

Identification of IT-Service Metrics for a Business Process when Planning a Transition to Outsourcing

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Abstract— Business processes, especially key value-add processes, need to be supported by targeted and relevant information services to ensure high performance. These services have more forms of utilization in a company. The basic use is creating and sustaining database which is utilized at the operational run of the processes as such. Further utilization takes the form of creating special information sources which serve as support of management decision making in managing business processes. Company management perceives information services as a necessary part of the business process and expects their continuous performance. Therefore, the cost of IT technologies represents a significant item in company budget. This places executives into a contradictory position. On one hand, they should increase efficiency and decrease cost; on the other hand they need to devote financial/human/technological resources to develop information services as the company information environment needs to be flexibly adapted to the needs of the changing markets. Developing of internal information environment by own resources is demanding and it takes sources of the company which could be devoted to its primary activities. One of the solutions for this situation is outsourcing, however transition to outsourcing is related to many risks. They include the transition to a new mode of service providing, the necessity to include the relation "external service provider - internal service customer", selection of correct type of outsourcing and suitable external provider. The greatest risk is connected with defining the service parameters in contractual relationship for ensuring service quality; this risk is related to identification of these service quality parameters. This text focuses on defining the assumptions for monitoring of information services quality within information processes which are selected for outsourcing. A method is modelled which identifies the metrics that will become the base for definition of information services quality parameters.

Keywords— IT quality management; IT service metrics; transition IT services to outsourcing

I. INTRODUCTION

Outsourcing is considered a strategic tool which is mainly expected to increase efficiency, reach cost savings and enable optimal allocation of internal sources to primary enterprise activity. Outsourcing is closely linked with the efforts of organizations when every organization attempts to maintain performance in long term and improve its production which is performed within business processes [1]. There are different perceptions of outsourcing which include: Outsourcing is a long-term contractual relationship outside the organization

itself for providing services in one or more of the organization's activities, Outsourcing is focused on increasing company efficiency especially by de-allocating some of the company activities and responsibilities to an external subject, Outsourcing represents transferring one or more activities from the organization to and external organization and the results of these activities (i.e. products or services) are purchased by the original organization from the external organization [2] [3]. The company expects benefits such as [4] [5] [6] - decreasing the cost and increasing profit, simplification of management work and support for obtaining competitive advantage. Outsourcing also represents risks such as [7] long-term dependence on one supplier, underestimating of process and organizational rules of cooperation, safety risks or incorrectly set contract relationship. Outsourcing is difficult to realize especially for small enterprises which have little experience with outsourcing and are afraid to entrust too many rights over their data and processes to an external partner [8]. A specific category is outsourcing of information services. Information services, respectively information systems represent complex socio-technical systems consisting of four basic types of components – hardware, software, organizational and human [9]. Outsourcing of information services represents ensuring activities related to IT through external supplier services [7]. These include [4] [7] - IT development outsourcing (e.g. tailor-made information system, customized methodology of information system development), partial outsourcing of particular activities of company IT (e.g. running a concrete application) or full outsourcing (development and running of whole IT environment). Companies expect outsourcing to bring e.g. [4] [7] - possibility to concentrate on their primary activity, access to experts and technologies, guaranteed quality and service level, decrease of IT cost. High-quality information service must be well balanced; this service has to find a balance between three aspects which are - customer requirement on the content, acceptable performance level and such price that the customer is willing to accept it [10]. The risks are wrongly set up metrics, or even too high expectations e.g. that the transition to outsourcing will radically increase the throughput of activities.

II. FORMULATION OF THE PROBLEM

The author has defined the problem area as the situation when a company is rolling to outsourcing mode and needs

radically to solve IT service quality (information technology service, further written as IT service). The focus is especially on harmony with company process metrics and IT services which support these. The metrics often exist on the level of business process but their propagation to IT service parameters defined by service levels is usually missing. The definition of the parameters of provided services is, however, crucial for the transition to outsourcing model and it forms a part of the contract relationship.

The author used their personal experience from entrepreneurial sphere to set a typical situation of a company planning outsourcing:

- Approach of the company:
 - the company intends to outsource some IT services; the motivation to this is expected financial and performance benefit; so far the company has little direct experience with outsourcing;
 - an internal IT department exists in the company; it provides IT services to the internal users, i.e. business process owners, business process administrators and business process actors. There is no formal contractual relationship between internal users and IT department, therefore, there are no specific parameters of provided IT services;
 - the company has made a partial process analysis, i.e. there are basic process maps;
- The approach of business process managers, i.e. owners and administrators of business processes, to planned IT service outsourcing:
 - business process managers assume that the activities related with the planned IT services outsourcing concerns especially the internal IT department, in other words that the IT department will identify the IT service for outsourcing and will lead necessary communication with the external supplier and will carry out all activities to implement outsourcing;
 - business process managers do not perceive IT services outsourcing as a potential risk; they automatically assume they will not feel the change in the value of outsourced IT service or that the service quality will increase. Therefore, the business process managers do not see the need that they should participate at the forward risk elimination of a bad IT service. As a result, they do not see the need to participate on business metrics identification in order to define the planned outsourcing and thus to participate on metrics identification for the contractual relationship (further Service Level Agreement, SLA);

- The approach of the internal IT department to the planned outsourcing of some IT services:
 - the internal IT department will further be the provider of all services to the internal user, only some of them will be supplied externally;
 - the internal IT department will further be responsible for the parameters of the supplied services and their key parameters by which it takes over the responsibilities supplied by the external provider;
 - the customer of the outsourced services is thus not directly the user but the internal IT department. Therefore, the contractual relationship and SLA parameters must be given high attention.

The text solves the problem of IT service level definition and the metrics for its defining in a contractual relationship. Identification of these metrics is a vital step for quality management of IT services.

III. QUALITY MANAGEMENT OF IT SERVICE

An IT service in the context of company IT enables to execute business processes. It is important to map the relations between business process and supporting information processes as well as the relations within information processes [11] [12]. In order to define the relations of the service to business processes and other information elements, it is possible to use the SPSPR model (S, Strategy; P, Business Processes; S, ICT Services; P, ICT Processes; R, ICT Resources), which defines the responsibilities of business and ICT manager for managing the "business - company IT" relationship [4] (see Figure 1). The measuring points in the model identify the places where it is suitable to define metrics monitoring quality, volume, efficiency and other features of monitored objects.

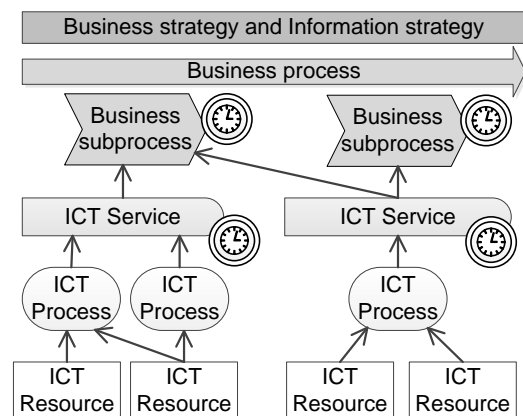


Figure 1. Model SPSPR; source: own, prepared based on [4]

The quality of the outsourced IT service has to be managed; in other words, any IT service should be managed disregarding whether it is outsourced or not. IT service quality management in an organization may be carried out based on a particular framework or model. These include a set of best practices of

enterprise informatics via ITIL (Information Technology Infrastructure Library) [13] and the standard for evaluation of the level of information processes execution COBIT (Control Objectives for Information and Related Technology) [14]. Both frameworks consider ICT services among key areas of interest. IT service is defined by ITIL as [15] [16] "A service provided by an IT service provider. An IT service is made up of a combination of information technology, people and processes. Relationships between these objects can be analyzed by using of various classic tools as well as by recent approaches such as social network analyzing [17]. A customer-facing IT service directly supports the business processes of one or more customers and its service level targets should be defined in a service level agreement. Other IT services, called supporting services, are not directly used by the business but are required by the service provider to deliver customer-facing services.". Such an IT service does not represent a concrete program application but it represents the final value given to the user, i.e. worker within business process. There is a contractual relationship between the service provider and user which is defined by Service Level Agreement (SLA) and which characterizes IT service level.

The definition of SLA within the ITIL framework is described as "An agreement between an IT service provider and a customer. A service level agreement describes the IT service, documents service level targets, and specifies the responsibilities of the IT service provider and the customer. A single agreement may cover multiple IT services or multiple customers." [18]. SLA describes information service from the viewpoint of content (functionality, trainings etc.), volume (number of users, volume of processed data etc.), quality (application availability, transaction processing time, security) and price (fee for the service, penalty etc.) [4].

The term "high-quality IT service" means that the user gets exactly such service that the customer ordered and specified within the agreement between the internal user and external provider. It is the identification of suitable metrics which is the key point for ensuring high-quality IT service, respectively for creating the supporting documents for negotiating the IT service and ensuring its future execution as per the customer expectations.

IV. IDENTIFICATION OF IT SERVICE METRICS

The author focused on the critical point of the presented situation; that is the identification of business and IT metrics for negotiating the IT service delivery. Service details should include the characteristics of the business process as well as the IT process (see Figure 2).

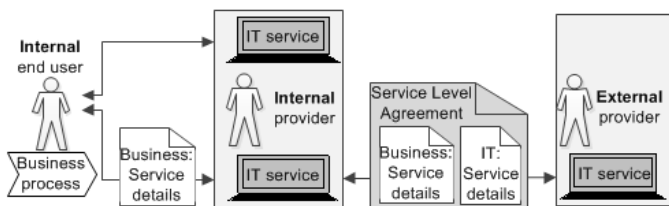


Figure 2. Model defines the roles of internal and external provider, the succession of obtaining indicators for service details; source: own

The proposed method introduces three phases:

1. Collection of business process metrics
2. Determining the impact on IT services
3. Identification of the metrics of individual IT elements and design of IT service levels

A. Phase: Collection of business process metrics

The goal of this phase is to obtain the business metrics for the outsourced IT service, especially hard metrics, i.e. objectively measurable. The starting factor is decision about outsourcing at strategic level. The process of this phase is shown in Figure 3. First, process area is selected, after that dialogue with key users is led to define the requirements on metrics of the particular processes. Hard metrics are preferred (in line with ITIL framework) when identifying the business process metrics.

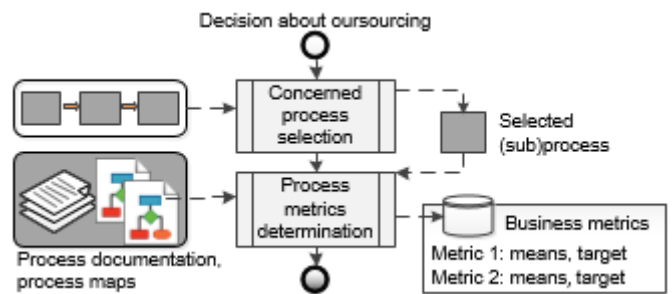


Figure 3. Phase "Collection of business process metrics" - activities, inputs, outputs; source: own

The input to metrics definition is either existing process documentation including process models or using dialogue with the key users to obtain verbal process description. The identification of metrics is carried out by process owners together with key users.

Following aspects are taken into account at metrics definition:

- business process importance,
- impact of process outage,
- requested mode of availability.

Let me introduce a model situation of a decision to outsource IT Service "Records Service" which is a part of business process "Correspondence Processing". For overview of the process, see Figure 4.

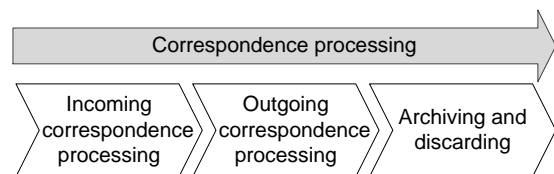


Figure 4. Map of business process "Correspondence Processing" Source: own

Consultations with the process owner and key users helped to define the process importance and outage impact. The outage impact is:

- on process users: impossibility to send electronic correspondence; number of impacted users = 20 internal,
- on external customer: impossibility to send electronic correspondence; number of impacted users = 5000.
- financial impact: risk of financial penalty in case of not complying to a request e.g. of the state organs; financial loss in regards to the customer (risk of losing customer, decreasing customer satisfaction, impossibility to process orders),
- other impacts: decreasing customer satisfaction, risk of data loss with regards to correspondence archiving in case of non-functional process.

The consultation with the key users led to key metrics definition (see Table I).

TABLE I. PROCESS CRITICALITY AND DEFINED BUSINESS METRICS

Metric	Requested value
1. Process criticality for the company	medium (selection from options low/medium/high)
2. Requested availability	5 days x 10 hours Monday - Friday 8-18.00
3. Requested operations	7 x 24
4. Maximum outage time	4 hours
5. Process throughput:	User requests:
a) volume of processed units per hour (data message, email, paper)	a) 60 units
b) maximum length of one request processing	b) 2 minutes
c) number of simultaneously running workflows for approval	c) requested value is 100, real measuring at the application level will be used as default value
6. Time of response to incident and request	Standard (90%): up to 15 minutes. Maximum: up to 60 minutes.

B. Phase: Determining the impact on IT services

The goal of this phase is identification of IT applications and services which are related to the outsourced IT process within the particular business process.

When mapping the relations "business process - IT process", it is important to define the measuring points which will serve to determine the concrete places in the process where measuring will take place. This measuring is vital for comparing the compliance of the measured values with the required metrics. Measuring points are placed to process steps where transitions between used means take place (here IT applications, IT services). The outputs of this phase are important for determining the impact and identification of the mutual dependencies between services realizing the particular process.

Let me continue in the model example of IT service "Records Service", a part of "Correspondence Processing" business process, outsourcing. Consultations with key users and process documentation analysis helped to find which IT processes take part on business process activity execution. As

not all found IT processes are a part of the planned outsourcing, it will be the responsibility of the internal IT department to ensure harmony of service parameters (provided internally) with required process metrics. Business process, IT process and related IT services mapping is shown in Figure 5, model SPSPR was used to create the scheme.

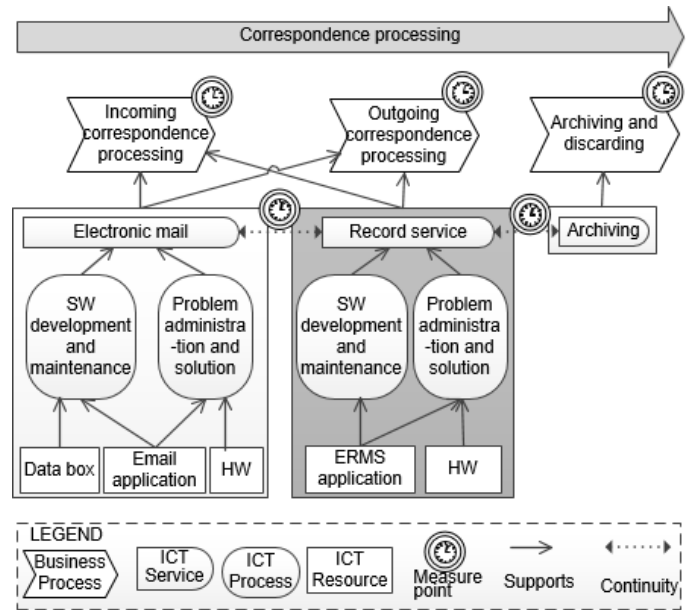


Figure 5. Business process map of "Correspondence processing" with relations definition to IT services and processes; source: own

The model also defines measuring points. These points are specified by business users based on the process needs. The measuring is carried out by IT department workers based on these identified points. The measuring point workflow is visible in Figure 6.

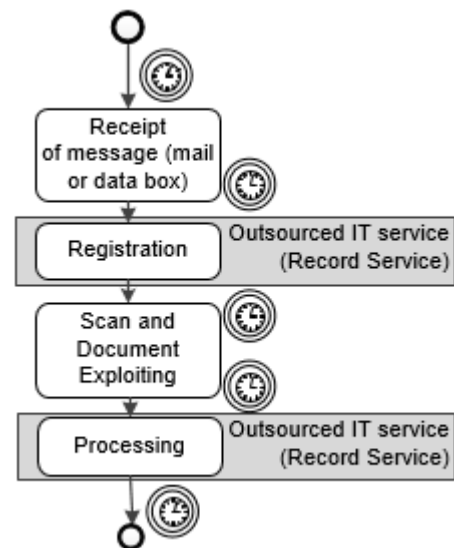


Figure 6. Measuring points of the process; source: own

C. Phase: Identification of the metrics of individual IT elements and design of IT service levels

The objective of this phase is definition of IT metrics, consolidation of business and IT metrics and definition of the requested service level. This is the most difficult part with regards to effort and needed time, although it is not necessary to communicate with key users of the business process in this stage.

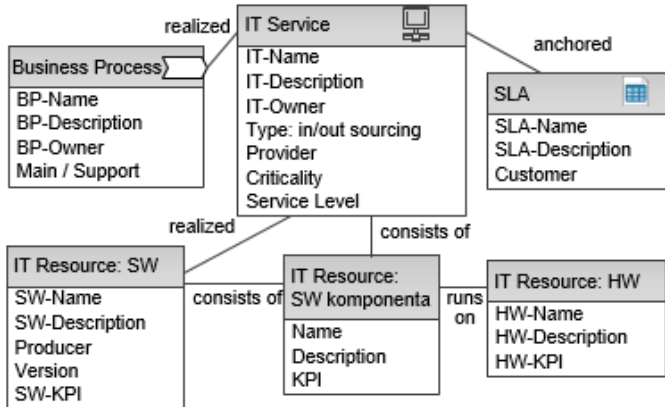


Figure 7. Service mapping in CMDB database; Source: own

The source of information is the available documentation at IT department where data on applications and IT services are expected; e.g. architecture, components, location, key user data, availability etc. The author further suggests (in compliance with ITIL) to use database CMDB (Configuration management database) as another significant source of information. This database can take different forms, its implementation, however, always starts with individual elements, relations and restrictions description. For the needs of service mapping in CMDB database, including key service indicators, the author suggests to use a model which can be extended if needed - see Figure 7.

TABLE II. MEASURED VOLUMES OF PROCESSED TRANSACTIONS IN 24 HOURS

Parameters measured within 24 hours	Value
1. Received messages: a) email, data messages, post shipments b) messages per hour in working hours (8-18 hrs)	a) total 1012, emails 710, data messages 55, post shipments 246 b) average 90 messages per hour
2. Sent messages: a) email, data messages, post shipments b) messages per hour in working hours (8-18 hrs)	a) total 466, emails 274, data messages 60, post shipments 132 b) average 59 messages per hour
3. Processed transactions: a) number of transactions total b) transaction processing time	a) total 1512 transactions b) average 36 seconds per transaction processing
4. Standard workflow per hour	Average 115, max.128, min. 74
5. Simultaneously working users	average 8, max. 12 users

Metrics of individual applications and IT source can be obtained from measuring directly at the particular IT source or

by monitoring outside the application. Monitoring also provides the possibility to store data for report creation on source utilization so an overview in long term can be obtained and occurrences of higher load can be identified. The obtained values will serve as the default requested value of the metrics for SLA and they can be also used as basic values for deviation from the requested state measuring. At the same time, they can provide a lead for the trend of source utilization, in addition the extreme values will show the time period when the sources should be strengthened. This data will serve for source allocation optimization in the particular time.

The last step of this phase is to consolidate all metrics and requirements obtained in the previous phases. The output is the required level of service and other requirements for supplier negotiation and anchoring these in contractual relationship in the form of SLA. This data should provide information to both sides about the current application (IT services) behaviour and should provide the default values for further comparison of the current status against the required target values.

TABLE III. OVERVIEW OF CONSOLIDATED HARD METRICS

Metric/value	Means of measuring
Availability: 5 x 10	In % expressed time of application availability on particular user's device in relation to total effective working hours in defined time unit (without planned outages) Means of measuring: monitoring.
Maximum outage length: 4 hours	Absolute time from the start of outage till the reason of outage is eliminated and system available. Means of measuring: monitoring/time of incident duration.
Standard and max. acceptable critical time of response to incident and request (based on severity and impact): Response in 90% up to 15 min Other 10% up to 60 .	Absolute time units. Values as per definition in service level. Means of measuring: incident level. Primary value of response is related to the defined application availability.
Ratio of wrongly processed transactions from the total number may not exceed 2%.	Ratio of defects in comparison to the total number of processed transactions in %. Means of measuring: monitoring.

Let me continue in the model example of IT service "Records Service", a part of "Correspondence Processing" business process, outsourcing. Based on the records in CMDB database it has been determined that the IT service "Records Service" uses three application modules (Email application, Data box application, Archiving application) running on two physical servers. Measurement on the application level has been carried out in 24-hour cycle for a period of one month. The measured values are in Table II. The measured values did not directly influence the composition of defined parameters of the services level but they serve as the input for setting up the base values of these parameters. The final design of the service level consolidates business metrics and IT metrics. The mode of application availability is 5 days/10 hours (Monday to Friday, 8.00 to 18.00), the mode of application operation is 7/24, maximum outage 4 hours, maximum number of

unplanned outages 1 per month, time window for maintenance 1 x 8 hours (Sunday 23:00 till Monday 7:00), standard time of response to incident 15 minutes, maximum time of response to incident 60 minutes. Together with the service level also parameters which will be a part of the SLA have been defined. Hard metrics are shown in Table III (partial list). Also soft metrics were set up - e.g. compliance of the application provider with legislation requirements, integration with current applications, support and helpdesk availability, level and availability of training, user interface friendliness.

V. DISCUSSION

The outputs obtained in individual phases of the process are a basic foundation for tender and following negotiation with the future service provider. The negotiation as such harmonizes viewpoints of both parties; the customer concretely characterizes expected parameters of service level and the supplier/provider offers the standard service level. A compromise might be reached in some non-key parameters, e.g. level of offered support or amount of training. In regards to key parameters, however, any potential modification against the standard service level might lead to extra cost for both parties which is undesirable as cost saving is expected. The intention of the service provider is cost minimization and optimization of source allocation necessary for operating the supplied services in required quality. The supplier will see the compliance with standard service levels in the price of the service which should be lower than if the service is realized by internal source; lower cost is achieved by sharing production factors among more service customers. The outputs, consolidated in previous steps, play two important roles. First, they enable the supplier better understand the base situation in the company and understand the current service parameters. Further, for a company rolling to outsourcing, the outputs enable to decrease the risk of insufficient quality of supplier services thanks to the specification of expected service level parameters. Understanding of the current level of services is also important as a lead for future measurements and comparing parameters before and after outsourcing realization.

VI. CONCLUSION

The objective of the text was to determine the conditions for monitoring IT services quality within IT processes which are selected for outsourcing. It has been identified as a key need to define qualitative parameters of IT services and consequently to embed these into a supplier agreement. The proposed method consists of three connected phases - 1) Collection of business process metrics 2) Determining the impact on IT services 3) Identification of the metrics of individual IT elements and design of IT service levels. The situation before transition to IT outsourcing when the company uses IT services provided by the internal IT department and metrics are not defined was marked as the initial state. This reflects the reality of many companies. The specification of the method put emphasis on utilizing the information which is available in the company and their consolidation to the form of

requirements put on IT services. Activities, their succession, inputs and outputs were defined for each phase of the activity. Created models map the current service and its level, the models are: SPSPR with measuring point indication and IT services overview, Model for measuring point specification from the full process view, Scaling of application IT sources (HW, SW, components) and Reports providing information about the trend of the application load in particular time. The benefits of the proposed method include: implementing principles of service level management in a company, service level optimization based on user department requirements and optimization of need sources allocation.

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