리눅스 프로젝트
4조 REST

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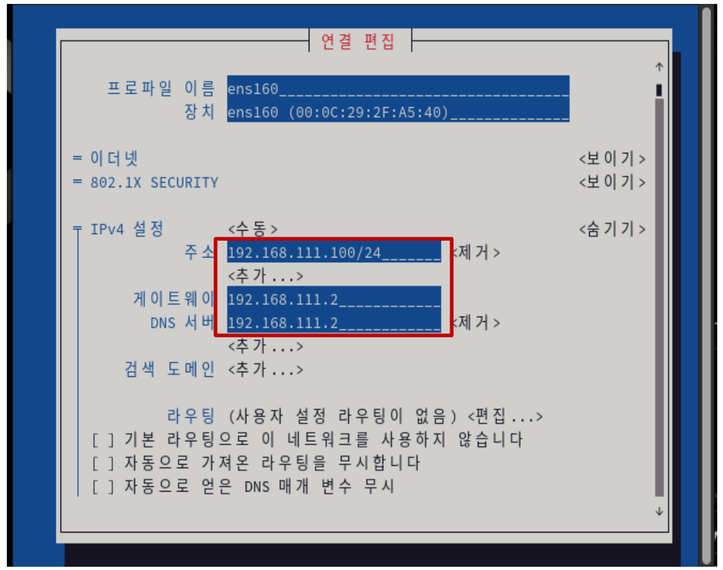
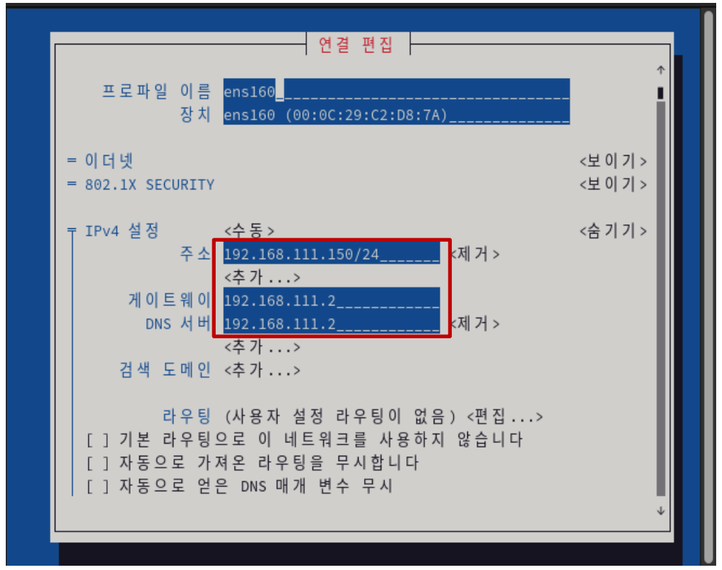
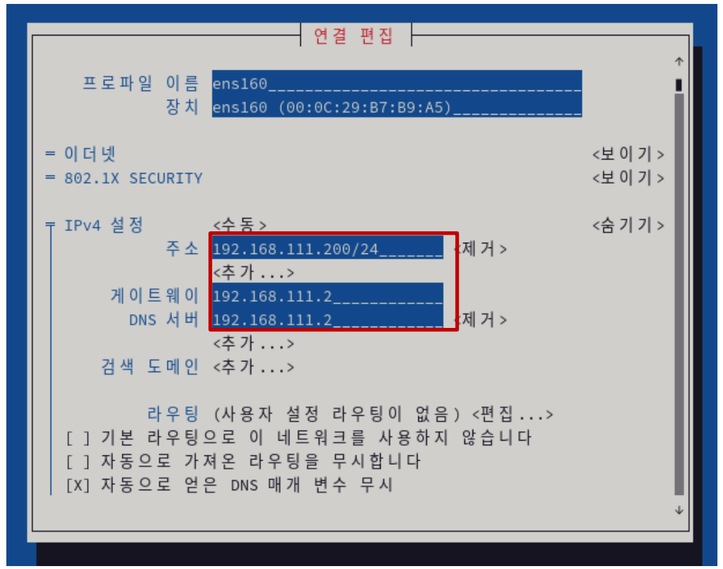
CHAPTER 01

1. Rocky Linux 주소 설정







Server1

IP 주소 : 192.168.111.100/24
게이트웨이 : 192.168.111.2
DNS 서버 : 192.168.111.2

Server2

IP 주소 : 192.168.111.150/24
게이트웨이 : 192.168.111.2
DNS 서버 : 192.168.111.2

Server3

IP 주소 : 192.168.111.200/24
게이트웨이 : 192.168.111.2
DNS 서버 : 192.168.111.2

사용자 및 그룹 등록

CHAPTER 02

2. 사용자 및 그룹 등록

사용자 등록

```
[root@Server1 ~]# adduser shkang
[root@Server1 ~]# adduser dugo
[root@Server1 ~]# adduser sjyu
[root@Server1 ~]# adduser smchoi
[root@Server1 ~]# adduser swhan
[root@Server1 ~]# adduser hmson
[root@Server1 ~]# adduser kilee
[root@Server1 ~]# adduser mjkim
[root@Server1 ~]# adduser hchwang
```

→ 사용자 추가

```
[root@Server1 ~]# passwd shkang
shkang 사용자의 비밀 번호 변경 중
새 암호:
잘못된 암호: 암호는 8 개의 문자 보다 짧습니다
새 암호 재입력:
passwd: 모든 인증 토큰이 성공적으로 업데이트 되었습니다.
```

```
[root@Server1 ~]# tail /etc/shadow
lima:$6$SAfYkENg...y6GHy$/67MaVQnLk7z7JTfA9D6.94Iwfm4ntmHVp8U4v/roEiFzEA9r9R8zJPEdI
8kjwoQ4TUAmF3Raq/HIlQgt3I3R1::0:99999:7:::
shkang:$6$rounds=100000$3LHQMN19QenfO023$u3wU4Dr/wshiHbyyhJXqGg63ENjgkENsNGl3AKPU8h
Bl1dKO5qchl2HNEFEWPgkMQBv/Jr4vj3nnQk1Igcxbh/:20223:0:99999:7:::
dugo:$6$rounds=100000$y6pqhDPRoG02fKNo$Go/6VSC.CzH9uabIdlXLFfGv1yT7vqMYH4WD2tl1IyBo
iM8qyGC5Bt8.T/ZPnmmytAbreAJJdBhZly7ES6kQI0:20223:0:99999:7:::
sjyu:$6$rounds=100000$sc50DVLXX9492FGP$WpuThsLNeaeneyML1y8BKPo5u4AvfaZXr/tLVe4gxspL
C/EGoFkyPq0EljcC9rd55W29j8TOd9BSYI62k6VMm0:20223:0:99999:7:::
smchoi:$6$rounds=100000$6GcILhzqty07eJgS$FxJ8WWLtL9rYHXneC7EbcQucoXJmYuRBLXHMu4BfSF
adxNmV0qF5D6.vNDW1fuBjUJ8s15YaDHQp.75A2g5jj/:20223:0:99999:7:::
swhan:$6$rounds=100000$DOFbL.cAEdGeQ4KK$4NqUqQL26CyAhOc9isWQrKoGvnRFZEFbe3IHA7IBCzh
Amih0sOz9smoi/U2rdNf5wgfEVNvCUMNMV4IUZyQ9C0:20223:0:99999:7:::
hmson:$6$rounds=100000$NNoqf70Hksy1rMwz$FRJGAP39DGEvnKvavRAoRZRz9ZRHPXVUWDvgsSuf6K7
V7Yf.aNBnRTgQg/SLCzVC.5fY3Pa8obb.4VuSHmE/p1:20223:0:99999:7:::
kilee:$6$rounds=100000$0EahVxwAsVOIABcT$Yt1PrQSY7clXJTSpwiAWAZ9znrffXcDMFppzMktsnK4
YqgK1qX7cwG5zlijaYJaibNmXVAdR0WLi0.0JgoqWg1:20223:0:99999:7:::
mjkim:$6$rounds=100000$4qxfs1xD0ylIfFoN$PzCjjqlS7fWuTPnEOLyGVXjcQk/gBSItPRm8WfJZa28
Sjgyg7TERKF7.sUvtnv3avXjJYgVqYd.dfTgBeNvB2.:20223:0:99999:7:::
hchwang:$6$rounds=100000$7ySAx6WKyB9YZmb.$DN43t8t6uk84Msv09lhMbHwOyZ6574x0xKuckcE5V
auJqShkapLw5RDR1i5cTGIbO5EWc6Dfk2mT3KPA7a11M/:20223:0:99999:7:::
```

→ 사용자 비밀번호 설정 확인

2. 사용자 및 그룹 등록

그룹 등록

```
[root@Server1 ~]# groupadd eusoccer
[root@Server1 ~]# groupadd krsoccer
```

→ 그룹 생성

↓

```
[root@Server1 ~]# usermod -aG eusoccer hmson
[root@Server1 ~]# usermod -aG eusoccer kilee
[root@Server1 ~]# usermod -aG eusoccer mjkim
[root@Server1 ~]# usermod -aG eusoccer hchwang
[root@Server1 ~]# usermod -aG krsoccer shkang
[root@Server1 ~]# usermod -aG krsoccer dugo
[root@Server1 ~]# usermod -aG krsoccer sjyu
[root@Server1 ~]# usermod -aG krsoccer smchoi
[root@Server1 ~]# usermod -aG krsoccer swhan
```

→ 그룹 지정

→

```
[root@Server1 ~]# tail /etc/passwd
lima:x:1000:1000:lima:/home/lima:/bin/bash
shkang:x:1001:1011::/home/shkang:/bin/bash
dugo:x:1002:1011::/home/dugo:/bin/bash
sjyu:x:1003:1011::/home/sjyu:/bin/bash
smchoi:x:1004:1011::/home/smchoi:/bin/bash
swhan:x:1005:1011::/home/swhan:/bin/bash
hmson:x:1006:1010::/home/hmson:/bin/bash
kilee:x:1007:1010::/home/kilee:/bin/bash
mjkim:x:1008:1010::/home/mjkim:/bin/bash
hchwang:x:1009:1010::/home/hchwang:/bin/bash
```

→ 사용자 계정 정보 확인

```
[root@Server1 ~]# tail /etc/group
dugo:x:1002:
sjyu:x:1003:
smchoi:x:1004:
swhan:x:1005:
hmson:x:1006:
kilee:x:1007:
mjkim:x:1008:
hchwang:x:1009:
eusoccer:x:1010:hmson,kilee,mjkim,hchwang
krsoccer:x:1011:shkang,dugo,sjyu,smchoi,swhan
```

→ 그룹 정보 확인

→ eusoccer에 포함된 사용자

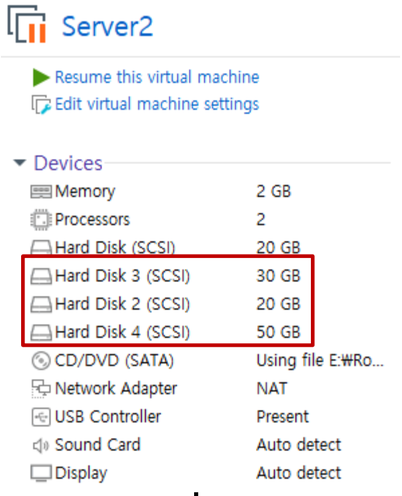
→ krsoccer에 포함된 사용자

디스크 추가 후 LVM 구성

CHAPTER 03

3. 디스크 추가 후 LVM 구성

디스크 추가




```
[root@Server2 ~]# lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda      8:0    0   20G  0 disk
├─sda1   8:1    0  3.7G  0 part /boot/efi
├─sda2   8:2    0  3.7G  0 part [SWAP]
└─sda3   8:3    0 12.5G  0 part /
sdb      8:16   0   20G  0 disk
sdc      8:32   0   30G  0 disk
sdd      8:48   0   50G  0 disk
sr0     11:0    1 1024M  0 rom
```

디스크 정보 확인

추가된 디스크

```
[root@Server2 ~]# fdisk /dev/sdb
```

파티션 생성

```
Welcome to fdisk (util-linux 2.37.4).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xb1263f27.

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): 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: 0xb1263f27

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.
```

```
[root@Server2 ~]# lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda      8:0    0   20G  0 disk
├─sda1   8:1    0  3.7G  0 part /boot/efi
├─sda2   8:2    0  3.7G  0 part [SWAP]
└─sda3   8:3    0 12.5G  0 part /
sdb      8:16   0   20G  0 disk
└─sdb1   8:17   0   20G  0 part
sdc      8:32   0   30G  0 disk
└─sdc1   8:33   0   30G  0 part
sdd      8:48   0   50G  0 disk
└─sdd1   8:49   0   50G  0 part
sr0     11:0    1 1024M  0 rom
```

3개의 파티션 생성 후 디스크 정보 확인

3. 디스크 추가 후 LVM 구성

LVM 설정

```
[root@Server2 ~]# pvcreate /dev/sdb1
  Physical volume "/dev/sdb1" successfully created.
  Creating devices file /etc/lvm/devices/system.devices
[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/sdb1         lvm2 [<20.00 GiB]
  PV /dev/sdc1         lvm2 [<30.00 GiB]
  PV /dev/sdd1         lvm2 [<50.00 GiB]
  Total: 3 [<100.00 GiB] / in use: 0 [0   ] / in no VG: 3 [<100.00 GiB]
```

PV 생성

PV 상태 확인

```
[root@Server2 ~]# vgcreate DATA /dev/sdb1 /dev/sdc1 /dev/sdd1
  Volume group "DATA" successfully created
[root@Server2 ~]# vgdisplay -v DATA
  --- Volume group ---
  VG Name               DATA
  System ID
  Format                lvm2
  Metadata Areas        3
  Metadata Sequence No  1
  VG Access             read/write
  VG Status             resizable
```

VG 생성

VG 정보 확인

```
[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
```

LV 생성

LV 상태 확인

```
sdb               8:16   0   20G  0 disk
└─sdb1            8:17   0   20G  0 part
  └─DATA-AUDIO 253:1    0   60G  0 lvm
sdc               8:32   0   30G  0 disk
└─sdc1            8:33   0   30G  0 part
  └─DATA-AUDIO 253:1    0   60G  0 lvm
sdd               8:48   0   50G  0 disk
└─sdd1            8:49   0   50G  0 part
  ├─DATA-VIDEO 253:0    0   40G  0 lvm
  └─DATA-AUDIO 253:1    0   60G  0 lvm
```

남은 전체 공간 - sdb1, sdc1, sdd1에 분산 저장

40G - sdd1에 할당

3. 디스크 추가 후 LVM 구성

LVM 설정

```
[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: b7cb9c78-7c47-45aa-a52c-0a3260a95300
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
```

→ /dev/DATA/VIDEO 파일 시스템 생성

```
[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: 6694788a-266d-4611-b95f-3031012ce84a
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624, 11239424

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

→ /dev/DATA/AUDIO 파일 시스템 생성

→

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

→ lvm1에 VIDEO 마운트

→ lvm2에 AUDIO 마운트

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

→ /etc/fstab 설정

```
sdb               8:16   0   20G  0 disk
└─sdb1            8:17   0   20G  0 part
  └─DATA-AUDIO 253:1    0   60G  0 lvm  /lvm2
sdc               8:32   0   30G  0 disk
└─sdc1            8:33   0   30G  0 part
  └─DATA-AUDIO 253:1    0   60G  0 lvm  /lvm2
sdd               8:48   0   50G  0 disk
└─sdd1            8:49   0   50G  0 part
  ├─DATA-VIDEO 253:0    0   40G  0 lvm  /lvm1
  └─DATA-AUDIO 253:1    0   60G  0 lvm  /lvm2
```

→ lvm2 설정 완료

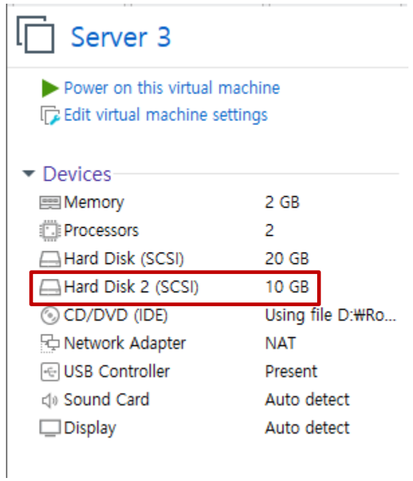
→ lvm1 설정 완료

디스크 쿼터 설정

CHAPTER 04

4. 디스크 쿼터 설정

디스크 추가




```
[root@Server3 ~]# lsblk  → 디스크 정보 확인
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda      8:0    0   20G  0 disk
├─sda1   8:1    0  3.7G  0 part /boot/efi
├─sda2   8:2    0  3.7G  0 part [SWAP]
└─sda3   8:3    0 12.5G  0 part /
sdb      8:16   0   10G  0 disk  → 추가된 디스크
sr0     11:0    1 1024M  0 rom
```

→

```
[root@Server3 ~]# fdisk /dev/sdb  → 파티션 생성

Welcome to fdisk (util-linux 2.37.4).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x2c3f3bfb.

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): 1
First sector (2048-20971519, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-20971519, default 20971519)


Created a new partition 1 of type 'Linux' and of size 10 GiB.

Command (m for help): p
Disk /dev/sdb: 10 GiB, 10737418240 bytes, 20971520 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: 0x2c3f3bfb

Device     Boot Start      End  Sectors Size Id Type
/dev/sdb1        2048 20971519 20969472  10G 83 Linux

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

4. 디스크 쿼터 설정

마운트

```
[root@Server3 ~]# mkfs -t ext4 /dev/sdb1
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 2621184 4k blocks and 655360 inodes
Filesystem UUID: 2670f4f2-3697-4cc2-a115-bd704e08ed9b
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done
```

→ 파일 시스템 생성

```
[root@Server3 ~]# mkdir /rest
[root@Server3 ~]# mount /dev/sdb1 /rest
```

→ 마운트할 디렉터리 생성

→ 마운트

```
/dev/sdb1       /rest   ext4    defaults        0       0
```

→ /etc/fstab 설정

```
[root@Server3 ~]# useradd -d /rest/aespa aespa
[root@Server3 ~]# useradd -d /rest/IVE IVE
[root@Server3 ~]# useradd -d /rest/NewJeans NewJeans
```

→ 사용자 생성

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

→ /etc/fstab
자동 마운트 설정

```
[root@Server3 ~]# mount --options remount /rest
```

→ 리마운트

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

→ 마운트 확인

4. 디스크 쿼터 설정

디스크 추가

```
[root@Server3 ~]# cd /rest
[root@Server3 rest]# quotaoff -avug
[root@Server3 rest]# quotacheck -agumn
[root@Server3 rest]# rm -rf aquota.*
[root@Server3 rest]# quotacheck -augmn
[root@Server3 rest]# touch aquota.user aquota.group
[root@Server3 rest]# chmod 600 aquota.*
[root@Server3 rest]# quotacheck -augmn
[root@Server3 rest]# quotaon -avug
```

quotaoff -avug → 쿼터 DB 종료

quotacheck -agumn → 쿼터 관련 사항 체크

quotaon -avug → 쿼터 DB 생성

```
[root@Server3 rest]# ls -l
합계 28
drwx------. 3 IVE      IVE       4096  5월  20 20:03 IVE
drwx------. 3 NewJeans NewJeans  4096  5월  20 20:03 NewJeans
drwx------. 3 aespa    aespa     4096  5월  20 20:03 aespa
-rw-------. 1 root     root         0  5월  20 20:10 aquota.group
-rw-------. 1 root     root         0  5월  20 20:10 aquota.user
drwx------. 2 root     root     16384  5월  20 20:02 lost+found
```

→ 쿼터 관련된 파일 생성 확인

```
[root@Server3 rest]# edquota -u aespa
```

→ 쿼터 DB 종료

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

soft → 소프트웨어 할당량 편집

hard → 하드웨어 할당량 편집

```
[root@Server3 rest]# repquota /rest/
*** 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              3     0     0
aespa     --      28  716800 1048576              7     0     0
IVE       --      28  716800 1048576              7     0     0
NewJeans  --      28  716800 1048576              7     0     0
```

→ 사용자별 현재 사용량 확인

서버 구현

CHAPTER 05

5. 서버 구현

SSH

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

→ SSH 설치 여부 확인
해당 패키지가 없을 시 dnf –y install openssh-server 명령어로 설치

→ 설치 완료

```
[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 Tue 2025-05-20 20:49:04 KST; 1s ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 2996 (sshd)
      Tasks: 1 (limit: 10754)
     Memory: 1.5M
        CPU: 12ms
     CGroup: /system.slice/sshd.service
             └─2996 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"
```

→ SSH 방화벽 상태 확인

→ SSH 서비스 설치 확인

→ SSH 서비스 활성화

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

→ SSH 방화벽 허용

→ 방화벽 재가동

→ 방화벽 리스트 확인

→ SSH 방화벽 추가 확인

5. 서버 구현

SSH

```
[root@Server1 ~]# ssh lima@192.168.111.100
lima@192.168.111.100's password:
Last login: Tue May 20 21:05:00 2025 from 192.168.111.100
[lima@Server1 ~]$
```

→ Server1의 SSH 접속

→ 접속 확인

```
[root@Server2 ~]# ssh lima@192.168.111.100
lima@192.168.111.100's password:
Last login: Tue May 20 21:09:10 2025 from 192.168.111.150
[lima@Server1 ~]$
```

→ Server2의 SSH 접속

→ 접속 확인

```
[root@Server3 ~]# ssh lima@192.168.111.100
lima@192.168.111.100's password:
Last login: Tue May 20 21:10:47 2025 from 192.168.111.200
[lima@Server1 ~]$
```

→ Server3의 SSH 접속

→ 접속 확인

5. 서버 구현

XRDP

```
[root@Server1 ~]# rpm -qa xrdp epel-release
epel-release-9-7.el9.noarch
xrdp-0.10.3-1.el9.x86_64
[root@Server1 ~]# systemctl status xrdp
● xrdp.service - xrdp daemon
     Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled; preset: disabled)
     Active: active (running) since Tue 2025-05-20 21:22:33 KST; 5min ago
       Docs: man:xrdp(8)
             man:xrdp.ini(5)
   Main PID: 34558 (xrdp)
      Tasks: 1 (limit: 10754)
     Memory: 2.5M
        CPU: 18ms
     CGroup: /system.slice/xrdp.service
             └─34558 /usr/sbin/xrdp --nodaemon
```

→ XRDP, 저장소 설치 여부 확인
해당 패키지가 없을 시
dnf –y install xrdp
dnf –y install epel-release

→ XRDP 서비스 설치 확인

→ XRDP 서비스 활성화

```
[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 방화벽 허용

→ 방화벽 재가동

→ 방화벽 리스트(포트) 확인

→ XRDP 방화벽 추가 확인

→ 접속할 네트워크 입력

→ 접속할 계정의 이름과 패스워드 작성

→ 접속 완료

5. 서버 구현

DNS(Web, FTP)

```
[root@Server1 ~]# rpm -qa bind bind-chroot
bind-9.16.23-24.el9_5.3.x86_64
```

→ DNS Server 관련 패키지 설치 여부 확인

```
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
   cursion.
23          - If you are building a RECURSIVE (caching) DNS server, y
    enable
24            recursion.
25          - If your recursive DNS server has a public IP address, y
   able access
26            control to limit queries to your legitimate users. Fail
   so will
27            cause your server to become part of large scale DNS amp

28            attacks. Implementing BCP38 within your network would g
29            reduce such attack surface
30         */
31         recursion yes;
32
33         dnssec-validation no;
```

→ /etc/named.conf 환경 설정

```
[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 2025-05-22 19:59:52 KST; 9s ago
   Main PID: 38201 (named)
      Tasks: 8 (limit: 10754)
     Memory: 23.4M
        CPU: 68ms
     CGroup: /system.slice/named.service
             └─38201 /usr/sbin/named -u named -c /etc/named.conf
```

→ DNS Server 방화벽 상태 확인

→ DNS Server 서비스 설치 확인

→ DNS Server 서비스 활성화

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

→ DNS Server 방화벽 허용

→ 방화벽 재가동

→ 방화벽 리스트 확인

→ DNS Server 방화벽 추가 확인

```
[root@Server1 ~]# nslookup
> server 192.168.111.100
Default server: 192.168.111.100
Address: 192.168.111.100#53
> www.nate.com
Server:         192.168.111.100
Address:        192.168.111.100#53

Non-authoritative answer:
Name:   www.nate.com
Address: 120.50.131.112
```

→ DNS Server 작동 확인

5. 서버 구현

DNS(Web, FTP)

```
[root@Server1 ~]# rpm -qa httpd
httpd-2.4.62-1.el9_5.2.x86_64
```

→ Web Server 관련 패키지 설치 여부 확인

```
[root@Server1 ~]# vi /etc/httpd/conf/httpd.conf
[root@Server1 ~]# cd /var/www/html
[root@Server1 html]# ls
index.html
```

→ Web Server index.html 생성 및 수정 후 저장

```
[root@Server1 html]# systemctl status httpd
● httpd.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: di
     Active: active (running) since Thu 2025-05-22 20:21:49 KST; 48s ago
       Docs: man:httpd.service(8)
   Main PID: 38964 (httpd)
     Status: "Total requests: 0; Idle/Busy workers 100/0;Requests/sec: 0; Bytes
      Tasks: 177 (limit: 1073)
     Memory: 48.7M
        CPU: 116ms
     CGroup: /system.slice/httpd.service
             ├─38964 /usr/sbin/httpd -DFOREGROUND
             ├─38965 /usr/sbin/httpd -DFOREGROUND
             ├─38966 /usr/sbin/httpd -DFOREGROUND
             ├─38967 /usr/sbin/httpd -DFOREGROUND
             └─38968 /usr/sbin/httpd -DFOREGROUND
```

→ Web Server 방화벽 상태 확인

→ Web Server 서비스 설치 확인

→ Web Server 서비스 활성화

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

→ Web Server 방화벽 상태 확인

→ 방화벽 재가동

→ 방화벽 리스트 확인

→ 방화벽 추가 확인

5. 서버 구현

DNS(Web, FTP)

```
[root@Server2 ~]# rpm -qa vsftpd
vsftpd-3.0.5-6.el9.x86_64
```
→ FTP 관련 패키지 설치 여부 확인

```
nameserver 192.168.111.100
```
→ /etc/resolv.conf에서 Server1 IP로 고정

```
[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 2025-05-22 20:25:16 KST; 10s ago
   Main PID: 41626 (vsftpd)
      Tasks: 1 (limit: 10754)
     Memory: 736.0K
        CPU: 3ms
     CGroup: /system.slice/vsftpd.service
             └─41626 /usr/sbin/vsftpd /etc/vsftpd/vsftpd.conf
```
→ FTP Server 방화벽 상태 확인

FTP 서비스 설치 확인

FTPr 서비스 활성화

```
[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 http ssh
```
→ FTP 방화벽 상태 확인

→ 방화벽 재가동

→ 방화벽 리스트 확인

방화벽 추가 확인

```
[root@Server2 ~]# cd /var/ftp
[root@Server2 ftp]# ls
pub  welcome.msg
[root@Server2 ftp]# cat welcome.msg
Welcome!!! This is Linux. FTP Server
```
→ /var/ftp에 welcome.msg 파일 생성 및 수정

```
[root@Server2 ftp]# cat /etc/vsftpd/vsftpd.conf | sed -n '1p; 13p'
banner_file=/var/ftp/welcome.msg
anonymous_enable=YES
```
→ vsftpd.conf 파일 내용 추가

```
60 zone "rest.com" IN {
61         type master;
62         file "rest.com.db";
63         allow-update { none;};
64 };
```
→ Server1에서 /etc/named/conf 파일 내용 추가

```
[root@Server1 ~]# named-checkconf
```
→ 문법 확인

```
[root@Server1 ~]# cd /var/named/
[root@Server1 named]# touch rest.com.db
[root@Server1 named]# ls
chroot  dynamic   named.empty      named.loopback  slaves
data    named.ca  named.localhost  rest.com.db
```
→ 정방향 영역 파일 생성

5. 서버 구현

DNS(Web, FTP)

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

www     IN      A       192.168.111.100
ftp     IN      A       192.168.111.150
```

→ rest.com.db 파일 수정

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

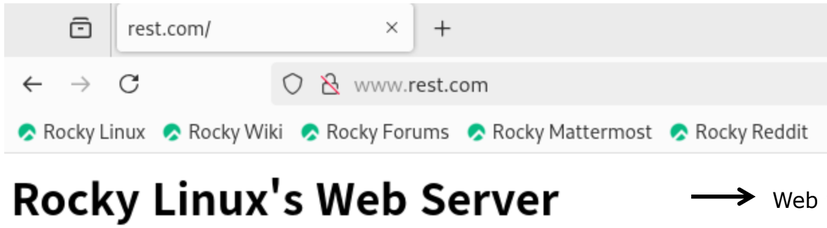
→ 문법 이상 확인

```
[root@Server1 named]# systemctl restart named
```

→ 설정 내용 저장

```
[root@Server2 ftp]# ftp ftp.rest.com
Connected to ftp.rest.com (192.168.111.150).
220-Welcome!!! This is Linux. FTP Server
220
```

→ FTP 출력 확인



→ Web 출력 확인

5. 서버 구현

NFS

```
[root@Server3 ~]# rpm -qa nfs-utils
nfs-utils-2.5.4-27.el9_5.1.x86_64
```

→ NFS 서버 설치 여부 확인

```
[root@Server3 ~]# mkdir /share
[root@Server3 ~]# cp /boot/vm* /share
[root@Server3 ~]# ls /share
vmlinuz-0-rescue-91ba88533aa4467b81ee5b6b21f247ad
vmlinuz-5.14.0-503.14.1.el9_5.x86_64
```

→ /share로 복사 후 확인

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

→ /etc/exports 환경 설정

```
[root@Server3 ~]# systemctl status nfs-server
● nfs-server.service - NFS server and services
     Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; enabled; preset: dis>
    Drop-In: /run/systemd/generator/nfs-server.service.d
             └─order-with-mounts.conf
     Active: active (exited) since Wed 2025-05-21 16:43:28 KST; 13s ago
       Docs: man:rpc.nfsd(8)
             man:exportfs(8)
    Main PID: 35273 (code=exited, status=0/SUCCESS)
         CPU: 34ms
```

→ NFS 방화벽 상태 확인

→ NFS 서비스 설치 확인

→ NFS 서비스 활성화

```
[root@Server3 ~]# exportfs -v
/share          <world>(sync,wdelay,hide,no_subtree_check,sec=sys,rw,secure,root_squash,
no_all_squash)
```

→ 서비스 가동 확인

5. 서버 구현

NFS

```
[root@Server3 ~]# firewall-cmd --permanent --add-service=nfs
success
[root@Server3 ~]# firewall-cmd --permanent --add-service=mountd
success
[root@Server3 ~]# firewall-cmd --permanent --add-service=rpc-bind
success
[root@Server3 ~]# firewall-cmd --reload
success
[root@Server3 ~]# firewall-cmd --list-services
cockpit dhcpv6-client mountd nfs rpc-bind ssh
```

NFS 방화벽 허용

방화벽 재가동

방화벽 리스트 확인

방화벽 추가 확인

```
[root@Server1 ~]# showmount -e 192.168.111.200
Export list for 192.168.111.200:
/share *
[root@Server1 ~]# mkdir myShare
[root@Server1 ~]# mount -t nfs 192.168.111.200:/share myShare
[root@Server1 ~]# ls -l myShare
합계 28240
-rwxr-xr-x. 1 root root 14457672  5월  21 16:40 vmlinuz-0-rescue-91ba88533aa4467b81ee5b6b21f247ad
-rwxr-xr-x. 1 root root 14457672  5월  21 16:40 vmlinuz-5.14.0-503.14.1.el9_5.x86_64
```

Server1에서 NFS 서버 관련 패키지 설치 후 NFS 서버의 공유 디렉터리 확인

NFS 서버에 마운트

5. 서버 구현

Samba

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

→ Samba 서버 설치 여부 확인

↓

```
[root@Server3 ~]# mkdir /share
[root@Server3 ~]# cp /boot/vm* /share
[root@Server3 ~]# ls /share
vmlinuz-0-rescue-91ba88533aa4467b81ee5b6b21f247ad
vmlinuz-5.14.0-503.14.1.el9_5.x86_64
```

→ /share로 복사 후 확인

↓

```
[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.
```

→ 그룹 생성 후 변경, 권한 변경 후
그룹 포함 및 비밀번호 설정

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

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

→ /etc/samba/smb.conf 환경 설정

↓

```
[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
```

→ 환경설정 오류 확인

5. 서버 구현

Samba

```
[root@Server3 ~]# systemctl restart smb nmb
[root@Server3 ~]# systemctl enable smb nmb
Created symlink /etc/systemd/system/multi-user.target.wants/smb.service → /usr/lib/sys
temd/system/smb.service.
Created symlink /etc/systemd/system/multi-user.target.wants/nmb.service → /usr/lib/sys
temd/system/nmb.service.
[root@Server3 ~]# systemctl status smb
● smb.service - Samba SMB Daemon
     Loaded: loaded (/usr/lib/systemd/system/smb.service; enabled; preset: disa>
     Active: active (running) since Wed 2025-05-21 20:31:23 KST; 48s ago
       Docs: man:smbd(8)
             man:samba(7)
             man:smb.conf(5)
   Main PID: 36150 (smbd)
     Status: "smbd: ready to serve connections..."
      Tasks: 3 (limit: 10754)
     Memory: 8.2M
        CPU: 55ms
     CGroup: /system.slice/smb.service
             ├─36150 /usr/sbin/smbd --foreground --no-process-group
             ├─36153 /usr/sbin/smbd --foreground --no-process-group
             └─36154 /usr/sbin/smbd --foreground --no-process-group
```

Smb, nmb 재시작 및 활성화

Smb 활성화 상태 확인

Samba 서비스 활성화

Samba 서비스 설치 확인

```
[root@Server3 ~]# systemctl status nmb
● nmb.service - Samba NMB Daemon
     Loaded: loaded (/usr/lib/systemd/system/nmb.service; enabled; preset: disabled)
     Active: active (running) since Wed 2025-05-21 20:31:23 KST; 2min 8s ago
       Docs: man:nmbd(8)
             man:samba(7)
             man:smb.conf(5)
   Main PID: 36151 (nmbd)
     Status: "nmbd: ready to serve connections..."
      Tasks: 1 (limit: 10754)
     Memory: 3.0M
        CPU: 55ms
     CGroup: /system.slice/nmb.service
             └─36151 /usr/sbin/nmbd --foreground --no-process-group
```

nmb 활성화 상태 확인

Samba 서비스 활성화

Samba 서비스 설치 확인

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

Samba 방화벽 허용

방화벽 재가동

방화벽 리스트 확인

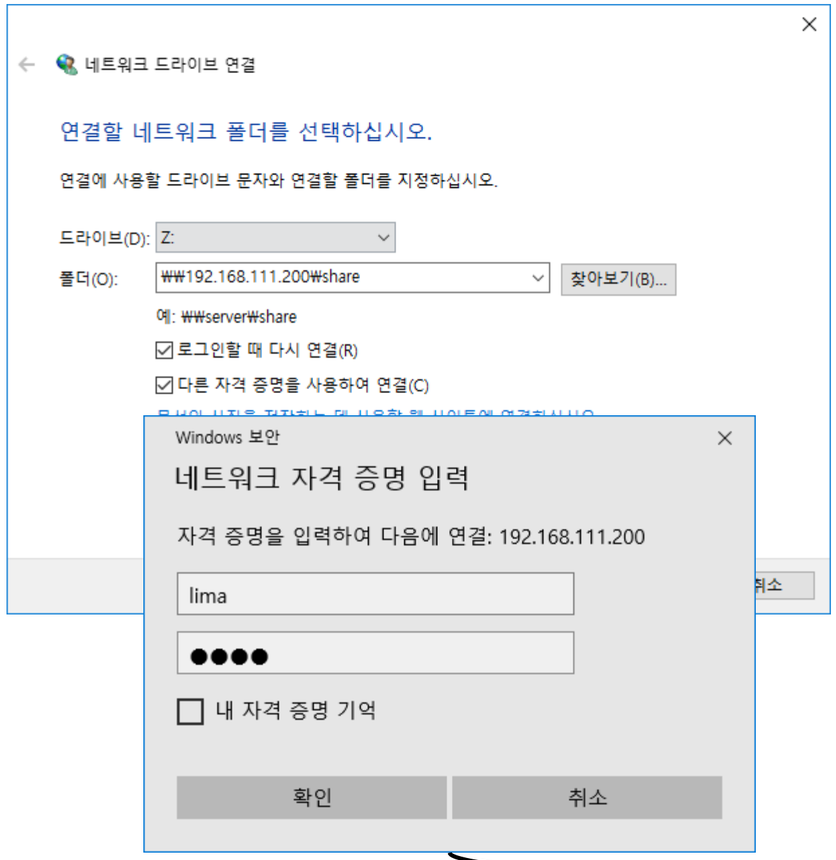
방화벽 추가 확인

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

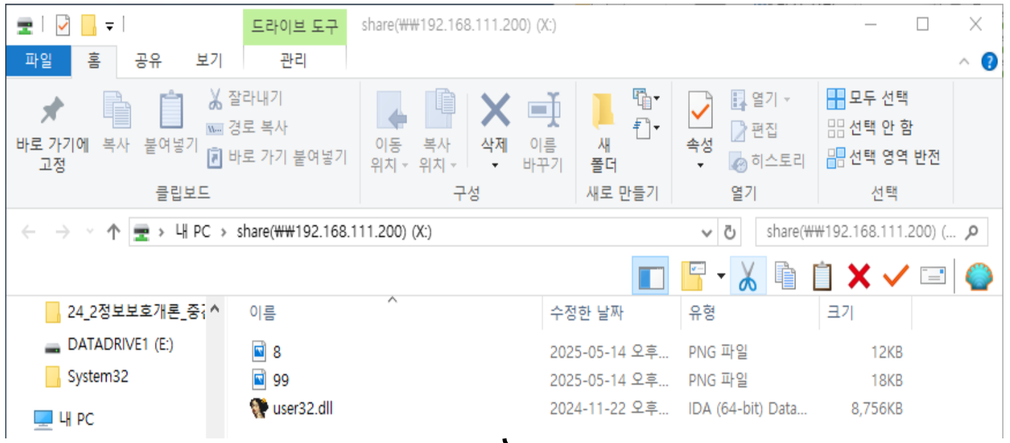
SELinux 설정

5. 서버 구현

Samba



계정 이름과 비밀번호 입력



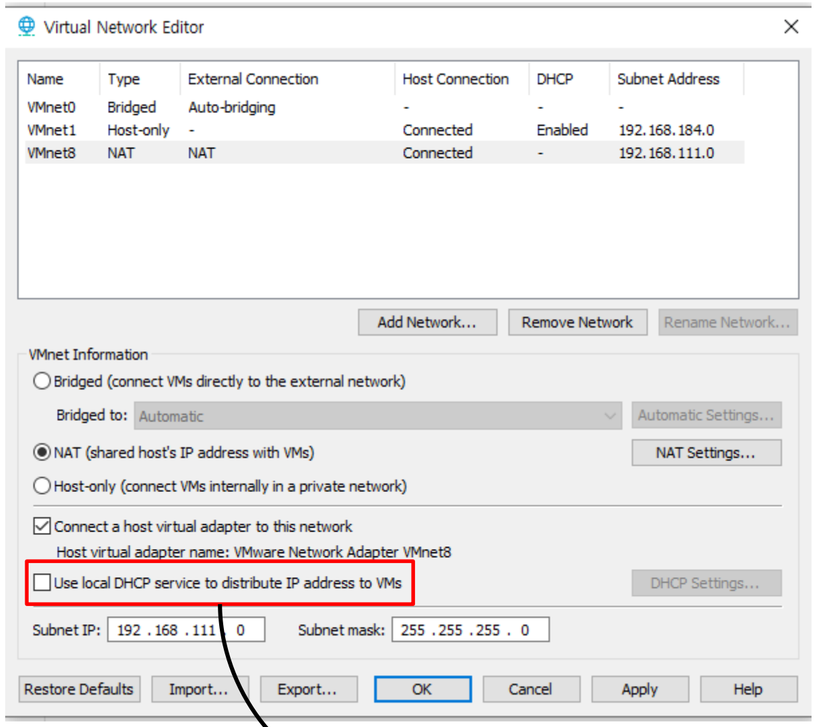
네트워크 드라이브 연결 확인
아무 파일 복사

```
[root@Server3 ~]# ls -l /share
합계 8788
-rwxrw-rw-. 1 lima lima   11758  5월  14 21:30 8.PNG
-rwxrw-rw-. 1 lima lima   17642  5월  14 21:40 99.PNG
-rwxrw-rw-. 1 lima lima 8965442 11월  22 17:12 user32.dll.i64
```

윈도우에서 복사한 파일 확인

5. 서버 구현

DHCP



VMWare 프로그램의 DHCP 서비스 중지

```
[root@Server2 /]# rpm -qa dhcp-server
dhcp-server-4.4.2-19.b1.el9.x86_64
[root@Server2 /]#
```

→ DHCP 서버 관련 패키지 설치 여부 확인

```
ddns-update-style interim;
subnet 192.168.111.0 netmask 255.255.255.0 {
        option routers 192.168.111.2;
        range dynamic-bootp 192.168.111.50 192.168.111.90;
        option domain-name-servers 8.8.8.8;
        default-lease-time 10000;
        max-lease-time 50000;
}
```

→ /etc/dhcp/dhcpd.conf 환경 설정

```
[root@Server2 /]# systemctl status dhcpd
● dhcpd.service - DHCPv4 Server Daemon
     Loaded: loaded (/usr/lib/systemd/system/dhcpd.service; enabled; preset: di
     Active: active (running) since Tue 2025-05-20 20:50:13 KST; 15s ago
       Docs: man:dhcpd(8)
             man:dhcpd.conf(5)
   Main PID: 4457 (dhcpd)
     Status: "Dispatching packets..."
      Tasks: 1 (limit: 10767)
     Memory: 9.4M
        CPU: 15ms
     CGroup: /system.slice/dhcpd.service
             └─4457 /usr/sbin/dhcpd -f -cf /etc/dhcp/dhcpd.conf -user dhcpd -gr
```

→ DHCP 활성화 상태 확인

DHCP 서비스 활성화

DHCP 서비스 설치 확인

5. 서버 구현

Mail

```
[root@Server2 ~]# rpm -qa sendmail
^[[Asendmail-8.16.1-11.el9.x86_64
[root@Server2 ~]# rpm -qa sendmail
sendmail-8.16.1-11.el9.x86_64
[root@Server2 ~]# rpm -qa sendmail-cf
sendmail-cf-8.16.1-11.el9.noarch
[root@Server2 ~]# rpm -qa dovecot
dovecot-2.3.16-14.el9.x86_64
```

→ Mail Server 관련 패키지 설치 여부 확인

→ Mail Server 관련 패키지 설치 여부 확인

→ Mail Server 관련 패키지 설치 여부 확인

```
mail.rest.com
```

→ /etc/hostname 환경 설정 (호스트 이름 수정)

```
192.168.111.150 mail.rest.com
```

→ /etc/hosts 환경 설정

```
mail.rest.com
```

→ /etc/mail/local-host-name 환경 설정

```
HOSTNAME=mail.rest.com
```

→ /etc/sysconfig/network 환경 설정

```
options {
        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; };
```

```
zone "rest.com" IN {
                type master;
                file "rest.com.db";
                allow-update { none;};
};
```

→ /etc/named.conf 환경 설정

```
$TTL    3H
@       SOA     @       root.   ( 2 1D 1H 1W 1H )
        IN      NS      @
        IN      A       192.168.111.150
        IN      MX      10      mail.rest.com.

mail    IN      A       192.168.111.150
```

→ /var/naemd/rest.com.db 설정

```
[root@mail named]# named-checkconf
[root@mail named]# named-checkzone rest.com rest.com.db
zone rest.com/IN: loaded serial 2
OK
```

→ 문법 확인

→ 정방향 영역 파일 생성

```
root@mail named]# systemctl status named
 named.service - Berkeley Internet Name Domain (DNS)
     Loaded: loaded (/usr/lib/systemd/system/named.service; enabled; preset: di
     Active: active (running) since Thu 2025-05-22 20:52:37 KST; 13s ago
   Main PID: 3008 (named)
      Tasks: 8 (limit: 10754)
     Memory: 20.9M
        CPU: 72ms
     CGroup: /system.slice/named.service
             └─3008 /usr/sbin/named -u named -c /etc/named.conf
```

→ DNS 활성화 상태 확인

→ DNS 서비스 설치 확인

→ DNS 서비스 활성화

5. 서버 구현

Mail

```
[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
```

→ Mail 프로토콜 방화벽 허용

```
[root@mail named]# firewall-cmd --reload
success
```

→ 방화벽 재가동

```
[root@mail named]# firewall-cmd --list-service
cockpit dhcpv6-client imap pop3 smtp ssh
```

→ 방화벽 리스트 확인

방화벽 추가 확인

```
[root@mail named]# nslookup
> server 192.168.111.150
Default server: 192.168.111.150
Address: 192.168.111.150#53
> mail.rest.com
Server:         192.168.111.150
Address:        192.168.111.150#53

Name:   mail.rest.com
Address: 192.168.111.150
```

→ DNS 서버 주소 확인

```
[root@mail named]# cat /etc/mail/sendmail.cf | sed -n '85p; 268p'
Cwrest.com
O DaemonPortOptions=Port=smtp, Name=MTA
```

→ sendmail.cf 파일 내용 수정

```
[root@mail named]# tail -2 /etc/mail/access
rest.com                                RELAY
192.168.111                             RELAY
```

→ Access 파일 내용 추가

```
[root@mail named]# cat /etc/dovecot/dovecot.conf | sed -n '24p; 30p; 33p'
protocols = imap pop3 lmtp submission
listen = *, ::
base_dir = /var/run/dovecot/
```

→ /dovecot.conf 파일 주석 제거

```
[root@mail named]# cat /etc/dovecot/conf.d/10-ssl.conf | sed -n '8p'
ssl = yes
```

→ 10-ssl.conf 파일 내용 수정

```
[root@mail named]# cat /etc/dovecot/conf.d/10-mail.conf | sed -n '25p; 121p; 166p'
mail_location = mbox:~/mail:INBOX=/var/mail/%u
mail_access_groups = mail
lock_method = fcntl
```

→ 10-mail.conf 파일 주석 제거 및 내용 수정

```
[root@mail /]# useradd rest
[root@mail /]# passwd rest
rest 사용자의 비밀 번호 변경 중
새 암호:
잘못된 암호: 암호는 8 개의 문자 보다 짧습니다
새 암호 재입력:
passwd: 모든 인증 토큰이 성공적으로 업데이트 되었습니다.
```

→ 사용자 & 비밀번호 추가

5. 서버 구현

Mail

```
[root@mail ~]# systemctl restart dovecot
[root@mail ~]# systemctl enable dovecot
[root@mail ~]# systemctl status dovecot
● dovecot.service - Dovecot IMAP/POP3 email server
     Loaded: loaded (/usr/lib/systemd/system/dovecot.service; enabled; preset:
     Active: active (running) since Fri 2025-05-23 13:18:42 KST; 9s ago
       Docs: man:dovecot(1)
             https://doc.dovecot.org/
   Main PID: 3557 (dovecot)
     Status: "v2.3.16 (7e2e900c1a) running"
      Tasks: 4 (limit: 10754)
     Memory: 5.2M
        CPU: 56ms
     CGroup: /system.slice/dovecot.service
             ├─3557 /usr/sbin/dovecot -F
             ├─3558 dovecot/anvil
             ├─3559 dovecot/log
             └─3560 dovecot/config
```

dovecot 활성화 상태 확인

dovecot 서비스 설치 확인

dovecot 서비스 활성화

```
[root@mail ~]# systemctl restart sendmail
[root@mail ~]# systemctl enable sendmail
[root@mail ~]# systemctl status sendmail
● sendmail.service - Sendmail Mail Transport Agent
     Loaded: loaded (/usr/lib/systemd/system/sendmail.service; enabled; preset:
     Active: active (running) since Fri 2025-05-23 13:18:13 KST; 20s ago
   Main PID: 3488 (sendmail)
      Tasks: 1 (limit: 10754)
     Memory: 3.5M
        CPU: 42ms
     CGroup: /system.slice/sendmail.service
             └─3488 "sendmail: accepting connections"
```

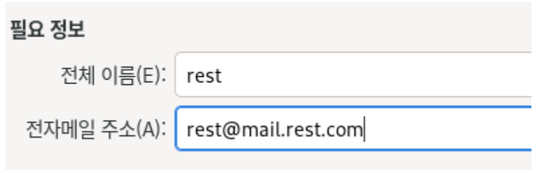
sendmail 활성화 상태 확인

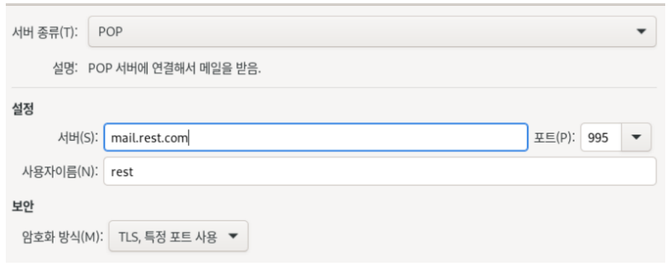
sendmail 서비스 설치 확인

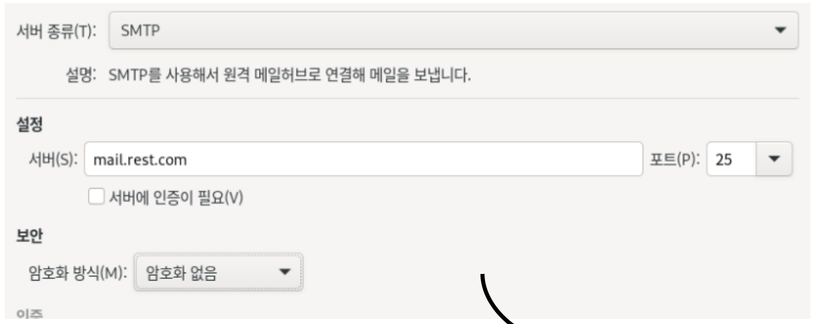
sendmail 서비스 활성화

5. 서버 구현

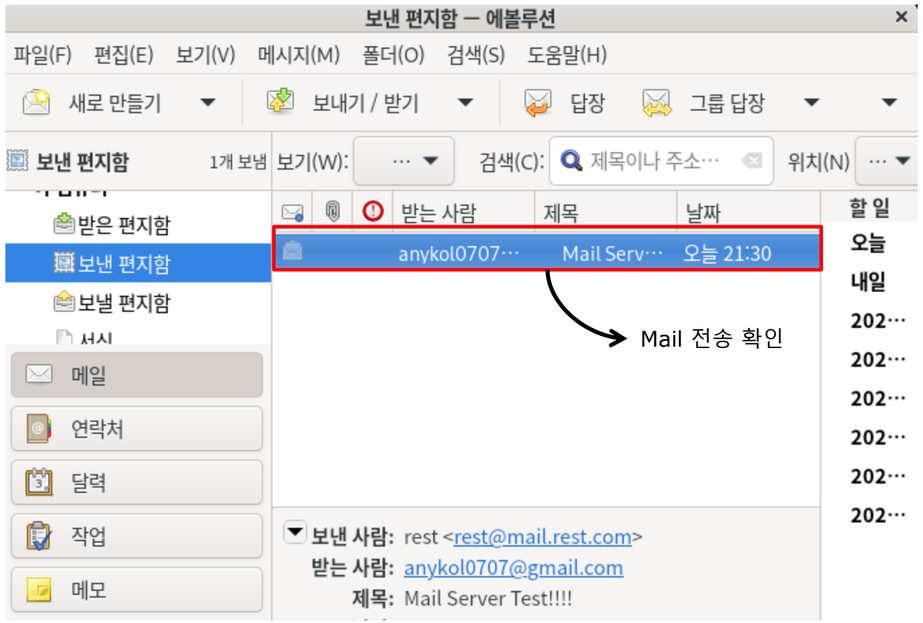
Mail







에볼루션 초기 설정



Mail 전송 확인

5. 서버 구현

MariaDB

```
[root@Server3 ~]# rpm -qa mariadb-server
mariadb-server-10.5.27-1.el9_5.0.1.x86_64
```
→ MariaDB 설치 여부 확인

```
[root@Server3 ~]# vi /etc/my.cnf.d/mariadb-server.cnf
```
→ 환경설정 수정

```
37 bind-address=0.0.0.0
```

```
[root@Server3 ~]# systemctl start mariadb
[root@Server3 ~]# systemctl enable mariadb
Created symlink /etc/systemd/system/mysql.service → /usr/lib/systemd/system/mariadb.serv
ice.
Created symlink /etc/systemd/system/mysqld.service → /usr/lib/systemd/system/mariadb.ser
vice.
Created symlink /etc/systemd/system/multi-user.target.wants/mariadb.service → /usr/lib/s
ystemd/system/mariadb.service.
[root@Server3 ~]# systemctl status mariadb
● mariadb.service - MariaDB 10.5 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: disabl>
     Active: active (running) since Wed 2025-05-21 21:15:18 KST; 10s ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 38249 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 16 (limit: 10754)
     Memory: 67.4M
        CPU: 394ms
     CGroup: /system.slice/mariadb.service
             └─38249 /usr/libexec/mariadbd --basedir=/usr
```
→ MariaDB 시작 및 활성화

→ MariaDB 활성화 상태 확인

→ MariaDB 서비스 설치 확인

→ MariaDB 서비스 활성화

```
[root@Server3 ~]# firewall-cmd --permanent --add-service=mysql
success
[root@Server3 ~]# firewall-cmd --reload
success
[root@Server3 ~]# firewall-cmd --list-service
cockpit dhcpv6-client mountd mysql nfs rpc-bind samba ssh
```
→ MariaDB 방화벽 허용

→ 방화벽 재가동

→ 방화벽 리스트 확인

→ MariaDB 서비스 설치 확인

```
[root@Server3 ~]# mysqladmin -u root password '1234'
[root@Server3 ~]# mysql -h localhost -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 7
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)]>
```
→ 관리자 비밀번호 설정

→ SQL 로컬 접속

5. 서버 구현

MariaDB

```
MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.000 sec)
```

→ 데이터베이스 목록 확인

```
MariaDB [(none)]> use mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [mysql]>
```

→ mysql 사용

```
MariaDB [mysql]> GRANT ALL ON *.* TO root@'%' IDENTIFIED BY '1234';
Query OK, 0 rows affected (0.002 sec)
```

→ 외부 접속 허용 권한 부여

```
MariaDB [mysql]> flush privileges;
Query OK, 0 rows affected (0.000 sec)
```

→ 변경된 사용자 권한 정보 즉시 적용

```
MariaDB [mysql]> exit
Bye
```

```
[root@Server1 ~]# mysql -h 192.168.111.200 -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)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.004 sec)
```

→ Server1에서 Server3 접속

감사합니다!

강승환, 고동우, 유세종, 최성민, 한시완