The Media Streaming Journal

February 2023

Covering Audio and Video
Internet Broadcasting

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The Media Streaming Journal Staff

Derek Bullard
Publication Director
info@radiosolution.info

David Childers
Editor In Chief
editor@radiosolution.info

Advertising
advertising@radiosolution.info

www.radiosolution.info

Welcome to The Media Streaming Journal

Welcome to the latest edition of The Media Streaming Journal.

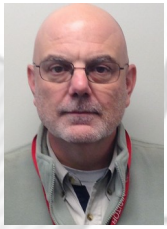
This month's edition covers the latest version of the FreeBSD fork NomadBSD. NomadBSD is a complete and fully functional operating system based on the FreeBSD operating system, a derivative of the original Bell System Research Unix operating system. Nomad can run as a persistent live system on USB flash drives. This BSD derivative is unique as it is designed to be used as a live desktop system that works without comprehensive configuration using automatic hardware detection and setup.

Please feel free to contact either the Publication Director (Derek Bullard) or myself if you have any questions or comments regarding The Media Streaming Journal.

Namaste

David Childers

The Grand Master of Digital Disaster
(Editor In Chief)



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The Media Streaming Journal

What is in this edition of the Media Streaming Journal

Nomad BSD Handbook
December 05, 2022

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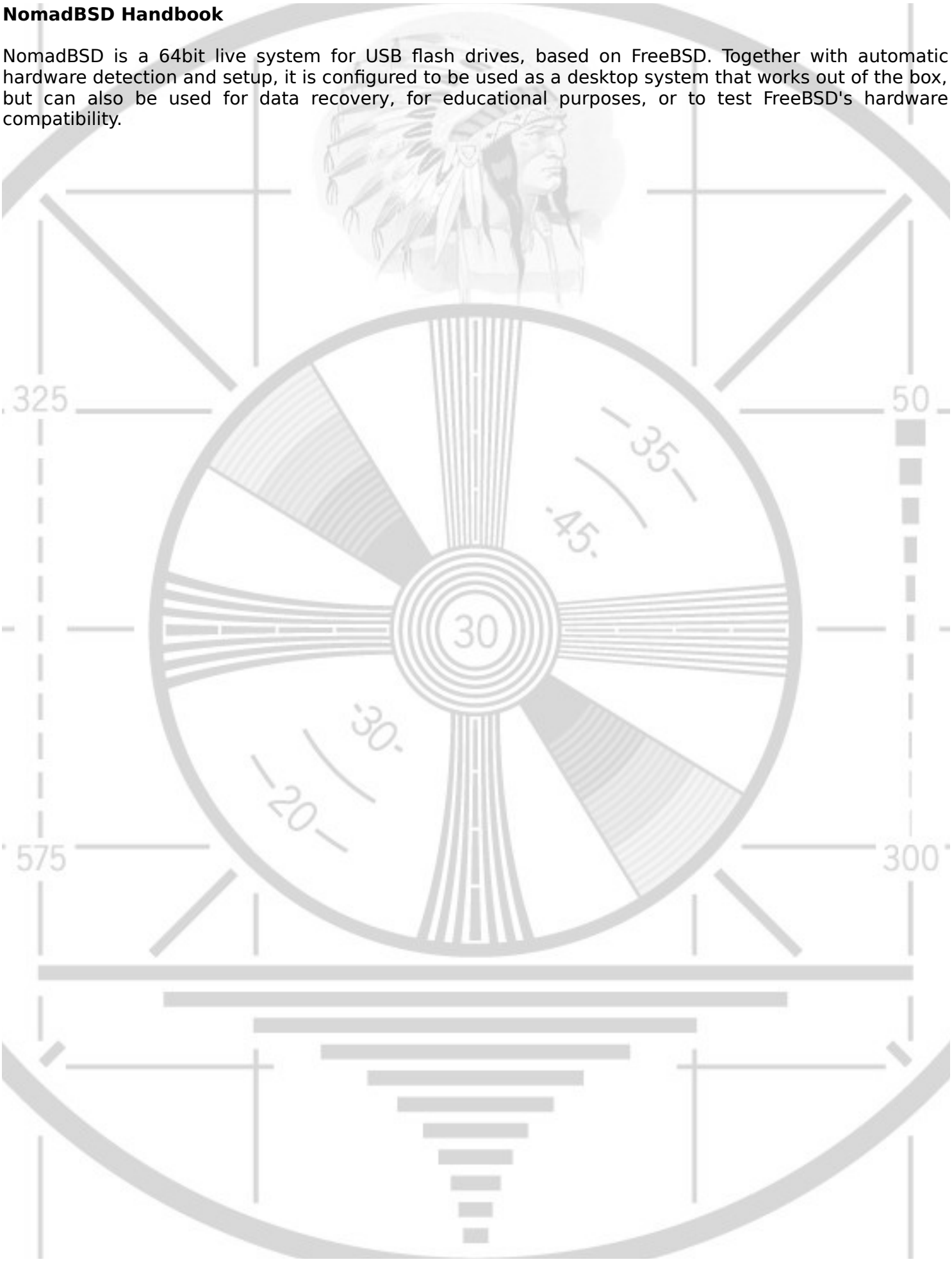
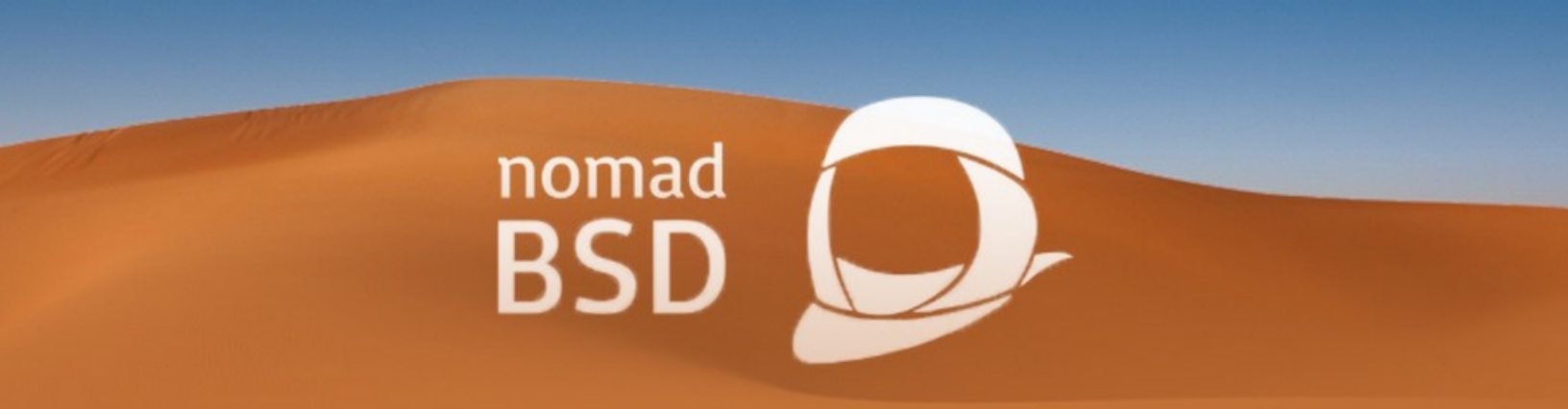
NomadBSD Handbook

NomadBSD is a 64bit live system for USB flash drives, based on FreeBSD. Together with automatic hardware detection and setup, it is configured to be used as a desktop system that works out of the box, but can also be used for data recovery, for educational purposes, or to test FreeBSD's hardware compatibility.



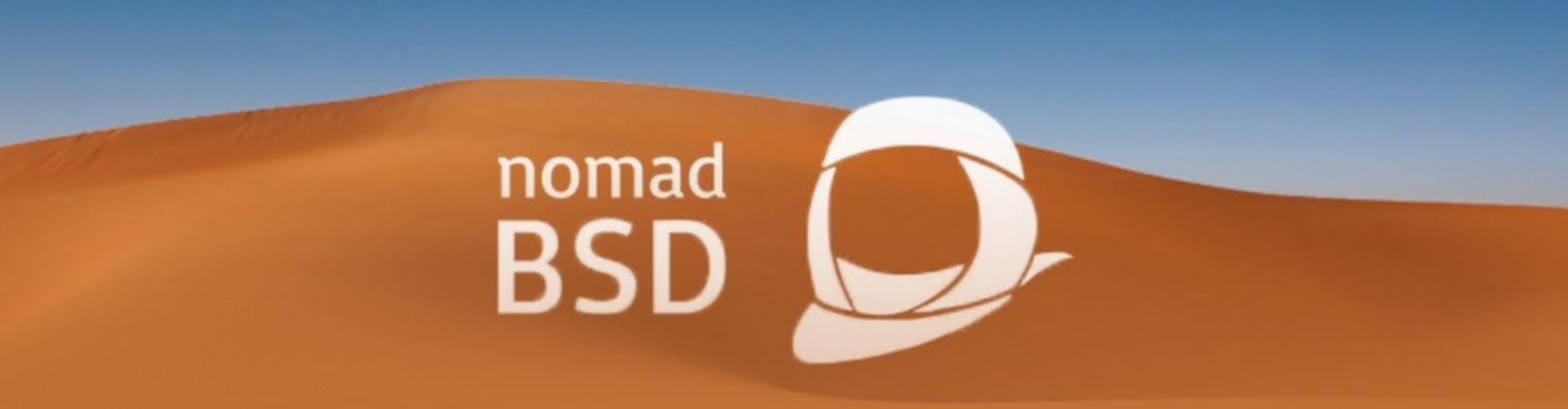


nomad BSD | HANDBOOK

Check our website for more information

https://nomadbsd.org/

Updated on Dec 05, 2022



Intro

NomadBSD is a 64bit live system for USB flash drives, based on FreeBSD®. Together with automatic hardware detection and setup, it is configured to be used as a desktop system that works out of the box, but can also be used for data recovery, for educational purposes, or to test FreeBSD®'s hardware compatibility.

Installation

i. Choosing a USB flash drive

NomadBSD performs well on USB 2.X flash drives, but writing many small files can be very slow. To improve performance, you should consider using a USB 3.X flash drive even on a USB 2.X port, as they tend to be faster. See **USB 3.0 Flash Drive Roundup**. Do not use cheap no-name thumb drives they sell at super markets and drug stores. These drives are very slow and unreliable.

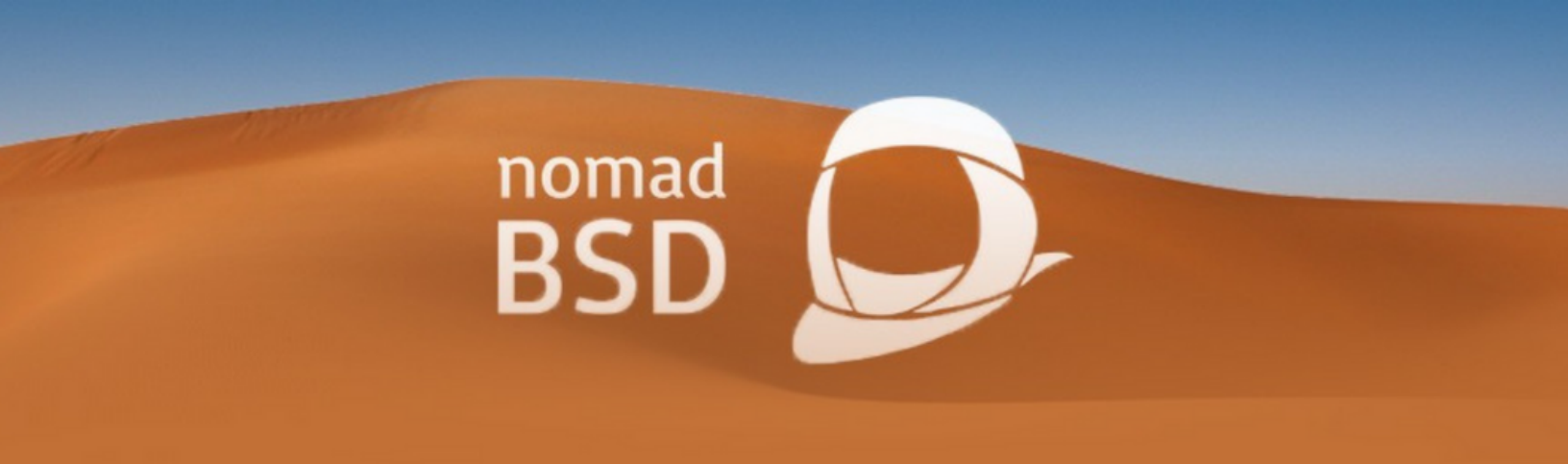
ii. Downloading and writing the image

Instructions for writing the image to a flash drive from different operating systems can be found **here**.

The NomadBSD setup

When you boot NomadBSD for the first time, it will run the setup wizard which allows you to set your locale, timezone, keyboard settings, password, encryption, and default applications. The setup of the UFS version creates a new partition for the /data directory which uses the remaining space on the storage device. Depending on the size, creating the file system can take several minutes. The setup of the ZFS version expands the pool to the remaining space of the storage device.

Overview



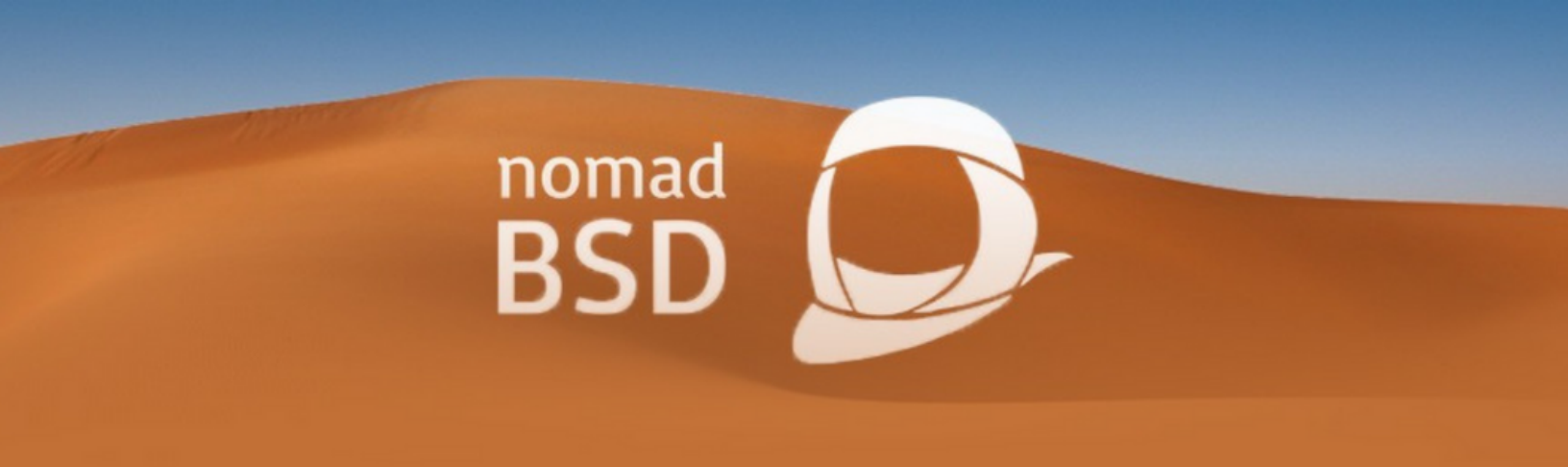
1- Openbox menu. You can reach it by pressing the Windows® key (or Super key)/⌘ key (Mac®), or by right-clicking on the background image (root window).

2- DSBBatmon. By hovering over the icon you can see the battery's current status and charge. Clicking on it brings up the configuration menu.

3- DSBMC. Clicking on the icon brings up the main window in which you can see all the mountable storage devices attached to the system. Use the context menu of the device icons to select an action (un/mounting, opening, playing, ejecting) or double click to mount and open the device in your default file manager. You can use the preferences menu to change the file manager, autoplay setting, and multimedia programs.

4- DSBMixer. By hovering over the icon you can see the current volume of the master channel. Using the mouse wheel on it lets you change the master volume. Clicking on it brings up the main window of **DSBMixer**.

5- Keyboard Layout Settings. Left-Clicking on the icon opens a menu to switch between keyboard layouts. Right-Clicking opens the menu for settings.



6- NetworkMgr. Clicking on the icon shows the menu from which you can connect to wireless networks.

7- Date and time. Clicking in that area brings up a calendar.

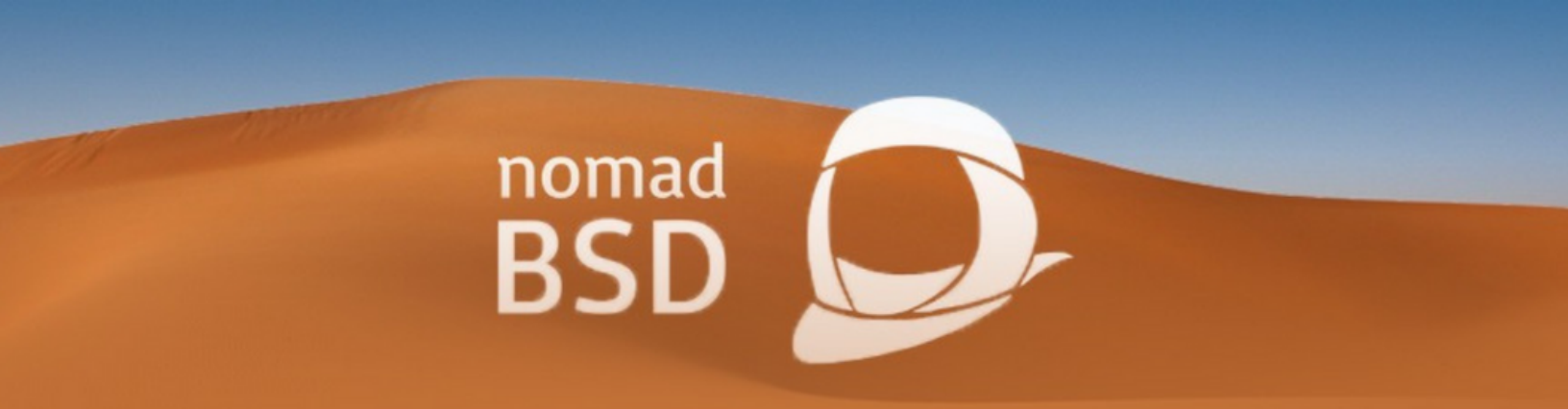
Key bindings

Global keybindings

Keys	Function
Alt+F2	Open DSBExec to execute a command.
Ctrl+Alt+L	Lock the screen.
Ctrl+Space	Open **dmenu-run** to execute a command.
Print	Open XFCE 4 screenshooter.

Terminal Keybindings

Keys	Function
Ctrl++	Increase font size
Ctrl+-	Decrease font size
Shift+Ctrl+C	Copy selected text
Shift+Ctrl+V	Paste copied text
Ctrl+Shift+T	Open a new tab
Ctrl+Shift+W	Close current tab

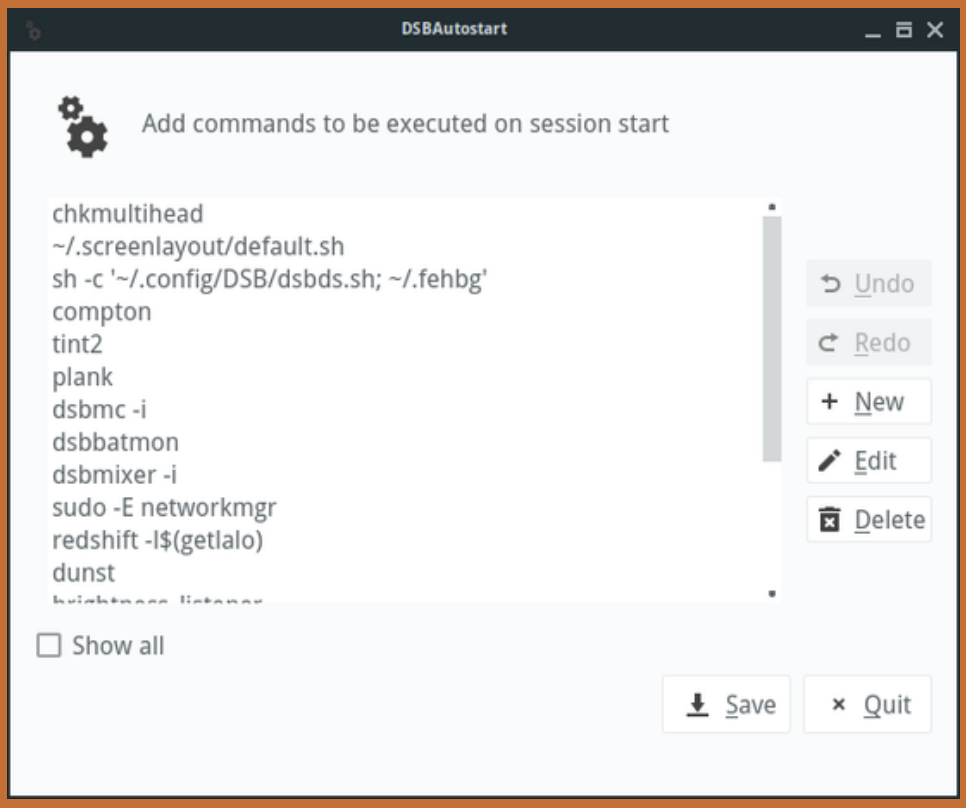


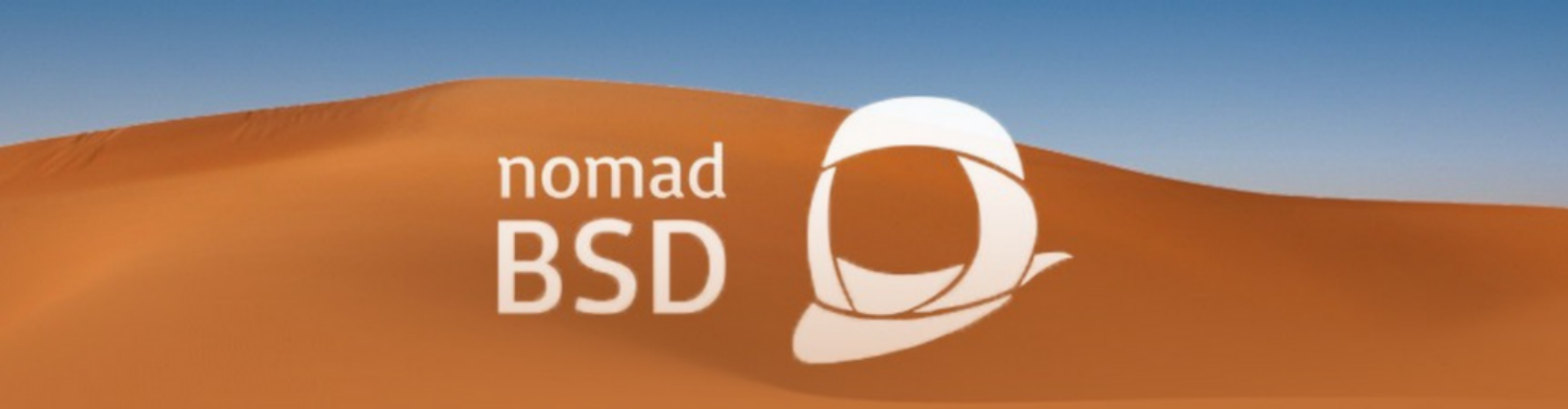
Keys cont'd	Function cont'd
Alt+Left cursor	Previous tab
Alt+Right cursor	Next tab
Alt+[1-9]	Switch to tab N (1-9)
Ctrl+Shift+S	Toggle scrollbar
Ctrl+Shift+Left click	Open link
F11	Fullscreen
Shift+PageUp	Scroll up one page
Shift+PageDown	Scroll down on page
Ctrl+Shift+Up	Scroll up one line
Ctrl+Shift+Down	Scroll down one line

nomad BSD

Enable/Disable desktop components & auto-start programs

The program **DSBAutostart** (**Openbox** menu → Settings → Autostart Settings) allows you to control which programs are automatically executed when the graphical interface starts. Further, it allows you to enable/disable some components of the NomadBSD desktop. The changes take place after logging out and in again.





Adding applications to the plank panel

Open your preferred graphical file manager, and navigate to /usr/local/share/applications. You can also get there by clicking the shortcut Applications on the side pane. Use Drag&Drop to add application icons to the plank panel.

Display manager settings: Auto login, default user, and theme

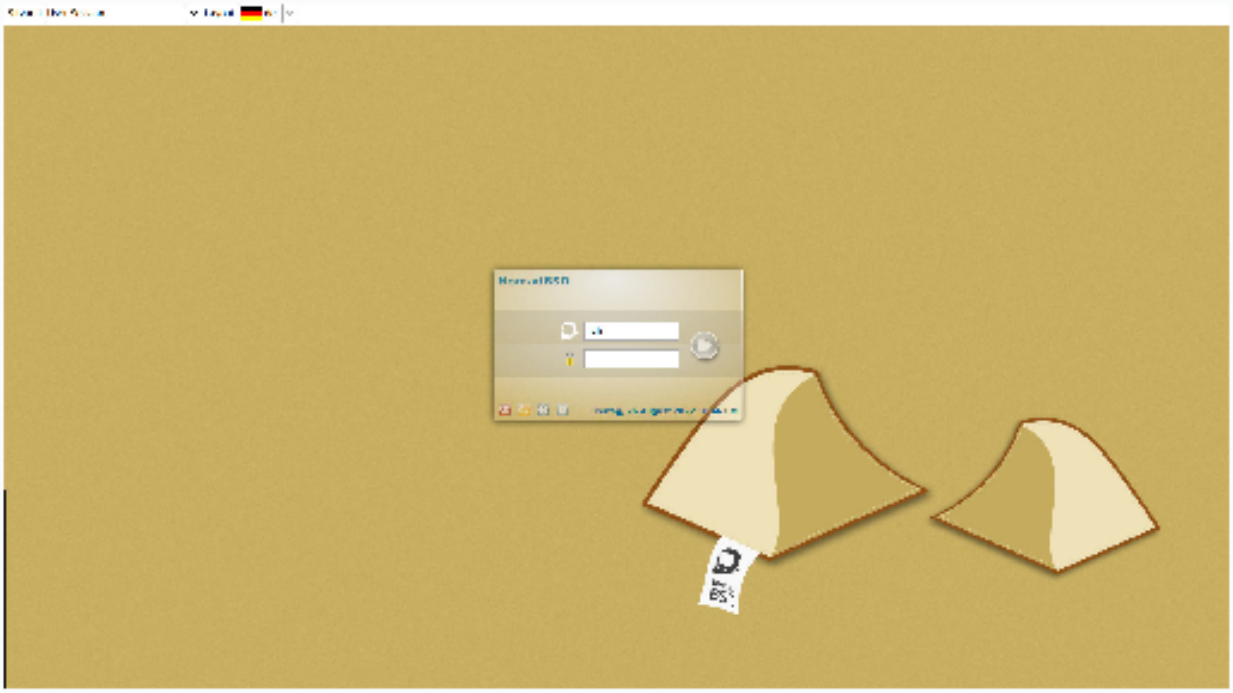
The display manager, **SDDM**, used by NomadBSD is configured to automatically log in the default user nomad. The program nomadbsd-dmconfig (Openbox menu → Settings → Display manager settings) allows you to change/disable the default user, select the default session, and to enable/disable auto login. Furthermore, it lets you change the theme. If you want to add a new theme, copy the theme's directory to /usr/local/share/sddm/themes/. To see a preview in nomadbsd-dmconfig copy a screenshot of the login screen to /usr/local/share/sddm/themes/your-theme-name/your-theme-name.jpg.

nomad BSD

Display manager settings

Theme nomadbsd-elarun

Preview

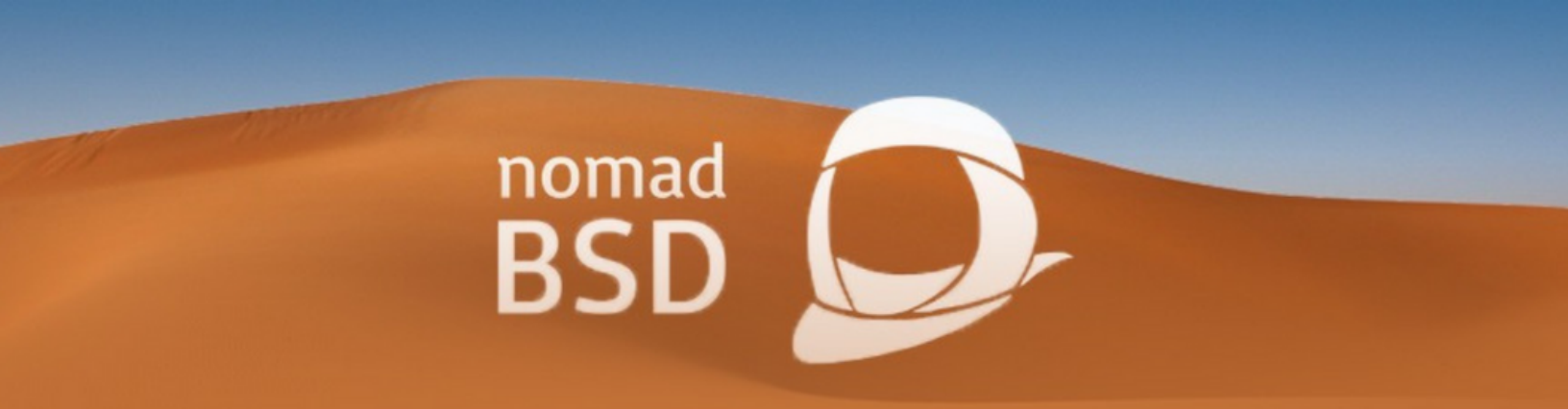


Default user nomad

Default Session xinitrc

Auto login

Save Quit



Adding a preconfigured user account

If you want to add a further preconfigured user account use nomadbsd-adduser (Openbox menu → System → Add user). Since NomadBSD is configured to automatically log in the user nomad you need to change that behaviour in order to be able to log in as another user. See nomadbsd-dmconfig.

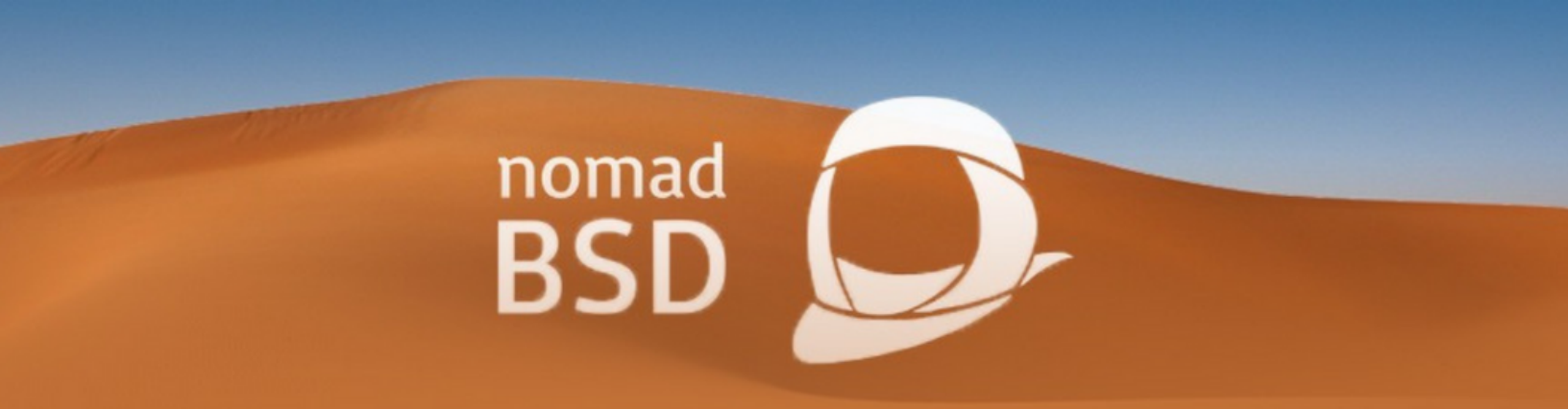
Filesystems

NomadBSD comes with a bunch of pre-installed filesystems (CD9660, FAT, HFS+, NTFS, Ext2/3/4). You can mount storage devices via **DSBMC** (see Overview), which is a graphical client for **DSBMD**.

Automount

You can enable automount in DSBMC under File → Preferences → Automatically mount devices

Alternatively, you can use **dsbmc-cli**: Execute the command dsbmc-cli -a to automount all currently connected storage devices, and to enable automounting on devices attached later to the system. To start this command automatically on session start, open DSBAutostart, and add a new entry for the above command.



Extending filesystem support

The following subsections describe how to extend the filesystems support. Rebooting the system, or restarting **DSBMD** is not necessary.

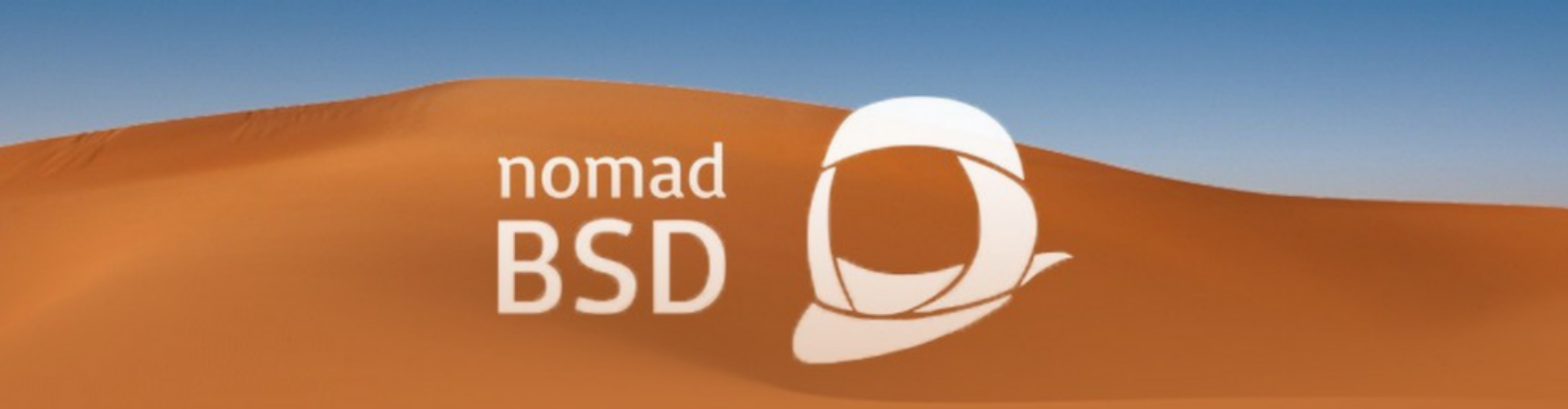
ExFat

Unfortunately, sysutils/fusefs-exfat requires a license from Microsoft®, and so it can't be pre-installed. You have to build it yourself by using the ports:

```
# pkg install autoconf automake
# svnlite co https://svn.freebsd.org/ports/head/Mk /usr/ports/Mk
# svnlite co https://svn.freebsd.org/ports/head/Templates /usr/ports/Templates
# svnlite co https://svn.freebsd.org/ports/head/sysutils/fusefs-exfat /tmp/fusefs-exfat
# cd /tmp/fusefs-exfat
# make DISTDIR=/tmp install
```

or the Git repo:

```
# pkg install autoconf automake
# git clone https://github.com/relan/exfat.git
# cd exfat
# autoreconf --install
# ./configure
# make && make install
```



BTRFS and XFS

Install the package fusefs-lkl for BTRFS and XFS support.

pkg install fusefs-lkl

Filesystems

Wireless Networking

The program **networkmgr**, which runs in the tray, allows you to connect to wireless networks.

Installing software packages

You can install and upgrade software packages with **OctoPkg** (Openbox menu → System → OctoPkg) which is a graphical front-end to FreeBSD's **pkg**.

Installing Linux® browsers for watching Netflix, Prime Video, etc.

The program lbi-gui (Openbox menu → Network → Linux Browser Installer GUI) allows you to install **Widevine** capable Linux browsers.

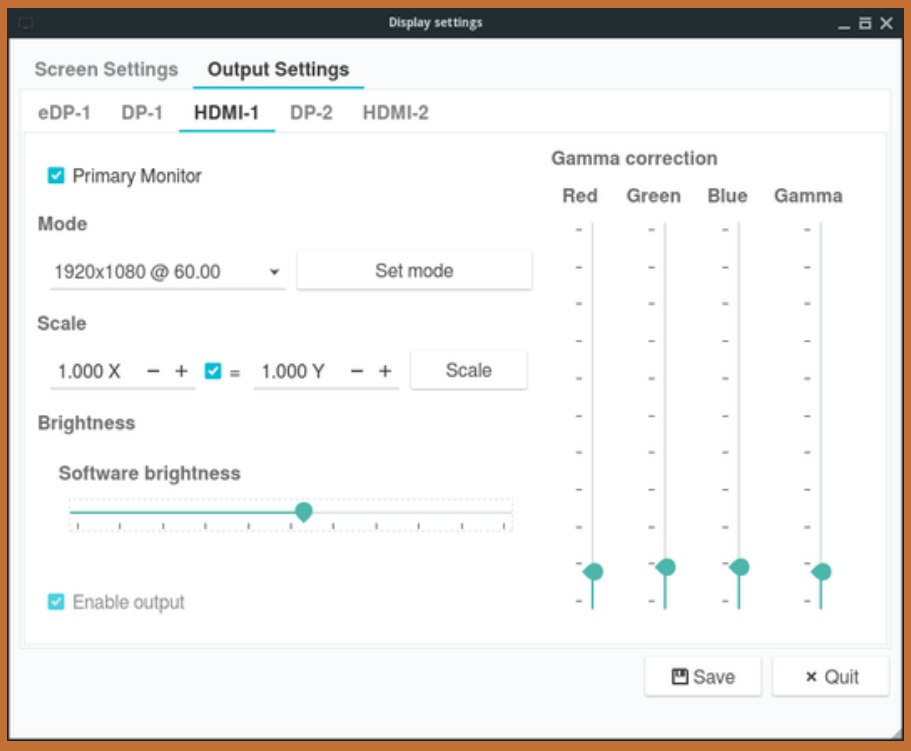
Graphics

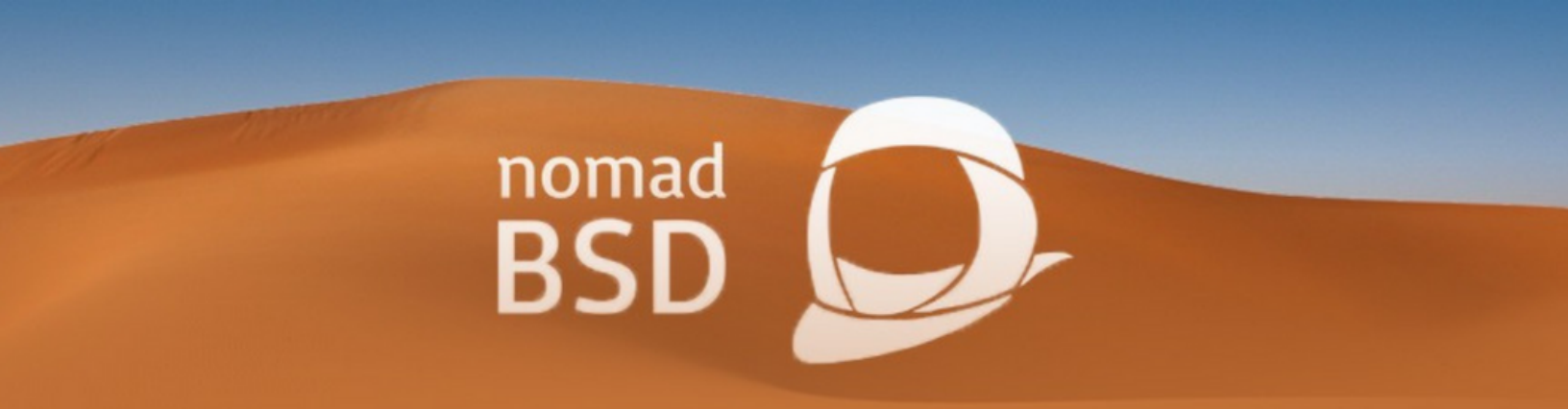
Multihead setup

By default, NomadBSD enables all connected outputs (monitors). The tool **ArandR** (Openbox menu→ Settings → ArandR) allows you to configure the position, resolution, etc. of your monitors. Save your changes to ~/.screenlayout/default.sh which is automatically executed on session start.

Changing display settings

The program (Openbox menu→ Settings → Display Settings) allows you to change the brightness, gamma, screen mode, display power management (DPMS) settings, etc.





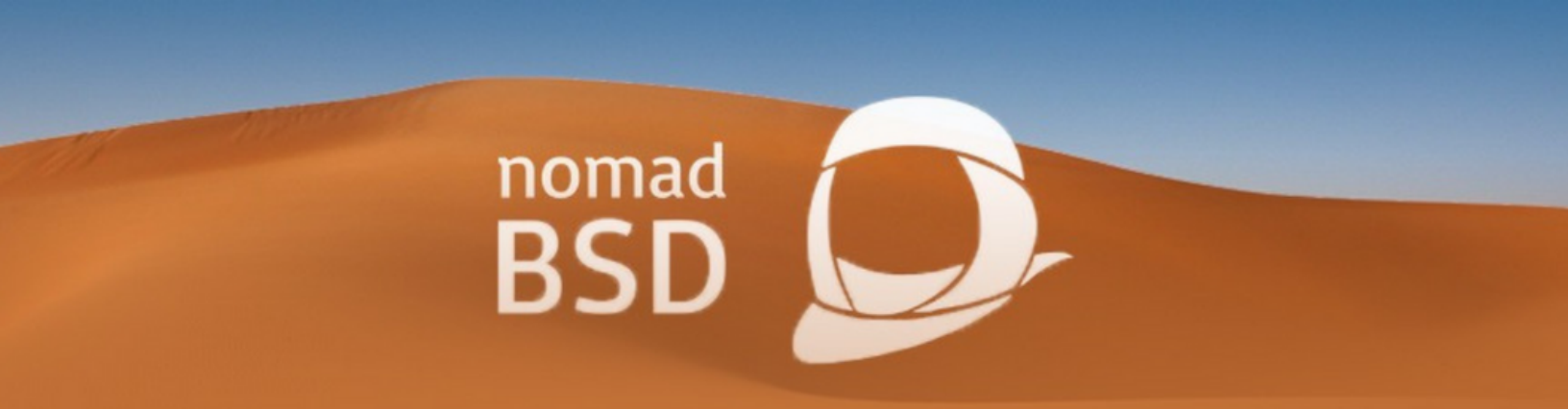
Sound

Selecting the default audio device

Right-click on the speaker/volume indicator icon in the panel, and choose Preferences from the menu. In the preferences window go to the Default device tab, select the sound card/device, and click on Ok. In order to take effect make sure to restart your audio application(s).

Using an alternative window manager

You can install different window managers and desktop environments on NomadBSD. Select the one you want to start by selecting from the sessions menu at the graphical login manager (**SDDM**).



Advanced Topics

Resetting NomadBSD (UFS version only)

If you are a tester, or your experiments with the systems left a total mess, you might want to reset NomadBSD.

Warning: *The reset will delete /home, /private, /etc, /var, /root, and /usr.local.etc. Make a backup if there are any files you want to keep.*

You can reset NomadBSD as follows:

1. Boot into single-user mode by (re)booting and choosing 2 in the boot menu.
2. Execute /usr/libexec/nomadbsd-reset

After rebooting you'll be greeted by the setup again.

Limitations

If you have modified or deleted system files from directory trees other than /home, /private, /etc, /var, /root, /tmp, and /usr.local.etc, you might not be able to cleanly reset NomadBSD.

Disabling the automatic graphics driver setup

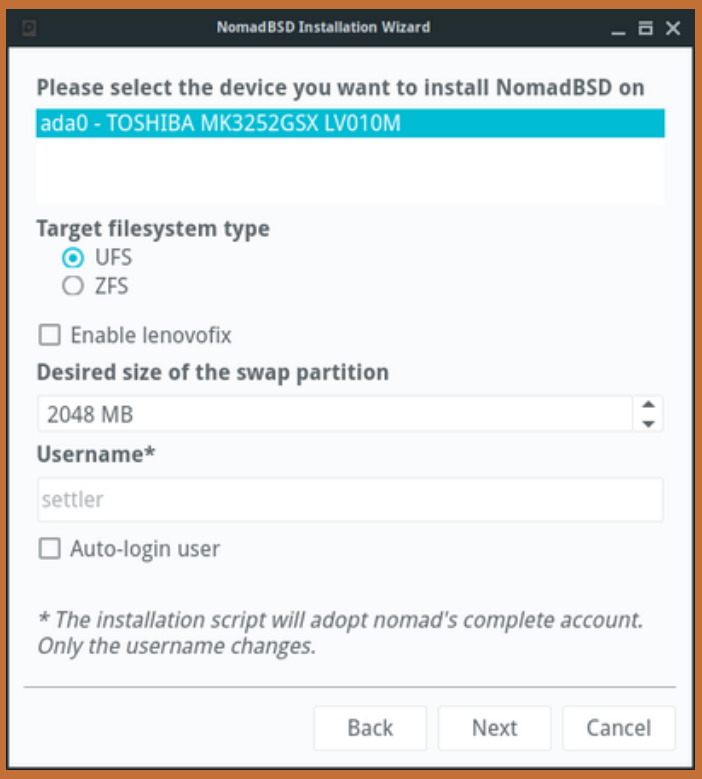
If you want to create your own graphics driver settings, you can disable initgfx by adding

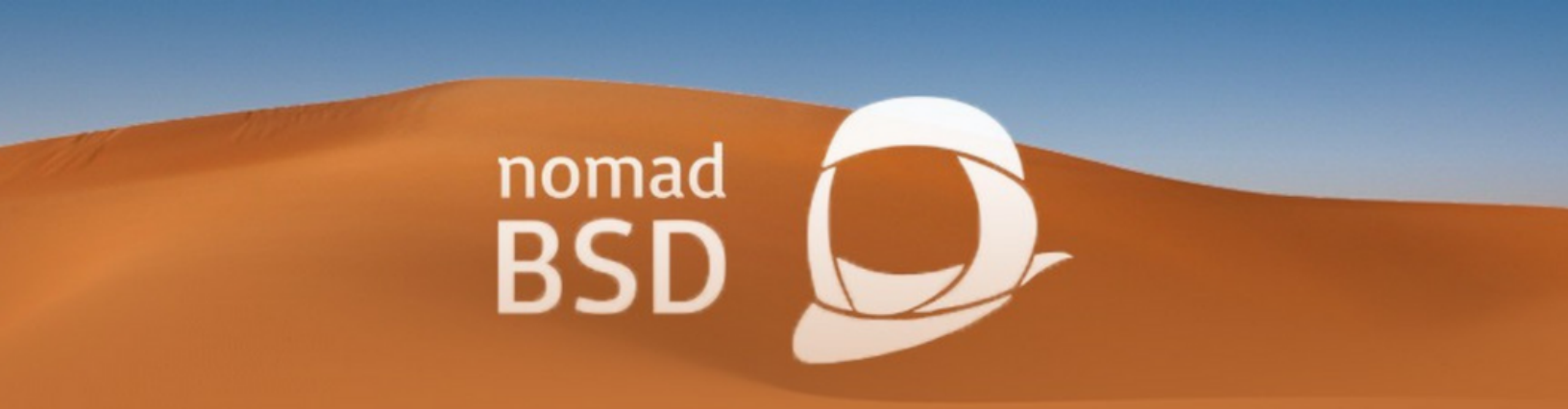
initgfx_enable="NO" to /etc/rc.conf.

Installing NomadBSD on a hard disk

Start Openbox menu → System → NomadBSD Installer and follow the instructions.

Note: *The NomadBSD installer will use the entire disk. Installing to a single partition is currently not possible.*





Running NomadBSD in Virtualbox™

1- Download and extract an image you intend to run.
2- Create a virtual harddisk (VDI) from the image:

```
VBoxManage convertfromraw nomadbsd-x.y.z.img \
    nomadbsd-x.y.z.vdi --format VDI
```

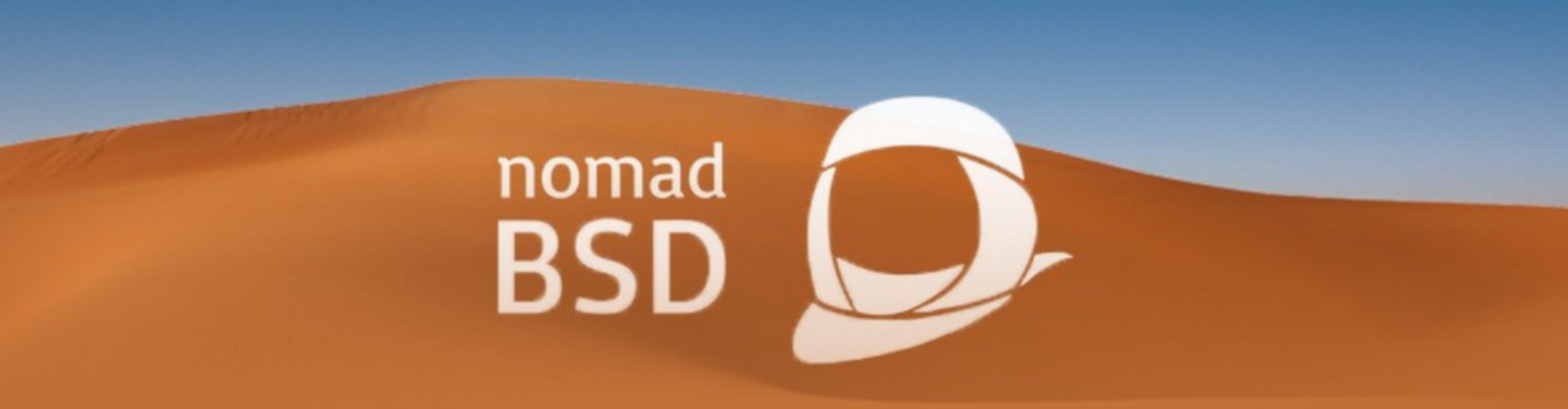
3- Change the size of the virtual harddisk, so that you have enough space to store files, and install packages. NomadBSD's base system requires approx. 4 GB, so resizing the VDI to 8 GB (8000 MB), which is the minimum recommended size, will give you about 4 GB for your files.

```
VBoxManage modifyhd nomadbsd-x.y.z.vdi --resize 8000
```

Note: Increasing the size of the VDI after running the NomadBSD setup will not have any effect on NomadBSD's filesystem capacity.

4- Start VirtualBox™, and create a new virtual machine. Select Use an existing virtual hard disk file in the Hard disk settings, and choose nomadbsd-x.y.z.vdi which we created in 2.

5- Go to Settings → Display and set the video memory to 128MB or more. And set the processors to 2.



Installing Linux® packages

Before you can install Linux® packages it is necessary to enable Linux® **binary compatibility**. Let's say you want to install **linux-sublime** you can proceed as follows:

```
# sysrc linux_enable=YES
# service abi start
# pkg install linux-sublime
```

Troubleshooting

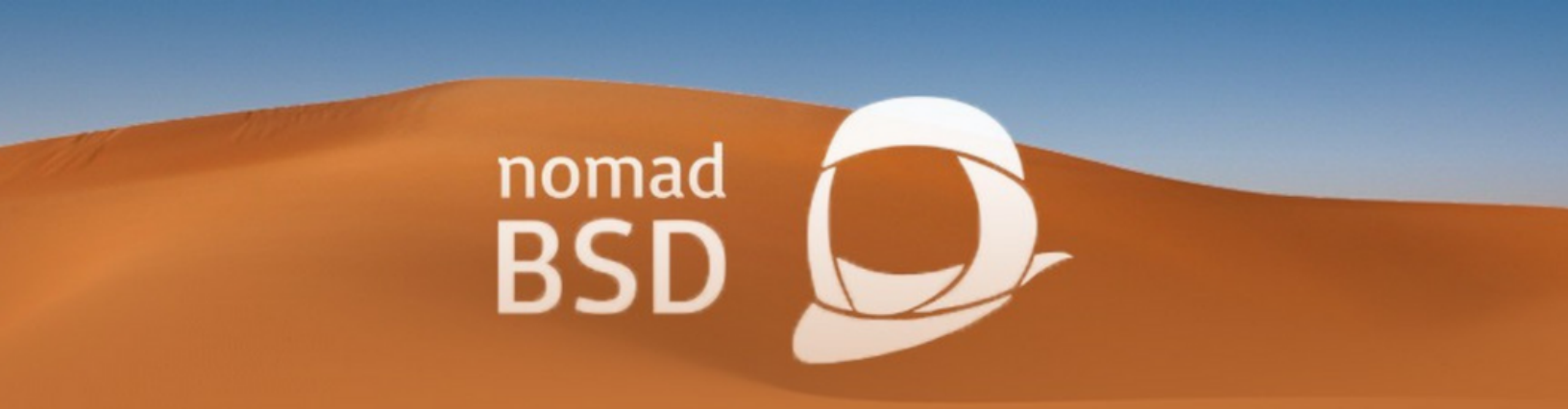
Errata

If you experience any problems, consult the NomadBSD Errata first.

Boot problems

The boot process stops at the mountroot prompt

If you are using a USB 3.X port, try to use a USB 2.X port instead.



Graphics

Automatic graphics card detection crashes the system

If the graphics driver detection crashes the system, you can use a non-accelerated fallback driver (VESA or SCFB) by disabling the automatic detection in the boot menu:

1. (Re)boot and enter the boot submenu Boot Options (7).
2. Change Disable automatic Graphics detection to On by pressing the key matching the item number.
3. Go back to main menu, and press <Enter> to boot.

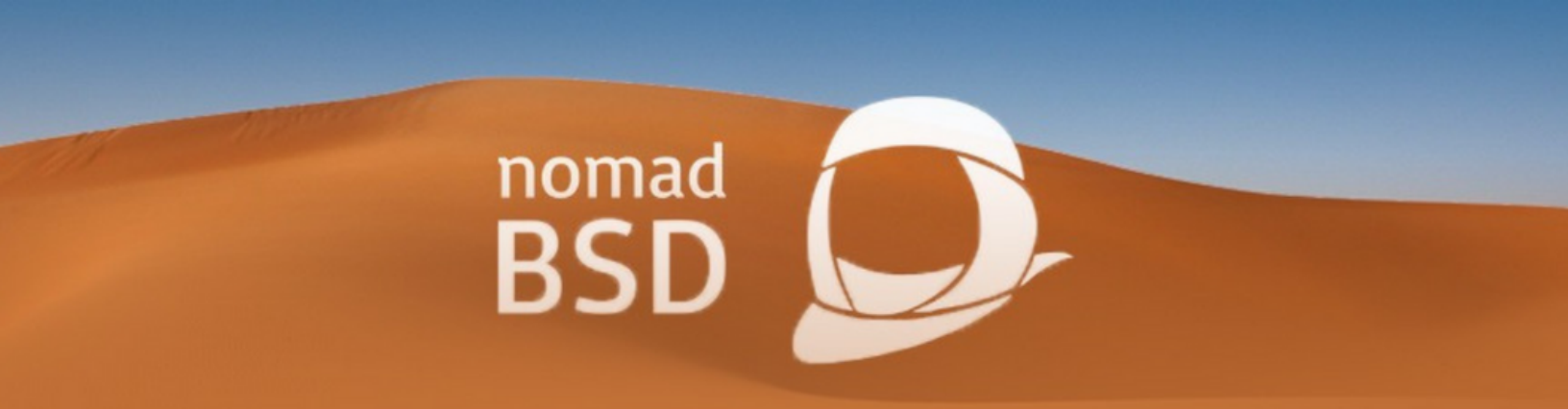
ATI/AMD

If you are booting a system with ATI/AMD graphics via UEFI, you might experience some problems. Due to a conflict with the EFI framebuffer, NomadBSD might crash or hang when the graphics driver gets loaded, or it just isn't able to start the X window system.

Try the following workaround:

1. (Re)boot and enter the boot submenu Boot Options (7).
2. Change Disable syscons to On by pressing the key matching the item number.
3. Go back to main menu, and press <Enter> to boot.

Note: You won't see any boot messages until the graphics driver gets loaded.



NVIDIA

If you see an error message like device_attach: nvidia0 attach returned 6 you could try to add debug.acpi.disabled="sysres" to /boot/loader.conf.

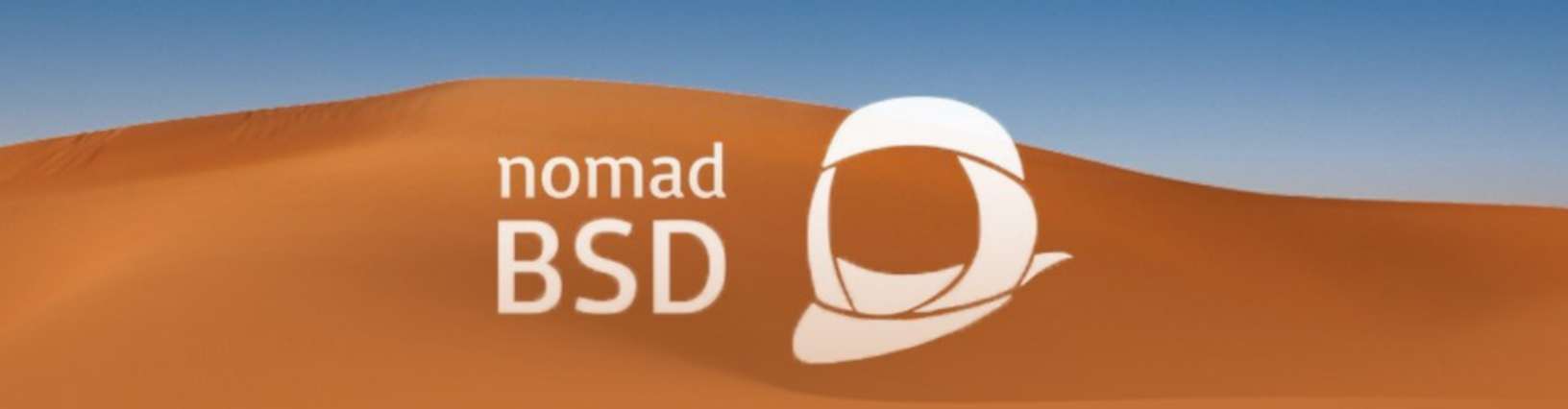
Distorted/squished EFI framebuffer screen

If you happened to see that the screen content seems to be squished into the upper 1/3 of your monitor you can try the following:

1. Reboot, and then enter the loader prompt by pressing 3 at the boot menu.
2. Type: gop set 0 boot

If that didn't solve the problem, enter the loader prompt as described above, and type list gop to see a list of supported modes. According to the list try another mode number for the gop set command in 2.). If you found a mode that resolves the problem, you can save that setting by adding the line exec="gop set X" to /boot/loader.conf, where X is the mode number.

Another way to solve this problem is to boot your system in legacy mode. Consult your EFI/BIOS manual.



Hybrid Combination/Switchable Graphics

NomadBSD doesn't support switchable graphics like Optimus yet. If the Xorg server fails to start, disable one of the GPUs in your system's BIOS/UEFI.