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Proposal for Optimization of Information System

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Abstract

The main objective of this paper was to analyze the enterprise information system in a selected organization, summarizing the benefits and identifying the deficits of the system, followed up by a proposal of system changes with the aim to compensate the identified deficits. Firstlyit is necessary to present theoretical perspective on the topic: defining what an enterprise information system is, outlining the types of enterprise information systems, and describing a life cycle of an enterprise information system. Next, there is described environment of the enterprise information system, its implementation, as well as the enterprise information system itself – hardware, software, people, and processes. In the last part of this paper we are dealing with the proposal of the optimization of the IS and its selection.

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Keywords: Information system, selecting of information system, ERP, criterions for the selection;

1. Introduction

In every large enterprise's information system (IS) is an important tool for managing the organization. Information systems are mainly used to automate performance of routine activities of the management and administrative management system. Information and work with information is considered a key economic resource. Field of information technologies is special in the fact that it reflects the dynamic changes. Information systems are constantly evolving. Every year there are new versions of software and hardware elements of IS as well as new technologies. Information systems need incorporating of legislative changes; therefore the development of information systems is a never ending process.

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To keep the business competitive it should keep pace with the advent of new technologies. The use of new technologies, of course, does not automatically create a competitive advantage, since it is a work with information. IS is only helpful for decisions and the decisions themselves should create a competitive advantage.

In this article we will look in detail at the information system of the selected company, analyze the used technology and processes and consequently we will propose amendment, which the organization should take in order to optimize the information system. We will bear in mind the fact that the cost of construction and operation of this information system should be adequate to its features and benefits for the organization.

In this article we describe the information system of a private company;it is described in a more complex mannermoreover we propose changes to optimize the information system.

The main objective was to describe the information system of the selected company, followed by proposals for system optimization. The authors evaluate the pros and cons of the existing system and propose measures to correct deficiencies. Examination of the information system was carried out comprehensively. While the information system consists of hardware, software, people, processes and data, all the components of IS were examined. We were not focused only on the type of software. The corrective measures have been proposed so as to be able to benefitfrom new trends in information technology (virtualization, clouds etc.) but at the same time taking into account the cost of developmentand operating an information system, which should be adequate to its features and benefits for the organization.

1.1. Hardware

An important part of every information system is hardware. Examined the issue was divided into three parts:

- Networks
- Servers
- Client computers and accessories

Network infrastructure is tackled by active network components - routers and switches. All computers are connected using cable network, Wi-Fi network is used, but it is limited only to selected users. Internet access is provided from a fixed line company Beneštra (GTS), whose bandwidth is 50 Mbit / s. Line end is using Cisco ASA box. The company has one public IP address; the other IP addresses are internal. Internet access is provided via a proxy server. Network switches are located in the server, as well as in the building and in the warehouse and sales department.

Servers are located in the main building in the server room. This room is provided with air conditioning and in case of power failure the UPS modules are installed to ensure power for a short period of time and correct server shutdown. Access to the room is limited and security of the room is sufficient. The company uses Hewlett-Packard servers for securing important parts of IS but also ‘no name’ servers or rather workstations used as a server, to secure some less essential systems.

Following servers are used:

- File server - for sharing of documents and files,
- Database server - for accounting and PAM,
- Mail server - server for e-mail,
- Proxy server - providing Internet access for users,
- Domain parent server - server for the Active Directory service,
- Backup Server - server for storing backups

All servers are physical, virtualization is not used. The latest server is three years old, the other servers are older and some are after expiration date. Cloud computing is not used, an attempt to use the cloud failed, this topic will be discussed in separate sections. Servers are installed regarding high availability.

Client computers and accessories were provided successively, as the company was expanding, with the prize of the computer being the most important factor. The purchase method is also applied at present. Purchases are made

from local suppliers of IT. Brand of computers is not fixed. Ordinary workers use desktop computers, department managers use laptops. Sales representatives use tablets. The number of personal computers throughout the company is 72. Life cycle variations hardware is not controlled. In the event of inadequate computer performance the employee must contact his immediate superior to request a replacement.

The company makes extensive use of printers. All printers are mainly Hewlett-Packard but to a lesser extent they also use Canon and Samsung printers. Altogether, the company has 32 printers; all printers are the property of the company. The graphics department uses network scanner. Scanners are also included in some network multifunction printers but primarily are not used for scanning.

1.2. Software and data

This area of IS will be divided into two parts: operating systems, application software

Mainly Microsoft server operating systems are used and also versions of Windows Server 2003 and Windows Server 2008 are used. Mail service is ensured by Linux. Also Domain Services ActiveDirectory is used. Client computers that are in the Professional edition are connected to this domain. Windows operating systems are in the OEM version.

Workstations mainly use Windows 7 (57 computers), as well as Windows XP (12 computers) and Windows 8 (3 computers). System versions are OEM, no Volume license agreement was concluded with Microsoft. Some computers are in Home edition, so are not connected to the domain. Tablets used by agents use Android system, especially because of easy installation of applications on connected to storage management.

Application software can be divided into two groups: office systems, ERP.

In the field of office systems mainly Microsoft Office is used. These applications use all users of electronic mail (Outlook) and people who work with word processing and spreadsheets. There were attempts to deploy applications of free Open Office which, which are free and can save the organization license fees, but problems with file compatibility arose, especially with Excel files. The company therefore has no problem, where relevant, if end-user requests the MS Office package. ERP systems are the main applications of the internal enterprise information system, which serves to identify a resource planning for business needs. In the monitored enterprise, the following three main applications are used: Golem, Omega fromKros company, Olymp from the Kroscompany.

2. Material and Methods

When creating this article it was necessary to study professional literature and consultation with competent staff of enterprise as well as with programmers and administrators of the IS application. In the process of gathering information were used methods of analysis and synthesis followed by a comparative method. In this section we compare the current information system deployed with the requirements and trends of modern information systems.

At the outset, we define systems, information systems, we describe the types of information systems, life cycle of the information system, the basic functions of IS, we describe ERP systems, server virtualization and cloud computing. At the same time objectives and methods of investigation were set.

Furthermore we devote to description of an information system in its comprehensive sense, i.e. description of the hardware, software, people, processes and description of selected data.

In the final part of the examination, results are compared to the set target of this article, our own attitudes to which we have come together with competent staff of enterprises areassessed and also the recommendations that we have created on the basis of available information.

3. Results

3.1. The GOLEM system

This system can be considered as the main part of the ERP system, as it is the input for most of data into the ERP, and after processing it is one of the major suppliers of the output data. The observed organization operates in the distribution of goods and it needs to record inputs and outputs of goods.Thisensures Golem system.

Simply putGolem system can be considered to be the warehouse management that is linked to the accounting system and the aggregated outputs of purchases and sales are used by sales department managers and even the Director-General. The programs is used primarily by sales workers, warehouse workers but also the sales department personnel who are in charge of ordering supplies and monitoring of the sale of goods for which they are responsible.

The functionality of the application does not currently differ from the modules of warehouse management of most similar systems. The program mainly serves for development of warehouse management agenda and of creation of inventory documents and inventory itself.

Features and functionality of the application:

- Working with multiple warehouses
- Stock cards
- Mass Changes in cards
- Bookkeeping of movements in stock
- Warehouse receipts
- Warehouseissue cards
- Invoicing and delivery notes
- Warehouse printouts
- Warehouse book closing
- Physical inventory of warehouse
- Import and export of data
- EDI

3.2. OMEGA system

The Omega system is used mainly by the economic department. It is mainly used for bookkeeping, invoicing and VAT. The CEO uses management outputs of this module as an information source when making decisions. We do not know the application details therefore we have used information materials from the website of the software manufacturer.

The system includes the following modules:

- Double entry accounting
- Billing and trade
- Warehousing
- Customer Relations
- Assets
- Driving and DPMV
- Users
- Network connection

Double-entry accounting enables the recording and accounting of all types of documents using the automatic account coding patterns and the possibility of accounting for the marketing year. In addition to all the basic accounting information the module also provides financial analysis. It is possible to register a charge of repayments in the module. The module includes an overview of important financial indicators in the company. The program itself carries out checks ledger and the general ledger, suggests a way of correction and allows correcting the document directly in the data overview. It includes remote banking (Databanking SLSP). It is possible to create domestic and foreign payment orders and use the possibility to import bank statements in the accounts.

Additional functionality:

- Accounting to the centers
- Accounting for the contract

- Domestic treasury
- Foreign currency treasury
- The VAT module
- Tax returns, accounting notes
- Exchange rates

Billing and trade enables convenient creation of customer invoices, credit notes, advance invoices as well as cancellation or penalty invoices. It also offers delivery notes, reminders, claims and repair order. Invoicing is connected with the stock and accounting. Final documents can be printed in several versions. For VAT payers theVAT module is essential. The module orderly administrates sent and received orders; it checks the condition of equipment orders or reservations.

Warehouse management - the company investigated does not use this module. In the program there is a possibility to create an unlimited number of warehouses. Warehouse Management supports the stock price via FIFO method or does averaging. Invoicing and warehouse are linked in handing out of goods. For managing the efficiency of inventory it is possible to use tracking of minimum and maximum amount of each type of goods. For each warehouse there is a large menu of reports and printouts (i.e. Income from sales, sale checks, the status of the stock, movement of stock, inventory, etc.).

Relationships with customers.The CRM module allows the entire customer communication, all phone calls, e-mails and documents found in one place. There is a full communication history with the customer, which is very valuable within customer support. Very practical is the calendar feature with reminders where you can schedule meetings, phone calls, business trips and other important events. The module also includes a statistical evaluation.

The asset is a complete evidence of current assets with an overview of the accounting and tax deduction. It contains an overview of inventory and the amount of output reports and allows monitoring of any movement of assets, including printing the necessary reports (a placement report, exclusion protocol, comparing the accounting and tax deduction, inventory, labels and cards of fixed assets, etc.).

It includes the following modules: Current assets,non-current assets

Rides–it allows you to record ridesof private and company vehicles at home and abroad. It includes distances dial, dial of compensation for the use of vehicles and it can print tax return of the vehicle to an original form and submit it electronically. The program easily creates a travel order directly from the ride records. Creating a travel order can be done manually but also via import of the log book. Board and pocket money for domestic and foreign travelscalculates the program automatically.

3.3. The OLYMP system

The Olymp application is mainly used by the department of personnel and wages. It is accessed by the finance director and outputs of the application are sent to the General Director.

Platform OLYMP payroll and human resources issoftwareforquick and correct calculation of payroll and human resources management. The program is primarily designed for the calculation of salaries, as well as processing fees for other types of employment, such as part-timers, statutory and shareholders. For each employee it can conduct thorough and comprehensive record of the amount of personal and professional data. Thanks to convenient operation and advanced features it makes payroll processing quick and easy. The program is appropriate for the calculation of wages under the Labor Code and according to Public Interest Act.

The program includes more than 200 output sets and reports to health insurance, to social insurance and to tax authorities. These reports can also be printed in their original forms or sent electronically.

4. Discussion

4.1. A hardware partition

Servers

The company operates its own servers in the server room and many of them are close to the end of their physical operating life. Some servers are actually work stations with installed server operating system. High availability of servers is not secured in case of failure of one of the servers which may jeopardize run of the entire company.

Suggestions for improvement:

The company has many small and old servers. The ideal solution would be to replace servers using the cloud. This solution would have to be done comprehensively by firstly replacing storage management that runs in the DOS environment which is not suitable for the cloud use. As a second variant, it would be possible to mention server consolidation using virtualization. We propose that the server consolidation could be done by purchase of two new physical servers which would replace the existing ones. By using virtualization it is possible to transfer existing servers to new servers and virtual environment will run without the need for system changes. Two servers are designed in order to achieve high availability of servers.

Virtualization means running several operating systems on a single physical computer. The basic principle of hardware virtualization is to create virtual machines by using software that can emulate a physical computer. This creates separate operating system environment that is logically isolated from the host server.

Workstations

The company owns 72 workstations, purchased from local suppliers with price of the computer being the most important factor. We appreciate the fact that sales representatives use tablets, as this sufficiently covers the needs of workers at a reasonable price. Life cycle variations of changing the hardware are not controlled and in the event of poor performance, the worker himself must ask for exchange computer.

Suggestions for improvement:

We have reservations about the fact that there is no concept of hardware purchase. The only criterion is the price which may initially seem like an advantage but in case of problems customer service is hard to achieve. We suggest that the company contracts one IT supplier, and determining the parameters of the computer purchase of, focusing on computers designed for office and business. Brand of purchased computers should be unified with focus on products that have at least three year warranty. IT supplier should be a long-established company with a serious approach;without possibility of downfall. We also have a reservation for a non-existent concept of hardware variations. We propose setting of the hardware replacement cycle which would be doneautomatically.

Printers

The company which has 80 employees and 72 computers operates 32 printers. It seems disproportionately many to us if one printer is used on average by two computers.

Suggestions for improvement:

Printers are purchased after the request from the employee almost automatically. Consolidation or analysis of the use of printers is not addressed. We propose to postpone the purchase of any printer. Use analysis of individual printers should be carried out and based on this analysis should be consolidated the number of printers.

4.2. Software area

In the software part we will focus on IS optimizing in terms of application equipment, as well as operating system optimization.

Operating Systems

The company mostly usesMicrosoft Windows operating system as well as LINUX which is used on some servers and also Android operated tablets are used. All licenses are OEM. Central systems updating via Windows Server Update Services (WSUS) is not performed.

Suggestions for improvement: For Windows XP software manufacturer support ended in 2014 and in July 2015 will end support for Windows 2003. Despite this fact, the Company continues to use the mentioned operating systems. Without the system support it is running but no updates are available which can cause problems in the security of the system. We propose the transition to the current versions of OS, in case that the hardware for the transition is not sufficientwe suggest changing the entire computer. We suggest that the company concludes a contract with Microsoft and purchase office applications purchased through volume licensing program. To volume licensing program it is possible to purchase Software Assurance - when Microsoft releases a new version of

software the company automatically gets a license for the software and can use it legally. Price for Software Assurance is 25% of the regular license.

Application Systems

One of the most important parts of the information system is the area of application software. The surveyed companies use three main applications - Omega and Olympia from Kroscompany and system Golem which wasin-house developed. All workers who use e-mail services use Microsoft Outlook, some workers use Microsoft Word and Excel. Versions of Office are not consistent and all versions of Office from 2003 up to 201 3are used, predominantly version 2010.

The "relationships with customers" module is only used for recording incoming correspondence. The main function of this module was purchased but is not used. The "warehouse management" module wasn't purchased. This module is replaced by custom application – Golem System. Within The Olympapplication all modules have been purchased and are also used.

Suggestions for improvement: We have no objections to the use of paid Office software however it would be appropriate to unify the application versions. There is also 2003 version where files are not compatible with newer upgrades (vs. DOC DOCX, XLS, XLSX vs. etc.). Producer support for this version also ended. We suggestswitching to the latest version. This transition could be solved by licensing agreement with Microsoftalong with the conclusion of Software Assurance agreement. For accounting and payroll the company uses Omega orOlymp from Kroscompany. It is a system for SMEs which runs under Microsoft Windows. It can work well under the SQL database; so the system responses are sufficient even if the system is used by multiple users.

Internet, Intranet

In the software field, we would like to mention the use of web server on the Internet and Intranet. The Company uses a website which contains basic information about the company, range of their products, contact of the company and current events. The page is createdusing static HTML code and in our opinion does not meet the parameters for contemporary modern website. It is not constructed in accordance with responsive design. Responsive web design is used for web pages whose graphics are adapted to different types of devices like mobile phones, computers, tablets and the like. Website can recognize the characteristics of the equipment in which it is displayed and consequentlyadapts itself. Company intranet is not used at all.All corporate information is exchanged only via mail. All tasks, regulations and orders from General Director are sent via mail.

Suggestions for improvement: We recommend redoing the website in order to comply with responsive design. We also recommend adding informative content to the website. We also recommend considering the use of e-shop through which the customers create their own orders, without the need of sales representatives. Exchange of information within the company would be done via the intranet site. Since the company is focused on systems from Microsoft we suggest the intranet to be created in SharePoint. Microsoft SharePoint is the application platform for web developed by Microsoft. It provides services such as CMS (Content Management System) and integration with other services.

5. Conclusion

Companies with its own capital that originated in early 90s began to build their information systems gradually. Given the prices of hardware and software at the time, information systems were not automated by computers and were only in paper form. Only later they started to gradually automate information systems, started purchasing personal computers, servers and software. This way of building information system was applied also in the company of our choice. The aim of the paper was to analyze the current state of company's information system, compare the current situation and then propose solutions to optimize the IS. We designed the optimization of all components of the IS. Examined company built its information system gradually and in certain areas did not respond to the dynamic changes taking place in information technology. We pointed out these shortcomings and propose solutions to optimize the information system with regard to new trends in information technology but at the same time wetook into account the cost of development and operation of the information system, which should be adequate to its features and benefits for the organization. The proposed changes (see below) should optimize the existing information system so that the company keeps pace in the field of information and at the same time optimize the costs of operation of the system and ensure the availability of services.

To clarify the proposed steps to optimize our designs we present the following summary:

- Server consolidation
- Use of virtualization
- Ensuring high availability of servers
- Establishing general contract with a supplier of IT hardware
- Unify the brand of purchased computers
- To purchase computers with the longest guarantee period and with a secure service
- Define the concept of hardware variations
- Consolidation of printers
- Analyze the use of printers, followed by the proposed optimization
- The transition to the current version of operating system (including servers andworkstations)
- Close volume licensing contract with Mirosoft
- Purchase of Software Issurance
- Start using WSUS to update systems
- Start using CRM system
- Stop system development of Golem and change it for the storage system Omega
- Upgrade the website
- Start using the Internet for e-shop orders from customers
- Start using intranet

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