

🌐 IT 네트워크 시스템 *IT Network Systems Administration*

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❖ - Worldskills Korea - Assessment Task (IT Network Systems) - ❁ [Written by NullBins]

- By default, the commands are executed as a root user.

[Project-1] <🐧 Linux Environments>

1. 네트워크 구성 (Network Configuration)

- ⚡ 서버 및 호스트 네트워크 IP 설정 호스트네임 변경 및 IP 주소 지정.

< Configuration >

- [DONG-R]

```
ip link show           # 네트워크 이더넷 이름 확인 (ex. ens3X | ens32, ens33)
```

```
vim /etc/network/interfaces
```

```
auto ens32 ens33
iface ens32 inet static
    address 117.121.35.100/24
iface ens33 inet static
    address 192.168.1.254/24
    dns-nameservers 192.168.1.1
```

```
vim /etc/resolv.conf
```

```
nameserver 192.168.1.1
domain donghyun.net
search donghyun.net
```

```
vim /etc/hosts
```

```
127.0.1.1 DONG-R.donghyun.net DONG-R
```

```
hostnamectl set-hostname DONG-R  
reboot
```

- [**DONG-SRV1**]

```
ip link show # 네트워크 이더넷 이름 확인 (ex. ens3X | ens32)
```

```
vim /etc/network/interfaces
```

```
auto ens32  
iface ens32 inet static  
    address 192.168.1.1/24  
    gateway 192.168.1.254  
    dns-nameservers 192.168.1.1 192.168.1.2
```

```
vim /etc/resolv.conf
```

```
nameserver 192.168.1.1  
nameserver 192.168.1.2  
domain donghyun.net  
search donghyun.net
```

```
vim /etc/hosts
```

```
127.0.1.1 DONG-SRV1.donghyun.net DONG-SRV1
```

```
hostnamectl set-hostname DONG-SRV1  
reboot
```

- [DONG-SRV2, DAE-R, DAE-SRV] -> 과제지를 참고하여 위처럼 동일하게 설정.

2. SAMBA AD 서비스 구성 (Samba Active Directory Service Configuration)

- ⚡ DONG-SRV1 // Samba Active Directory Service 구성 시 패키지 도구는 BIND9 및 SAMBA-AD-DC를 사용함.

< Configuration >

- [DONG-SRV1]

```
apt install bind9 krb5-user krb5-config winbind samba smbclient migrationtools  
ldb-tools -y
```

When users attempt to use Kerberos realm that principal belongs to, of a Kerberos service running on domain.

Default Kerberos version 5 realm:

DONGHYUN.NET

Configuring Kerberos Authentication
Enter the hostnames of Kerberos servers in the DONGHYUN.NET Kerberos
Kerberos servers for your realm:

DONG-SRV1.donghyun.net

<OK>

Configuring Kerberos Authentication
Enter the hostname of the administrative (password changing) server for the DONGHYUN.NET
Administrative server for your Kerberos realm:

DONG-SRV1.donghyun.net

<OK>

```
mv /etc/samba/smb.conf /etc/samba/smb.conf.bak
samba-tool domain provision --use-rfc2307 --interactive
```

```
root@DONG-SRV1:~# samba-tool domain provision --use-rfc2307 --interactive
Realm [DONGHYUN.NET]:
Domain [DONGHYUN]:
Server Role (dc, member, standalone) [dc]:
DNS backend (SAMBA_INTERNAL, BIND9_FLATFILE, BIND9_DLZ, NONE) [SAMBA_INTERNAL]: BIND9_DLZ
Administrator password:
Retype password:
```

```
cp /var/lib/samba/private/krb5.conf /etc/
```

```
vim /var/lib/samba/bind-dns/named.conf
```

```
dlz "donghyun.net" {
    database "dlopen /usr/lib/x86_64-linux-gnu/samba/bind9/dlz_bind9_16.so";
};
```

```
cat /var/lib/samba/bind-dns/named.txt | grep tkey >> /etc/bind/named.conf
```

```
vim /etc/bind/named.conf
```

```
// include "/etc/bind/named.conf.options";
// include "/etc/bind/named.conf.local";
include "/etc/bind/named.conf.default-zones";
include "/var/lib/samba/bind-dns/named.conf";

options {
    directory "/var/cache/bind";
    listen-on { any; };
    allow-query { any; };
    allow-update { any; };
    dnssec-validation no;
    tkey-gssapi-keytab "/var/lib/samba/bind-dns/dns.keytab";
};

zone "1.168.192.in-addr.arpa" {
    type master;
    file "192.rev";
};
```

```
zone "daeseong.net" {
    type forward;
    forwarders { 172.16.1.1; };
};
```

```
systemctl restart bind9
systemctl stop smbd nmbd winbind
systemctl disable smbd nmbd winbind
systemctl unmask samba-ad-dc
systemctl enable samba-ad-dc
systemctl restart samba-ad-dc
kinit Administrator
cd /usr/share/migrationtools/
```

```
vim migrate_common.ph
```

```
$NAMINGCONTEXT{'passwd'} = "ou=DONG";
$DEFAULT_MAIL_DOMAIN = "donghyun.net";
$DEFAULT_BASE = "dc=donghyun,dc=net";
```

```
cp migrate_common.ph /usr/share/perl5/
./migrate_base.pl > ou.ldif
```

```
vim ou.ldif
```

```
1 dn: ou=DONG,dc=donghyun,dc=net
2 ou: DONG
3 objectClass: top
4 objectClass: organizationalUnit
```

```
ldbadd -H /var/lib/samba/private/sam.ldb ou.ldif
```

```
vim /root/users.sh
```

```
#!/bin/bash
for i in {01..05}
do
    samba-tool user create user1$i Skill39 --userou=OU=DONG --uid-number=10$i
    --gid-number=1000 --script-path=/bin/bash --home-directory=/home/user1$i
    samba-tool user create visitor1$i Skill39 --userou=OU=DONG --uid-
    number=20$i --gid-number=2000 --script-path=/bin/bash --home-
    directory=/home/visitor1$i
done
```

```
chmod +x /root/users.sh
bash /root/users.sh
```

```
kinit Administrator
klist
wbinfo -u
```

- [DONG-SRV2]

```
apt install krb5-user krb5-config winbind samba smbclient -y
mv /etc/samba/smb.conf /etc/samba/smb.conf.bak
scp DONG-SRV1:/etc/krb5.conf /etc/
kinit Administrator
samba-tool domain join donghyun.net DC -UAdministrator
systemctl stop smbd nmbd winbind
systemctl disable smbd nmbd winbind
systemctl unmask samba-ad-dc
systemctl enable samba-ad-dc
systemctl restart samba-ad-dc
```

3. DNS 서비스 구성 (DNS Service Configuration)

- ⚡ DONG-SRV 및 DAE-SRV, DNS 도메인 네임서버 구성 구성 시 패키지 도구는 BIND9을 사용함.

< Configuration >

- [DONG-SRV1]

```
kinit Administrator
```

```
samba-tool dns add 192.168.1.1 donghyun.net www.donghyun.net CNAME DONG-SRV1.donghyun.net
samba-tool dns add 192.168.1.1 donghyun.net mail.donghyun.net CNAME DONG-SRV2.donghyun.net
samba-tool dns add 192.168.1.1 donghyun.net @ MX "mail.donghyun.net 10"
samba-tool dns query 192.168.1.1 donghyun.net @ ALL -U Administrator
```

```
cp /etc/bind/db.127 /var/cache/bind/192.rev
chown bind:bind -R /var/cache/bind/
sed -i "s/localhost/DONG-SRV1.donghyun.net/g" /var/cache/bind/192.rev
```

```
vim /var/cache/bind/192.rev
```

1	IN	PTR	DONG-SRV1.donghyun.net
2	IN	PTR	DONG-SRV2.donghyun.net

```
systemctl restart bind9
```

- [**DAE-SRV**]

```
apt install bind9 -y
```

```
vim /etc/bind/named.conf
```

```
// include "/etc/bind/named.conf.options";
// include "/etc/bind/named.conf.local";
// include "/etc/bind/named.conf.default-zones";

options {
    directory "/var/cache/bind";
    listen-on { any; };
    allow-query { any; };
    dnssec-validation no;
};

view int {
    match-clients { 192.168.1.0/24; 172.16.1.0/24; localhost; };
```

```
include "/etc/bind/named.conf.default-zones";
zone "daeseong.net" {
    type master;
    file "int-daeseong.zone";
    allow-update { 172.16.1.254; };
};

zone "donghyun.net" {
    type forward;
    forwarders { 192.168.1.1; };
};

view ext {
    match-clients { 117.121.35.0/24; };
    include "/etc/bind/named.conf.default-zones";
    zone "daeseong.net" {
        type master;
        file "ext-daeseong.zone";
    };
};
```

```
cp /etc/bind/db.0 /var/cache/bind/int-daeseong.zone
cp /etc/bind/db.0 /var/cache/bind/ext-daeseong.zone
chown bind:bind -R /var/cache/bind/
sed -i "s/localhost/DAE-SRV.daeseong.net/g" /var/cache/bind/int-daeseong.zone
sed -i "s/localhost/DAE-SRV.daeseong.net/g" /var/cache/bind/ext-daeseong.zone
```

```
vim /var/cache/bind/int-daeseong.zone
```

```
DAE-SRV      IN  A   172.16.1.1
www          IN  CNAME  DAE-SRV
```

```
vim /var/cache/bind/ext-daeseong.zone
```

```
DAE-SRV      IN  A   117.121.35.150
www          IN  CNAME  DAE-SRV
```

```
systemctl restart bind9
```

4. DHCP 서버 구성 (DHCP Service Configuration)

- ☞ DONG-R 및 DAE-R, DHCP 서버 구성 시 패키지 도구는 ISC-DHCP-SERVER를 사용함.

< Configuration >

- [DONG-R]

```
apt install isc-dhcp-server -y
```

```
vim /etc/default/isc-dhcp-server
```

INTERFACESv4="ens33" # 해당 인터페이스는 내부망 이더넷으로 지정해야 함.

```
vim /etc/dhcp/dhcpd.conf
```

```
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.150 192.168.1.200;
    option routers 192.168.1.254;
    option domain-name "donghyun.net";
    option domain-name-servers 192.168.1.1;
    default-lease-time 600;
    max-lease-time 7200;
}

zone donghyun.net {
    primary 192.168.1.1;
}

zone 1.168.192.in-addr.arpa {
    primary 192.168.1.1;
}

ddns-update-style standard;
```

```
systemctl restart isc-dhcp-server
```

- [DAE-R]

```
apt install isc-dhcp-server -y
```

```
vim /etc/default/isc-dhcp-server
```

```
INTERFACESv4="ens33"      # 해당 인터페이스는 내부망 이더넷으로 지정해야 함.
```

```
vim /etc/dhcp/dhcpd.conf
```

```
subnet 172.16.1.0 netmask 255.255.255.0 {
    range 172.16.1.150 172.16.1.200;
    option routers 172.16.1.254;
    option domain-name "daeseong.net";
    option domain-name-servers 172.16.1.1;
    default-lease-time 600;
    max-lease-time 7200;
}

zone daeseong.net {
    primary 172.16.1.1;
}

ddns-update-style standard;
```

```
systemctl restart isc-dhcp-server
```

5. [S2S] GRE-over-IPsec VPN 구성 (GRE-over-IPsec VPN Configuration)

- ⚡ DONG-R 및 DAE-R, VPN SITE 구성 시 패키지 도구는 STRONGSWAN을 사용함.

< Configuration >

- [DONG-R]

```
vim /etc/network/interfaces
```

```
auto tun0
iface tun0 inet tunnel
    address 10.0.0.1
    netmask 255.255.255.252
    dstaddr 10.0.0.2
    local 117.121.35.100
    endpoint 117.121.35.150
    mode gre
    ttl 255
    post-up ip route add 172.16.1.0/24 dev tun0
    pre-down ip route add 172.16.1.0/24 dev tun0
```

```
modprobe ip_gre
systemctl restart networking
```

```
apt install strongswan -y
```

```
vim /etc/ipsec.conf
```

```
conn GRE-IPSEC-VPN
    left=117.121.35.100
    leftprotoport=gre
    right=117.121.35.150
    rightprotoport=gre
    type=transport
    authby=secret
    keyexchange=ikev2
    auto=start
```

```
vim /etc/ipsec.secrets
```

```
117.121.35.150 117.121.35.100 : PSK "Skill39"
```

```
systemctl restart strongswan-starter
```

- [DAE-R]

```
vim /etc/network/interfaces
```

```
auto tun0
iface tun0 inet tunnel
    address 10.0.0.2
    netmask 255.255.255.252
    dstaddr 10.0.0.1
    local 117.121.35.150
    endpoint 117.121.35.100
    mode gre
    ttl 255
    post-up ip route add 192.168.1.0/24 dev tun0
    pre-down ip route add 192.168.1.0/24 dev tun0
```

```
modprobe ip_gre
systemctl restart networking
```

```
apt install strongswan -y
```

```
vim /etc/ipsec.conf
```

```
conn S2S-VPN
    left=117.121.35.100
    leftprotoport=gre
    right=117.121.35.150
    rightprotoport=gre
    type=transport
    authby=secret
    keyexchange=ikev2
    auto=start
```

```
vim /etc/ipsec.secrets
```

```
117.121.35.100 117.121.35.150 : PSK "Skill39"
```

```
systemctl restart strongswan-starter
```

6. Certificate Authority 구성 (Certificate Authority Configuration)

- ☞ DONG-SRV1 에서 DONG-CA 인증기관 설정 구성 시 패키지 도구는 OPENSSL를 사용함.

< Configuration >

- [DONG-SRV1]

```
apt install openssl -y
```

```
vim /etc/ssl/openssl.cnf
```

```
[ CA_default ]
dir = /etc/ssl/DONG-CA
x509_extensions = v3_req
policy = policyAnything

[ req_distinguished_name ]
countryName_default = KR
#stateOrProvinceName_default = Some-State
0.organizationName_default = DONG
```

```
vim /usr/lib/ssl/misc/CA.pl
```

```
my $CADAYS = "-days 1825";      # 5년
my $CATOP = "/etc/ssl/DONG-CA";
```

```
/usr/lib/ssl/misc/CA.pl -newca      # CN=DONG-CA 설정
```

```
Common Name (e.g. server FQDN or YOUR name) [] :DONG-CA
```

```
cp /etc/ssl/DONG-CA/cacert.pem /usr/local/share/ca-certificates/ca.crt
update-ca-certificates
```

7. LDAP 서버 구성 (LDAP Service Configuration)

- ~~DAE-SRV~~에서 LDAP 서버 구성 시 패키지 도구는 SLAPD를 사용함.

< Configuration >

- [DAE-SRV]

```
apt install slapd migrationtools -y      # 설치시 비밀번호는 "Skill39"를 사용함.
```

```
vim /etc/ldap/ldap.conf
```

```
BASE    dc=daeseong,dc=net
URI     ldapi://
```

```
systemctl restart slapd
ldapsearch -x      # dn: dc=daeseong,dc=net 확인
```

```
vim /root/users.sh
```

```
#!/bin/bash
for i in {01..05}
do
    echo -e "Skill39\nSkill39" | adduser --gecos "" --uid 20$i user2$i
done
```

```
chmod +x /root/users.sh
bash /root/users.sh
cd /usr/share/migrationtools/
```

```
vim migrate_common.ph
```

```
$NAMINGCONTEXT{ 'passwd' }      = "ou=users";
$DEFAULT_MAIL_DOMAIN = "daeseong.net";
$DEFAULT_BASE = "dc=daeseong,dc=net";
```

```
cp migrate_common.ph /usr/share/perl5/
./migrate_base.pl > ou.ldif
```

```
vim ou.ldif      # ou=users 제외하고 전부 삭제
```

```
1 dn: ou=users,dc=daeseong,dc=net
2 ou: users
3 objectClass: top
4 objectClass: organizationalUnit
```

```
./migrate_passwd.pl /etc/passwd > passwd.ldif
```

```
vim passwd.ldif      # user201 ~ user205 제외하고 전부 삭제
```

```
1 dn: uid=user201,ou=users,dc=daeseong,dc=net
2 uid: user201
3 cn: user201
4 objectClass: account
5 objectClass: posixAccount
6 objectClass: top
7 objectClass: shadowAccount
8 userPassword: {crypt}y$j9T$.2502N.0ZMPcxAADvGuVn1$5e1B0ApNLiC./uDguyRBN7cSDZCgsPhwTrCKtHWG094
9 shadowLastChange: 20479
10 shadowMax: 99999
11 shadowWarning: 7
12 loginShell: /bin/bash
13 uidNumber: 2001
14 gidNumber: 65534
15 homeDirectory: /home/user201
16 gecos: ,,,
```

해당 사진처럼 user201 ~ user205 유저들만 남긴다.

```
ldapadd -cWD "cn=admin,dc=daeseong,dc=net" -f ou.ldif          # PW: Skill39
ldapadd -cWD "cn=admin,dc=daeseong,dc=net" -f passwd.ldif       # PW: Skill39
ldapsearch -x | grep dn
```

```
dn: dc=daeseong,dc=net
dn: ou=users,dc=daeseong,dc=net
dn: uid=user201,ou=users,dc=daeseong,dc=net
dn: uid=user202,ou=users,dc=daeseong,dc=net
dn: uid=user203,ou=users,dc=daeseong,dc=net
dn: uid=user204,ou=users,dc=daeseong,dc=net
dn: uid=user205,ou=users,dc=daeseong,dc=net
```

해당 사진처럼 출력되어야 한다.

```
vim /root/users.sh
```

```
#!/bin/bash
for i in {01..05}
do
    # echo -e "Skill39\nSkill39" | adduser --gecos "" --uid 20$i user2$i
    userdel -r user2$i
done
```

```
bash /root/users.sh
```

- ☞ DAE-CLI에서 LDAP 서버 인증 설정 구성 시 패키지 도구는 LIBNSS-LDAPD를 사용함.
- [DONG-CLI]

```
apt install libnss-ldapd -y
```

Multiple URIs can be separated by spaces.

LDAP server URI:

ldap://DAE-SRV.daeseong.net/

<0k>

LDAP server search base:

dc=daeseong,dc=net

<0k>

```
You can select the services that should have LDAP lookups. New LDAP lookups will be added as the last datasource. These changes.
```

```
Name services to configure:
```

```
[*] passwd  
[*] group  
[ ] shadow  
[ ] hosts  
[ ] networks
```

```
<0k>
```

사진대로 설정

```
vim /etc/ldap/ldap.conf
```

```
BASE      dc=daeseong,dc=net  
URI       ldap://DAE-SRV.daeseong.net/
```

```
echo "session optional pam_mkhomedir.so" >> /etc/pam.d/common-session  
reboot
```



.....



Creating directory '/home/user203'.

사진처럼 user201 ~ user205 유저로 로그인 되는지 확인

8. SSSD 구성 (Samba AD Client Joining)

- ⚡ DONG-CLI 에서 SSSD 구성 시 패키지 도구는 SSSD를 사용함.

< Configuration >

- [DONG-CLI]

```
apt install krb5-user krb5-config samba sssd -y
```

```
scp DONG-SRV1:/etc/krb5.conf
```

```
vim /etc/samba/smb.conf
```

```
[global]
workgroup = DONGHYUN
realm = DONGHYUN.NET

client signing = yes
client use spnego = yes
kerberos method = secrets and keytab
security = ads
```

```
net ads join -UAdministrator
systemctl restart smbd nmbd
cp /usr/share/doc/sssd-common/examples/sssd-example.conf /etc/sssd/sssd.conf
```

```
vim /etc/sssd/sssd.conf
```

```
[sssd]
config_file_version = 2
services = nss, pam
domains = AD

[domain/AD]
id_provider = ad
auth_provider = ad

override_homedir = /home%u
```

```
default_shell = /bin/bash
ldap_id_mapping = false
enumerate = true

ad_hostname = DONG-CLI.donghyun.net
ad_server = DONG-SRV1.donghyun.net
ad_domain = donghyun.net
```

```
chown root:root /etc/sssd/sssd.conf
chmod 700 /etc/sssd/sssd.conf
echo -e "session optional pam_mkhomedir.so" >> /etc/pam.d/common-session
systemctl restart sssd
```

9. Docker 서버 구성 (Docker Service Configuration)

- ☞ DONG-SRV2에서 Docker 및 MySQL 서비스 구성 시 패키지 도구는 docker.io를 사용함.

< Configuration >

- [DONG-SRV2]

```
apt install docker* -y
docker load -i /mnt/mysql.tar
```

```
vim /etc/docker/daemon.json
```

```
{
  "insecure-registries": ["192.168.1.2:5000"]
}
```

```
vim /etc/docker/registry/config.yaml
```

```
# auth:
#   htpasswd:
#     realm: basic-realm
#     path: /etc/docker/registry
```

```
systemctl restart docker
systemctl restart docker-registry
docker image tag mysql:latest 192.168.1.2:5000/mysql:latest
docker push 192.168.1.2:5000/mysql:latest
docker rmi 192.168.1.2:5000/mysql:latest
docker rmi mysql:latest
docker run -d --name MYSQL --hostname mysql --restart always -p 3306:3306 -e
MYSQL_ROOT_PASSWORD=Skill39 192.168.1.2:5000/mysql:latest
docker exec -it MYSQL mysql -u root -p          # PW=Skill39
```

```
>create database WEB;
>create database MAIL;
>grant all privileges on *.* to 'root'@'%';
>flush privileges;
```

10. Web 서버 구성 (Web Service Configuration)

- ☞ DONG-SRV 및 DAE-SRV에서 Web 서버 구성 시 패키지 도구는 APACHE2를 사용함.

< Configuration >

- [DONG-SRV]

```
apt install apache2 -y
```

```
cd /etc/ssl/DONG-CA/certs
openssl req -new -out dong-www.req -newkey rsa:2048 -keyout dong-www.key -nodes
# CN=www.donghyun.net
```

```
vim san
```

```
subjectAltName = DNS:www.donghyun.net
```

```
openssl ca -in dong-www.req -out dong-www.crt -extfile san      # PW: Skill39
```

```
vim /etc/apache2/sites-available/default-ssl.conf
```

```
<IfModule mod_ssl.c>
  <VirtualHost _default_:443>
    ServerName www.donghyun.net
    DocumentRoot /var/www/html

    SSLCertificateFile      /etc/ssl/DONG-CA/certs/dong-www.crt
    SSLCertificateKeyFile   /etc/ssl/DONG-CA/certs/dong-www.key

    SSLCACertificatePath    /etc/ssl/DONG-CA/
    SSLCACertificateFile    /etc/ssl/DONG-CA/cacert.pem
  </VirtualHost>
</IfModule>
```

```
vim /var/www/html/index.html
```

```
<center><h2>Welcome to Donghyun Networks!</h2></center>
```

```
a2enmod ssl authnz_ldap
a2ensite default-ssl.conf
systemctl restart apache2
```

- [DAE-SRV]

```
apt install apache2 php libapache2-mod-php -y
```

```
cd /etc/ssl/DONG-CA/certs
openssl req -new -out dae-www.req -newkey rsa:2048 -keyout dae-www.key -nodes
# CN=www.daeseong.net
```

```
vim san
```

```
subjectAltName = DNS:www.daeseong.net
```

```
openssl ca -in dae-www.req -out dae-www.crt -extfile san # PW: Skill39
```

```
vim /etc/apache2/apache2.conf
```

```
<Directory /var/www/php>
    AuthType basic
    AuthName "ldap"
    AuthBasicProvider ldap
    AuthLDAPURL "ldap://DAE-SRV.daeseong.net/dc=daeseong,dc=net?uid"
    Require valid-user
</Directory>
```

```
vim /etc/apache2/sites-available/default-ssl.conf
```

```
<IfModule mod_ssl.c>
    <VirtualHost _default_:443>
        ServerName www.daeseong.net
        DocumentRoot /var/www/php

        SSLCertificateFile      /etc/ssl/DONG-CA/certs/dae-www.crt
        SSLCertificateKeyFile   /etc/ssl/DONG-CA/certs/dae-www.key

        SSLCACertificatePath    /etc/ssl/DONG-CA/
        SSLCACertificateFile    /etc/ssl/DONG-CA/cacert.pem
    </VirtualHost>
</IfModule>
```

```
mkdir -p /var/www/php
```

```
vim /var/www/php/index.php
```

```
<?php
$username = $_SERVER['REMOTE_USER'];
echo "<center><h2>Welcome to Daeseong Networks, $username</h2></center>";
>
```

```
1 <?php
2     $username = $_SERVER['REMOTE_USER'];
3     echo "<center><h2>Welcome to Daeseong Networks, $username</h2></center>";
4 ?>
```

```
a2enmod ssl authnz_ldap
a2ensite default-ssl.conf
systemctl restart apache2
```

- ⚡ DONG-CLI 및 DAE-CLI 0//서 Web 서버 인증 설정 DONG-CA에서 RootCA 인증서를 가져와 인증합니다.
- [DONG-CLI]

```
scp root@dong-srv.donghyun.net:/etc/ssl/DONG-CA/cacert.pem /usr/local/share/ca-certificates/ca.crt
update-ca-certificates
```

The screenshot shows the Firefox Privacy & Security settings page. On the left, there's a sidebar with options: General, Home, Search, **Privacy & Security** (which is selected and highlighted with a red border), and Sync. Below the sidebar, there's a "More from Mozilla" link. The main content area is titled "Browser Privacy" and "Enhanced Tracking Protection". It features a shield icon and text explaining that trackers follow users online to collect information about their habits and interests, and that Firefox blocks many of these. A "Learn more" link is provided. At the bottom of this section, there's a "Standard" button. In the "Certificates" section, there's a checked checkbox for "Query OCSP responder servers to confirm the current validity of certificates" and two buttons: "View Certificates..." (which is also highlighted with a red border) and "Security Devices...".

AC Camerfirma SA CIF A82743287

Camerfirma Chambers of Commerce R... Builtin Object Token

Camerfirma Global Chambersign Root Builtin Object Token

View... Edit Trust... **Import...** Export... Delete or Distrust...

Select File containing CA certificate(s) to import

Name	Location	Size	Type	Accessed
ca.crt	/usr/local/share/ca-certificates	4.2 kB	X.509 Certificate	06:39

위와 같이 설정합니다.

- ⚡ Web 서버 접속 테스트

https://www.donghyun.net

Sign In Started

⊕ www.donghyun.net
This site is asking you to sign in.

Username
user101

Password

Cancel **Sign in**

https://www.donghyun.net

Welcome to Linux Env, user101

위와 같이 뜨면 성공입니다.

- [DAE-SRV, DAE-CLI] -> 과제지를 참고하여 위처럼 동일하게 Web Service 설정.

11. Network 패킷 제어 (Network Packet Control)

- ⚡ DAE-R 및 DONG-R에서 Destination NAT 및 Filtering 설정 구성 시 패키지 도구는 IPTABLES를 사용함.

< Configuration >

- [DAE-R]

```
apt install iptables -y
```

```
vim /etc/network/interfaces
```

...

부가적으로 밑의 내용을 추가합니다.

```
up iptables -t nat -A PREROUTING -s 117.121.35.0/24 -d 117.121.35.150 -p tcp  
--dport 443 -j DNAT --to 172.16.1.1  
up iptables -t nat -A PREROUTING -s 117.121.35.0/24 -d 117.121.35.150 -p udp  
--dport 53 -j DNAT --to 172.16.1.1  
up iptables -t nat -A PREROUTING -s 117.121.35.0/24 -d 117.121.35.150 -p tcp  
--dport 53 -j DNAT --to 172.16.1.1
```

```
reboot
```