

Install Arch Linux!

Download:

[https://mirrors.kernel.org/archlinux/iso/2017.12.01/archlinux-2017.12.01-x86\\_64.iso](https://mirrors.kernel.org/archlinux/iso/2017.12.01/archlinux-2017.12.01-x86_64.iso)

## Step 1: Build a Virtual Machine

VirtualBox

=====

New Machine

2 processors

40G hard drive (fixed)

4096 MB RAM

Storage: hookup archlinux-2017.12.01-x86\_64.iso

Move the Virtual Machine to your SSD drive.

=====

[http://zeus.cs.pacificu.edu/chadd/cs460s18/Lectures/CS460\\_1.pdf#page=22](http://zeus.cs.pacificu.edu/chadd/cs460s18/Lectures/CS460_1.pdf#page=22)

## Step 2: Boot the ISO image

Boot the Virtual Machine Arch Linux install disk.

=====

We will follow the Installation Guide closely but I have all the commands you need in the document.

[https://wiki.archlinux.org/index.php/Installation\\_guide](https://wiki.archlinux.org/index.php/Installation_guide)

```
ls
```

```
touch test
```

```
ls
```

```
ls /sys/firmware/efi/efivars
```

(should not find this file when using Virtual Box)

```
# check networking
```

```
# should work
```

```
ping -c 3 archlinux.org
```

```
=====
```

```
set the date/time
```

```
=====
```

```
date
```

```
timedatectl list-timezones
```

```
timedatectl set-timezone America/Los_Angeles
```

```
timedatectl set-ntp true
```

```
timedatectl status
```

```
date
```

```
=====  
fdisk (Partition Disk) and format partitions
```

```
=====  
fdisk -l
```

```
fdisk /dev/sda
```

```
p
```

```
# make / partition
```

```
n
```

```
p
```

```
1
```

```
[enter] default start sector
```

```
+15G (size of partition
```

```
p
```

```
# make swap partition
```

```
n
```

```
p
```

```
2
```

```
[enter] default start sector
```

```
+2G (size of partition
```

```
# make /home partition
```

```
n
```

```
p
```

```
3
```

```
[enter] default start sector
```

```
[enter] default size
```

```
p
```

```
w
```

```
=====
```

```
format partitions
```

```
=====
```

```
mkfs.ext4 /dev/sda1
```

```
mkswap /dev/sda2
```

```
mkfs.xfs /dev/sda3
```

```
swapon /dev/sda2
```

```
=====
```

```
mount
```

```
=====
```

```
mount /dev/sda1 /mnt
```

```
mkdir /mnt/home
```

```
mount /dev/sda3 /mnt/home
```

```
=====
```

```
install mirrors
```

```
=====
```

```
vi /etc/pacman.d/mirrorlist
```

```
# Spread the load!
```

```
# if your PUNetID's last digit is odd put pdx at the top
```

```
# otherwise put osuosl at the top!
```

```
# copy the pdx.edu mirror to the top!
```

```
/ pdx
```

```
yy
```

```
:1
```

```
p
```

```
# copy the osuosl.edu mirror to the top!
```

```
/ osuosl
```

```
yy
```

```
:2
```

```
p
```

```
:wq
```

```
# make sure it worked
```

```
head /etc/pacman.d/mirrorlist
```

```
=====
```

```
install base system
```

```
=====
```

```
pacstrap /mnt base
```

```
=====
```

```
fstab
```

```
=====
```

```
genfstab -L /mnt >> /mnt/etc/fstab
```

```
# make sure /home is added
```

```
# sometimes it does not get added.
```

```
vi /mnt/etc/fstab
```

```
i
```

```
/dev/sda2 swap swap defaults 0 0
```

```
/dev/sda3 /home xfs defaults 0 2
```

```
[escape]
```

```
:wq
```

```
cat /mnt/etc/fstab
```

```
=====
```

```
chroot
```

```
=====
```

```
arch-chroot /mnt
```

```
# now we are working with the newly installed system!
```

```
=====
```

```
timezone
```

```
=====
```

```
ln -sf /usr/share/zoneinfo/America/Los_Angeles /etc/localtime
```

```
hwclock --systohc
```

```
date
```

```
=====
```

```
locale
```

```
=====
```

```
vi /etc/locale.gen
```

```
/ en_US.UTF
```

```
/ [to search twice]
```

```
x [delete the hash mark]
```

```
:wq
```

```
locale-gen
```

```
vi /etc/locale.conf
```

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

```
[escape]
```

```
:wq
```

=====

hostname

=====

vi /etc/hostname

# use your punetid

i cs460-punetid

[escape]

:wq

vi /etc/hosts

i 127.0.1.1 cs460-punetid

[escape]

:wq

=====

root password

=====

passwd

Use any password CS460PAC!!

=====

boot loader

=====

pacman -S grub

grub-install /dev/sda

grub-mkconfig -o /boot/grub/grub.cfg

=====

reboot!

=====

exit

umount -R /mnt

shutdown -P now

<remove iso from VirtualBox>

Boot Virtual Machine!

=====

console login

=====

root/password

```
=====
network config
=====
```

```
lspci -v | less
# look for ethernet (should see e1000)
```

```
dmesg | grep e1000
# see the loaded driver
```

```
# find address of network card (enp0s3)
ip link
ip addr
ping -c 3 archlinux.org
```

```
# install network manager
pacman -S dhcpcd
systemctl enable dhcpcd
systemctl start dhcpcd
```

```
# wait 30 seconds to get an ip address
sleep 30
```

```
ip addr
ping -c 3 archlinux.org
```

```
=====
```

```
Create User
```

```
=====
```

```
useradd -m -G wheel -s /bin/bash punetid
passwd punetid
```

```
cat /etc/passwd
cat /etc/shadow
```

```
pacman -S sudo
```

```
visudo
uncomment or add:
%wheel ALL=(ALL) ALL
```

```
exit
```

```
=====
```

```
console login
```

```
=====
```

```
punetid/password
```

```
cat /etc/shadow
sudo cat /etc/shadow
```

```
=====
Install VB Guest additions
=====
```

```
# you must install the guest additions and reboot
# before building the new kernel!
```

```
sudo pacman -Syu linux-headers
sudo pacman -S virtualbox-guest-utils virtualbox-guest-dkms
```

```
=====
Window Manager
=====
```

```
# X Server
sudo pacman -S xorg # (all) 1 Y
```

```
# Window Manager / Desktop environment # (all) (all) Y
sudo pacman -S xfce4 xfce4-goodies
```

```
# Display Manager
sudo pacman -S lightdm lightdm-gtk-greeter
```

```
sudo systemctl enable lightdm.service
```

```
sudo reboot
```

```
=====
lightdm login
=====
```

```
# if the screen is a blurry mess here the VB drivers are
# not loaded.
# boot using init=/bin/bash
# systemctl disable lightdm.service
# reboot
# go back and reinstall the VB Guest additions
# Reinstalling the Guest Additions is almost always the answer.
```

```
punetid/password
```

```
# choose default config
```

```
Open Terminal
```

```
sudo pacman -S terminator geany gvim
sudo pacman -S base-devel ttf-dejavu # (all)
```

```
sudo pacman -S chromium OR firefox # 1
sudo pacman -S subversion git
```

```
=====
reboot
```

```
# can you resize the Virtual Machine?
# if not, reinstall Guest Additions
```

```
# upgrade all the packages -- do this later on your own time at your own risk
sudo pacman -Syu
```

```
Add SSHD
=====
```

```
sudo pacman -S openssh
sudo systemctl enable sshd
sudo systemctl start sshd
ssh localhost
exit
```

```
Add atd
=====
```

```
sudo pacman -S at
sudo systemctl enable atd
sudo systemctl start atd
at now+1 minutes
ls > out
control-d
# wait 1 minute
ls out
```

```
Allow Host OS to ssh to guest OS
===
```

```
VirtualBox | Network | Advanced | Port Forwarding |
Host Port 2222
Guest Port 22
```

```
In Windows:
Putty
Host Name: localhost
Port: 2222
```

Accept key and connect as your punetid!



=====

## Custom Kernel

uname -a # show current kernel

pacman -S base-devel xmlto docbook-xsl kmod inetutils bc wget qt5-base # (all)

mkdir ~/kernelbuild

cd ~/kernelbuild

wget https://www.kernel.org/pub/linux/kernel/v4.x/linux-4.14.6.tar.xz

mkdir pristine-linux

cd pristine-linux

tar -xvJf linux-4.14.6.xz

cd linux-4.14.6

make clean && make mrproper

cd ~/kernelbuild

tar -xvJf linux-4.14.6.xz

cd linux-4.14.6 # this is the kernel you will edit

geany Makefile &

extraversion = -punetid

lsmod | grep vb # VB modules must be loaded !

make clean && make mrproper

make localmodconfig # VB modules must be loaded ! (vboxvideo,vboxsf,vboxguest)

# choose all defaults

# not strictly necessary, just for show

make xconfig # search for drm, should not need to make any changes

make -j6 # (with 2 CPUs) ~10 min

sudo make modules\_install

sudo cp -v arch/x86\_64/boot/bzImage /boot/vmlinuz-linux-CS460

sudo mkinitcpio -k 4.14.6-punetid-ARCH -g /boot/initramfs-linux-CS640.img

sudo cp System.map /boot/System.map-CS460

```
sudo grub-mkconfig -o /boot/grub/grub.cfg
```

```
reboot
```

(default is new kernel, advanced config allows you to select the stock kernel (fallback))

```
choose default kernel
```

```
passwd/password
```

```
uname -a # is your kernel running?
```

```
# Can you resize the screen?
```

```
pacman -S virtualbox-guest-utils virtualbox-guest-dkms
```

Build a Patch

=====

```
cd ~/kernelbuild/linux-4.14.6
```

```
make clean ; make mrproper
```

```
diff -rcNP ~/kernelbuild/pristine-linux/linux-4.14.6 ~/kernelbuild/linux-4.14.6 > ~/kernelbuild/patch.out
```

Resources

=====

[https://wiki.archlinux.org/index.php/Arch\\_boot\\_process](https://wiki.archlinux.org/index.php/Arch_boot_process)

[https://wiki.archlinux.org/index.php/Installation\\_guide](https://wiki.archlinux.org/index.php/Installation_guide)

[https://wiki.archlinux.org/index.php/Network\\_configuration](https://wiki.archlinux.org/index.php/Network_configuration)

[https://wiki.archlinux.org/index.php/General\\_recommendations](https://wiki.archlinux.org/index.php/General_recommendations)

<https://wiki.archlinux.org/index.php/Help:Reading>

<https://wiki.archlinux.org/index.php/fstab>

[https://wiki.archlinux.org/index.php/Network\\_configuration](https://wiki.archlinux.org/index.php/Network_configuration)

[https://wiki.archlinux.org/index.php/Network\\_Debugging](https://wiki.archlinux.org/index.php/Network_Debugging)

<https://kernelnewbies.org/KernelBuild>

google: archlinux xxxxx

## Topics Necessary

=====

systemd / systemctl [enable|disable|start|stop]

journalctl

dmesg

kernel

boot loader (grub)

partition

sudo

lspci

ip link

ip addr

ntpd

sshd

dhcpcd / dhcp

disk /dev/sda

    partition / /home swap

    filesystem

    swap

XServer (xorg)

Window Manager (xfce)

Displaymanager (lightdm)