Service Level Agreements in Municipal IT Dependability Management

Kim Weyns
Department of Computer Science,
Lund University,
Box 118, S-221 00 Lund, Sweden
kim.weyns@cs.lth.se

Martin Höst
Department of Computer Science,
Lund University,
Box 118, S-221 00 Lund, Sweden
martin.host@cs.lth.se

***Abstract*—Service Level Agreements (SLA) are considered a good practice not only for IT outsourcing but also for IT management within an organisation. In this paper we study the usage of SLAs in municipal IT management. Municipal IT management traditionally involves a large organisation, often with a low IT maturity, but with high requirements on software quality and information security. In this study, a series of interviews was conducted with IT managers from a number of Swedish municipalities which shows a need for more support for municipalities trying to write and improve their SLAs. Based on a number of SLAs collected, this study proposes a specific SLA template for municipal IT management that focuses especially on information security issues. In a final step, the proposed template was evaluated in a focus group meeting with practitioners from Swedish municipalities.**

I. Introduction

In most large organisations, the responsibility for servicing the IT systems lies with someone else than the users of the system. IT management can either be centralized to a special IT department or outsourced to an IT service supplier. This way IT services can be used more effectively because of rationalizations and since competence can be centralized [1], [2]. Because the IT services are provided by someone else than the organization using the systems, there is a need to negotiate the quality levels for these services. Aspects like which IT services should be provided by the IT organization, their cost, availability and so on need to be explicitly agreed upon. This type of agreement is often documented in a Service Level Agreement (SLA), a written contract between the organization using the IT system and the IT management organization [3].

SLAs can be written both between different organizations, i.e. when an organization outsources IT management to an external contractor, and within an organization between the organisations own IT department and the rest of the organisation [1]. In the former case, the focus of the SLA is on the contractual elements and this use of SLAs has been discussed in detail by Goo [4]. In the latter case, the main goal of the SLA is to function as a communication tool between the different partners, especially concerning the responsibilities and the quality of the IT services offered by the IT department. This latter use of SLAs is the focus of this study.

When an SLA is written this is done in a negotiation between the different parties. In this process, support is needed concerning which quality aspects of the IT services to include in the SLA [5]. There is a need to define templates for SLAs which can be adapted to different situations [3], more specific than the general guidelines on SLAs offered by frameworks such as ITIL [1], COBIT [6] or ISO 20000:4 [7]. Outsourcing requires a different kind of SLA than for the management of in-house IT services [8]. Also, the content of the SLA depends on the type of the organisation and the role of IT systems within the organisation. In this paper, an SLA template is proposed especially for municipalities where IT services are provided by an internal IT department. Municipalities, especially in Sweden where this research was conducted, are typically very large organisations with many different types of IT systems. Many of these IT systems are not only critical to the organisation itself, but support critical functions in our modern society such as social services and education. Further municipalities also have an active role in the emergency management procedures during and after a crisis. This poses special requirements on the services provided by a municipality and therefore on the IT systems it needs to provide these services. Therefore the template proposed in this paper focuses especially on business continuity and information security issues.

This paper presents the result of a research initiative where the literature on SLAs was surveyed, and a set of already developed SLAs was investigated in order to define a first version of an SLA template specially directed at municipalities. The template was further based on an interview study concerning the current SLA practices used by the municipalities in southern Sweden. This template was then evaluated at a focus group meeting with representatives from the IT departments in 6 Swedish municipalities.

Section II first discusses some related work, both on the topic of SLAs and on IT management challenges for municipalities. Secondly, an overview of the research methodology used during this study is presented in Section III and more details of the data collection are discussed in Section IV. Next, the main contribution of this paper, the proposed SLA template, is presented in Section V. Section VI focuses on the details of the evaluation of this template. Finally, the main results and the limitations of this study are discussed in Section VII.

II. Related Work

A. Service Level Agreement

Although the usage of service level agreements is a well-established practice in IT management, few scientific articles

have been published that study the actual contents of SLAs. Goo [4] has studied the use of SLAs as part of outsourcing contracts. Their study of several SLAs used in practice also resulted in a proposed structure for service level agreements used in outsourcing. Trienekens et al. [5] discuss the different aspects of SLA specification and some common problems associated with this process.

ITIL [1] has been an important factor in the spreading of service level agreements. ITIL defines both service level agreements (SLA) and operational level agreements (OLA). The difference is that an SLA is an agreement between an IT supplier and customer and an OLA is an agreement between different IT units within the same organisation. Although service management is central in ITIL, ITIL does not define explicitly which elements should be included in an SLA or OLA.

One way to make Service Level Agreements more concrete is to integrate them with the Enterprise Architecture as has been proposed by Correia and Abreu [9]. This leads to a more formal description of the SLA, more suited for the technical aspects of IT management. However, this does not cover the organisational issues associated with service level agreements that are the focus of this study.

Service level agreements are not only restricted to IT services but can also be used to specify other types of services. For example, the use of SLAs in hospitals has been investigated in a number of studies [10], [11]. They conclude that the usage of SLAs has a positive influence in an organisation both on the services provided and on the administration of those services.

The practical SLA management process in four companies has been studied by Kajko-Mattsson and Makridis [3]. They also propose a simplified management process based on their findings and the processes defined in ITIL [1] and COBIT [6]. However, their framework focuses only on the process of writing the SLA, not on the actual contents of the SLA.

One field of research focuses especially on the process of writing SLAs, for example with the help of the SEAM method from the field of Requirements Engineering [12].

B. IT Dependability Management for Governmental Actors

This study of service level agreements is part of a larger project studying the IT dependability management at governmental actors. Earlier studies [13] have identified a series of common problems in this field, directly related to communication problems between IT personnel and the rest of the organisation. The IDEM3 maturity model has been proposed as a process improvement framework for IT dependability management [14]. One of the attributes of the maturity model is the use of service level agreements.

Li Helgesson [15] also proposed Service Level Agreements as an important tool in risk management at public service organisation. The template developed in this study also focuses especially on information security and risk management activities.

III. Research Methodology

The SLA template discussed in this paper is the result of a research study conducted in four steps as presented in Figure 1. The goal of this study was both to better understand the way service level agreements are used in practice today at Swedish municipalities and to develop a template to help these municipalities to write and improve their SLAs. To achieve this goal, first some data about current SLA practices and SLA templates was collected. Secondly, the data was analysed and processed resulting in the first version of the SLA template. This version was then evaluated at a focus group meeting resulting in the final version of the template presented in this paper. For the planning of the research, for the interview study, and for the focus group meeting with the final questionnaire the methodology as described by Robson [16] was used. Each of these steps is further elaborated upon in the next sections.

IV. Data Collection

In a first phase of this study, to better understand the need and the possible contents of an SLA template, data was gathered from 4 different sources: from the research literature on SLAs, through interviews with IT managers of Swedish municipalities, from service level agreements collected from Swedish municipalities and from Service level agreements available online.

A. Research literature

As described in Section II-A, few scientific articles are available on the actual contents that can be found in a service level agreement. Concerning SLAs for outsourcing, Goo [4] has studied several SLAs and defined a general structure of an SLA. Their study identified 11 contractual elements, divided over three categories: Foundation characteristics, Change management characteristics and Governance characteristics. These categories and subcategories were also used in the analysis of the gathered service level agreements.

B. Interviews with IT managers of Swedish municipalities

Over a period of a few weeks, telephone interviews were conducted with 22 IT managers or Chief Information Officers (CIO) from Swedish municipalities concerning their experiences with service level agreements. Together these 22 IT managers cover 25 out of 33 municipalities in Skåne, Sweden's most southern region, as three of these CIOs each represented two municipalities that shared their IT services. In the remaining 8 municipalities in Skåne the CIO could not be reached or did not wish to take part in the study. This region was selected because of convenience because in the next phase of this study, the interested CIOs were invited to take part in a focus group meeting concerning SLAs as described in the next sections.

The interviews were conducted over the telephone by the first author of this paper. The interviews first used some open questions about the municipalities experience with SLAs and concluded with some more specific questions depending on the municipalities experience with service level agreements. For the preparation of the interview questions and for the actual interviews, the methodology of semi-structured interviews as described by Robson [16] was used.

Of the 22 interviewed CIOs, 10 were currently using internal SLAs. Of these 10, 6 were currently completely reworking their SLAs because of important changes in their

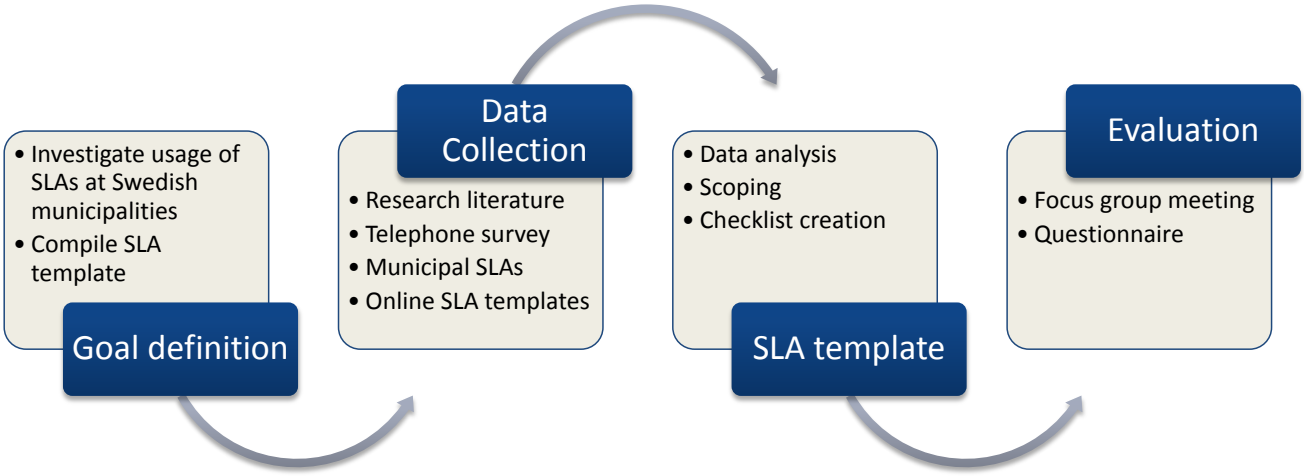

Fig. 1. Overview of the research steps taken in the study described in this paper.

IT management processes. Of the 12 municipalities that were currently not using SLAs in their IT management, 4 were currently in the process of writing SLAs and another 3 municipalities had long term plans to start using SLAs, 1 municipality had completely outsourced their IT management, and 4 had no interest in using SLAs in the near future. In total, this means that there were 10 out of 22 municipalities actively working with writing or rewriting their SLAs, which further shows the current need for more research on Service Level Agreements.

In all municipalities with some experience with SLAs, the initiative for introducing SLAs came from the IT unit and not from the users. The most important reasons for using SLAs were to standardize the IT services offered by the IT unit and to clearly define the scope and responsibilities for the IT services. There were large differences in how SLAs were being used, but smaller municipalities tended to have one or a few SLAs for the complete organisation, while larger municipalities often had separate SLAs for every system or service.

Many municipalities had experienced difficulties in writing effective SLAs and actively sought practical guidelines or templates for writing SLAs. When introducing SLAs, most municipalities had relied on some experiences from neighbouring municipalities, but there was no organized regional cooperation on service level agreements as there was on some other IT management issues.

C. Service level agreements from Swedish municipalities

Of the interviewed municipalities, four contributed their internal service level agreements to this study. The elements in these service level agreements were categorized based on the categories proposed by Goo [4]. Further, all specific metrics and service levels were extracted from each service level agreement.

Of these 4 service level agreements, one was little more than an agreed price list and budget for the IT services provided. The three other documents were true service level agreements. The only elements from the categorization from Goo [4] that were present in all 3 agreements were the defining the objectives of the SLA (from the point of view of the service provider), process ownership and the definition of explicit service levels. A number of other elements, among which all the elements in the top category of change management and all elements in the subcategory of measurement were not present in any of the 3 service level agreements. The former can be explained by the fact that change management does not need to be as formally defined in internal SLAs as in outsourcing SLAs, where the SLA is part of a legally binding contract between two organisations. However, the fact that none of the SLAs define any measurement goals or processes, show that there is much room for improvement in the use of SLAs in these municipalities.

A number of specific service levels were present in each of the service level agreements concerning:

- the helpdesk, with attributes such as opening hours, and targets for solving times and response times,
- the backup procedures, and
- the process for ordering new systems.

D. Service level agreements found online

To further complement the list of possible elements to include in an SLA, an internet search was made for service level agreements or SLA templates. From all the templates available online, 8 were included in this study, selected because they were all quite extensive and they were from a research institution, had a focus on IT management for governmental organisations or had a strong link to ITIL. The selected templates were collected from the following 8 sources (all of them retrieved on December 20th, 2010):

1) University of California, Santa Cruz, Information Technology Services, Service Level Agreement (SLA) Template[1]

[1] http://its.ucsc.edu/about_us/smt/06_07/sla_template_final.pdf

2) GeoNOVA Service Level Agreement Template, Version 3 – Final[2]
3) TechRepublic, Sample SLA for application support[3]
4) SLA Template.com, Service Level Agreement (SLA)[4]
5) IT Process Maps, Checklist SLA OLA UC[5]
6) Purdue University, Information Technology Service Level Agreement Template[6]
7) e-Government of Saudi Arabia, SLA Template[7]
8) KnowledgeLeader, SLA Sample Template[8]

These templates, between 6 and 42 pages long, were all much more formal and elaborate than the SLAs collected from the municipalities. In this study we do not make any statements about the quality of these individual templates but only use them as a source for extending the list of possible elements to include in our SLA template.

V. Service Level Agreement Template

The data gathered in the first part of the study, clearly showed a need for a template that could help Swedish municipalities to write and to evaluate service level agreements. Therefore the next step in this study was to compile such a template from the material gathered in the previous step.

Before a template could be compiled, a number of decisions needed to be made about the scope and the form of the template.

First of all, it was decided to compile the template specifically for IT management inside an organisation and not for outsourcing. This meant we would not focus on the contractual details of the agreement, but more on the specification of the services itself, with special attention given to aspects related to information security which had already previously been identified as a weak factor in municipal IT management.

Secondly, it was decided to specifically target the SLA-template towards municipal IT management, even if this meant that the template would be less general. The template is likely to also be useful to other governmental actors that are critically dependant on their information security, and in a lesser degree even to commercial organisations, but this is outside the scope of this study. It was preferred to compile a well-targeted version of the template that filled a concrete need for a small set of organisations than a general version that was only of little use to a large set of organisations.

Finally, some of the studied service level agreements were specific for one IT system or service, others were specific for one administrative part of an organisation and a third category of SLA included the complete IT services of the organisation in one agreement. These differences in the scope of an SLA of course have implications for the elements that need to be included in the agreement.

1) **Objectives**
2) **Scope**
3) **Service levels**
   - **IT support processes**
   - **Backup processes**
4) **Risk and vulnerability analysis**
5) **Incident management processes**
6) **Innovation processes**
7) **References to related documents**
8) **Follow-up processes**
9) **Practical matters**
10) **Appendices**
    - **Word list**
    - **List of systems**

Fig. 2. Proposed outline of the service level agreement template for municipal IT management.

Especially important for the specification of the SLA is the difference between IT systems that are common to the whole organisation and systems that are specific to one organisational unit. Email systems are a typical example of the former category of systems, which are typically owned by the IT unit of the organisation and offered as a service to the rest of the organisation. The latter category of systems are typically owned by a different organisational unit and only serviced by the IT unit.

The template needed to be general enough to be applicable in all these situations, therefore it was decided to include even aspects that are important only in one of the cases mentioned above, but to explicitly mention that not all elements in the template are specifically needed in each situation. Instead the template is meant to serve as a list of suggestion of parts that can be included in a service level agreement not a minimum list of compulsory items that always need to be included.

For this process, all elements in the collected service level agreements, were labelled and a complete list of all components, divided over a number of categories was compiled. First the SLAs collected from the municipalities were analysed and categorized, and afterwards the list was extended with elements from the templates found online. This labelling was based on the SLA-structure proposed by Goo [4]. Except for these general structural elements, also specific service level descriptions were labelled and extracted.

In a next step, all the categories relevant for municipal IT management were selected from the list and ordered in they would most logically appear in a Service Level Agreement to form the basic structure of the document. All elements found at least one of the municipal SLAs were included, complemented with the most relevant additional elements found in the online templates. This resulted in the outline for the proposed template presented in Figure 2.

This is substantially different from the structure proposed by Goo [4] in a number of ways. First of all this template

[2]http://www.gov.ns.ca/geonova/pdf/geonova_sla_template.pdf
[3]http://articles.techrepublic.com.com/5100-10878_11-1048632.html?tag=rbxccnbtr1
[4]http://www.slatemplate.com/
[5]http://wiki.en.it-processmaps.com/index.php/Checklist_SLA_OLA_UC
[6]http://www.purdue.edu/bscompt/Projects/SLAs/SLADraftTemplate_111901.doc
[7]http://www.docstoc.com/docs/9123520/Service-Level-Agreement
[8]http://www.knowledgeleader.com/KnowledgeLeader/content.nsf/Web+Content/SAMServiceLevelAgreementSampleTemplate!OpenDocument

has a more limited area of applicability and can therefore be much more concrete. Secondly, all change management characteristics and governance characteristics that were more important for outsourcing contracts have in our template been compressed into the two short final categories while the foundation characteristics have been made more explicit.

Each of these elements of the template is further explained in the next sections. Together these subsections, in the order they are listed, constitute the proposed SLA template.

A. Objectives

The first part of an SLA should state what the organisation wants to achieve with writing the SLA. The objective should clearly represent both the viewpoint of the service provider and the service receiver. The objective should be based on common goals within the organisation. Objectives can include:

- Defining different service levels
- Scoping IT services provided by the supplier to the customer
- Communication about actual service levels expected for different services
- Listing responsibilities of both partners on IT management issues
- Defining system and process ownership
- Defining a common vocabulary
- Achieving uniformity across the organisation concerning IT management
- Providing contact information
- Budgeting arrangements and price agreements
- Conflict resolution and prevention

B. Scope

Scoping the IT services provided is one of the main functions of the service level agreement. Therefore the second part of the template consists of a list of what is and is not included in the agreement, with an explicit list of responsibilities for both partners. This serves as a summary of the main elements of the SLA. All the important activities and processes in the following sections of the document should be listed as responsibilities of the service provider and/or customer, with explicit references to relevant sections below.

C. Service Levels

This is the main section of the SLA where the provided service levels are defined. For an organisation such as a municipality with a critical role in society and an active role in crisis relief, there is an obvious need for some IT support to be offered at all times, even during night-time or holidays. At the same time there are also many systems where such a high level of support is not necessary. Therefore the template proposes to define at least two levels of service, one basic level for all but the most critical systems and one higher level of service for the most critical systems. An explicit list of systems which fall in this critical category should be attached to the SLA. For some systems that are only critical in some specific situations, exceptions to the basic rule can also be defined (e.g. the wage payment system around each monthly payday). For most systems the service levels can probably be limited to availability requirements, support processes and backup services. These are discussed below. For more critical systems also performance requirements might need to be defined (e.g. for the telephone system, the central network or the public website of the municipality). For systems that contain highly sensitive data it might also be useful to define some extra security requirements.

1) Availability Requirements: An availability goal should be set for all basic systems, for example 99%, which means a total downtime of less than 90 hours on a year. This should take into account regular planned service interruptions for maintenance and updates. An important factor influencing availability can be the access to a backup power supply. It should be specifically stated which systems have access to backup power in case of a blackout, for example all critical systems as defined before.

2) IT Support Processes: The technical support provided to the users in case of problems is a subject found in nearly all SLAs. There are a lot of service levels associated with this service that need to be explicitly defined in a good SLA:

- opening hours of support
- average / maximum response time
- average solving time
- 'customer satisfaction index': percentage of support requests successfully solved
- status reporting: how the user is informed of the status and completion of a service request
- regular access to IT technician on site: in some organizations each business unit has regular access to an IT technician at an agreed time each week or month to discuss minor problems
- participation of customer in solving high-priority problems
- prioritization of service requests
- availability of user training

3) Backup Processes: Another important service that should be defined in detail concerns the backup routines. Backup solutions can often be quite technical, but it is important for users to be aware of the possibilities and limitations of restoring systems after a crash. The main attribute to be defined for backup is the frequency, as it guarantees the maximum amount of time for which information can be lost. On a more technical level, both a frequency for incremental and complete backup of all systems can be defined. Often a daily backup routine is used. For the most critical systems a transaction-based backup can also be defined. Another important service level for a backup service that is often overlooked is how long it takes to restore a system from the backup. Also this should be explicitly agreed upon in a service level agreement. Backup solutions should also regularly be tested to investigate whether systems can reliably be restored.

D. Risk and Vulnerability Analysis

All system owners for critical systems should be responsible for conducting a risk and vulnerability analysis of these systems. IT personnel should actively take part in these analyses. Preferably a standardized risk analysis method should be used.

E. Incident Management Processes

Incident management can be considered a part of normal IT support, but the management of the most critical IT incidents is important enough to be discussed in a separate section. For all incidents with critical systems, a formally defined incident management process should be followed. This should not only cover the immediate response to the incident but also procedures for following up that lessons are learned from the incident to prevent similar incidents from occurring in the future, even for other systems.

For large IT-incidents a response group should be assembled and the necessary personnel should be available to resolve the problem as quickly as possible and to provide the users with information about the problem and the progress in resolving the problem. Even for emergency situations that are not directly IT-related, the organisation might need to declare a state of emergency and setup a crisis central in which communication systems are likely to play an important role. Access to IT support for these systems should be included in the crisis plans.

A more detailed study of the requirements for an incident management process compliant with the ITIL framework, has been conducted by Jantti [17].

F. Innovation Processes

As innovation is often very fast in the field of information technology, the SLA should also define the responsibilities of the SP and SR concerning the introduction of new systems or the update of older systems. This section should describe the processes for ordering new software and hardware products and also for updating existing systems. This can even include special procedures for large IT innovation projects. For the most critical systems, a testing environment should be set up where new updates can be tested before they are deployed to all users.

G. References to Related Documents

The SLA is just one of the documents describing details concerning IT management within the organisation. Many organisations also have an IT safety or security policy, an IT handbook, IT user guidelines and technical system documentation. The SLA can be a good place to define who is responsible for administrating all these other documents and where the latest version of these documents can be found. Other documents related to the SLA for which the responsibilities should be described in the SLA include contracts with external suppliers, national or international standards the organisation must follow and national information management laws concerning secrecy and public information.

H. Follow-up Processes

It is important to make sure that the service level goals described in the SLA are achieved in practice. This can only be known if the goals are written in a measurable way and if the service levels are actually being measured. Defining a measurement plan as part of the SLA is a good way to assure that the service levels are written in a way that they can be measured and not on a too abstract level. Measuring the most important service level outcomes can help the organisation to discover problems as early as possible. The measurement plan should also include a description of how the collected data will be analysed and reported to all involved parties.

Because of the fast evolution in IT the SLA will probably need to be updated on a regular basis. This section of the SLA should also describe how often the SLA will be reviewed and changes will be discussed. The data collected through the measurement process can also give important information about how the SLA needs to be updated. The SLA should also explicitly define the responsibilities for spreading information about the SLA and about any later changes in the SLA. The latest version should always be available to the users and to the IT-personnel. System owners should make sure that the users are aware of the existence and the contents of the most important points in the SLA, just as the CIO should be responsible for spreading information about the SLA to all personnel of the IT-unit.

I. Financial Aspects

Depending on the internal structure of the organisation, a number of practical, financial matters might need to be defined explicitly in a contract between the service provider and the users. In many SLAs these have become the main focus of the SLA, but in a complete SLA the focus should instead be on the level of service, and these financial aspects should only be a part of the contract. These financial aspects can include pricing agreements, licensing issues, insurance aspects and possible compensation for breaching the service levels promised in the SLA. Internally in an organisation, financial compensation for not fulfilling part of the SLA is often not an effective way to deal with this kind of problems. However, it can be useful to require that, as a form of compensation, an investigation into the problem is conducted and reported upon, in a similar way as after critical incidents.

J. Appendices

The following appendices should preferably be added to the SLA:

- Glossary
- List of explicit systems ownership for all IT systems
- Contact list for all issues relating to the SLA, on both the service provider's and the customer's side
- Classification of all critical systems for Confidentiality, Integrity and Availability based on the Swedish classification system developed by MSB [18], which in turn is based on the ISO/IEC 27000 series [19]
- List of known critical dependencies between systems.

VI. Evaluation

To evaluate the service level agreement template presented above, we organized a half-day focus group meeting for CIOs and service managers of regional municipalities where the template would be presented and the municipalities could discuss their experience with SLA together. Nine IT-professionals from 6 different municipalities participated in the focus group meeting, 3 more municipalities had to cancel their participation in the last minute and another 4 CIOs expressed their explicit interest in the material of the focus group meeting but could not participate because it collided with other appointments in their calendar.

On the focus group meeting, first, the results of the background study about SLA were presented and then each of the sections of the template was discussed. In these discussions, the practitioners from the different municipalities shared their experiences about SLA. There was strong agreement about an urgent need for more support in the process of writing SLAs and on the need for such as template based on the experience of all the participating municipalities, which were currently all working with their service level agreements. There was also unanimous agreement on the usefulness of the proposed template.

At the end of the meeting, each of the participants individually filled in a survey questionnaire about the focus group meeting and the presented SLA template. On the questions whether they saw a general need for this type of SLA template and whether they would use this particular template in their work, all 9 participants answered strongly positive. The completeness of the template and the ease of use because of the way the template is set up as a checklist were identified as the greatest strengths of the template.

Participants were further asked as which they considered to be the most important parts or functions of a service level agreement. Two elements were present in nearly all respondents' answers: defining of responsibilities and scoping of the IT services delivered.

The central part of the questionnaire listed all the elements in the SLA template and asked the participants to mark whether they agreed that these elements should be part of a municipal SLA, on a five-point Likert scale. The responses are summarized in Figure 3. Some participants missed one or two of the questions in the questionnaire, therefore some of the responses only show 8 instead of 9 answers.

The main conclusion from this data is that there was positive support for each of the listed elements as part of an SLA, with strongest support for *Objectives*, *List of responsibilities*, *Availability requirements* and *Backup routines* and only marginal support for *Insurances* and *Information security policies*. No additional elements that should be added to the template were suggested in the answers to the questionnaire. The results also show that there is significant disagreement between the participants on which elements should be part of an SLA, implying that there is no standard SLA that fits all municipalities.

Finally the respondents were also asked to comment on the usefulness of the complete focus group meeting. There was strong support for the value of the meeting for each of the participants. Most participants listed the possibility to share experiences between the municipalities as the most important aspect of the meeting, together with the actual template presented at the focus group meeting.

VII. Discussion

The results of the evaluation of the SLA template in the previous section clearly show that the template in its current form fills a need for many Swedish municipalities. Based on the evaluation of the different parts of the template, no parts of the template were removed. Some minor changes to the formulation of the descriptions of the different parts were made, based on feedback received on the focus group meeting. Also, two small elements were added to the template based on the discussions during the focus group meeting: the appendix with critical dependencies between systems and the requirement of a report as compensation for failing to deliver the promised service levels. For simplicity, they were immediately included in the template presented in Section V in this paper but were not included in the first version of the template that was presented at the meeting.

Concerning the validity of the results of this study, a number of issues need to be discussed. First of all, the template itself is specifically directed at Swedish municipalities that have a centralized IT unit inside the organisation. It is outside the scope of this study to investigate the usefulness of the proposed template for other types of organisations. It can be assumed that the template in its current form is likely to also be directly useful for other Swedish governmental actors that are confronted with similar problems concerning IT management and that have a critical role in society. For the template to be equally useful for commercial enterprises the focus would probably need to be shifted to include more business alignment issues and commercial aspects that are less relevant to governmental actors.

Swedish municipalities have a large set of responsibilities that also includes an explicitly defined active role in emergency management. Traditionally they are large organisations with only a small IT unit and low IT maturity. The relevance of the presented template for municipalities and other governmental actors in other countries depends mostly on their organisational structure and their responsibilities.

The template is specifically meant for organisations with an in-house IT service provider. For municipalities or other organisations that outsource a large part of their IT management, service level agreements need to focus much more on contractual issues such as pricing and compensation which are only a minor part of the template presented in this paper. For a more extensive overview of the use of SLAs in outsourcing we refer to the work by Goo et al. [8] and Goo [4].

Although the template is specifically directed at municipalities, there are still some ways in which this study is relevant for other organisations. The methodology of this study and the form of the final template should be applicable to other types of organisations where a similar need for a clear SLA template exists. The scarcity of the available published studies on the use of SLAs in different types of organisations shows a need for more research in this area. Further, the issues listed in this SLA template can definitely form a basis for other specific

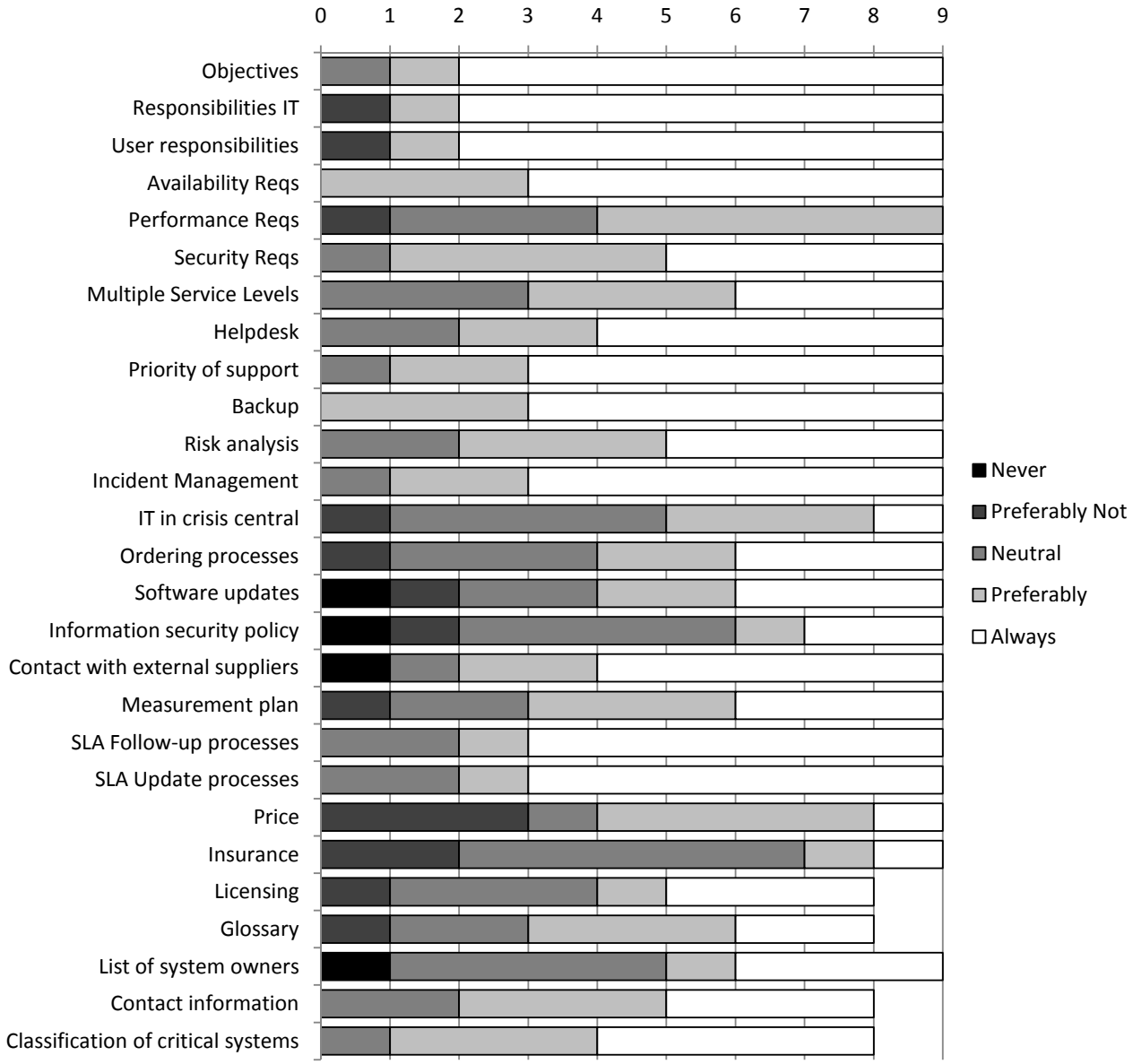

Fig. 3. Responses from the 9 respondents on the survey questions whether each element should be part of a municipal SLA, on a 5-point Likert scale. For each element, the positive responses outnumber the negative ones.

SLA templates, especially in those areas where information security is critical.

A second issues concerning validity concerns the selection of the municipalities involved in the study. Only municipalities in one Swedish region were involved in the interview study, and only few municipalities participated in the focus group. Because the responsibilities of municipalities are the same across Sweden, the results of the study would likely be very similar in case a different region had been chosen. The selection of the municipalities for the focus group was however far from random. Although all municipalities in the most southern region of Sweden were invited to the meeting, only municipalities with at least a general interest in service level agreements and the template are likely to have participated in the focus group . Therefore the positive evaluation of the template cannot be generalized to all municipalities. As the first set of interviews also showed, there is also a substantial group of municipalities with little interest in service level agreements. For them the template is probably of little value except for that it lists a number of issues that should be dealt with in IT management. Nevertheless, the majority of the municipalities contacted in the study showed strong support for the template.

A threat to the validity that should be considered when using a focus group, is that one or a few participants strongly dominate the discussion. To mitigate this risk, all the participants of the focus group individually filled in the questionnaire described in Section VI and the results of this survey are used

as the main data to evaluate the template. Further, during the focus group, attention was given to make sure that all participants contributed to the discussion and to minimise the effect of the researchers present on the conclusions of the discussion.

A final threat to the validity of the results of this paper concerns the completeness of the proposed template. Although the template has been evaluated in a focus group meeting, it is unlikely that all possible additions and improvement to the template were identified during this evaluation. Therefore the proposed template is not considered a one-time publication of a template, but rather as the first version of a living document that can be appended and updated in future revision. Further, the continuous evolution of the field of IT management and is likely to add new requirements for this template. To facilitate the further updating of the proposed template, the template (in Swedish) is made available by the Swedish Civil Contingencies Agency (MSB) in a community cooperating on the standardization of information security practices for Swedish municipalities on their website http://www.informationssakerhet.se.

VIII. Conclusions and Future Work

The main result of this study is a proposed service level agreement template for the use in municipal IT management presented in Section V of this paper. The template was based on a telephone survey among municipalities from the south of Sweden, an overview of the SLA research literature and example SLAs and SLA templates collected both from municipalities and different online sources. The template was then evaluated in a focus group meeting with Swedish municipalities. The template focuses especially on information security issues.

The evaluation of this template by the municipalities involved in the study was strongly positive and the study identified a clear need for such a template, with many of the interviewed municipalities currently in the process of writing or reorganizing their SLAs and explicitly stating the need for more support in this process. The template will now be made available for other Swedish municipalities and governmental organisations with the help of the Swedish Civil Contingencies Agency.

Concerning future work, this study also identified a lack of empirical studies on the use of service level agreements in different kinds of organisations. Many other types of organisations are likely to benefit from a similar type of SLA template specifically focused on their IT management needs. Further future work could also include case studies following municipalities using this template to introduce SLAs into their IT management to evaluate the practical applicability of the template and to further study the process of introducing SLAs in a practical setting.

Acknowledgment

The authors would specially like to thank all the participants to the focus group and in the interview study.

The work in this study was funded by the Swedish Emergency Management Agency under grant for FRIVA, Framework Programme for Risk and Vulnerability Analysis of Technological and Social Systems.

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