

BSD Survival Guide

Mariusz Zaborski

Adam Wołk

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IT'S DANGEROUS TO GO
ALONE! TAKE THIS.





FreeBSD

Mariusz Zaborski



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 ;



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 ;

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



FreeBSD®



BACK TO THE FUTURE

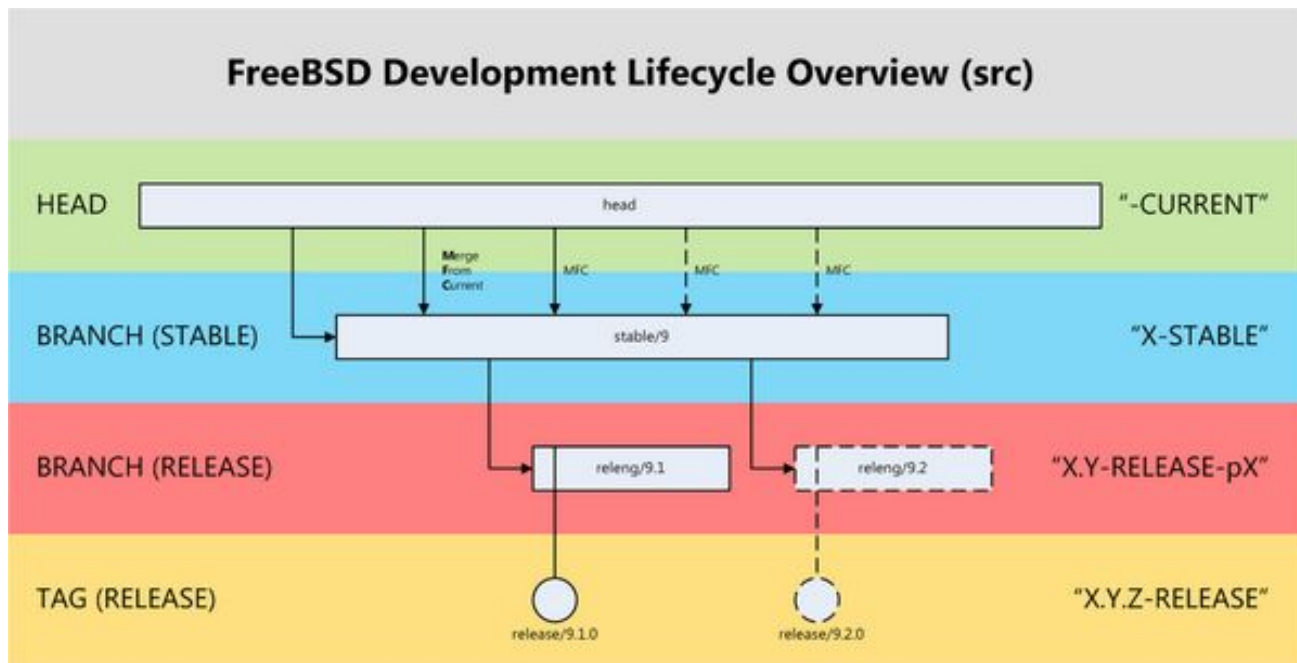


Head, stable, release

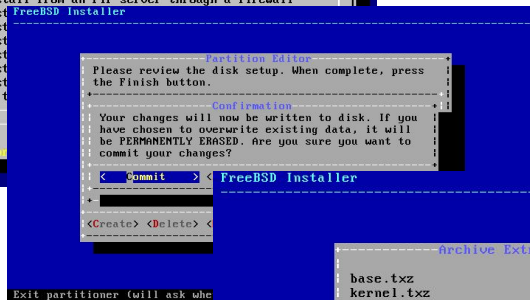
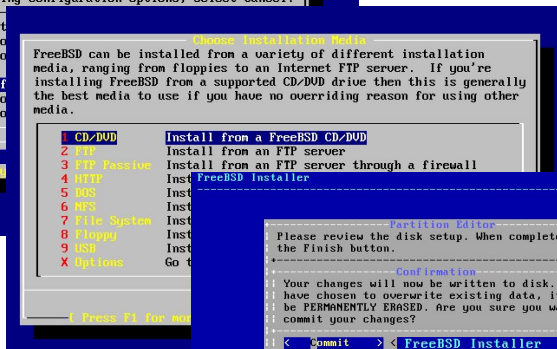
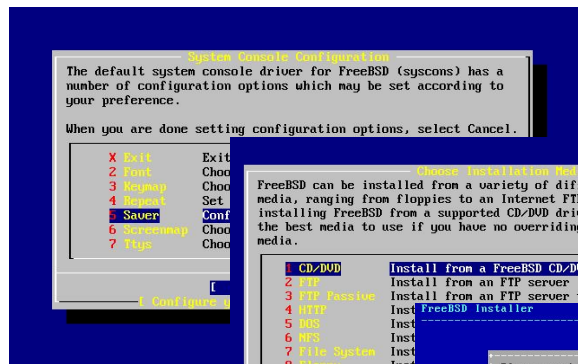
- Current/HEAD - tam lądują wszystkie nowe commity
- Stable - przetestowane zmiany pomiędzy releasami, API/ABI nie może się zmienić
- Release - oficjalny release



Head, stable, release



Instalacja



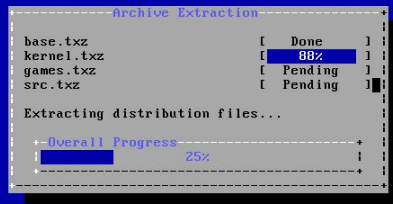
FreeBSD desktop

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 konfigurowa
 - Tylko passphrase





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



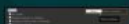
Файловая
система



Видео



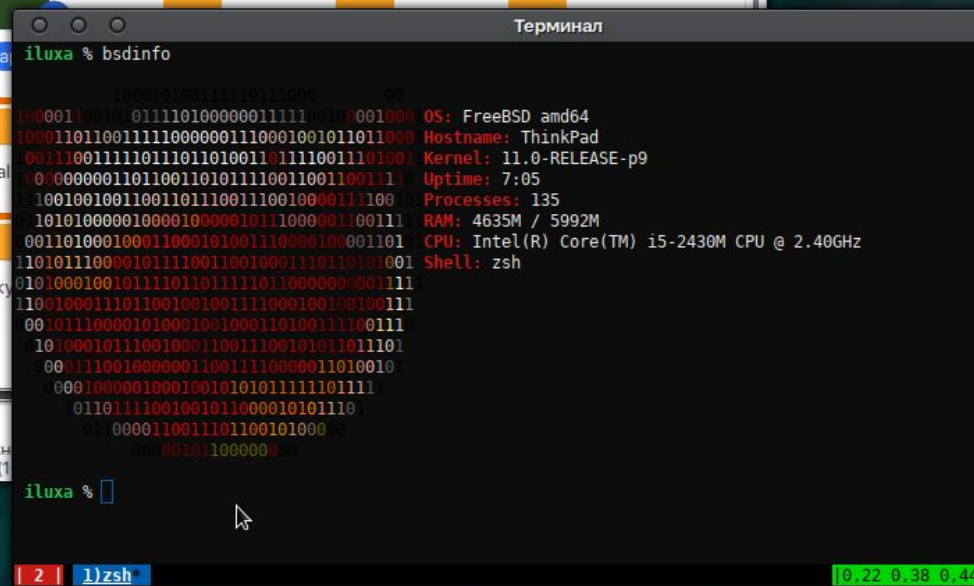
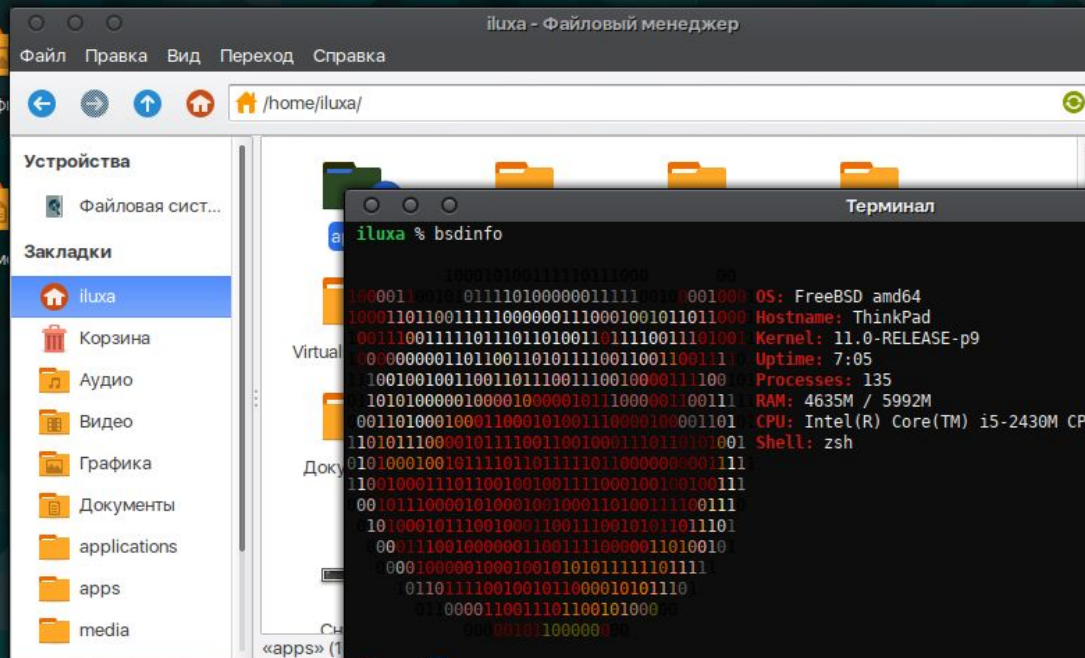
VirtualBox VMs



Снимок
экрана 2017...



```
select-font-  
size.diff
```



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

BAT:  charging (82%)



```
phoenix@trace-1663: ~$ ./phoenix-test-suite -h
[phoenix@trace-1663] ~/phoenix-test-suite $
[phoenix@trace-1663] ~/phoenix-test-suite ./phoenix-test-suite system-info

Phoenix Test Suite v6.9.0b5
System Information

PROCESSOR: Intel® Core i5-7500AE @ 2.50GHz
Core Count: 32

GRAPHICS: NVIDIA GeForce GTX 1670 8192MB
OpenGL: 4.5.0
Display Driver: NVIDIA 470.25
Monitor: Acer G2509
Screens: 2x1920x1080

MOTHERBOARD: ASUS PRIME Z390-A
Chipset: Intel® C610 Chipset
Audio: Intel® Audio Driver
Network: Intel® PRO/1000 Gigabit

MEMORY: 32GB

DISK: Generic SATA Device
File-System: ZFS

OPERATING SYSTEM: FreeBSD
Kernel: 12.0-CURRENT (amd64)
Desktop: LXDE 1.4.2
Display Server: X Server 1.20.4
Compiler: clang 6.0.0 (SW 204080)
Security: SMP Protection

[phoenix@trace-1663] ~/phoenix-test-suite $
```

Update FreeBSD - paczki

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



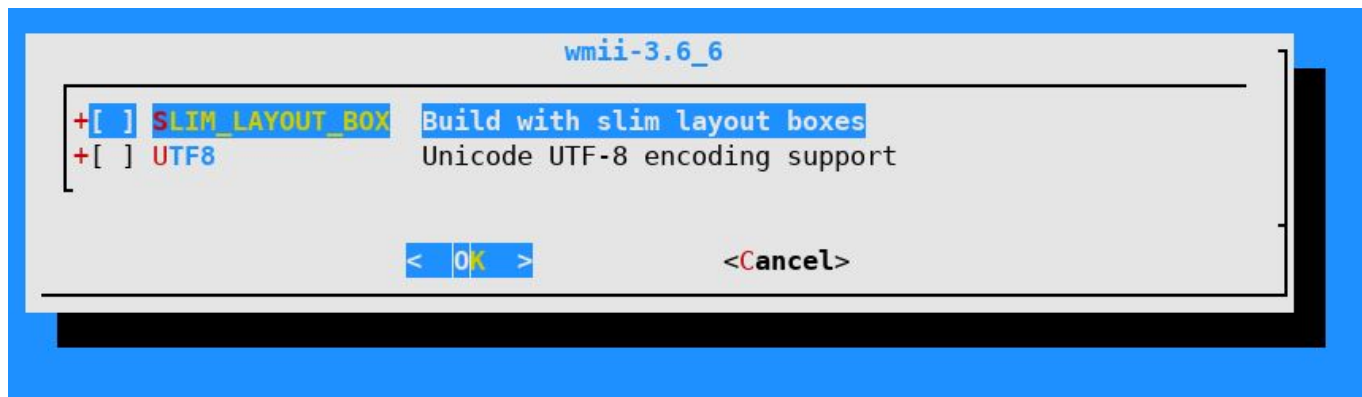
Update FreeBSD - porty

- portsnap fetch
- portsnap extract

- svn checkout

[https://svn.FreeBSD.org/ports/head /usr/ports](https://svn.FreeBSD.org/ports/head/usr/ports)

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



Update FreeBSD - freebsd-upgrade

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



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`



Update FreeBSD - make

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



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 Enviroments
 - `beadm`
 - `bectl`

ZFS Boot Environments
Intro

Polish BSD User Group
2018/07/30

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	MOUNTPPOINT
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



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



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



Update FreeBSD - co jeżeli coś pójdzie nie tak?

UFS Version

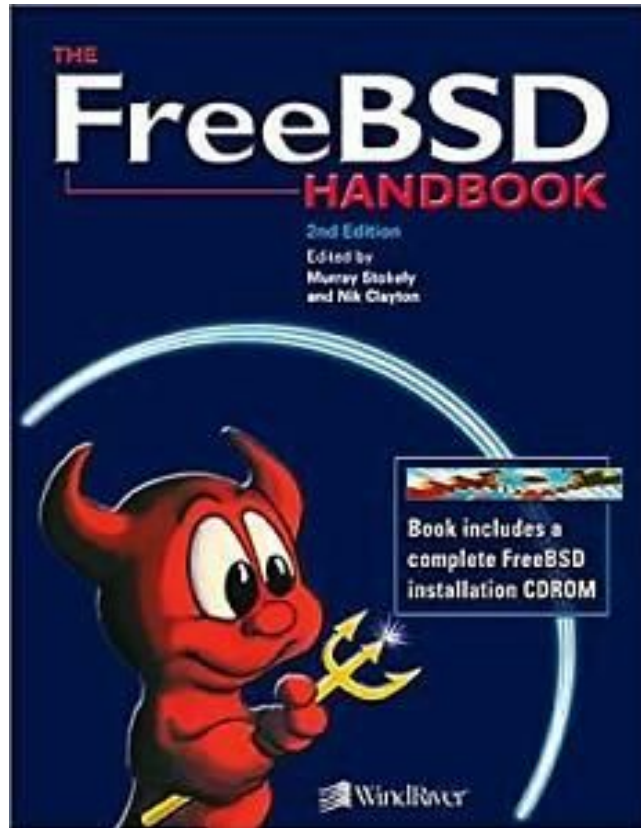
```
# gpart show md0
=>      40   25165744   md0   GPT   (12G)
        40         128     1   freebsd-boot (64K)
       168      8388608     2   freebsd-ufs [bootme] (4.0G)
      8388776      8388608     3   freebsd-ufs [bootonce,bootme]
(4.0G)
     16777384      8388400     4   freebsd-ufs (4.0G)
```



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



~~Survival guide~~ Handbook



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 \(TSS2\)](#)



Twitter radzi



Jan-Piet MENS @jpmens · 56m

Replying to @oshogbovx and @ed_maste
Boot Environments, Jails, ZFS.



1



Andrey Fesenko @f0andrey · 3h

Replying to @peteranthropos @oshogbovx and 3 others
With BE for sure ;)



1



PTR @peteranthropos · 3h

Replying to @oshogbovx @netzverweigerer and 2 others
Pick ZFS on install time. This alone prevents tones of headaches in the future



1



freeBSD®

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 ;-)





OpenBSD

Adam Wołk



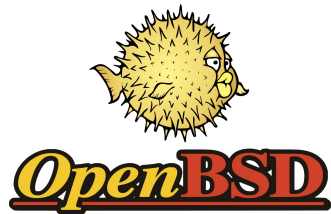
I run something you don't want.

"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.

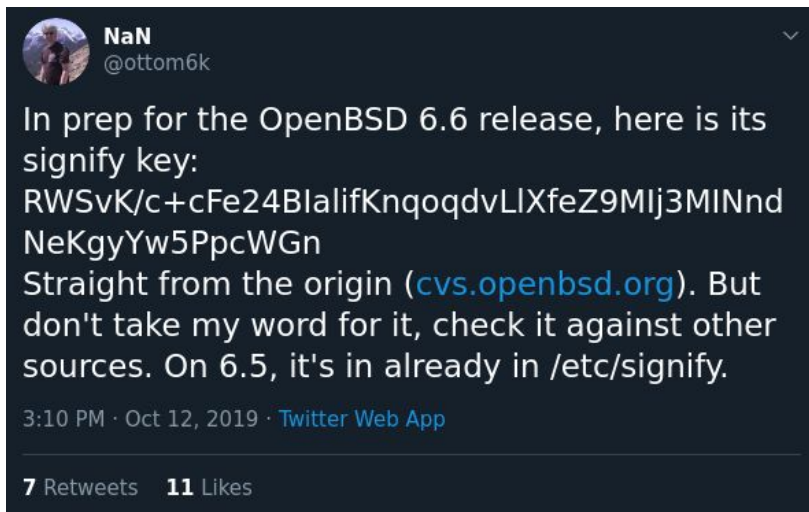
Nevertheless, I'm using OpenBSD and I'm not alone 🐙

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

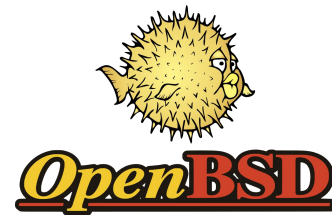


Signify

```
$ cat o66.pub
untrusted comment: openbsd 6.6 base public key
RWSvK/c+cFe24BIalifKnqoqdvLlXfeZ9MIj3MINndNeKgyYw5PpcWGn
$ signify -Cp o66.pub -x SHA256.sig install66.iso
Signature Verified
install66.iso: OK
$
```



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

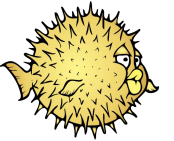


Installation

```
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 configu
red
"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, ver
sion 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 ad
dr 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

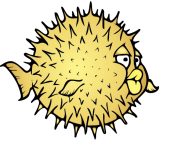
Installation

```
(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

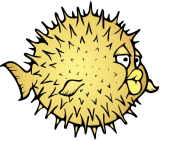
Available network interfaces are: em0 vlan0.
Which network interface do you wish to configure? (or 'done') [em0]
IPv4 address for em0? (or 'dhcp' or 'none') [dhcp]
em0: 10.0.2.15 lease accepted from 10.0.2.2 (52:54:00:12:35:02)
IPv6 address for em0? (or 'autoconf' or 'none') [none]
Available network interfaces are: em0 vlan0.
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 vlan0.  
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 vlan0.  
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]
```



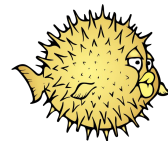
Full Disk Encryption

```
Available network interfaces are: em0 vlan0.
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 vlan0.
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]
```

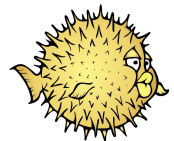
<https://www.openbsd.org/faq/faq14.html#softraidFDE>



OpenBSD

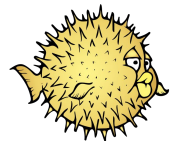
Full Disk Encryption

```
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
```



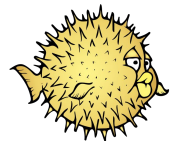
Full Disk Encryption

```
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# 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
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]
```



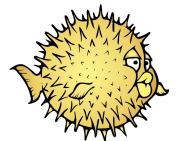
Partitioning

```
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  [fsize  bsize    cppl
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]
```



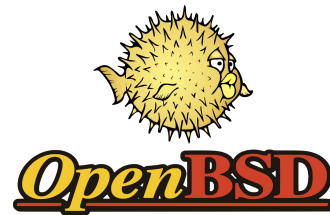
Partitioning

```
> 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)



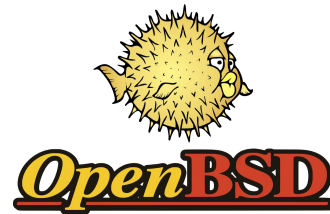
Partitioning

```
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

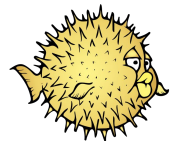
- Have at least
 - /usr/local for wxallowed ports
 - /home to keep it over re-installs
 - /var for internet facing systems



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,
odev, nosuid)
/dev/sd0d (2e08d64ce11487bf.d) on /mnt/tmp type ffs (rw, asynchronous, local, no
dev, nosuid)
/dev/sd0f (2e08d64ce11487bf.f) on /mnt/usr type ffs (rw, asynchronous, local, no
dev)
/dev/sd0g (2e08d64ce11487bf.g) on /mnt/usr/X11R6 type ffs (rw, asynchronous, loc
al, nodev)
/dev/sd0h (2e08d64ce11487bf.h) on /mnt/usr/local type ffs (rw, asynchronous, loc
al, nodev)
/dev/sd0j (2e08d64ce11487bf.j) on /mnt/usr/obj type ffs (rw, asynchronous, loca
, nodev, nosuid)
/dev/sd0i (2e08d64ce11487bf.i) on /mnt/usr/src type ffs (rw, asynchronous, loca
, nodev, nosuid)
/dev/sd0e (2e08d64ce11487bf.e) on /mnt/var type ffs (rw, asynchronous, local, no
dev, 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 '?')
```

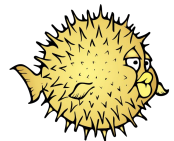


Sets

```
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

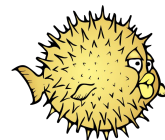
HTTP Server? (hostname, list#, 'done' or '?') 1
HTTP Server? (hostname, list#, 'done' or '?') [cdn.openbsd.org]
Server directory? [pub/OpenBSD/6.6/amd64]

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]
```



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 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? (cd@ disk http nfs or 'done') [done]
```



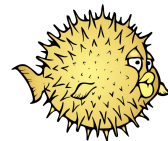
Finishing up

```
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 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!

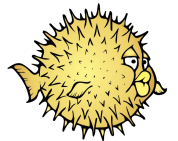
When you login to your new system the first time, please read your mail
using the 'mail' command.

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

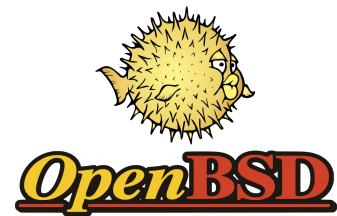
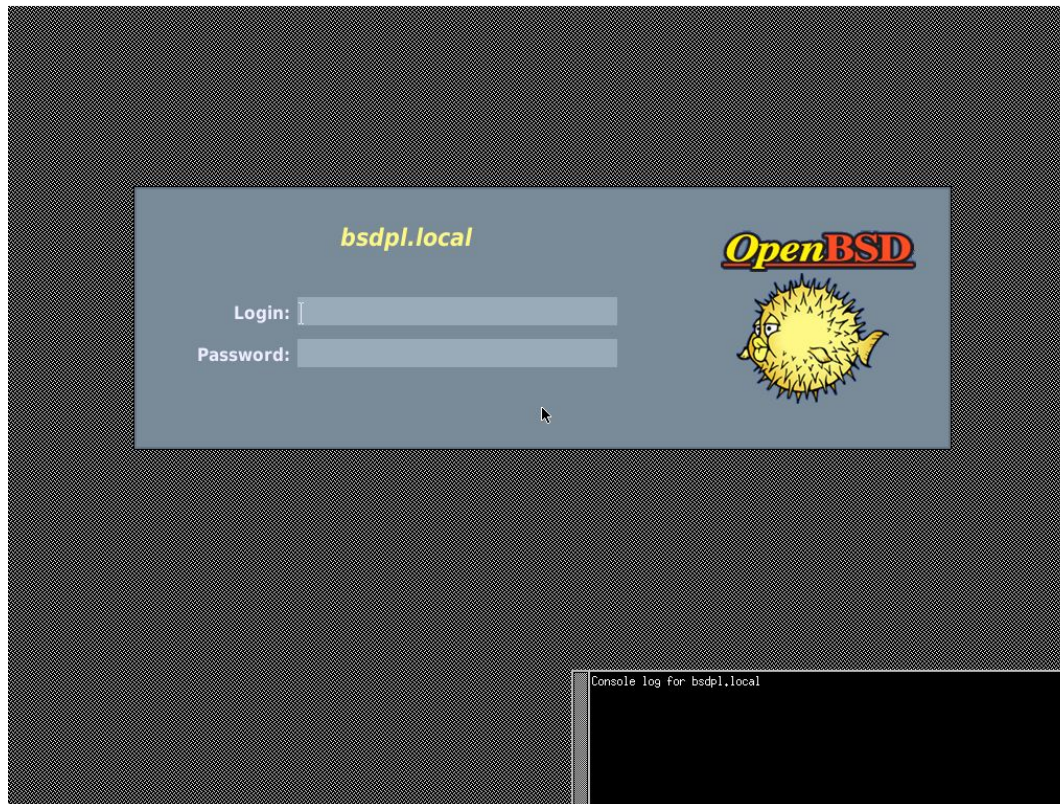


Booting up

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



XDM



fvmw

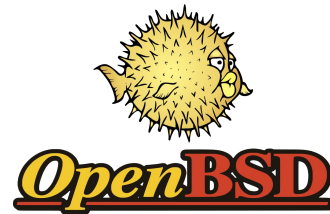


Firmware & syspatch

```
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.

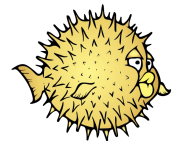
Checking for available binary patches...
Run syspatch(8) to install:
001_bpf      002_ber      003_bgpd      004_net80211  005_sysupgrade
006_ifioctl  007_inteldrm  008_mesa
starting local daemons: cron xenodm.
Sun Dec 1 16:43:31 CET 2019
bsdpl# █
```



Firmware & syspatch

```
xterm
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_net8021... 100% |*****| 64839 00:00
Installing patch 004_net80211
Get/Verify syspatch66-005_sysupgr... 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_intelldr... 100% |*****| 21468 KB 00:03
Installing patch 007_intelldr
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#
```

I

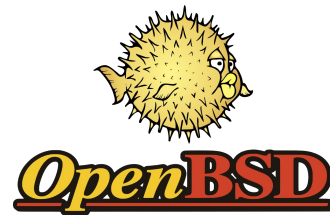


Stable, Release or Current?

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

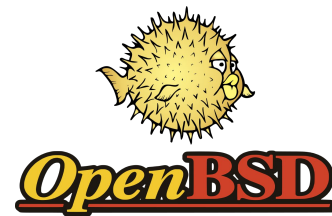
Only two latest releases are supported and receive fixes.

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>



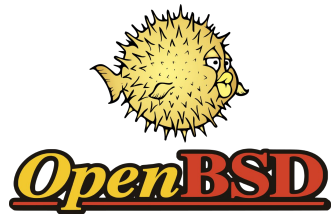
Autoinstall

```
$ 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

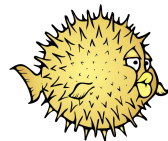
```
$ cat /etc/doas.conf
permit setenv { ENV PS1 SSH_AUTH_SOCKET } :wheel
permit persist puffy as root
$ doas whoami
doas (puffy@bsdpl.local) password:
root
bsdpl$ doas whoami
root
bsdpl$
```



Xfce4, but applies to all desktops

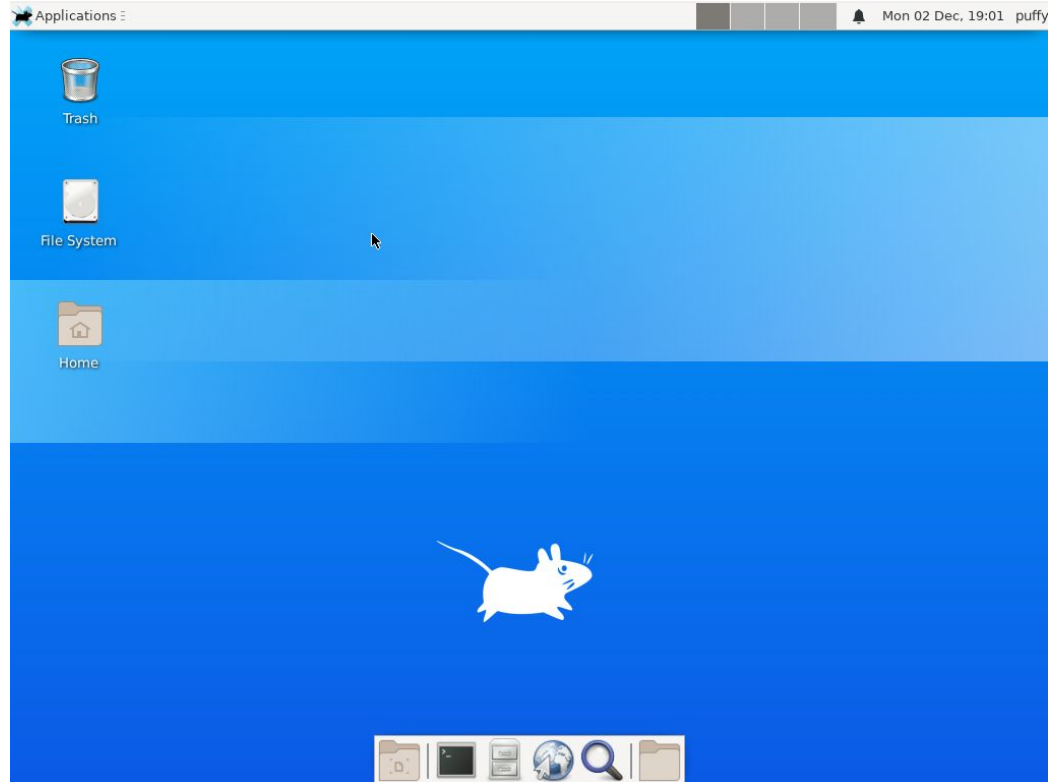
- `pkg_info -Q xfce` - search for packages
- `doas pkg_add xfce` install the package

```
Running tags: ok
The following new rcscripts were installed: /etc/rc.d/avahi_daemon /etc/rc.d/avahi_dnsconfd /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/gnupg
  /usr/local/share/doc/pkg-readmes/gtk+2
  /usr/local/share/doc/pkg-readmes/gtk+3
  /usr/local/share/doc/pkg-readmes/sdl2
  /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.
  # 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
```



i3, but applies to all desktops

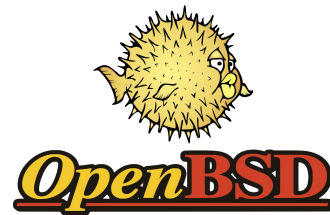
```
$ doas pkg_add i3
$ cat /home/mulander/.xsession
export LC_CTYPE=pl_PL.UTF-8
xset -b
xidle &
setxkbmap pl &
exec i3
$
```



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:
```

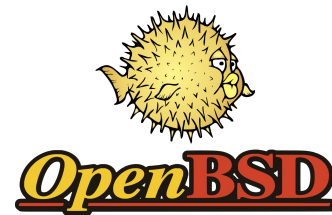


WiFi roaming

- `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.ams

<https://openbsd.amsterdam/>

OpenBSD
.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.”



€60 / year

512M RAM 50G HDD

Want more memory or storage? (limited availability)

+€10 / year for extra 512M RAM

+€50 / year for extra 50G HDD

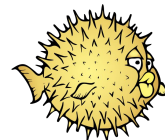
Dedicated **IPv4** (DHCP assigned) and dedicated **IPv6** (/64).

Console access with vmctl(8) using su(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



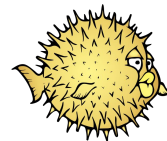
OpenBSD Innovations <https://www.openbsd.org/innovations.html>

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 `bgpd(8)`, `dhclient(8)`, `dhcpcd(8)`, `dvmrpd(8)`, `eigrpd(8)`, `file(1)`, `httpd(8)`, `iked(8)`, `ldapd(8)`, `ldpd(8)`, `mountd(8)`, `npppd(8)`, `ntpd(8)`, `ospfd(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 FAQ

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

OpenBSD Frequently Asked Questions

This FAQ is supplemental documentation to the man pages, which are available both for features and changes in the [development version](#) of OpenBSD (-current) that are not yet in a release.

Quick Links:

Security Updates	Manual Pages	Porter's Handbook
Upgrading to 6.6	Mailing Lists	Port Testing Guide
Following -current	Reporting Bugs	PF User's Guide

Introduction to OpenBSD

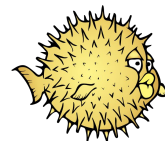
- [About OpenBSD](#)
- [Hardware Support](#)
- [Manual Pages](#)
- [Mailing Lists](#)
- [Migrating to OpenBSD](#)
- [Reporting Bugs](#)
- [Supporting the Project](#)

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](#)



OpenBSD



NetBSD

Konrad Witaszczyk





Supported architectures

CPU	Tier(s)	Port(s)
alpha	II	alpha
arm	I, II, III	acorn26 acorn32 cats epoc32 evbarm hpcarm iyonix 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

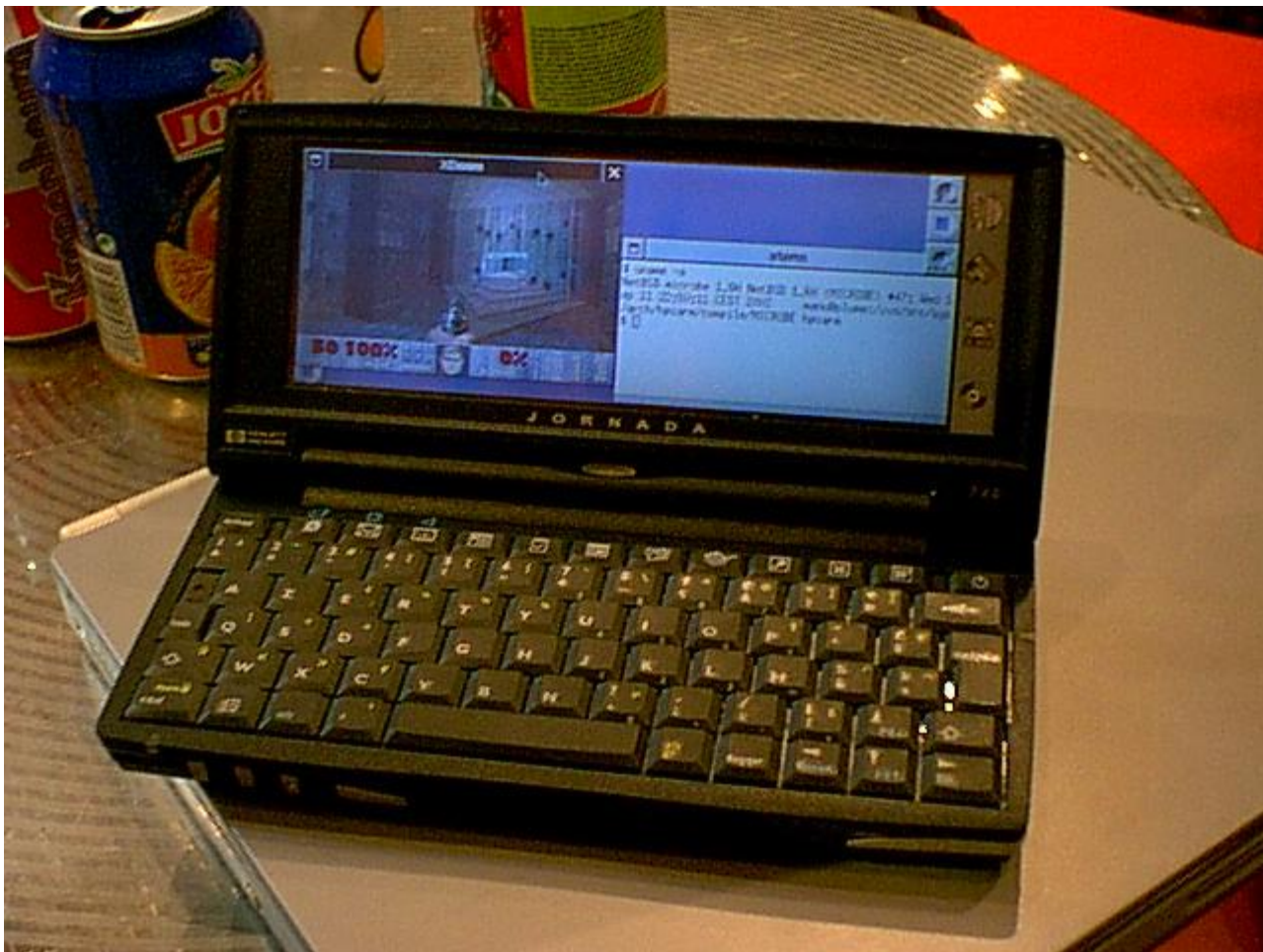
In total: 58 ports (8 Tier I, 49 Tier II, 1 Tier III)



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

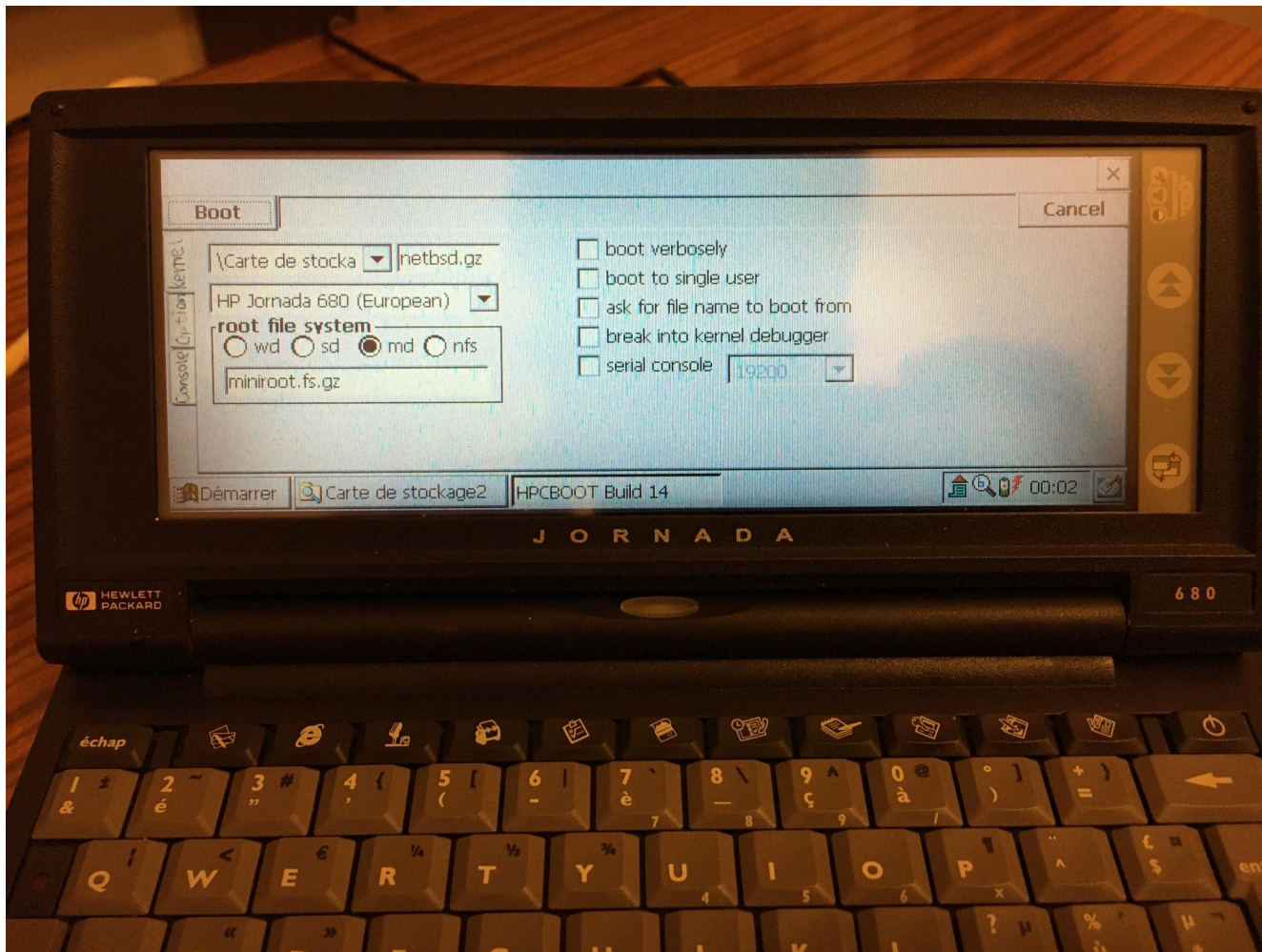
Media=0xf0 FATsecs=24 SecPerTrack=32 Heads=64 HiddenSecs=0

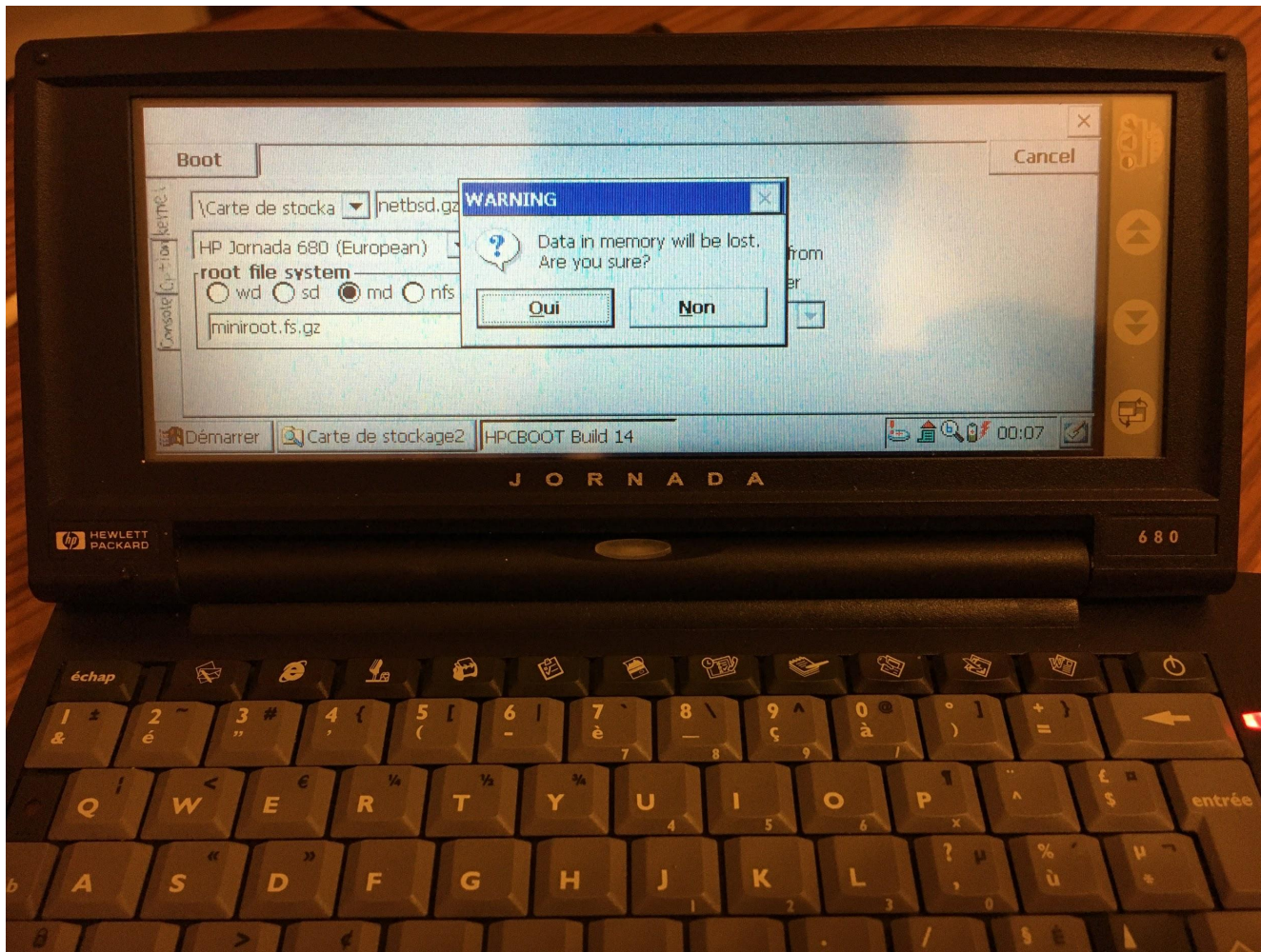
```
# mount -t msdosfs /dev/da1s1 /mnt/jornada
```

```
# cp hpcboot-sh3.exe netbsd.gz miniroot/miniroot.fs.gz /mnt/jornada/
```

```
# umount /mnt/jornada
```







NetBSD/hpcsh 9.99.19

This menu-driven tool is designed to help you install NetBSD to a hard disk,
or upgrade an existing NetBSD system, with a minimum of work.
In the following menus type the reference letter (a, b, c, ...) to select an
item, or type CTRL+N/CTRL+P to select the next/previous item.
The arrow keys and Page-up/Page-down may also work.
Activate the current selection from the menu by typing the enter key.

If you booted from an external device, you may now remove it.
Thank you for using NetBSD!

```
NetBSD-9.99.19 Install System
a: Install NetBSD to hard disk
b: Upgrade NetBSD on a hard disk
c: Re-install sets or install additional sets
d: Reboot the computer
e: Utility menu
f: Config menu
x: Exit Install System
```

J O R N A D A

hp HEWLETT
PACKARD

680



```
# 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 0-24/0/32)
1: <UNUSED>
2: <UNUSED>
3: <UNUSED>
No active partition.
Drive serial number: 0 (0x00000000)
# disklabel -i -I wd0
^C
^C^C^C■
```

J O R N A D A

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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	[fsize	bsize	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 -xpvzf 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

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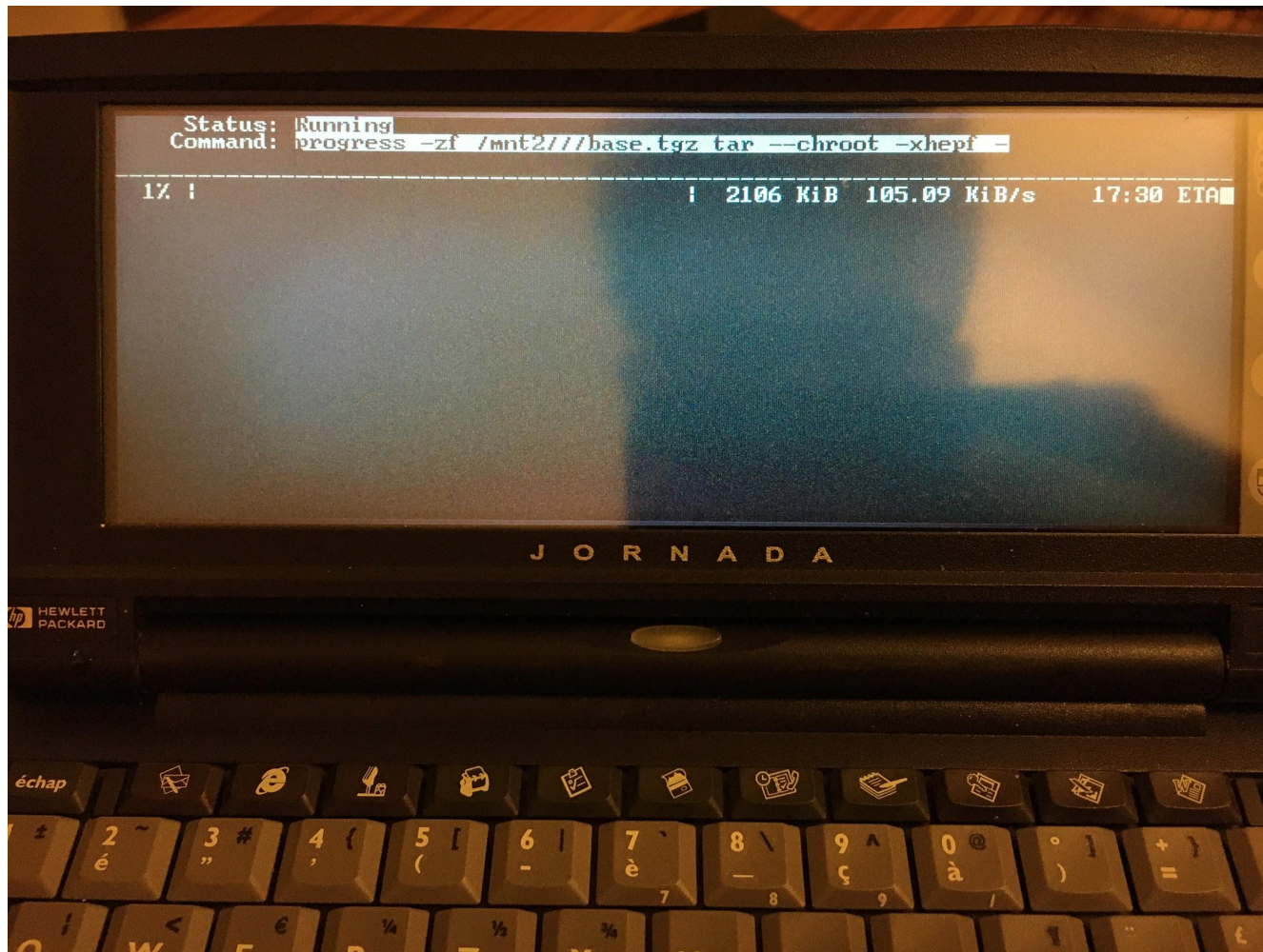
Enter the unmounted local device and directory on that device where the
distribution is located.
Remember, the directory should contain the .tgz files.

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

J O R N A D A

LETT
CARD





```
Status: Command failed
Command: /etc/rc.d/random_seed stop
Hit enter to continue

[1] Bad system call (core dumped) df -G "${1}" !
Done
random_seed: /var/db/entropy-file: Bad file system type
```

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680

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1 2 3 4 5 6 7 8 9 0
~ ` # \$ % ^ & * () _ + =
Q W E R T Y U I O P
4 5 6 7 8 9 0



Configure the additional items as needed.

a: Configure network	configure
b: Timezone	UTC
c: Root shell	/bin/sh
d: Change root password	password set
e: Enable installation of binary packages	install
f: Fetch and unpack pkgsrc for building from source	install
g: Enable sshd	NO
h: Enable ntpd	NO
i: Run ntpdate at boot	NO
j: Enable mdnsd	NO
k: Enable xdm	NO
l: Enable cgd	YES
m: Enable lvm	NO
n: Enable raidframe	YES
o: Add a user	
>x: finished configuring	

J O R N A D A

ETT
ARD



```
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

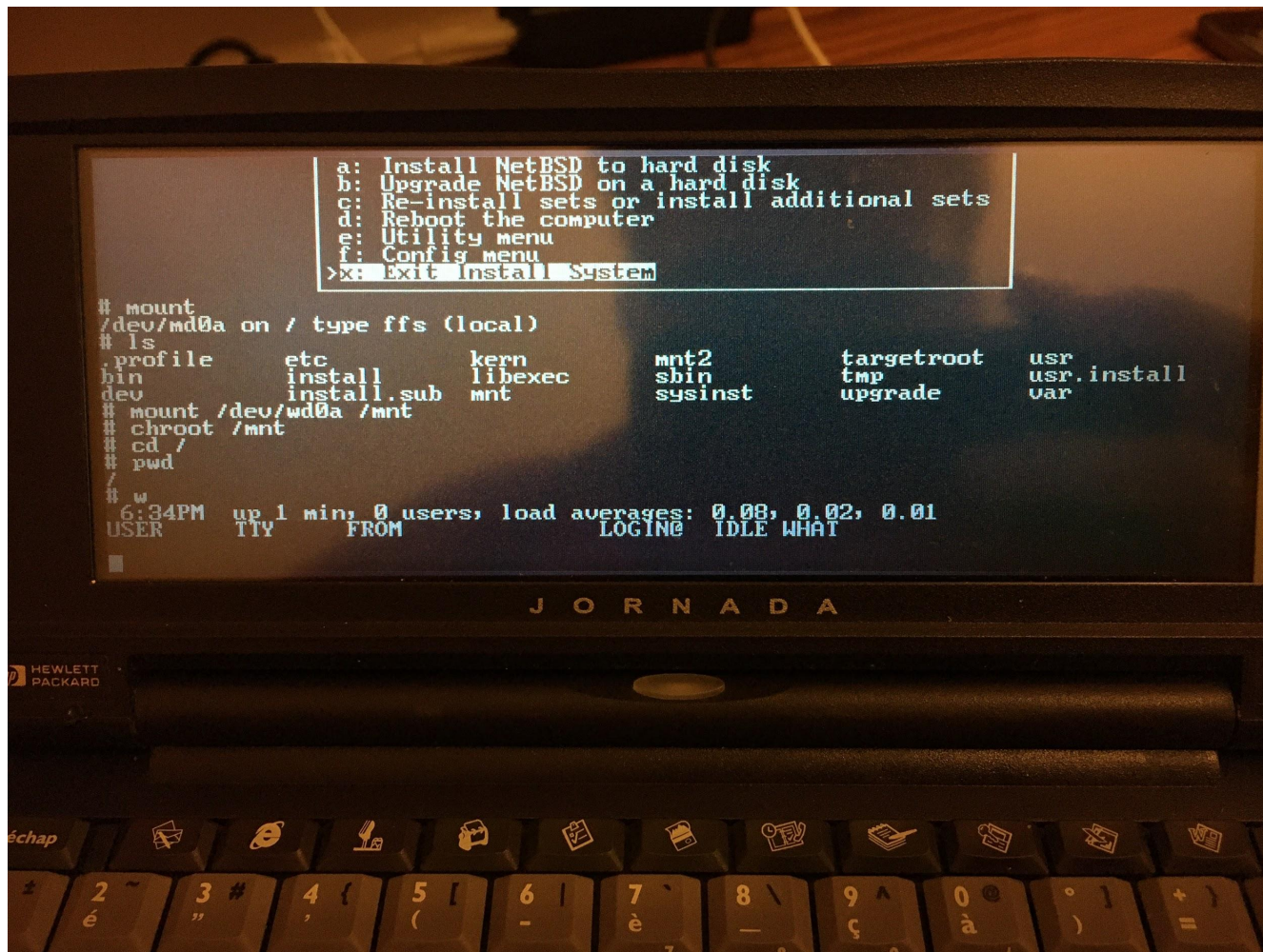
NetBSD/hpcsh (Amnesiac) (ttyE0)

login: █
```

J O R N A D A

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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 -xvpzf /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 (cgdroot module);
- NFS boot;
- DTrace(?);
- ZFS(?).



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



Zapraszamy



NetBSD®



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