My home ip range is 192.168.232.3 to 192.168.232.127 and my default gateway is 192.168.232.2

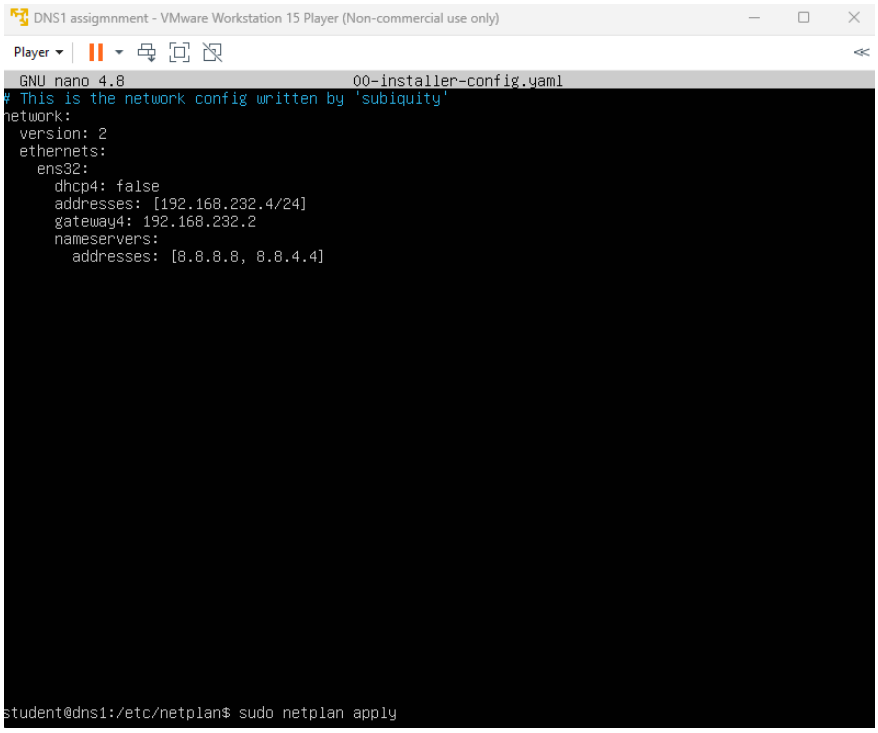
DNS setup and configuration

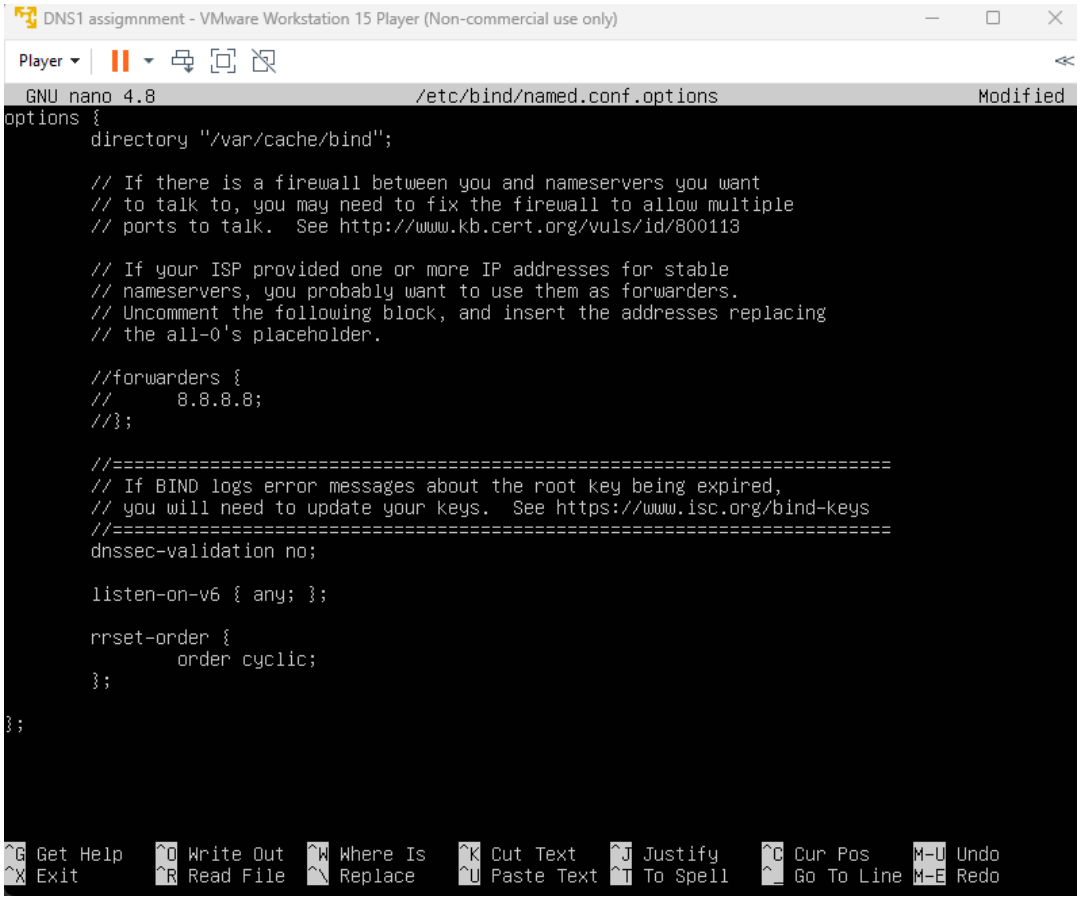
Q1 The company will need 2 primary DNS (one of the primary DNS will be for the subdomain), 2 secondary DNS.

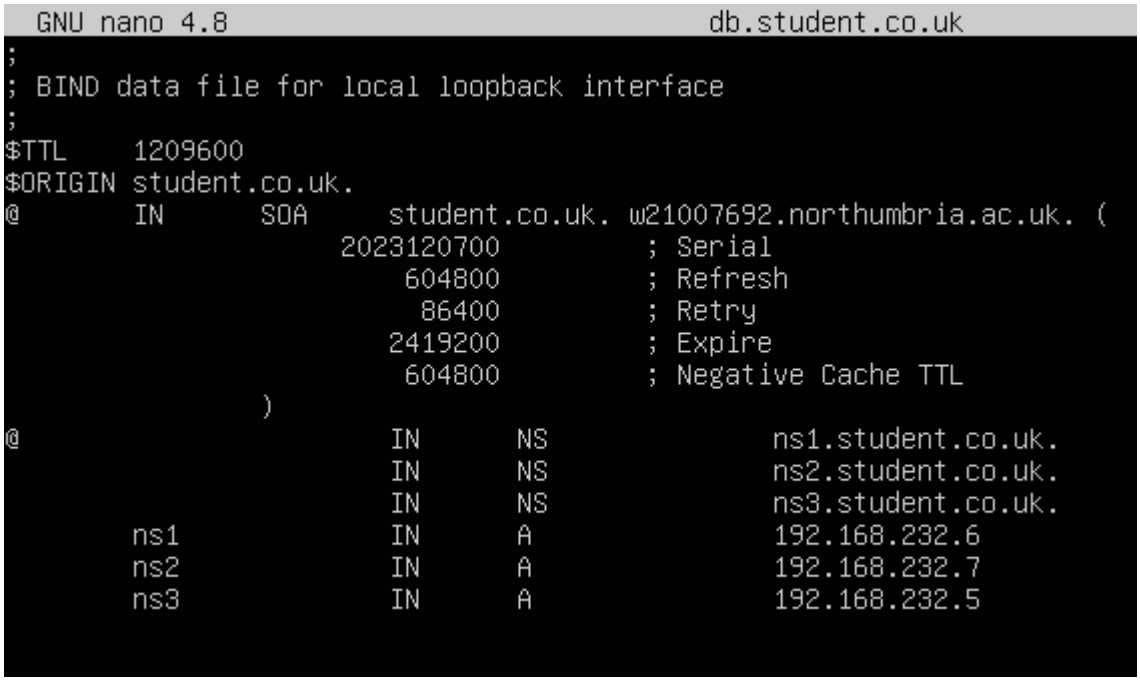
Make sure that Ip addresses for each server are different, install bind on all the servers, and the gateway address will be the same for all the servers (192.168.100.254). The primary DNS 1 will hold the authoritative copies of the zone data, in this case “unn.co.uk”, “tech.co.uk”, whereas the subdomain will hold the authoritative zone files for “staff.unn.co.uk” to help balance the load. The secondary DNS replicates the zone information from the primary server through zone transfers so that if the primary server fails then the secondary servers can take over. Make sure you limit access to zones by using allow-query.

Primary server 1 set-up

- Set up the DNS server IP and gateway in the YAML configuration file (00 Installer Config YAML or 10 Cloud-Init YAML) which are in /etc/netplan. To save modifications type sudo netplan apply.
- Add forwarder 8.8.8.8 to the file named.conf.options located in /etc/bind/ and restart bind to apply changes(sudo systemctl restart bind9).
- Add zones “unn.co.uk”, “tech.co.uk”, “staff.unn.co.uk” and “168.192.in-addr.arpa” to the file named.conf.local(located in /etc/bind) . The zones “unn.co.uk”, “tech.co.uk” and “168.192.in-addr.arpa” will be type Master but staff.unn.co.uk will be type slave because db.staff.unn.co.uk is located in the subdomain server.
- Specify the master IP for “staff.unn.co.uk” as the IP address of the subdomain server.
- For zones “unn.co.uk”, “tech.co.uk” and “168.192.in-addr.arpa” specify their database location which is /etc/bind/db.unn.co.uk for unn.co.uk and /etc/bind/db.tech.co.uk for tech.co.uk and /etc/bind/db.168.192.in-addr.arpa for 168.192.in-addr.arpa
- For all the zones ensure that allow-transfer and allow-query include the IP addresses of Secondary DNS 1 and Secondary DNS 2 for successful zone transfers.
- In the zone files, specify the name server entries for “db.unn.co.uk” and “db.tech.co.uk.”
- Restart the bind after every change.


DNS1 assigmnment - VMware Workstation 15 Player (Non-commercial use only)
Player
GNU nano 4.8 00-installer-config.yaml
This is the network config written by 'subiquity'
network:
version: 2
ethernets:
ens32:
dhcp4: false
addresses: [192.168.232.4/24]
gateway4: 192.168.232.2
nameservers:
addresses: [8.8.8.8, 8.8.4.4]
student@dns1:/etc/netplan$ sudo netplan apply


DNS1 assigmnment - VMware Workstation 15 Player (Non-commercial use only)
Player
GNU nano 4.8 /etc/bind/named.conf.options Modified
options {
directory "/var/cache/bind";
// If there is a firewall between you and nameservers you want
// to talk to, you may need to fix the firewall to allow multiple
// ports to talk. See http://www.kb.cert.org/vuls/id/800113
// If your ISP provided one or more IP addresses for stable
// nameservers, you probably want to use them as forwarders.
// Uncomment the following block, and insert the addresses replacing
// the all-0's placeholder.
//forwarders {
// 8.8.8.8;
//};
//==
// If BIND logs error messages about the root key being expired,
// you will need to update your keys. See https://www.isc.org/bind-keys
//==
dnssec-validation no;
listen-on-v6 { any; };
rrset-order {
order cyclic;
};
};
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos M-U Undo
^X Exit ^R Read File ^\ Replace ^U Paste Text ^T To Spell ^_ Go To Line M-E Redo



Primary server 2 set-up(subdomain)

- Modify ip and gateway same way I did it in the first step of primary server 1 configuration but use different ip.
- Add forwarder 8.8.8.8 to the file named.conf.options located in /etc/bind/ and restart bind to apply changes
- In named.conf.local on the subdomain server, add the "staff.unn.co.uk" zone as a master type.
- Specify the file location as /etc/bind/db.staff.unn.co.uk.

- Set allow-query to the IP address of the primary DNS (to allow connection) and set notify to No.
- Create the name server entry for "staff.unn.co.uk" in the db.staff.unn.co.uk file.
- Restart the bind after every change.

```
# This is the network config written by 'subiquity'
network:
  version: 2
  ethernets:
    ens32:
      dhcp4: false
      addresses: [192.168.232.5/24]
      gateway4: 192.168.232.2
      nameservers:
        addresses: [8.8.8.8, 8.8.4.4]
```

```
options {
        directory "/var/cache/bind";

        // If there is a firewall between you and nameservers you want
        // to talk to, you may need to fix the firewall to allow multiple
        // ports to talk.  See http://www.kb.cert.org/vuls/id/800113

        // If your ISP provided one or more IP addresses for stable
        // nameservers, you probably want to use them as forwarders.
        // Uncomment the following block, and insert the addresses replacing
        // the all-0's placeholder.

        // forwarders {
        //      8.8.8.8;
        // };

        //========================================================================
        // If BIND logs error messages about the root key being expired,
        // you will need to update your keys.  See https://www.isc.org/bind-keys
        //========================================================================
        dnssec-validation no;

        listen-on-v6 { any; };
};
```

```
 GNU nano 4.8                                    named.conf.local
//
// Do any local configuration here
//

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "greater.student.co.uk" {
        type master;
        file "/etc/bind/db.greater.student.co.uk";
        notify no;
        allow-transfer {
                192.168.232.4;
        };
        allow-query {
                192.168.232.4;
        };
};
```

```
 GNU nano 4.8                              db.greater.student.co.uk
;
; BIND data file for local loopback interface
;
$TTL    604800
$ORIGIN greater.student.co.uk.
@       IN      SOA     greater.student.co.uk. w21007692.northumbria.ac.uk. (
                     2023120700         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@               IN      NS      ns1.student.co.uk.
@               IN      NS      ns2.student.co.uk.
ns4             IN      A       192.168.232.5_
```

Secondary dns 1

- Follow the step 1 and step 2 of Primary DNS setup explanation.
- Add “unn.co.uk”, “tech.co.uk”, “staff.unn.co.uk” and “168.192.in-addr.arpa” zones to named.conf.local and set all types to slave, specify the master IP as the IP of the primary DNS and allow query to localnets
- Restart the bind after every change.

```
# This is the network config written by 'subiquity'
network:
  version: 2
  ethernets:
    ens32:
      dhcp4: false
      addresses: [192.168.232.6/24]
      gateway4: 192.168.232.2
      nameservers:
        addresses: [8.8.8.8, 8.8.4.4]
```

```
  GNU nano 4.8                                  named.conf.local
//

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "student.co.uk" {
        type slave;
        file "db.student.co.uk";
        masters { 192.168.232.4; };
        allow-query {
                localnets;
        };
};

zone "greater.student.co.uk" {
        type slave;
        file "db.greater.student.co.uk";
        masters { 192.168.232.4; };
        allow-query {
                localnets;
        };
};

zone "168.10.in-addr.arpa" {
        type slave;
        file "db.168.10.in-addr.arpa";
        masters { 192.168.232.4; };
        allow-query {
                localnets;
        };
};
```

Secondary dns 2

- Like Secondary server 1, create Secondary DNS 2.
- Ensure a different static IP for Secondary DNS 2.
- Follow the same steps for network configuration, forwarders, and zone definition as Secondary DNS 1.

```
  GNU nano 4.8                          00-installer-config.yaml
# This is the network config written by 'subiquity'
network:
  version: 2
  ethernets:
    ens32:
      dhcp4: false
      addresses: [192.168.232.7/24]
      gateway4: 192.168.232.2
      nameservers:
        addresses: [8.8.8.8, 8.8.4.4]
```

```
  GNU nano 4.8                                named.conf.local

// Consider adding the 1918 zones here, if they are not used in your
// organization
//include "/etc/bind/zones.rfc1918";

zone "student.co.uk" {
        type slave;
        file "db.student.co.uk";
        masters { 192.168.232.4; };
        allow-query {
                localnets;
        };
};

zone "greater.student.co.uk" {
        type slave;
        file "db.greater.student.co.uk";
        masters { 192.168.232.4; };
        allow-query {
                localnets;
        };
};


zone "168.10.in-addr.arpa" {
        type slave;
        file "db.168.10.in-addr.arpa";
        masters { 192.168.232.4; };
        allow-query {
                localnets;
        };
};
```