

1. Verify DNS Resolution

- Checked the system's DNS configuration using `cat /etc/resolv.conf` to identify the configured nameserver.
- Used `dig internal.example.com` and `dig @8.8.88 internal.example.com` to test DNS resolution.
- Both commands returned `NXDOMAIN`, indicating the domain could not be resolved.
- This points to two possible issues:
 - There is no public DNS record for `internal.example.com`.
 - The system is not configured to use the correct internal DNS server responsible for resolving internal domains.

```
ubuntu@ip-172-31-6-26:~$ dig @8.8.8.8 internal.example.com

; <<>> DiG 9.18.30-0ubuntu0.24.04.2-Ubuntu <<>> @8.8.8.8 internal.example.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 31820
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;internal.example.com.      IN      A

;; AUTHORITY SECTION:
example.com.                1800    IN      SOA     ns.icann.org. noc.dns.icann.org. 2025011626 7200 3600 1209600 3600

;; Query time: 90 msec
;; SERVER: 8.8.8.8#53(8.8.8.8) (UDP)
;; WHEN: Mon Apr 28 18:47:21 UTC 2025
;; MSG SIZE rcvd: 105

ubuntu@ip-172-31-6-26:~$ dig internal.example.com 8.8.8.

; <<>> DiG 9.18.30-0ubuntu0.24.04.2-Ubuntu <<>> internal.example.com 8.8.8.
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 52913
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;internal.example.com.      IN      A

;; AUTHORITY SECTION:
example.com.                3277    IN      SOA     ns.icann.org. noc.dns.icann.org. 2025011626 7200 3600 1209600 3600

;; Query time: 91 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Mon Apr 28 19:02:25 UTC 2025
;; MSG SIZE rcvd: 105

;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 25296
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;8.8.8.                     IN      A

;; AUTHORITY SECTION:
.                            1943    IN      SOA     a.root-servers.net. nstld.verisign-grs.com. 2025042801 1800 900 604800 86400

;; Query time: 4 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Mon Apr 28 19:02:25 UTC 2025
;; MSG SIZE rcvd: 109
```

```
ubuntu@ip-172-31-6-26:~$ cat /etc/resolv.conf | grep server
# Run "resolvectl status" to see details about the uplink DNS servers
nameserver 127.0.0.53
ubuntu@ip-172-31-6-26:~$
```

2- Diagnose Service Reachability:

Used the resolved IP to check service ports with `telnet`.

Command: `telnet <resolved-ip> 80` and `telnet <resolved-ip> 443`.

Output: `telnet: Unable to connect to remote host: Connection refused`.

Logged into the server and ran `ss -tln` to verify listening services.

Output: Server was not listening on port 80 or 443.

```
ubuntu@ip-172-31-6-21:~$ ss -tln
Netid      State      Recv-Q     Send-Q     Local Address:Port      Peer Address:Port      Process
udp        UNCONN     0           0           127.0.0.1:323           0.0.0.0:*
udp        UNCONN     0           0           127.0.0.54:53           0.0.0.0:*
udp        UNCONN     0           0           127.0.0.53%lo:53        0.0.0.0:*
udp        UNCONN     0           0           172.31.6.21%enx0:08      0.0.0.0:*
udp        UNCONN     0           0           [::]:323                [::]:*
tcp        LISTEN     0           4096        127.0.0.53%lo:53        0.0.0.0:*
tcp        LISTEN     0           4096        127.0.0.54:53           0.0.0.0:*
tcp        LISTEN     0           128        127.0.0.1:6010          0.0.0.0:*
tcp        LISTEN     0           128        [::]:6010               [::]:*
tcp        LISTEN     0           4096        *:22                     *:*
```

```
ubuntu@ip-172-31-6-26:~$ telnet 63.177.76.56
Trying 63.177.76.56...
telnet: Unable to connect to remote host: Connection refused
ubuntu@ip-172-31-6-26:~$ telnet 63.177.76.56 80
Trying 63.177.76.56...
telnet: Unable to connect to remote host: Connection refused
ubuntu@ip-172-31-6-26:~$ telnet 63.177.76.56 443
Trying 63.177.76.56...
telnet: Unable to connect to remote host: Connection refused
ubuntu@ip-172-31-6-26:~$
```

3. Possible Causes

- **DNS Problems:**
 - Incorrect DNS server configured in `/etc/resolv.conf` or via `systemd-resolved`.
 - Missing or incorrect DNS record for `internal.example.com`.
- **Network Problems:**
 - Firewall blocking DNS traffic (port 53) or web traffic (ports 80/443).
- **Web Server Problems:**
 - Web server is down or not running.

4. Propose and Apply Fixes

- **DNS Problems:**

A) Incorrect DNS Server Configured

- Check which DNS servers are currently set.
Cat `cat /etc/resolv.conf`

Fixed by

Edit `/etc/resolv.conf` with the correct DNS server.

b) incorrect DNS record

Check DNS records with `dig` and check ip returned

Fixed by: Update the DNS record on the internal DNS server

- **Network**

A) Firewall Blocking DNS or Web Traffic

Test DNS and web port connectivity:

```
nc -vz ip > 80
```

```
nc -vz ip > 443
```

Fix:

- Open required ports on firewall.

```
sudo firewall-cmd --add-port=53/udp --permanent
```

```
sudo firewall-cmd --add-port=80/tcp --permanent
```

```
sudo firewall-cmd --add-port=443/tcp --permanent
```

```
sudo firewall-cmd --reload
```

- **Web server**

A) Web Server is Down

Check if service is active.

```
sudo systemctl status nginx
```

Fix:

- Start the web server.

```
sudo systemctl start nginx
```

