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У збірнику подано іноземними мовами результати наукових досліджень студентів, аспірантів та молодих науковців у різних галузях економіки, що можуть зацікавити світову наукову спільноту. Регулярні публікації робіт допоможуть виявити талановиту студентську молодь, здатну брати участь у міжнародному професійному, науковому та освітньому обміні та втілювати одержаний досвід у розвиток передових технологій.

Усі матеріали публікуються в авторській редакції.

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components are the basis of model construction. When formulating an area, two components must be considered: latitude and depth.

Latitude means defining the boundaries of a model that will be considered inside the system and outside.

Depth determines at which level of detail the model is considered complete. The purpose of the simulation is determined by the answers to the question:

- why this process should be modeled;
- what the model should show;
- what an information system client can get.

Viewpoint is the perspective from which the system is observed when building a model. The view must be consistent with the purpose and boundaries of the simulation. As a rule, the point of view of the person in charge of the simulated work is selected.

The functional model analysis allows us to understand where the weaknesses of existing business processes are, what will be the benefits of new business processes.

Further, the design process involves functional decomposition when the overall function is broken down into large subfunctions. Then each subfunction is decomposed into smaller ones, and so to the required level of detail description.

## **References**

1. Modern Integrated Technology of Information Systems Design and Development. URL: <https://books.google.com.ua/books?id=ym9sDwAAQBAJ&pg=PA250&lpg#v=onepage&q&f>.
2. Репин В. Два способа построения моделей бизнес-процессов в IDEF0. URL: <https://www.cfin.ru/itm/bpr/idefo.shtml>.
3. Тарасова О. О. Моделювання бізнес-процесів торговельного підприємства з використанням стандарту IDEF0. URL: <http://ena.lp.edu.ua/bitstream/ntb/26315/1/27-172-178.pdf>.

**Savchenko V. M.**

## **VIRTUALIZATION TECHNOLOGIES IN A MODERN UNIVERSITY**

*Language Advisor – Asst. Prof. Chevychelova O. O.  
Kharkiv National Automobile and Highway University*

Virtualization technology has been known since the 60s of the twentieth century (IBM System / 360™ Model 67), but it has developed rapidly over the past 15 years. From a technical point of view, they distinguish emulation (Qemu), full hardware virtualization (Intel-VT, AMD-V), para-virtualization (Xen) and OS-level virtualization (OpenVZ, FreeBSD Jail, etc.).



Most often, educational institutions use virtualization technologies in the form of virtual machines (Oracle VirtualBox), which allows you to create customized jobs for various tasks.

Oracle Virtualbox. The author has experience of using Oracle VirtualBox in the learning process. Advantages: free; ease of deployment through built-in cloning mechanism; the ability to work with various operating systems in full access mode; low level of occurrence for using this technology; You can find many ready-to-use virtual machine images on the Internet (for example, <https://bitnami.com/stacks>, <https://virtualboxes.org>, <http://www.oracle.com>).

The disadvantages include certain and rather high requirements for equipment: a minimum of 512 MB of RAM (in practice, from 1-1.5 GB and above); the presence of free space on the hard drive (from about 10 GB per image); availability of hardware virtualization support, without which it is impossible to run 64-bit operating systems and some operating systems (FreeBSD, OpenBSD, latest versions of Windows 8-10).

Thus, the minimum requirements can be considered a personal computer with such characteristics – a processor with support for Intel-VT or AMD-V, RAM from 1GB, free hard disk space from 10 GB per image. Despite the fact that these requirements are not too high, but in some cases, they will be the main constraint.

OpenVZ. The author also have the experience of using OS-level virtualization for several years in the following configuration: HP Proliant ML150 server (Intel Xeon 5050 (2-core), 2 GB RAM, two 300 GB SATA HDDs combined in a RAID array); operating system – Debian GNU Linux with a modified kernel to support OpenVZ; a classroom of 20 personal computers in different configurations, integrated into a local network with a data transfer rate of 100 Gb/sec. In this case, the client computer must be equipped with a network card and any program, for example, PuTTY (<http://www.putty.org>), which allows you to remotely connect to a Linux server [1].

The virtual computer lab in the described configuration was used for students studying computer technology, operating systems, computer networks, programming, and Web programming and has shown its high efficiency.

The advantages include the absence of special requirements for client hardware and software; centralized management of virtual network infrastructure; the possibility of simultaneous operation of a large number of virtual machines (in the specified server configuration, up to 300-320 virtual machines).

Among the shortcomings, we highlight: fairly high requirements for the server; fairly high requirements for the qualifications of staff; relatively high complexity of the initial configuration; limited set of supported operating systems (Linux only);

In general, virtualization technologies have been successfully used and are used in the educational process for students in various fields, including non-computer.

Cloud services is a next type of virtualization. Now many education resources going to clouds and this is a new form of educational services. Traditionally, there are three main types of cloud services [2–4]:

- Infrastructure as a service (IaaS). The service provider provides the user with basic computing power - hardware, virtualization platform, certain network traffic, and agreement on use, tools for accounting for resources used and their billing. Payment includes charging common or guaranteed allocated computing power;
- Platform as a service (PaaS). The user is provided with a customized operating system and development tools – DBMS, compiler or interpreter of programming language, debugging and testing tools. PaaS payment is calculated based on the amount of computing power used (software uptime, data volume, number of transactions, network traffic, etc.);
- Software as a service (SaaS). This model offers the end user-customized software for access to which the Internet is used. Among the most famous providers of such services, Microsoft (Microsoft Office 365, Exchange Online, etc.), Google (Google Apps for Work, Google Cloud Platform), Zoho and others are traditionally distinguished. This segment offers applications for office, project management, financial computing, scientific computing, modeling, etc.

Conclusion. The application of virtualization technologies and cloud computing for information content of the educational process is considered. It is shown that virtualization and cloud computing can reasonably extend the life of the computer park.

## References

1. Мнушка О. В., Савченко В. М. Вибір засобів віртуалізації для застосування в учбовому процесі та дистанційному навчанні. *Проблеми й перспективи розвитку IT-індустрії*: матеріали І-ї Міжн. наук.-практ. конференції. Харків : ХНЕУ, 2009. С. 323–324.
2. Fernández A., Peralta D., Herrera F., Benítez J. M. An Overview of E-Learning in Cloud Computing. *Workshop on Learning Technology for Education in Cloud*. Springer Berlin, Heidelberg, 2012. Pp. 35–46.
3. Pocatilu P., Alecu F., Vetrici F. Using cloud computing for E-learning systems. *Proc. of the 8<sup>th</sup> WSEAS Int. Conf. on Data networks, comm., computers*. Stevens Point, Wisconsin, USA, 2009. Pp. 54–59.
4. Alabbadi M. Cloud computing for education and learning: Education and learning as a service (ELaaS). *Proc. of 14<sup>th</sup> Int. Conf. on Interactive Collaborative Learning*. Piestany, 2011. PP. 589–594.

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Адреса редакції: 61002, м. Харків, вул. Ярослава Мудрого, 25, тел. 752-88-87