“Київський фаховий коледж зв’язку”

Циклова комісія Комп’ютерної інженерії

**ЗВІТ ПО ВИКОНАННЮ**

**ЛАБОРАТОРНОЇ РОБОТИ №1**

з дисципліни: «Операційні системи»

**Тема: «Ознайомлення з робочим середовищем віртуальних машин та операційних систем різних сімейств»**

Виконали студенти

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Перевірив викладач

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**Мета роботи:**

1. Отримання практичних навиків роботи з середовищами віртуальних машин та операційними системами різних типів та сімейств – їх графічною оболонкою, входом і виходом з системи, ознайомлення зі структурою робочого столу, вивчення основних дій та налаштувань при роботі в системі.

**Матеріальне забезпечення занять**

1. ЕОМ типу IBM PC.

2. ОС сімейства Windows (Windows 7).

3. Віртуальна машина – Virtual Box (Oracle).

4. Операційна система GNU/Linux – CentOS.

**Завдання для попередньої підготовки**

***Готував матеріал студент Скряга П.***

1. Прочитайте короткі теоретичні відомості до лабораторної роботи та зробіть невеличкий словник базових англійських термінів з питань класифікації ОС.

|  |  |
| --- | --- |
| Термін англійською | Термін українською |
| **Operating System** | Операційна система |
| **Shared hosting** | Віртуальний хостинг |
| **Dedicated hosting** | Власний хостинг |
| **Binary translation** | Двійковий переклад |
| **Software** | Програмне забезпечення |
| **Kernel** | Ядро |
| **JVM (Java Virtual Machine).** | JVM (віртуальна машина Java). |
| **Open Source** | Відкритий вихідний код |
| **Distributions** | Дистрибутиви |
| **Modularity** | Модульність |
| **Specification** | Специфікація |
| **Hardware and Software Components** | Апаратні та програмні компоненти |
| **Multi-tasking** | Багатозадачність |
| **System administration** | Системи адміністрування |
| **Terminal** | Термінал |
| **Command line functions** | Функції командного рядка |

1. Прочитавши матеріал з коротких теоретичних відомостей дайте відповіді на наступні питання:

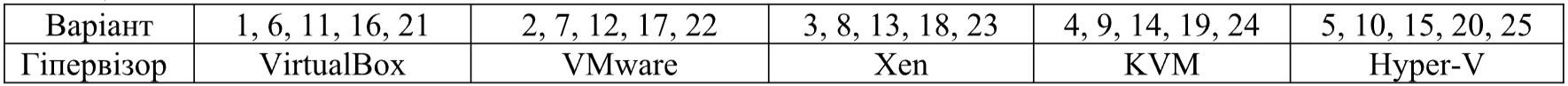
***Готував матеріал студент Скряга П.***

2.1 Охарактеризуйте поняття «гіпервізор». Які бувають їх типи?

*A hypervisor, also known as a virtual machine monitor (VMM), is a software layer that enables the virtualization of physical hardware resources, allowing multiple operating systems to run concurrently on a single physical machine. There are basically two types of hypervisors. Type 1 and type 2. Type two is divided into pure and practical hypervisor. There is also a third type (hybrid) that combines the properties of both types.*

2.2 Перерахуйте основні компоненти та можливості гіпервізорів відповідно до свого варіанту (порядковий номер по журналу), табл.1.

Таблиця 1 (11 варіант)



*Oracle VM VirtualBox are the most popular Type 2 hypervisors. Oracle VM VirtualBox is a modular crossplatform hypervisor for Linux, macOS, Microsoft Windows, FreeBSD, Solaris/OpenSolaris, ReactOS, DOS and other Oracle systems. The hypervisors was created in 2007 by Sun Microsystem; after Oracle absorbed the company, work on the hypervisor continued. The source code of the basic version was opened through the GNU GPL license; the hypervisor is popular due to the unlimited modification capabilities. VirtualBox can support x64 guest operating systems, even if the host OS is 32-bit.*

*A typical VirtualBox deployment includes the following components:*

* *A hypervisor for the host system.*
* *A software development kit (SDK) and an application programming interface (API) for administering guest VM operations.*
* *A command-line tool for local guest management.*
* *A web service that enables users to manage guests remotely.*
* *A wizard-style tool for guest management.*
* *A console that displays guest applications on the host.*
* *A remote desktop protocol (RDP) server enables users to access guests using a remote client.*

*A typical VirtualBox features:*

* *Snapshots of the RAM and storage that allow reverting to a prior state.*
* *Screenshots and screen video capture*
* *"Host key" for releasing the keyboard and mouse cursor to the host system if captured (coupled) to the guest system, and for keyboard shortcuts to features such as configuration, restarting, and screenshot.*
* *Mouse pointer integration, meaning automatic coupling and uncoupling of mouse cursor when moved inside and outside the virtual screen, if supported by guest operating system.*
* *Seamless mode – the ability to run virtualized applications side by side with normal desktop applications*
* *Shared clipboard*
* *Shared folders through "guest additions" software*
* *Ability to specify amount of shared RAM, video memory, and CPU execution cap*
* *Ability to emulate multiple screens*
* *Command line interaction (in addition to the GUI)*
* *Nested paging for AMD-V and Intel VT*
* *Limited support for 3D graphics acceleration*
* *Teleportation (aka Live Migration)*
* *2D video output acceleration (not to be mistaken with video decoding acceleration)*

**Хід роботи**

***Готувала матеріал студентка Чурюмова К.***

2.1. Перерахуйте етапи для розгортання операційної системи на базі віртуальної машини VirtualBox.

* Go to the virtual machine settings, media section
* Press the add optical drive button
* Choose the image that we downloaded before, click OK
* Starting the virtual machine
* In the window that appears, choose - download CentOS 7
* Choose the language of the system
* In the item "placement and installation" we choose "automatic disk partitioning"
* Keep KDUMP enabled
* We begin the installation
* Select the "root password" section and set the administrator password
* After the installation is complete, press the restart button
* In a new window, enter the "root" login and password

2.2. Чи є якісь апаратні обмеження при встановленні 32- та 64-бітних ОС?

For 32-bit RAM at least 392 MB (CLI) and 512 MB (GUI). The hard drive capacity is at least 2 GB.

For 64-bit RAM, at least 1024 MB. The hard drive capacity is at least 2 GB.

2.3. Які основні етапи при встановленні CentOS в текстовому режимі?

***Готував матеріал студент Скряга П.***

* *Downloading CentOs (using CentOs 6.5 as an example)*

*Boot your computer from the CentOS 6.5 installation DVD*

* *Switch to text mode*

*Press TAB and simply type "text" and press enter. You will automatically switch to text mode.*

* *The Anaconda installation process*

*Next you need to do everything as if you were downloading a regular application and select a couple of options according to your needs, such as*

* + *Selecting the system language*
  + *Selecting the keyboard language*
  + *Hard drive partition (ignore or re-initialize)*
  + *Time zone selection*
  + *Root password*
  + *Partitioning type (use entire drive/replace existing Linux system/use free space)*
  + *And then the recording to the disc*
  + *At the end, reboot the system*
* *Log in to the virtual system host*

*You will need to activate the interface with the command (ifup eth0)*

2.4. Яким чином можна до установити графічні оболонки Gnome та KDE на CentOS, якщо вона вже встановлена в текстовому режимі (вкажіть необхідні команди та пакети)?

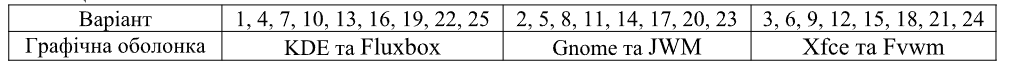
***Готував матеріал студент Скряга П.***

*Make sure that the system is connected to the Internet and run the command (yum groupinstall "GNOME Desktop" "X Window System" "Fonts", "Dekstop Platform") for GNOME and (yum groupinstall "KDE Desktop" "X Window System", "Fonts", "Dekstop Platform") for KDE. After that, restart the system*

***Готувала матеріал студентка Чурюмова К.***

2.5. Дайте коротку характеристику графічних інтерфейсів, що використовуються в різних дистрибутивах Linux відповідно до свого варіанту (порядковий номер по журналу)

Таблиця 2



***Готувала матеріал студентка Чурюмова К. (13 варіант)***

*KDE is a full-featured graphical shell for Linux and Unix-like operating systems that offers many features and extensions for a user-friendly and productive working environment. It has a graphically designed user interface with many customizable elements such as taskpads, file manager, window manager, etc. KDE uses Qt for rendering and has a large community of users and developers.*

*Fluxbox is a lightweight graphical shell that offers minimalistic design and high performance. It is based on the Blackbox window manager and provides quick access to programs and windows using keyboard shortcuts. Fluxbox does not have a large number of built-in functions, but allows users to easily customize their working environment using text configuration files. It is especially suitable for users looking for a simple and efficient work environment.*

**Відповіді на контрольні запитання**

***Готувала матеріал студентка Чурюмова К.***

1. Порівняйте гіпервізори типу 1 та типу 2, яка між ними відмінність та сфера їх застосування?

*Differences: Type 1 hypervisor (e.g. Xen, VMware ESXi) works directly at the hardware level, without the need for a host operating system. A type 2 hypervisor (for example, VirtualBox, VMware Workstation) is installed on top of the host operating system. Type 1 hypervisor (for example, Xen, VMware ESXi) works directly at the hardware level, without the need for a host operating system. A type 2 hypervisor (for example, VirtualBox, VMware Workstation) is installed on top of the host operating system. The type 2 hypervisor, although less interfering with the system layer, may be more convenient for development and testing. Scope: Type 1 hypervisors are used in server environments where many virtual machines need to be virtualized. Type 2 hypervisors are more commonly used on workstations for development, testing, and local virtualization.*

2. Розкрийте поняття «GNU GPL», яка його основна концепція?

*The GNU GPL (General Public License) is a license agreement developed by the Free Software Foundation (FSF) that provides free access, use, modification and distribution of software. The basic principles of the GPL include the obligation to store open source code for all changes that have been made in the software product, and the prohibition of taking this right for subsequent versions.*

3. В чому суть програмного забезпечення з відкритим кодом?

*Open Source Software (OSS) is software for which source code is available and users have the right to view, modify and distribute it.*

4. Що таке дистрибутив?

*Distribution indicates an operating system package that includes the Linux kernel, system utilities, libraries, tools, and additional software*

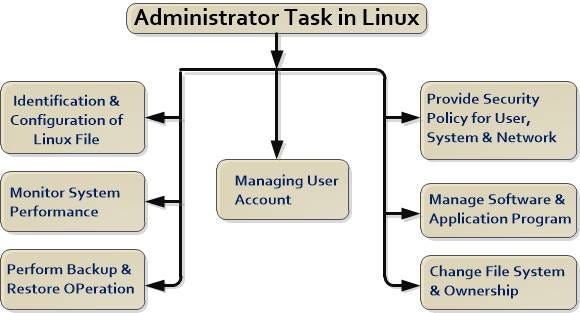
***Готував матеріал студент Скряга П.***

5. Які задачі системного адміністрування можна реалізувати на базі ОС Linux?

*The main tasks of system administration based on Linux are*

* *Managing users and groups (creating, deleting and managing users and groups, granting access rights to files and directories)*
* *Network configuration*
* *Process management (start, suspend, resume, delete processes)*
* *Security settings (setting access rights to files)*
* *Software update and management*

*This diagram shows the work of a system administrator in a good way:*



6. Як пов’язані між собою ОС Android та Linux?

*The Linux kernel is the most popular operating system, while the Android framework is built on top of the Linux kernel. Linux is the core part of the Android operating system but it does not include more like a linux. The android developers can modify the linux kernel as per their*

*requirements. That is to say all Android devices use the Linux kernel, but Android is not present in every Linux device.*

7. Основні можливості та сфера використання Embedded Linux?

*Key features of embedded Linux include a small footprint, support for real-time applications, power management capabilities, a variety of networking protocols, and customizable user interfaces. The main application of Embedded Linux is to power specially designed hardware for specialised use cases.*

8. Яким чином можна змінити типу завантаження Linux: в текстовому режимі (3 рівень) або графічному (рівень 5)? Чим відрізняються режими CLI та GUI?

*The procedure is as follows to change into a text mode runlevel under systemd:*

* *Open the terminal application.*
* *For remote Linux servers, use the ssh command.*
* *Find which target unit is used by default: systemctl get-default*
* *To change boot target to the text mode: sudo systemctl set-default multi-user.target*
* *Reboot the system using the reboot command: sudo systemctl reboot*

*Want to revert change boot to GUI instead of text mode?*

* *Open the Linux terminal application.*
* *Again, for remote Linux servers, use the ssh command.*
* *Find which target unit is used by default: systemctl get-default*
* *To change boot target to the GUI mode: sudo systemctl set-default graphical.target*
* *Make sure you reboot the Linux box using the command: sudo reboot*

*The difference between GUI and CLI:*

|  |  |
| --- | --- |
| *CLI* | *GUI* |
| *CLI is difficult to use.* | *Whereas it is easy to use.* |
| *It consumes low memory.* | *While consuming more memory.* |
| *In CLI we can obtain high precision.* | *While in it, low precision is obtained.* |
| *CLI is faster than GUI.* | *The speed of GUI is slower than CLI.* |
| *CLI operating system needs only a keyboard.* | *While GUI operating system needs both a mouse and keyboard.* |
| *CLI’s appearance can not be modified or changed.* | *While its appearance can be modified or changed.* |
| *In CLI, input is entered only at a command prompt.* | *While in GUI, the input can be entered anywhere on the screen.* |
| *In CLI, the information is shown or presented to the user in plain text and files.* | *While in GUI, the information is shown or presented to the user in any form such as: plain text, videos, images, etc.* |
| *In CLI, there are no menus provided.* | *While in GUI, menus are provided.* |
| *There are no graphics in CLI.* | *While in GUI, graphics are used.* |
| *Some command-line environments provide multitasking but it is complicated to see several things on one screen.* | *GUI enables a user to easily observe and operate various things at once.* |
| *CLI enables a user to simply script a series of instructions to carry out a task or execute a program.* | *GUI does not provide the facility to script a sequence of commands.* |

**Висновки**

*Conclusion: in the course of laboratory work, we studied various types of hypervisors, the main types of modern operating systems. In more detail, the question of the VirtualBox hypervisor and the KDE and Fluxbox graphical shells is theoretically investigated.*