BAHIRDAR INSTITIUTION OF TECHNOLOGY(BiT)

Domentation for

Virtual Machine Configuration and installation for Debian 12 Installation

(VMware Workstation)

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Introduction

Debian is a free and open-source Linux operating system that has been continuously developed since 1993 by the Debian Project, a global community of volunteers. It is one of the oldest and most respected Linux distributions, well known for its strong commitment to stability, security, and open-source principles. Many popular operating systems, including Ubuntu, are derived from Debian, which highlights its importance in the Linux ecosystem.

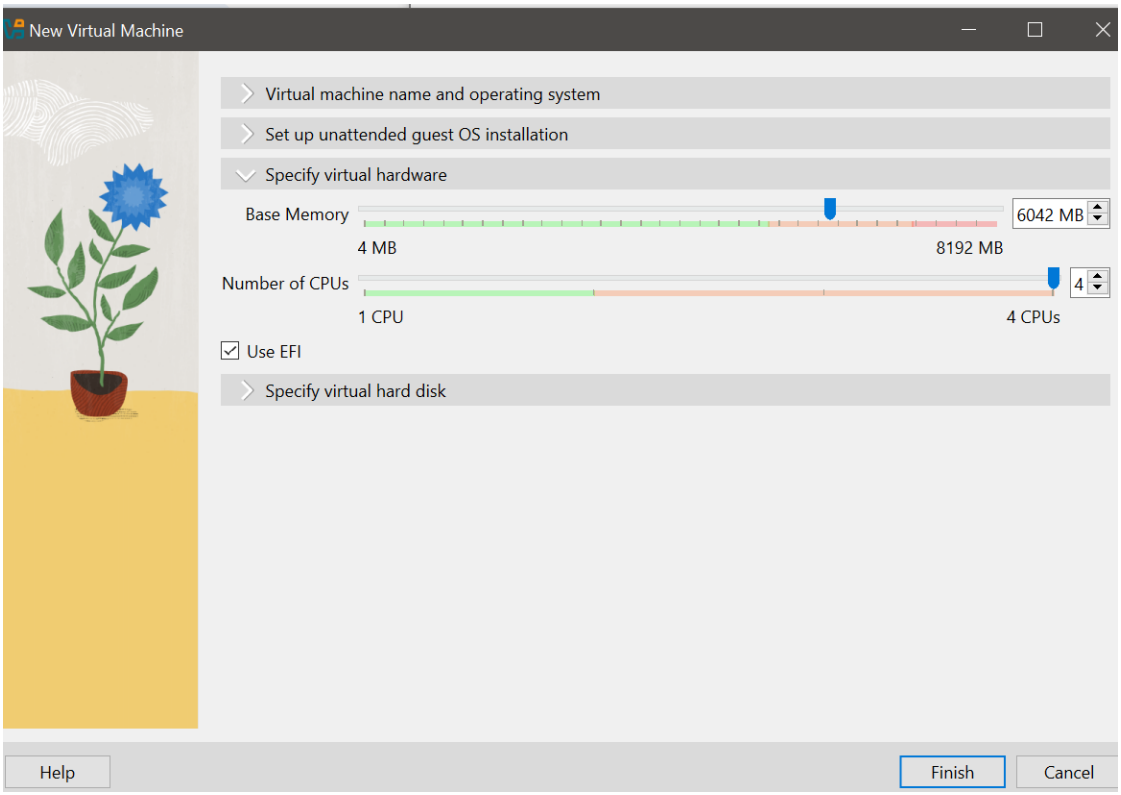
Debian 12, codenamed **Bookworm**, is the latest stable release of the Debian operating system. It provides updated software packages, improved hardware support, enhanced security features, and long-term maintenance. Debian 12 is designed to be reliable and efficient, making it suitable for desktops, servers, and virtualized environments.

The motivation for using Debian 12 in this project is to gain practical experience with a stable Linux operating system while preserving the existing Windows environment. By installing Debian 12 using virtualization technology, it is possible to explore Linux system installation, configuration, and management without affecting the host operating system. This approach offers a safe learning environment and helps develop technical skills related to operating systems, virtualization, and Linux administration.

1.This screen is part of the **VMware Workstation setup wizard** used to create a new virtual machine (VM) for installing Debian 12. It allows you to customize the virtual hardware and installation settings before launching the VM.

Key Sections Explained

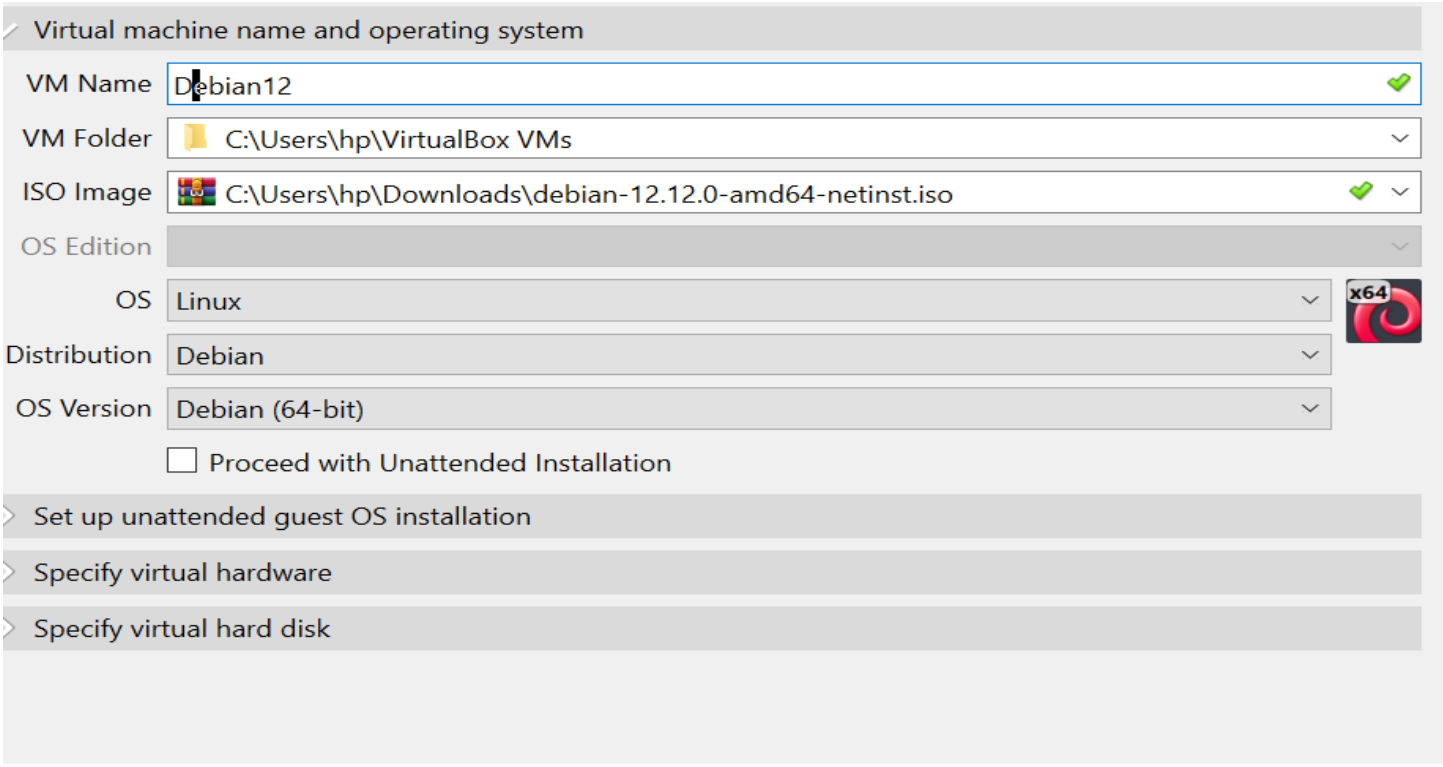
- **Virtual Machine Name and OS**: You specify the name of the VM and select Debian 12 as the guest operating system, which helps VMware optimize compatibility.
- **Unattended Guest OS Installation**: This option automates the OS installation by pre-filling user credentials, hostname, and other setup steps. If enabled, Debian will install without manual input.
- **Specify Virtual Hardware**: This section lets you allocate system resources to the VM:
    - **Base Memory**: Set to **6042 MB**, which is the RAM allocated to the VM. This affects performance—more RAM allows smoother operation.
    - **Number of CPUs**: Set to **4**, meaning the VM will use four virtual CPU cores.
    - **Use EFI**: Checked, which means the VM will boot using the **EFI firmware** instead of legacy BIOS. This is recommended for modern Linux distributions like Debian 12.
- **Specify Virtual Hard Disk** (collapsed): This section allows you to configure the size and type of the virtual disk where Debian will be installed.
- **Finish Button**: Clicking this will finalize the VM setup and begin the installation process.



2.This screen is part of the **Oracle VirtualBox VM creation wizard**, where you're configuring a new virtual machine to install Debian 12. It's a foundational step for running Debian in a virtualized environment.

Key Elements Explained

- **VM Name**: You've named the virtual machine **Debian12**, which helps identify it in your VirtualBox manager.
- **VM Folder**: The VM will be stored in `C:\Users\hp\VirtualBox VMs`, where all its configuration files and virtual disks will reside.
- **ISO Image**: You've selected the Debian 12.12.0 netinst ISO file, which is a minimal installation image. It downloads packages during setup, making it ideal for custom installations.
- **Operating System Settings**:
  - **OS**: Linux
  - **Distribution**: Debian
  - **Version**: Debian (64-bit) These settings ensure VirtualBox allocates compatible virtual hardware and optimizations for Debian.
- **Unattended Installation**: This option is **unchecked**, meaning you'll manually go through the Debian installation steps inside the VM. This gives you full control over partitioning, user setup, and package selection.

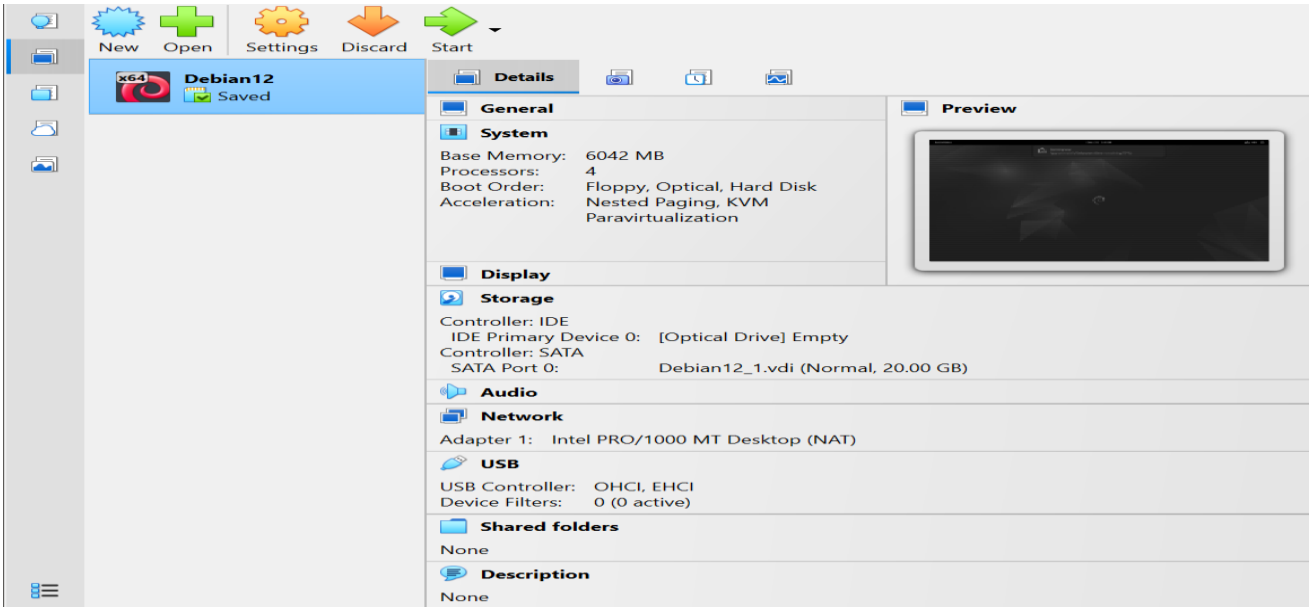


3.This screen shows the **configuration overview** of your Debian 12 virtual machine inside VirtualBox Manager. It provides a snapshot of all the key settings that define how the VM behaves and interacts with your host system.

Key Configuration Details

- **System Settings**:
  - **Base Memory**: 6042 MB of RAM allocated to the VM, which is suitable for most desktop environments.
  - **Processors**: 4 virtual CPUs assigned, allowing good multitasking performance.
  - **Boot Order**: The VM will try to boot from Floppy → Optical → Hard Disk. Since floppy is rarely used, you can reorder this if needed.
  - **Acceleration**: Features like **Nested Paging** and **KVM Paravirtualization** improve performance and compatibility with Linux guests.
- **Storage**:
  - **IDE Controller**: No optical disk currently attached.
  - **SATA Controller**: Contains `Debian12_1.vdi`, a 20 GB virtual hard disk where Debian is installed.
- **Network**:
  - **Adapter 1**: Set to **Intel PRO/1000 MT Desktop (NAT)**, which allows the VM to access the internet through your host's connection.
- **USB**:

    - **Controllers**: OHCI and EHCI enabled, supporting USB 1.1 and 2.0 devices.
    - **Device Filters**: None active, meaning no specific USB devices are automatically passed through to the VM.
- **Shared Folders**: None configured yet. You can set this up later to share files between your host and the VM.
- **Preview Window**: Shows a live thumbnail of the VM's current state, which is **Saved**—meaning it was paused and can resume from where you left off.



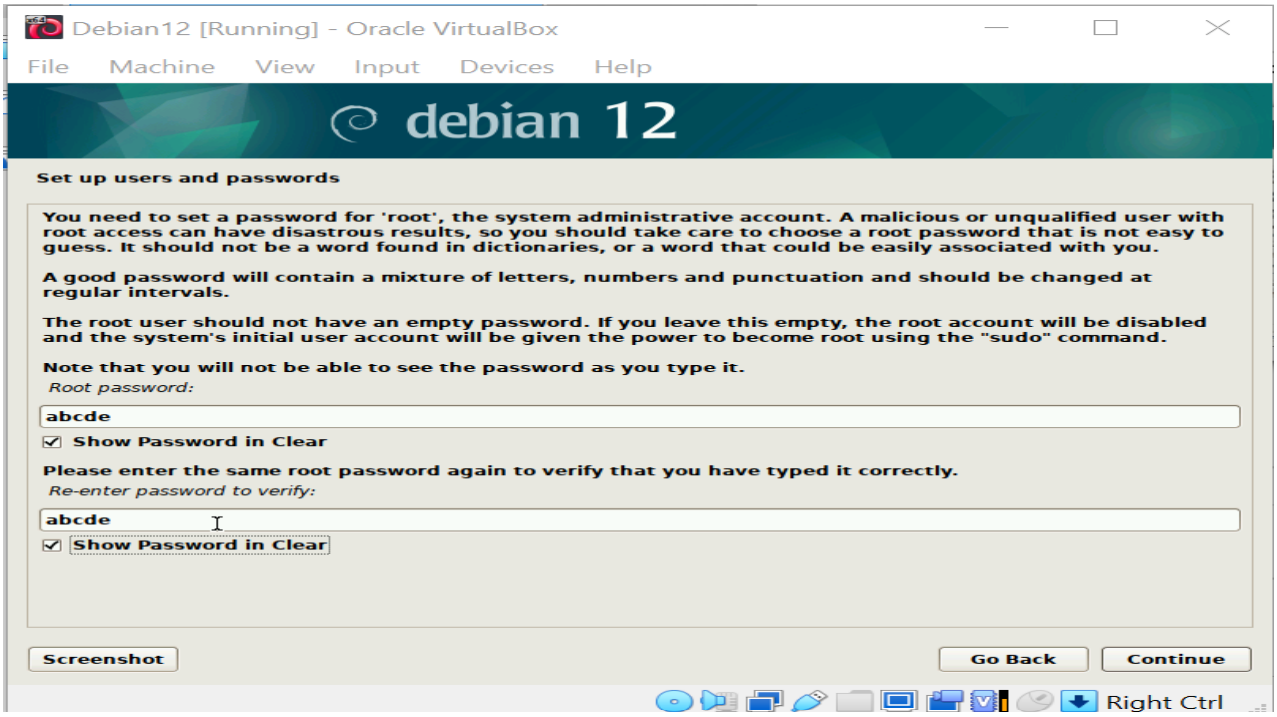
4.This screen is part of the **Debian 12 installer** running inside Oracle VirtualBox. You're at the stage where the system prompts you to set a password for the **root user**, which is the most powerful administrative account in Linux.

What This Step Means

- **Root Account**: The root user has unrestricted access to the entire system. It's used for system-level tasks like installing software, modifying system files, and managing users.
- **Password Requirements**: You're asked to choose a secure password. Debian recommends using a mix of letters, numbers, and punctuation to prevent unauthorized access.
- **Security Note**: If you leave the root password blank, Debian disables the root account and instead allows the first regular user to gain root privileges using `sudo`.
- **Your Input**: You've entered `"abcde"` as the root password and enabled the "Show Password in Clear" option to make it visible. While this is fine for testing, it's **not secure** for real-world use.

Next Step

Clicking **Continue** will move you to the next screen, where you'll create a regular user account. This user will be used for everyday tasks and can be granted administrative privileges if needed.



5.This screen is part of the **"Set up users and passwords"** section in the Debian 12 installer. After setting the root password, you're now creating a **non-administrative user account** for everyday use.

What This Step Means

- **Purpose of the Account**: This user will be your main login for daily tasks like browsing, editing files, and running applications. It's safer than using the root account, which has full system control.
- **Full Name Field**: You've entered **"abebe getachew"** as the full name. This name will appear in system messages, email headers, and user-facing applications.
- **Next Steps**: After clicking **Continue**, you'll be asked to choose a **username** (often a lowercase version of your name) and then set a **password** for this account.

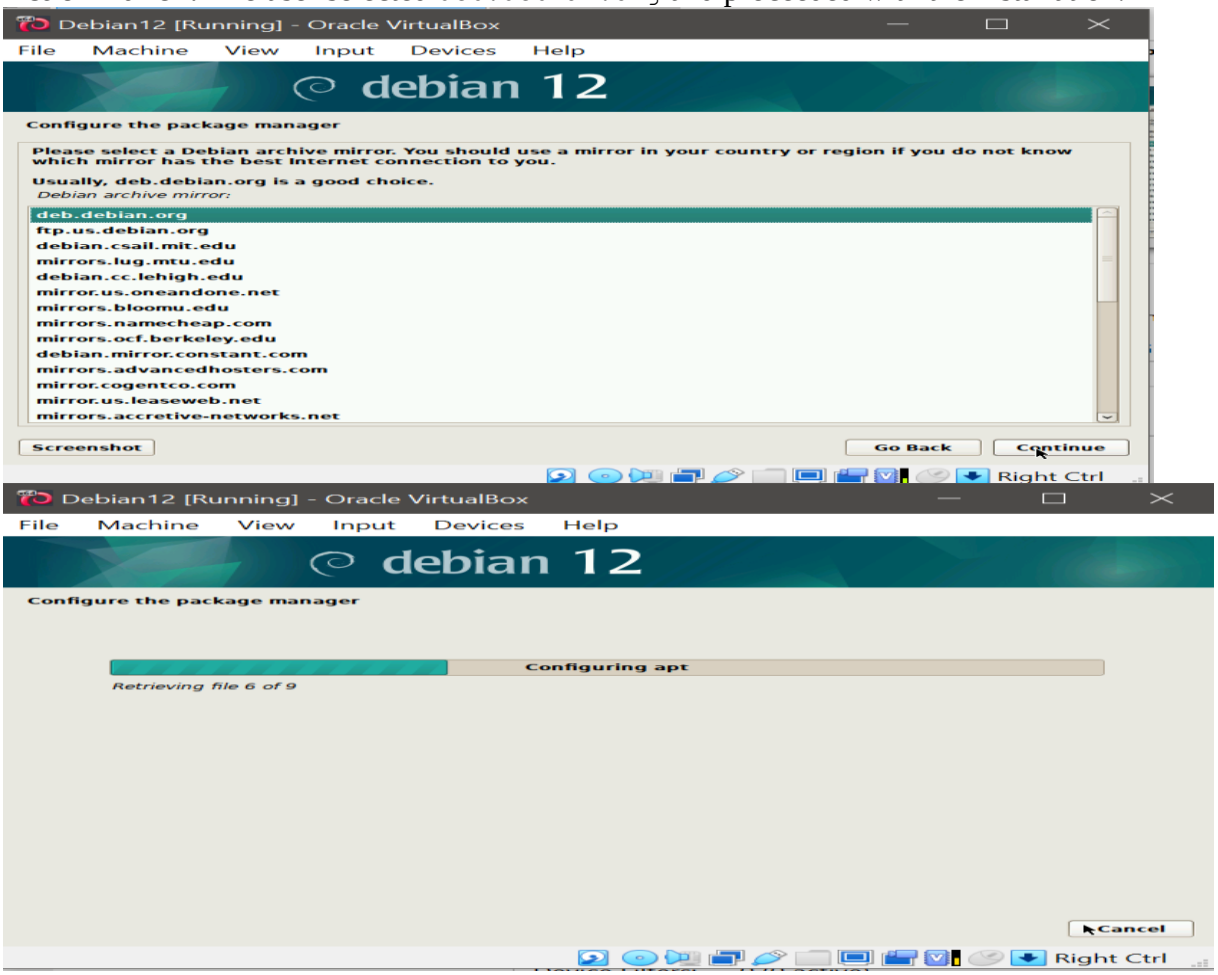
6.Purpose: Documents the mirror selection step during Debian 12 installation

Summary: During the Debian 12 installation process, the system prompts the user to select a Debian archive mirror. This mirror serves as the primary source for retrieving software packages and updates during and after installation.

Details:

- **Mirror Chosen:** `deb.debian.org`
- **Purpose:**
  - Provides access to the official Debian package repositories
  - Enables downloading required components, updates, and additional software

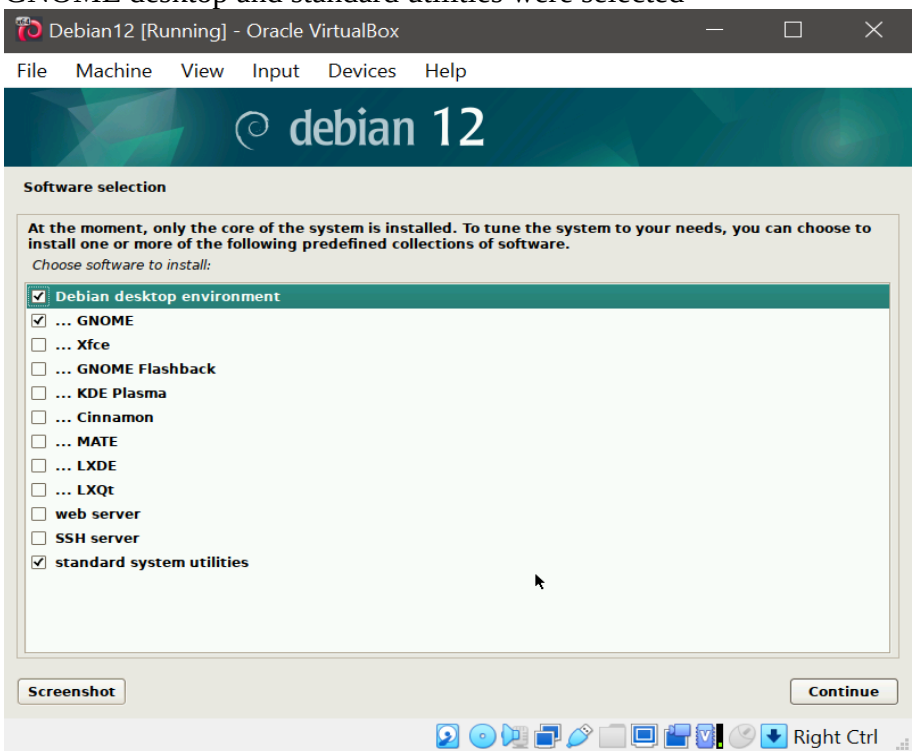
    - Improves download speed and reliability when chosen based on geographic proximity
- **Notes:**
    - `deb.debian.org` is recommended by the installer due to its global CDN-backed infrastructure
    - Alternative mirrors (e.g., university or regional servers) are available but may vary in speed and availability
- **Action Taken:** The user selected `deb.debian.org` and proceeded with the installation.



7. **Purpose:** Documents the software selection step during Debian 12 installation

Summary: This step allows the user to customize the Debian system by selecting predefined software collections. It includes options for desktop environments, server roles, and essential utilities.

Details:

- **Selected Options:**
  - **Debian Desktop Environment**
    - **GNOME** (checked)
  - **Standard System Utilities** (checked)
- **Available Desktop Environments (not selected):**
  - Xfce
  - GNOME Flashback
  - KDE Plasma
  - Cinnamon
  - MATE
  - LXDE
  - LXQt
- **Available Server Roles (not selected):**
  - Web Server
  - SSH Server
- **Purpose of This Step:**
  - Installs graphical interface and core utilities for general use
  - Allows customization based on user needs (e.g., lightweight desktops, server configurations)
  - Ensures the system is ready for typical desktop or server tasks
- **User Action:**
  - GNOME desktop and standard utilities were selected
  - 

8.Device Selected

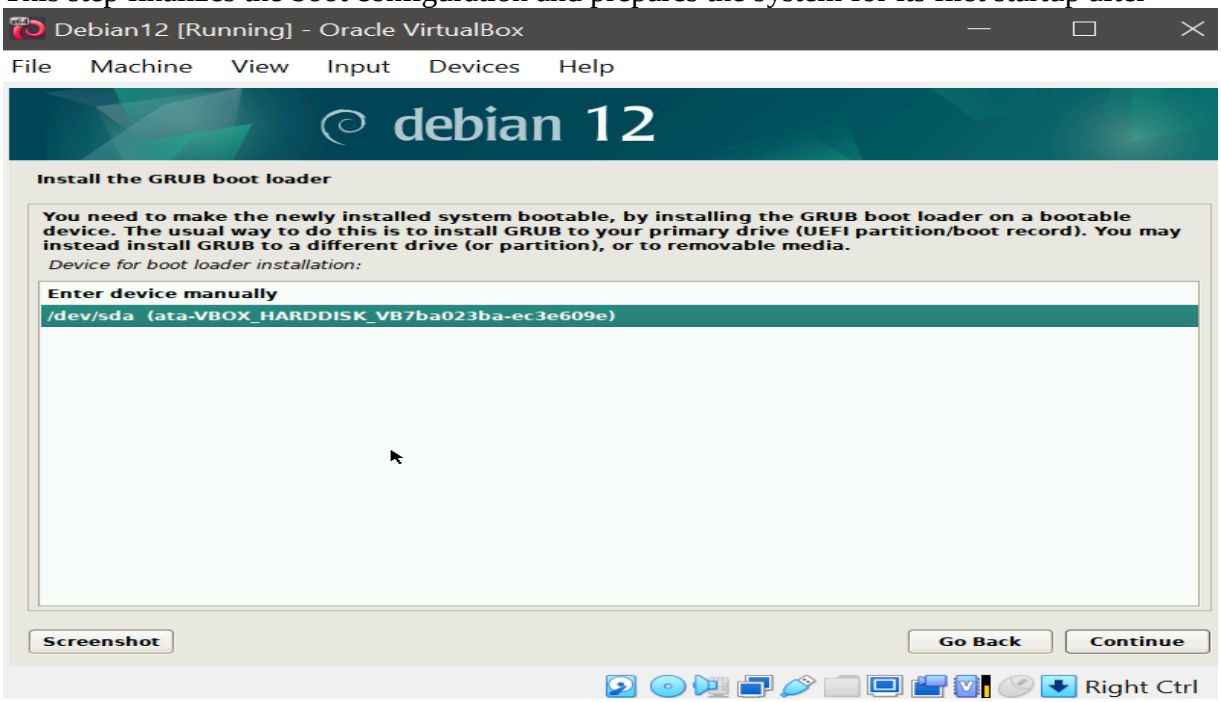
- **/dev/sda** — identified as `ata-VBOX_HARDDISK_VB7ba023ba-ec3e609e`

Purpose

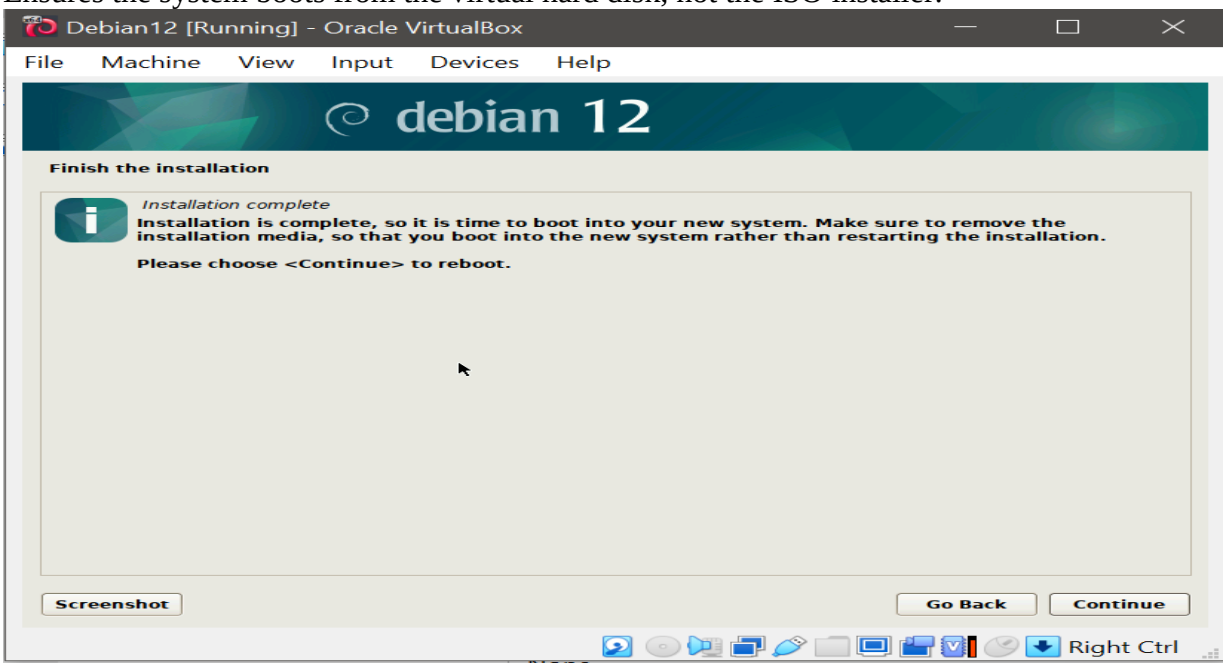
- GRUB (GRand Unified Bootloader) is responsible for loading the operating system at startup.
- It supports multiple operating systems and kernel configurations.
- Installing GRUB ensures the system can boot into Debian after installation completes.

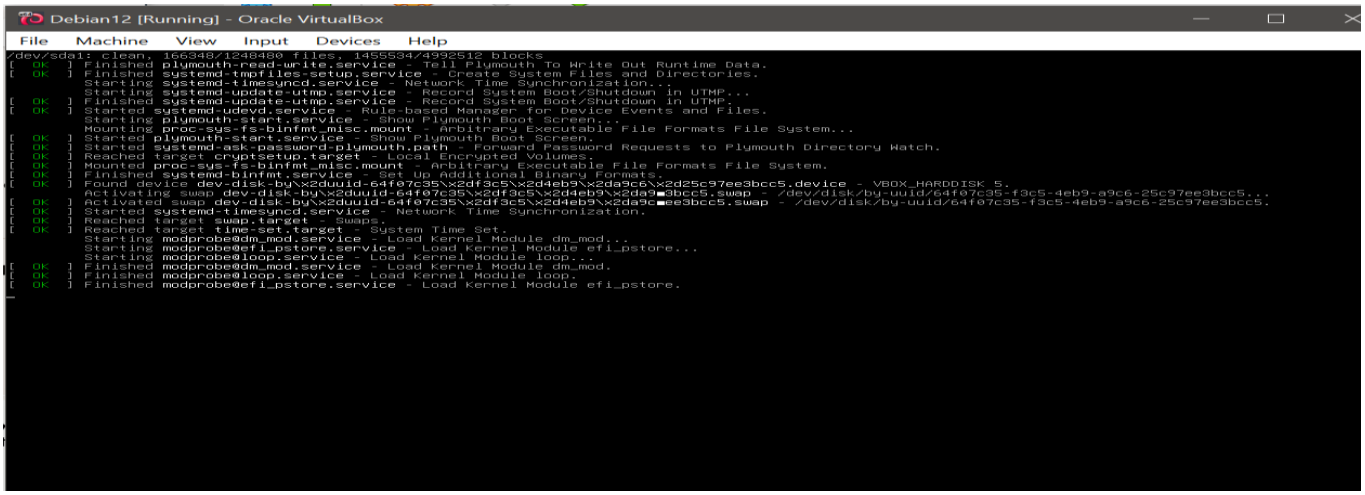
User Action

- The user confirmed installation to `/dev/sda` and proceeded by clicking **Continue**.
- This step finalizes the boot configuration and prepares the system for its first startup after



9.Finalizes the setup and transitions from the installer to the actual operating system.

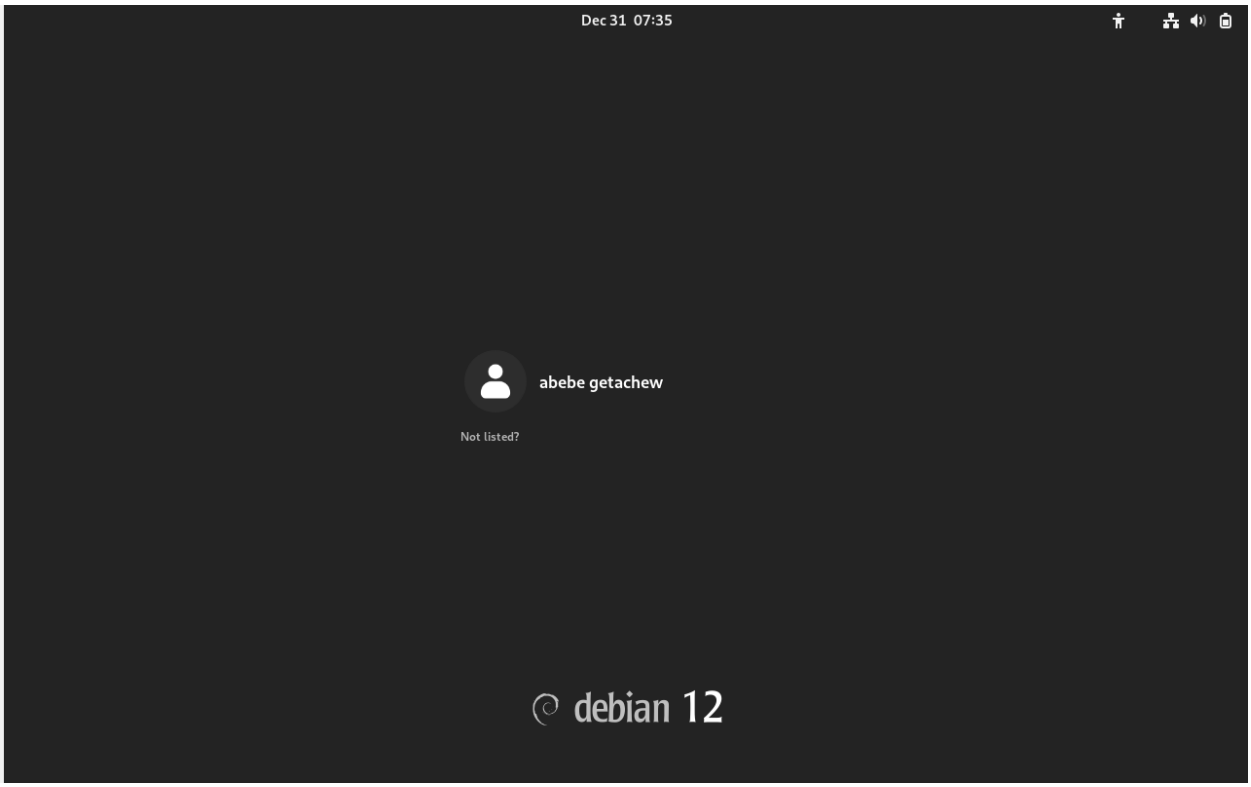
- Ensures the system boots from the virtual hard disk, not the ISO installer.
- 



11. This screen confirms that your Debian 12 system has successfully booted for the first time after installation. You're now at the **login interface**, ready to access your desktop environment.

Key Elements

- **User Account**: The account you created during installation, **abebe getachew**, is displayed and ready for login.
- **Date and Time**: Shown at the top center — in this case, **Dec 31 07:35**.
- **Operating System Branding**: The **Debian 12** logo and version number appear at the bottom center.
- **System Controls** (top right corner): Icons for accessibility, system settings, volume control, and power options.
- **Login Options**: "Not listed?" allows login with other users not shown on the screen.



12. This screen shows the **GNOME desktop environment** on your freshly installed Debian 12 system. It's the default graphical interface you selected during installation, and it's now fully loaded and ready to use.

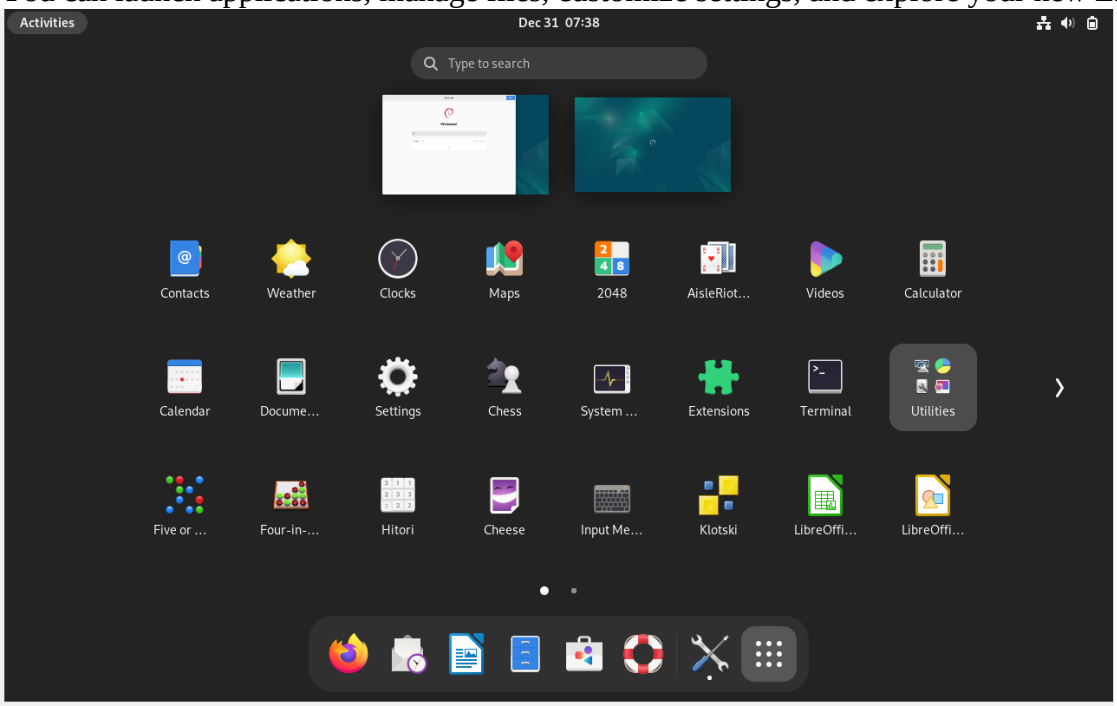
Key Elements

- **Search Bar**: At the top, labeled "Type to search," lets you quickly find apps or settings.
- **Date and Time**: Displayed as "Dec 31 07:38" at the top center.
- **Open Windows Preview**: Two thumbnails below the search bar show currently open applications.
- **Application Grid**: A scrollable grid of installed apps, including:
    - Productivity: **LibreOffice Calc**, **Draw**, **Documents**, **Calendar**, **Calculator**
    - System Tools: **Settings**, **System Monitor**, **Terminal**, **Extensions**
    - Games: **2048**, **AisleRiot**, **Chess**, **Five or More**, **Four-in-a-row**, **Hitori**, **Klotski**

    - Utilities: **Weather**, **Maps**, **Clocks**, **Cheese** (camera), **Contacts**
- **Dock (Bottom Center)**: Quick access to frequently used apps like **Firefox**, **Email**, **Text Editor**, **File Manager**, and **Help**.

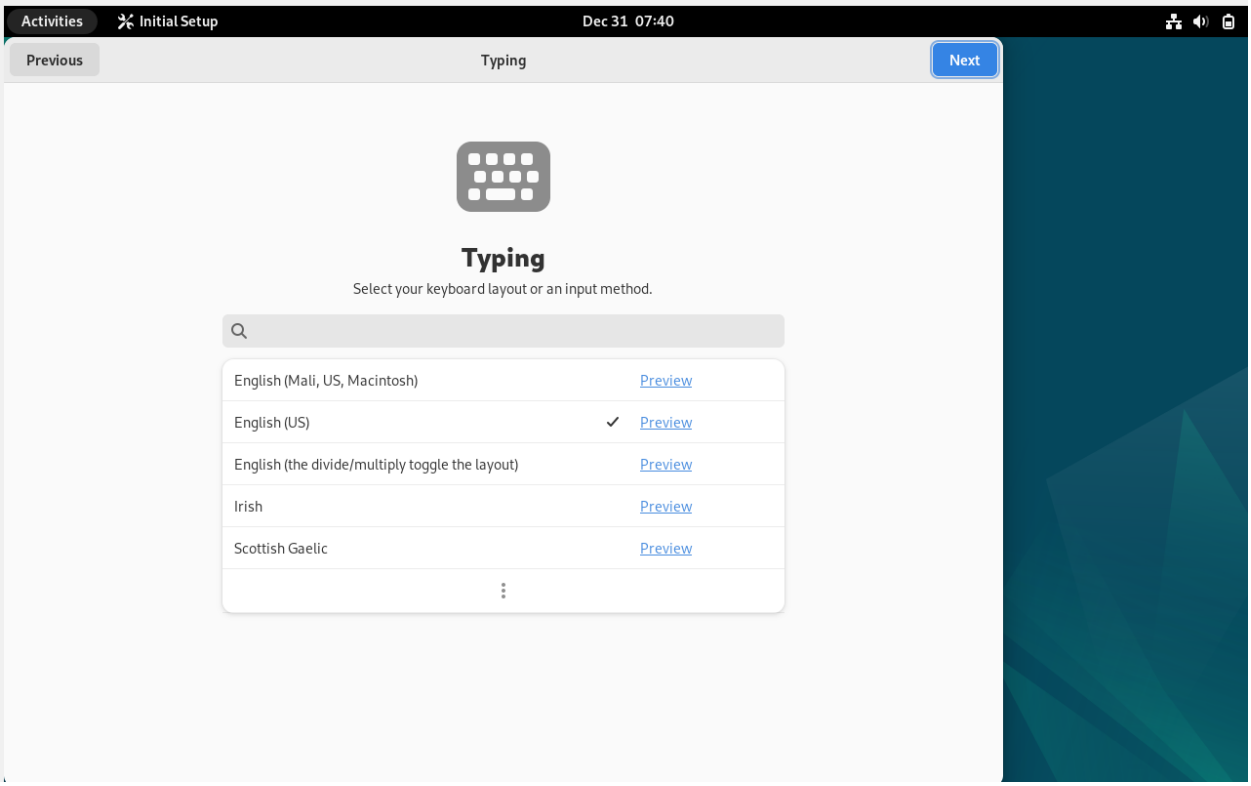
Purpose

This interface gives you full access to your Debian system through a clean, user-friendly layout. You can launch applications, manage files, customize settings, and explore your new Linux

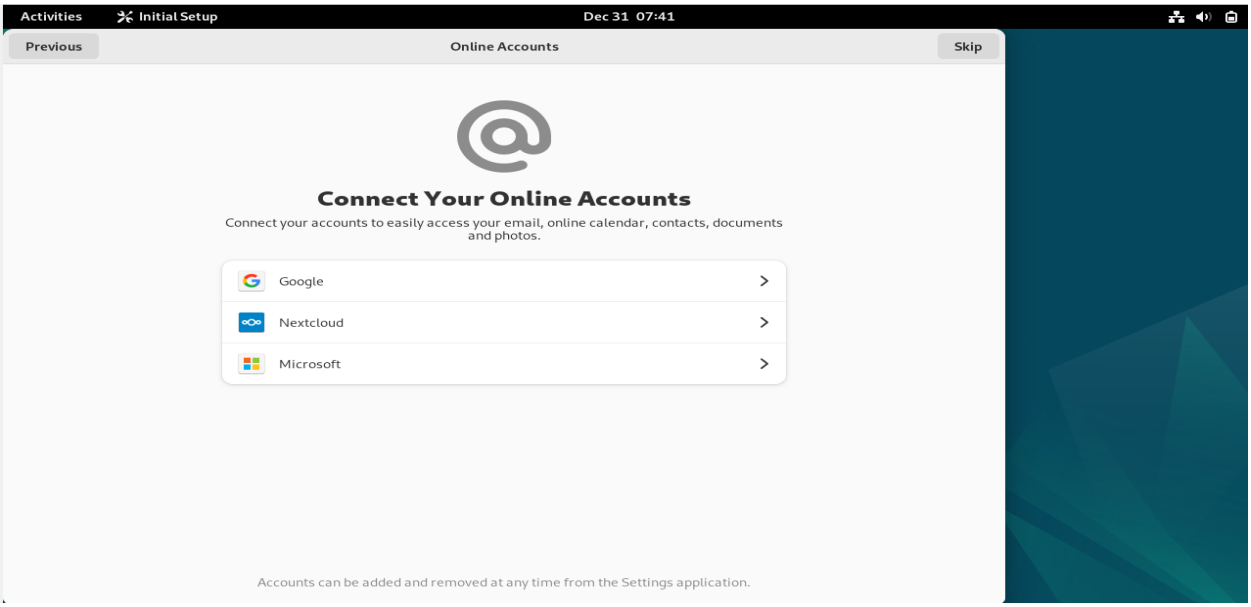


environment.

13.This screen is part of the initial GNOME desktop setup **after installing Debian 12. It helps you configure your** keyboard layout or input method **to match your typing preferences.**



14.This screen is part of the initial GNOME desktop setup **after installing Debian 12. It allows you to connect your system to online services so you can easily access your email, calendar, contacts, documents, and photos.**



15. the **successful completion** of the Debian GNU/Linux setup process using the GNOME desktop environment. It confirms that your system is fully installed and ready to use.

Key Elements

- **Header**: “Setup Complete” — indicates the end of the initial configuration.
- **Confirmation Message**: “All done! Debian GNU/Linux is ready to be used. We hope that you love it!”
- **Visual Cue**: A large green checkmark reinforces that everything went smoothly.
- **Action Button**: **Start Using Debian GNU/Linux** — clicking this launches the desktop environment and gives you full access to your system.
- **Date and Time**: Displayed as **Dec 31 07:42**