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Application Guide Hongdian Router-Linux-Bandwith Bonding



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Revision History

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Doc Version	Product	Release Data	Details
V1.0	Hongdian Router	2017.12.19	First release.

1 Overview

Hongdian Router supports different WAN interfaces to access the Internet, including dual modem, WiFi client, and Ethernet WAN, but mostly these WAN interface are independent for Internet accessing, only one gateway is available for the router at the same time.

For one WAN link, the transmission speed is not fast enough, if we can combine two or more WAN interface to incerase the bandwith, the transmission can be faster and more stable.

Hongdian router provides bandwith bonding allows the Hongdian router access the Internet via multiple WAN, and the bandwidth can be superimposed.

The bandwidth bonding function can be also told as bandwidth aggregation, and also satisfy the load balancing.

With bandwith bongding, the transmission is faster than a signel modem link, it can provide the increaseing at least 60% of the second link's rate; Support multiple links binding, and the router can be expanded to 4 modems; All the available links can be used for binding for increasing the bandwidth, not just for the modem; Support VPN link, including IPSec, L2TP, gre and etc.

2 Topology



In customer's application, the purpose is to make sure the terminal can send data to the server.

In this topology, the data package can be transmissed via modem1 and modem2 links of the Hongdian router, if the modem1 or modem2 is up to 1M, the router should be up to 1M+1M*60%(or higher).

The Linux is the proxy for combining the data package with multiple links. It uses two Ethernet adapter, while Eth1 gets public IP, and Eth2 gets internal IP. The application server is in the same segment with the Eth2 of the linux proxy.

3 Deployment

Here we take an example to show you how to configure and test the bindwith bonding function.

3.1 Networking

The demo networking is as below.



This demo requires the related software or tool as below:

- HFS.exe
- ubuntu-14.04-desktop-amd64.iso
- H8922S_APP_V7.0.2_T1_bon ding_1709061801.trx
- Dumeter.exe

3.2 HTTP Server

In the demo networking, PC2 is http server.

1. Download the "hfs.exe" and install it to the PC2, you can download it from Internet or from the URL:

http://turekuba.cz/hfs/hfs.exe

2. Open the HTTP File Server, Right click ->add a folder from disk, to add a folder "test" as below, which show in red color.

🙀 HFS ~ HTTP File Server 2.3k	Build 299	
🛃 Menu 🛛 🖗 Port: 80 🛛 🕵 You are in Easy mode		
Open in browser http://192.168.8.22/test/		Copy to clipboard
	Top sp	eed: 1021.7 KB/s 8174 kbps
Virtual File System	Log	
G C I New folder G ♥ Int	<pre>19:58:03 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-2.2.6.exe 19:59:33 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-2.2.6.exe 20:00:06 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:00:10 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:01:11 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:01:11 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:01:11 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:01:51 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:01:50 whyou@192.168.8.1:54025 Fully uploaded Wireshark-win32-1.1.1.rar 20:01:50 whyou@192.168.8.1:54025 Fully uploaded GET /test/ 20:01:50 whyou@192.168.8.1:14110 Fequeated CET /test/ 20:01:60 whyou@192.168.8.1:14110 Fequeated CET /test/ 20:12:42 uploaded Wireshark-win32-1.1.1.rar 20:12:42 uploaded Wireshark-win32-1.1.1.rar 20:12:42 uploaded Wireshark-win32-1.1.1.rar 20:12:42 uploaded Wireshark-win32-2.1.1.rar 20:12:42 uploaded Wireshark-win32-2.2.6.exe 20:13:80 whyou@192.168.8.1:141150 Fequeated CET /test/ 20:13:80 whyou@192.168.8.1:141150 Fequeated CET /made-japaery 20:13:80 whyou@192.168.8.1:141150 Fequeated CET /made-japaery 20:741 whyou@192.168.8.1:141165 Fequea</pre>	× E
🔋 IP address 🗔	File Status Speed Time Progress	
Out: 0.0 KB/s In: 0.0 KB/s		

3. Focus on "test" folder, right click ->Properties->Permission->Upload, check the box to allow anyone to upload.

🚔 HFS ~ HTTP File Server 2.3k	A Properties for test	
🛓 Menu 📅 Port: 80 👥 Yo	Permissions Flags Diff template Comment File masks Other	
🔗 Open in browser http://192.16	Access Delete Upload	Copy to clipboard
Virtual File Syst	Can change n	
6 /	New account	ET /New folder/
: 📁 test		ET /?mode=jquery ET /New folder/
	All / None	ET /?mode=jquery
		ET /New folder/Oold/
	Any account	ET /test/
	Anonymous	ET /?mode=jquery
	✓ Anyone	
🔋 IP address		Speed Time Progress
	Manage accounts	
Out: 0.0 KB/s In: 0.0 KB/s	OK Apply Cancel	

4. Configure the IP of the PC2,make it in the same segment of the Linux proxy, for example: PC2 IP is 192.168.8.44, and the Linux PC Eth2 IP is 192.168.8.1. (They can ping each other).

3.3 Linux Proxy

The OS is the Ubuntu 14.04 (64-bite) as the Linux proxy.

You can download the Ubuntu 14.04 ios file from the Internet, or the URL below:

https://dl-sh-ctc-2.pchome.net/32/sc/ubuntu-14.04-desktop-amd64.iso?key=277233fa9a63caa43534b771b256971e&tmp=1513390 951154

Install the Ubuntu 14.04 to your computer, and run it. The Ubuntu computer should install two Ethernet adapter, one for accessing the Internet, and is got the public IP (Eth1), the other is in the same segment with the PC2 and its IP can be 192.168.8.1(Eth2).

After install the Ubuntu OS,

Open the terminal on the Ubuntu, login with the system administrator permissions, which start with the symbol "#"



Continue input the commands as below:

1. Install the "gpg-apt-key"

wget -q -O - http://multipath-tcp.org/mptcp.gpg.key | sudo apt-key add -

 Add a new line " deb http://multipath-tcp.org/repos/apt/debian trusty main" to the end of the file "mptcp.list"

sudo vi /etc/apt/sources.list.d/mptcp.list

Add:

deb http://multipath-tcp.org/repos/apt/debian trusty main

deb http://multipath-tcp.org/repos/apt/debian wheezy main

Then save and quit.

3. Turn to terminal shell and continue:

sudo apt-get update

sudo apt-get install linux-mptcp

Reboot system

reboot

4. Check status after reboot

dmesg | grep MPTCP

If the installation is successful, the MPTCP version number will be printed as below, otherwise there will be no print.



If it return null after the "dmesg | grep MPTCP" command, please try to install mptcp in other's way, as below Refer to : http://multipath-tcp.org/pmwiki.php/Users/AptRepository

For the newest release, please follow the below steps:

First, add the gpg-apt-key with:

sudo apt-key adv --keyserver hkp://keys.gnupg.net --recv-keys 379CE192D401AB61

Then, just add the following line to your /etc/apt/sources.list:

deb https://dl.bintray.com/cpaasch/deb jessie main

Now, install MPTCP with the following:

sudo apt-get update

sudo apt-get install linux-mptcp

And reboot your machine.

5. Enable the routing rule of the Ubuntu.

Change the file "/etc/sysctl.conf". Find the line "net.ipv4.ip_forward=1", remove the front "#" to enable it, as shown below.



Use below command to make it work (or reboot the system)

sudo sysctl -p

6. Install TCP proxy

Get the tcpproxy-1.1.tar.gz from Internet or the URL:



#note: if it requires to install ragel tool after make command, install it as below.

sudo apt-get install ragel make

7. Now the tcp proxy is installed, run the command to enable the proxy function:

tcpproxy -1 0.0.0.0 -p 5678 -r 192.168.8.44 -o 80

Command description:

-1: local IP address monitor, 0.0.0.0 means all matches;

-p: local port monitor, e.g. specified as 5678;

-r: monitor remote IP address of the connection, which is the IP address of the http server in before setting.

-o: monitor connected remote port, which is the previously configured port of the http server.

8. Check if it works

ps -ef | grep tcpproxy
It should print the info, if commands work:

tcpproxy -I 0.0.0.0 -p 5678 -r 192.168.8.44 -o 80

```
root@ubuntu:/home/henry/tcpproxy-l.l/src# ps -ef | grep tcpproxy
root 2960 1 0 20:10 ? 00:00:00 tcpproxy -l 0.0.0.0 -p 5678 -r 1
92.168.8.44 -o 80
```

3.4 Hongdian Router Config

1. Prepare a Hongdian router with dual modem, it should have use the the custom firmware such as: H8922S APP V7.0.2 T1 bonding 1709061801.trx

This version has enabled the MPTCP function in default, which is for the bandwidth bonding.

Insert 2 SIM card of the router, and make sure the two SIM card network are online.

2. Config

Login the Web UI of the router. Input public IP of the Ubuntu(Eth1 IP) and the mapping port as below.

Local port: router's local port

Remote address: public IP of the Ubuntu(Eth1 IP)

Remote port: remote service port (the mapping port of Ubuntu)

Network Applications VP	ing Machine Contro I Forward Security	ol Panel System Status	Build time: 170906-171602 Time: Sat Oct 28 06:44:26 2017
ICMP Check DDINS SIMMP	M2M Timing TCPPROXT		Help
TCPPROXY Status	Enable Disable		Server Port: If the Server Port field is empty, the default port will be port number 80.
Basic Settings			User Name / Password:
local port	5678	* 1-65535	The User name and password are provided by your service provider.
remote address	113.91.135.105	* eg. 192.168.8.1	
remote port	5678	* 1-65535	
	Save Refresh		

3. Configure dual modem dialing rules. Make sure both are using pppd mode, as below.

Netwo	rk /	Applications	VPN	Forward	Security	System	Status			
LAN	WAN	WLAN	Modem	Parameter Se	lect Netw	ork Type	Link Backup	DHCP Server		
A	uto-Dialu	p		Enable	Disable					
Basic Se	ttings									
In	iterface I	Name		0		* Ma	x length is 12			
М	odule Ty	pe		modem						
A	PN				Max length is 64					
Se	ervice Co	de				Max	ength is 64			
U	sername			card		Max	ength is 64			
Pa	assword			•••••	•••	Max	ength is 64			
PI	IN					Max	ength is 64			
N	etwork T	ype		auto	•					
Si	mcard			SIN	11 🔘 SIM2					
C	onnectior	n mode		pppd	-					
A	dvanced	Settings		Display						

4. Configure the routing rules, modem 1 is the default routing, and modem 2 is the policy routing.

	Connecting Machine	Control P	anel	_
Network Application	is VPN Forward	Security Sy	stem Status	
NAT Routing RIP	OSPF QoS			
Route Type	Network	Gateway	Priority	Operation
Policy Route	modem2	modem2	12	Delete
Static Route	0.0.0/0	modem		Delete
		Defeat		
	Add	Refresh		

Wherein, the policy route detail setting for modem2 is shown below.

	Ľ.	Hong	dian (Connecti	ng Machin	E Contro	ol Panel	
Netwo	ork	Appl	lications	; VPN	Forwar	d Security	System	Status
NAT	Ro	uting	RIP	OSPF	QoS			

Static Route Policy Route interface
interface 👻
modem2 -
modem2 +
interface 💌
modem2 🔻
12 * 3-252

Check the routing table as below

📸 mptcp link_百辰 🗙 👿 Multipath TCP - 3	x 🛛 🔍 UI	ountu下配置M ×	MultiPath TCP - Lin X	MultiPath TCP - Li	n 🗙 36/4	4G Router	🗙 📓 ubuntu 路由_百二×	C 配置ubuntu描述 ×	+		×
(←) → C' û () 19	92.168.8.1	/gui/route_tab	le.cgi			0	♪☆ へ 安装ubuntu	\rightarrow	$\overline{\mathbf{A}}$	III\ 🗊	=
🗘 最常访问 🛅 火狐官方站点 🌏 新手上路 🤅	🖮 常用网址	D 京东商城									
	Network	Applications	Connecting Machine VPN Forward	Control Pane Security System	Status		Build time: 170900 Time: Thu Sep 7 15:08	i-171602 :52 2017			
							Help				
	Static Rou	ite					Display: This page displays system's curre	nt			
		Network	Subnet Mask	Gateway	Interface	Metric	routing table. There will be one default route st	atus			
		0.0.0.0	0.0.0.0	0.0.0.0	modem	1	displayed when the link backup				
		192.168.8.0	255.255.255.0	0.0.0.0	br0	0	function is enabled. See Network configuration: Link Backup.				
		92.168.10.0	255.255.255.0	0.0.0.0	eth0	0					
	1	92.168.251.0	255.255.255.255	0.0.0.0	modem2	0					
	19	2.100.231.123	200.200.200.200	0.0.0.0	[modem						
	Policy Rot	ite									
		Network	Subnet Mask	Gateway	Interface	Priority					
	1	0.74.159.108	255.255.255.255	0.0.0.0	[modem2	12					
			Ref	resh					5 ktyps		
										0.0 kbps 1	0.21

3.5 HTTP Client

1. It is the PC1 that directly connect to the LAN of the Hongdian router. Configure the PC1 access the Internet via Hongdian Router.

Currently in this test the router LAN IP is 192.168.8.1, the PC1's IP should be 192.168.8.X, and its gateway is 192.168.8.1.

2. Open browser on PC1, visit the URL: 192.168.8.1:5678, so as to visit the HTTP File Server page, as below:

HFS /test/	× +					Û	- 🗆 ×					
🍤 < > ሮ 습 ጛ 🖲	9 192.168.8.1:5678/test/				🤨 🏠 🗸 🧿 360搜索	Q 🚦	$\downarrow \equiv$					
忽的奴隶夫是空的,请从其他询阅薛导入。 <u>立即导入权需求…</u>												
Ser whyou	Name .extension	Size	Timestamp	Hits								
Polder	uploaded by whyou	7.8 MB	2017/12/5 18:19:05	0								
Home Go Up	fzshelext.dll uploaded by whyou	91.5 KB	2017/12/5 18:21:41	0								
» test	wireshark-win32-1.1.1 (1).rar uploaded by whyou	16.4 MB	2017/12/5 20:12:42	0								
0 folders, 7 files, 162.2 Mbytes	wireshark-win32-1.1.1.rar uploaded by whyou	16.4 MB	2017/12/5 20:01:11	0								
Search go	Wireshark-win32-2.2.6 (1).exe uploaded by whyou	42.5 MB	2017/12/5 20:18:06	0								
	🔲 📕 Wireshark-win32-2.2.6 (2).exe	36.5 MB	2017/12/5 20:20:24	0								
& Select	Wireshark-win32-2.2.6.exe uploaded by whyou	42.5 MB	2017/12/5 19:59:36	0								
0 items selected												
Actions Upload New folder Comment Archive Get list					215 (b .							
Server information Http://deServer.2.3k Server time: 2017/12/5 20:44:16 Server uptime: 02:30:18					4. 0.0 kbps 1	0.3 kbps	<u></u>					
					B R	<u>ش</u>	E Q					

3.6 Test

1. Download a data rate tool on PC1 for viewing the bit rate, which is named "Dumeter.exe". You can download it from the Internet, or from the URL:

http://dlsw.baidu.com/sw-search-sp/soft/ea/18621/DUMeter_V7.8.4749.0_Install.1436351295.exe



2. In order to reflect the test results, we can make the bit rate limit operation for the modem1 and modem2 in the router.

Enter Hongdian Router's web UI, enter "Forward->QoS" and set the QoS rules as below, which is limite modem and modem2 with 2000kbit/s



3. Click "upload" button to upload a file to the HTTP File Server on PC1.

Application Guide - Hongdian Router-Linux-Bandwidth Bonding											
HFS /test/	× +					0 – 8 ×					
💙 < > C 쇼 5 ☆ 🖸	9 192.168.8.1:5678/test/				🧯 🏫 🗸 🔾 360搜索	् 🖬 🕹 🗏					
您的收藏夹是空的,请从其他浏览器导入。 <u>立即</u>	导入收藏夹										
Suser whyou	Name .extension	Size	Timestamp	Hits							
	Discrete state and the second	7.8 MB	2017/12/5 18:19:05	0							
Folder 💭 Up	in Strate State St	91.5 KB	2017/12/5 18:21:41	0							
» test	wireshark-win32-1.1.1 (1).rar uploaded by whyou	16.4 MB	2017/12/5 20:12:42	0							
0 folders, 7 files, 162.2 Mbytes	wireshark-win32-1.1.1.rar uploaded by whyou	16.4 MB	2017/12/5 20:01:11	0							
🧐 Search 🛛 😨 🧕	Wireshark-win32-2.2.6 (1).exe uploaded by whyou	42.5 MB	2017/12/5 20:18:06	0							
	🔲 📕 Wireshark-win32-2.2.6 (2).exe	36.5 MB	2017/12/5 20:20:24	0							
K Select	Wireshark-win32-2.2.6.exe uploaded by whyou	42.5 MB	2017/12/5 19:59:36	0							
0 items selected											
Actions Upload New folder Comment Archive Get list Server information Http://server.information						TISE THE TIME THE TIM					
Server uptime: 02:30:18											

4. View the upload rate:

The modem and modem2 have been limited to 2Mbps, and the actual upload rate is 4Mbps, as below.







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