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 I found myself using. You can watch a video of my first time experience below:

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/frebsd-7-day-challenge.html
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 „bezbolesnie” zacząć przygodę z FreeBSD na pulpicie

Polish BSD User Group Meetup
2019-11-07

(wersja po poprawkach)
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
Instalacja X11... going beyond...

vermade

Another $[(RANDOM)$ sysadmin sharing his experiences of work at IT industry.

HOME  POSTS  ARCHIVE  CONTACT

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 Supress [2018/06]
• Part 12 ... Configuration ... Openbox [2018/07] +1 UPDATE

FreeBSD desktop
Jak „bezboleśnie” zacząć przygodę z FreeBSD na pulpicie

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Polish BSD User Group Meetup
2019-11-07

(wersja po poprawkach)

Rafał Cichocki
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

- 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 Environments**
  - `beadm`
  - `bectl`
Update FreeBSD - co jeżeli coś pójdzie nie tak?

ZFS Version

<table>
<thead>
<tr>
<th>NAME</th>
<th>USED</th>
<th>AVAIL</th>
<th>REFER</th>
<th>MOUNTPOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>zroot</td>
<td>9.87G</td>
<td>7.51G</td>
<td>96K</td>
<td>/zroot</td>
</tr>
<tr>
<td>zroot/ROOT</td>
<td>4.37G</td>
<td>7.51G</td>
<td>96K</td>
<td>none</td>
</tr>
<tr>
<td>zroot/ROOT/default</td>
<td>204K</td>
<td>7.51G</td>
<td>1.37G</td>
<td>/</td>
</tr>
<tr>
<td>zroot/ROOT/newbe</td>
<td>204K</td>
<td>7.51G</td>
<td>1.40G</td>
<td>/</td>
</tr>
<tr>
<td>zroot/ROOT/upgrade-12</td>
<td>4.37G</td>
<td>7.51G</td>
<td>2.31G</td>
<td>/</td>
</tr>
<tr>
<td>zroot/tmp</td>
<td>376K</td>
<td>7.51G</td>
<td>272K</td>
<td>/tmp</td>
</tr>
<tr>
<td>zroot/usr</td>
<td>656M</td>
<td>7.51G</td>
<td>96K</td>
<td>/usr</td>
</tr>
<tr>
<td>zroot/usr/home</td>
<td>264K</td>
<td>7.51G</td>
<td>180K</td>
<td>/usr/home</td>
</tr>
<tr>
<td>zroot/usr/ports</td>
<td>656M</td>
<td>7.51G</td>
<td>656M</td>
<td>/usr/ports</td>
</tr>
<tr>
<td>zroot/usr/src</td>
<td>96K</td>
<td>7.51G</td>
<td>96K</td>
<td>/usr/src</td>
</tr>
<tr>
<td>zroot/var</td>
<td>4.77M</td>
<td>7.51G</td>
<td>96K</td>
<td>/var</td>
</tr>
<tr>
<td>zroot/var/tmp</td>
<td>224K</td>
<td>7.51G</td>
<td>136K</td>
<td>/var/tmp</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>BE</th>
<th>Active</th>
<th>Mountpoint</th>
<th>Space</th>
<th>Created</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>-</td>
<td>-</td>
<td>866.2M</td>
<td>2016-07-13 09:18</td>
</tr>
<tr>
<td>newbe</td>
<td>-</td>
<td>-</td>
<td>164.2M</td>
<td>2018-08-19 20:31</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>BE</th>
<th>Active</th>
<th>Mountpoint</th>
<th>Space</th>
<th>Created</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>-</td>
<td>-</td>
<td>866.2M</td>
<td>2016-07-13 09:18</td>
</tr>
<tr>
<td>newbe</td>
<td>-</td>
<td>-</td>
<td>164.2M</td>
<td>2018-08-19 20:31</td>
</tr>
</tbody>
</table>
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/
<table>
<thead>
<tr>
<th>Laptop</th>
<th>Graphics</th>
<th>External DP/HDMI/VGA</th>
<th>Sound</th>
<th>WiFi</th>
<th>Ethernet</th>
<th>USB</th>
<th>Suspend / Resume</th>
<th>Needs config</th>
<th>Year introduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ASUS_FM200</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>/ASUS_UX31E</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>/ASUS_UX32VD</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>/ASUS_UX430U</td>
<td>✓</td>
<td>drm-next</td>
<td>Not tested</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td>2017</td>
</tr>
<tr>
<td>/ASUS_GL552V</td>
<td>✓</td>
<td>i915km:</td>
<td>Not tested</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td>2017</td>
</tr>
<tr>
<td>/ASUS_S510U</td>
<td>✓</td>
<td>drm-next</td>
<td>Not tested</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>no</td>
<td>2017</td>
</tr>
<tr>
<td>/Acer_AspireOne_D250</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td>2007-2009?</td>
</tr>
<tr>
<td>/Acer_AspireOne_ZG5</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td>2009</td>
</tr>
<tr>
<td>/Acer_Aspire_4730Z</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td>2011</td>
</tr>
<tr>
<td>/Acer_Aspire_5742G</td>
<td>✓</td>
<td>i915kms, Nvidia Optimus</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes</td>
<td>2011</td>
</tr>
<tr>
<td>/Acer_Aspire_E5_773G_78RN</td>
<td>i915kms: ✓</td>
<td>i915kms: ✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>yes (Xorg) 2015Q4</td>
<td></td>
</tr>
<tr>
<td>/Acer_Aspire_V3_771G</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>2012</td>
</tr>
<tr>
<td>/Acer_Aspire_V5_171</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>2011</td>
</tr>
<tr>
<td>/Apple_MacBookAir4,2</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>2011</td>
</tr>
<tr>
<td>/Apple_MacBookProRetina</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>Early 2015</td>
</tr>
<tr>
<td>/Dell_Inspiron_15-3521</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>/Dell_Inspiron_7537</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>/Dell_Inspiron_N4050</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>/Dell_Inspiron_N4120</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>/Dell_Latitude_3550</td>
<td>vesa: ✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>2015</td>
</tr>
</tbody>
</table>

https://wiki.freebsd.org/Laptops
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_ifad
- 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
Relying to @oshogbovx and @ed_maste
Boot Environments, Jails, ZFS.

Andrey Fesenko @f0andrey · 3h
Relying to @peteranthropos @oshogbovx and 3 others
With BE for sure ;)

PTR @peteranthropos · 3h
Relying to @oshogbovx @netzverweigerer and 2 others
Pick ZFS on install time. This alone prevents tones of headaches in the future
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 ;-)
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+cFe24BIalifKnqoqdvlXfeZ9Mlj3MINndNeKgyYw5PpcW Gn
$ signify -Cp o66.pub -x SHA256.sig install66.iso
Signature Verified
install66.iso: OK
$

In prep for the OpenBSD 6.6 release, here is its signify key:
RWSvK/c+cFe24BIalifKnqoqdvlXfeZ9Mlj3MINndNeKgyYw5PpcW Gn
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
Installation

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
Installation

(1)nstall, (U)pgrade, (A)utoreinstall 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] 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 xcdotm(1)? [no] yes
Setup a user? (enter a lower-case loginnname, or 'no') [no]

OpenBSD
Installation

Available network interfaces are: em0 vlan0.
Which network interface do you wish to configure? (or 'done') [em0] [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 xenomd(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
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 -i y 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: [4.2BSD1 RAID
wd0-> w
wd0> q
No label changes.
bsdpl# biocl -c C -l wd0a softraid0
New passphrase:
Re-type passphrase:
bsdpl# 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/rdskc 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 sofraid0
New passphrase:
Re-type passphrase:
bsd0 at scsibus1 targ 1 lun 0: <OPENBSD, SR CRYPTO, 006>
bsd0: 16378MB, 512 bytes/sector, 33543128 sectors
sofraid0: CRYPTO volume attached as sd0
bsdpl# dd if=/dev/zero of=/dev/rdsd0c bs=1m count=1
419430400 records in
419430400 records out
442375360 bytes transferred in 0.007 secs (144590567 bytes/sec)
bsdpl# exit
Available disks are: wd0 sd0.
Which disk is the root disk? ('?' for details) [wd0]?
wdo: VBOX HARD_DISK (16.0G)
bsd0: 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] ?
w0: VBOX HARDISK (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:

<table>
<thead>
<tr>
<th>size</th>
<th>offset</th>
<th>fstype</th>
<th>fsize</th>
<th>bsize</th>
<th>cpg</th>
</tr>
</thead>
<tbody>
<tr>
<td>a:</td>
<td>429.4M</td>
<td>64</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>b:</td>
<td>638.9M</td>
<td>879552</td>
<td>swap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c:</td>
<td>16378.5M</td>
<td>0</td>
<td>unused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d:</td>
<td>567.1M</td>
<td>2188000</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>e:</td>
<td>806.5M</td>
<td>3349408</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>f:</td>
<td>1779.4M</td>
<td>5001216</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>g:</td>
<td>551.7M</td>
<td>8645504</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>h:</td>
<td>1862.3M</td>
<td>9775296</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>i:</td>
<td>1411.8M</td>
<td>13589344</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>j:</td>
<td>5343.5M</td>
<td>16480640</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
<tr>
<td>k:</td>
<td>2900.2M</td>
<td>27424224</td>
<td>4.2BSD</td>
<td>2048</td>
<td>16384</td>
</tr>
</tbody>
</table>

Use (A)uto layout, (E)dit auto layout, or create (C)ustom layout? [a]
Partitioning

```
> p v
OpenBSD area: 64-1342166490: size: 640.0G: free: 0.0G
# size   offset  ftype  [fsze bsze  cpg]
a: 1.0G   64  4.2BSD  2048 16384  1 # /
b: 4.0G   2104512  swap
b: 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, 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 fgl.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]'.


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

<table>
<thead>
<tr>
<th>Task</th>
<th>Status</th>
<th>Size</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get/Verify SHA256.sig</td>
<td>100%</td>
<td>2141</td>
<td>00:00</td>
</tr>
<tr>
<td>Signature Verified</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get/Verify bsd</td>
<td>100%</td>
<td>18250 KB</td>
<td>00:03</td>
</tr>
<tr>
<td>Get/Verify bsd.rd</td>
<td>100%</td>
<td>10058 KB</td>
<td>00:02</td>
</tr>
<tr>
<td>Get/Verify base66.tgz</td>
<td>100%</td>
<td>236 MB</td>
<td>00:10</td>
</tr>
<tr>
<td>Get/Verify comp66.tgz</td>
<td>100%</td>
<td>72109 KB</td>
<td>00:12</td>
</tr>
<tr>
<td>Get/Verify man66.tgz</td>
<td>100%</td>
<td>7418 KB</td>
<td>00:01</td>
</tr>
<tr>
<td>Get/Verify game66.tgz</td>
<td>100%</td>
<td>2745 KB</td>
<td>00:00</td>
</tr>
<tr>
<td>Get/Verify xbase66.tgz</td>
<td>100%</td>
<td>22092 KB</td>
<td>00:03</td>
</tr>
<tr>
<td>Get/Verify xshare66.tgz</td>
<td>100%</td>
<td>4482 KB</td>
<td>00:01</td>
</tr>
<tr>
<td>Get/Verify xfont66.tgz</td>
<td>100%</td>
<td>39342 KB</td>
<td>00:06</td>
</tr>
<tr>
<td>Get/Verify xserv66.tgz</td>
<td>100%</td>
<td>15757 KB</td>
<td>00:03</td>
</tr>
<tr>
<td>Installing bsd</td>
<td>100%</td>
<td>18250 KB</td>
<td>00:00</td>
</tr>
<tr>
<td>Installing bsd.rd</td>
<td>100%</td>
<td>10058 KB</td>
<td>00:00</td>
</tr>
<tr>
<td>Installing base66.tgz</td>
<td>100%</td>
<td>236 MB</td>
<td>01:13</td>
</tr>
<tr>
<td>Extracting etc.tgz</td>
<td>100%</td>
<td>260 KB</td>
<td>00:00</td>
</tr>
<tr>
<td>Installing comp66.tgz</td>
<td>100%</td>
<td>72109 KB</td>
<td>00:07</td>
</tr>
<tr>
<td>Installing man66.tgz</td>
<td>100%</td>
<td>7418 KB</td>
<td>00:00</td>
</tr>
<tr>
<td>Installing game66.tgz</td>
<td>100%</td>
<td>2745 KB</td>
<td>00:00</td>
</tr>
<tr>
<td>Installing xbase66.tgz</td>
<td>100%</td>
<td>22092 KB</td>
<td>00:02</td>
</tr>
<tr>
<td>Extracting xetc.tgz</td>
<td>100%</td>
<td>7017</td>
<td>00:00</td>
</tr>
<tr>
<td>Installing xshare66.tgz</td>
<td>100%</td>
<td>4482 KB</td>
<td>00:01</td>
</tr>
<tr>
<td>Installing xfont66.tgz</td>
<td>100%</td>
<td>39342 KB</td>
<td>00:02</td>
</tr>
<tr>
<td>Installing xserv66.tgz</td>
<td>100%</td>
<td>15757 KB</td>
<td>00:01</td>
</tr>
</tbody>
</table>

Location of sets? (cd0 disk http nfs or 'done') [done]
Finishing up

Get/Verify xserver66.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% |========================================================| 22992 KB 00:02
Extracting xetc.tgz 100% |========================================================| 7817 KB 00:00
Installing xshare66.tgz 100% |========================================================| 4182 KB 00:01
Installing xfont66.tgz 100% |========================================================| 39342 KB 00:02
Installing xserver66.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=on1
disk: hd0* sr0*
>> OpenBSD/amd64 BOOT 3.45
Passphrase: _
XDM
Firmware & syspatch

```
kern.securelevel: 0 -> 1
creating runtime link editor directory cache.
preserving editor files.
starting network daemons: sshd smtpd sbsd.
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_bgpdk  004_net80211  005_sysupgrade
  006_ioctl  007_inteldrm  008_mesa
starting local daemons: cron xenodm.
Sun Dec 1 16:43:31 CET 2019
bsdpl# 1
```
Firmware & syspatch

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>resolvconf</code></td>
<td>Configuration file for the resolver</td>
</tr>
<tr>
<td><code>sysstat</code></td>
<td>System statistics for the system</td>
</tr>
<tr>
<td><code>sysctl</code></td>
<td>System control and status commands</td>
</tr>
<tr>
<td><code>syslogd</code></td>
<td>System logging daemon</td>
</tr>
<tr>
<td><code>sysstat</code></td>
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</tr>
<tr>
<td><code>sysctl</code></td>
<td>System control and status commands</td>
</tr>
<tr>
<td><code>syslogd</code></td>
<td>System logging daemon</td>
</tr>
</tbody>
</table>

Errors can be reviewed under `/var/syspatch`
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](https://www.openbsd.org/faq/upgrade66.html)
- `sysupgrade -s` to go current
  - Always check following current! [https://www.openbsd.org/faq/current.html](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$
Xfcee4, 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_dnsconf /etc/rc.d/messagebus
See rctl(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/gtk4+
   /usr/local/share/doc/pkg-readmes/gtk3+
   /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 mozila dictionaries for extra hunspell languages.
e.g.
   # pkg_add mozilla-dicts-ca
--- # python-2.7.15p1 -------------
If you want to use this package as your default system python, as root,
create symbolic links like so (overwritting 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
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 &
   setxkbmp 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)`

```bash
$ 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
“We are OpenBSD Amsterdam and we run dedicated `vmm(4)/ymd(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

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+ €10 / year for extra 512M RAM
+ €50 / year for extra 50G HDD

Dedicated IPv4 (DHCP assigned) and dedicated IPv6 (64).
Console access with `ssh root@` using `putty`.
Reverse DNS upon request.
We accept PayPal, IDEAL, and SEPA.

[Book your VM](#)
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

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.
- **inetd(4):** First complete integration and adoption of IPv6 led by "itojun" (Dr. Junichiro Hagiwara) [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), dhcpd(8), dymrpdp(8), eigrpd(8), file(1), httpd(8), ikey(8), ldapd(8), ldap(8), mountd(8), ncpd(8), ospf(8), ospfd(8), pf(8), radiusd(8), relayd(8), ripd(8), script(1), smtpd(8), syslogd(8), tcpdump(8), tmux(1), xconsole(1), xdm(1), Xserver(1), yoldap(8), pkey_ad(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 system wide 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 pr_openbsd_wanted and it is located on a filesystem mounted with the 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 PIE was the first widely used operating system to enable it globally by default, on seven hardware platforms.
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

OpenBSD Frequently Asked Questions

This FAQ is supplemental documentation to the man pages, which are available for features and changes in the development version of OpenBSD (current) that are not.

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 dmseg After the Install
- Customizing the Install Process
- Multibooting

System Management

- Security Update
NetBSD

Konrad Witaszczyk
# Supported architectures

<table>
<thead>
<tr>
<th>CPU</th>
<th>Tier(s)</th>
<th>Port(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>alpha</td>
<td>II</td>
<td>alpha</td>
</tr>
<tr>
<td>arm</td>
<td>I, II, III</td>
<td>acorn26 acorn32 cats epoc32 evbarm hpcarm lyonix netwinder shark zaurus</td>
</tr>
<tr>
<td>hppa</td>
<td>II</td>
<td>hppa</td>
</tr>
<tr>
<td>i386</td>
<td>I</td>
<td>i386 xen</td>
</tr>
<tr>
<td>m68010</td>
<td>II</td>
<td>sun2</td>
</tr>
<tr>
<td>m68k</td>
<td>II</td>
<td>amiga atari cesfic hp300 luna68k mac68k mvme68k news68k next68k sun3 x68k</td>
</tr>
<tr>
<td>mipsb</td>
<td>I, II</td>
<td>emips evbmips ews4800mips mipsco newsmips sbmips sgimips</td>
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<tr>
<td>mipsel</td>
<td>I, II</td>
<td>algor arc cobalt evbmips hpcmips pmax sbmips</td>
</tr>
<tr>
<td>powerpc</td>
<td>I, II</td>
<td>amigappp bebox evbpc ibmnws macppc mvmepc ofppc prep rs6000 sandpoint</td>
</tr>
<tr>
<td>sh3eb</td>
<td>II</td>
<td>evbsh3 mmeye</td>
</tr>
<tr>
<td>sh3el</td>
<td>II</td>
<td>dreamcast evbsh3 hpcsh landisk</td>
</tr>
<tr>
<td>sparc</td>
<td>II</td>
<td>sparc</td>
</tr>
<tr>
<td>sparc64</td>
<td>I</td>
<td>sparc64 (Can also run sparc binaries)</td>
</tr>
<tr>
<td>vax</td>
<td>II</td>
<td>vax</td>
</tr>
<tr>
<td>x86_64</td>
<td>I</td>
<td>amd64 (Can also run i386 binaries), xen</td>
</tr>
</tbody>
</table>

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
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:

```bash
# 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
```
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 menu 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 NetBSD1

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
# 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
First we create separate partitions for Windows and NetBSD:

```bash
# 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:

```bash
# 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:

```bash
# 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 ' ' '
' | 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
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
b: File system
c: Base directory
d: Binary set directory
e: Source set directory
f: Exit
XX: Continue
Status: Command failed
Command: /etc/rc.d/random_seed stop
Hit enter to continue

[1] Bad system call (core dumped) df -G "{$1}
Done while read line; do set -- {$1}; if [ "{$2}... random_seed: /var/db/entropy-file: Bad file system type
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 mDNS
k: Enable XDM
l: Enable CSD
m: Enable LUM
n: Enable raidframe
o: Add a user

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

**Finished configuring**
boot: device: wd0
root on wd0a dumps on wd0b
root file system type: iffs
WARNING: clock lost 7639 days
WARNING: using filesystem time
WARNING: CHECK AND RESET THE DATEN
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 'ttyE1': Bad file descriptor
NetBSD/hpcsh (Amnesiac) (ttyE0)
login: 

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:

```bash
# mount /dev/wd0a /mnt
# mount -t msdos /dev/wd0e /mnt2
# cd /mnt
# tar -xvpzf /mnt2/base.tgz
# tar -xvpzf /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 na pizze