Arch Linux

AISK

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1. Flash USB

1.1 Download Arch ISO

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

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

1.2 USB Preparation

1. **Create Partition Table**

```
root# parted -s </dev/sdX> mktable gpt
```

2. **Print change:**

```
root# parted </dev/sdX> (p)rint [free]
```

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
3. **Select USB entry.**

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]>
```

- **See partitions:**

```
root# parted </dev/sdX> (p)rint [free]
```

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 GPT Partition Table**

```
root# parted -s </dev/sdX> mktable gpt
```

3. **Create Paritions:**

   (a) **Enter cfdisk:**

```
root# cfdisk  </dev/sdX>
```

   (b) **Create EFI Partition (max 512MiB):**

```
cfdisk> n
cfdisk> 512MiB
```

```
cfdisk> t
cfdisk> EFI System
```

(c) **Create Root Partition:**

```
cfdisk> n
cfdisk>   (Enter)
```

(d) **Write Changes:**

```
cfdisk> W
cfdisk> yes
```

(e) **Quit cfdisk:**

```
cfdisk> Q
```

4. **Create filesystems:**

(a) **Create FAT32 for EFI:**

```
root# mkfs.fat [-F 32] [-n "EFI"] </dev/sdX1>
```

(b) **Create Encrypted filesystem:**

i. **Encrypt root partition:**

```
root# cryptsetup [--label "LUKS"] luksFormat </dev/sdX2>
> YES
> <PASSWORD>
> <PASSWORD (VERIFY)>
```

ii. **Open Encrypted root partition:**

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

iii. **Create EXT4 for Root:**

```
root# mkfs.ext4 [-L "LUKS_ROOT"] </dev/mapper/luks_root>
```

5. **OPTIONAL LUKS stuff:**

- **Close LUKS:**

```
root# cryptsetup close <luks_root>
```

- **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/luks_root> </mnt/>
```

2. **Create boot dir:**

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

3. **Mount boot partition:**

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

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]
```

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
```

5. **Set up DNS for chrooted environment:**

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

6. **Install packages:**

   - **Install vim:**

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

7. **Add encrypted support to mkinitcpio:**
   File (/etc/mkinitcpio.conf):

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

8. **Recreate initramfs with encrypted support:**

```
[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
en_US ISO-8859-1
...
```

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:**

   - **Install WiFi control:**
     ```
     [root#] [yes |] pacman -S wpa_supplicant
     ```
   - **Install DHCP client:**
     ```
     [root#] [yes |] pacman -S dhcpcd
     ```

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 [--boot-directory=</boot/>]
   --efi-directory=</boot/> --bootloader-id=<ArchLinux>
   ```

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

   ```
   [root#] blkid | grep "crypto_LUKS"
   ```

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

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

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# poweroff
   ```

4. Post-Installation

4.1 Disable pcspkr

1. **Blacklist pcspkr module:**
   File (/etc/modprobe.d/blacklist.conf):

   ```
   blacklist pcspkr
   ```

4.2 Repository mirrors

To be added

5. GRUB

5.1 Configuration

5.2 Colors

5.3 Update

6. References

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

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

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