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## USAGE OF VIRTUALIZATION TECH IN LOGISTIC INFORMATION SYSTEMS

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### **Abstract:**

*The article focuses on the implementation of a technical solution of the company's logistic information system using x86 virtualization technology. It will going to cover mainly information acquisition, information processing, information storage and backup, distribution and high availability of the information system. Aim of the article is to manage enterprise information systems by virtual computers and servers to get effective information flows. Rationalization will focus on managing information flows within existing information systems (logistics including) and re-designing the information technologies used in them.*

### **Key words:**

*Information systems, virtualization, logistic*

## INTRODUCTION

Information systems (IS) are integrated into company logistics. They must be designed so that the logistics flows can be effectively managed. Their design influences all logistics processes of the company. IS are formed and depend on information technologies that directly affect them (positive or negative). Within the enterprise's logistics exist several different managed flows like a material, financial, distribution and other, but the article deals mainly with information flows using by existing information systems (including logistics). Covers possibility of using the appropriate virtualization technologies inside.

## 1 THEORY AND METHODS

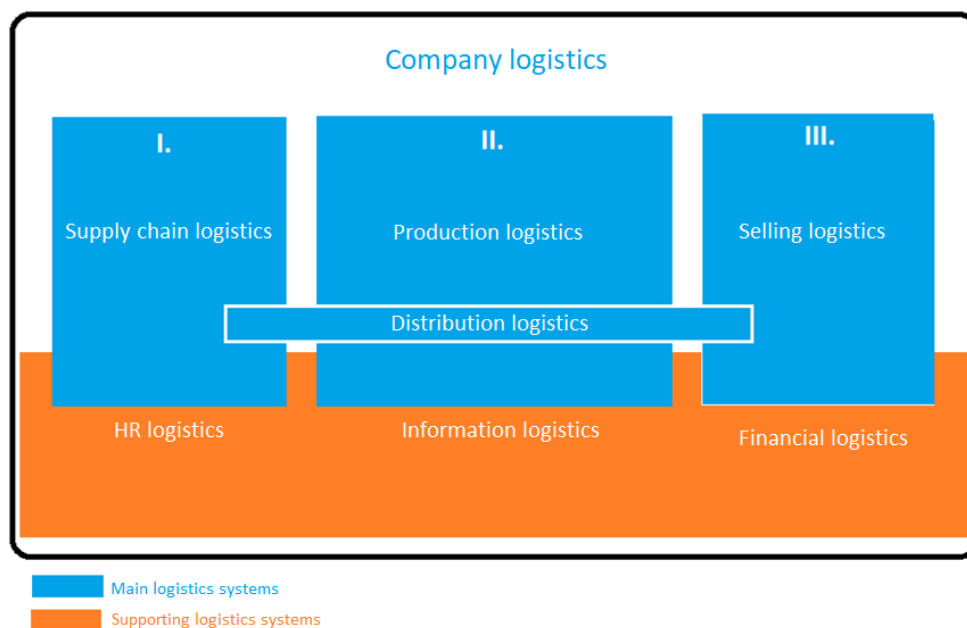
In each company is required to manage material and information flows that are related together. The role of logistics is not only management these flows, but also to plan and evaluate

them. Each company has different levels of management, but we can always find there top management, middle and executive management for each one.

The purpose of logistics is to ensure efficient flow management (in company logistics, it is mainly material, information, finance) so that they are always available in the appropriate amount, time and the right recipient in order to meet the needs and requirements of the customer or of another systems as an inputs. The logistics system can be defined as the steering of production, transport, information and other activities as flows, while such a system meets the logistics principles. Information logistics is the science of managing the company's information system and processes while respecting the basic principles of logistics [1]. It is a supportive and inseparable subsystem of logistics. The basic unit of information logistics is information and main focus is on the following tasks:

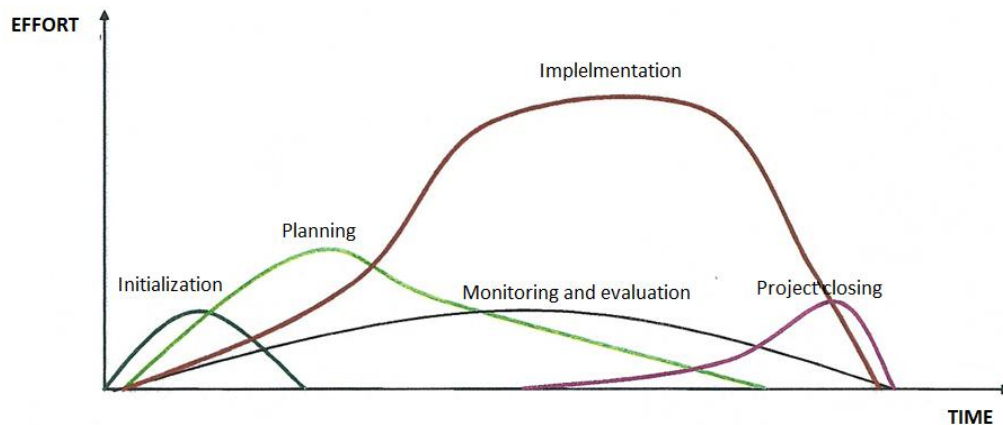
- Collecting, processing and securing the flow of information related to the movement and processing of material, goods and services.
- Integrating logistics activities by deploying an appropriate information system.
- Provide information to management who can set, strategies, goals and assess performance evaluation.

Each information system, and thus the logistics information system also, includes the technical equipment, the software and the service staff itself. The IS architecture consists of a functional, technological and data subsystem [5] as shown in Figure 1.



**Fig.1** Main and other logistics subsystems of company

Designing of information systems is a complex task, and every step requires special attention. The development phases of any system are: preliminary analysis, system specification, system design, implementation, handover into production with full documentation. The individual design phases have different time and performance requirements as shown in Figure 2 according to the PMI methodology.



*Fig.2 Phases of project based on PMI [3]*

There are several methodologies for designing the IS, such as [4]:

- Process-oriented approaches (Gane-Sarson methodology),
- Data-Object Access (Warnier / Orr State Chart Extensions),
- Combination of the two previous methods (Yourdon's method)
- Structured methods (STC, JSP, JSD).

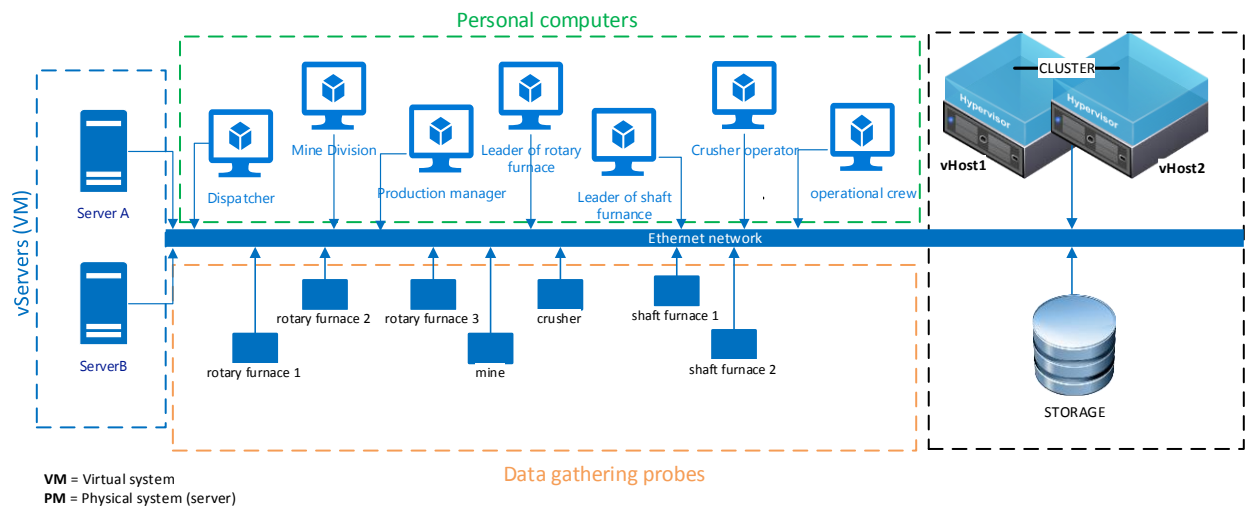
The Gane-Sarson methodology puts emphasis on Data Flow Diagrams (DFDs) when creating a logical model of the system. Another method mentioned is SSADM developed by LBMS, which puts focus on verifying the results at each stage, so that the faults will not be transferred to the result later. Yourdon method is one of the traditional methods where modeling is the essence for subsequent implementation into a particular environment.

Design of information systems is covered also in publication *Projektování informačních systémů* from D. Kajzar. [6]

### **1.1 Application of virtualization of information and logistics systems in the mining company**

One of the functions of logistics information systems is to support logistics functions in production, management and control. Information must be available in time, in the required quality for the relevant manager or other systems. [1]. All of these data flows strongly depend on the ICT systems that make up the technical and technological part of the logistics information systems. Therefore, if we want to achieve greater reliability, efficiency and higher logistic systems productivity, we must put our attention on this component too.

As example, we have company in which virtualization is implemented will have several workplaces from raw material extraction, subsequent crushing, various material processing, rotary and chess furnaces, mills, packaging and warehouses. When each workstation is connected to an Ethernet network, it is possible to use them for any information flows or information exchange. For the management purposes it is advisable to centralize these flows. Implementation of virtualization technology for mining company which produce of several products from raw materials and distribute it to the metallurgical industry, scheme should looks like it is described on Figure 3.



**Fig.3** Scheme of LS for production controlling based on virtualization tech

Virtualization can bring many benefits over the traditional deployment of computing and information technology (a large number of physical servers, desktop computers). Like a consolidation of systems, independence of virtual systems on the used hardware, high efficiency of the use of computing power or scalability of the solution. Who wants to go deeper, learn more about virtualization itself, tries to search for book from Matthew Portnoy *Virtualization Essentials* [7] which cover from common definition of virtualization to creation of virtual machines and run application inside them.

### 3 CONCLUSIONS

In the traditional deployment of information technology exists several physical components like servers with high performance required, but also a larger number of computers for users who are actively or passively entering into production process. Everyone and everything in defined process must have available information. However, if important information systems of our logistics system fail due to a hardware or software failure, information flow can be interrupted and production should have unnecessary delays or complete outage. Another business-critical demands are production without information loss. Someday in the future, the company should decide to expand its production which requires expansion of logistics and information systems also. With traditional solution, what was mentioned above can be a significant problem because, it will have to replace obsolete systems, which will cause longer downtime and inaccessibility of the information system.

Solution is use virtualization tech to eliminate amount of physical systems needed for collecting, transmitting, evaluating and displaying the information to a minimum. By using of x86 virtualization you can get advantages like high availability, scalability, system adaptability to change, and better use of computing power.

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