

“Київський фаховий коледж зв’язку”
Циклова комісія Комп’ютерної інженерії

**ЗВІТ ПО ВИКОНАННЮ
ЛАБОРАТОРНОЇ РОБОТИ №2**

з дисципліни: «Операційні системи»

Тема: “Знайомство з інтерфейсом та можливостями ОС
Linux”

Виконавли студенти

групи Бікс-03

Команда: Козирєв С; Дяченко Н.

Перевінив викладач: Сушанова В.С.

Київ 2022

Мета роботи:

1. Знайомство з інтерфейсами ОС Linux.
2. Отримання практичних навиків роботи в середовищах ОС Linux та мобільної ОС – 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.
5. Сайт мережевої академії Cisco netacad.com та його онлайн курси по Linux

Готував матеріал студент Козирев С.

Завдання для попередньої підготовки.

1. Прочитайте короткі теоретичні відомості до лабораторної роботи та зробіть невеликий словник базових англійських термінів з питань призначення команд та їх параметрів.

Термін англійською	Термін українською
Server Applications: Software that has no direct interaction with the monitor and keyboard of the machine it runs on. Its purpose is to serve information to other computers, called clients.	Серверні програми: програмне забезпечення, яке не має прямої взаємодії з монітором і клавіатурою машини, на якій воно працює. Його мета — надавати інформацію іншим комп'ютерам, які називаються клієнтами.
Desktop Applications: Web browsers, text editors, music players, or other applications with which users interact directly. In many cases, such as a web browser, the application is talking to a server on the other end and interpreting the data. This is the “client” side of a client/server application.	Настільні програми: веб-браузери, текстові редактори, музичні плеєри або інші програми, з якими користувачі взаємодіють безпосередньо. У багатьох випадках, наприклад у веб-браузері, програма спілкується з сервером на іншому кінці та інтерпретує дані. Це «клієнтська» сторона програми клієнт/сервер.

Tools: A loose category of software that exists to make it easier to manage computer systems. Tools can help configure displays, provide a Linux shell that users type commands into, or even more sophisticated tools, called compilers, that convert source code to application programs that the computer can execute.	Інструменти: вільна категорія програмного забезпечення, яке існує для полегшення керування комп'ютерними системами. Інструменти можуть допомогти налаштовувати дисплеї, надавати оболонку Linux, у яку користувачі вводять команди, або навіть більш складні інструменти, які називаються компілятори, які перетворюють вихідний код на прикладні програми, які може виконувати комп'ютер.
---	--

2. Вивчіть матеріали онлайн-курсу академії Cisco “NDG Linux Essentials”:

- Chapter 3 - Working in Linux
- Chapter 4 - Open Source Software and Licensing

3. Пройдіть тестування у курсі NDG Linux Essentials за такими темами:

- Chapter 03 Exam
- Chapter 04 Exam

4. Дайте визначення наступним поняттям:

- CLI-режим

CLI is a simple text input system for entering anything from single-word commands to complicated scripts.

- Термінал на основі графічного інтерфейсу користувача

A GUI terminal is a program within the GUI environment that emulates a terminal window. GUI terminals can be accessed through the menu system.

- Віртуальний термінал

A virtual terminal can be run at the same time as a GUI but requires the user to log in via the virtual terminal before they can execute commands.

5. Підготувати в електронному вигляді початковий варіант звіту:

- Титульний аркуш, тема та мета роботи
- Словник термінів
- Відповіді на п.5 та п.6 з завдань для попередньої підготовки

Хід роботи.

Готував матеріал студент Козирев С.

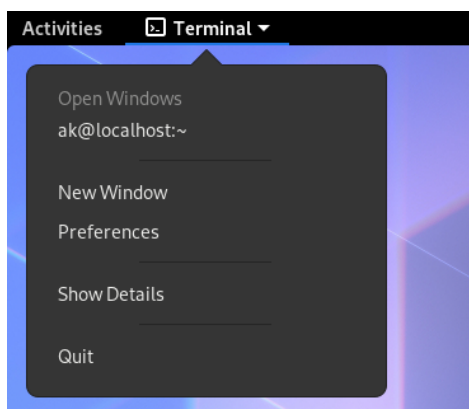
1. Робота в графічному режимі в ОС сімейства Linux (робота з інтернет-джерелами):

1.1. Оберіть графічну оболонку для ОС сімейства Linux, яку ви хочете розглянути.

Розгляньте структуру робочого простору користувача, та опишіть основні його компоненти (**показано основні компоненти оболонки Gnome):

- Закладка Applications

Application menu, located beside the Activities button, shows the name of the active application alongside with its icon and provides quick access to windows and details of the application, as well as a quit item.



- Закладка Places

The Places menu is a quick way to go to various locations on your computer and your local network. The Places menu allows you to open the following items:

- Your Home folder
- The Desktop folder, which corresponds to the items displays in the desktop.
- The items in your Nautilus bookmarks.
- Your computer, which shows all your drives.
- The Nautilus CD/DVD Creator.
- The local network.

The last three items on the menu perform actions rather than open locations.

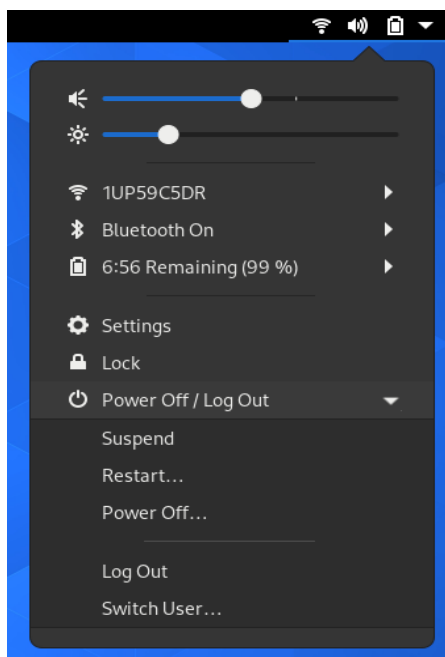
- **Connect to Server** lets you choose a server on your network.
- **Search for Files** lets you search for files on your computer.
- The **Recent Documents** submenu lists the documents you have recently opened. The last entry in the submenu clears the list.

- Меню System

Its analogue is the Windows control panel. Only here, all management is divided into two categories: settings and administration. The difference between them is that the settings from the first category are personal, while the settings from the "administration" category affect the entire system.

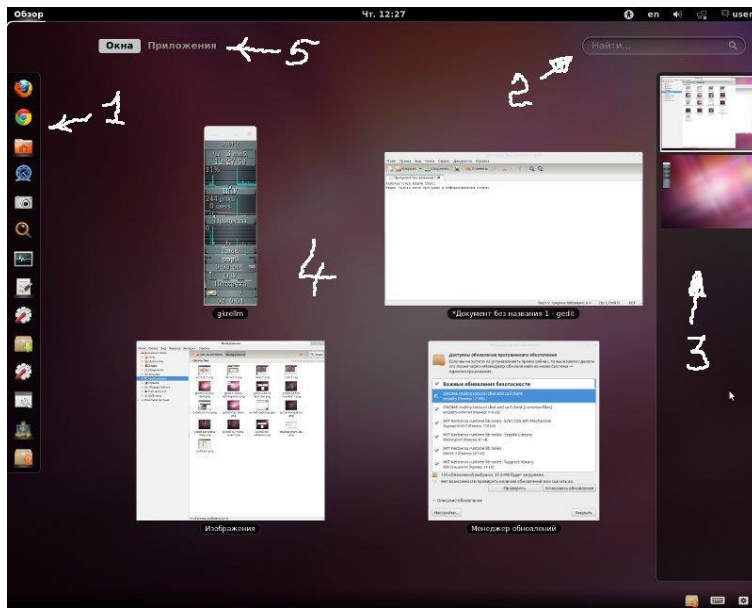
To manage system settings and computer operation, click on the system menu in the upper right corner of the screen.

When you leave your computer, you can lock your screen to prevent other people from using it. You can also quickly switch users without logging out completely to give somebody else access to the computer, or you can suspend or power off the computer from the menu. If you have a screen that supports vertical or horizontal rotation, you can quickly rotate the screen from the system menu. If your screen does not support rotation, you will not see the button.



- Навігаційний простір Activities overview

This is a whole screen that provides access to open programs, desktops and launch menus, as well as recently opened files, all at once, in one place:



The navigation space consists of five control zones:

1. **Program Quick Launch Panel (Favorites).** The same panel displays icons of already running programs.
2. **Search programs and files by name** . As you type letters in this field, you are automatically presented with a list of programs and files that have those letters in their names. When you open the navigation space, this field gets the focus and you can immediately type the name of the program or file.
3. **Available Desktops** . This panel displays previews of the available desktops. Window previews can be dragged onto desktop previews and thus move programs to different desktops. If you click on the desktop preview, the zone 4 context will change to this desktop. That is, it is the ability to move between desktops.
4. **Preview windows of running programs** . You can go to the desired program by clicking on the preview of its window.
5. **Access to the global** launch menu for all installed programs.

In normal, working mode, the navigation space is invisible. In order to open it, you need to perform any of these actions:

- Click on the word "Browse" on the left side of the top panel.
- Move the mouse pointer (or finger on the touchscreen) to the upper left corner of the screen.
- Press the Win key (or Alt+F1) on your keyboard.

The navigation space closes automatically if you switch to the program window or start the program. You can manually close it by doing any of the following:

- Click on the word "Browse" on the left side of the top panel.
- Move the mouse pointer (or finger on the touchscreen) to the upper left corner of the screen.

- Press the Esc or Win (or Alt+F1) key on your keyboard.

1.2. Запуск програм. Дослідіть можливості запуску додатків різними способами (описати спосіб і по-можливості показати скріншоти):

- Запуск програм через панель швидкого запуску
- Запуск програм через пошук в меню
- Запуск програм через віджет запуску
- Запуск програм через глобальне меню

There are several ways of opening an application once you're in the Activities overview:

- Start typing the name of an application — searching begins instantly. (If this doesn't happen, click the search bar at the top of the screen and start typing.) If you don't know the exact name of an application, try to type an related term. Click the application's icon to start it.
- Some application icons are in the sidebar - a vertical bar on the left side of Overview . To launch an application, click on its icon.

Frequently used applications can be added to the sidebar .

- Click the grid button at the bottom of the dash. You will see the first page of all installed applications. To see more applications, press the dots on the right, to view other applications. Press on the application to start it.
- The application can be launched in a separate workplace by dragging the application icon from the sidebar (or application list) to one of the workplaces on the right side of the screen. After dragging and dropping, the application will be opened in the selected workspace.

To launch an application in a new workspace, drag its icon to an empty workspace at the bottom of the workspace switcher, or to a small gap between workspaces.

1.3. Вихід з системи та завершення роботи в Linux. Як виконати в графічному інтерфейсі наступні дії

(наведіть скріни):

- Зміна користувача на root

Step 1

First, we need to set a password on the root user account. Most distros these days just have normal user accounts use ***sudo*** when they need elevated privileges, and leave the root account without a password. We will need to set a password in order to log in with the root account later. Open a command line terminal and execute the following command.

```
$ sudo passwd
```

You will be prompted to enter a password twice. This will be the new password for your system's root account.

Step 2

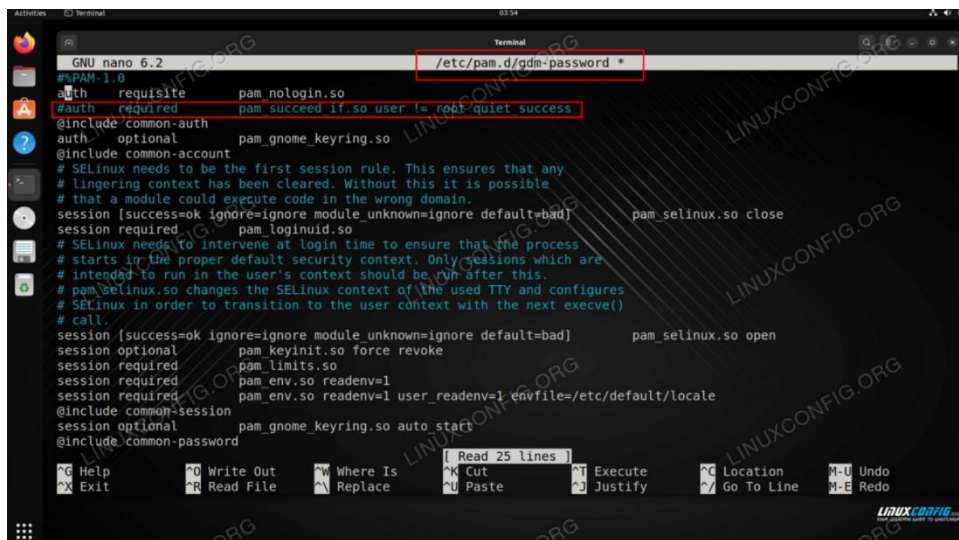
(this step is only necessary if you are running a Debian based Linux distribution, such as Debian Linux, Ubuntu Linux, Linux Mint, etc.)

Use nano or your preferred text editor to open the following file with root permissions.

```
$ sudo nano /etc/pam.d/gdm-password
```

Then find the line below and comment it out (put a **#** in front of it) and save your changes to the file when done.

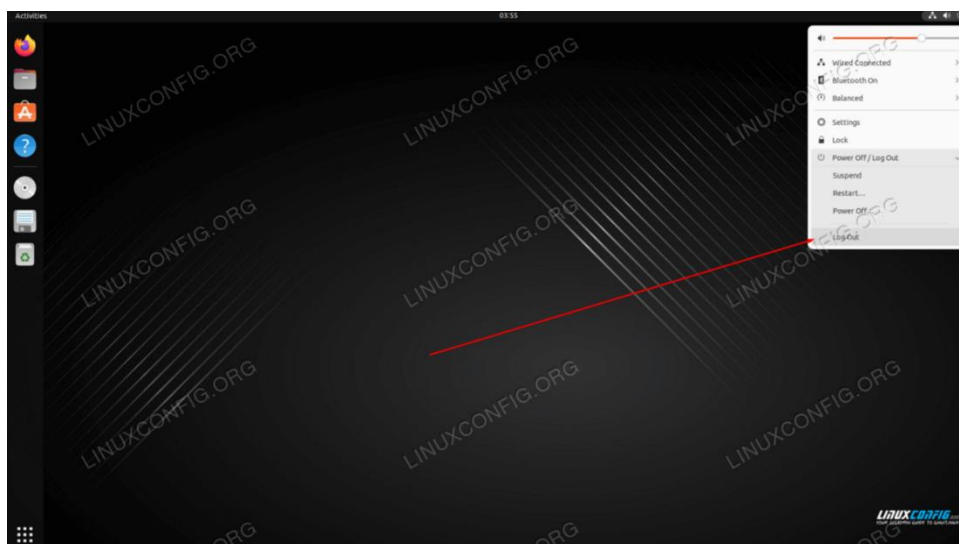
```
auth required pam_succeed_if.so user != root quiet
```

```
GNU nano 6.2 /etc/pam.d/gdm-password *
#%PAM-1.0
auth requisite pam_nologin.so
#auth required pam_succeed_if.so user != root quiet success
auth required pam_unix.so
@include common-auth
auth optional pam_gnome_keyring.so
@include common-account
# SELinux needs to be the first session rule. This ensures that any
# lingering context has been cleared. Without this it is possible
# that a module could execute code in the wrong domain.
session [success=ok ignore=ignore module_unknown=ignore default=bad] pam_selinux.so close
session required pam_loginuid.so
# SELinux needs to intervene at login time to ensure that the process
# starts in the proper default security context. Only sessions which are
# intended to run in the user's context should be run after this.
pam_selinux.so changes the SELinux context of the used TTY and configures
# SELinux in order to transition to the user context with the next execve()
# call.
session [success=ok ignore=ignore module_unknown=ignore default=bad] pam_selinux.so open
session optional pam_keyinit.so force revoke
session required pam_limits.so
session required pam_env.so readenv=1
session required pam_env.so readenv=1 user_readenv=1 envfile=/etc/default/locale
@include common-session
session optional pam_gnome_keyring.so auto start
@include common-password
```

Step 3

Now you may log out of your current account in order to return to the login screen.



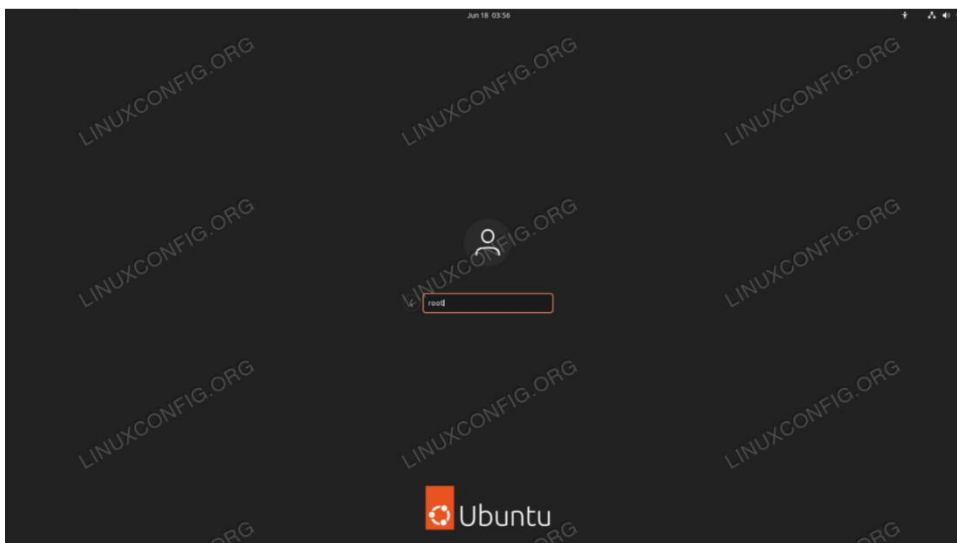
Step 4

At the login prompt, click on the little text that says "Not listed?" in order to specify a different user account than the usual one you log in with.



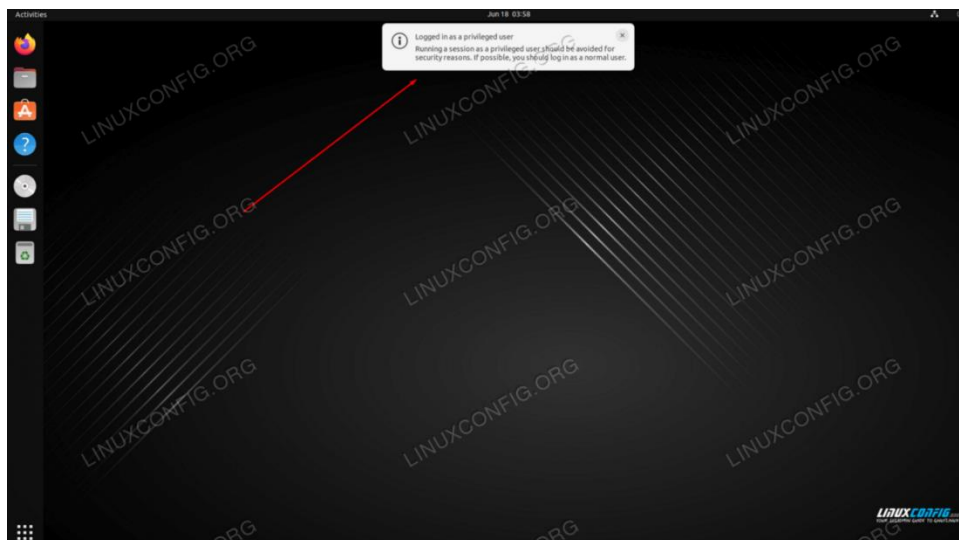
Step 5

Enter your username, in this case **root**, and the password to finish logging into GNOME GUI with the root account.



Step 6

Each time you log in to the GNOME GUI with the system's root account, you will see a small notification to let you know that this is not a recommended practice, just like we mentioned earlier. This warning can be ignored (if you know what you are doing) and will go away quickly so it will not bother you.



- Перезавантаження системи

To restart the Gnome Shell session while everything is frozen, start pressing the key combination **Alt + F2**.

- Вимкнення системи

The power off icon in the system area of the Gnome panel (a component that is part of GnomeFlashback and provides panels and default applets for the desktop. A panel is a horizontal or vertical bar that can be added to each side of the screen. By default there is one panel on the top of the screen and one on the bottom, but this is configurable.). You need to open the system menu and turn off your computer.

2. Робота в середовищі мобільної ОС.

2.1. Опишіть головне меню вашої мобільної ОС, який графічний інтерфейс вона використовує?

2.2. Опишіть меню налаштувань компонентів мобільного телефону.

2.3. Використання комбінацій клавіш для виконання спеціальних дій.

2.4. Вхід у систему та завершення роботи пристрою. Особливості налаштувань живлення батареї.

Готував матеріал студент Дяченко. Н.

1. Easy to operate, easy and fast access to applications

2. IOS

3. Easy-to-use menu, quick access to iCloud, quick graphics settings

4. Apple pay-combination of two clicks on the power button, Screenshot-combination of two clicks on the power button and sound boost button

5. Login to your personal account - iCloud. To do this, you need your login and password from your iCloud personal account, fast charging of the device, wireless charging of the device, distribution of battery charge in percent in the device settings in the Battery section, and a special connector for recharging the device.

Контрольні запитання

Готував матеріал студент Козирев С.

1. Наведіть приклади серверних додатків Linux для сервера баз даних, серверів розсилки повідомлень та файлообмінників.

Examples of Database Server applications:

1. Microsoft SQL
2. MySQL
3. MongoDB
4. SQLite
5. PostgreSQL

Examples of Server File sharing applications:

1. SolarWinds Solar-PuTTY
2. Files.com
3. ExaVault
4. WinSCP
5. FileZilla

Examples of Server mailing applications:

1. Exim
2. Postfix
3. SquirrelMail
4. Axigen
5. Citadel

2. Порівняйте оболонки Bourne, C, Bourne Again (Bash), the tcsh, Korn shell (Ksh) та zsh.

Готував матеріал Дяченко Нікіта

Bourne- The command shell is named after its creator Stephen Bourne. Most of the operators were borrowed by him from the language of Algol 68. It was released in the 7th edition of the UNIX

operating system, where it was a standard shell. So far, the vast majority of Unix-like systems have /bin/sh - a symbolic or hard reference to an sh-compatible shell.

C- C shell, executable file: csh The command shell was developed by vi author Bill Joy. The basis for the scripting language csh was taken, as is known from the name, the C. T.K. language at that time, in 1978, it was the most popular programming language among the developers and users of BSD UNIX. Now the free implementation of csh - tcsh is more popular.

Bourne Again (Bash)- The name can be translated as "Revived went Bourne". Most likely the most popular shell today. The de facto standard for Linux.

the tcsh- It was in tcsh that autocomplete once appeared. It is the default shell in FreeBSD.

Korn shell (Ksh)- Unlike several other implementations of Bourne-shell-compatible command languages, there is absolute Ksh compatibility with Sh from the bottom up. In other words, a command program (script) written for Bourne-shell will be guaranteed to work with Korn-shell.

zsh-Free modern sh-compatible shell. It has several advantages over bash, mainly related to work in interactive mode.

3. Для чого потрібен менеджер пакетів. Які менеджери пакетів ви знаєте у Linux?

Готував матеріал студент Козирєв С.

A package manager is a set of software in Linux that installs, configures, uninstalls, and updates both individual packages (programs) and the entire system.

Some of the most famous package managers are:

- Yum and RPM on Red Hat -like systems;
- dpkg - on Debian -like systems;
- Pacman - in Arch Linux ;
- Portage and Paludis are in Gentoo ;

4. Які засоби безпеки використовуються в Linux?

Готував матеріал студент Козирєв С.

To ensure security on Linux, you need to regularly install up-to-date software updates. In them, developers fix security vulnerabilities, thereby significantly reducing the risk of infection with new types of threats.

For production servers that work with a distribution with long-term support, it is important to be able to install security fixes without the need for a complete update of the operating system.If the system can be accessed via the Internet, ESET experts recommend using a two-factor authentication (2FA) solution on the SSH protocol. It can help protect your network if your credentials are stolen or reused. It is also possible to download some protection tools (antiviruses) to improve security. Examples of such tools are:

- CIRClean

- ClamAV
- BleachBit
- KeePaasXC

5. Чому використання віртуалізації зараз стало таким актуальним?

Готував матеріал студент Козирев С.

The cost and complexity of building and running a single physical server means that efficiently adding or removing resources to quickly meet changing demand is difficult, and in some cases impossible. Safely testing new configurations or complete applications before releasing them can also be a complex, costly, and time-consuming process. In this situation, virtualization comes to the rescue.

Successful virtualization should provide an environment that:

- Equivalent to a physical computer, so software access to hardware resources and drivers should be indistinguishable from an unvirtualized experience.
- Allows the customer to have full control over the hardware of the virtualized system.
- Performs operations as efficiently as possible directly on underlying hardware resources, including the CPU.

Properly configured virtual isolated resources can provide more secure applications with no visible communication between environments. Virtualization also allows you to create and run new virtual machines almost instantly, and then destroy them as soon as they are no longer needed. For large applications that support ever-changing business needs, being able to scale quickly up and down can mean the difference between survival and failure. The agility that virtualization offers allows scripts to add or remove virtual machines in seconds, rather than the weeks it might take to purchase, provision, and deploy a physical server.

6. Як ви розумієте поняття контейнеризації?

Готував матеріал студент Козирев С.

This is a method of virtualization in which the operating system kernel maintains multiple isolated instances of user space instead of one. These instances are identical in terms of the processes they run to a single instance of the operating system.

7. Які переваги/недоліки використання програмного забезпечення з відкритим кодом?

Готував матеріал студент Козирев С.

Pros

High reliability

A common misconception is that open source software is prone to crashing. On the contrary, it is very reliable as it is tested by many developers, testers, and users.

Flexibility

Since open source software doesn't tie you to your own product, you're not limited to a specific IT architecture. Patented products typically require both hardware and software updates. Thus, open source software allows users to combine and combine their software to create a unique IT infrastructure that meets their needs.

Cons

Vulnerability to malicious attacks

Some people who have access to the source code of open source software are not well-intentioned. While most people use such access to look for defects and improve software, others are looking for ways to exploit the vulnerabilities.

Unlike commercial software, OSS may not be user-friendly

Not every open source software is user-friendly. It is designed to meet the needs of developers in the implementation of their ideas. Thus, they do not pay much attention to the user interface, which makes it difficult to use for those who do not have special knowledge.

Lacks extensive customer support

Commercially produced software provides peace of mind to its users. After all, they know who designed, created, and distributed the software. This way, they know who is responsible if the software doesn't work or causes hardware damage. This means that you will not get any support if the software has issues and breaks performance. While the open source community tends to be quick to respond to issues, no one is legally required to help. However, some OSS applications provide support services for a fee.

8. ***1)Скільки активних віртуальних консолей (терміналів) може бути у процесі роботи Linux по замовчуванню. 2)Як їх викликати та між ними перемикається? 3)Наведіть приклади?

Готував матеріал студент Козирев С.

1) On GNU/Linux operating systems, a text terminal with a UNIX shell prompt usually provides the first six virtual consoles that switch from an X session (GUI) to which you can use Ctrl + Alt + F1-6.

2) To switch between virtual terminals, the same key combinations are used as for switching between workspaces of the graphical interface. Press Ctrl+Alt+F1; (or Ctrl+Alt+F2; Ctrl+Alt+F3; Ctrl+Alt+F4; and so on to Ctrl+Alt+F6;) to switch to one of the six virtual terminals. Behind the last virtual terminal there is a graphical interface, so to switch to it (if it is running), you can press Ctrl+Alt+F7; or Ctrl+Alt+F8. If four virtual terminals are enabled in the system, you must press Ctrl+Alt+F5 to switch to the graphical interface. Note that users can override these default key combinations.

3) Many Linux operating systems, including FedoraCore and RedHat Enterprise Linux, Debian-like, all popular and non-popular Linux distributions, run several virtual terminals that allow you to use the same number of command interpreters without using a graphical interface.

9. ***Яка віртуальна консоль (термінал) виконує функцію графічної оболонки?

Готував матеріал студент Дяченко Нікіта

In Linux consoles and other platforms, usually the first six virtual consoles provide a text terminal with a request to log in to the Unix shell. The X Window graphics system traditionally runs in the seventh virtual console, although this depends on the configuration.

10. ***Чи можлива реєстрація в системі Linux декілька разів під одним і тим же системним ім'ям? Які переваги це може надати?

Готував матеріал студент Дяченко Нікіта

Even if all users have only one monitor and one system keyboard at their disposal, this feature is useful: simultaneous registration of several users in the system allows you to work alternately without having to complete all the tasks that have been started each time and then update them. Moreover, there are no obstacles to registering with the system several times under the same input name. Thus, you can access the same resources and organize parallel work on several tasks.

Висновок

Готував матеріал студент Дяченко Нікіта

From the results of our joint work with the student Kozyrev S. We got acquainted with the interface and capabilities in Linux OS, described the abilities of Linux and mobile devices with its OS, how to perform the simplest tasks in this interface, gave examples of server applications in Linux, and studied the basic actions and settings when working in this system.