howto, pfsense, apu, apu4d4, pcengines, install

Install pfSense 2.6.0 Community Edition On PC Engines APU4D4

This howto will guide you through the installation process for pfSense 2.6.0 on a PC Engines APU4D4. You can find generic installation instructions in the netgate documentation.

Sources

- https://www.pfsense.org/download/
- https://docs.netgate.com/pfsense/en/latest/
- https://docs.netgate.com/pfsense/en/latest/install/index.html
- https://docs.netgate.com/pfsense/en/latest/install/install-pfsense.html
- https://forum.netgate.com/topic/162959/root-mount-waiting-for-cam/6
- https://pcengines.ch/apu4d4.htm
- https://pcengines.ch/pdf/apu4.pdf

Prerequisites

- USB flash drive (e.g.)
- USB to serial converter (e.g.)
- Null modem cable (e.g.)
- mSATA disk plugged into the mSATA-port of the PC Engines APU4D4-board (e.g.)

Serial Console Image Download

All commands are assumed to be executed as **root**.

Download the installer image (360 MB)

```
cd ~/Downloads
wget https://frafiles.netgate.com/mirror/downloads/pfSense-CE-memstick-serial-2.6.0-RELEASE-amd64.img.gz
```

Alternatively - Browse to the pfSense download page and download the “Latest Stable Version (Community Edition)” (direct link) to your local harddisk.

- Version: **2.6.0**
- Architecture: **AMD64 (64-bit)**
- Installer: **USB Memstick Installer**
- Console: **Serial**
- Mirror: **<select the mirror server closest to your location>**

This should result in a downloaded file **“pfSense-CE-memstick-serial-2.6.0-RELEASE-amd64.img.gz”** somewhere on your local file system.

Verify the installer integrity

```
sha256sum -c <<< $(lynx --dump
https://www.pfsense.org/hashes/pfSense-CE-memstick-serial-2.6.0-RELEASE-amd64.img.gz.sha256)
```

```
pfSense-CE-memstick-serial-2.6.0-RELEASE-amd64.img.gz: OK
```

Prepare Installation Media

Decompress the installer image (this will result in a 800 MB file)

```
gzip -d pfSense-CE-memstick-serial-2.6.0-RELEASE-amd64.img.gz
```

Plug the USB flash drive into a USB-port an find its device name

```
lsblk
```

```
NAME   MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda      8:0    0 238,5G  0 disk
├─sda1   8:1    0     8M  0 part
├─sda2   8:2    0 222,9G  0 part /var
│                               /usr/local
│                               /srv
│                               /root
│                               /opt
│                               /home
│                               /boot/grub2/x86_64-efi
│                               /boot/grub2/i386-pc
│                               /.snapshots
│                               /
└─sda3   8:3    0  15,6G  0 part [SWAP]
sdb      8:16   1   1,9G  0 disk
└─sdb1   8:17   1   1,9G  0 part
sr0     11:0    1  1024M  0 rom
```

The USB flash drive (in my case) is **/dev/sdb**.

Wipe the partition table of the USB flash drive

```
dd if=/dev/zero of=/dev/sdb bs=1M count=1
```

```
1+0 records in
1+0 records out
1048576 bytes (1.0 MB, 1.0 MiB) copied, 0.413913 s, 2.5 MB/s
```

Now write the installer image to the USB flash drive

```
dd bs=1M if=./pfSense-CE-memstick-serial-2.6.0-RELEASE-amd64.img of=/dev/sdb && sync
```

```
799+1 records in
799+1 records out
837919232 bytes (838 MB, 799 MiB) copied, 142.203 s, 5.9 MB/s
```

Connect To The Serial Console

Use the USB to serial converter and null modem cable to connect your workstation to the APU4D4 serial port and find the device name of your serial converter

```
ls -la /dev/ttyUSB*
```

```
crw-rw---- 1 root dialout 188, 0 Feb  9 18:51 /dev/ttyUSB0
```

```
dmesg | grep ttyUSB
```

```
[120741.844003] usb 3-1.2: FTDI USB Serial Device converter now attached to ttyUSB0
```

so, the device seems to be **/dev/ttyUSB0**.

check if your terminal is using UTF8 encoding

```
locale charmap
```

```
UTF-8
```

now connect a terminal to the serial console

```
screen /dev/ttyUSB0 115200
```

Installation Of pfSense

Plug the USB flash drive into the USB port of your APU4D4 and power on your device. For boot options press F10.

```
SeaBIOS (version rel-1.12.1.3-0-g300e8b7)

Press F10 key now for boot menu

Select boot device:

1. USB MSC Drive Kingston DataTraveler R PMAP
2. AHCI/0: SATA SSD ATA-11 Hard-Disk (15272 MiBytes)
3. Payload [setup]
4. Payload [memtest]
```

press 1 to boot from the USB flash drive.

Wait for pfSense to finish the autoboot sequence and until a prompt, asking for the console type, will appear

```
Welcome to pfSense!

Please choose the appropriate terminal type for your system.
Common console types are:
   ansi     Standard ANSI terminal
   vt100    VT100 or compatible terminal
   xterm    xterm terminal emulator (or compatible)
   cons25w  cons25w terminal

Console type [vt100]:
```

press ENTER to accept the default vt100 type

```
┌──────────────────────Copyright and distribution notice──────────────────────┐
│ Copyright and Trademark Notices.                                            │
│                                                                             │
│ Copyright(c) 2004-2016. Electric Sheep Fencing, LLC ("ESF").                │
│ All Rights Reserved.                                                        │
│                                                                             │
│ Copyright(c) 2014-2021. Rubicon Communications, LLC d/b/a Netgate           │
│ ("Netgate").                                                                │
│ All Rights Reserved.                                                        │
│                                                                             │
│ All logos, text, and content of ESF and/or Netgate, including underlying    │
│ HTML code, designs, and graphics used and/or depicted herein are            │
│ protected under United States and international copyright and trademark     │
│ laws and treaties, and may not be used or reproduced without the prior      │
│ express written permission of ESF and/or Netgate.                           │
│                                                                             │
│ "pfSense" is a registered trademark of ESF, exclusively licensed to         │
│ Netgate, and may not be used without the prior express written              │
│ permission of ESF and/or Netgate. All other trademarks shown herein are     │
│ owned by the respective companies or persons indicated.                     │
│                                                                             │
│                                                                        28%  │
│                                <Accept>                                     │
└─────────────────────────────────────────────────────────────────────────────┘
```

press ENTER to accept the copyright and distribution notice

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────




                                  Welcome
  ┌──────────────────────────────────────────────────────────────────────┐
  │ Welcome to pfSense!                                                  │
  │ ┌──────────────────────────────────────────────────────────────────┐ │
  │ │   Install             Install pfSense                            │ │
  │ │   Rescue Shell        Launch a shell for rescue operations       │ │
  │ │   Recover config.xml  Recover config.xml from a previous install │ │
  │ └──────────────────────────────────────────────────────────────────┘ │
  │                                                                      │
  │                                                                      │
  │                                                                      │
  │                     <  OK  >           <Cancel>                      │
  └──────────────────────────────────────────────────────────────────────┘
```

press ENTER to start the installation process

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────
      ┌──────────────────────Keymap Selection──────────────────────┐
      │ The system console driver for pfSense defaults to standard "US" │
      │ keyboard map. Other keymaps can be chosen below.           │
      │ ┌────────────────────────────────────────────────────────┐ │
      │ │>>> Continue with default keymap                        │ │
      │ │-> Test default keymap                                  │ │
      │ │( ) Armenian phonetic layout                            │ │
      │ │( ) Belarusian                                          │ │
      │ │( ) Belgian                                             │ │
      │ │( ) Belgian (accent keys)                               │ │
      │ │( ) Brazilian (accent keys)                             │ │
      │ │( ) Brazilian (without accent keys)                     │ │
      │ │( ) Bulgarian (BDS)                                     │ │
      │ │( ) Bulgarian (Phonetic)                                │ │
      │ │( ) Canadian Bilingual                                  │ │
      │ └──┴(+)──────────────────────────────────────────────12%──┘ │
      │                                                            │
      │                  <Select>          <Cancel>                │
      └─────────────────[Press arrows, TAB or ENTER]─────────────────┘
```

use the up/down arrow keys (↑/↓) to move to the line with your corresponding keymap, then press ENTER to select it

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────
      ┌──────────────────────Keymap Selection──────────────────────┐
      │ The system console driver for pfSense defaults to standard "US" │
      │ keyboard map. Other keymaps can be chosen below.           │
      │ ┌────────────────────────────────────────────────────────┐ │
      │ │>>> Continue with de.kbd keymap                         │ │
      │ │-> Test de.kbd keymap                                   │ │
      │ │( ) Armenian phonetic layout                            │ │
      │ │( ) Belarusian                                          │ │
      │ │( ) Belgian                                             │ │
      │ │( ) Belgian (accent keys)                               │ │
      │ │( ) Brazilian (accent keys)                             │ │
      │ │( ) Brazilian (without accent keys)                     │ │
      │ │( ) Bulgarian (BDS)                                     │ │
      │ │( ) Bulgarian (Phonetic)                                │ │
      │ │( ) Canadian Bilingual                                  │ │
      │ └──┴(+)──────────────────────────────────────────────12%──┘ │
      │                                                            │
      │                  <Select>          <Cancel>                │
      └─────────────────[Press arrows, TAB or ENTER]─────────────────┘
```

```
Test the currently selected keymap
```

press up arrow key (↑) and then ENTER to use the selected keymap

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────


      ┌──────────────────────────Partitioning──────────────────────────┐
      │ How would you like to partition your disk?                     │
      │ ┌────────────────────────────────────────────────────────────┐ │
      │ │   Auto (ZFS)       Guided Root-on-ZFS                      │ │
      │ │   Auto (UFS) BIOS  Guided Disk Setup using BIOS boot method│ │
      │ │   Auto (UFS) UEFI  Guided Disk Setup using UEFI boot method│ │
      │ │   Manual           Manual Disk Setup (experts)             │ │
      │ │   Shell            Open a shell and partition by hand      │ │
      │ └────────────────────────────────────────────────────────────┘ │
      │                                                                │
      │                                                                │
      │                                                                │
      │                  <  OK  >          <Cancel>                    │
      └────────────────────────────────────────────────────────────────┘
```

press ENTER to go with the default “Guided Root-on-ZFS” option

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────


                ┌──────────────────ZFS Configuration──────────────────┐
                │ Configure Options:                                  │
                │ ┌─────────────────────────────────────────────────┐ │
                │ │ >>> Install          Proceed with Installation  │ │
                │ │ T Pool Type/Disks:   stripe: 0 disks            │ │
                │ │ - Rescan Devices     *                          │ │
                │ │ - Disk Info          *                          │ │
                │ │ N Pool Name          pfSense                    │ │
                │ │ 4 Force 4K Sectors?  YES                        │ │
                │ │ E Encrypt Disks?     NO                         │ │
                │ │ P Partition Scheme   GPT (BIOS)                 │ │
                │ │ S Swap Size          1g                         │ │
                │ │ M Mirror Swap?       NO                         │ │
                │ │ W Encrypt Swap?      NO                         │ │
                │ └─────────────────────────────────────────────────┘ │
                │                                                     │
                │             <Select>       <Cancel>                 │
                └─────────────────────────────────────────────────────┘


Create ZFS boot pool with displayed options
```

press ENTER to accept the selected partition and filesystem options and to proceed with installation

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────


                ┌──────────────────ZFS Configuration──────────────────┐
                │ Select Virtual Device type:                         │
                │ ┌─────────────────────────────────────────────────┐ │
                │ │ stripe  Stripe - No Redundancy                  │ │
                │ │ mirror  Mirror - n-Way Mirroring                │ │
                │ │ raid10  RAID 1+0 - n x 2-Way Mirrors            │ │
                │ │ raidz1  RAID-Z1 - Single Redundant RAID         │ │
                │ │ raidz2  RAID-Z2 - Double Redundant RAID         │ │
                │ │ raidz3  RAID-Z3 - Triple Redundant RAID         │ │
                │ └─────────────────────────────────────────────────┘ │
                │                                                     │
                │             <  OK  >      <Cancel>                  │
```

```
                └──────────[Press arrows, TAB or ENTER]──────────┘




[1+ Disks] Striping provides maximum storage but no redundancy
```

press ENTER to accept the selected ZFS configuration options (Stripe - No Redundancy) and to proceed with installation

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────




                          ┌──ZFS Configuration──┐
                          │ ┌─────────────────┐ │
                          │ │[ ] ada0  SATA SSD │ │
                          │ │[ ] da0          │ │
                          │ └─────────────────┘ │
                          ├─────────────────────┤
                          │ <  OK  > < Back >   │
                          └─────────────────────┘
```

press SPACE select ada0 and then ENTER to proceed with the installation

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────




              ┌──────────────ZFS Configuration──────────────┐
              │ Last Chance! Are you sure you want to destroy │
              │ the current contents of the following disks:  │
              │                                               │
              │     ada0                                      │
              │                                               │
              ├───────────────────────────────────────────────┤
              │             < YES >       < NO  >             │
              └──────────[Press arrows, TAB or ENTER]─────────┘
```

press left arrow key (←) and then ENTER to install pfSense to the mSATA SSD

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────




                    ┌────────Manual Configuration─────────┐
                    │ The installation is now finished.   │
                    │ Before exiting the installer, would │
                    │ you like to open a shell in the new │
                    │ system to make any final manual     │
                    │ modifications?                      │
                    ├─────────────────────────────────────┤
                    │         < Yes >     < No  >         │
                    └─────────────────────────────────────┘
```

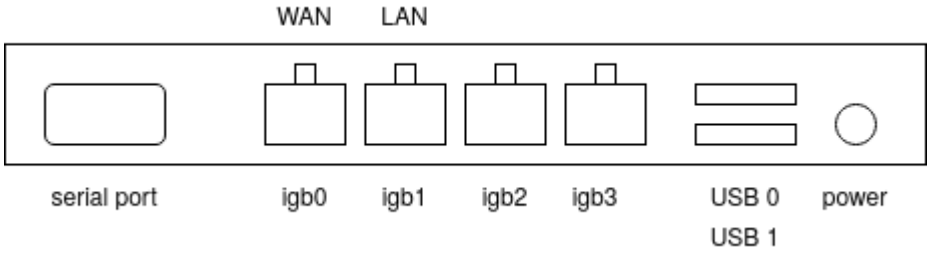
press ENTER to continue

```
pfSense Installer
──────────────────────────────────────────────────────────────────────────────


                          ┌──────────Complete──────────┐
                          │ Installation of pfSense    │
                          │ complete! Would you like   │
                          │ to reboot into the         │
                          │ installed system now?      │
                          ├────────────────────────────┤
                          │   <Reboot>  <Shell >       │
                          └────────────────────────────┘
```

press ENTER to reboot into the installed pfSense system.

When pfSense has booted up, you can connect a computer to **eth1** and let it get an IP configuration via DHCP. Then use a browser to connect to the web configuration GUI of pfSense at https://192.168.1.1/. The default user name is “**admin**” and the password is “**pfsense**”.



~~DISCUSSION~~