures. Therefore we have chosen them for the interviews.

The aim of the interviews is to get more information about real application cases of real cooperation projects. How have the cooperation project been set up so far referring to the IT supported processes, software and hardware? Answers to these questions shall be given in this chapter.

### 4.2.1 Interview with Berger Münch AG

The company Berger-Münch AG develops project management software and It-solutions for collaboration projects in the automotive area. The CEO of the company, Harald Berger-Münch, has been interviewed.

H. Berger-Münch has described two potential application cases for the SPIKE platform. For both application cases the Berger-Münch AG has already developed an individual solution.

#### **Application case 1: complaint management process**

A car manufacturer and an automotive supplier are sharing one database to which only the Berger Münch AG has full access. The manufacturer transfers data about single complaints referring to product defects in an XML format via a VPN tunnel and writes this data into the shared database. Usually photos are added. This transfer must be initiated through the car manufacturer. The transfer is then followed by a workflow on a system in the extranet in order to identify the reason for the defect and to solve the problem for the future. The employees of both companies get **access** to the workflow via clients in dependency of their roles in the companies. Therefore a user and permission management has to be installed. The workflow of the complaint management process follows the 8D methodology which has become a standard in at least the German automotive industry. During the workflow an 8D-report has to be developed.

A web service can provide the data transport, implementing parts of the data model QDX, which is about to form a standard for the exchange of quality related information in the automotive industry of Germany.

#### *Relevance of this application case*

The integration of suppliers and customers into the supply chain is a constant objective for companies in a network of production resources, especially in the automotive industry. Complaints of OEMs and suppliers in this field of business must be processed with high urgency and precision by the complaint management. The extended 8D-method can be applied to an unlimited number of customer-supplier-relations along the supply chain.

The following requirements described in chapter 8 are related to this application case:

F-Req.-1, F-Req.-9, F-Req.-16

Application case 2: documented web based access to the Berger Münch project management software

The departments of a large automotive company are working together on projects with a project management software called PM4 at different locations. Up to now, they are working together in an extranet. The direct access to the PM4 related database via a web frontend is not allowed. A web service in the middle is needed to fulfil the company's compliance regulations.

Berger-Münch developed a solution which, via Rich Internet Applications developed with Adobe Flex, starts a web service for interacting with the PM4 database. This configuration leads to time outs at the client. This problem can be solved through another service which continuously sends unchanged website information to the client till the requested data from PM4 is sent.

Another company specification is the full documentation of each database access. (Who did what at what point of time?). Therefore a protocol service is needed.

*Relevance of this application case*

The access to databases via the internet can be protected by approved web services.

The following requirements described in chapter 8 relate to this application case:

F-Req.-4, F-Req.-32

## **4.2.2 Interview with Conceptnet GmbH**

The company Conceptnet GmbH develops a data converter in cooperation with ERP solution providers. The Managing Director of the company, Roland Wurm, has been interviewed. The application case shows a problem which need to be solved referring to a generally restricted database access in cooperation projects.

### **Application case 3: restricted access to a database**

The Conceptnet GmbH is working together with an ERP Software Company and one of its clients in order to develop a data converter for a specific ERP system. Data from anywhere sent to the client has to be converted to get the proper data structure for the specific ERP System. It can be for example data which is related to an order.

In order to test the proper data conversion, access to the database of the ERP-System which runs at the client is needed. Usually it is difficult and time consuming to hide most of the data in this production ERP database and to allow only access to the data which was converted during a test order for example.

The current cooperation process therefore forces the Conceptnet project manager to travel many times to the client of the ERP Software Company where somebody of the company sits next to him for surveying.

With the SPIKE platform a solution of this problem should be provided.

*Relevance of this application case*

Usually the development of a converter lasts 2 to 4 month with a lot of travel effort because of the restricted access. The described problem is general. It is reality in many projects where access to a database with confidential data is needed in order to test proper data conversion.

The following requirements described in chapter 8 are related to this application case:

F-Req.-16, F-Req.-32

### **4.2.3 Interview with Scheu + Wirth GmbH**

Scheu + Wirth is a construction firm which very often works together with other companies in construction projects. These projects usually last several months to a few years. For this time the companies build a consortium. Every company is responsible for one craft.

The interview was conducted with Mr Peter Eibl. He has been an employee and now is responsible for setting up the IT environment for construction consortiums in containers located next to the construction site with his own IT company.

He described the following situation:

Each construction project consists of many crafts which depend upon each other.

Before a specific craft can be started, information about the realisation of other crafts must be provided. Was everything realized as described in the plans? Has the project manager accepted these changes? Do changed interfaces require additional attention?

#### **Application case 4 - Mobile Access**

Mobile access is needed to support the project manager when he is checking the realization of a specific craft at the construction site. He must be provided with plans, especially CAD plans. Access to these plans is necessary via PDA.

By means of special templates for PDA's, provided by the SPIKE platform, the project manager can give feedback to the construction partners regarding the respective craft. This feedback must then initiate a workflow. For example, if the project manager accepts the accomplishment of the craft, work on the following craft can be started. The acceptance must be signed with a digital signature and stored on the platform. Changes compared to the original plans have to be documented in a change record. These changes also need to be accepted with a digital signature.

The following requirements described in chapter 8 relate to this application case:

F-Req.-1, F-Req.-3, F-Req.-7, F-Req.-8, F-Req.-10, F-Req.-11, F-Req.-16

### **4.2.4 Interview with Optitool GmbH**

Optitool GmbH is an experienced software development company. Its core competence is to solve combinatorial optimization problems regarding various restrictions. The software is used for strategic, tactical and dynamic planning of transport routes and is highly integrated in the business process of the customers. The interview has been conducted with Dr. Rackl, the managing director of Optitool.

### Application case 5: optimisation of logistic processes

In a typical project of Optitool, a communication platform has to be set up and communicate between the ERP-system of the supplier, Optitool programs and lorries. The system is already realised with Optitool technology and shown in Figure 4-4.

A web service (running on the communication platform of Figure 4-4) takes data about orders (e.g. oil) from an ERP system and data about the position of lorries and transfers this data to the Optitool optimisation (e.g. Optitool OIL/3) programme where it is used to produce planned lorry tours. The tour plans vary a few times during the day because of new orders or other changes, for example traffic jams. Changes of the schedule and bills of delivery have to be sent to the lorry in real time as part of a workflow.

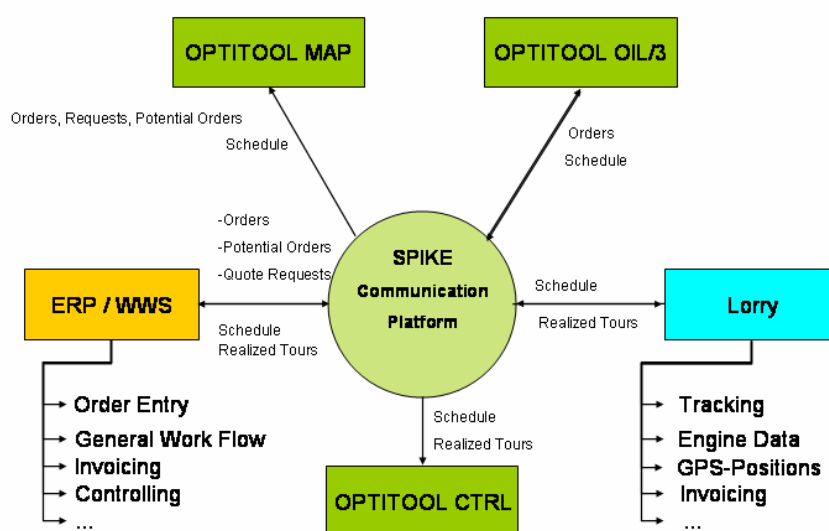


Figure 4-4: Structure of logistic collaboration

The dispatcher and the salesman of the supplier have a complete overview about the current scheduling and orders with a program called Optitool Map. This program can be realised on the SPIKE platform as a web service, integrating maps, transport routes, locations of orders and potential orders, the position of lorries (GPS data) and other data from different sources.

The lorry driver sends information of the realised tour to the communication platform where it is passed to the program Optitool CTRL. This program compares schedule and realised tour.

The SPIKE system therefore has to realise the described workflow, show maps, transfer and store documents. The workflow and maps must integrate real time data about orders and GPS positions.

*Relevance of this application case*

The described platform describes a solution which is of great use for each kind of supplier and transportation company. Setting up an infrastructure as described and shown in Figure 4-4 takes Optitool a very long time. Most of this time is spent programming the workflow, combining data from different sources, programming the interfaces and fulfilling all security restrictions. With the SPIKE platform, the time for building such an IT infrastructure will be reduced. Therefore, short-term transportation alliances can be supported, too, with reasonable effort.

The following requirements described in chapter 8 are in direct relation to this application case:

F-Req.-1, F-Req.-3, F-Req.-7, F-Req.-8, F-Req.-30, F-Req.-31, F-Req.-32, F-Req.-33

### **4.3 Requirements from the Secondary Market Research**

Within this section, results from research conducted by other parties such as other EU-funded projects clustered under the EU FP6 ICT for Enterprise Networking initiative or other research institutions are presented. Also, a brief overview on these sources is given within this chapter.

First of all, a selection of relevant EU projects will be looked at and their possible contribution to SPIKE on the area of user requirements will be evaluated. Afterwards, implications on SPIKE's user requirements coming from other research performed by i.e. the Fraunhofer Institute will be considered and evaluated regarding their potential contribution.

#### **4.3.1 Research results from other EU-funded projects**

In order to find out relevant user requirements and to complete the picture received by considering the application cases delivered by SPIKE's user partners AIT, CIT and INF as well as the survey and interviews conducted, project output of related EU-funded projects has been considered.

In detail, the projects already identified in SPIKE's Description of Work [ANN07] have been evaluated concerning their potential use for the SPIKE platform regarding their user requirements:

- STASIS
- DBE
- FUSION
- CROSSWORK
- ECOLEAD
- TrustCoM

Generally, this list of projects covers projects that are funded via the EU's FP6 programme. In the following section of this document, the objectives of each project, the benefits gained by evaluating it for SPIKE's requirements analysis as well as a differentiation to SPIKE in terms of its goals is briefly laid out.



The **STASIS**<sup>1</sup> project is funded through the IST Sixth Framework Programme and consists of 12 partners across Europe and China. The project commenced on September 1st 2006 and runs for 3 years until August 2009. [STA07a] The STASIS project targets at developing “software for ambient semantic interoperable services”. Its objectives are in research, development and validation of open, web services-based, distributed semantic services for SME empowerment within the automotive, furniture and other sectors. [STA06] The STASIS user requirements report shows 45 functional and 13 non-functional requirements which have been taken into account when designing the requirements for the application case on legacy applications described in section 6 of this document. Furthermore, the SPIKE user requirements analysis could benefit from the research of requirements with STASIS’ strong reference to semantic services and applications based on the open SEEM registry and repository network. In addition to STASIS’ results, SPIKE will also offer process and security support.

**DBE** - The Digital Business Ecosystem<sup>2</sup> is an internet-based software environment in which business applications can be developed and used. The Digital Business Ecosystem (DBE) is a P2P platform designed specifically to enable users to create, integrate and operate with both real-world and software services for small-to-medium sized enterprises (SMEs) via a digital network. [DBE06] The unique feature of the DBE is that applications within the ecosystem are able to perform new functions that would not have been possible otherwise. The SPIKE user requirements analysis has gained benefits from DBE’s research of service-oriented architecture with a peer-to-peer infrastructure, related components and applications of SPIKE. Also, targeting integration and operation of software services specifically for small-to-medium sized enterprises, SPIKE development gained a good impression of the challenges tackled by the DBE project. Going beyond DBE’s goals, however, SPIKE is also focusing on short term alliances, which creates new requirements of its own.

The **FUSION**<sup>3</sup> project is also funded by the European Commission within the 6th Framework Programme, started on February 1<sup>st</sup>, 2006 with a project duration of 30 months. FUSION puts its focus on the e-Business domain as FUSION aims at enabling efficient business collaboration and interconnection between enterprises by developing a framework and innovative technologies for the semantic fusion of service-oriented businesses applications that exist within the collaborating companies. [FUS07]

Particularly, the FUSION project tries to achieve three main goals: [FUS06]

- FUSION aims at the development of an innovative approach, methodology and integration mechanism for the semantic integration of a heterogeneous set of business applications (ERP and CRM applications from different technology providers), platforms and languages within SMEs.

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<sup>1</sup> <http://www.stasis-project.net>

<sup>2</sup> <http://www.digital-ecosystem.org>

<sup>3</sup> <http://www.fusionweb.org/Fusion/home.asp>

- FUSION aims at the integration of research activities carried out in the Enlarged Europe in the areas of Business Process Management, Semantic Web and Web Services.
- FUSION aims at the validation of research results by developing proof-of-concept pilots in collaborative commerce across semantically-enriched supply chains and value networks across the Enlarged Europe. In particular, the FUSION approach, methodology and integration mechanism are expected to facilitate three trans-national cases, each of which has operations spanning the Enlarged Europe.

SPIKE development could benefit from input of the FUSION project obtained by researching service-oriented business applications. Going beyond FUSION's objectives, SPIKE also focuses on security aspects.

**CROSSWORK**<sup>4</sup> is a project funded within the "IST-2002-2.3.1.9 Networked business and governments" programme of the FP6 programme, running from January 1<sup>st</sup>, 2004 until December 31<sup>st</sup>, 2006 [IST08]. It focused on dynamic networks and the building of alliances and agile partnerships between different companies. Similar to SPIKE, it followed the objective of developing mechanisms for automated workflow formation and enactment [CRO04]. Although primarily focused on the automotive sector, SPIKE could gain valuable input on workflow management systems from the Crosswork project's results, especially on the domain of formalisms of modelling workflows and specifications of an open platform and quality factors to determine quality of a given input/output factor. Extending the goals of Crosswork, SPIKE will develop open source solutions and will not only target the automotive sector, but primarily focus on small-to-medium-sized enterprises.

**ECOLEAD** is funded within the FP6 programme of the European Union, with a project duration of 51 months, running from April 1<sup>st</sup>, 2004 until June 30<sup>th</sup>, 2008. ECOLEAD aims at creating strong foundations and mechanisms needed to establish the most advanced collaborative and network-based industry society in Europe [ECO04]. The ECOLEAD project focuses on three building blocks as basis for dynamic and sustainable networked organisations [ECO04a]:

- Breeding environments
- Dynamic virtual organisations
- Professional virtual communities

The fundamental assumption in ECOLEAD is that a substantial impact in materialising networked collaborative business ecosystems requires a holistic approach [ECO04b]. SPIKE received valuable input from the research of security requirements, workflow requirements, access mechanism and interfacing of dynamic virtual organizations. In contrast to ECOLEAD, however, SPIKE will focus on short-term collaborative networks between SMEs.

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<sup>4</sup> <http://www.crosswork.info>

**TRUSTCOM**<sup>5</sup> is a project funded within the EU FP6 programme, started in 2004. TRUSTCOM has developed a framework for trust, security and contract management in dynamically evolving virtual organisations that will meet the needs of this situation and provide the basis of products and services. The provision of such a business infrastructure in the ICT market could be as an extension of existing ERP products, or as a service provided by network providers and telecom companies. The TRUSTCOM framework has been delivered as an open source reference implementation building on public specifications. [TRU04]

Generally, the TRUSTCOM project provides two independent application cases demonstrating its functionality, according to [TRU04a]:

- Large scale collaborative projects in the engineering domain
- Dynamic VOs providing ad-hoc aggregated services

SPIKE development could benefit from TRUSTCOM's input via making use of the experience of implementing a service-oriented architecture with web-services technologies (SOAP, WSDL). Another important source of information for the SPIKE project was the case study treating different scenarios for virtual organisations [TRU04b] as TRUSTCOM's focus also is on the dynamic nature of virtual organisations. Contrary to TRUSTCOM's goals, however, SPIKE also focuses on semantic services and business process issues.

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<sup>5</sup> <http://www.eu-trustcom.com>

## **5 User Requirements from Application Case “Information Hotel: Providing Intra- and Interorganisational Technical Documentation Services”**

### **5.1 Introduction**

As a part of its participation in the SPIKE project, Citec Information will pilot an Information Hotel solution, the purpose of which is to provide intra- and inter-organisational technical documentation services. The goal of this pilot is to enable efficient and close collaboration and communication in a situation where there are several collaborating partners (including, for example, the producer of a product, a supplier contracted by the producer, and a documentation service provider) involved in a documentation project and/or process.

In this application case, the SPIKE infrastructure will be deployed to aid documentation service providers in communicating with the other actors involved in the project and help them in accessing, refining, and disseminating relevant project information throughout the product development organisation. Citec Information will focus on the novel semantic data transformation functionality of SPIKE, aiming to make collaboration more flexible in terms of faster and easier exchange of differing data formats. With the Information Hotel approach, Citec will create an interface that allows the seamless flow of information between all collaborating parties.

While SPIKE provides the missing links for intra-organisational cooperation, it can be extended to inter-organisational business as well. The Information Hotel solution will define and unify methods and technology for collaboration processes, so that documentation services can be offered under the involvement of multiple parties. The Information Hotel will provide services for secure information management (including content management and document management) between the collaborating parties. The Information Hotel can be virtual, meaning that each party owns their own parts or Information Hotel services, or hosted, meaning that Citec Information or some other collaborator would be hosting the entire environment.

The Information Hotel solution will use the SPIKE infrastructure to control and automate documentation management processes, related sub-processes, and workflows. This solution will lower the documentation management costs on both sides, shorten the time-to-market for all parties and improve the quality of the documentation. Consequently, the use of SPIKE can also be expected to mitigate risks related to documentation management and also decrease costs related to overlapping functions or a lack of resources.

In addition, SPIKE will allow more advanced access to status information about the document management activities such as the overall documentation maturity status of a project. Reporting and automated notification functionalities will be used to improve the transparency of partnerships (including relationships such as Citec-client, client-supplier, Citec-supplier).

The application case may also include a possibility to add supplier delivery capabilities (e.g. to third parties).

The SPIKE infrastructure is also expected to create new business opportunities for technical documentation service providers. Furthermore, the tight integration of documentation service providers into the information processes of product development organisations – enabled by the SPIKE system – brings new opportunities and a significant added value for the product development organisations themselves.

The description of this application case forms the basis for the work of software analysts responsible for defining the functional specifications of SPIKE in detail. It describes SPIKE from a business point of view by defining one application case that the product is intended to cover. There are also certain general requirements (e.g. performance, easy-to-use interfaces etc.) which can be considered as preconditions for the implementation of the SPIKE platform to be considered successful.

## 5.2 Overall Description

There are typically a number of complex issues related to managing large technical documentation projects that involve several collaborating parties, such as a producer and the producer's documentation service provider, suppliers, and subcontractors. The problems related to this process include issues such as:

- Incompatibility or inconsistency of the information produced by the different parties (different data storage formats, different information structuring and organising principles, inconsistent use of terminology etc)
- Differences in standardisation
- Update and change management is a slow and complex process, that requires a relatively large amount of resources and which may easily prolong the time-to-market.

### Problems related to information inconsistencies

As not all (if any) of the information required for a specific publication is typically in a format that would allow single-source publishing, there are considerable costs and risks of delayed deliveries related to information management and e.g. localisation activities.

In an effort to address this problem, Producers may demand that all of their Suppliers deliver their documentation in one unified format (e.g. as XML or Adobe FrameMaker files). This approach, however, does not solve the original problem but merely transfers the responsibility of dealing with it to Suppliers alone. Furthermore, a Supplier typically has a number of clients, each of which have their own specific requirements. Especially if the Supplier is a small or medium-sized enterprise (SME), it is highly unlikely to have the resources or the expertise necessary to meet all of these different requirements. Delivering documentation in various different formats thus also represents overwhelming costs for a SME.

### Problems related to information management

In addition to issues related to the consistency of information, information management, that is, acquiring, processing, and compiling the technical information to be published may also represent a significant hurdle for SMEs. During the initial stages of a new collaboration relationship, responsibilities are transferred and network access issues are solved. It is often the case that the initial stages also reveal a multitude of process interfaces, input channels, and system access requirements that had not been planned for. Most companies do not have a clear definition and understanding of all the interfaces related to creating technical documentation and typically the real extent of organisational input is realised only after the process has been outsourced. In most organisations there are a lot of hidden costs behind the creation of technical documentation, including involvement from parts of the organisation whose input has never before been calculated to the total cost of producing technical communication materials. The time required to adjust the operative mode and the agreements made to include the emerging new

interfaces, system access requirements and input channels may cause further delays for reaching a truly functioning operative phase.

To further complicate the situation, companies need to regularly update and modify their processes, organisations, tools, and applications. Consequently, also the operative mode and related access rights, interfaces, and connectivity must be modified at ever increasing intervals. Managing the information flow between the different parties is often also subject to different information delivery schedules and cycles. In addition, the nature of the information itself may vary: some of the information may be bilateral, while some of it is multilateral. Thus, there is a need for a flexible collaboration system in order to maintain the productive operative mode.

For the reasons described above, companies may decide to transfer the documentation coordination function to a documentation service provider with experience about managing such information flows. While the Documentation Service Provider may be better equipped to analyse the information flows and workflows, it can also be argued that this approach also adds yet another complication to the information management process. Thus, a flexible collaboration system can also help create new business opportunities for technical documentation service providers, as already mentioned in the introduction to this application case, section 5.1 of this document.

### **Introducing the case: document control at Wärtsilä Power Plants**

As suggested in the previous section, few companies that decide to outsource their documentation management function fully realise the extent of tight integration and amount of interfaces required by collaboration in the technical communication area. The ability to provide a safe access platform with which to enable quick transition to the collaborative mode would erase much of the cost and the challenges of a truly functioning operative collaboration. The Information Hotel solution piloted by Citec aims to increase the efficiency and satisfaction of all collaborating companies and enable them to reach their targets within a reasonable transition period.

The Information Hotel application will be piloted in cooperation with Wärtsilä Power Plants (WPP), who has outsourced their documentation management to Citec Information. Consequently, the pilot will be firmly grounded on actual, real-life needs and an actual operational environment. The WPP case demonstrates the typical characteristics of managing a distributed technical documentation process as described above. On the other hand, these requirements also apply to basically all other companies as well who have decided to outsource their technical documentation to Citec Information. The application case has been and will be reviewed also by Citec staff with knowledge and experience about the documentation interfaces with other Citec customers. For clarity, from here onwards the application case is described using terms associated specifically with the WPP case.

The application case is written from a Citec point of view: the term “client” thus refers to a company with which Citec Information has a collaboration contract. The term “supplier” refers to a supplier company with whom the client company has a collaboration contract.

This application case uses the following terminology:

- DC – Documentation Coordinator
- WPP – Wärtsilä Power Plants
- SAP – Wärtsilä’s Operations Management System, provided by SAP (see <http://www.sap.com/>)



- IDM (Integrated Document Management) – Wärtsilä's Document Management System
- LIB – Wärtsilä's reporting system (a database) which is integrated to SAP and IDM
- SST (Supplier Search Tool) – An information database which in the future should be integrated to SAP. Today the information is inserted and updated manually.

In addition, the use of the terms information management, documentation management, and content management should be clarified: the use of these terms is not yet fully established and the terms may sometimes be used interchangeably.

Here, 'Information management' is an umbrella term that encompasses all the systems and processes within an organisation for the creation and use of corporate information. Information management covers systems such as document management, content management, records management, etc. Consequently, SPIKE will implement various types of information management systems. The term document management system in turn refers to a system used to manage complete documents, while content management systems are used to manage content units that can be linked to generate various outputs, such as documents.

The Information Hotel will be designed to aid the management of daily routines of the Document Control Department at Citec Information. Document Control is a function at Citec Information which refers to the responsibility of administrating the documents received from the supplier of a Citec client for delivery documentation. (Additional functions at Citec information related to the production of delivery documentation include compiling and structuring of delivery documents and writing project-specific and other instructions.)

The document control department is responsible for managing delivery documentation for their clients. A typical delivery documentation package consists of:

- client's own general instructions that apply for several projects
- project-specific instructions
- supplier documents (referred to as OEM manuals).

The SPIKE system needs to make the collaborators' work more transparent and reduce the amount of manual work (and thus possibility for human error) and enhance communication between partners. This means that the primary emphasis in the Citec pilot application case is on making the work of documentation coordinators easier and in some cases, even completely eliminating certain manual tasks.

### **5.2.1 Blocked Invoices Process**

When the deadline of a customer's delivery documentation project approaches, but the required documentation has not yet been received, the documentation coordinator starts a so called *blocked invoices process* of supplier documents. This means that the documentation coordinator checks the purchase orders of a specific project from SAP against the information stored in the LIB database about currently received/missing documentation for the purchase order in question. The documentation coordinator then contacts the suppliers and asks them to send the needed documents, if any.

The *blocked invoices* process ensures that the required documents are received in time (before the expiry of the payment due date) from the suppliers. The blocked invoices process is performed as follows:

1. The process starts from the client's project team who makes a purchase list for the purchase department.
2. The purchase department then orders the required parts from suppliers.
3. The supplier sends the order confirmation.
4. When the purchase department receives the order confirmation from the supplier, the purchase department adds the purchase order to a list of blocked invoices in SAP. The blocked invoices list is a list of all purchase orders where suppliers have not delivered everything ordered. This means that the purchase order will not be paid until the supplier has delivered everything included to the order, which includes also the documentation.
5. The documentation coordinator follows the list of blocked invoices from a documentation point of view. S/he monitors the purchase orders that are soon due and contacts the suppliers and asks for the documentation.

From a documentation control point of view, the process of blocked invoices is performed as follows:

1. The DC fetches the list of blocked invoices from SAP.
2. The DC checks which subcontractors are on the list.
3. The DC checks from the purchase order what documents are missing from suppliers.
4. The DC contacts the suppliers who have purchase order's payment day near, and asks them to send the required documents.

Some problems may also occur in the document control process such as the following:

- The supplier sends the wrong documentation.
- The quality of the sent documents is unacceptable (e.g. the certificates are not signed), resulting to reclamation.
- The supplier does not send the required documents at all.

If the supplier does not send the documents even after a reclamation/notification sent by the DC, the DC makes a formal complaint about the supplier to the client project team managing the customer project. This procedure occurs very rarely.

For a visual representation of the blocked invoices process please see Figure 10-1 in the annex to this document.

### **5.2.2 Effective Document Control Process**

The effective document control process is a subprocess of the blocked invoices process.

Effective document control is performed as follows:

1. The documentation coordinator (DC) receives documents from suppliers via e-mail or mail.
2. The documentation coordinator finds the right project by comparing the received documents to the purchase orders that can be found in the customer's operations management system (SAP).



3. The documentation coordinator checks the documents (that they are the ones that were ordered) and their quality (e.g. the quality of the digital format, correctness of language).
4. The documentation coordinator uploads the documents under the correct customer project in the customer's Document Management System (IDM) with predefined metadata. (If print documents were received, the DC first scans them in order to be able to store them in an electronic format.)
5. The documentation coordinator uses the LIB database (which is integrated with SAP and the document management system (IDM)) to report the delivery and approval of the received documents.
6. The documentation coordinator archives the e-mails to the document management system (IDM) with predefined metadata. The regular mail received from the supplier is stored to Citec's archives.
7. When necessary, the documentation coordinator prints out a "compiling recipe" (also called an Inpost report) from LIB for a specific customer project. The compiling recipe tells the document compilers which supplier documents have been received for the customer project in question and which part of an OM manual the received documents belong to.

The effective document control process is depicted in Figure 10-2 in the annex to this document.

### 5.3 User Classes and Characteristics

There are at least three levels of users:

- End users, performing the process tasks with the help of the system.
- Administrators managing the infrastructure, systems, and interfaces.
- Designers/Coordinators defining the SPIKE information architecture, that is, the workflows and related processes, access, categories, system-level metadata, etc.

The user class *End users* includes the following actors/roles:

- Client Project Team – The team typically consists of Mechanical Project Engineers/Electrical Project Engineers who specify to the client purchase department what needs to be purchased from suppliers for a specific project.
- Client Chief Project Engineer(s) – A member of the Client Project Team. Assists the Documentation Coordinator when necessary. For example, the Documentation Coordinator may check with the Client Chief Project Engineer whether certain instructions need to be delivered by a supplier.
- Client Purchase Department staff
- Client Quality Coordinator (Quality Development Coordinator) - For example, the Client Quality Coordinator informs new suppliers about the client's documentation requirements. In addition, the Documentation Coordinator may consult the Client Quality Coordinator in general quality-related matters.
- Citec Compiler – a person responsible for compiling the delivery documentation.
- Citec Documentation Coordinator
- Supplier's contact person

The user class *Administrator* includes the following actors/roles:

- System Designer
- System Support Engineer

The user class *Designer* includes the following actors/roles:

- Citec Concept Owner
- Citec Information/Business/Solution Architects

The above-mentioned roles are e.g. responsible for doing information analyses in order to design the overall information architecture of the services hosted in the Information Hotel. (When need be, they may in addition consult other Citec personnel such as Citec Project Managers or a project's Information Designer, who is responsible for defining the architecture of the delivered documentation set.)

It should be noted that all of these user categories are not considered equally important in the scope of the SPIKE pilot. Their importance depends, for example, on the frequency of use as well as the scope of user tasks. While it is useful to define and understand the overall relationships and communication between the different collaborator roles involved in this application case, it is very unlikely that all use cases related to the secondary roles can be implemented in the pilots. To guide the development and implementation efforts better, we have identified primary and secondary users for the Information Hotel. In the use cases that follow, we will concentrate only on the needs of the following types of end-users as the main users of the SPIKE platform:

- Citec Documentation Coordinator
- Supplier's contact person for the project
- Client's purchase department staff and Project Team members (i.e. Mechanical Project Engineers / Electrical Project Engineers).

The Documentation Coordinator administers the documents received from suppliers. Suppliers therefore are another type of key users of SPIKE: they will use the Information Hotel to send their documents, based on a purchase order written by the Client Project Manager (PM). SPIKE should ease the suppliers' life by making it easier and more transparent for them to send the right documents and be up-to-date on whether they are accepted or whether corrections need to be performed.

The Supplier role is central when defining the exception cases for the Document Control process using the Information Hotel. For example, the Supplier may send some wrong documentation or the quality of documents is unacceptable (e.g. the certificates are not signed) which results to a reclamation. Or, the Supplier does not send the required documents at all which results in a formal complaint about ignoring the contract.

Other important users are also found at the Client side, for example, Client Project Team members, who need to have an up-to-date view and visibility into the communication between Citec DC and the Supplier, and the status of deliverables from the Supplier end.

## 5.4 Use cases

### 5.4.1 Upload/Send documents

AC 1, UC 1		Upload/Send documents	
<b>Context of Use</b>		The Supplier uploads the ordered documents onto the SPIKE platform.	
<b>Scope</b>		The Information Hotel should have separate, yet integrated databases for managing information about uploaded and approved document. The Supplier cannot be allowed to upload the documents directly to the Client's DMS (IDM database), but could use a "staging area" of the DMS. It is a task of the DC to upload the approved documents to the DMS after performing the document control process. However, the two systems could be interlinked to ease and speed up the process of transferring approved documents from one system to another. Both systems should also have a notification/messaging system that allows notifications to be sent to the relevant parties about successful file uploads, document approvals, etc.	
<b>Level</b>		Primary task, MUST	
<b>Primary Actor</b>		Supplier contact person	
<b>User groups and Interests</b>		<b>User groups</b>	<b>Interests</b>
		End user	
<b>Preconditions</b>			
<b>Description</b>		<b>Step</b>	<b>Action</b>
		1	The user logs into SPIKE.
		2	The SPIKE system either automatically identifies the user as belonging to a certain project, or the user chooses the project from a list. (TO BE DECIDED)

AC 1, UC 1	Upload/Send documents	
	3	The user uploads the documents.
	4	The SPIKE system sends a notification to the Documentation coordinator.

### 5.4.2 Receive documents from supplier

AC 1, UC 2	Receive documents from supplier	
<b>Context of Use</b>	The Documentation Coordinator (DC) receives a notification from the SPIKE system about an uploaded document (or a document set).	
<b>Scope</b>	The Information Hotel is responsible for sending an email notification for received documentation. The message is sent to the DC's mailbox in their email application (for example, an interface to Outlook or other office applications is thus needed). The notification should include a link to the uploaded document stored in the DMS "staging area". The DC then clicks the link, logs into SPIKE (if not already signed in), and is transferred directly to the document.	
<b>Level</b>	Primary task, MUST	
<b>Primary Actor</b>	Citec Documentation Coordinator	
<b>User groups and Interests</b>	<b>User groups</b>	<b>Interests</b>
	End user	
<b>Preconditions</b>		
<b>Description</b>	<b>Step</b>	<b>Action</b>
	1	The user follows the link in the notification.

AC 1, UC 2	Receive documents from supplier	
	<b>2</b>	The user logs into SPIKE (if not logged in already).
	<b>3</b>	The document is opened either in a built-in viewer (platform independent) or a system call is made to the application (e.g. Adobe PDF Reader) on the user's workstation.  (This case assumes, for simplicity, that a built-in viewer is used.)

### 5.4.3 Verify uploaded documents

AC 1, UC 3	Verify uploaded documents	
<b>Context of Use</b>	The DC user checks the quality of the received document(s) and changes the status of the document(s) in the LIB database from <i>uploaded</i> to <i>approved</i> or <i>rejected</i> .	
<b>Scope</b>	The Information Hotel is responsible for providing centralised access to all the data needed by the DC when verifying the quality and accuracy of the received documents.  This use case can be divided into several other use cases.	
<b>Level</b>	Primary task, MUST	
<b>Primary Actor</b>	Documentation Coordinator	
<b>User groups and Interests</b>	<b>User groups</b>	<b>Interests</b>
	End user	
<b>Preconditions</b>		
<b>Description</b>	<b>Step</b>	<b>Action</b>
	<b>1</b>	The user verifies that the document matches the Purchase Order made for the document (that is, the

AC 1, UC 3	Verify uploaded documents	
		correct document was sent). Searching for the quality criteria has been defined in a separate use case (see 5.4.4.).
	2	After viewing the document, the SPIKE system displays a dialog for the DC asking the user to either approve or reject the document.
	3	If the document is OK, the DC changes the status of the document to <i>approved</i> .
	4	If the document is not OK, the DC changes the status to <i>rejected</i> .

#### 5.4.4 Search for Project and/or Purchase Order Related Information

AC 1, UC 4	Search for Project and/or Purchase Order related information (Effective document control process)	
Context of Use	This use case is part of the <i>Effective document control</i> process described above.	
Scope	<p>The Information Hotel should provide a search function to find the purchase orders and related data from the integrated databases. The Information Hotel communicates with SAP and also LIB, IDM and SST.</p> <p>NOTE: in this context, SPIKE should also provide links from the Purchase Order to the version history of all the communication that has been going on between the Citec DC and the Supplier's contact person. For example, it has to be verifiable which documents were received and if they are approved and archived.</p> <p>The history should show clearly if some documentation is still missing for a certain project approaching its deadline, and what has been the overall communication history.</p>	
Level	Primary task, MUST	
Primary Actor	Citec documentation coordinator, Client Project Manager	
User groups and Interests	User groups	Interests

AC 1, UC 4		Search for Project and/or Purchase Order related information (Effective document control process)
	End user	
Preconditions		
Description	Step	Action
	1	<p>The user searches for the projects within SPIKE based on predefined criteria, e.g. a date range for projects for Operation and Maintenance manuals that have deadlines approaching.</p> <p>Additional search criteria (metadata) could include, for example, project names, contact person names, Purchase Order IDs, and document IDs.</p>
	2	SPIKE displays a list of matching projects.
	3	<p>The user selects the project from the list and SPIKE displays the planned delivery contents, that is, a list of all the documents that are needed for the particular delivery.</p> <p>For this function, SPIKE should have some mechanism for automatically showing document status, for example: missing documents flagged with red, OK (approved &amp; archived) documents flagged with green.</p> <p>TO BE DECIDED how the application is integrated into existing systems such as LIB in this respect, and also what kind of data should be transferred.</p>
	4	<p>The user clicks on a missing document marked with red and sees details about it.</p> <p>The details could include, for example, the communication history with the Supplier as well as the Supplier's contact person.</p>

### 5.4.5 Monitor list of blocked invoices

AC 1, UC 5		Monitor list of blocked invoices (Blocked invoices process)	
<b>Context of Use</b>		The documentation coordinator follows the list of blocked invoices from a documentation point of view. S/he monitors the purchase orders that are soon due and contacts the suppliers and asks for the documentation.	
<b>Scope</b>		<p>The Information Hotel should have an interface towards the client's SAP system. The purchase order will not be paid until the supplier has delivered everything included in the order, which includes also the documentation.</p> <p>For an overview of what data needs to be in the SAP and SPIKE system before this, see section "BLOCKED INVOICES PROCESS" (5.2.1) above.</p>	
<b>Level</b>			
<b>Primary Actor</b>		Citec documentation coordinator	
<b>User groups and Interests</b>		<b>User groups</b>	<b>Interests</b>
		End user	
<b>Preconditions</b>			
<b>Description</b>		<b>Step</b>	<b>Action</b>
		<b>1 a</b>	<p>The Citec DC receives a notification that certain POs are soon due and need checking.</p> <p>For this functionality, the SPIKE system should automatically monitor the payment dates assigned to POs in the SAP system.</p> <p>The notification that the Citec DC sees should contain a link to the Purchase Order in question.</p>
		<b>1 b</b>	<p>Another option is that the DC user searches for the Project Orders from SPIKE based on predefined criteria, e.g. Purchase Order ID or a date range, if they</p>



AC 1, UC 5	Monitor list of blocked invoices (Blocked invoices process)	
		<p>know that certain POs are soon due.</p> <p>SPIKE displays a list of matching project orders.</p>
	2	<p>SPIKE displays the required contents of the Purchase Order, that is, a list of all the documents that are needed for the particular delivery and their statuses.</p> <p>For this function, SPIKE should have some mechanism for automatically showing document status, for example: missing documents flagged with red, OK (approved &amp; archived) documents flagged with green.</p>
	3	<p>If everything has been delivered from the documentation point of view, the Citec DC adds a flag to the Purchase Order that everything is correct from the documentation perspective. This will be decided in more detail.</p> <p><b>Note:</b> this is just the documentation view point. Possibly another user (at the Client end) has more user rights to remove a supplier from the blocked invoices list in SAP altogether, which means that they will receive their payments at due date if everything else has been delivered too.</p> <p>This part of the use case is related to the overall user rights/access management in SPIKE.</p>
	4	<p>If some documents are missing from the delivery, the Citec DC sends a notification/reminder message to the supplier.</p> <p>From this point of view, <i>UC6</i> from this application case can be applied for message and notification sending.</p> <p>In this case, too, the client project manager should receive a copy of the reminder message. The message should also indicate the date by which response from the supplier is needed.</p>

#### 5.4.6 Send reminder messages to suppliers

AC 1, UC 6	Send reminder messages to suppliers
Context of Use	This use case is part of the <i>Blocked Invoices</i> process described

AC 1, UC 6		Send reminder messages to suppliers	
		<p>above.</p> <p>This functionality enables easy communication between the suppliers of the client and document control department at Citec Information.</p>	
Scope		<p>The Information Hotel should automate sending reminder e-mails to the suppliers who have not sent documentation required to certain operation and maintenance manuals.</p> <p>The Information Hotel communicates with SAP and also LIB, IDM and SST.</p>	
Level		MUST	
Primary Actor		Citec documentation coordinator	
User groups and Interests	User groups	Interests	
	End user		
Preconditions		The user has searched and found missing documents for a delivery.	
Description	Step	Action	
	1	The user checks the supplier's contact person details for the missing document.	
	2	<p>The user selects a predefined message template from SPIKE's messaging system containing a standard notification text for this context.</p> <p>TO BE DECIDED how templates such as these are handled and designed. Most likely, the SPIKE administrator creates ready-made templates for different usages while setting up the system. They should reference the purchase order details (e.g. ID), as well as document IDs and other identifications, including the deadline for document delivery.</p> <p>Possibly supplier search tool (SST) interface is also</p>	

AC 1, UC 6	Send reminder messages to suppliers	
		needed here.
	3	<p>Send a reminder e-mail to the supplier about missing documents, stating the deadline for delivering the missing piece.</p> <p>Note: The SPIKE email or the Outlook interface must contain a “read receipt” or “response required” function for this. If deadlines are close, the Citec DC has to receive confirmation from the supplier’s end that the reminder message has been received.</p>
	4	<p>(Optional) The SPIKE system could possibly also automatically send a copy of the reminder message to the client project manager, to increase this user’s visibility to the overall status of the project and its possible problems.</p> <p>To make this happen, SPIKE needs to have users mapped into user/project groups. (to be outlined in separate use cases)</p> <p>Note: this could be marked as an optional feature for the users, if they do not wish to receive all possible email communication.</p>

#### 5.4.7 Create a complaint for missing documents

AC 1, UC 7	Create a complaint for missing documents (Blocked invoices process)
<b>Context of Use</b>	The documentation coordinator follows the list of blocked invoices from documentation point of view. The DC sends a reminder to the supplier for the missing documents. If the supplier still does not send the missing material, the Citec DC creates a complaint about this for the client project team.
<b>Scope</b>	<p>The Information Hotel should keep the DC user up-to-date of the document status.</p> <p>Information about the documents not delivered should probably be communicated towards the SAP system, too because it means that no payments will be done.</p>
<b>Level</b>	Secondary task, FUTURE
<b>Primary Actor</b>	Citec documentation coordinator

AC 1, UC 7		Create a complaint for missing documents (Blocked invoices process)	
User groups and Interests		User groups	Interests
		End user	
Preconditions		The DC has sent a reminder to the supplier but no documents have been received.	
Description	Step	Action	
	1	The SPIKE system shows a notification to the DC that the supplier has not responded by the date indicated in DC's reminder message.  (The purchase order data and the blocked invoices data should also include a track of all this communication.)	
	2	The DC creates a complaint by using a ready-made template defined in the SPIKE system.  The complaint template should contain, for example, a link to the communication history between the DC and supplier (e.g. to prove that information has been requested) and link to the purchase order originally created for the delivery (e.g. to show which items are still missing).	
	3	The DC sends the complaint to the client project manager and other needed project personnel.  A copy of the complaint should also be sent to the supplier to ensure that they also remain up-to-date of their status.	

#### 5.4.8 Assign users to groups according to project

AC 1, UC 9		Assign users to groups according to project
Context of Use		The DC and supplier may be administrated on project (project ID) and/or purchase order basis in the SPIKE user database. This data will be used during login and in personalisation of

AC 1, UC 9		Assign users to groups according to project	
		the SPIKE/Information Hotel user interface. This data is also relevant for security aspects.	
Scope		A SPIKE administrator manages end users on project ID and/or purchase order basis. Different users have limited access to the various databases (SAP, LIB, SST, etc) accessed through SPIKE. Client PMs have access to all databases, while a supplier typically has more limited access.	
Level		Primary task, MUST	
Primary Actor		SPIKE Administrator	
User groups and Interests		User groups	Interests
		Administrators	
Preconditions		The solution/information architect has designed the required workflows and metadata.	
Description		Step	Action
		1	The administrator sets up a project.
		2	The administrator configures the required project metadata (project ID, purchase order number, etc).
		3	The administrator adds the project members (client PM, supplier, DC, etc) to the project. At least access rights and contact information needs to be established.

## 6 User Requirements from Application Case “Legacy Applications”

To reduce the complexity of the application case "Business Alliances and Identity Management" it has been split into two application cases:

- "Legacy Systems"
- SPIKE Identity Federations (SPIKE/IF)

The “Legacy Application” application case describes SPIKE’s requirements on how to locate services of partners, how to use them in a structured way and respectively their integration into workflows on a detailed (but generic) level. Meanwhile SPIKE/IF describes requirements arising from a generic and structured approach to setup collaborations between partners. Legacy Applications therefore are one of the “building blocks” which can be used in a collaboration described in SPIKE/IF. During the definition of the trials both application cases will be joined together again.

### 6.1 Introduction

The requirements specified in this document are related to the “SPIKE service portal” that enables service providers to offer their specific services to any service requestor. Such a requested service can be handled by a specific software application or also be a manual service (performed by a human individual). One service provided by the SPIKE service portal can consist of one or more separate steps and therefore the SPIKE service portal will need a workflow component to easily define such workflows.

SPIKE will in this way enable outsourcing of parts of the value chain to business partners. In case that the whole outsourced service or one step of such a service is covered by a legacy application, the integration of it must be ensured by a customized connector. In general it is clear that outsourcing parts of a value chain will only be considered if SPIKE provides the necessary security mechanisms.

One important success factor is the “time-to-market” within which a service can be set up in the SPIKE platform, can be distributed via SPIKE and subsequently be used by any customer. This major goal has to be kept in mind during the whole software development cycle (beginning with the design) because it affects all parts of the system (flexible connectors, easy to define workflows, user-friendly interfaces etc.).

### 6.2 Overall Description of the application

As details are provided in chapter 6.4, only a high level summary is needed here.

#### Functions/Use Cases:

- Create/Maintain/Delete user account for Service Provider
- Create/Maintain/Delete service information and configuration
- Track services ordered/contracted by reports/audit functionality
- Search for services required
- Order/contract service

- Cancel contract for a service
- Use a contracted service
- Perform a contracted service

**Further requirements:**

- Easy to set up workflows
- Customizable connectors for easy and fast integration of external services such as legacy applications
- State of the art security functionality
- User-friendly GUI for the whole SPIKE portal
- Auditing functionality for Service Providers to keep control of their services provided
- 24\*7 availability
- Secure data exchange and storage
- All kind of access controlled by an access control system

### **6.3 User Classes and Characteristics**

**SPIKE service portal Administrator**

His obligation is to maintain basic data/functions to run the SPIKE service portal itself. The SPIKE service portal administrator creates user accounts for service providers, maintains their access rights etc.

**Service Provider**

The provider of a specific service registers the service and provides all necessary information for the service via the Service Catalogue (including configuration of the service, descriptions, pricing etc.), maintains the related contracts (access rights of users for a specific service, duration of the contract etc.) and uses the reporting/auditing functionality of the SPIKE service portal to keep track of the use of his services offered and sold. The service provider additionally configures all parts of the workflow if the service provided consists of more than one step.

**Service Requestor**

The Service Requestor tries to find a provider for a specific service (performed by a piece of software or by organisations/human individuals) within the SPIKE service portal. If the service requestor finds the required service in the Service Catalogue he gets in contact with the Service Provider, settles all business related questions/contractual issues and orders/contracts the service itself.

**Service User**

The service user is the user of the specific service that has been contracted by the service requestor. The service user completes the required business tasks according to his responsibility and during this “workflow”. The workflow can be a real workflow, controlled by a separate workflow engine outside of SPIKE or just a sequence of business tasks. The service user triggers the requested service via the SPIKE service portal.

## Service Executor

Depending on the individual kind of service, the service executor can be a piece of software as well as a human being or organisation, executing the requested service.

Additional user classes that are of interest within this application case are listed in chapter 7.3 of this document within the description of the application case SPIKE/IF. These user classes have been placed there as their design principles are explained on a more detailed level in the context of SPIKE/IF anyway and the requirements arising from their functions, duties and the interactions between them are expressed more precisely. There exists a close connection to the SPIKE Portal Administrator and Service Users described in this chapter whereas the other user classes only have a connection to SPIKE/IF.

## 6.4 Use Cases

### 6.4.1 Create/Maintain/Delete user account

AC 2, UC 1	Create/Maintain/Delete user account
<b>Context of Use</b>	This functionality enables the administrator of SPIKE to add new users (e.g., service provider) and give them appropriate access rights within the platform.
<b>Scope</b>	<p>The service portal administrator will have his own “admin console” with different views to the users in the system:</p> <ul style="list-style-type: none"> <li>▪ All users</li> <li>▪ Active/inactive users</li> <li>▪ Deleted users</li> </ul> <p>The content (=columns) of the views must not be hardcoded but rather customizable (also by the Service Portal Administrator), sorting must be possible by different criteria.</p> <p>Starting on this views the Service Portal Administrator will be able to change attributes of existing users, delete users (in this case user is not physically deleted from SPIKE but only marked with an “delete”-flag) and add new users. The attributes (such as name, address, position, company, role...) describing such an individual must not be hardcoded but customizable.</p> <p>SPIKE shall differentiate between different types of users like “individual” and “organisation”; individuals can be assigned to one or more organisations.</p>



AC 2, UC 1		Create/Maintain/Delete user account	
		In addition to the views described above there should also be a “search” functionality which allows the administrator to search for users in SPIKE by different search criteria.	
<b>Level</b>		Primary task, MUST	
<b>Primary Actor</b>		SPIKE service portal Administrator	
User group and Interest		User group	Interest
		SPIKE Portal Provider	Interested in running a SPIKE portal with valuable number of customers
		Service Provider	Interested in taking part at the SPIKE platform in order to offer/sell services to customers
<b>Preconditions</b>		SPIKE portal up and running in a stable environment.	
Description		Step	Action
		1	Search for existing users within SPIKE or simply use one of the views that list the users
		2	Add new user, maintain existing one or delete user
		3	Save data

#### 6.4.2 Create/Maintain/Delete service information and configuration

AC 2, UC 12		Create/Maintain/Delete service information and configuration	
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AC 2, UC 12	Create/Maintain/Delete service information and configuration
<b>Context of Use</b>	The functionality enables Service Providers to register new services and maintain them within the SPIKE platform.
<b>Scope</b>	<p>The service provider will have his own views within SPIKE in order to maintain the services he offers:</p> <ul style="list-style-type: none"> <li>▪ All my services</li> <li>▪ All my services currently contracted</li> <li>▪ All my historical contracts</li> <li>▪ All my service contracts for a specific client</li> </ul> <p>The same views – but not restricted to a specific service provider – will be available for the service portal administrator. This means that the service portal administrator can see all contracts for all service providers.</p> <p>The content (=columns) of the views must not be hardcoded but rather customizable by the service portal administrator, sorting must be possible by different criteria.</p> <p>Starting on these views, the service provider will be able to change attributes of existing services, delete services NOT CONTRACTED (in this case the service is not physically deleted from SPIKE but only marked with a “delete”-flag) and add new services. Services that are already contracted cannot be deleted but “locked”. This means that no further contracts are possible for such a locked service.</p> <p>The attributes describing such a service (e.g. name of service, time period during which the service is valid and available, specification of an interface call including parameters and results, other technical attributes) must not be hardcoded but customisable.</p> <p>During the specification of such a service there will also be the task of workflow definition, either from scratch or by using predefined templates.</p> <p>In addition to the views described above there will also be a “search” functionality which allows the service provider to search for services in SPIKE by different search criteria.</p>

AC 2, UC 12	Create/Maintain/Delete service information and configuration	
Level	Primary task, MUST	
Primary Actor	Service Provider	
User group and Interest	User group	Interest
	Service Provider	Interested in taking part at the SPIKE platform in order to offer/sell services to customers
Preconditions	SPIKE portal up and running stable, user account for Service provider created, service provider successfully logged in.	
Description	Step	Action
	1	Search for existing services within SPIKE or simply use one of the views that list the services
	2	Add new services, maintain existing ones or delete services
	3	Save data

#### 6.4.3 Track ordered/contracted services by reports/audit functionality

AC 2, UC 3	Track ordered/contracted services by reports/audit functionality
Context of Use	A service provider can keep track of the usage of his contracted services

AC 2, UC 3		Track ordered/contracted services by reports/audit functionality	
<b>Scope</b>		<p>Once a service is contracted by a customer, all activities within SPIKE performed by this service (i.e. for this specific service contract) will be logged, providing information such as:</p> <ul style="list-style-type: none"> <li>when and by whom has the service been called</li> <li>all steps of the related workflow</li> <li>when was the service finished</li> <li>what were the results (success or error)</li> </ul> <p>This log can be viewed by the service provider either online via the audit trail or by printing out such reports.</p> <p>The same functionality is given to the SPIKE service portal administrator; the difference is that the SPIKE service portal administrator is allowed to view the data not only for one specific service provider but for all of them.</p>	
<b>Level</b>		Primary task, MEDIUM	
<b>Primary Actor</b>		Service Provider	
User group and Interest		User group	Interest
		Service Provider	Interested in taking part at the SPIKE platform in order to offer/sell services to customers
<b>Preconditions</b>		SPIKE portal up and running, services sold already to customers and being in use by them.	
<b>Description</b>		<b>Step</b>	<b>Action</b>

AC 2, UC 3	Track ordered/contracted services by reports/audit functionality	
	1	Search for Service Contract of interest
	2	Display Audit Trail
	3	Print Report

#### 6.4.4 Search for service required

AC 2, UC 4	Search for service required	
<b>Context of Use</b>	Potential service users or service requestor can search the service catalogue by different criteria to find appropriate services satisfying their business needs.	
<b>Scope</b>	<p>A service requestor can search the service catalogue or use different views to the service catalogue respectively in order to find a service he could sell/use.</p> <p>The separate views (as well as the search criteria) shall not be hardcoded but rather be configurable by the SPIKE administrator (in order to ensure maximum flexibility). This goes of course also to the order of the columns within the views, categorization within views, sorting of columns etc.</p>	
<b>Level</b>	Primary task, MUST	
<b>Primary Actor</b>	Service Requestor	
<b>User group and Interest</b>	<b>User group</b>	<b>Interest</b>
	Service Requestor	Interested in having a comfortable platform to find services that fulfil his business requirements.

AC 2, UC 4		Search for service required
	Service Provider	Interested in taking part at the SPIKE platform in order to offer/sell services to customers
<b>Preconditions</b>	SPIKE portal up and running, services configured already and ready to be used by service users.	
Description	Step	Action
	1	Choose one of the provided views showing available services in the service catalogue or select the “search”-screen
	2	Search for service by one of the views or “search” functionality

#### 6.4.5 Order/contract service

AC 2, UC 5		Order/contract service
<b>Context of Use</b>	In this step a specific service is ordered by the service requestor and as soon as contractual issues are settled (out of scope of SPIKE), the service provider marks the service as “contracted”. The service now can be used by the service requestor.	
<b>Scope</b>	<p>As soon as the Service Requestor has detected a service that fulfills his business requirements, he can order the service by selecting it and mark it as „ordered”. A Service Contract will be created and marked accordingly (status “ordered”) in all his views and additionally the service requestor will get informed by email about this request.</p> <p>Service Provider will get in contact with the requestor, will clarify all necessary details (depending on the kind of service) and settle contractual issues (out of scope of SPIKE). At this point the service provider will enter all information that is additionally required during lifetime of the service (like period of validity of the service etc.) and mark the Service Contract as “contracted”.</p>	

AC 2, UC 5		Order/contract service	
		Important: the data that have to be entered for each Service Contract when changing status to “contracted” must not be hardcoded but rather customizable!	
Level		Primary task, MUST	
Primary Actor		Service Requestor, Service Provider	
User group and Interest	User group	Interest	
	Service Requestor	Interested contracting the specific service that supports his business requirements.	
	Service Provider	Interested in selling the offered service via the SPIKE platform.	
Preconditions		Service requestor has searched the service catalogue and found a service that supports his business needs.	
Description	Step	Action	
	1	Service requestor selects the service he is interested in, marks it as “ordered”	
	2	Service contract is created and marked as “ordered”, service provider gets informed via email	
	3	service provider clarifies all necessary details, enters required information into system and stores Service Contract as “contracted”	

#### 6.4.6 Cancel contract for a service

AC 2, UC 6	Cancel contract for a service
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AC 2, UC 6		Cancel contract for a service	
<b>Context of Use</b>		Once a service contract is created, there shall also be the possibility for the service provider to cancel the contract in the system before the predefined end of period of validity for a specific service usage.	
<b>Scope</b>		<p>The service provider can select one of his contracted service contracts and mark it as “cancelled”. The service requestor will be informed via email about the cancellation.</p> <p>The service contract will not be deleted but only marked accordingly and from this time onwards, the service user cannot call the service anymore.</p>	
<b>Level</b>		Primary task, MUST	
<b>Primary Actor</b>		Service provider	
<b>User group and Interest</b>		<b>User group</b>	<b>Interest</b>
		Service provider	Interested in cancelling the contracted service for whatever reason in time.
<b>Preconditions</b>		Service has been contracted before between service requestor and service provider.	
<b>Description</b>		<b>Step</b>	<b>Action</b>
		1	Service contract selected by service provider
		2	Service contract marked as “cancelled”
		3	Service requestor informed about cancellation by email



### 6.4.7 Use a contracted service

AC 2, UC 7		Use a contracted service
Context of Use	Once a service contract is settled between service requestor and service provider, the service contract can be used (triggered) by authorised service users.	
Scope	<p>The service user will select a service contract from a view that displays him all contracted services he is authorised to use. He can then trigger such a service contract and if the service requires input parameters, he will be asked to enter them into the system.</p> <p>Additionally, a service contract can also be triggered by an external software system (such as a workflow engine in the environment of the service user) and SPIKE in this case has to cover the possibility that some of the input parameters will be passed to SPIKE directly via the service bus and also there might be some additional parameters that have to be entered at this very time by the service user.</p> <p>As soon as the service user triggers a service contract, a new instance in SPIKE for this service contract is created, can be displayed in appropriate views and all activities regarding this instance will be logged!</p>	
Level	Primary task, MUST	
Primary Actor	Service User	
User group and Interest	User group	Interest
	Service User	Interested in using a contracted service contract in order to support his business requirements.
Preconditions	Service contract active in SPIKE, ready to be used/triggered.	

AC 2, UC 7	Use a contracted service	
Description	Step	Action
	1	Select service contract manually and trigger it or trigger the service contract by external software system (WFE etc.)
	2	Receive results of performed service contract
	3	Use results and continue the activities of the original value chain

#### 6.4.8 Perform a contracted service

AC 2, UC 8	Perform a contracted service	
Context of Use	The service executor performs the predefined steps for a specific service and returns the results.	
Scope	<p>A service executor can be any kind of software application that is called by the WFE of SPIKE during execution of the predefined workflow for a specific service. In that case, the software will return the results (as parameters) to the WFE, which will continue with the predefined workflow.</p> <p>Additionally, the service executor can also be a human being (or team or any kind of organisation) that has to perform manual steps. This actor therefore has to be informed in a proper way (by the WFE of SPIKE or by any other kind of software application that gets the information from SPIKE WFE via an interface) and has to have the possibility to enter results after performing the service (again by entering the return values directly by using GUI of the WFE or by entering them into a separate software application having an interface to SPIKE's WFE).</p>	
Level	Primary task, MUST	
Primary Actor	Service executor	
User group and Interest	User group	Interest

AC 2, UC 8	Perform a contracted service	
	Service executor	Interested in performing the predefined steps for a specific service contract properly
Preconditions	Service contract active in SPIKE, an instance of the service contract triggered by the service user.	
Description	Step	Action
	1	Get information from SPIKE WFE about requested activity
	2	Perform all tasks necessary for this service
	3	Enter return values either directly into SPIKE or via another application using interface to SPIKE

## 7 User Requirements from Application Case “Identity Federations”

### 7.1 Introduction

Prior to the introduction of the Identity Management System (IDMS) in 2005, access information on file shares, computers and accounts was distributed to several systems like Active Directory, SunOne and other applications. Those systems worked independently and there was no mechanism available to guarantee *consistent* data (e.g. departments, cost center, phone numbers and names of persons), based on the delivery from *designated* master systems (like the global HR system), throughout the different systems deployed in the company. Thus, helpdesk support was required frequently.

Therefore Infineon introduced the IDMS to have a mechanism at hand to collect data from different master systems, combining the necessary data to digital identities and distribute and enforce this identity information consequently throughout different directory services and applications. In order to improve the IDMS and to *save* the ROI, an automatic user provisioning system and RBAC has to be set up in a next step.

The major function of provisioning is once a *new identity* enters the IDMS from the global HR system, an automatic workflow is triggered to its manager based on certain attributes (like location and manager information). The respective manager chooses the respective roles for the new employee and dependent on the request the necessary access to resources (accounts, groups, group memberships) is set by the IDMS (mostly no human interaction is necessary anymore). Thus, during the life cycle of the identity roles are added and removed and once an employee leaves the company access to his resources will be disabled completely. The last case is also called de-provisioning. A basic approach for provisioning (without a portal- and workflow solution) was developed and implemented at Infineon in 2007. The results are shown in [OBI07].

Another issue which cannot be tackled exclusively by a *centrally-organized* IDMS is the collaboration with external partners. This topic has been deeply researched for more than two decades. Already started in the mid of the 1980s, research in this area is still ongoing. Well-known and representative terms used for enterprise collaboration (*alliances*) are Virtual Organizations [SKY07], Networked Organizations [LIP94] and Collaborative Innovation Networks [GL06]. The so-called Virtual Team represents another well-known expression on the *micro-level* [LIP97].

A common sense of the mentioned concepts can be summarized by the following aspects: [LIP97]

- Independent people and groups act as independent nodes in a network,
- are linked across conventional boundaries (e.g. departments and geographies)
- and work together for a common purpose.
- A collaboration has multiple leaders, lots of voluntary links and interacting levels,
- Is based on mutual responsibility, i.e. there is no hierarchical management structure but the involved individuals act as equal partners,
- And teams are readjusted or disbanded as needed.

A successful collaboration requires the fulfillment of the following principles (solely an excerpt) [SKY07]:

- Each partner must contribute some distinctive added value for the corporation.
- Members must develop high degree of mutual trust and understanding. Thus, similar groups or even the same people will work together again and again.
- Projects or whole services should be the focus of the cooperation.
- In the run-up of a collaboration one has to define general rules of engagement in terms of inputs to the cooperation and rewards expected, though the momentum is lost if these are too formalized too soon.
- Members of the cooperation should recognize the need for coordination roles and either commit time to develop and nurture these roles or pay one of the members to undertake the coordination roles on behalf of them.
- A clear interface needs to be developed with *non virtual* customers - they like tidy relationships and clear contracts. Thus either one member of the virtual cooperation must act on behalf of the others (using them as subcontractors) or create a joint company to act as their legal entity and administration service.

Some benefits of Virtual Organizations are listed:

- Enables access to a wide range of specialized resources.
- Provides a unified face to large corporate buyers.
- Individual members retain their independence and continue to develop their niche skills.
- They can reshape and change members according to the project or task at hand.
- There is no need to worry about as much as in formal joint ventures once the collaboration ends.

The highly dynamic business forces Infineon to set up strategic alliances (project partnerships) frequently, in order to be competitive in cost and time. The chip design process and the production environment (silicon foundries) serve as good examples for necessary alliances. While partnerships in the course of the chip design aim at reducing the time to market, alliances during the production focus on covering customer demands which increase the available production capacities. Especially the design process for very complex chips sometimes requires setting up an alliance with one or more *competitors* to reduce the overall development costs of the chip. For the automotive industry (one of our three business areas), highly-logic special-function chips are designed. The business strategy of Infineon also includes cooperation in terms of an alliance with a customer to develop “next generation” chips which represent a *quantum leap* in technology and/or function [SCH08[SCH08](#)].

Strategic business alliances can also be found within the support processes of IFX. The material supply (e.g. wafer suppliers) or the administrative area, like Information Technology (IT), wherein defined services are outsourced to external organizations (which are specialized to the services and which results in a cost reduction for IFX) are good examples for possible alliances in the support processes. The consortium member AIT is a possible alliance partner in the IT area. Among other things, AIT has operational responsibility for the terminal service environment (access platform for Infineon employees and users from external service providers). The complete Infineon intranet and also the access from outside

are monitored in the Network Operating Center which is staffed with AIT employees who have their workplaces at Infineon's facilities.

Another aspect affecting collaborations occurs during the carve-in phase of company mergers. Thereby the working environment for *new colleagues* must be set up quickly in order to enable productive working as soon as possible.

Today, a complex process for the setup of collaborations exists (see Figure 7-2). The process starts with an *internal employee* requesting an identity entry in the IDMS for the external persons belonging to other organisations of the business alliance. The following phases include the provisioning of resources and carrying out the revocation of access on the respective resources once the alliance ends. This process is applied for each (strategic) alliance wherein external staff is involved.

However, this approach requires an internal employee at Infineon to trigger a lot of things prior to an external *alliance partner* being able to start performing his tasks. A lot of *single* resources have to be provisioned for the external partners (there is currently no role-model and a suitable tooling available) accompanied by a lot of *approval workflows* which slows down the whole setup process. Furthermore, knowledge about external employees, e.g. which resources they need to access at Infineon, is necessary in advance (reduction in flexibility). Moreover, today the whole identity information of external persons is also kept in the IDMS whereby the data volume is blowing up.

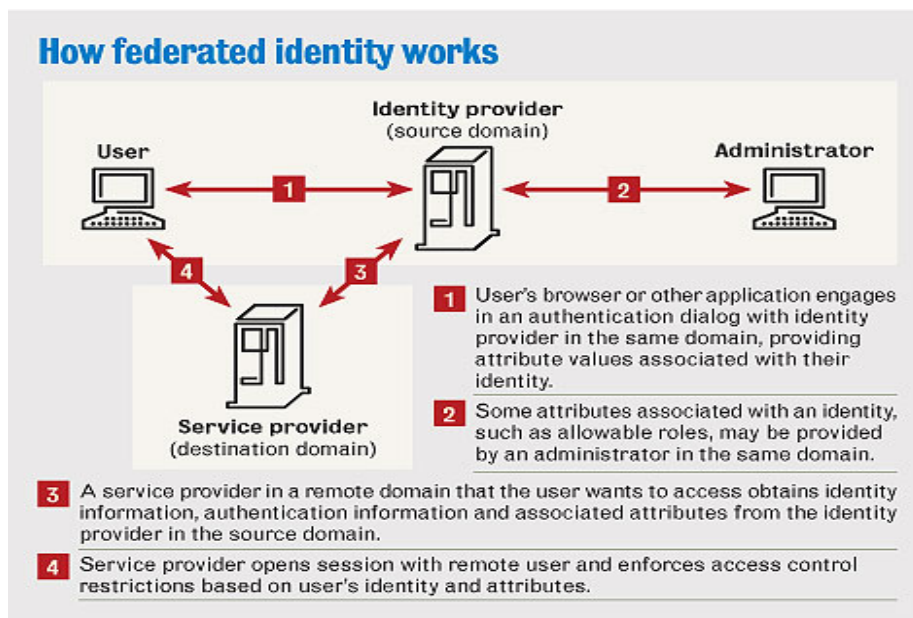


Figure 7-1: Concept of identity federations [STA07]

To overcome these deficiencies, the approach of *Federated Identity Management* (also called identity federations) whose core idea (see Figure 7-1) is to allow individuals to use the same

accounts and passwords they have in their company to get access to a network of another company was established.

In step 1 of Figure 7-1, a user's identity data is maintained at an identity provider in its IDMS. In the context of SPIKE, the partner company of INF takes over the role of an identity provider, while INF acts as service provider during this collaboration. Subsequently, the user tries to access a service (an application, a data source, etc.) of the service provider. Thereby, the user is verified at the identity provider (the collaboration partner) by the service provider (INF) as shown in step 3. If the identity provider *successfully* authenticates the data - or spoken in SPIKE terminology fulfils the tasks which were negotiated in the collaboration contract -, the user will get access to the requested service (step 4).

Federated Identity Management is based on *trust*. Business partners trust each other for the user authentication mechanisms they employ in their company and also guarantee that only authenticated users will have access to *services* (resources, applications) of the alliance partner. This is a precondition for companies to use applications in a common way without being forced to use the same directory services, authentication mechanisms and duplicate *digital identities* (user accounts) to the other system.

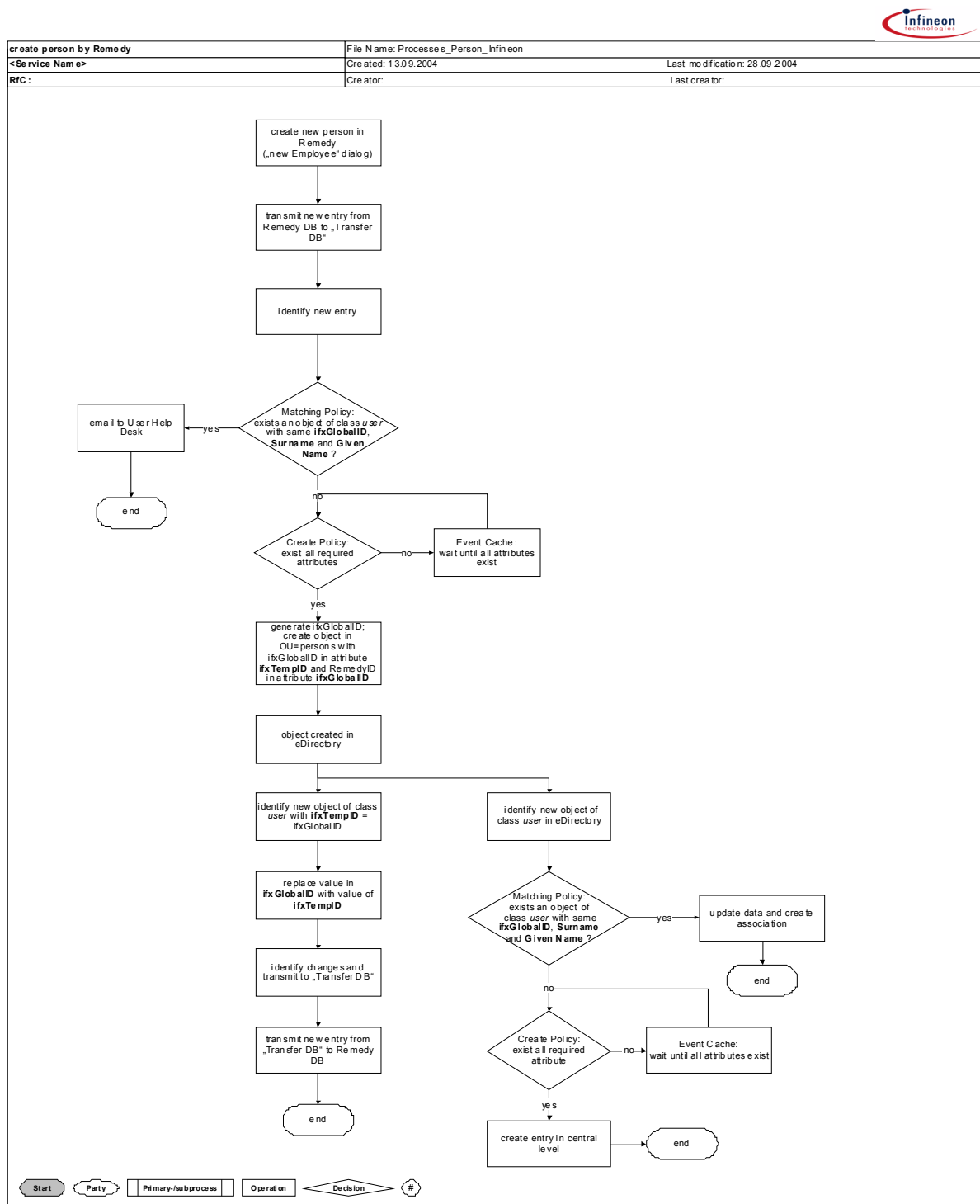


Figure 7-2: Creation process for external collaboration partners at INF

Federated Identity Management also reduces the administration overhead in an alliance because it is not required that the collaboration partner has to know the involved employees who need access to the resources of the alliance partner in advance. The identity provider has also a large



flexibility to *manage* (exchange, increase, decrease) the staff during the existence of the alliance according to the needs of the service provider. The service provider only has to care for the access to applications needed by both companies (e.g. design application in the chip design area or administration applications in the IT area etc.).

In the next chapters the requirements of the component SPIKE/IF (identity federation module) of a life cycle model for collaborations will be described in order to overcome the mentioned deficiencies.

## 7.2 Overall Description of the application

### 7.2.1 Product Perspective

SPIKE Identity Federation Module (short SPIKE/IF) is the building block in the architecture (see Figure 7-3) for:

- Setting up collaborations between companies
- Defining roles and resource bundles
- The access management of federated identities during collaboration phase

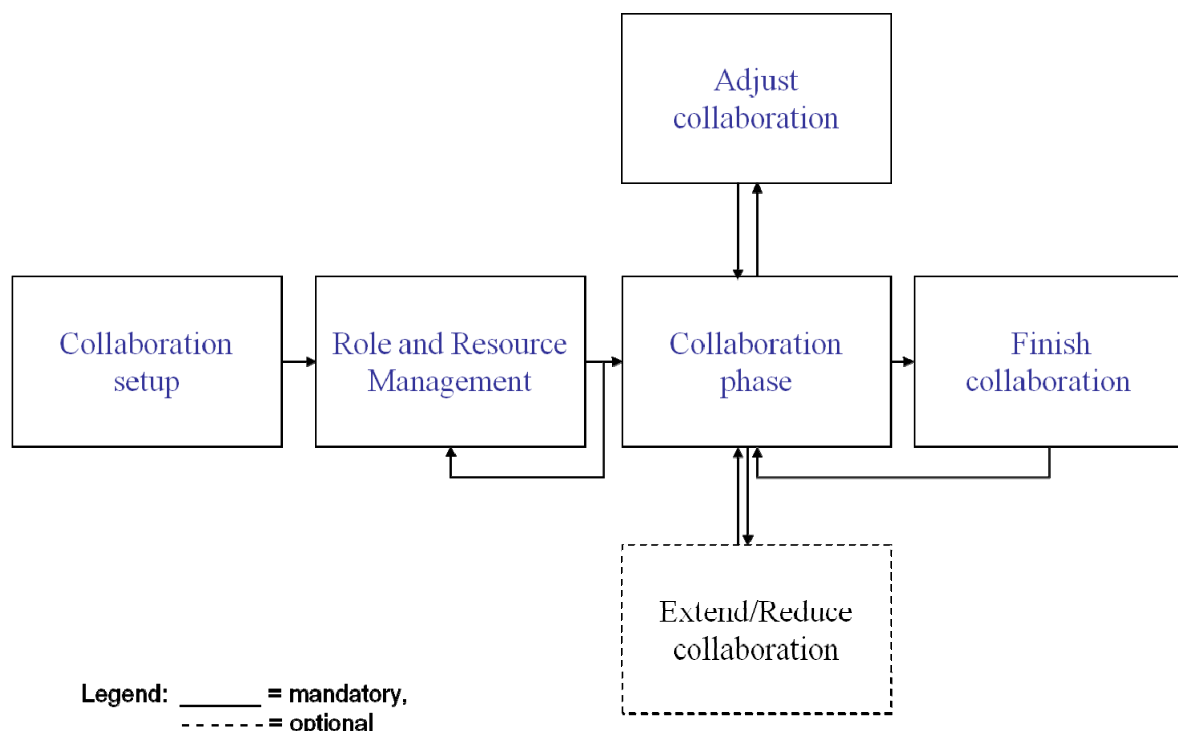


Figure 7-3: SPIKE/IF life cycle model

### 7.2.2 Product Features

Collaboration setup (**MUST**) :

- Setup of collaboration partners, major administration roles, collaboration specific attributes (collaboration time, etc.)

- Decision of user management (SPIKE/IF intra user management, using directory services)
- Definition of access management components (SPIKE/IF intra or using market-leading products)
- Setup a decision mechanism for adding/excluding partners from the collaboration (host only, majority, all, etc.)
- Automatic reminder that informs about days/weeks left until the end of the collaboration

**Role and Resource Management (MUST) :**

- Definition of collaboration roles
- Assignment of resource bundles to roles
- Assignment of (federation) users to collaboration roles

**Collaboration phase (MUST) :**

- Execution of complete services by collaboration partners (e.g. supply of a service by an outsourcing partner)
- Execution of single/multiple (outsourced to a partner) tasks in workflows

**Adjust collaboration (MUST) :**

- Change of collaboration relevant attributes (time period, administration role re-assignment etc.)
- Re-assignment of administrative users

**Extend/Reduce collaboration (MEDIUM) :**

- Add additional partners to a collaboration, disable/exclude partners from a collaboration
- Merge collaborations

**Finish collaboration (MUST) :**

- Disable all roles and consequently revoke assigned (to limit access)
- Block/disconnect electronic communication links (if further collaboration with the partners is not planned for the future)

### 7.3 User Classes and Characteristics

User classes described in this chapter are at least necessary to set up a collaboration partnership. According with their functions they can have a (strong) relationship to the user classes of ITI, AIT and CIT as defined in section 2 of this document.

**Design Principles:**

- Flat user hierarchy to enable fast setup and easy maintenance (suited for collaboration between SME's and large enterprises)
- Clear structure according to the responsibilities between different user classes
- Hierarchical security concept, which enables the user at a certain level to conduct all functions of users assigned to the levels below
- Users from a company can only be mapped to roles by *collaboration responsables* of their own company (to guarantee flexibility and security)

To maintain the SPIKE/IF Portal there are some **administrative users** necessary:

**SPIKE/IF Admin<sup>6</sup>**

- Installation/basic setup/maintenance of the SPIKE/IF infrastructure **(MUST)**
- Creates/maintains/disables/deletes collaboration administrative users **(MUST)**
- Creates resources, enable/disable access<sup>7</sup> to them, deletes resources **(MUST)**
- Has the ability to conduct collaboration administrative users **(MUST)**
- Communication between SPIKE/IF admins and *administrative users* of a collaboration
  - Via email **(MUST)**
    - SPIKE/IF integrates a rudimentary requesting and notification system in case of completing a request (e.g. a Hub responsible may order a further resource
    - is sent to a pool of administrators; if the resource is created by an admin the requester gets a notification) **(MEDIUM)**

The **Collaboration Hub** is the company which has the main interest in the collaboration and major control of changing collaboration partners/parameters (see chapter 7.4.4, 7.4.5). It has the main responsibility for managing a collaboration at the SPIKE/IF portal. Collaboration Hub user classes are:

Hub Responsible (collaboration administrative role)

- Configures/maintains a collaboration in SPIKE/IF **(MUST)**
- Creates/maintains/disable/delete administrative user-accounts needed in a collaboration (e.g. Business Contacts) **(MUST)**
- Has the ability to conduct Business Contact functions **(MUST)**
- Can only maintain collaborations for which he is in charge of (are assigned to him, security aspect) **(MUST)**

Business Contact (collaboration administrative role, with a deeper knowledge about the tasks in the collaboration)

---

<sup>6</sup> SPIKE/Admins must have a deep IT knowledge and must be provided with necessary admin rights (access to servers, databases, directories, application etc.) to create requested resources for collaborations

<sup>7</sup> If a resource is disabled and is bound to active roles than it must not be available to all users which are mapped to this role

- Definition of collaboration roles (e.g. Designer, Logistician etc.) **(MUST)**
- Maps resource bundles needed for certain roles (e.g. Access to Applications, File Shares, Databases etc.) **(MUST)**
- Assigns Hub users of the Hub company to roles **(MUST)**
- Can only maintain collaborations which he is assigned to (security aspect) **(MUST)**

#### **Hub Users**

- Executing tasks in a collaboration **(MUST)**
- May also use services from a collaboration partner (multi-site collaborations) **(MUST)**

**Collaboration Partner(s)** take part in collaborations and supply a full service or take over tasks in workflows.

Collaboration Partner user-roles are:

#### Partner Responsible (collaboration administrative role)

- Assignment of Partner Users to roles from the Hub company **(MUST)**
- Creates/maintains/disable/delete user-accounts needed in a collaboration (e.g. Partner Contacts) **(MUST)**
- Can only maintain collaborations which he is assigned to (security aspect) **(MUST)**

Partner Contact (collaboration administrative role, with a deeper knowledge about the tasks in the collaboration)

- Definition of collaboration roles **(MUST)**
- Maps resource bundles needed for roles **(MUST)**
- Assignment of Partner Users to roles from the Partner company **(MUST)**
- Assignment of Partner Users to roles from the Hub company **(MUST)**
- Can only maintain collaborations which he is assigned to (security aspect) **(MUST)**

#### Partner Users

- Executing tasks in a collaboration, mostly at the Hub company **(MUST)**
- May also use services from a partner company **(MUST)**

An example could be a joint-venture for designing a chip. INF would set up a collaboration with an Institute of a University having competency in semiconductor physics, an integrated partner whose core competency is chip design and also an embedded customer who is involved in the project to supply requirements, receive first samples and conduct intensive testing.

The information which must be available for SPIKE/IF admins and the administrative users is:

- Naming Attributes **(MUST)**
- Contact Information (email, phone numbers) **(MUST)**

- Connection to identity entries in a directory **(MEDIUM)**

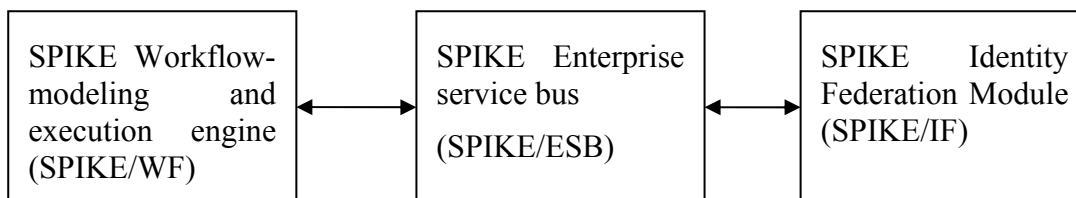


Figure 7-4: SPIKE architecture components

## 7.4 Use cases

### 7.4.1 Collaboration set up

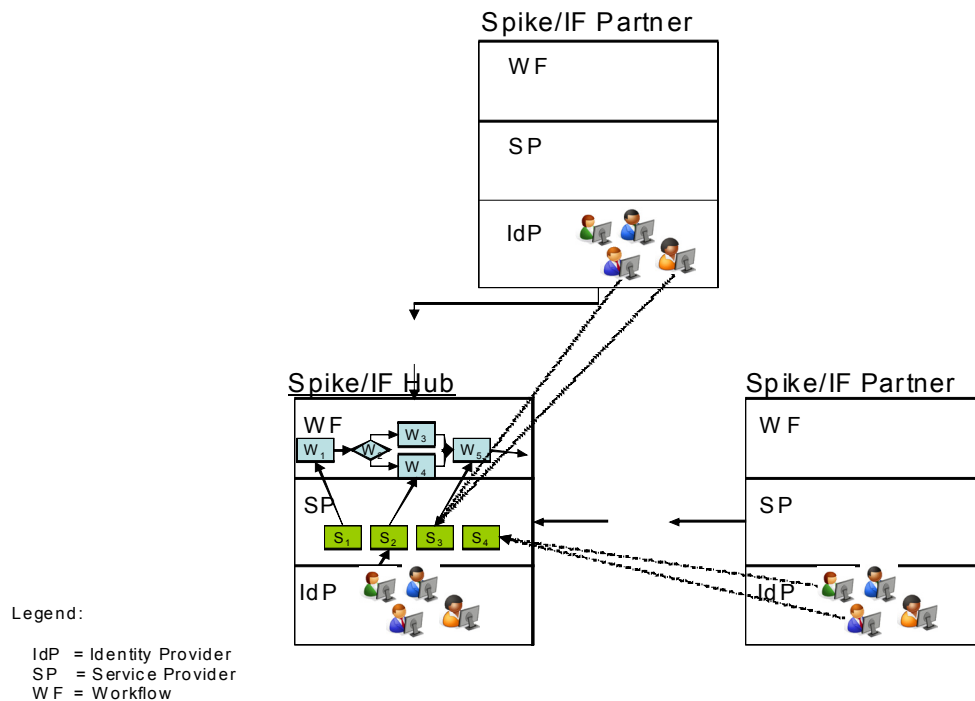
#### Design Principles:

- Users of a company can only be assigned to services of a partner company by the *responsibles* of their own company (security, reducing complexity and keep flexibility). **(MUST)**
- Only the Hub company (see section 7.3 of this document) can extend a collaboration with additional partner companies (security aspect). **(MUST)**

Different types of collaborations are possible in SPIKE/IF, depending on who is carrying out the service provider function in the collaboration **(MUST)**

#### Centralized Collaboration (see Figure 7-5) **(MUST)**

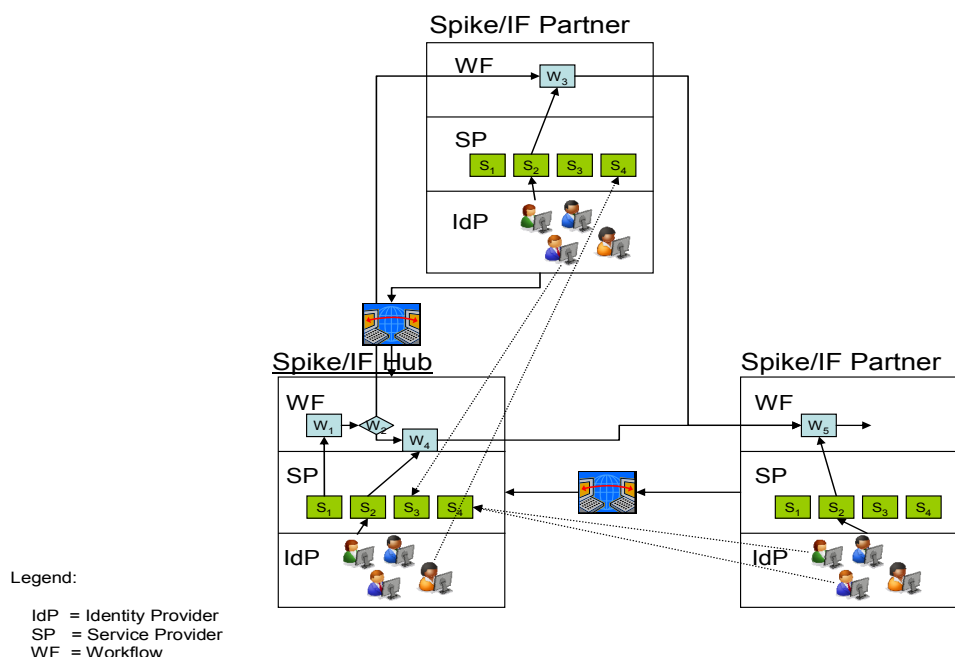
1. Only the Hub Company offers services which are accessed by partners
2. Partner companies only act as identity Provider for their federated users
3. This type of collaboration mostly appears when (see also scientific overview in chapter 7.1):
  - a. Only one large company is involved which offers a large service and application landscape with complex business processes supported by workflow management systems.
  - b. Partners are mostly smaller companies without an own service infrastructure but specialized and/or cost-efficient employees which take over whole outsourced services of the Hub company.



**Figure 7-5: Centralized collaboration**

### Decentralized collaboration (see Figure 7-6) (MUST)

4. All partners in the collaboration offer services (act as Service Providers) which are accessed mutually
5. All Partner act as identity Provider for their federated users
6. This type of collaboration often appears when:
  - a. One or more large companies are involved which offer a large service and application landscape with complex business processes supported by workflow management systems and those workflows include the involvement of highly specialized partner companies.
  - b. Partners are companies with few but highly specialized services which can be offered cost-efficiently.



**Figure 7-6: Decentralized collaboration**

AC 3, UC 1	Collaboration setup
<b>Context of Use</b>	<p>Every collaboration starts with more or less long lasting negotiations that result in a contract which specifies the intension of the collaboration, the contributions of the partners, financial and liability statements, etc.</p> <p>Upon completion of this phase the setup of an environment is necessary enabling partners to yield their work. As described in chapter 7.1 this may be a complicated and long lasting process step.</p> <p>The collaboration setup in SPIKE/IF is necessary to define the basic parameters of the IT environment in order to enable cross-domain communication and to determine the major roles for the collaboration management.</p>
<b>Scope</b>	<p>SPIKE/IF only focuses on the IT-aspect of collaborations (environment, applications, access management)</p> <p>SPIKE/IF is strongly related to SPIKE/WF as it should be possible to model <i>external services</i> in Workflows which are mapped to roles defined in collaborations (chapter 7.4.2)</p>
<b>Level</b>	primary task (see Figure 7-7) <b>(MUST)</b>

AC 3, UC 1		Collaboration setup	
<b>Primary Actor</b>		SPIKE/IF Admin, Hub Responsible	
<b>User group and Interest</b>	<b>User group</b>	<b>Interest</b>	
	Hub company	Strategic partnerships enable advantages over competitors (shorter time to market, cost reduction, outsourcing task to more specialized partners etc. see 7.1)	
	Partner company(ies)	The same as for Hub company. Additionally, if the partner is a smaller company that forms an alliance with a large hub, the partner can benefit of the power of a large company (purchase volume enable better prices etc. see 7.1)	
<b>Preconditions</b>		<p>SPIKE is installed at each partner</p> <p>Successful negotiations with a contract containing statements of work</p> <p>The main responsables for the collaboration are known and have access to SPIKE/IF</p> <p>Depending on the collaboration type there are more or less things to configure (see Figure 7-5 and Figure 7-6)</p>	
<b>Description</b>	<b>Step</b>	<b>Action</b>	
	1	<p>SPIKE/IF Admin takes care of the environmental settings for a collaboration like:</p> <ul style="list-style-type: none"> <li>required DNS-Entries,</li> <li>coupling with existing directory services, IDMS</li> <li>create necessary user accounts for the SPIKE/IF to be able to create further user accounts/groups in directory services</li> </ul>	



AC 3, UC 1	Collaboration setup	
		<ul style="list-style-type: none"> <li>coupling to WEB-Servers where services are hosted</li> <li>enables access to the company intranet from outside (firewall configuration)</li> <li>creates resources (access to applications, servers, databases) needed by collaborations</li> </ul>
	2	The SPIKE/IF Admin creates the HUB Responsible user for a new collaboration, if this user is not already existing
	3	<p>The Hub Responsible now creates a new collaboration and maintains all necessary data:</p> <p>like type of collaboration (see introduction of 7.4.3)</p> <p>the partner companies and domain-specific information (needed for role modeling)</p> <p>he creates one or more business contacts which are responsible for role definition and resource bundle mapping<sup>8</sup></p> <p>he creates one or more partner responsible(s)<sup>9</sup></p>
	4	<p>The partner(s) responsible</p> <ul style="list-style-type: none"> <li>create partner contacts if needed</li> </ul>

## 7.4.2 Role and Resource Management

Modeling roles is a research topic with a long history. There are a lot of approaches [FER03], more or less successful. The approaches can be classified according to three different strategies:

- Top-down (classic) is based on the analysis of business processes and organizational structures
- Bottom-up tries to analyze information of existing permissions throughout different systems and aggregate similar patterns (clusters) to roles
- Hybrid approaches combine the top-down and bottom-up strategy

Role model development in organizations already started years ago but it is still a hot topic [KUP06]. It became also a branch in Identity Management. Thus, today's companies of market-leading IDMS are also offering role management modules to cover this topic [NOV08, BHO07].

<sup>8</sup> As specified in chapter 7.3 this is not a must, for small collaborations he can do this himself

<sup>9</sup> At least one Partner Responsible per partner company must exist

There are different views how to define roles [RAV96, SCH05], like

- organizational-oriented roles are defined based on organizational charts
- task-oriented roles are mostly based on job descriptions or workplace descriptions
- group-oriented users are grouped according different attributes, e.g. internal/external, management/employee etc.

### **Design Principles for Role Management in SPIKE/IF:**

- Supports 5 role types (level of granularity) **(MUST)**
  - Roles with explicit user assignment
  - Dynamic Roles with assignment of users according to similar attributes (at least department, area, location/legal entity information)
  - Company roles for a partner company (all users with a certain domain info are members)
  - Collaboration roles include the respective employees of all partner companies in a collaboration
  - Public roles<sup>10</sup> comprise all users of any company
- Creation of Roles for Partners **(MUST)**
- Maintenance of Roles with functions (assign/remove users, add/remove resource bundles, activate/disable role, default is activated) **(MUST)**
- Deletion of Roles, all connections to resource bundles must remain for reuse in potentially future collaborations **(MUST)**
- Definition of an inheritance relation<sup>11</sup> between roles **(MEDIUM)**
- A role editor must be available where **(MUST)**
  - Roles can be defined, searched for different criteria (e.g. which roles have resources of type file share, database, certain application types etc.)
  - Users assigned to or can be removed from roles

The type of a role **cannot** be changed<sup>12</sup>

Resources are single objects to which users must be granted access according their tasks they have within a collaboration. SPIKE/IF should support access to the following resource types:

- File shares<sup>13</sup> to store files produced by applications

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<sup>10</sup> Company roles should be available in all collaborations where the company is a member of, public roles should be available in any collaboration

<sup>11</sup> Inheritance relation means, that RoleA inherits all resources from RoleB, RoleC,... (RoleB, RoleC ...are direct successors of RoleA) if it is at a higher level in the role-hierarchy (a so called predecessor). This is an inverse direction as it is known from object-oriented approaches in programming languages. So the top-level (level 0) contains the most powerful role.

<sup>12</sup> Changing the type of a role e.g. from dynamic to collaboration has a dramatic effect as it could be that users can get access to resources which were not intended but overlooked

- Databases<sup>14</sup> which can be accessed via management tools, applications or connection-providers
- Applications

AC 3, UC 2	Role and Resource Management	
<b>Context of Use</b>	A collaboration has been created in SPIKE/IF and subsequently, the <i>administrative users</i> created for this collaboration have to define the necessary roles at their companies in order to enable the executing (federated) users to start to work.	
<b>Scope</b>	<p>SPIKE/IF only focuses on the IT-aspect of collaborations (environment, applications, access management)</p> <p>SPIKE/IF is strongly related to SPIKE/WF as it should be possible to model <i>external services</i> in Workflows which are mapped to roles defined in collaborations (chapter 7.4.2)</p>	
<b>Level</b>	Primary task (see Figure 7-8) <b>(MUST)</b>	
<b>Primary Actor</b>	SPIKE/IF Admin, Hub Responsible, Business Contact, Partner Responsible, Partner Contact	
<b>User group and Interest</b>	<b>User group</b>	<b>Interest</b>
	Hub company	Strategic partnerships enable advantages over competitors (shorter time to market, cost reduction, outsourcing task to more specialized partners etc. see 7.1)

<sup>13</sup> Traditional file shares which reside on a file-server and can be mapped to a user session by specifying a pair consisting of Server name\Share name. An alternative concept which should be supported are Sharepoint/MOSS Teamsites / Webspaces (™ Microsoft), which are accessible via a URL specified in a WEB-Browser

<sup>14</sup> At least the products Oracle (™ Oracle Corp.) and MS SQL Server (™ Microsoft) must be supported. Data which must be specified are the Server name, Port, Database (a specialty for Oracle is that a database can be named like a fully qualified server name, a so called TNS-Name)

AC 3, UC 2	Role and Resource Management	
	Partner company(ies)	The same as for Hub company. Additionally, if the partner is a smaller company that forms an alliance with a large Hub, the partner can benefit of a large company (purchase volume enable better prices etc. see 7.1)
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>Resources which are required for a collaboration must be determined once the tasks each company has to take over are defined in the course of the <i>negotiation phase</i>. Thus, the SPIKE/IF admin can create the needed resources in advance (because this could be a time consuming task) and make them available in SPIKE/IF.</li> <li>A collaboration between two or more companies must have been set up.</li> <li>The administrative users for this collaboration must have been created.</li> </ul>	
<b>Description</b>	<b>Step</b>	<b>Action</b>
	1	SPIKE/IF Admin creates the required resources in advance
	2	SPIKE/IF Admin is requested to create further resources by administrative users
	3	SPIKE/IF Admin communicates the completion of the request to the administrative users
	4	Hub responsables, business contacts, partner responsible or partner contacts create the required roles
	5	Hub responsables, business contacts, partner responsible or partner contacts maintain the created roles (assign resources to roles, assign users to roles)
6	Hub responsables, business contacts, partner responsible or partner contacts activate/disable/delete roles	

### 7.4.3 Collaboration Phase

AC 3, UC 3	Collaboration Phase	
<b>Context of Use</b>	<p>In the course of the collaboration phase the actual work of the <i>Virtual Organization</i> [SYK08] takes place. All executive users are now assigned to their roles and have access to the resources they need to perform their tasks.</p> <p>This productive phase is accompanied by some administrative tasks like:</p> <ul style="list-style-type: none"> <li>▪ Create new / Maintain existing roles</li> <li>▪ Create new / Maintain existing resources</li> <li>▪ Maintain executive Users</li> </ul> <p>as presented in chapter 7.2.2 and in detail in 7.4.2.</p> <p>Furthermore minor and major changes of the existing collaboration must be taken into account. On the one hand the collaboration needs some minor adjustments regarding administrative roles and basic parameters (see section 7.5.4). However, on the other hand adding or removing of collaboration partners affects an existing collaboration significantly (see section 7.5.5).</p>	
<b>Scope</b>	<p>SPIKE/IF only focuses on the IT-aspect of collaborations (environment, applications, access management)</p> <p>SPIKE/IF is strongly related to SPIKE/WF as it should be possible to model <i>external services</i> in Workflows which are mapped to roles defined in collaborations (cf. section 7.4.2)</p>	
<b>Level</b>	Primary task (see Figure 7-9) <b>(MUST)</b>	
<b>Primary Actor</b>	Executive Users, Hub/Partner Responsibles, Contacts	
<b>User group and Interest</b>	<b>User group</b>	<b>Interest</b>
	Hub company	Strategic partnerships enable advantages over competitors (shorter time to market, cost reduction,

AC 3, UC 3	Collaboration Phase	
		outsourcing task to more specialized partners etc. see 7.1)
	Partner company(ies)	The same as for Hub company. Additionally, if the partner is a smaller company that forms an alliance with a large Hub, the partner can benefit of the power of a large company. (purchase volume enable better prices etc. see 7.1)
<b>Preconditions</b>	<ul style="list-style-type: none"> <li>Resources are available and assigned to roles</li> <li>Users are assigned to roles</li> </ul>	
<b>Description</b>	<b>Step</b>	<b>Action</b>
	1	Executive (federation) Users perform their tasks
	2	Change requests for further roles and resources occur
	3	Change basic administrative roles
	4	Adjust the whole collaboration by changing partner companies

#### 7.4.4 Adjust collaboration

AC 3, UC 4	Adjust collaboration
<b>Context of Use</b>	During the collaboration some changes may occur which require some adjustments of parameters of the collaboration like extending the determined collaboration time or changes of <i>administrative</i> roles due to job rotations of the involved employees.
<b>Scope</b>	<p>SPIKE/IF only focuses on the IT-aspect of collaborations (environment, applications, access management)</p> <p>SPIKE/IF is strongly related to SPIKE/WF as it should be possible to model <i>external services</i> in Workflows which are</p>

AC 3, UC 4		Adjust collaboration
		mapped to roles defined in collaborations (chapter 7.4.2)
Level		Primary Task (see Figure 7-9) <b>(MUST)</b>
Primary Actor		SPIKE/IF Admin, Hub / Partner Responsible
User group and Interest	User group	Interest
	Hub company	Strategic partnerships enable advantages over competitors (shorter time to market, cost reduction, outsourcing task to more specialized partners etc. see 7.1)
	Partner company(ies)	The same as for Hub company. Additionally, if the partner is a smaller company that forms an alliance with a large Hub, the partner can benefit of the power of a large company. (purchase volume enable better prices etc. see 7.1)
Preconditions		Changes planned/not planned during the collaboration need re-arrangement of the respective parameters
Description	Step	Action
	1	Hub Responsible can adjust the end date of the collaboration
	2	Hub Responsible creates new/delete existing Business Contacts, Partner responsible

AC 3, UC 4	Adjust collaboration	
	3	SPIKE/IF Admin has to create a new Hub Responsible for a collaboration. <sup>15</sup> The new Hub Responsible inherits all collaborations from the old one. Thus, a smooth transition is guaranteed.

### 7.4.5 Extend/reduce/merge collaboration

The whole use case is a reasonable extension of SPIKE/IF as in collaborations the changing of Partner Companies is sometimes inevitable. This building block is rated as **(MEDIUM)**.

#### Design principles for changing collaborations:

- An extension of a collaboration describes adding a new partner company to an existing collaboration.
- A reduction of a collaboration describes removing a Partner Company from an existing collaboration.
- Merging of two existing collaborations describes the case that two collaborations of SPIKE/IF are married and thus merged in one collaboration.

#### Extend collaboration:

- Can only be carried out by the Hub Responsible or SPIKE/IF Admin
- An easy way to implement this is without *asking* Partner Companies a mechanism where a *quasi-democratic* approach would be implemented would be welcome.
- A simple voting mechanism could be implemented in order to enable all partner companies to get involved in the decision process whether a company will be added or not<sup>16</sup>. However, only the Hub-company can initiate the extension of an existing collaboration.
- After adding the new company to the collaboration the Hub Responsible creates new administrative users and roles.<sup>17</sup>

#### Reduce collaboration:

- Can only be carried out by the Hub Responsible or SPIKE/IF Admin
- After removing a partner company from a collaboration all assigned roles in conjunction with the collaboration must be disabled
- A simple voting mechanism could be implemented in order to enable all partner companies to get involved in the decision process whether a company will be removed or not. However, only the Hub-company can initiate the removal of a partner.

<sup>15</sup> There must exist exactly 1 Hub Responsible for each collaboration.

<sup>16</sup> In this case each existing partner (Partner Responsible) gets a notice and can accept or deny with a justification, but the final decision is at the HUB company

<sup>17</sup> The new partner company automatically has access to all existing collaboration and public roles



### Merge collaborations:

- This task is limited to the SPIKE/IF Admin because access rights beyond the scope of a Hub Responsible are required.
- The merge of a collaboration requires that a so called “winning” collaboration has to be determined. The remaining companies and their roles from other collaborations are incorporated. Solely the Hub Responsible of the *winning* collaboration *survives*.

AC 3, UC 5	Extend/Reduce collaboration
Context of Use	<p>As in the use case “Adjust collaboration” (see 7.4.4) only some <i>minor</i> changes are handled, the adjustments described in this case are of much more consequence and affect the existing collaboration significantly.</p> <p>Changes of partners could occur during collaborations because of the following reasons:</p> <ul style="list-style-type: none"> <li>▪ Service quality is not as expected and agreed on</li> <li>▪ New pricing of a partner is unacceptable, alternative companies become more attractive</li> <li>▪ A partner resigns a service</li> <li>▪ A partner becomes insolvent</li> <li>▪ Etc.</li> </ul> <p>Another topic during collaborations are situations where <i>merges</i> could result in an overall benefit.</p> <ul style="list-style-type: none"> <li>▪ A service partner is limited in its capacity. Thus, another partner should provide the needed resources</li> <li>▪ To support a <i>second source</i> strategy</li> <li>▪ The range of required tasks is extended and no existing partner can cover the new requirements</li> <li>▪ Etc.</li> </ul>
Scope	<p>SPIKE/IF only focuses on the IT-aspect of collaborations (environment, applications, access management)</p> <p>SPIKE/IF is strongly related to SPIKE/WF as it should be possible to model <i>external services</i> in Workflows which are mapped to roles defined in collaborations (chapter 7.4.2)</p>
Level	Primary Task (see Figure 7-11) <b>(MEDIUM)</b>

AC 3, UC 5		Extend/Reduce collaboration	
<b>Primary Actor</b>		SPIKE/IF Admin	
<b>User group and Interest</b>	<b>User group</b>	<b>Interest</b>	
	Hub company	Strategic partnerships enable advantages over competitors (shorter time to market, cost reduction, outsourcing task to more specialized partners etc. see 7.1)	
	Partner company(ies)	The same as for Hub company. Additionally, if the partner is a smaller company that forms an alliance with a large Hub, the partner can benefit of the power of a large company. (purchase volume enable better prices etc. see 7.1)	
<b>Preconditions</b>		Situations as described in the context section of this use case occur and evoke a change of partner companies for a collaboration	
<b>Description</b>	<b>Step</b>	<b>Action</b>	
	1	Extend a collaboration by a new partner	
	2	Reduce a collaboration by an existing partner	
	3	Merge two collaborations	

#### 7.4.6 Finish collaboration

AC 3, UC 6		Finish collaboration
<b>Context of Use</b>		The last phase of a collaboration is reached once

AC 3, UC 6	Finish collaboration	
	<ul style="list-style-type: none"> <li>▪ The contract with one or more partner(s) expires (e.g. the project is finished, the resources of partners are not needed anymore)</li> <li>▪ Reasons enumerated in the context of use of Use case 5 (7.4.5) lead to a termination, possibly prematurely to the determined end</li> </ul> <p>In case of a termination of a collaboration SPIKE/IF has to take care that all roles of executive and administrative users of the respective collaboration will be disabled. Only a SPIKE/IF Admin can reopen the collaboration if this is a management decision at the Hub company</p>	
<b>Scope</b>	<p>SPIKE/IF only focuses on the IT-aspect of collaborations (environment, applications, access management)</p> <p>SPIKE/IF is strongly related to SPIKE/WF as it should be possible to model <i>external services</i> in Workflows which are mapped to roles defined in collaborations (chapter 7.4.2)</p>	
<b>Level</b>	Primary task (see Figure 7-12) <b>(MUST)</b>	
<b>Primary Actor</b>	Hub Responsible, SPIKE/IF Admin	
<b>User group and Interest</b>	<b>User group</b>	<b>Interest</b>
	Hub company	Strategic partnerships enable advantages over competitors (shorter time to market, cost reduction, outsourcing task to more specialized partners etc. see 7.1)
	Partner company(ies)	The same as for Hub company. Additionally, if the partner is a smaller company that forms an alliance with a large Hub, the partner can benefit of the power of a large

AC 3, UC 6		Finish collaboration
		company. (purchase volume enable better prices etc. see 7.1)
<b>Preconditions</b>	A collaboration is finished once: <ul style="list-style-type: none"> <li>▪ The termination date is reached</li> <li>▪ A Hub Responsible / SPIKE/IF Admin terminated the collaboration</li> </ul>	
<b>Description</b>	<b>Step</b>	<b>Action</b>
	<b>1</b>	SPIKE/IF Admin gets order to remove access for one or more partners to the intranet
	<b>2</b>	A decision was made to reopen and continue the collaboration

## 7.5 Modeling use cases

### 7.5.1 Modeling Collaboration set up

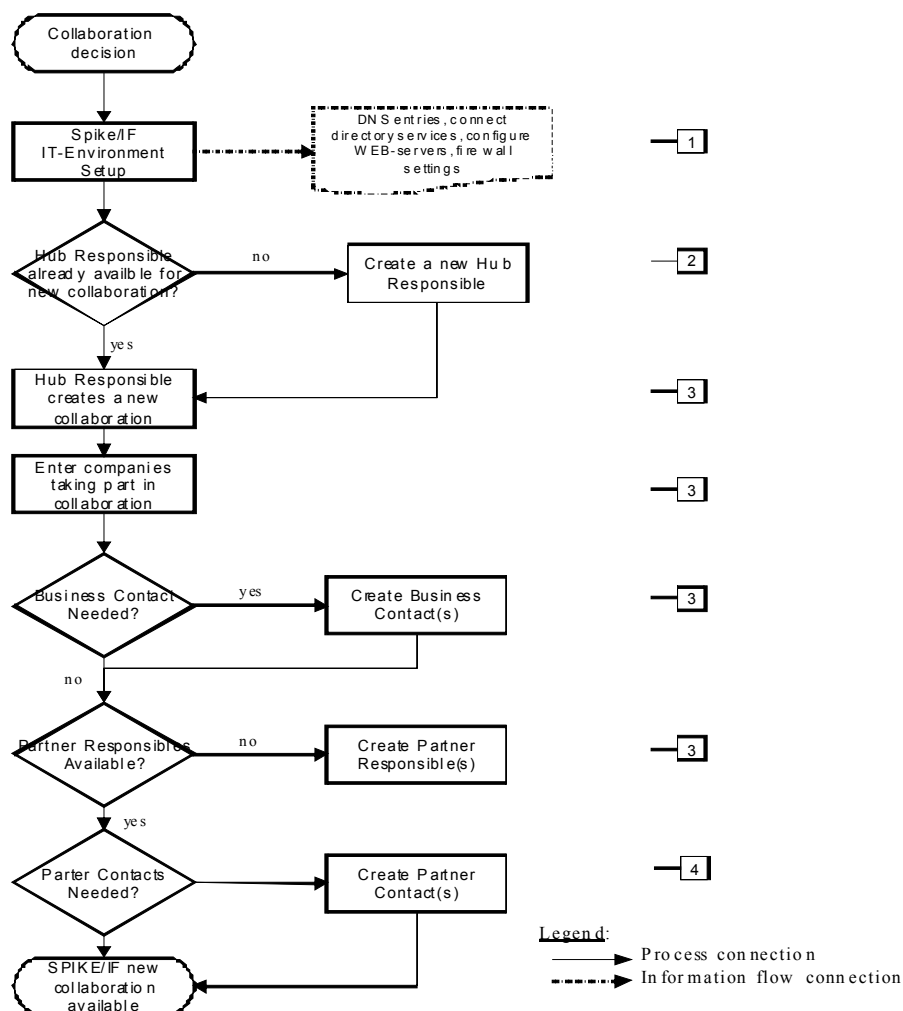


Figure 7-7: Steps to set up a collaboration

### 7.5.2

## Modeling Role and Resource Management

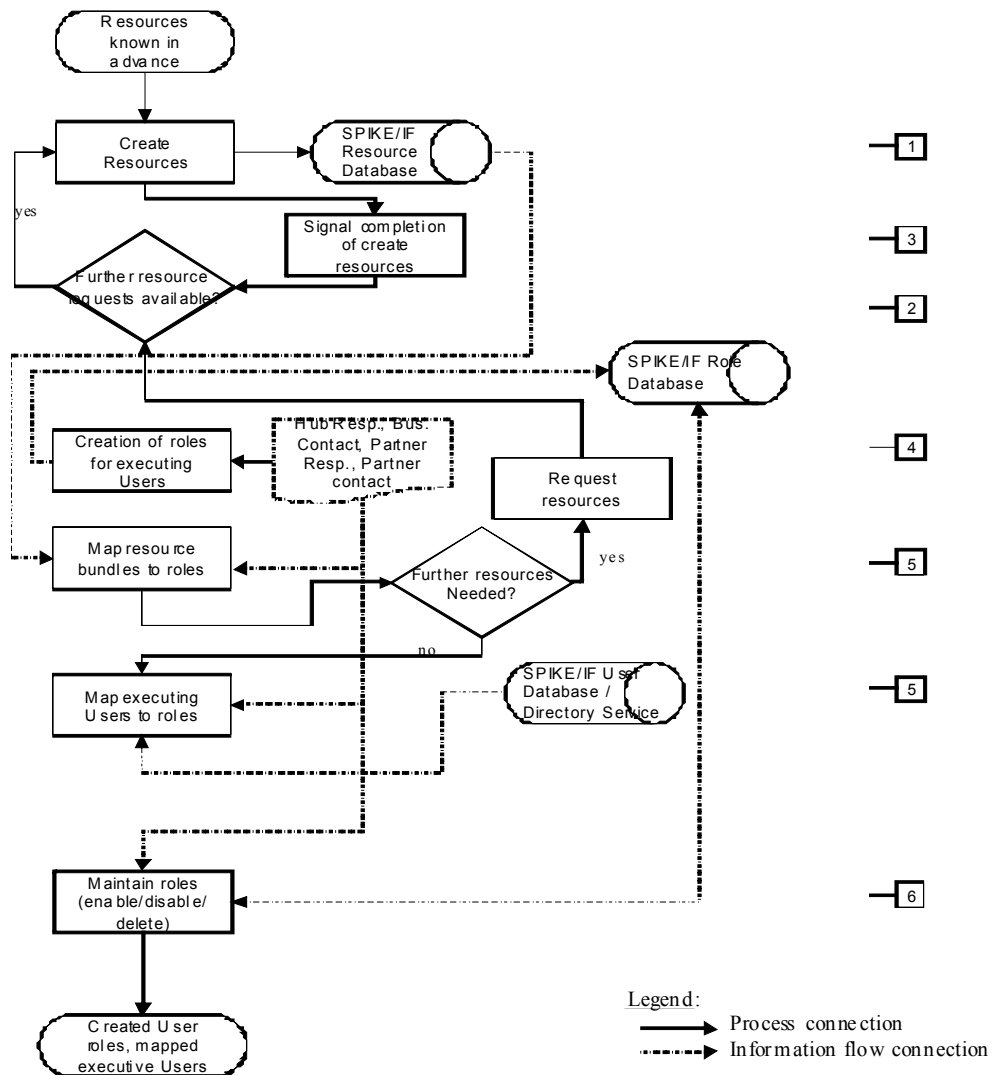


Figure 7-8: Steps during role and resource management

### 7.5.3

## Modeling collaboration

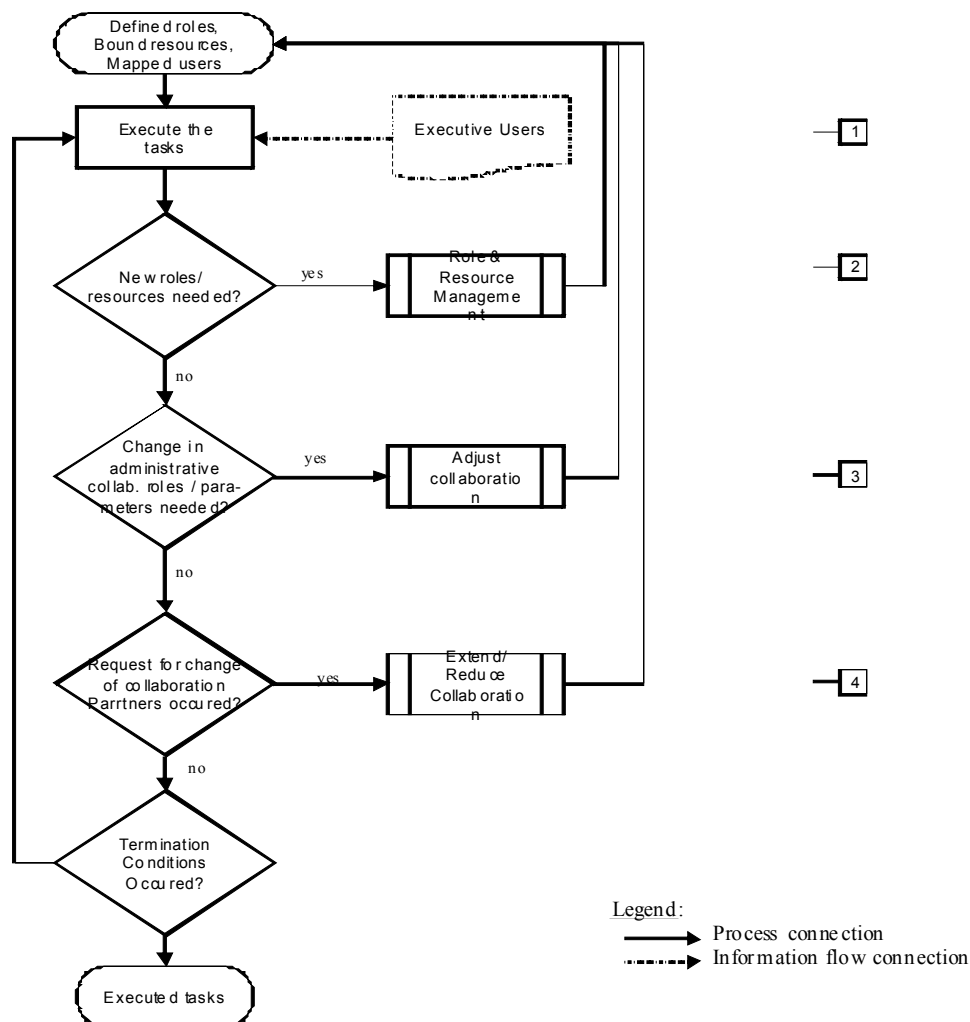


Figure 7-9: Steps of the collaboration phase

### 7.5.4

## Modeling adjust collaboration

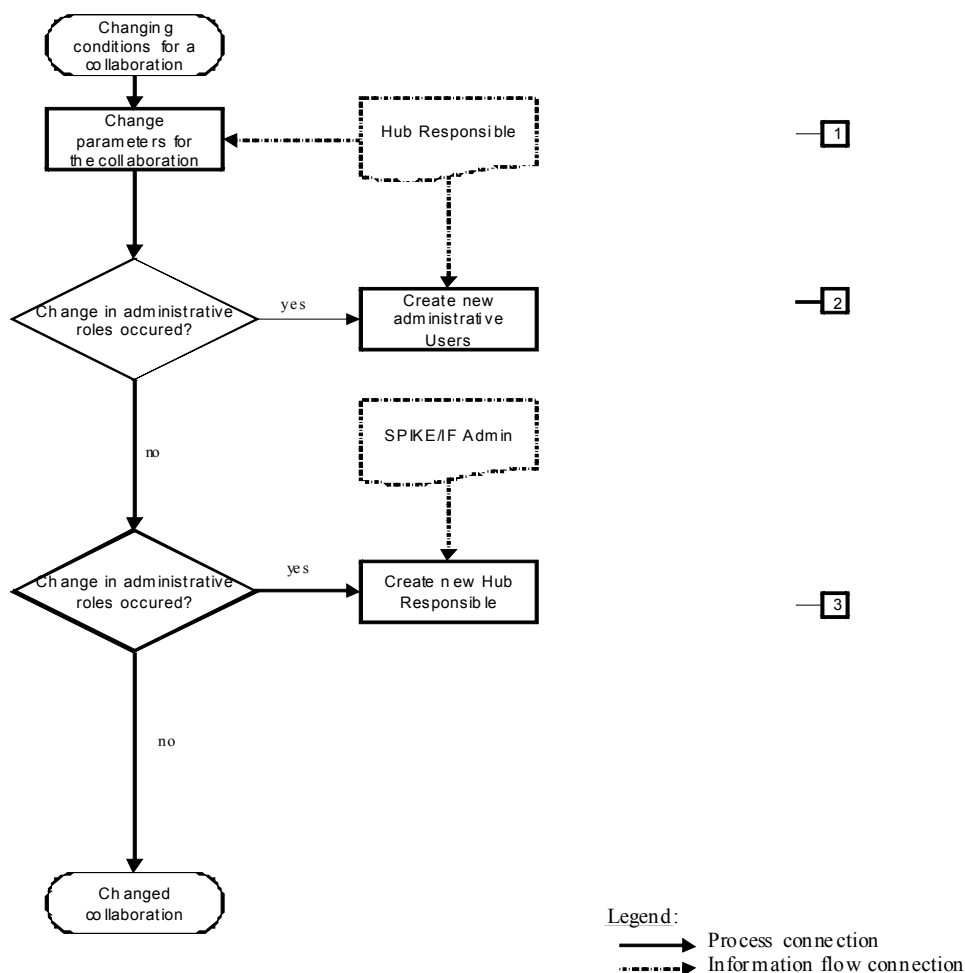


Figure 7-10: Steps when adjusting a collaboration

### 7.5.5



## Modeling extend/reduce collaboration

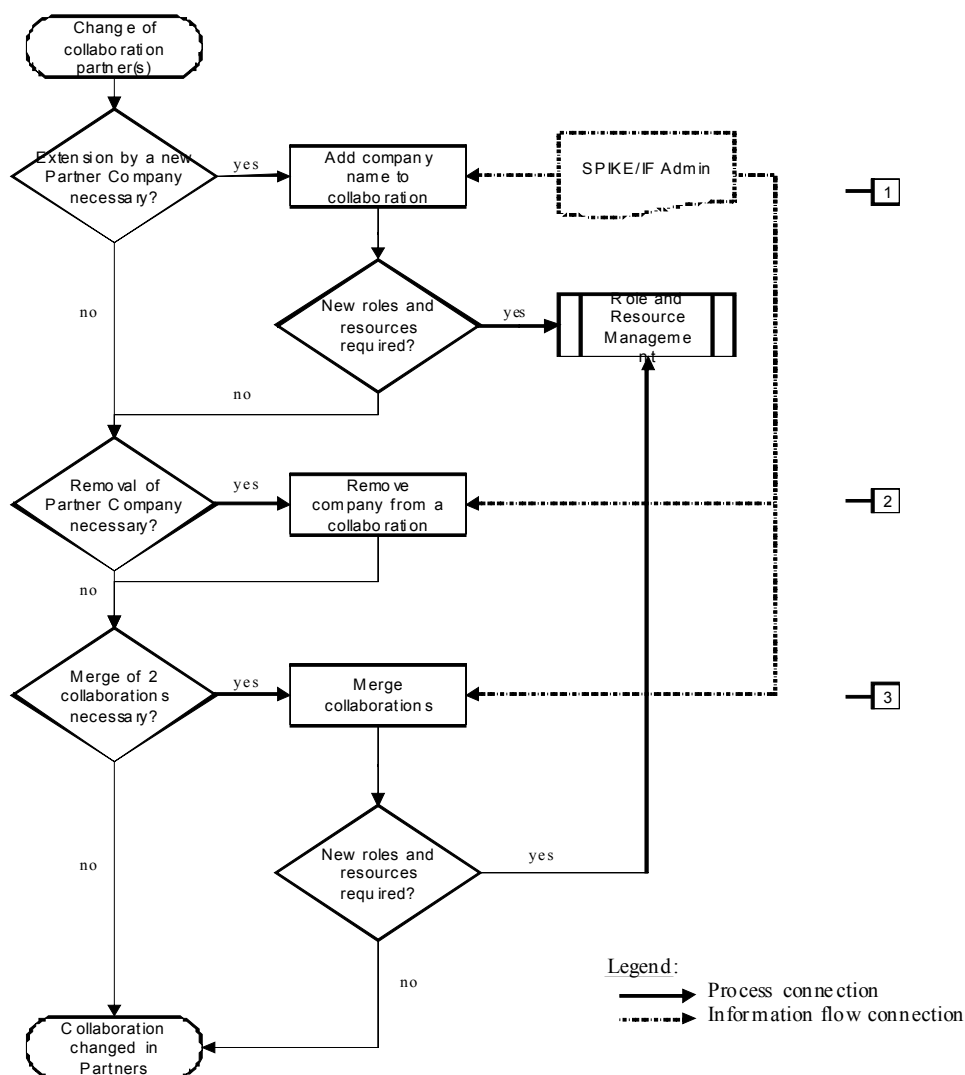


Figure 7-11: Steps for extending/reducing a collaboration

### 7.5.6

## Modelling finish collaboration

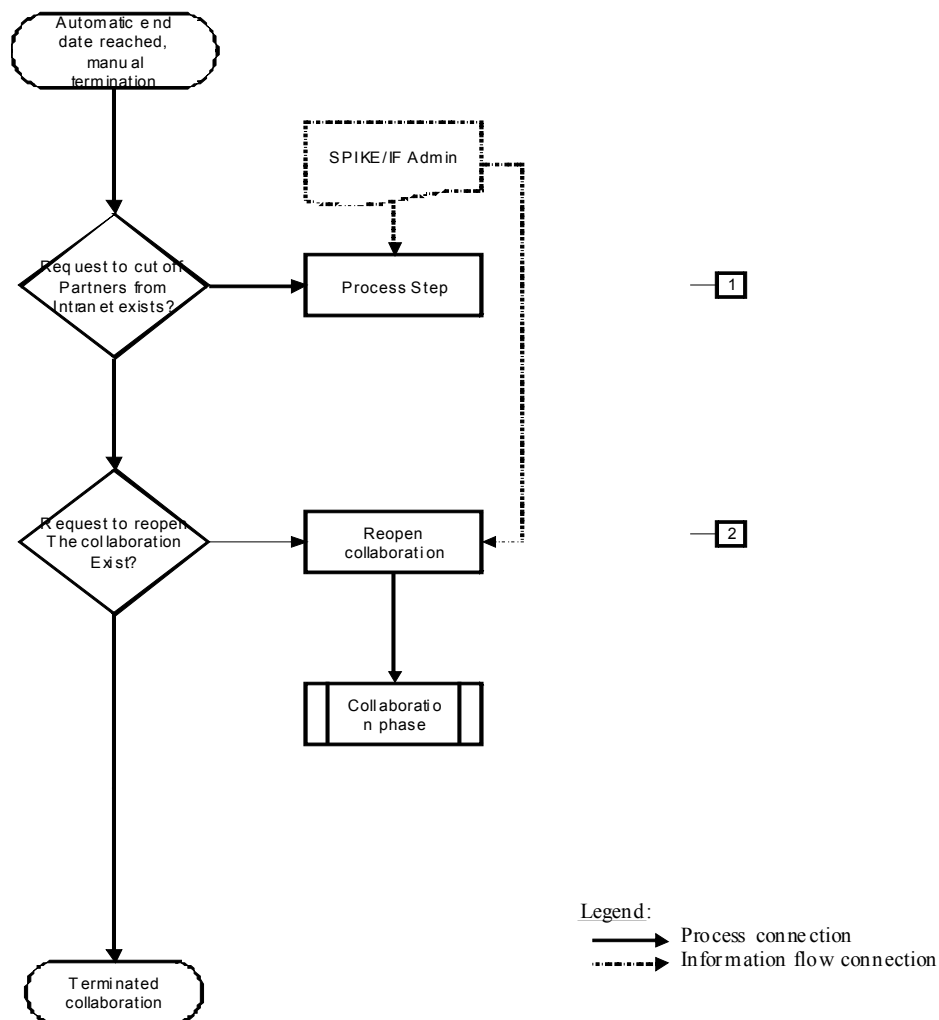


Figure 7-12: Steps to finish a collaboration

## 8 List of Requirements

The following list contains requirements based on the use cases collected on the basis of the applications cases from the user partners:

- Application Case 1: Intra- and Interorganisational Offering of Technical Documentation Services (AC1), as laid out in section 5 of this document,
- Application Case 2: Legacy Applications (AC2), as laid out in section 6 of this document, and
- Application Case 3: Identity Federations (AC3), as described in section 7 of this document.

Also, requirements from the market research (MR) from the following sources have been taken into account, as further explained in sections 3 and 4 of this document:

- Questionnaire (MR)
- Interviews (MR)
- Secondary Market Research (MR)

The requirements are categorised into two individual classes: Functional (F) and non-functional (NF) requirements. The order number corresponds to the class of the requirement.

The abbreviations for the sources from the requirements are shown in the field “reference” within the requirement template. The field “importance” shows the priority of the requirements.

During a workshop held June 10<sup>th</sup> and 11<sup>th</sup> in Vaasa the classification and the set of priority have been done by all consortium members. Both are described in chapter 2.5.

In total, 35 functional and 24 non-functional have been identified during the user requirements analysis phase. These requirements are listed and briefly explained in the following two sections.

## 8.1 Functional Requirements

Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-1	<b>Workflow Management</b>	A workflow is the specification and automatic execution of an activity or a series of activities representing a business process. A workflow management system manages, defines and executes workflows.	The system consists of different applications, a workflow engine, process definition tools, workflow client applications, invoked applications, workflow enactment services as well as administration and monitoring tools.	MR, AC 1	MUST
F-Req.-2	<b>Communication</b>	<p>Asynchronous and synchronous communication between the cooperation partners is needed. The communication tool must be easy to use, clearly defined and accessible directly via the SPIKE platform. For synchronous communication, especially instant messaging and videoconferencing functionalities have to be considered.</p> <p>The SPIKE project management functionality allows the allocation of tasks and responsibilities to project members. It also supports the organisation of group meetings, for example video conferences.</p>	<p>The functionalities must be easy to use and therefore addressable directly from the web frontend via a portlet. The communication tool must link to contact information about the relevant persons (internal and external). In the case of text-based communication using instant-messaging, the communication needs to be stored.</p> <p>Group conferencing functionalities for organizing appointments are needed (e.g. invitation, confirmation, writing into another user's calendar – granted the user has given his permission beforehand).</p> <p>It must be possible that the project members can be reminded to appointments, invitations to group meetings and upcoming tasks and milestones automatically. Every project member should be able to manage his own appointments and reminders, whereas the project manager should be able to manage the appointment and reminder service on a global level for his institution.</p>	MR, AC 1	FUTURE

Req. No.	Req. Name	Description	Implication	Reference	Importance
<b>F-Req.-3</b>	<b><i>Archive Functions</i></b>	Archive functionality is needed in order to store several documents in a repository, offering the possibility to exchange them between individual cooperation partners. Furthermore, archive functionality is needed in order to comply with legal requirements.	It is necessary to implement archive functionality using a pre-defined interface to external archiving services using an XML-based exchange format.	MR, AC 1	MEDIUM
<b>F-Req.-4</b>	<b><i>Version Management</i></b>	<p>The SPIKE system must be able to track changes made to content or documents stored within the SPIKE platform as well as to their corresponding metadata. Moreover, versioning of relevant data during a collaboration, i.e. process models, is needed.</p> <p>Furthermore, in Application Case 1 (Information Hotel), it should be noted that a delivery documentation project can last for years and it is likely that some items (documents or metadata) will have version</p>	<p>It is necessary that every version is stored together with information about this version. This metadata must contain information about the person who has made the changes, the time when the new version has been stored and the changes compared to the previous version.</p> <p>For document management, if a document has been changed, the system should ask automatically whether a new version should be created. Changes to a document without versioning can only be done by the creator of the last version. The different versions must be easily accessible.</p>	MR, AC 1	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
<b>F-Req.-5</b>	<b><i>Version management: Relations between versions</i></b>	upgrades during that time.	<p>In addition to different versions (i.e., editions of the documents), there may also be language variants (e.g. documents translated to different language(s)) which must be able to link to their original version.</p> <p>Different clients and sub-suppliers often use different implementations of the same concepts (for example, the same document may be named differently by different users, while the different names refer to the same instance of the document). The system must be able to handle this type of variation.</p>	AC 1	MEDIUM
<b>F-Req.-6</b>	<b><i>Search Facilities</i></b>	SPIKE includes many kinds of unstructured data and different media types in the collaboration platform. Thus, search functionality is needed.	<p>The workspace objects must be retrievable based on content metadata tags, author and date of last modification.</p> <p>Search functionality includes searching for processes, collaboration partners and offered services, collaboration users and roles as well as content elements.</p>	MR, AC 1	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
<b>F-Req.-7</b>	<b><i>Integration of Information Management Systems</i></b>	“Information Management” is an umbrella term that encompasses all the systems and processes within an organisation for the creation and use of corporate information. Information management covers systems such as document management, content management, records management, resources management (for example, in the case of Application Case 1, the information stored in the SAP database), etc. SPIKE implements a standard interface to various types of information management systems adhering to this interface.	SPIKE must provide a standardized interface to integrate different kinds of information management systems. Based on this interface, SPIKE must be able to integrate different information management systems following this interface to allow users to easily store, send, find, and retrieve information related, for example, to a specific project.  The integration interface must have standard information exchange capabilities (e.g. XML data modelling) in order to introduce possible new applications.	AC 1	MUST
<b>F-Req.-8</b>	<b><i>Mobile Access</i></b>	Application case 4 coming out of the interview with Scheu + Wirth GmbH describes the necessity of connecting PDA devices with the SPIKE platform.	The mobile access usually uses UMTS via PDAs. Therefore the SPIKE webpage for the specific application must be easy to be optimised for small screens and small bandwidths.	MR, AC 1	LOW

Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-9	<b><i>Complaint Management Process</i></b>	Data about single complaints is transferred in an XML format via a VPN tunnel and written into a shared database. The transfer is then followed by a workflow in order to identify the reason for the complaint and to solve the problem for the future. Depending on their roles in the companies, the employees of two collaborating companies get access to the workflow via clients. The workflow of the complaint management process follows the 8D methodology.	A web service has to be developed which transfers data using the data model QDX via a VPN tunnel. A workflow following the 8D methodology must be built. A user and permission management system has to be installed. During the workflow an 8D report has to be developed and managed by a document management system afterwards.	MR, AC 1	FUTURE
F-Req.-10	<b><i>Digital Signature</i></b>	For contracts in short-time projects it can be a positive and time-saving feature if the partners do not have to meet physically in order to sign a contract.	A qualified electronic signature functionality, which is legally accepted, has to be set up.	MR, AC 1	FUTURE
F-Req.-11	<b><i>Common Cooperative Environment</i></b>	Every cooperation project has many essential documents, for example visions, templates, project plans, requirements specifications and qualification descriptions of project members related. Access to these documents must be easy.	Every member of the cooperation project must find these essential documents bundled at a central place independent of their position in a file system. It can be compared to the daily work with a room-metaphor. Access to the project room should be possible by clicking a related icon on the web frontend.	MR, AC 1	MUST



Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-12	<b><i>Semantic Content Management</i></b>	<p>In cooperation projects many documents are written, stored and changed by different project members. A semantic content management system is therefore needed.</p> <p>Integrating semantic content management is one of the key applications of the SPIKE project.</p>	<p>A semantic content management system has to be integrated into the SPIKE platform using defined interfaces. This semantic content management system needs to provide access to tools to create, manage, process, and publish both the concept models (semantic models) themselves as well as the implementation of each model (e.g. documents, records, reports etc.)</p> <p>The semantic content management system (including workflow, metadata, access rights) must be adaptable according to users' business processes and related concepts, so that all content handled by different parties can be mapped to this model.</p> <p>The semantic content management system must have a layered architecture that enables the use of several standard storage systems using an interface provided by the SPIKE platform.</p>	MR, AC 1	MUST
F-Req.-13	<b><i>Semantic Content Management: UI Layer</i></b>		The user interface layer must enable users to access the CMS from their own UIs (assuming that these fulfil the standard integration interface requirements).	AC 1	LOW
F-Req.-14	<b><i>Semantic Content Management: Advanced functionality</i></b>		Nice-to-have CMS features include data life cycle (discarding old revisions, backing up old versions, etc), link management (it is not possible to delete objects that are in use), custom metadata, and reviewing functionality.	MR, AC 1	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-15	<b><i>Semantic Content Management: Team functionality</i></b>		Furthermore, joint editing capabilities are needed in order to collaboratively work on content using the SPIKE platform.	AC 1	MEDIUM
F-Req.-16	<b><i>Identification, Authentication and Authorization</i></b>	<p>In order to provide controlled access to SPIKE, functionality needs to be available to support user identification and authentication, as well as authorization on information.</p> <p>Users may be organized into groups and assigned to multiple roles. Information owners may decide who is granted access to which resources on a user basis.</p>	<p>Mechanisms and storage models need to be set up to identify and authenticate users.</p> <p>The SPIKE platform aims at creating a network of enterprises where they can share resources. Thus, a mechanism performing identification, authentication and authorization of users is considered very important in the SPIKE platform.</p> <p>The access control service provides means to ensure that resources are accessed only by authorized subjects. Resources concerned may be the physical system, the system software, applications and data. The access control service can be defined and implemented at different levels of granularity: At agent level, object level or attribute level. The limitations of access are laid out in access control information: the means to determine which entities are authorized to have access; what kind of access is allowed (reading, writing, modifying, creating, and deleting).</p> <p>All kinds of activities (maintenance of the SPIKE platform as well as the use of it like using a specific service) have to be logged in detail for later</p>	MR, AC 1, AC 2, AC 3	MUST

Req. No.	Req. Name	Description	Implication	Reference	Importance
			<p>investigations. If a user's session is expired, the user has to be logged off automatically. SPIKE needs to provide an access control system that allows controlling the possible activities of all users of SPIKE based on transaction level.</p> <p>The complete identification, authentication and authorization information traffic through SPIKE/IF must be encrypted.</p>		
<b>F-Req.-17</b>	<b><i>Single Sign On</i></b>	<p>Collaboration platforms can be seen as extensions of enterprise portals. During a collaboration project, usually access to data and programs stored respectively run within the partners' IT infrastructure is needed.</p> <p>SPIKE/IF should be widely open and flexible with standardized (state of the art) interfaces so that many applications can be integrated</p> <p>Single Sign On mechanisms through the complete integrated application landscape is a major requirement within SPIKE/IF .</p>	<p>A standardized mechanism for integration with existing Single Sign On (SSO) infrastructures is needed. By using SSO, a SPIKE server may be integrated into an IT infrastructure where different applications share the same user base to provide a central login mechanism to end users.</p> <p>One common interface to directory services (e.g. Active Directory, eDirectory, Novell Identity Management, SunOne LDAP, Open LDAP etc.) to retrieve identity data for users is needed.</p>	MR, AC 1, AC 2, AC 3	MUST
<b>F-Req.-18</b>	<b><i>Secure Document Transfer</i></b>	<p>During a cooperation project, documents are usually transferred between the participating companies.</p> <p>The confidentiality service provides protection against unauthorized disclosure</p>	<p>The following kinds of confidentiality services can be distinguished which are to be selectively implemented during the SPIKE development phase.</p> <p>Data Confidentiality: This service can be used to provide protection of data from unauthorized</p>	MR, AC 1, AC 2, AC 3	MUST

Req. No.	Req. Name	Description	Implication	Reference	Importance
		of exchanged data.	<p>disclosure. The data confidentiality service is supported by the authentication framework. It can be used to protect against data interception.</p> <p>Connection Confidentiality: Security service to provide confidentiality of all (N)-user data on a (N)-connection.</p> <p>Selective Field Confidentiality: A security service to provide confidentiality of selected fields within the (N)-user-data on an (N)-connection.</p> <p>Traffic-flow Confidentiality: A confidentiality service to protect against traffic analysis, i.e. a security service to provide the protection of information which might be derived from observation of traffic flows.</p> <p>Communication between SPIKE instances of different collaboration companies should be encrypted (security principle against attacks from the internet)</p> <p>Secure point-to-point connection needs to be implemented. If a document is transferred to many nodes during a workflow process, another concept is needed because identification and authentication about the person who has ordered something and created a related document for example gets lost.</p>		

Req. No.	Req. Name	Description	Implication	Reference	Importance
<b>F-Req.-19</b>	<b><i>Document Encryption</i></b>	The system must provide support for key management and integrated document encryption based on public/private key technology.	End users may upload a public key and make it available to other platform users. Within a shared workspace, users may define a public group key. End users shall be able to store the private key for decryption at the client side. Import from external key servers is needed. Optionally, documents can be encrypted before uploading them to the platform.	MR, AC 1, AC 2, AC 3	MEDIUM
<b>F-Req.-20</b>	<b><i>Data Synchronisation</i></b>	If data is stored on different devices, for example a SPIKE client and the SPIKE platform, data synchronisation between these devices is necessary.	Depending on the application data, synchronisation functionality must be developed.	MR	FUTURE
<b>F-Req.-21</b>	<b><i>Identity Federation: Strong Adherence to Federation Standards</i></b>	SPIKE/IF should be widely open and flexible with standardized (state of the art) interfaces so that many applications can be integrated.	Strong adherence to federation standards SAML/SPML/XACML (Oasis), WS-Standards (MS/IBM), IDFF.x (Liberty alliance), Shibboleth	AC 3	MUST
<b>F-Req.-22</b>	<b><i>Identity Federation: Access Bundles</i></b>	Access to resource bundles (applications, file shares, databases) is controlled via roles. Therefore SPIKE/IF has to guarantee that a user only can access resources which are within the “scope” of its role(s)	Roles defining access bundles for different resources have to guarantee execution security (It can only be used what is defined to be used), strong security like Active Directory ACLs	AC 3	MUST

Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-23	<b>Identity Federation:</b> <b>Federated Users</b>	Administrative roles for setting up a collaboration should also have the possibility to “actively” take part in collaborations by executing tasks (e.g. working with applications, access resources)	Executive Users as <i>administrative</i> users for collaborations, too, should be <i>federated users</i>	AC 3	MUST
F-Req.-24	<b>Identity Federation:</b> <b>Admin rights</b>	The SPIKE/IF Admin role should only have full power on establishing resources and setting up collaborations but should not have access to the “business” of collaboration	SPIKE/IF admins must not be <i>federated users</i> (Security principle, as these roles have too much power)	AC 3	MUST
F-Req.-25	<b>Role Management:</b> <b>User Interfaces</b>	Designing user interfaces is a highly creative process [SOM92SOM92,TID05]. GUIs are the standard way of employing software products from a user’s perspective today. Their main focus is on reducing the complexity of an application in a structured way which becomes visible in menus, windows and function buttons to guide the user in an <i>intuitive</i> way and make the user work efficiently.	Hub/Partner Users should be able to see all their roles assigned to them. Clicking on a role shows the resource bundle belonging to this role and which of this roles/resources are active and which are disabled	AC 3	MUST
F-Req.-26	<b>Role Management:</b> <b>Administrative Interfaces</b>		Hub/Partner <i>administrative</i> users should be able to see ONLY the collaborations they are part of, all the roles they have created, all the resources bound to roles and all the users mapped to roles	AC 3	MUST
F-Req.-27	<b>Role Management:</b> <b>Query for Certain Users</b>	The best <i>quality measure</i> for a GUI is its acceptance by the users [JOH07], there have been published <i>a lot</i> of principles and	Hub/Partner <i>administrative</i> users should be able to query for certain users and see in which of their collaborations they maintain the user is a member of	AC3	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-28	<b>Role Management: admins</b>	criteria; compliance to them is inevitable to be successful. A comprehensive list can be found online at [TOG08, HOB08]. In addition to standard principles, some special requirements to SPIKE GUI are listed.	SPIKE/IF admins have unlimited power, they can see all items in all collaborations	AC 3	MUST
F-Req.-29	<b>Software Interfaces: Interface to Access Management Products</b>	SPIKE/IF should be widely open and flexible with standardized (state of the art) interfaces so that many applications can be integrated.	Interface to access management products (e.g. Novell Identity Access Manager, Firepass, Juniper, Tarantella etc.) which can be used to incorporate configuration data for already existing collaborations to Partner Companies	MR, AC 1, AC 2, AC 3	MEDIUM
F-Req.-30	<b>Software Interfaces: Support SOA, Web Services</b>		Support SOA, web services	MR, AC 1, AC 2, AC 3	MUST
F-Req.-31	<b>Software Interfaces: Support SAP Portal Access</b>		Support SAP Portal access via interfaces including authentication and Single Sign On	MR, AC 1, AC 2, AC 3	MUST
F-Req.-32	<b>Software Interfaces: Support Windows/X11-based applications</b>		Support Windows/X11-based applications	MR, AC 1, AC 2, AC 3	MUST

Req. No.	Req. Name	Description	Implication	Reference	Importance
F-Req.-33	<i>Software Interfaces: Support of mainframe-based applications</i>		Support of mainframe-based applications	MR, AC 1, AC 2, AC 3	LOW
F-Req.-34	<i>Reporting</i>	The SPIKE system will contain a large amount of business-critical information that is constantly used in decision-making and as input in other systems and processes. Therefore it is important that all data in the system can be searched, retrieved, and reported efficiently.	A standard (XML-compliant) reporting interface is needed. The reporting interface enables certain users to log into the SPIKE system, collect the data they need, and run a report (in the form of an XML or CSV file) and then pass it forward. It must be possible to trigger this reporting functionality anywhere in the system. When necessary, users must be able to trigger standard reports, meaning that the reports are run automatically when triggered by a timestamp, function, or user interaction.  The reporting functionality can be linked to email functionality so that reports can be emailed.	AC 1	MEDIUM
F-Req.-35	<i>Reporting: Rendering</i>		In order to give a visual representation of reports created and data collected, it is desirable to render reports in a configurable manner (i.e., as spreadsheet, PDF, image)	AC 1	FUTURE

Table 8-1: Functional Requirements



## 8.2 Non-Functional Requirements

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-1	<i>Performance Requirements</i>	It will make sense and be appreciated to differentiate between end-user-screens and e.g. screens for administrators only for this requirement. Of course for the acceptance of the product the end-user performance has to have a higher priority.	<p>The system shall reach the following online response times:</p> <p>simple transaction, e.g. open one specific/simple screen</p> <p>Total response time 0.75 s, consisting of:</p> <ul style="list-style-type: none"> <li>• Transfer over WAN: 0.25 s (assumptions: 256 KBit/s, about 7 KByte data volume, compressed, HTTPS)</li> <li>• Latency time of network: 0.1 s</li> <li>• Server response time: 0.2 s (assumptions: client data taken from database, average server load)</li> <li>• Time to display HTML page on client: 0.2 s</li> <li>• With 64 KBit/s, the total response time would be around 1.5 s.</li> </ul> <p>complex transaction, e.g. open a complex screen (a lot of different data, from different sources etc.):</p> <p>Total response time: 1.5 s, consisting of:</p> <ul style="list-style-type: none"> <li>• Transfer over WAN: 0.4s (assumptions: 256 KBit/s, about 12 KByte data volume, compressed, HTTPS)</li> <li>• Latency time of network: 0.1 s</li> </ul>	AC 2	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
			<ul style="list-style-type: none"> <li>Server response time: 0.6 s (assumptions: 0.4s for middleware/backend access, average server load)</li> <li>Time to display HTML page on client: 0.4 s</li> </ul> <p>With 64 KBit/s, the total response time would be around 2.5 s.</p>		
	<i>File handling capacities</i>		<p>The system should be able to store and manage large files (&gt;40MB).</p> <p>The system should be able to process large (&gt;8GB) mass imports and exports (consisting of several files and associated concepts/metadata).</p>	AC 1	MEDIUM
NF-Req.-2	<i>Reliability</i>	<p>Backup/restore/basic concept allowing to run software in a disaster recovery scenario (cluster).</p> <p>Since the services provided by Service Providers via SPIKE platform might also be safety-critical ones (depending on the context in which they are used maybe also ones upon which also human lives may depend) the whole platform as such has to be treated as a safety-critical subsystem! This statement will have to have impact to the whole software design process because it effects all parts of the platform, e.g.:</p>	User interface has to be designed in a way that reduces the probability of human errors as much as possible.	AC 2	LOW

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-3	<i>External Interfaces</i>	SPIKE has to be developed in a manner that ensures highest stability, availability and safety. Therefore the whole software development process needs a setup that ensures state of the art software engineering basics:	Special attention has to be paid in the design of all external interfaces because they have to be very flexible and also stable!	MR, AC 1, AC 2, AC 3	MUST
NF-Req.-4	<i>Application Interoperability</i>	Application interoperability provides full support for platform-independent web services, business web applications, and development based on open standards.	<b>Terminal/Access:</b> Support for terminal protocols is clearly a very important first step in providing access to an existing system.	MR, AC 1, AC 2, AC 3	MUST
NF-Req.-5	<i>Extensibility</i>	The SPIKE platform can easily acquire and adapt features supporting the augmentation of existing functionality and the deployment of new functionality alongside the existing features.	The background semantic modules are the most likely targets of customizations, since they have a direct impact on the core SPIKE system features.	MR, AC 1	MUST
NF-Req.-6	<i>Integrity</i>	This service is offered by others such as data integrity service or system integrity service.	<p>Data Integrity Service: Security service that protects against unauthorized changes to data, including both intentional change or destruction and accidental change or loss, by ensuring that changes to data are detectable. A more specific service within data integrity service is a Connectionless Data Integrity Service.</p> <p>System Integrity Service: Security service that protects system resources in a verifiable manner against unauthorized or accidental change, loss or destruction.</p>	MR	MUST

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-7	<i>Privacy</i>	<p>The right of individuals to control or influence what information related to them may be collected and stored and by whom and to whom that information may be disclosed.</p> <p>N. B: Because this term relates to the rights of individuals, it cannot be very precise and its use should be avoided except as a motivation for requiring security</p>	<p>A mode of communication in which only the explicitly enabled parties can interpret the communication. This is typically achieved by encryption and shared key(s) for the cipher.</p> <p>A way to ensure that information is not disclosed to anyone other than the intended parties. Information is usually encrypted to provide confidentiality.</p>	MR	MUST
NF-Req.-8	<i>Availability</i>	Backup/restore/basic concept allowing to run software in a disaster recovery scenario (cluster).	Software design capable to ensure 24*7 availability (which means most probably also the possibility of hot-deployment)	MR, AC 1, AC 2, AC 3	MUST
NF-Req.-9	<i>Robustness</i>	<p>Since the services provided by service providers via the SPIKE platform might also be safety-critical ones (depending on the context in which they are used, maybe also services human lives may depend on) the whole platform as such has to be treated as a safety-critical subsystem! This statement will have to have impact to the whole software design process because it affects all parts of the platform.</p>	<p>Designed-in failure modes in all software components</p> <p>Malfunction of a component may not terminate the whole application and should therefore result in a notification of the user. Also, the application should be reset to a consistent state</p>	MR, AC 1, AC 2, AC 3	MUST
NF-Req.-10	<i>Usability</i>	Usability	Intuitively usable interfaces, online help available for key functionality	MR, AC 1, AC 2, AC 3	LOW

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-11	<i>Structured development</i>		Structured and well organized development environment ensuring proper testing and possibility of keeping track of all changes (incl. fallback scenarios).	MR, AC 1, AC 2, AC 3	MEDIUM
NF-Req.-12	<i>New Version</i>	SPIKE has to be developed in a manner that ensures highest stability, availability and safety. Therefore the whole software development process needs a setup that ensures state of the art software engineering basics.	All changes of a new version of SPIKE compared to an existing one have to be tracked by the system in order to keep control for the testers (to be able to adopt test cases and testing itself), for the maintenance team etc.	MR, AC 1, AC 2, AC 3	FUTURE
NF-Req.-13	<i>Deployment Process</i>		Deployment process for new software versions has to ensure that in case of problems with new version the step back to the existing version is possible	MR, AC 1, AC 2, AC 3	FUTURE
NF-Req.-14	<i>Runtime Environment</i>		Deployment process has to ensure that no unintended changes in the runtime environment are possible.	MR, AC 1, AC 2, AC 3	MEDIUM
NF-Req.-15	<i>Comparison of Versions</i>		Procedures need to be in place to support automatic comparison of software versions (e.g. runtime with test environment etc.)	AC 2	MEDIUM
NF-Req.-16	<i>SPIKE Software Design</i>		Software design (especially for all interfaces but also for other software components) has to be verified by a structured Review Process as well as also the software code itself has to be reviewed accordingly (both to be planned and reflected in the Quality Management Plan).	AC 2	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-17	<i>Professional Test Environment</i>		Professional Test Environment has to be in place and controlled procedure for the transport of versions between different environments (e.g. from Test Environment to Production Environment etc.) is also necessary. Testing it has to be planned (not only intuitive testing but creation/execution of documented Test Cases etc.) and performed properly as well as the detected bugs have to be managed (prioritization, controlled fixing and re-testing of bugs etc.).	MR, AC 1, AC 2, AC 3	MEDIUM
NF-Req.-18	<i>Software Design</i>		Software designers have to develop fault-tolerant designs, which will detect and compensate for software faults "on the fly". This is necessary because it is usually impossible to develop software WITHOUT any errors.	MR, AC 1, AC 2, AC 3	FUTURE
NF-Req.-19	<i>Source Code Documentation</i>		Source-Code documentation: SPIKE will be developed in cooperation between different parties and also for the future enhancements it is important that the code is readable for other programmers. Therefore the coding has to be very structured/readable and the quality of the source code commenting has to be checked!	MR, AC 1, AC 2, AC 3	MEDIUM

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-20	<i><b>Rapid Deployment</b></i>	Time to market”: one of the most significant goals of SPIKE is to ensure the setup of short term alliances (around 6 months) between different organisations.	Therefore it is obvious that the portal itself has to be designed with a very strong focus on great usability and as much as possible customisation (in best case no coding should be necessary to setup a new cooperation between two partners by outsourcing parts of the value chain). Integration of legacy applications has to be ensured by tailoring of connectors to the portal (service bus), without coding. This goes also for registering new services and definition of workflows.	AC 3	FUTURE
NF-Req.-21	<i><b>Portability</b></i>	Portability	Executable on today’s most spread platforms	AC 3	MUST
NF-Req.-22	<i><b>Marketability</b></i>	Marketability	SPIKE at the end of this project is a commercially available product	AC 3	FUTURE

Req. No.	Req. Name	Description	Implication	Reference	Importance
NF-Req.-23	<b>Documentation</b>	Ensuring user satisfaction and full utilization of the system	<p>The SPIKE system should be accompanied by user documentation for all user groups, delivered either as a common documentation set or as several separate, user-specific guides.</p> <p>The documentation should describe the main tasks the users are expected to perform with the system. It must also include relevant reference documentation for setting up and configuring the system. The format of the documentation can be either online help or electronic/paper manuals depending on the user and task.</p> <p>Quick guides may also be needed.</p>	AC 1	MUST
NF-Req.-24	<b>Implementation /use support</b>	Support model for implementation and use of SPIKE	For a complex system such as SPIKE, a use support function is probably needed and a model and/or documentation is needed to help customers to build support function and provide support during implementation and use of SPIKE system.	AC 1	LOW

Table 8-2: Non-Functional Requirements



## 9 Trial Outline

The development process within SPIKE will be characterised by deployment from its early beginning. Early deployment will provide developers with important feedback and will drive all further development. The SPIKE system will be developed in an iterative process with several development cycles giving SPIKE's user partners the opportunity to redefine their needs prior to further development as well as to evaluate the capabilities of the SPIKE platform for their individual use cases.

Two trial tests will be conducted; one for evaluation of the basic components and their interaction, and a second one in order to guarantee that feedback from the first trial phase is accurately incorporated in the final productive version of SPIKE. Problems arising during the evaluation of each trial phase are expected to be fixed in the development cycle subsequent to the trial phase. Feedback from the second trial of the integrated SPIKE platform software version will also be used to re-fine the quality of SPIKE software in order to discover required improvements to eventually prepare for market-readiness. Both trial settings will presumably be conducted in a productive environment in order to guarantee professional relevance of the final version of SPIKE.

As laid out in the Description of Work [SPIKE07], it is SPIKE's vision to research and implement a system for enterprises of all sizes to be used for realizing competitive advantage by forming business alliances. SPIKE therefore aims at supporting the following four building blocks [OeFA01]:

- networked processes: direct collaboration between partners and organisational core processes
- business bus: building alliances between partners based on a high level of standardisation
- electronic services: cooperation using standardised external services
- service integrator: building alliances using "infomediaries" within business networking

Each pilot case will provide a specific test-bed for the technology and methodology designed in the SPIKE project. The fact that user feedback is actively sought after from the earliest stages of development to its completion, makes this iterative approach best suited for SPIKE's user-centred and user-driven strategy:

- INF contributes to SPIKE mainly with pilot cases: collaboration with a partner enterprise (AIT) and developing a generic identity management service for business alliances.
- AIT contributes to the identity management service and business alliance case with INF by providing test cases for using legacy applications via the SPIKE platform.
- CIT contributes with the cases on documentation services, later extended to the "Information Hotel" as a test case for the overall collaboration capabilities of the SPIKE platform.

Consequently, two goals will have to be met by the two trials outlined below: On the one hand, SPIKE's vision as laid out in the description of work will have to be fulfilled by SPIKE's further development. On the other hand, the user requirements collected within this document are considered as an important source of input to drive SPIKE's development.

Specifically, the Description of Work [SPIKE07] lists the following characteristics which are envisioned to be implemented by SPIKE. The list below is a slightly modified version of the characteristics envisioned for SPIKE development:

- A semantically enriched service oriented infrastructure including a service bus for message and process control and semantic filtering and transformation of messages
- A collaborative process portal capturing the user's working context and seamlessly transmitting it to other applications and services according to the current workflow
- Integration of legacy systems via tailored portlets and connectors
- An easy-to-administer security infrastructure supporting the management of individual user roles

This requires generic reference processes and adaptable patterns for collaboration and value chain connection, with special attention paid to the factors “cost feasibility” and ease of deployment.

The general setup of the two trials is to establish basic platform functionality within Trial 1 and extend SPIKE's functionality towards the evaluation phase of Trial 2.

Based on the surveyed user requirements and the SPIKE vision, a preliminary version of prototype testing and trial strategy is roughly outlined below. These broadly described pilots of the SPIKE platform and their evaluation will later on be specified in the upcoming deliverables **D9.1 Trial evaluation strategy** and **D9.2 Specification of pilots**, both due at the end of M14.

## 9.1 Trial 1: Basic components

Trial 1, running from month 21 to month 25, will focus on implementing the basic functionality necessary for offering fundamental collaboration services. Its aim is to evaluate the basic components and their interaction, giving the intended audience of SPIKE a possibility to get an overview of the overall progress of the project as well as to instruct the SPIKE development team with further details about the next steps to be taken. Specifically, Trial 1 will focus on the following aspects:

- **Basic platform services.** Basic platform services include the ability to offer login and user management services, also focusing on different user roles' implementation.
- **Basic workflow operational services,** implying the possibility to import modelled workflows and execute them accordingly, by leveraging the underlying SPIKE service bus for communication purposes.
- **Basic collaboration support,** implying basic support for management of cooperations between different organisations, such as searching for partners, setup of cooperations etc.

## 9.2 Trial 2: Integrated platform

With Trial 1 of SPIKE having its main focus on the creation of basic components for the SPIKE platform, Trial 2 of SPIKE will strive towards further extending the SPIKE platform with elaborated collaboration capabilities. Doing so, it will also be assured that feedback from Trial 1 has been accurately incorporated into the further development of SPIKE. The second trial is scheduled to run from month 31 until month 34 of the SPIKE project.

One major building block of Trial 2 will consist of completing the identity management requirements as imposed by the application case "Business Alliances and Identity Management" provided by SPIKE partner INF. Specifically, major effort will be put into implementing single-sign-on techniques in order to support collaboration across application and domain boundaries.

Another major building block which is scheduled for testing during Trial 2 will be on application integration. In particular, this will focus on embrace existing applications and provide means for usage of these applications within SPIKE.

The third building block of Trial 2 will consist of evaluation of work performed for finishing the support of collaboration services. In detail, this building block of Trial 2 will focus on automatic retrieval and usage of services offered via the SPIKE platform, eventually requiring additional communication between individual portlet instances.

It is, however, important to note that development of SPIKE will not be finished after the completion of Trial 2. Instead, the outcome of the evaluation phase after Trial 2 will be used to do a final adjustment and check for compliance with the project's initial goals.

### 9.3 Evaluation of Trials

In summary, SPIKE will realise the following cases as software pilots:

- Forming a business alliance with portal-based user interfaces to legacy applications and a workflow concept
- Management of user identities in the networked enterprise
- Documentation service in support of intra-enterprise product development. This case will later on be extended to the
- Information Hotel for documentation services involving multiple participants as one potential deployment of the SPIKE platform.

These pilots will be evaluated by SPIKE's user partners for several reasons:

First, SPIKE's user partners will get the opportunity to evaluate the capabilities of the SPIKE platform for their individual appropriateness. As every user partner has a different focus regarding the capabilities of a collaboration platform, the Trials of the SPIKE platform will provide valuable input to eventually make the SPIKE platform a market-ready software bundle.

Secondly, developers will get some feedback regarding the applicability and usability of the SPIKE platform. Especially the first SPIKE pilot will certainly not offer broad and sophisticated collaboration support. However, it will present basic services and possibly some further capabilities. As we will combine and possibly enhance a number of state-of-the-art technologies to form the final SPIKE platform and since the SPIKE platform aims to be useful for enterprises of all sizes, user feedback related to the usability of SPIKE is of major interest.

Last but not least, SPIKE user partners will have the chance to provide the developers to some extent with additional requirements to be implemented for Trial 2. As the field of networked enterprises and collaboration is evolving rapidly, early user feedback and the opportunity to adjust the requirements helps the SPIKE developers to keep the SPIKE platform up-to-date and to produce an extendable collaboration tool to tackle future technological challenges.

A detailed strategy to evaluate the individual trials of the SPIKE platform is out of scope of this document as it will be accurately described in deliverable **D9.1 Trial evaluation strategy**, due at the end of M14.

## 10 Annex

## 10.1 Glossary

### Active Directory (AD)

Active Directory (™ Microsoft) is a directory service based on LDAP to manage accounts, groups, computers and domains on Windows-based platforms [MIC08]

### eDirectory

eDirectory (™ Novell Inc.) is a meta directory service based on LDAP to manage accounts, groups, computers. It is available on Windows, Unix and Linux platform [NOV08]

### Firepass

Firepass (™ Firewall Systems) is a firewall product to secure a company's intranet from the internet. Features are detection of security compliant systems, preventing infection, automatic integration with the largest number of virus scanning and personal firewall solutions in the industry, automatic protection from infected file uploads or email attachments, automatic re-routing and quarantine of infected or non-compliant systems to a self remediation network - reducing help desk calls, a secure workspace, preventing eavesdropping and theft of sensitive data, secure login with a randomized key entry system, preventing keystroke logger snooping, full integration with the FirePass Visual Policy Editor. This enables the creation of custom template policies based on the endpoints accessing a company's network and a company's security profile [FIR08]

### IDEF.x

Identity Federation Standards, released by Liberty Alliance. There are currently three standards Identify Federation Framework (allows SSO and account linking between partners), identity web services framework (allows groups of trusted partners to link to other groups and gives users control over how their information is shared) and identity services interface specifications (builds a set of interoperable services on top of identity web services framework) [LIB08]

### IDMS

Identity Management System.

### LDAP

The Lightweight Directory Access Protocol is a standardized communication protocol to access (hierarchically organized) directories; it is a small subset of the very complex X.500 protocol and was developed in 1993 (version 1). Nowadays most likely LDAP v3 is used. The communication is based on the TCP/IP network protocol [IAM08]

## **Liberty Alliance**

Liberty Alliance is a union of 170 companies for developing specifications for federated identity-management. In the beginning it envisioned to create a single comprehensive federated identity specification which resulted finally in three separate specifications which can be used independently [LIB08]

## **OASIS**

The Organization for the Advancement of Structured Information Standards is a non-profit consortium for producing e-business standards [OAS08]

## **RBAC**

Role based access control is an access concept for multi user environments. Access to resources (computers, files, services, applications etc.) is controlled by roles. A role bundles access to one or more resources mostly throughout different systems. Users can have different roles depending on their functions in an organisation [FER03].

## **SAML.x**

The Secure Assertion Mark-up Language is an XML-based authentication standard that allows a user to log on once for affiliated but separate web sites. SAML is designed for business-to-business (B2B) and business-to-consumer (B2C) transactions. It specifies three components: assertions, protocol and binding. There are three assertions: authentication, attribute, and authorization. Authentication assertion validates the user's identity. An attribute assertion contains specific information about the user. An authorization assertion identifies what the user is authorized to do [OAS08].

## **Shibboleth**

The Shibboleth System is a standards-based, open source software package for web single sign-on across or within organizational boundaries. It allows sites to make informed authorization decisions for individual access of protected online resources in a privacy-preserving manner. [SHI08]

## **SME**

Small or medium-sized enterprise

## **SPML**

The Service Provisioning Mark-up Language is an XML-based standard that facilitates the exchange of provisioning information among applications and organizations, corporations, or agencies. Provisioning, according to the technical group providing support for it, is the automation of all the steps required to manage (setup, amend, and revoke) user or system access entitlements or data relative to electronically published services [OAS08].

## **SSO**

Single Sign-On, denotes a one-time authentication mechanism to transparently use different applications and systems. [IAM08]

## **SunOne**

SunOne (™ Sun Microsystems) is a directory service based on LDAP to manage accounts, groups, computers. It is available on Solaris platform [SUN08]

## **WS-Federation**

The Web Services Federation specification is another component of the Web Services Security model that defines mechanisms to allow different security realms to federate by allowing and brokering trust of identities, attributes, authentication between participating Web services. The mechanisms defined in this specification can be used by passive and active requestors. The Web service requestors are assumed to understand the new security mechanisms and be capable of interacting with Web service providers [IBM02].

## **WS-Policy**

The Web Services Policy defines a general-purpose XML-based model and syntax that may be used to describe and communicate the policies that inhere to any Web-based service. In other words, WS-Policy assertions express the capabilities and constraints that apply to some particular Web service to which they pertain [IBM02].

## **WS-Security**

Web Services Security is a proposed IT industry standard (IBM, Microsoft, Verisign) that addresses security when data is exchanged as part of a Web service. It specifies enhancements to SOAP messaging aimed at protecting the integrity and confidentiality of a message and

authenticating the sender. WS-Security also specifies how to associate a security token with a message, without specifying what kind of token is to be used. It does describe how to encode X.509 certificates and Kerberos tickets. In general, WS-Security is intended to be extensible so that new security mechanisms can be used in the future [IBM02].

### **WS-Trust**

Web Services Trust Language is a specification that uses the secure messaging mechanisms of WS-Security to facilitate trust relationships in diverse Web service environments. WS-Trust is an integral part of the Microsoft model for a standards-based distributed identity infrastructure. WS-Trust defines a request/response process for the exchange of security tokens in Kerberos, X.509 and SAML (Security Assertion Mark-up Language). The intent is to ensure operability for the exchange of security information between different technologies, operating systems or domains. WS-Trust allows multiple security tokens to be combined, supporting identification of a service in conjunction with a separate security token for each individual subscriber. WS-Trust can supplement existing security technologies and methods [IBM02].

### **XACML**

Extensible Access Control Mark-up Language is a standard based on XML which was designed to express security policies and access rights to information for Web services, digital rights management and enterprise security applications. It was developed to standardize access control through XML so that, for example, a person can access several affiliated Web sites with a single logon [OAS08].



## 10.2 Bibliography

- [ANN07] SPIKE Annex I – “Description of Work”, 2007
- [BHO07] BHOLD Company: BHOLD Enterprise Authorization Management – Understanding BHOLD RBAC, White Paper v1.0, 2007.
- [COC98] Cockburn, A: Use case template. [http://alistair.cockburn.us/index.php/Basic\\_use\\_case\\_template](http://alistair.cockburn.us/index.php/Basic_use_case_template), 1998, last retrieved 2008-05-11.
- [CRO04] CROSSWORK project: Mission. <http://www.crosswork.info/index.php?page=mission>, 2004, last retrieved 2008-07-15.
- [DBE06] Digital Business Ecosystems Project: Introduction to the DBE for software developers. <http://www.digital-ecosystem.org/downloadfiles/The%20DBE%20for%20Software%20Developers.pdf>, 2006, last retrieved 2008-06-13.
- [ECO04] ECOLEAD project: ECOLEAD. [http://www.ve-forum.org/apps/comm.asp?\\$1=284](http://www.ve-forum.org/apps/comm.asp?$1=284), 2004, last retrieved 2008-07-15.
- [ECO04a] ECOLEAD project: ECOLEAD basic presentation. [http://www.ve-forum.org/Projects/284/Leaflet/ECOLEAD\\_basic\\_presentation.pdf](http://www.ve-forum.org/Projects/284/Leaflet/ECOLEAD_basic_presentation.pdf), 2004, last retrieved 2008-07-15.
- [ECO04b] ECOLEAD project: ECOLEAD leaflet. [http://www.ve-forum.org/Projects/284/Leaflet/ECOLEAD\\_leaflet.pdf](http://www.ve-forum.org/Projects/284/Leaflet/ECOLEAD_leaflet.pdf), 2004, last retrieved 2008-07-15.
- [FER03] Ferraiolo, David F., Kuhn, Richard D., Chandramouli, R.: Role-Based Access Control, Artech House, 2003.
- [FIR08] Firewall Systems: Firepass. <http://www.firewalls.com.au/section.asp?section=14&item=8&detailno=3>, 2008, last retrieved 2008-05-11.
- [FUS06] FUSION project: FUSION objectives. [http://www.fusionweb.org/Fusion/objectives/FUSION\\_objectives.asp](http://www.fusionweb.org/Fusion/objectives/FUSION_objectives.asp), 2006, last retrieved 2008-06-13.
- [FUS07] Fusion Project: General Project Information. [http://www.seerc.org/projects/fusion/fusion\\_project\\_flyer.pdf](http://www.seerc.org/projects/fusion/fusion_project_flyer.pdf), 2007, last retrieved 2008-06-13.
- [GLO06] Gloor, Peter A.: Swarm Creativity: Competitive Advantage Through Collaborative Innovation Networks, Oxford Univ Pr, 2006.
- [HOB95] Hobart, J.: Principles of good GUI Design. Unix Review, vol. 3, number 10, 1995. [http://www.iie.org.mx/Monitor/v01n03/ar\\_ihc2.htm](http://www.iie.org.mx/Monitor/v01n03/ar_ihc2.htm), last retrieved 2008-05-11.
- [IAM08] Identity and Access Management Wikipedia: <http://www.iam-wiki.org/>, 2008, last retrieved 2008-05-11.



- [IBM02] Web Services Security: Moving up the stack. <http://www-128.ibm.com/developerworks/library/ws-secroad/>, 2002, last retrieved 2008-05-17.
- [IST08] IST World: Cross-organisational workflow formation and enactment. <http://www.ist-world.org/ProjectDetails.aspx?ProjectId=ed40e9a653524a89a946d2f02809ce58&SourceDatabaseId=7cff9226e582440894200b751bab883f>, 2008, last retrieved 2008-06-15.
- [JOH07] Johnson J.: GUI Bloopers 2.0: Common User Interface Design Don'ts and Dos, 2nd edition, Morgan Kaufmann, 2007
- [KUP06] Kuppinger M.: Die Renaissance des Rollenmanagements. [http://www.kuppingercole.de/articles/renaissance\\_rolle](http://www.kuppingercole.de/articles/renaissance_rolle), 2006, last retrieved 2008-05-17.
- [LIB08] Liberty Alliance: <http://www.projectliberty.org>, 2008, last retrieved 2008-05-11.
- [LIP94] Lipnack J., Stamps J.: The age of the Network – Organizing principles for the 21<sup>st</sup> century, John Wiley & Sons, 1994.
- [LIP97] Lipnack J., Stamps J.: Virtual Teams – Reaching across space, time and organizations with technology, John Wiley & Sons, 1997.
- [MIC08] Microsoft Corporation: <http://www.microsoft.com>, 2008, last retrieved 2008-05-11.
- [NOV08] Novell, Inc.: <http://www.novell.com>, 2008, last retrieved 2008-05-11.
- [OAS08] Organization for the Advancement of Structured Information Standards: <http://www.oasis-open.org/home/index.php>, 2008, last retrieved 2008-05-11.
- [OBI07] Obiltschnig, A.: Role-based Provisioning - Ein praktischer Ansatz im Identity Management, Institute for Applied Computer Science, Faculty for Technical Sciences, University of Klagenfurt, 2007.
- [OEF01] Österle, H., Fleisch, E. and Alt, R.: Business Networking - Shaping Collaboration between Enterprises, Springer Verlag, 2001.
- [RAV96] Ravi S. et.al: Role-Based Access Control Models, IEEE Computer, Volume 29, No. 2, Feb. 1996.
- [SCH08] Schmelmer M.: Infineon setzt bei IT auf Einsparungen. <http://www.cio.de/strategien/methoden/850789/index.html>, 2008, last retrieved 2008-06-25.
- [SCH05] Schlegelmilch J., Steffens U.: Role mining with ORCA, Proceedings of the tenth ACM symposium on Access control models and technologies, 2005.
- [SHI08] The Shibboleth System: <http://shibboleth.internet2.edu/>, 2008, last retrieved 2008-05-17.
- [SKY07] Skyrme D.: Insights. <http://www.skyrme.com/insights/>, 2007, last retrieved 2008-05-14.

- [SOM92] Sommerville I.: Software Engineering, Addison-Wesley Publ. Company, 4<sup>th</sup> edition, Reading, Mass., 1992.
- [STA06] STASIS project: STASIS Overview. <http://www.stasis-project.net/about/home.cfm>, last retrieved 2008-06-23.
- [STA07] Stallings W.: Understanding federated identity. <http://www.networkworld.com/news/tech/2007/090307techupdate.html?page=1>, 2007, last retrieved 2008-05-12.
- [STA07a] STASIS project: Deliverable D2.1 - Vision and Technical Consensus Statement. [http://www.stasis-project.net/downloads/files/STASIS\\_D21.doc](http://www.stasis-project.net/downloads/files/STASIS_D21.doc), 2007, last retrieved 2008-06-13.
- [STA07b] STASIS project: Deliverable D2.2.4 - Requirements Report. [http://www.stasis-project.net/downloads/files/STASIS\\_D224.doc](http://www.stasis-project.net/downloads/files/STASIS_D224.doc), 2007, last retrieved 2008-06-13.
- [SUN08] Sun Microsystems: <http://www.sun.com>, last retrieved 2008-05-15.
- [TID05] Tidwell J.: Designing Interfaces: Patterns for Effective Interaction Design, O'Reilly Media, Inc., 2005.
- [TOG08] Tognazzi B.: First Principles of Interaction Design. <http://www.asktog.com/basics/firstPrinciples.html>, last retrieved 2008-05-15.
- [TRU04] TrustCoM project: About the project. <http://www.eu-trustcom.com>, 2004, last retrieved 2008-07-18.
- [TRU04a] TrustCoM project: Results. [http://213.27.211.106/trustcom/?page\\_id=10](http://213.27.211.106/trustcom/?page_id=10), 2004, last retrieved 2008-07-18.
- [TRU04b] TrustCoM project: Deliverable 3 – Case Study Scenarios. <http://213.27.211.106/trustcom/wp-content/uploads/2007/08/d3+case+st.pdf>, 2004, last retrieved 2008-07-18.
- [WIG03] Wiegers, Karl E.: Software Requirements, 2<sup>nd</sup> Edition, Microsoft Press, Red., 2003.
- [WIN05] Windley, Phillip J.: Digital Identity – Unmasking Identity Management Architecture, O'Reilly Media, Inc., August 2005.

## 10.3 Blocked Invoices Process

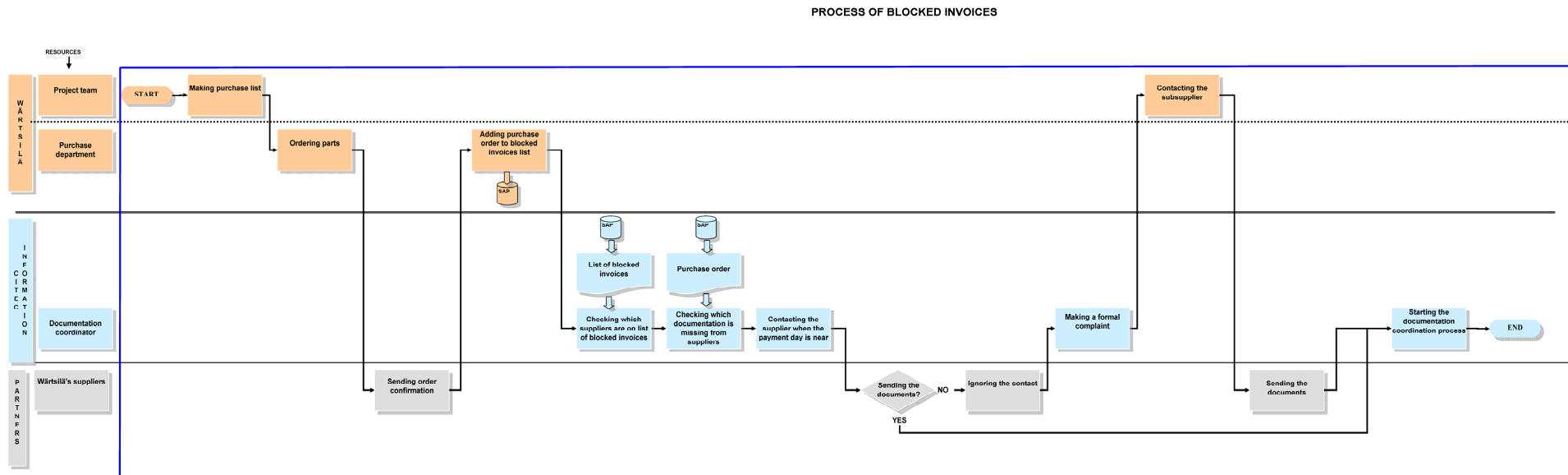


Figure 10-1: Blocked Invoices Process

## 10.4 Effective Document Control Process

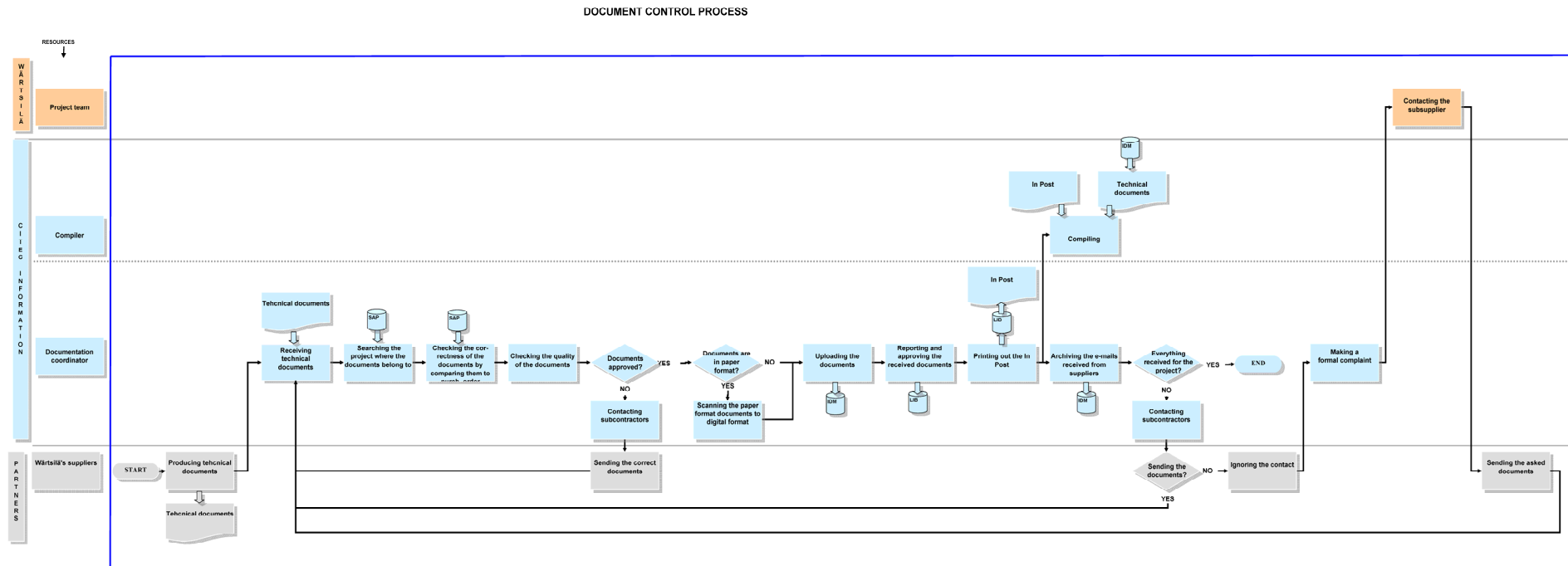


Figure 10-2: Effective Document Control Process

## **10.5 List of participants of the SPIKE user requirements survey**

Active Endpoints (2nd Avenue Waltham, MA 02541 USA, Larry Mikulski)  
allproducts.info IT solutions GmbH (Lakeside B01, 9020 Klagenfurt, Austria, Mr. Anton Trapp)  
Astrum IT GmbH (Erlangen)  
Berger-Münch Project Management AG (Weißenburgstr. 25, 93055 Regensburg, Germany, Harald Berger-Münch, Vorstand)  
BSC Presov spol. s r.o. (Reimannova 9, 080 01 Presov, Slovakia)  
Berlinger System Engineering GmbH (Hans Sachs Straße 9, 9020 Klagenfurt, Martin Reichmann, m.reichmann@berlinger.cc)  
CONCEPTNET GmbH (Bruderwoehrstr. 15b, 93055 Regensburg, Mr. Roland Wurm)  
Covidien Deutschland GmbH (Gewerbepark 1; 93333 Neustadt, Germany, Werner Hanneschläger)  
CS Result GmbH (Bischof-von-Henle Str. 2 D-93051 Regensburg, Heiko Müller)  
Dallmeier electronic GmbH & Co.KG (Cranachweg 1, 93051 Regensburg, Herbert Kehrls, herbert.kehrls@dallmeier-electronic.com)  
ilogs information logistics GmbH (Feldkirchner Str. 140, 9020 Klagenfurt)  
initPRO GmbH (Bruderwoehrstr. 15b, 93055 Regensburg, Norbert Jungbauer)  
iNTENCE Automotive electronics GmbH (Bruderwöhrdstr. 15b, 93055 Regensburg, Peter Schmidt)  
InterSoft, a. s. (Florianska 19, 04001, Kosice, Slovakia, Martin Tomasek)  
Josef Witt GmbH (Schillerstr. 4-12, 92637 Weiden, Germany, Thomas Schertel)  
OPTITOOL GmbH (Bruderwöhrdstr. 15b, 93055 Regensburg, Dr. Josef Rackl)  
otms s.r.o. (Hurbanova 32, 040 01 Kosice, Ing.Katarina Chlebova, 00421905458548)  
priorIT EDV-Dienstleistungen GmbH (Kohldorferstr. 98, 9020 Klagenfurt, Franz Benjamin Nässler)  
PROSOT Ltd. (Letna 27, 040 01 Kosice, Pavol Jesensky)  
Raiffeisenbank Cham-Roding-Furth im Wald eG (Schwanenstraße 17-19, 93413 Cham, Germany, Christian Mühlbauer)  
Research Studios Austria Forschungsgesellschaft mbH (Leopoldskron Str. 30, 5020 Salzburg, Austria, Christoph Dicklberger)  
Scheu + Wirth TGA u. Service GmbH (Dr. Gessler Str. 43, 93051 Regensburg, Peter Eibl)  
Kinetiq GmbH (Bruderwöhrdstraße 15b, 93055 Regensburg, Christian Vogl)  
meiller direct GmbH (Gutenbergstr. 1-5, Schwandorf, Germany)  
VSE a.s. (Mlynska 31, Kosice, Juraj Sabol)



## 10.6 Questionnaire from the SPIKE user requirements survey

### SOFTWARE REQUIREMENTS



SPIKE is a Research and Development Project promoted by the 7th Framework programme of the EU, Information and Communication Technologies.

Purpose of SPIKE is to develop a software service platform for an easy and fast start-up of virtual business alliances.

SPIKE focuses on Secure Process-oriented Integrative Service Infrastructure for Networked Enterprises.

Goals of the project are for example:

- \* enabling outsourcing of parts of the value chain to business partners
- \* achieving interoperability and integration between organisations of all size
- \* simplifying collaboration between the members of participating organisations

The survey will be subdivided in six sections and every section contains a battery of questions. If somebody was not very versed in one of the fields, the section could be skipped. The items are also optional and not required.

Point 1 deal with general questions on the company and its IT-strategy while Point 2 contains questions on cooperation/collaboration with other companies, on projects, and collaboration platforms. Here too we have the option of finding out whether these technologies provide genuine improvement opportunities which may be taken by the companies in question.

Point 3 deals with the company's security domain.

Point 4 and 5 contain questions on the implementation of service oriented architecture (SOA) and business process management (BPM) software in companies. Here we try to find out whether SOA and BPM-Software are relevant for companies, or are these technologies considered as nothing more than a temporary fashion. Additionally, we ascertain which specific objectives and expectations relating to SOA and BPM are set by companies interested in applying these technologies.



Within Point 6 additional comments, requests, and feedback may be posted.

## I. ABOUT YOU AND YOUR COMPANY

### GENERAL COMPANY DATA

PLEASE STATE DATA BELOW:

COMPANY NAME

ADDRESS

BRANCH

CONTACT PERSON

1. WHAT IS YOUR POSITON IN THE COMPANY?

2. HOW MANY EMPLOYEES DOES YOUR COMPANY HAVE?

- ☐ LESS THAN 10
- ☐ 11 – 50
- ☐ 51 – 100
- ☐ 101 – 500
- ☐ MORE THAN 500
- ☐ OTHER:

3. WHAT LANGUAGE OR LANGUAGES DO YOU PERFER WHEN VISITING WEB SITES?

## **II. GENERAL QUESTIONS ON COOPERATIONS WITH OTHER COMPANIES, PROJECTS iN COLLABOATION PLATFORMS**

4. HOW LONG HAS THE AVERAGE PROGRAM DURATION OF YOUR PROJECTS IN COLLABORTION WITH OTHER COMPANIES SET UP SO FAR BEEN?

- ☐ UNDER 3 MONTHS
- ☐ 4 TO 6 MONTHS
- ☐ 7 TO 12 MONTHS
- ☐ 1 TO 2 YEARS
- ☐ MORE THAN 2 YEARS
- ☐ DO NOT KNOW

5. WHO WAS YOUR PROJECT MANAGER?

- ☐ A PROVIDER'S SOFTWARE CONSULTANT
- ☐ AN EXTERNAL CONSULTANT
- ☐ AN IN-HOUSE USER/CONSULTNT
- ☐ IT PERSONNEL
- ☐ DO NOT KNOW
- ☐ OTHER:

6. DURING THE PAST 12 MONTH, DID YOU COOPERATE WITH ANY OTHER COMPANIES WHERE IT WOULD HAVE BEEN HELPFUL...

- ☐ ...IF YOU HAD ACCESS TO THE COMPANY'S DATA?
- ☐ ...IF YOU HAD ACCESS TO THE COMPANY'S PROGRAMS?
- ☐ ...IF A WORKFLOW WERE TO BE EXPEDITIOUSLY REPRESENTED VIA WEB SERVICES INCLUDING EXISTING IT SYSTEMS
- ☐ ... DO NOT KNOW
- ☐ OTHER:

7. ARE YOU CURRENTLY WORKING WITH A COLLABORATION SYSTEM?

- ☐ YES
- ☐ NO
- ☐ DO NOT KNOW

8. ARE YOU SATISFIED WITH EXISTING COLLABORATION SYSTEM?

- ☐ WE DO NOT HAVE ANY COLLABORATION SYSTEM
- ☐ YES
- ☐ NO

9. IF NOT, NOT PLEASE STATE WHY:

10. IN WHICH PORTAL-BASED SERVICES ARE YOU INTERESTED?

PLEASE RATE EACH FACTOR ON A 5 POINT SCALE.

1 – NOT USEFUL. THIS IS TOTALLY IRRELEVANT TO THE NEXT HIGHER-LEVEL FACTOR.

2 – MARGINALLY USEFUL. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY NOT MORE THAN 10%.

3– MODERATELY USEFUL. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 10-25%.

4– EXTREMELY USEFUL - THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 25-75%%.

5 – BLOCKBUSTER. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY MORE THAN 75%%.

	1	2	3	4	5
REDUTION OF CYCLE TIMES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REDUTION OF ERROR RATIOS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOWNSIZING OF PROCESSES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IMPROVEMENT OF BUSINESS / IT ALIGNMENTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DO NOT KNOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 11. IN WHICH APPLICATION MODULES ARE YOU INTERESTED?

PLEASE RATE EACH FACTOR ON A 5 POINT SCALE.

1 – NOT INTERESTED. THIS IS TOTALLY IRRELEVANT TO THE NEXT HIGHER-LEVEL FACTOR.

2 – MARGINALLY INTERESTED. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY NOT MORE THAN 10%.

3– MODERATELY INTERESTED. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 10-25%.

4– EXTREMELY INTERESTED - THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 25-75%%.

5 – BLOCKBUSTER. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY MORE THAN 75%%.

	1	2	3	4	5
GROUPWARE (EMAIL, CALENDAR)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WORKFLOW MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOCUMENT MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
USER MANAGEMENT:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 12. WHICH FEATURES ARE VERY IMPORTANT FOR YOU?

PLEASE RATE EACH FACTOR ON A 5 POINT SCALE.

1 – NOT IMPORTANT. THIS IS TOTALLY IRRELEVANT TO THE NEXT HIGHER-LEVEL FACTOR.

2 – MARGINALLY IMPORTANT. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY NOT MORE THAN 10%.

3– MODERATELY IMPORTANT. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 10-25%.

4– EXTREMELY IMPORTANT - THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 25-75%%.

5 – BLOCKBUSTER. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY MORE THAN 75%%.

	1	2	3	4	5
AUTHENTICATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SSO – SINGLE SIGN ON	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOCUMENT TRANSFER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOCUMENT ENCRYPTION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ARCHIVE FUNKTIONS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

VERSION MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DATA SYNCHRONIZATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TAGS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEARCH FACILITIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
APPOINTMENT AND REMINDER SERVICE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EVENT NOTIFICATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ONLINE SURVEYS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MOBILE ACCESS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DISCUSSION FORUMS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COMMUNITIES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BLOGS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NO IDEA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 13. HOW DO YOU USE THE PLATFORM?

- ☐ For sharing information with suppliers
- ☐ For sharing information with customers
- ☐ Do not know:
- ☐ OTHER:

### 14. ARE THERE ANY REQUIREMENTS NEEDED BY YOUR COOPERATION PARTNER TO YOUR IT INFRASTRUCTURE?

- ☐ YES
- ☐ NO

☐ DO NOT KNOW

15. IF YOU CHECK YES, PLEASE STATE WHICH:

16. PLEASE DESCRIBE YOUR GENERAL OPINION ON AND YOUR EXPERIENCE WITH COLLABORATION PLATFORMS AND POTENTIAL FORMS OF COLLABORATION IN A FEW SENTENCES:

### III. SECURITY QUESTIONS

17. DO YOU PROVIDE A CENTRAL SYSTEM FOR AUTHENTICATION AND AUTHORIZATION?

- ☐ YES
- ☐ NO
- ☐ DO NOT KNOW

18. PLEASE DESCRIBE THE SYSTEM USED.

19. IMAGINE THE SITUATION THAT YOU ARE COOPERATING WITH ANOTHER COMPANY USING A COLLABORATION PLATFORM. HOW WOULD YOU RATE?

PLEASE RATE EACH FACTOR ON A 5 POINT SCALE.

1 – NOT IMPORTANT. THIS IS TOTALLY IRRELEVANT TO THE NEXT HIGHER-LEVEL FACTOR.

2 – marginally important. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY NOT MORE THAN 10%.

3– MODERATELY IMPORTANT. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 10-25%.

4– EXTREMELY IMPORTANT - THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 25-75%%.

5 – BLOCKBUSTER. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY MORE THAN 75%%.

	1	2	3	4	5
THE IMPORTANCE FOR SECURITY TO PREVENT					
UNAUTHORIZED ACCESS TO YOUR DATA?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANONYMITY REQUIREMENTS IN SUCH A SETTING?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
THE NEED FOR AVAILABILITY OF THE PLATFORM?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
THE INTEGRITY OF THE DATA EXCHANGED ON SUCH A					
PLATFORM?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
THE IDENTIFICATION AND AUTHENTICATION OF COMMUNICATING					
PARTIES?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
THE IMPORTANCE TO BE ABLE TO SET A PRIVACY USING					
A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



COLLABORATION LEVEL OF SERVICES OFFERED PLATFORM, SO PARTIES CAN  
NOT GAIN KNOWLEDGE ABOUT YOUR THAT UNAUTHORIZED THIRD SERVICES  
OFFERED?

20. ARE THERE OTHER POSSIBLE SECURITY REQUIREMENTS WHEN  
COLLABORATING USING A PLATFORM OVER THE INTERNET WHICH HAVE NOT  
BEEN MENTIONED SO FAR?

- ☐ YES
- ☐ NO
- ☐ DO NOT KNOW

21. PLEASE SPECIFY:

22. WHICH METHODS OF AUTHENTICATION DOES YOUR ORGANISATION  
CURRENTLY USE?

- ☐ PASSWORD-BASED
- ☐ BASED UPON BIOMETRIC CHARACTERISTICS NO
- ☐ POSSESSION-BASED, I.E. HARDWARE TOKENS
- ☐ DO NOT KNOW
- ☐ OTHER:

**IV. INFORMATION ON THE APPLICATION OF SERVICE ORIENTED ARCHITECTURE  
(SOA) IN YOUR COMPANY**

SERVICE ORIENTED ARCHITECTURE (SOA) IS A COMPUTER SYSTEMS ARCHITECTURAL STYLE FOR CREATING AND USING BUSINESS PROCESSES, PACKAGED AS SERVICES, THROUGHOUT THEIR LIFECYCLE.

SOA ALSO DEFINES AND PROVISIONS THE IT INFRASTRUCTURE TO ALLOW DIFFERENT APPLICATIONS TO EXCHANGE DATA AND PARTICIPATE IN BUSINESS PROCESSES. THESE FUNCTIONS ARE LOOSELY COUPLED WITH THE OPERATING SYSTEMS AND PROGRAMMING LANGUAGES UNDERLYING THE APPLICATIONS. (NEWCOMER, ERIC; LOMOW, GERG, 2005) SOA SEPARATES FUNCTIONS INTO DISTINCT UNITS (SERVICES), WHICH CAN BE DISTRIBUTED OVER A NETWORK AND CAN BE COMBINED AND REUSED TO CREATE BUSINESS APPLICATIONS.(A B C BELL, MICHAEL, 2008)

23. HOW WOULD YOU DESCRIBE YOUR KNOWLEDGE ABOUT SOA?

- ☐ EXPERT
- ☐ GOOD
- ☐ BASIC
- ☐ NONE
- ☐ DO NOT KNOW

24. HOW BIG IS THE IMPORTANCE TO SOA IN YOUR COMPANY?

- ☐ PRIME
- ☐ GREAT
- ☐ AVERAGE
- ☐ LITTLE
- ☐ BARELY
- ☐ DO NOT KNOW

25. WHICH OF THE FOLLOWING STRATEGIC GOALS DO YOU PURSUE BY IMPLEMENTING SOA? MULTIPLE ANSWERS ARE PERMITTED

- ☐ ACHIEVE COMPLIANCE
- ☐ GAIN MORE FLEXIBILITY
- ☐ HIGHER LEVEL OF INNOVATION
- ☐ PUSH DECISIONS
- ☐ COST REDUCTION
- ☐ ENHANCE CUSTOMER SATISFACTION
- ☐ RISE IN PRODUCTIVITY
- ☐ IMPROVEMENT OF QUALITY
- ☐ INCREASE OF INTEREST MARGIN
- ☐ DO NOT KNOW
- ☐ OTHER:

26. POSSIBLE APPLICATIONS FOR SOA WITHIN YOUR COMPANY? MULTIPLE ANSWERS ARE PERMITTED

- ☐ IT
- ☐ CUSTOMER SERVICE
- ☐ SALES AND DISTRIBUTION
- ☐ PURCHASING
- ☐ FINANCES
- ☐ ENHANCE CUSTOMER SATISFACTION
- ☐ OTHER:

## 27. WHICH TECHNOLOGIES DO YOU USE, OR WOULD YOU LIKE TO USE WITH REGARDS TO SOA IN YOUR COMPANY?

PLEASE RATE EACH FACTOR ON A 5 POINT SCALE.

1 – NOT IMPORTANT. THIS IS TOTALLY IRRELEVANT TO THE NEXT HIGHER-LEVEL FACTOR.

2 – MARGINALLY IMPORTANT. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY NOT MORE THAN 10%.

3– MODERATELY IMPORTANT. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 10-25%.

4– EXTREMELY IMPORTANT - THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 25-75%%.

5 – BLOCKBUSTER. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY MORE THAN 75%%.

	1	2	3	4	5
.NET REMOTING	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COM/DCOM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
J2EE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CORBA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WEB-SERVICES, EG. SOAP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DO NOT KNOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## V. OPERATION OF BUSINESS PROCESS MANAGEMENT (BPM) SOFTWARE

BUSINESS PROCESS MANAGEMENT (BPM) IS A SYSTEMATIC APPROACH TO IMPROVING AN ORGANIZATION'S BUSINESS PROCESSES. BPM ACTIVITIES SEEK TO MAKE BUSINESS PROCESSES MORE EFFECTIVE, MORE EFFICIENT, AND MORE CAPABLE OF ADAPTING TO AN EVER-CHANGING ENVIRONMENT.

28. HOW WOULD YOU DESCRIBE YOUR KNOWLEDGE ABOUT BPM IN YOUR COMPANY?

- ☐ EXPERT
- ☐ GOOD
- ☐ BASIC
- ☐ NONE
- ☐ DO NOT KNOW

29. WHAT ARE YOUR CIRCUMSTANCES CONSIDER USING BPM SOFTWARE?

- ☐ GENERAL INTERESTS
- ☐ SPECIFIC PROBLEM WITHOUT A PROJECT
- ☐ SPECIFIC PROBLEM IN A CURRENT PROJECT
- ☐ PRODUCT RESEARCH FOR A PROJECT
- ☐ DO NOT KNOW
- ☐ OTHER:

30. IN WHICH DEPARTMENTS OF YOUR COMPANY WOULD YOU USE BPM SOFTWARE?

- ☐ MANAGEMENT
- ☐ SALES AND MARKETING
- ☐ PRODUCTION AND LOGISTIC
- ☐ FINANCE AND CONTROLLING
- ☐ IT

- ☐ HUMAN RESOURCES
- ☐ DO NOT KNOW
- ☐ OTHER:

### 31. WHAT TOPICS CHARACTERIZE YOUR CURRENT INTEREST AND RESPECTIVELY YOUR PROBLEM OR PROJECT GOALS?

PLEASE RATE EACH FACTOR ON A 5 POINT SCALE.

1 – NOT USEFUL. THIS IS TOTALLY IRRELEVANT TO THE NEXT HIGHER-LEVEL FACTOR.

2 – MARGINALLY USEFUL. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY NOT MORE THAN 10%.

3– MODERATELY USEFUL. THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 10-25%.

4– EXTREMELY USEFUL - THIS COULD INCREASE (OR DECREASE) THE NEXT HIGHER-LEVEL FACTOR BY 25-75%%.

	1	2	3	4	5
TRANSPARENCY USING DOCUMENTED PROCESSES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REDUCTION OF CYCLE TIMES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
REDUCTION OF ERROR RATIOS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STANDARDISATION OF PROCESSES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOWNSIZING OF PROCESSES	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IMPROVEMENT OF BUSINESS / IT ALIGNMENTS:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHERS:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DO NOT KNOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**VI. ADDITIONAL****32. ADDITIONAL COMMENTS****33. WOULD YOU LIKE TO RECEIVE MORE DETAILED INFORMATION ON THE  
MATTER OF COLLABORATION PLATFORMS?**

IN THIS CASE, YOU CAN SUBSCRIBE TO THE SPIKE NEWSLETTER BY ENTERING YOUR EMAIL  
ADDRESS BELOW. THE SPIKE NEWSLETTER WILL PROVIDE YOU WITH INFORMATION ABOUT THE  
STATE OF DEVELOPEMENT OF THE SPIKE PLATFORM FREE OF CHARGE.

IF YOU WANT A COPY OF YOUR COMPLETET QUESTIONNAIRE, PLEASE PRINT IT OUT NOW.

AFTER PRESSING THE 'SUBMIT SURVEY' BUTTON YOU WILL NOT HAVE ACCESS TO THE  
QUESTIONNAIRE ANY LONGER