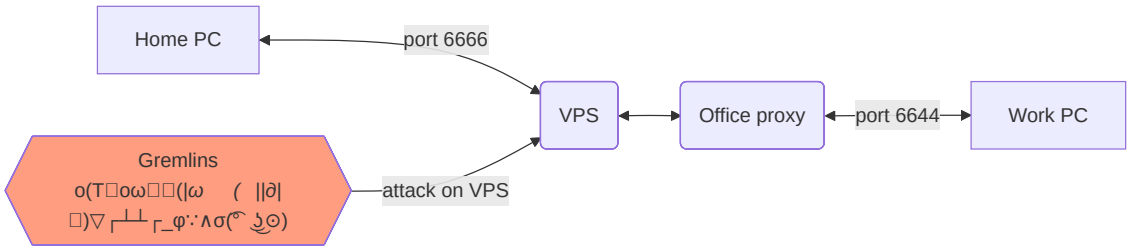
HopBit — There and Back Again

This guide describes how to set up an SSH tunnel between two computers via an external gateway. A basic understanding of the `ssh` command (particularly the `-R` and `-p` options) is sufficient for following this guide.

The `corkscrew` utility is used to bypass internal firewalls that block direct SSH access to a VPS over the standard port 22. This can be useful in corporate environments where the IT or security department restricts outbound connections.

> ***Security note:*** *For better protection against unauthorized access, configure SSH key-based authentication and disable password logins. This is not covered in detail here.*

Network Layout



Hosts:

- **Home PC**
  - `home_ip`
  - `home_user`
- **VPS**
  - `vps_ip`
  - `vps_user`
- **Work PC**
  - `work_ip`
  - `work_user`

Ports:

- Random port 1 — **6666**
- Random port 2 — **6644**

Quick Reference

Tunnel from VPS to Home PC

1. On the Home PC, open a reverse SSH tunnel (keep it running):
   home@ `ssh -R 6666:localhost:22 vps_user@vps_ip`

2. From the VPS, connect to the Home PC:
   vps@ `ssh -CX home_user@localhost -p 6666`

Connect from Work PC to VPS

1. Install **corkscrew** on the Work PC: https://github.com/bryanpkc/corkscrew
2. Configure SSH on the Work PC, replacing `INTERNAL_PROXY_IP` and `INTERNAL_PROXY_PORT` with your office proxy details:

```
host name_vps
    HostName vps_ip
    Port 443
    User vps_user
    ProxyCommand /usr/local/bin/corkscrew INTERNAL_PROXY_IP
INTERNAL_PROXY_PORT %h %p

host name_home
    HostName localhost
    User home_user
    Port 6666
    ProxyJump name_vps
```

3. Connect to the VPS:
   work@ `ssh -CX name_vps`

Connect from Work PC to Home PC

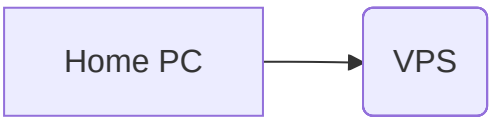
1. Ensure the Home PC has the reverse tunnel running:
   home@ `ssh -R 6666:localhost:22 vps_user@vps_ip`
2. From the Work PC:
   work@ `ssh -CX name_home`

Connect from Home PC to Work PC

1. On the Work PC, start a reverse SSH tunnel:
   work@ `ssh -R 6644:localhost:22 name_vps`
2. From the Home PC:
   home@ `ssh -CX vps_user@vps_ip`
   vps@ `ssh -CX work_user@localhost -p 6644`

Detailed Instructions

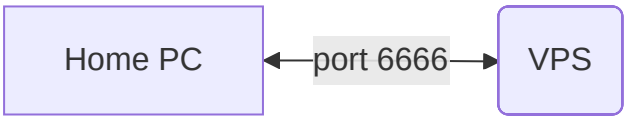
1. Connect to VPS



From the Home PC:
home@ `ssh vps_user@vps_ip`

> ***Initial setup on VPS (optional)***
>
> *Verify that networking, package management, and basic tools are working:*
>
> ***vps@*** *`apt update`*
> ***vps@*** *`apt install mc htop`*
>
> *If your VPS provider gives you only the* `root` *account:*
>
> ```
> sudo useradd vps_user
> sudo usermod -aG sudo vps_user
> sudo usermod -aG root vps_user
> ```
>
> *Disable direct root login in* `/etc/ssh/sshd_config` *:*
>
> ```
> PermitRootLogin no
> ```
>
> *Restart the SSH service:*
>
> ```
> sudo service ssh restart
> ```

2. Reverse Tunnel from VPS to Home PC



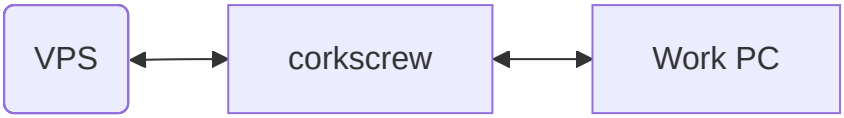
A VPS cannot initiate an SSH connection to a home machine with a private (NAT) IP address. Instead, the Home PC must establish a reverse tunnel **to the VPS**.

1. Open Remonte tunnel on Home PC (should be running):
   home@ `ssh -R 6666:localhost:22 vps_user@vps_ip`
2. Connect to Home PC from VPS:
   vps@ `ssh -CX home_user@localhost -p 6666`
3. Keep the tunnel alive automatically:

autossh ins't standart util

home@ `sudo apt install autossh`
home@ `autossh -f -N -R 6666:localhost:22 vps_user@vps_ip`

3. Connect from Work PC to VPS



If the office network restricts outbound SSH:

1. Install corkscrew:
   https://github.com/bryanpkc/corkscrew
2. Configure SSH on the Work PC:

```
host name_vps
    HostName vps_ip
    Port 443
    User vps_user
    ProxyCommand /usr/local/bin/corkscrew INTERNAL_PROXY_IP
INTERNAL_PROXY_PORT %h %p
```

3. Connect:
   work@ `ssh -CX name_vps`

4. Connect from Home PC to Work PC

1. On the Work PC:
   work@ `ssh -R 6644:localhost:22 name_vps`
2. On the Home PC:
   home@ `ssh -CX vps_user@vps_ip`
   vps@ `ssh -CX work_user@localhost -p 6644`

SSH Config Examples

Home PC

```
host name_vps
    HostName vps_ip
    User vps_user

host name_vps_R
    HostName vps_ip
    User vps_user
    RemoteForward 6666 localhost:22

host *
```

```
    ForwardX11 yes
    Compression yes
```

Work PC

```
host name_vps
    HostName vps_ip
    Port 443
    User vps_user
    ProxyCommand /usr/local/bin/corkscrew 192.168.172.129 3128 %h %p

host name_vps_R
    HostName vps_ip
    User vps_user
    RemoteForward 6644 localhost:22

host name_home
    HostName localhost
    User home_user
    Port 6666
    ProxyJump name_vps

host *
    ForwardX11 yes
    Compression yes
```

VPS

```
host name_home
    HostName localhost
    User home_user
    Port 6666

host name_work
    HostName localhost
    User work_user
    Port 6644

host *
    ForwardX11 yes
    Compression yes
```

Using `autossh`

```
sudo apt install autossh
export AUTOSSH_DEBUG=1
export AUTOSSH_GATETIME=0
```

```
export AUTOSSH_PORT=20037
autossh -f -N vps_user@vps_ip -R 6666:127.0.0.1:22
```