

System Administration 1

Prepared by Dr. Ahmed Omar

IT391

System Administration 1

Lecture 7



Installing and Configuring Linux

Lecture 7

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Agenda

- ☐ Comparing User Interfaces: CLI vs. GUI
- ☐ Introduction to the Linux Operating System
- ☐ The Linux Command Line Environment
- ☐ Installing Linux in a Virtual Machine
- ☐ Fundamental Linux Commands

CLI vs GUI

 **CLI: Command Line Interface** allows users to interact with the computer using text commands.

 **GUI: Graphical User Interface** enables interaction through graphical elements like windows, icons, and menus.

✓ Both have their use cases in modern computing.

CLI vs GUI

>_ Command Line Interface (CLI)

-  **Text-based:** Requires knowledge of specific commands and syntax
-  **Performance:** Fast and lightweight, uses minimal system resources
-  **Automation:** Scriptable and powerful for batch processing
-  **Remote work:** Ideal for remote server administration
-  **Learning curve:** Steeper learning curve, requires memorization
-  **Efficiency:** More efficient for power users and experienced admins

🖥️ Graphical User Interface (GUI)

-  **Visual:** Intuitive interaction through graphical elements
-  **Resources:** More resource-intensive, requires graphics rendering
-  **Accessibility:** Beginner-friendly with visual cues and feedback
-  **Visual tasks:** Better for design, browsing, and multimedia work
-  **Adoption:** Easier to learn and use for most computer users
-  **Environment:** Suitable for everyday desktop use and multitasking

When to Use CLI vs GUI

> When to Use CLI

-  **System Administration** - Managing remote servers without graphical interface
-  **Automation** - Creating scripts for repetitive tasks and batch processing
-  **Performance** - Working on systems with limited resources
-  **Development** - Git operations, compilation, and deployment processes
-  **Data Processing** - Handling large datasets with tools like grep, awk, sed

When to Use GUI

-  **Creative Work** - Graphic design, video editing, and content creation
-  **Data Visualization** - Viewing and interacting with graphs and charts
-  **Web Browsing** - Everyday internet use and multimedia consumption
-  **User Training** - Teaching beginners who need visual cues
-  **Entertainment** - Gaming and media consumption

What is Linux?

Linux is an open-source operating system **kernel** that serves as the foundation for many different operating system distributions. Created by **Linus Torvalds** in **1991**, Linux is based on **Unix** principles and has become one of the most widely used operating systems in the world.

- open-source software meaning anyone can view, modify, and distribute its source code.



What is Linux?

- ❑ **Linux** is a "**Unix-like**" operating system that was created from scratch to be a **free** and **open-source** alternative to the proprietary Unix systems.
- ❑ Linux is the modern, open-source re-implementation of those ideas, which made the power of a Unix-like system accessible to everyone.



What is kernel?

The **kernel** is the core component of an operating system that acts as a bridge between applications and the computer's hardware. It's the most fundamental part of the OS that manages system resources and provides essential services.

What is kernel?

A good way to understand the **kernel** is to think of it as the **brain** of the operating system. It manages all the essential, low-level operations that you rarely see but that are **critical** for the computer to function.

Just as your brain coordinates all your body's functions without you consciously thinking about it, the kernel manages the computer's resources behind the scenes.

What is kernel?

Key Functions of the Kernel:

- ☐ Hardware Management
- ☐ Resource Allocation
- ☐ Process Management
- ☐ Memory Management
- ☐ Security and Access Control
- ☐ System Calls



Linux Key Features



Stability & Reliability

Exceptional uptime and resistance to crashes, making it ideal for critical systems



Security

Robust permission system and fewer vulnerabilities compared to other operating systems



Flexibility & Customization

Highly adaptable to various needs, from embedded devices to supercomputers

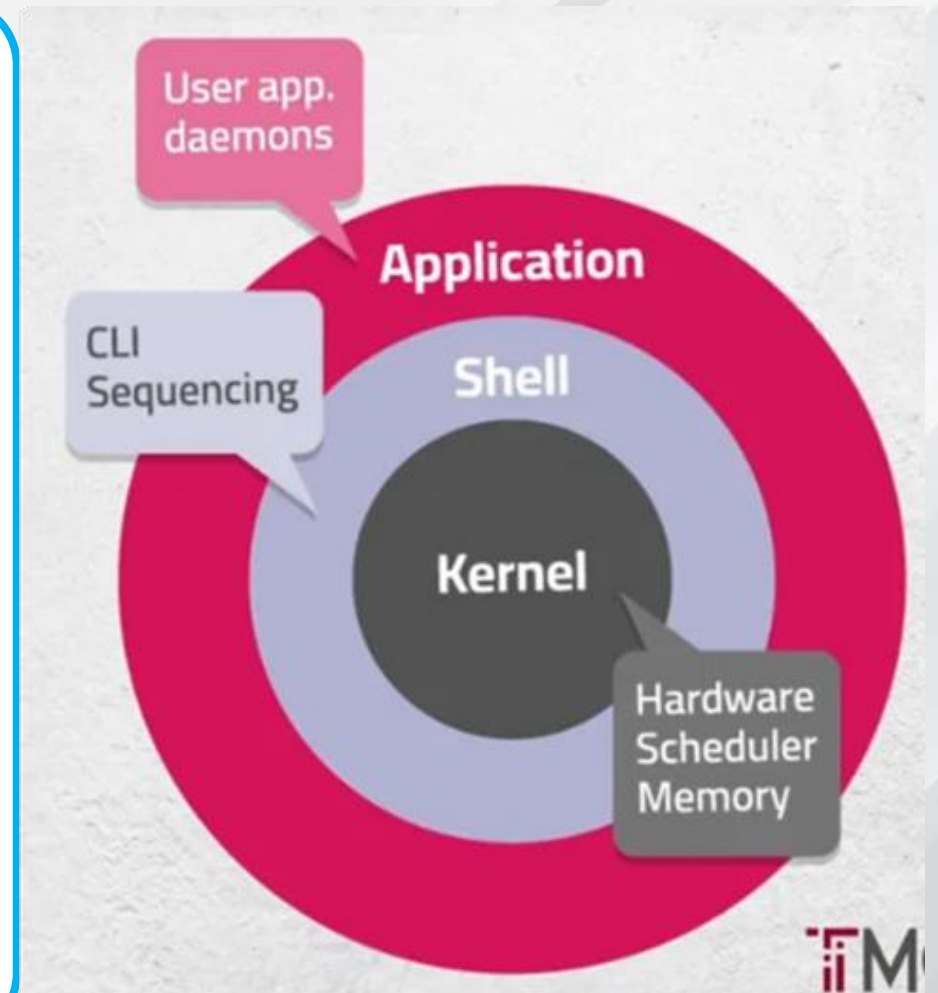


Open Source

Community-driven development with transparent code and collaborative improvement

Linux Architecture

Linux follows a **layered architecture** design where each layer provides specific services to the layers above it.



Linux Architecture

❑ Kernel

The core of Linux that interfaces directly with hardware. Manages memory, processes, devices, and system calls.

❑ Shell

Command interpreter that provides an interface between the user and the kernel. Executes commands and scripts.

❑ Application Layer

User applications, system utilities, and daemons (background services) that run on top of the shell and kernel.

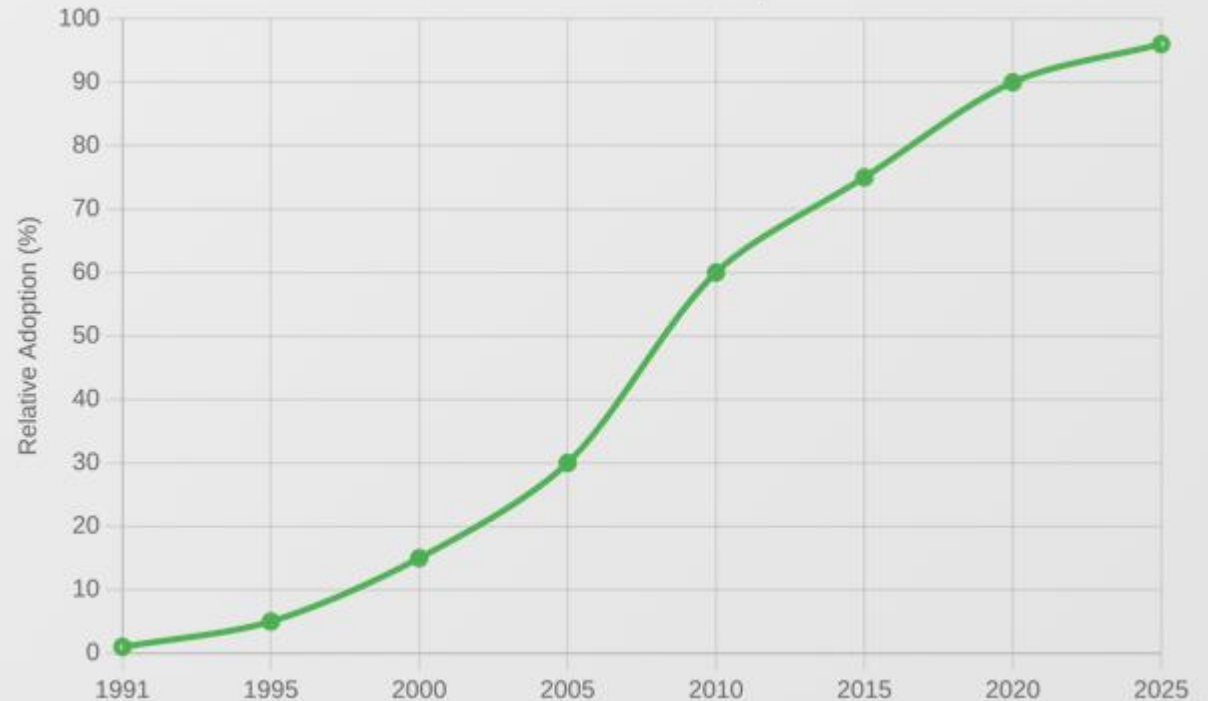
❑ Hardware Interaction

The kernel manages hardware resources through schedulers, memory management, and device drivers.

A Brief History

- **1983:** Richard Stallman announces the GNU Project to create a free Unix-like operating system
- **1991:** Linus Torvalds, a Finnish student, begins working on a new kernel as a hobby project
- **1992:** Linux is released under the GNU General Public License (GPL)
- **1993:** Over 100 developers begin contributing to Linux development
- **1994:** First major Linux distribution, Slackware, is released
- **1996:** Tux the penguin becomes the official Linux mascot
- **2025:** Linux powers millions of devices worldwide, from smartphones to supercomputers

Linux Growth and Adoption



Linux Distributions

A **Linux distribution** is an operating system built from the Linux kernel and a collection of software.

- Over **600** active Linux distributions exist today

Popular Distributions



Ubuntu

User-friendly, great for beginners



Fedora

Cutting-edge features, developer-focused



Debian

Stable, reliable, community-driven



Linux Mint

Elegant, modern, easy to use



Arch Linux

Lightweight, flexible, DIY approach



Red Hat Enterprise Linux

Enterprise-grade, commercial support

Linux Terminology

The **terminal** is the program that provides a **text-based** interface window where you can **type** commands. It's essentially a text input/output environment that displays a command prompt and shows the results of commands you run. Think of it as the "window" or "screen" where you interact with the system through text.

Linux Terminology

The **shell** is the command interpreter program that actually processes the commands you type in the terminal. When you type a command, the shell **reads** it, **interprets** what you want to do, executes the appropriate programs, and **returns** the results. The shell acts as an **intermediary** between you and the operating system kernel. It handles things like command parsing, variable expansion, and running programs.

Linux Terminology

Bash (Bourne Again Shell) is a specific type of shell - arguably the most popular and widely-used shell in Linux systems. It's the default shell on most Linux distributions. Bash includes features like command history, tab completion, scripting capabilities, and various built-in commands. Other shells include zsh, fish, dash, and the original Bourne shell (sh).

Linux Terminology

Common Linux Shells

- › **Bash** (Bourne Again Shell) - Default on most Linux distributions
- › **Zsh** - Extended Bourne shell with improved features and themes
- › **Fish** - User-friendly shell with autosuggestions
- › **Dash** - Lightweight shell optimized for speed

Terminal Emulators

- › **GNOME Terminal** - Default for GNOME desktop environment
- › **Konsole** - KDE's terminal emulator
- › **xterm** - Standard terminal emulator for X Window System
- › **Alacritty** - GPU-accelerated terminal emulator

Linux Terminology

How They Work Together:

1. You open a **terminal** application.
2. The **terminal** starts a **shell** program, which is usually **Bash** by default
3. You **type** a command into the terminal.
4. The shell (Bash) **interprets** the command and tells the operating system what to do.
5. The output of the command is then **displayed** back to you in the terminal window.

Linux Terminology

Basic Commands

ls

List files and directories

cd directory_name

Change directory

pwd

Print working directory

man command_name

Display manual for a command

mkdir directory_name

Create a new directory

Linux Account

Root Account

- **Superuser:** Has complete administrative control over the system
- **User ID (UID):** Always 0
- **Privileges:** Can access all files, modify system configurations, install/remove software, manage other users, and perform any system operation
- **Prompt:** Typically shows # symbol
- **Home directory:** Usually /root
- **Risk:** Commands run as root can potentially damage or compromise the entire system

Linux Account

Regular User Account

- **Limited privileges:** Can only access their own files and perform non-administrative tasks
- **User ID (UID):** Typically **1000** and above for regular users
- **Restrictions:** Cannot modify system files, install system-wide software, or access other users' private files without permission
- **Prompt:** Typically shows \$ symbol
- **Home directory:** Usually **/home/username**
- **Safety:** Mistakes are generally contained to the user's own files and space

Download ISO

<https://cdimage.debian.org/debian-cd/current/amd64/iso-dvd/>

For more information about how to do these steps, read the [verification guide](#).

Only the first few images are available! Where are the rest?

We don't store/serve the full set of ISO images for all architectures, to reduce the amount of space taken up on the mirrors. You can [use the jigdo tool](#) to recreate the missing ISO images instead.

Non-free Firmware

This Debian image build only includes Free Software where possible. However, many systems include hardware which depends on non-free firmware to function properly so this build also includes those firmware files for those cases. See the Debian Wiki [non-free firmware](#) page for more information.

Other questions?

See the Debian CD [FAQ](#) for lots more information about Debian CDs and installation.

The images here were put together by the [Debian CD team](#) , using debian-cd and other software.

	Name	Last modified	Size
	Parent Directory		-
	SHA256SUMS	2025-05-17 19:52	2.1K
	SHA256SUMS.sign	2025-05-17 19:55	833
	SHA512SUMS	2025-05-17 19:52	3.5K
	SHA512SUMS.sign	2025-05-17 19:55	833
	debian-12.11.0-amd64-DVD-1.iso	2025-05-17 13:50	3.7G

Creating a new virtual machine

WORKSTATION PRO™ 17



Create a New
Virtual Machine



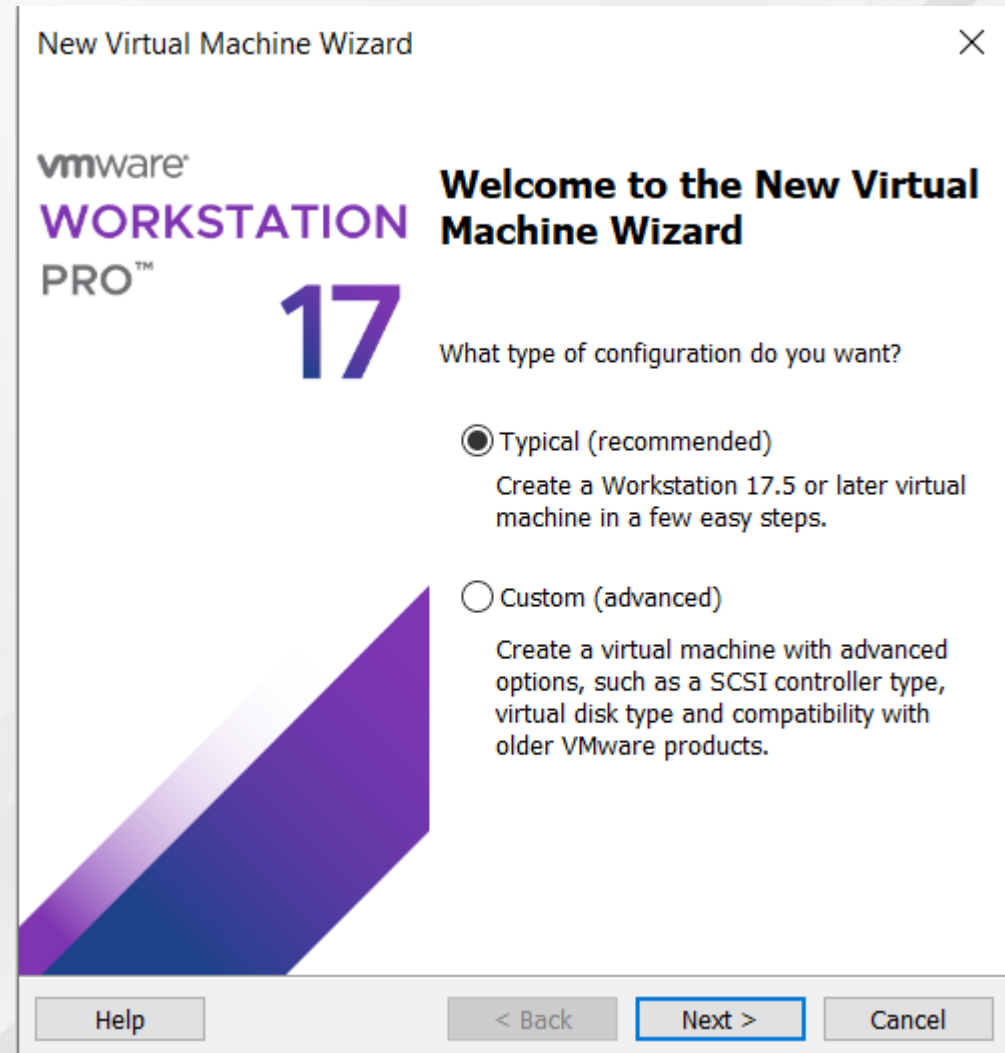
Open a Virtual
Machine



Connect to a
Remote Server

Creating a new virtual machine

Select Typical



Creating a new virtual machine

Selecting the Linux ISO file

New Virtual Machine Wizard

Guest Operating System Installation

A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

☐ Installer disc:

No drives available

☒ Installer disc image file (iso):

H:\MidOcean\IT391 - System Administration 1\debian

Browse...

Debian 12.x 64-bit detected.

☐ I will install the operating system later.

The virtual machine will be created with a blank hard disk.

Help < Back Next > Cancel

Creating a new virtual machine

- **Type Name**
- **Select Location**

New Virtual Machine Wizard

×

Name the Virtual Machine

What name would you like to use for this virtual machine?

Virtual machine name:

Debian

Location:

G:\Virtual Machine\Debian

Browse...

The default location can be changed at Edit > Preferences.

< Back

Next >

Cancel

Creating a new virtual machine

- Chose Disk size (20 GB minimum)
- Select Single File installation

New Virtual Machine Wizard

Specify Disk Capacity
How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB):

Recommended size for Debian 12.x 64-bit: 20 GB

☒ Store virtual disk as a single file

☐ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help < Back Next > Cancel

Creating a new virtual machine

- You can customize hardware

New Virtual Machine Wizard

Ready to Create Virtual Machine
Click Finish to create the virtual machine and start installing Debian 12.x 64-bit.

The virtual machine will be created with the following settings:

Name:	Debian
Location:	G:\Virtual Machine\Debian
Version:	Workstation 17.5 or later
Operating System:	Debian 12.x 64-bit
Hard Disk:	50 GB
Memory:	2048 MB
Network Adapter:	NAT
Other Devices:	2 CPU cores, CD/DVD, USB Controller, Sound Card

Customize Hardware...

☒ Power on this virtual machine after creation

< Back Finish Cancel

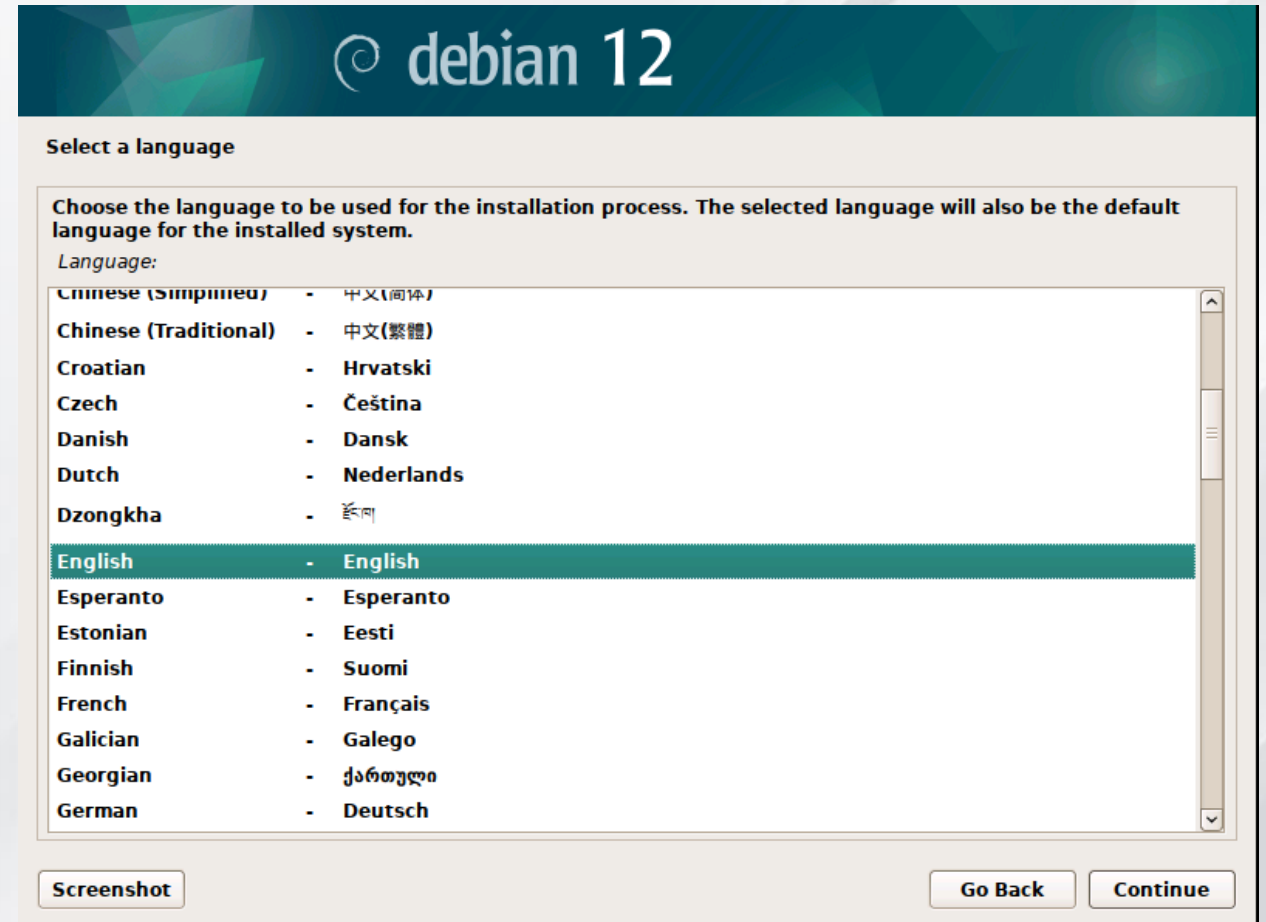
Install Linux

- Click Graphical Install



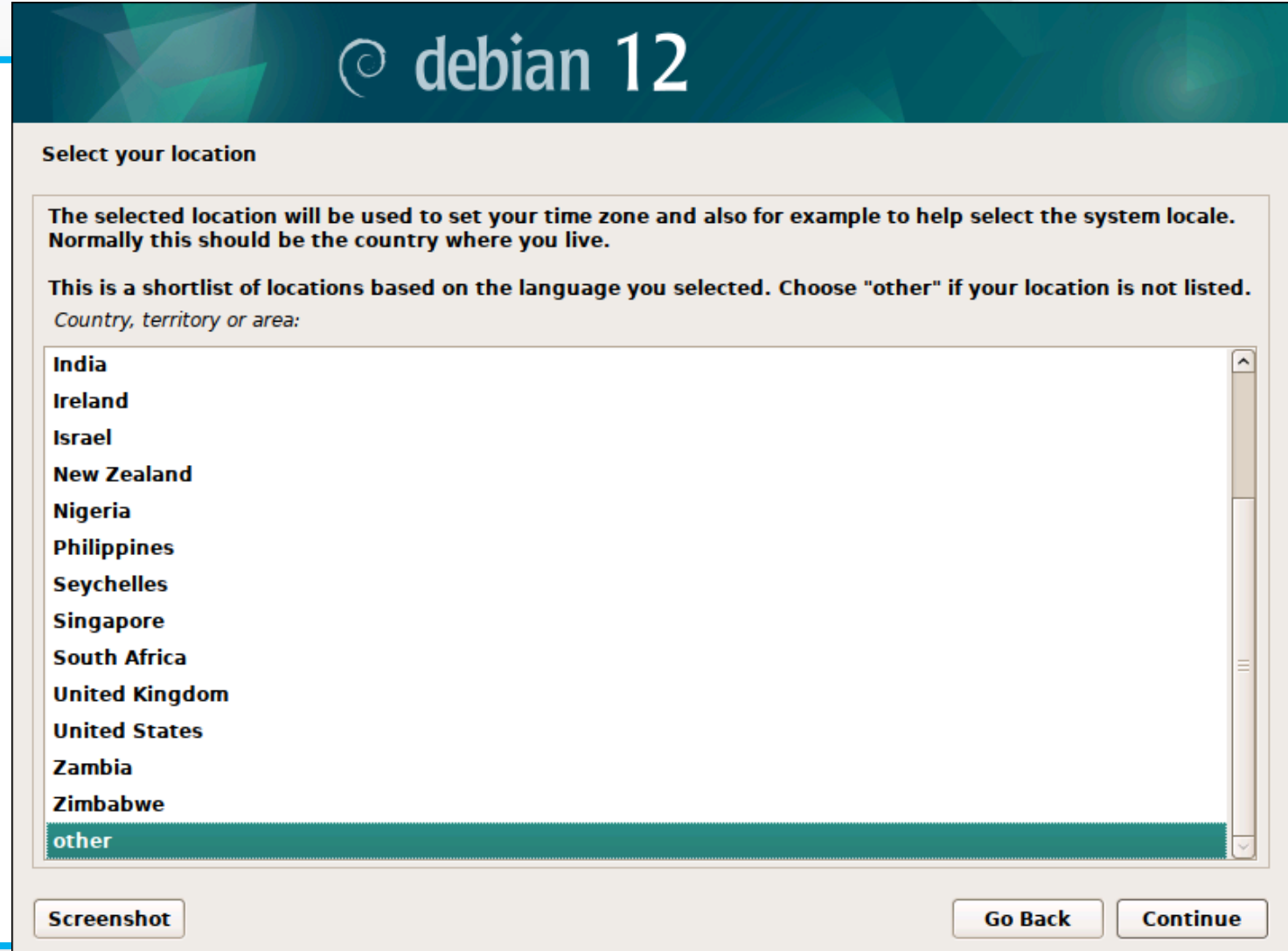
Install Linux

■ Select Language



Install Linux

- Select Country



© debian 12

Select your location

The selected location will be used to set your time zone and also for example to help select the system locale. Normally this should be the country where you live.

This is a shortlist of locations based on the language you selected. Choose "other" if your location is not listed.

Country, territory or area:

- India
- Ireland
- Israel
- New Zealand
- Nigeria
- Philippines
- Seychelles
- Singapore
- South Africa
- United Kingdom
- United States
- Zambia
- Zimbabwe
- other

Screenshot

Go Back

Continue

Install Linux

- Select keyboard Language

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Configure locales

There is no locale defined for the combination of language and country you have selected. You can choose your preference from the locales available for the selected language. The locale that will be used is the one in the second column.

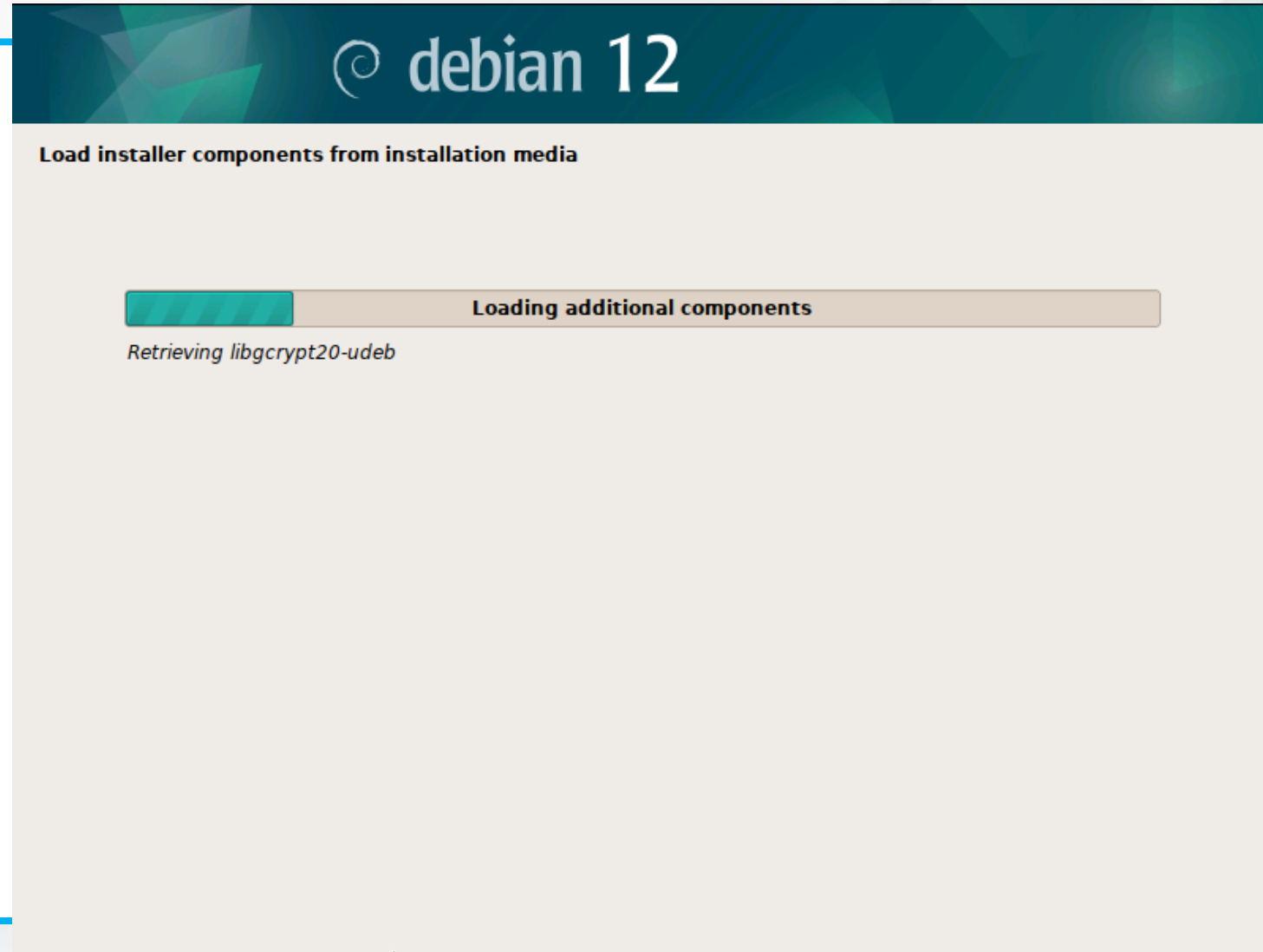
Country to base default locale settings on:

Canada	- en_CA.UTF-8
Hong Kong	- en_HK.UTF-8
India	- en_IN
Ireland	- en_IE.UTF-8
Israel	- en_IL
New Zealand	- en_NZ.UTF-8
Nigeria	- en_NG
Philippines	- en_PH.UTF-8
Seychelles	- en_SC.UTF-8
Singapore	- en_SG.UTF-8
South Africa	- en_ZA.UTF-8
United Kingdom	- en_GB.UTF-8
United States	- en_US.UTF-8
Zambia	- en_ZM
Zimbabwe	- en_ZW.UTF-8

Screenshot Help Go Back

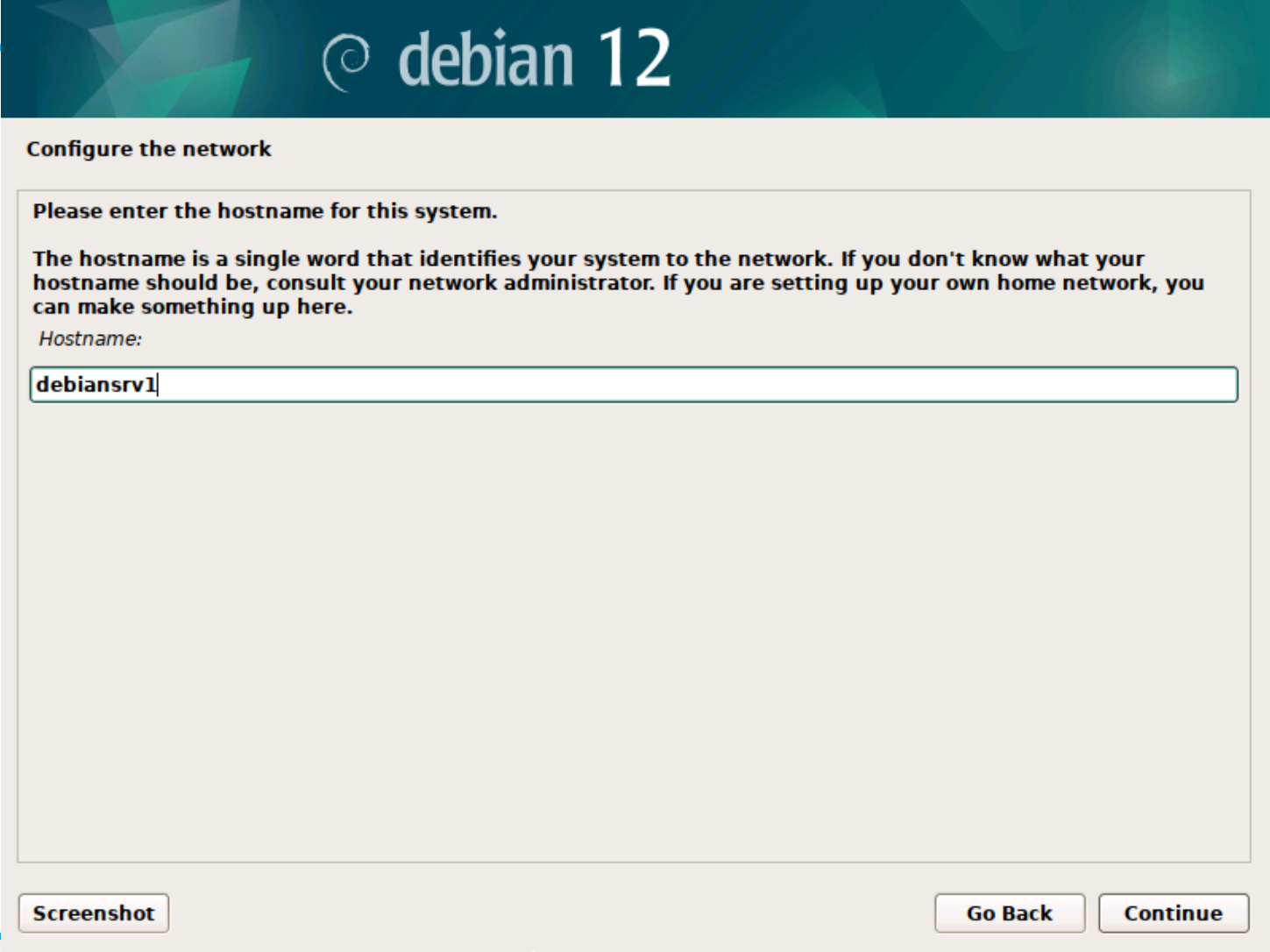
Install Linux

- Load installer



Install Linux

- Write the server's name



The image shows a screenshot of the Debian 12 network configuration window. The title bar at the top is dark teal with the Debian logo and 'debian 12' text. Below the title bar, the window has a light beige background. The main heading is 'Configure the network'. Below this, there is a text prompt: 'Please enter the hostname for this system.' followed by a detailed explanation of what a hostname is. A text input field is provided with the value 'debiansrv1' entered. At the bottom of the window, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

© debian 12

Configure the network

Please enter the hostname for this system.

The hostname is a single word that identifies your system to the network. If you don't know what your hostname should be, consult your network administrator. If you are setting up your own home network, you can make something up here.

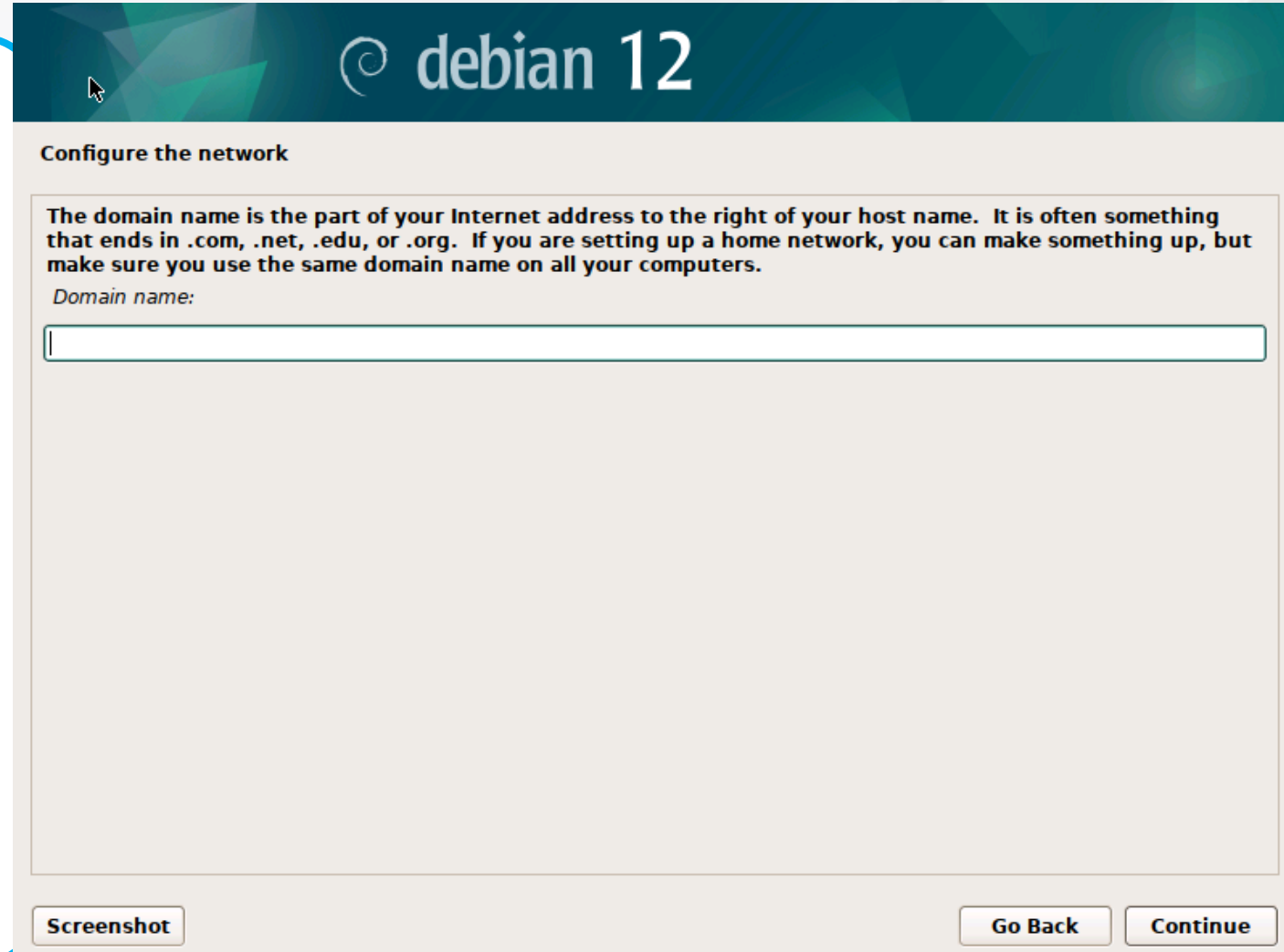
Hostname:

debiansrv1

Screenshot Go Back Continue

Install Linux

- If you want to join Domain, write its name or leave it blank



The screenshot shows the 'Configure the network' screen in the Debian 12 installer. The header is dark teal with the Debian logo and 'debian 12' text. The main area is light gray and contains a text box for the domain name. Below the text box are two buttons: 'Screenshot' and 'Go Back'. At the bottom right are two buttons: 'Go Back' and 'Continue'.

© debian 12

Configure the network

The domain name is the part of your Internet address to the right of your host name. It is often something that ends in .com, .net, .edu, or .org. If you are setting up a home network, you can make something up, but make sure you use the same domain name on all your computers.

Domain name:

Screenshot

Go Back

Continue

Install Linux

- The root password
- Pw=root

© debian 12

Set up users and passwords

You need to set a password for 'root', the system administrative account. A malicious or unqualified user with root access can have disastrous results, so you should take care to choose a root password that is not easy to guess. It should not be a word found in dictionaries, or a word that could be easily associated with you.

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

The root user should not have an empty password. If you leave this empty, the root account will be disabled and the system's initial user account will be given the power to become root using the "sudo" command.

Note that you will not be able to see the password as you type it.

Root password:

☐ Show Password in Clear

Please enter the same root password again to verify that you have typed it correctly.

Re-enter password to verify:

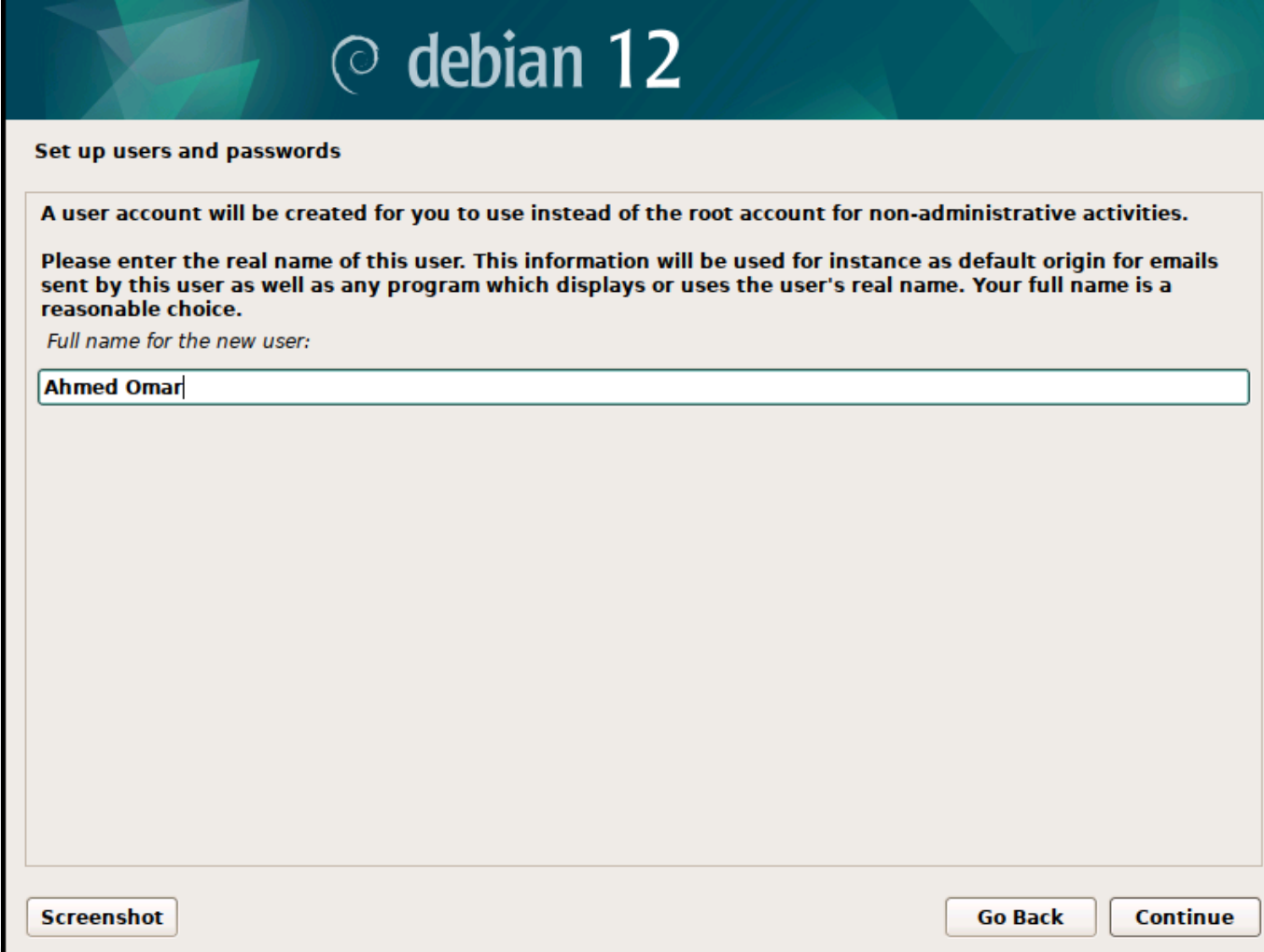
☐ Show Password in Clear

Screenshot

Go Back Continue

Install Linux

- Write user full name



The image shows a screenshot of the Debian 12 installation process. The top header is dark teal with the Debian logo and 'debian 12' text. Below this, the section is titled 'Set up users and passwords'. A message states: 'A user account will be created for you to use instead of the root account for non-administrative activities. Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.' Below this, it says 'Full name for the new user:' followed by a text input field containing 'Ahmed Omar'. At the bottom, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

© debian 12

Set up users and passwords

A user account will be created for you to use instead of the root account for non-administrative activities.

Please enter the real name of this user. This information will be used for instance as default origin for emails sent by this user as well as any program which displays or uses the user's real name. Your full name is a reasonable choice.

Full name for the new user:

Ahmed Omar

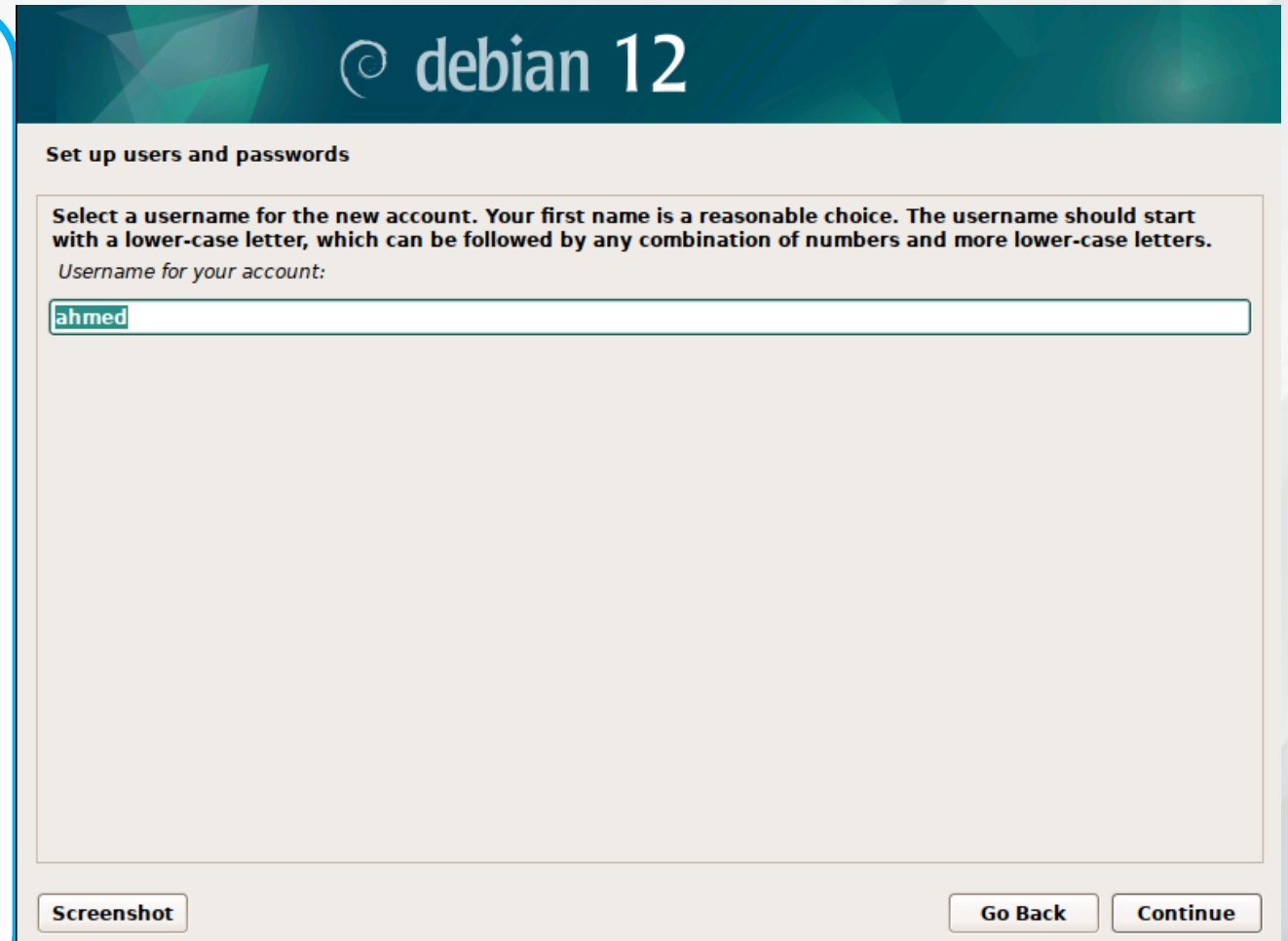
Screenshot

Go Back

Continue

Install Linux

- Write user name used to login



The image shows a screenshot of the Debian 12 installer's 'Set up users and passwords' screen. The window has a dark teal header with the Debian logo and 'debian 12'. Below the header, the title 'Set up users and passwords' is displayed. A text box contains instructions: 'Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.' Below this, it says 'Username for your account:' followed by a text input field containing 'ahmed'. At the bottom of the window, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

debian 12

Set up users and passwords

Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

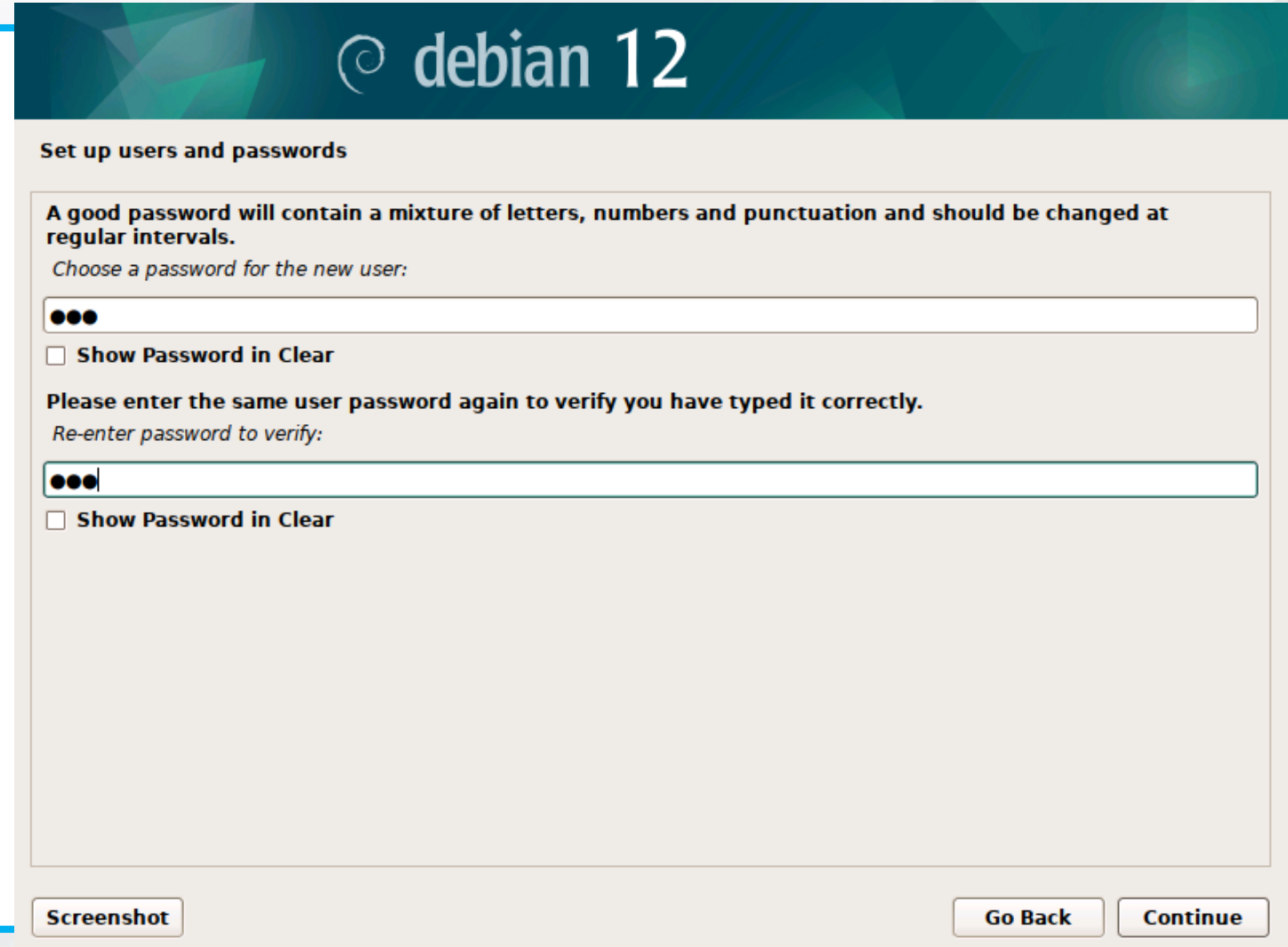
Username for your account:

ahmed

Screenshot Go Back Continue

Install Linux

- Write password for the user



The image shows a screenshot of the Debian 12 installation window. The title bar is dark teal with the Debian logo and 'debian 12' text. The main content area is light beige and titled 'Set up users and passwords'. It contains instructions on password requirements and two password input fields. The first field is for the new user's password, and the second is for verification. Both fields have a 'Show Password in Clear' checkbox. At the bottom, there are 'Screenshot', 'Go Back', and 'Continue' buttons.

© debian 12

Set up users and passwords

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.
Choose a password for the new user:

●●●

☐ Show Password in Clear

Please enter the same user password again to verify you have typed it correctly.
Re-enter password to verify:

●●●

☐ Show Password in Clear

Screenshot

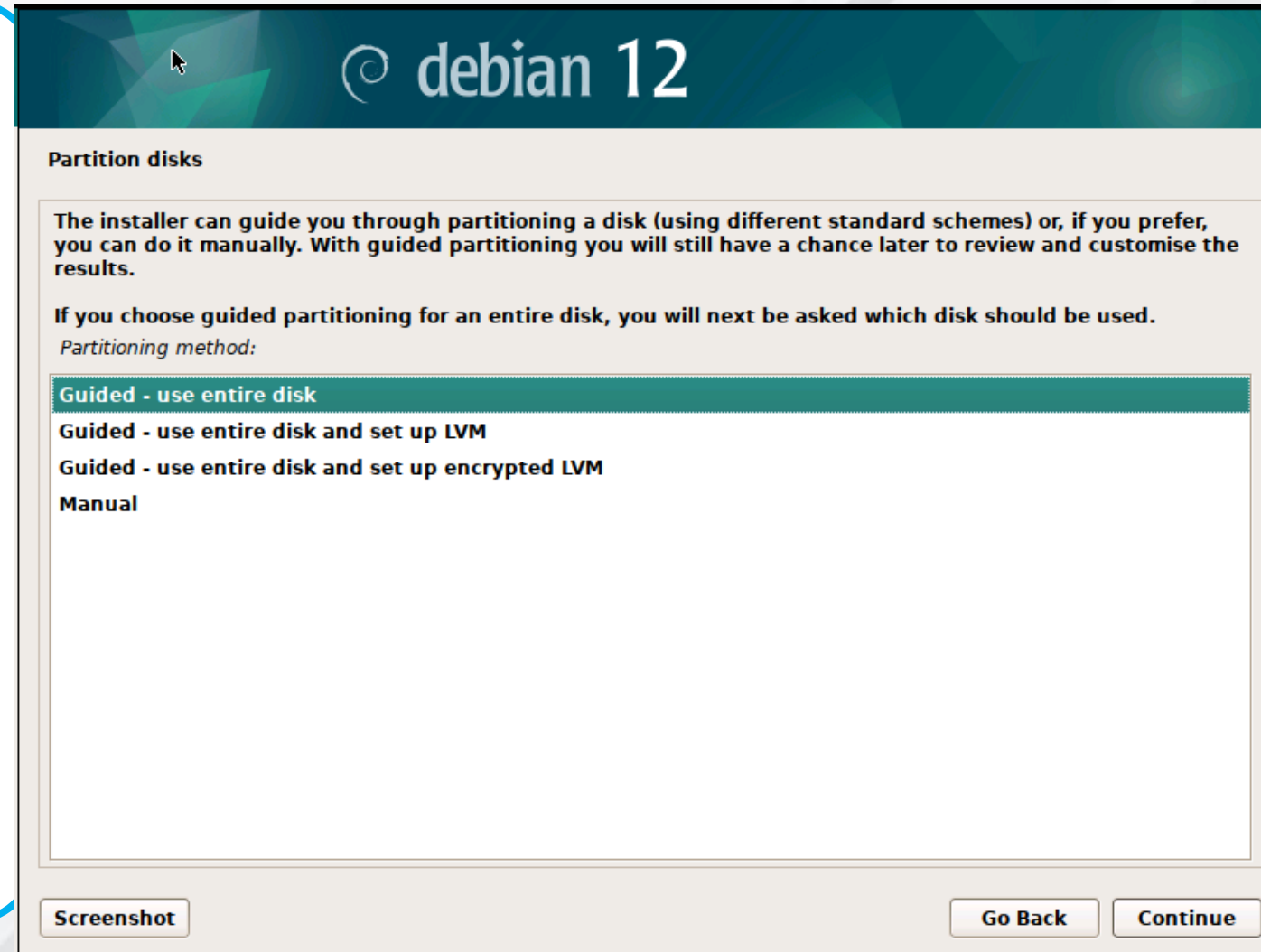
Go Back Continue

Install Linux

- Chose the Partition disks :

how the hard drive will be organized
to store the operating system files

Guided - use entire disk



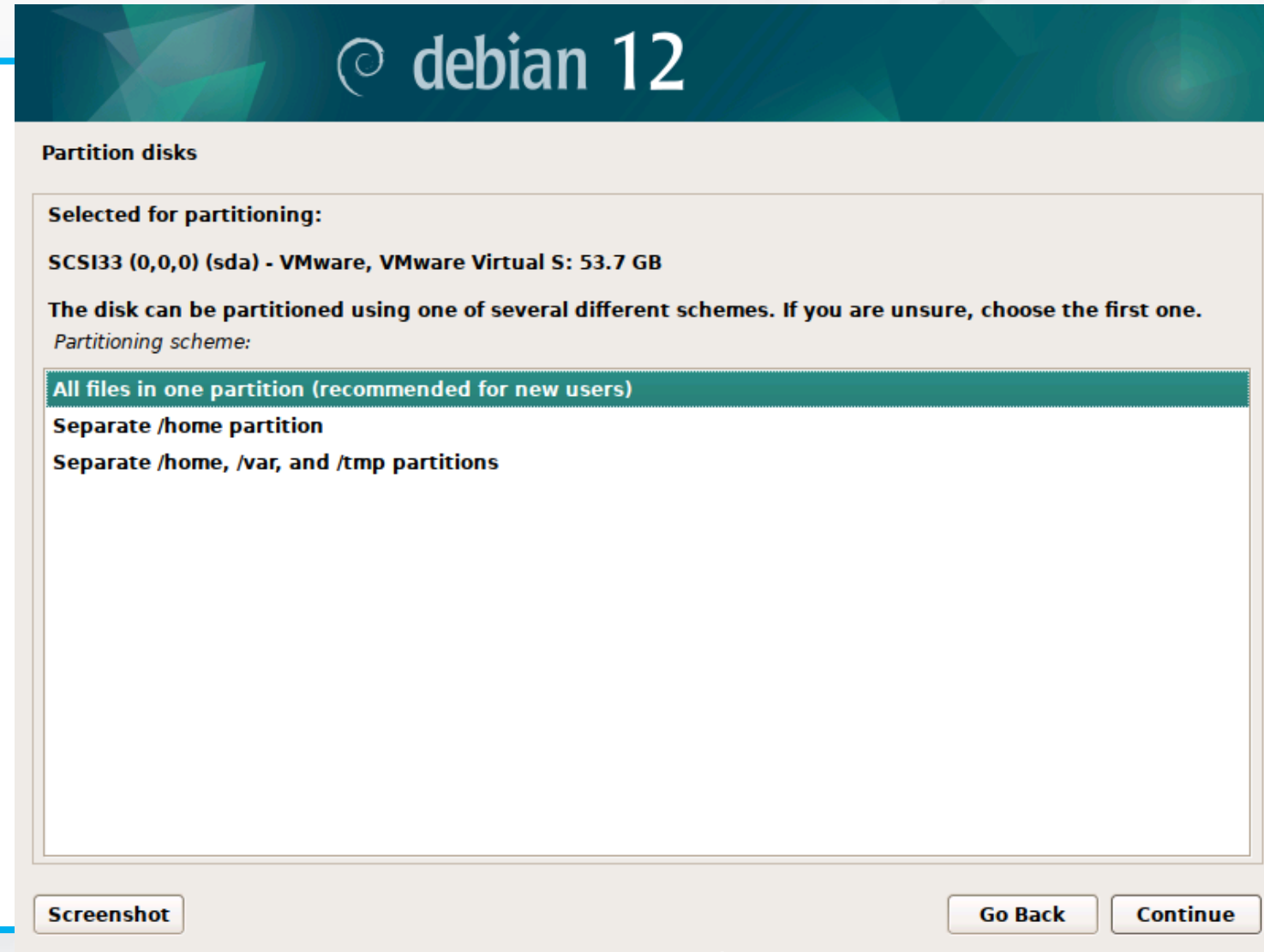
Install Linux

- select the hard drive



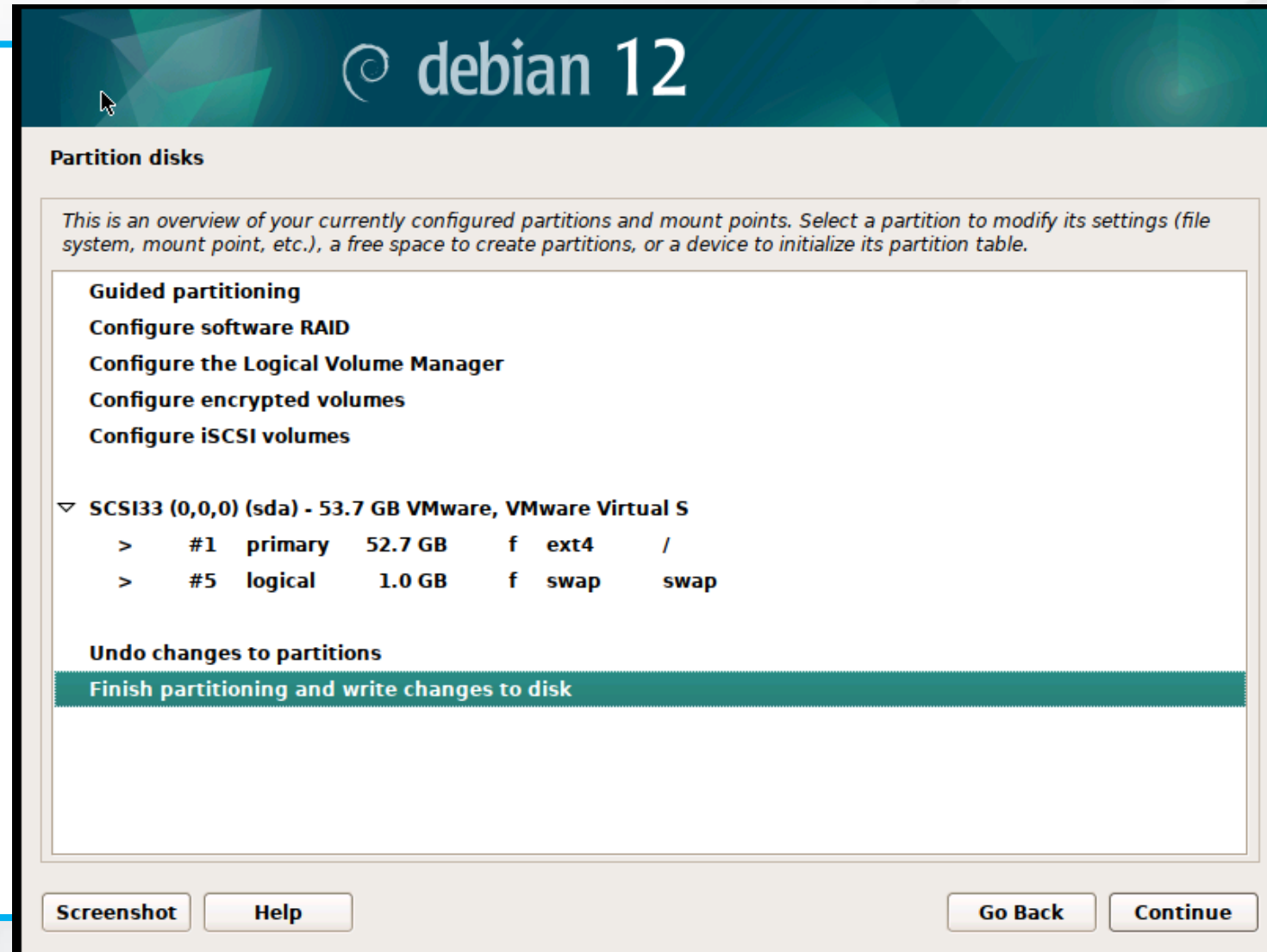
Install Linux

- choose the partitioning scheme



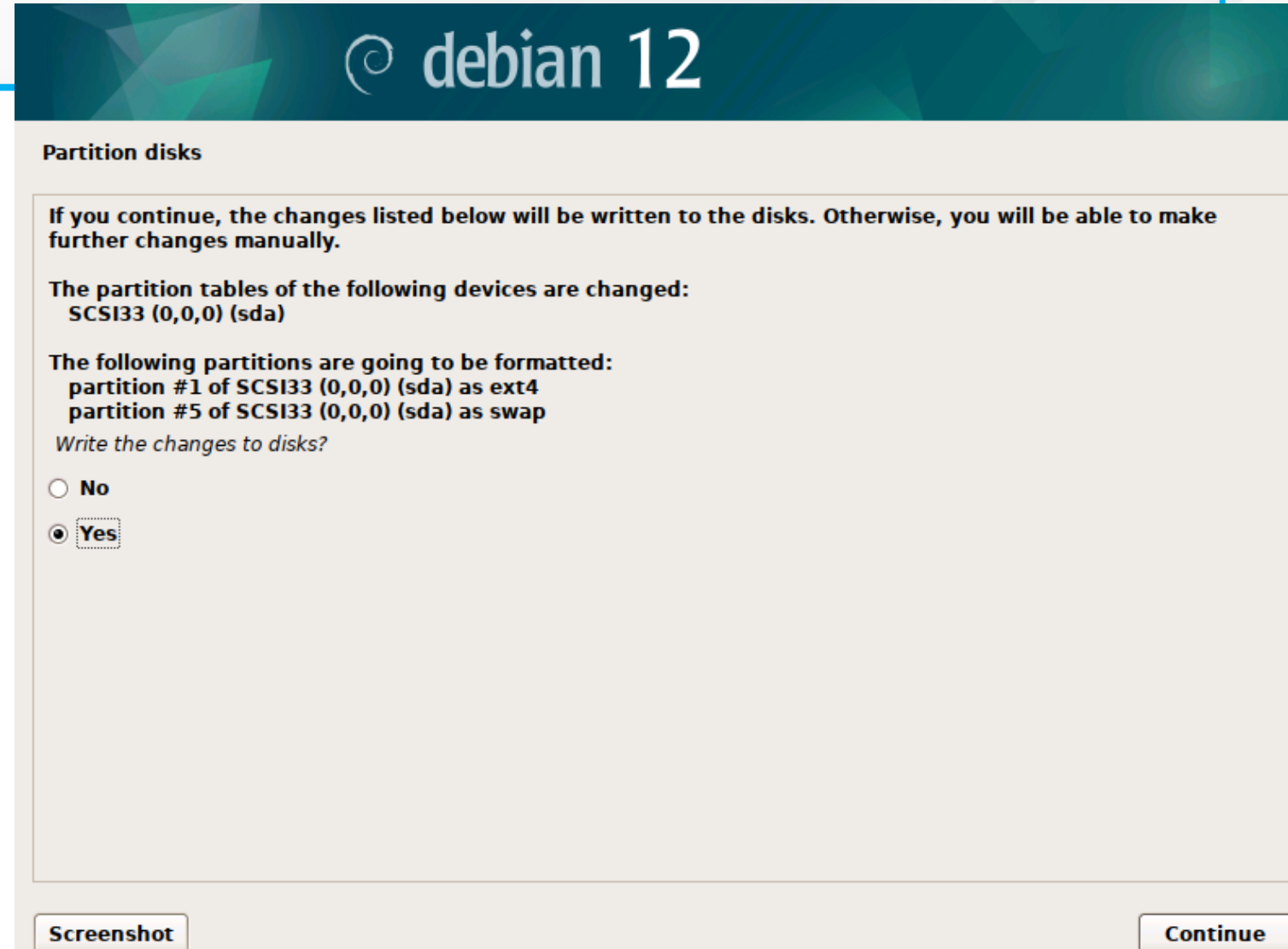
Install Linux

■ Partitioning Plan overview



Install Linux

- Confirm (Yes)



The image shows a screenshot of the Debian 12 installer's 'Partition disks' screen. The window has a dark teal header with the Debian logo and 'debian 12'. The main content area is light gray and contains the following text: 'Partition disks', 'If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.', 'The partition tables of the following devices are changed: SCSI33 (0,0,0) (sda)', 'The following partitions are going to be formatted: partition #1 of SCSI33 (0,0,0) (sda) as ext4, partition #5 of SCSI33 (0,0,0) (sda) as swap', and 'Write the changes to disks?'. There are two radio buttons: 'No' (unselected) and 'Yes' (selected). At the bottom, there are two buttons: 'Screenshot' and 'Continue'.

Partition disks

If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.

The partition tables of the following devices are changed:
SCSI33 (0,0,0) (sda)

The following partitions are going to be formatted:
partition #1 of SCSI33 (0,0,0) (sda) as ext4
partition #5 of SCSI33 (0,0,0) (sda) as swap

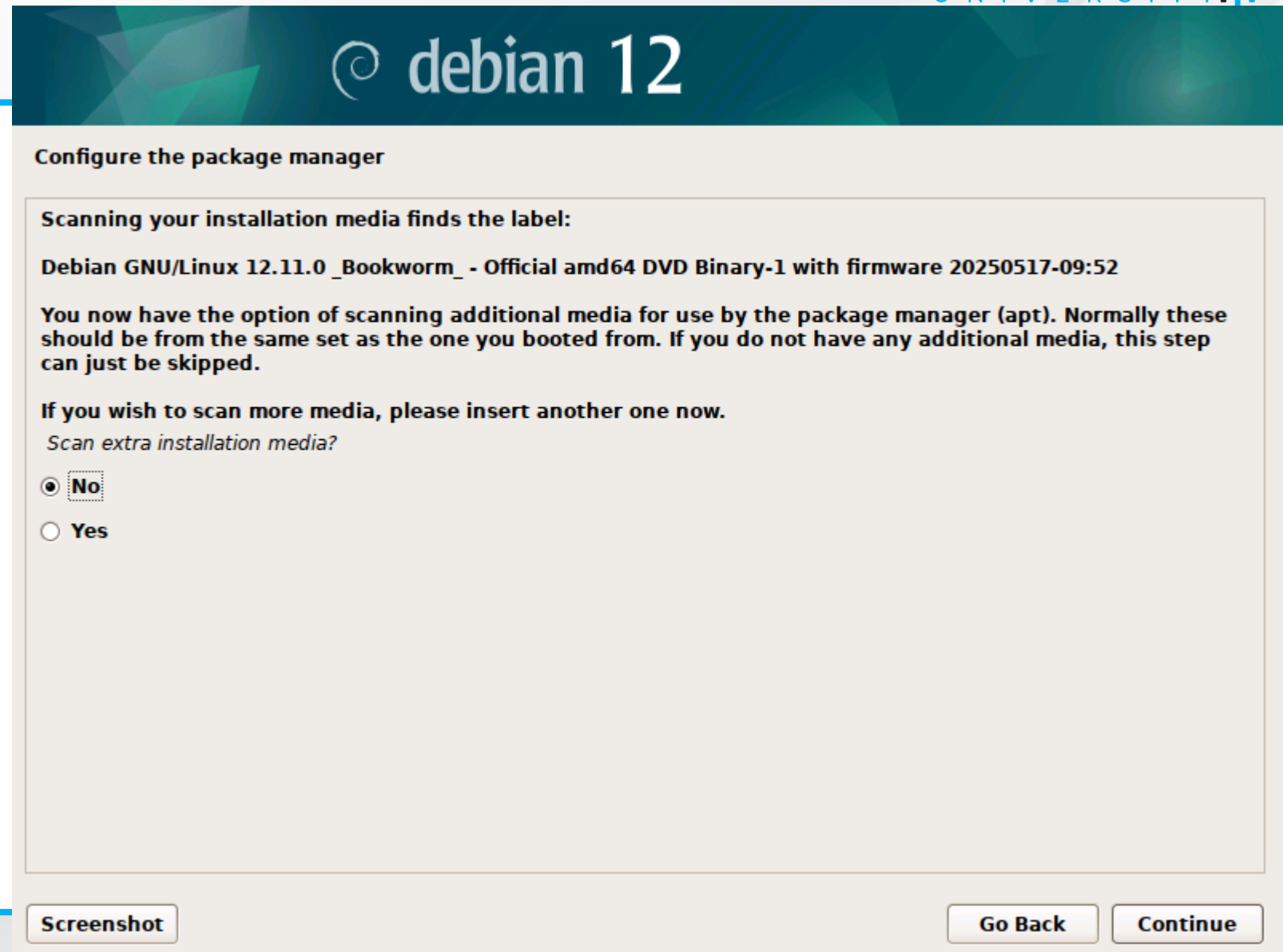
Write the changes to disks?

☐ No
☒ Yes

Screenshot Continue

Install Linux

- no

A screenshot of the Debian 12 installation window. The title bar is dark teal with the Debian logo and 'debian 12' text. The main content area is light gray and contains the following text: 'Configure the package manager', 'Scanning your installation media finds the label:', 'Debian GNU/Linux 12.11.0 _Bookworm_ - Official amd64 DVD Binary-1 with firmware 20250517-09:52', 'You now have the option of scanning additional media for use by the package manager (apt). Normally these should be from the same set as the one you booted from. If you do not have any additional media, this step can just be skipped.', 'If you wish to scan more media, please insert another one now.', and 'Scan extra installation media?'. There are two radio buttons: 'No' (selected) and 'Yes'. At the bottom, there are three buttons: 'Screenshot', 'Go Back', and 'Continue'.

© debian 12

Configure the package manager

Scanning your installation media finds the label:

Debian GNU/Linux 12.11.0 _Bookworm_ - Official amd64 DVD Binary-1 with firmware 20250517-09:52

You now have the option of scanning additional media for use by the package manager (apt). Normally these should be from the same set as the one you booted from. If you do not have any additional media, this step can just be skipped.

If you wish to scan more media, please insert another one now.

Scan extra installation media?

☒ No

☐ Yes

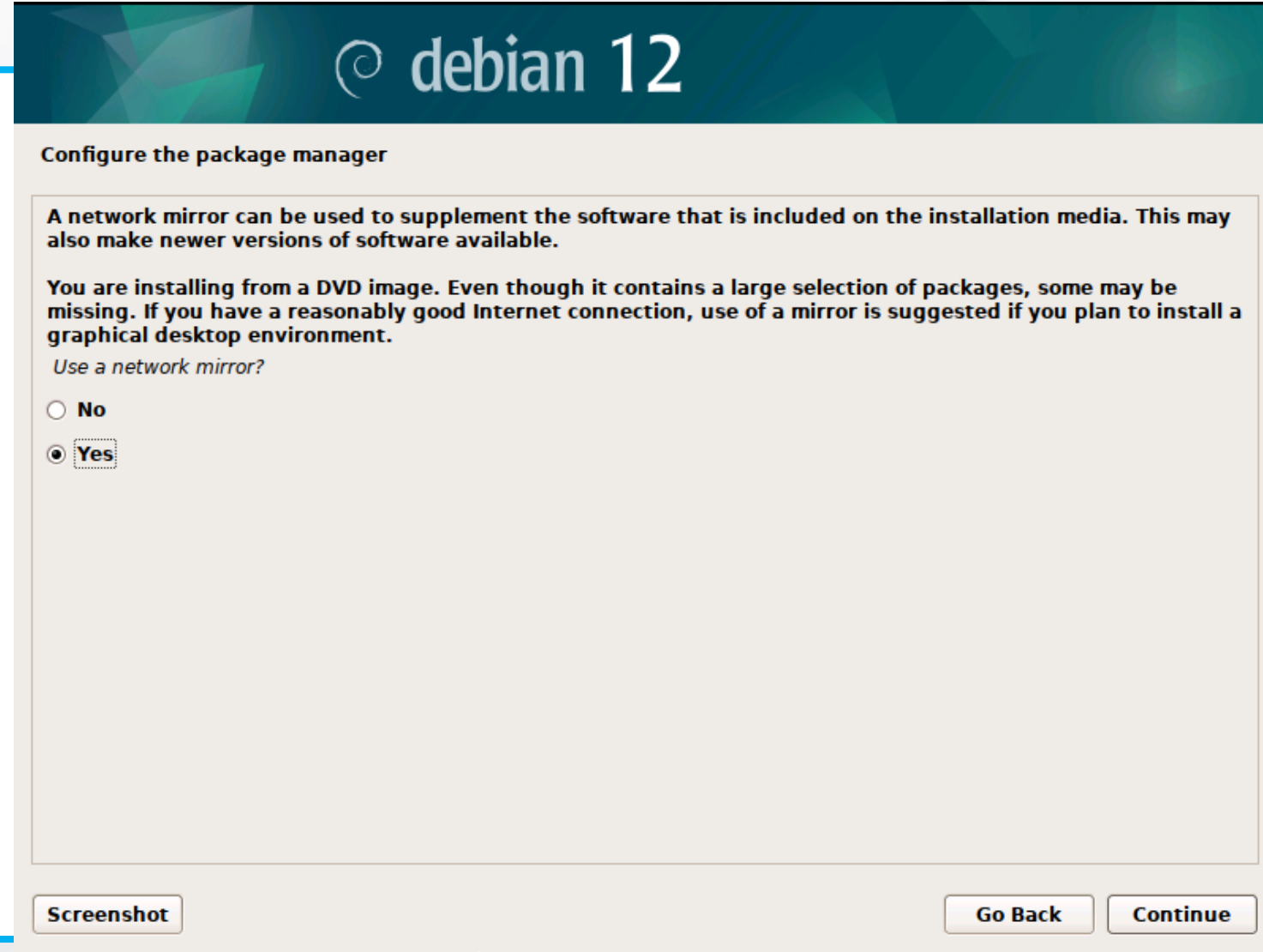
Screenshot

Go Back

Continue

Install Linux

- Use network mirror : yes



The image shows a screenshot of the Debian 12 installation window. The title bar at the top says "© debian 12". The main content area is titled "Configure the package manager". It contains a text box with the following text: "A network mirror can be used to supplement the software that is included on the installation media. This may also make newer versions of software available. You are installing from a DVD image. Even though it contains a large selection of packages, some may be missing. If you have a reasonably good Internet connection, use of a mirror is suggested if you plan to install a graphical desktop environment. Use a network mirror?". Below this text are two radio buttons: "No" and "Yes". The "Yes" radio button is selected. At the bottom of the window, there are three buttons: "Screenshot", "Go Back", and "Continue".

© debian 12

Configure the package manager

A network mirror can be used to supplement the software that is included on the installation media. This may also make newer versions of software available.

You are installing from a DVD image. Even though it contains a large selection of packages, some may be missing. If you have a reasonably good Internet connection, use of a mirror is suggested if you plan to install a graphical desktop environment.

Use a network mirror?

☐ No

☒ Yes

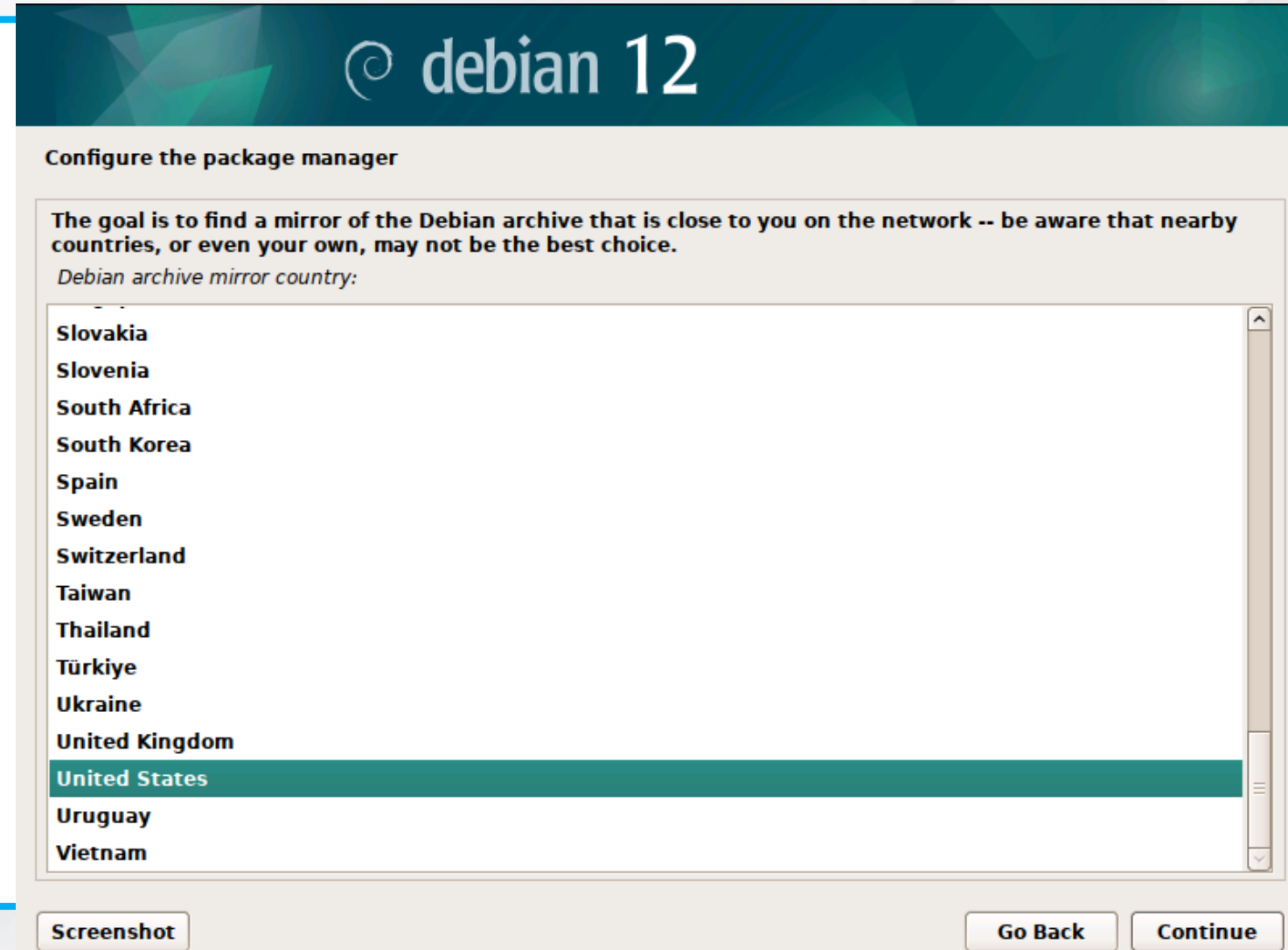
Screenshot

Go Back

Continue

Install Linux

- Server country



© debian 12

Configure the package manager

The goal is to find a mirror of the Debian archive that is close to you on the network -- be aware that nearby countries, or even your own, may not be the best choice.

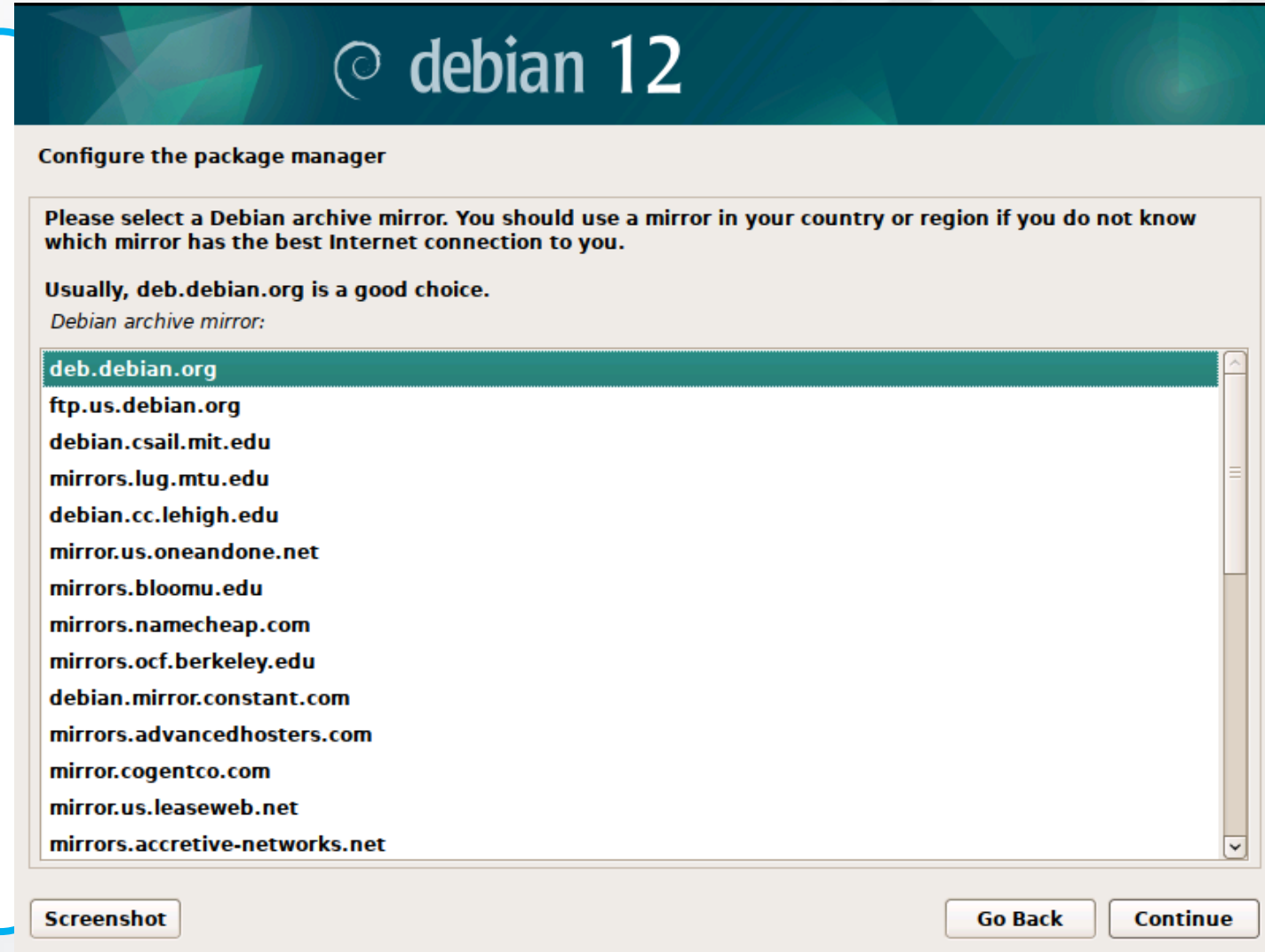
Debian archive mirror country:

- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- Türkiye
- Ukraine
- United Kingdom
- United States**
- Uruguay
- Vietnam

Screenshot Go Back Continue

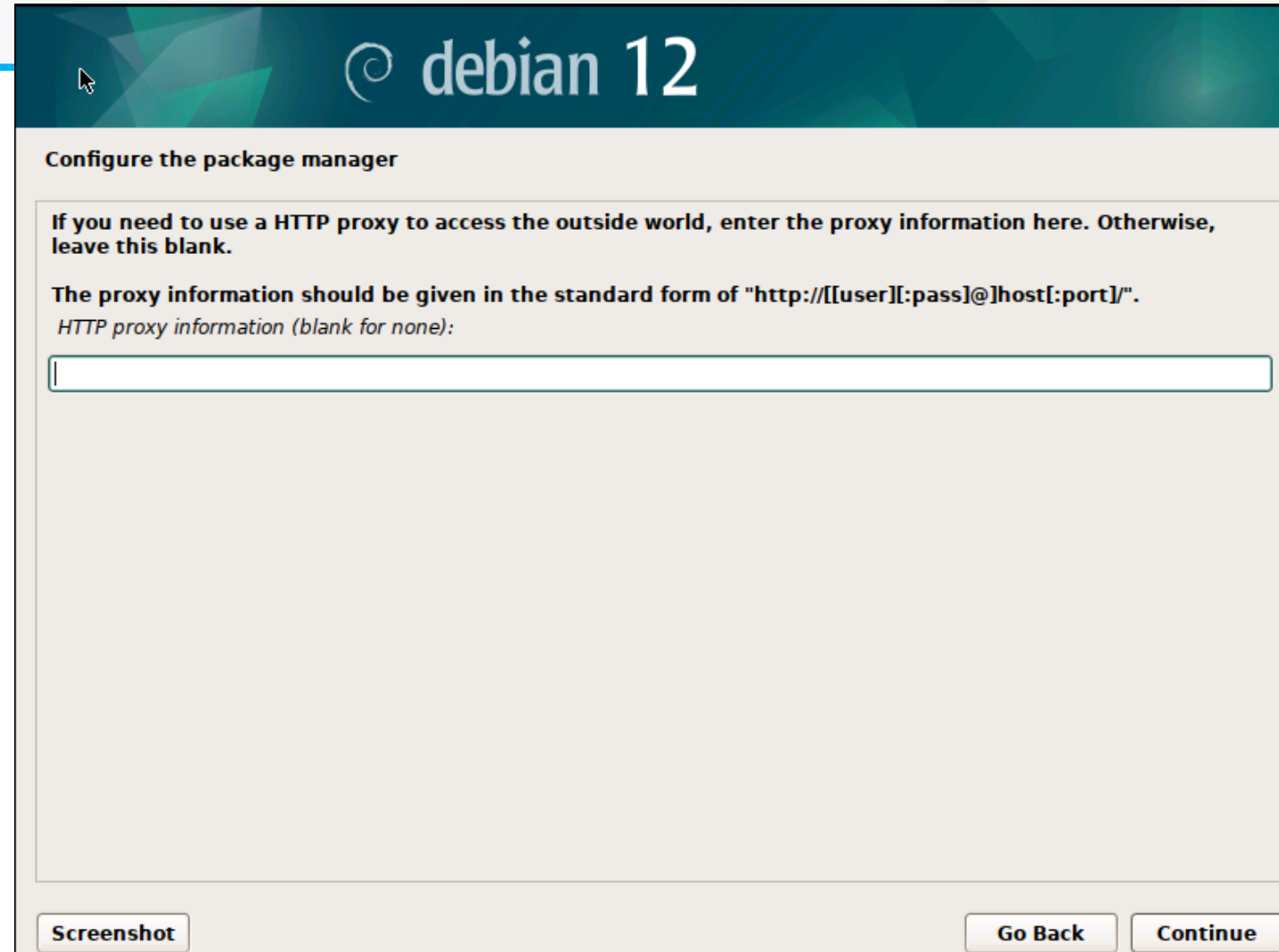
Install Linux

- Server name



Install Linux

- Proxy : blank



The image shows a window from the Debian 12 installation process. The title bar is dark teal with the Debian logo and the text "debian 12". The main content area has a light beige background. At the top, it says "Configure the package manager". Below this, there is a text block explaining that proxy information should be entered if needed, with a note that it should be in the format "http://[user][:pass]@host[:port]/". A text input field is provided for this information, and it is currently empty. At the bottom of the window, there are three buttons: "Screenshot", "Go Back", and "Continue".

© debian 12

Configure the package manager

If you need to use a HTTP proxy to access the outside world, enter the proxy information here. Otherwise, leave this blank.

The proxy information should be given in the standard form of "http://[user][:pass]@host[:port]/".
HTTP proxy information (blank for none):

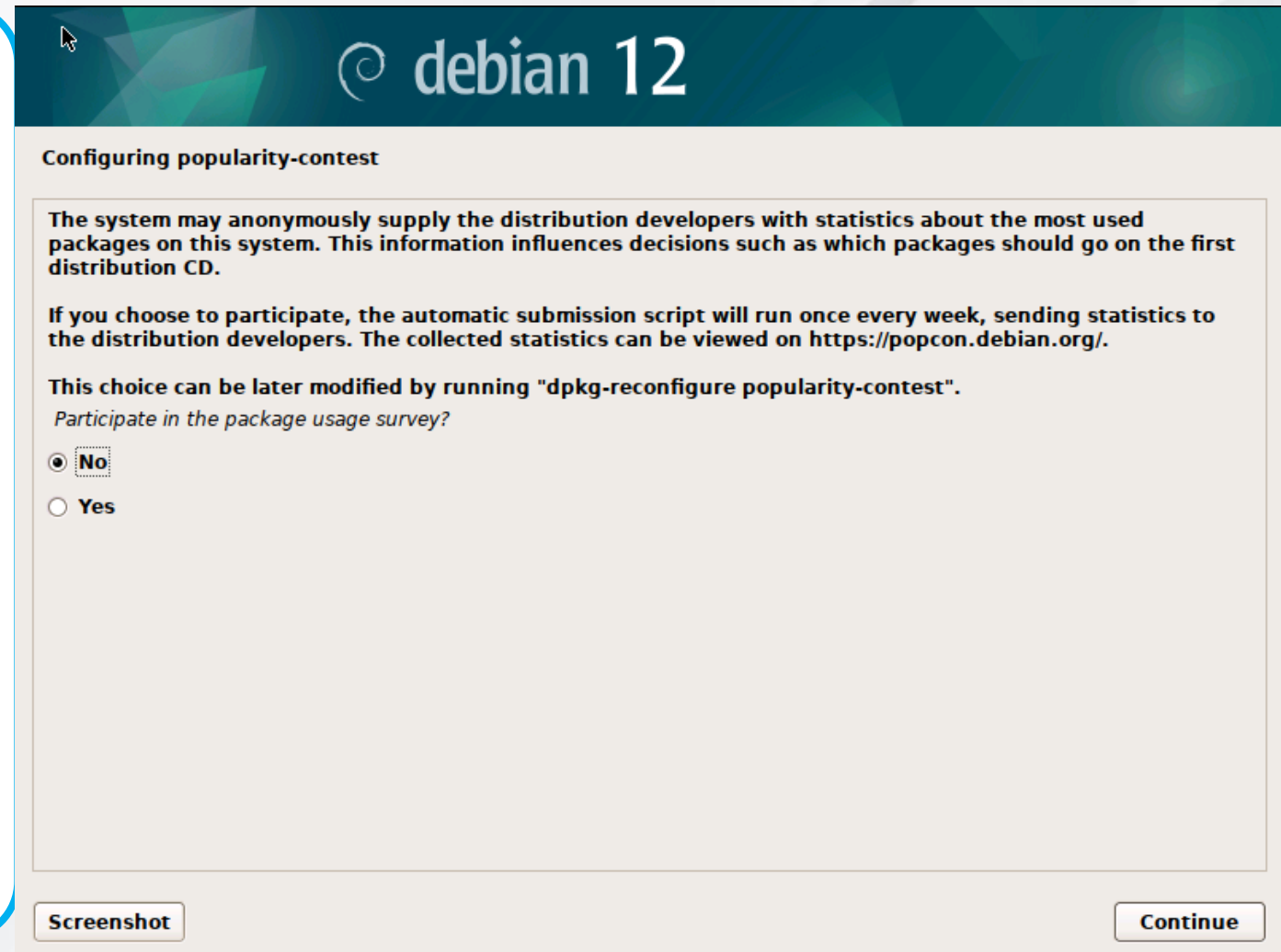
Screenshot Go Back Continue

Install Linux



Install Linux

- No



The image shows a screenshot of the Debian 12 installation process. The window has a dark teal header with the Debian logo and the text 'debian 12'. Below the header, the title 'Configuring popularity-contest' is displayed. The main content area contains the following text:

The system may anonymously supply the distribution developers with statistics about the most used packages on this system. This information influences decisions such as which packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week, sending statistics to the distribution developers. The collected statistics can be viewed on <https://popcon.debian.org/>.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

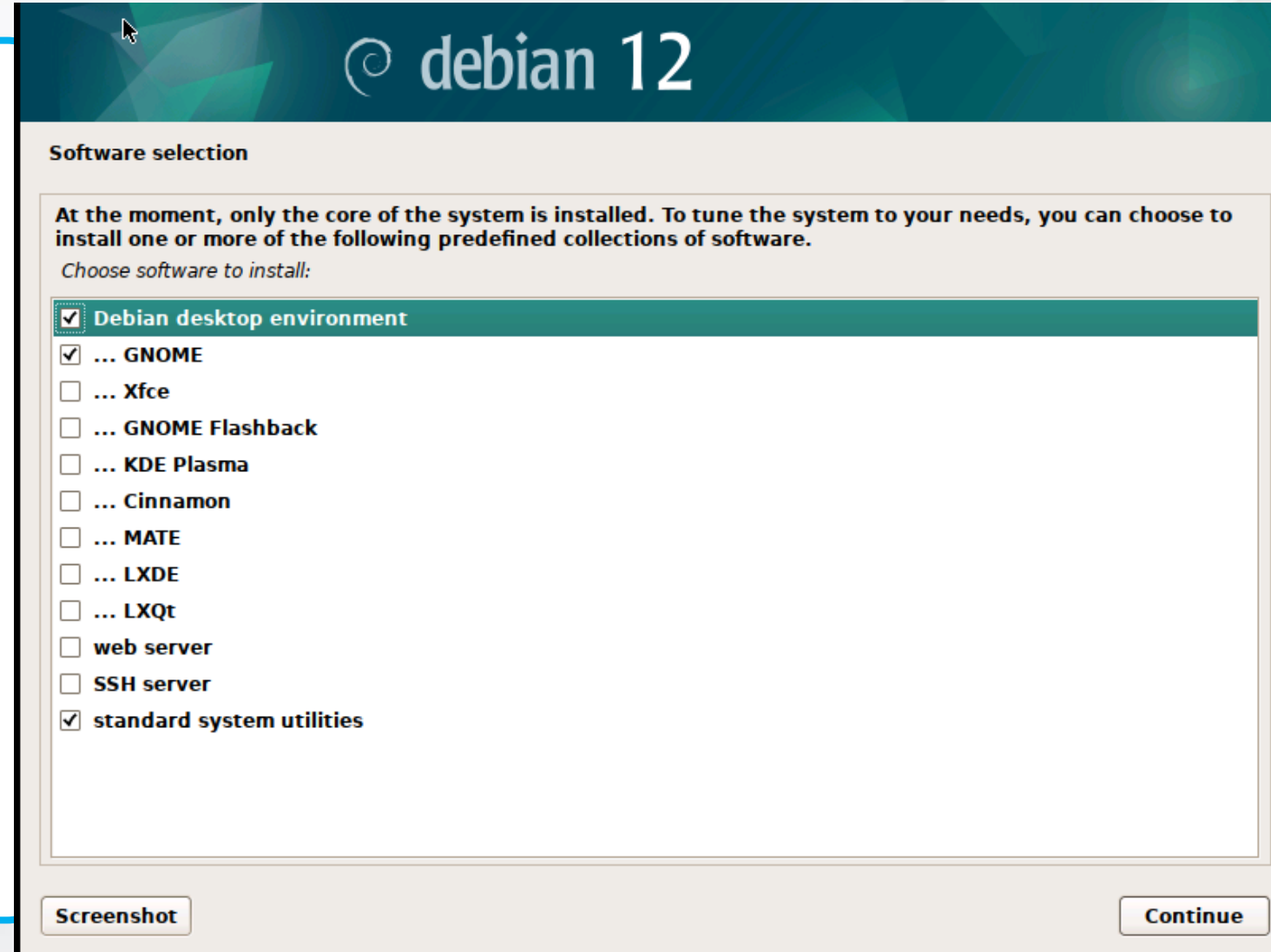
There are two radio buttons: 'No' (selected) and 'Yes'.

At the bottom of the window, there are two buttons: 'Screenshot' and 'Continue'.

Install Linux

Software selection

- Continue



The screenshot shows the 'Software selection' window of the Debian 12 installer. The window has a dark teal header with the Debian logo and 'debian 12'. Below the header, the title 'Software selection' is displayed. A text box explains that only the core system is installed and offers predefined software collections. A list of options follows, with checkboxes for each. The 'Debian desktop environment' is selected, which includes GNOME, Xfce, GNOME Flashback, KDE Plasma, Cinnamon, MATE, LXDE, LXQt, web server, SSH server, and standard system utilities. The 'Continue' button is at the bottom right.

© debian 12

Software selection

At the moment, only the core of the system is installed. To tune the system to your needs, you can choose to install one or more of the following predefined collections of software.

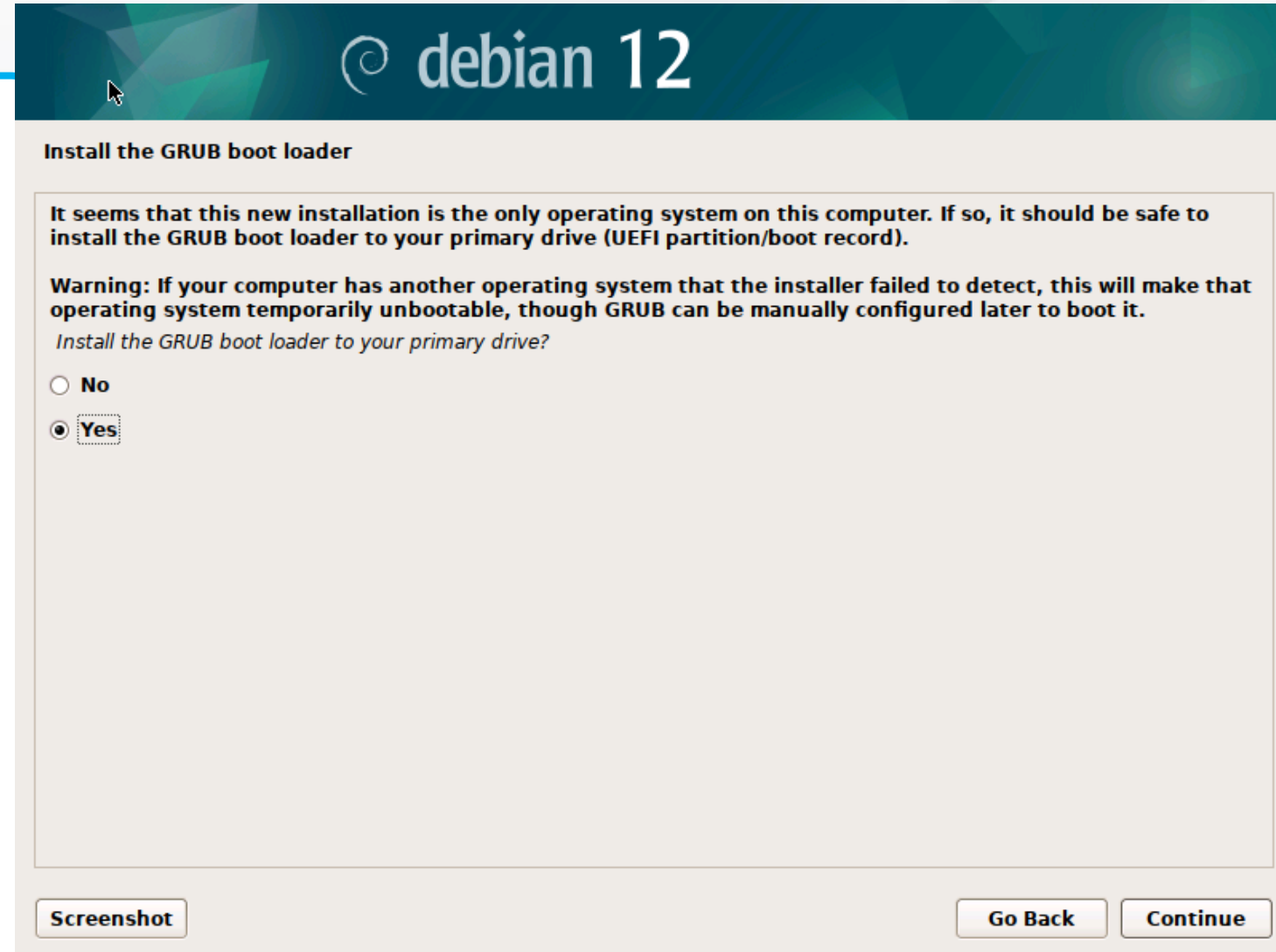
Choose software to install:

- ☒ **Debian desktop environment**
 - ☒ ... GNOME
 - ☐ ... Xfce
 - ☐ ... GNOME Flashback
 - ☐ ... KDE Plasma
 - ☐ ... Cinnamon
 - ☐ ... MATE
 - ☐ ... LXDE
 - ☐ ... LXQt
 - ☐ web server
 - ☐ SSH server
 - ☒ standard system utilities

Screenshot Continue

Install Linux

- A **boot loader** is the first program that runs when you turn on your computer
- **Install GRUB boot loader (yes)**



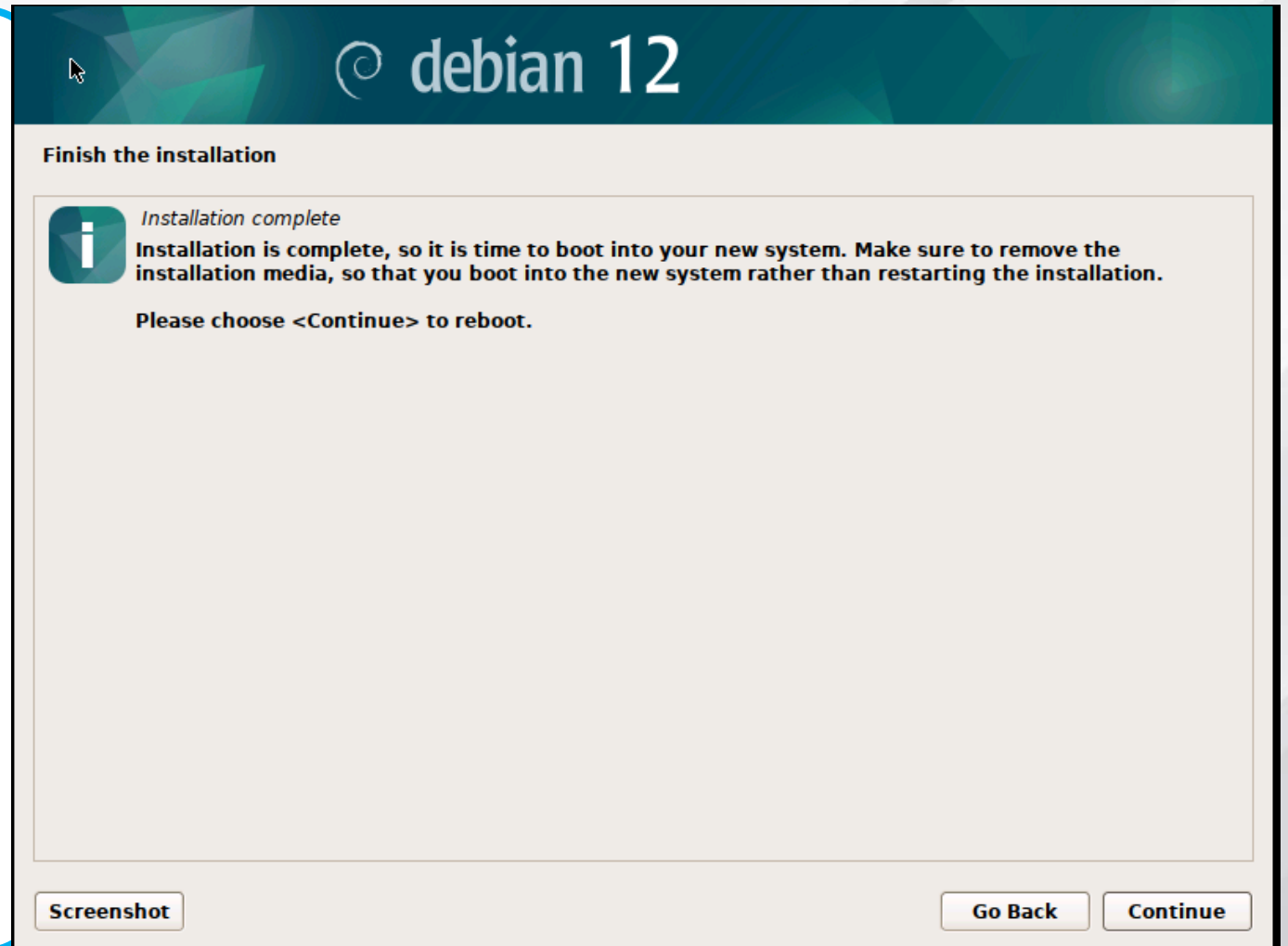
Install Linux

- Select disk `/dev/sda`



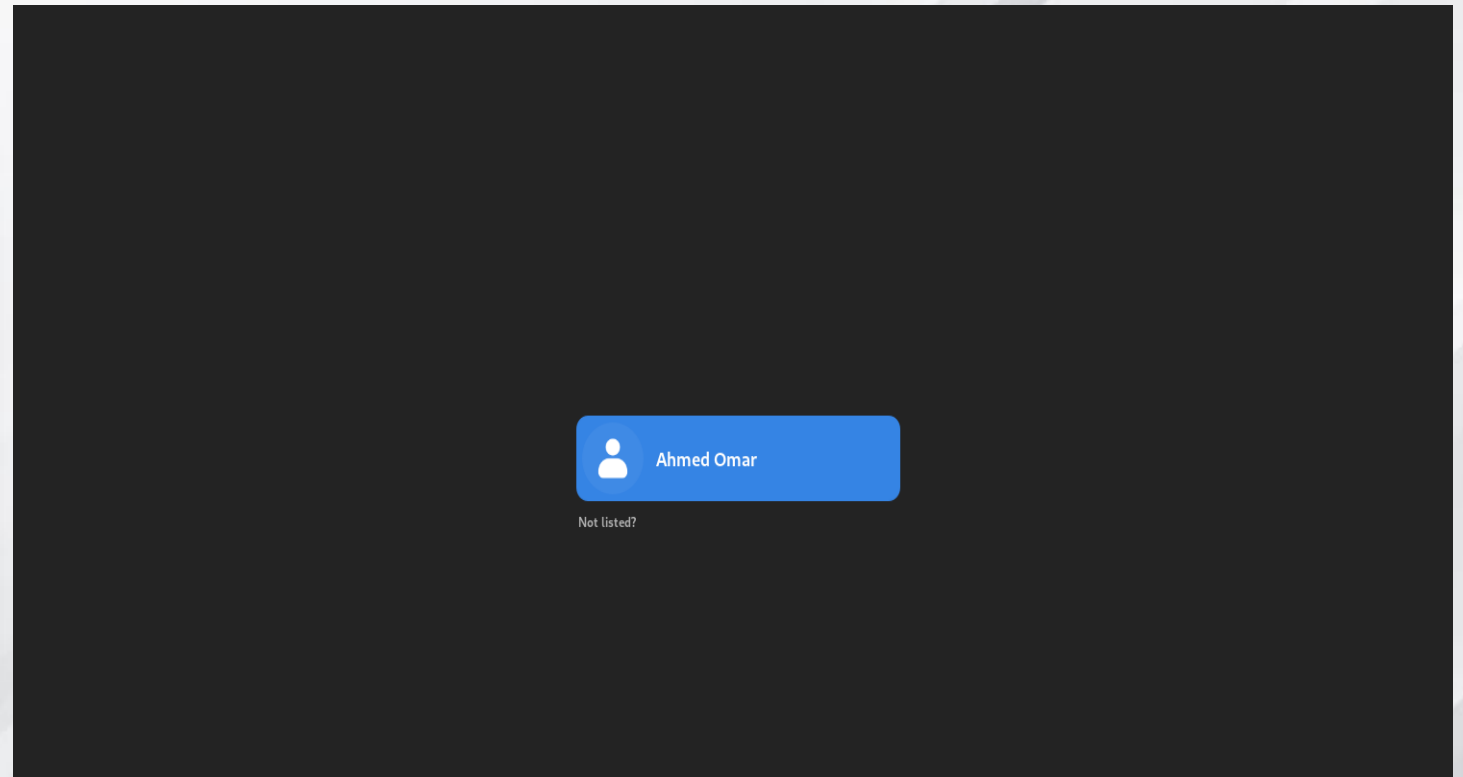
Install Linux

- continue



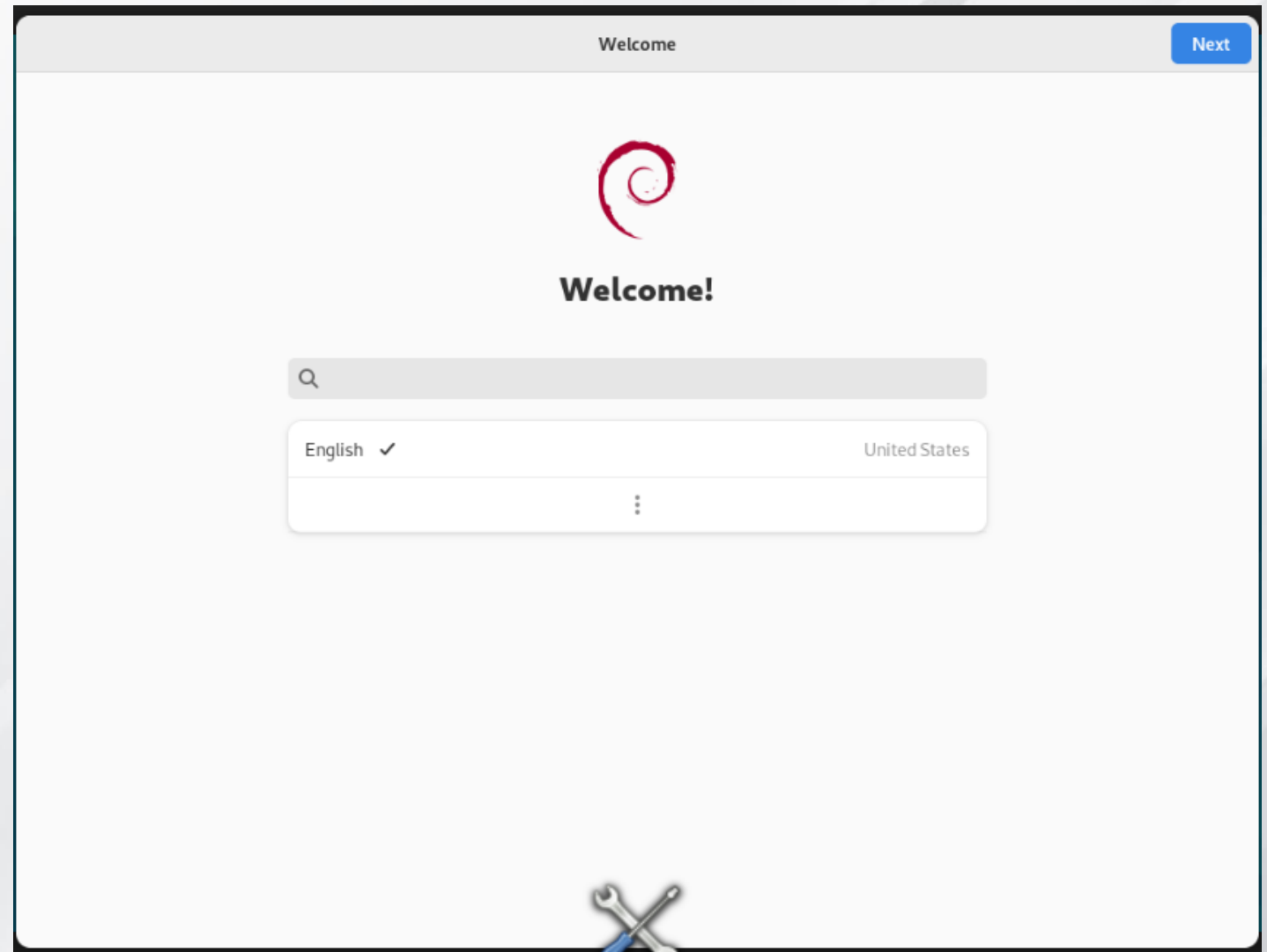
Open Linux

- Write user password



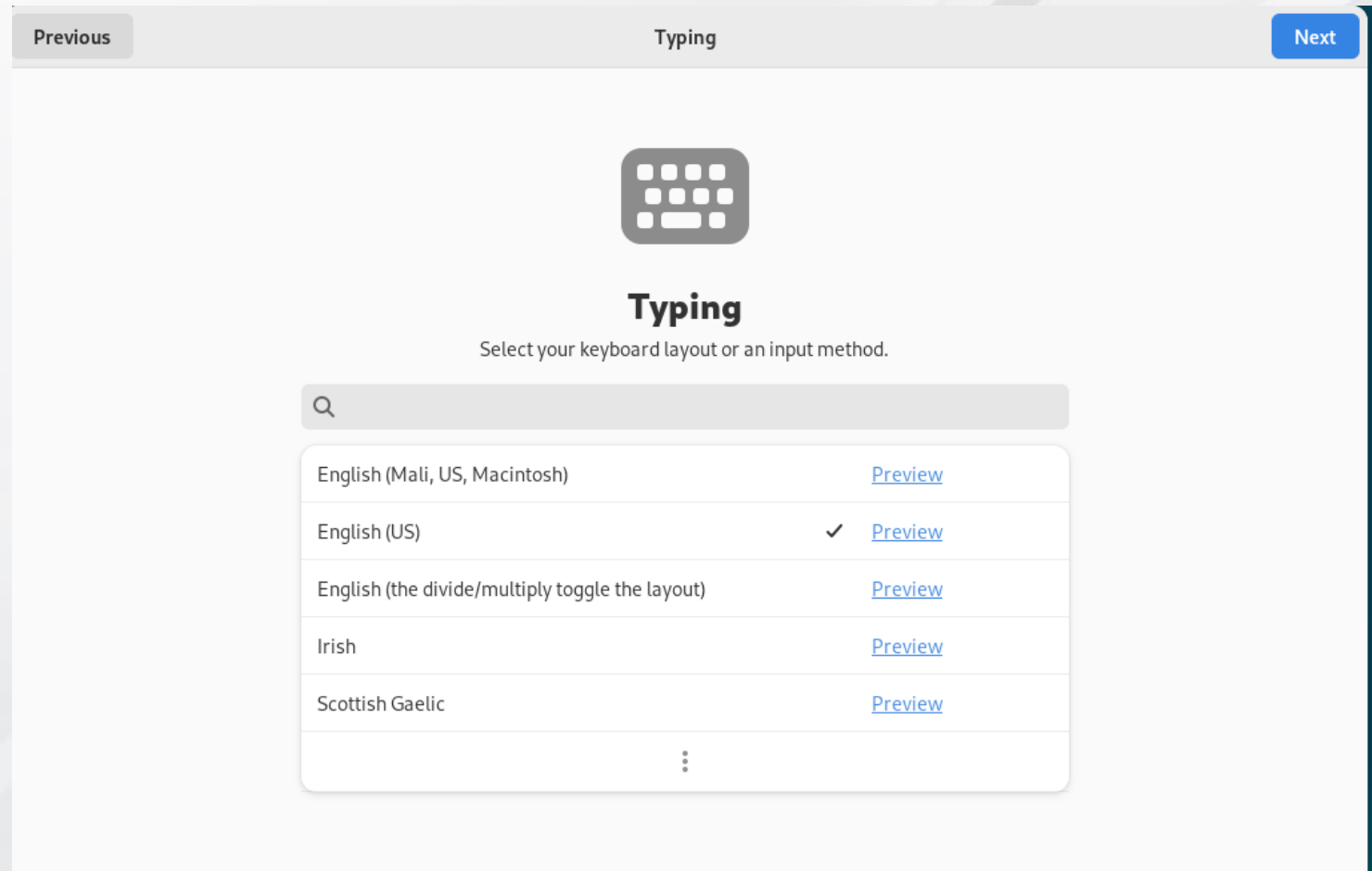
Install Linux

- Next



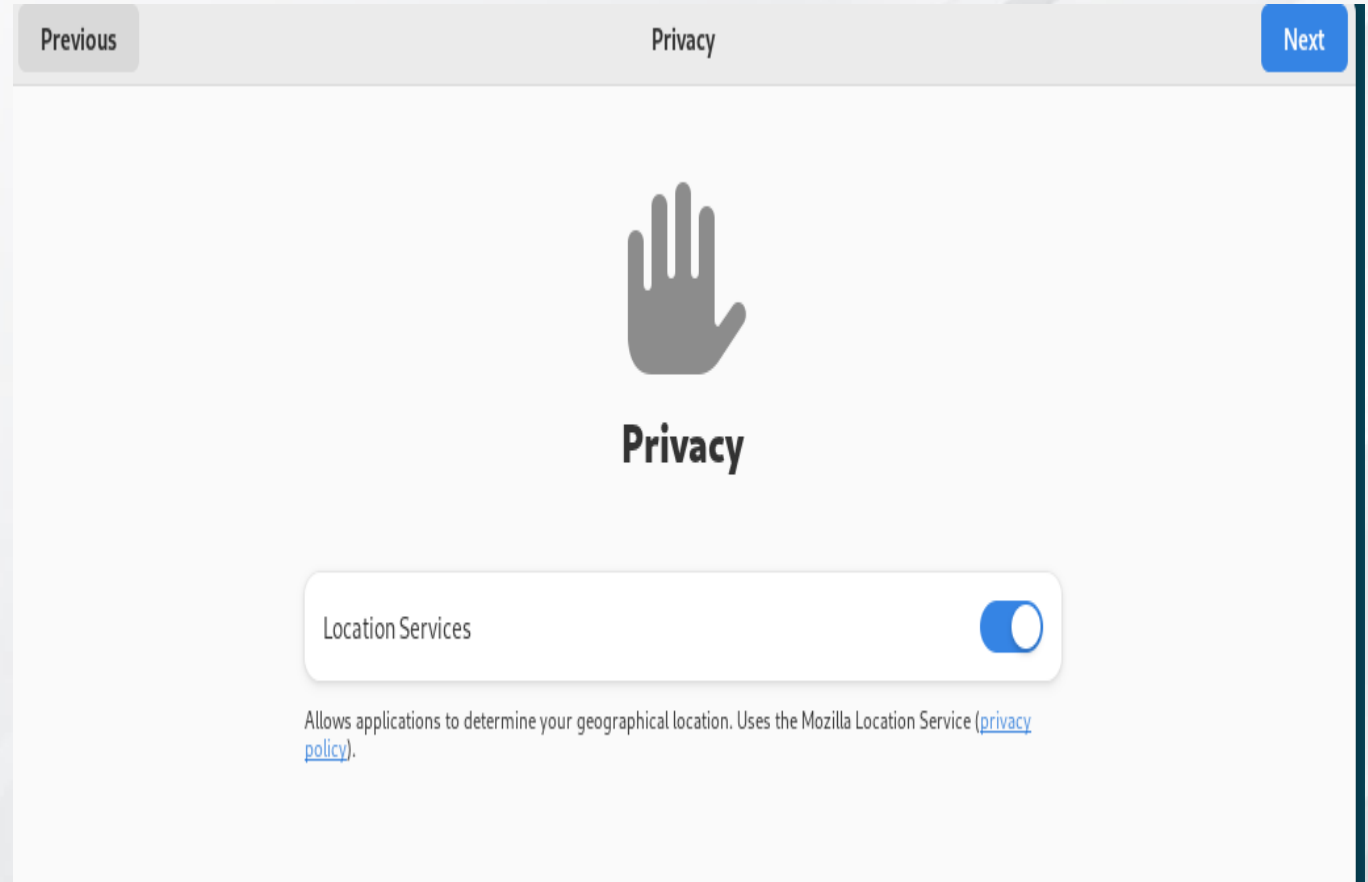
Install Linux

- Next



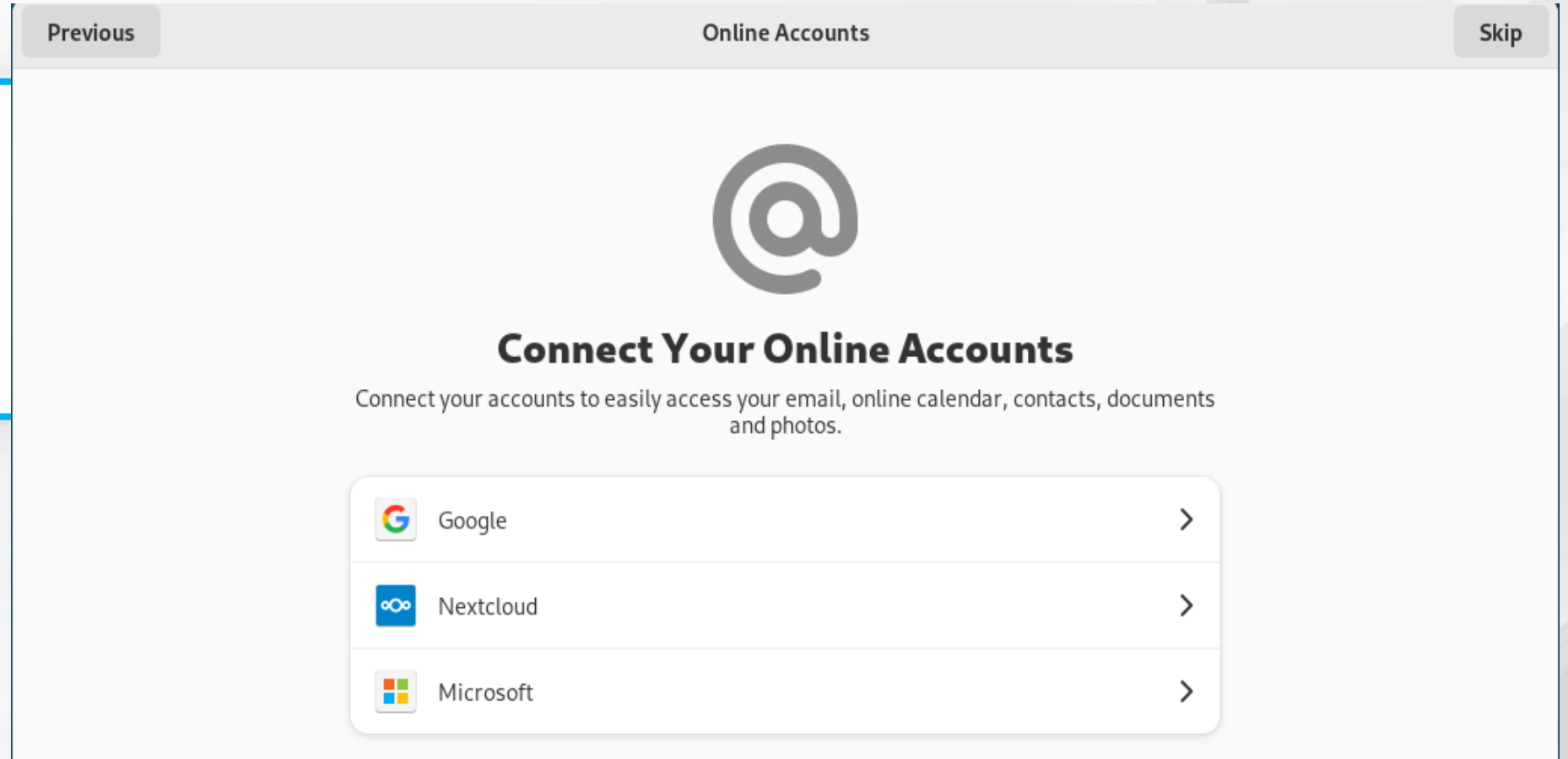
Install Linux

- Next



Install Linux

- Skip



Install Linux

- Start using Debian

Setup Complete



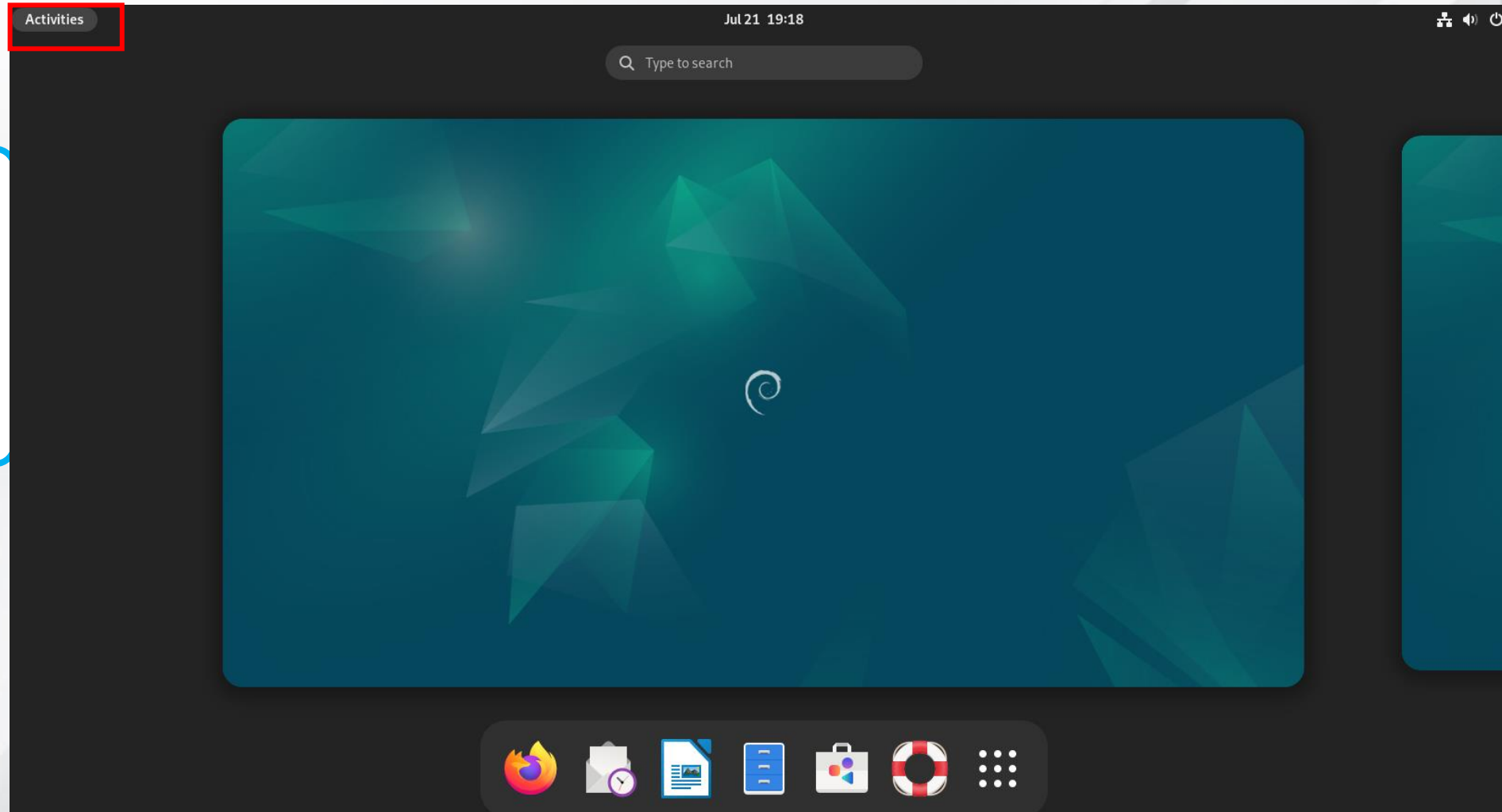
All done!

Debian GNU/Linux is ready to be used. We hope that you love it!

[Start Using Debian GNU/Linux](#)

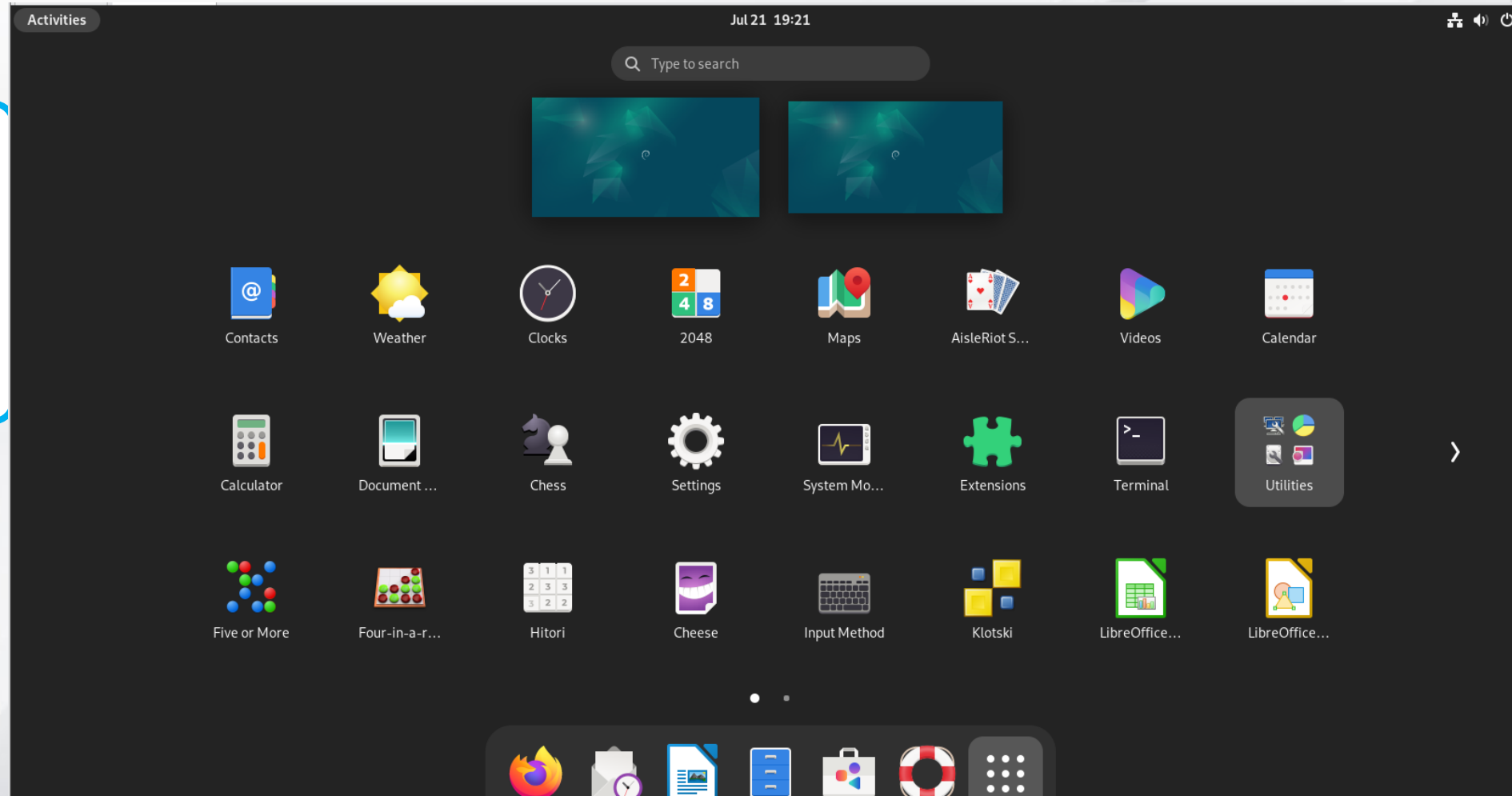
Works with Linux

- Click Activities

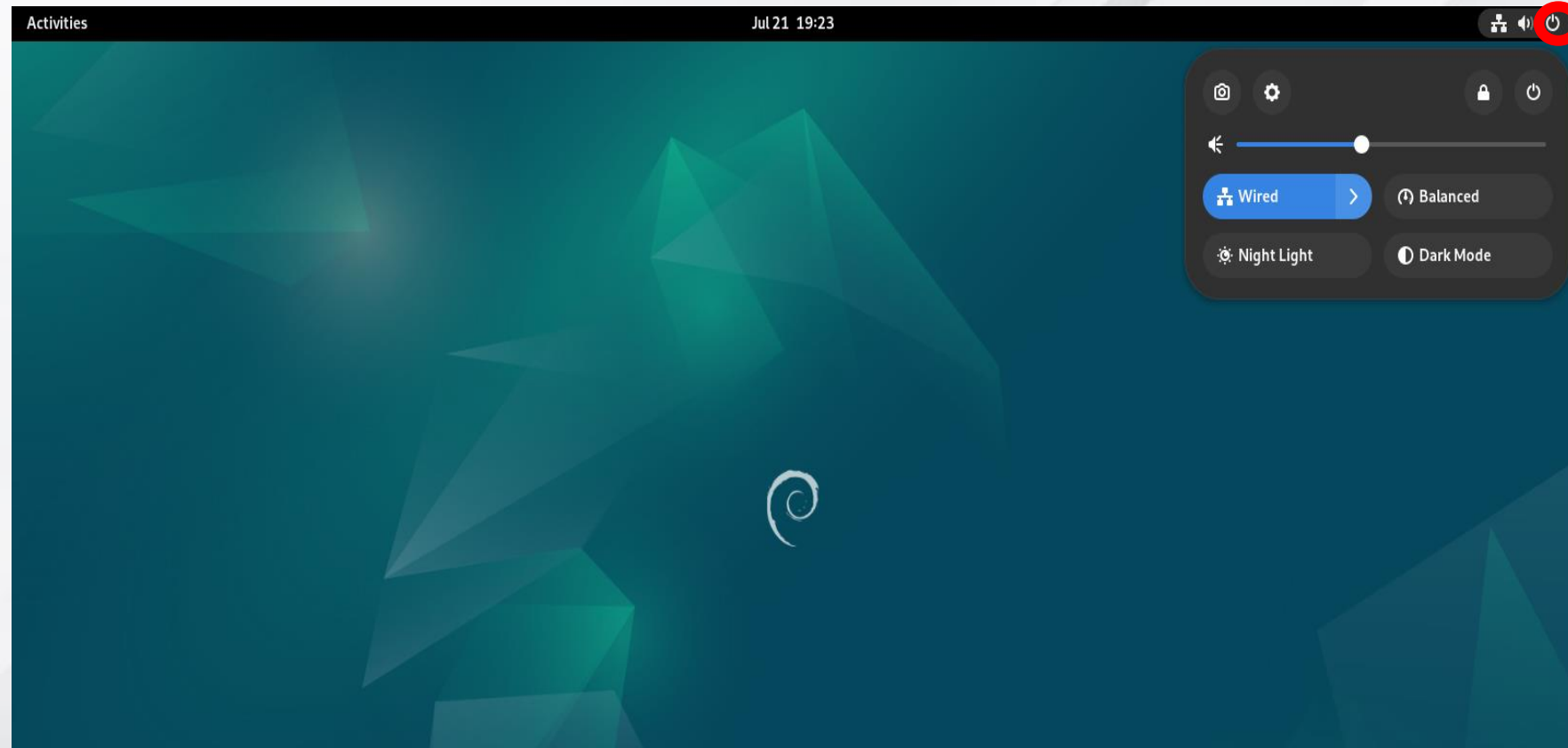


Works with Linux

- Double click

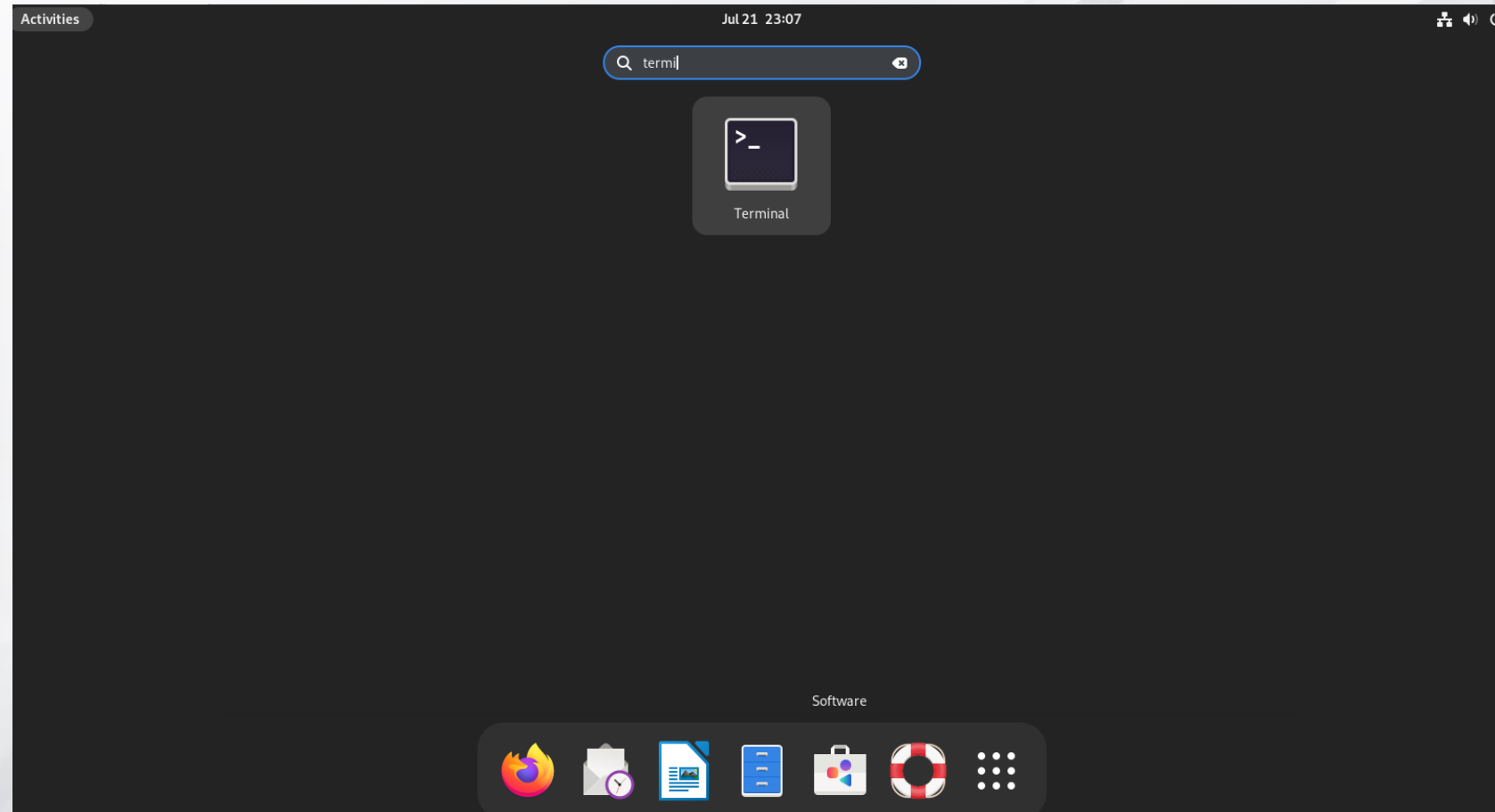


Creating a new virtual machine



Open Terminal

- Click Activities
- Type terminal in search box

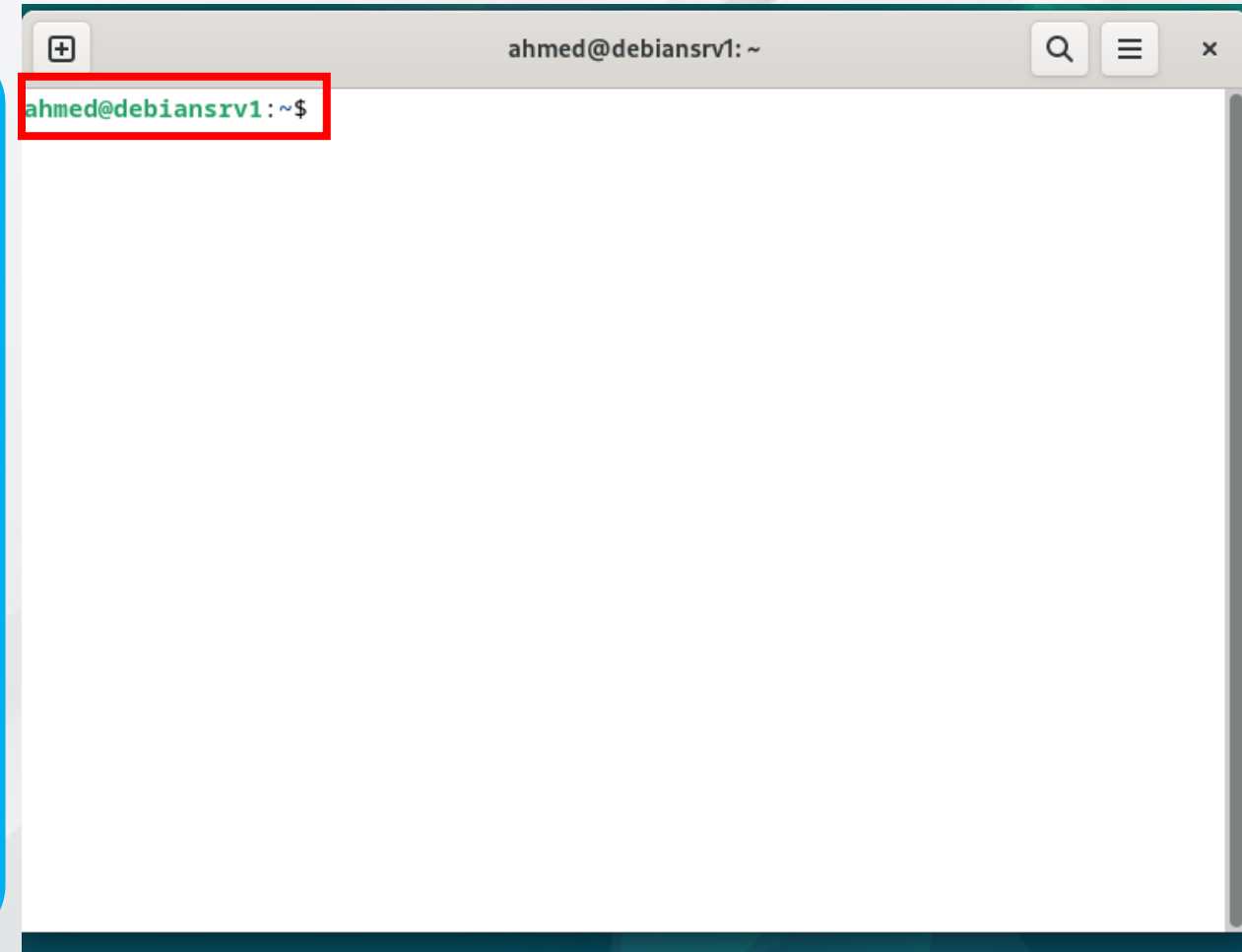


Linux Terminal

- **The Shell Prompt**

When you open a terminal, you'll see a line of text where you can start typing.

This is called the shell prompt. It tells you that the system is ready for your commands.

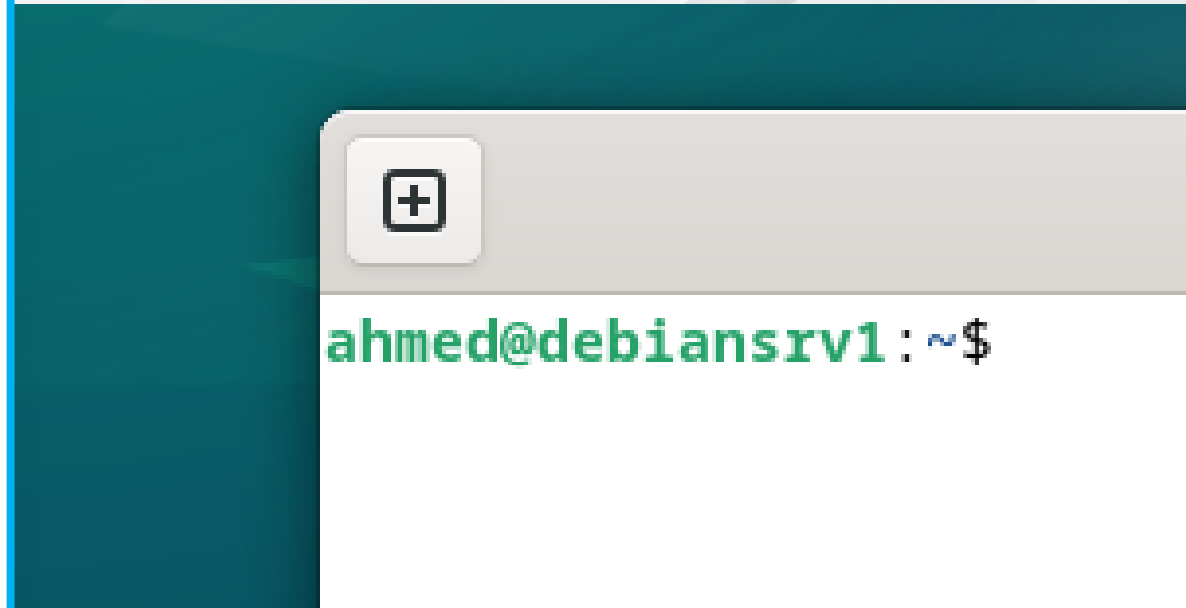


Linux Terminal

■ **ahmed@debiansrv1:~\$**

Let's break it down:

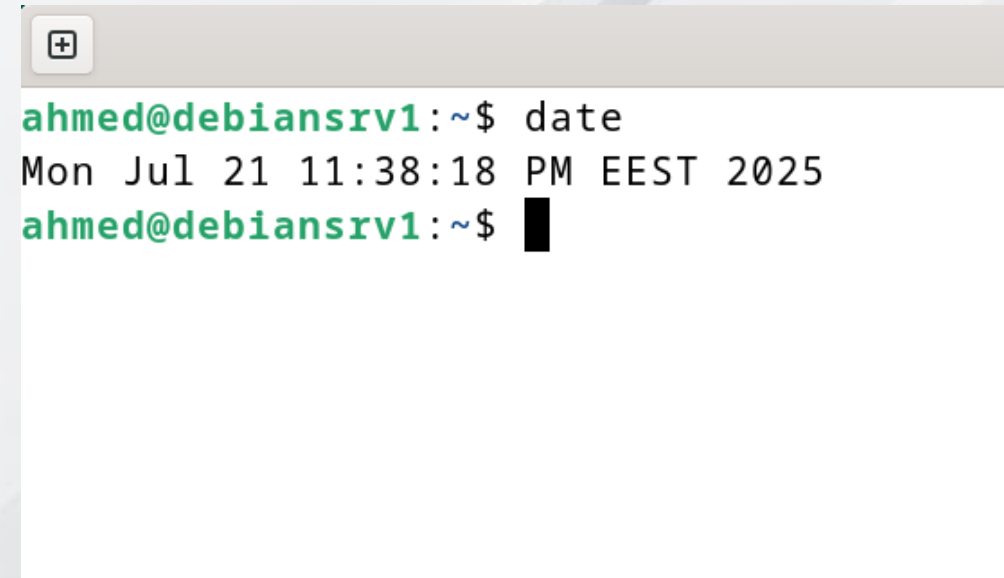
- **user:** The username of the currently logged-in user.
- **hostname:** The name of the computer you are working on.
- **~/directory:** The current working directory. The **tilde** (~) is a shortcut for your **home** directory.
- **\$:** This symbol indicates that the shell is waiting for a command from a regular user. **#** for root user



Linux Commands

- **date:**

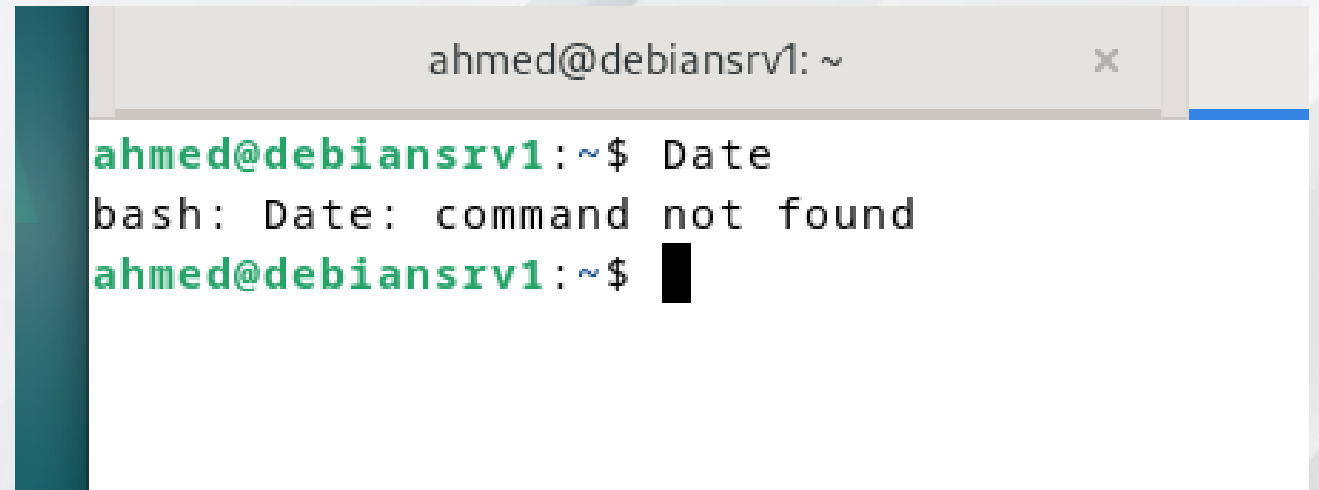
Displays the current system date and time.



```
ahmed@debiansrv1:~$ date
Mon Jul 21 11:38:18 PM EEST 2025
ahmed@debiansrv1:~$
```

Linux Terminal

- Linux commands are case-sensitive
That means:
- **Date** and **date** are not the same:

A screenshot of a Linux terminal window. The title bar at the top reads 'ahmed@debiansrv1: ~' with a close button on the right. The terminal content shows the prompt 'ahmed@debiansrv1:~\$' followed by the command 'Date'. The next line shows the error message 'bash: Date: command not found'. The prompt 'ahmed@debiansrv1:~\$' appears again, followed by a black cursor block.

```
ahmed@debiansrv1:~$ Date
bash: Date: command not found
ahmed@debiansrv1:~$
```

Linux Commands

- **cal:**

Displays a simple **calendar** in the terminal.

```
ahmed@debiansrv1:~$ cal
```

```
    July 2025
```

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September

```

27 28 29 30
25 26 27 28 29 30 31
29 30

      July
Su Mo Tu We Th Fr Sa
      1  2  3  4  5
6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31

      August
Su Mo Tu We Th Fr Sa
      1  2
3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31

      September
Su Mo Tu We Th Fr Sa
      1  2  3  4  5  6
7  8  9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30

      October
Su Mo Tu We Th Fr Sa
      1  2  3  4
5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31

      November
Su Mo Tu We Th Fr Sa
      1
2  3  4  5  6  7  8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30

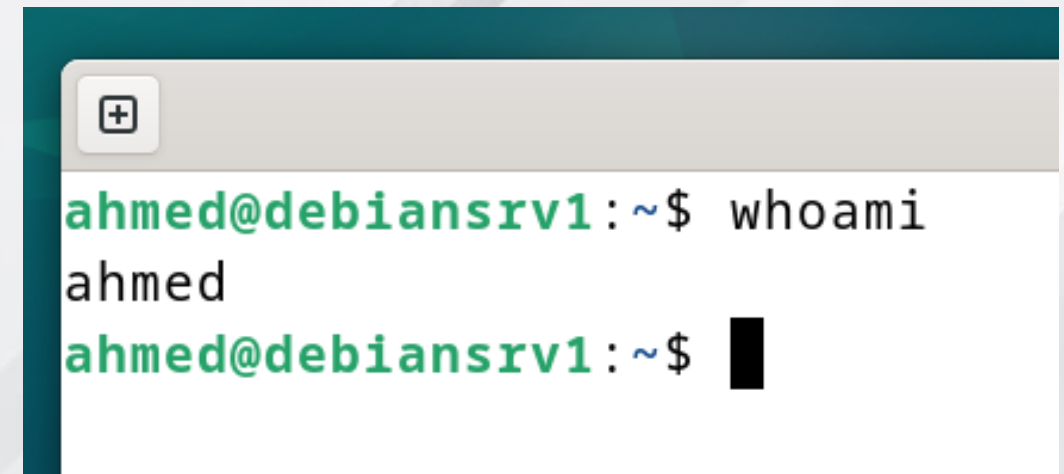
      December
Su Mo Tu We Th Fr Sa
      1  2  3  4  5  6
7  8  9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31

ahmed@debiansrv1:~$ clear

```

Linux Commands

- **whoami:**
Prints the **username** of the account you are currently using.

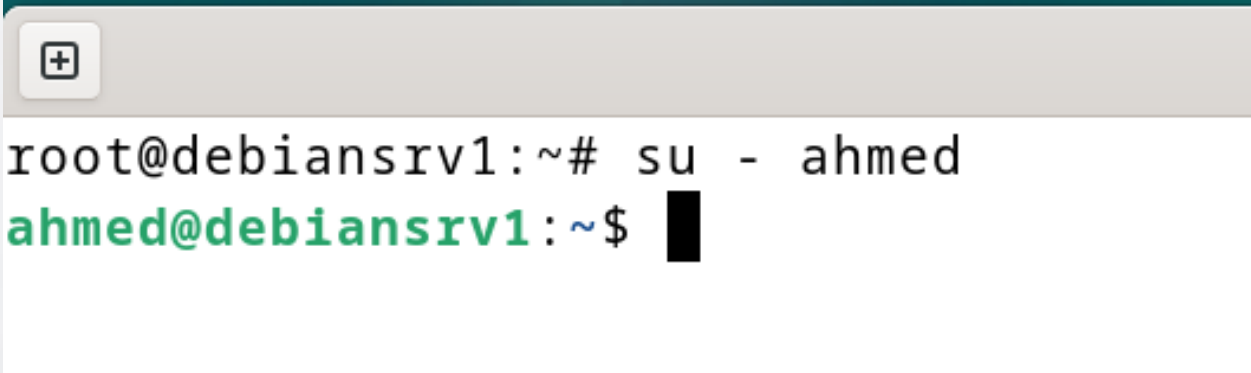
A terminal window with a dark teal header bar containing a plus icon. The terminal text shows a user named 'ahmed' on a machine named 'debiansrv1' running the 'whoami' command, which returns 'ahmed'.

```
ahmed@debiansrv1:~$ whoami
ahmed
ahmed@debiansrv1:~$
```

Linux Commands

- **su:**

Stands for "**S**witch **U**ser" It allows you to temporarily become another user. If you just type su, it will try to switch to the superuser (root).

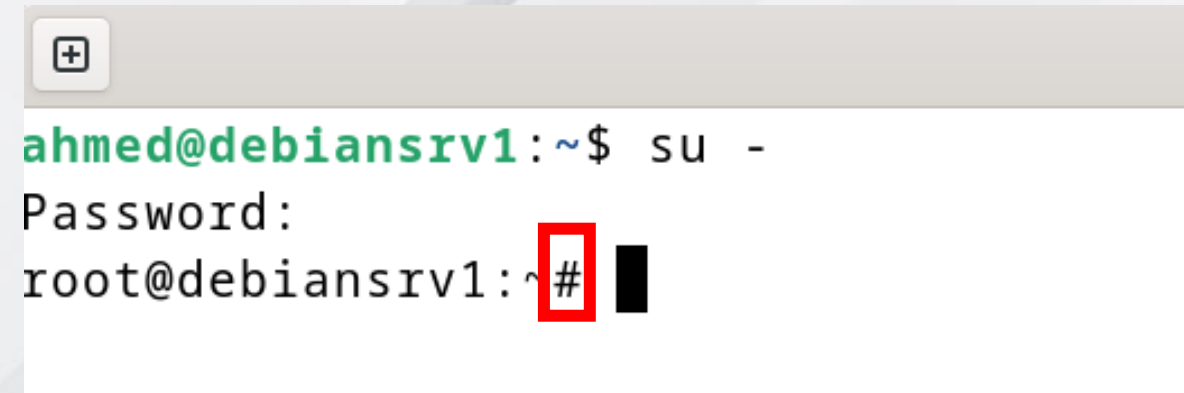


```
root@debiansrv1:~# su - ahmed
ahmed@debiansrv1:~$
```

Linux Commands

- **Switch to root user:**
- **Su -**
- **Su - root**

Note the password will never appears



```
ahmed@debiansrv1:~$ su -  
Password:  
root@debiansrv1:~#
```

Linux Commands

- **ID (User ID)**
- It is a unique number assigned by the system to each user.

```
ahmed@debiansrv1:~$ id
uid=1000(ahmed) gid=1000(ahmed) groups=1000(ahmed),24(cc
),46(plugdev),100(users),106(netdev),111(bluetooth),113(
```

```
root@debiansrv1:~# id
uid=0(root) gid=0(root) groups=0(root)
```

Linux Commands

- **pwd**
- Print Working Directory
- It shows the full (absolute) path of the current directory you are in.

```
root@debiansrv1:~# pwd  
/root
```

```
ahmed@debiansrv1:~$ pwd  
/home/ahmed
```

Summary

- ✓ **CLI vs. GUI**
- ✓ **Linux Fundamentals**
- ✓ **Practical Installation of Debian Linux**
- ✓ **Basic Linux Commands**



Thank You