Product Manual

SG-3100

Netgate

Nov 08, 2018

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Thank you for your purchase of the pfSense® SG-3100 System. This hardware platform provides a powerful, reliable, cost-effective solution.

Quick Start Guide

The Quick Start Guide covers the first time connection procedures and will provide you with the information you need to get your appliance up and running.

CHAPTER

ONE

I/O PORTS

1.1 Rear Side

Ports are assigned as pictured.

1.1.1 Routed Ethernet

Interface Name	Port Name
WAN	mvneta2
OPT1	mvneta0

LED Pattern	Description
Left LED only green	Flashes with **1Gb** traffic, solid with link.
Both LEDs green	Both flash with **100Mb** traffic, solid with link.
Right LED only green	Flashes with **10Mb** traffic, solid with link.

1.1.2 Switched Ethernet

Interface Name	Port Name
LAN1	mvneta1
LAN2	mvneta1
LAN3	mvneta1
LAN4	mvneta1

LED Pattern	Description
Both LEDs green	Left Flashes with **1Gb** traffic, solid with link.
Left LED only green	Left flashes with **100Mb** traffic, solid with link.
Right LED only green	Left Flashes with **10Mb** traffic, solid with link.

Note: Prior to pfSense software version 2.4.3, the switched Ethernet ports on the SG-3100 did not support auto MDI-X and required crossover cable unless the client-side connection supported auto MDI-X. This was resolved with 2.4.3 and later versions and a crossover cable is no longer required.

Warning: The LAN ports do not support the Spanning Tree Protocol (STP). Two or more ports connected to another Layer 2 switch, or connected to 2 or more different interconnected switches, could create a flooding loop between the switches. This can cause the router to stop functioning until the loop is resolved.

1.1.3 Other Ports

- Power (12 VDC with threaded locking connector)
- Recessed Reset Button (performs a hard reset, immediately turning the system off)
- USB 3.0
- Micro SIM
- Console (Mini-USB)

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.

1.2 Front Side

LED Pattern	Description
Boot Process	The sequence, circle -> square -> diamond, quickly flashes blue.
Boot Completed	The diamond slowly flashes blue.
Update is Available	The square slowly flashes orange.

CHAPTER

TWO

SG-3100 SWITCH OVERVIEW

This optional guide shows the steps required to configure the 4 switched Ethernet ports as discrete ports.

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.

The following attributes are used in this configuration guide but can be changed to suit your particular requirements:

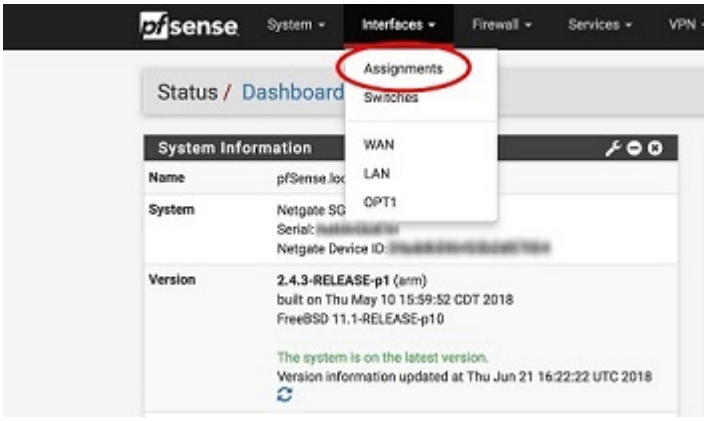
SG-3100 Ethernet Port: **LAN4**

IP Address Assignment: **192.168.100.1/24**

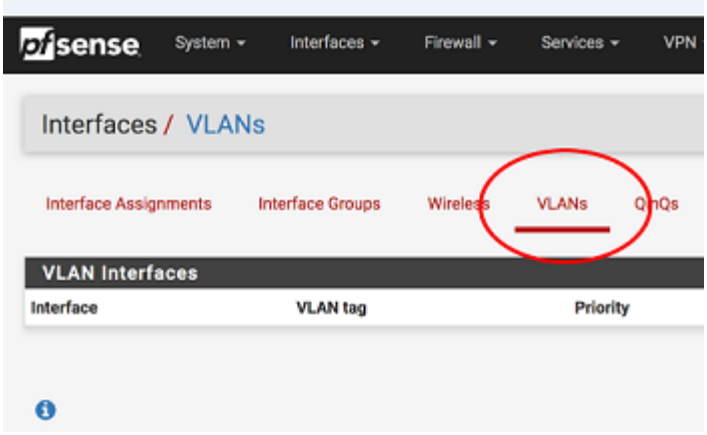
VLAN Tag: **4084** (VLAN tags should be 4081-4084 for LAN Ports 1-4)

2.1 Configuring the Switch

1. Open the pfSense WebGUI and log in.
2. From the menu, navigate to **Interfaces > Assignments**.

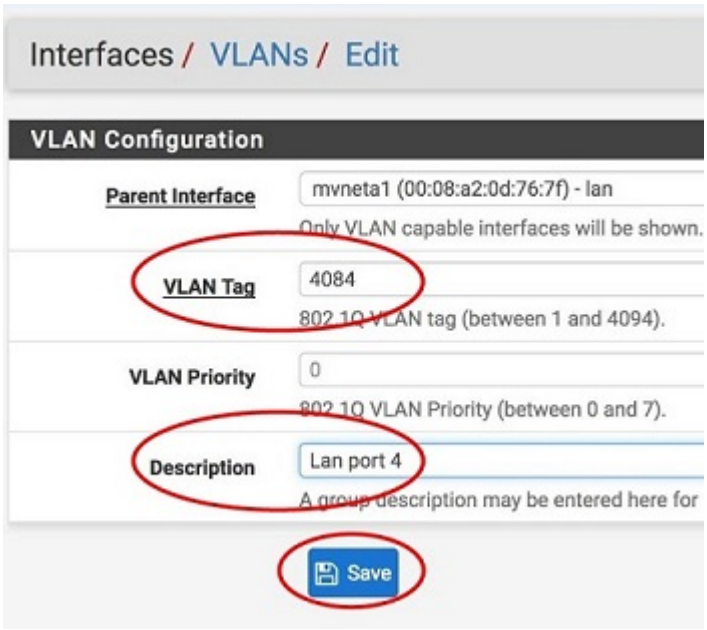


3. Go to the **VLANs** sub-menu.



4. In the lower right-hand corner of the screen, click **+ Add**.
5. Choose **mvneta1 (MAC Address) - lan** from the **Parent Interface** drop-down menu.

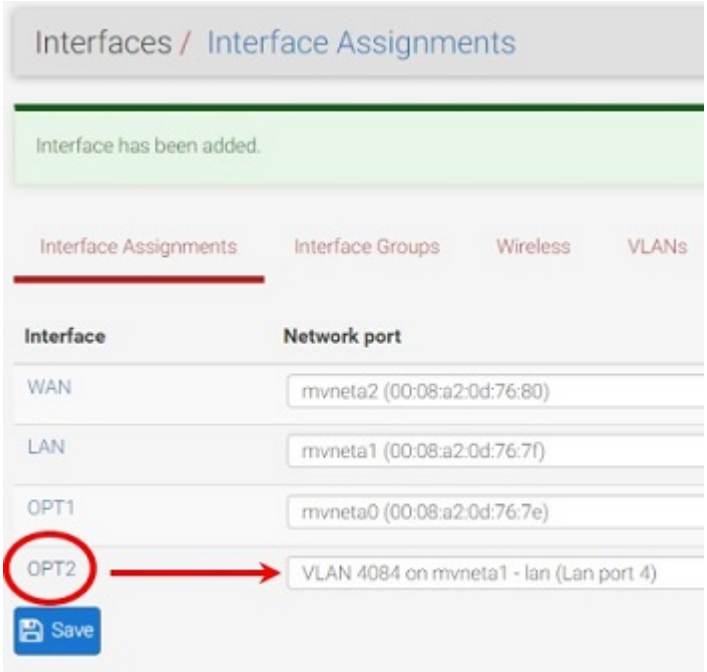
6. Set the **VLAN Tag** to **4084**. Type **Lan port 4** as the **Description**. Click **Save**.



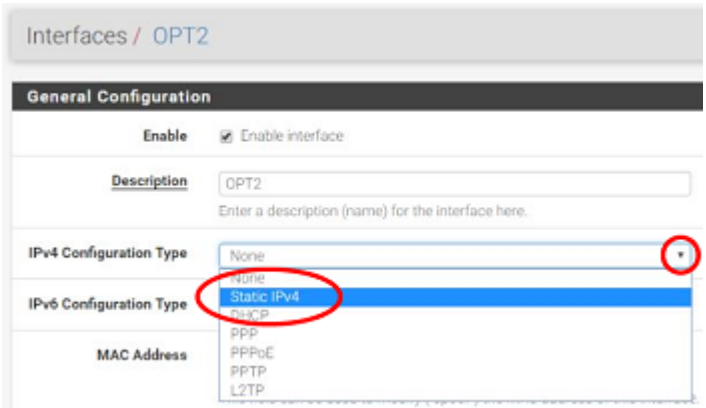
Note: 4084 in is used as an example in this guide. The value for the tags must be unique for each VLAN and must be between 1 and 4094. Avoid using values that are already in use. Best practice is not to use 1.

7. Go to the **Interface Assignments** sub-menu.
8. Ensure **Available network ports:** is correct. It is VLAN 4084 on mvneta1 - lan (Lan port 4) in this example. Click on **+ Add**.

9. Click on **OPT2**. This is the Interface that matches the new VLAN being created.



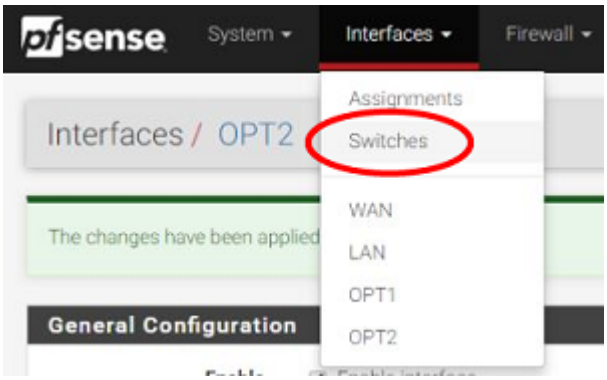
10. Check the **Enable Interface** check-box.
11. Change the **IPv4 Configuration Type** from None to **Static IPv4**.



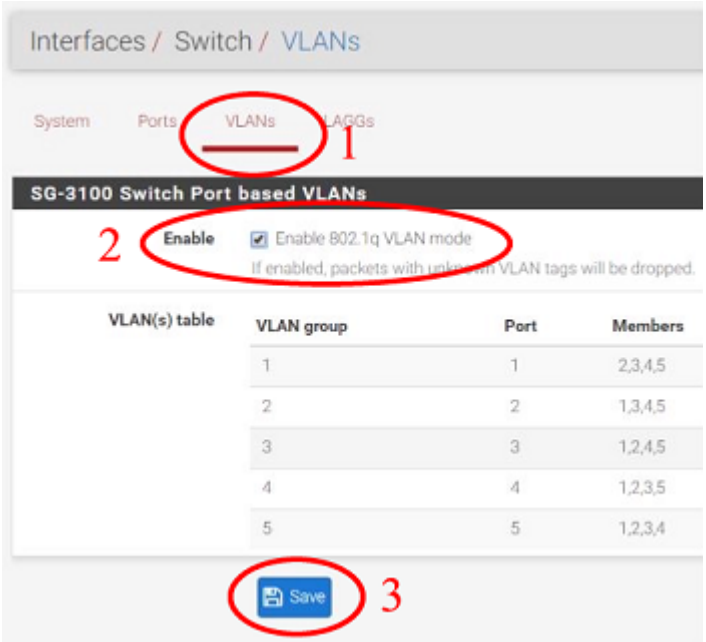
12. Scroll down and make the IPv4 Address **192.168.100.1/24** (in this example).

13. Click **Save**.
14. Click **Apply Changes**.

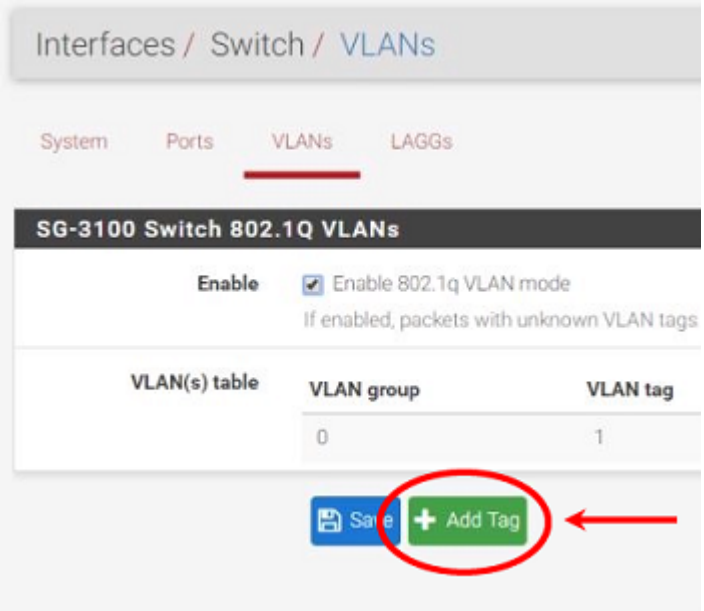
15. Go to **Interfaces -> Switches**.



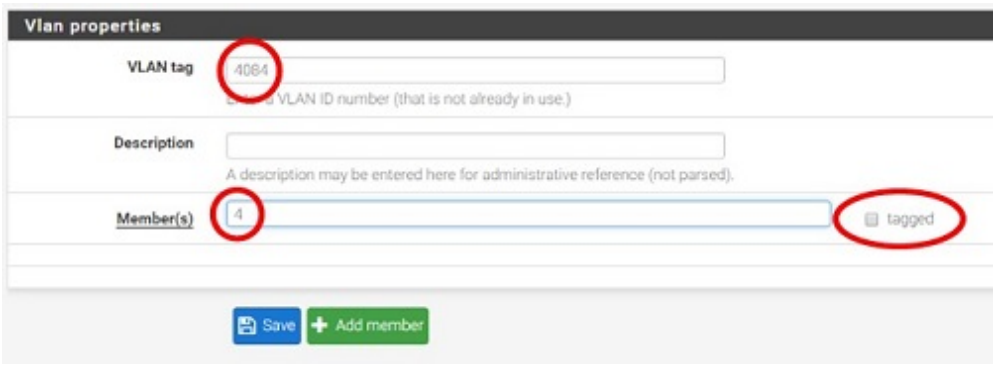
16. Go to the **VLANs** sub-menu. Click in the **Enable 802.1q VLAN mode** check-box and click **Save**.



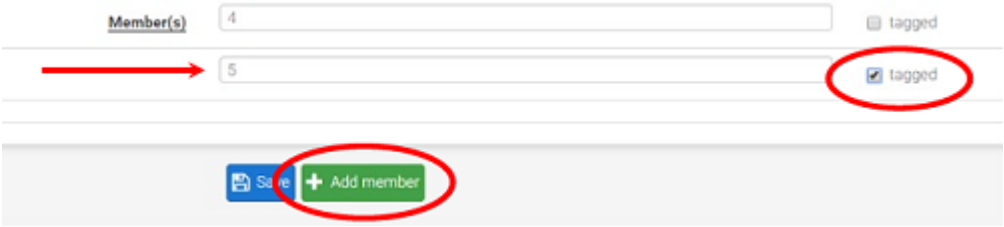
17. You will notice that the table changes. Click **+ Add Tag**.



18. Type `4084` for the **VLAN Tag** and `4` for **Member(s)**. This represents LAN4 (port 4) and tagged should be **unchecked**.



19. Click **+ Add Member** to add the LAN Uplink, 5. This member should be **tagged** as shown.

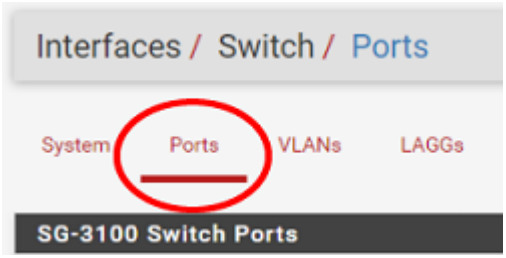


20. Click **Save**.

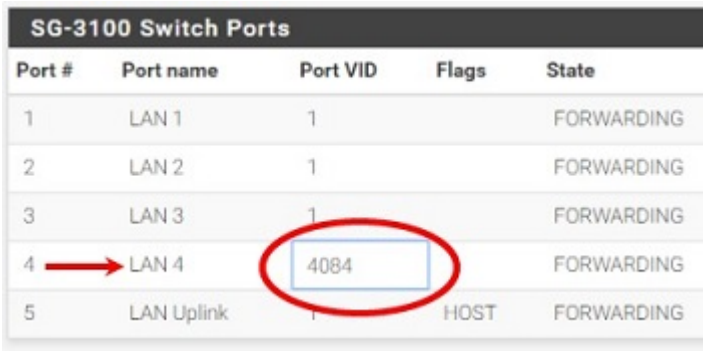
21. Click on  beside VLAN group 0.

22. Click **Delete** beside Member(s) **4**. This will remove LAN4 from this VLAN group.

23. Click **Save**.
24. Go to the **Ports** sub-menu.



25. Click on **Port VID 1** beside **LAN4**. Backspace through `1` and insert `4084`, the new VLAN ID.



26. Click **Save**.

This completes the configuration of a discrete port on the SG-3100.

You will need to create the appropriate firewall rules because by default, all traffic is blocked. Go to **Firewall > Rules** and then the **OPT2** sub-menu (in this example) to configure the firewall rules.

You should also enable DHCP if necessary, by going to **Services > DHCP Server > OPT2** (for the example above).

CHAPTER

THREE

GETTING STARTED

The basic firewall configuration begins with connecting the pfSense appliance to the Internet. Neither the modem nor the pfSense appliance should be powered up at this time.

Establishing a connection to the Internet Service Provider (ISP) starts with connecting one end of an ethernet cable to the WAN port (shown in the *I/O Ports* section) of the pfSense appliance.

Warning: The default LAN subnet on the firewall is `192.168.1.0/24`. The same subnet **cannot** be used on both WAN and LAN, so if the subnet on the WAN side of the firewall is also `192.168.1.0/24`, **disconnect the WAN** interface until the LAN interface has been renumbered to a different subnet.

The opposite end of the same ethernet cable should be inserted in to the LAN port of the ISP-supplied modem. The modem provided by the ISP might have multiple LAN ports. If so, they are usually numbered. For the purpose of this installation, please select port 1.

The next step is to connect the LAN port (shown in the *I/O Ports* section) of the pfSense appliance to the computer which will be used to access the firewall console.

Connect one end of the second ethernet cable to the LAN port (shown in the *I/O Ports* section) of the pfSense appliance. Connect the other end to the network connection on the computer. In order to access the web configurator, the PC network interface must be set to use DHCP, or have a static IP set in the `192.168.1.x` subnet with a subnet mask of `255.255.255.0`. Do not use `192.168.1.1`, as this is the address of the firewall, and will cause an IP conflict.

3.1 Initial Setup

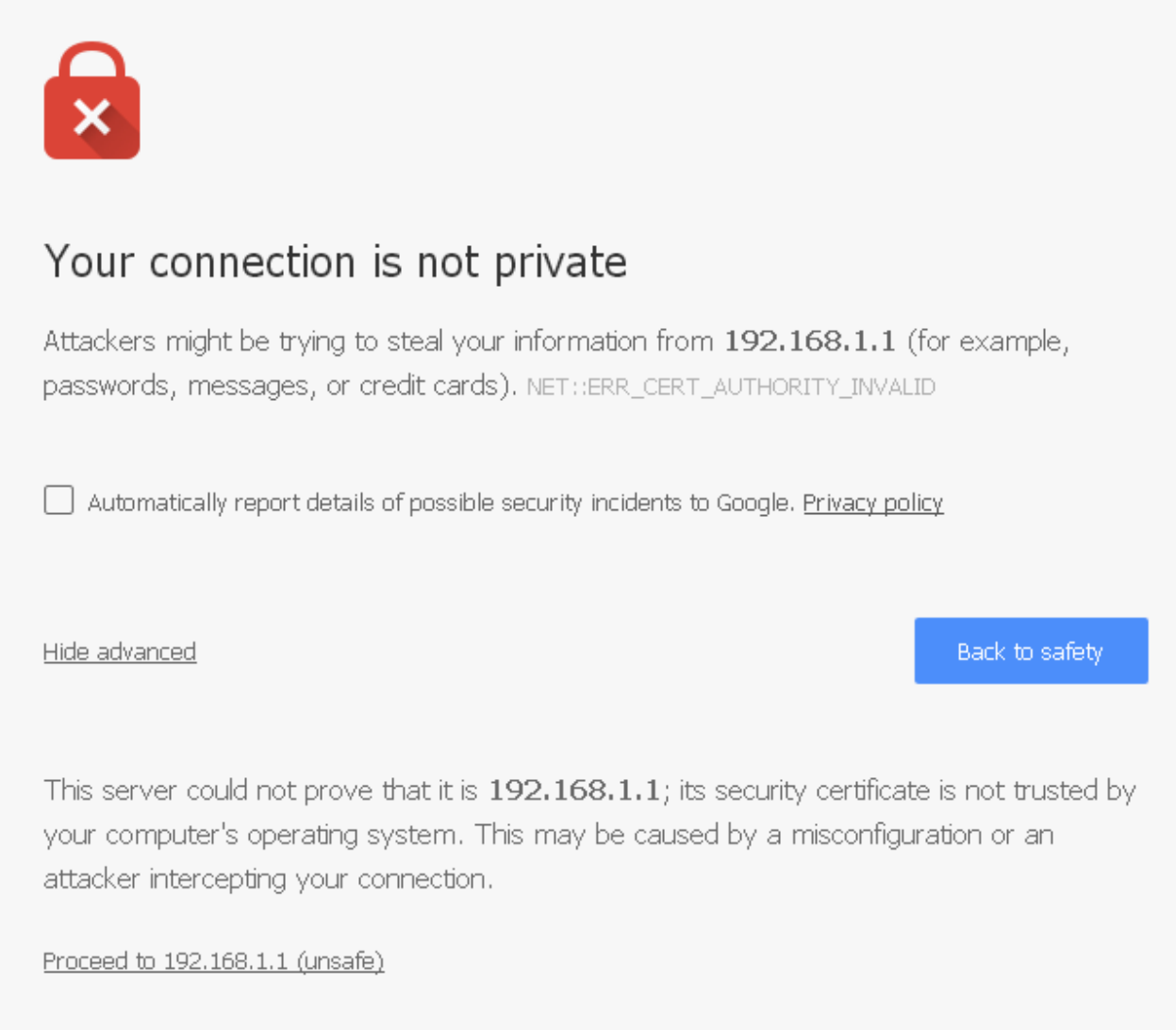
The next step is to power up the modem and the firewall. Plug in the power supply to the power port (shown in the *I/O Ports* section).

Once the modem and pfSense appliance are powered up, the next step is to power up the computer.

Once the pfSense appliance is booted, the attached computer should receive a `192.168.1.x` IP address via DHCP from the pfSense appliance.

3.2 Logging Into the Web Interface

Browse to https://192.168.1.1 to access the web interface. In some instances, the browser may respond with a message indicating a problem with website security. Below is a typical example in Google Chrome. If this message or similar message is encountered, it is safe to proceed.



At the login page enter the default pfSense password and username:

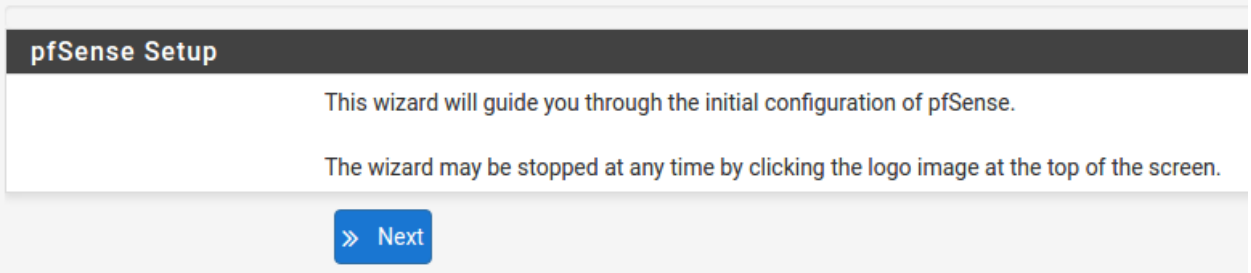
Username `admin`

Password `pfsense`

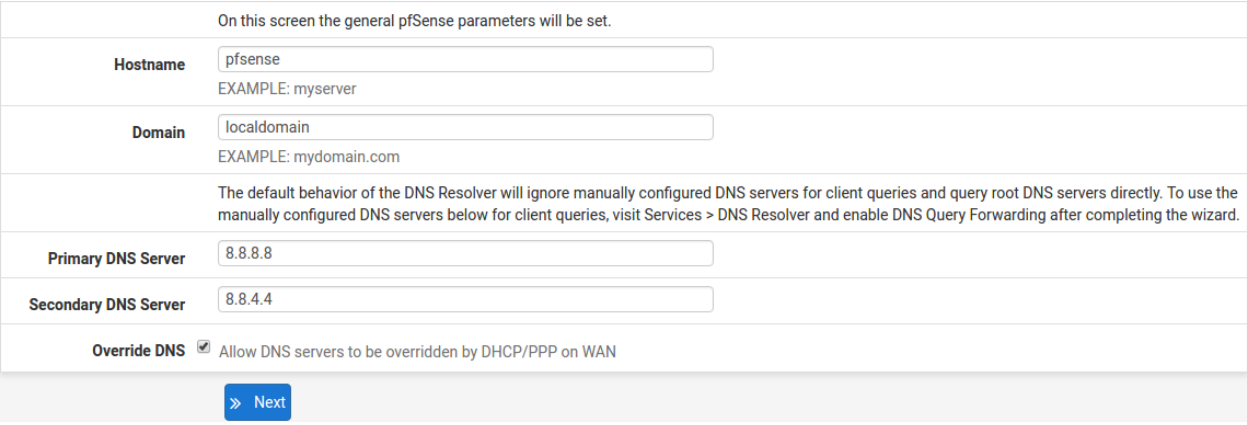
Click **Login** to continue

3.3 Wizard

Upon successful login, the following is displayed.



3.4 Configuring Hostname, Domain Name and DNS Servers



3.5 Hostname

For **Hostname**, any desired name can be entered as it does not affect functionality of the firewall. Assigning a hostname to the firewall will allow the GUI to be accessed by hostname as well as IP address.

For the purposes of this guide, use `pfsense` for the hostname. The default hostname, `pfsense` may be left unchanged.

Once saved in the configuration, the GUI may be accessed by entering http://pfsense as well as http://192.168.1.1

3.6 Domain

If an existing DNS domain is in use within the local network (such as a Microsoft Active Directory domain), use that domain here. This is the domain suffix assigned to DHCP clients, which should match the internal network.

For networks without any internal DNS domains, enter any desired domain name. The default `localdomain` is used for the purposes of this tutorial.

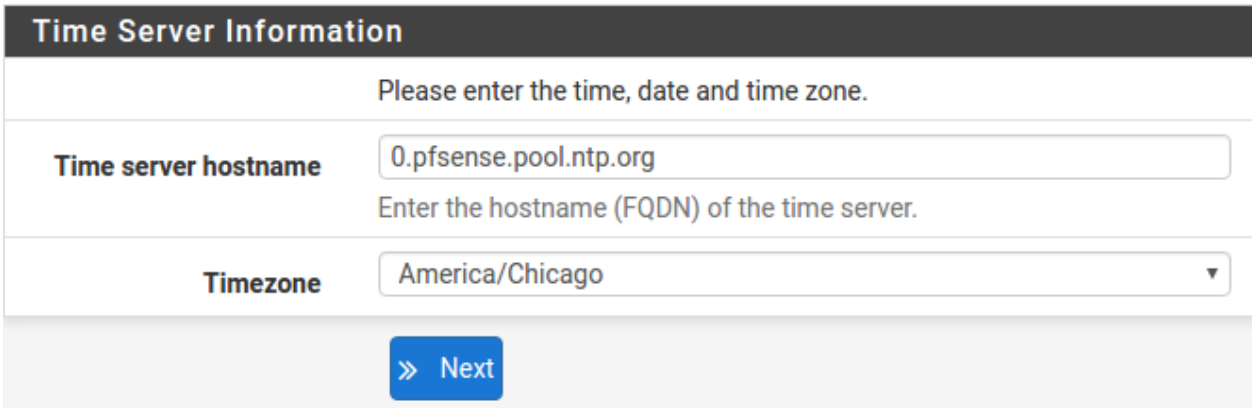
3.7 DNS Servers

The DNS server fields can be left blank if the DNS Resolver is used in non- forwarding mode, which is the default behavior. The settings may also be left blank if the WAN connection is using DHCP, PPTP or PPPoE types of Internet

connections and the ISP automatically assigns DNS server IP addresses. When using a static IP on WAN, DNS server IP addresses must be entered here for name resolution to function if the default DNS Resolver settings are not used.

DNS servers can be specified here even if they differ from the servers assigned by the ISP. Either enter the IP addresses provided by the ISP, or consider using Google public DNS servers (`8.8.8.8`, `8.8.4.4`). Google DNS servers are used for the purpose of this tutorial. Click **Next** after filling in the fields as appropriate.

3.8 Time Server Configuration



3.9 Time Server Synchronization

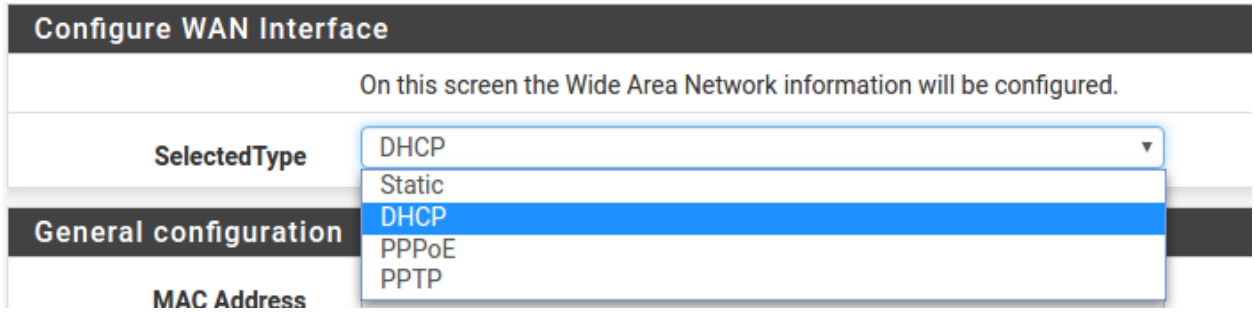
Setting time server synchronization is quite simple. We recommend using the default pfSense time server address, which will randomly select an NTP server from a pool.

3.10 Setting Time Zone

Select an appropriate time zone for the location of the firewall. For purposes of this manual, the Timezone setting will be set to `America/Chicago` for US Central time.

3.11 Configuring Wide Area Network (WAN) Type

The WAN interface type is the next to be configured. The IP address assigned to this section becomes the Public IP address that this network will use to communicate with the Internet.

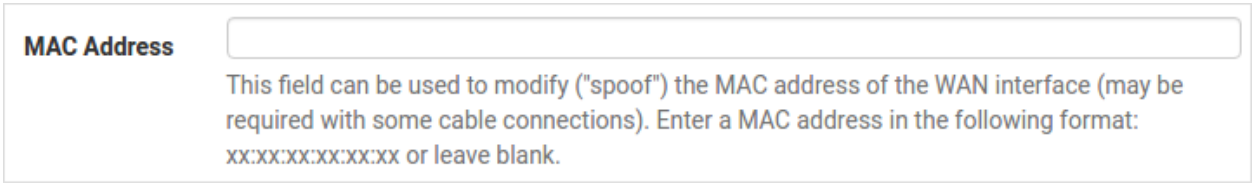


This depicts the four possible WAN interface types. Static, DHCP, PPPoE and PPTP. One must be selected from the drop-down list.

Further information from the ISP is required to proceed when selecting *Static*, *PPPoE* and *PPTP* such as login name and password or as with static addresses, an IP address, subnet mask and gateway address.

DHCP is the most common type of interface for home cable modems. One dynamic IP address is issued from the ISP DHCP server and will become the public IP address of the network behind this firewall. This address will change periodically at the discretion of the ISP. Select *DHCP* as shown and proceed to the next section.

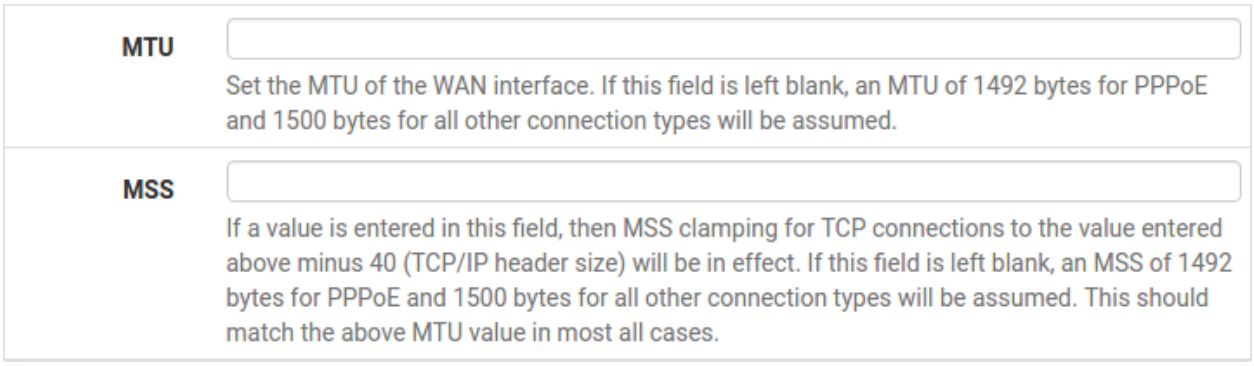
3.12 MAC Address



If replacing an existing firewall, the WAN MAC address of the old firewall may be entered here, if it can be determined. This can help avoid issues involved in switching out firewalls, such as ARP caches, ISPs locking to single MAC addresses, etc.

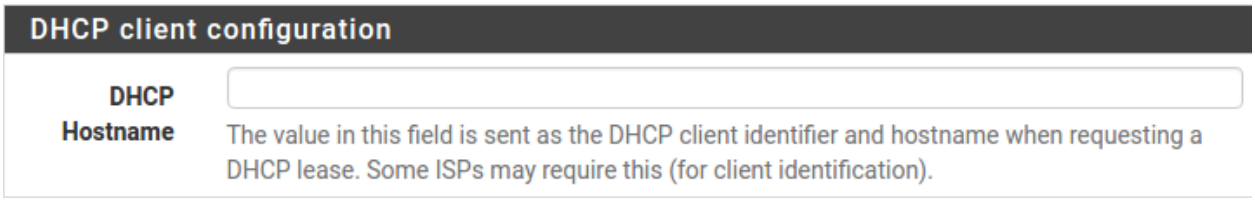
If the MAC address of the old firewall cannot be located, the impact is most likely insignificant. Power cycle the ISP router and modem and the new MAC address will usually be able to get online. For some ISPs, it may be necessary to call them when switching devices, or an activation process may be required.

3.13 Configuring MTU and MSS



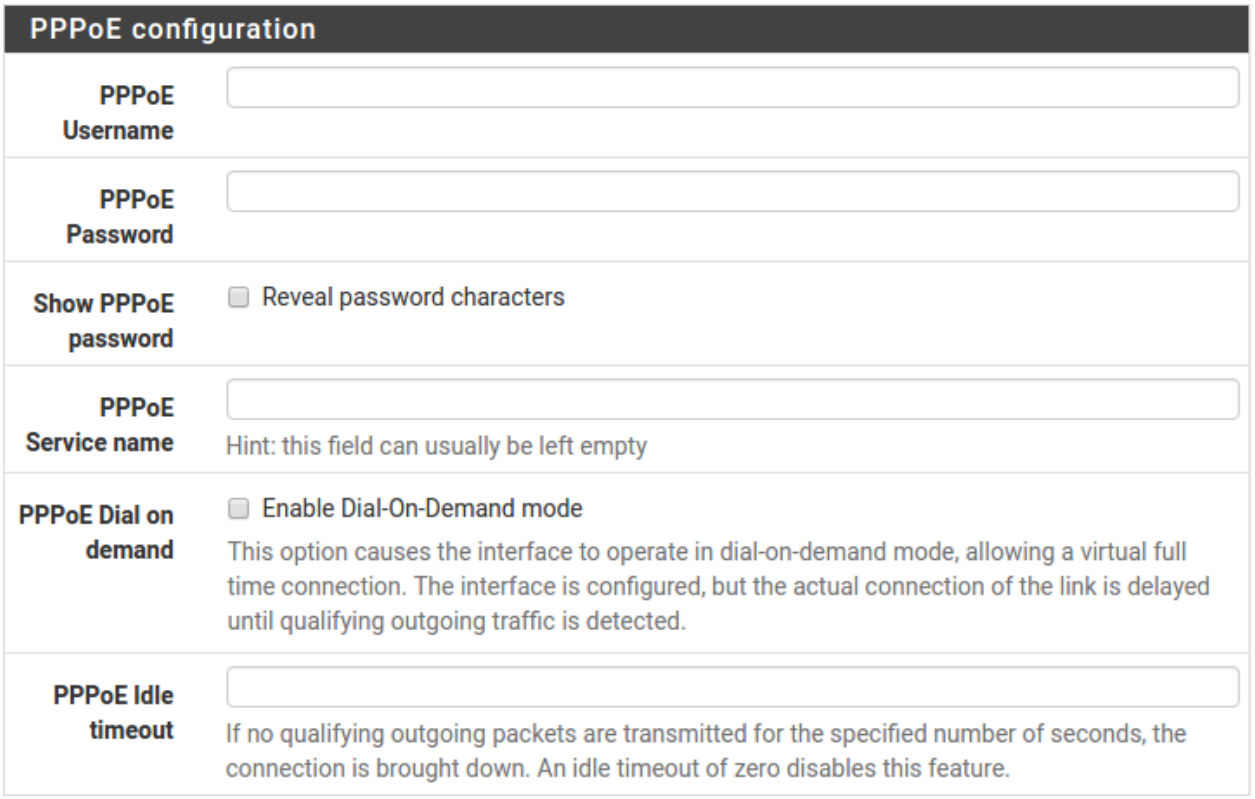
MTU or Maximum Transmission Unit determines the largest protocol data unit that can be passed onwards. A 1500-byte packet is the largest packet size allowed by Ethernet at the network layer and for the most part, the Internet so leaving this field blank allows the system to default to 1500-byte packets. PPPoE is slightly smaller at 1492-bytes. Leave this blank for a basic configuration.

3.14 Configuring DHCP Hostname



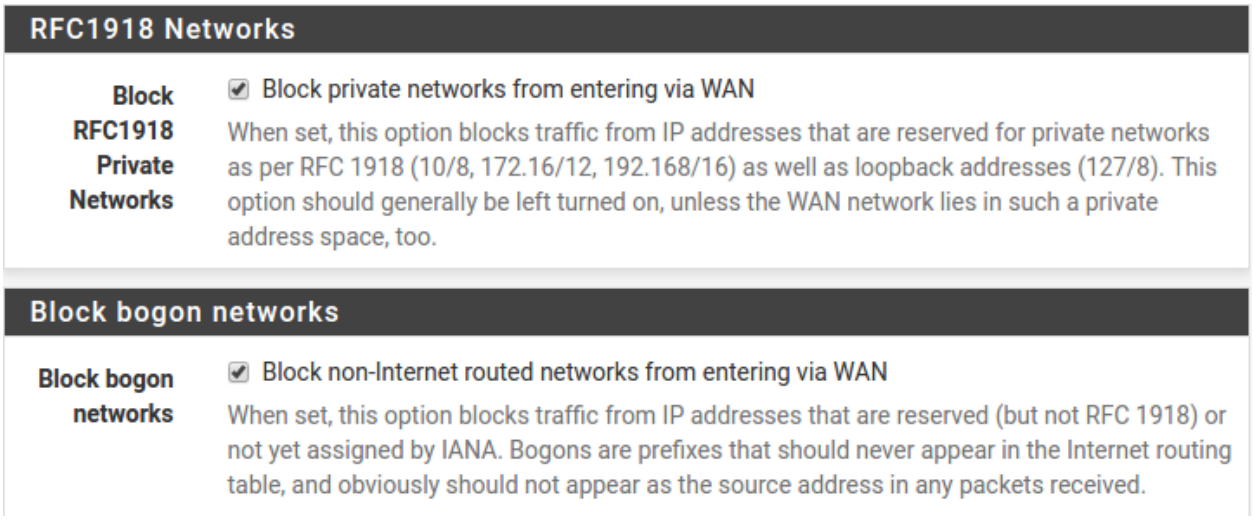
Some ISPs specifically require a **DHCP Hostname** entry. Unless the ISP requires the setting, leave it blank.

3.15 Configuring PPPoE and PPTP Interfaces



Information added in these sections is assigned by the ISP. Configure these settings as directed by the ISP

3.16 Block Private Networks and Bogons



When enabled, all private network traffic originating on the internet is blocked.

Private addresses are reserved for use on internal LANs and blocked from outside traffic so these address ranges may be reused by all private networks.

The following inbound address Ranges are blocked by this firewall rule:

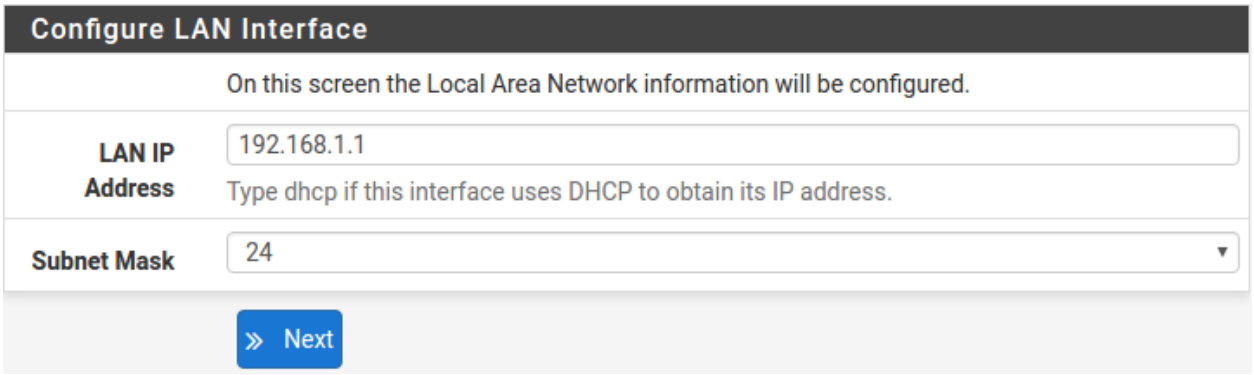
- `10.0.0.1` to `10.255.255.255`
- `172.16.0.1` to `172.31.255.254`
- `192.168.0.1` to `192.168.255.254`
- `127.0.0.0/8`
- `100.64.0.0/10`
- `fc00::/7`

Bogons are public IP addresses that have not yet been allocated, so they may typically also be safely blocked as they should not be in active use.

Check **Block RFC1918 Private Networks** and **Block Bogon Networks**.

Click **Next** to continue.

3.17 Configuring LAN IP Address & Subnet Mask

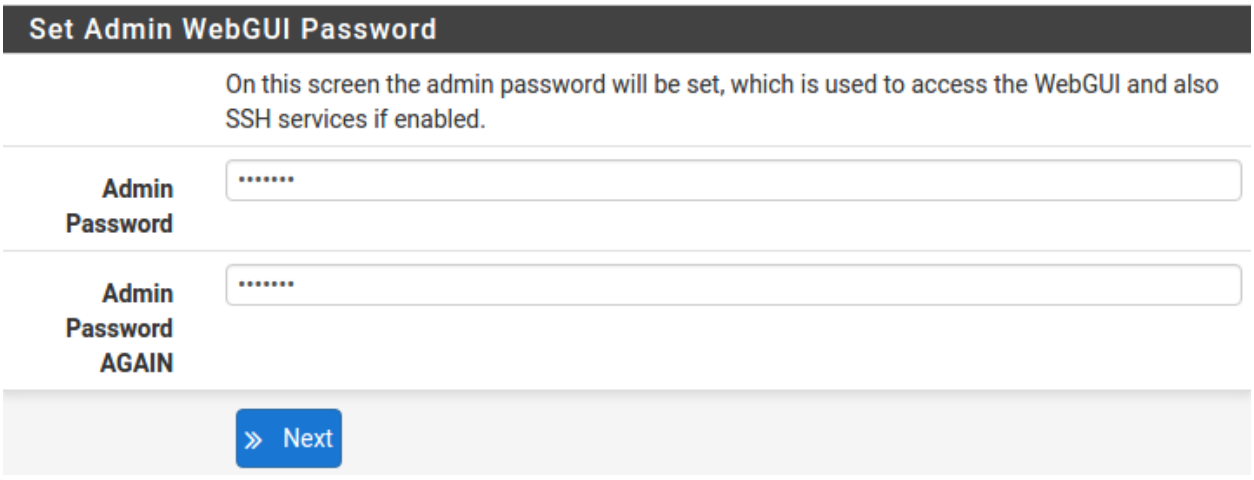


A static IP address of `192.168.1.1` and a subnet mask (CIDR) of `24` was chosen for this installation. If there are no plans to connect this network to any other network via VPN, the `192.168.1.x` default is sufficient.

Click **Next** to continue.

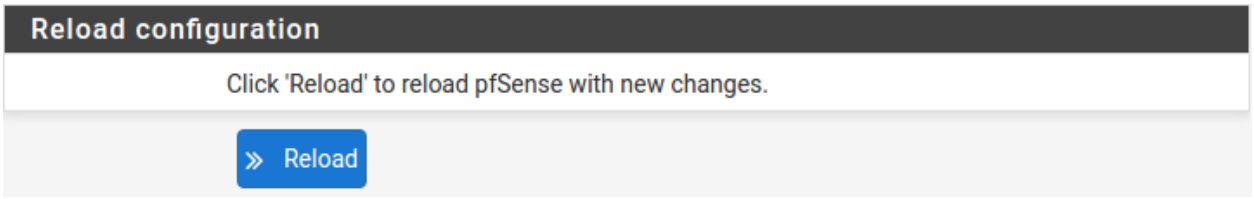
Note: If a Virtual Private Network (VPN) is configured to remote locations, choose a private IP address range more obscure than the very common `192.168.1.0/24`. IP addresses within the `172.16.0.0/12` RFC1918 private address block are the least frequently used. We recommend selecting a block of addresses between `172.16.x.x` and `172.31.x.x` for least likelihood of having VPN connectivity difficulties. An example of a conflict would be If the local LAN is set to `192.168.1.x` and a remote user is connected to a wireless hotspot using `192.168.1.x` (very common), the remote client won't be able to communicate across the VPN to the local network.

3.18 Change Administrator Password



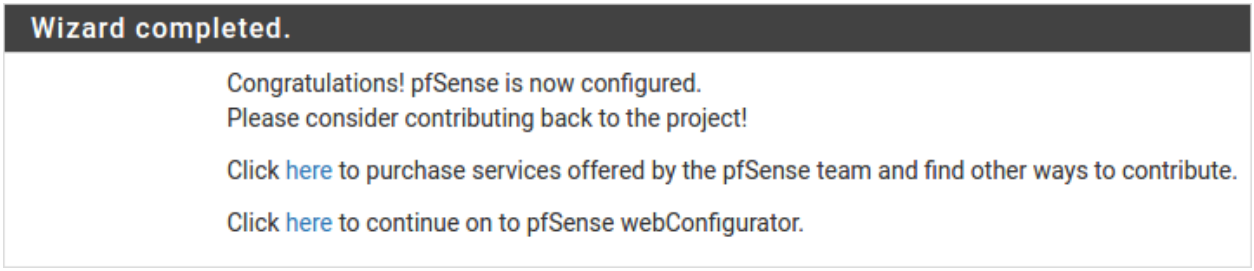
Select a new **Administrator Password** and enter it twice, then click **Next** to continue.

3.19 Save Changes

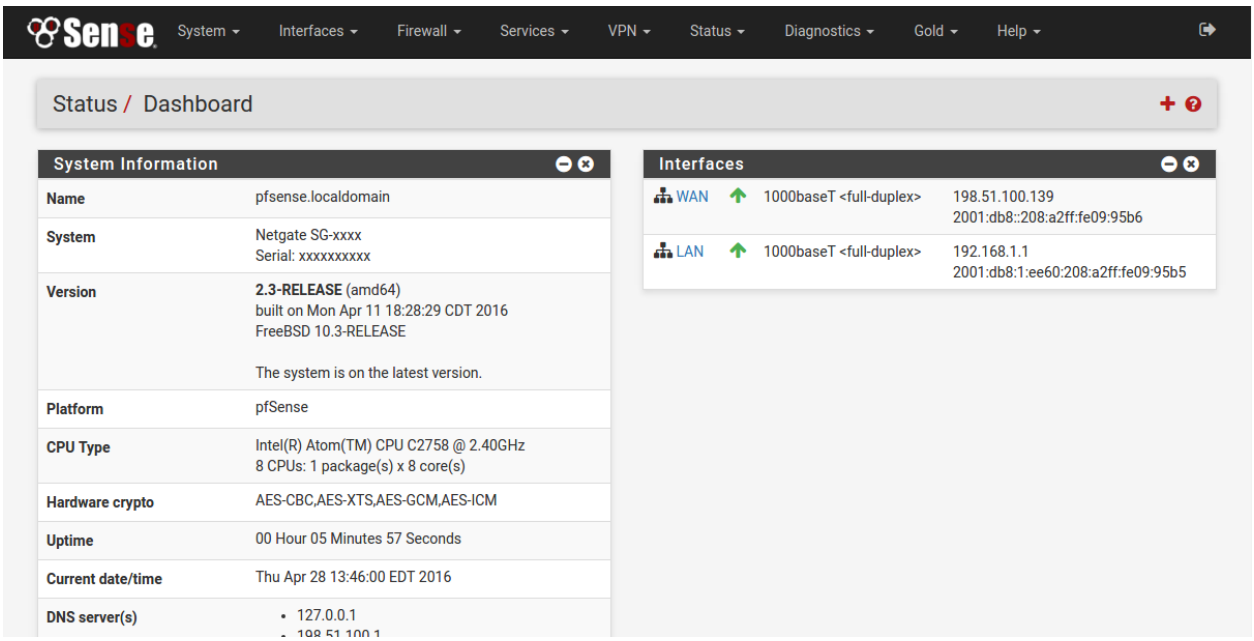


Click **Reload** to save configuration.

3.20 Basic Firewall Configured

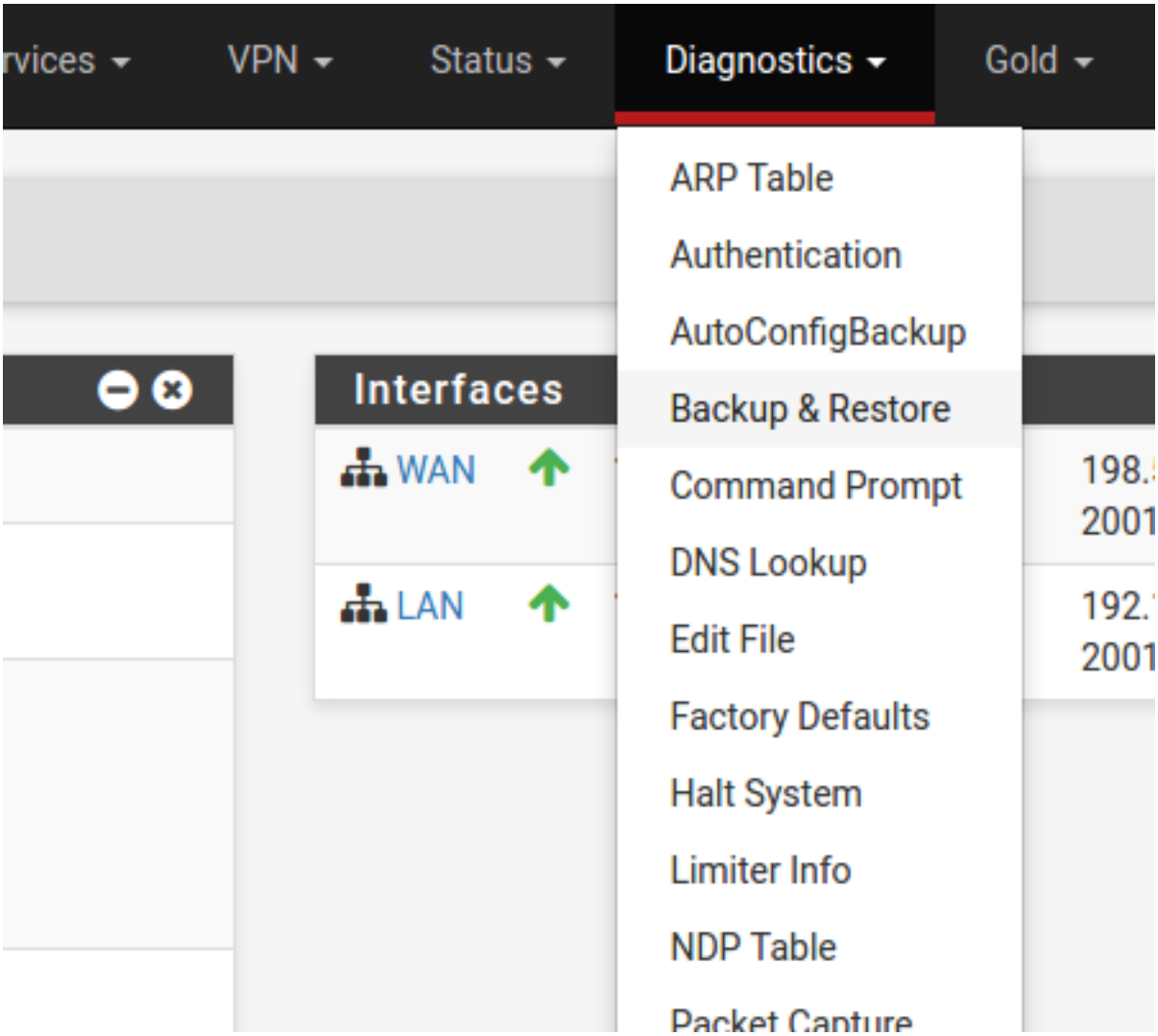


To proceed to the webConfigurator, make the selection as highlighted. The Dashboard display will follow.

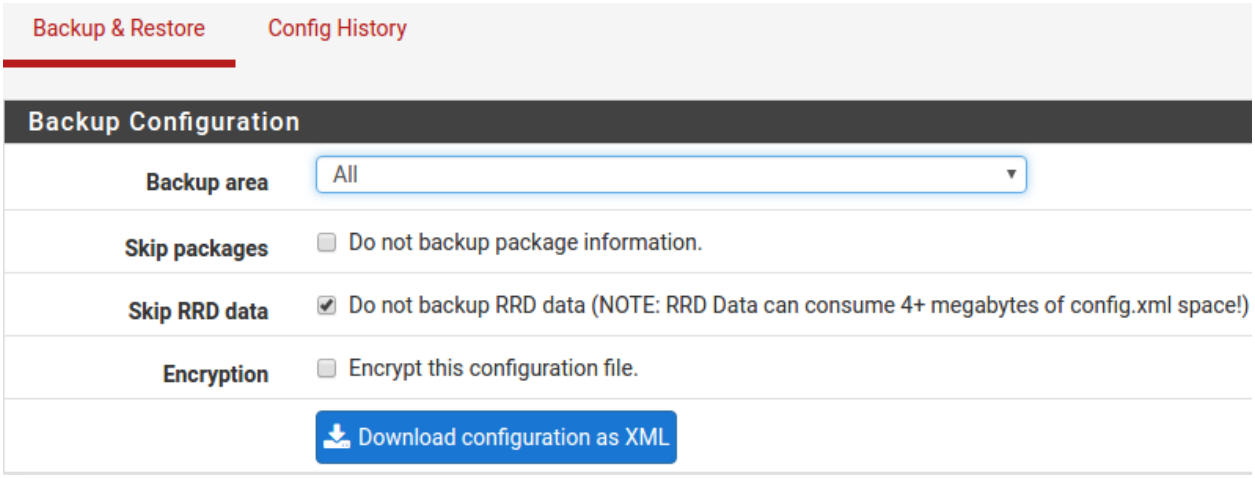


3.21 Backing Up and Restoring

At this point, basic LAN and WAN interface configuration is complete. Before proceeding, backup the firewall configuration. From the menu at the top of the page, browse to **Diagnostics > Backup/Restore**.



Click **Download Configuration** and save a copy of the firewall configuration.



This configuration can be restored from the same screen by choosing the backup file under **Restore configuration**.

3.22 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.

See also:

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

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

CHAPTER

FOUR

CONNECTING TO CONSOLE PORT

4.1 Simple Configuration

Below are the simple instructions for connecting to the console port with Microsoft Windows. If these steps do not work for you or if you're an operating system other than Windows, then please skip forward to *Advanced Configuration*.

4.1.1 Serial Terminal Emulation Client

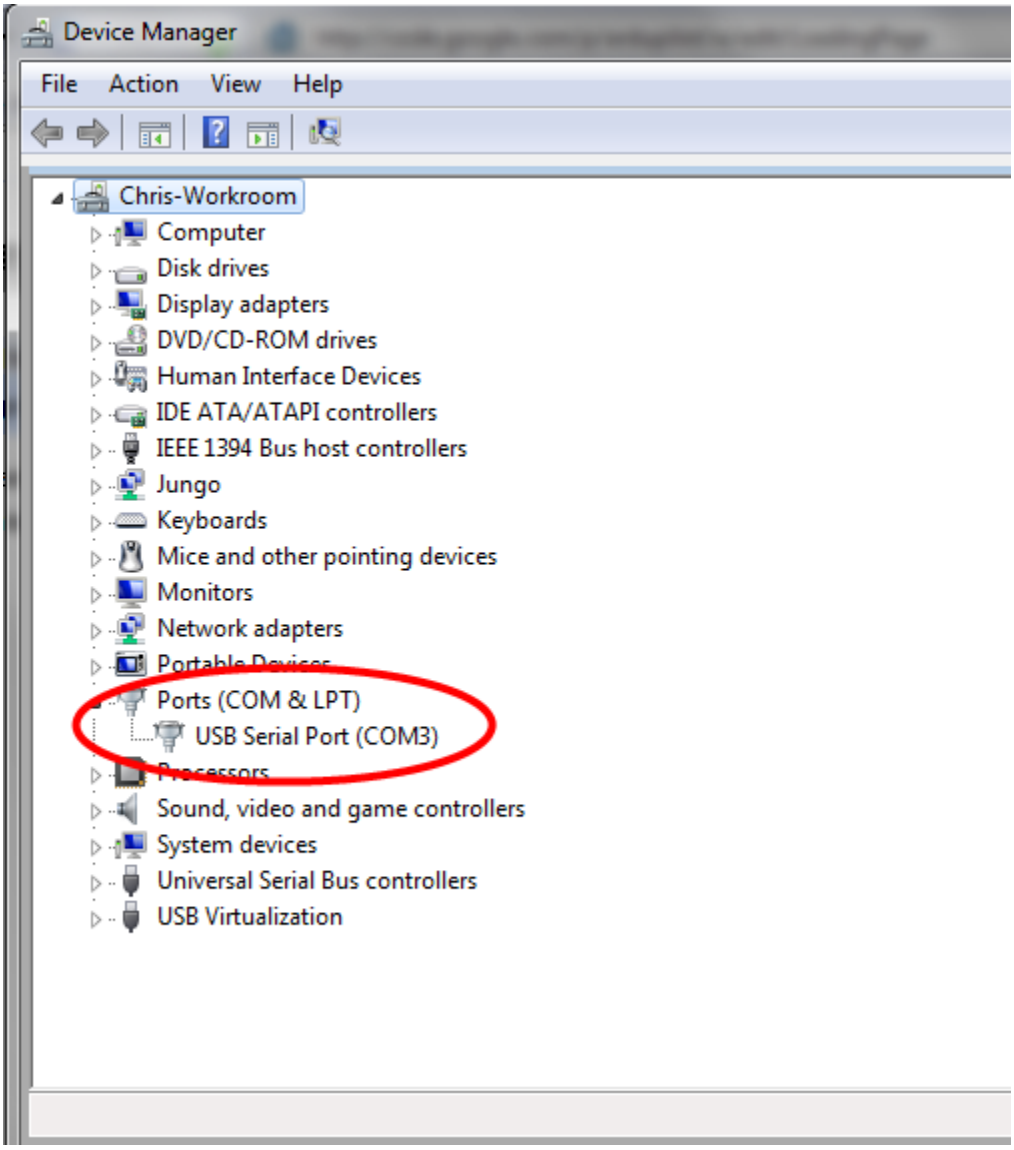
A serial terminal emulation program is required to access the pfSense appliance console through the serial interface. Microsoft Windows no longer includes HyperTerminal in Versions 7 and up. PuTTY is free and can be downloaded from:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

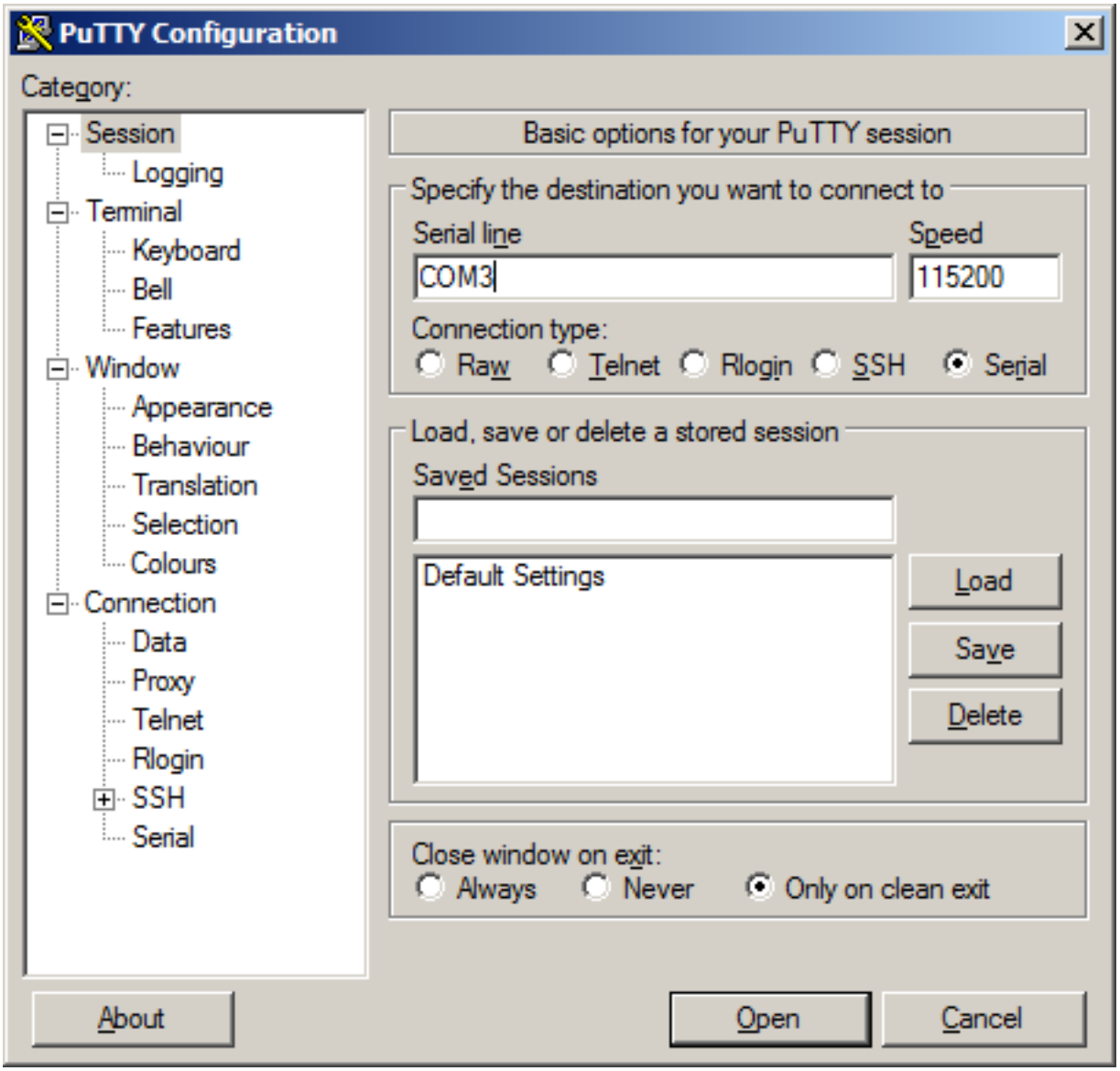
4.1.2 Configuring Serial Terminal Emulator

PuTTY must be configured to communicate with the pfSense appliance. In order to do so, you must first know what COM Port your computer has assigned to your serial port. Even if you assigned your serial port to COM1 in the BIOS, Windows may remap it to a different COM Port.

To determine this, you must open Windows Device Manager and view the COM port assignment:



Open PuTTY and locate the **Session** display as shown below. For the **Connection type**, select **Serial**. Set **Serial line** to the COM Port that is displayed in Windows Device Manager, `COM3` for this example, and the **Speed** to `115200` bits per second, the speed of the BIOS in this case.



Select **Open** and the console screen will be displayed.

4.2 Advanced Configuration

A Silicon Labs CP210x USB-to-UART bridge is used to provide access to the serial port that acts as a system console. This is exposed via a Mini-USB port on the front of the case. There are several steps required to access the system console via this port.

4.2.1 Install the Driver

Install an appropriate CP210x USB to UART Bridge VCP (virtual COM port) driver on the workstation used to connect with the system if needed. There are drivers available for Windows, Mac OS X, and Linux available in the Download Software section of the Silicon Labs Website.

Warning: Do not download the **SDK**, only download the driver.

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

Loading the Linux Driver

If the device does not appear automatically, the CP210x driver module may need to be loaded manually, especially if the version of Linux being run is not recent. If the driver was provided with the Linux distribution, run `modprobe cp210x` as root or using `sudo`. If it had to be built manually, run `insmod ./cp210x.ko` assuming the module is in the current directory.

4.2.2 Connect a USB Cable

Next, locate an appropriate USB cable. The type of cable required for the serial console has a Mini-USB 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.

Attach the USB cable between a workstation and the system. Gently push the Mini-B plug end into the console port on the system and connect the USB type A plug into an available USB port on the workstation.

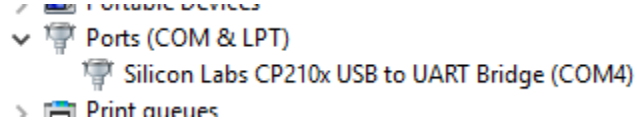
Tip: Be certain to gently push in the Mini-B connector on the system side completely. With most cables there will be a tangible "click", "snap", or similar indication when the cable is fully engaged.

4.2.3 Locate the Console Port Device

The appropriate device to attach the terminal program to each platform varies by platform and must be located before attempting to connect to the console.

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 **Silicon Labs CP210x USB to UART Bridge**. If there is a label in the name that contains "COMX" where X is a decimal digit (e.g. COM1), that value is what would be used as the port in the terminal program.



Mac OS X

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

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`.

4.2.4 Launch a Terminal Program

Use a terminal program to connect to the system console port. PuTTY is a popular terminal program that is available on various operating systems. Some other choices of terminal programs:

- Linux: screen, PuTTY, minicom, dterm
- Mac OS X: screen, ZTerm, cu
- Windows: PuTTY, SecureCRT, **Do not use Hyperterminal**
- FreeBSD: screen, cu

The settings to use within the terminal program are:

Speed 115200 baud

Data bits 8

Parity none

Stop bits 1

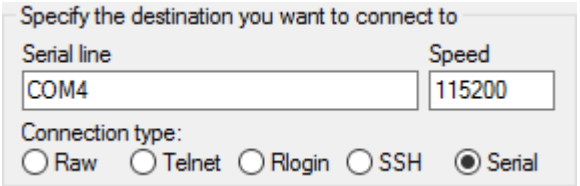
Flow Control Off or XON/OFF. Hardware flow control (RTS/CTS) **must** be disabled.

Client-Specific Examples

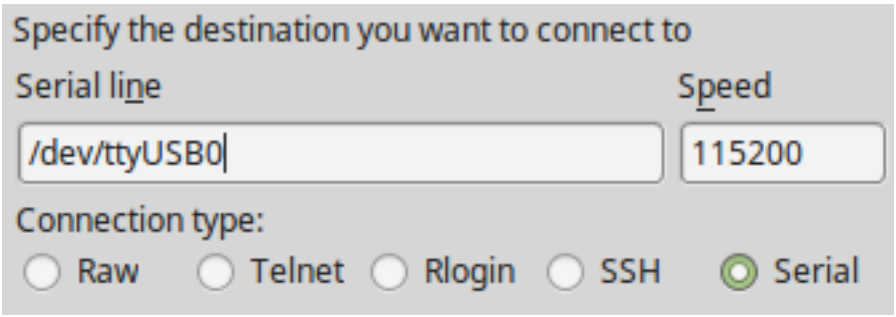
PuTTY

Launch PuTTY and configure it for a **Serial** type connection with a speed of **115200** using the port name located previously.

- Windows Example:



- Linux Example:



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):

Window Columns x Rows = *80x24*

Window > Appearance Font = *Courier New 10pt* or *Consolas 10pt*

Window > Translation Remote Character Set = *Use font encoding* or *UTF-8*

Window > Translation Handling of line drawing characters = *Use font in both ANSI and OEM modes* or *Use Unicode line drawing code points*

Window > Colours Indicate bolded text by changing = The colour

GNU screen

In many cases *screen* may be invoked simply by using the proper command line:

- Mac OS X

```
sudo screen /dev/cu.SLAB_USBtoUART 115200
```

- Linux

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

- FreeBSD

```
sudo screen /dev/cuaU0 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. For example, on OS X this is commonly required

```
sudo screen -U /dev/cu.SLAB_USBtoUART 115200
```

Adding the `-U` parameter to the *screen* command line arguments forces it to use UTF-8 for character encoding.

4.2.5 Troubleshooting

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. `ttyS1` in Linux). Consult the various operating install guides on this site for further information.

Garbled Serial Output

If the serial output apears 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")

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. `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.

CHAPTER

FIVE

ADDITIONAL RESOURCES

5.1 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

5.2 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/

5.3 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/

5.4 Community Support Options

You can find out more information about our active community on our forums, subreddit, and more here.

https://www.netgate.com/support/contact-support.html#community-support

CHAPTER

SIX

WARRANTY AND SUPPORT INFORMATION

- One year manufacturer's warranty.
- 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.

CHAPTER

SEVEN

SAFETY AND LEGAL

Contents

- *Safety and Legal*
  - *Safety Notices*
  - *Electrical Safety Information*
  - *FCC Compliance*
  - *Industry Canada*
  - *Australia and New Zealand*
  - *CE Marking*
  - *RoHS/WEEE Compliance Statement*
  - *Declaration of Conformity*
  - *Disputes*
  - *Applicable Law*
  - *Site Policies, Modification, and Severability*
  - *Miscellaneous*
  - *Limited Warranty*

7.1 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.

7.2 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.

7.3 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.

7.4 Industry Canada

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

7.5 Australia and New Zealand

This is a AMC Compliance level 2 product. This product is suitable for domestic environments.

7.6 CE Marking

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

7.7 RoHS/WEEE Compliance Statement

7.7.1 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.

7.7.2 Deutsch

Die Europäische Richtlinie 2002/96/EC verlangt, dass technische Ausrüstung, die direkt am Gerät und/oder an der Verpackung mit diesem Symbol versehen ist, nicht zusammen mit unsortiertem Gemeindeabfall entsorgt werden darf. Das Symbol weist darauf hin, dass das Produkt von regulärem Haushaltmüll getrennt entsorgt werden sollte. Es liegt in Ihrer Verantwortung, dieses Gerät und andere elektrische und elektronische Geräte über die dafür zuständigen und von der Regierung oder örtlichen Behörden dazu bestimmten Sammelstellen zu entsorgen. Ordnungsgemäßes Entsorgen und Recyceln trägt dazu bei, potentielle negative Folgen für Umwelt und die menschliche Gesundheit zu vermeiden. Wenn Sie weitere Informationen zur Entsorgung Ihrer Altgeräte benötigen, wenden Sie sich bitte an die örtlichen Behörden oder städtischen Entsorgungsdienste oder an den Händler, bei dem Sie das Produkt erworben haben.

7.7.3 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.

7.7.4 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.

7.7.5 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.

7.8 Declaration of Conformity

7.8.1 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.

7.8.2 Dansk [Danish]

Undertegnede NETGATE erklærer herved, at følgende udstyr NETGATE device, overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

7.8.3 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.

7.8.4 English

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

7.8.5 Eesti [Estonian]

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

7.8.6 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.

7.8.7 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)

7.8.8 Ελληνική [Greek]

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ NETGATE ΔΗΛΩΝΕΙ ΟΤΙ NETGATE device, ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1995/5/ΕΚ.

7.8.9 Magyar [Hungarian]

Alulírott, NETGATE nyilatkozom, hogy a NETGATE device, megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.

7.8.10 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.

7.8.11 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.

7.8.12 Latviski [Latvian]

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

7.8.13 Lietuviškai [Lithuanian]

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

7.8.14 Malti [Maltese]

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

7.8.15 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.

7.8.16 Slovensky [Slovak]

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

7.8.17 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.

7.8.18 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.

7.8.19 Polski [Polish]

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

7.8.20 Português [Portuguese]

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

7.8.21 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.

7.9 Disputes

ANY DISPUTE OR CLAIM RELATING IN ANY WAY TO YOUR USE OF ANY PRODUCTS/SERVICES, OR TO ANY PRODUCTS OR SERVICES SOLD OR DISTRIBUTED BY RCL OR ESF WILL BE RESOLVED BY BINDING ARBITRATION IN AUSTIN, TEXAS, RATHER THAN IN COURT. The Federal Arbitration Act and federal arbitration law apply to this agreement.

THERE IS NO JUDGE OR JURY IN ARBITRATION, AND COURT REVIEW OF AN ARBITRATION AWARD IS LIMITED. HOWEVER, AN ARBITRATOR CAN AWARD ON AN INDIVIDUAL BASIS THE SAME DAMAGES AND RELIEF AS A COURT (INCLUDING INJUNCTIVE AND DECLARATORY RELIEF OR STATUTORY DAMAGES), AND MUST FOLLOW THE TERMS OF THESE TERMS AND CONDITIONS OF USE AS A COURT WOULD.

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.

7.10 Applicable Law

By using any Products/Services, you agree that the Federal Arbitration Act, applicable federal law, and the laws of the state of Texas, without regard to principles of conflict of laws, will govern these terms and conditions of use and any dispute of any sort that might arise between you and RCL and/or ESF. Any claim or cause of action concerning these terms and conditions or use of the RCL and/or ESF website must be brought within one (1) year after the claim or cause of action arises. Exclusive jurisdiction and venue for any dispute or claim arising out of or relating to the parties' relationship, these terms and conditions, or the RCL and/or ESF website, shall be with the arbitrator and/or courts located in Austin, Texas. The judgment of the arbitrator may be enforced by the courts located in Austin, Texas, or any other court having jurisdiction over you.

7.11 Site Policies, Modification, and Severability

Please review our other policies, such as our pricing policy, posted on our websites. These policies also govern your use of Products/Services. We reserve the right to make changes to our site, policies, service terms, and these terms and conditions of use at any time.

7.12 Miscellaneous

If any provision of these terms and conditions of use, or our terms and conditions of sale, are held to be invalid, void or unenforceable, the invalid, void or unenforceable provision shall be modified to the minimum extent necessary in order to render it valid or enforceable and in keeping with the intent of these terms and conditions. If such modification is not possible, the invalid or unenforceable provision shall be severed, and the remaining terms and conditions shall be enforced as written. Headings are for reference purposes only and in no way define, limit, construe or describe the scope or extent of such section. Our failure to act with respect to a breach by you or others does not waive our right to act with respect to subsequent or similar breaches. These terms and conditions set forth the entire understanding and agreement between us with respect to the subject matter hereof, and supersede any prior oral or written agreement pertaining thereto, except as noted above with respect to any conflict between these terms and conditions and our reseller agreement, if the latter is applicable to you.

7.13 Limited Warranty

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY

THE PRODUCTS/SERVICES AND ALL INFORMATION, CONTENT, MATERIALS, PRODUCTS (INCLUDING SOFTWARE) AND OTHER SERVICES INCLUDED ON OR OTHERWISE MADE AVAILABLE TO YOU THROUGH THE PRODUCTS/SERVICES ARE PROVIDED BY US ON AN "AS IS" AND "AS AVAILABLE" BASIS, UNLESS OTHERWISE SPECIFIED IN WRITING. WE MAKE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO THE OPERATION OF THE PRODUCTS/SERVICES, OR THE INFORMATION, CONTENT, MATERIALS, PRODUCTS (INCLUDING SOFTWARE) OR OTHER SERVICES INCLUDED ON OR OTHERWISE MADE AVAILABLE TO YOU THROUGH THE PRODUCTS/SERVICES, UNLESS OTHERWISE SPECIFIED IN WRITING. YOU EXPRESSLY AGREE THAT YOUR USE OF THE PRODUCTS/SERVICES IS AT YOUR SOLE RISK.

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References

- *Reinstalling pfSense*
- *Optional M.2 SATA Installation*
- pfSense Documentation
- Resource Library

CHAPTER

EIGHT

REINSTALLING PFSENSE

1. Registered users can log in to their Portal account page and download the appropriate factory installer image:

   `pfSense-netgate-SG-3100-recover-2.4.4-RELEASE-armv6.img.gz`

   If you no longer have an active portal subscription, please contact support to re-enable access to the image free of charge.

   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.

   See also:

   Connecting to Console Port Connecting to the console port. Cable is required.
4. Insert the memstick into the USB port and boot the system.
5. When prompted, press any key to stop the autoboot process.
6. Type `run recovery` at the **Marvell>>** prompt and press `Enter`.
7. Select the destination device.

   Note: The onboard eMMC flash memory is always mmcsd0.

8. Once the install has completed, press any key to reboot.

```
MMC:   mv_sdh: 0
DBG: Calling spi_flash_probe from env_relocate_spec()
SF: Probing bus 0 cs 0 @ 20000000Hz mode 3
SF: Detected N25Q128 with page size 64 KiB, total 16 MiB
PCI-e 0: Detected No Link.
PCI-e 1: Detected No Link.
USB2.0 0: Host Mode
USB3.0 1: Host Mode

Map:   Code:                    0x7fedc000:0x7ff975a8
       BSS:                     0x7ffef600
       Stack:                   0x7f4cbf20
       Heap:                    0x7f4cc000:0x7fedc000
       U-Boot Environment:      0x00100000:0x00110000 (SPI)

Board configuration detected:
Net:
|  port   | Interface | PHY address  |
|---------|-----------|--------------|
| egiga0 |   RGMII   |     0x00     |
| egiga1 |   RGMII   |     0x01     |
| egiga2 |   SGMII   |   In-Band    |
egiga0 [PRIME], egiga1, egiga2
Hit any key to stop autoboot:  3
```

```
DBG: Calling spi_flash_probe from env_relocate_spec()
SF: Probing bus 0 cs 0 @ 20000000Hz mode 3
SF: Detected N25Q128 with page size 64 KiB, total 16 MiB
PCI-e 0: Detected No Link.
PCI-e 1: Detected No Link.
USB2.0 0: Host Mode
USB3.0 1: Host Mode

Map:   Code:                    0x7fedc000:0x7ff975a8
       BSS:                     0x7ffef600
       Stack:                   0x7f4cbf20
       Heap:                    0x7f4cc000:0x7fedc000
       U-Boot Environment:      0x00100000:0x00110000 (SPI)

Board configuration detected:
Net:
|  port   | Interface | PHY address  |
|---------|-----------|--------------|
| egiga0 |   RGMII   |     0x00     |
| egiga1 |   RGMII   |     0x01     |
| egiga2 |   SGMII   |   In-Band    |
egiga0 [PRIME], egiga1, egiga2
Hit any key to stop autoboot:  0
Marvell>> run recovery
```

```
FreeBSD 11.1-RELEASE-p2 (ARMADA38X) #0 r313908+7eae9364d25(RELENG_2_4): Sun Oct
22 18:48:22 CDT 2017


Welcome to pfSense 2.4.1-RELEASE...

Netgate SG-3100 firmware recovery
Serial: 1[redacted]

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 mmc
sd0:
```

```
Done!

The system will halt now, please power off and remove the firmware
recNov  2 16:38:23 sg-3100-recoveryStopping cron.
Waiting for PIDS: 768.
Stopping devd.
Waiting for PIDS: 558.
Writing entropy file:.
Writing early boot entropy file:.
Terminated
.
Nov  2 16:38:25 sg-3100-recovery syslogd: exiting on signal 15
Waiting (max 60 seconds) for system process `vnlru' 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 1 0 done
All buffers synced.
Uptime: 3m39s

The operating system has halted.
Please press any key to reboot.
```

CHAPTER

NINE

OPTIONAL M.2 SATA INSTALLATION

The SG-3100 has built-in onboard eMMC storage. Optionally, a M.2 SATA drive could be installed as an upgrade or to bypass the onboard eMMC flash memory. The SG-3100 has two slots capable of installing M.2 SATA drives, J10 and J11.

The J10 connector is for a 2280 (22mm x 80mm) M.2 SATA only. The 80mm standoff cannot be moved.

The J11 connector is for a 2242 (22mm x 42mm) M.2 SATA drive, **or** it can be used for a cellular card in conjunction with a microSIM card. The 42mm standoff is also permanent and cannot be moved.

Note: For more information on Cellular Configuration in pfSense software, please visit the pfSense Documentation page.

Warning: Before proceeding:

1. Backup your configuration file, if possible.
2. Unplug the system for at least 60 seconds to ensure all phantom power has dissipated.
3. Anti-static protection must be used throughout this procedure.
4. Any hardware damage incurred during this procedure is **not covered** by the hardware warranty.

Note: pfSense must be reinstalled on the M.2 SATA drive. By default, the M.2 SATA drive will then be the first drive recognized by pfSense software.

For purposes of this installation, the **J11** M.2 SATA slot will be used with a 2242 M.2 SATA Drive. Procedures for installing the 2280 M.2 SATA Drive in the J10 slot are similar.

1. Turn the system over carefully to avoid scratching the top of the system. Remove the four **T10 Torx** screws as indicated below.
2. Turn system upright and carefully remove the cover. Set the cover off to the side and keep it upright so the top is not scratched. Identify where the M.2 SATA drive slot is located and remove the screw from the standoff.
3. After the screw has been removed, insert the M.2 SATA drive into the slot at about a 30° angle.

   Warning: The M.2 SATA card is keyed. Do not force it into the slot.

4. Gently push down the M.2 SATA card and replace the screw into the standoff.

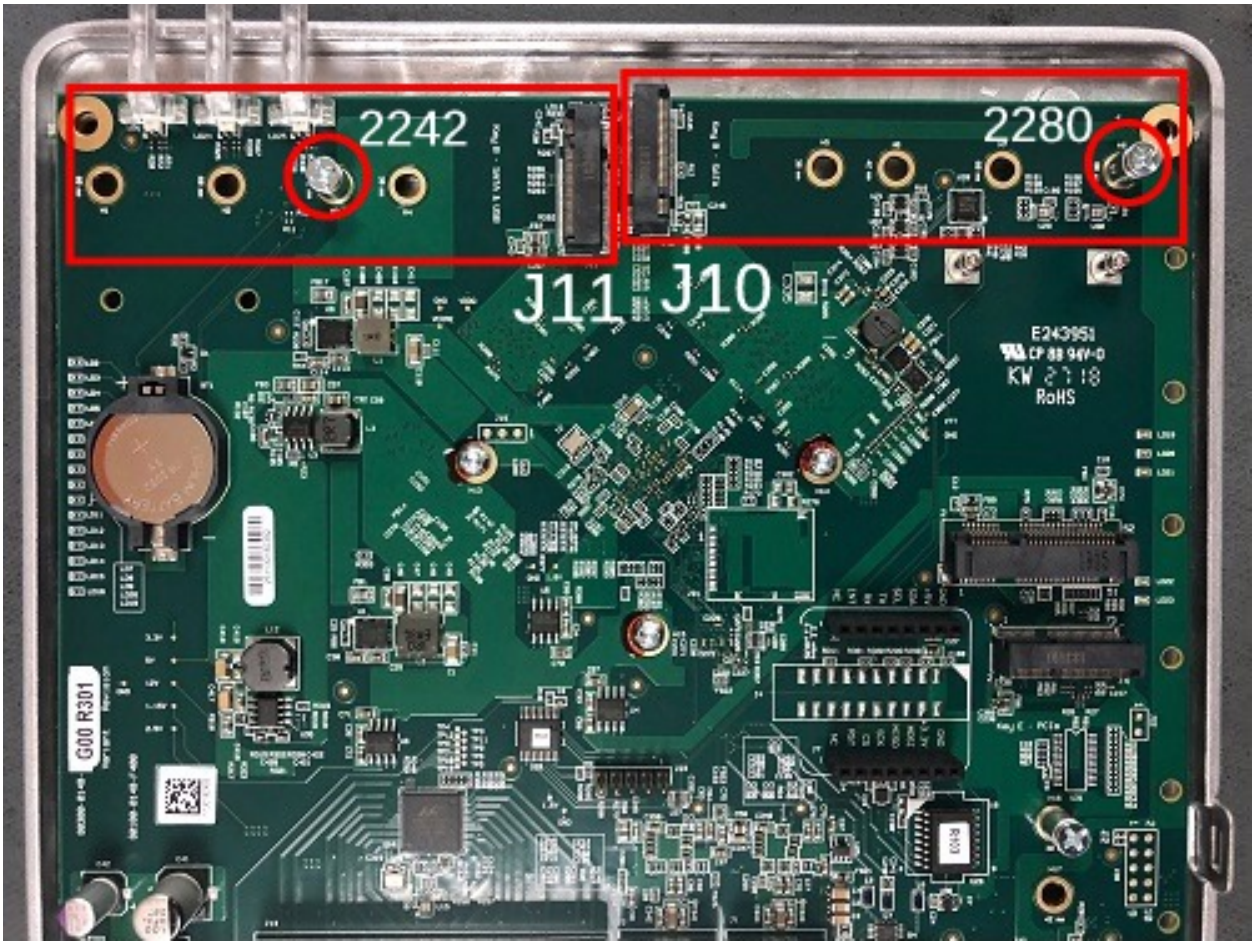

Fig. 1: SG-3100 M.2 SATA Locations

Fig. 2: Removing the SG-3100 Case Screws

5. Place the cover back on and turn the SG-3100 over. Replace the four **T10 Torx** case screws. Be careful not to crossthread the screws.
6. Reinstall the pfSense software on the new M.2 SATA drive.
7. Restore your configuration backup if you have one.

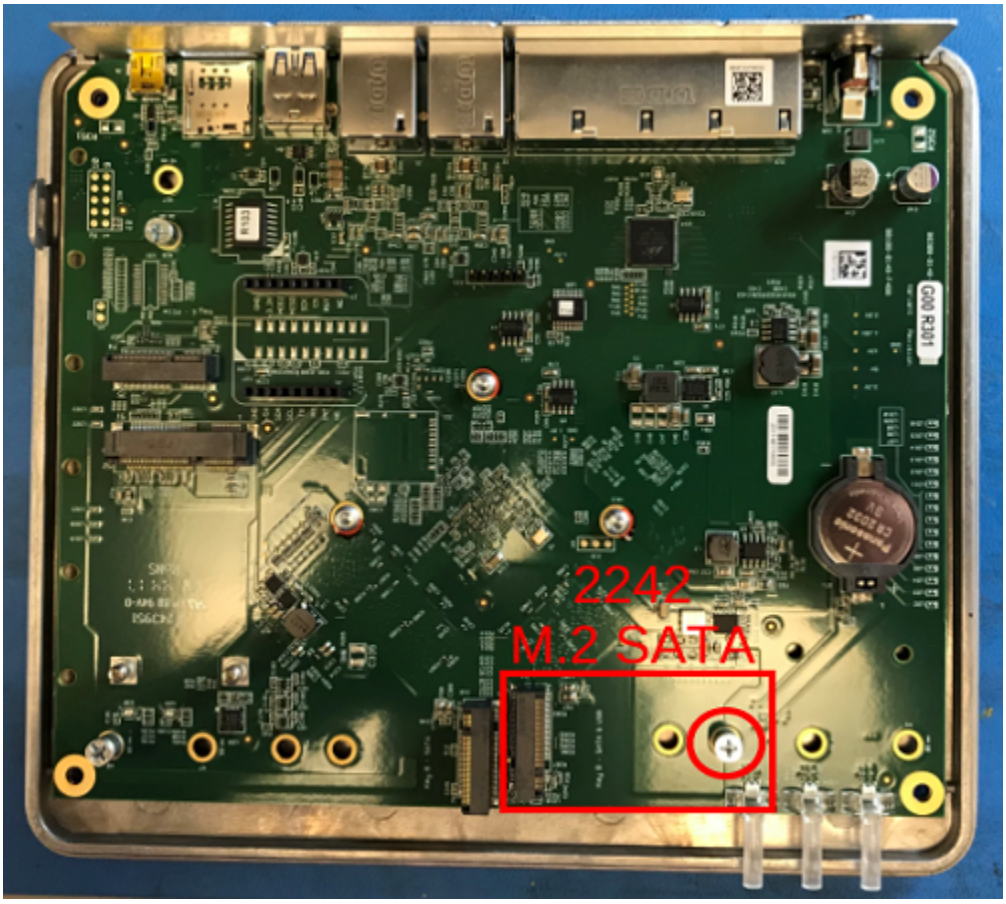

Fig. 3: M.2 SATA Location and Screw

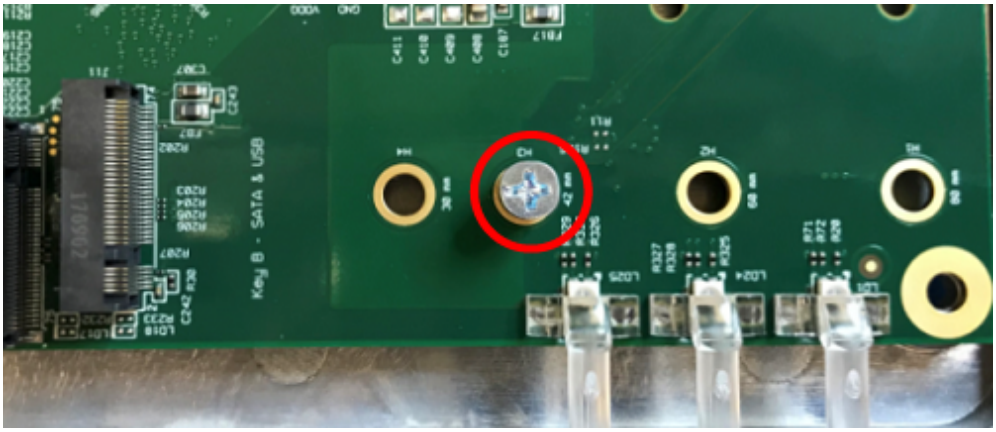

Fig. 4: M.2 SATA Location and Screw Close-up

Fig. 5: Insert the M.2 SATA Drive at about a 30° Angle

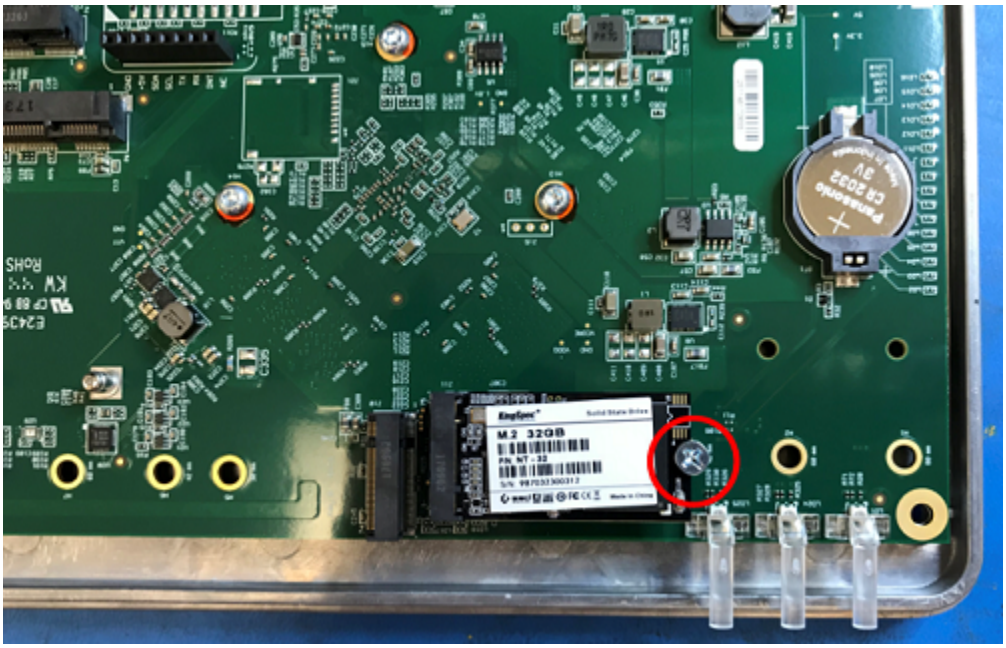

Fig. 6: The M.2 SATA Drive Installed