

第十一週

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1. 新增一個 1GB、2 GB、3GB 硬碟。

	Hard Disk (SCSI)	1 GB
	Hard Disk 3 (SCSI)	3 GB
	Hard Disk 2 (SCSI)	2 GB
	Hard Disk (NVMe)	15 GB

```
s11127138@localhost:~  
[s11127138@localhost ~]$ ls -al /dev/s*  
brw-rw----. 1 root disk 8, 0 Nov 30 10:14 /dev/sda  
brw-rw----. 1 root disk 8, 16 Nov 30 10:14 /dev/sdb  
brw-rw----. 1 root disk 8, 32 Nov 30 10:14 /dev/sdc  
crw-rw----+ 1 root cdrom 21, 0 Nov 30 10:14 /dev/sg0  
crw-rw----. 1 root disk 21, 1 Nov 30 10:14 /dev/sg1  
crw-rw----. 1 root disk 21, 2 Nov 30 10:14 /dev/sg2  
crw-rw----. 1 root disk 21, 3 Nov 30 10:14 /dev/sg3  
crw-----+ 1 root root 10, 231 Nov 30 10:14 /dev/snapshot  
brw-rw----+ 1 root cdrom 11, 0 Nov 30 11:11 /dev/sr0  
lrwxrwxrwx. 1 root root 15 Nov 30 10:14 /dev/stderr -> /proc/self/fd/2  
lrwxrwxrwx. 1 root root 15 Nov 30 10:14 /dev/stdin -> /proc/self/fd/0  
lrwxrwxrwx. 1 root root 15 Nov 30 10:14 /dev/stdout -> /proc/self/fd/1  
[s11127138@localhost ~]$ lsblk  
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS  
sda          8:0    0    1G  0 disk  
sdb          8:16   0    2G  0 disk  
sdc          8:32   0    3G  0 disk  
sr0         11:0    1 10.2G  0 rom  /run/media/s11127138/Rocky-9-4-x86_64-dvd  
nvme0n1     259:0    0   15G  0 disk  
└─nvme0n1p1 259:1    0    1G  0 part /boot  
└─nvme0n1p2 259:2    0   14G  0 part  
    └─rl-root 253:0    0  12.5G  0 lvm  /  
        └─rl-swap 253:1    0    1.5G  0 lvm  [SWAP]  
[s11127138@localhost ~]$
```

2. 新增做成 xfs 檔案系統，掛載在 /1GB。

```
[s11127138@localhost ~]$ sudo mkfs -t xfs /dev/sda
[sudo] password for s11127138:
Sorry, try again.
[sudo] password for s11127138:
meta-data=/dev/sda            isize=512    agcount=4, agsize=65536 blks
       =                       sectsz=512    attr=2, projid32bit=1
       =                       crc=1        finobt=1, sparse=1, rmapbt=0
       =                       reflink=1    bigtime=1 inobtcount=1 nrext64=0
data      =                    bsize=4096    blocks=262144, imaxpct=25
       =                       sunit=0      swidth=0 blks
naming    =version 2          bsize=4096    ascii-ci=0, ftype=1
log       =internal log      bsize=4096    blocks=16384, version=2
       =                       sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none              extsz=4096    blocks=0, rtextents=0
[s11127138@localhost ~]$ sudo mkdir /1GB
[s11127138@localhost ~]$ sudo mount /dev/sda /1GB
[sudo] password for s11127138:
[s11127138@localhost ~]$
```

3. 新增一 VG，VG 名為 myVG，myVG 使用 2GB 硬碟。

```
[s11127138@localhost ~]$ sudo pvcreate /dev/sdb
[sudo] password for s11127138:
Physical volume "/dev/sdb" successfully created.
[s11127138@localhost ~]$ sudo vgcreate myVG /dev/sdb
Volume group "myVG" successfully created
[s11127138@localhost ~]$
```

4. 在 myVG 中切割 2 個 LV，一為 200 MB 做成 ext4 檔案系統、一為 300MB 做成

xfs 檔案系統。

```
[s11127138@localhost ~]$ sudo lvcreate -L 200M -n myVG200 myVG
[sudo] password for s11127138:
Logical volume "myVG200" created.

--- Logical volume ---
LV Path                /dev/myVG/myVG200
LV Name                 myVG200
VG Name                 myVG
LV UUID                 w6Fk6A-wbV1-ySQL-rwbu-wZW9-WLLF-86tjmE
LV Write Access         read/write
LV Creation host, time  localhost.localdomain, 2024-12-01 23:44:19 +0800
LV Status                available
# open                  0
LV Size                 200.00 MiB
Current LE               50
Segments                1
Allocation               inherit
Read ahead sectors       auto
- currently set to      256
Block device            253:2

[s11127138@localhost ~]$ sudo lvcreate -L 300M -n myVG300 myVG
Logical volume "myVG300" created.
```

```

--- Logical volume ---
LV Path                /dev/myVG/myVG300
LV Name                 myVG300
VG Name                 myVG
LV UUID                 3X2aLf-0wCf-4nBc-iSL4-7gLL-eVSr-oGx8lX
LV Write Access         read/write
LV Creation host, time  localhost.localdomain, 2024-12-01 23:45:38 +0800
LV Status                available
# open                  0
LV Size                 300.00 MiB
Current LE               75
Segments                1
Allocation               inherit
Read ahead sectors      auto
- currently set to      256
Block device            253:3

```

```

[s11127138@localhost ~]$ sudo mkfs -t ext4 /dev/myVG/myVG200
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 204800 1k blocks and 51200 inodes
Filesystem UUID: 6036d973-9d39-4437-968d-388fc833e134
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

```

```

[s11127138@localhost ~]$ sudo mkfs -t xfs /dev/myVG/myVG300
meta-data=/dev/myVG/myVG300      isize=512    agcount=4, agsize=19200 blks
=                               sectsz=512    attr=2, projid32bit=1
=                               crc=1        finobt=1, sparse=1, rmapbt=0
=                               reflink=1     bigtime=1 inobtcount=1 nrext64=0
data      =                       bsize=4096    blocks=76800, imaxpct=25
=                               sunit=0       swidth=0 blks
naming    =version 2              bsize=4096    ascii-ci=0, ftype=1
log       =internal log          bsize=4096    blocks=16384, version=2
=                               sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none                  extsz=4096    blocks=0, rtextents=0

```

5. 將 200MB LV 掛載在 /LV_1， 300MB LV 掛載在 /LV_2。

```

[s11127138@localhost ~]$ sudo mkdir /LV_1
[s11127138@localhost ~]$ sudo mkdir /LV_2
[s11127138@localhost ~]$ ls /
1GB  bin  dev  home  lib64  LV_2  mnt  proc  run  srv  tmp  usr
afs  boot  etc  lib   LV_1  media  opt  root  sbin  sys  tonyhome  var
[s11127138@localhost ~]$ sudo mount /dev/myVG/myVG200 /LV_1
[s11127138@localhost ~]$ sudo mount /dev/myVG/myVG300 /LV_2
[s11127138@localhost ~]$ lsblk
NAME                MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
sda                  8:0    0   1G  0 disk /1GB
sdb                  8:16   0   2G  0 disk
└─myVG-myVG200      253:2   0 200M  0 lvm  /LV_1
└─myVG-myVG300      253:3   0 300M  0 lvm  /LV_2
sdc                  8:32   0    3G  0 disk
sr0                  11:0    1 10.2G  0 rom  /run/media/s11127138/Rocky-9-4-x86_64-dvd
nvme0n1              259:0   0   15G  0 disk
└─nvme0n1p1         259:1   0    1G  0 part /boot
└─nvme0n1p2         259:2   0   14G  0 part
    └─rl-root        253:0   0 12.5G  0 lvm  /
        └─rl-swap     253:1   0   1.5G  0 lvm  [SWAP]
[s11127138@localhost ~]$

```

6. 將 3GB 硬碟擴充到 myVG 中。

```
[s11127138@localhost ~]$ sudo pvcreate /dev/sdc
Physical volume "/dev/sdc" successfully created.
[s11127138@localhost ~]$ sudo vgextend myVG /dev/sdc
Volume group "myVG" successfully extended
[s11127138@localhost ~]$ sudo vgdisplay -v myVG
```

```
--- Physical volumes ---
PV Name           /dev/sdb
PV UUID           M2pQiH-nFen-TlBn-KBCN-eBd0-WQn5-bbfNGa
PV Status         allocatable
Total PE / Free PE 511 / 386

PV Name           /dev/sdc
PV UUID           qoelF9-Entz-L0UN-EmT5-oxXH-2vSg-czvQvm
PV Status         allocatable
Total PE / Free PE 767 / 767
```

7. 擴大 200MB LV 成 400MB，300MB LV 擴大成 600MB。(檔案系統也要擴大)

```
[s11127138@localhost ~]$ df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        4.0M   0  4.0M   0% /dev
tmpfs           368M   0  368M   0% /dev/shm
tmpfs           148M  5.1M  143M   4% /run
/dev/mapper/rl-root 13G  4.7G  7.8G  38% /
/dev/nvme0n1p1  960M 521M  440M  55% /boot
tmpfs           74M   104K   74M   1% /run/user/1000
/dev/sr0         11G   11G    0 100% /run/media/s11127138/Rocky-9-4-x86_64-dvd
/dev/sda         960M  39M  922M   5% /1GB
/dev/mapper/myVG-myVG200 182M  14K  168M   1% /LV_1
/dev/mapper/myVG-myVG300 236M  17M  220M   8% /LV_2
```

```
[s11127138@localhost ~]$ sudo lvextend -L 400M /dev/myVG/myVG200
Size of logical volume myVG/myVG200 changed from 200.00 MiB (50 extents) to 400.00 MiB (100 extents).
Logical volume myVG/myVG200 successfully resized.
[s11127138@localhost ~]$ sudo resize2fs /dev/myVG/myVG200
resize2fs 1.46.5 (30-Dec-2021)
Filesystem at /dev/myVG/myVG200 is mounted on /LV_1; on-line resizing required
old_desc_blocks = 2, new_desc_blocks = 4
The filesystem on /dev/myVG/myVG200 is now 409600 (1k) blocks long.
```

```
[s11127138@localhost ~]$ sudo lvextend -L 600M /dev/myVG/myVG300
Size of logical volume myVG/myVG300 changed from 300.00 MiB (75 extents) to 600.00 MiB (150 extents).
Logical volume myVG/myVG300 successfully resized.
[s11127138@localhost ~]$ sudo resize2fs /dev/myVG/myVG300
resize2fs 1.46.5 (30-Dec-2021)
resize2fs: Bad magic number in super-block while trying to open /dev/myVG/myVG300
Couldn't find valid filesystem superblock.
[s11127138@localhost ~]$ sudo xfs_growfs /dev/myVG/myVG300
meta-data=/dev/mapper/myVG-myVG300 isize=512    agcount=4, agsize=19200 blks
       =                       sectsz=512    attr=2, projid32bit=1
       =                       crc=1        finobt=1, sparse=1, rmapbt=0
       =                       reflink=1     bigtime=1 inobtcount=1 nnext64=0
data      =                       bsize=4096   blocks=76800, imaxpct=25
       =                       sunit=0       swidth=0 blks
naming    =version 2              bsize=4096   ascii-ci=0, ftype=1
log       =internal log          bsize=4096   blocks=16384, version=2
       =                       sectsz=512    sunit=0 blks, lazy-count=1
realtime  =none                  extsz=4096   blocks=0, rtextents=0
data blocks changed from 76800 to 153600
```

```
[s11127138@localhost ~]$ df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        4.0M   0  4.0M   0% /dev
tmpfs           368M   0  368M   0% /dev/shm
tmpfs           148M  5.1M  143M   4% /run
/dev/mapper/rl-root 13G  4.7G  7.8G  38% /
/dev/nvme0n1p1  960M  521M  440M  55% /boot
tmpfs           74M   104K   74M   1% /run/user/1000
/dev/sr0        11G   11G    0 100% /run/media/s11127138/Rocky-9-4-x86_64-dvd
/dev/sda        960M   39M  922M   5% /1GB
/dev/mapper/myVG-myVG200 369M   14K  347M   1% /LV_1
/dev/mapper/myVG-myVG300 536M   20M  517M   4% /LV_2
```

8. 顯示 myVG 相關資料，要能看到 VG、LV 及使用那些硬碟的資訊。

```
[s11127138@localhost ~]$ sudo vgdisplay -v myVG
--- Volume group ---
VG Name                myVG
System ID
Format                 lvm2
Metadata Areas         2
Metadata Sequence No   6
VG Access               read/write
VG Status               resizable
MAX LV                 0
Cur LV                2
Open LV                2
Max PV                 0
Cur PV                2
Act PV                2
VG Size                4.99 GiB
PE Size                4.00 MiB
Total PE               1278
Alloc PE / Size        250 / 1000.00 MiB
Free PE / Size         1028 / <4.02 GiB
VG UUID                quzCDn-MdSK-e62T-5GzT-SMYy-DqxE-8CjqFb
```

--- Logical volume ---

LV Path /dev/myVG/myVG200
LV Name myVG200
VG Name myVG
LV UUID w6Fk6A-wbV1-ySQL-rwbu-wZW9-WLlF-86tjmE
LV Write Access read/write
LV Creation host, time localhost.localdomain, 2024-12-01 23:44:19 +0800
LV Status available
open 1
LV Size 400.00 MiB
Current LE 100
Segments 2
Allocation inherit
Read ahead sectors auto
- currently set to 256
Block device 253:2

--- Logical volume ---

LV Path /dev/myVG/myVG300
LV Name myVG300
VG Name myVG
LV UUID 3X2aLf-0wCf-4nBc-iSl4-7gLl-eVSr-oGx8lX
LV Write Access read/write
LV Creation host, time localhost.localdomain, 2024-12-01 23:45:38 +0800
LV Status available
open 1
LV Size 600.00 MiB
Current LE 150
Segments 2
Allocation inherit
Read ahead sectors auto
- currently set to 256
Block device 253:3

--- Physical volumes ---

PV Name /dev/sdb
PV UUID M2pQiH-nFen-TlBn-KBCN-eBd0-WQn5-bbfNGa
PV Status allocatable
Total PE / Free PE 511 / 261

PV Name /dev/sdc
PV UUID qoelF9-Entz-L0UN-EmT5-oxXH-2vSg-czvQvm
PV Status allocatable
Total PE / Free PE 767 / 767