Q2 : Scenario

First let's make first Bonus to work with it and configure a local **/etc/hosts** entry to bypass DNS for testing by adding the domain in **/etc/hosts**, in addition: there's a running project in my local-host

```
127.0.0.1       visa.local
127.0.0.1       localhost
127.0.1.1       rawash-Lenovo-Z50-70
127.0.0.1 social.example.com
127.0.0.1 internal.example.com
# The following lines are desirable for IPv6 capable hosts
::1     ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

(**127.0.0.1**).

1. Verify DNS Resolution:

Now we need to check the Domain access from main server (Using: **/etc/resolv.conf**) and from external server (Like: **8.8.8.8**) and to do this we need to use **dig** Command (domain information groper) and compare the output like in the image

```
rawash@rawash-Lenovo-Z50-70:/media/rawash/New Volume/Dev/Fawry Intern/Fawry-N-De
vOps-Internship$ dig internal.example.com

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> internal.example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 20858
;; flags: qr aa rd ra ad; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

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

;; ANSWER SECTION:
internal.example.com.   0       IN      A       127.0.0.1

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53) (UDP)
;; WHEN: Mon Apr 28 14:57:27 EEST 2025
;; MSG SIZE  rcvd: 65

rawash@rawash-Lenovo-Z50-70:/media/rawash/New Volume/Dev/Fawry Intern/Fawry-N-De
vOps-Internship$
```

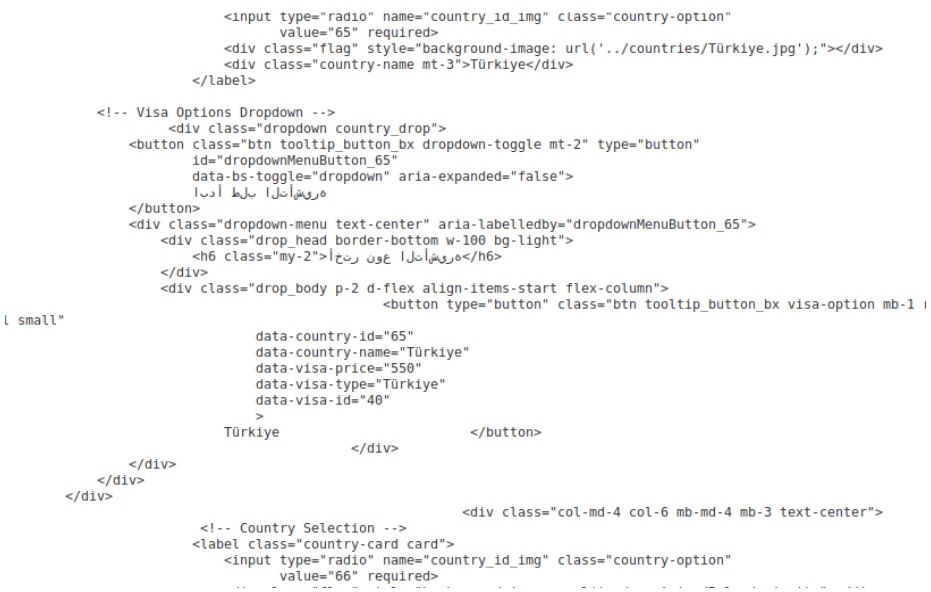
```
rawash@rawash-Lenovo-Z50-70:/media/rawash/New Volume/Dev/Fawry Intern/Fawry-N-De
vOps-Internship$ dig @8.8.8.8 internal.example.com

; <<>> DiG 9.18.30-0ubuntu0.22.04.2-Ubuntu <<>> @8.8.8.8 internal.example.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 53484
;; 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.
 2025011625 7200 3600 1209600 3600

;; Query time: 145 msec
;; SERVER: 8.8.8.8#53(8.8.8.8) (UDP)
;; WHEN: Mon Apr 28 14:57:24 EEST 2025
;; MSG SIZE  rcvd: 105

rawash@rawash-Lenovo-Z50-70:/media/rawash/New Volume/Dev/Fawry Intern/Fawry-N-De
vOps-Internship$
```

So, as we see we can't see the answer from @8.8.8.8 but we see the answer from local storage, so that's means the DNS not in global.

2. Diagnose Service Reachability:

- Confirm whether the web service (port **80** or **443**) is reachable on the resolved IP.
- Use **curl, telnet, netstat,** or **ss** to find if the service is listening and responding.

So first I will check if the server is reachable using **curl** command



As we see in image the curl fount the local project, now let's check the ports **80** and **443** using (**telnet)**, and expected to be port **80** is response and **443** not response because I didn't run SSL encryption to the local server

```
rawash@rawash-Lenovo-Z50-70:/media/rawash/New Volume/Dev/Fawry Intern/Fawry-N-DevOps-Internship$ telnet internal.example.com 443
Trying 127.0.0.1...
telnet: Unable to connect to remote host: Connection refused
rawash@rawash-Lenovo-Z50-70:/media/rawash/New Volume/Dev/Fawry Intern/Fawry-N-DevOps-Internship$ telnet internal.example.com 80
Trying 127.0.0.1...
Connected to internal.example.com.
Escape character is '^]'.

]
HTTP/1.1 400 Bad Request
Date: Mon, 28 Apr 2025 12:06:02 GMT
Server: Apache/2.4.52 (Ubuntu)
Content-Length: 301
Connection: close
Content-Type: text/html; charset=iso-8859-1
```

So, as we see the port 80 is open but the error because the server can't handle the request.

3. Trace the Issue – List All Possible Causes

- Your goal here is to identify and list all potential reasons why **internal.example.com** might be unreachable, even if the service is up and running. Consider both DNS and network/service layers.

1. Error in the DNS settings on the device or server: may be the DNS record redirect to another IP.
2. Problem with the **/etc/resolv.conf** file: may be the error because the Domain is not in **/etc/resolv.conf** , or
3. Problem with the internal DNS server itself, the internal DNS can't redirect the right project.
4. Network issue (firewall, routing).

4. Propose and Apply Fixes ☑ For each potential issue you identified in Point 3, do the following:

- Explain how you would confirm it's the actual root cause
- Show the exact Linux command(s) you would use to fix it

1. The **/etc/resolv.conf** file has an incorrect DNS server. After reading the file**: /etc/resolv.conf** using **cat** command

   cat /etc/resolv.conf

   Edit the file using **sudo**

   sudo nano /etc/resolv.conf and add a correct server.

2. The internal DNS server isn't resolving the domain.

   After **dig internal.example.com**.

   Talk to your network administrator or add an external server to test.

3. The service isn't running or the port isn't open.

Using ss

ss -tuln

Restart the service using **systemctl** or **systemd**:

sudo systemctl restart httpd, nginx or apache (depending on the server type).

(**Note:** to ignore this to happen again we can use enable to auto run if the server restarted or cracked or anything may be happened and we need to retrun the server).

4. The firewall is blocking access. Using iptables

sudo iptables -L

, and edit the rules or temporarily disable the firewall to test.

Bonus:

1- Configure a local /etc/hosts entry to bypass DNS for testing:

We already make this as first step:

```
127.0.0.1       visa.local
127.0.0.1       localhost
127.0.1.1       rawash-Lenovo-Z50-70
127.0.0.1 social.example.com
127.0.0.1 internal.example.com
# The following lines are desirable for IPv6 capable hosts
::1     ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

2- **Show how to persist DNS server settings using systemd-resolved or NetworkManager.**

Using **systemd-resolved** we can use:

sudo systemctl restart systemd-resolved