Escape from Imprisonment

written by Mert SARICA | 1 April 2019

As someone who has used the ADSL modem of internet service providers for years and conducted security research on them (such as “How Secure are ISP Modems?” and “The Importance of Firmware Analysis“), I cannot say that I have a positive attitude towards using gift modems on an individual level. Some of the main reasons for this are: the embedded user accounts used by internet service providers can be easily discovered by anyone, and if the end user leaves the management page of the modem/router open to internet access, it can be misused by others; the firmware is a special version, which means that it cannot be updated to the latest and most secure version; and the firewall cannot be set up for each port, and the management pages are limited.

About two years ago, when the fiber internet infrastructure came to my house, the ADSL modem was replaced by a router. The Tilgin brand router, model HG1332, which is not even mentioned by name on its own website, that my internet service provider forced me to use, replaced the enjoyable days I had on the internet with imprisonment. The WiFi signal strength beyond average, the absence of OpenVPN support, which has become commonplace in routers, the lack of support for modern security world’s encrypted DNS communication (DoH), and the limited support for dynamic DNS (DDNS) are just a few of the many negative reasons that I can mention.

After a short unhappy relationship with this router, I contacted my internet service provider to change the router, but unfortunately, I received a negative response. When I researched on the internet to get rid of this router, I could not find any tangible sources other than complaints, and as I did not have much time to do so, I had to resign myself to my fate over time.

As the time I spent with Tilgin HG1332 became increasingly unhappy, I learned that after a year of searching on the internet, my internet service provider allows you to use your own router by using the HG1332 in bridge mode. As time went by, I began to search for ways to completely get rid of the HG1332 that I hated so much. When I called for help through my social network accounts, many people volunteered to help. After Aykut ALPER told me that he had done this with a Mikrotik router on a different internet service provider, and another helper told me that I could get rid of the HG1332 by using the VLAN ID, PPOE username and password, I started working on the list of needs.

Some of the questions that came to my mind when I was preparing the list were:

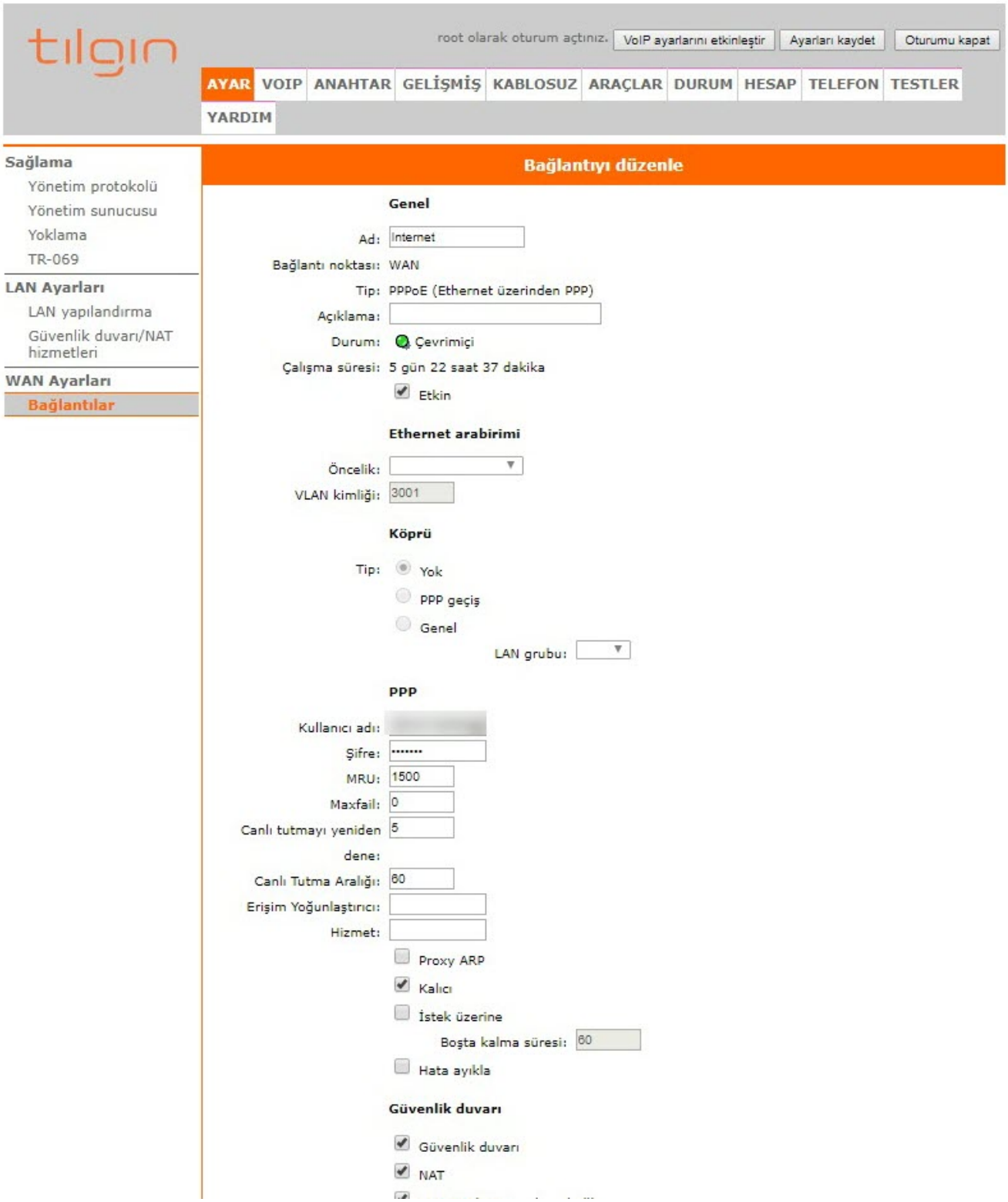
1. Which brand and model of router should I buy?
   Since I know that for years, DD-WRT, Tomato, Asuswrt-Merlin, and other custom firmware can be easily installed on Asus routers and modems, I prefer Asus brand. And because the hardware software Asuswrt-Merlin has security features that I liked, I choose it. Since the models supported by Asuswrt-Merlin are generally expensive, I bought the RT-AC1900U model, which was the most suitable for me in terms of price and performance.



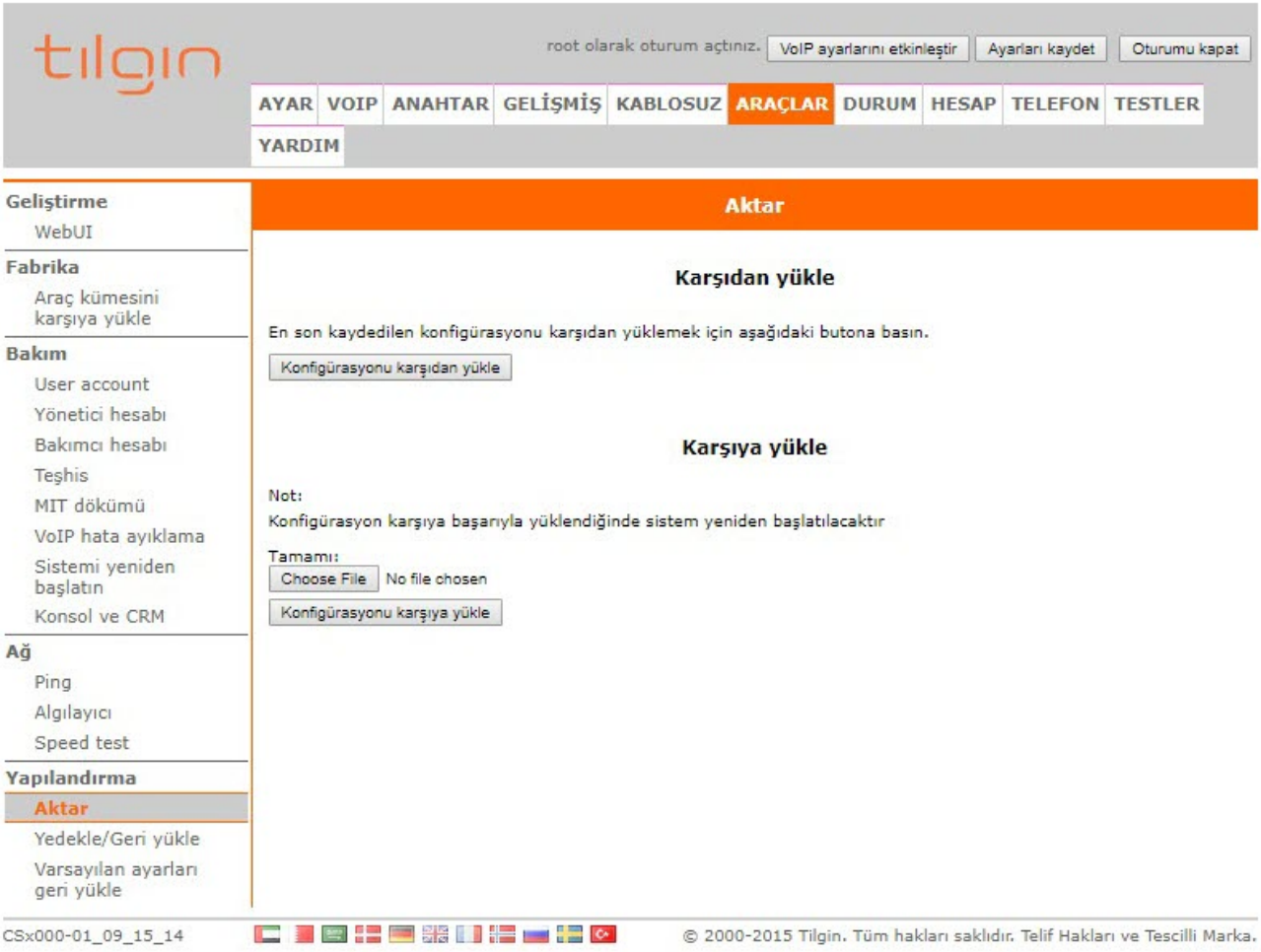

Dual Band Gigabit Router
ASUS
IN SEARCH OF INCREDIBLE
Global Site: http://www.asus.com
VIP Registration: https://account.asus.com

2. What is my VLAN ID?

   When I connected to the interface of Tilgin HG1332 as an admin user, unfortunately, most of the management pages where I could see my VLAN ID were hidden. When I researched HG1332 on the internet, I came across a successful work by İlteriş EROĞLU, who had managed to obtain the username and passwords defined on HG1332. In my article “The Importance of Firmware Analysis” from 2015, I also drew attention to the TR-069 communication that takes place over an insecure channel, and it surprised me to see that it was still in use in İlteriş’s work years later. In the article, I was able to easily learn my VLAN ID by connecting to the interface of HG1332 with the root user.



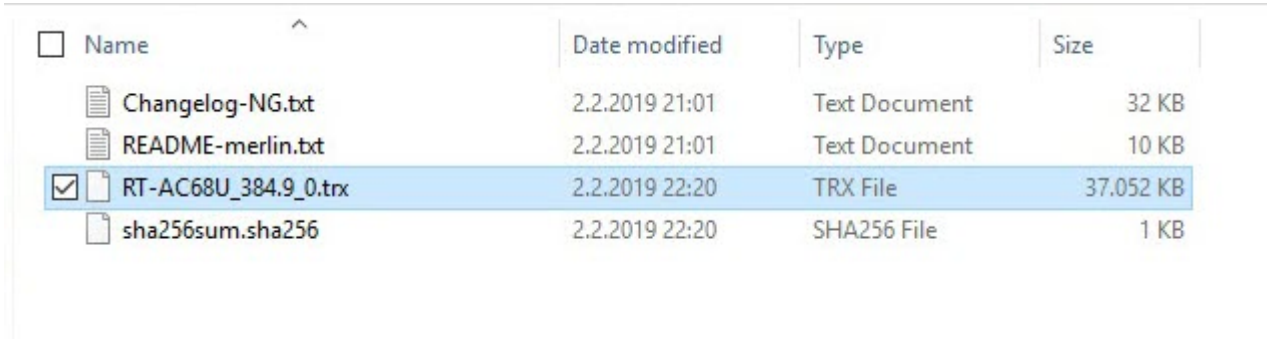
3. How can I find out my PPPoE username and password without contacting my internet service provider?
   After entering the interface with the root user, I was able to obtain the PPPoE password by downloading the current configuration from the router and extracting it from there, as the PPPoE user’s password was masked.

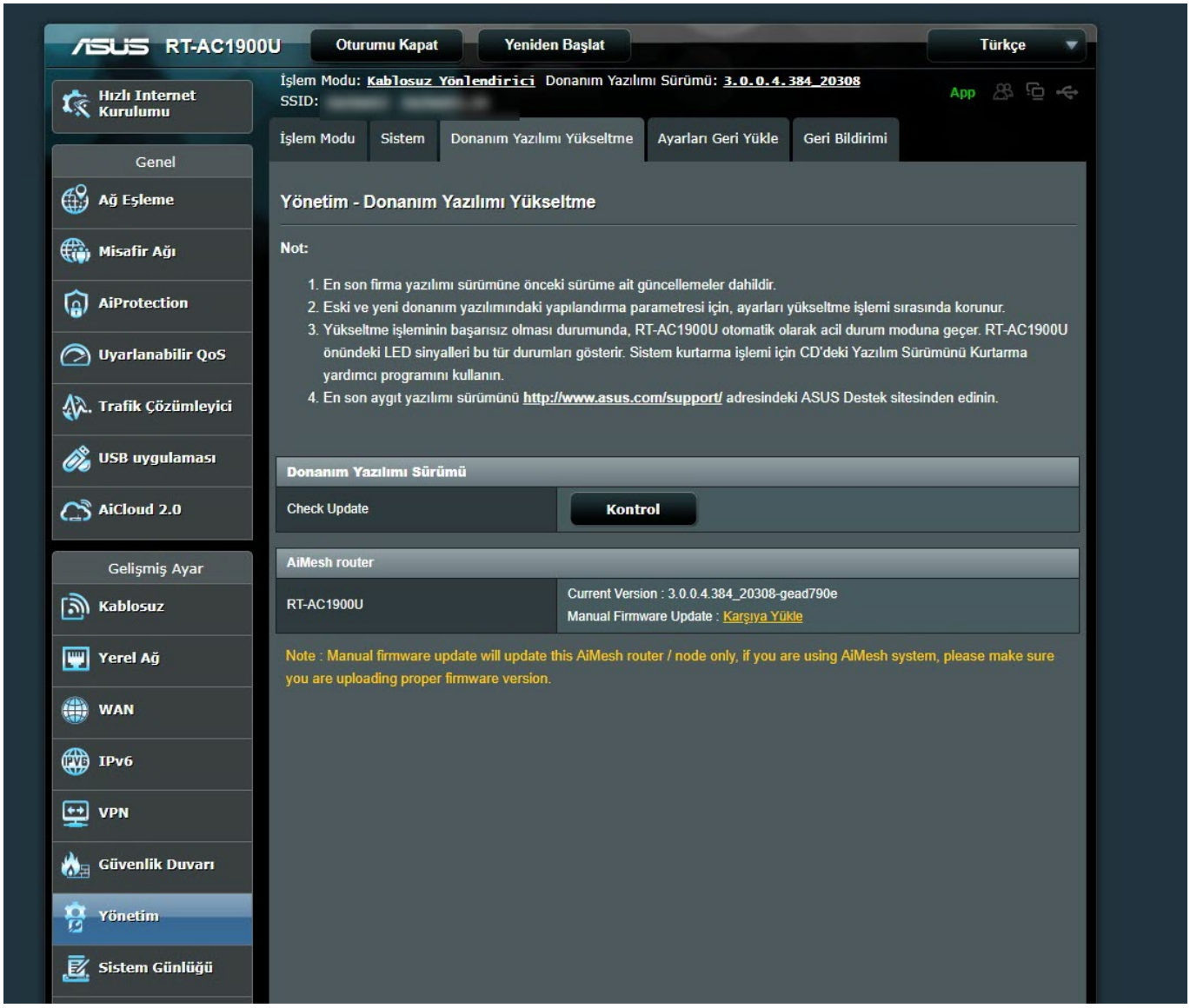

tılgın
root olarak oturum açtınız.
VoIP ayarlarını etkinleştir
Ayarları kaydet
Oturumu kapat
AYAR
VOIP
ANAHTAR
GELİŞMİŞ
KABLOSUZ
ARAÇLAR
DURUM
HESAP
TELEFON
TESTLER
YARDIM
Geliştirme
WebUI
Fabrika
Araç kümesini karşıya yükle
Bakım
User account
Yönetici hesabı
Bakımcı hesabı
Teşhis
MIT dökümü
VoIP hata ayıklama
Sistemi yeniden başlatın
Konsol ve CRM
Ağ
Ping
Algılayıcı
Speed test
Yapılandırma
Aktar
Yedekle/Geri yükle
Varsayılan ayarları geri yükle
Aktar
Karşıdan yükle
En son kaydedilen konfigürasyonu karşıdan yüklemek için aşağıdaki butona basın.
Konfigürasyonu karşıdan yükle
Karşıya yükle
Not:
Konfigürasyon karşıya başarıyla yüklendiğinde sistem yeniden başlatılacaktır
Tamamı:
Choose File
No file chosen
Konfigürasyonu karşıya yükle
CSx000-01_09_15_14
© 2000-2015 Tilgin. Tüm hakları saklıdır. Telif Hakları ve Tescilli Marka.

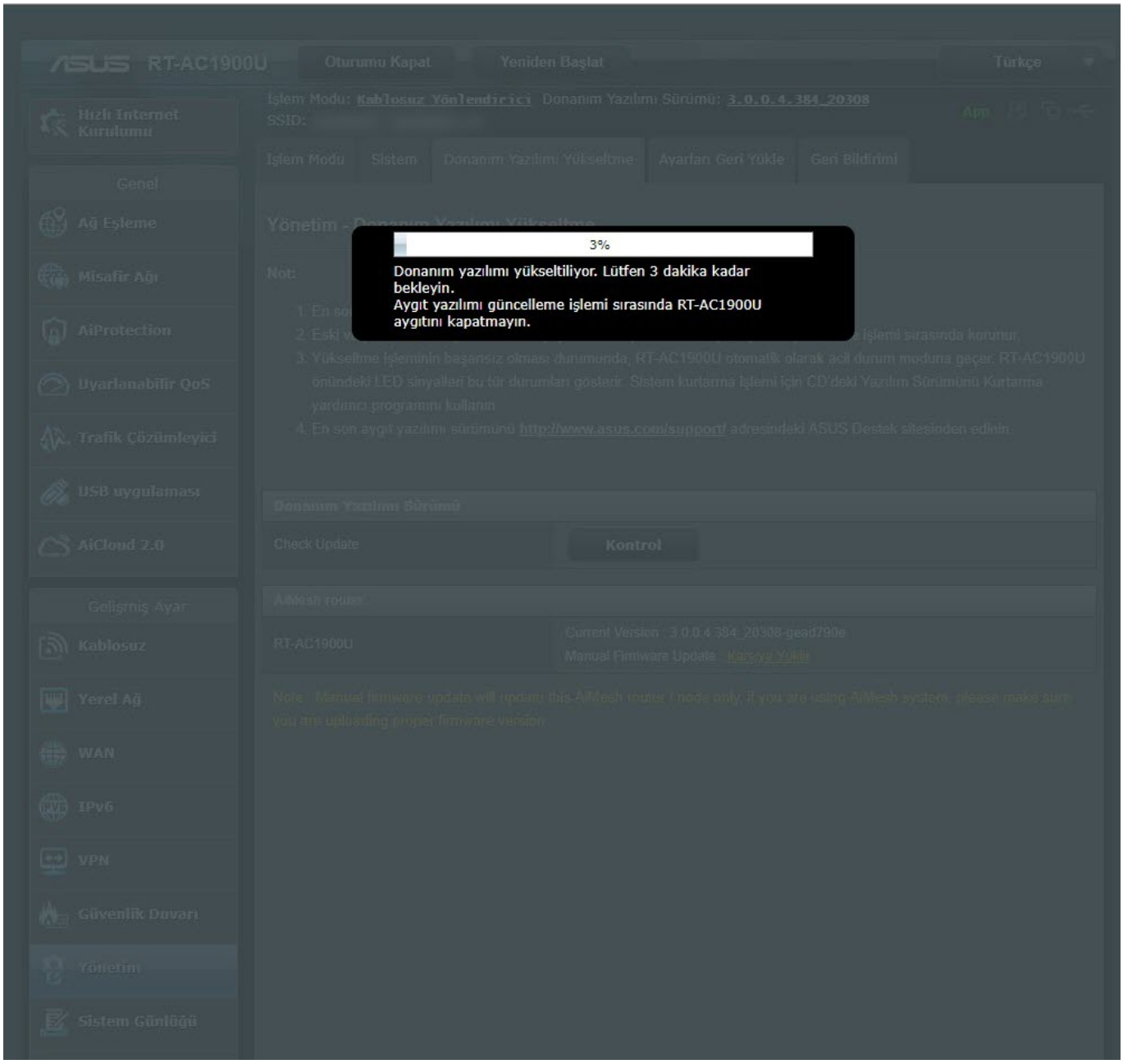
config.cm

```
    in "config_map" string ""
    out "link" "" "/connection/device/table/1/configured/4"
}
find "/connection/device/table/1/configured/4/layer" {
    in "type" link "/connection/layer/ip_ipcp"
    out "/connection/device/table/1/configured/4/layer/3"
}
find "/connection/device/table/1/configured/4/layer" {
    in "type" link "/connection/layer/ppp"
    out "/connection/device/table/1/configured/4/layer/2"
}
set "/connection/device/table/1/configured/4/layer/2/param/username" string "[redacted]"
set "/connection/device/table/1/configured/4/layer/2/param/password" string "[redacted]"
set "/connection/device/table/1/configured/4/layer/2/param/service_name" string ""
set "/connection/device/table/1/configured/4/layer/2/param/ac_name" string ""
set "/connection/device/table/1/configured/4/layer/2/param/padi_timeout" s32 "0"
set "/connection/device/table/1/configured/4/layer/2/param/auth_type" string "Auto"
set "/connection/device/table/1/configured/4/layer/2/param/mru" u16 "1500"
set "/connection/device/table/1/configured/4/layer/2/param/persist" boolean "True"
set "/connection/device/table/1/configured/4/layer/2/param/maxfail" u16 "0"
set "/connection/device/table/1/configured/4/layer/2/param/demand" boolean "False"
set "/connection/device/table/1/configured/4/layer/2/param/idle" u16 "60"
set "/connection/device/table/1/configured/4/layer/2/param/proxyarp" boolean "False"
set "/connection/device/table/1/configured/4/layer/2/param/debug" boolean "False"
set "/connection/device/table/1/configured/4/layer/2/param/keepalive_retry" u16 "5"
set "/connection/device/table/1/configured/4/layer/2/param/keepalive_interval" u16 "60"
action "/connection/device/table/1/add" {
    in "index" string "2"
    in "type" string "DHCP"
    in "name" string "Management"
    in "description" string ""
    in "config_map" string ""
    out "link" "" "/connection/device/table/1/configured/2"
}
```

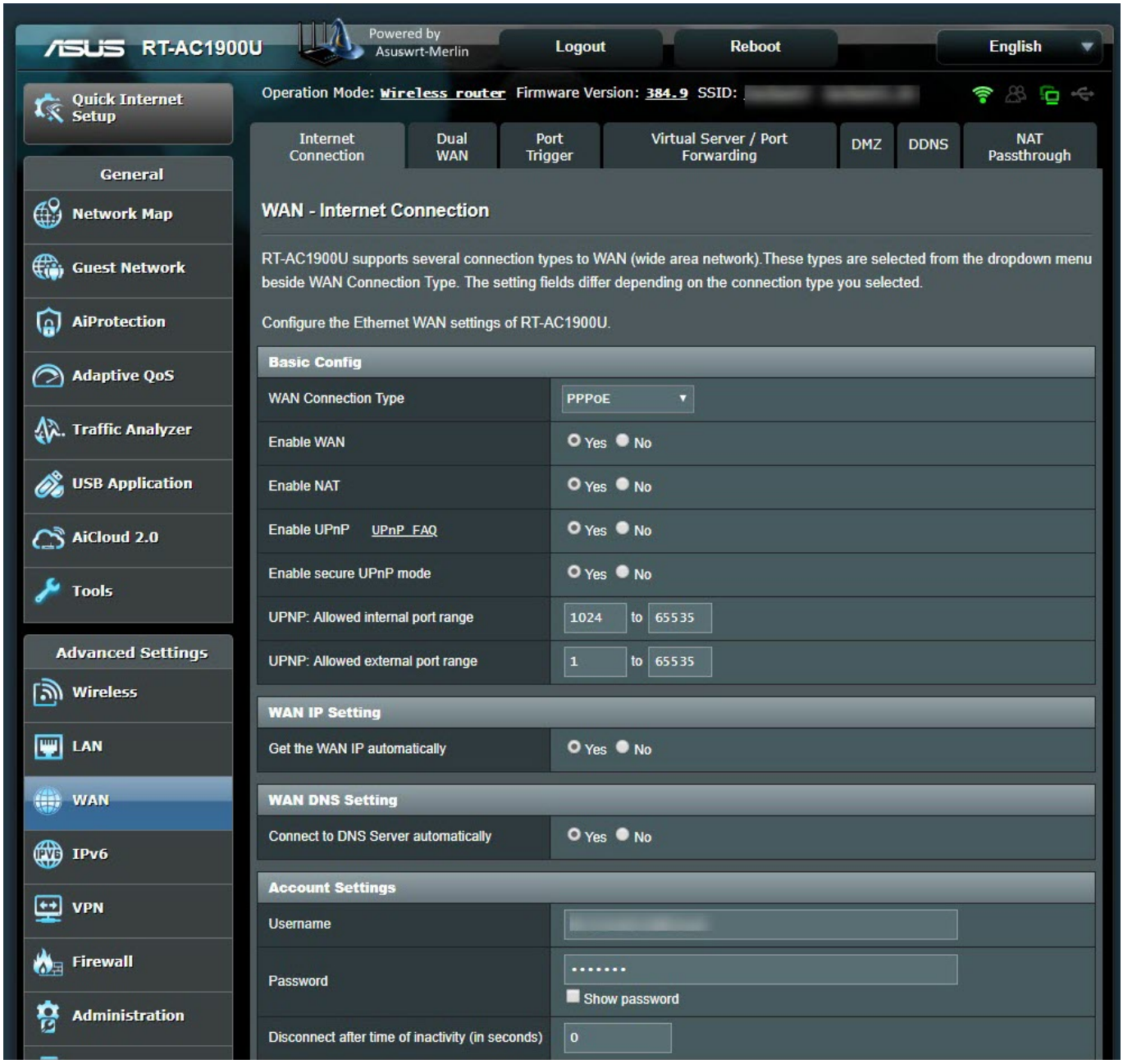
I downloaded the relevant firmware version (RT-AC68U firmware should be used for RT-AC1900U) from the Asuswrt-Merlin website for the RT-AC1900U, and successfully installed it through the web interface. Then I also made the PPPoE and VLAN ID definitions, and saw that the router was able to connect to the internet successfully.

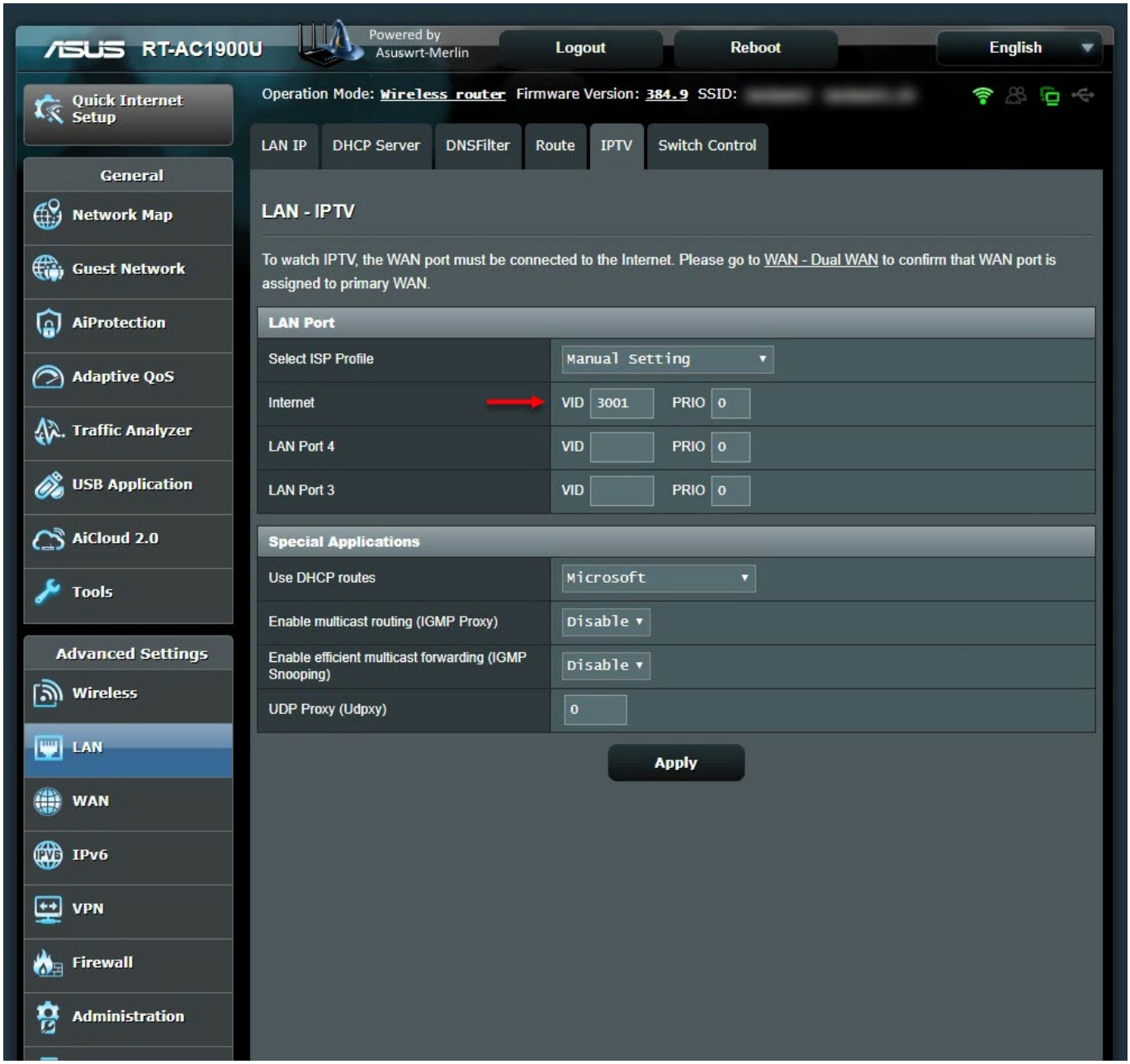



RT-AC1900U
Oturumu Kapat
Yeniden Başlat
Türkçe
Hızlı Internet Kurulumu
İşlem Modu: Kablosuz Yönlendirici Donanım Yazılımı Sürümü: 3.0.0.4.384_20308
SSID:
App
Genel
Ağ Eşleme
Misafir Ağı
AiProtection
Uyarlanabilir QoS
Trafik Çözümleyici
USB uygulaması
AiCloud 2.0
Gelişmiş Ayar
Kablosuz
Yerel Ağ
WAN
IPv6
VPN
Güvenlik Duvarı
Yönetim
Sistem Günlüğü
İşlem Modu
Sistem
Donanım Yazılımı Yükseltme
Ayarları Geri Yükle
Geri Bildirimi
Yönetim - Donanım Yazılımı Yükseltme
Not:
1. En son firma yazılımı sürümüne önceki sürüme ait güncellemeler dahildir.
2. Eski ve yeni donanım yazılımındaki yapılandırma parametresi için, ayarları yükseltme işlemi sırasında korunur.
3. Yükseltme işleminin başarısız olması durumunda, RT-AC1900U otomatik olarak acil durum moduna geçer. RT-AC1900U önündeki LED sinyalleri bu tür durumları gösterir. Sistem kurtarma işlemi için CD'deki Yazılım Sürümünü Kurtarma yardımcı programını kullanın.
4. En son aygıt yazılımı sürümünü http://www.asus.com/support/ adresindeki ASUS Destek sitesinden edinin.
Donanım Yazılımı Sürümü
Check Update
Kontrol
AiMesh router
RT-AC1900U
Current Version : 3.0.0.4.384_20308-gead790e
Manual Firmware Update : Karşıya Yükle
Note : Manual firmware update will update this AiMesh router / node only, if you are using AiMesh system, please make sure you are uploading proper firmware version.

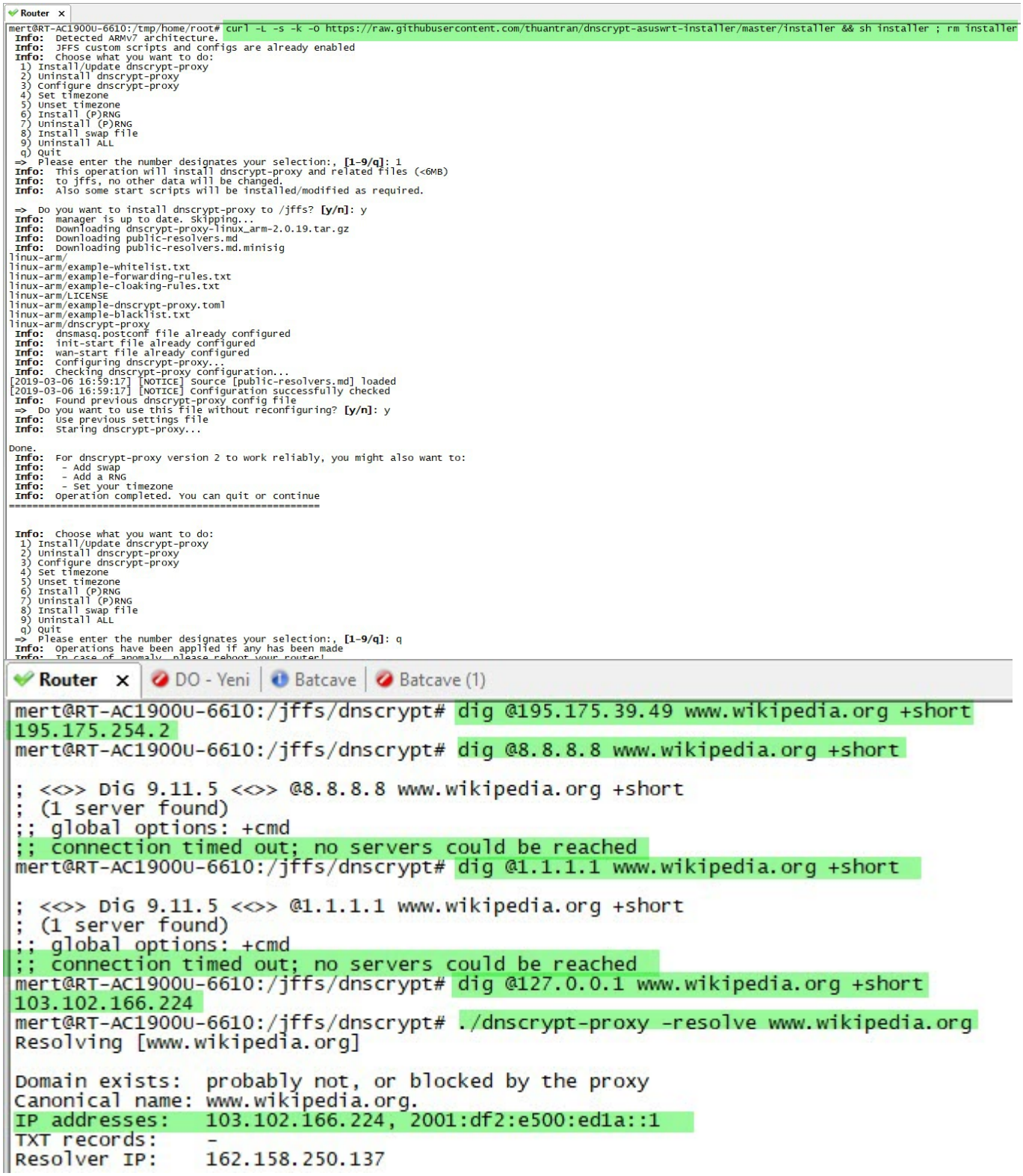

RT-AC1900U
Oturumu Kapat
Yeniden Başlat
Türkçe
Hızlı İnternet Kurulumu
İşlem Modu: Kablosuz Yönlendirici Donanım Yazılımı Sürümü: 3.0.0.4.384_20308
SSID:
İşlem Modu
Sistem
Donanım Yazılımı Yükseltme
Ayarları Geri Yükle
Geri Bildirimi
Genel
Ağ Eşleme
Misafir Ağı
AiProtection
Uyarlanabilir QoS
Trafik Çözümleyici
USB uygulaması
AiCloud 2.0
Gelişmiş Ayar
Kablosuz
Yerel Ağ
WAN
IPv6
VPN
Güvenlik Duvarı
Yönetim
Sistem Günlüğü
Yönetim - Donanım Yazılımı Yükseltme
3%
Donanım yazılımı yükseltiliyor. Lütfen 3 dakika kadar bekleyin.
Aygıt yazılımı güncelleme işlemi sırasında RT-AC1900U aygıtını kapatmayın.
Not:
3. Yükseltme işleminin başarısız olması durumunda, RT-AC1900U otomatik olarak acil durum moduna geçer. RT-AC1900U önündeki LED sinyalleri bu tür durumları gösterir. Sistem kurtarma işlemi için CD'deki Yazılım Sürümünü Kurtarma yardımcı programını kullanın.
4. En son aygıt yazılımı sürümünü http://www.asus.com/support/ adresindeki ASUS Destek sitesinden edinin.
Donanım Yazılımı Sürümü
Check Update
Kontrol
AiMesh router
RT-AC1900U
Current Version : 3.0.0.4.384_20308-gead790e
Manual Firmware Update : Konuma Yükle
Note : Manual firmware update will update this AiMesh router node only. If you are using AiMesh system, please make sure you are uploading proper firmware version.


RT-AC1900U
Powered by Asuswrt-Merlin
Oturumu Kapat
Yeniden Başlat
Türkçe
Hızlı Internet Kurulumu
İşlem Modu: Kablosuz Yönlendirici Donanım Yazılımı Sürümü: 384.9
SSID:
Genel
Ağ Eşleme
Misafir Ağı
AiProtection
Uyarlanabilir QoS
Trafik Çözümleyici
USB uygulaması
AiCloud 2.0
Tools
Gelişmiş Ayar
Kablosuz
Yerel Ağ
WAN
IPv6
VPN
Güvenlik Duvarı
Yönetim
Internet durumu:
Ağ kablosu bağlı değil.
Güvenlik düzeyi:
WPA2-Personal
İstemciler: 1
Listeyi Görüntüle
USB 3.0
Aygıt Yok
USB 2.0
Aygıt Yok
Sistem Durumu
2.4GHz
5GHz
Durum
İşlemci
Core 1 10%
Core 2 7%
100%
50%
0%
Bellek
Kullanılan 65MB
Boş 191MB
Toplam 256MB
25%
Ethernet Bağlantı Noktaları
Bağlantı Noktaları
Durum
WAN
Unplugged
LAN 1
100 Mbps
LAN 2
Unplugged
LAN 3
Unplugged
LAN 4
Unplugged


RT-AC1900U
Powered by Asuswrt-Merlin
Logout
Reboot
English
Quick Internet Setup
Operation Mode: Wireless router Firmware Version: 384.9 SSID:
General
Network Map
Guest Network
AiProtection
Adaptive QoS
Traffic Analyzer
USB Application
AiCloud 2.0
Tools
Advanced Settings
Wireless
LAN
WAN
IPv6
VPN
Firewall
Administration
Internet Connection
Dual WAN
Port Trigger
Virtual Server / Port Forwarding
DMZ
DDNS
NAT Passthrough
WAN - Internet Connection
RT-AC1900U supports several connection types to WAN (wide area network).These types are selected from the dropdown menu beside WAN Connection Type. The setting fields differ depending on the connection type you selected.
Configure the Ethernet WAN settings of RT-AC1900U.
Basic Config
WAN Connection Type
PPPoE
Enable WAN
Yes No
Enable NAT
Yes No
Enable UPnP
UPnP FAQ
Yes No
Enable secure UPnP mode
Yes No
UPNP: Allowed internal port range
1024
to
65535
UPNP: Allowed external port range
1
to
65535
WAN IP Setting
Get the WAN IP automatically
Yes No
WAN DNS Setting
Connect to DNS Server automatically
Yes No
Account Settings
Username
Password
Show password
Disconnect after time of inactivity (in seconds)
0



Next, it was time to make all the DNS traffic performed by the router encrypted (Dns over HTTPS – DoH). My first task was to connect a USB disk where I could install and run the packages on the router. Then, I completed the installation quickly by running the command entware-setup.sh in the command line. To install the dnscrypt-proxy tool, which supports DoH, I ran the command curl -L -s -k -O https://raw.githubusercontent.com/thuantran/dnscrypt-asuswrt-installer/master/installer && sh installer ; rm installer and completed the installation. To confirm that the dnscrypt-proxy tool was working properly, I attempted to resolve the IP address of the wikipedia.org address, which is still banned in my country, and I saw that the tool was working successfully.



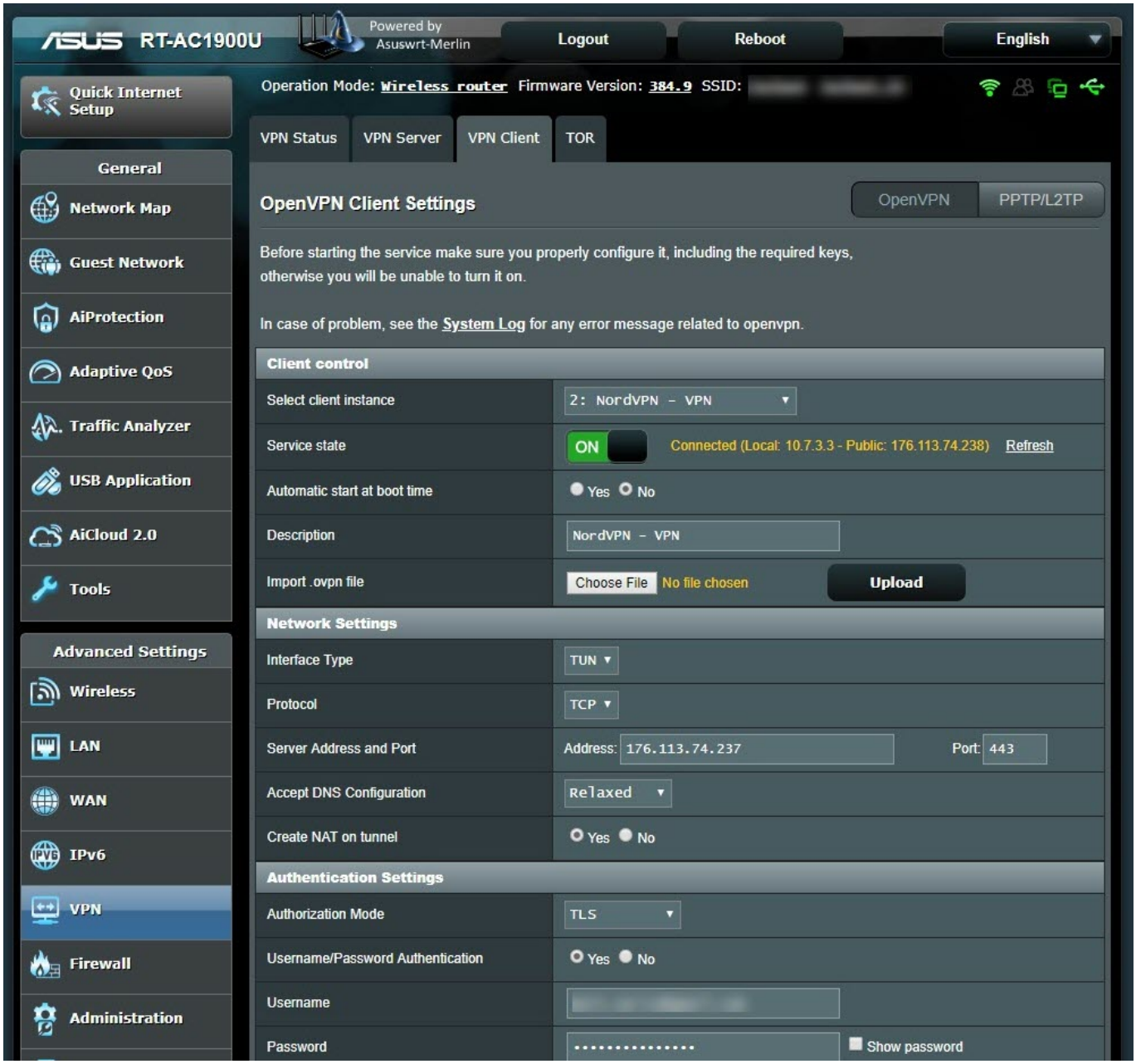
To take advantage of the router's capabilities, I decided to test its connection with VPN services (Netflix users will understand the reason well. :)) I decided to subscribe to NordVPN, a VPN service provider that I saw many advertisements for while traveling in the US. I was able to successfully connect to one of NordVPN's servers by following the steps on their help page specifically created for Asuswrt-Merlin users.

After connecting to NordVPN, I noticed that my internet connection had slowed

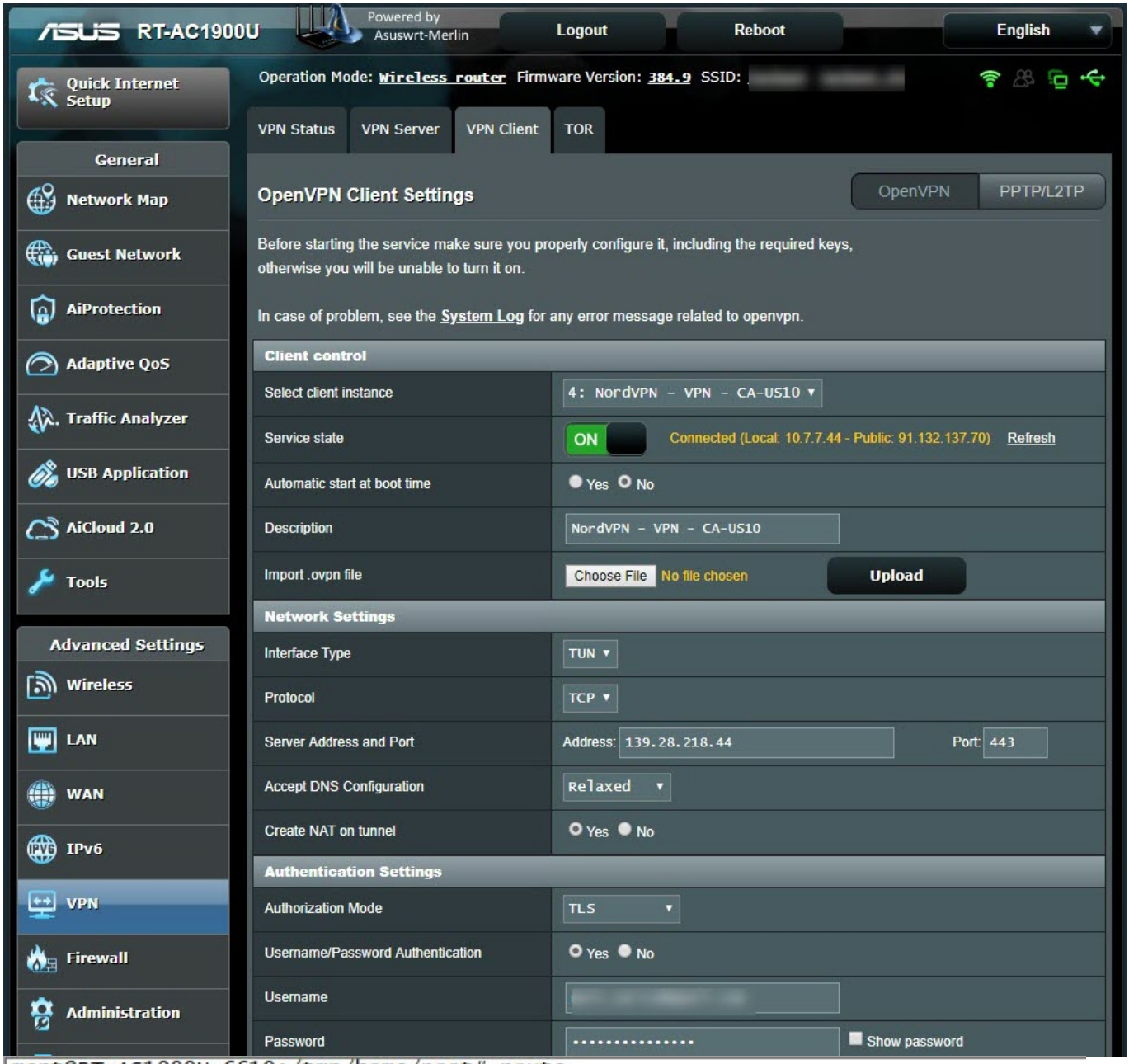
down to the point where I couldn’t access any web sites. I was thinking “There must be a problem with this VPN server” and “Is this VPN server slow too?” when I realized that I couldn’t connect to any of the 10 servers I connected to. Just as I was about to question NordVPN’s service quality, I remembered reading some messages on social media about claims that VPN services were being slowed down.



I noticed that when I pinged the IP address 8.8.8.8, which is Google’s DNS server, from the NordVPN servers I connected to, the response times were increasing exponentially.


ASUS RT-AC1900U
Powered by Asuswrt-Merlin
Logout
Reboot
English
Quick Internet Setup
Operation Mode: Wireless router Firmware Version: 384.9 SSID:
General
Network Map
Guest Network
AiProtection
Adaptive QoS
Traffic Analyzer
USB Application
AiCloud 2.0
Tools
Advanced Settings
Wireless
LAN
WAN
IPv6
VPN
Firewall
Administration
VPN Status
VPN Server
VPN Client
TOR
OpenVPN Client Settings
OpenVPN
PPTP/L2TP
Before starting the service make sure you properly configure it, including the required keys, otherwise you will be unable to turn it on.
In case of problem, see the System Log for any error message related to openvpn.
Client control
Select client instance
2: NordVPN - VPN
Service state
ON
Connected (Local: 10.7.3.3 - Public: 176.113.74.238)
Refresh
Automatic start at boot time
Yes
No
Description
NordVPN - VPN
Import .ovpn file
Choose File
No file chosen
Upload
Network Settings
Interface Type
TUN
Protocol
TCP
Server Address and Port
Address: 176.113.74.237
Port: 443
Accept DNS Configuration
Relaxed
Create NAT on tunnel
Yes
No
Authentication Settings
Authorization Mode
TLS
Username/Password Authentication
Yes
No
Username
Password
Show password

```
mert@RT-AC1900U-6610:/tmp/home/root# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
                *               255.255.255.255 UH    0      0        0 ppp0
176.113.74.237  [redacted]      255.255.255.255 UGH   0      0        0 ppp0
192.168.1.0     *               255.255.255.0   U     0      0        0 br0
10.7.3.0        *               255.255.255.0   U     0      0        0 tun12
169.254.0.0     *               255.255.0.0     U     0      0        0 vlan3001
127.0.0.0       *               255.0.0.0       U     0      0        0 lo
default         [redacted]      0.0.0.0         UG    0      0        0 ppp0
mert@RT-AC1900U-6610:/tmp/home/root# ping -I tun12 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=55 time=6648.268 ms
64 bytes from 8.8.8.8: seq=1 ttl=55 time=5648.283 ms
64 bytes from 8.8.8.8: seq=2 ttl=55 time=4648.953 ms
64 bytes from 8.8.8.8: seq=3 ttl=55 time=12224.073 ms
64 bytes from 8.8.8.8: seq=4 ttl=55 time=11224.201 ms
64 bytes from 8.8.8.8: seq=5 ttl=55 time=10224.202 ms
64 bytes from 8.8.8.8: seq=6 ttl=55 time=9614.864 ms
64 bytes from 8.8.8.8: seq=7 ttl=55 time=12234.947 ms
64 bytes from 8.8.8.8: seq=8 ttl=55 time=11235.023 ms
64 bytes from 8.8.8.8: seq=9 ttl=55 time=10235.036 ms
64 bytes from 8.8.8.8: seq=10 ttl=55 time=9235.121 ms
64 bytes from 8.8.8.8: seq=11 ttl=55 time=16509.917 ms
64 bytes from 8.8.8.8: seq=12 ttl=55 time=15509.886 ms
64 bytes from 8.8.8.8: seq=13 ttl=55 time=14510.849 ms
64 bytes from 8.8.8.8: seq=14 ttl=55 time=13510.848 ms
64 bytes from 8.8.8.8: seq=15 ttl=55 time=12510.775 ms
64 bytes from 8.8.8.8: seq=16 ttl=55 time=11512.011 ms
64 bytes from 8.8.8.8: seq=17 ttl=55 time=10513.375 ms
64 bytes from 8.8.8.8: seq=18 ttl=55 time=9513.429 ms
64 bytes from 8.8.8.8: seq=19 ttl=55 time=8513.435 ms
64 bytes from 8.8.8.8: seq=20 ttl=55 time=13145.176 ms
64 bytes from 8.8.8.8: seq=21 ttl=55 time=12145.169 ms
64 bytes from 8.8.8.8: seq=22 ttl=55 time=11147.973 ms
64 bytes from 8.8.8.8: seq=23 ttl=55 time=10147.933 ms
64 bytes from 8.8.8.8: seq=24 ttl=55 time=9147.860 ms
64 bytes from 8.8.8.8: seq=25 ttl=55 time=8147.774 ms
64 bytes from 8.8.8.8: seq=26 ttl=55 time=7147.687 ms
64 bytes from 8.8.8.8: seq=27 ttl=55 time=11516.101 ms
64 bytes from 8.8.8.8: seq=28 ttl=55 time=11761.391 ms
64 bytes from 8.8.8.8: seq=29 ttl=55 time=10761.391 ms
64 bytes from 8.8.8.8: seq=30 ttl=55 time=9761.313 ms
64 bytes from 8.8.8.8: seq=31 ttl=55 time=8761.224 ms
64 bytes from 8.8.8.8: seq=32 ttl=55 time=7761.279 ms
64 bytes from 8.8.8.8: seq=33 ttl=55 time=9896.576 ms
64 bytes from 8.8.8.8: seq=34 ttl=55 time=8896.620 ms
64 bytes from 8.8.8.8: seq=35 ttl=55 time=7898.961 ms
64 bytes from 8.8.8.8: seq=36 ttl=55 time=6898.912 ms
64 bytes from 8.8.8.8: seq=37 ttl=55 time=5898.834 ms
64 bytes from 8.8.8.8: seq=38 ttl=55 time=4898.749 ms
64 bytes from 8.8.8.8: seq=39 ttl=55 time=16923.183 ms
64 bytes from 8.8.8.8: seq=40 ttl=55 time=15923.461 ms
64 bytes from 8.8.8.8: seq=41 ttl=55 time=14924.623 ms
64 bytes from 8.8.8.8: seq=42 ttl=55 time=13924.561 ms
64 bytes from 8.8.8.8: seq=43 ttl=55 time=29231.054 ms
64 bytes from 8.8.8.8: seq=44 ttl=55 time=28231.044 ms
64 bytes from 8.8.8.8: seq=45 ttl=55 time=27231.986 ms
64 bytes from 8.8.8.8: seq=46 ttl=55 time=26231.979 ms
64 bytes from 8.8.8.8: seq=47 ttl=55 time=31198.969 ms
64 bytes from 8.8.8.8: seq=48 ttl=55 time=30198.990 ms
64 bytes from 8.8.8.8: seq=49 ttl=55 time=29198.962 ms
64 bytes from 8.8.8.8: seq=50 ttl=55 time=28198.983 ms
64 bytes from 8.8.8.8: seq=51 ttl=55 time=27198.956 ms
64 bytes from 8.8.8.8: seq=52 ttl=55 time=26201.187 ms
64 bytes from 8.8.8.8: seq=53 ttl=55 time=25201.248 ms
64 bytes from 8.8.8.8: seq=54 ttl=55 time=24201.256 ms
^C
--- 8.8.8.8 ping statistics ---
80 packets transmitted, 55 packets received, 31% packet loss
```

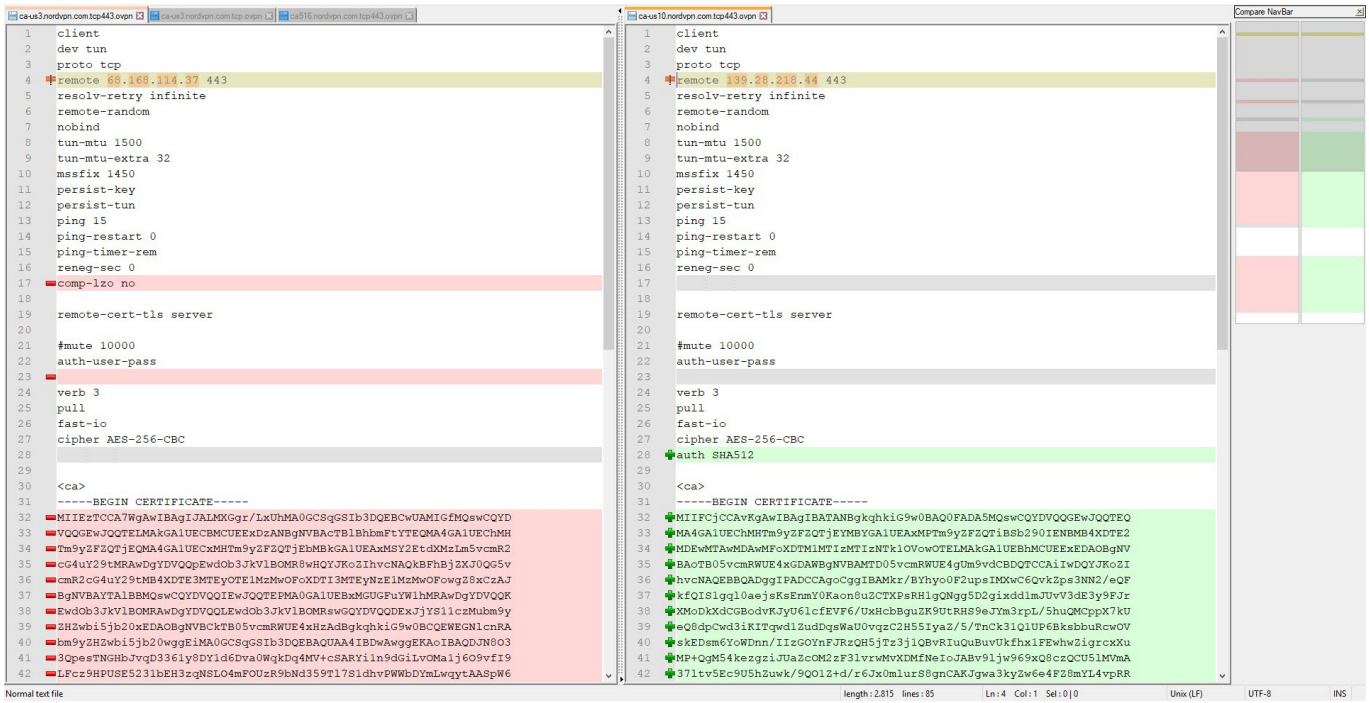



```
mert@RT-AC1900U-6610:/tmp/home/root# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
139.28.218.44                   255.255.255.255 UGH   0      0        0 ppp0
                *               255.255.255.255 UH    0      0        0 ppp0
192.168.1.0     *               255.255.255.0   U     0      0        0 br0
10.7.7.0        *               255.255.255.0   U     0      0        0 tun14
169.254.0.0     *               255.255.0.0     U     0      0        0 vlan3001
127.0.0.0       *               255.0.0.0       U     0      0        0 lo
default                         0.0.0.0         UG    0      0        0 ppp0
mert@RT-AC1900U-6610:/tmp/home/root# ping -I tun14 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=47 ttl=117 time=866.553 ms
64 bytes from 8.8.8.8: seq=48 ttl=117 time=1191.751 ms
64 bytes from 8.8.8.8: seq=49 ttl=117 time=2292.490 ms
64 bytes from 8.8.8.8: seq=50 ttl=117 time=31483.191 ms
64 bytes from 8.8.8.8: seq=52 ttl=117 time=29483.216 ms
64 bytes from 8.8.8.8: seq=53 ttl=117 time=34078.320 ms
64 bytes from 8.8.8.8: seq=54 ttl=117 time=33078.304 ms
64 bytes from 8.8.8.8: seq=55 ttl=117 time=32078.228 ms
64 bytes from 8.8.8.8: seq=56 ttl=117 time=31078.140 ms
64 bytes from 8.8.8.8: seq=57 ttl=117 time=30078.070 ms
```

When I connected to one of NordVPN’s servers with the Double VPN feature, I

saw that the ping time was much more reasonable and I could access websites. When I connected to another Double VPN server, I again noticed that my connection was incredibly slow. When I compared the OpenVPN connection settings of the two VPN servers, I found that the AUTH parameter (HMAC digest algorithm) used in message verification was different (SHA512 instead of SHA1). When I tried to connect to all NordVPN servers that use the AUTH parameter of SHA1, I found that the connection did not slow down and therefore I believe that the slowdown could be related to the SHA512 algorithm.

When I asked on LinkedIn what could cause the delay in PING times, the general responses were that the line could be saturated, the router in between could be malfunctioning, there could be a problem with the ethernet card, there could be a grounding problem in the local network, the firewall connection list could be full, the system could be under attack. Based on the screenshots I shared and the comments from LinkedIn, I decided to leave it to you, dear readers, to find out what caused this delay as an exercise.



```
mert@RT-AC1900U-6610:/tmp/home/root# route
Kernel IP routing table
Destination     Gatewav         Genmask         Flags Metric Ref    Use Iface
68.168.114.37   [redacted]      255.255.255.255 UGH   0      0        0 ppp0
[redacted]                      255.255.255.255 UH    0      0        0 ppp0
192.168.1.0     *               255.255.255.0   U     0      0        0 br0
10.7.7.0        *               255.255.255.0   U     0      0        0 tun13
169.254.0.0     *               255.255.0.0     U     0      0        0 vlan3001
127.0.0.0       *               255.0.0.0       U     0      0        0 lo
default         [redacted]      0.0.0.0         UG    0      0        0 ppp0
mert@RT-AC1900U-6610:/tmp/home/root# ping -I tun13 8.8.8.8
PING 8.8.8.8 (8.8.8.8): 56 data bytes
64 bytes from 8.8.8.8: seq=0 ttl=121 time=416.562 ms
64 bytes from 8.8.8.8: seq=1 ttl=121 time=163.178 ms
64 bytes from 8.8.8.8: seq=2 ttl=121 time=227.239 ms
64 bytes from 8.8.8.8: seq=3 ttl=121 time=163.491 ms
64 bytes from 8.8.8.8: seq=4 ttl=121 time=164.102 ms
64 bytes from 8.8.8.8: seq=5 ttl=121 time=163.397 ms
64 bytes from 8.8.8.8: seq=6 ttl=121 time=163.538 ms
64 bytes from 8.8.8.8: seq=7 ttl=121 time=165.894 ms
64 bytes from 8.8.8.8: seq=8 ttl=121 time=163.354 ms
64 bytes from 8.8.8.8: seq=9 ttl=121 time=163.095 ms
64 bytes from 8.8.8.8: seq=10 ttl=121 time=163.285 ms
64 bytes from 8.8.8.8: seq=11 ttl=121 time=180.063 ms
64 bytes from 8.8.8.8: seq=12 ttl=121 time=163.515 ms
64 bytes from 8.8.8.8: seq=13 ttl=121 time=183.941 ms
64 bytes from 8.8.8.8: seq=14 ttl=121 time=163.153 ms
64 bytes from 8.8.8.8: seq=15 ttl=121 time=164.452 ms
64 bytes from 8.8.8.8: seq=16 ttl=121 time=239.481 ms
64 bytes from 8.8.8.8: seq=17 ttl=121 time=247.684 ms
64 bytes from 8.8.8.8: seq=18 ttl=121 time=229.615 ms
64 bytes from 8.8.8.8: seq=19 ttl=121 time=163.541 ms
64 bytes from 8.8.8.8: seq=20 ttl=121 time=308.787 ms
64 bytes from 8.8.8.8: seq=21 ttl=121 time=163.751 ms
64 bytes from 8.8.8.8: seq=22 ttl=121 time=164.228 ms
64 bytes from 8.8.8.8: seq=23 ttl=121 time=189.868 ms
64 bytes from 8.8.8.8: seq=24 ttl=121 time=163.761 ms
64 bytes from 8.8.8.8: seq=25 ttl=121 time=163.222 ms
64 bytes from 8.8.8.8: seq=26 ttl=121 time=163.220 ms
64 bytes from 8.8.8.8: seq=27 ttl=121 time=163.683 ms
64 bytes from 8.8.8.8: seq=28 ttl=121 time=163.683 ms
64 bytes from 8.8.8.8: seq=29 ttl=121 time=163.792 ms
64 bytes from 8.8.8.8: seq=30 ttl=121 time=163.429 ms
64 bytes from 8.8.8.8: seq=31 ttl=121 time=325.651 ms
64 bytes from 8.8.8.8: seq=32 ttl=121 time=178.039 ms
64 bytes from 8.8.8.8: seq=33 ttl=121 time=163.946 ms
64 bytes from 8.8.8.8: seq=34 ttl=121 time=163.651 ms
64 bytes from 8.8.8.8: seq=35 ttl=121 time=163.740 ms
64 bytes from 8.8.8.8: seq=36 ttl=121 time=340.520 ms
64 bytes from 8.8.8.8: seq=37 ttl=121 time=236.380 ms
64 bytes from 8.8.8.8: seq=38 ttl=121 time=433.735 ms
64 bytes from 8.8.8.8: seq=39 ttl=121 time=163.266 ms
64 bytes from 8.8.8.8: seq=40 ttl=121 time=163.345 ms
64 bytes from 8.8.8.8: seq=41 ttl=121 time=163.188 ms
64 bytes from 8.8.8.8: seq=42 ttl=121 time=163.783 ms
64 bytes from 8.8.8.8: seq=43 ttl=121 time=163.224 ms
64 bytes from 8.8.8.8: seq=44 ttl=121 time=163.706 ms
64 bytes from 8.8.8.8: seq=45 ttl=121 time=164.327 ms
64 bytes from 8.8.8.8: seq=46 ttl=121 time=163.542 ms
^C
--- 8.8.8.8 ping statistics ---
47 packets transmitted, 47 packets received, 0% packet loss
round-trip min/avg/max = 163.095/194.426/433.735 ms
```

In conclusion, after years of using the Tilgin HG1332 router without choice and complaining, I was finally able to escape and get a new router that I could secure myself, full of security features. Especially with the support of OpenVPN, when I want to take advantage of free public WiFi services in public places like shopping centers, hotels, cafes, airports, etc., which are free but pose a risk to users in terms of information security, I can connect

to my router at home securely via VPN from my computer or mobile phone, and minimize that risk, which made me very happy.

Hope to see you in the following articles.