

SSH Local Port Forwarding

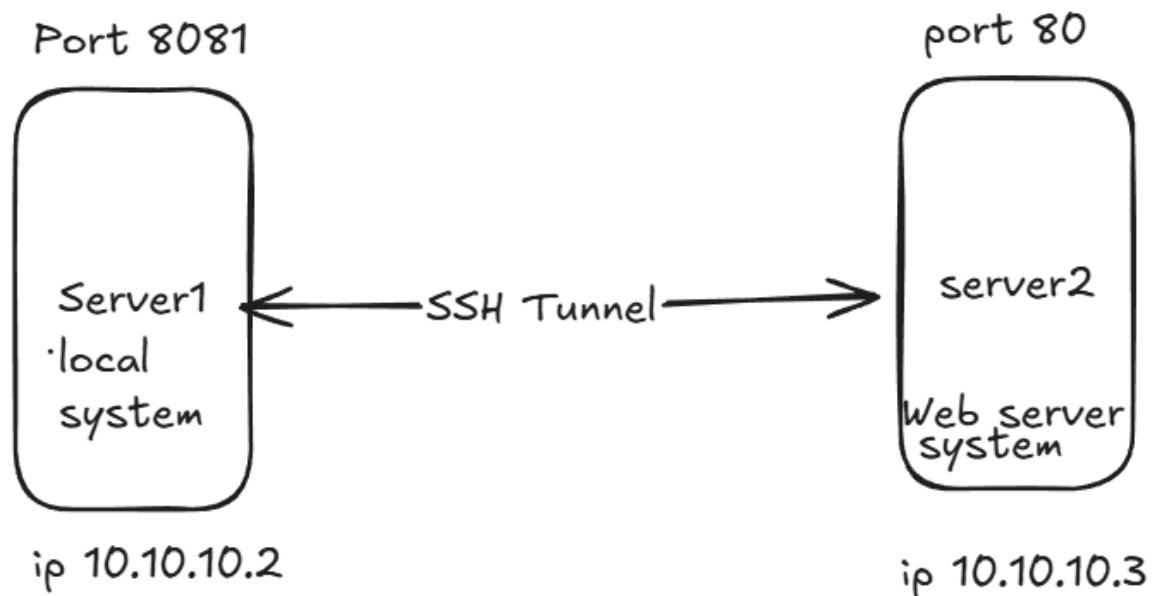
Includes:

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- Technology: Linux, SSH, Nginx
- Environment: Local Virtual Machines
- Date 15-12-2025

Introduction

This document demonstrates SSH Local Port Forwarding using two local virtual machines. The goal is to securely access a remote web service that is not publicly accessible, using an encrypted SSH tunnel.

Lab Architecture Diagram



Explanation:

- Client forwards local port 8081
- SSH tunnel connects to server via port 22
- Nginx listens on localhost:80
- Service is not exposed externally

Lab Setup

Include:

- Two local VMs
- OS: Ubuntu
- SSH Port: 22
- Web Service: Nginx (Port 80)

Step-by-Step Implementation (VERY IMPORTANT)

◆ Step 1: Verify Web Service

Activities Terminal Dec 15 04:46

vboxuser@server2: ~

```
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2025-12-14 19:50:25 IST; 8h ago
       Docs: man:nginx(8)
   Process: 522 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
  Process: 573 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (code=exited, status=0/SUCCESS)
 Main PID: 585 (nginx)
    Tasks: 2 (limit: 2268)
      Memory: 3.1M
        CPU: 263ms
       CGroup: /system.slice/nginx.service
           ├─585 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
           ├─587 "nginx: worker process"

Dec 14 19:50:22 server2 systemd[1]: Starting A high performance web server and a reverse proxy server...
Dec 14 19:50:25 server2 systemd[1]: Started A high performance web server and a reverse proxy server.
vboxuser@server2: ~
```

Explanation below screenshot:

This confirms that the Nginx service is running on the server VM.

◆ Step 2: Check Listening Port

Command:

```
sudo ss -tuln | grep :80
```

Explanation:

Nginx is bound to 127.0.0.1:80, meaning it is not accessible externally.

◊ Step 3: Direct Access Test (Fail Case)

Command:

```
curl http://10.10.10.3:80
```

Explanation:

Direct access fails because the service is bound to localhost or blocked by firewall.

◊ Step 4: Create SSH Local Port Forwarding

Command:

```
ssh -L 8081:localhost:80 vboxuser@10.10.10.3
```

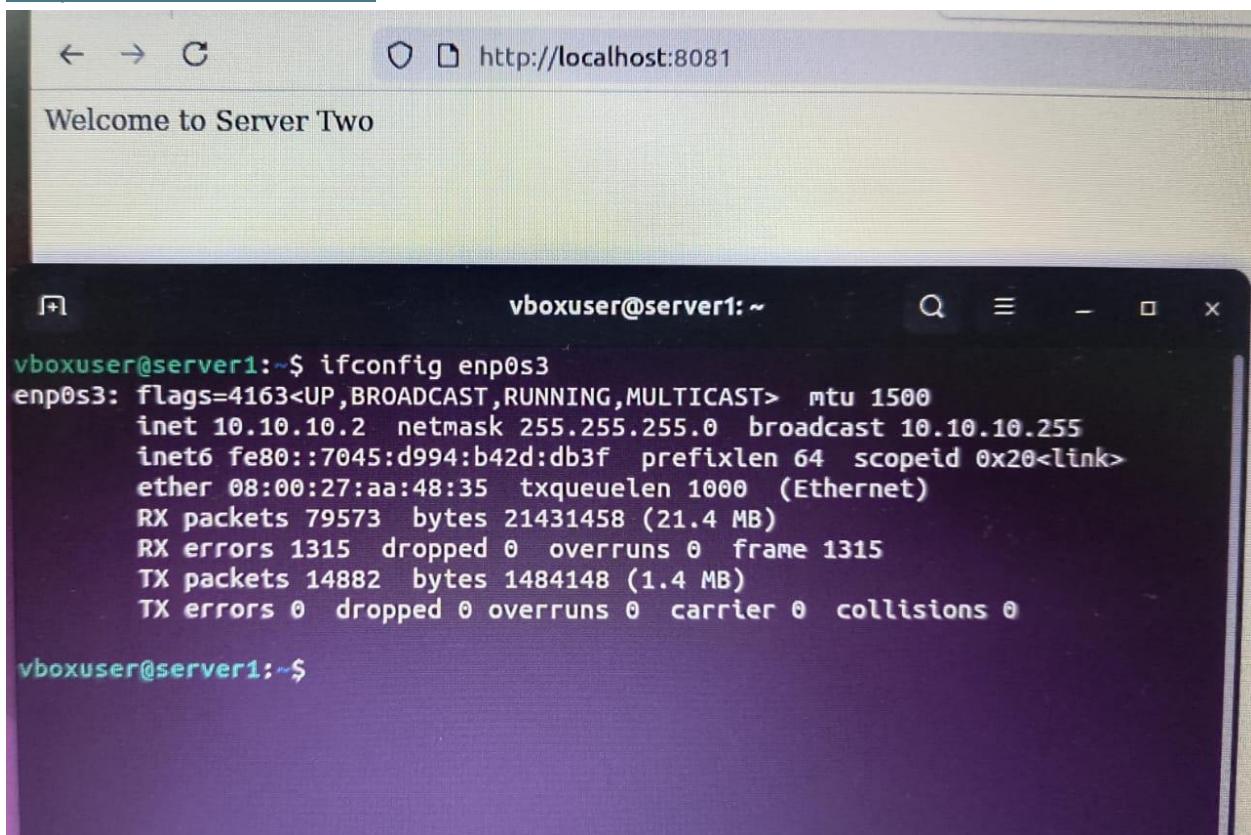
Explanation:

- 8081 → local port on client
- localhost:80 → remote service
- Traffic flows through SSH (port 22)

◊ Step 5: Access Service Locally

Browser URL:

<http://localhost:8081>



A screenshot of a terminal window titled "vboxuser@server1:~". The window shows the output of the "ifconfig" command. The output details the configuration of the "enp0s3" interface, including its flags (UP, BROADCAST, RUNNING, MULTICAST), MTU (1500), IP address (10.10.10.2), subnet mask (255.255.255.0), broadcast address (10.10.10.255), and MAC address (08:00:27:aa:48:35). It also lists statistics for RX and TX packets, errors, and collisions.

```
vboxuser@server1:~$ ifconfig enp0s3
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.10.10.2 netmask 255.255.255.0 broadcast 10.10.10.255
              inet6 fe80::7045:d994:b42d:db3f prefixlen 64 scopeid 0x20<link>
                ether 08:00:27:aa:48:35 txqueuelen 1000 (Ethernet)
                  RX packets 79573 bytes 21431458 (21.4 MB)
                  RX errors 1315 dropped 0 overruns 0 frame 1315
                  TX packets 14882 bytes 1484148 (1.4 MB)
                  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

vboxuser@server1:~$
```

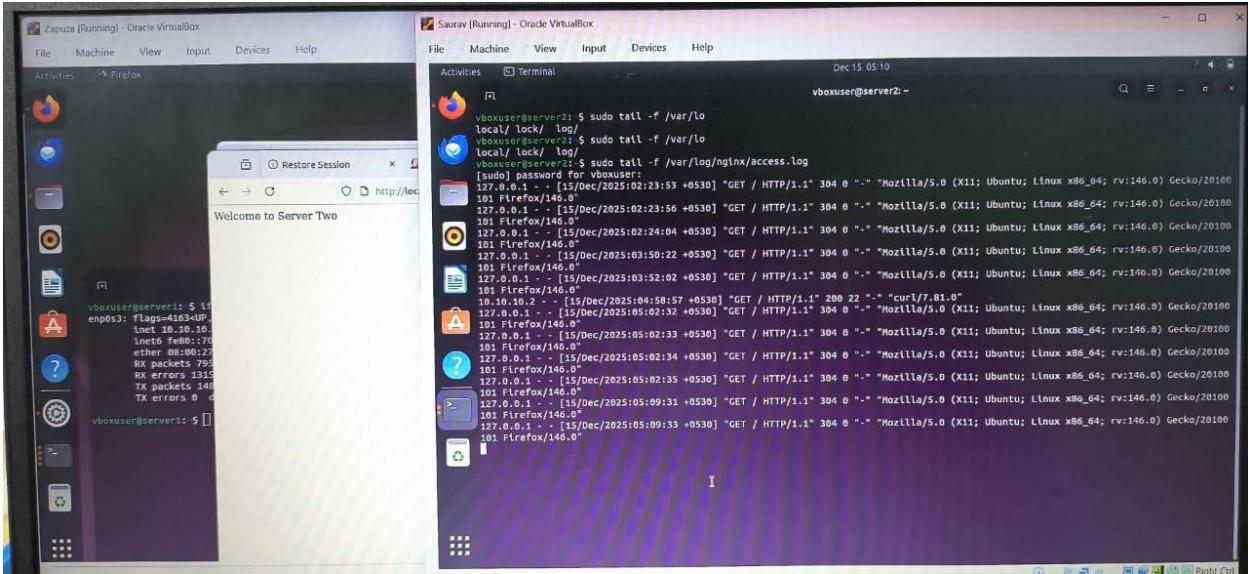
Explanation:

The web service is successfully accessed locally via SSH tunnel.

◊ Step 6: Verify Server Logs

Command:

```
sudo tail -f /var/log/nginx/access.log
```



Explanation:

The client IP appears as 127.0.0.1 because SSH forwarding terminates locally on the server.

End Result / Conclusion

Example: This lab proves that SSH Local Port Forwarding allows secure access to internal services without exposing them publicly. Only users with SSH access can reach the service, making it suitable for production environments.