

The Ultimate How-To Guide on Getting Pfsense (2.0.3/2.1) to Work with Google Fiber as Your One and Only Router

V1.1

Be free from your terrible Network Box.

Preface

First and foremost, Google has determined that taking these actions is not against the Google Fiber Terms of Service (as of 2/6/2014). I have spoken with a few Google reps and taken part in the official discussion going on at the Google Fiber forums. You can join that discussion [here](#) (I am Atlantisman in the thread). These instructions are confirmed to work in Provo; the TV servers may be at different addresses for other Google Fiber cities.

I did this on a Zyxel GS1910 switch; the instructions for the switch itself will be basic, since it is unlikely that everyone will have that exact switch. You will have to find out how to accomplish the switch instructions on your hardware. There are two sections to this guide: 1) getting your internet services to work through pfsense and 2) getting your TV services to work through pfsense.

Note: You cannot have anything in the 10.16/16 or the 10.30/16 subnets locally for the TV services to work. If you do, you will need to change them.

Things you will need:

- A managed switch compatible with VLANs and QoS classes. I will be using a Zyxel GS1910 for the purposes of this guide. Below you will find the least expensive switch that should have all the features needed. (Thanks to Patrick O. on the Google Product forums for finding this switch)
 - <http://www.amazon.com/Netgear-GS108T-NAS-Prosafe-8-Port-Gigabit/dp/B003KP8VSK/>
- Pfsense Router - tested on pfsense 2.0.3 and 2.1

Section 1 – Internet Configuration

Step 1 – Plug the wires in:

- Physically wire everything, plug the fiber jack into switch port 1 on your switch, and plug the WAN interface for pfsense into switch port 2.

Step 2 – Getting the internet to function with a 3rd party router:

- Access your switch's settings and configure port 1 & 2 for VLAN 2 as shown below:

VLAN Membership Configuration

Start from VLAN with entries per page.

Delete	VLAN ID	VLAN Name	Port Members																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<input type="checkbox"/>	1	default	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	2	WAN	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

At this point, you should now be able to access the internet, though the upload speed will be limited to about 10Mbps.

Step 3 – QoS Rules to increase upload speed

- Access your switch's configuration and access the QoS port mapping settings. You will need to map port 1 on your switch with the QoS priority bit of 3., The easiest thing to do is to map all classes to 3., Though it would be best to tag DHCP traffic to 2, IMGP traffic to 6, and everything else to 3, I found doing this to not be necessary. Setting all QoS classes to 3 is shown below:

QoS Egress Port Tag Remarking Port 1

Tag Remarking Mode

(QoS class, DP level) to (PCP, DEI) Mapping

QoS class	DP level	PCP	DEI
*	*	<>	<>
0	0	3	0
0	1	3	1
1	0	3	0
1	1	3	1
2	0	3	0
2	1	3	1
3	0	3	0
3	1	3	1
4	0	3	0
4	1	3	1
5	0	3	0
5	1	3	1
6	0	3	0
6	1	3	1
7	0	3	0
7	1	3	1

At this point your internet service should be working completely at full speed. If you're only an internet subscriber and do not have Google Fiber TV, there is nothing more you need to do except to enjoy Google Fiber with your own router.

Section 2: TV Services

Step 1 – Static Routes:

- The Google Fiber TV streaming servers are on the 10.16.0.0/16, and 10.30.0.0/16 subnets, but they're on the network right above your router. In order to get to them you'll need static routes, so navigate to your pfSense webgui and go to **System -> Routing -> Routes**. Add two static routes, one for the 10.16.0.0/16 network, and one for the 10.30.0.0/16 network and direct them to your WAN Gateway, as shown below:

Network	Gateway	Interface	Description
10.16.0.0/16	WAN - 23.255.224.1	WAN	Route TV service
10.30.0.0/16	WAN - 23.255.224.1	WAN	Route TV service

Step 2 – IGMP Proxy Settings:

- Google's IPTV service relies heavily on IGMP, so pfSense needs to know where to send those requests. Navigate to **Services -> IGMP Proxy** and add a new rule, set the interface as WAN, the description as anything you want., Set the type to Upstream Interface, leave the threshold blank, , add the following three networks to the list: 10.30.0.0/16, 10.16.0.0/16 and save the settings. Add another rule and set the interface to LAN, type should be set to Downstream Interface, leave the threshold blank and set the network to 192.168.2.0/24 (or whatever your LAN network is). It should look something like this:

Services: IGMP Proxy

Name	Type	Values	Description
WAN	upstream	10.30.0.0/16, 10.16.0.0/16	WAN
LAN	downstream	192.168.2.0/24	LAN

Save

Note:
Please add the interface for upstream, the allowed subnets, and the downstream interfaces you would like the proxy to allow. Only one 'upstream' interface can be configured.

- To complete your IGMP configuration navigate to **Firewall -> Rules -> LAN**, edit your default allow any rule on your LAN network, scroll down to **Advanced Features -> Advanced Options** and check the first box., It should read, "This allows packets with OP options to pass. Otherwise they are blocked by default. This is usually only seen with multicast traffic." Save the rule and apply your firewall settings.

NOTE: Doing this appears to give me intermittent wireless issues for some reason; I believe it has something to do with DHCP. If anyone has any idea of why this could be, please contact me.

Step 3 – More Firewall settings:

- Now that pfsense knows where to send your IGMP requests we'll need to configure some firewall rules so pfsense doesn't block the traffic. Navigate to **Firewall -> Rules -> WAN** and setup the same rules as pictured below:

<input type="checkbox"/>	<input checked="" type="checkbox"/>	UDP	10.30.0.0/16	*	225.0.0.0/8	2000	*	none		GFTV	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	UDP	10.16.0.0/16	*	225.0.0.0/8	2000	*	none		GFTV	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	UDP	10.16.0.0/16	*	225.0.0.0/8	6543	*	none		GFTV	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	UDP	10.30.0.0/16	*	225.0.0.0/8	6543	*	none		GFTV	

- Finally, Check your interface configuration (**Interfaces -> WAN**) and be sure that "Block private networks" is NOT checked, this should be done on both your LAN and WAN interfaces as shown below:

Private networks

Block private networks
When set, this option blocks traffic from IP addresses that are reserved for private networks as per RFC 1918 (10/8, 172.16/12, 192.168/16) as well as loopback addresses (127/8). You should generally leave this option turned on, unless your WAN network lies in such a private address space, too.

Block bogon networks
When set, this option blocks traffic from IP addresses that are reserved (but not RFC 1918) or not yet assigned by IANA. Bogons are prefixes that should never appear in the Internet routing table, and obviously should not appear as the source address in any packets you receive.

You should now restart your Storage Box and TV Box by unplugging them for 10 seconds and plugging them back in. I always make sure the Storage box boots up completely before plugging in the TV Box again.

Conclusion

Your TV and Internet services should now both be 100% functional. If you have any questions, comments, or other concerns please leave a comment on either the pfsense thread found [here](#) or the Google Fiber thread found [here](#).

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Here is my litecoin address too: LhX1CPeTkAhvPGntdYQaeZY7dJmmnLLkQA