This Quick Start Guide covers the first time connection procedures for the Netgate® SG-1100 Firewall Appliance and will provide the information needed to keep the appliance up and running.
CHAPTER ONE

GETTING STARTED

The basic firewall configuration begins with connecting the pfSense® appliance to the Internet. The pfSense appliance should be unplugged at this time.

Connect one end of an Ethernet cable to the WAN port (shown in the Input and Output Ports section) of the pfSense appliance. The other end of the same cable should be inserted into a port of the Cable or DSL modem. The modem provided by the ISP should have multiple LAN ports. Any port should work.

Next, connect one end of a second Ethernet cable to the LAN port (shown in the Input and Output Ports section) of the pfSense appliance. Connect the other end to the computer.
**Warning:** The default IP Address on the LAN subnet on the pfSense firewall is 192.168.1.1/24. The same subnet cannot be used on both WAN and LAN, so if the default IP address on the ISP-supplied modem is also 192.168.1.1/24, **disconnect the WAN** interface until the LAN interface on the firewall has been renumbered to a different subnet (like 192.168.2.1/24).
Plug the power cable into the power port (shown in the Input and Output Ports section) to turn on the pfSense Firewall. Allow 4 or 5 minutes to boot up completely.

1. From the computer, log into the Web Interface

   Open a web browser (Google Chrome in this example) and type in 192.168.1.1 on the address bar. Press Enter.

   ![Fig. 1: Enter the Default LAN IP Address](image)

2. A warning message may appear. If this message or similar message is encountered, it is safe to proceed. Click the Advanced Button and the click Proceed to 192.168.1.1 (unsafe) to continue.

3. At the Sign In page, enter the default pfSense username and password and click Next.
   - Default Username: admin
   - Default Password: pfsense

### 2.1 The Setup Wizard

The following steps will step through the Setup Wizard for the initial configuration of the firewall.

**Note:** Ignore the warning to reset the ‘admin’ account password. One of the steps in the Setup Wizard is to change the default password.

1. Click Next to start the Setup Wizard.
2. Click Next after you have read the information on Netgate Global Support.
3. On the General Information page, use the following as a guide to configure the firewall.
   - **Hostname:** Any desired name can be entered. For the purposes of this guide, the default hostname pfsense is used.
   - **Domain:** The default localdomain is used for the purposes of this tutorial.
Your connection is not private

Attackers might be trying to steal your information from 192.168.1.1 (for example, passwords, messages, or credit cards). Learn more.

NETERR_CERT_AUTHORITY_INVALID

Help improve Safe Browsing by sending some system information and page content to Google.
Privacy policy

Fig. 2: Click Advanced and then Proceed to 192.168.1.1 (unsafe)

Fig. 3: Click Next
DNS Servers: For purposes of this setup guide, use the Google public DNS servers (8.8.8.8 and 8.8.4.4).

![Image of pfSense DNS configuration page]

4. Use the following information for the Time Server Information page.

   **Time Server Hostname:** Use the default pfSense time server address.

   **Timezone:** Select the time zone for the location of the firewall. For this guide, the Timezone will be set to *America/Chicago* for US Central time.

5. The WAN interface is the Public IP address the network will use to communicate with the Internet. Use the following information for the WAN configuration page.

   **DHCP** is the default and is the most common type of interface for home cable modems.

   **Default settings** for the other items on this page should be acceptable for normal home users.

6. Configuring LAN IP Address & Subnet Mask. The default LAN IP address of 192.168.1.1 and subnet mask of 24 is usually sufficient.

7. Change the **Admin Password.** Enter the same password in both fields.

8. Click **Reload** to save the configuration.

9. After a few seconds, a message will indicate the Setup Wizard has completed. To proceed to the pfSense dashboard, click **Finish.**

10. A final notification screen will appear stating that **NO COMMERCIAL DISTRIBUTION…** Click **Accept** to continue to the pfSense dashboard.

This completes the basic configuration for the pfSense firewall.
Fig. 5: Change the Timezone and Click Next

Fig. 6: Default Settings Should be Acceptable. Click Next
Fig. 7: Read and Click Accept
CHAPTER THREE

PFSENSE OVERVIEW

This page provides an overview of the pfSense® dashboard and navigation. It also provides information on how to perform frequent tasks such as backing up the pfSense software and connecting to the pfSense firewall console.

3.1 The Dashboard

pfSense software is highly configurable, all of which can be done through the dashboard. This orientation will help to navigate and further configure the firewall.

![Fig. 1: The pfSense Dashboard]

Section 1 shows important system information such as the model, Serial Number, and Netgate Device ID for this pfSense firewall.

Section 2 identifies what version of pfSense software is installed, and if an update is available.
Section 3 describes Netgate Service and Support.

Section 4 shows the various menu headings. Each menu heading has drop-down options for a wide range of configuration choices.

### 3.2 Re-running the Setup Wizard

To re-run the Setup Wizard, navigate to **System -> Setup Wizard.**

![Fig. 2: Re-run the Setup Wizard](image)

### 3.3 Backup and Restore

It is important to backup the firewall configuration prior to updating or making any configuration changes. From the menu at the top of the page, browse to **Diagnostics > Backup/Restore.**

Click **Download configuration as XML** and save a copy of the firewall configuration to the computer connected to the pfSense firewall.

This backup (or any backup) can be restored from the same screen by choosing the backed up file under **Restore Configuration.**

**Note:** Auto Config Backup is a built-in service located at **Services -> Auto Config Backup.** This service will save up to 100 encrypted backup files automatically, any time a change to the configuration has been made. Visit the Auto Config Backup page for more information.

### 3.3.1 Connecting to the Console

There are times when accessing the console is required. Perhaps GUI console access has been locked out, or the password has been lost or forgotten.
Fig. 3: Backup & Restore

Fig. 4: Click Download configuration as XML
See also:

*Connecting to the Console Port* Connect to the console. Cable is required.

**Tip:** To learn more about getting the most out of your pfSense appliance, sign up for a pfSense Training course or browse our extensive Resource Library.
4.1 Front Side

4.1.1 Ethernet Ports

<table>
<thead>
<tr>
<th>Interface Name</th>
<th>Port Name</th>
<th>Port Type</th>
<th>Port Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAN</td>
<td>mvneta0.4090</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>LAN</td>
<td>mvneta0.4091</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>OPT</td>
<td>mvneta0.4092</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
</tbody>
</table>

Note: The ethernet ports are switched and configured by default on their own VLAN, see the *Switch Overview* for more information.

4.1.2 Other Front Ports

- 1x USB 2.0 (left side)
- 1x USB 3.0 (right side)
4.2 Rear Side

From left to right:

1. Power Connector (12VDC 2A Center Pin Positive)
2. Micro USB Console Port
3. Recessed Reset Button (performs a hard reset, immediately turning the system off)

**Warning:** A hard reset of the system could cause data corruption and should be avoided. Halt or reboot the system through the console menu or the web configurator to avoid data corruption.

4.3 Top Side

Indicators:

<table>
<thead>
<tr>
<th>Status LED</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Diamond</td>
<td>Blink Fast</td>
<td>pfSense® boot in progress</td>
</tr>
<tr>
<td></td>
<td>Solid</td>
<td>pfSense boot complete</td>
</tr>
<tr>
<td></td>
<td>Blink Slow</td>
<td>pfSense upgrade is available</td>
</tr>
<tr>
<td>Blue Square</td>
<td>Active</td>
<td>mPCIe activity (not supported)</td>
</tr>
<tr>
<td>Green Circle</td>
<td>Solid</td>
<td>Power</td>
</tr>
</tbody>
</table>

5.1 Safety Notices

1. Read, follow, and keep these instructions.
2. Heed all warnings.
3. Only use attachments/accessories specified by the manufacturer

**Warning:** Do not use this product in location that can be submerged by water.

**Warning:** Do not use this product during an electrical storm to avoid electrical shock.

5.2 Electrical Safety Information

1. Compliance is required with respect to voltage, frequency, and current requirements indicated on the manufacturer’s label. Connection to a different power source than those specified may result in improper operation, damage to the equipment or pose a fire hazard if the limitations are not followed.
2. There are no operator serviceable parts inside this equipment. Service should be provided only by a qualified service technician.
3. This equipment is provided with a detachable power cord which has an integral safety ground wire intended for connection to a grounded safety outlet.
   a) Do not substitute the power cord with one that is not the provided approved type. If a 3 prong plug is provided, never use an adapter plug to connect to a 2-wire outlet as this will defeat the continuity of the grounding wire.
   b) The equipment requires the use of the ground wire as a part of the safety certification, modification or misuse can provide a shock hazard that can result in serious injury or death.
   c) Contact a qualified electrician or the manufacturer if there are questions about the installation prior to connecting the equipment.
   d) Protective grounding/earthing is provided by Listed AC adapter. Building installation shall provide appropriate short-circuit backup protection.
   e) Protective bonding must be installed in accordance with local national wiring rules and regulations.
5.3 FCC Compliance

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment.

5.4 Industry Canada

This Class B digital apparatus complies with Canadian ICES-3(B). Cet appareil numérique de la classe B est conforme à la norme NMB-3(B) Canada.

5.5 CE Marking

CE marking on this product represents the product is in compliance with all directives that are applicable to it.

5.6 RoHS/WEEE Compliance Statement

5.6.1 English

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

5.6.2 Deutsch

5.6.3 Español

La Directiva 2002/96/CE de la UE exige que los equipos que lleven este símbolo en el propio aparato y/o en su embalaje no deben eliminarse junto con otros residuos urbanos no seleccionados. El símbolo indica que el producto en cuestión debe separarse de los residuos domésticos convencionales con vistas a su eliminación. Es responsabilidad suya desechar este y cualesquiera otros aparatos eléctricos y electrónicos a través de los puntos de recogida que ponen a su disposición el gobierno y las autoridades locales. Al desechar y reciclar correctamente estos aparatos estará contribuyendo a evitar posibles consecuencias negativas para el medio ambiente y la salud de las personas. Si desea obtener información más detallada sobre la eliminación segura de su aparato usado, consulte a las autoridades locales, al servicio de recogida y eliminación de residuos de su zona o pregunte en la tienda donde adquirió el producto.

5.6.4 Français

La directive européenne 2002/96/CE exige que l’équipement sur lequel est apposé ce symbole sur le produit et/ou son emballage ne soit pas jeté avec les autres ordures ménagères. Ce symbole indique que le produit doit être éliminé dans un circuit distinct de celui pour les déchets des ménages. Il est de votre responsabilité de jeter ce matériel ainsi que tout autre matériel électrique ou électronique par les moyens de collecte indiqués par le gouvernement et les pouvoirs publics des collectivités territoriales. L’élimination et le recyclage en bonne et due forme ont pour but de lutter contre l’impact néfaste potentiel de ce type de produits sur l’environnement et la santé publique. Pour plus d’informations sur le mode d’élimination de votre ancien équipement, veuillez prendre contact avec les pouvoirs publics locaux, le service de traitement des déchets, ou l’endroit où vous avez acheté le produit.

5.6.5 Italiano

La direttiva europea 2002/96/EC richiede che le apparecchiature contrassegnate con questo simbolo sul prodotto e/o sull’imballaggio non siano smaltite insieme ai rifiuti urbani non differenziati. Il simbolo indica che questo prodotto non deve essere smaltito insieme ai normali rifiuti domestici. È responsabilità del proprietario smaltire sia questi prodotti sia le altre apparecchiature elettriche ed elettroniche mediante le specifiche strutture di raccolta indicate dal governo o dagli enti pubblici locali. Il corretto smaltimento ed il riciclaggio aiuteranno a prevenire conseguenze potenzialmente negative per l’ambiente e per la salute dell’essere umano. Per ricevere informazioni più dettagliate circa lo smaltimento delle vecchie apparecchiature in Vostro possesso, Vi invitiamo a contattare gli enti pubblici di competenza, il servizio di smaltimento rifiuti o il negozio nel quale avete acquistato il prodotto.

5.7 Declaration of Conformity

5.7.1 Česky[Czech]

NETGATE tímto prohla uje, e tento NETGATE device, je ve shod se základními po adavky a dal ími p íslu n mi ustanoveními sm rnice 1999/5/ES.

5.7.2 Dansk [Danish]

Undertegnede NETGATE erklærer herved, at følgende udstyr NETGATE device, overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
5.7.3 Nederlands [Dutch]
Hierbij verklaart NETGATE dat het toestel NETGATE device, in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG. Bij deze verklaart NETGATE dat deze NETGATE device, voldoet aan de essentiële eisen en aan de overige relevante bepalingen van richtlijn 1999/5/EC.

5.7.4 English
Hereby, NETGATE, declares that this NETGATE device, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

5.7.5 Eesti [Estonian]
Käesolevaga kinnitab NETGATE seadme NETGATE device, vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

5.7.6 Suomi [Finnish]
NETGATE vakuuttaa täten että NETGATE device, tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen. Français [French] Par la présente NETGATE déclare que l’appareil Netgate, device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

5.7.7 Deutsch [German]
Hiermit erklärt Netgate, dass sich diese NETGATE device, in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet”. (BMWi)

5.7.8 Ελληνικά [Greek]
ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ ΝΕΤΓΑΤΕ ΔΗΛΩΝΕΙ ΟΤΙ ΝΕΤΓΑΤΕ device, ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΝΕΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.

5.7.9 Magyar [Hungarian]
Alulírott, NETGATE nyilatkozom, hogy a NETGATE device, megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.

5.7.10 Íslenska [Icelandic]
Hér me l sir NETGATE yfir ví a NETGATE device, er í samræmi vi grunnkröfur og a rar kröfur, sem ger ar eru í tilskipun 1999/5/EC.

5.7.11 Italiano [Italian]
Con la presente NETGATE dichiara che questo NETGATE device, è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
5.7.12 Latviski [Latvian]

Ar o NETGATE deklar, ka NETGATE device, atbilst Direkt vas 1999/5/EK b tiskaj m pras b m un citem ar to saist tajiem noteikumiem.

5.7.13 Lietuviškai [Lithuanian]

NETGATE deklaruoja, kad šis NETGATE įrenginys atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

5.7.14 Malti [Maltese]

Hawnhekk, Netgate, jiddikjara li dan NETGATE device, jikkonforma mal- ti iijet essenzjali u ma provvedimenti o rajn relevanti li hemm fid-Dirrettiva 1999/5/EC.

5.7.15 Norsk [Norwegian]

NETGATE erklærer herved at utstyret NETGATE device, er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

5.7.16 Slovensky [Slovak]

NETGATE t mto vyhlasuje, e NETGATE device, sp a základné po iadavky a v etky príslu né ustanovenia Smernice 1999/5/ES.

5.7.17 Svenska [Swedish]

Härmed intygar NETGATE att denna NETGATE device, står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

5.7.18 Español [Spanish]

Por medio de la presente NETGATE declara que el NETGATE device, cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

5.7.19 Polski [Polish]

Niniejszym, firma NETGATE o wiadcza, e produkt serii NETGATE device, spełnia zasadnicze wymagania i inne istotne postanowienia Dyrektywy 1999/5/EC.

5.7.20 Português [Portuguese]

NETGATE declara que este NETGATE device, está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
5.7.21 Română [Romanian]

Prin prezenta, NETGATE declară că acest dispozitiv NETGATE este în conformitate cu cerințele esențiale și alte prevederi relevante ale Directivei 1999/5/CE.

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To begin an arbitration proceeding, you must send a letter requesting arbitration and describing your claim to the following:

Rubicon Communications LLC  
Attn.: Legal Dept.  
4616 West Howard Lane, Suite 900  
Austin, Texas 78728  
legal@netgate.com

The arbitration will be conducted by the American Arbitration Association (AAA) under its rules. The AAA’s rules are available at www.adr.org. Payment of all filing, administration and arbitrator fees will be governed by the AAA’s rules.

We each agree that any dispute resolution proceedings will be conducted only on an individual basis and not in a class, consolidated or representative action. We also both agree that you or we may bring suit in court to enjoin infringement or other misuse of intellectual property rights.

5.9 Applicable Law

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There are times when directly accessing the console is required. Perhaps webGUI or SSH access has been locked out, or the password has been lost or forgotten. This guide shows how to regain access directly through the console.

6.1 Install the Driver

A Prolific PL2303 USB-to-UART Bridge driver is used to provide access to the console, which is exposed via the Micro-USB B port on the appliance.

If needed, install an appropriate Prolific PL2303 USB to UART Bridge driver on the workstation used to connect with the system.

**Windows**
There are drivers available for Windows available for download.

**Mac OSX**
There are drivers available for Mac OSX available for download.

For Mac, choose Mac OS X Universal Binary Driver.

**Linux**
There are drivers available for Linux available for download.

Recent versions of many Linux distributions include this driver and will not require manual installation.

**FreeBSD**
Recent versions of FreeBSD include this driver and will not require manual installation.

6.2 Connect a USB Cable

Next, locate an appropriate USB cable that has a Micro-USB B connector on one end and a regular USB Type A plug on the other end. These cables are commonly used with smaller USB peripherals such as GPS units, cameras, and so on.

Gently push the Micro-USB B plug end into the console port on the appliance and connect the USB Type A plug into an available USB port on the workstation.

**Tip:** Be certain to gently push in the Micro-USB B connector on the system side completely. With most cables there will be a tangible “click”, “snap”, or similar indication when the cable is fully engaged.
6.3 Locate the Console Port Device

The appropriate console port device that the workstation assigned as the serial port must be located before attempting to connect to the console.

**Note:** Even if the serial port was assigned in the BIOS, the workstation’s OS may remap it to a different COM Port.

**Windows**

To locate the device name on Windows, open **Device Manager** and expand the section for **Ports (COM & LPT)**. Look for an entry with a title such as **Prolific USB-to-Serial Comm Port**. If there is a label in the name that contains “COMX” where X is a decimal digit (e.g. **COM3**), that value is what would be used as the port in the terminal program.

**Mac OSX**

The device associated with the system console is likely to show up as **/dev/cu.usbserial**.

**Linux**

The device associated with the system console is likely to show up as **/dev/ttyUSB0**. Look for messages about the device attaching in the system log files or by running **dmesg**.

**Note:** If the device does not appear in **/dev/**, see the note above in the driver section about manually loading the Linux driver and then try again.

**FreeBSD**

The device associated with the system console is likely to show up as **/dev/cuaU0**. Look for messages about the device attaching in the system log files or by running **dmesg**.

6.4 Launch a Terminal Program

Use a terminal program to connect to the system console port. Some choices of terminal programs:

**Windows**

For Windows it is recommended to run **PuTTY** or **SecureCRT**. An example of how to configure Putty is below.
Warning: Do not use Hyperterminal.

Mac OSX
For Mac OSX it is recommended to run screen, or cu. An example of how to configure screen is below.

Linux
For Linux it is recommended to run screen, PuTTY, minicom, or dterm. An example of how to configure Putty and screen is below.

FreeBSD
For FreeBSD it is recommended to run screen or cu. An example of how to configure screen is below.

6.4.1 Client-Specific Examples

PuTTY
Open PuTTY and select Session under Category on the left hand side. Set Serial line to the console port that was located above and the Speed to 115200 bits per second. For the Connection type, select Serial.

Click the Open button and the console screen will be displayed.

GNU screen
In many cases screen may be invoked simply by using the proper command line, where <console-port> is the console port that was located above.

```
sudo screen <console-port> 115200
```

If portions of the text are unreadable but appear to be properly formatted, the most likely culprit is a character encoding mismatch in the terminal. Adding the -U parameter to the screen command line arguments forces it to use UTF-8 for character encoding:

```
sudo screen -U <console-port> 115200
```

6.4.2 Terminal Settings

The settings to use within the terminal program are:

- **Speed**  115200 baud, the speed of the BIOS
- **Data bits**  8
- **Parity**  none
- **Stop bits**  1

**Flow Control**  Off or XON/OFF. Hardware flow control (RTS/CTS) must be disabled.
Fig. 1: An example of using PuTTY in Windows.
6.5 Troubleshooting

6.5.1 No Serial Output

If there is no output at all, check the following items:

- Ensure the cable is correctly attached and fully inserted
- Ensure the terminal program is using the correct port
- Ensure the terminal program is configured for the correct speed. The default BIOS speed is 115200, and many other modern operating systems use that speed as well. Some older operating systems or custom configurations may use slower speeds such as 9600 or 38400.
- Ensure the operating system is configured for the proper console (e.g. \texttt{ttyS1} in Linux). Consult the various operating install guides on this site for further information.

6.5.2 PuTTY has issues with line drawing

PuTTY generally handles most cases OK but can have issues with line drawing characters on certain platforms. These settings seem to work best (tested on Windows):

- \texttt{Window Columns x Rows} = 80x24
- \texttt{Window > Appearance Font} = \textit{Courier New 10pt} or \textit{Consolas 10pt}
- \texttt{Window > Translation Remote Character Set} = \textit{Use font encoding} or \textit{UTF-8}
- \texttt{Window > Translation Handling of line drawing characters} = \textit{Use font in both ANSI and OEM modes} or \textit{Use Unicode line drawing code points}
- \texttt{Window > Colours Indicate bolded text by changing} = The colour

6.5.3 Garbled Serial Output

If the serial output appears to be garbled, binary, or random characters check the following items:

- Ensure the terminal program is configured for the correct speed. (See “No Serial Output” above)
- Ensure the terminal program is configured for the proper character encoding, such as UTF-8 or Latin-1, depending on the operating system. (See the previous entry under “GNU screen”)

6.5.4 Serial Output Stops After the BIOS

If serial output is shown for the BIOS but stops afterward, check the following items:

- Ensure the terminal program is configured for the correct speed for the installed operating system. (See “No Serial Output” above)
- Ensure the installed operating system is configured to activate the serial console.
- Ensure the installed operating system is configured for the proper console (e.g. \texttt{ttyS1} in Linux). Consult the various operating install guides on this site for further information.
- If booting from a USB flash drive, ensure that the drive was written correctly and contains a bootable operating system image.
1. Please open a support ticket to request access to the factory firmware by selecting **Firmware Access** as the **General Problem** and then select **Netgate SG-1100** for the platform. Make sure to include the serial number in the ticket to expedite access.

   Once the ticket is processed, the latest stable version of the firmware will be attached to the ticket, with a name such as:
   
   pfSense-netgate-SG-1100-recovery-2.4.4-RELEASE-p3-aarch64.img.gz

   **Note:** The pfSense® factory version is the version that is preinstalled on units purchased from Netgate. The factory image is optimally tuned for our hardware and contains some features that cannot be found elsewhere, such as the AWS VPN Wizard.

2. Write the image to a USB memstick. Locating the image and writing it to a USB memstick is covered in detail under **Writing Flash Drives**.

3. **Connect to the console port** of the pfSense device.

4. Insert the memstick into the USB port and boot the system.

   **Tip:** Best practice is to **turn off** the system, **insert** the USB memstick, ensure you have **console access**, and **reboot** the system. You will need to **interrupt the boot process** very soon after initial boot.

5. When prompted, press any key to stop the autoboot process.

6. Type **run usbrecovery** at the **Marvell>>** prompt and press **Enter**.

7. Select the destination device by pressing **Enter**, then confirm by pressing **y** and **Enter**.

   **Note:** The onboard eMMC flash memory is always **mmcsd0**.

8. Wait for the installation to the eMMC to complete.

9. Once the install has completed, remove the memstick, and cycle the power (unplug the SG-1100 and plug it back in) to reboot the SG-1100.

**Note:** For information on restoring from a previously saved configuration, go to **Backup and Restore**.
NOTICE: BL2: Built : 16:19:45, Nov 1 20
NOTICE: BL31: v1.3(release):armada-17.10.8:34247e0
NOTICE: BL31:

U-Boot 2017.03-armada-17.10.2-g6a6581a-dirty (Nov 01 2018 - 16:04:57 -0300)

Model: Marvell Armada 3720 Community Board ESPRESSOBin
CPU @ 1200 [MHz]
L2 @ 800 [MHz]
TClock @ 200 [MHz]
DDR @ 750 [MHz]

DRAM: 1 GiB
U-Boot DT blob at : 000000003f716298
Comphy-0: USB3 5 Gbps
Comphy-1: PCIe0 2.5 Gbps
Comphy-2: SATA0 6 Gbps
SATA link 0 timeout.
AHCI 0001.0300 32 slots 1 ports 6 Gbps 0x1 impl SATA mode
flags: nqo led only pmp fbss pio slum part sxs
PCIe-0: Link down
MMC: sdhci@d0000: 0, sdhci@d8000: 1
SF: Detected mx25u3235f with page size 256 Bytes, erase size 64 KiB, total 4 MiB
Net: eth0: neta@30000 [PRIME]
Hit any key to stop autboot: 2

10.8:34247e0
NOTICE: BL31:

U-Boot 2017.03-armada-17.10.2-g6a6581a-dirty (Nov 01 2018 - 16:04:57 -0300)

Model: Marvell Armada 3720 Community Board ESPRESSOBin
CPU @ 1200 [MHz]
L2 @ 800 [MHz]
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DRAM: 1 GiB
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Comphy-0: USB3 5 Gbps
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SATA link 0 timeout.
AHCI 0001.0300 32 slots 1 ports 6 Gbps 0x1 impl SATA mode
flags: nqo led only pmp fbss pio slum part sxs
PCIe-0: Link down
MMC: sdhci@d0000: 0, sdhci@d8000: 1
SF: Detected mx25u3235f with page size 256 Bytes, erase size 64 KiB, total 4 MiB
Net: eth0: neta@30000 [PRIME]
Hit any key to stop autboot: 0
Marvell>> run usbrecovery

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Welcome to pfSense 2.4.4-RELEASE1...
Netgate SG-1100 firmware recovery
Serial:
Netgate Crypto ID:

This will install the standard firmware and will erase all the existing contents of the destination device permanently.

eMMC device: mmcsd0

Type the name of the destination device (mmcsd0) or type enter to install on mmcsd0:

Selected eMMC device: mmcsd0

Are you sure you want to continue? (y/N) y

Erasing the eMMC contents...
Writing the firmware to eMMC...
(this may take a few minutes to complete)
FreeBSD/arm64 (pfSense-sg1100-recovery) (ttyu0)

May 16 10:46:48 pfSense-sg1100-recovery shutdown: halt by root:
Stopping cron.
Waiting for PIDS: 521.
Stopping devd.
Waiting for PIDS: 318.
Writing entropy file:.
Writing early boot entropy file:.
Terminated.

May 16 10:46:51 pfSense-sg1100-recovery syslogd: exiting on signal 15
Waiting (max 60 seconds) for system process 'vnlrut' to stop... done
Waiting (max 60 seconds) for system process 'bufdaemon' to stop... done
Waiting (max 60 seconds) for system process 'syncer' to stop...
Syncing disks, vnodes remaining... 1 0 0 done
All buffers synced.

Uptime: 2m46s

The operating system has halted.
Power cycle or reset to reboot.
CHAPTER EIGHT

CONFIGURING A ROUTER ON A STICK

This optional guide shows the steps required to configure all three VLANs on one port. In this example we will use the OPT port.

**Note:** Performing this configuration from the LAN port will help prevent us from being locked out. Also, the WAN and LAN ports will still work with untagged devices connected to them. The LAN port could be used as a management port. In normal operation, the switch would only need to be connected to OPT, with WAN and LAN disconnected.

1. Connect to the LAN port on the SG-1100.
2. From the pfSense® webGUI menu, navigate to **Interfaces > Switches**.
3. Go to the **VLANs** tab.
4. Click on the **button for VLAN group 3**.
   
   **Warning:** VLAN group 0 must remain in place and VLAN groups 1-3 must include 0t as a member, in order to function properly.

5. Check **tagged** for **Member 1**, then click **Save**.
6. Click on the **button for VLAN group 2**.
7. Click on the **Add member** button, Enter **Member 1**, check **tagged** and then click **Save**.
8. Click on the **button for VLAN group 1**.
9. Click on the **Add member** button, Enter **Member 1**, check **tagged** and then click **Save**.
10. Click on the **Ports** tab.
11. Click on the **Port VID** for OPT. Change the default value 4092 to 1. In the lower right-hand corner click **Save**.

When completed the Ports and VLANs configuration should reflect the screenshots below:

You can now connect a managed switch (VLANs 4090-4092 must be trunked on the switchport of the managed switch) to OPT with VLANs 4090 (WAN), 4091 (LAN), and 4092 (OPT) tagged to it.

If you need access to the WebConfigurator on LAN, you can just connect a laptop to LAN and you should receive a DHCP lease (unless DHCP Server on LAN has been disabled). You will also be able to access the WebGUI (unless the default Anti-Lockout Rule has been disabled) and internet (unless the Default allow LAN to any rule has been disabled).
WARNING: The 'admin' account will have the default value. Change it as soon as possible.

Switches
### Interfaces / Switch / Ports

<table>
<thead>
<tr>
<th>Port #</th>
<th>Port name</th>
<th>VID</th>
<th>LAGG</th>
<th>Flags</th>
<th>State</th>
<th>Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>LAN</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
<td>Ethernet 1000baseT &lt;full-duplex&gt;</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
<td>OPT</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
<tr>
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<td>LAN</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
<tr>
<td>3</td>
<td>WAN</td>
<td>4090</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
</tbody>
</table>

### Interfaces / Switch / VLANs

#### SG-1100 Switch 802.1Q VLANs

- **Enable**: Enable 802.1q VLAN mode
  - If enabled, packets with unknown VLAN tags will be dropped.

<table>
<thead>
<tr>
<th>VLAN(s) table</th>
<th>VLAN group</th>
<th>VLAN tag</th>
<th>Members</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Default System VLAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4090</td>
<td>0t.3</td>
<td>WAN</td>
<td></td>
</tr>
<tr>
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<td>2</td>
<td>4091</td>
<td>0t.2</td>
<td>LAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4092</td>
<td>0t.1</td>
<td>OPT</td>
<td></td>
</tr>
<tr>
<td>Port #</td>
<td>Port name</td>
<td>Port VID</td>
<td>LAGG</td>
<td>Flags</td>
<td>State</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
<td>----------</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>0</td>
<td>LAN Uplink</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
</tr>
<tr>
<td>1</td>
<td>OPT 4092</td>
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<td>-</td>
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<tr>
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<td>-</td>
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<td>Default (no preference, typically autoselect)</td>
</tr>
<tr>
<td>3</td>
<td>WAN 4090</td>
<td>-</td>
<td>-</td>
<td>FORWARDING</td>
<td>Ethernet autoselect (1000baseT &lt;full-duplex&gt;)</td>
</tr>
</tbody>
</table>
### Interfaces / Switch / VLANs

#### SG-1100 Switch 802.1Q VLANs

<table>
<thead>
<tr>
<th>Enable</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>☑ Enable 802.1q VLAN mode</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VLAN group</th>
<th>VLAN tag</th>
<th>Members</th>
<th>Description</th>
</tr>
</thead>
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<tr>
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<td>0</td>
<td>Default System VLAN</td>
</tr>
<tr>
<td>1</td>
<td>4090</td>
<td>0,1,3</td>
<td>WAN</td>
</tr>
<tr>
<td>2</td>
<td>4091</td>
<td>0,1,2</td>
<td>LAN</td>
</tr>
<tr>
<td>3</td>
<td>4092</td>
<td>0,1,t</td>
<td>OPT</td>
</tr>
</tbody>
</table>

[Save] [Add Tag]
### Interfaces / Switch / Ports

**System**  |  **Ports**  |  **VLANs**
---|---|---

Port settings updated.

#### SG-1100 Switch Ports

<table>
<thead>
<tr>
<th>Port #</th>
<th>Port name</th>
<th>Port VID</th>
<th>LAGG</th>
<th>Flags</th>
<th>State</th>
<th>Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>LAN Uplink</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
<td>Ethernet 1000baseT &lt;full-duplex&gt;</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
<td>OPT</td>
<td>1</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
<tr>
<td>2</td>
<td>LAN</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
<tr>
<td>3</td>
<td>WAN</td>
<td>4090</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
</tbody>
</table>

**Save**

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INSTALLING THE WALLMOUNT KIT

This page shows how to install the optional SG-1100 Wall Mount Kit.

**Tip:** Save the SG-1100 MAC Address, Serial Number, and NDI, located on the bottom of the system, before attaching the SG-1100 to the wall.

Fig. 1: Loop one side of the Silicone Band under the wall mount of the SG-1100

**Note:** Remove the rubber standoff feet from the SG-1100 prior to attaching to the wall mount. Do **not** remove the
Fig. 2: Stretch the Silicone Band to the opposite side of the wall mount
Fig. 3: Loop the silicone band under the opposite side of the wall mount
Fig. 4: The silicone band should look like this
Fig. 5: Tuck both sides of the silicone band under the wall mount
screws that are under the rubber standoff feet.

Fig. 6: Place the SG-1100 over the silver aluminum standoffs on the wall mount and pull one side of the silicone band over the SG-1100, then the other

**Tip:** Remember to save the SG-1100 MAC Address, Serial Number, and NDI, located on the bottom of the system, before attaching the SG-1100 to the wall.

Hang the wall mount with the cables hanging down. Secure the cables to the holes on the wall mount with cable ties to relieve the weight from the ports.
Fig. 7: When mounted properly, the SG-1100 should look like this
Fig. 8: Note the silicone band under the SG-1100 when installed correctly
Fig. 9: An SG-1100 wall mount kit correctly installed
This optional guide shows the steps required to configure the LAN and OPT ethernet ports to be on the same VLAN.

**Note:** When connecting to the webConfigurator, be sure you are NOT connected to the port you are going to configure or you will lose connectivity during this procedure.

1. Open the pfSense® WebGUI and log in.
2. From the menu, navigate to **Interfaces > Switches**.
3. Go to the **Ports** sub-menu.

4. Click on the **Port VID** for **OPT**. Change the default value from 4092 to 4091. In the lower right-hand corner click **Save**.

   At this point **Interfaces > Switches > Ports** should look like the following:

5. Click on the **VLANs** tab.

6. Click on the **button for VLAN group 3**.

   **Warning:** **VLAN group 0** must remain in place and **VLAN groups 1-3** must include 0t as a member, in order to function properly.

7. Click **Delete** for **Member 1**, then click **Save**.

8. Click on the **button on VLAN group 2**.

9. Click on the **Add member** button. Enter Member 1, uncheck **tagged** and then click **Save**.

10. Confirm the configuration matches the screenshots below:
**Note:** Unlike software bridging, traffic between ports 1 and 2 will never leave the switch chip so it will perform at switching speed. You also cannot filter traffic between the two ports as pfSense will never see it, just like with any other (external) switch.

<table>
<thead>
<tr>
<th>Port</th>
<th>Port name</th>
<th>VID</th>
<th>LAGG</th>
<th>Flags</th>
<th>State</th>
<th>Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>LAN Uplink</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
<td>Ethernet 1000baseT &lt;full-duplex&gt;</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
<td>OPT</td>
<td>4092</td>
<td>-</td>
<td>FORWARDING</td>
<td>Default (no preference, typically autoselect)</td>
<td>No Carrier</td>
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<td>FORWARDING</td>
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<td>No Carrier</td>
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<tr>
<td>3</td>
<td>WAN</td>
<td>4090</td>
<td>-</td>
<td>FORWARDING</td>
<td>Ethernet autoselect (1000baseT &lt;full-duplex&gt;)</td>
<td>Active</td>
<td></td>
</tr>
</tbody>
</table>
### Interfaces / Switch / Ports

<table>
<thead>
<tr>
<th>Port #</th>
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<tr>
<td>0</td>
<td>LAN Uplink</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
<td>Ethernet 1000baseT &lt;full-duplex&gt;</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
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<td>-</td>
<td>FORWARDING</td>
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<td>No Carrier</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>LAN 4091</td>
<td>-</td>
<td>-</td>
<td>FORWARDING</td>
<td>Default (no preference, typically autoselect)</td>
<td>No Carrier</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>WAN 4090</td>
<td>-</td>
<td>-</td>
<td>FORWARDING</td>
<td>Default (no preference, typically autoselect)</td>
<td>No Carrier</td>
<td></td>
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</table>
Interfaces / Switch / Ports

SG-1100 Switch Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Port name</th>
<th>Port VID</th>
<th>LAGG</th>
<th>Flags</th>
<th>State</th>
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<tbody>
<tr>
<td>0</td>
<td>LAN</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
<td>Ethernet 1000BaseT &lt;full-duplex&gt;</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
<td>OPT</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
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<td>2</td>
<td>LAN</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
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</tr>
<tr>
<td>3</td>
<td>WAN</td>
<td>4090</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference typically autoselect)</td>
<td>No Carrier</td>
</tr>
</tbody>
</table>

Interfaces / Switch / VLANs

SG-1100 Switch 802.1Q VLANs

Enable: [ ] Enable 802.1q VLAN mode
If enabled, packets with unknown VLAN tags will be dropped.

<table>
<thead>
<tr>
<th>VLAN(s) table</th>
<th>VLAN group</th>
<th>VLAN tag</th>
<th>Members</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>Default System VLAN</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4090</td>
<td>0t.3</td>
<td></td>
<td>WAN</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4091</td>
<td>0t.2</td>
<td></td>
<td>LAN</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4092</td>
<td>0t.1</td>
<td></td>
<td>OPT</td>
<td></td>
</tr>
</tbody>
</table>
### Interfaces / Switch / VLANs / Edit

**Vlan properties**

- **VLAN tag**: 4091
  - Enter a VLAN ID number (that is not already in use.)
- **Description**: LAN
  - A description may be entered here for administrative reference (not parsed).
- **Member(s)**:
  - 0
  - 2
  - 1
  - [Tagged](#)
  - [Delete](#)

### Interfaces / Switch / VLANs

**SG-1100 Switch 802.1Q VLANs**

<table>
<thead>
<tr>
<th>VLAN(s) table</th>
<th>VLAN group</th>
<th>VLAN tag</th>
<th>Members</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>Default System VLAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4090</td>
<td>0,3</td>
<td>WAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4091</td>
<td>0,1,2</td>
<td>LAN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4092</td>
<td>0</td>
<td>OPT</td>
<td></td>
</tr>
</tbody>
</table>
## Interfaces / Switch / Ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Port name</th>
<th>VID</th>
<th>LAGG</th>
<th>Flags</th>
<th>State</th>
<th>Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>LAN Uplink</td>
<td>1</td>
<td>-</td>
<td>HOST</td>
<td>FORWARDING</td>
<td>Ethernet 1000baseT &lt;full-duplex&gt;</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
<td>OPT</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference, typically autoselect)</td>
<td>No Carrier</td>
</tr>
<tr>
<td>2</td>
<td>LAN</td>
<td>4091</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Default (no preference, typically autoselect)</td>
<td>No Carrier</td>
</tr>
<tr>
<td>3</td>
<td>WAN</td>
<td>4090</td>
<td>-</td>
<td></td>
<td>FORWARDING</td>
<td>Ethernet autoselect (1000baseT &lt;full-duplex&gt;)</td>
<td>Active</td>
</tr>
</tbody>
</table>
11.1 Netgate Training

Netgate training offers training courses for increasing your knowledge of pfSense® products and services. Whether you need to maintain or improve the security skills of your staff or offer highly specialized support and improve your customer satisfaction; Netgate training has got you covered.

https://www.netgate.com/training

11.2 Resource Library

To learn more about how to use your pfSense appliance and for other helpful resources, make sure to browse our Resource Library.

https://www.netgate.com/resources

11.3 Professional Services

Support does not cover more complex tasks such as CARP configuration for redundancy on multiple firewalls or circuits, network design, and conversion from other firewalls to pfSense®. These items are offered as professional services and can be purchased and scheduled accordingly.

https://www.netgate.com/our-services/professional-services.html

11.4 Community Options

If you elected not to get a paid support plan, you can find help from the active and knowledgeable pfSense community on our forums.

https://forum.netgate.com/
WARRANTY AND SUPPORT

- One year manufacturer’s warranty (optional 2nd year warranty available at time of purchase only).
- Please contact Netgate for warranty information or view our Product Lifecycle page.
- All Specifications subject to change without notice

For support information, view our support plans.

See also:

For more information on how to use pfSense® software, see the pfSense Documentation and Resource Library.