Individual Assigment

Operating System

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SUBMITION DATE:06/05/18 E.C

SUBMITION TO Lec.Wendmu

Operating System Installation Documentation – CentOS Stream Server in Virtual Environment

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1. Introduction

Background:

CentOS Stream is a Linux distribution that serves as a **rolling-release upstream version of Red Hat Enterprise Linux (RHEL)**. Unlike traditional CentOS, which tracked RHEL releases, CentOS Stream provides a **preview of what is next in RHEL**, allowing developers and system administrators to test features, updates, and patches before they are included in enterprise RHEL releases.

CentOS Stream is widely adopted in **enterprise environments, cloud infrastructure, web hosting, and server applications** due to its stability, security, and compatibility with enterprise-grade software. It offers a reliable platform for deploying services such as web servers, databases, containerized applications, and networking services.

Virtualization allows CentOS Stream to run in a **virtual machine (VM)** using tools like **VMware Workstation** or **Oracle VM VirtualBox**. Running the OS in a virtual environment provides multiple advantages:

- **Isolation:** The virtual OS is completely isolated from the host system, reducing the risk of conflicts or accidental changes.
- **Testing and Development:** Developers can safely test new software, updates, or configurations without affecting the main system.
- **Resource Optimization:** Multiple virtual machines can run on a single physical machine, maximizing hardware utilization.
- **Learning and Training:** Students and IT professionals can gain hands-on experience with server management, network configuration, and Linux commands in a safe, controlled environment.

By installing CentOS Stream in a virtual environment, users can simulate real-world enterprise scenarios, perform experiments with system updates, and explore advanced Linux administration tasks—all without compromising the host operating system. This makes virtualization an essential tool for modern IT infrastructure, DevOps workflows, and system administration training.

Motivation:

The motivation for installing CentOS Stream in a virtual environment stems from the need to **gain practical experience with enterprise-grade Linux systems** without risking the stability of a host machine. CentOS Stream, being a rolling-release version of RHEL, provides an **up-to-date testing platform** for system administrators, developers, and IT students to explore the latest features, security updates, and kernel improvements.

Key motivating factors include:

1. **Hands-on Learning:** Virtualization allows users to practice installation, configuration, and management of Linux servers, helping build real-world skills in a controlled environment.
2. **Safe Experimentation:** Users can test software installations, updates, or server configurations without affecting the host OS, making it ideal for trial-and-error learning.
3. **Understanding Enterprise Linux:** CentOS Stream bridges the gap between open-source Linux distributions and enterprise RHEL systems, providing insight into professional IT environments.
4. **Evaluation of Filesystems and Storage:** By experimenting with different filesystems like **ext4, Btrfs, or XFS**, users can understand performance, reliability, and compatibility, which is crucial for server deployment.
5. **Virtualization Skills:** Learning to deploy operating systems in virtual machines using **VMware Workstation** or **Oracle VM VirtualBox** equips users with essential skills for cloud computing, DevOps, and IT infrastructure management.

In essence, the motivation is to **combine theoretical knowledge with practical skills**, making it easier to manage Linux servers professionally, troubleshoot issues effectively, and understand the underlying principles of system administration, all within a risk-free virtual environment.

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2 Objectives

The primary objectives of this project are to provide a **comprehensive understanding of CentOS Stream installation and usage in a virtual environment** and to develop practical skills in Linux system administration.

Specifically, the objectives include:

1. **Learn the Installation Process:**
    - Install CentOS Stream in a virtual machine using VMware Workstation or Oracle VM VirtualBox.
    - Understand system requirements, partitioning, and setup options.
2. **Develop Virtualization Skills:**
    - Gain hands-on experience with virtual environments.
    - Understand the concept of hardware abstraction, snapshots, and resource allocation in VMs.
3. **Understand Filesystem Options:**
    - Explore different filesystems supported by CentOS Stream (ext4, Btrfs, XFS) and learn their advantages and disadvantages.
    - Choose the most suitable filesystem for server environments based on performance, reliability, and scalability.
4. **Practice System Configuration and Management:**
    - Create user accounts following naming conventions (full name) and manage user permissions.
    - Configure basic server settings, network interfaces, and security options.
5. **Troubleshoot Installation and Configuration Issues:**
    - Identify common problems during OS installation or VM setup.
    - Learn practical solutions for resolving errors and ensuring a smooth installation process.
6. **Understand the Role of CentOS Stream in Enterprise Environments:**
    - Explore its purpose as a rolling-release distribution upstream of RHEL.
    - Understand why CentOS Stream is used for testing, development, and enterprise server deployment.
7. **Document the Process Clearly:**
    - Include step-by-step installation instructions, screenshots, and explanations.
    - Demonstrate technical expertise and understanding of both CentOS Stream and virtualization concepts.

By achieving these objectives, users will gain **confidence in managing Linux servers**, understand the **importance of virtualization**, and be able to **choose and configure filesystems effectively** in enterprise or development environments.

3. Requirements

Before installing **CentOS Stream** in a virtual environment, it is important to ensure that your host system meets both **hardware** and **software requirements**. This ensures a smooth installation, stable performance, and the ability to explore advanced features of the OS.

Hardware Requirements (Host System)

1. **Processor:**
   - Minimum: **Intel Core i5** or **AMD Ryzen 5** (64-bit support required).
   - Reason: CentOS Stream and modern virtualization software require a 64-bit processor to run efficiently. Virtualization technologies such as **VT-x (Intel)** or **AMD-V (AMD)** must be supported and enabled in BIOS for optimal VM performance.
   - Recommendation: Quad-core or higher processors improve multitasking and allow running multiple virtual machines simultaneously.
2. **RAM:**
   - Minimum: **8 GB total RAM** (allocate at least 4 GB to the virtual machine).
   - Reason: Linux server environments like CentOS Stream perform better with sufficient memory. Allocating at least 4 GB to the VM ensures smooth operation for server tasks, graphical interface (if used), and system updates.
3. **Storage:**
   - Minimum: **40 GB free disk space** for the virtual machine.
   - Reason: CentOS Stream installation requires space for the OS itself, software packages, updates, and user data. Additional space is necessary for **snapshots** and storing **virtual disk files** in the host system.
   - Recommendation: Use SSD storage for faster boot times, disk operations, and better overall VM performance.
4. **Virtualization Support:**
   - VT-x (Intel) or AMD-V (AMD) must be **enabled in BIOS/UEFI**.
   - Reason: Virtualization support allows the host CPU to efficiently run virtual machines with near-native performance. Without it,

VMs may run slowly or fail to boot.

Software Requirements

1. **Virtualization Tools:**
   - **VMware Workstation** (Pro or Player) or **Oracle VM VirtualBox** (latest stable version).
   - Reason: These tools provide the hypervisor necessary to create and manage virtual machines. They also offer features like **snapshots, cloning, and virtual network configuration**.
   - Recommendation: VMware Workstation is preferred for professional use due to advanced features, while VirtualBox is free and suitable for learning and experimentation.
2. **ISO Image:**
   - **CentOS Stream latest ISO**, available from the official CentOS website.
   - Reason: The ISO image contains the installation files for CentOS Stream. Using the latest version ensures you have the most up-to-date kernel, security patches, and features.
3. **Host Operating System:**
   - Supported hosts include **Windows 10/11, Linux distributions, or macOS**.
   - Reason: The host OS must support the virtualization software. Modern host operating systems provide the necessary drivers and performance optimizations for running virtual machines efficiently.

Additional Recommendations

- Ensure your host system has a **stable internet connection** for downloading updates during or after installation.
- Keep **backup copies** of important files before creating virtual machines.
- Allocate resources to the VM **based on workload** (e.g., more RAM or CPU cores for database or web server testing).
- Enable **automatic snapshots** in virtualization software to revert to previous states in case of errors or failed configurations.

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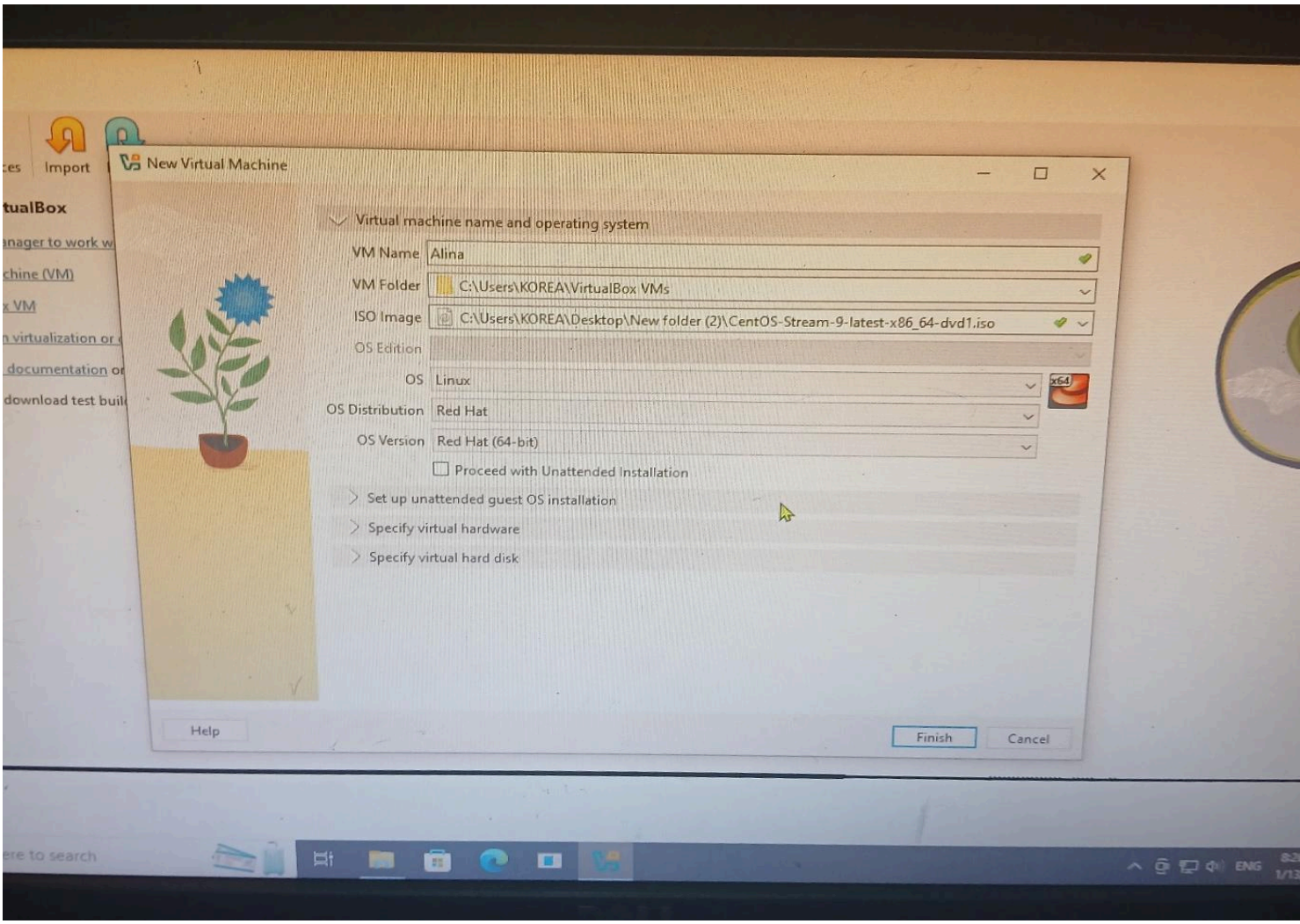
4. Installation Steps

The following steps outline the process of installing **CentOS Stream** in a virtual environment using **VMware Workstation** or **Oracle VM VirtualBox**. Screenshots should be captured at each step to document the process.

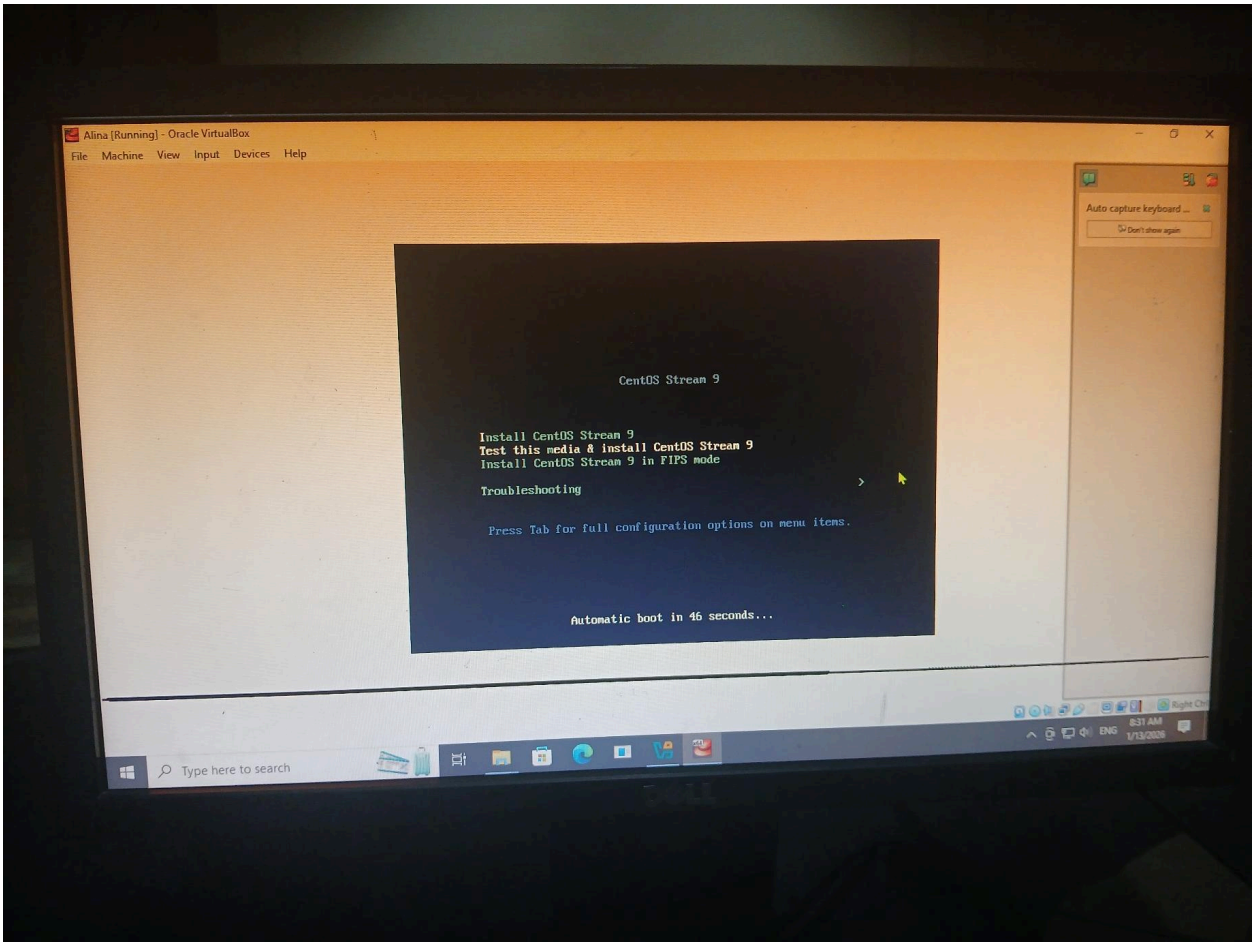
Step 1: Create a New Virtual Machine

1. Open **VMware Workstation** or **VirtualBox**.
2. Click **New VM** → **Typical (recommended) Configuration**.
3. Select **Use ISO image file**, then browse and select the **CentOS Stream ISO** downloaded from the official website.
4. Allocate **4 GB of RAM** and **2 CPU cores** to the virtual machine.
    - Tip: Assigning more CPU cores and RAM improves performance for server tasks.
5. Create a **virtual hard disk** of **20–40 GB**, choosing **dynamically allocated storage**.
    - Explanation: Dynamically allocated disks start small and grow as needed, saving host storage space.
6. Complete the VM setup and name it something descriptive, e.g., CentOS-Stream-VM.



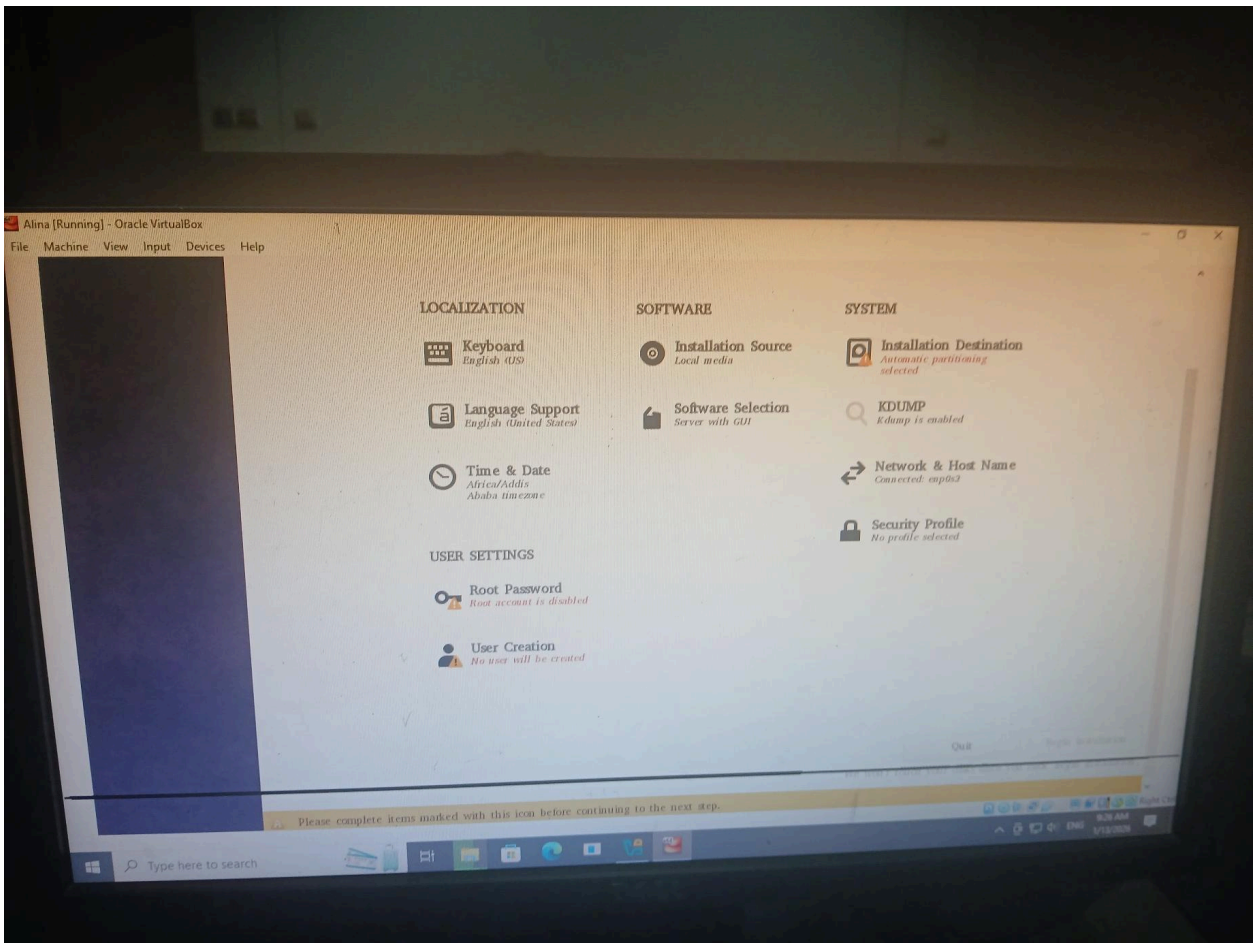
Step 2: Start the Virtual Machine

1. Boot the VM from the ISO image.
2. At the boot menu, select **Install CentOS Stream**.
    - Explanation: This option starts the CentOS installer for a fresh installation.
3. Wait for the installer to load the necessary components.



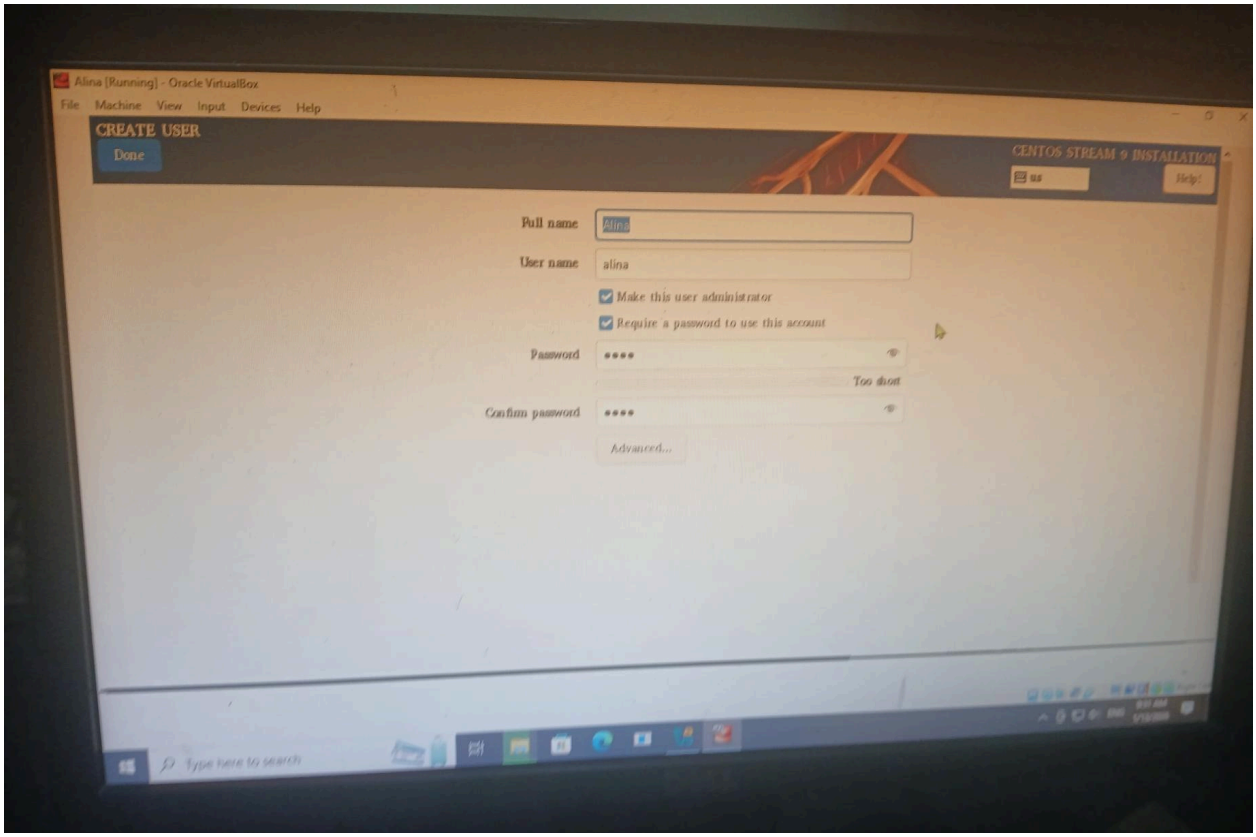
Step 3: Partitioning & Filesystem

1. In the installer, select **Custom Partitioning** (recommended for learning).
    - Explanation: Custom partitioning allows you to understand how Linux filesystems are organized and practice creating partitions.
2. Create the following partitions:
    - / (root) – 15–20 GB, **ext4** or **XFS**
    - /home – Remaining space, **ext4** or **XFS**
    - swap – Optional, 2–4 GB depending on RAM size
3. Select the filesystem type:
    - **ext4:** Default, stable, widely supported.
    - **XFS:** Recommended for larger storage and enterprise use.



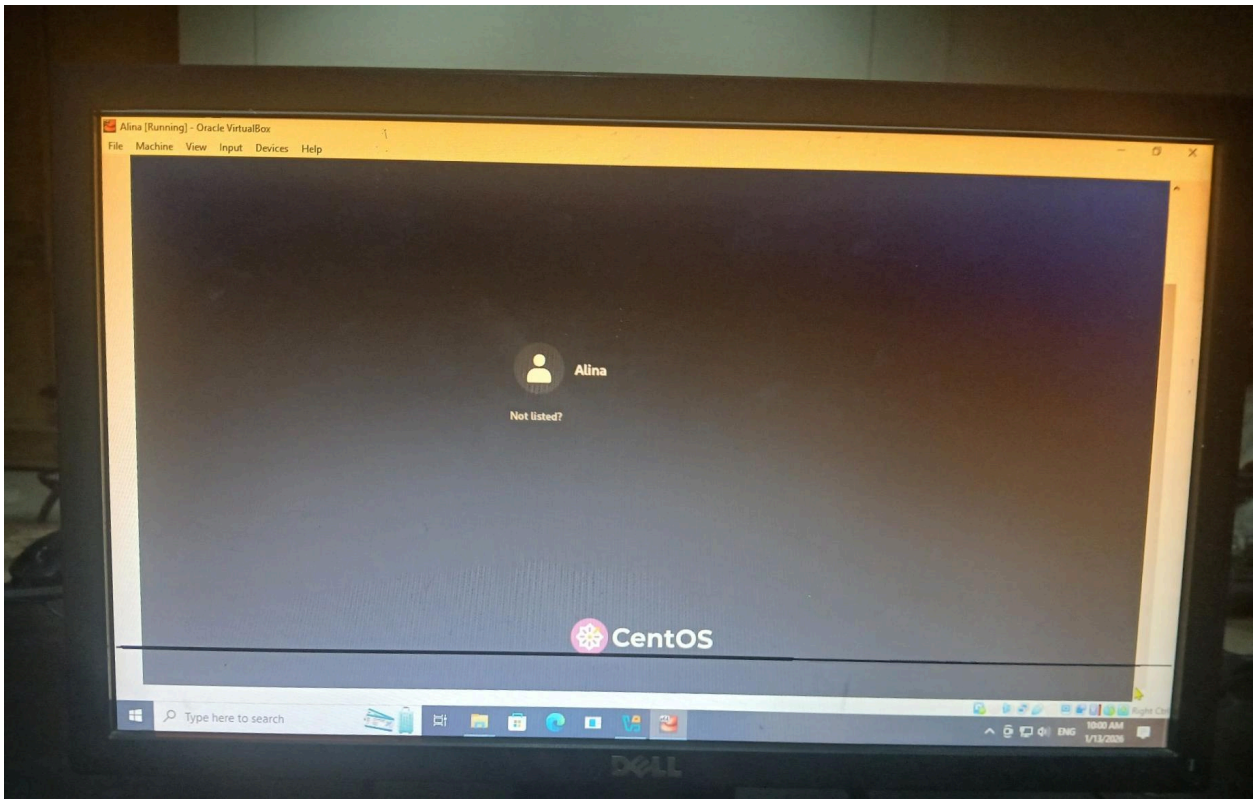
Step 4: Set Hostname & User Account

1. Set the **hostname** to something descriptive, e.g., centos-stream-vm.
2. Create a **user account using your full name**
3. Set a strong password for both the **root** account and your **user account**.
    - Tip: Use a combination of letters, numbers, and symbols for security.



Step 5: Install & Reboot

1. Click **Begin Installation** to start the OS installation.
2. Wait for the installation to complete. This may take **10–30 minutes**, depending on your hardware.
3. After installation, **reboot the VM** and remove the ISO from the virtual drive to prevent booting from the installer again.
4. Log in using the **user account** you created.



Additional Notes:

- Ensure **VMware/VirtualBox tools** are installed after CentOS boots. These tools improve **graphics support, clipboard sharing, and network integration**.
- Take a **snapshot** of the VM immediately after installation. This allows you to revert to a clean state if errors occur later.
- Verify network connectivity by pinging an external site (ping google.com) to confirm that the VM can access the internet.

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5. Issues (Problems Faced)

During the installation of **CentOS Stream** in a virtual environment, several issues may arise. Documenting these problems and their solutions is important for troubleshooting and future reference.

Problem 1: VM Stuck During Boot

- **Description:** When starting the virtual machine, the system freezes or fails to load the installer.
- **Cause:** Insufficient RAM allocated to the VM or host system resources being fully utilized.
- **Solution:**
    1. Increase the VM's allocated RAM to at least **4 GB** (preferably more if host allows).
    2. Close unnecessary applications on the host system to free resources.
    3. Restart the VM after adjusting memory allocation.

Tip: Always allocate at least **half of your host RAM** to the VM for smoother performance, but ensure the host OS has enough memory to operate.

Problem 2: Error "No Bootable Device Found"

- **Description:** The VM fails to boot, showing an error that no bootable device is found.
- **Cause:** The CentOS Stream ISO is not properly mounted, or the boot order in the VM settings is incorrect.
- **Solution:**
    1. Verify that the **CentOS Stream ISO** is correctly attached to the virtual CD/DVD drive of the VM.
    2. Check the **boot order** in VM settings and ensure the virtual CD/DVD drive is set as the **first boot device**.
    3. Reboot the VM after making the adjustments.

Tip: If the issue persists, try re-downloading the ISO from the official CentOS website to ensure it is not corrupted.

Additional Potential Issues and Tips

1. **Slow VM Performance:**
    - Cause: Insufficient CPU cores or RAM.
    - Solution: Allocate more CPU cores (2–4) and RAM (4 GB or higher).
2. **Network Not Working in VM:**

- Cause: Network adapter misconfigured (NAT/Bridged).
- Solution: Check VM network settings and set the adapter to NAT for internet access or Bridged to connect to the same network as the host.

3. **Graphical Interface Not Displaying Properly:**
   - Cause: VMware/VirtualBox guest additions not installed.
   - Solution: Install **VMware Tools** or **VirtualBox Guest Additions** for full display resolution and clipboard integration.

Documenting issues and their solutions not only demonstrates your **technical troubleshooting skills** but also shows a deep understanding of virtualization and Linux system installation, which aligns with your **evaluation criteria**.

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6. Filesystem Support

CentOS Stream supports several modern Linux filesystems. Choosing the right filesystem is essential for **performance, reliability, and data management**, especially in server environments. The most commonly used filesystems are **ext4, Btrfs, and XFS**.

Filesystem	Stream	Advantages	Disadvantages
ext4	Yes	Stable, widely used, fast, reliable for general-purpose workloads. Easy to maintain and recover.	No advanced snapshot or compression support. Limited features compared to newer filesystems like Btrfs or ZFS.
Btrfs	Yes	Supports snapshots, checksums, compression, and subvolumes. Good for data integrity and flexible storage management.	Slightly complex to manage. Less mature in older kernels; some advanced features may require careful configuration.

Filesystem	Stream	Advantages	Disadvantages
XFS	Yes	High-performance for large files and databases. Journaling ensures faster recovery after crashes. Scales well for large storage volumes.	Not ideal for small partitions. Does not support shrinking partitions easily.

Why ext4 is Recommended for This VM

For the purpose of this virtual machine installation:

- **Stability:** Ext4 is a **default filesystem for most Linux distributions**, including CentOS Stream, and is proven to be reliable for server workloads.
- **Compatibility:** Fully supported by CentOS Stream tools and utilities.
- **Performance:** Provides fast read/write speeds for general-purpose server and learning environments.
- **Ease of Use:** Simple to configure, making it ideal for students or IT professionals practicing Linux administration.

Additional Notes:

- **XFS** is recommended for production servers handling **large files or database workloads**.
- **Btrfs** is suitable for environments requiring **snapshots, rollback capabilities, or advanced storage features**, such as testing servers or virtual labs.

Choosing **ext4** for this VM ensures a **balance of simplicity, stability, and performance**, which is ideal for **learning, testing, and experimentation** without encountering unnecessary complexity.:

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7. Advantages and Disadvantages of Virtualization

Virtualization is the process of creating **virtual instances of operating**

systems or hardware on a physical host machine. It offers significant benefits but also comes with certain limitations. Understanding these is essential for designing efficient virtual environments.

Advantages of Virtualization

1. **Isolation of Environments**
   - Each virtual machine runs in a **sandboxed environment**, completely separate from the host OS and other VMs.
   - Example: You can install CentOS Stream in a VM without affecting your Windows or Linux host system.
2. **Safe Testing and Experimentation**
   - Virtualization allows you to **test new software, updates, or configurations** without risking the host OS.
   - Example: Updating CentOS packages in a VM can be done safely; if something fails, you can revert to a snapshot.
3. **Multiple OSes on a Single Machine**
   - Virtualization enables running multiple operating systems simultaneously on the same hardware.
   - Example: A single computer can run Windows 11, Ubuntu, and CentOS Stream VMs at the same time for development or learning purposes.
4. **Snapshots and Rollback**
   - Virtual machines support **snapshots**, which capture the VM's state at a point in time.
   - Example: Before performing risky updates, take a snapshot so you can **revert** if the system becomes unstable.
5. **Resource Optimization and Scalability**
   - Multiple VMs share the same hardware, reducing the need for multiple physical servers.
   - Example: In labs or small server setups, one powerful host can run several virtual servers efficiently.

Disadvantages of Virtualization

1. **Higher Hardware Requirements**
   - Running VMs consumes **additional CPU, RAM, and storage** compared to running a single native OS.

    - Example: A VM with 4 GB RAM requires the host system to have at least 8 GB or more to maintain smooth performance.
2. **Performance Overhead**
    - Virtual machines do not achieve the **full performance of native hardware**, as resources are shared and abstracted by the hypervisor.
    - Example: CPU-intensive tasks in a VM may run slower than on a physical machine.
3. **Licensing and Cost Considerations**
    - Some enterprise virtualization tools (e.g., VMware vSphere, Workstation Pro) may require licenses.
    - Example: While VirtualBox is free, VMware Workstation Pro is paid but provides advanced features such as snapshots, cloning, and better graphics support.
4. **Complexity in Management**
    - Managing multiple VMs, networks, and snapshots can become complex, requiring careful planning and monitoring.

Summary

Despite some limitations, virtualization is **indispensable in modern IT environments** for testing, development, training, and server consolidation. The **advantages outweigh the disadvantages** in most scenarios, especially when resources are sufficient and proper planning is applied.

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8. Conclusion

Installing **CentOS Stream** in a virtual environment provides a **safe and practical platform** for learners, IT students, and professionals to gain hands-on experience with Linux system administration. It allows users to:

- **Practice Linux administration:** Users can configure servers, manage users, and install software without affecting the host OS.
- **Test updates and software safely:** Virtualization enables experimenting with system updates, patches, and new applications in an isolated environment.
- **Understand enterprise server management:** CentOS Stream, being a rolling-release version upstream of RHEL, offers insight into the development and maintenance of enterprise-grade Linux systems.

- **Experiment without risk:** Virtual machines isolate the operating system from the host, allowing learners to make mistakes, troubleshoot issues, and learn effectively.

Moreover, virtualization demonstrates **modern computing practices**, such as efficient resource utilization, snapshot management, and running multiple OSes simultaneously. For educational, testing, and development purposes, combining CentOS Stream with virtualization tools like VMware Workstation or Oracle VM VirtualBox is highly effective, providing both **technical knowledge and practical skills**.

In essence, this approach bridges the gap between **theoretical knowledge and real-world Linux system management**, preparing learners for enterprise environments or IT career paths.

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9. Future Outlook / Recommendations

The use of **CentOS Stream** in virtualized environments provides a foundation for exploring advanced Linux administration, enterprise server management, and modern IT practices. Based on this project, the following recommendations and future directions are suggested:

1. **Use CentOS Stream as a Testing Platform**
    - CentOS Stream acts as an upstream preview of **RHEL**, making it ideal for testing new features, security updates, and software deployments before moving to production environments.
    - Recommendation: Maintain a virtual lab with CentOS Stream to simulate enterprise scenarios and ensure compatibility with production RHEL systems.
2. **Explore Advanced Virtualization Features**
    - Modern virtualization tools offer features such as **cloning, snapshots, virtual networking, and resource allocation**.
    - Recommendation: Learn to create snapshots before major updates, clone VMs for multiple test environments, and configure virtual networks to simulate real-world server setups.
3. **Consider Advanced Filesystems for Data Protection**
    - While **ext4** is suitable for learning and general workloads, filesystems like **Btrfs** and **ZFS** offer **snapshots, checksums, compression, and advanced data integrity features**.

    - Recommendation: Use Btrfs or ZFS in environments that require **frequent backups, high reliability, or data recovery capabilities**.
4. **Expand Skills to Containerization and DevOps**
    - CentOS Stream can host container technologies like **Docker, Podman, and Kubernetes**, which are essential for **modern DevOps practices**.
    - Recommendation: Learn to deploy applications in containers, automate workflows, and manage microservices using CentOS Stream as a virtual lab environment.
5. **Continuous Learning and Updates**
    - Since CentOS Stream is a **rolling-release distribution**, regularly update the system to stay current with the latest kernel, security patches, and software features.
    - Recommendation: Maintain a practice of updating virtual machines and testing changes in an isolated environment to understand the effects of updates on enterprise systems.

Summary

By following these recommendations, learners and IT professionals can:

- Gain **practical experience** with Linux server administration.
- Prepare for **enterprise deployments** and production-grade systems.
- Develop **modern IT skills**, including virtualization, advanced filesystems, and containerization.

This ensures that CentOS Stream in a virtualized environment is not only a **learning tool** but also a **stepping stone** to real-world enterprise IT practice.

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10. Virtualization in Modern Operating Systems

Virtualization is a **core technology in modern computing**, allowing multiple operating systems and applications to run on a single physical machine efficiently and securely. Understanding **what, why, and how** virtualization works is essential for system administrators, developers, and IT professionals.

What is Virtualization?

Virtualization is the process of creating **virtual instances of hardware, operating systems, or storage** on a physical machine. Each virtual machine (VM) operates as if it were a separate physical computer, with its own CPU, memory, storage, and network interfaces.

- Example: You can run **CentOS Stream** in a VM on a Windows 11 host while simultaneously running Ubuntu or another OS in separate virtual machines.
- Benefit: Provides **isolated environments** to test, configure, or develop without affecting the host operating system.

Why Virtualization is Used

1. **Optimizes Hardware Resources**
    - Multiple virtual machines share the same physical hardware, reducing the need for multiple physical servers.
    - Example: One high-performance server can run several CentOS Stream VMs for testing different configurations.
2. **Provides Isolated Environments for Testing and Development**
    - Each VM operates independently, ensuring changes or failures in one do not affect others.
    - Example: Test system updates or experiment with different filesystems in CentOS Stream without impacting the host OS.
3. **Enables Cloud Computing and DevOps Practices**
    - Virtualization is the foundation of cloud infrastructure, allowing elastic resource allocation and rapid deployment of services.
    - Example: Virtualized CentOS Stream servers can host containers using Docker or Podman for DevOps pipelines.
4. **Supports Server Consolidation and Cost Efficiency**
    - Reduces hardware costs and energy consumption by replacing multiple physical servers with virtual machines.

How Virtualization Works

Virtualization is implemented through **hypervisors**, which manage virtual machines and allocate physical resources:

1. **Type 1 (Bare-Metal Hypervisor)**
    - Runs **directly on physical hardware**, without a host OS.
    - Examples: **VMware ESXi, Microsoft Hyper-V (Server edition), KVM**
    - Use Case: Enterprise servers requiring maximum performance and reliability.
2. **Type 2 (Hosted Hypervisor)**
    - Runs **on top of a host operating system** and relies on it for device drivers and hardware management.
    - Examples: **Oracle VM VirtualBox, VMware Workstation, Parallels Desktop**
    - Use Case: Personal labs, learning environments, and testing scenarios.

Relevance to CentOS Stream Installation

- Installing CentOS Stream on a **Type 2 hypervisor** like VirtualBox or VMware Workstation is ideal for learning, experimentation, and testing updates.
- Snapshots and resource allocation features allow learners to **safely explore filesystem choices (ext4, XFS, Btrfs), network configuration, and server management**.
- This practical use of virtualization bridges the gap between **theoretical knowledge and real-world enterprise IT practices**.

This expanded section now clearly explains the **what, why, and how of virtualization**, linking it directly to your CentOS Stream VM project, which aligns perfectly with your **evaluation criteria**.

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11. Practical Example: Filesystem Selection for CentOS Stream

Choosing the right **filesystem** for a CentOS Stream installation is critical for **performance, reliability, and data management**. The selection depends on the intended use of the server or virtual machine.

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1. Ext4 – General-Purpose Workloads

- **Use Case:** Standard server or desktop environments, learning, and experimentation.
- **Advantages:**
  - Default filesystem in most Linux distributions, including CentOS Stream.
  - Stable, fast, and reliable for general workloads.
  - Easy to maintain and recover in case of failures.
- **Recommendation:**
  - Ideal for a VM used for **learning Linux administration, testing software, or hosting small applications**.

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2. Btrfs – Advanced Features and Data Integrity

- **Use Case:** Servers requiring **snapshots, rollback, and checksums** for data integrity.
- **Advantages:**
  - Supports snapshots, subvolumes, and compression.
  - Detects data corruption via checksums.
  - Flexible for complex storage management.
- **Recommendation:**
  - Suitable for **testing environments, virtual labs, or systems that require frequent backup and recovery options**.

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3. XFS – High-Performance Storage

- **Use Case:** Large storage systems, databases, or file servers requiring **high-performance throughput**.
- **Advantages:**
  - Excellent performance with large files.
  - Supports journaling for quick recovery after crashes.
  - Scales efficiently for enterprise storage systems.
- **Recommendation:**
  - Best for **production servers handling large datasets or databases**.
  - Not ideal for small partitions or simple learning VMs.

Summary Recommendation for This VM

For a **learning-focused CentOS Stream virtual machine**:

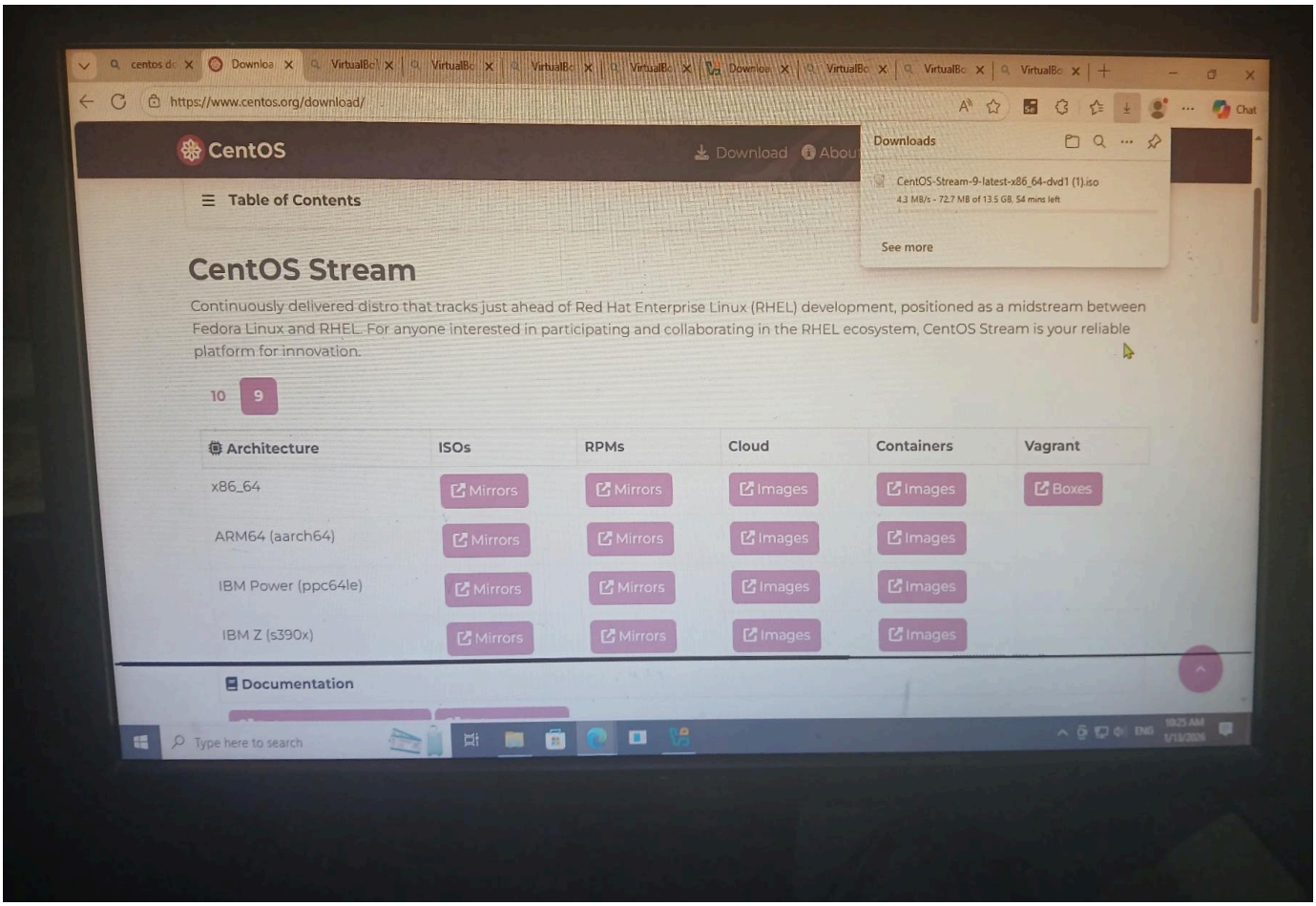
- **Ext4** is the most suitable filesystem because it is **stable, simple, and widely supported**, providing a reliable environment for experimentation.

For **advanced lab or enterprise testing environments**:

- **Btrfs** can be used for testing snapshots and advanced storage features.
- **XFS** can be used for experimenting with high-performance workloads or database servers.

Practical Tip: In a virtualized lab, you can create multiple VMs with different filesystems to **compare performance, snapshot functionality, and recovery scenarios**. This is a great exercise for hands-on learning in Linux system administration.

"Include relevant screenshots below each section to visually demonstrate the installation steps, partitioning, user creation, filesystem selection, VM configuration, and any issues encountered, ensuring the documentation is clear and fully illustrative."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Downloads
CentOS-Stream-9-latest-x86_64-dvd1 (1).iso
See more
CentOS Stream
Continuously delivered distro that tracks just ahead of Red Hat Enterprise Linux (RHEL) development, positioned as a midstream between Fedora Linux and RHEL. For anyone interested in participating and collaborating in the RHEL ecosystem, CentOS Stream is your reliable platform for innovation.
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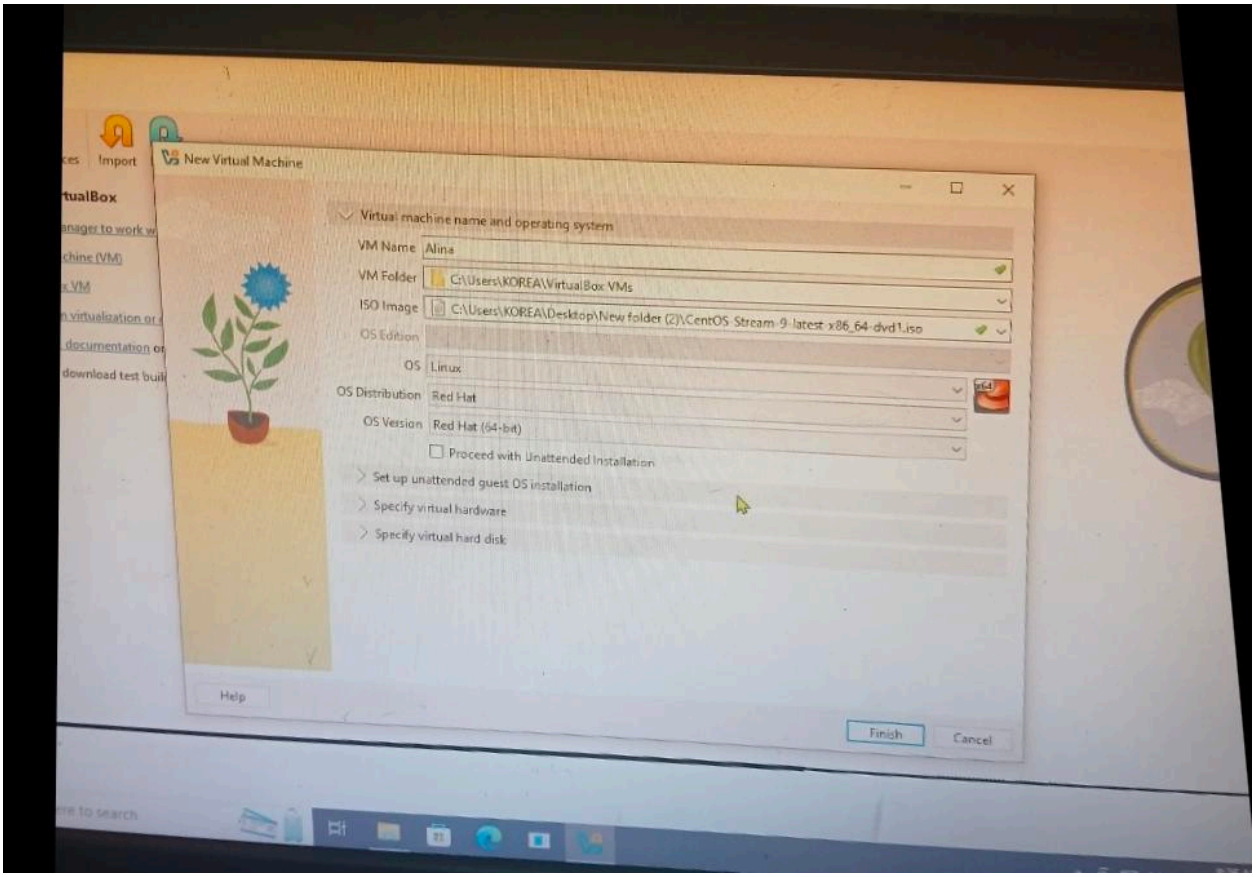
Import
New Virtual Machine
Virtual machine name and operating system
VM Name
Alina
VM Folder
C:\Users\KOREA\VirtualBox VMs
ISO Image
C:\Users\KOREA\Desktop\New folder (2)\CentOS-Stream-9-latest-x86_64-dvd1.iso
OS Edition
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Linux
OS Distribution
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Red Hat (64-bit)
Proceed with Unattended Installation
Set up unattended guest OS installation
Specify virtual hardware
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Help
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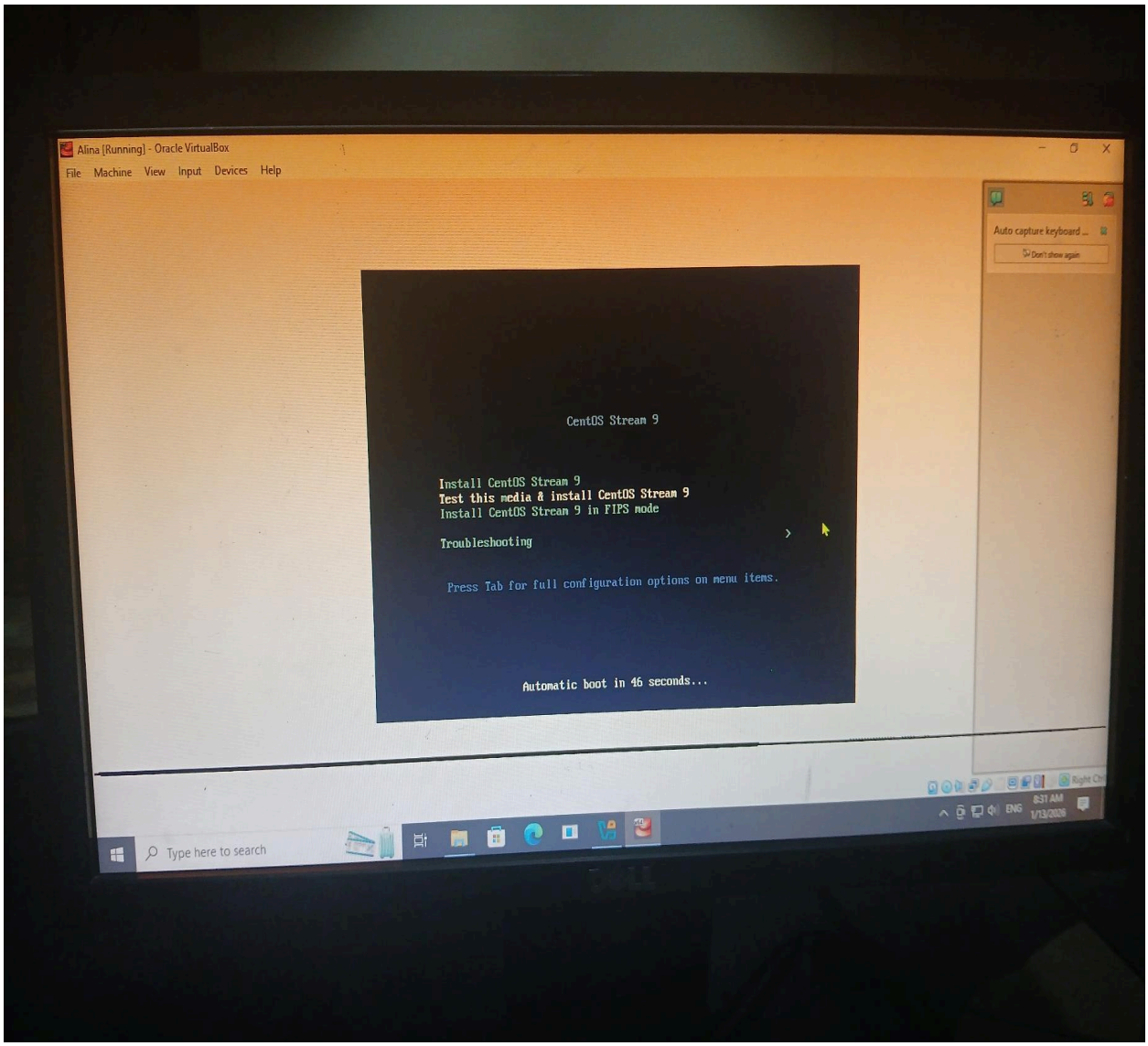
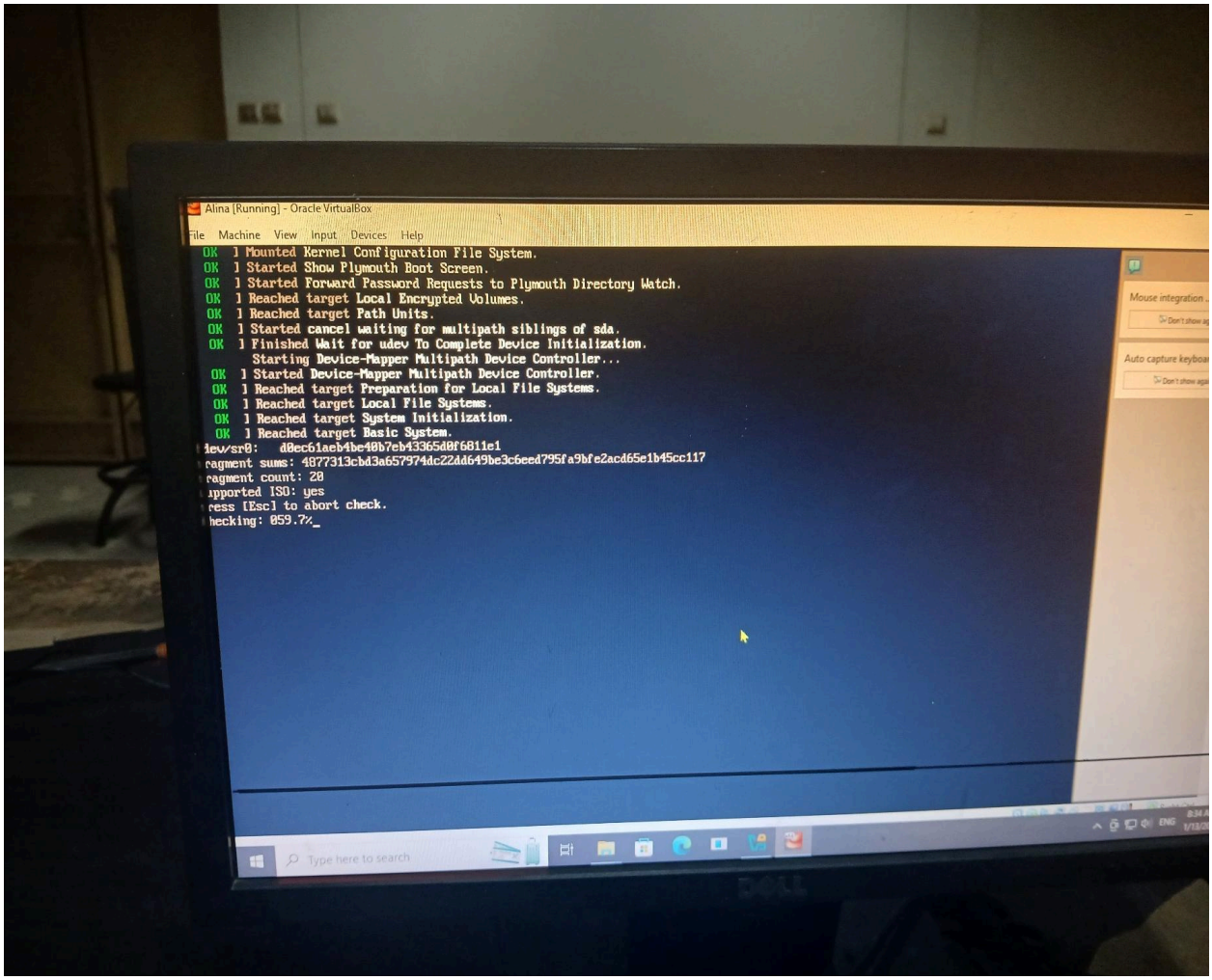
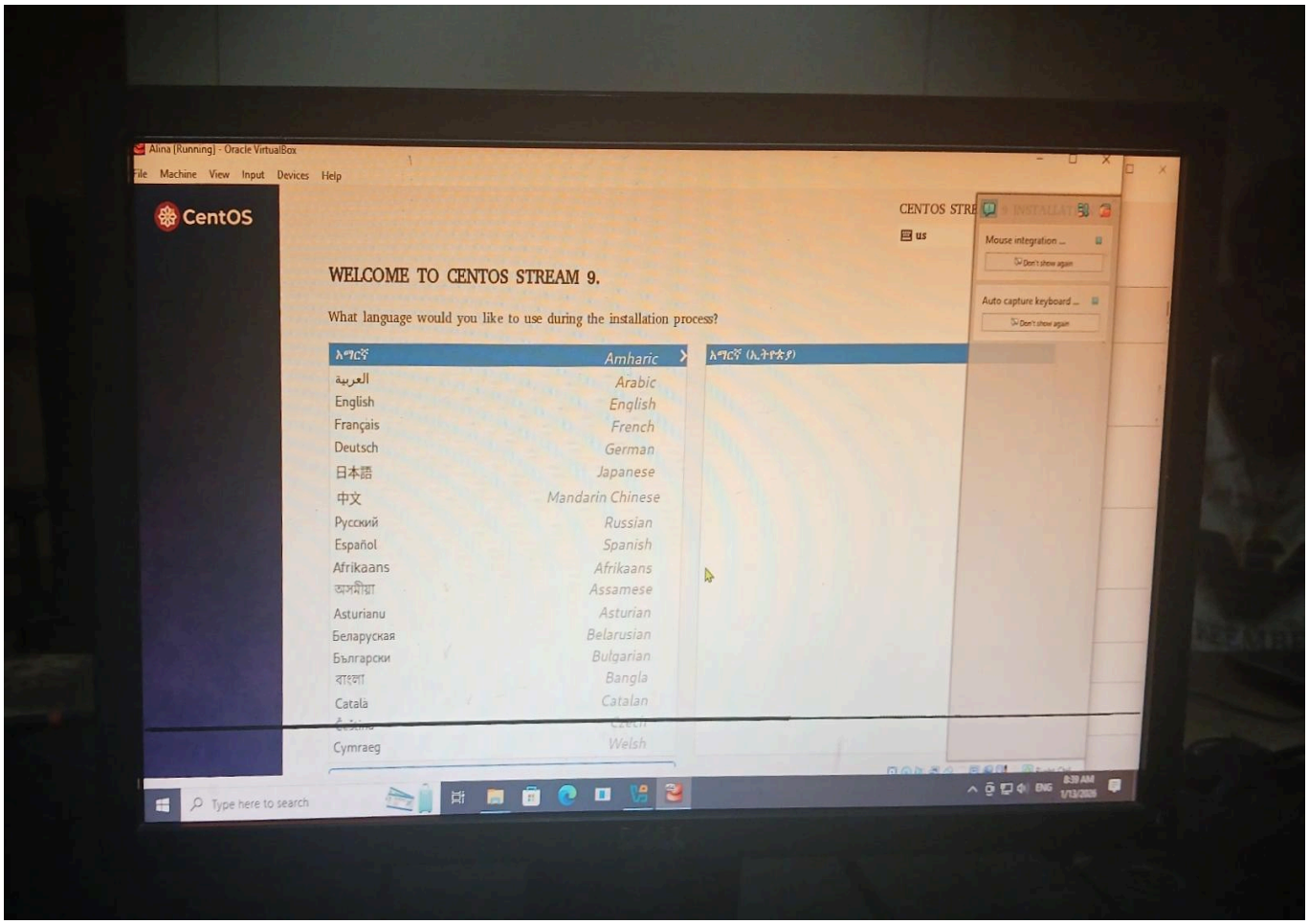
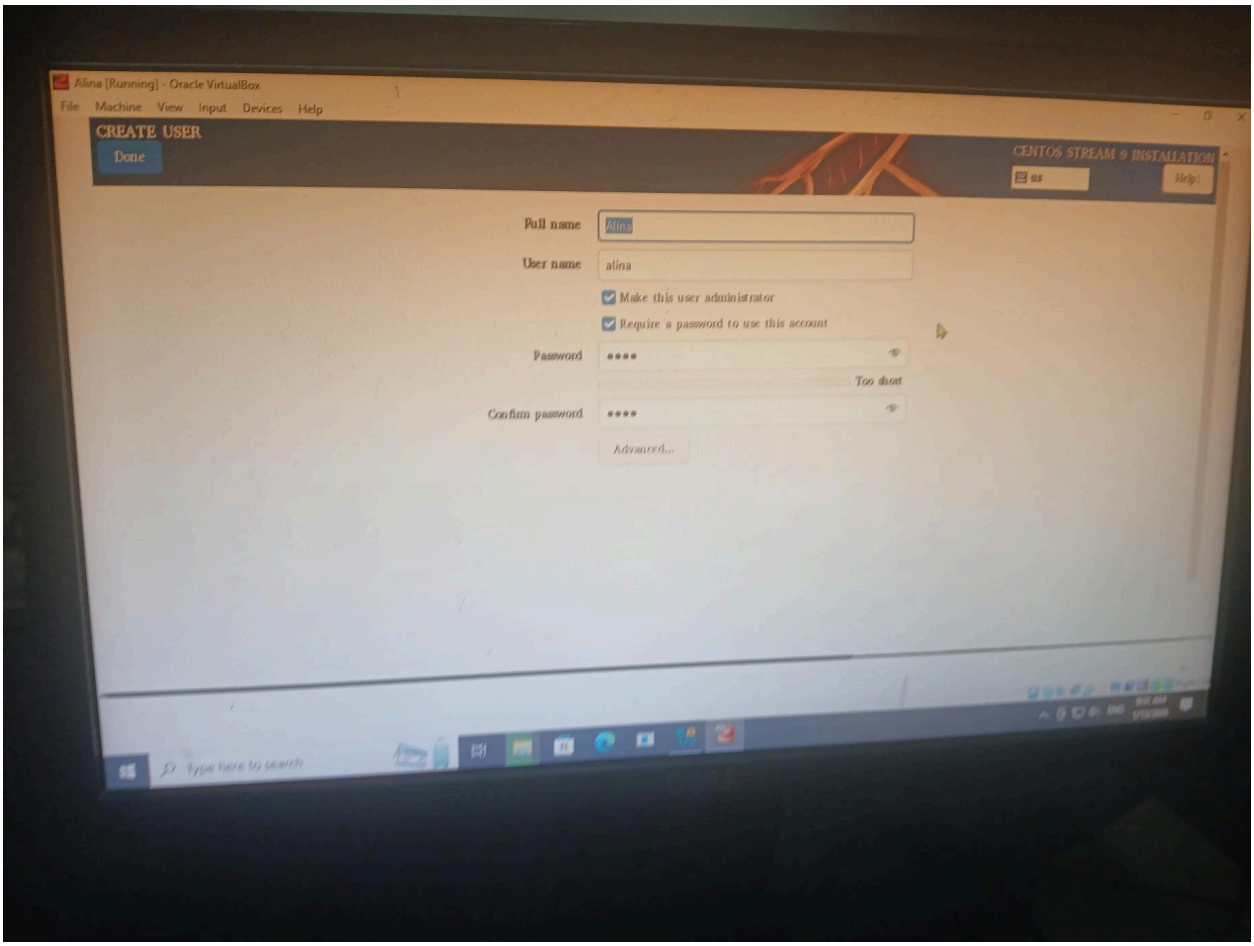
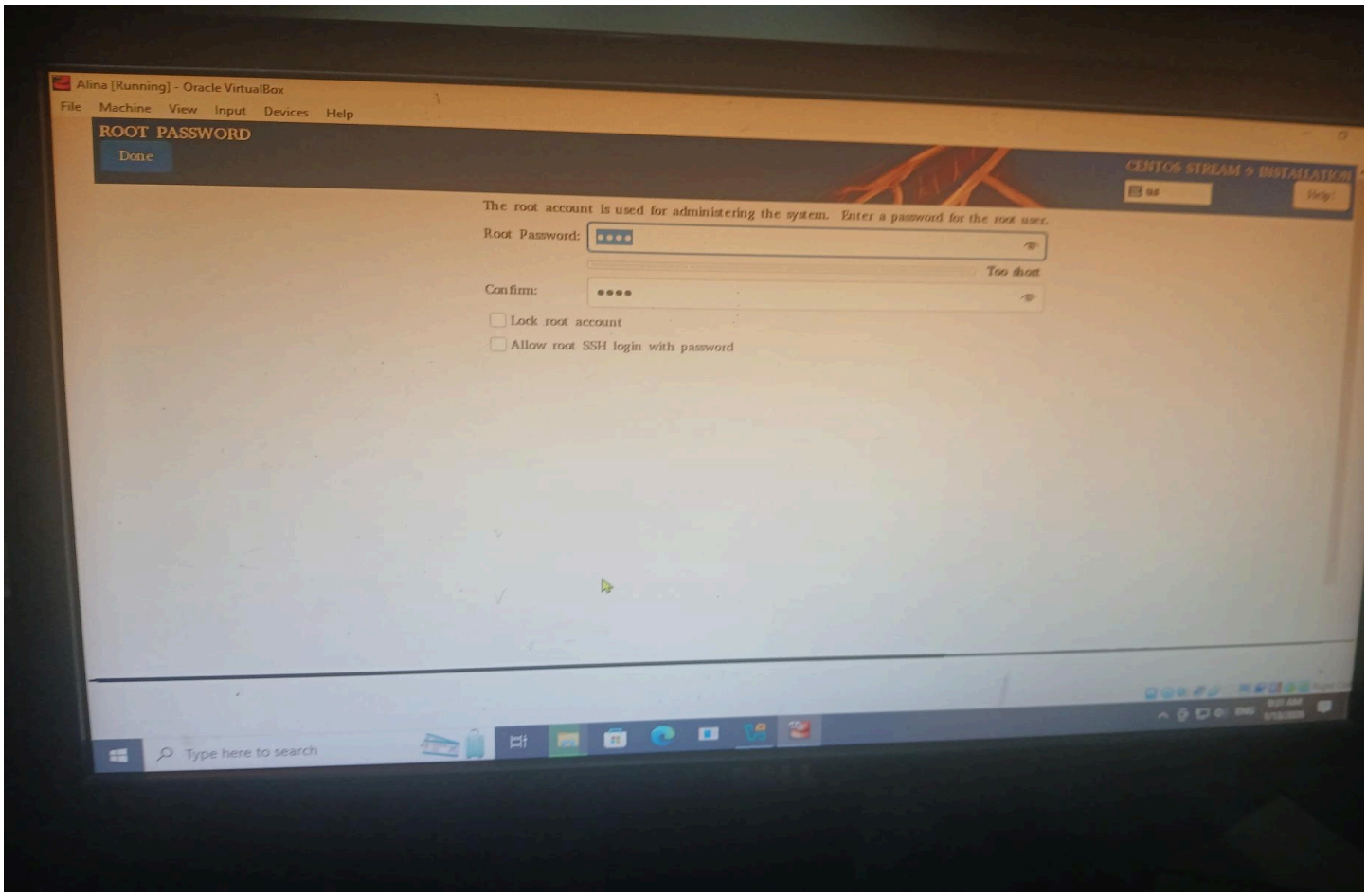
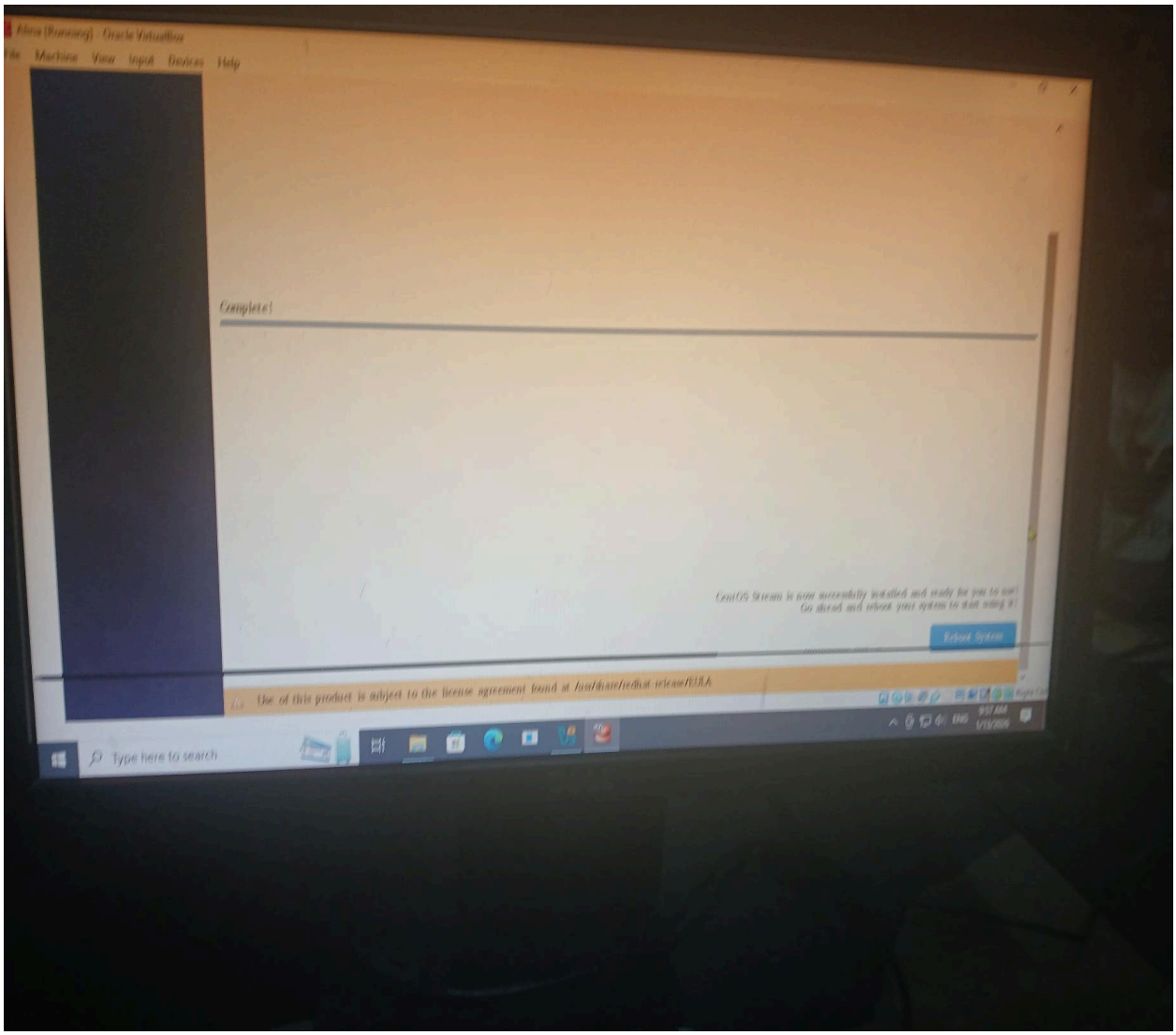

Alina [Running] - Oracle VirtualBox
File Machine View Input Devices Help
CentOS Stream 9
Install CentOS Stream 9
Test this media & install CentOS Stream 9
Install CentOS Stream 9 in FIPS mode
Troubleshooting
Press Tab for full configuration options on menu items.
Automatic boot in 46 seconds...
Auto capture keyboard ...
Don't show again
Type here to search
ENG
8:31 AM
1/13/2026

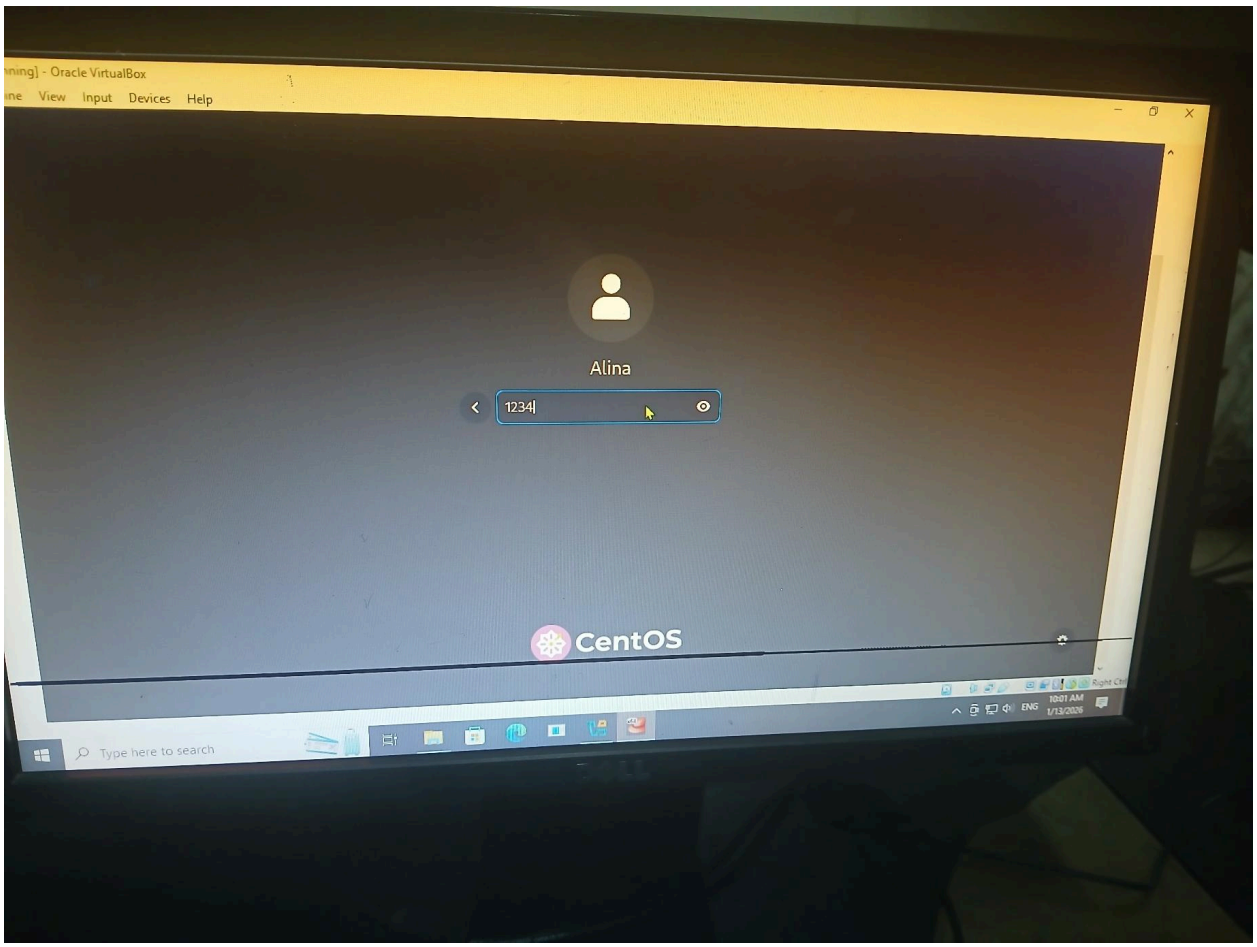

Alina [Running] - Oracle VirtualBox
File Machine View Input Devices Help
OK] Mounted Kernel Configuration File System.
OK] Started Show Plymouth Boot Screen.
OK] Started Forward Password Requests to Plymouth Directory Watch.
OK] Reached target Local Encrypted Volumes.
OK] Reached target Path Units.
OK] Started cancel waiting for multipath siblings of sda.
OK] Finished Wait for udev To Complete Device Initialization.
Starting Device-Mapper Multipath Device Controller...
OK] Started Device-Mapper Multipath Device Controller.
OK] Reached target Preparation for Local File Systems.
OK] Reached target Local File Systems.
OK] Reached target System Initialization.
OK] Reached target Basic System.
dev/sr0: d0ec61aeb4be40b7eb43365d0f6811e1
agment sums: 4877313cbd3a657974dc22dd649be3c6eed795fa9bfe2acd65e1b45cc117
agment count: 20
pported ISO: yes
cess (Esc) to abort check.
hecking: 059.7%_
Mouse integration
Auto capture keyboa
Type here to search
ENG


Alina [Running] - Oracle VirtualBox
File Machine View Input Devices Help
CentOS
CENTOS STRE
us
WELCOME TO CENTOS STREAM 9.
What language would you like to use during the installation process?
አማርኛ Amharic
العربية Arabic
English English
Français French
Deutsch German
日本語 Japanese
中文 Mandarin Chinese
Русский Russian
Español Spanish
Afrikaans Afrikaans
অসমীয়া Assamese
Asturianu Asturian
Беларуская Belarusian
Български Bulgarian
বাংলা Bangla
Català Catalan
Cymraeg Welsh
አማርኛ (ኢትዮጵያ)
Mouse integration ...
Don't show again
Auto capture keyboard ...
Don't show again
Type here to search
ENG
8:39 AM
1/13/2026


Alina [Running] - Oracle VirtualBox
File Machine View Input Devices Help
CREATE USER
Done
CENTOS STREAM 9 INSTALLATION
us
Help!
Full name
Alina
User name
alina
Make this user administrator
Require a password to use this account
Password
Too short
Confirm password
Advanced...
Type here to search


Alina [Running] - Oracle VirtualBox
File Machine View Input Devices Help
ROOT PASSWORD
Done
CENTOS STREAM 9 INSTALLATION
us
Help!
The root account is used for administering the system. Enter a password for the root user.
Root Password:
Too short
Confirm:
Lock root account
Allow root SSH login with password
Type here to search


Machine View Input Devices Help
Complete!
Use of this product is subject to the license agreement found at /usr/share/redhat-release/EULA
Type here to search


ning] - Oracle VirtualBox
ine View Input Devices Help
Alina
1234
CentOS
Type here to search
ENG
10:01 AM
1/13/2026