“Kyiv specialized College of Communications”

Commission of computer engineering

**REPORT ON THE IMPLEMENTATION**

**LABORATORY WORK №1**

From the discipline: "Operating systems"

**Topic: "Introduction to the virtual machine environment and features of the Linux operating system"**

The students

performed Groups RPZ-03

Team 3:

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**Objectives:**

1. Familiarity with hypervisors of various types, virtualization when working with operating systems.

2. Familiarity with the main types of modern operating systems, a brief overview of their capabilities.

**Material support of classes**

1. IBM PC type computer.

2. OS of the Windows family (Windows 7).

3. Virtual machine - Virtual Box (Oracle).

4. GNU/Linux operating system - CentOS.

5. Cisco Network Academy website netacad.com and its online courses on Linux

***The material was prepared by student Кryvenko Andrew (AndrewKryvenko)***

1.Read the brief theoretical information for the lab and make a small glossary of basic English terms on the classification of virtual environments.

high-end enterprise servers – сервери високого класу

separate computers – окремі комп’ютери

dedicated hosting – виділений хостинг

kernel module – модуль ядра

distinction – відмінність

GUI – графічний інтерфейс

Shipped – відправлено

Definition – визначення

uniquely portable – унікально портативна

fledgling operating system – молода операційна система

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

2.1 Describe the concept of "hypervisor". What are their types?

A hypervisor is a software layer that allows the creation and management of virtual environments on a computer. It acts as an intermediary between the physical hardware of a computer and the virtual environments (also known as virtual machines) that run on top of it. The hypervisor provides a secure and isolated environment for each virtual machine, ensuring that they cannot interfere with each other or access the underlying physical hardware directly.

There are two types of hypervisors:

Type 1 Hypervisor: Also known as a bare-metal hypervisor, this type of hypervisor runs directly on the host's physical hardware, without the need for a host operating system. It provides full control and isolation between the physical hardware and the virtual machines, making it ideal for use in security-sensitive environments such as datacenters and cloud computing.

Type 2 Hypervisor: This type of hypervisor runs as an application on top of a host operating system. It provides a less secure and isolated environment compared to a type 1 hypervisor, but is simpler and easier to use, making it ideal for desktop virtualization and testing purposes.

2.2 List the main components and capabilities of hypervisors according to your variant (serial number in the log), Table 1.

Xen is a hypervisor that provides virtualization for x86 and ARM architectures. Here are some of its main components and features:

Xen Core: This is the core component of the Xen hypervisor, responsible for virtualizing the physical resources of the host and creating virtual machines.

Virtual Machine Monitor (VMM): The VMM is responsible for creating and managing virtual machines, controlling their access to physical resources, and managing the communication between VMs and the physical network.

Virtual Devices: Xen provides virtualized versions of physical devices, such as network interfaces and storage devices, that can be assigned to virtual machines.

Paravirtualization: Xen uses paravirtualization, which requires the guest operating systems to be modified to run in a virtual environment, resulting in higher performance and security compared to full virtualization.

Resource Management: Xen provides tools and mechanisms for resource management and allocation, such as CPU scheduling, memory management, and network resource control.

Live Migration: Xen supports live migration, which enables virtual machines to be moved from one host to another while they are running, without any disruption to the users or applications.

Security: Xen provides security features, such as isolation between virtual machines, control over resource allocation, and support for virtualization-aware security solutions.