Arch Linux

AISK

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Contents

1. Flash USB

1.1 Download

1. **Download Arch ISO from:**
   https://archlinux.org/download/

2. **Verify Download:**

```
user$ sha1sum <archlinux-YYYY.MM.DD-x86_64.iso>
```

1.2 Disk Preparation

1. **Create Partition Table**

```
root# parted [-a optimal] </dev/sdX>
(parted) mktable <gpt>
```

2. **Print change:**

```
(parted) (p)rint [free]
```

3. **Quit parted:**

```
(parted) (q)uit
```

1.3 Flash ISO to USB

1. **Unmount any mounted FS on HARD DRIVE!**

2. **Flash to USB (/dev/sdX):**

```
root# dd if=<./archlinux-YYYY.MM.DD-x86_64.iso> of=</dev/sdX>
[bs=4M | status=progress]
```

1.4 Boot Live Installer

1.4.1 Secure Boot

Make sure, that Secure Boot is Disabled!

1. **During POST press Key to Access BIOS/UEFI:**
   BIOS/UEFI Menu Keys For All Vendors
2. **Disable Secure Boot**
3. **Poweroff/Restart**

1.4.2 Boot

1. **Plug in Flashed USB**
2. **During POST press Key to access Boot Menu:**
   Boot Menu Keys For All Vendors

2. Pre-Installation

2.1 Check Disk for bad sectors

2.1.1 Theory

- **Block:** group of sectors, every file must occupy at least 1 block. 0b file occupy whole block.
  - **512b** = good for lot of small files. More blocks = more metadata.
  - **4096b** = good for larger files, less metadata. Waste if there are small files.

2.1.2 Disk Info gathering

- **Find disks (block devices):**

```
user$ lsblk [-ap | -apf]
root# fdisk -l [/dev/sdX]
root# blkid
```

- **Get raw disk info:**
  - **Disk size in bytes:**

```
root# blockdev [-v] --getsize64 </dev/sdX[Y]>
```

  - **Disk block size in bytes:**

```
root# blockdev [-v] --getbsz </dev/sdX[Y]>
```

  - **Check if disk is readonly (1 = ro, 0 = rw):**

```
root# blockdev [-v] --getro </dev/sdX[Y]>
```

2.1.3 Check Disk for bad sectors

1. **Unmount FS!**
2. **Check disk for bad blocks:**

```
root# badblocks [-b 4096] [-w [-t 0xaa]] [-v] [-s]
</dev/sdX[Y]> | tee -a <OUTPUT_FILE>
```

3. Installation

3.1 ISO specific

3.1.1 Remove pcspkr

- **Remove pcspkr module:**

```
root# modprobe -r pcspkr
```

3.1.2 Connect to WiFi

1. **Enable WiFi:**

```
root# rfkill unblock wlan
```

2. **Start services:**

```
root# systemctl start wpa_supplicant.service dhcpcd.service
```

3. **Configure WiFi:**
File (/etc/wpa_supplicant/wpa_supplicant.conf):

```
ctrl_interface=/run/wpa_supplicant
update_config=1
country=<2-LETTER-ISO-CODE>

# WPA-PSK protected:
network={
    ssid="<ESSID>"
    scan_ssid=1 # Find hidden network
    key_mgmt=WPA-PSK
    psk="<PLAINTEXT-PASSWD>"
    #psk=<32byte-HEX-NUMBER>
    priority=1 # To which WiFi connect first
}

# WPA-EAP protected::
network={
```

```
        ssid="<ESSID>"
        scan_ssid=1 # Find hidden network
        key_mgmt=WPA-EAP
        #eap=PEAP
        identity="<USERNAME>@<DOMAIN>"
        password="<PLAINTEXT-PASSWD>"
        #psk=<32byte-HEX-NUMBER>
        #ca_cert="/etc/cert/ca.pem"
        #phase1="peaplabel=0"
        phase2="auth=MSCHAPV2"
        priority=2 # To which WiFi connect first
}

# Unprotected:
network={
    ssid="<ESSID>"
    scan_ssid=1 # Find hidden network
    key_mgmt=NONE
    priority=3 # To which WiFi connect first
}
```

4. **Connect to WiFi:**

```
root# wpa_supplicant -B -D wext -i <wlan0>
-c </etc/wpa_supplicant/wpa_supplicant.conf>
```

3.2 Disk Partitioning

3.2.1 GPT UEFI

1. **Get info about disks:**
   See section **2.1.2**.

2. **Create Partition Table:**

```
root# parted [-a optimal] </dev/sdX>
(parted) mktable <gpt>
```

3. **Set Unit Size (sectors):**

```
(parted) unit <s>
```

4. **Create Partitions**

   (a) **See partitions and free space:**

```
(parted) (p)rint [free]
```

(b) **Partition - EFI (>= 300MB -> 512MB):**

```
(parted) mkpart primary <2048s> <1050623s>
(parted) name 1 efi
(parted) set 1 boot on
(parted) set 1 esp on
```

(c) **Partition - LVM**

```
(parted) mkpart primary <1050624s> 100%
(parted) name 2 crypt
```

(d) **Quit parted:**

```
(parted) (q)uit
```

5. **Create filesystems:**

(a) **Create EFI filesystem:**

```
root# mkfs.vfat </dev/sdX1>
```

(b) **Encrypted root filesystem:**

i. **Encrypt root partition:**

```
root# cryptsetup luksFormat </dev/sdX2>
> YES
> <PASSWORD>
> <PASSWORD (VERIFY)>
```

ii. **Open Encrypted root partition:**

```
root# cryptsetup open --type luks </dev/sdX2> <cryptroot>
> <PASSWORD>
```

iii. **Create Root filesystem:**

```
root# mkfs.ext4 </dev/mapper/cryptroot>
```

6. **OPTIONAL LUKS stuff:**

- **Close LUKS:**

```
root# cryptsetup close <lvm>
```

- **LUKS header:**

(a) **See LUKS header:**

```
root# cryptsetup luksDump </dev/sdX2>
```

(b) **Make LUKS header backup:**

```
root# cryptsetup luksHeaderBackup </dev/sdX2>
--header-backup-file <FILE>
```

(c) **Destroy LUKS header :**

```
root# cryptsetup luksErase </dev/sdX2>
```

(d) **restore LUKS header:**

```
root# cryptsetup luksHeaderRestore </dev/sdX2>
--header-backup-file <FILE>
```

3.3 Mount FS

1. **Mount Root filesystem:**

```
root# mount </dev/mapper/cryptroot> </mnt/>
```

2. **Create EFI dir:**

```
root# mkdir </mnt/efi/>
```

3. **Mount EFI partition:**

```
root# mount </dev/sdX1> </mnt/efi/>
```

3.4 Install Arch

1. **Check Mirrors:**

```
root# cat /etc/pacman.d/mirrorlist
```

2. **Download Arch:**
This installs BASE packages, LINUX kernel and common LINUX-FIRMWARE for common hardware:

```
root# pacstrap </mnt/> base linux linux-firmware
[intel-ucode|amd-ucode]
```

3. **Generate fstab:**

```
root# genfstab -U </mnt/> >> /mnt/etc/fstab
```

4. **Chroot into arch:**

   (a) **Mount filesystems:**

```
root# mount -t proc /proc/ </mnt/proc/>
root# mount --rbind /sys/ </mnt/sys/>
root# mount --make-rslave </mnt/sys/>
root# mount --rbind /dev/ </mnt/dev/>
root# mount --make-rslave </mnt/dev/>
```

   (b) **Chroot to root filesystem:**

```
root# chroot </mnt/> /bin/bash
```

   (c) **Set DNS for chrooted environment:**

```
root# echo "nameserver 1.1.1.1" > /etc/resolv.conf
```

5. **Install packages:**

   - **Install VFAT fs support:**

```
[root#] [yes |] pacman -S dosfstools
```

   - **Install vim:**

```
[root#] [yes |] pacman -S vim
```

6. **Add LVM support to mkinitcpio:**
   File (/etc/mkinitcpio.conf):

```
...
HOOKS=(base udev autodetect modconf block encrypt lvm2 filesystems
keyboard fsck)
...
```

7. **Recreate initramfs for LVM:**

```
[root#] mkinitcpio -P
```

3.5 Customize settings

3.5.1 Time

1. **Select timezone:**

```
[root#] ln -sf </usr/share/zoneinfo/Europe/Copenhagen> /etc/localtime
```

2. **Update HW clock (generate: /etc/adjtime):**

```
[root#] hwclock --systohc
```

3.5.2 Locales

1. **Select locales:**
   File (/etc/locale.gen):

```
...
en_US.UTF-8 UTF-8
...
```

2. **Generate locales:**

```
[root#] locale-gen
```

3. **Set language:**
   File (/etc/locale.conf):

```
LANG=en_US.UTF-8
```

4. **Set keyboard:**
   File (/etc/vconsole.conf):

```
KEYMAP=us
```

3.5.3 Network

1. **Set hostname:**
   File (/etc/hostname):

   ```
   <HOSTNAME>
   ```

2. **Install network packages:**

   ```
   [root#] [yes |] pacman -S dhcpcd wpa_supplicant
   ```

3.6 Install bootloader

1. **Download packages:**

   ```
   [root#] [yes |] pacman -S efibootmgr grub
   ```

2. **Make sure EFI partition is mounted!**
   See section **3.3**.

3. **Install GRUB:**

   ```
   [root#] grub-install --target=x86_64-efi
   --efi-directory=</efi/> --bootloader-id=GRUB
   ```

4. **Find UUID of encrypted root fs:**

   ```
   [root#] blkid | grep "<cryptsetup>"
   ```

5. **Edit GRUB config for encryption:**
   File (/etc/default/grub):

   ```
   GRUB_CMDLINE_LINUX="cryptdevice=UUID=<UUID>:<cryptsetup> root=</dev/mapper/cryptsetup>"
   ```

6. **Make/Update GRUB config file:**

   ```
   [root#] grub-mkconfig -o /boot/grub/grub.cfg
   ```

3.7 Finish installation

3.7.1 Root Password

1. **Create root password:**

   ```
   [root#] passwd root
   > <PASSWORD>
   > <PASSWORD-VERIFY>
   ```

3.7.2 Finish installation

1. **Exit chroot:**

   ```
   [root#] exit
   ```

2. **Umount disk partitions:**

   ```
   root# umount -R </mnt/>
   ```

3. **Reboot:**

   ```
   root# reboot
   ```

WIKI

4. References

- **Boot Procedure:**
  https://wiki.archlinux.org/title/Arch_boot_process
- **Partition Optimal:**
  Partitioning
- **Booted from UEFI:**

```
root# ls /sys/firmware/efi/efivars
```