Installation

This page exists to provide a basic overview to get started. Before actually installing, it can help to skim through the Frequently Asked Questions (FAQ), as well as to refer to the official installation guide at docs.alpinelinux.org (https://docs.alpinelinux.org/).

Tip: This is a wiki!

If something isn't correct, or is incomplete, you will have to figure it out, or ask for the correct solution in the community (https://alpinelinux.org/community/).

And then carefully edit the wiki page.

Just as those before who did it for you.

Minimal Hardware Requirements

Main article: Requirements

- At least 128 MB of RAM. [A graphical desktop system may require up to 512 minimum.]. Note that an installation itself (from ISO) generally requires at least 320 MB during installation.
- At least 0-700 MB space on a writable storage device. [Only required in "sys" or "data" mode installations. It is optional in "diskless" mode, where it may be used to save newer data and configurations states of a running system.]
- A working internet connection is required to complete "sys" mode installation.

Note:

Most of the steps outlined on this page applies to all architectures of Alpine Linux. For more specific installation instructions, refer to their respective pages:

- Alpine on ARM
- 64 bit PowerPC
- IBM S390x
- 64 bit RISC V
- 64 bit LoongArch

Refer custom installation instructions for headless system, virtualization etc.

Installation Overview

Alpine Linux can be installed and run in three modes i.e Diskless Mode, Data Disk Mode and

System Disk Mode. The installation procedure for Alpine Linux **requires basic understanding of the three modes** explained in brief below:

Diskless Mode

In Diskless mode the entire operating system with all applications are first loaded into RAM and then only run from there. Alpine Linux uses this method to boot the .iso installation images. The `setup-alpine` script configures the installed system to continue to boot like this if "disk=none" is specified. The mode is extremely fast and can save on unnecessary disk spin-ups, power, and wear. For further info, refer Diskless Mode.

Data Disk Mode

In Data Disk mode also the operating system runs from system RAM, thus it enjoys the same accelerated operation speed as "diskless" mode. However, swap storage and the entire `/var` directory tree get mounted from a persistent storage device. This mode is useful for having RAM accelerated servers with variable amounts of user-data that exceed the available RAM size. For further info, refer Data Disk Mode.

System Disk Mode

System or **sys** Disk Mode is the traditional hard-disk install. `setup-alpine` script based install supports only default layout. For further info, refer System Disk Mode.

General course of action

Note: It is really helpful for many use cases to prepare and complete the Installation until the base configuration step, then proceed with installation of the target system with any one of the various alternate courses of action.

Alternate courses of action

Examples of preparation options:

- Download and install some specific driver or software tool.
- Do a Manual partitioning of the harddisk that avoids overwrite of an entire disk.
- Installing something that may be missing in the live system to configure the hardware, e.g. by using the alpine package manager apk.
- Use more specific setup-scripts in order to proceed with the final installation in a custom way.

Examples of proceeding options:

- To install Alpine Linux on an **entire hard disk** with default layout proceed with setup-alpine based System Disk Install
- Use `setup-lbu` to configure a "local backup" location for the diskless system, and `lbu commit` to then save the local configuration state.

- Use `setup-apkcache` to configure a local package cache storage location.
- Use `setup-disk` to add a "data" mode partition
- Use `setup-disk` to complete a traditional hard-disk installation or to Dualboot or to configure RAID, encryption or LVM for both "data" disk and "system" disk mode or to use environment variables.
- Use `setup-bootable` to create a bootable medium to be used with a **diskless** or **data** disk-mode installed to (and booting from) a device with a writable filesystem.

There are many more setup-scripts available. All these tools may also be run later to adjust specific configurations. For example, to set up a graphical environment as covered under Post-Installation below.

Preparing for the installation

Downloading installation image

Download the stable-release installation image-file (https://alpinelinux.org/downloads/) for the target computer's architecture with their corresponding `sha256` (checksum) and `GPG` (signature) files.

Note: Download `sha256` (checksum) and `GPG` (signature) files only from official (https://alpinelinux.org/downloads/) site and not from mirrors.

Now you have three files of the following format..

```
alpine-standard-*.iso
alpine-standard-*.iso.sha256
alpine-standard-*.iso.asc
```

alpine-standard-3.20.3-x86_64.iso is the **3.20.3** version **Standard** image file in **iso** format for **x86_64** architecture. Image file can also be **gz** for certain cases.

Verifying downloaded image

From Security point of view, verify the downloaded image file for both checksum and GPG signature before proceeding further. The three required utilities i.e `sha256`, `curl` and `gpg` or their equivalents are available in every operating system including Linux, windows, Mac and BSD derivaties.

Tip: Ensure that all the three downloaded files remain in the same folder. If not, adjust the commands accordingly.

The `sha256` checksum verifies the integrity of the downloaded image i.e no modifications occurred during download.

```
sha256sum -c alpine-*.iso.sha256
```

The GPG signature verifies the link between the downloaded image to the individual who signed it. Signature verification involves two steps:

Step 1. Download and import the gpg signature from official website

```
curl https://alpinelinux.org/keys/ncopa.asc | gpg --import ;
```

Step 2. Verify that the image signature matches with the one downloded in Step 1.

```
gpg --verify alpine-*.iso.asc alpine-*.iso
```

Preparing installation media

See also: Burning ISOs

Note: These instructions are exclusively for x86_64 and x86. For ARM boards, see Alpine on ARM.

All data currently on the installation media will be **lost**, when the Alpine Linux image is written on it. Be extremely careful to correctly identify the device name for the installation media.

In Linux, dd command can write the downloaded image file to the installation media i.e target device. To identify the target device, all connected "bulk storage devices" can be listed with `lsblk` and `blkid`.

```
# lsblk
NAME            MAJ:MIN RM   SIZE RO TYPE  MOUNTPOINT
sdX               0:0    0  64,0G  0 disk
├─sdX1            0:1    0     2G  0 part
└─sdX2            0:2    0    30G  0 part  /mnt/sdX2

# blkid
/dev/sdX1: LABEL="some" UUID="..." TYPE="vfat"
/dev/sdX2: LABEL="other" UUID="..." TYPE="ext4"
```

For example, if /dev/sdX is the desired target device, ensure that all mounted partitions of the target device are un-mounted first. In the above case, for device sdX with partitions sdX1 and sdX2, the partition sdX2 needs to be unmounted:

```
# umount /dev/sdX2
```

Note: In dd command, do not specify partition number for target device i.e use **/dev/sdX** and not **/dev/sdX1**

The syntax for dd command is as follows:

```
# dd if=<iso-image-file> of=<target-device> bs=4M status=progress; eject <target-de
```

If your version of dd does not support the option "status=progress", remove it. The `eject` command removes the target device from the system and ensures the write cache is completely flushed.

A complete example for dd command with image file *alpine-standard-3.20.3-x86_64.iso* and target device **/dev/sdd** is shown below:

Warning: Below command will overwrite data on target device **/dev/sdd**. Modify **if** and **of** according to the name of your image file and target device

```
# dd if=~/Downloads/alpine-standard-3.20.3-x86_64.iso of=/dev/sdd bs=4M status=prog
```

In Windows, Rufus (https://rufus.ie/) has been tested to create bootable USB flash drives and worked for Alpine Linux 3.12.x with the following settings:

- **Partition scheme**: `MBR` **Target system**: `BIOS or UEFI`
- **File system**: `FAT32` **Cluster size**: `4096 bytes (default)`

Verifying Installation media

After detaching and re-attaching the device, a bit-wise comparison can verify the data written to the device (instead of just data buffered in RAM). If the comparison terminates with an end-of-file error on the .iso file side, all the contents from the image have been written (and re-read) successfully:

```
# cmp ~/Downloads/alpine-standard-3.20.3-x86_64.iso /dev/sdX
cmp: EOF on alpine-standard-3.20.3-x86_64.iso
```

Booting Installation Media

Insert the Installation media to a proper drive or port of the computer and turn the machine on, or restart it, if already running.

Note: To successfully boot and install Alpine Linux, disable secure boot in the BIOS. Once Alpine Linux is installed, this can be enabled.

If the computer does not automatically boot from the desired device, one needs to bring up the boot menu and choose the media to boot from. Depending on the computer, the menu may be accessed by repeatedly pressing a key quickly when booting starts. Some computers require that you press the button *before* starting the computer and hold it down while the computer boots. Typical keys are: F9 - F12, sometimes F7 or F8. If these don't bring up the boot menu, it may be necessary to enter the BIOS configuration and adjust the boot settings, for which typical keys are: Del F1 F2 F6 or Esc.

Installation Step Details

Boot Process

The boot process of the alpine installation image first copies the entire operating system into the RAM memory, and then already starts a complete Alpine Linux system from there. It will

initially only provide a basic command line environment that does not depend on reading from any (possibly slow) initial boot media, anymore.

Local log-in is possible as the user `root`. Initially, the **root** user has no password.

At the command prompt, an interactive script named `setup-alpine` is available to configure and install the initial Alpine Linux system. Using environment variables at this stage is optional. Launch the Alpine Linux Installation by running the `setup-alpine` script :

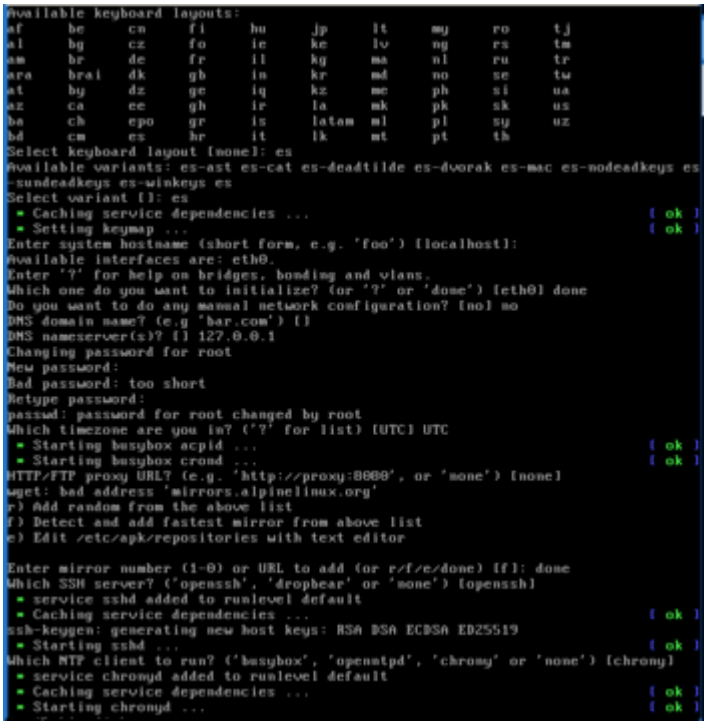
```
#setup-alpine
```

Base configuration

The question-and-answer dialog of `setup-alpine` takes care of the base configuration.

It allows to configure the system to boot into one of three different **Alpine Linux "disk" modes**: **"diskless"**(none), **"data"** or **"sys"**.

The `setup-alpine` script offers the following configuration options:



Example `setup-alpine` session

- **Keyboard Layout** (Local keyboard language and usage mode, e.g. *us* and variant of *us-nodeadkeys*.)
- **Hostname** (The name for the computer.)
- **Network** (For example, automatic IP address discovery with the "DHCP" protocol.)
- **DNS Servers** (Domain Name Servers to query. If unsure, leave DNS domain name blank and using `9.9.9.9 2620:fe::fe (https://quad9.net/)` for DNS is typically adequate.)
- **Root password** (the password used to login to the root account)
- **Timezone** (Optionally display times/dates in your local time zone)
- **HTTP/FTP Proxy** (Proxy server to use for accessing the web/ftp. Use "none" for direct connections to websites and FTP servers.)
- **Mirror** (From where to download packages. Choose the organization you trust giving your usage patterns to.)
- **Setup a user** (Setting up a regular user account)
- **NTP** (Network Time Protocol client used for keeping the system clock in sync with a time server. Package "chrony" is part of the default install image.)

- **SSH** (Secure SHell remote access server. "OpenSSH" is part of the default install image. Use "none" to disable remote login, e.g. on laptops.)
- In most cases, either one of following line(s) is displayed as follows: **No disks found.** or **Available disks are: sda (128.0 GB JMicron Tech)**
- **Disk Mode** (A pre-setup of the "diskless" system or base configuration is completed by answering "none" when asked for the following questions.)
  - Which disk(s) would you like to use? (or '?' for help or 'none') **none**
  - Enter where to store configs (/media/ or 'none') **none**
  - The location of the package cache **none**

Base configuration is complete with the above step. Refer to the alternate courses of action to proceed further.

setup-alpine based System Disk Install

If you have **entire hard disk(s)** for Alpine Linux and default layout is acceptable to you, at the final step of base configuration do not choose **none** for the prompts in the **Disk Mode**.

- At the **Disk Mode** stage, **sda** or relevant disk(s) must be chosen in the below screen:
- Which disk(s) would you like to use? (or '?' for help or 'none') **sda**
- Confirmation for the chosen disk(s) appears. *The following disk is selected:* **sda (128.0 GB JMicron Tech).**
- For automatic RAID configuration, you can select multiple disks as explained in default layout section.
- Pay close attention and verify that the disk(s) matches your requirement. Answering **none** in the next step or pressing **Ctrl+c** will exit/abort the installation process.

Warning: If you enter **sys** in the next step, data on the chosen disk(s) will be overwritten! No further questions will be asked. Proceed only if you are 100% sure.

- How would you like to use it? ('sys', 'data', 'lvm' or '?' for help) **sys**

If **sys** is chosen, the `setup-alpine` script will complete the traditional hard-disk installation of Alpine Linux on the chosen disk as per default layout. Once the installation is complete, you can skip the next steps and proceed to reboot the system to complete the installation.

Custom partitioning

Refer Setting up disks manually page for specific configurations related to RAID, encryption, LVM, etc. as well as to manually partition the harddisk.

For "diskless" or "data disk" mode installs, manual partitioning may be needed to prepare the

harddisk for committing local backups of the system state with `lbu commit`, to have a place for a package cache, or to use it for a /var mount.

For "System disk" mode install, custom partitioning is needed only if the desired layout scheme differs default layout.

Preparing for the first boot

If System Disk Mode of installation was performed, ignore this section and proceed to reboot.

If the new local system was configured to run in "diskless" or "data" mode, and you do not want keep booting from the initial (and possibly read-only) installation media, the boot system needs to be copied to another device or partition.

The target partition may be identified using `lsblk` (after installing it with `apk add lsblk (https://pkgs.alpinelinux.org/packages?name=lsblk&branch=edge&repo=&arch=x86_64&maintainer=)`) and/or `blkid`, similar to previously identifying the initial installation media device.

The procedure to copy the boot system is explained at setup-bootable.

Once everything is in place, save your customized configuration with `lbu commit` before rebooting.

Reboot

First, remove the initial installation media from the boot drive, or detach it from the port it's connected to.

The system may now be power-cycled or rebooted to confirm everything is working correctly.

The relevant commands for this are `poweroff` or `reboot`. Login into the new system with the root account.

Completing the installation

The installation script installs only the base operating system. **No** applications e.g. web server, mail server, desktop environment, or web browsers are installed.

Please look under Post-Installation below, for some common things to do after installation.

Custom Installation Instructions

Custom-made headless apkovl can be done by first booting the install media on some computer with a display and keyboard attached, or in a virtual machine, and doing an intermediate "diskless" setup of just the boot media (more details below), i.e. using the offical `setup-alpine` to configure the system's network, possibly for dhcp if needed, a ssh server, and a login user. Choosing "disks=none" for now, yet, configure to store configs on the boot media (if it is writable, otherwise on a separate storage media). And afterwards calling `lbu commit` to store the configs as local backup. Then your completed setup, including its securely created own private keys, will readily get (re)loaded on every subsequent (headless) boot from your custom-build `<hostname>.apkovl.tar.gz` stored on the boot media (or on an auxilary media or

server location, in case the boot media is read-only).

- Bootstrap Alpine Linux on a headless system (https://github.com/macmpi/alpine-linux-headless-bootstrap/) using pre-built `apkovl` overlay file.
- Kernels *(kernel selection, e.g. for VMs or RPi)*
- How to make a custom ISO image with mkimage *(installation media with its own configuration)*
- Directly booting an ISO file *(without flashing it to a disk or device)*
- Netboot Alpine Linux using iPXE
- Virtualization

Also see other Installation Category pages.

Post-Installation

Tip: Alpine Linux packages stay close to the upstream design. Therefore, all upstream documentation about configuring a software package, as well as good configuration guides from other distributions that stay close to upstream, e.g. those in the ArchWiki (https://wiki.archlinux.org/), or Gentoo wiki (https://wiki.gentoo.org/wiki/) are to a large degree, also applicable to configuring the software on Alpine Linux, thus can be very useful.

Daily driver guide

Many people think that Alpine is only made for containers and servers, but it is actually a general purpose distro which can definitely be used as a daily driver.

Alpine is extremely small, simple and resource-efficient, making it easy to customize.

Note: This guide assumes you have already installed a minimal Alpine system by following the Installation guide

Basics

- Create a non-privileged user account for security reasons.
- Learn the alpine package keeper basics (https://docs.alpinelinux.org/user-handbook/0.1a/Working/apk.html) or refer apk wiki for more details.
- Ensure that `community` repository is enabled
- Install graphics driver for your video hardware.
- Install a desktop using Setup-desktop or manually install a desktop of your choice.
- Install some fonts.
- Setup PipeWire to manage your audio, if setup-desktop did not install it for your already or you installed your desktop environment manually.
- Configure your Bluetooth, if you have one. Also check pipewire bluetooth, if needed.
- Configure your printer.

- Enable docs, so man pages are available.
- To keep your system secure, regularly check and apply updates with the package manager.

Advanced

- If you find busybox lacking in features or options, it is easy to get regular stuff working
- Use Flatpak to add packages that are not in the repositories.
- Install `gcompat (https://pkgs.alpinelinux.org/packages?name=gcompat&branch=edge&repo=&arch=&maintainer=)` package to add a glibc compatability layer which lets you run glibc binaries as normal.
- Secure your system by installing firewall software like awall or UFW.
- Install a sandboxing application like AppArmor or Bubblewrap.
- Learn basics of openrc (https://docs.alpinelinux.org/user-handbook/0.1a/Working/openrc.html), the alpine Linux init system or refer Open rc wiki
- If you want the rolling release version of Alpine Linux, enable the Edge repository.
- You may want to enable the testing repository, as it provides a lot more applications.

Other topics

Topics not strictly related to using Alpine Linux as desktop are listed below:

- Upgrade your OS, when a new version is released (https://www.alpinelinux.org/releases/).
- Change default shell
- Setting up Networking *(including non-standard configurations)*
- Local backup utility `lbu` *(persisting RAM system configurations)*
  - Back Up a Flash Memory Installation *("diskless mode" systems)*
  - Manually editing a existing apkovl *(the stored custom configs)*
- Init System (OpenRC) *(configure a service to automatically boot at next reboot)*
  - Writing Init Scripts
  - Multiple Instances of Services
- Hosting services on Alpine *(links to several mail/web/ssh server setup pages)*

See also

- Tutorials and Howtos
- FAQs
- Comparison with other distros *(how common things are done on Alpine)*
- Wiki etiquette *(to collaborate on this documentation)*