"Kyiv Professional College of Communication"

Cycle Commission of Computer Engineering

REPORT ON THE IMPLEMENTATION

LABORATORY WORK №1

in the discipline: "Operating systems"

Topic: "Familiarization with the working environment of virtual machines and operating systems of different families"

Performed by a student

of the group BIX-13

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Purpose of the work:

1. Acquiring practical skills in working with virtual machine environments and operating systems of various types and families - their graphical shell, logging in and out of the system, familiarizing yourself with the structure of the desktop, learning the basic actions and settings when working in the system.

<p style="text-align: center;">**Material support for classes**</p>

<p style="text-align: center;">**1. Computer such as IBM PC.**</p>

<p style="text-align: center;">**2. OS of the Windows family (Windows 7).**</p>

<p style="text-align: center;">**3. Virtual machine - Virtual Box (Oracle).**</p>

<p style="text-align: center;">**4. GNU/Linux operating system - CentOS.**</p>

<p style="text-align: center;">**Tasks for preliminary preparation**</p>

<p style="text-align: center;">**Translated with DeepL.com (free version)**</p>

1. Read the brief theoretical information for the laboratory work and make a small dictionary of basic English terms on the classification of operating systems.

Термін англійською	Термін українською
Operating System	Операційна система
Shared hosting	Общий хостинг
Type 1 hypervisor	Гипервизор типа 1
Machine simulators	Машинные тренажеры
Binary translation	Двоичный перевод
Type 2 hypervisors	Гипервизоры типа 2
Host operating system	Хостовая операционная система
Guest operating system	Гостевая операционная система
Java Virtual Machine	Виртуальная машина Java

2. After reading the material on brief theoretical information, answer the following questions:

2.1. A hypervisor is software or hardware that allows you to run and manage virtual machines. They are of two types:

-Type 1 Hypervisor: Located directly on the hardware level. Examples include VMware ESXi and Microsoft Hyper-V Server.

-Type 2 Hypervisor: Sits on top of the host operating system. Examples include VMware Workstation and Oracle VirtualBox.

2.2. The main components and features of VMware hypervisors:

-VMware vSphere Hypervisor (ESXi): Type 1 Hypervisor that provides virtual machines with direct access to hardware resources. It has powerful tools for managing and monitoring virtual environments.

-VMware Workstation: Type 2 Hypervisor for creating and running virtual machines on workstations. It provides advanced features for testing and software development.

-VMware vCenter Server: A centralized virtual environment management platform that allows you to manage multiple hypervisors and virtual machines from a single interface.

Procedure.

2.1. The steps to deploy an operating system based on a VirtualBox virtual machine usually include the following:

Downloading the operating system image.

Create a new virtual machine in VirtualBox.

Configure the virtual machine parameters (for example, the amount of memory, number of processors, hard disk space, etc.).

Connect the operating system image to the virtual machine.

Start the virtual machine and begin the operating system installation process.

Enter the necessary settings and complete the installation process.

2.2 Yes, there are hardware limitations when installing 32- and 64-bit operating systems. For example, to install a 64-bit operating system, you need a processor that supports 64-bit architecture. Also, the amount of available RAM may be limited when installing a 32-bit operating system.

2.3 The main steps in installing CentOS in text mode usually include:

Downloading the CentOS image.

Selecting the installation mode (text mode).

Selecting the language and other settings.

Selecting a partition to install the operating system.

Configure the network, users, and other settings.

Finish the installation process.

2.4. The following commands and packages can be used to install the Gnome and KDE graphical desktop environments on CentOS if it is already installed in text mode:

For Gnome:

```
sudo yum groupinstall "Server with GUI"
sudo systemctl set-default graphical.target
sudo systemctl start graphical.target
```

For KDE:

sudo yum groupinstall "KDE Plasma Workspaces"
sudo systemctl set-default graphical.target
sudo systemctl start graphical.target

2.5. A brief description of graphical interfaces:

KDE (K Desktop Environment): Has a powerful and advanced functionality with many effects and customizations. Its interface is quite similar to the traditional Windows-style, with a large number of programs and applications.

Fluxbox: A lightweight and fast graphical interface that consumes few system resources. It offers a minimalist design and a limited number of built-in features, but allows the user to customize it as desired.

Answers to the test questions.

1. Comparison of type 1 and type 2 hypervisors:

  Type 1 (hardware-directed):

    - Located directly on the hardware layer.

    - Does not require a host operating system.

    - Has direct access to hardware resources.

    - Examples: VMware ESXi, Microsoft Hyper-V Server.

  Type 2 (guest):

    - Sits on top of the host operating system.

    - Uses the resources of the host operating system.

    - Less efficient because it runs in a virtual environment.

    - Examples: VMware Workstation, Oracle VirtualBox.

  Scope of application:

  - Type 1 hypervisors are more commonly used in large data centers to deploy a large number of virtual machines on servers.

  - Type 2 hypervisors are popular for use on workstations or for testing on local computers.

2. GNU GPL (General Public License) is a software license developed by the Free Software Foundation (FSF). The basic concept is that software released under this license should be free to use, copy, modify

and distribute. Key principles include the freedom of the user to use the software for any purpose and the freedom to access the source code.

3. Open source software is software whose source code is available for review, modification and distribution. It promotes openness, collaboration and innovation in software development.

4. A distribution is a variant of the Linux operating system that includes the Linux kernel, system programs and utilities, and various software. They often include different components, customizations, and tools for specific user needs.

5. Linux-based system administration tasks include network configuration, user and group management, file system management, system monitoring, security settings, and much more.

6. Android OS is based on the Linux kernel. It uses the Linux kernel to interact with the hardware and manage device resources.

7. Embedded Linux is the use of Linux in embedded systems such as mobile phones, media players, routers, set-top boxes, and other devices. It provides a stable and flexible framework for embedded devices and can be adapted to different manufacturer needs.

8. Change the Linux boot type:

**   - You can use the systemctl utility to change the boot type to text mode (level 3) or graphical mode (level 5).**

**   - For example, to switch to text mode: sudo systemctl set-default multi-user.target.**

**   - The CLI (Command Line Interface) mode allows the user to interact with the system through the command line, while the GUI (Graphical User Interface) mode provides a graphical user interface using the mouse and windows.**

Conclusion.

In the course of the laboratory work, I have studied the Linux system and its distributions, and theoretically investigated the issues of the system's operation in more detail. I have gained practical skills in working with the sudo, yum, ls, pwd, exit commands, and so on.