OPEN SOURCE 13

I ♥ TecMint :

OpenVPN Server and Client Installation and Configuration on Debian 7

by Michael David | Published: April 4, 2014 | Last Updated: January 7, 2015

Download Your Free eBooks NOW - 10 Free Linux eBooks for Administrators | 4 Free Shell Scripting eBooks

This article details how to obtain **IPv6** connectivity on **OpenVPN** using **Debian Linux**. The process has been tested on **Debian 7** on a **KVM VPS** with **IPv6** connectivity as the server, and a Debian 7 desktop. The commands are to be run as root.

SHARE
+
+
NEED HELP?

Install OpenVPN in Debian

What is OpenVPN?

OpenVPN is a VPN program that uses SSL/TLS to create secure, encrypted VPN connections, to route your Internet traffic, thus preventing snooping. Open VPN is highly capable of transparently traversing through firewalls. In fact, if the situation requires it, you can run it on the same TCP port as HTTPS (443), making the traffic indistinguishable and thus virtually impossible to block

BEGINNER'S GUIDE FOR LINUX
Start learning Linux in minutes

Vi/Vim Editor BEGINNER'S GUIDE
Learn vi/vim as a Full Text Editor

Linux Foundation Certification
Exam Study Guide to LFCS and LFCE

25 Hardening Security Tips for Linux Servers

OpenVPN can use a variety of methods such as pre-shared secret keys, certificates, or usernames/passwords, to let clients authenticate to the server. OpenVPN uses the OpenSSL protocol and implements many security and control features such as challenge response authentication, single sign-on capability, load balancing and failover features and multi daemon support.

Why use OpenVPN?

Think secure communications – think OpenVPN. If you do not want anyone snooping on your internet traffic, use OpenVPN to route all your traffic through a highly encrypted, secure tunnel.

This is especially important when connecting to public WIFI networks in airports and other places. You can never be sure as to who is snooping on your traffic. You can channel your traffic through your own OpenVPN server to prevent snooping.

If you are in any of the countries that routinely monitor all your traffic and block websites at will, you can use OpenVPN over TCP port 443, to make it indistinguishable from HTTPS traffic. You can even combine OpenVPN with other security strategies like tunnelling your OpenVPN traffic over an SSL tunnel, to beat Deep Packet Inspection techniques that might be able to identify OpenVPN signatures.

System Requirements

OpenVPN requires very minimal requirements to run. A system with 64 MB RAM and 1 GB HDD space is enough to run OpenVPN. OpenVPN runs on almost all the mainstream Operating Systems.

Installation and Configuration of OpenVPN on Debian 7

Install OpenVPN on Master Server

Run the following command to install OpenVPN.

```
# apt-get install openvpn
```

★ 💬

How to Add Linux Host to Nagios Monitoring Server Using NRPE Plugin

How to Install Nagios 4.3.4 on RHEL, CentOS and Fedora

Install Cacti (Network Monitoring) on RHEL/CentOS 7.x/6.x/5.x and Fedora 24-12

Google Chrome 63 Released – Install on RHEL/CentOS 7 and Fedora 26-20

How to Install Ubuntu 16.10/16.04 Alongside With Windows 10 or 8 in Dual-Boot

Tecmint's Guide to Red Hat RHCSA / RHCE Certification Preparation Study Guide

BORYS SAYS:
In CentOS 7 default time sync daemon is chrony. Do not...

RONAN SAYS:
Useful post, if I wanted to run a section of code,...

25 Hardening Security Tips for Linux Servers

By default, the easy-rsa scripts are installed under '**/usr/share/easy-rsa/**' directory. So, we need to copy these scripts to desired location i.e. **/root/easy-rsa**.

```
# mkdir /root/easy-rsa
cp -prv /usr/share/doc/openvpn/examples/easy-rsa
```

Generate CA Certificate and CA Key

Open file '**vars**' and make the following changes, but before making changes I suggest you to take backup of original file.

```
# cp vars{,.orig}
```

Using your text editor, set up the default values for easy-rsa. For example.

```
KEY_SIZE=4096
KEY_COUNTRY="IN"
KEY_PROVINCE="UP"
KEY_CITY="Noida"
KEY_ORG="Home"
KEY_EMAIL="user@example.net"
```

Here, I am using a **4096** bit key. You can use a **1024**, **2048**, **4096** or **8192** bit key as desired.

Export the default values by running the command.

```
# source ./vars
```

Clean up any certificates that were generated previously.

```
./clean-all
```

Next, run the following command to generate **CA** certificate and **CA** key.

```
# ./build-ca
```

Generate the server certificate by running the command. Substitute the 'server name' with your server-name.

PAT SAYS:
Thanks for the reply Matei. It turns out it was...

SOPH SAYS:
Thanks for reply.. Changed to read: &stop

DUC SAYS:
Dear Aaron, thank you for the fast message but I have...

AARON KILI SAYS:
@Daniel Try to contact the developers of Samsung...

Linux System Administrator Bundle with 7-Courses (96% off)

Add to Cart - $69

Ending In: 3 days

Computer Hacker Professional Certification Course (96% Off)

Add to Cart - $59

Ending In: 4 days

LINUX EBOOKS

- Introducing Learn Linux In One Week and Go from Zero to Hero

```
# ./build-key-server server-name
```

Generate the **Diffie Hellman PEM** certificate.

```
# ./build-dh
```

Generate the client certificate. Substitute the 'client name' with your client-name.

```
# ./build-key client-name
```

Generate the HMAC code.

```
# openvpn --genkey --secret /root/easy-rsa/keys/
```

Copy the certificates to the client and server machines as follows.

- Ensure that the **ca.crt** is present on both the client and the server.
- The **ca.key** key should be on the client.
- The server requires **server.crt**, **dh4096.pem**, **server.key** and **ta.key**.
- **client.crt**, **client.key** and **ta.key** should be on the client.

To set up the keys and certificates on the server, run the commands.

```
# mkdir -p /etc/openvpn/certs
# cp -pv /root/easy-rsa/keys/{ca.{crt,key},serve
```

Configuring OpenVPN Server

Now you need to configure OpenVPN server. Open file '**/etc/openvpn/server.conf**'. Please make changes as described below.

```
script security 3 system
port 1194
proto udp
dev tap
ca /etc/openvpn/certs/ca.crt
cert /etc/openvpn/certs/server-name.crt
key /etc/openvpn/certs/server-name.key
dh /etc/openvpn/certs/dh4096.pem
```

25 Hardening Security Tips for Linux Servers

- RedHat RHCE/RHCSA Certification Preparation Guide
- Linux Foundations LFCS/LFCE Certification Guide
- Postfix Mail Server Setup Guide for Linux
- Ansible Setup Guide for Linux
- Django Setup Guide for Linux
- Awk Getting Started Guide for Beginners
- Citrix XenServer Setup Guide for Linux

Never Miss Any Linux Tutorials, Guides, Tips and Free eBooks

Join Our Community Of **150,000+ Linux Lovers** and get a weekly newsletter in your inbox

YES! SIGN ME UP

```
tls-auth /etc/openvpn/certs/ta.key 0
server 192.168.88.0 255.255.255.0
ifconfig-pool-persist ipp.txt
push "redirect-gateway def1 bypass-dhcp"
push "dhcp-option DNS 8.8.8.8"
push "dhcp-option DNS 8.8.4.4"
keepalive 1800 4000
cipher DES-EDE3-CBC # Triple-DES
comp-lzo
max-clients 10
user nobody
group nogroup
persist-key
persist-tun
#log openvpn.log
#status openvpn-status.log
verb 5
mute 20
```

Enable IP forwarding on the server.

```
# echo 1 > /proc/sys/net/ipv4/ip_forward
```

Run the following command to set up OpenVPN to start on boot.

```
# update-rc.d -f openvpn defaults
```

Start OpenVPN service.

```
# service openvpn restart
```

Install OpenVPN on Client

Run the following command to install OpenVPN on the client machine.

```
# apt-get install openvpn
```

Using a text editor, setup the OpenVPN client configuration in '**/etc/openvpn/client.conf**', on the client. An example configuration is as follows:

```
script security 3 system
client
remote vpn_server_ip
ca /etc/openvpn/certs/ca.crt
cert /etc/openvpn/certs/client.crt
key /etc/openvpn/certs/client.key
cipher DES-EDE3-CBC
comp-lzo yes
```

25 Hardening Security Tips for Linux Servers

```
dev tap
proto udp
tls-auth /etc/openvpn/certs/ta.key 1
nobind
auth-nocache
persist-key
persist-tun
user nobody
group nogroup
```

Run the following command to set up OpenVPN to start on boot.

```
# update-rc.d -f openvpn defaults
```

Start OpenVPN service on the client.

```
# service openvpn restart
```

Once you are satisfied that OpenVPN is running well on **IPv4**, here is how to get **IPv6** working over OpenVPN.

Getting IPv6 working with OpenVPN on Server

Add the following lines to the end of the server configuration '**/etc/openvpn/server.conf**' file.

```
client-connect /etc/openvpn/client-connect.sh
client-disconnect /etc/openvpn/client-disconnect
```

These two scripts build/destroy the **IPv6** tunnel each time a client connects/disconnects.

Here is the content of client-connect.sh.

```
#!/bin/bash
BASERANGE="2a00:dd80:003d:000c"
ifconfig $dev up
ifconfig $dev add ${BASERANGE}:1001::1/64
ip -6 neigh add proxy 2a00:dd80:003d:000c:1001::
exit 0
```

My host assigns me **IPV6** addresses from the **2a00:dd80:003d:000c::/64** block. Hence, I use **2a00:dd80:003d:000c** as the BASERANGE. Modify this value as per what your host has assigned you.

Each time a client connects to OpenVPN 25 Hardening Security Tips for Linux Servers

assigns the address **2a00:dd80:003d:000c:1001::1** as the **IPV6** address of the **tap0** interface of the server.

The last line sets up Neighbour Discovery for our tunnel. I have added the **IPv6** address of the client side **tap0** connection as the proxy address.

Here is the content of **client-disconnect.sh**.

```
#!/bin/bash
BASERANGE="2a00:dd80:003d:000c"
/sbin/ip -6 addr del ${BASERANGE}::1/64 dev $dev
exit 0
```

This just deletes the **IPv6** tunnel address of the server, when the client disconnects. Modify the value of BASERANGE as appropriate.

Make the scripts executable.

```
# chmod 700 /etc/openvpn/client-connect.sh
# chmod 700 /etc/openvpn/client-disconnect.sh
```

Add the following entries to '/etc/rc.local' (You can also modify the appropriate sysctls in **/etc/sysctl.conf**).

```
echo 1 >/proc/sys/net/ipv6/conf/all/proxy_ndp
echo 1 > /proc/sys/net/ipv4/ip_forward
echo 1 > /proc/sys/net/ipv6/conf/all/forwarding
/etc/init.d/firewall stop && /etc/init.d/firewal
```

These entries activate Neighbor Discovery and Forwarding. I have also added a firewall.

Create '**/etc/init.d/firewall**' and put in the following content.

```
#!/bin/sh
# description: Firewall
IPT=/sbin/iptables
IPT6=/sbin/ip6tables
case "$1" in
start)
$IPT -F INPUT
$IPT -A INPUT -i eth0 -m state --state ESTABLISH
$IPT -A INPUT -i eth0 -p tcp --dport 22 -j ACCEP
$IPT -A INPUT -i eth0 -p icmp -j ACCEPT
$IPT -A INPUT -i eth0 -p udp --dport 1194 -j ACC
$IPT -A INPUT -i tap+ -j ACCEPT
$IPT -A FORWARD -i tap+ -j ACCEPT
$IPT -A FORWARD -m state --state ESTABLISHED,REL
```

25 Hardening Security Tips for Linux Servers

```
$IPT -t nat -F POSTROUTING
$IPT -t nat -A POSTROUTING -s 10.8.0.0/24 -o eth
$IPT -A INPUT -i eth0 -j DROP
$IPT6 -F INPUT
$IPT6 -A INPUT -i eth0 -m state --state ESTABLIS
$IPT6 -A INPUT -i eth0 -p tcp --dport 22 -j ACCE
$IPT6 -A INPUT -i eth0 -p icmpv6 -j ACCEPT
$IPT6 -A FORWARD -s 2a00:dd80:003d:000c::/64 -i
$IPT6 -A INPUT -i eth0 -j DROP
exit 0
;;
stop)
$IPT -F
$IPT6 -F
exit 0
;;
*)
echo "Usage: /etc/init.d/firewall {start|stop}"
exit 1
;;
esac
```

Run '/etc/rc.local' and start the firewall.

```
# sh /etc/rc.local
```

This completes the server side modifications.

Getting IPv6 working with OpenVPN on Client

Add the following as the last lines of your client configuration file '/etc/openvpn/client.conf'.

```
# create the ipv6 tunnel
up /etc/openvpn/up.sh
down /etc/openvpn/down.sh
# need this so when the client disconnects it te
explicit-exit-notify
```

The up and down scripts build/destroy the IPV6 client end points of the client tap0 connection each time a client connects/disconnects to or from the OpenVPN server.

Here is the content of up.sh.

```
#!/bin/bash
IPV6BASE="2a00:dd80:3d:c"
ifconfig $dev up
ifconfig $dev add ${IPV6BASE}:1001::2/64
ip -6 route add default via ${IPV6BASE}:1001::1
exit 0
```

25 Hardening Security Tips for Linux Servers

The script assigns the IPV6 address 2a00:dd80:3d:c:1001::2 as the client IPV6 address and sets the default IPV6 route through the server.

Modify IPV6BASE to be the same as BASERANGE in the server configuration.

Here is the content of down.sh.

```
#!/bin/bash
IPV6BASE="2a00:dd80:3d:c"
/sbin/ip -6 addr del ${IPV6BASE}::2/64 dev $dev
/sbin/ip link set dev $dev down
/sbin/ip route del ::/0 via ${IPV6BASE}::1
exit 0
```

This just deletes the IPV6 address of the client and tears down the IPV6 route when the client disconnects from the server.

Modify IPV6BASE to be the same as BASERANGE in the server configuration and make script executable.

```
# chmod 700 /etc/openvpn/up.sh
# chmod 700 /etc/openvpn/down.sh
```

Optionally, modify '/etc/resolv.conf' and add Google's IPV6 nameservers for DNS resolution.

```
nameserver 2001:4860:4860::8888
nameserver 2001:4860:4860::8844
```

Restart openvpn on the server and then connect to it from the client. You should be connected. Visit test-ipv6.com to see that your IPV6 connectivity over OpenVPN is working.

Reference Links

OpenVPN Homepage

Source: stavrovski

If You Appreciate What We Do Here On

25 Hardening Security Tips for Linux Servers

TecMint, You Should Consider:

1. Stay Connected to: Twitter | Facebook | Google Plus
2. Subscribe to our email updates: Sign Up Now
3. Get your own self-hosted blog with a Free Domain at ($3.95/month).
4. Become a Supporter - Make a contribution via PayPal
5. Support us by purchasing our premium books in PDF format.
6. Support us by taking our online Linux courses

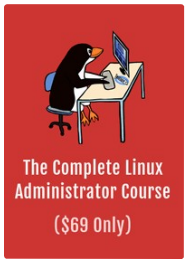
We are thankful for your never ending support.

Tags: openvpn

Michael David View all Posts

I am an outstanding Technical Writer with exemplary System Administration skills in Linux/FreeBSD. Have over 18+ years in IT and currently work as a Project Manager in Noida.

Your name can also be listed here. Got a tip? Submit it here to become an TecMint author.



PREVIOUS STORY
Nautilus Terminal: An Embedded Terminal for Nautilus File Browser in GNOME

NEXT STORY
Install Zentyal as PDC (Primary Domain Controller) and Integrate Windows System – Part 1

YOU MAY ALSO LIKE...

25 Hardening Security Tips for Linux Servers

Online Music Streaming with Winamp Player and Mixxx DJ console using "SHOUTcast Radio Server" in Linux

26 SEP, 2014

Linux is an Art – Driving Force Behind Linux

20 MAY, 2013

Etherpad – A Real Time Web Based Online Collaborative Document Editor for Linux

17 DEC, 2013

13 RESPONSES

Comments 13 Pingbacks 0

Michael ⊙ April 16, 2017 at 11:53 am

@vmh: fe80 is a localhost IPv6 address. Are you really sure your ISP assigned it? Google ipv6 test and do an ipv6 test to see if you actually have ipv6 and post the result.

Reply

Vmh ⊙ April 18, 2017 at 6:53 am

@Michael – you are actually correct. Once I sorted out what was going on: I was looking at the wrong thing – that was actually a loopback IP address. I was assigned a block of IP addresses (from ::f000-f00f).

These are verifiable. The problem is that in any of the articles I have read on configuring IPv6 VPN's, it requires (or strongly recommends) a /64 block. It appears that Digital Ocean is assigning me a /112 block of which I need one address for the server itself.

This won't work from what I understand. My dilemma is that I cannot find anything that addresses this on Digital Ocean. It seems extreme to open a ticket for this – I am a little astonished that no one seems to have the same problem … almost like I am missing something very obvious.

Reply

Michael ⊙ April 18, 2017 at 2:20 pm

@vmh use baserange/112 instead of baserange/64 for your config.

Reply

Vmh ⊙ April 13, 2017 at 5:36 am

I am still struggling with IPv6 addresses. The author mentioned the "**BASE RANGE**" above in the configuration that the ISP assigns. For myself, I have been assigned an IP address like this: "**fe80::[group]:[group]:[group]**".

I am stuck trying to understand out of this mess what is the "base range" that I should use for my OpenVPN server configuration. Unfortunately, even a Google search of "**IPv6 Base Range**" doesn't give much useful information. Any help would be appreciated.

25 Hardening Security Tips for Linux Servers

Reply

realware ⊙ November 22, 2015 at 3:41 pm
Key size 2048 would suffice. 4096 makes the tls handshake terribly slow

Reply

madnexus ⊙ October 8, 2014 at 1:19 pm
Is there any way to avoid client scripts and pull routes and ips straight away? This is not convenient if you are using openvpn on a phone…

Reply

Andy ⊙ August 15, 2014 at 2:46 pm
ca.key on the client? Really? I don't think so.

Reply

Mirwoj ⊙ January 21, 2016 at 8:16 pm
me too :)

Reply

Ray ⊙ February 17, 2016 at 5:55 am
yup, thought that too.

Please fix.

Good tutorial! Thanks!

Reply

Michael David ⊙ July 19, 2014 at 11:30 am
Dan, it only means your keys on the server and the client do not match. Please check again.

Reply

Dan ⊙ June 8, 2014 at 3:05 pm
I did this tutorial on my server exactly step by step, and I have a problem with ta.key file :

Jun 7 17:03:05 test ovpn-openvpn[5618]: Authenticate/Decrypt packet error: packet HMAC authentication failed
Jun 7 17:03:05 test ovpn-openvpn[5618]: TLS Error: incoming packet authentication failed from [AF_INET]80.**.**.***:54179

Reply

Jeremy Davis ⊙ April 8, 2014 at 1:36 pm
TurnKey Linux offers a pre-installed, pre-configured OpenVPN server (on a Debian 7 base) as a ISO, virtual machine image or in the cloud.

Have a look here:
http://www.turnkeylinux.org/openvpn

Reply

Marevoula ⊙ April 7, 2014 at 3:37 pm
There is also an integration for OpenVPN with the Linux Enterprise distribution Univention Corporate Server = OpenVPN4UCS.
It is available via the Univention App Center at:
http://www.univention.com/products/ucs/app-catalogue/app/details/openvpn4ucs

Reply

GOT SOMETHING TO SAY? JOIN THE DISCUSSION.

Comment

25 Hardening Security Tips for Linux Servers