“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

групи КСМ-03Б

Команда: Кучмій-Зікеєв

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Перевірив викладач

Сушанова В.С.

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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 10).

3. Віртуальна машина – Virtual Box (Oracle).

4. Операційна система GNU/Linux – CentOS.

**Завдання для попередньої підготовки**

***Готував матеріал студент Звєрьков А.***

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 |
| **Type 1 hypervisor** | Гіпервізор 1 типу |
| **Machine simulators** | Машинні симулятори |
| **Binary translation** | Двійковий переклад |
| **Type 2 hypervisors** | Гіпервізори 2 типу |
| **Host operating system** | Операційна система хоста |
| **Guest operating system** | Гостьова операційна система |
| **Graphical user interface** | Графічний інтерфейс користувача |
| **Сommand line interface** | Інтерфейс командного рядка |

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

***Готували матеріал студенти Кучмій-Зікеєв М., Звєрьков А., Зінченко І.***

2.1 A hypervisor is a form of virtualization software used in Cloud hosting to divide and allocate the resources on various pieces of hardware. The program which provides partitioning, isolation, or abstraction is called a virtualization hypervisor. The hypervisor is a hardware virtualization technique that allows multiple guest operating systems (OS) to run on a single host system at the same time. A hypervisor is sometimes also called a virtual machine manager (VMM). There are two types of hypervisors:

• TYPE-1 — The hypervisor runs directly on the underlying host system. It is also known as a “Native Hypervisor” or “Bare metal hypervisor”. It does not require any base server operating system. It has direct access to hardware resources.

• TYPE-2 — A Host operating system runs on the underlying host system. It is also known as ‘Hosted Hypervisor”. Such kind of hypervisors doesn’t run directly over the underlying hardware rather they run as an application in a Host system (physical machine). Basically, the software is installed on an operating system.

2.2

***Готував матеріал студент Кучмій-Зікеєв М. Варіант 9 (Але заміна варіанту на 1, через повтор)***

**VirtualBox** is a cross-platform virtualization application. What does that mean? For one thing, it installs on your existing Intel or AMD-based computers, whether they are running Windows, Mac OS X, Linux, or Oracle Solaris operating systems (OSes). Secondly, it extends the capabilities of your existing computer so that it can run multiple OSes, inside multiple virtual machines, at the same time. As an example, you can run Windows and Linux on your Mac, run Windows Server 2016 on your Linux server, run Linux on your Windows PC, and so on, all alongside your existing applications. You can install and run as many virtual machines as you like. The only practical limits are disk space and memory.

VirtualBox is deceptively simple yet also very powerful. It can run everywhere from small embedded systems or desktop class machines all the way up to datacenter deployments and even Cloud environments.

**The techniques and features that Oracle VM VirtualBox provides are useful in the following scenarios:**

* **Running multiple operating systems simultaneously.** VirtualBox enables you to run more than one OS at a time. This way, you can run software written for one OS on another, such as Windows software on Linux or a Mac, without having to reboot to use it. Since you can configure what kinds of virtual hardware should be presented to each such OS, you can install an old OS such as DOS or OS/2 even if your real computer's hardware is no longer supported by that OS.
* **Easier software installations.** Software vendors can use virtual machines to ship entire software configurations. For example, installing a complete mail server solution on a real machine can be a tedious task. With VirtualBox, such a complex setup, often called an appliance, can be packed into a virtual machine. Installing and running a mail server becomes as easy as importing such an appliance into VirtualBox.
* **Testing and disaster recovery.** Once installed, a virtual machine and its virtual hard disks can be considered a container that ca be arbitrarily frozen, woken up, copied, backed up, and transported between hosts.
* **Infrastructure consolidation.** Virtualization can significantly reduce hardware and electricity costs. Most of the time, computers today only use a fraction of their potential power and run with low average system loads. A lot of hardware resources as well as electricity is thereby wasted. So, instead of running many such physical computers that are only partially used, one can pack many virtual machines onto a few powerful hosts and balance the loads between them.

***Готував матеріал студент Зінченко І. Варіант 4***

***Готував матеріал студент Звєрьков А. Варіант 3***

***XEN hypervisor***

XEN is a hypervisor that enables the simultaneous creation, execution and management of multiple virtual machines on one physical computer. Xen is primarily a bare-metal, type-1 hypervisor that can be directly installed on computer hardware without the need for a host operating system. Because it's a type-1 hypervisor, Xen controls, monitors and manages the hardware, peripheral and I/O resources directly. Xen supports multiple instances of the same or different operating systems with native support for most operating systems, including Windows and Linux. Moreover, Xen can be used on x86, IA-32 and ARM processor architecture.

XEN has two the most significant features: paravirtualization and the minimum code of the hypervisor itself. The basic principle of paravirtualization is to prepare guest operating systems by slightly modifying their kernel before running in a virtualized environment. The second factor that relates to the features of XEN is the insignificant amount of code of the hypervisor itself. This is achieved by moving more management functions out of the hypervisor itself.

The Xen hypervisor allows a company to consolidate multiple virtual machines into one hardware platform. It also allows you to share resources so that instead of having say 6 physical systems that each need 20% free CPU to handle spikes, the 6 virtual machines can run closer to the capacity of the larger host system since they won’t all be experiencing CPU spikes at the same time. If you have some spare capacity you could even spin up additional machines during peak times. The virtual machines can be more easily monitored and controlled using XenCenter. As for the disadvantages, you users might have have to pay more attention to capacity planning to avoid performance issues on the bank of virtual systems.

**Хід роботи**

1. Подивіться ознайомчі відео та демонстраційні матеріали з наступних напрямків:

1.1 GNU/Linux. Базові відомості.

1.2 Встановлення CentOS у VirtualBox.

1.3 Встановлення CentOS в текстовому режимі.

1.4 Встановлення оточення робочого столу Gnome в CentOS.

1.5 Встановлення оточення робочого столу KDE в CentOS.

1.6 The Shell (Linux)

1.7 Огляд графічних оболонок Linux

2. Після перегляду відео дайте відповіді на питання:

***Готував матеріал студент Кучмій-Зікеєв М.***

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***Готував матеріал студент Кучмій-Зікеєв М. Варіант 9***

***Готував матеріал студент Зінченко І. Варіант 4***

***Готував матеріал студент Звєрьков А. Варіант 3 (Але заміна варіанту на 2, через повтор)***

***GNOME GUI***

GNOME ([GNU](https://www.techtarget.com/searchdatacenter/definition/GNU-Linux) Network Object Model Environment, pronounced gah-NOHM) is a graphical user interface and set of computer [desktop](https://www.techtarget.com/searchenterprisedesktop/definition/desktop) [applications](https://www.techtarget.com/searchsoftwarequality/definition/application) for users of the [Linux operating system](https://www.techtarget.com/searchdatacenter/definition/Linux-operating-system).

• **Minimalist Distraction-Free Design**

On GNOME, the panel at the top does not contain any app launchers. This panel is small and black, like on a phone or tablet, and is lately static. It contains the date and time, a few system indicators in the top right, an Activities button in the top left, and the name of the currently running app next to that.

• **Focused, Consistent, and Intuitive Apps**

GNOME’s minimalist design extends from the desktop to the apps themselves. You don’t have various menus to navigate or numerous preferences to toggle. Most features are often found right at the top of the app in what’s called the headerbar.

• **Desktop, Tablet, and Mobile-Friendly**

These GNOME apps not only fit well on your desktop, but if you shrink them down, you find that most now adjust to fit a mobile device as well. Adaptive design is great on desktops because that means you can tuck an app away at the side of your screen and find that the interface is still usable.

• **Support for the Latest Technologies**

There’s an audio server managing sound. There are package formats that apps come in. On Linux, there are multiple versions of each of these system components, with newer ones hitting the scenes every few years. These system components are agnostic about which desktop environment you use, but GNOME is often the first or among the first to integrate these new technologies.

**• All the Programs Needed to Do the Essentials**

The GNOME Project has been around for decades, and in that time a sizable number of programs have popped into existence and matured. Everything is in place for a fully-functional desktop operating system.

***JWM GUI***

• JWM Kit is a new set of software design to simplify usage of JWM (Joe’s Window Manager). In order to maximize personal customization JWM Kit focus on providing a graphical interface for editing menus, trays, groups, etc. No part of the kit is designed to run in the background. It only runs when the user starts it, and properly quits when “closed”, or for notifications will close when timed out in a few seconds.

• The quick and easy setup of a taskbar and application menu makes for a quick, sensible default configuration for all the users who want that common setup. For technical users, the XML configuration may be a refreshing change from the custom configuration formats in other environments. Joe's Window Manager, in a way, demonstrates the rich diversity of open source

**Відповіді на контрольні запитання**

***Готував матеріал студент Зінченко І.***

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**Висновки**

В ході виконання лабораторної роботи мною було досліджено, більш детально теоретично досліджено питання Отримано практичні навики роботи з командами, налаштування