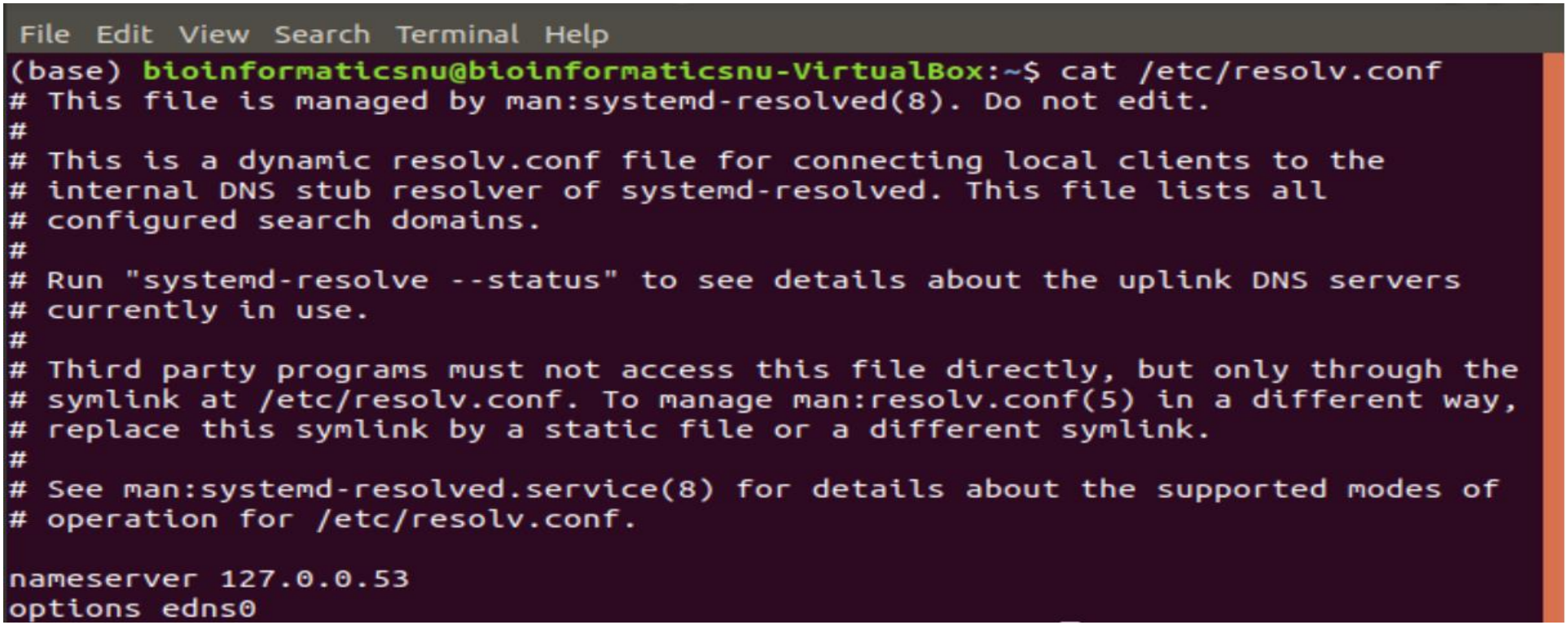
Scenario 2

Step 1: Verify DNS Resolution

A - Check the DNS server:

Output : 127.0.053

This means that system-resolved is managing DNS.



B – check with nslookup:

Output : server can't find internal.example.com: NXDOMAIN

This means the domain doesn't resolve with current DNS.

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ nslookup internal.exampl
e.com
Server:         127.0.0.53
Address:        127.0.0.53#53

** server can't find internal.example.com: NXDOMAIN
```

C – check with google DNS (8.8.8.8)

This is an internal domain, so the public DNS won't know it

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ nslookup internal.exampl
e.com 8.8.8.8
Server:         8.8.8.8
Address:        8.8.8.8#53

** server can't find internal.example.com: NXDOMAIN
```

2. Diagnose Service Reachability

Since DNS fails, you can't reach the service yet. But if you knew the IP (e.g., 192.168.1.100), you could test:

A – Check id web port (80/443) is open:

If connection succeeds, the service is up but DNS is broken.

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ telnet 192.168.1.100 80
Trying 192.168.1.100...
telnet: Unable to connect to remote host: Connection refused
```

B - Test with curl (If DNS Worked)

fail with Could not resolve host.

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ curl -v http://internal.
example.com
* Rebuilt URL to: http://internal.example.com/
* Could not resolve host: internal.example.com
* Closing connection 0
curl: (6) Could not resolve host: internal.example.com
```

3 - List All Possible Causes (Hypothetical)

Since internal.example.com fails in DNS, possible issues:

1. **DNS Misconfiguration**
    - **Wrong DNS server in /etc/resolv.conf**
    - **Missing DNS record in internal DNS**
2. **Network Issues**
    - **Firewall blocking DNS queries (port 53)**
    - **Internal DNS server down**
3. **Local System Issues**
    - **systemd-resolved not forwarding requests correctly**
    - **/etc/hosts overriding DNS**

4. Propose and Apply Fixes

Fix 1: Use Correct Internal DNS Server

Since Google DNS (8.8.8.8) fails, switching to the internal DNS (e.g., 10.0.0.1) (Bonus)

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ sudo nano /etc/systemd/r
esolved.conf
```

```
File  Edit  View  Search  Terminal  Help
  GNU nano 2.9.3                /etc/systemd/resolved.conf                Modified

#  This file is part of systemd.
#
#  systemd is free software; you can redistribute it and/or modify it
#  under the terms of the GNU Lesser General Public License as published by
#  the Free Software Foundation; either version 2.1 of the License, or
#  (at your option) any later version.
#
# Entries in this file show the compile time defaults.
# You can change settings by editing this file.
# Defaults can be restored by simply deleting this file.
#
# See resolved.conf(5) for details

[Resolve]
#DNS=10.0.0.1
#FallbackDNS=
#Domains=example.com
#LLMNR=no
#MulticastDNS=no
#DNSSEC=no
#Cache=yes
#DNSStubListener=yes


^G Get Help    ^O Write Out   ^W Where Is    ^K Cut Text    ^J Justify
^X Exit        ^R Read File   ^\ Replace     ^U Uncut Text  ^T To Spell
```

Then restart systemd-resolved:

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ sudo systemctl restart s
ystemd-resolved
```

Fix 2 : Check the firewall

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ sudo ufw status
Status: inactive
```

Fix 3: Bypass DNS with /etc/hosts (Bonus 1)

The IP we will add is 192.168.1.100

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ echo "192.168.1.100 inte
rnal.example.com" | sudo tee -a /etc/hosts
192.168.1.100 internal.example.com
```

Problem solved :

Now the nslookup internal.example.com will work

```
(base) bioinformaticsnu@bioinformaticsnu-VirtualBox:~$ nslookup internal.exampl
e.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   internal.example.com
Address: 192.168.1.100
```