

BSD Survival Guide

Mariusz Zaborski

Adam Wołk

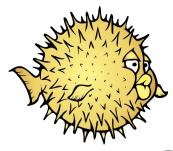
Konrad Witaszczyk



FreeBSD

IT'S DANGEROUS TO GO
ALONE! TAKE THIS.





FreeBSD

Mariusz Zaborski



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FreeBSD 7 Day Challenge

FreeBSD

I've always used Linux for as long as I can remember and only knew BSD by name and some minor experience with it running the server operating system on a NAS. I knew it was capable of being a desktop operating system for a laptop or computer but I had never given it a go. Until a little while ago when I tried it for the very first time and was pleasantly surprised with what it found myself using. You can watch a video of my first time experience below ;



<https://tylertechnow.blogspot.com/2019/11/frebsd-7-day-challenge.html>

This led me to begin a 7 day challenge where I use FreeBSD as my daily driver. That means everything I would usually use Linux for will now be handled by FreeBSD for one week. The first video of that challenge you can watch below where I set up my environment and packages for the 7 days;



As you can see the first day went well. The third day into this challenge provided me with a couple of issues that I didn't anticipate but I'm sure I'll overcome them by the end of the challenge. You can watch that video below too ;



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BACK TO THE FUTURE



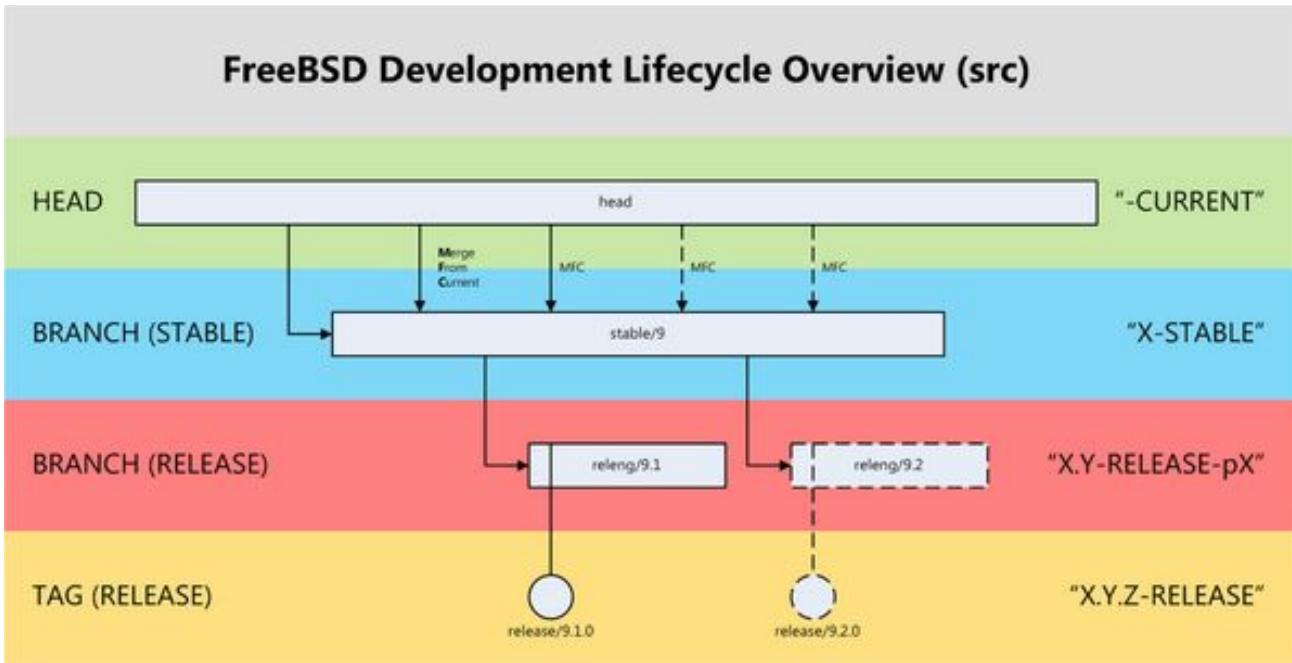
Head, stable, release

- Current/HEAD - tam lądują wszystkie nowe commity
- Stable - przetestowane zmiany pomiędzy releasesami, API/ABI nie może się zmienić
- Release - oficjalny release



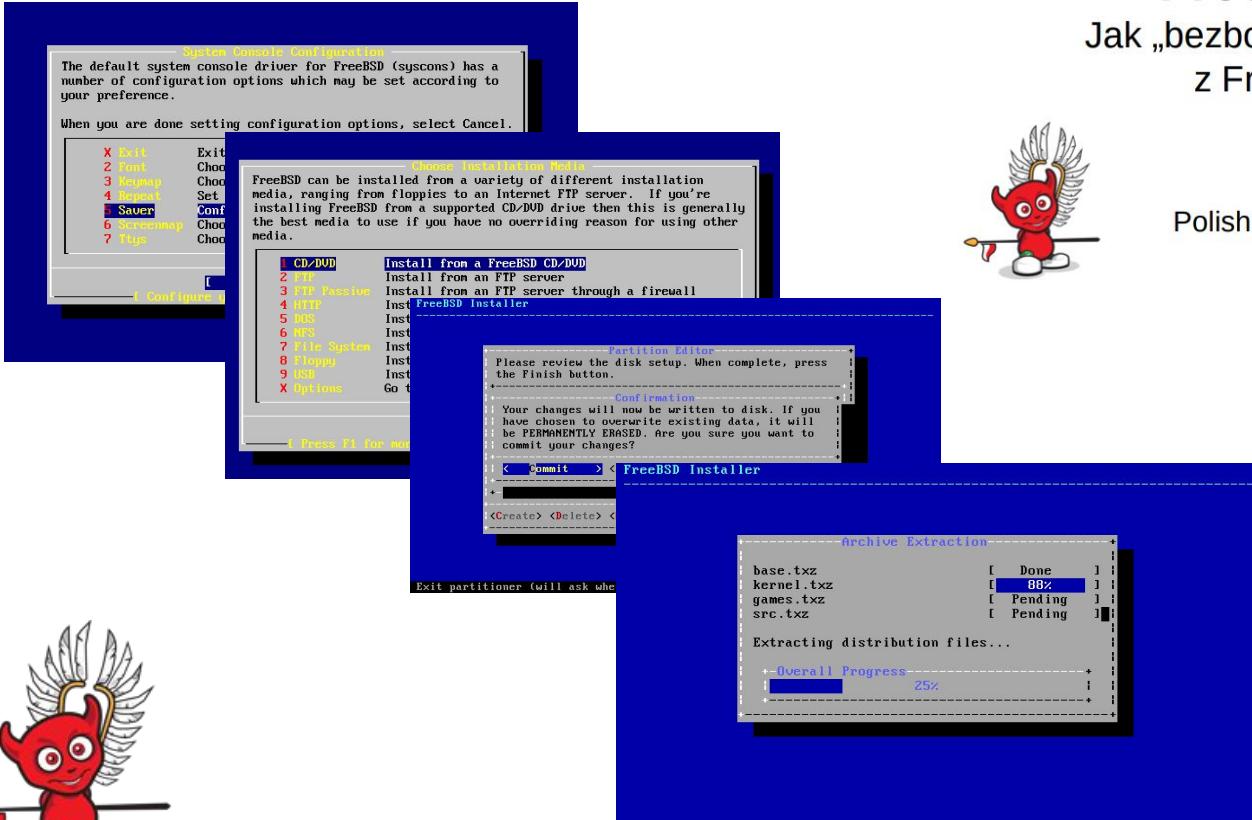
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Head, stable, release



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Instalacja



FreeBSD desktop

Jak „bezboleśnie” zacząć przygodę
z FreeBSD na pulpicie



Polish BSD User Group Meetup
2019-11-07

(wersja po poprawkach)

Rafał Cichocki



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Instalacja

- Umożliwia instalację na ZFS
- Umożliwia instalację na UFS
 - Oraz prze partycjonowanie
- Umożliwia full disk encryption
 - Jeszcze kilka lat temu trzeba było samemu to konfigurować
 - Tylko passphrase



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SCARY MOVIE

Instalacja X11... going beyond...

vermaden

Another \${RANDOM} sysadmin sharing his experiences of work at IT industry.

HOME POSTS ARCHIVE CONTACT



Posts

FreeBSD Desktop Series

- [Global ... FreeBSD Desktop](#) [Table of Contents/Episodes Description]
- [Part 1 ... Simplified Boot](#) [2018/03] +3 UPDATES
- [Part 2 ... Install FreeBSD 11](#) [2018/04] +1 UPDATE
- [Part 2.1 - Install FreeBSD 12](#) [2018/11]
- [Part 3 ... X11 Window System](#) [2018/05] +3 UPDATES
- [Part 4 ... Key Components - Window Manager](#) [2018/06] +1 UPDATE
- [Part 5 ... Key Components - Status Bar](#) [2018/06]
- [Part 6 ... Key Components - Task Bar](#) [2018/06]
- [Part 7 ... Key Components - Wallpaper Handling](#) [2018/06]
- [Part 8 ... Key Components - Application Launcher](#) [2018/06]
- [Part 9 ... Key Components - Keyboard/Mouse Shortcuts](#) [2018/06]
- [Part 10 ... Key Components - Locking Solution](#) [2018/06] +1 UPDATE [NEW]
- [Part 11 ... Key Components - Blue Light Spectrum Suppress](#) [2018/06]
- [Part 12 ... Configuration - Openbox](#) [2018/07] +1 UPDATE

FreeBSD desktop

Jak „bezboleśnie” zacząć przygodę
z FreeBSD na pulpicie



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Rafał Cichocki



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Корзина



Аудио



mount



apps



local-etc



history



Файловая система



Видео



Графика



Документы



VirtualBox VMs



Снимок экрана_2017...



select-font-size.diff

ॐ नमः शिवाय

iluxa - Файловый менеджер

Файл Правка Вид Переход Справка

Графика /home/iluxa/

Устройства

Файловая сист...

Закладки

iluxa Корзина Аудио Видео Графика Документы applications apps media

Терминал

```
iluxa % bsdinfo
OS: FreeBSD amd64
Hostname: ThinkPad
Kernel: 11.0-RELEASE-p9
Uptime: 7:05
Processes: 135
RAM: 4635M / 5992M
CPU: Intel(R) Core(TM) i5-2430M CPU @ 2.40GHz
Shell: zsh
```

iluxa %

| 2 | 1)zsh | 0.22 0.38 0.44|

UP: 7h 5m
TIME: 00:47
CPU0: 2% 59°C
CPU1: 3% 58°C
CPU2: 2% 56°C
CPU3: 4% 55°C

CPU: Xorg 7.18
vncviewer 3.17
xfce4-xkb-plugin 1.1
plank 0.98
wrapper-1.0 0.29
conky 0.20

MEM: firefox 6.51
chrome 4.30
chrome 3.47
chrome 2.88
chrome 2.78
chrome 2.65

3.50GiB / 5.69GiB

RAM

37.7MiB / 2.00GiB

SWAP

BAT: charging (82%)



```
File Actions Edit View Help  
phoronix@traco0-1603 ~$ phoronix-test-suite -s  
phoronix@traco0-1603 ~$ phoronix-test-suite -s /phoronix-test-suites /phoronix-test-suites system-info
```

Phoronix Test Suite v6.9.865
System Information

PROCESSOR: Intel Core i9-7980XE @ 2.6GHz
Core count: 20

GRAPHICS: NVIDIA GeForce GTX 1070 8GB VRAM
OpenGL: 4.5.0
Display Driver: NVIDIA X39_25
Monitor: Acer B270K
Screen: 2488x1784

VIDEOCARD: AMD PRO 5250-A
Chipset: SiI4238 Sky Link-E DRIS Registers
Audio: SiI4238-KatyLake-H ISA
Network: SiI4238 PRO/1000 Connection

MEMORY: 38128MB
Disk: generic VMW device
File-System: ZFS

OPERATING SYSTEM: FreeBSD
Kernel: 12.0-CURRENT (696.94)
Desktop: LUMIOS 3.4.2
Display Server: X Server 1.18.4
Compiler: Clang 6.0.0 (SRN 924600)
Security: GPGPU PyTorch108

```
phoronix@traco0-1603 ~$ phoronix-test-suite -s
```

Update FreeBSD - paczki

- Pre budowane paczki w FreeBSD, umożliwiające szybkie łatwe instalowanie oprogramowania
- `pkg install <nazwa>`
- `pkg search <nazwa>`
- `pkg info`
- `pkg remove <nazwa>`

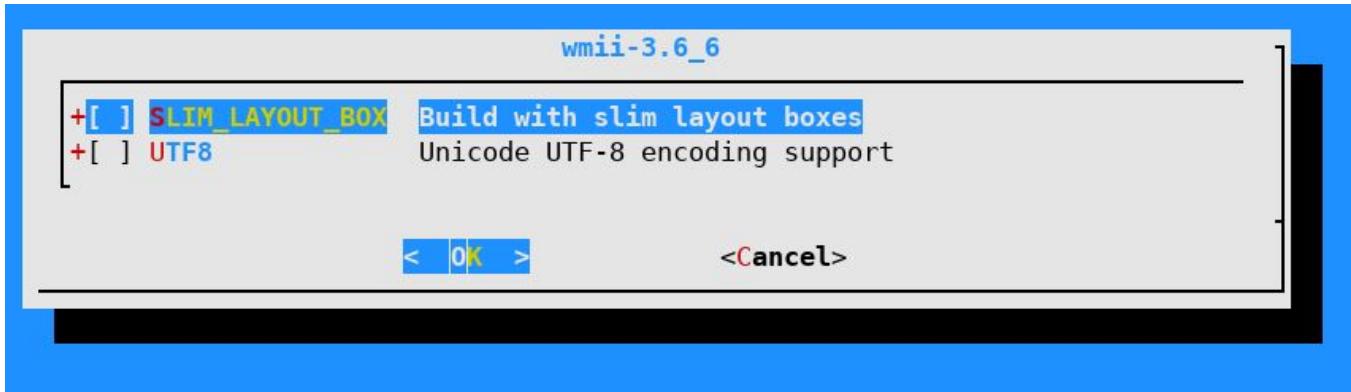


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Update FreeBSD - porty

- portsnap fetch
- portsnap extract
- svn checkout
<https://svn.FreeBSD.org/ports/head /usr/ports>

- make config
- make fetch
- make patch
- make
- make install
- make rmconfig
- make deinstall



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Update FreeBSD - freebsd-upgrade

- freebsd-update fetch
- freebsd-update install
- freebsd-update -r 12.0-RELEASE upgrade



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Update FreeBSD - pkg base upgrade



Update FreeBSD - make

- less UPDATING
- make buildkernel -ssj16 KERNCONF=GENERIC
- make buildworld -ssj16 KERNCONF=GENERIC
- make installworld -ssj16 KERNCONF=GENERIC
- make installkernel -ssj16 KERNCONF=GENERIC



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Update FreeBSD - make

- mergemaster -p
- mergemaster
- make delete-old
- make delete-old-libs
- make buildenv



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Update FreeBSD - co jeżeli coś pójdzie nie tak?

ZFS Version

- Snapshoty
 - `zfs snapshot -r data@upgrade`
 - `zfs list -t snapshot -H -o name data | xargs zfs rollback`
- Checkpointy
 - `zpool checkpoint`
 - `Zpool import --rewind-to-checkpoint`
- Boot Environments
 - `beadm`
 - `bectl`

ZFS Boot Environments

Sławomir Wojciech Wojtczak
 vermaden@interia.pl
vermaden.wordpress.com
twitter.com/vermaden

<https://is.gd/BEADM>



Update FreeBSD - co jeżeli coś pójdzie nie tak?

ZFS Version

NAME	USED	AVAIL	REFER	MOUNTPOINT
zroot	9.87G	7.51G	96K	/zroot
zroot(ROOT)	4.37G	7.51G	96K	none
zroot(ROOT/default)	204K	7.51G	1.37G	/
zroot(ROOT/newbe)	204K	7.51G	1.40G	/
zroot(ROOT/upgrade-12)	4.37G	7.51G	2.31G	/
zroot/tmp	376K	7.51G	272K	/tmp
zroot/usr	656M	7.51G	96K	/usr
zroot/usr/home	264K	7.51G	180K	/usr/home
zroot/usr/ports	656M	7.51G	656M	/usr/ports
zroot/usr/src	96K	7.51G	96K	/usr/src
zroot/var	4.77M	7.51G	96K	/var
zroot/var/tmp	224K	7.51G	136K	/var/t



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Update FreeBSD - co jeżeli coś pójdzie nie tak?

ZFS Version

- beadm
 - beadm create newone
 - beadm rename newone upgrade-12
 - beadm activate upgrade-12
 - beadm list
- W portach
- Napisane w shellu

BE	Active	Mountpoint	Space	Created
default	-	-	866.2M	2016-07-13 09:18
newbe	-	-	164.2M	2018-08-19 20:31
upgrade-12	NR	/	4.4G	2019-06-19 23:55



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Update FreeBSD - co jeżeli coś pójdzie nie tak?

ZFS Version

- bectl
 - beadm create newone
 - beadm rename newone upgrade-12
 - beadm activate upgrade-12
 - beadm list
- W base system
- Napisane w C
- Kompatybilne z beadm

BE	Active	Mountpoint	Space	Created
default	-	-	866.2M	2016-07-13 09:18
newbe	-	-	164.2M	2018-08-19 20:31
upgrade-12	NR	/	4.4G	2019-06-19 23:55



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Update FreeBSD - co jeżeli coś pójdzie nie tak?

UFS Version

```
# gpart show md0
=>      40  25165744  md0    GPT   (12G)
          40        128     1  freebsd-boot  (64K)
         168    8388608     2  freebsd-ufs  [bootme]  (4.0G)
    8388776    8388608     3  freebsd-ufs  [bootonce,bootme]
(4.0G)
  16777384    8388400     4  freebsd-ufs  (4.0G)
```

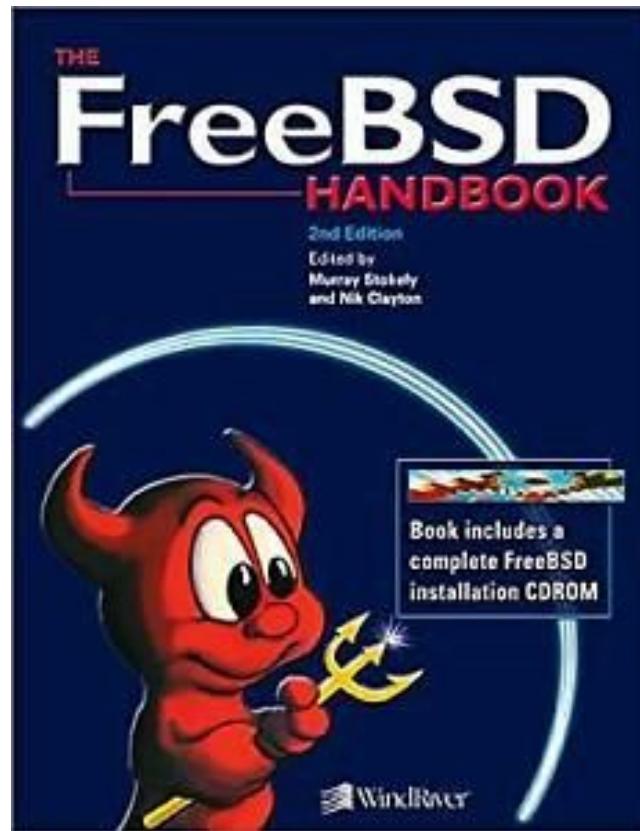


<https://oshogbo.vexillium.org/blog/62/>



FreeBSD®

~~Survival guide~~ Handbook



FreeBSD®

A-F

Laptop	Graphics	External DP/HDMI/VGA	Sound	WiFi	Ethernet	USB	Suspend / Resume	Needs config	Year introduced
/ASUS_FM200	✓	⚠	✗	✗	✓	✓	✗	no	
/ASUS_UX31E	✓	✓	✓	✓	✓	✓	✓	yes	
/ASUS_UX32VD	✓	✓	✓	✓	✓	✓	✓	yes	
/ASUS_UX430U	✓ drm-next	Not tested	⚠	✓	none	✓	✓	yes	2017
/ASUS_GL552V	✓ i915km:	Not tested	✓	✗	✓	✓	✗	yes	2017
/ASUS_S510U	✓ drm-next	Not tested	✓	✓	none	✓	✓	no	2017
/Acer_AspireOne_D250	✓	ⓘ	⚠	⚠	⚠	⚠	⚠	?	
/Acer_AspireOne_ZG5	✓	✓	✓	✓	✓	✓	✓	yes	
/Acer_Aspire_4730Z	✓	⚠	✓	✓	✓	✓	✓	yes	2009?
/Acer_Aspire_5742G	✓ i915kms, ✓ Nvidia Optimus	✓	✓	✓	✓	✓	✓	yes	2011
/Acer_Aspire_E5_773G_78RN	i915kms: ✓	i915kms: ✓	✓	✓	✓	✓	✗ (screen fails resume)	yes (Xorg)	2015Q4
/Acer_Aspire_V3_771G	✓	✓	ⓘ	✓	✓	✓		?	2012
/Acer_Aspire_V5_171	✓	✓	✓	✗	✓	✓	✗		
/Apple_MacBookAir4,2	✓	⚠	✓	✓	none	✓	✗	?	2011
/Apple_MacBookProRetina	✓	⚠	✓	✗	✗	✓	✗	?	Early 2015
/Dell_Inspiron_15-3521	✗	✗	⚠	✗	✓	⚠	✗	?	
/Dell_Inspiron_7537	⚠	⚠	✓	✗	✓	⚠	⚠	?	
/Dell_Inspiron_N4050	⚠	⚠	✓	✗	✓	⚠	⚠	?	
/Dell_Inspiron_N4120									
/Dell_Latitude_3550	vesa: ✓	⚠	⚠	✓	✓	✓	⚠	?	2015

<https://wiki.freebsd.org/Laptops>



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FreeBSD Status Reports

FreeBSD Team Reports

- [Cluster Administration Team](#)
- [Continuous Integration](#)
- [FreeBSD Core Team](#)
- [FreeBSD Foundation](#)
- [FreeBSD Graphics Team status report](#)
- [FreeBSD Release Engineering Team](#)
- [FreeBSD Security Team](#)

Projects

- [FAT / msdosfs support for makefs\(8\)](#)
- [FUSE](#)
- [Google Summer of Code 2019](#)
- [GSoC'19 Project - MAC policy on IP addresses in Jail:
mac_ipacl](#)
- [Improving laptop support](#)
- [NFS Version 4.2 implementation](#)
- [Rockchip RK3399 SoC's eMMC support](#)
- [syzkaller on FreeBSD](#)
- [TPM2 Software Stack \(TSS2\)](#)



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Twitter radzi



Jan-Piet MENS @jpmens · 56m
Replies to [@oshogbovx](#) and [@ed_maste](#)
Boot Environments, Jails, ZFS.



1



Andrey Fesenko @f0andrey · 3h
Replies to [@peteranthropos](#) @oshogbovx and 3 others
With BE for sure ;)



1



PTR @peteranthropos · 3h
Replies to [@oshogbovx](#) @netzverweigerer and 2 others
Pick ZFS on install time. This alone prevents tones of headaches in
the future



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Twitter radzi



thorkson @thorkson · 2h

Replying to [@oshogbovx](#) and [@FiLiS](#)

That the people behind it build a mature OS. Without too much YOLO, systemd and that supporting those people is more polite than doing full disclosure ;-)



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OpenBSD

Adam Wołk



FreeBSD

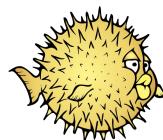
I run something you don't want.

"You can try OpenBSD but you won't have fast wifi, no bluetooth, no exotic hardware like IoT crap, no netflix, no Wine, no virtualization except for another openbsd, slow FS, no linux compat, slow USB, no docker, no nvidia driver"

That will stop most people.

Nevertheless, I'm using OpenBSD and I'm not alone 

solene@ <https://bsd.network/@solene/103135123551600651>



OpenBSD

Signify

```
$ cat o66.pub
untrusted comment: openbsd 6.6 base public key
RWSvK/c+cFe24BIalifKnqoqdvL1XfeZ9MIj3MINndNeKgyYw5PpcWGn
$ signify -Cp o66.pub -x SHA256.sig install66.iso
Signature Verified
install66.iso: OK
$
```



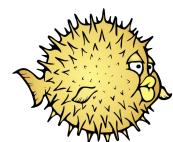
NaN
@ottom6k

In prep for the OpenBSD 6.6 release, here is its signify key:
RWSvK/c+cFe24BIalifKnqoqdvL1XfeZ9MIj3MINnd
NeKgyYw5PpcWGn
Straight from the origin (cvs.openbsd.org). But don't take my word for it, check it against other sources. On 6.5, it's in already in /etc/signify.

3:10 PM · Oct 12, 2019 · Twitter Web App

7 Retweets 11 Likes

<https://www.openbsd.org/faq/faq4.html#Download>



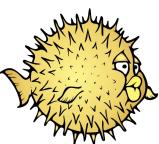
OpenBSD

Installation

```
vga1 at pci0 dev 2 function 0 "InnoTek VirtualBox Graphics Adapter" rev 0x00
vga1: aperture needed
wsdisplay1 at vga1 mux 1: console (80x25, vt100 emulation)
em0 at pci0 dev 3 function 0 "Intel 82540EM" rev 0x02: apic 1 int 19, address 08
:00:27:aa:58:62
"InnoTek VirtualBox Guest Service" rev 0x00 at pci0 dev 4 function 0 not configured
"Intel 82801AA AC97" rev 0x01 at pci0 dev 5 function 0 not configured
ohci0 at pci0 dev 6 function 0 "Apple Intrepid USB" rev 0x00: apic 1 int 22, version 1.0
"Intel 82371AB Power" rev 0x08 at pci0 dev 7 function 0 not configured
usb0 at ohci0: USB revision 1.0
uhub0 at usb0 configuration 1 interface 0 "Apple OHCI root hub" rev 1.00/1.00 address 1
isa0 at mainbus0
pckbc0 at isa0 port 0x60/5 irq 1 irq 12
pckbd0 at pckbc0 (kbd slot)
wskbd0 at pckbd0: console keyboard, using wsdisplay1
softraid0 at root
scsibus1 at softraid0: 256 targets
root on rd0a swap on rd0b dump on rd0b
erase ^?, werase ^W, kill ^U, intr ^C, status ^T

Welcome to the OpenBSD/amd64 6.6 installation program.
(I)nstall, (U)pgrade, (A)utoinstall or (S)hell?
```

<https://www.openbsd.org/faq/faq4.html>



OpenBSD



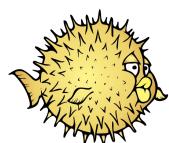
Installation

```
(I)nstall, (U)pgrade, (A)utoinstall or (S)hell? I  
At any prompt except password prompts you can escape to a shell by  
typing '!'. Default answers are shown in []'s and are selected by  
pressing RETURN. You can exit this program at any time by pressing  
Control-C, but this can leave your system in an inconsistent state.
```

```
Choose your keyboard layout ('?' or 'L' for list) [default] pl  
System hostname? (short form, e.g. 'foo') bsdpl
```

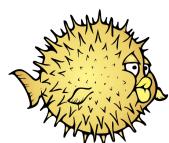
```
Available network interfaces are: em0 wlan0.  
Which network interface do you wish to configure? (or 'done') [em0]  
IPv4 address for em0? (or 'dhcp' or 'none') [dhcp]  
em0: 10.0.2.15 lease accepted from 10.0.2.2 (52:54:00:12:35:02)  
IPv6 address for em0? (or 'autoconf' or 'none') [none]  
Available network interfaces are: em0 wlan0.  
Which network interface do you wish to configure? (or 'done') [done]  
DNS domain name? (e.g. 'example.com') [my.domain] local  
Using DNS nameservers at 87.204.204.204 62.233.233.233
```

```
Password for root account? (will not echo)  
Password for root account? (again)  
Start sshd(8) by default? [yes]  
Do you expect to run the X Window System? [yes]  
Do you want the X Window System to be started by xenodm(1)? [no] yes  
Setup a user? (enter a lower-case loginname, or 'no') [no]
```



Installation

```
Available network interfaces are: em0 wlan0.  
Which network interface do you wish to configure? (or 'done') [em0]  
IPv4 address for em0? (or 'dhcp' or 'none') [dhcp]  
em0: 10.0.2.15 lease accepted from 10.0.2.2 (52:54:00:12:35:02)  
IPv6 address for em0? (or 'autoconf' or 'none') [none]  
Available network interfaces are: em0 wlan0.  
Which network interface do you wish to configure? (or 'done') [done]  
DNS domain name? (e.g. 'example.com') [my.domain] local  
Using DNS nameservers at 87.204.204.204 62.233.233.233  
  
Password for root account? (will not echo)  
Password for root account? (again)  
Start sshd(8) by default? [yes]  
Do you expect to run the X Window System? [yes]  
Do you want the X Window System to be started by xenodm(1)? [no] yes  
Setup a user? (enter a lower-case loginname, or 'no') [no] puffy  
Full name for user puffy? [puffy]  
Password for user puffy? (will not echo)  
Password for user puffy? (again)  
WARNING: root is targeted by password guessing attacks, pubkeys are safer.  
Allow root ssh login? (yes, no, prohibit-password) [no]  
What timezone are you in? ('?' for list) [Europe/Warsaw]  
  
Available disks are: wd0.  
Which disk is the root disk? ('?' for details) [wd0]
```



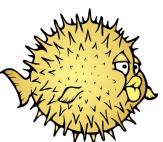
Full Disk Encryption

```
Available network interfaces are: em0 wlan0.
Which network interface do you wish to configure? (or 'done') [em0]
IPv4 address for em0? (or 'dhcp' or 'none') [dhcp]
em0: 10.0.2.15 lease accepted from 10.0.2.2 (52:54:00:12:35:02)
IPv6 address for em0? (or 'autoconf' or 'none') [none]
Available network interfaces are: em0 wlan0.
Which network interface do you wish to configure? (or 'done') [done]
DNS domain name? (e.g. 'example.com') [my.domain] local
Using DNS nameservers at 87.204.204.204 62.233.233.233

Password for root account? (will not echo)
Password for root account? (again)
Start sshd(8) by default? [yes]
Do you expect to run the X Window System? [yes]
Do you want the X Window System to be started by xenodm(1)? [no] yes
Setup a user? (enter a lower-case loginname, or 'no') [no] puffy
Full name for user puffy? [puffy]
Password for user puffy? (will not echo)
Password for user puffy? (again)
WARNING: root is targeted by password guessing attacks, pubkeys are safer.
Allow root ssh login? (yes, no, prohibit-password) [no]
What timezone are you in? ('?' for list) [Europe/Warsaw]

Available disks are: wd0.
Which disk is the root disk? ('?' for details) [wd0]
```

<https://www.openbsd.org/faq/faq14.html#softraidFDE>

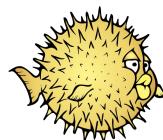


OpenBSD



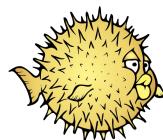
Full Disk Encryption

```
Which disk is the root disk? ('?' for details) [wd0] !
Type 'exit' to return to install.
bsdpl# cd /dev && sh MAKEDEV wd0
bsdpl# fdisk -iy wd0
Writing MBR at offset 0.
bsdpl# disklabel -E wd0
Label editor (enter '?' for help at any prompt)
wd0> a a
offset: [64]
size: [33543656] *
FS type: [4.2BSD] RAID
wd0*> w
wd0> q
No label changes.
bsdpl# bioctl -c C -l wd0a softraid0
New passphrase:
Re-type passphrase:
sd0 at scsibus1 targ 1 lun 0: <OPENBSD, SR CRYPTO, 006>
sd0: 16378MB, 512 bytes/sector, 33543128 sectors
softraid0: CRYPTO volume attached as sd0
bsdpl# dd if=/dev/zero of=/dev/rsd0c bs=1m count=1
1+0 records in
1+0 records out
1048576 bytes transferred in 0.007 secs (144590547 bytes/sec)
bsdpl# exit
```



Full Disk Encryption

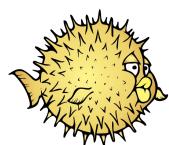
```
label editor (enter '?' for help at any prompt)
wd0> a a
offset: [64]
size: [33543656] *
FS type: [4.2BSD] RAID
wd0*> w
wd0> q
No label changes.
bsdpl# ioctl -c C -l wd0a softraid0
New passphrase:
Re-type passphrase:
sd0 at scsibus1 targ 1 lun 0: <OPENBSD, SR CRYPTO, 006>
sd0: 16378MB, 512 bytes/sector, 33543128 sectors
softraid0: CRYPTO volume attached as sd0
bsdpl# dd if=/dev/zero of=/dev/rsd0c bs=1m count=1
1+0 records in
1+0 records out
1048576 bytes transferred in 0.007 secs (144590547 bytes/sec)
bsdpl# exit
Available disks are: wd0 sd0.
Which disk is the root disk? ('?' for details) [wd0] ?
wd0: UBOX HARDDISK (16.0G)
sd0: OPENBSD, SR CRYPTO, 006 (16.0G)
Available disks are: wd0 sd0.
Which disk is the root disk? ('?' for details) [wd0]
```



OpenBSD

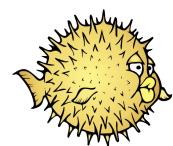
Partitioning

```
1048576 bytes transferred in 0.007 secs (144590547 bytes/sec)
bsdpl# exit
Available disks are: wd0 sd0.
Which disk is the root disk? ('?' for details) [wd0] ?
wd0: UBOX HARDDISK (16.0G)
sd0: OPENBSD, SR CRYPTO, 006 (16.0G)
Available disks are: wd0 sd0.
Which disk is the root disk? ('?' for details) [wd0] sd0
No valid MBR or GPT.
Use (W)hole disk MBR, whole disk (G)PT or (E)dit? [whole]
Setting OpenBSD MBR partition to whole sd0...done.
The auto-allocated layout for sd0 is:
#          size      offset  fstype [fsizbbsize  cpg]
  a:    429.4M            64  4.2BSD   2048 16384    1 # /
  b:    638.9M        879552    swap
  c:  16378.5M            0  unused
  d:    567.1M    2188000  4.2BSD   2048 16384    1 # /tmp
  e:    806.5M    3349408  4.2BSD   2048 16384    1 # /var
  f:   1779.4M    5001216  4.2BSD   2048 16384    1 # /usr
  g:    551.7M    8645504  4.2BSD   2048 16384    1 # /usr/X11R6
  h:   1862.3M    9775296  4.2BSD   2048 16384    1 # /usr/local
  i:   1411.8M   13589344  4.2BSD   2048 16384    1 # /usr/src
  j:   5343.5M   16480640  4.2BSD   2048 16384    1 # /usr/obj
  k:   2980.2M   27424224  4.2BSD   2048 16384    1 # /home
Use (A)uto layout, (E)dit auto layout, or create (C)ustom layout? [a]
```



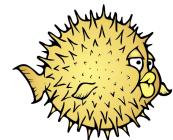
Partitioning

```
> p g
OpenBSD area: 64-1342166490; size: 640.0G; free: 0.0G
#          size      offset  fstype [fsize bsize  cpg]
a:    1.0G           64  4.2BSD   2048 16384    1 # /
b:    4.0G        2104512    swap
c:  640.0G            0  unused
d:    4.0G       10490464  4.2BSD   2048 16384    1 # /tmp
e:  600.0G       18892416  4.2BSD   8192 65536    1 # /var
f:    4.0G       1277183488  4.2BSD   2048 16384    1 # /usr
g:    1.0G       1285569472  4.2BSD   2048 16384    1 # /usr/X11R6
h:   10.0G       1287657920  4.2BSD   2048 16384    1 # /usr/local
i:    2.0G       1308622752  4.2BSD   2048 16384    1 # /usr/src
j:    4.0G       1312815712  4.2BSD   2048 16384    1 # /usr/obj
k:   10.0G      1321201664  4.2BSD   2048 16384    1 # /home
>
```



Partitioning

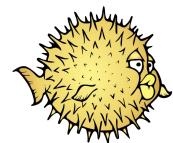
- Security (nosuid, nodev, noexec or wxallowed)
- Stability (critical filesystems separated from common usage)
- More flexible setups (ie. mount read-only)



OpenBSD

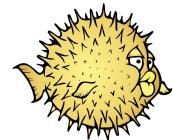
Partitioning

```
tintagel$ cat /etc/fstab
526e8525c7463ce0.b none swap sw
526e8525c7463ce0.a / ffs rw 1 1
526e8525c7463ce0.k /home ffs rw, nodev, nosuid 1 2
526e8525c7463ce0.d /tmp ffs rw, nodev, nosuid 1 2
526e8525c7463ce0.f /usr ffs rw, nodev 1 2
526e8525c7463ce0.g /usr/X11R6 ffs rw, nodev 1 2
526e8525c7463ce0.h /usr/local ffs rw, nodev, wxallowed 1 2
526e8525c7463ce0.j /usr/obj ffs rw, nodev, nosuid 1 2
526e8525c7463ce0.i /usr/src ffs rw, nodev, nosuid 1 2
526e8525c7463ce0.e /var ffs rw, nodev, nosuid 1 2
tintagel$
```



Partitioning

- Have at least
 - /usr/local for wwwallowed ports
 - /home to keep it over re-installs
 - /var for internet facing systems

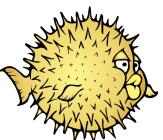


OpenBSD

Sets

```
5 cylinder groups of 200.83MB, 12853 blocks, 25728 inodes each
Available disks are: wd0.
Which disk do you wish to initialize? (or 'done') [done]
/dev/sd0a (2e08d64ce11487bf.a) on /mnt type ffs (rw, asynchronous, local)
/dev/sd0k (2e08d64ce11487bf.k) on /mnt/home type ffs (rw, asynchronous, local, nodev, nosuid)
/dev/sd0d (2e08d64ce11487bf.d) on /mnt/tmp type ffs (rw, asynchronous, local, nodev, nosuid)
/dev/sd0f (2e08d64ce11487bf.f) on /mnt/usr type ffs (rw, asynchronous, local, nodev)
/dev/sd0g (2e08d64ce11487bf.g) on /mnt/usr/X11R6 type ffs (rw, asynchronous, local, nodev)
/dev/sd0h (2e08d64ce11487bf.h) on /mnt/usr/local type ffs (rw, asynchronous, local, nodev)
/dev/sd0j (2e08d64ce11487bf.j) on /mnt/usr/obj type ffs (rw, asynchronous, local, nodev, nosuid)
/dev/sd0i (2e08d64ce11487bf.i) on /mnt/usr/src type ffs (rw, asynchronous, local, nodev, nosuid)
/dev/sd0e (2e08d64ce11487bf.e) on /mnt/var type ffs (rw, asynchronous, local, nodev, nosuid)

Let's install the sets!
Location of sets? (cd0 disk http nfs or 'done') [cd0] http
HTTP proxy URL? (e.g. 'http://proxy:8080', or 'none') [none]
HTTP Server? (hostname, list#, 'done' or '?')
```



Sets

10	mirror.csclub.uwaterloo.ca/pub/OpenBSD	Waterloo, Ontario, Canada
11	openbsd.mirror.netelligent.ca/pub/OpenBSD	Montreal, QC, Canada
12	mirrors.ucr.ac.cr/pub/OpenBSD	Costa Rica
13	mirrors.dotsrc.org/pub/OpenBSD	Aalborg, Denmark
14	mirror.one.com/pub/OpenBSD	Copenhagen, Denmark
15	ftp.eenet.ee/pub/OpenBSD	Estonia
16	ftp.fr.openbsd.org/pub/OpenBSD	Paris, France
17	mirror.hs-esslingen.de/pub/OpenBSD	Esslingen, Germany
18	ftp.bytemine.net/pub/OpenBSD	Oldenburg, Germany
19	ftp.halifax.rwth-aachen.de/pub/OpenBSD	Aachen, Germany
20	artfiles.org/openbsd	Hamburg, Germany
21	ftp.hostserver.de/pub/OpenBSD	Frankfurt, Germany
22	ftp.fau.de/pub/OpenBSD	Erlangen, Germany
23	ftp.cc.uoc.gr/pub/OpenBSD	Heraklion, Greece
24	openbsd.hk/pub/OpenBSD	Hong Kong

HTTP Server? (hostname, list#, 'done' or '?') 1

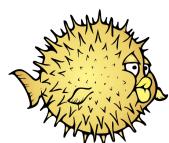
HTTP Server? (hostname, list#, 'done' or '?') [cdn.openbsd.org]

Server directory? [pub/OpenBSD/6.6/amd64]

Select sets by entering a set name, a file name pattern or 'all'. De-select
sets by prepending a '-', e.g.: '-game*'. Selected sets are labelled '[X]'.

[X] bsd [X] comp66.tgz [X] xbase66.tgz [X] xserv66.tgz
[X] bsd.rd [X] man66.tgz [X] xshare66.tgz
[X] base66.tgz [X] game66.tgz [X] xfont66.tgz

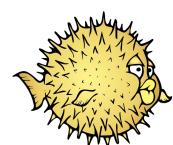
Set name(s)? (or 'abort' or 'done') [done] _



OpenBSD

Sets

Get/Verify SHA256.sig	100%	*****	2141	00:00
Signature Verified				
Get/Verify bsd	100%	*****	18250 KB	00:03
Get/Verify bsd.rd	100%	*****	10058 KB	00:02
Get/Verify base66.tgz	100%	*****	236 MB	00:40
Get/Verify comp66.tgz	100%	*****	72109 KB	00:12
Get/Verify man66.tgz	100%	*****	7418 KB	00:01
Get/Verify game66.tgz	100%	*****	2745 KB	00:00
Get/Verify xbase66.tgz	100%	*****	22092 KB	00:03
Get/Verify xshare66.tgz	100%	*****	4482 KB	00:01
Get/Verify xfont66.tgz	100%	*****	39342 KB	00:06
Get/Verify xserv66.tgz	100%	*****	15757 KB	00:03
Installing bsd	100%	*****	18250 KB	00:00
Installing bsd.rd	100%	*****	10058 KB	00:00
Installing base66.tgz	100%	*****	236 MB	00:13
Extracting etc.tgz	100%	*****	260 KB	00:00
Installing comp66.tgz	100%	*****	72109 KB	00:07
Installing man66.tgz	100%	*****	7418 KB	00:00
Installing game66.tgz	100%	*****	2745 KB	00:00
Installing xbase66.tgz	100%	*****	22092 KB	00:02
Extracting xetc.tgz	100%	*****	7017 KB	00:00
Installing xshare66.tgz	100%	*****	4482 KB	00:01
Installing xfont66.tgz	100%	*****	39342 KB	00:02
Installing xserv66.tgz	100%	*****	15757 KB	00:01
Location of sets? (cd0 disk http nfs or 'done') [done]				



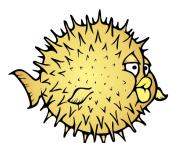
Finishing up

```
Get/Verify xserv66.tgz 100% |*****| 15757 KB 00:03
Installing bsd      100% |*****| 18250 KB 00:00
Installing bsd.rd   100% |*****| 10058 KB 00:00
Installing base66.tgz 100% |*****| 236 MB 00:13
Extracting etc.tgz  100% |*****| 260 KB 00:00
Installing comp66.tgz 100% |*****| 72109 KB 00:07
Installing man66.tgz  100% |*****| 7418 KB 00:00
Installing game66.tgz 100% |*****| 2745 KB 00:00
Installing xbase66.tgz 100% |*****| 22092 KB 00:02
Extracting xetc.tgz  100% |*****| 7017 KB 00:00
Installing xshare66.tgz 100% |*****| 4482 KB 00:01
Installing xfont66.tgz 100% |*****| 39342 KB 00:02
Installing xserv66.tgz 100% |*****| 15757 KB 00:01
Location of sets? (cd0 disk http nfs or 'done') [done]
Time appears wrong. Set to 'Sun Dec 1 16:40:04 CET 2019'? [yes]
Saving configuration files... done.
Making all device nodes... done.
Relinking to create unique kernel... done.
```

CONGRATULATIONS! Your OpenBSD install has been successfully completed!

When you login to your new system the first time, please read your mail using the 'mail' command.

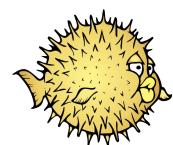
Exit to (S)hell, (H)alt or (R)eboot? [reboot]



OpenBSD

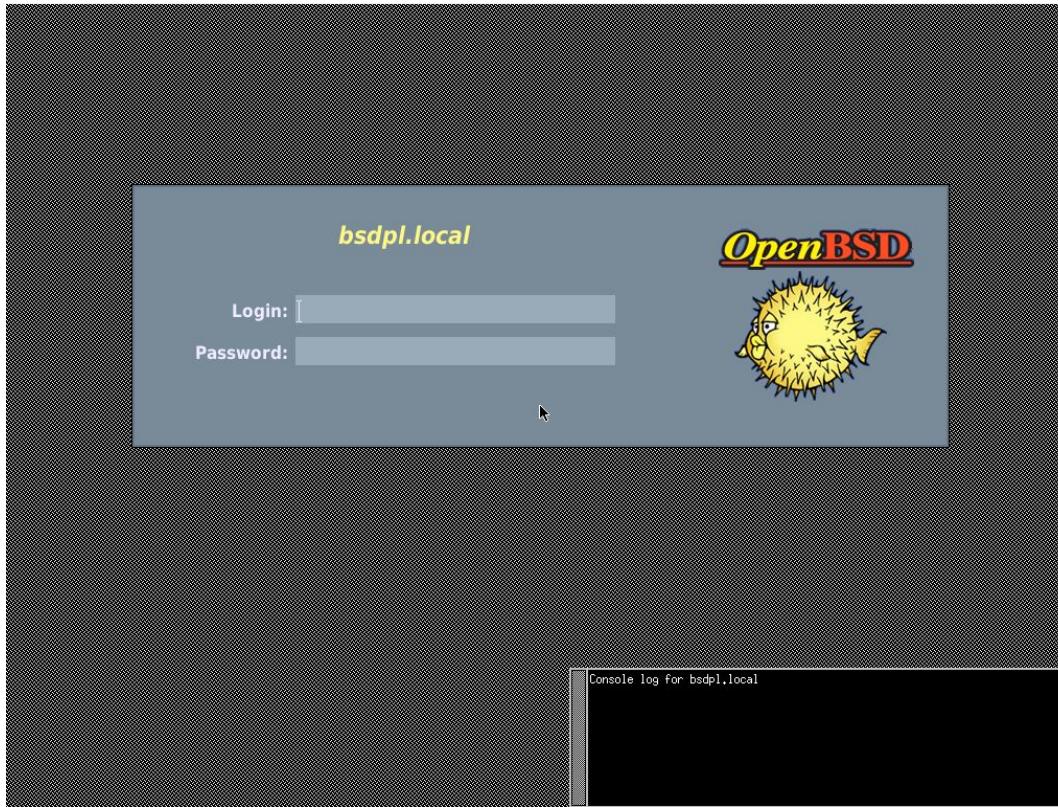
Booting up

```
Using drive 0, partition 3.  
Loading.....  
probing: pc0 mem[639K 1022M a20=on]  
disk: hd0+ sr0*  
>> OpenBSD/amd64 BOOT 3.45  
Passphrase: _
```

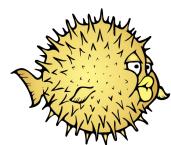
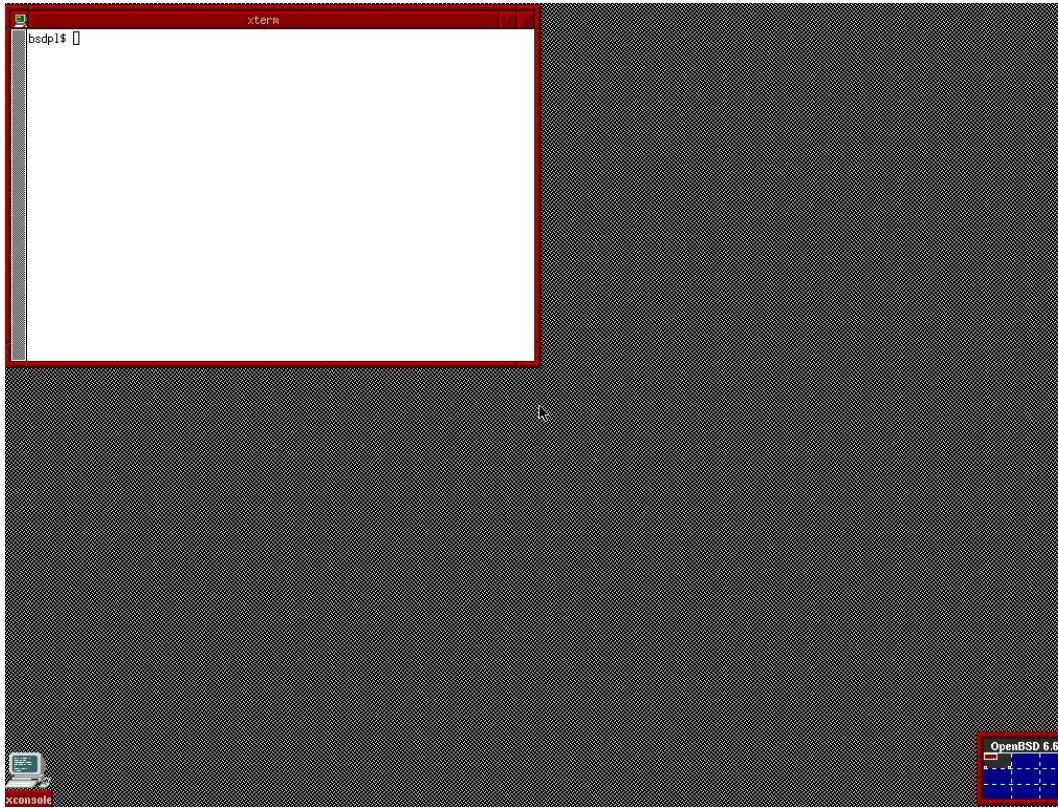


OpenBSD

XDM



fvmw



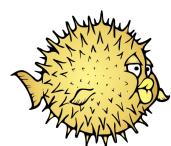
OpenBSD

Firmware & syspatch

```
kern.securelevel: 0 -> 1
creating runtime link editor directory cache.
preserving editor files.
starting network daemons: sshd smtpd sndiod.
running rc.firsttime
Path to firmware: http://firmware.openbsd.org/firmware/6.6/
Installing: intel-firmware

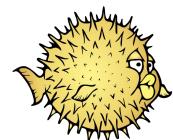
*** CPU microcode has been updated - reboot to apply.

Checking for available binary patches...
Run syspatch(8) to install:
001_bpf      002_ber      003_bgpd      004_net80211   005_sysupgrade
006_ifioctl  007_inteldrm  008_mesa
starting local daemons: cron xenodm.
Sun Dec 1 16:43:31 CET 2019
bsdpl# ■
```



Firmware & syspatch

```
bsdpl# syspatch
Get/Verify syspatch66-001_bpf.tgz 100% |*****| 102 KB 00:00
Installing patch 001_bpf
Get/Verify syspatch66-002_ber.tgz 100% |*****| 660 KB 00:00
Installing patch 002_ber
Get/Verify syspatch66-003_bgpd.tgz 100% |*****| 181 KB 00:00
Installing patch 003_bgpd
Get/Verify syspatch66-004_net80211... 100% |*****| 64839 00:00
Installing patch 004_net80211
Get/Verify syspatch66-005_sysupgrade... 100% |*****| 3023 00:00
Installing patch 005_sysupgrade
Get/Verify syspatch66-006_ifioctl... 100% |*****| 381 KB 00:00
Installing patch 006_ifioctl
Get/Verify syspatch66-007_inteldrm... 100% |*****| 21468 KB 00:03
Installing patch 007_inteldrm
Get/Verify syspatch66-008_mesa.tgz 100% |*****| 5598 KB 00:01
Installing patch 008_mesa
Relinking to create unique kernel... done; reboot to load the new kernel
Errata can be reviewed under /var/syspatch
bsdpl#
```



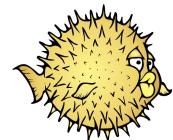
OpenBSD

Stable, Release or Current?

- -release ; new version every 6 months
- -current ; development version, becomes -release every 6 months
- -stable ; backported security & reliability fixes

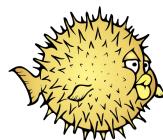
Only two latest releases are supported and receive fixes.

6.4 becomes unsupported when 6.6 is released.



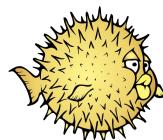
Updates

- Only two latest releases are supported and receive fixes.
 - Only latest release receives binary port updates (**pkg_add -uiv**)
 - Last two releases receive base system binary updates (**syspatch**)
- 6.4 becomes unsupported when 6.6 is released.
- **sysupgrade** to update to a new release
 - Follow the upgrade notes! <https://www.openbsd.org/faq/upgrade66.html>
- **sysupgrade -s** to go current
 - Always check following current! <https://www.openbsd.org/faq/current.html>



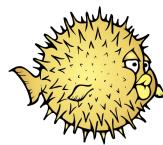
Autoinstall

```
$ cat install.conf
System hostname = server1
Password for root = $2b$14$Z4xRMg8vDpgYH...GVot3ySoj8yby
Change the default console to com0 = yes
Which speed should com0 use = 19200
Setup a user = puffy
Password for user = *****
Public ssh key for user = ssh-ed25519 AAAAC3NzaC1...g3Aqre puffy@ai
What timezone are you in = Europe/Stockholm
Location of sets = http
HTTP Server = cdn.openbsd.org
```



doas

```
$ cat /etc/doas.conf
permit setenv { ENV PS1 SSH_AUTH_SOCK } :wheel
permit persist puffy as root
$ doas whoami
doas (puffy@bsdpl.local) password:
root
bsdpl$ doas whoami
root
bsdpl$
```

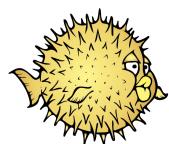


OpenBSD

Xfce4, but applies to all desktops

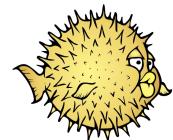
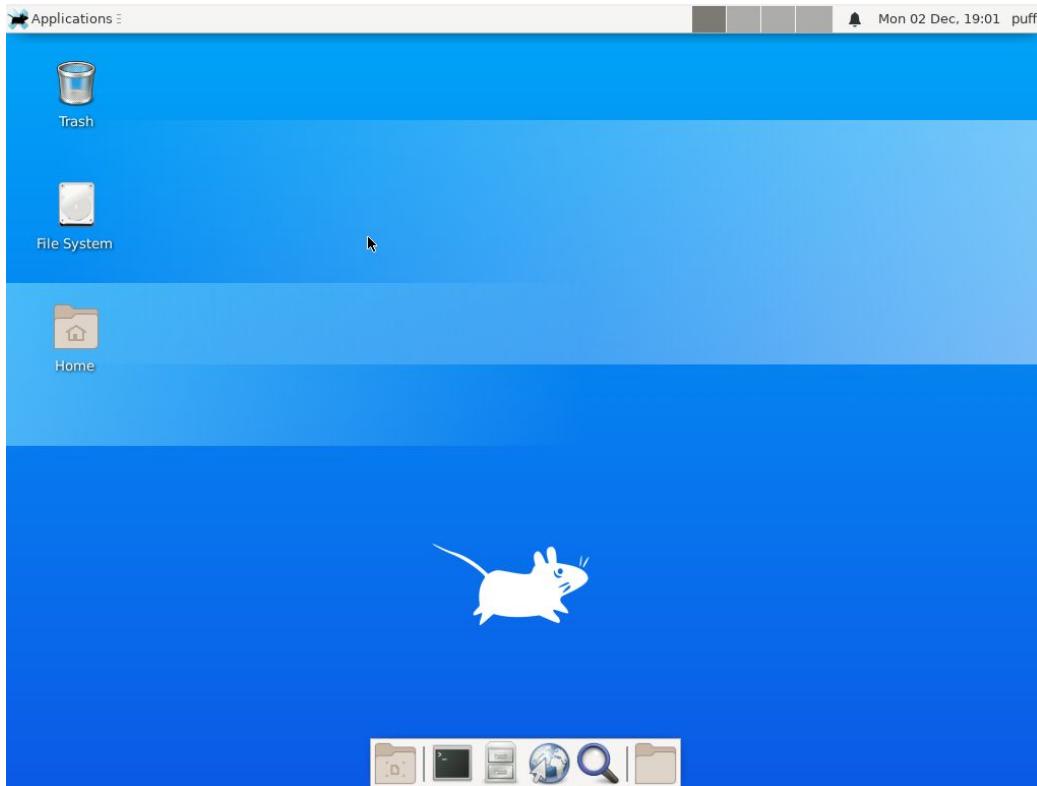
- **pkg_info -Q xfce** - search for packages
- **doas pkg_add xfce** install the package

```
Running tags: ok
The following new rcscripts were installed: /etc/rc.d/avahi_daemon /etc/rc.d/avahi_dnscnfd /etc/rc.d/messagebus
See rcctl(8) for details.
New and changed readme(s):
    /usr/local/share/doc/pkg-readmes/avahi
    /usr/local/share/doc/pkg-readmes/consolekit2
    /usr/local/share/doc/pkg-readmes/dbus
    /usr/local/share/doc/pkg-readmes/ffmpeg
    /usr/local/share/doc/pkg-readmes/glib2
    /usr/local/share/doc/pkg-readmes/grupg
    /usr/local/share/doc/pkg-readmes/gtk+2
    /usr/local/share/doc/pkg-readmes/gtk+3
    /usr/local/share/doc/pkg-readmes/sdl12
    /usr/local/share/doc/pkg-readmes/upower
    /usr/local/share/doc/pkg-readmes/xfce
--- +hunspell-1.6.2p0 ---
Install mozilla dictionaries for extra hunspell languages.
e.g.   I
        # pkg_add mozilla-dicts-ca
--- +python-2.7.16p1 ---
If you want to use this package as your default system python, as root
create symbolic links like so (overwriting any previous default):
ln -sf /usr/local/bin/python2.7 /usr/local/bin/python
ln -sf /usr/local/bin/python2.7-2to3 /usr/local/bin/2to3
ln -sf /usr/local/bin/python2.7-config /usr/local/bin/python-config
ln -sf /usr/local/bin/pydoc2.7 /usr/local/bin/pydoc
bsdpl# ±#
```



Xfce4, but applies to all desktops

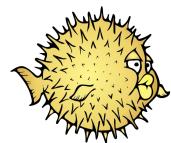
```
$ echo "exec /usr/local/bin/startxfce4" > ~/.xsession
```



OpenBSD

i3, but applies to all desktops

```
$ doas pkg_add i3
$ cat /home/mulander/.xsession
export LC_CTYPE=pl_PL.UTF-8
xset -b
xidle &
setxkbmp pl &
exec i3
$
```

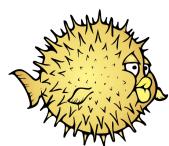


OpenBSD

Raise limits

/etc/login.conf

```
#  
# Staff have fewer restrictions and can login even when nologins are set.  
#  
staff:\  
    :datasize-cur=1536M:\\  
    :datasize-max=infinity:\\  
    :maxproc-max=512:\\  
    :maxproc-cur=256:\\  
    :ignorenologin:\\  
    :requirehome@:\\  
    :tc=default:
```



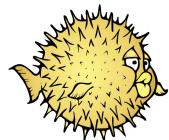
OpenBSD

WiFi roaming

- ifconfig iwn0 join home-net wpakey passwordhere
- or define it in /etc/hostname.if(5)

```
$ cat /etc/hostname.iwn0
join home-net wpakey passwordhere
join work-net wpakey passwordhere
join cafe-wifi
dhcp
```

<https://www.openbsd.org/faq/faq6.html>



OpenBSD

OpenBSD.ams

<https://openbsd.amsterdam/>

OBSD
.ams

[302 VMs deployed](#) 

"We are **OpenBSD Amsterdam** and we run dedicated
vmm(4)/vmd(8) servers to host opinionated VMs.
We donate €10 per VM and then **€15** for every renewal
to OpenBSD Foundation.

We are home for many wonderful projects and can't wait for
you to join our kind fans."



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512M RAM 50G HDD

Want more memory or storage? (limited availability)

+€10 / year for extra **512M RAM**

+€50 / year for extra **50G HDD**

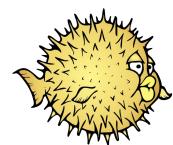
Dedicated **IPv4** (DHCP assigned) and dedicated **IPv6** (/64).

Console access with vncd(8) using cu(1).

Reverse DNS upon request.

We accept PayPal, iDEAL, and SEPA.

[Book your VM](#)



OpenBSD

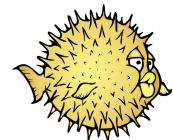
OpenBSD.rocks <https://why-openbsd.rocks/fact/>

why-OpenBSD.rocks

The facts

A list of all the great things that OpenBSD has. Why this site exists, see [About](#).

- 64bit Time
- acme-client(1)
- afterboot(8)
- AnonCVS and open source repos
- Anti-ROP
- arc4random(3)
- ASLR
- Audio recording



OpenBSD

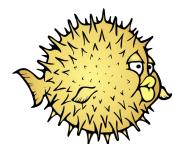
OpenBSD Innovations <https://www.openbsd.org/innovations.html>

OpenBSD Innovations

This is a list of software and ideas developed or maintained by the OpenBSD project, sorted in order of approximate introduction. Some of them are explained in detail in our [research papers](#).

Concepts

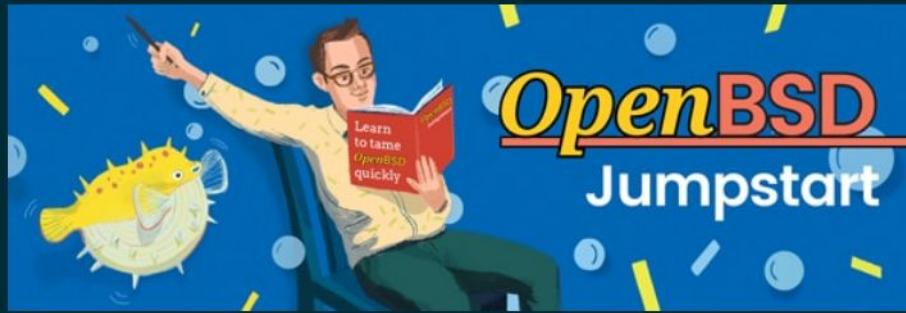
- [**ipsec\(4\)**](#): Started by John Ioannidis, Angelos D. Keromytis, Niels Provos, and Niklas Hallqvist, imported February 20, 1997. OpenBSD was the first free operating system to provide an IPsec stack.
- [**inet6\(4\)**](#): First complete integration and adoption of IPv6 led by "Itojun" (Dr. Junichiro Hagino) [WIDE/KAME], Craig Metz [NRL], and Angelos D. Keromytis starting Jan 6, 1999. Almost fully operational Jun 6, 1999 during the [first OpenBSD hackathon](#). OpenBSD 2.7.
- **Privilege separation**: First implemented by Niels Provos and Markus Friedl in OpenSSH in March 2002, released with OpenBSD 3.2. The concept is now used in many OpenBSD programs, for example [**bogus\(8\)**](#), [**dhclient\(8\)**](#), [**dhcpd\(8\)**](#), [**dvmrpd\(8\)**](#), [**eigrpd\(8\)**](#), [**file\(1\)**](#), [**httpd\(8\)**](#), [**iked\(8\)**](#), [**ldapd\(8\)**](#), [**mountd\(8\)**](#), [**npppd\(8\)**](#), [**ntpd\(8\)**](#), [**ospf6d\(8\)**](#), [**ospf6d\(8\)**](#), [**pflogd\(8\)**](#), [**radiusd\(8\)**](#), [**relayd\(8\)**](#), [**ripd\(8\)**](#), [**script\(1\)**](#), [**smtpd\(8\)**](#), [**syslogd\(8\)**](#), [**tcpdump\(8\)**](#), [**tmux\(1\)**](#), [**xconsole\(1\)**](#), [**xdm\(1\)**](#), [**Xserver\(1\)**](#), [**ypldap\(8\)**](#), [**pkg_add\(1\)**](#), etc.
- **Privilege revocation**: Related to the work on privilege separation, some programs were refactored to drop privileges while holding onto a tricky resource such as a raw socket, reserved port, or modification-locked bpf(4) descriptor, for example [**ping\(8\)**](#), [**traceroute\(8\)**](#), etc.
- **Stack protector**: Developed since 2001 as "propolice" by Hiroaki Etoh. Integrated, and implemented for additional hardware platforms, by Miod Vallat and Theo de Raadt. OpenBSD 3.3 was the first operating system to enable it systemwide by default.
- **W^X**: First used for sparc, sparc64, alpha, and hppa in OpenBSD 3.3. Strictly enforced by default since OpenBSD 6.0: a program can only violate it if the executable is marked with `PT_OPENBSD_WXNEEDED` and it is located on a filesystem mounted with the `wxallowed` [**mount\(8\)**](#) option.
- **GOT and PLT protection** by ld.so: first done as part of the W^X work in OpenBSD 3.3, by Dale Rahn and Theo de Raadt. The GOT and PLT regions are read-only outside of ld.so itself. Extended to the .init/.fini sections (constructors and destructors) in OpenBSD 3.4.
- **ASLR**: OpenBSD 3.4 was the first widely used operating system to provide it by default.
- [**gcc-local\(1\)**](#) attribute `__bounded__` static analysis annotation and checking mechanism: Started by Anil Madhavapeddy on June 26, 2003 and ported to GCC 4 by Nicholas Marriott. First released with OpenBSD 3.4.
- [**malloc\(3\)**](#) randomization implemented by Thierry Deval. Guard pages and randomized (delayed) free added by Ted Unangst. Reimplemented by [**Otto Moerbeek**](#) for OpenBSD 4.4.
- **Position-independent executables (PIE)**: OpenBSD 5.3 was the first widely used operating system to enable it globally by default, on seven hardware platforms.



OpenBSD

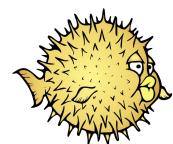
OpenBSD 6.5 jumpstart

<http://www.openbsdjumpstart.org>



6.5 Updated!

July 1st, 2019, proudly hosted by ARP Networks. Follow me on Twitter.



OpenBSD

OpenBSD FAQ

<https://www.openbsd.org/faq/>

OpenBSD Frequently Asked Questions

This FAQ is supplemental documentation to the man pages, which are available both in the [development version](#) of OpenBSD (-current) that are not yet included in the stable releases.

Quick Links:

[Security Updates](#)
[Upgrading to 6.6](#)
[Following -current](#)

[Manual Pages](#)
[Mailing Lists](#)
[Reporting Bugs](#)

[Porter's Handbook](#)
[Port Testing Guide](#)
[PF User's Guide](#)

Introduction to OpenBSD

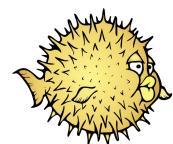
- [About OpenBSD](#)
- [Hardware Support](#)
- [Manual Pages](#)
- [Mailing Lists](#)
- [Migrating to OpenBSD](#)
- [Reporting Bugs](#)
- [Supporting the Project](#)

Installation Guide

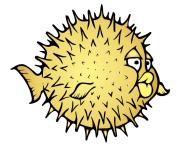
- [Overview of the Installation Procedure](#)
- [Pre-installation Checklist](#)
- [Downloading OpenBSD](#)
- [Creating Install Media](#)
- [Performing a Simple Install](#)
- [File Sets](#)
- [Disk Partitioning](#)
- [Sending Your dmesg After the Install](#)
- [Customizing the Install Process](#)
- [Multibooting](#)

System Management

- [Security Updates](#)



***Open*BSD**



NetBSD

Konrad Witaszczyk



FreeBSD®



NetBSD®

Supported architectures

CPU	Tier(s)	Port(s)
alpha	II	alpha
arm	I, II, III	acorn26 acorn32 cats epoch32 evbarm hpcarm ionix netwinder shark zaurus
hppa	II	hppa
i386	I	i386 xen
m68010	II	sun2
m68k	II	amiga atari cesfic hp300 luna68k mac68k mvme68k news68k next68k sun3 x68k
mipseb	I, II	emips evbmips ews4800mips mipsco newsmips sbmips sgimips
mipsel	I, II	algor arc cobalt evbmips hpcmips pmax sbmips
powerpc	I, II	amigappc bebox evbppc ibmnws macppc mvmeppc ofppc prep rs6000 sandpoint
sh3eb	II	evbsh3 mmeye
sh3el	II	dreamcast evbsh3 hpcsh landisk
sparc	II	sparc
sparc64	I	sparc64 (Can also run sparc binaries)
vax	II	vax
x86_64	I	amd64 (Can also run i386 binaries), xen

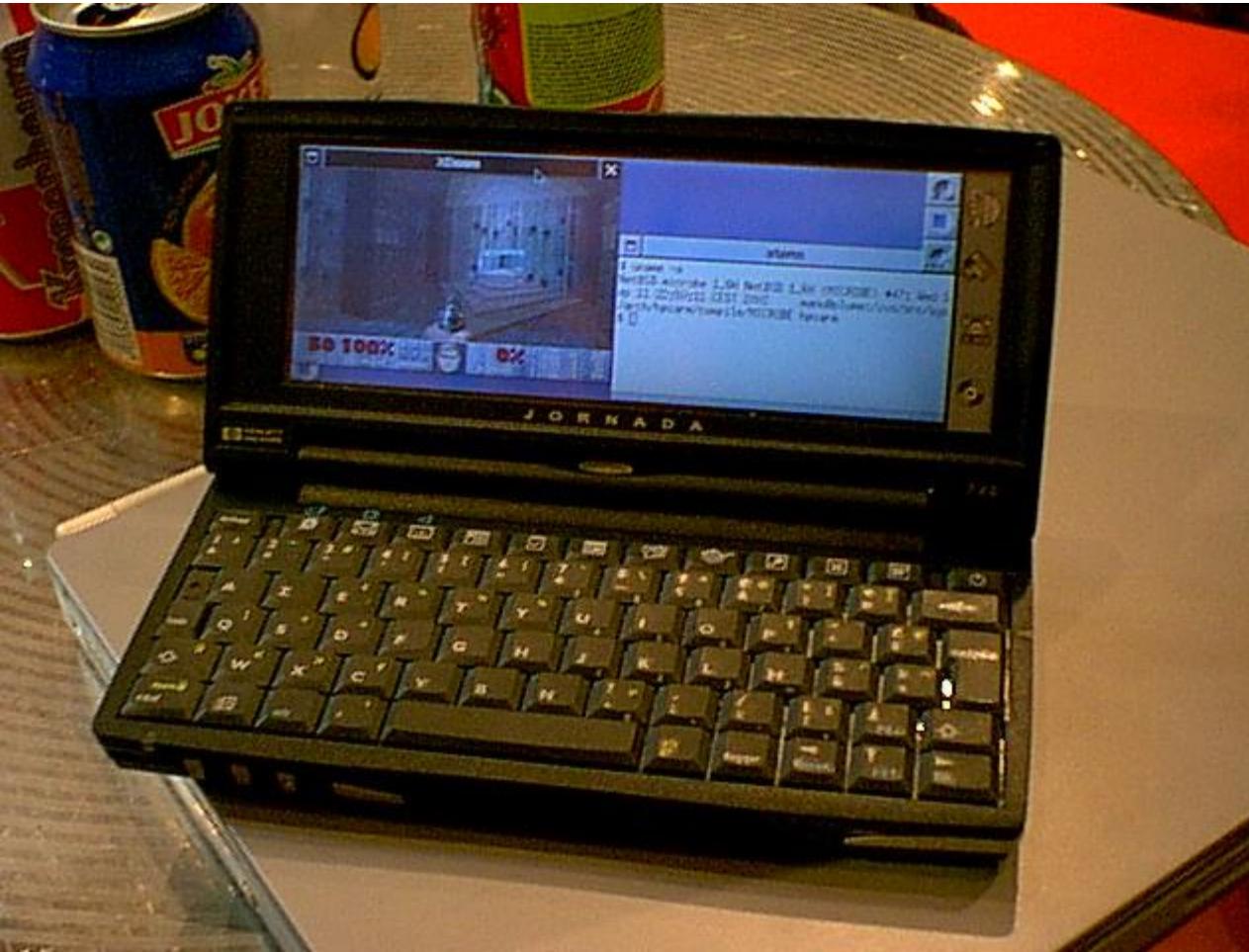
In total: 58 ports (8 Tier I, 49 Tier II, 1 Tier III)



HP Jornada 680 (port hpcsh)

- Hitachi SuperH SH-3 133 MHz
- 32MB RAM
- Windows CE 2.11
- Modem
- Microphone and speaker
- CompactFlash
- PCMCIA
- Released in 1998





Source: <https://www.netbsd.org/gallery/in-Action/>



Goal

Install NetBSD-current on Jornada 680 using FreeBSD, and use the PCMCIA cards.



Requirements

1. CompactFlash card with a reader.
2. Kernel.
3. Root filesystem.
4. hpcboot(8) that loads and boots the kernel on Windows CE.

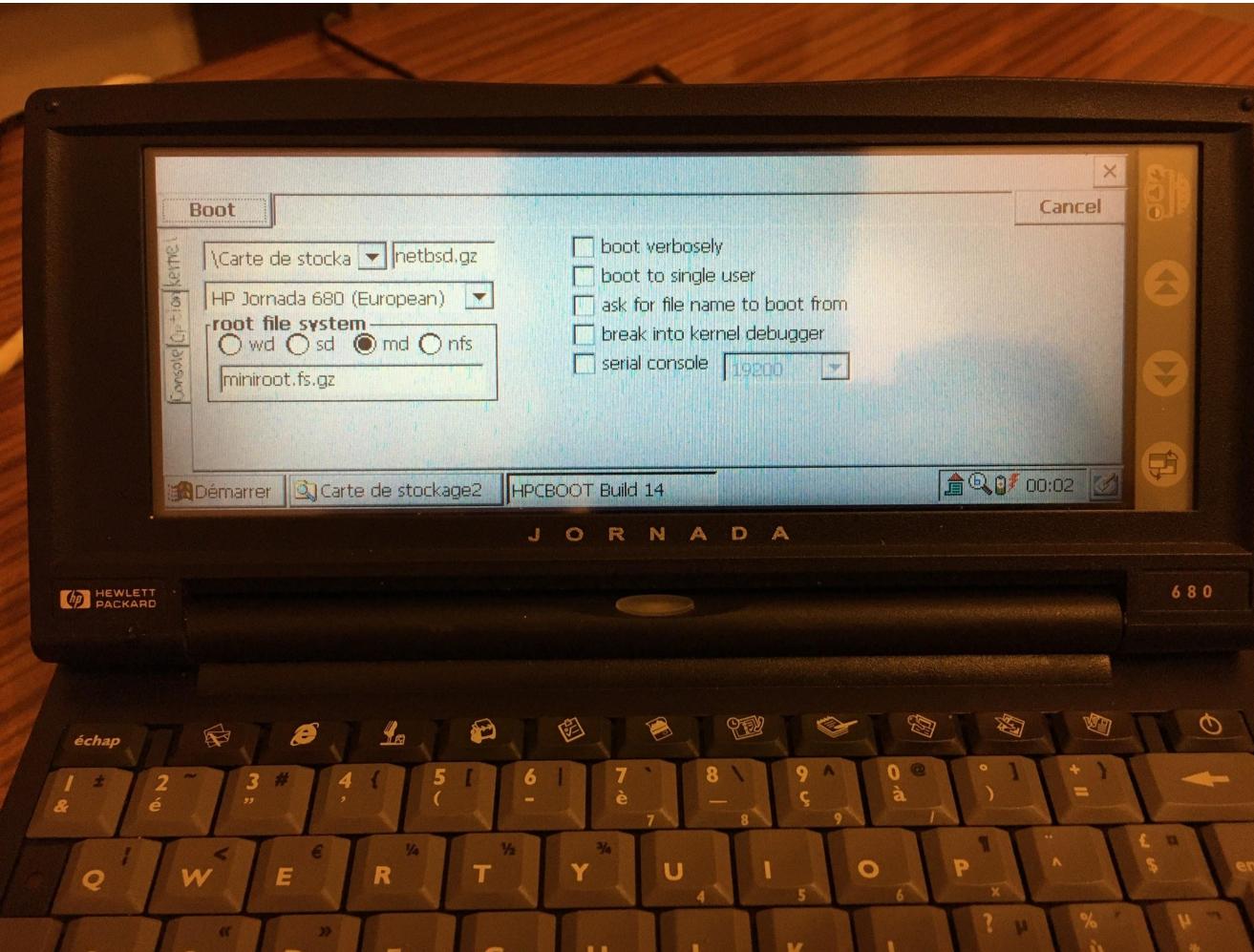


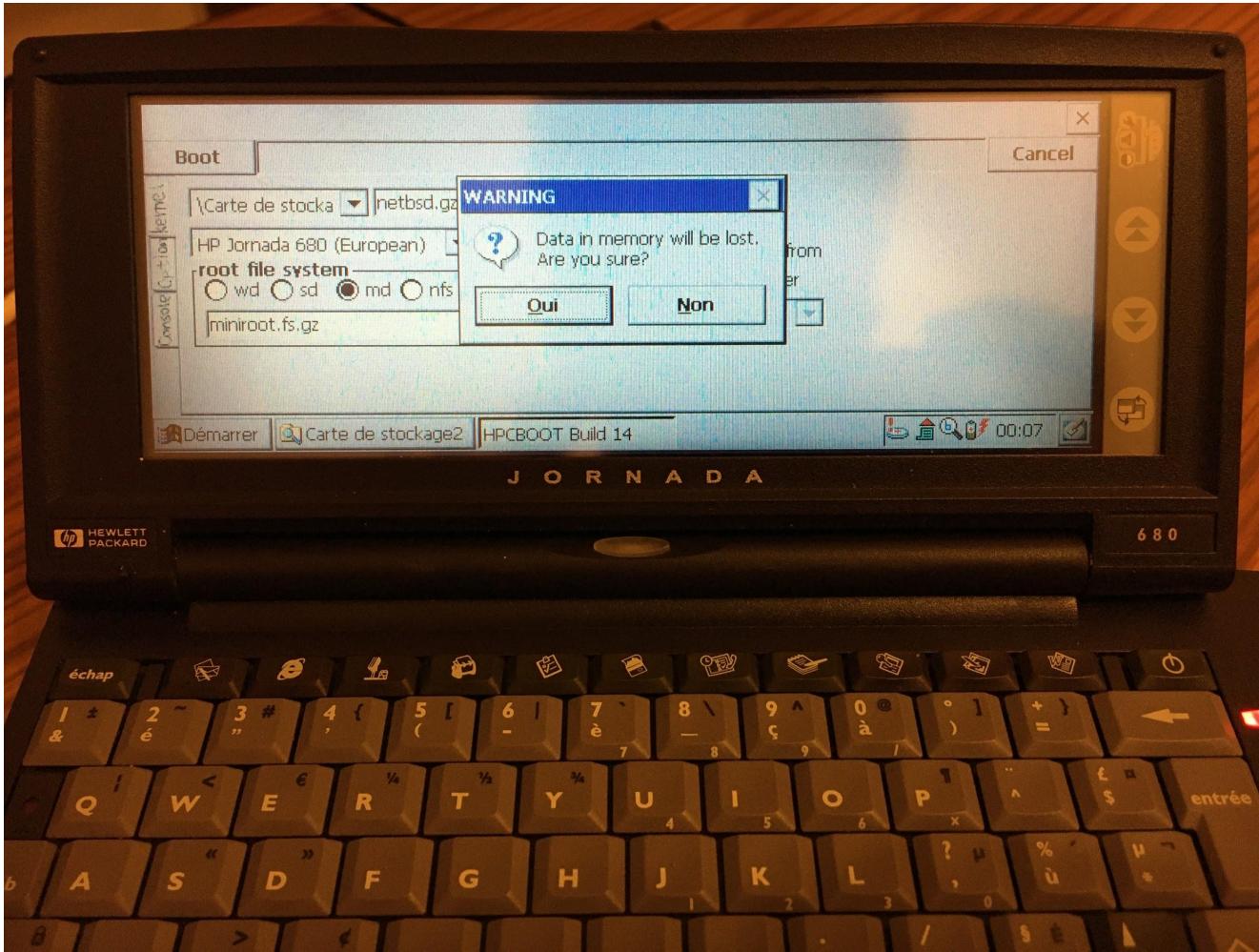
Attempt 1: miniroot on md(4)

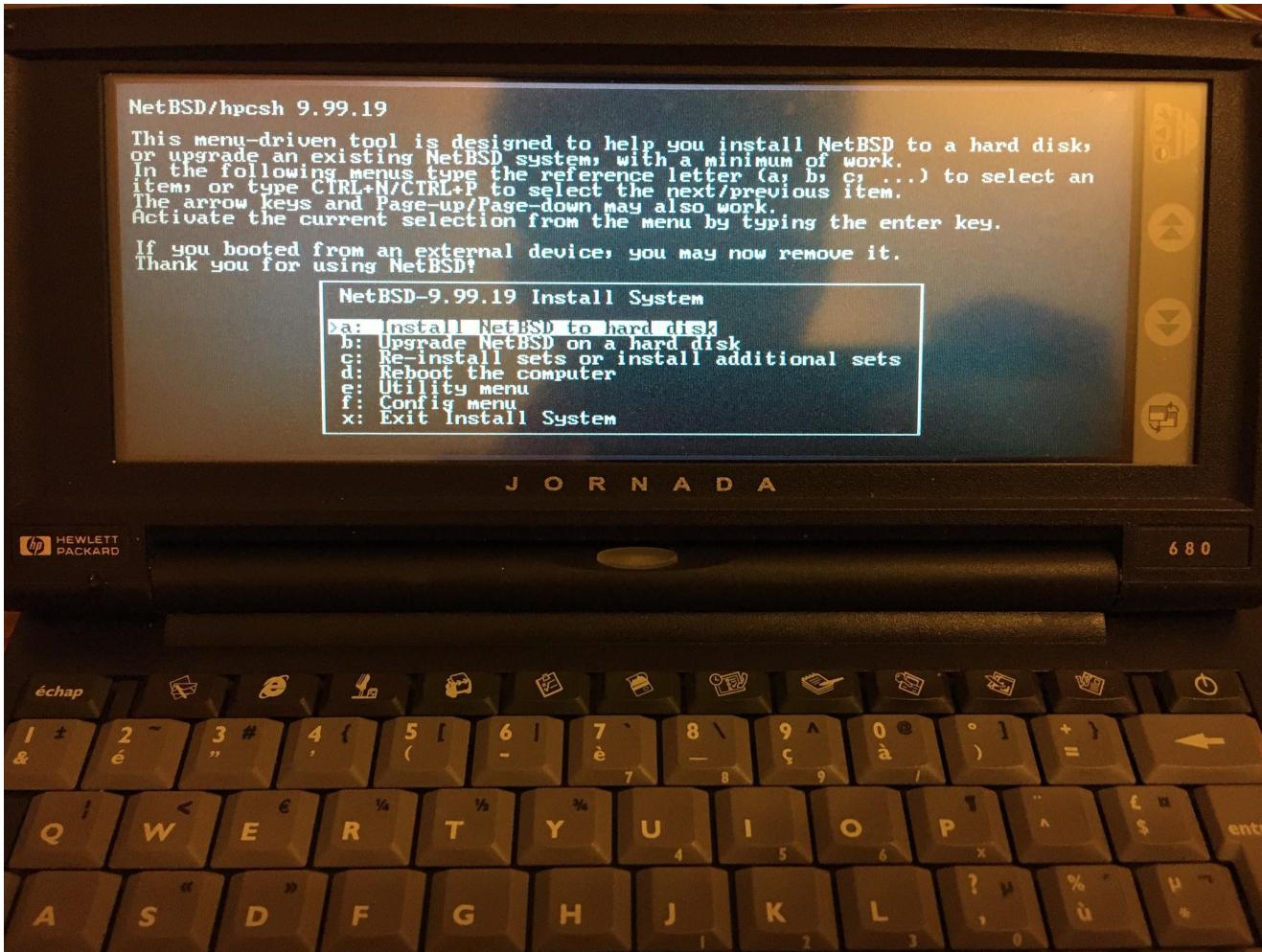
We create one FAT16 partition with hpcboot(8) and miniroot:

```
# gpart create -s mbr da1
da1 created
# gpart add -t '\!6' -s 24M da1
da1s1 added
# newfs_msdos -F16 /dev/da1s1
/dev/da1s1: 49064 sectors in 6133 FAT16 clusters (4096 bytes/cluster)
BytesPerSec=512 SecPerClust=8 ResSectors=1 FATs=2 RootDirEnts=512 Sectors=49152
Media=0xf0 FATsecs=24 SecPerTrack=32 Heads=64 HiddenSecs=0
# mount -t msdosfs /dev/da1s1 /mnt/jornada
# cp hpcboot-sh3.exe netbsd.gz miniroot/miniroot.fs.gz /mnt/jornada/
# umount /mnt/jornada
```









```
# fdisk wd0
Disk: /dev/rwd0
NetBSD disklabel disk geometry:
cylinders: 1985, heads: 16, sectors/track: 63 (1008 sectors/cylinder)
total sectors: 2000880, bytes/sector: 512
BIOS disk geometry:
cylinders: 977, heads: 64, sectors/track: 32 (2048 sectors/cylinder)
total sectors: 2000880
Partitions aligned to 2048 sector boundaries, offset 32
Partition table:
0: Primary, big DOS, 16-bit FAT (> 32MB) (sysid 6)
    start 32, size 49152 (24 MB, Cyls 0-24/0732)
1: <UNUSED>
2: <UNUSED>
3: <UNUSED>
No active partition.
Drive serial number: 0 (0x00000000)
# disklabel -i -I wd0
^C
^C^C^C■
```

JORNADA

HEWLETT
PACKARD



Attempt 2: root on wd(4)

First we create separate partitions for Windows and NetBSD:

```
# fdisk da1
(...)
Media sector size is 512
Warning: BIOS sector numbering starts with sector 1
Information from DOS bootblock is:
The data for partition 1 is:
sysid 1 (0x01),(Primary DOS with 12 bit FAT)
    start 32, size 262144 (128 Meg), flag 80 (active)
    beg: cyl 0/ head 1/ sector 1;
    end: cyl 128/ head 0/ sector 32
The data for partition 2 is:
sysid 169 (0xa9),(NetBSD)
    start 262176, size 1736672 (847 Meg), flag 0
    beg: cyl 128/ head 1/ sector 1;
    end: cyl 975/ head 63/ sector 32
(...)
```



There is no `mbrlabel(8)` on FreeBSD so we must create labels manually:

```
# disklabel da1
# /dev/da1:
16 partitions:
#      size          offset    fstype     [fsiz... bps/cpg]
   a: 1736672        262176    4.2BSD     1024       8192       0
   c: 2000880            0    unused       0           0      # "raw" part, don't edit
   e: 262144          32    MSDOS       0           0       0
#
#
```



Finally, we copy NetBSD sets:

```
# newfs_msdos -F16 /dev/da1s1
# newfs /dev/da1s2
# mount -t msdosfs /dev/da1s1 /mnt/jornada-windows
# mount /dev/da1s2 /mnt/jornada-netbsd
# cp installation/hpcboot-sh3.exe
binary/kernel/netbsd-GENERIC.gz /mnt/jornada-windows/
# echo base.tgz etc.tgz modules.tgz rescue.tgz | tr ' ' '\n' |
xargs -I % tar -xpzf binary/sets/% -C /mnt/jornada-netbsd/
# umount /mnt/jornada-netbsd
# umount /mnt/jornada-windows
```



NetBSD doesn't boot because device nodes are missing. There is a script dev/MAKEDEV to create them but it doesn't run on FreeBSD.

It means that we need NetBSD to install NetBSD...



Attempt 3: root on wd(4) installed from miniroot on md(4) with NetBSD 7

Run hpcboot(8) as in the 1st attempt, partition CF as in the 2nd attempt,
place sets on the FAT partition and install NetBSD using sysinst(8).



The NetBSD distribution is broken into a collection of distribution sets. There are some basic sets that are needed by all installations and there are some other sets that are optional. You may choose to install a core set (Minimal installation), all of them (Full installation), or a custom group of sets (Custom installation).

Select your distribution

- a: Full installation
- b: Installation without X11
- c: Minimal installation**
- d: Custom installation
- x: Abandon installation

JORNADA

WLETT
CKARD



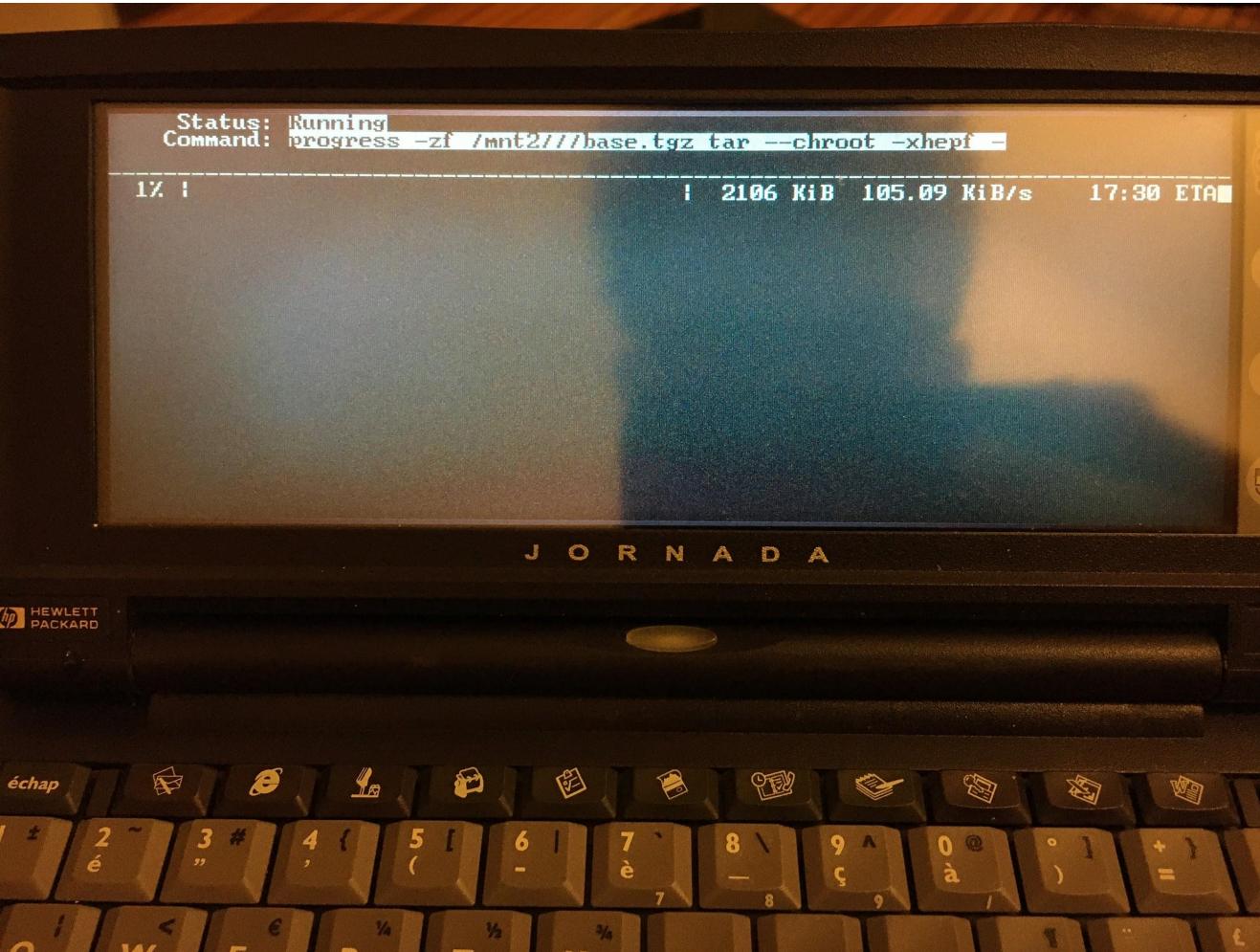
Enter the unmounted local device and directory on that device where the distribution is located.
Remember, the directory should contain the .tgz files.

a: Device wd0e
b: File system msdos
c: Base directory
d: Binary set directory
e: Source set directory
f: Exit
xx: Continue

J O R N A D A

LETT
KARD







Configure the additional items as needed.

a: Configure network
b: Timezone
c: Root shell
d: Change root password
e: Enable installation of binary packages
f: Fetch and unpack pkgsrc for building from source
g: Enable sshd
h: Enable ntpd
i: Run ntpdate at boot
j: Enable mdnsd
k: Enable xdm
l: Enable cgd
m: Enable lvm
n: Enable raidframe
o: Add a user
xx: Finished configuring

configure	
UTC	/bin/sh
password set	install
install	install
NO	NO
YES	YES
NO	YES

ETT
ARD

JORNADA



```
boot device: wd0
root on wd0a dumps on wd0b
root file system type: ffs
WARNING: clock lost 7639 days
WARNING: using filesystem time
WARNING: CHECK AND RESET THE DATE!
Sun Dec 1 19:19:24 UTC 2019
[2] Bad system call for rcd in ${rc_directories:-/etc/rc.d}; do te...
Sun Dec 1 19:19:25 UTC 2019
init: can't add utmpx record for 'system boot': Bad file descriptor
init: can't add utmpx record for 'runlevel': Bad file descriptor
init: kernel security level changed from 0 to 1
init: can't add utmpx record for 'ttyE0': Bad file descriptor
init: can't add utmpx record for 'ttyE1': Bad file descriptor

NetBSD/hpcsh (Amnesiac) (ttyE0)

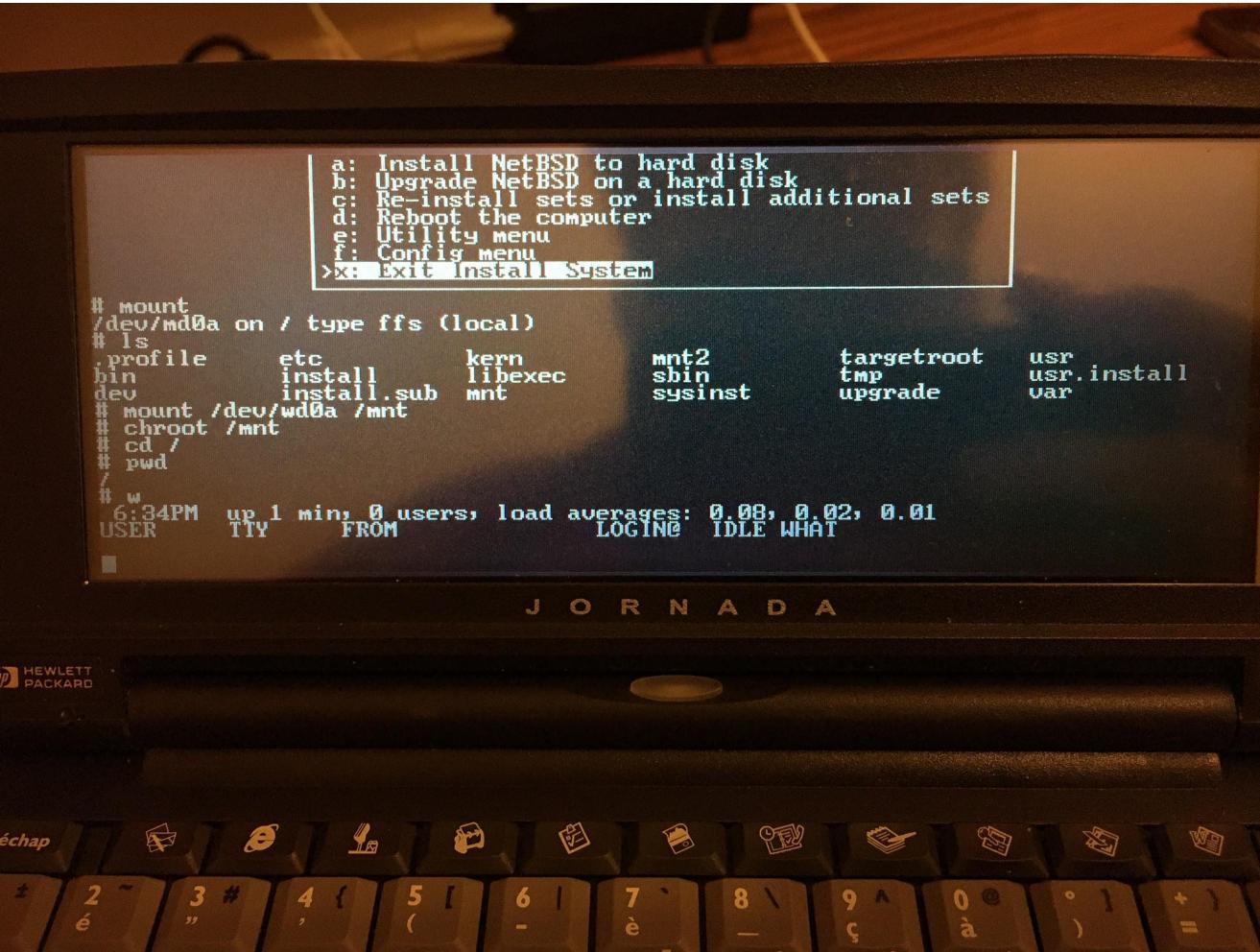
login: root
init: can't add utmpx record for 'ttyE0': Bad file descriptor
init: can't add utmpx record for 'ttyE0': Bad file descriptor

NetBSD/hpcsh (Amnesiac) (ttyE0)

login: ■
```

JORNADA





Attempt 4: root on wd(4) installed from miniroot on md(4) with NetBSD 5.0.1

Run hpcboot(8) as in the 1st attempt, partition CF as in the 2nd attempt,
place sets on the FAT partition and extract NetBSD sets manually.



We mount partitions, extract sets and add basic configuration to boot:

```
# mount /dev/wd0a /mnt
# mount -t msdos /dev/wd0e /mnt2
# cd /mnt
# tar -xpvzf /mnt2/base.tgz
# tar -xpvzf /mnt2/etc.tgz
# tar -xpvzf /mnt2/kern.tgz
# sed 's@rc_configured=NO@rc_configured=YES@' etc/rc.conf >etc/rc.conf.new
# echo 'hostname="jornada"' >>etc/rc.conf.new
# mv etc/rc.conf.new etc/rc.conf
# echo "/dev/wd0a / ffs rw,noatime,nodevmtime 1 1" >etc/fstab
# cd dev
# ./MAKEDEV all
# halt
```





Conclusion

- Unfortunately Tier 2 platforms are not well tested;
- It would be great if we could use sysinst(8);
- NetBSD must be installed from NetBSD (at least it didn't work in my case);
- However, a disk can be prepared on FreeBSD. It's important to use fdisk and disklabel.



Future ideas

- Debug why NetBSD-current doesn't run on hpcsh;
- Configure and start X server;
- Run Doom;
- Full disk encryption (cgdrroot module);
- NFS boot;
- DTrace(?);
- ZFS(?).



Check if you have some old hardware that can run NetBSD!



Zapraszamy



na pizza