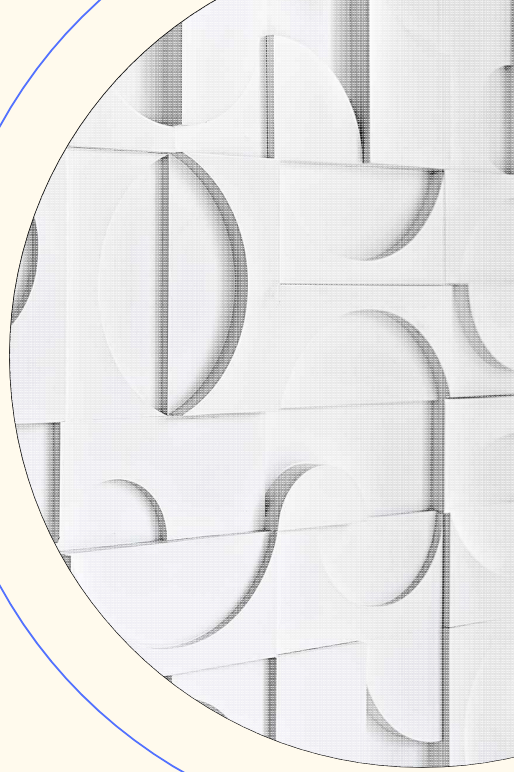
리눅스 프로젝트
Apex



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Rocky Linux주소 설정

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1. Rocky Linux 주소 설정

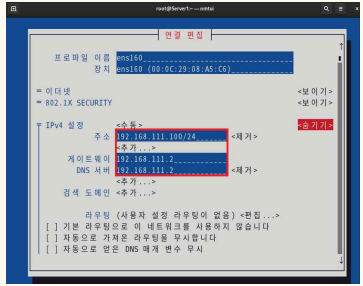
IP 주소 설정 전

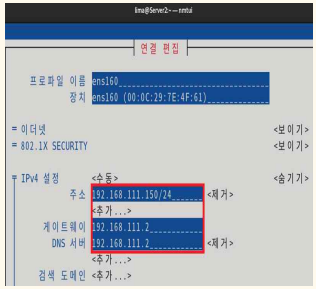
```
root@Server1:~
[root@Server1 ~]# ifconfig
ens160: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.111.132  netmask 255.255.255.0  broadcast 192.168.111.255
        inet6 fe80::20c:29ff:fe08:a5c6  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:08:a5:c6  txqueuelen 1000  (Ethernet)
        RX packets 9688  bytes 14150153 (13.4 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2842  bytes 173449 (169.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

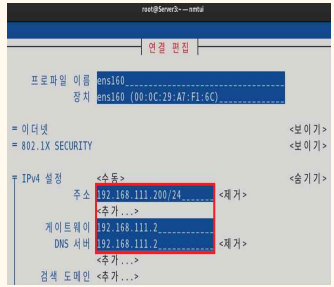
IP 주소 설정 후

```
root@Server1:~
[root@Server1 ~]# ifconfig
ens160: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.111.100  netmask 255.255.255.0  broadcast 192.168.111.255
        inet6 fe80::20c:29ff:fe08:a5c6  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:08:a5:c6  txqueuelen 1000  (Ethernet)
        RX packets 22  bytes 2200 (2.1 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 57  bytes 5871 (5.7 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Nmtui에서 주소 및 게이트웨이, DNS 서버 변경
(Server 1 , 2, 3 모두 변경)







사용자 그룹 등록

2. 사용자 및 그룹 등록

사용자 생성 및 확인

```
root@Server1:~
[root@Server1 ~]# useradd jilee
[root@Server1 ~]# useradd jgseo
[root@Server1 ~]# useradd jglim
[root@Server1 ~]# useradd mhkim
[root@Server1 ~]# useradd kilee
[root@Server1 ~]# useradd mjkim
[root@Server1 ~]# useradd hchwang
[root@Server1 ~]# useradd hmshon
```

사용자 추가

```
[root@Server1 ~]# passwd jilee
jilee 사용자의 비밀 번호 변경 중
새 암호:
잘못된 암호: 암호가 앞뒤 어느쪽에서 읽어도 같은 문맥임
새 암호 재입력:
passwd: 모든 인증 토큰이 성공적으로 업데이트 되었습니다.
```

사용자 비밀번호 변경

사용자 비밀번호 설정 확인

```
[root@Server1 ~]# tail /etc/shadow
tcpdump:!!:20220::::::
lima:$6$KUOshZ/sUT08e57s$UNicGH1zx6T7teA6Vc9J8NgefTxgp
jilee:$6$rounds=100000$1Wow1rGGc5V4nvbw$ZU0Y4nFCoWh4h4
21:0:99999:7:::
jgseo:$6$rounds=100000$0xsm4zaWx9/28ydl$Lq7ivwX3YC0add
21:0:99999:7:::
mhkim:$6$rounds=100000$BzGmyKy3WC/2Xpws$dmcS0xEDpBXK.4
21:0:99999:7:::
kilee:$6$rounds=100000$.lxvuTX0z84bZOne$/HVU89bPoU8jUc
21:0:99999:7:::
mjkim:$6$rounds=100000$H0ifbPNJrbUZIOXD$mVIG7lJMi7Lbxd
21:0:99999:7:::
hchwang:$6$rounds=100000$hdfVRB2upIll1RMY$DiKp9lj2MQM3
0221:0:99999:7:::
```

2. 사용자 및 그룹 등록

그룹 생성 및 확인

```
[root@Server1 ~]# groupadd eusoccer
[root@Server1 ~]# groupadd krsoccer
[root@Server1 ~]#
[root@Server1 ~]# usermod -g eusoccer hmshon
[root@Server1 ~]# usermod -g eusoccer kilee
[root@Server1 ~]# usermod -g eusoccer hchwang
[root@Server1 ~]# usermod -g eusoccer mjkim
[root@Server1 ~]# usermod -g krsoccer jilee
[root@Server1 ~]# usermod -g krsoccer jglim
[root@Server1 ~]# usermod -g krsoccer jgseo
[root@Server1 ~]# usermod -g krsoccer mhkim
```

그룹 추가

그룹 지정

사용자 및 그룹 정보 확인

```
[root@Server1 ~]# tail /etc/passwd
tcpdump:x:72:72::/:/sbin/nologin
lima:x:1000:1000:lima:/home/lima:/bin/bash
jilee:x:1002:1012::/home/jilee:/bin/bash
jgseo:x:1003:1012::/home/jgseo:/bin/bash
mhkim:x:1005:1012::/home/mhkim:/bin/bash
kilee:x:1006:1011::/home/kilee:/bin/bash
mjkim:x:1007:1011::/home/mjkim:/bin/bash
hchwang:x:1008:1011::/home/hchwang:/bin/bash
hmshon:x:1009:1011::/home/hmshon:/bin/bash
jglim:x:1010:1012::/home/jglim:/bin/bash
```

사용자 정보

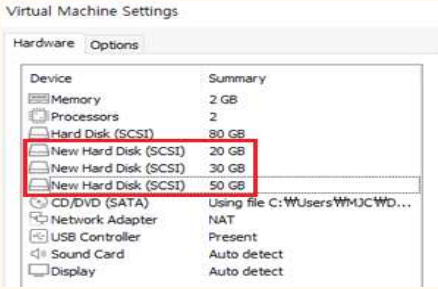
그룹 정보

디스크 추가 후 LVM 설정

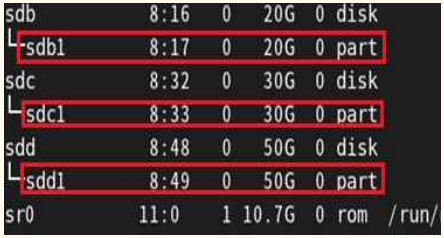
APEX

3. 디스크 추가 후 LVM 설정

하드디스크 추가



파티션 확인



파티션 생성

```
Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-41943039, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-41943039, default 41943039):

Created a new partition 1 of type 'Linux' and of size 20 GiB.

Command (m for help): t
Selected partition 1
Hex code or alias (type L to list all): 8e
Changed type of partition 'Linux' to 'Linux LVM'.

Command (m for help): p
Disk /dev/sdb: 20 GiB, 21474836480 bytes, 41943040 sectors
Disk model: VMware Virtual S
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x026eb709

Device     Boot Start      End  Sectors Size Id Type
/dev/sdb1        2048 41943039 41940992  20G 8e Linux LVM

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.
```

<파티션 설정>
n > p> 1> enter> enter> t> p> w

3. 디스크 추가 후 LVM 설정

PV구성

3개의 PV 생성 및 구성 확인

```
[root@Server2 ~]# pvcreate /dev/sdb1
  Physical volume "/dev/sdb1" successfully created.
[root@Server2 ~]# pvcreate /dev/sdc1
  Physical volume "/dev/sdc1" successfully created.
[root@Server2 ~]# pvcreate /dev/sdd1
  Physical volume "/dev/sdd1" successfully created.
[root@Server2 ~]# pvscan
  PV /dev/sda3   VG rl   lvm2 [78.41 GiB / 0    free]
  PV /dev/sdb1           lvm2 [<20.00 GiB]
  PV /dev/sdc1           lvm2 [<30.00 GiB]
  PV /dev/sdd1           lvm2 [<50.00 GiB]
  Total: 4 [<178.41 GiB] / in use: 1 [78.41 GiB] / in no VG: 3 [<100.00 GiB]
```

pvcreate로 /dev/sdb1, /dev/sdc1, /dev/sdd1 생성

pvscan 명령어로 PV 구성 확인

3. 디스크 추가 후 LVM 설정

VG구성

```
[root@Server2 ~]# vgcreate DATA /dev/sdb1 /dev/sdc1 /dev/sdd1
  Volume group "DATA" successfully created
[root@Server2 ~]# vgdisplay
  --- Volume group ---
  VG Name               DATA
  System ID
  Format                lvm2
  Metadata Areas        3
  Metadata Sequence No  1
  VG Access             read/write
  VG Status             resizable
  MAX LV                0
  Cur LV                0
  Open LV               0
  Max PV                0
  Cur PV                3
  Act PV                3
  VG Size               <99.99 GiB
  PE Size               4.00 MiB
  Total PE              25597
  Alloc PE / Size       0 / 0
  Free  PE / Size       25597 / <99.99 GiB
  VG UUID               kUEZpc-Y7gO-CM8t-zmYB-lCtB-nAoQ-0nI5el
```

vgcreate 명령어 > 3개의 물리 볼륨을 하나로 합성

vgdislay 명령어 > 볼륨 그룹 생성 확인

LVM구성

```
[root@Server2 ~]# lvcreate --size 40G --name VIDEO DATA
  Logical volume "VIDEO" created.
[root@Server2 ~]# lvcreate --extents 100%FREE  --name AUDIO DATA
  Logical volume "AUDIO" created.
[root@Server2 ~]# lvscan
  ACTIVE            '/dev/DATA/VIDEO' [40.00 GiB] inherit
  ACTIVE            '/dev/DATA/AUDIO' [<59.99 GiB] inherit
  ACTIVE            '/dev/rl/swap' [<2.02 GiB] inherit
  ACTIVE            '/dev/rl/home' [25.06 GiB] inherit
  ACTIVE            '/dev/rl/root' [51.33 GiB] inherit
```

Lvcreate > 40GB인 “VIDEO” 파티션 생성 및 나머지 공간을 “AUDIO” 파티션에 할당

```
[root@Server2 ~]# lsblk
NAME          MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda             8:0    0    80G  0 disk
├─sda1          8:1    0   600M  0 part /boot/efi
├─sda2          8:2    0     1G  0 part /boot
└─sda3          8:3    0 78.4G  0 part
  ├─rl-root   253:0    0 51.3G  0 lvm  /
  ├─rl-swap   253:1    0    2G  0 lvm  [SWAP]
  └─rl-home   253:2    0 25.1G  0 lvm  /home
sdb             8:16   0    20G  0 disk
└─sdb1          8:17   0    20G  0 part
  └─DATA-AUDIO
                253:4    0    60G  0 lvm
sdc             8:32   0    30G  0 disk
└─sdc1          8:33   0    30G  0 part
  └─DATA-AUDIO
                253:4    0    60G  0 lvm
sdd             8:48   0    50G  0 disk
└─sdd1          8:49   0    50G  0 part
  ├─DATA-VIDEO
                253:3    0    40G  0 lvm
  └─DATA-AUDIO
                253:4    0    60G  0 lvm
sr0            11:0    1 10.7G  0 rom  /run/media/r
```

DATA-VIDEO에 삽입| LVM 삽입 확인
DATA-AUDIO에 삽입| LVM 삽입 확인

3. 디스크 추가 후 LVM 설정

설정완료

/dev/DATA/VIDEO 파일시스템 생성

```
[root@Server2 ~]# mkfs.ext4 /dev/DATA/VIDEO
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 10485760 4k blocks and 2621440 inodes
Filesystem UUID: e170d5cc-388a-4fa2-b9c6-b13aac2bd16e
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624

Allocating group tables: done
Writing inode tables: done
Creating journal (65536 blocks): done
Writing superblocks and filesystem accounting information: done

[root@Server2 ~]# mkfs.ext4 /dev/DATA/AUDIO
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 15725568 4k blocks and 3932160 inodes
Filesystem UUID: efaab31f-502e-4c03-8397-6c8d7c1657ff
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624, 11239424
```

/dev/DATA/AUDIO 파일시스템 생성

```
[root@Server2 ~]# mkdir /lvm1 /lvm2
[root@Server2 ~]# mount /dev/DATA/VIDEO /lvm1
[root@Server2 ~]# mount /dev/DATA/AUDIO /lvm2
```

LVM1에 /dev/DATA/VEDIO 마운트
LVM2에 /dev/DATA/AUDIO 마운트

```
/dev/DATA/VIDEO /lvm1   ext4    defaults        0       0
/dev/DATA/AUDIO /lvm2   ext4    defaults        0       0
```

DATA-VIDEO의 내용 수정
DATA-AUDIO의 내용 수정

```
└─sdb1          8:17   0   20G  0 part
  └─DATA-AUDIO
              253:4    0   60G  0 lvm  /lvm2
sdc             8:32   0   30G  0 disk
└─sdc1          8:33   0   30G  0 part
  └─DATA-AUDIO
              253:4    0   60G  0 lvm  /lvm2
sdd             8:48   0   50G  0 disk
└─sdd1          8:49   0   50G  0 part
  ├─DATA-VIDEO
              253:3    0   40G  0 lvm  /lvm1
  └─DATA-AUDIO
              253:4    0   60G  0 lvm  /lvm2
sr0            11:0    1 10.7G  0 rom  /run/media/r
```

DATA-VIDEO에 삽입| LVM 1삽입 확인
DATA-AUDIO에 삽입| LVM 2삽입 확인

디스크 쿼터 설정

4. 디스크 쿼터 설정

디스크 설정

```
[root@Server3 ~]# lsblk
NAME MAJ:MIN RM   SIZE RO TYPE MOUNTPOINTS
sda    8:0    0    40G  0 disk
├─sda1
│      8:1    0   600M  0 part /boot/efi
├─sda2
│      8:2    0     1G  0 part /boot
└─sda3
       8:3    0 38.4G  0 part
  ├─rl-root
  │  253:0    0 36.4G  0 lvm  /
  └─rl-swap
     253:1    0     2G  0 lvm  [SWAP]
sdb    8:16   0    10G  0 disk
└─sdb1
       8:17   0    10G  0 part
sr0   11:0    1 10.7G  0 rom  /run/media/
```

사용자 공간 할당

vi로 /etc/fstab 파일 수정

```
# /etc/fstab
# Created by anaconda on Tue May 13 09:07:20 2025
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
/dev/mapper/rl-root     /                       xfs     defaults        0 0
UUID=b847292f-10c2-446d-9c78-90411fe6d171 /boot                   xfs     defaults        0 0
UUID=BC50-E39F          /boot/efi               vfat    umask=0077,shortname=winnt 0 2
/dev/mapper/rl-swap     none                    swap    defaults        0 0

/dev/sdb1       /userHome       ext4    defaults,usrjquota=aquota.user,jqfmt=vfsv0      0       0
```

재부팅되어도 /dev/sdb1 디렉터리가
자동 마운트되도록 /etc/fstab 수정

4. 디스크 쿼터 설정

쿼터 생성

사용자 3개 생성

```
[root@Server3 ~]# useradd -d /userHome/aespa aespa
[root@Server3 ~]# useradd -d /userHome/Ive Ive
[root@Server3 ~]# useradd -d /userHome/NewJeans NewJeans
[root@Server3 ~]# passwd aespa
[root@Server3 ~]# passwd Ive
[root@Server3 ~]# passwd NewJeans
```

마운트 재시작

```
[root@Server3 ~]# mount --options remount /userHome
[root@Server3 ~]# mount | grep userHome
/dev/sdb1 on /userHome type ext4 (rw,relatime,seclabel,jqfmt=vfsv0,usrjquota=aquota)
```

리마운트

마운트 확인

4. 디스크 쿼터 설정

디스크 공간 및 사용 한도 제한 확인

쿼터 명령어로 할당된 디스크 공간 확인

```
Disk quotas for user aespa (uid 1001):
  Filesystem                blocks       soft      hard     inodes     soft     hard
  /dev/sdb1                     28     716800   1048576          7        0        0
Disk quotas for user NewJeans (uid 1003):
  Filesystem                blocks       soft      hard     inodes     soft     hard
  /dev/sdb1                     28     716800   1048576          7        0        0
Disk quotas for user Ive (uid 1002):
  Filesystem                blocks       soft      hard     inodes     soft     hard
  /dev/sdb1                     28     716800   1048576          7        0        0
```

```
[root@Server3 userHome]# edquota -u aespa
[root@Server3 userHome]# edquota -u Ive
[root@Server3 userHome]# edquota -u NewJeans
```

edquota –u [사용자] 명령어를 사용해서
aespa, IVE, New Jeans 사용자가 사용할 수 있는 공간 한도 변경

사용 한도 제한 확인

```
[root@Server3 userHome]# repquota /userHome/
*** Report for user quotas on device /dev/sdb1
Block grace time: 7days; Inode grace time: 7days
                        Block limits                File limits
User            used    soft    hard  grace    used  soft  hard  grace
----------------------------------------------------------------------
root      --      20       0       0              2     0     0
aespa     --      28  716800 1048576              7     0     0
Ive       --      28  716800 1048576              7     0     0
NewJeans  --      28  716800 1048576              7     0     0
```

repquota /clin2 명령어를 통해
사용자별 현재 사용량 확인

서버 구성

APEX

5-1 SSH Server

SSH server 설치 및 확인

```
[root@Server1 ~]# rpm -qa openssh-server
openssh-server-8.7p1-43.el9.x86_64
```

설치 완료

SSH 서비스 시작

```
[root@Server1 ~]# systemctl status sshd
● sshd.service - OpenSSH server daemon
     Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: enabled)
     Active: active (running) since Mon 2025-05-12 21:10:14 KST; 2 days ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 1072 (sshd)
      Tasks: 1 (limit: 22794)
     Memory: 2.6M
        CPU: 15ms
     CGroup: /system.slice/sshd.service
             └─1072 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

5월 12 21:10:14 Server1 systemd[1]: Starting OpenSSH server daemon...
5월 12 21:10:14 Server1 sshd[1072]: Server listening on 0.0.0.0 port 22.
5월 12 21:10:14 Server1 sshd[1072]: Server listening on :: port 22.
5월 12 21:10:14 Server1 systemd[1]: Started OpenSSH server daemon.
```

SSH 활성화 상태 확인

SSH 활성화 설치 확인

SSH 서비스 활성화

SSH IP주소 확인

```
[root@Server1 ~]# ssh lima@192.168.111.100
lima@192.168.111.100's password:
Last login: Wed May 14 21:21:06 2025 from 192.168.111.100
```

SSH Server 방화벽 설정

```
[root@Server1 ~]# firewall-cmd --permanent --add-service=ssh
success
[root@Server1 ~]# firewall-cmd --reload
success
[root@Server1 ~]# firewall-cmd --list-services
cockpit dhcpv6-client ssh
```

5-2 XRDP Server

XRDP Server 설치 및 확인

```
[root@Server1 ~]# dnf -y install epel-release
```

XRDP 서비스 시작

```
xrdp.service - xrdp daemon
     Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled; preset: disabled)
     Active: active (running) since Wed 2025-05-14 21:37:52 KST; 19s ago
       Docs: man:xrdp(8)
             man:xrdp.ini(5)
   Main PID: 36759 (xrdp)
      Tasks: 1 (limit: 22794)
     Memory: 1.3M
        CPU: 13ms
     CGroup: /system.slice/xrdp.service
             └─36759 /usr/sbin/xrdp --nodaemon
```

XRDP 활성화 설치 확인

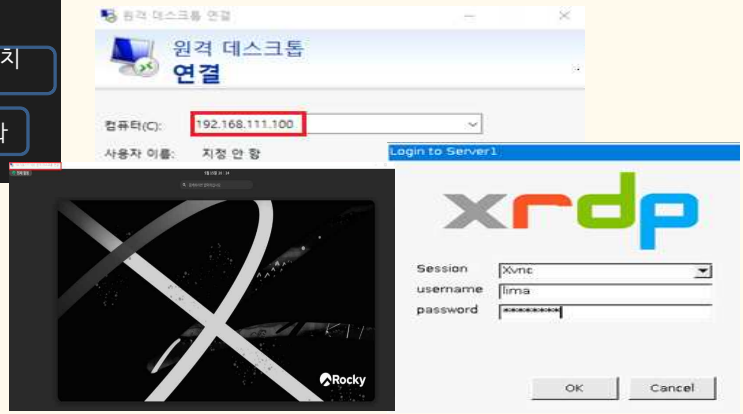
XRDP 서비스 활성화

XRDP 방화벽 설정

```
[root@Server1 ~]# firewall-cmd --permanent --add-port=3389/tcp
success
[root@Server1 ~]# firewall-cmd --reload
success
[root@Server1 ~]# firewall-cmd --list-ports
3389/tcp
```

XRDP(3389 포트)에 방화벽 가동 확인

XRDP Server 테스트



APEX

- Rocky Linux 추소 설정
- 사용자 그룹 등록
- 디스크 추가 후 LVM 설정
- 디스크 쿼터 설정
- 서버 구성

5-3 DNS Server

DNS Server 설치 및 확인

```
[root@Server1 ~]# rpm -qa bind bind-chroot
[root@Server1 ~]# dnf -y install bind bind-chroot
```

DNS 서비스 시작 및 상태 확인

```
[root@Server1 ~]# systemctl restart named
[root@Server1 ~]# systemctl enable named
Created symlink /etc/systemd/system/multi-user.target.wants/named.service → /usr/lib/systemd/system/named.service.
[root@Server1 ~]# systemctl status named
● named.service - Berkeley Internet Name Domain (DNS)
     Loaded: loaded (/usr/lib/systemd/system/named.service; enabled; preset: disabled)
     Active: active (running) since Thu 2025-05-15 20:15:57 KST; 16s ago
   Main PID: 3695 (named)
      Tasks: 8 (limit: 22794)
     Memory: 24.7M
        CPU: 231ms
     CGroup: /system.slice/named.service
             └─3695 /usr/sbin/named -u named -c /etc/named.conf
```

DNS Server 활성화

DNS 환경설정

```
 9
10 options {
11         listen-on port 53 { any; };
12         listen-on-v6 port 53 { none; };
13         directory       "/var/named";
14         dump-file       "/var/named/data/cache_dump.db";
15         statistics-file "/var/named/data/named_stats.txt";
16         memstatistics-file "/var/named/data/named_mem_stats.txt";
17         secroots-file   "/var/named/data/named.secroots";
18         recursing-file  "/var/named/data/named.recursing";
19         allow-query     { any; };
20
21         /*
22          - If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.
23          - If you are building a RECURSIVE (caching) DNS server, you need to enable
24            recursion.
25          - If your recursive DNS server has a public IP address, you MUST enable access
26            control to limit queries to your legitimate users. Failing to do so will
27            cause your server to become part of large scale DNS amplification
28            attacks. Implementing BCP38 within your network would greatly
29            reduce such attack surface
30         */
31         recursion yes;
32
33         dnssec-validation no;
```

DNS 설치파일 수정

```
[root@Server1 ~]# nslookup
> server 192.168.111.100
Default server: 192.168.111.100
Address: 192.168.111.100#53
```

5-3 DNS Server

vi /etc/resolv.conf로 DNS Server 변경

```
[root@Server1 ~]# vi /etc/resolv.conf
# Generated by NetworkManager
nameserver 192.168.111.100
```

vi /etc/named.conf으로 도메인 설정

```
[root@Server1 ~]# vi /etc/named.conf
60 zone "apex.com" IN {
61         type master;
62         file "apex.com.db";
63         allow-update {none;};
64 };
```

팀 이름

```
[root@Server1 ~]# vi /var/www/html/index.html
<h1>Team apex</h1>
```

출력될 html 입력

정방향 영역 파일 문법 체크 후 재시작

```
[root@Server1 named]# named-checkzone apex.com apex.com.db
zone apex.com/IN: loaded serial 2
OK
[root@Server1 named]# systemctl restart named
```

nslookup으로 팀이름 도메인 테스트

```
[root@Server1 ~]# nslookup
> ftp.apex.com
Server:         192.168.111.100
Address:        192.168.111.100#53

Name:   ftp.apex.com
Address: 192.168.111.150
> www.apex.com
Server:         192.168.111.100
Address:        192.168.111.100#53

Name:   www.apex.com
Address: 192.168.111.100
> server
Default server: 192.168.111.100
Address: 192.168.111.100#53
```

5-3 DNS Server (FTP설치)

FTP Server 설치및 확인

```
[root@Server2 ~]# rpm -qa vsftpd
vsftpd-3.0.5-6.el9.x86_64
```

서비스 시작 및 상태 확인

```
[root@Server2 ~]# systemctl start vsftpd
[root@Server2 ~]# systemctl enable vsftpd
Created symlink /etc/systemd/system/multi-user.target.wants/vsftpd.service → /usr/lib/systemd/system/vsftpd.service.
[root@Server2 ~]# systemctl status vsftpd
● vsftpd.service - Vsftpd ftp daemon
     Loaded: loaded (/usr/lib/systemd/system/vsftpd.service; enabled; preset: disabled)
     Active: active (running) since Thu 2025-05-15 21:34:31 KST; 16s ago
   Main PID: 3561 (vsftpd)
      Tasks: 1 (limit: 10736)
     Memory: 992.0K
        CPU: 4ms
     CGroup: /system.slice/vsftpd.service
             └─3561 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf

5월 15 21:34:31 Server2 systemd[1]: Starting Vsftpd ftp daemon...
5월 15 21:34:31 Server2 systemd[1]: Started Vsftpd ftp daemon.
```

서비스 활성화

설치확인

방화벽 설정

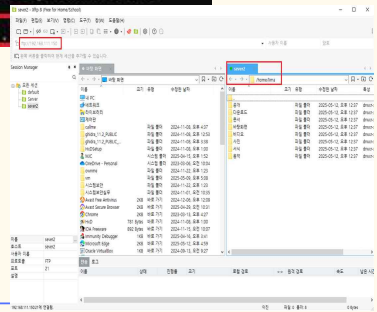
```
[root@Server2 ~]# firewall-cmd --permanent --add-service=ftp
success
[root@Server2 ~]# firewall-cmd --reload
success
[root@Server2 ~]# firewall-cmd --list-services
cockpit dhcpv6-client ftp ssh
```

환경설정 수정

```
anonymous_enable=YES
#
# Uncomment this to allow
local_enable=YES
#
# Uncomment this to enabl
write_enable=YES
#
# Default umask for local
# if your users expect th
local_umask=022
#
```

FTP Server 작동확인

```
C:₩Users₩MJC>ftp 192.168.111.150
192.168.111.150에 연결되었습니다.
220 (vsFTPd 3.0.5)
200 Always in UTF8 mode.
사용자(192.168.111.150:(none)): lima
331 Please specify the password.
암호:
230 Login successful.
```

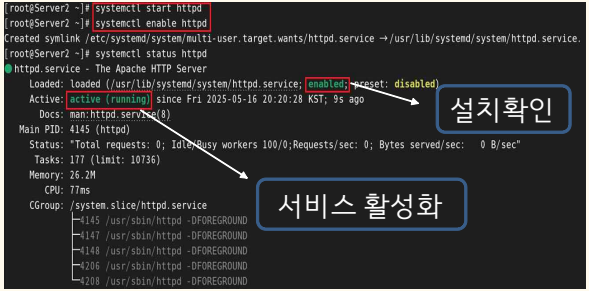


5-3 DNS Server (Web설치)

Web Server 설치 및 확인

```
[root@Server2 ~]# rpm -qa httpd
httpd-2.4.62-1.el9_5.2.x86_64
```

서비스 시작 및 상태 확인



방화벽 설정

```
[root@Server2 ~]# firewall-cmd --permanent --add-service=http
success
[root@Server2 ~]# firewall-cmd --reload
success
[root@Server2 ~]# firewall-cmd --list-service
cockpit dhcpv6-client ftp http ssh
```

환경설정 수정

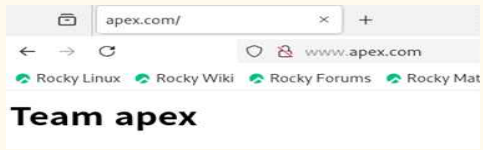
```
[root@Server2 ~]# vi /etc/httpd/conf/httpd.conf
124 DocumentRoot "/var/www/html/wordpress"
125
126 #
127 # Relax access to content within /var/www
128 #
129 <Directory "/var/www">
130     AllowOverride None
131     # Allow open access:
132     Require all granted
133 </Directory>
134
135 # Further relax access to the default doc
136 <Directory "/var/www/html/wordpress">
```

```
155     #
156     AllowOverride ALL
157
```

클라이언트 접속확인

```
[root@Server2 ~]# cat /etc/resolv.conf
# Generated by NetworkManager
nameserver 192.168.111.100
```

```
[root@Server2 ~]# ftp ftp.apex.com
Connected to ftp.apex.com (192.168.111.150).
220 (vsFTPd 3.0.5)
```



5-4 NFS Server

NFS Server 설치 및 확인

```
[root@Server2 ~]# rpm -qa nfs-utils
nfs-utils-2.5.4-27.el9.x86_64
```

/share로 복사 후 확인

```
[root@Server2 ~]# mkdir /share
[root@Server2 ~]# chmod 707 /share
[root@Server2 ~]# cp /boot/vm* /share
[root@Server2 ~]# ls /share
vmlinuz-0-rescue-4ccc3603828a4ce6919d2db7e94c6b3a  vmlinuz-5.14.0-503.14.1.el9_5.x86_64
```

NFS Server 환경설정 수정

```
[root@Server2 ~]# vi /etc/exports
```

```
/share  *(rw,sync)
```

NFS Server 방화벽 설정

```
[root@Server2 ~]# firewall-cmd --permanent --add-service=nfs
success
```

```
[root@Server2 ~]# firewall-cmd --permanent --add-service=mountd
success
[root@Server2 ~]# firewall-cmd --permanent --add-service=rpc-bind
success
[root@Server2 ~]# firewall-cmd --reload
success
[root@Server2 ~]# firewall-cmd --list-service
cockpit dhcpv6-client ftp http mountd nfs rpc-bind ssh
```

NFS Server 서비스 활성화 및 구동 확인

```
[root@Server2 ~]# systemctl start nfs-server
[root@Server2 ~]# systemctl enable nfs-server
Created symlink /etc/systemd/system/multi-user.target.wants/nfs-server.service → /usr/lib/syste
[root@Server2 ~]# systemctl status nfs-server
● nfs-server.service - NFS server and services
     Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; enabled; preset: disabled)
    Drop-In: /run/systemd/generator/nfs-server.service.d
             └─order-with-mounts.conf
     Active: active (exited) since Fri 2025-05-16 20:48:45 KST; 16s ago
```

서비스 활성화

```
[root@Server2 ~]# exportfs -v
/share          <world>(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,no_all_squash)
```

Client에서 공유한 디렉터리 사용

```
[root@Server1 ~]# showmount -e 192.168.111.150
Export list for 192.168.111.150:
/share *
```

```
[root@Server1 /]# mount -t nfs 192.168.111.150:/share myShare
```

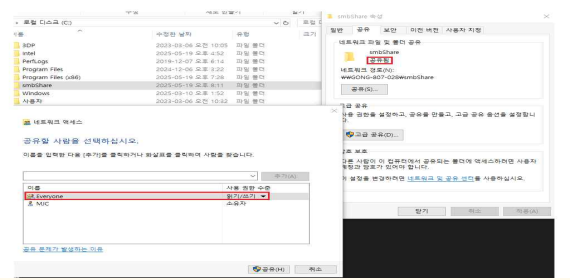
```
[root@Server1 /]# ls -l myShare
합계 42360
-rwxr-xr-x. 1 nobody nobody 14457672  5월 16 20:59 testfile
-rwxr-xr-x. 1 root   root   14457672  5월 16 20:47 vmlinuz-0-
-rwxr-xr-x. 1 root   root   14457672  5월 16 20:47 vmlinuz-5.
```

5-5 Samba Server(Linux -> Window폴더)

Samba Server 설치 및 확인

```
[root@Server3 ~]# rpm -qa samba
samba-4.20.2-2.el9_5.1.x86_64
```

윈도우에서 공유할 폴더 설정



리눅스에서 공유된 폴더 확인

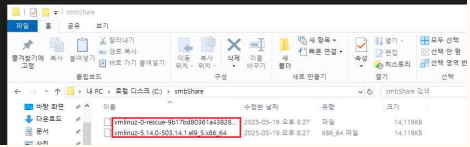
```
[root@Server3 ~]# smbclient -L 192.168.111.1
Password for [SAMBA\root]:

        Sharename       Type      Comment
        ---------       ----      -------
        ADMIN$          Disk      원격 관리
        C$              Disk      기본 공유
        D$              Disk      기본 공유
        IPC$            IPC       원격 IPC
        smbShare        Disk
SMB1 disabled -- no workgroup available
```

공유한 폴더에 마운트

```
[root@Server3 ~]# mkdir /sambaMount
[root@Server3 ~]# mount -t cifs //192.168.57.1/smbShare /sambaMount
Password for root@//192.168.57.1/smbShare:
```

리눅스에서 복사한 파일을 Window에서 확인

```
[root@Server3 ~]# ls /sambaMount/
[root@Server3 ~]# cp /boot/vm* /sambaMount/
[root@Server3 ~]# ls /sambaMount/
vmlinuz-0-rescue-9b17bd80361a4382872ac17c7bde1736  vmlinuz-5.14.0-503.14.1.el9_5.x86_64
[root@Server3 ~]#
```



5-5 Samba Server(Window -> Linux폴더)

Samba Server을 이용해 디렉터리 공유

```
[root@Server3 ~]# mkdir /share
[root@Server3 ~]# groupadd sambaGroup
[root@Server3 ~]# chgrp sambaGroup /share
[root@Server3 ~]# chmod 770 /share
[root@Server3 ~]# usermod -G sambaGroup lima
[root@Server3 ~]# smbpasswd -a lima
New SMB password:
Retype new SMB password:
Added user lima.
```

- *Samba로 공유할 디렉터리
- *Windows에서 접속을 허용할 그룹 생성
- *디렉터리의 소유 그룹을 변경
- *디렉터리 허가권 변경
- *사용자를 SambaGroup에 접속
- *사용자의 Samba 전용 비밀번호 지정

Samba 환경설정 및 파일 수정

```
[root@Server3 ~]# vi /etc/samba/smb.conf
```

```
10 [global]
11         workgroup = WORKGROUP
12         unix charset = UTF-8
13         map to guest = Bad User
14
15         security = user
```

```
45 [share]
46         path = /share
47         writable = yes
48         guest ok = no
49         create mode = 0777
50         directory mode = 0777
51         valid users = @sambaGroup
```

Samba Server설정 파일 오류 확인

```
[root@Server3 ~]# testparm
Load smb config files from /etc/samba/smb.conf
Loaded services file OK.
Weak crypto is allowed by GnuTLS (e.g. NTLM as a compatibility fallback)

Server role: ROLE_STANDALONE

Press enter to see a dump of your service definitions
```

5-5 Samba Server(Window -> Linux폴더)

Samba Server 서비스 시작

```
[root@Server3 ~]# systemctl restart smb nmb
[root@Server3 ~]# systemctl enable smb nmb
[root@Server3 ~]# systemctl status smb nmb
● smb.service - Samba SMB Daemon
     Loaded: loaded (/usr/lib/systemd/system/smb.service; enabled; p
     Active: active (running) since Mon 2025-05-19 20:36:50 KST; 12s
       Docs: man:smbd(8)
             man:samba(7)
             man:smb.conf(5)
```

설치확인

서비스 활성화

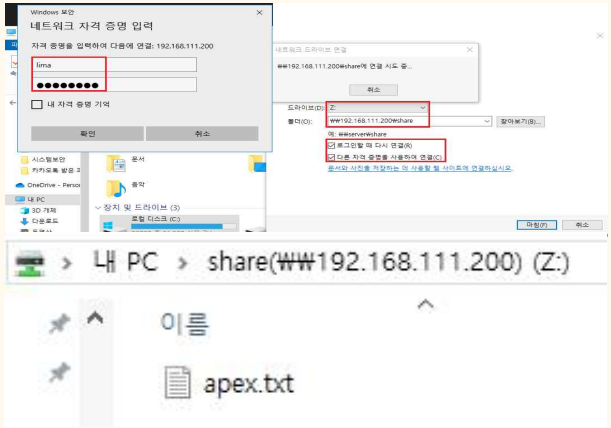
Samba Server 방화벽 설정

```
[root@Server3 ~]# firewall-cmd --permanent --add-service=samba
success
[root@Server3 ~]# firewall-cmd --reload
success
[root@Server3 ~]# firewall-cmd --list-service
cockpit dhcpv6-client samba ssh
[root@Server3 ~]# firewall-cmd --permanent --add-service=samba-client
success
[root@Server3 ~]# firewall-cmd --reload
success
[root@Server3 ~]# firewall-cmd --list-service
cockpit dhcpv6-client samba samba-client ssh
```

Samba Selinux 설정

```
[root@Server3 ~]# setsebool -P samba_enable_home_dirs on
[root@Server3 ~]# chcon -R -t samba_share_t /share
```

Samba 윈도우에서 네트워크 드라이브 연결 및 확인



Samba server 접속상태 확인

```
[root@Server3 ~]# ls -l /share/
합계 4
-rwxrw-rw-. 1 lima lima 6  5월 19 21:01 apex.txt
```

5-5 DHCP Server

DHCP 설정 확인

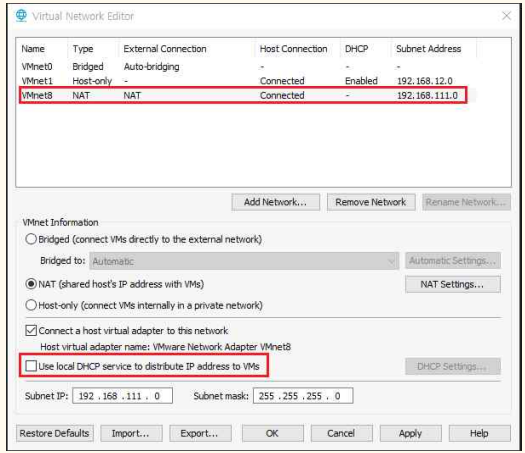
자동으로 할당된 IP 주소

```
[root@Server3 ~]# ifconfig ens160
ens160: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.111.200  netmask 255.255.255.0  broadcast 192.168.111.255
        inet6 fe80::20c:29ff:fea7:f16c  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:a7:f1:6c  txqueuelen 1000  (Ethernet)
        RX packets 54699  bytes 49775875 (47.4 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 31613  bytes 30853219 (29.4 MiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

자동으로 할당된 DNS 주소

```
[root@Server3 ~]# cat /etc/resolv.conf
# Generated by NetworkManager
search localdomain
nameserver 192.168.111.2
```

DHCP 서비스 중지



DHCP 클라이언트 패키지 설치

```
[root@Server3 ~]# rpm -qa dhcp-client
dhcp-client-4.4.2-19.b1.el9.x86_64
```

5-5 DHCP Server

중지 후 IP 정보 얻기 실패

```
[root@Server3 ~]# ifconfig ens160
ens160: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        ether 00:0c:29:a7:f1:6c  txqueuelen 1000  (Ethernet)
        RX packets 1011  bytes 1367674 (1.3 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 456  bytes 56172 (54.8 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

DHCP 서버 설정 파일 편집

```
[root@Server3 ~]# vi /etc/dhcp/dhcpd.conf
ddns-update-style interim;
subnet 192.168.111.0 netmask 255.255.255.0 {
        option routers 192.168.111.2 ;
        option subnet-mask 255.255.255.00 ;
        range dynamic-bootp 192.168.111.55 192.168.111.99 ;
        option domain-name-servers 8.8.8.8 ;
        defaul-lease-time 10000 ;
        max-lease-time 5000 ;
}
```

DHCP 서버 설정 파일 편집 수정

```
1 ddns-update-style interim;
2 subnet 192.168.111.0 netmask 255.255.255.0 {
3         option routers 192.168.111.2 ;
4         option subnet-mask 255.255.255.00 ;
5         range dynamic-bootp 192.168.111.55 192.168.111.99 ;
6         option domain-name-servers 8.8.8.8 ;
7         default-lease-time 10000 ;
8         max-lease-time 5000 ;
9 }
```

DHCP 서비스 시작

```
[root@Server3 ~]# systemctl restart dhcpd
[root@Server3 ~]# systemctl enable dhcpd
Created symlink /etc/systemd/system/multi-user.target.wants/dhcpd.ser
[root@Server3 ~]# systemctl status dhcpd
● dhcpd.service - DHCPv4 Server Daemon
     Loaded: loaded (/usr/lib/systemd/system/dhcpd.service; enabled;
     Active: active (running) since Mon 2025-05-19 21:22:08 KST; 15s
       Docs: man:dhcpd(8)
```

DHCP 방화벽 설정

```
[root@Server3 ~]# firewall-cmd --permanent --add-service=dhcp
success
[root@Server3 ~]# firewall-cmd --reload
success
[root@Server3 ~]# firewall-cmd --list-service
cockpit dhcp dhcpv6-client samba samba-client ssh
```

DHCP 클라이언트 작동 확인

5-6 Mail Server

Mail Server 설치 및 확인

```
[root@Server1 ~]# rpm -qa sendmail
sendmail-8.16.1-11.el9.x86_64
```

Mail Server 호스트 이름 수정

```
[root@mail ~]# hostnamectl set-hostname mail.apex.com
[root@mail ~]# hostname
mail.apex.com
[root@mail ~]#
```

Hostname확인 후 rebbot

dns 설정파일 수정 후 zone 추가

```
listen-on port 53 { any; };
listen-on-v6 port 53 { none; };
directory       "/var/named";
dump-file       "/var/named/data/cache_dump.db";
statistics-file "/var/named/data/named_stats.txt";
memstatistics-file "/var/named/data/named_mem_stats.txt";
secroots-file   "/var/named/data/named.secroots";
recursing-file  "/var/named/data/named.recursing";
allow-query     { any; };

dnssec-validation no;
```

```
59
60  zone "apex.com" IN {
61              type master;
62              file "apex.com.db";
63              allow-update {none;};
64  };
```

Mail Server 파일 수정

```
[root@Server1 ~]# vi /etc/hosts
127.0.0.1   localhost localhost.localdomain loca
::1         localhost localhost.localdomain loca

192.168.111.100 mail.apex.com
```

```
[root@Server1 ~]# vi /etc/mail/local-host-names
#  local-host-names  -  in
#
#
mail.apex.com
```

```
[root@Server1 ~]# vi /etc/sysconfig/network
# Created by anaconda
#
HOSTNAME=mail.apex.com
```

dns 설정파일 수정 후 오류검사

```
[root@mail ~]# named-checkconf
[root@mail ~]#
```

5-6 Mail Server

apex.com.db 파일 생성 및 수정

```
[root@mail ~]# cd /var/named/
[root@mail named]# ls
apex.com.db  dynamic        named.localhost
chroot       named.ca       named.loopback
```

```
$TTL    3H
@       SOA     @       root.   (2       1D      1H      1W      1H )
        IN      NS      @
        IN      A       192.168.111.100

mail    IN      A       192.168.111.100
```

Mail Server 서비스시작

```
named.service - Berkeley Internet Name Domain (DNS)
     Loaded: loaded (/usr/lib/systemd/system/named.service; enabled;
     Active: active (running) since Tue 2025-05-20 20:29:21 KST; 9s
   Main PID: 3207 (named)
      Tasks: 8 (limit: 22794)
     Memory: 24.6M
```

서비스 활성화

설치확인

Mail Server 방화벽 설정

```
[root@mail named]# firewall-cmd --permanent --add-service=smtp
success
[root@mail named]# firewall-cmd --permanent --add-service=pop3
success
[root@mail named]# firewall-cmd --permanent --add-service=imap
success
[root@mail named]# firewall-cmd --reload
success
[root@mail named]# firewall-cmd --list-service
cockpit dhcpv6-client dns ftp http https imap pop3 smtp ssh
[root@mail named]#
```

/etc/mail/sendmail.cf 수정

```
[root@mail named]# vi /etc/mail/sendmail.cf
```

```
 85 Cwapex.com
 86 # file containing names of hosts for
 87 Fw/etc/mail/local-host-names
 88
```

```
267
268 O DaemonPortOptions=Port=smtp,Name=MTA
269
```

/etc/mail/access 내용 추가

```
[root@mail named]# vi /etc/mail/access
```

```
Connect:localhost.localdomain                   RELAY
Connect:localhost                               RELAY
Connect:127.0.0.1                               RELAY

apex.com                RELAY
192.168.111             RELAY
```

5-6 Mail Server

/etc/mail/access 설정 내용 적용

```
[root@mail ~]# makemap hash /etc/mail/access < /etc/mail/access
```

/etc/dovecot/dovecot.conf 주석 제거

```
[root@mail named]# vi /etc/dovecot/dovecot.conf
 24 protocols = imap pop3 lmtp submission
 25
 26 # A comma separated list of IPs or hos
 27 # "*" listens in all IPv4 interfaces,
 28 # If you want to specify non-default p
 29 # edit conf.d/master.conf.
 30 listen = *, ::
 31
 32 # Base directory where to store runtim
 33 base_dir = /var/run/dovecot/
```

/etc/dovecot/conf.d/10-ssl.conf 수정

```
[root@mail named]# vi /etc/dovecot/conf.d/10-ssl.conf
  8 ssl = yes
```

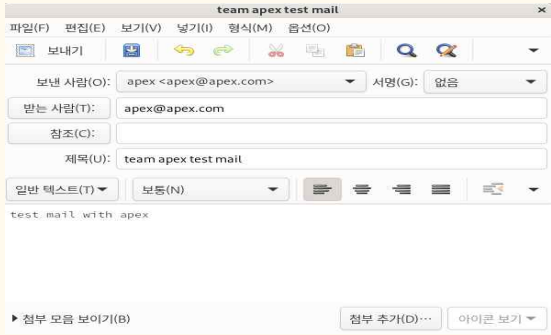
/etc/dovecot/conf.d/10-mail.conf 수정

```
[root@mail named]# vi /etc/dovecot/conf.d/10-mail.conf
 25    mail_location = mbox:~/mail:INBOX=/var/mail/%u
121 mail_access_groups = mail
166 lock_method = fcntl
```

Mail Server 서비스시작

```
[root@mail named]# systemctl enable sendmail
Created symlink /etc/systemd/system/multi-user.target.wants/sendmail.se
Created symlink /etc/systemd/system/multi-user.target.wants/sm-client.s
[root@mail named]# systemctl enable dovecot
Created symlink /etc/systemd/system/multi-user.target.wants/dovecot.ser
[root@mail named]# systemctl status sendmail
● sendmail.service - Sendmail Mail Transport Agent
   Loaded: loaded (/usr/lib/systemd/system/sendmail.s
   Active: active (running) since Tue 2025-05-20 20:4
  Main PID: 4546 (sendmail)
    Tasks: 1 (limit: 22794)
   Memory: 6.3M
      CPU: 51ms
   CGroup: /system.slice/sendmail.service
           └─4546 "sendmail: accepting connections"

5월 20 20:45:05 mail.apex.com systemd[1]: Starting Sen
5월 20 20:45:06 mail.apex.com sendmail[4546]: starting
5월 20 20:45:06 mail.apex.com systemd[1]: sendmail.ser
5월 20 20:45:06 mail.apex.com systemd[1]: Started Send
[root@mail named]# systemctl status dovecot
● dovecot.service - Dovecot IMAP/POP3 email server
   Loaded: loaded (/usr/lib/systemd/system/dovecot.service; enabled;
   Active: active (running) since Tue 2025-05-20 20:45:09 KST; 33s ag
```

Mail 전송



5-7 MariaDB Server

MariaDB Server 서비스 설치

```
[root@Server2 ~]# rpm -qa maria*
mariadb-connector-c-config-3.2.6-1.el9_0.noarch
mariadb-common-10.5.27-1.el9_5.0.1.x86_64
mariadb-connector-c-3.2.6-1.el9_0.x86_64
mariadb-errmsg-10.5.27-1.el9_5.0.1.x86_64
mariadb-gssapi-server-10.5.27-1.el9_5.0.1.x86_64
mariadb-backup-10.5.27-1.el9_5.0.1.x86_64
mariadb-10.5.27-1.el9_5.0.1.x86_64
mariadb-server-10.5.27-1.el9_5.0.1.x86_64
mariadb-server-utils-10.5.27-1.el9_5.0.1.x86_64
```

MariaDB Server 서비스 시작

```
[root@Server2 ~]# systemctl restart mariadb
[root@Server2 ~]# systemctl enable mariadb
[root@Server2 ~]# systemctl status mariadb
● mariadb.service - MariaDB 10.5 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled;
     Active: active (running) since Tue 2025-05-20 21:13:18 KST; 10s ag
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 6201 (mariadbd)
```

설치확인

서비스 활성화

MariaDB Server 방화벽 설정

```
[root@Server2 ~]# firewall-cmd --permanent --add-service=mysql
success
[root@Server2 ~]# firewall-cmd --reload
success
[root@Server2 ~]# firewall-cmd --list-services
cockpit dhcpv6-client ftp http mountd mysql nfs rpc-bind ssh
```

MariaDB Server 기본 보안 환경 설정 및 서버 접속

```
[root@Server2 ~]# mysqladmin -u root password '1234'
[root@Server2 ~]# mysql -h localhost -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 4
Server version: 10.5.27-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

새로운 사용자 생성, 192.168.111.xxx의 모든 IP 접속가능하도록 설정

```
MariaDB [(none)]> GRANT ALL ON *.* TO lima@'192.168.111.%' IDENTIFIED BY '4321';
Query OK, 0 rows affected (0.001 sec)
```

5-7 MariaDB Server

다른 서버로 MariaDB Server 접속

MariaDB 데이터 베이스 확인

```
MariaDB [(none)]> USE mysql;
Reading table information for comp
You can turn off this feature to g

Database changed
MariaDB [mysql]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.001 sec)

MariaDB [mysql]>
```

MariaDB Server 사용자 조회

```
MariaDB [mysql]> SELECT user, host FROM user WHERE user NOT LIKE '';
+-------------+---------------+
| User        | Host          |
+-------------+---------------+
| lima        | 192.168.111.% |
| mariadb.sys | localhost     |
| mysql       | localhost     |
| root        | localhost     |
+-------------+---------------+
```

감사합니다

Apex

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