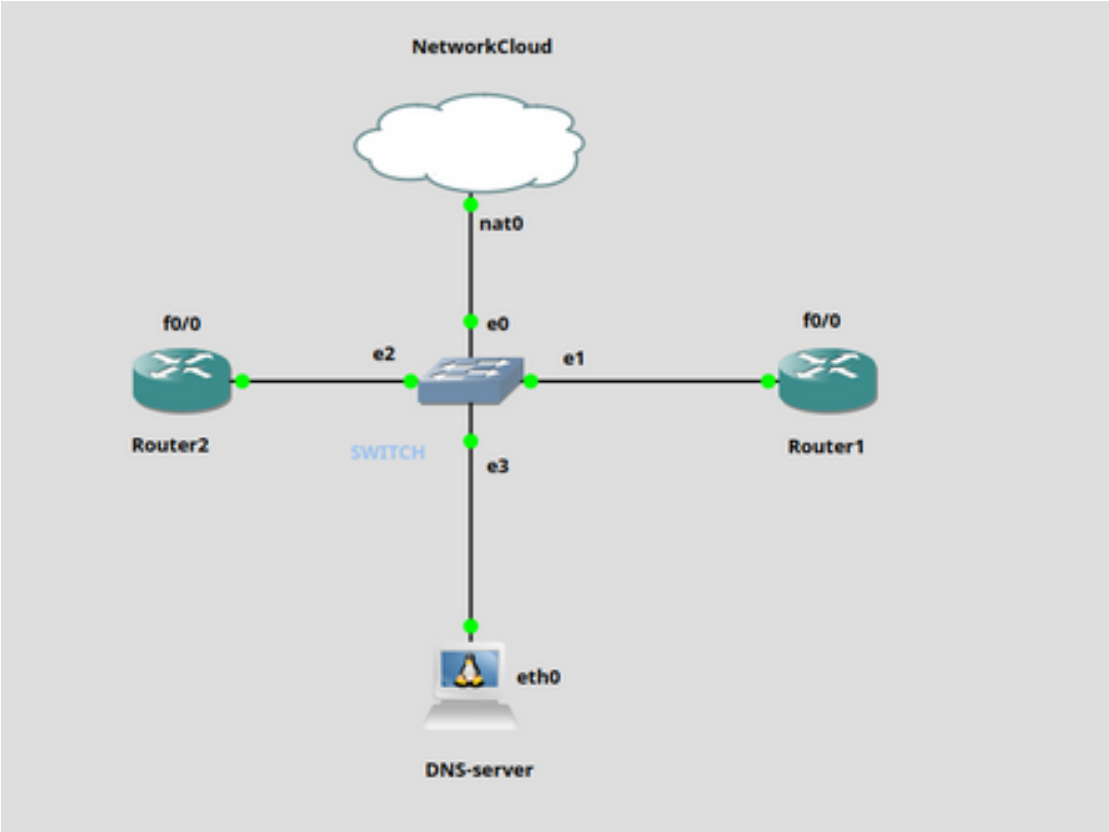
5. DNS Server Mapping Module: Create a DNS server to map the domain names to IP addresses and evaluate DNS resolution efficiency.



 # Background Research for the problem statement:

- **Gained a foundational understanding of Domain Name System and its role in translating human-readable domain names.**
- **Studied DNS resolution process.**
- **Understood about the DNS resolution efficiency.**
- **Studied the Time to Live values associated with DNS records.**
- **Understood how to pull Docker images for dnsmasq.**
- **dnsmasq is free software providing Domain Name System (DNS) caching, a Dynamic Host Configuration Protocol (DHCP) server, router advertisement, and network boot features intended for small computer networks.**

Current DNS server configuration:

```
root@DNS-server:~# cat /etc/hosts
127.0.1.1       DNS-server
127.0.0.1       localhost
::1     localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
192.168.122.201 r1.router r1
192.168.122.202 r2.router r2
```

#Observations:

- **Successful Implementation:**
  - Observed the successful implementation and configuration of the DNS server.
  - Confirmed that the DNS server is operational and responsive.
  - Checked the accuracy of DNS record configurations.

- **Query Response Time:**
  - Showed the efficiency of DNS resolution in translating domain names to IP addresses.

```
R2#ping r1.router
Translating "r1.router"...domain server (192.168.122.250) [OK]

Translating "r1.router"...domain server (192.168.122.250) [OK]

Translating "r1.router"...domain server (192.168.122.250) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.122.201, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 8/9/12 ms
```

```
R2#ping r1
Translating "r1"...domain server (192.168.122.250) [OK]

Translating "r1"...domain server (192.168.122.250) [OK]

Translating "r1"...domain server (192.168.122.250) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.122.201, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 84/90/100 ms
```