

What is Gentoo Linux? How to install?

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Gentoo Linux is a powerful and scalable distribution that sticks to the original source-based package management mechanism. Furthermore, the package manager, portage, is a powerful utility that allows you to tweak and tweak each aspect of the distribution. However, it is not an easy distribution to install and use. The following article will show you how to install Gentoo Linux to enjoy its countless benefits.

What is Gentoo Linux?

At its core, Gentoo Linux is a highly modular Linux distribution that gives you the power to create custom Linux machines for any purpose. Unlike other distributions, it does this by providing tools to compile and modify every installable package on the system.

One of the biggest advantages of this approach is that it removes the middleman between you and your system packages. You are not tied to a specific package manager and application format. With the source code, you can compile your own packages and customize them to suit your needs.

Download Gentoo

You can get your copy of Gentoo from its website. You can choose installers for different platforms. Gentoo supports both amd64 and arm64 along with other legacy architectures.

With the downloaded ISO file, you can use a USB burning program like balenaEtcher and dd to create a bootable flash drive.

Install Gentoo Linux

Before proceeding with Gentoo installation, it is important to note that this process is completely manual, which means a lot of commands will be executed during the process. Therefore, you should not only refer to this guide but also check Gentoo's official manual for further instructions during the installation process.

Plug the flash drive into the computer and boot it. It will take you to the Gentoo Installer desktop.

Step 1: Set up a network connection

To install Gentoo, you need an Internet connection. The installer will automatically connect on a wired connection. Check if you are currently online by running the following command:

```
ping -c 5 maketecheasier.com
```

```
To start an ssh server on this system, type "/etc/init.d/sshd start". If you
need to log in remotely as root, type "passwd root" to reset root's password
to a known value.

Please report any bugs you find to https://bugs.gentoo.org. Be sure to include
detailed information about how to reproduce the bug you are reporting.

Thank you for using Gentoo Linux!
livecd ~ # ping -c 5 maketecheasier.com
PING maketecheasier.com (45.79.102.186) 56(84) bytes of data.
64 bytes from 45-79-102-186.ip.linodeusercontent.com (45.79.102.186): icmp_seq=1
ttl=47 time=182 ms
64 bytes from 45-79-102-186.ip.linodeusercontent.com (45.79.102.186): icmp_seq=2
ttl=47 time=182 ms
64 bytes from 45-79-102-186.ip.linodeusercontent.com (45.79.102.186): icmp_seq=3
ttl=47 time=182 ms
64 bytes from 45-79-102-186.ip.linodeusercontent.com (45.79.102.186): icmp_seq=4
ttl=47 time=182 ms
64 bytes from 45-79-102-186.ip.linodeusercontent.com (45.79.102.186): icmp_seq=5
ttl=47 time=182 ms

--- maketecheasier.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 181.573/181.744/181.834/0.095 ms
livecd ~ #
```

If you need to connect to a wireless network, you need to set up **wpa_supplicant**, which will connect you to the wireless access point.

```
wpa_passphrase 'Your_SSID_Here' 'Your_Password_Here' >> /etc/wpa_supplicant/wpa_
```

Reload the **dhcpcd** daemon to start your wireless network connection:

```
rc-service dhcpcd restart
```

Step 2: Create EFI drive partition

Format the drive you want to install Gentoo on. Do that using the fdisk command, followed by the device file on your computer's drive:

```
fdisk /your/disklabel
```

```
livecd ~ # fdisk /dev/vda
Welcome to fdisk (util-linux 2.38.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x8d8738f8.

Command (m for help):
```

If you are not sure about your current drive partition structure, check it with the -l flag:

```
fdisk -l
```

Once in fdisk, press **G** to wipe the drive for any existing partitions.

```
livecd ~ # fdisk /dev/vda
Welcome to fdisk (util-linux 2.38.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x8d8738f8.

Command (m for help): g
Created a new GPT disklabel (GUID: 76971BC5-A271-4847-A3D9-5D1781DF697E).

Command (m for help): _
```

Press **N** to tell fdisk that you want to create a new partition. Fdisk will ask you for the partition number you want to use. Press **Enter** to use the default.

```
Command (m for help): n
Partition number (1-128, default 1): _
```

Type '+100M' into the 'Last sector' prompt, then press **Enter** .

```
Command (m for help): n
Partition number (1-128, default 1):
First sector (2048-31457246, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-31457246, default 31455231):
+100M_
```

Change your first partition type by pressing **T** . This will tell fdisk that you want to change the type of partition you just created. From there, set this partition to '**EFI System**' by typing **1** , then pressing **Enter** .

```
Command (m for help): t
Selected partition 1
Partition type or alias (type L to list all): 1
Changed type of partition 'Linux filesystem' to 'EFI System'.
Command (m for help): _
```

Step 3: Partition the rest of the drive

The next partition you have to create is the '/boot' partition where the Linux kernel and bootloader will be saved. Press **N** , then **Enter** to create a second partition for your system.

Type '**2**' , then press **Enter** to tell Fdisk that you are editing a second partition for the current drive.

```
Command (m for help): n
Partition number (2-128, default 2): 2
First sector (206848-31457246, default 206848): _
```

Press **Enter** to accept the default first sector value for the partition, then type '**+1G**' , then press **Enter** to set the partition size to 1GB.

```
Command (m for help): n
Partition number (2-128, default 2): 2
First sector (206848-31457246, default 206848):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (206848-31457246, default 31455231):
+1G_
```

Press **N** again, then type '**3**' to create a third partition for your hard drive. This will act as a swap partition on your machine, which can automatically swap out memory whenever it runs out of space.

Press **Enter** to set the default first sector value, then type '**+4G**' , then press **Enter** to set the swap partition size to 4GB.

```
Command (m for help): n
Partition number (3-128, default 3): 3
First sector (2304000-31457246, default 2304000):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2304000-31457246, default 31455231):
+4G
Created a new partition 3 of type 'Linux filesystem' and of size 4 GiB.
```

Note : The general rule for swap size is 1/2 to 2 times the amount of physical memory in your computer. This means that if you have a 16GB system, you can set swap between 8 and 32 GB.

Press **T** , then type '**3**' to change the third partition type.

Enter '**19**' to properly set this partition as the swap area, then press **Enter** .

```
Command (m for help): t
Partition number (1-3, default 3): 3
Partition type or alias (type L to list all): 19

Changed type of partition 'Linux filesystem' to 'Linux swap'.
```

Create a root partition where the rest of the system will be installed. Press **N** again, then type **'4'** to place the fourth partition on the drive.

Pressing **Enter** on both the first and last sectors will prompt to allocate the remainder of the drive to your root partition.

```
Command (m for help): n
Partition number (4-128, default 4): 4
First sector (10692608-31457246, default 10692608):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (10692608-31457246, default 31455231):

Created a new partition 4 of type 'Linux filesystem' and of size 9.9 GiB.
```

Press **P** to check if the partition table layout you made is correct.

```
Command (m for help): p
Disk /dev/vda: 15 GiB, 16106127360 bytes, 31457280 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: CC0758C9-EAC6-0449-ABC8-41D12E604264

Device      Start      End      Sectors  Size Type
/dev/vda1   2048       206847   204800   100M EFI System
/dev/vda2   206848     2303999  2097152   1G Linux filesystem
/dev/vda3   2304000    10692607 8388608   4G Linux swap
/dev/vda4   10692608   31455231 20762624 9.9G Linux filesystem
```

Press **W** to confirm and write the new partition table to the drive.

Step 4: Format the drive in Gentoo

Format the EFI System partition as FAT using the following command:

```
mkfs.vfat /dev/sda1
```

Creating a file system for the '/boot' partition using the simpler ext2 file system.

```
mkfs.ext2 /dev/sda2
```

Create and enable a swap partition to tell Gentoo that this partition can be used for direct memory swapping. To do that, run the following:

```
mkswap /dev/sda3 swapon /dev/sda3
```

Create an ext4 file system for the root partition by running the following command:

```
mkfs.ext4 /dev/sda4
```

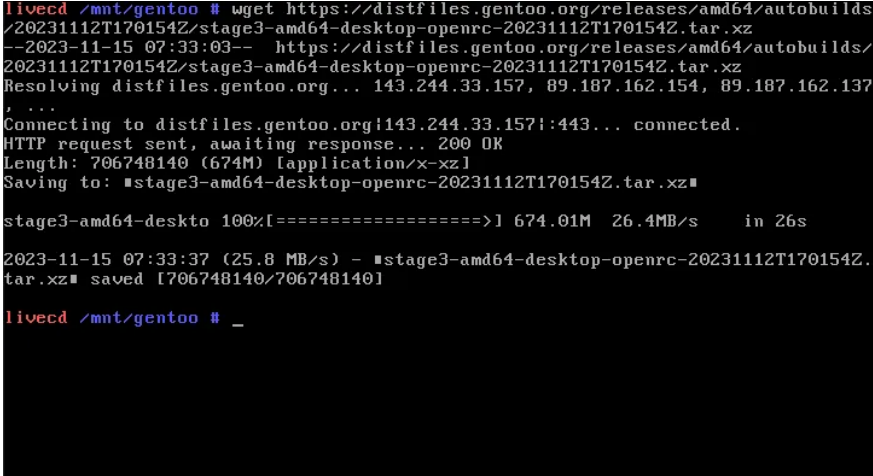
Step 5: Download Gentoo Stage 3 Tarball

Mount the root partition you just created into the '/mnt/gentoo' directory because the installation will be done on your computer's hard drive.

```
mount /dev/sda4 /mnt/gentoo && cd /mnt/gentoo
```

Download the Stage 3 tarball from the gentoo.org website using wget:

```
wget https://distfiles.gentoo.org/releases/amd64/autobuilds/20231112T170154Z/stage3-amd64-desktop-openrc-20231112T170154Z.tar.xz
```



```
livecd /mnt/gentoo # wget https://distfiles.gentoo.org/releases/amd64/autobuilds/20231112T170154Z/stage3-amd64-desktop-openrc-20231112T170154Z.tar.xz
--2023-11-15 07:33:03-- https://distfiles.gentoo.org/releases/amd64/autobuilds/20231112T170154Z/stage3-amd64-desktop-openrc-20231112T170154Z.tar.xz
Resolving distfiles.gentoo.org... 143.244.33.157, 89.187.162.154, 89.187.162.137
...
Connecting to distfiles.gentoo.org:143.244.33.157:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 706748140 (674M) [application/x-xz]
Saving to: #stage3-amd64-desktop-openrc-20231112T170154Z.tar.xz#

stage3-amd64-deskto 100%[=====>] 674.01M  26.4MB/s   in 26s
2023-11-15 07:33:37 (25.8 MB/s) - #stage3-amd64-desktop-openrc-20231112T170154Z.tar.xz# saved [706748140/706748140]

livecd /mnt/gentoo # _
```

Once that's done, extract it in the '/mnt/gentoo' directory using tar:

```
tar xpvf ./stage3-amd64-desktop-openrc-20231112T170154Z.tar.xz --xattrs-include=*
```

Step 6: Select Download Copy and copy DNS information

Figure out where you want to download your packages for this system by running the mirrorselect command:

```
mirrorselect -i -o >> /mnt/gentoo/etc/portage/make.conf
```

This will open the TUI program where you can select the server location closest to you.



Copy Gentoo's default repository file to your **'/etc/portage'** directory. Here is the configuration file that tells Portage how to download its packages:

```
mkdir -p /mnt/gentoo/etc/portage/repos.conf && cp /mnt/gentoo/usr/share/portage/
```

Copy the resolver information from your USB installer into the **'/mnt/gentoo'** directory :

```
cp --dereference /etc/resolv.conf /mnt/gentoo/etc/
```

Step 7: Mount the device file and Chroot

Mount special folders from the USB installer to your hard drive:

```
mount --types proc /proc /mnt/gentoo/proc mount --rbind /sys /mnt/gentoo/sys moun
```

Change the root of the current shell session from the Live ISO to the **'/mnt/gentoo'** directory :

```
chroot /mnt/gentoo /bin/bash source /etc/profile export PS1="[chroot] ${PS1}"
```

Step 8: Mount /boot partition and update Gentoo

Mount the **'/boot'** partition to your Gentoo machine to ensure that when you install the kernel later, it will be saved in the correct location:

```
mount /dev/sda2 /boot mkdir /boot/efi mount /dev/sda1 /boot/efi
```

Update your Gentoo repository to ensure you get the latest packages when you do your first system update:

```
emerge-webrsync
```

Update and install all basic EBUILDS to your system by running this emerge command:

```
emerge --ask --verbose --update --deep --newuse @world
```

Step 9: Time zone and location

Once done, set up your system's region-specific information, including your system time zone and locale. To set the time zone for your zone, find the location closest to you listed in the `'/usr/share/zoneinfo'` directory.

```
ls /usr/share/zoneinfo
```

Write the path to the directory and zonefile to the file `'/etc/timezone'`. For example, the nearest location is `'Asia/Manila'`:

```
echo "Asia/Manila" > /etc/timezone emerge --config sys-libs/timezone-data
```

```
[chroot] livecd / # echo "Asia/Manila" > /etc/timezone
[chroot] livecd / # emerge --config sys-libs/timezone-data

Configuring pkg...

* Found a regular file at /etc/localtime.
* Some software may expect a symlink instead.
* You may convert it to a symlink by removing the file and running:
*   emerge --config sys-libs/timezone-data
* Copying /usr/share/zoneinfo/Asia/Manila to /etc/localtime.

[chroot] livecd / #
```

Open the file `'locale.gen'` with your favorite text editor:

```
nano -w /etc/locale.gen
```

Delete the pound sign (#) in front of the first two lines in the `locale.gen` file.

```
GNU nano 7.2 /etc/locale.gen Modified
#
# Where <charset> is a charset located in /usr/share/i18n/charmaps/ (sans any
# suffix like ".gz").
#
# All blank lines and lines starting with # are ignored.
#
# For the default list of supported combinations, see the file:
# /usr/share/i18n/SUPPORTED
#
# Whenever glibc is emerged, the locales listed here will be automatically
# rebuilt for you. After updating this file, you can simply run `locale-gen`
# yourself instead of re-emerging glibc.

en_US ISO-8859-1
en_US.UTF-8 UTF-8
# ja_JP.EUC-JP EUC-JP
# ja_JP.UTF-8 UTF-8
# ja_JP EUC-JP
#en_HK ISO-8859-1
#en_PH ISO-8859-1
#de_DE ISO-8859-1

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute  ^M-U Undo
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^C Location ^M-E Redo
```

Note : You can see the full list of available languages by running the following command:

```
cat /usr/share/i18n/SUPPORTED
```

Apply your new locale settings by running the `locale-gen` program.

Step 10: Install Linux kernel and configure fstab

There are many ways to install Linux Kernel in Gentoo. Either manually configure all its features or use pre-made ones from Gentoo developers. The example would choose the latter.

To get started, install the `installkernel` and `kernel` packages:

```
emerge --ask sys-kernel/installkernel-gentoo sys-kernel/gentoo-kernel-bin
```

With the kernel installed, open the fstab file with your favorite text editor:

```
nano -w /etc/fstab
```

Shows all the partitions you created in fdisk. For example, in a UEFI system, your fstab file might look like this:

```
[.] /dev/sda1 /boot/efi vfat defaults 0 2 /dev/sda2 /boot ext2 defaults,noatime 0 2
```

```
GNU nano 7.2 /etc/fstab Modified
#
# NOTE: Even though we list ext4 as the type here, it will work with ext2/ext3
# filesystems. This just tells the kernel to use the ext4 driver.
#
# NOTE: You can use full paths to devices like /dev/sda3, but it is often
# more reliable to use filesystem labels or UUIDs. See your filesystem
# documentation for details on setting a label. To obtain the UUID, use
# the blkid(8) command.
#
# <fs>          <mountpoint>  <type>          <opts>          <dump>
#LABEL=boot     /boot          ext4             defaults         1 2
#UUID=58e72203-57d1-4497-81ad-97655bd56494 /              xfs              0 0
#LABEL=swap     none           swap             sw               0 0
#/dev/cdrom     /mnt/cdrom    auto             noauto,ro       0 0
/dev/vda1       /boot/efi     vfat             defaults         0 2
/dev/vda2       /boot         ext2             defaults,noatime 0 2
/dev/vda3       none          swap             sw               0 0
/dev/vda4       /             ext4             noatime 0       1
-
^G Help      ^O Write Out ^W Where Is  ^X Cut       ^T Execute  ^-U Undo
^X Exit      ^R Read File ^N Replace   ^U Paste     ^C Location ^-E Redo
```

Step 11: Set up root password and install additional tools

Create a root password for your system. This will ensure that you can still access your system after the installation process:

```
passwd
```

```
[chroot] livecd / # passwd
You can now choose the new password or passphrase.

A valid password should be a mix of upper and lower case letters, digits, and
other characters. You can use a password containing at least 7 characters
from all of these classes, or a password containing at least 8 characters
from just 3 of these 4 classes.
An upper case letter that begins the password and a digit that ends it do not
count towards the number of character classes used.

A passphrase should be of at least 3 words, 11 to 72 characters long, and
contain enough different characters.

Alternatively, if no one else can see your terminal now, you can pick this as
your password: "Ensure*Gone_divert".

Enter new password:
Weak password: not enough different characters or classes for this length.
Re-type new password:
passwd: password updated successfully
[chroot] livecd / #
```

Install additional network support tools for your Gentoo system. For example, if you want both Ethernet and wireless connections, set up as follows:

```
emerge --ask net-misc/dhcpd net-wireless/iw net-wireless/wpa_supplicant rc-updat
```

Once done, install a syslogger if you want to monitor system activity:

```
emerge --ask app-admin/sysklogd rc-update add sysklogd default
```

Finally, install file system utilities for the most common file systems you will interact with:

```
emerge --ask sys-fs/dosfstools sys-fs/ntfs3g
```

Step 12: Install Bootloader

The final step in the Gentoo installation process is the bootloader. This is a small program that loads right after the computer's BIOS and prepares to load the operating system's kernel.

To install GRUB Bootloader, run the following command:

```
emerge --ask sys-boot/grub
```

```
[chroot] livecd / # emerge --ask sys-boot/grub
* IMPORTANT: 14 news items need reading for repository 'gentoo'.
* Use eselect news read to view new items.

These are the packages that would be merged, in order:

Calculating dependencies... done!
Dependency resolution took 1.63 s.

[ebuild N] app-text/mandoc-1.14.6 USE="-cgi (-selinux) -system-man -test"
[ebuild N] sys-apps/pciutils-3.10.0 USE="kmod udev zlib -dns -static-libs
ABI_X86="(64) -32 (-x32)"
[ebuild N] sys-libs/efivar-38 USE="-test"
[ebuild N] sys-boot/efibootmgr-18-r1
[ebuild N] sys-boot/grub-2.06-r9 USE="fonts nls sdl themes trueuetype -devi
ce-mapper -doc -efiemu -libzfs -mount (-test) -verify-sig" GRUB_PLATFORMS="efi-6
4 pc -coreboot -efi-32 -emu -ieee1275 (-loongson) -multiboot -qemu (-qemu-mips)
-uboot -xen -xen-32 -xen-pvh"

Would you like to merge these packages? [Yes/No] _
```

Once installed, run the following commands to properly initialize and configure GRUB:

```
grub-install --target=x86_64-efi --efi-directory=/boot/efi grub-mkconfig -o /boot
```

Disconnect the USB installer and reboot the system by running the following:

```
exit cd umount -l /mnt/gentoo/dev{/shm,/pts,} umount -R /mnt/gentoo reboot
```

Installing Gentoo Linux is just the first step in understanding how your Linux distribution works. Learn how you can further optimize your system by speeding up compile times in Gentoo.

However, if you're still not sure which desktop environment to install, check out the best desktop environments on Linux.

You finished reading the article "[What is Gentoo Linux? How to install?](#)" edited by the [TipsMake](#) team. We hope this article has provided you with many useful tech tips and tricks. You can search for similar articles on tips and guides. Thank you for reading and for following us regularly.