Infrastructure management of software systems of modern “IT” in the automation of production processes

O N Nedzelskay, V V Moiseyev, A N Bikineeva and E N Bulakina
Siberian Federal University, Svobodny pr., 79. Krasnoyarsk, 660041, Russia
E-mail: elenagb09@mail.ru

Abstract. The article examines the methodology, describing the concept of information infrastructure management companies focused on their need, a comparison of models of information systems. The authors investigate the possibility of their joint use for maximum effect from the introduction of software systems. Process management of IT infrastructure of the enterprise has a number of advantages. Thus, in determining the types of activities, inputs, outputs, standards and requirements, an increase in the efficiency, the rationality of work can be achieved and quality management tools can be achieved. There are different methodologies for describing the achievement of business goals instruments with a high level of reliability of the information system. The most common was the British Library IT Infrastructure Library.

1. Introduction
To date, the majority of enterprises in our country use the standards for the organization of the information departments. It should be noted that the use of international practices and methodologies cannot run counter to the standards that must be met to the enterprise. Comparison of different approaches to the organization structure of enterprise information quality standards require changing view of IT, namely IT services consideration not as an opportunity for service, but as a unit of the enterprise using IT assets. Thus, the purpose of IT services will be to ensure the work of IT assets, repairs, maintenance work, elimination of emergency situations. Indeed, the Service Desk modules are most commonly used and the configuration database for the accounting technique of ITIL system. It should be noted, that in this case, these modules are used for the organization of work according to ISO 18322, which focuses on the elimination of failures and accounting techniques. Approach, focusing on maintenance and repair of IT assets, it is used in most enterprises, state and municipal institutions.

There are different methodologies for describing the tools to achieve business goals with a high level of reliability of information systems. Information technology, to date, is developing rapidly. This applies both to improving element basis, as a result, increasing computing power; to improve the system and application software, the implementation of mainframe technology in desktop personal computers (e.g., multi-threading, virtualization); to expanding the global Internet, which is available all the greater part of the world's population. Development of information technology provides growing opportunities for business relationships. The use of advanced technology gives a competitive advantage to the enterprise only if the most effective implementation of these technologies. Results of operations for the automation of production processes to meet the requirements put in the beginning of automation of the enterprise is: increasing productivity, optimizing management processes, improve product quality, to meet the new requirements. Automation of the process may have varying degrees
of maturity: from chaotic to carried out in accordance with the best practices of global companies. The effect of this process on the quality of the end result is undeniable. In a qualitative implementation of software system that meets the requirements of the enterprise, as a result will be achieved the desired implementation of quality indicators. When chaotic introduction of even the best software package available mass of bugs admitted at all stages of implementation.

2. System approach to automation of software systems in the workplace

There are several approaches evaluation software product quality indicators, such as the evaluation of internal and external quality indicators mixed approach [1]. Indeed, it is important when choosing automation guide program analysis tools. But the most important factor in achieving positive results in the automation activity is a systematic approach to all work as a whole.

The most common was the British Library IT Infrastructure Library (ITIL), COBIT (Control Objectives for Information and Related Technology (“Objectives for Information and Related Technology”), a methodological model of Microsoft Operation Framework (MOF). To date, the majority of enterprises in our country use standards for the organization of the information department. There are a number of standards to be applied to equipment maintenance, such as ISO 18322 (in Russian GOST 18322) standard management ISO 9004-2010 quality, the creation of GOST 34.601-90 automated systems to processes of life Ikl software ISO / IEC 12207-2010 and other [2-4].

Compliance with standards is considered to be one of the conditions necessary for the confirmation of the high quality of produced goods or services. In some ways, a certain conformity to strict standards makes it difficult, and sometimes even eliminates the opportunities of development, previously considered impossible to achieve performance metrics. One prominent example is the achievement of international fame due to high quality company Toyota as a result of the practice of Kaizen, also known as “lean production”. Today, many global companies have the experience of “lean production” and, thus, achieved outstanding results. It should be noted that over the past 10 years, many domestic companies have implemented or have taken the first steps towards the implementation of “lean production” and have been able to assess the results.

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As far as ITIL and MOF approaches, these approaches are fundamentally different from those used to stay with us, these approaches are similar, in some ways have serious differences. ITIL uses five elements lifecycle service strategy 1-, 2-projecting service 3-introduction service, service operation-4, 5-monitoring service. Continuous improvement processes satisfying PDCA model (Plan-Do-Check-Act). The core of MOF consists of three phases: planning, implementation, operation, which complement the level of control that is used for all life cycle phases [6].

It should be noted that ITIL is designed so that it can be used regardless of the case used in the technology or system. As a result, ITIL focuses on the management structure, allowing IT to work successfully in the enterprise, regardless of the technologies used. In turn, the MOF is built for success on the Microsoft platform. It believed that MOF can be applied for use with other platforms [7].

ITIL technology uses a process approach, most of the components describing the processes and functions. Processes characterized measurability, certain result, the orientation of the consumer, the trigger (figure 1).
Process management of IT infrastructure of the enterprise has a number of advantages. Thus, in determining the types of activities, inputs, outputs, standards and requirements, you can increase the efficiency, the rationality of work, getting quality management tools.

3. The process of managing IT infrastructure - as the quality management process

Structuring process allows to control the quality in accordance with the cycle of the Deming PDCA (figure 2).

Thus, ITIL MOF and methodology can be used for process control and quality control of the information processes for the enterprise.

But how the organization will manage its risks and ensure the security of information resources on which it is dependent? As an organization can be confident that the information structure is achieving its objectives and supports the development of the company? These questions are answered COBIT – a package of open documents, more than 40 international and national standards and guidelines in the field of IT management, audit and IT security.

In difficult conditions, the successful and rapid decision-making in respect of assets and risks of the enterprise is necessary to choose what and how should be measured. Enterprises need objective criteria for assessing their current state, and the improvements they require, as well as some tools with
which you can make improvements. To answer these questions, COBIT provides the following definitions:

All other paragraphs are indented (“DOS style text is indented”):

- Maturity model, which is expressed in the form of a comparative analysis of the efficiency and capacity of IT processes.
- Targets and indicators of IT processes necessary to identify and assess their results and efficiency, based on the principles of a balanced system of business indicators, proposed by Robert Kaplan and David Norton.
- Action Objectives for direct IT process management, based on the objectives of COBIT control [8].

Evaluating the effectiveness of the IT sector is part of the control (figure 4). Evaluating the effectiveness considered COBIT and includes setting and monitoring measurable objectives which define the processes of IT and capacity and process efficiency. In many studies it has been found that the defects in the transparency IT costs, risks, and determining values are among the main incentive to improve the management area of IT, figure 3. While other management are subject to evaluate the effectiveness, transparency is achieved primarily with her help.

![Figure 3. Key areas of IT management.](image)

- Compliance with business strategy is a priority area. This area is responsible for communication between the enterprise goals and IT enterprise.
- Risk management and resource management are in second place. The key issues of resource management is the optimization of infrastructure, investment, knowledge, library staff. Risk management provides leadership, the company information on the possible risks related to the company.
- Evaluating the effectiveness provides control over the implementation of the strategy, the project results, the use of resources, processes, efficiency and service. For this purpose, in particular, a balanced scorecard that convert strategy in sequence, the results of which are measured by other, compared with accounting, methods.
- Usefulness provides control over the IT to processes provide advantages, certain strategy reduced costs.

4. Speed, adaptation, management, quality. Integrating the use of IT services

These areas of enterprise IT management tasks describe works with senior management, implementing IT governance in their organizations. COBIT methodology provides a common process model that represents all the processes as elements of IT functions that makes this basic model understandable to
operational IT staff and management. This process model is correlated with the focus areas of IT governance responsibilities and connects operations personnel with the guidance [9,10].

The COBIT focuses on what is required to achieve adequate management of IT at a high level, it is linked to other, more detailed standards in the IT sector, as well as best practices and methodologies.

COBIT methodology acts as an integrator of guidance materials, summarizing key objectives under a single methodology, which, in turn, linked to the management and enterprise requirements (figure 4).

Figure 4. Scheme relationship COBIT components.

The COBIT focuses on what is required to achieve adequate management of IT at a high COBIT is a methodology and tool that allows managers to address the shortcomings with regard to the requirements of control, technical issues and risks, and to convey the current level of control to stakeholders enables develop clear policies and best practices for IT control in organizations.

Table 1 shows the matching problems and the methodologies used.

| Level                      | Appropriate methodology / standard                                      |
|----------------------------|--------------------------------------------------------------------------|
| Audit of the management and control system | ISO 20000: the process of comparing the test results with the criteria |
| management control         | COBIT: management and process management control                         |
| Process Management Service Management | ITSM: process management (ITIL, MOF, and others)                         |
| enabling technologies for the management of the customer (services) | ITSM: Quality management services                                         |
| infrastructure management  | Technical competence                                                   |

The company may pursue different goals when implementing new methodologies: the creation of a high-speed system, reducing risk, reducing costs, audit and others. How to evaluate the effectiveness of the implementation methodology? It depends on the task. For example, you can use Key
Performance Indicators - KPI, IT-related processes. To do this, we can pick up the KPI indicators that are the most related to the field of automation. For example, the introduction of call-center should be reduced response times to inquiries, registration, and other applications. After defining the KPI’s, quantitatively related to the IT services we can collect statistics, to track the dynamics of the specified parameters. Monitoring on the long stretches of time will allow to draw a conclusion on quantitative indicators, and to assess the possibilities for changing the test indicator. Such statistics will evaluate the efficiency of the implementation, as well as be used for further work on the automation. On its basis we will be able to make preliminary estimates predict the effectiveness of similar systems, make decisions about the appropriateness of process automation.

Formulas of economic efficiency indicators of the implementation of information management systems structure can be also used for the calculation:

\[ P_{IT} = (T_0 - T_S) q_h, \]  

where \( P_{IT} \) – is an indicator of IT productivity, which shows how efficiently the time is used by employees of the IT department;

\( T_0 \) – the time that one IT employee spent on average “manually” performing work before implementing an IT management system;

\( T_S \) – the time that one IT employee should spend on average “manually” performing work after implementing an IT management system;

\( q_h \) – average hourly earnings of performers.

\[ E_{IT} = (N_0 - N_S) q_y, \]  

where the \( E_{IT} \) – an indicator of the effectiveness of IT service personnel, which characterizes the reserve of personnel preparedness: what additional number of different technologies and devices an IT department can handle without an increase in the number of employees;

\( N_0 \) – the number of IT service employees needed to support additional devices, applications, and users before implementing an IT management system;

\( N_S \) – the expected number of IT service employees needed to support additional devices, applications, and users after the introduction of an IT management system;

\( q_y \) – the value of the annual salary of IT specialist.

Then increase user productivity while reducing downtime \( E \) is expressed by the formula:

\[ E = (W_0 - W_S) s_h, \]  

where \( W_0 \) – the time during which users do not have access to the applications necessary for the performance of their duties, before the implementation of the IT management system;

\( W_S \) – the expected time during which users will not have access to the applications necessary for the performance of their duties, after the introduction of an IT management system;

\( s_h \) – the average hourly wage of employees of the enterprise.

In such a calculation the economic indicators are summarized in each direction. If the deduction of implementation and operation of the system of this expenditure, we obtain an estimate of the effectiveness of implementation.

5. Conclusion

Changes related to IT infrastructure with enterprise asset at the service allows you to make the IT department the most relevant requirements of the time, as a result, to ensure the effectiveness of investments in the sphere of IT investments. The use of various technologies for the optimal functioning of IT departments is a complex task. When choosing methodologies, one should start from the goals that must be achieved. The most complete and structured methodology in the field of service management and ITIL service management library can be used, focused on process management,
which solves the management of infrastructure control and management system, has a positive effect on customer satisfaction.

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