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Communications of the IBIMA

Vol. 2011 (2011), Article ID 635464, 192 minipages.
DOI:10.5171/2011.635464
www.ibimapublishing.com

IT Service Level Management: Practices in Large Organizations

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Introduction

The Service Level Management issue

IT Service Level Management (SLM) is the process through which IT Service Levels are planned, monitored and controlled, namely the classic

Anthony's cycle (Anthony, R.A., 1966). SLM covers all phases of the IT system lifecycle, from the analysis of user needs to the software development

activities and, finally, to operations.

With the growing pervasiveness of computing, IT Service Level

is a key in corporations. IT Service Level measures the quality provided by IT services, e.g. the response time of a web ticketing system. IT Service Level

(Lewis, L., 1999) is a structural element of Service Level Agreements (SLA), that state service levels expected against a given fee (Buco, M.J., 2002;

Hiles, A.N. et al., 1994; Raimondi, F. et al., 2008; Winniford, M.A. et al., 2009). SLA are used by companies to define contracts with outsourcers

and, increasingly, to define also service levels of the IT department.

In a typical corporation you find a variety of SLA. The IT

corporate department issues SLA for the panoply of services supplied to corporate user departments. These SLA may contain in turn

services and related SLA of outsourcers, e.g. an IT department may provide web ticketing services, composed by network services supplied by

telecom operators, a front-end portal run by a software provider and, finally, a home made backend software. So, a simple software application

may imply several SLA and, moreover, the final service level to the end users may result from many intertwined service elements, that include

network, server, software and alike.

Our Research

Our research has two main objectives:

1. To define a complete SLM framework to address the business impact of IT services

2. To assess SLM best practices

The most challenging issue of the first step was the measure of the IT service

level on Long Running Processes (LRP), i.e. complex processes made of several activities and with a variety of stakeholders. For instance, the “freight train

composition" LRP involves Freight Division and Track Division and, also, Sales Offices and End Customers, who are interested in the service level of the whole

business process (Motta, 2010). As a result of the first step, we developed a SLM framework, called ESLAM -Extended Service Level Analysis Model-

(Barroero, T. et al., 2010; Motta, G. et al., 2010), that extends some well known IT management frameworks, as ITIL (Aib, I. et al., 2006; Bartolini, C. et

al., 2009; Case, G., 2007; Diao, Y. et al., 2008; Schaaf, T., 2007; Toleman, M. et al., 2009), COBIT (IT Governance Institute, 2007; Ribeiro, J. et al., 2009), MOF

(Microsoft, 2008), HP Service Management Framework (Soward, K. et al., 2007) and also CA's maturity framework (Logan, J.C., 2008). The

extension entails a wider view of SLM, that includes (a) the service variables/metrics to be measured by SLM, (b) the organizational framework

of roles and procedures to run SLM, and (c) the information systems that (i) capture performance data, (ii) calculate service performances and (iii)

report information to managers (Schaaf, T. et al., 2008).

As a second step we surveyed SLM practices in

Europe and Far East. This paper specifically deals with the survey and related issues. The first section explains the reference grid we used to map actual

practices. The following sections illustrate the method and main findings of the survey. A final section draws conclusions

and motivates future research.

The Survey Grid

The survey grid was based the reference framework that was developed in the first research step, called

ESLAM (Extended Service Analysis Framework), that is conceived for large corporations (Barroero, T. et al., 2010) and reflects ITIL principles (Menken, I.

et al., 2009). Here below we describe its main elements, namely (a) Service Variables, (b) Service Organization, and (c) Service Information system.

Service Variables

Service variables define what SLM measures. The wider the measurement span, the more mature SLM.

The measurement span may be divided in levels, each one reflecting a different class of IT services. Within each level, measurement span may be

defined in terms of measure metrics and measured objects. The higher the number of the metrics and the higher the number of objects

measured, the more mature the SLM. In short, within each service level m, the service variables V are given by the intersection of the set of objects O at the

level and the set of applicable metrics M of each level, that is lower or equal to Cartesian product (Equation 1).

$$\sum_{m=1}^{3} V_m : V_m = (O_m \cap M_m) \leq (O_m \times M_m)$$

Equation 1

Let us first illustrate what we mean by “levels”. According to ITIL taxonomy (Menken, I. et al., 2009) we identify three levels - IT Technical Services, IT

Business Services, Business Processes. IT Technical Services are the lowest level, e.g. an IT provider, which may be an external supplier or a department of

the corporation, supplies services e.g. operating a network. These services are not perceived by the end users. Business Services are the intermediate level. They

supply a specific application e.g. an airline reservation system that supports a given business process e.g. web seat selling, and directly support

business process activities and influence business results. Finally, Business Processes, the highest level, deliver business outcomes, e.g. in the process “Train

Composition” of a railway organization “Composed Trains” is a primary outcome.

Business Processes are the most complex level and the most critical to the business impact. For, business process performances reflect the stakeholders'

point of view, e.g. timeliness is critical for the end customers, which, by contrast, do not care of the productivity of railways; productivity, in turn, is a

key objective of the plant supervisor.

Figure 1 shows the stakeholder-oriented grid of business process performances (Longo, A. et al., 2006). Specifically,

columns list classes of performance (cost, quality, level of service) while rows list classes of stakeholders (manager, customer, worker), and quadrants

contain Key Performance Indicators (KPI).

Figure 1 - A Stakeholder Oriented Grid of Business Process Performances (redesigned from Longo, A. et al., 2006)

Please see Figure 1 in full PDF version

Service Level Information System

The reference architecture of the service level information system defines

building blocks that cover the whole systems life cycle (Figure 2).The wider the coverage of the reference architecture the more mature the SLM.

Let us comment each building block.

- Project Control (PC) supports the project cycle. It processes service level

information related to the project activities, e.g. timeliness, quality and alike. It also generates alarms in front of critical exceptions. It is a key point

in large organizations with hundreds running initiatives.

- Real Time Monitoring (RTM) collects, typically by

probes, performances and status of each object that contributes to technical and business services. It gathers and displays real-time information on components

as applications, operating systems, network protocols, and network infrastructure. RTM is a key ingredient of the so called “service control room”

where IT people monitor operations that may involve many thousands of components.

- Catalogue and SLA management maintain the catalogue of services along their life cycle, from design to operation and termination. Also they store

the relations within and across services levels, e.g. which applications (also called IT business services) support a given business process and which IT

services support a given application.

- Management Control (MC) is a business intelligence software that

stores and analyses time series of performances, thus supporting planning and periodical control of the performances. The wider the coverage of IT

services and business processes, and the span of performances indicators, the more mature the system is. A typical service MC system (a) stores

performance data on each application, middleware and hardware, (b) calculates service measures and (c) reports to the

appropriate responsible (Schaaf, T. et al., 2008).

Figure 2 - Building Blocks of The Service Level Information System (redesigned from Motta. et al., 2010)

Please see Figure 2 in full PDF version

An ideal implementation shall cover the whole ideal architecture. For, real time and project control block enable physical control. In turn, the business

intelligence block, with time series and summarized information, enables continuous improvement and benchmarking.

Service Organization

The organization framework describes an ideal organizational architecture of SLM in

terms of business processes, roles, and their relations. Generally, such framework is an extension of ITIL (Rudd, C. et al., 2007). The higher the

coverage of the reference organization the more mature SLM.

An overview of roles is given Figure 3. Let us

consider them. The Service Level Manager is the core role. Ideally, he or she is an independent position, assures that current and forthcoming services are

appropriately profiled, negotiates service levels for Service Level Agreements (SLA), Operational Level Agreements (OLA), Underpinning Contracts

(UC), identifies and designs the SLM reporting system, etc. The Service Catalogue Manager maintains the catalogue of IT Business and Technical Services.

Other roles are external to the SLM unit, but they are highly involved in the SLM process. E.g. the Capacity & Performance Manager assures that IT capacity can

enable requested service levels while the Security Manager defines security levels and is in charge of Disaster Recovery Plan, and, finally, the Supplier

Manager manages technical relations with service providers. Corporate users, e.g. departments or employees, generate and define service level demand

at business process level. Finally, Suppliers/Outsourcers provide technical and/or business services according

to their agreed SLA, UC and OLA.

Figure 3 - ESLAM Roles (redesigned from Motta. et al., 2010)

Please see Figure 3 in full PDF version

Figure 4 - ESLAM Process Phases (redesigned from Motta. et al., 2010)

Please see Figure 4 in full PDF version

The SLM process framework includes the phases by which SLM is planned, run and improved (Figure 4). Lets us consider each phase. Service

Catalogue Management defines and maintains the Service Catalogue, that describes all IT Business Services, related SLA and Service Level Objectives

(SLO). SLA Management manages the lifecycle of SLAs with actual service providers and related SLOs (Service Level Objectives). OLA/UC Management

manages the lifecycle of OLAs, UCs and related performance indicators. Monitoring and Reporting includes definition of reporting policies, service

level meetings, and definition of report contents. Finally in Service Level Improvement are included not only the usual reviews and negotiations

with suppliers but also uses periodical benchmarking activities in order to align service levels to the “best of breed”.

The RACI (Responsible, Accountable, Consulted, Informed) Table (Figure 5) maps the roles on the process phases. You can note that the end users are

heavily involved in defining and reviewing service levels, reflecting ESLAM philosophy according which service business outcomes are structural

parts of SLM and related SLAs.

Figure 5 - ESLAM RACI (simplified, redesigned from Motta. et al., 2010)

Please see Figure 5 in full PDF version

The Survey Questionnaire

The survey questionnaire is structured into three sections. Section 1

positions the company, section 2 sketches out the profile of the IT organization, and section 3 assesses SLM profile (Table 1). This structure enables

to relate the SLM profile to the organization structure, to the outsourcing options and to other context variables. The survey was performed via face-to-face

interviews with the CIOs and/or the manager in charge of service levels, from April to September 201

Table 1 - Summary of the Survey Questionnaire

Please see Table 1 in full PDF version

The Survey Sample

The sample was intended to compare best practices in IT intensive industries with the target industry, i.e.

railways. It is represented by T-shape in Figure 6. The leg includes five firms belonging to transportation industry, i.e. our target. The two arms include IT

intensive organizations, respectively Telecommunications and Financial Services. Companies surveyed are

listed in Table 2. Let us illustrate them.

Figure 6 - T-Shaped Sample

Please see Figure 6 in full PDF version

In the transportation sample we have considered railways of large European countries. Formerly government owned monopolies; they include

the same business units respectively for track, passenger transport, freight transport, stations, and services. Systems are critical to manage trains,

traffic, ticketing and freight. IT staff may count hundreds of people, and could be decentralized or centralized. To compare their practices we have

added two organizations of similar industries, namely municipal transportation and airlines. The municipal transportation operates in an urban European area of

about 2,5 million people. It is a reference, because of the high performance requirements of IT services to passengers and for real time traffic control. Airlines

have been added since they have developed from decades a structured and interoperable IT system.

Telecommunications are intensive users of IT, with their Business Support Systems (BSS) and Operations Support Systems (OSS). BSS support

internal transactions and transactions with the customers, such as order, billing and alike. OSS support network operations, such as service

provisioning, traffic management and alike. IT staff are very large and may count, in bigger organizations, over 1,000 people, with an IT budget

over 1 billion Euro. The high IT complexity requires a robust Service Level Management. Electricity and Entertainment are included in this sample,

because of the growing IT role for the business. Also we have considered public information about the three main telecommunications

in China that total over 500 million users.

Finally, we have included banking, where IT is part of business. A very large bank

should control IT service levels on huge volumes and can be considered as benchmark. A start-up can build its IT and its SLM without ties and therefore

can offer best practice. Mid size is a reference of the business practice

Table 2 - Companies Surveyed

Please see Table 2 in full PDF version

Survey Findings

Findings on SLM profile are summarized onto the three ESLAM dimensions, namely (a) service variables (b)

service information systems (c) service organization. The degree of maturity of surveyed organizations has been quantified by a school

mark, ranging from 0 to 1, and results have been reported on radar graphs.

First question is: "*Which industries are closer to a*

mature and complete SLM?" Not surprisingly IT intensive industries as Telecom and Financial services look more mature (Figure 7). Transportation,

where IT support is not yet critical, is still in early stages. Further analysis within each industry shows a uniform approach in Telecommunications, even

in China. This reflects their global stage of development against the localized one of Transportation and Financial industries.

A further question is: "*Are certifications and formalized approaches consistent with a mature SLM stage?*" Not surprisingly the finding is

positive. Adoption of ITIL (Menken, I. et al., 2009) and/or COBIT (IT Governance Institute, 2007) is part of the same evolution that drives

towards a service level aware management of IT (Figure 8).

Surprisingly, SLM maturity is not related to the

outsourcing strategy. Outsourcing, in our sample, reflects the overall business strategy rather than a specific maturity stage of IT

management itself (Figure 9).

Finally, the key issue is *"What really drives SLM maturity?"* Evidence, so far,

is very straight. It is the experience years. Figure 10 also shows that after some years, SLM mature organizations tend to invest heavily on technology, to

provide information to the whole service management process. Not surprisingly, these organizations have a complete technology architecture that mirrors

the framework of Figure 2. However, only in few cases, business outcomes are related to IT business services and, therefore, the business impact of IT

services is still a challenge. In some cases we found that business impact is traced ex-post

Figure 7 - SLM Maturity across Industries (redesigned from Motta. et al., 2010)

Please see Figure 7 in full PDF version

Figure 8 - SLM Maturity versus Management Certification (redesigned from Motta. et al., 2010)

Please see Figure 8 in full PDF version

Figure 9 - SLM Maturity versus Outsourcing Strategy (redesigned from Motta. et al., 2010)

Please see Figure 9 in full PDF version

Figure 10 - SLM Maturity versus Years of Experience (redesigned from Motta. et al., 2010)

Please see Figure 10 in full PDF version

Conclusions

We have presented a survey on SLM practices based on a comprehensive reference grid that includes

service levels, namely organization, variables and information systems. This in-depth survey shows important findings. In IT intensive corporations SLM

is a critical element of their IT management, regardless their size. A complete SLM requires years and it is not only matter of money but also of commitment on

organizational issues. Complete SLM require a substantial investment in SLM technology that may be a visible percentage of IT budget.

In perspective a critical question is SLM architecture in the cloud computing era. With cloud computing user organizations would not

see anymore the service chain that delivers a certain performance. However, providers' SLM, even if they would control only the section of IT service they

run, should communicate with both customers' and suppliers' SLM systems. This might require an even more sophisticated SLM system and start a new

maturity curve. SLM and cloud computing are precisely the scope of our next research step.

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