

Homework #01

FreeBSD Installation

Announce: 20080930

Due: 20081007

FreeBSD Branches/Tags

- Three parallel development branches:
 - > -RELEASE
 - Latest Release version:
 - **7.0 February 2008, 6.3 January 2008**
 - <http://www.freebsd.org/releases/>
 - > -STABLE: Tested new features and bug fixes
 - ABI-compatibility
 - MFC: Merge From Current
 - > -CURRENT: Working space for FreeBSD developers
 - Current version:
 - **8.0-CURRENT**
 - <http://www.freebsd.org/releng/>

FreeBSD version

- ◎ FreeBSD-A.B.C-Type
 - > A: major version Number
 - > B: minor version Number
 - > C: slight patch version number
 - > Type: version type
 - PRELEASE
 - BETA
 - RC
 - RELEASE
 - STABLE
 - CURRENT

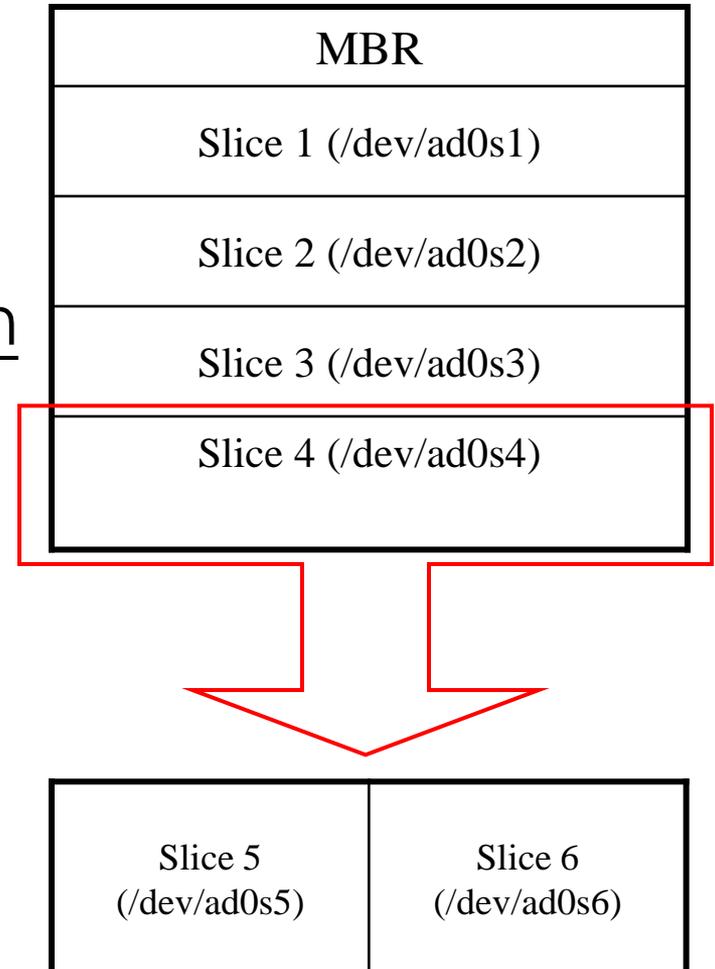
Choosing the FreeBSD Version That Is Right For You:

<http://www.freebsd.org/doc/en/articles/version-guide/index.html>

FreeBSD view of Disk (1)

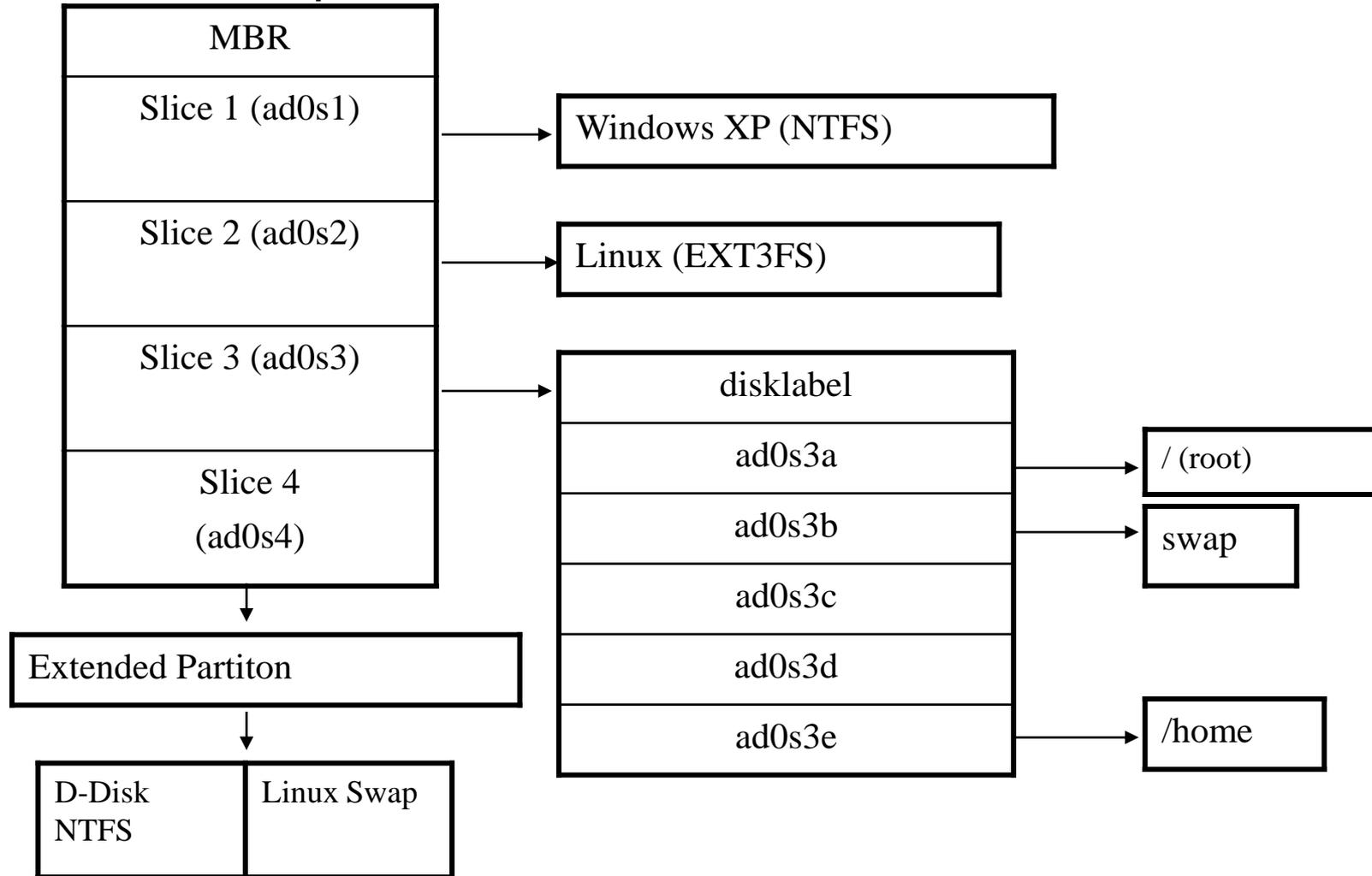
◎ The meaning of ad0s1e

- > Disk name
 - IDE: ad
 - SCSI: da
- > Slice is equal to the partition of common use
 - Primary partition: s1 ~ s4
 - Extended partition: s5 ~ sn
- > Label in each slice
 - a: root partition
 - b: swap
 - c: entire disk
 - d: entire partition
 - efgh: /usr, /home, ...



FreeBSD view of Disk (2)

○ An Example



Installing FreeBSD

- Steps
 1. Knowing your hardware
 2. Obtaining installation file
 3. Booting from CD
 4. sysinstall main menu
 5. Custom Installation Options
 1. Partition
 2. Label
 3. Distribution
 4. Media
 5. Commit
 6. Post Installation configurations

Installing FreeBSD –

1. knowing your hardware

- ◎ CPU
 - > 32bit or 64bit
 - > Architecture: alpha, amd64, i386, ia64, pc98, powerpc, sparc64
- ◎ RAM
 - > Size
- ◎ HD
 - > Size, amount, SCSI or IDE
- ◎ VGA
 - > Brand, ram size
- ◎ Sound
 - > Brand
- ◎ Network Interface Card
 - > Brand
 - > IP 、 Netmask 、 Default gateway 、 Hostname 、 DNS
- ◎ Other Special device

Installing FreeBSD –

2. Obtaining installation file

- FreeBSD installation CD
 - > <ftp://freebsd.cs.nctu.edu.tw/pub/ISO-IMAGES-i386/7.0/7.0-RELEASE-i386-bootonly.iso>
 - > <ftp://freebsd.cs.nctu.edu.tw/pub/ISO-IMAGES-i386/7.0/7.0-RELEASE-i386-disc1.iso>
 - > Burn CD or USB!
- Unofficial snapshot
 - > <http://pub.allbsd.org/FreeBSD-snapshots/>

Handbook!

- ◎ Chapter 2 Installing FreeBSD

- > <http://www.freebsd.org/doc/en/books/handbook/install.html>

- ◎ Chinese resources

- > <http://freebsd.doc.twbbs.org>

- > <https://opensvn.csie.org/trac.cgi/freebsd/doc>

Booting

```
ata0 master: QEMU HARDDISK ATA-7 Hard-Disk ( 64 GBytes)
ata1 master: QEMU DVD-ROM ATAPI-4 CD-Rom/DVD-Rom

Press F12 for boot menu.

Booting from CD-Rom...
509MB medium detected
CD Loader 1.2

Building the boot loader arguments
Looking up /BOOT/LOADER... Found
Relocating the loader and the BTX
Starting the BTX loader

BTX loader 1.00  BTX version is 1.01
Consoles: internal video/keyboard
BIOS CD is cd0
BIOS drive C: is disk0
BIOS 639kB/261056kB available memory

FreeBSD/i386 bootstrap loader, Revision 1.1
(root@logan.cse.buffalo.edu, Sun Feb 24 16:31:36 UTC 2008)
Loading /boot/defaults/loader.conf
/boot/kernel/kernel text=0x6fd45c -
```

Booting...

- Just press Enter
- “loader prompt”: some custom/special settings
Ex: loading modules, loader tunables

Welcome to FreeBSD!

1. Boot FreeBSD [default]
2. Boot FreeBSD with ACPI disabled
3. Boot FreeBSD in Safe Mode
4. Boot FreeBSD in single user mode
5. Boot FreeBSD with verbose logging
6. Escape to loader prompt
7. Reboot

Select option, [Enter] for default
or [Space] to pause timer 10

FreeBSD

Country Selection

Just use default or...



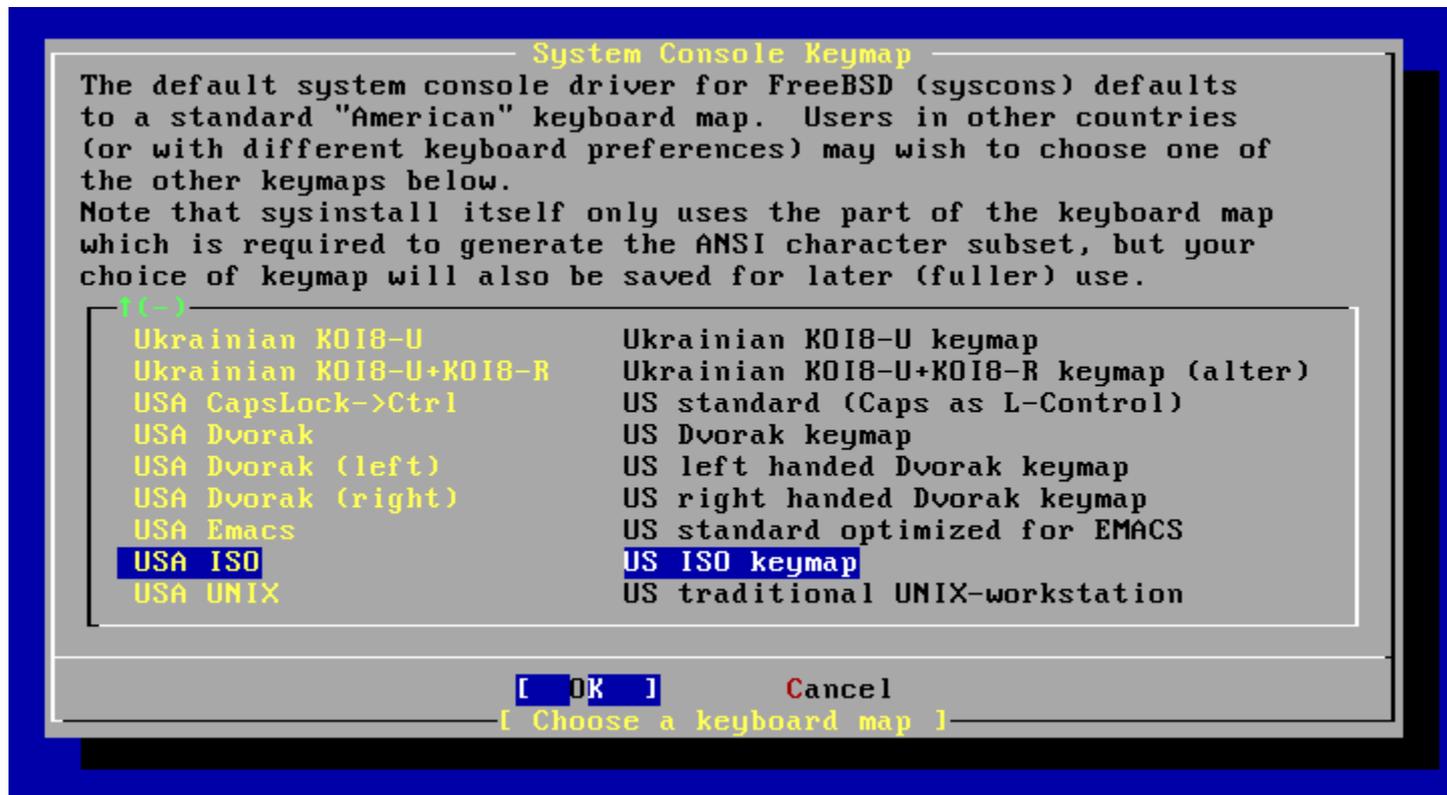
Country - Taiwan

This is loving Taiwan!



Keymap

Use USA ISO keymap because we don't have our keyboard layout...



Sysinstall Main Menu

Being experts!

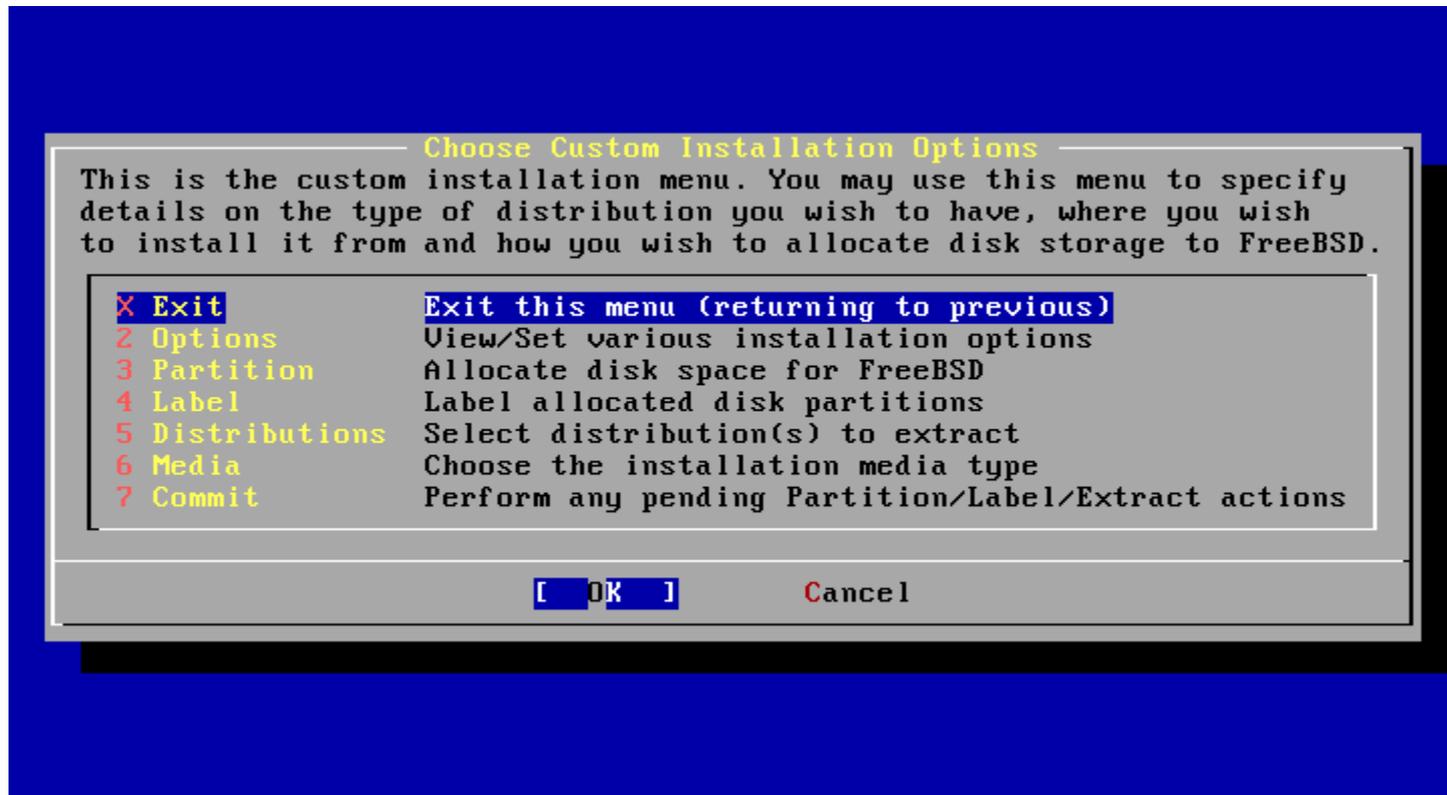
```
FreeBSD/i386 7.0-RELEASE - sysinstall Main Menu
Welcome to the FreeBSD installation and configuration tool. Please
select one of the options below by using the arrow keys or typing the
first character of the option name you're interested in. Invoke an
option with [SPACE] or [ENTER]. To exit, use [TAB] to move to Exit.

  Usage      Quick start - How to use this menu system
  Standard   Begin a standard installation (recommended)
  Express     Begin a quick installation (for experts)
  Custom     Begin a custom installation (for experts)
  Configure  Do post-install configuration of FreeBSD
  Doc        Installation instructions, README, etc.
  Keymap     Select keyboard type
  Options    View/Set various installation options
  Fixit      Repair mode with CDROM/DVD/floppy or start shell
  Upgrade    Upgrade an existing system
  Load Config Load default install configuration
  Index      Glossary of functions

[ Select ]      X Exit Install
```

Custom Installation

- Installation variables
- Partition your disk
- Label your disk
- What to install
- How to install
- Do it!



Options

- Sometimes you can change “Release Name”

```
Options Editor
Name          Value          Name          Value
-----
NFS Secure    NO
NFS Slow      NO
NFS TCP       NO
NFS version 3 YES
Debugging     NO
No Warnings   NO
Yes to All    NO
DHCP          NO
IPv6          NO
Skip PCCARD   NO
FTP username  ftp
Editor        /usr/bin/ee
Tape Blocksize 20
Extract Detail high
Release Name  7.0-RELEASE

Install Root  /
Browser package links
Browser Exec  /usr/local/bin/links
Media Type    <not yet set>
Media Timeout 300
Package Temp  /var/tmp
News Args     -b 16384 -f 2048
Fixit Console standard
Re-scan Devices <*>
Use Defaults  [RESET!]

Use SPACE to select/toggle an option, arrow keys to move,
? or F1 for more help.  When you're done, type Q to Quit.

NFS server talks only on a secure port
```

Partition

- C = Create
- D = Delete
- W = Write
- Q = Finish

```
Disk name:      ad0                               FDISK Partition Editor
DISK Geometry: 8354 cyls/255 heads/63 sectors = 134207010 sectors (65530MB)

Offset          Size(ST)          End          Name  PType          Desc  Subtype  Flags
-----
0  134217728  134217727  -      12      unused        0

The following commands are supported (in upper or lower case):

A = Use Entire Disk   G = set Drive Geometry   C = Create Slice   F = 'DD' mode
D = Delete Slice      Z = Toggle Size Units    S = Set Bootable  ; = Wizard m.
T = Change Type       U = Undo All Changes     Q = Finish
```

Use F1 or ? to get more help, arrow keys to select.

Partition

Size of the partition

Default value: entire free space

```
Disk name:      ad0                               FDISK Partition Editor
DISK Geometry: 8354 cyls/255 heads/63 sectors = 134207010 sectors (65530MB)

Offset      Size(ST)      End      Name  PType      Desc  Subtype  Flags
-----
0  134217728  134217727  -    12      unused  0

The follow
A = Use Entire Disk  G = set Drive Geometry  C = Create Slice  F = 'DD' mode
D = Delete Slice    Z = Toggle Size Units   S = Set Bootable  ; = Wizard m.
T = Change Type     U = Undo All Changes    Q = Finish

Use F1 or ? to get more help, arrow keys to select.
```

Value Required

Please specify the size for new FreeBSD slice in blocks or append a trailing 'M' for megabytes (e.g. 20M).

[OK] Cancel

Partition

165 - FreeBSD's magic number

```
Disk name:      ad0                               FDISK Partition Editor
DISK Geometry: 8354 cyls/255 heads/63 sectors = 134207010 sectors (65530MB)

Offset      Size(ST)      End      Name  PType      Desc  Subtype      Flags
-----
Value Required

Enter type of partition to create:

Pressing Enter will choose the default, a native FreeBSD
slice (type 165).  Other popular values are 6 for a
DOS FAT partition, 131 for a Linux ext2fs partition, or
130 for a Linux swap partition.

Note:  If you choose a non-FreeBSD partition type, it will not
be formatted or otherwise prepared, it will simply reserve space
for you to use another tool, such as DOS format, to later format
and actually use the partition.

A = Us
D = De
T = Ch

mode
rd m.

165

[ OK ]      Cancel

Use F1 or ? to get more help, arrow keys to select.
```

Partition

Partition hard disk as only one partition

```
Disk name:      ad0                               FDISK Partition Editor
DISK Geometry: 8354 cyls/255 heads/63 sectors = 134207010 sectors (65530MB)

Offset          Size(ST)          End          Name  PType      Desc  Subtype  Flags
-----
          0             63           62          -     12      unused     0
    63    134206947    134207009    ad0s1     8     freebsd    165
134207010     10718    134217727     -     12      unused     0

The following commands are supported (in upper or lower case):

A = Use Entire Disk      G = set Drive Geometry    C = Create Slice        F = 'DD' mode
D = Delete Slice         Z = Toggle Size Units     S = Set Bootable       | = Wizard m.
T = Change Type          U = Undo All Changes      Q = Finish
```

Use F1 or ? to get more help, arrow keys to select.

Partition

S = Set bootable

```
Disk name:      ad0                               FDISK Partition Editor
DISK Geometry: 8354 cyls/255 heads/63 sectors = 134207010 sectors (65530MB)

Offset          Size(ST)          End          Name  PType          Desc  Subtype          Flags
-----
          0             63           62          -     12          unused           0
        63    134206947    134207009    ad0s1    8          freebsd          165    A
134207010        10718    134217727    -         12          unused           0

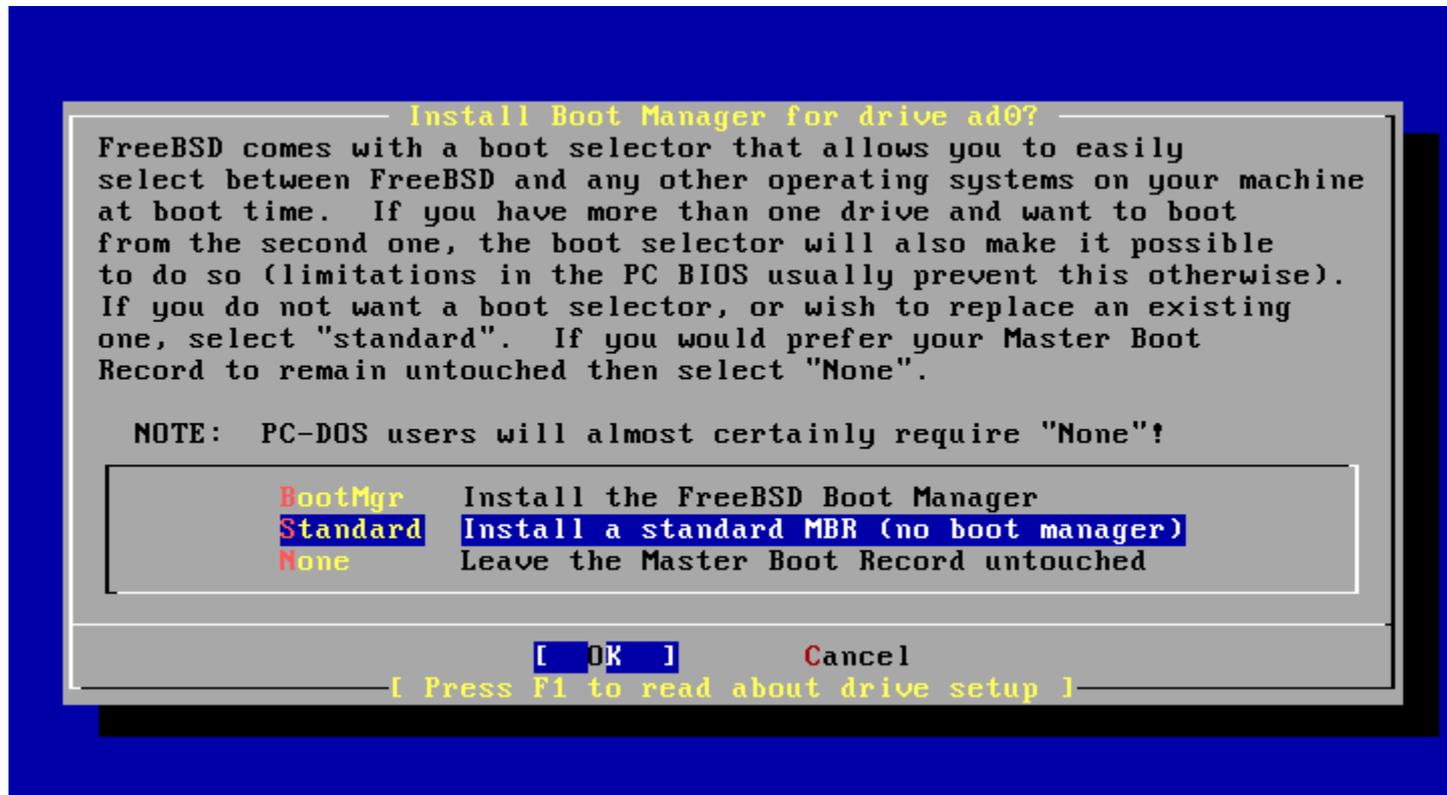
The following commands are supported (in upper or lower case):

A = Use Entire Disk      G = set Drive Geometry    C = Create Slice        F = 'DD' mode
D = Delete Slice         Z = Toggle Size Units     S = Set Bootable       I = Wizard m.
T = Change Type          U = Undo All Changes      Q = Finish
```

Use F1 or ? to get more help, arrow keys to select.

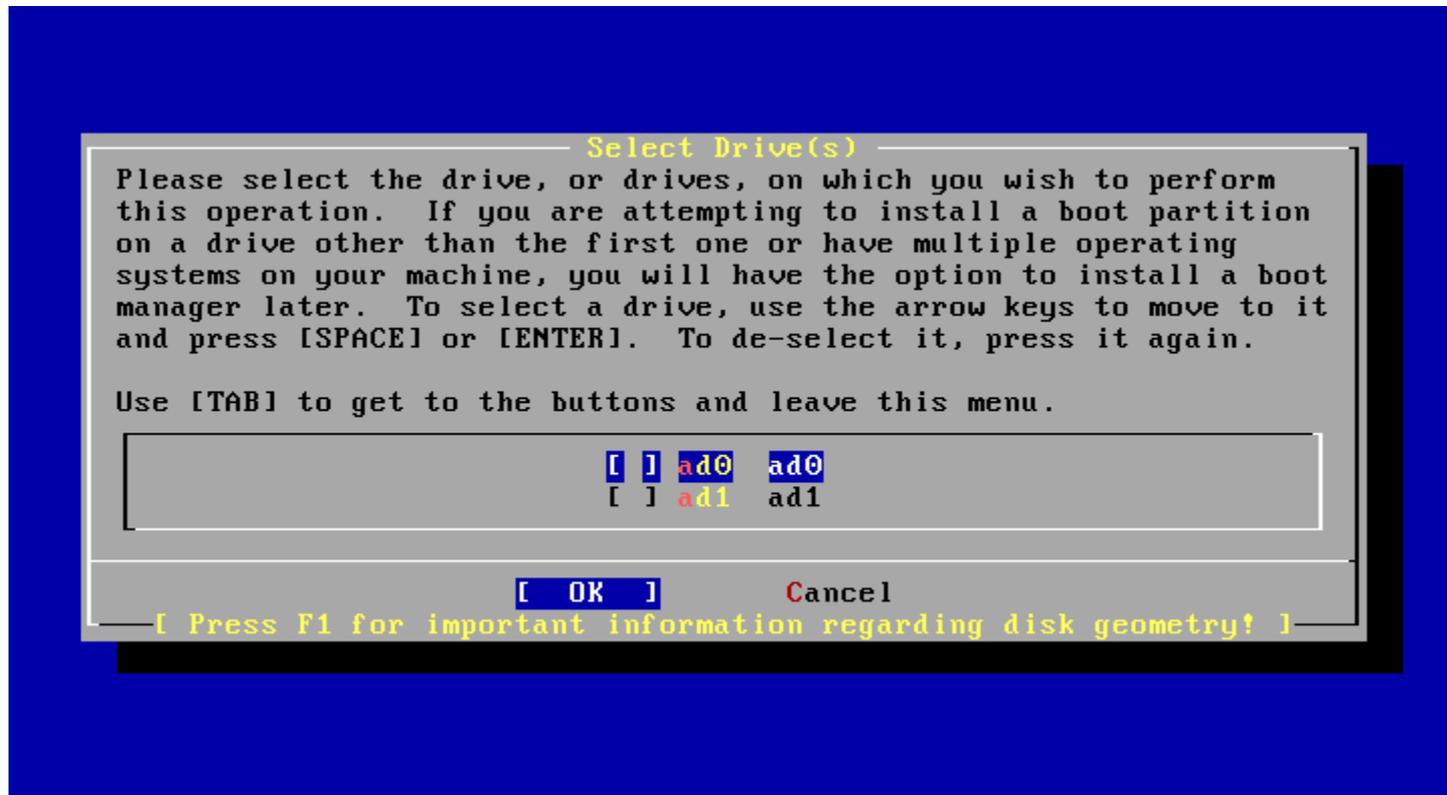
Partition - Boot Manager

- BootMgr - install a simple boot manager to disk MBR
- Standard - write to disk MBR
- None - leave it unchanged



Partition - More than 1 HDs

Be aware which disk is your right target!



Label

Allocation space for swap:
typically is 2x~2.5x of your memory size.
But this is not the absolute rule!

```
FreeBSD Disklabel Editor
Disk: ad0 Partition name: ad0s1 Free: 134206947 blocks (65530MB)
Part Mount Size Newfs Part Mount Size Newfs
-----
Value Required
Please specify the partition size in blocks or append a trailing G for
gigabytes, M for megabytes, or C for cylinders.
134206947 blocks (65530MB) are free.
1G
[ OK ] Cancel
The following commands are valid here (upper or lower case):
C = Create D = Delete M = Mount pt.
N = Newfs Opts Q = Finish S = Toggle SoftUpdates Z = Custom Newfs
T = Toggle Newfs U = Undo A = Auto Defaults R = Delete+Merge
Use F1 or ? to get more help, arrow keys to select.
```


Label

Default is all that remained...

```
FreeBSD Disklabel Editor
Disk: ad0 Partition name: ad0s1 Free: 132109795 blocks (64506MB)
Part Mount Size Newfs Part Mount Size Newfs
---- ----
ad0s1b swap 1024MB SWAP
Value Required
Please specify the partition size in blocks or append a trailing G for
gigabytes, M for megabytes, or C for cylinders.
132109795 blocks (64506MB) are free.
132109795
[ OK ] Cancel
The following commands are valid here (upper or lower case):
C = Create D = Delete M = Mount pt.
N = Newfs Opts Q = Finish S = Toggle SoftUpdates Z = Custom Newfs
T = Toggle Newfs U = Undo A = Auto Defaults R = Delete+Merge
Use F1 or ? to get more help, arrow keys to select.
```


Label

Setting mount point

For learning '/' is enough.

(Not so good for practical using,
unless all other things are on other machines)

```
FreeBSD Disklabel Editor
Disk: ad0 Partition name: ad0s1 Free: 132109795 blocks (64506MB)
Part Mount Size Newfs Part Mount Size Newfs
---- - - - - - ---- - - - - -
ad0s1b swap 1024MB SWAP

Value Required
Please specify a mount point for the partition
/

[ OK ] Cancel

The following commands are valid here (upper or lower case):
C = Create D = Delete M = Mount pt.
N = Newfs Opts Q = Finish S = Toggle SoftUpdates Z = Custom Newfs
T = Toggle Newfs U = Undo A = Auto Defaults R = Delete+Merge

Use F1 or ? to get more help, arrow keys to select.
```

Label

Then we have two labels for meet minimal requirement

```
FreeBSD Disklabel Editor
Disk: ad0      Partition name: ad0s1  Free: 0 blocks (0MB)

Part      Mount          Size Newfs  Part      Mount          Size Newfs
-----
ad0s1b    swap            1024MB SWAP
ad0s1a    /               64506MB UFS2  Y

The following commands are valid here (upper or lower case):
C = Create      D = Delete      M = Mount pt.
N = Newfs Opts  Q = Finish      S = Toggle SoftUpdates  Z = Custom Newfs
T = Toggle Newfs U = Undo      A = Auto Defaults      R = Delete+Merge

Use F1 or ? to get more help, arrow keys to select.
```

Label

S = Toggle SoftUpdates (something like journaling)
http://en.wikipedia.org/wiki/Soft_updates
<http://www.mckusick.com/softdep/>

```
FreeBSD Disklabel Editor
Disk: ad0      Partition name: ad0s1  Free: 0 blocks (0MB)

Part      Mount          Size Newfs  Part      Mount          Size Newfs
-----
ad0s1b    swap            1024MB SWAP
ad0s1a    /               64506MB UFS2+S Y

The following commands are valid here (upper or lower case):
C = Create      D = Delete      M = Mount pt.
N = Newfs Opts  Q = Finish      S = Toggle SoftUpdates  Z = Custom Newfs
T = Toggle Newfs U = Undo      A = Auto Defaults      R = Delete+Merge

Use F1 or ? to get more help, arrow keys to select.
```

Distributions

Choose Distributions

As a convenience, we provide several "canned" distribution sets. These select what we consider to be the most reasonable defaults for the type of system in question. If you would prefer to pick and choose the list of distributions yourself, simply select "Custom". You can also pick a canned distribution set and then fine-tune it with the Custom item.

Choose an item by pressing [SPACE] or [ENTER]. When finished, choose the Exit item or move to the OK button with [TAB].

(-)

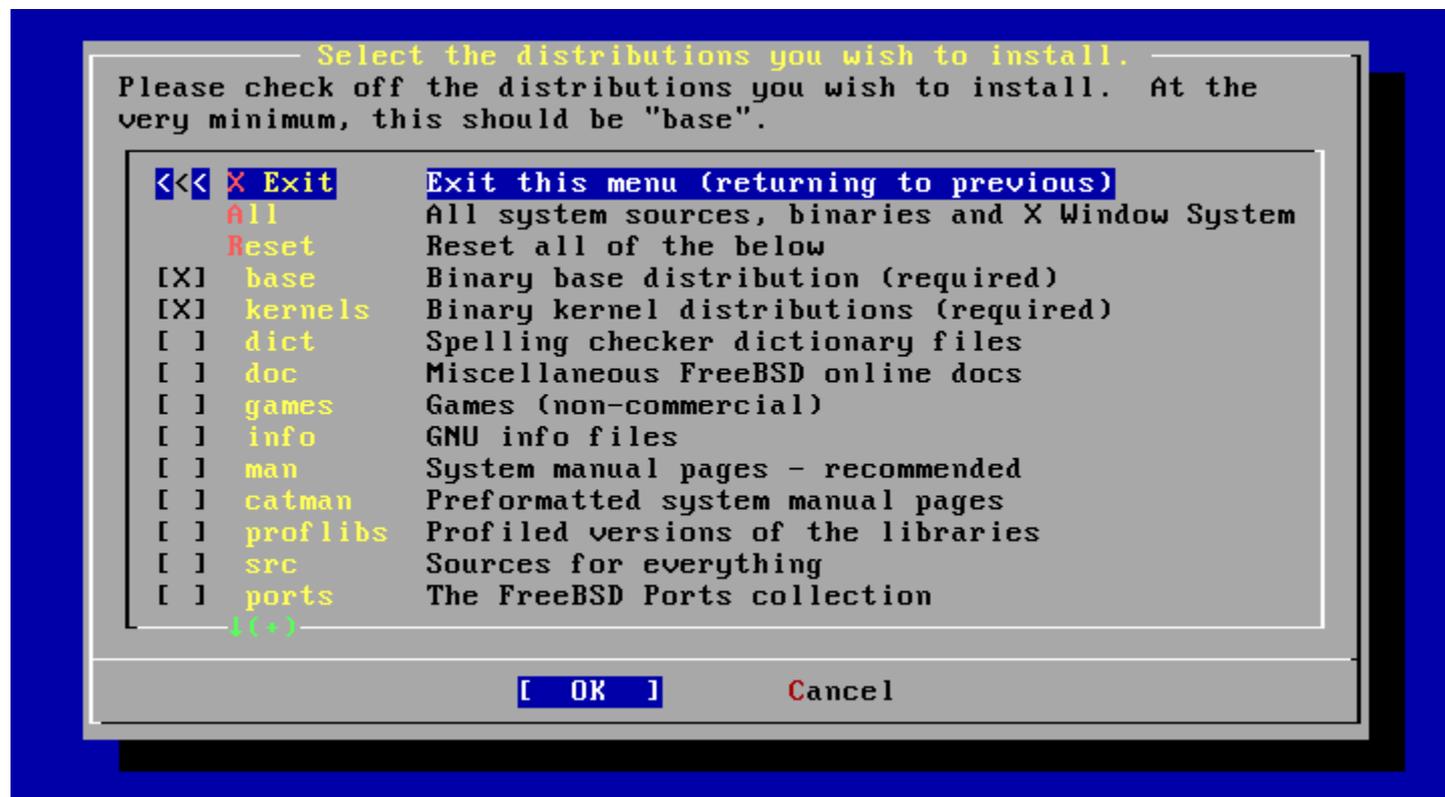
[]	4 Developer	Full sources, binaries and doc but no games
[]	5 X-Developer	Same as above + X Window System
[]	6 Kern-Developer	Full binaries and doc, kernel sources only
[]	7 X-Kern-Developer	Same as above + X Window System
[]	8 User	Average user - binaries and doc only
[]	9 X-User	Same as above + X Window System
[]	A Minimal	The smallest configuration possible
> >	B Custom	Specify your own distribution set

[OK] Cancel

[Press F1 for more information on these options.]

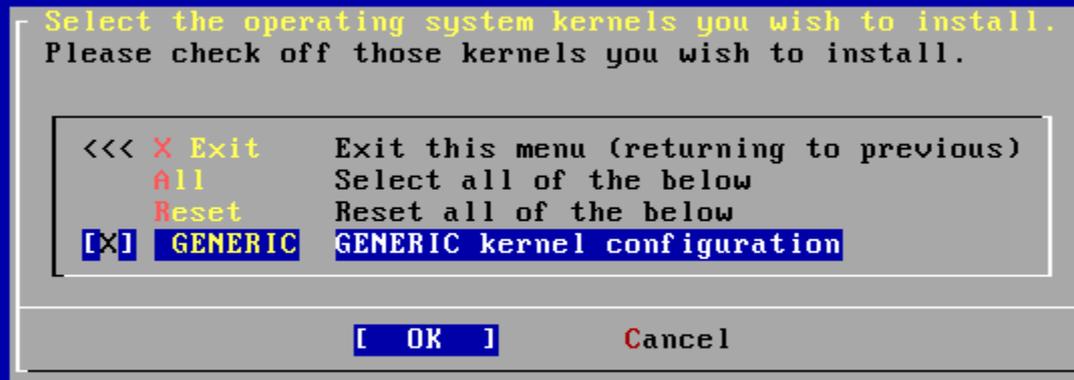
Distributions

Minimum: base and kernel
Also be good: src and ports



Distributions - kernel

- SMP



Media - CD/DVD

Choose Installation Media

FreeBSD can be installed from a variety of different installation media, ranging from floppies to an Internet FTP server. If you're installing FreeBSD from a supported CD/DVD drive then this is generally the best media to use if you have no overriding reason for using other media.

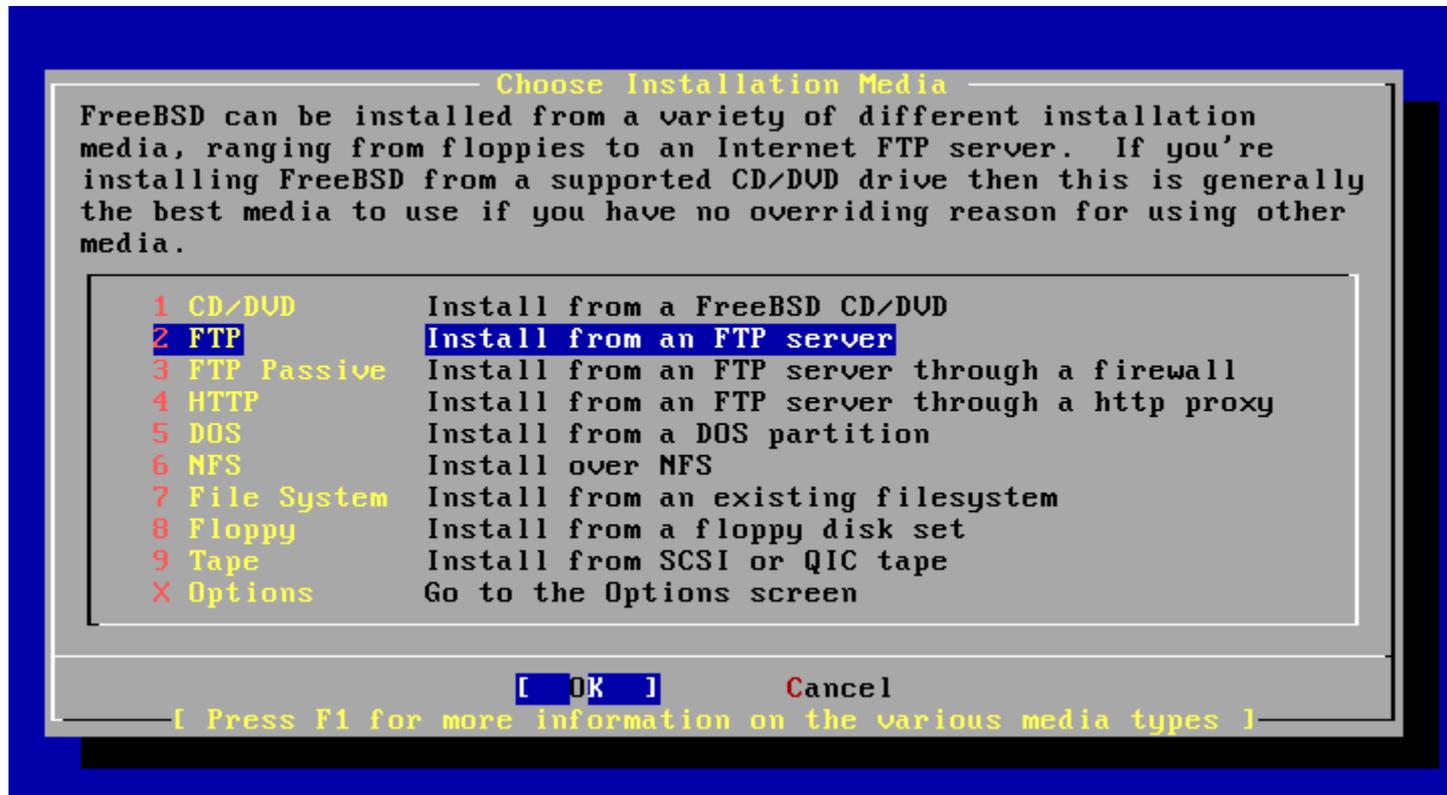
- | | |
|-----------------|---|
| 1 CD/DVD | Install from a FreeBSD CD/DVD |
| 2 FTP | Install from an FTP server |
| 3 FTP Passive | Install from an FTP server through a firewall |
| 4 HTTP | Install from an FTP server through a http proxy |
| 5 DOS | Install from a DOS partition |
| 6 NFS | Install over NFS |
| 7 File System | Install from an existing filesystem |
| 8 Floppy | Install from a floppy disk set |
| 9 Tape | Install from SCSI or QIC tape |
| X Options | Go to the Options screen |

[**DK**] Cancel

[Press F1 for more information on the various media types]

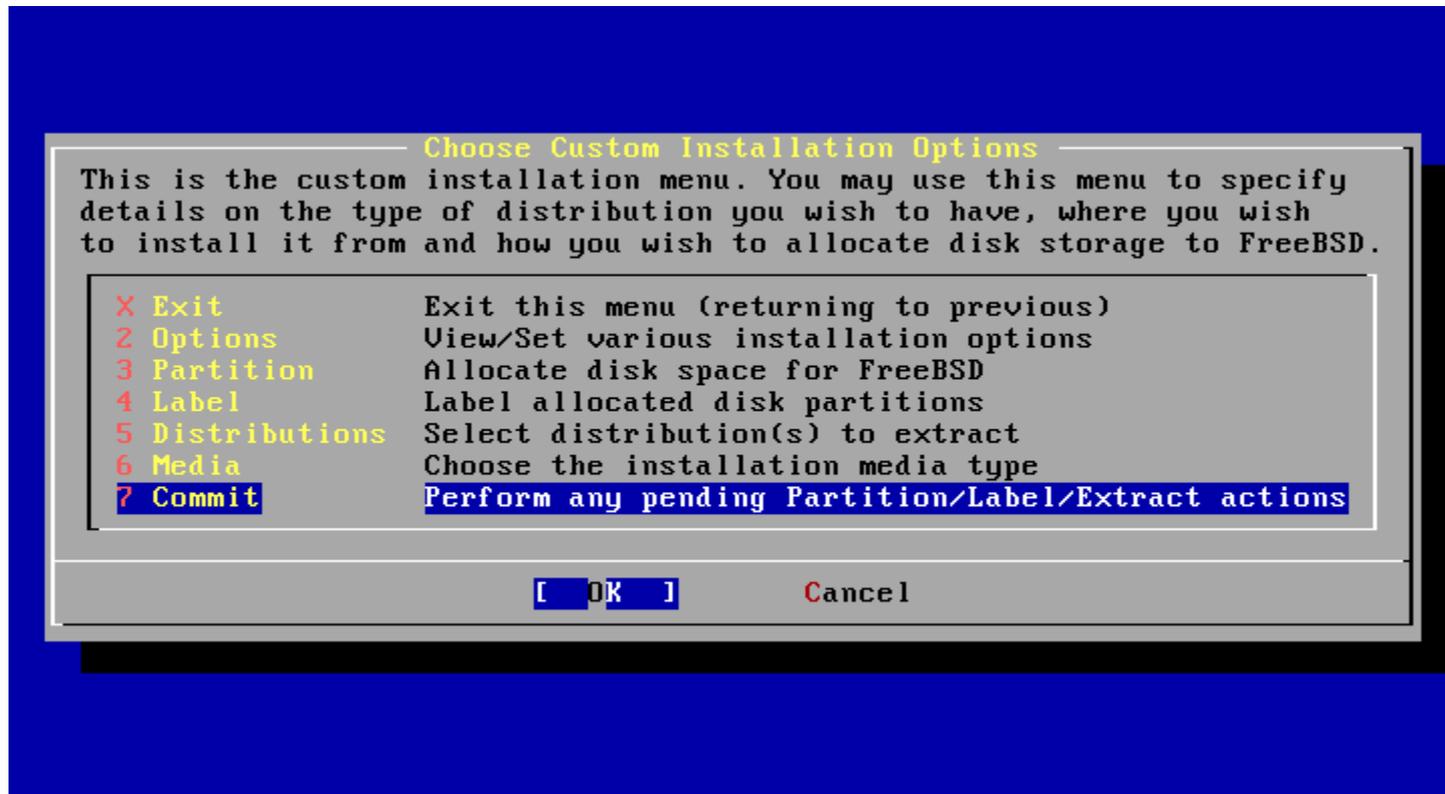
Media - FTP

- Passive Mode:
Server opens the port and let client to connect to.
(recommended)



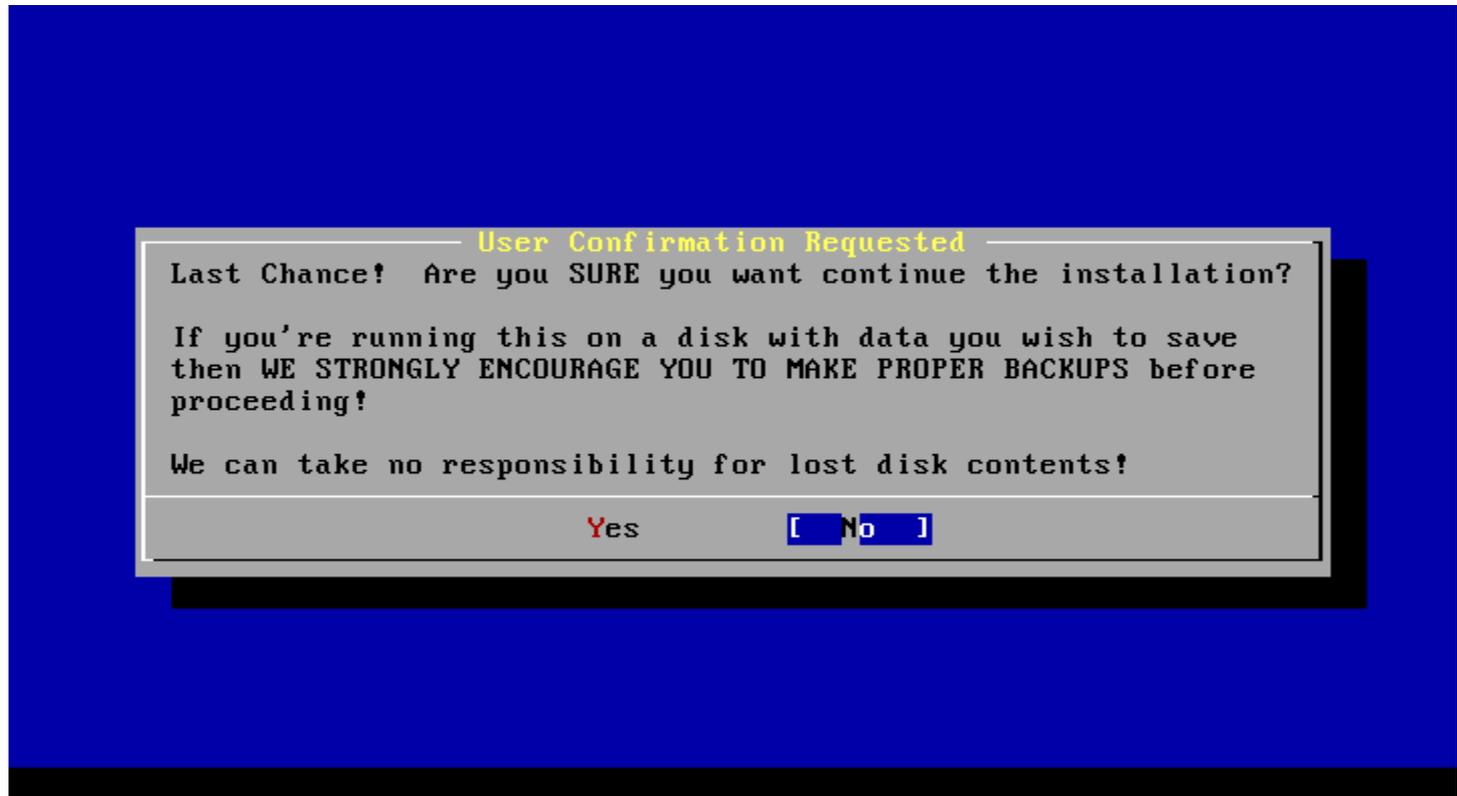
Commit

Just do it!

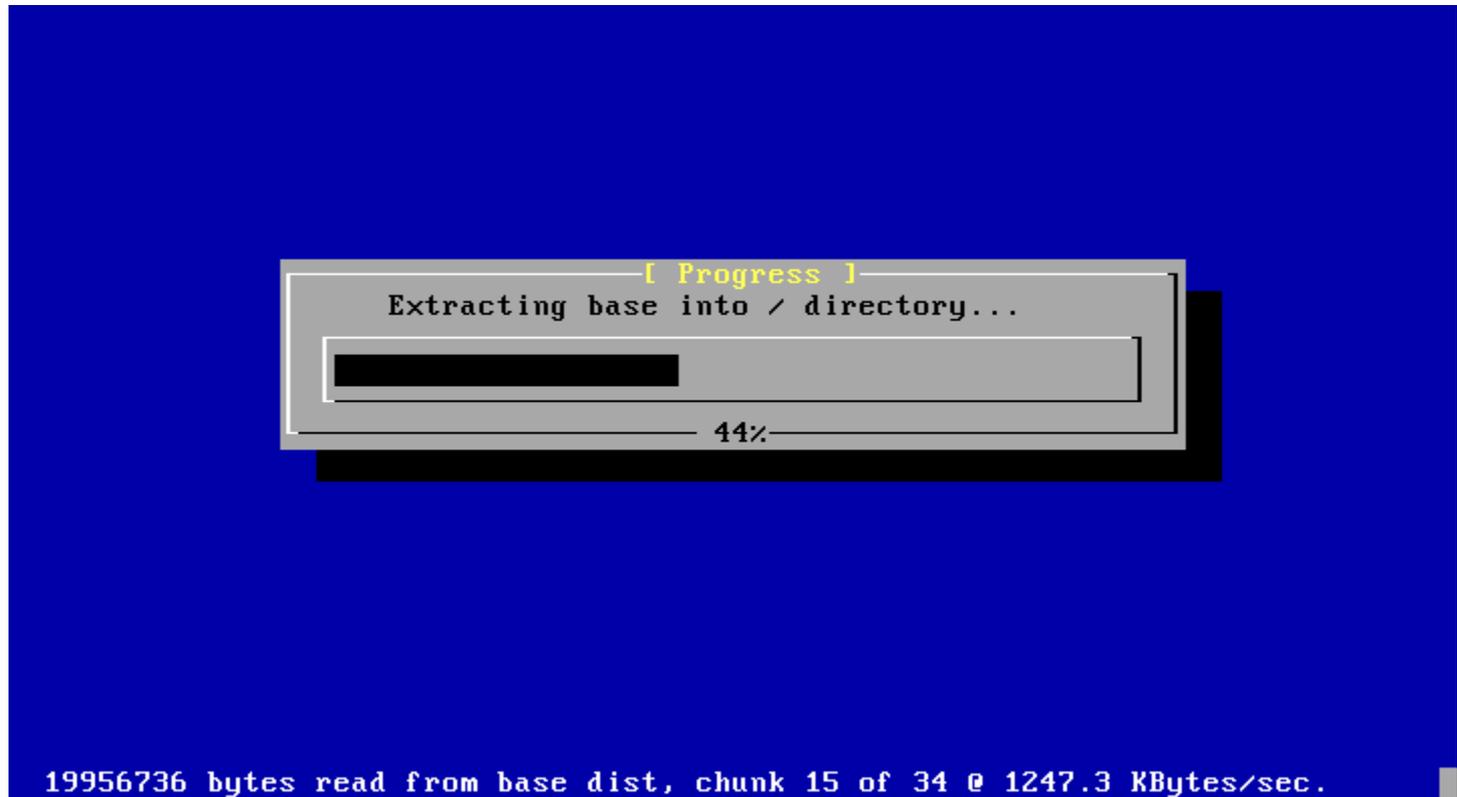


Last Chance!

We can take no responsibility for lost disk contents!
Don't forget backup!

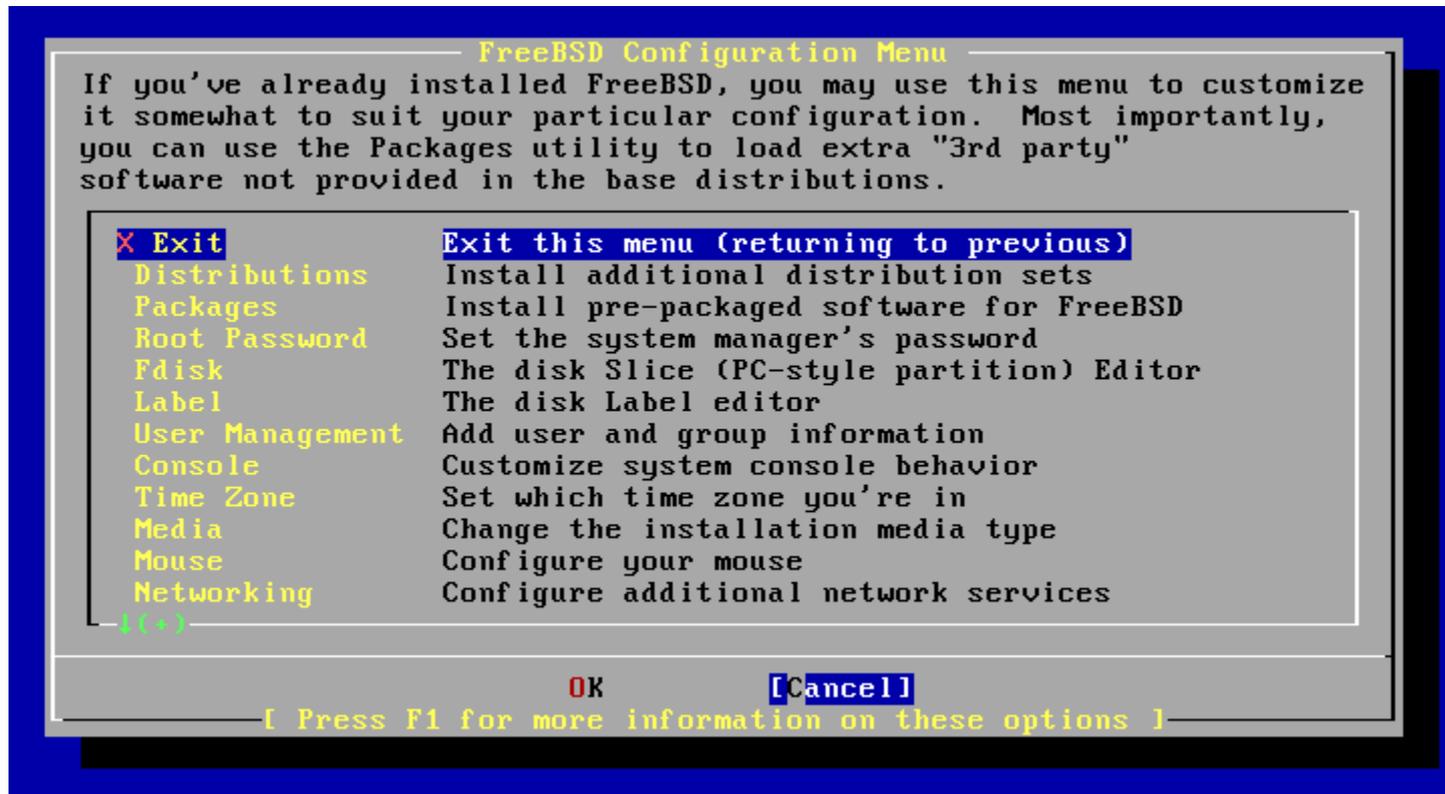


Installing...



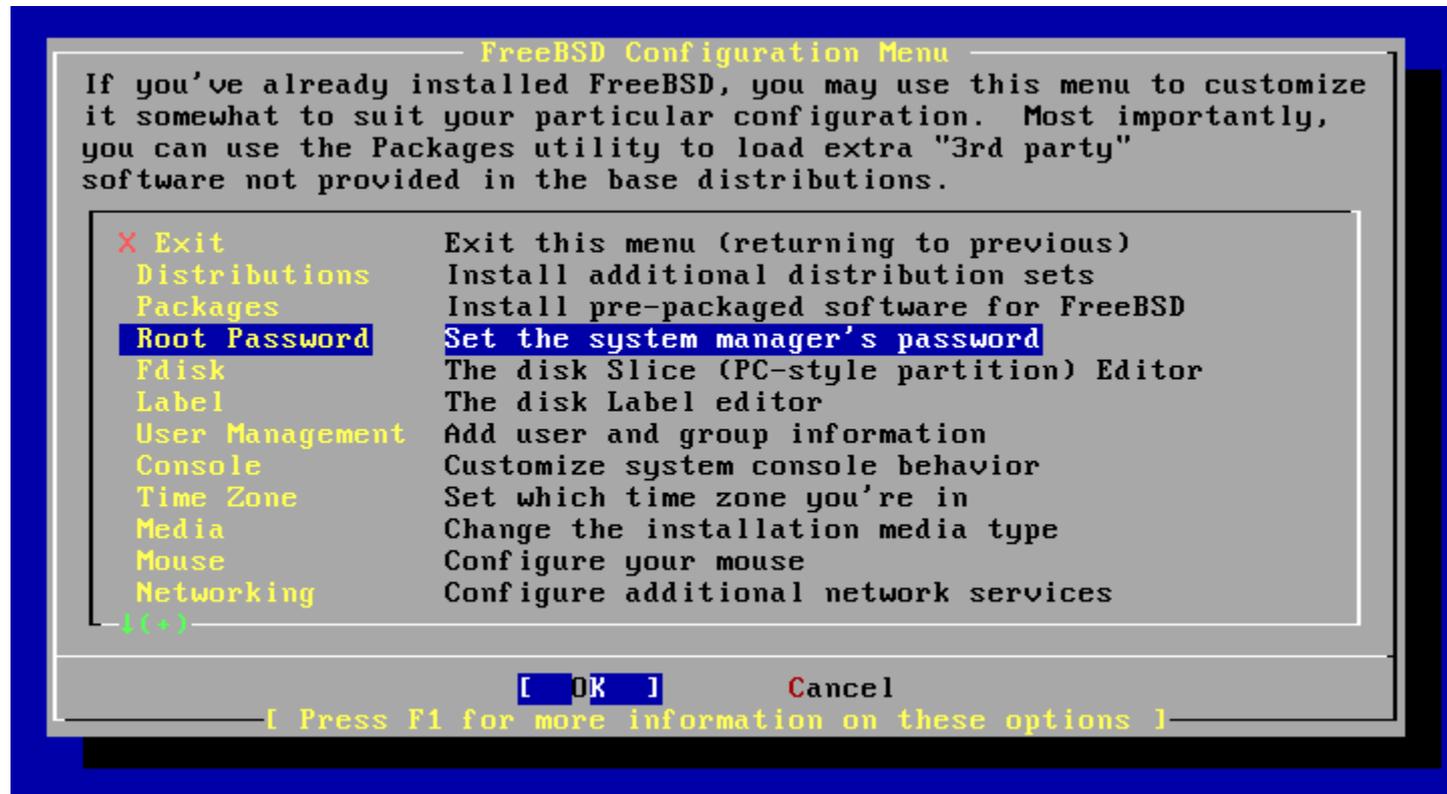
Configuration

- Root Password
- User Management
- Time Zone
- Networking



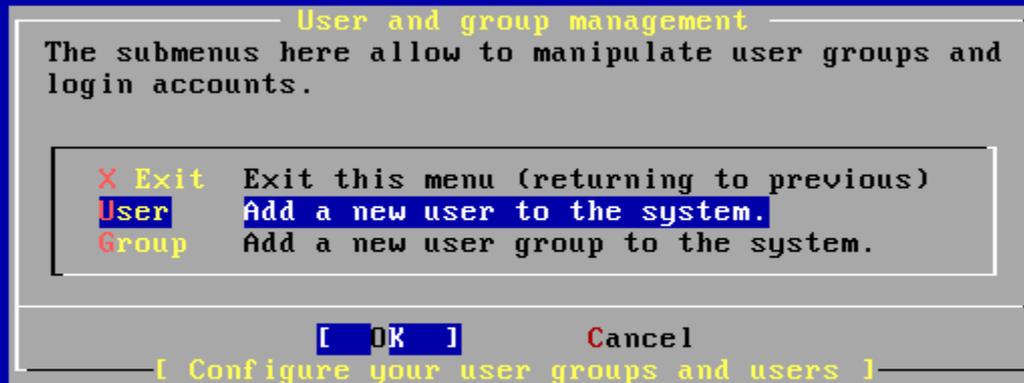
Root Password

Or your computer will be cracked barely by hitting one [Enter]



User Management

Create a user different than root for remote login



User Management

For administration user, “staff” is a good group.
If you want to become root, be sure you are in “wheel” group.

The screenshot shows a terminal window with a dialog box titled "User and Group Management". Inside the dialog, there is a section titled "Add a new user" with the following fields and values:

Login ID:	UID:	Group:	Password:
lwhsu	1001	staff	****
Full name:	Member groups:		
Li-Wen Hsu	wheel		
Home directory:	Login shell:		
/home/lwhsu	/bin/tcsh		

At the bottom of the dialog are two buttons: "OK" and "CANCEL".

[The user's login shell (leave blank for default)]

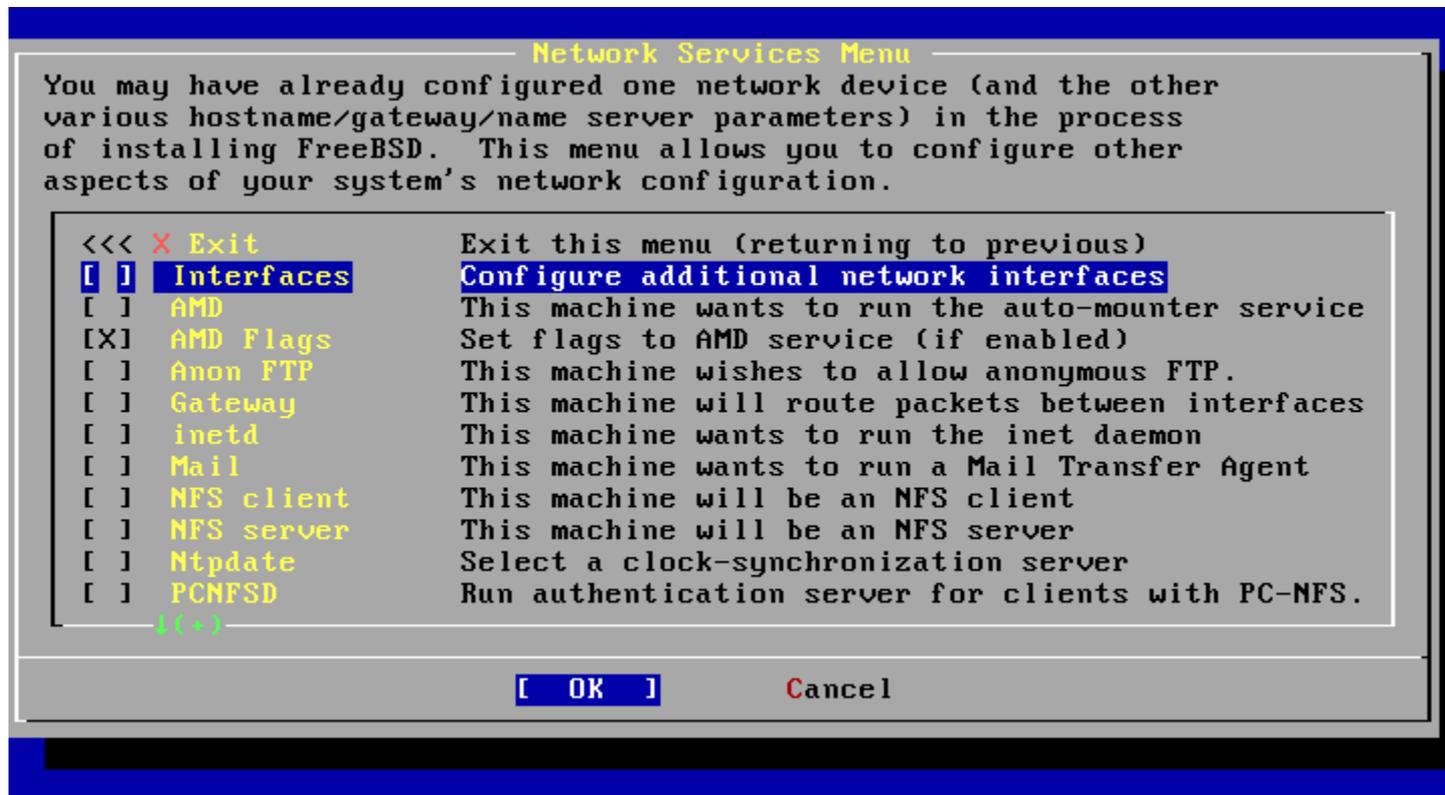
Time Zone

- Asia -> Taiwan
- Is BIOS time UTC? No.
- CST? Yes.



Network Services

- Interface
- sshd



Network Services - Interface

- DHCP?
- IPv6?

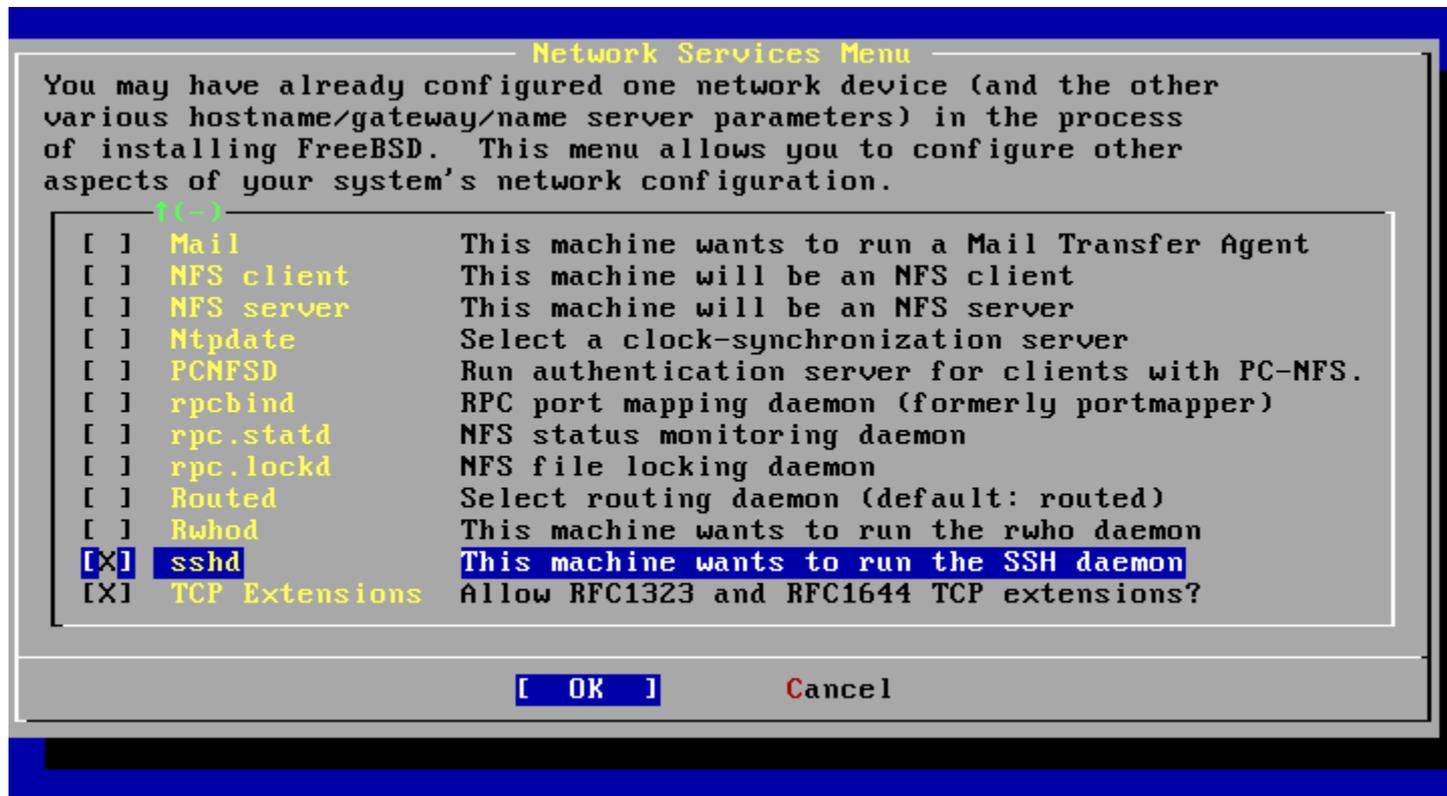
The image shows a terminal window with a 'Network Configuration' dialog box. The dialog is titled 'Network Configuration' and contains several input fields for network settings. The settings are as follows:

Field	Value
Host:	FreeBSD.lwhsu.org
Domain:	lwhsu.org
IPv4 Gateway:	140.113.123.254
Name server:	140.113.1.1
Configuration for Interface re0	
IPv4 Address:	140.113.123.133
Netmask:	255.255.255.0
Extra options to ifconfig (usually empty):	

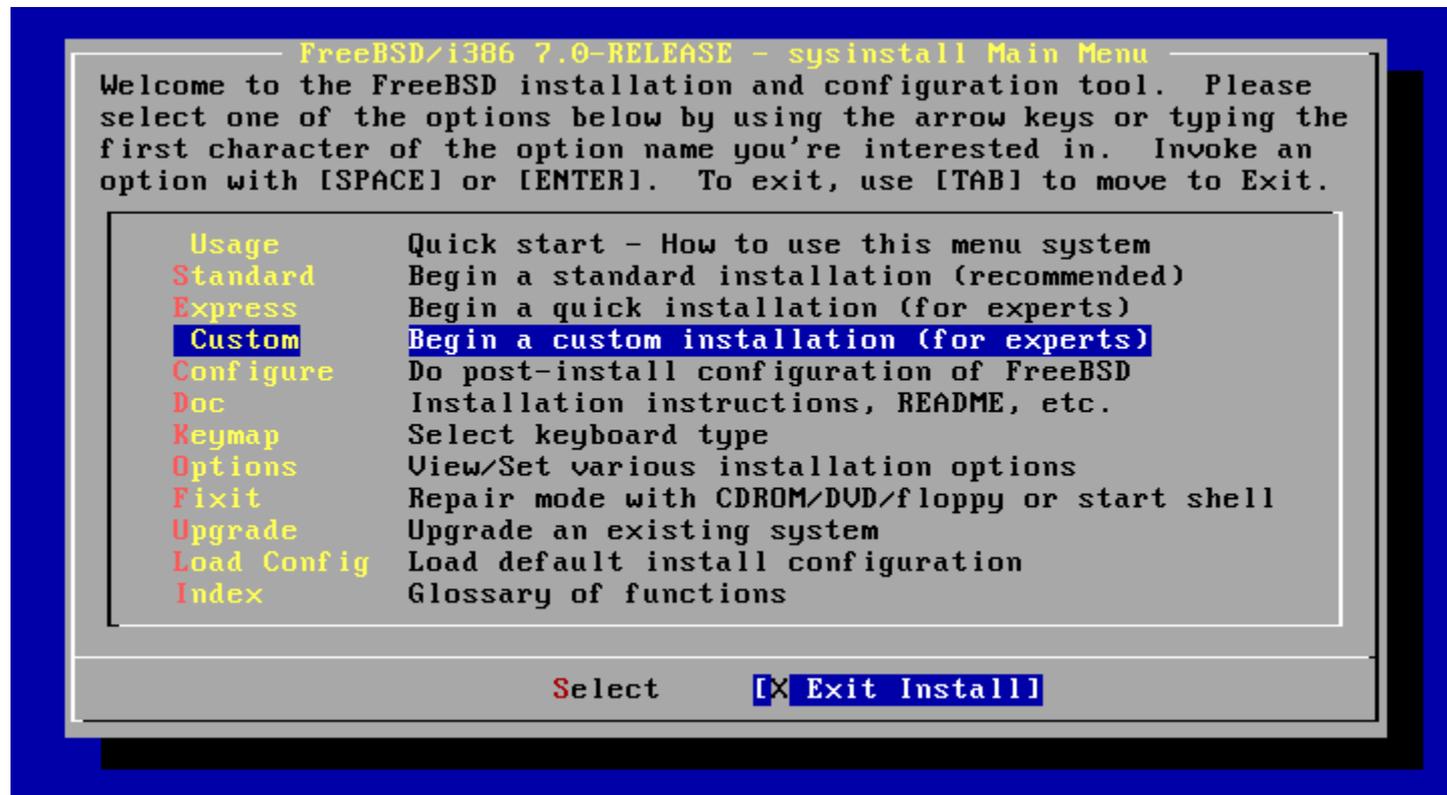
At the bottom of the dialog are two buttons: 'OK' and 'CANCEL'. Below the dialog, a yellow status bar contains the text: [Select this if you are happy with these settings]

Network Services - sshd

Open a way for remote login



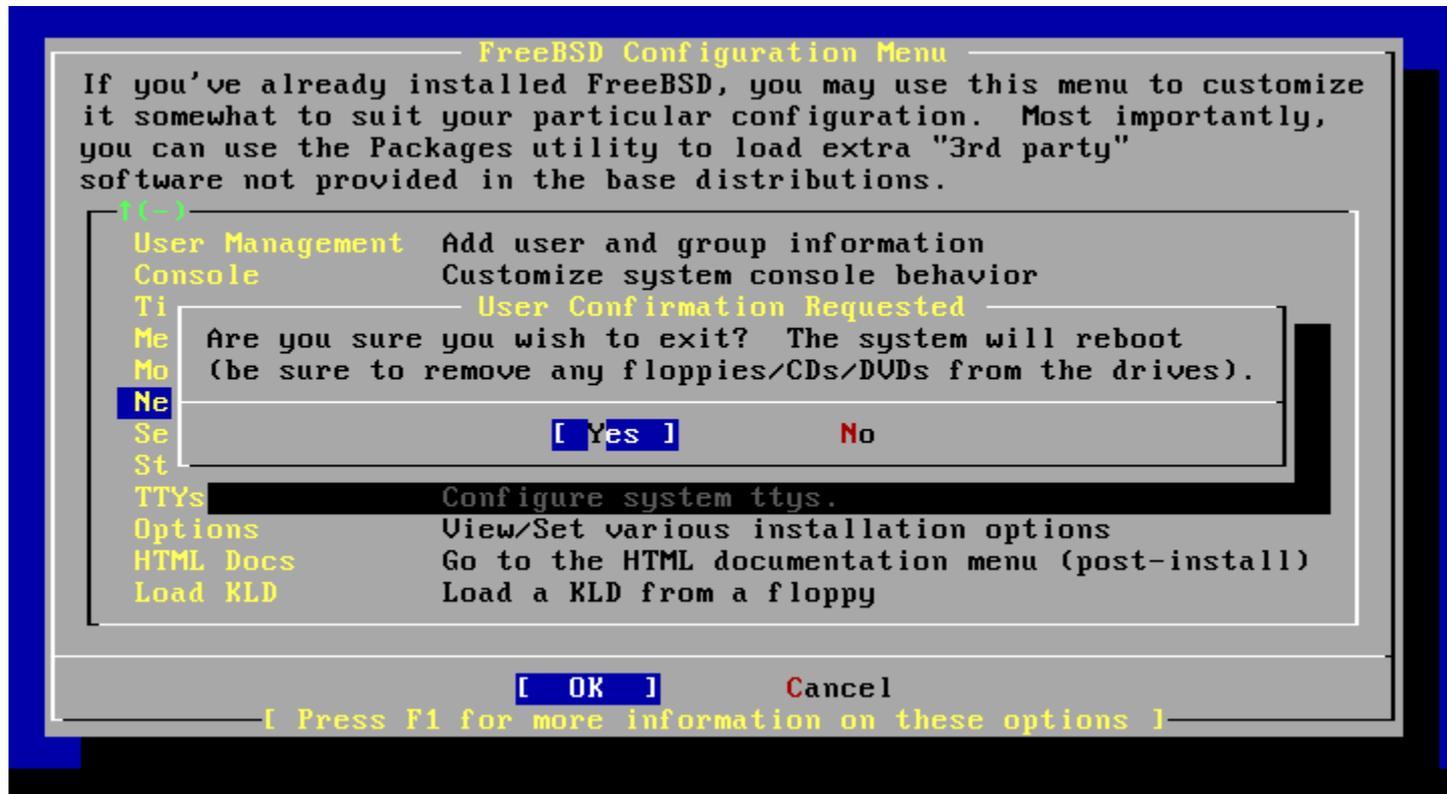
Done!



Last Step...

Be sure to remove booting media.

You would not want restart whole process again...



Finally, reboot and enjoy!

Other Installers

- Finstall

- > <http://sourceforge.net/projects/finstall/>



Exercise 1 – Keeping update
- build world and kernel

CVS Tags

◎ Branch Tags

- > HEAD (.) (-CURRENT)
- > RELENG_7 (-STABLE)
- > RELENG_7_0 (-RELEASE)
 - RELENG_7_0_BP

◎ Release Tags

- > RELENG_7_0_0_RELEASE

http://www.freebsd.org/doc/en_US.ISO8859-1/books/handbook/cvs-tags.html

CVSup Configuration File

- ◎ /usr/share/examples/cvsup/

- > standard-supfile

- *default host=cvsup.tw.FreeBSD.org

- *default base=/var/db

- *default prefix=/usr

- *default release=cvs tag=RELENG_7_0

- *default delete use-rel-suffix

- ◎ csup <supfile>

csup(1)

Make configuration file

/etc/make.conf:

SUP_UPDATE= yes

SUP= /usr/bin/csup

SUPFLAGS= -L 2

SUPFILE= /usr/local/etc/src-supfile

PORTSSUPFILE=/usr/local/etc/ports-supfile

KERNCONF= SABSD

CPUTYPE= core2

/usr/share/examples/etc/make.conf

/usr/share/mk/bsd.cpu.mk

Make configuration file (advanced)

NO_CLEANDIR=yes

NO_CLEAN=yes

NO_KERNELCLEAN= yes

#NO_MODULES= yes

#MODULES_WITH_WORLD= true

NO_PORTSUPDATE= yes

Use these options carefully!

/usr/src/Makefile.inc1

Steps

- `cd /usr/src`
- `make update`
- `mergemaster -p` (Pre-buildworld mode)
- `make buildworld`
- `make kernel` (`buildkernel`, `installkernel`)
(reboot and boot in single user mode)
- `make installworld`
- `mergemaster` (or `mergemaster -Ui`)
- (`make check-old`, `make delete-old`)
- `reboot`

`/usr/src/Makefile`, `mergemaster(8)`

Kernel configuration file

- ◎ Kernel configure file
 - > `cd /usr/src/sys/{i386,amd64}/conf/`
- ◎ “LINT”
 - > `make LINT`
- ◎ Make your own kernel configuration file
 - > `cp GENERIC “YOUR-KERNEL-NAME”`
- ◎ Edit your configuration file
- ◎ Edit `/etc/make.conf`

Parallel

- ◎ `make -jN`
 - > N: how many parallel process
 - > Not useable in ports

`make(1)`

Reboot & Check

- ◎ Reboot and enjoy it
 - > # reboot
- ◎ Check
 - > # uname -a

Handbook!

- ◎ Chapter 8 Configuring the FreeBSD Kernel
 - > <http://www.freebsd.org/doc/en/books/handbook/kernelconfig.html>
- ◎ 23.4 Rebuilding “world”
 - > <http://www.freebsd.org/doc/en/books/handbook/makeworld.html>

If Something Goes Wrong

- ◎ Boot from old kernel
 - > “6. Escape to loader prompt”
 - > Boot /boot/kernel.old/kernel

 - > cd /boot
 - > cp -R kernel.old kernel.ok
 - > rm -fr kernel
 - > mv kernel.old krenel

Handbook!

- ◎ 8.7 If Something Goes Wrong
 - > <http://www.freebsd.org/doc/en/books/handbook/kernelconfig-trouble.html>

Exercise 2 – Make FreeBSD more useable
- Install 3rd party software

Install software

- ◎ Use the Source!
 - > Tar ball
 - > `tar xzvf certain-source.tar.gz`
 - > `./configure`
 - > `make; make install`

Install software

◎ Package

- > Pre-built ports
- > pkg_add, pkg_delete, pkg_deinstall, pkg_info, pkg_version

◎ Ports

- > cd /usr/ports, make search, make install clean
- > ports/ports-mgmt/portupgrade
 - portinstall, portupgrade, portversion
 - **/usr/local/etc/pkgtools.conf**
- > Ports/ports-mgmt/portmaster

CVSup Configuration File

- ◎ /usr/share/examples/cvsup/

- > ports-supfile

- *default host=cvsup.tw.FreeBSD.org

- *default base=/var/db

- *default prefix=/usr

- *default release=cvs tag=.

- *default delete use-rel-suffix

Try to use ports

- ◎ Try to install some software, such as:
 - > vim
 - > mutt
 - > wget
 - > w3m
 - > Perl, Python Ruby