

lvm 볼륨 확장 및 파일시스템 용량 확장 작업

xfs로 만들어진 경로의 데이터 사용량 증가하고 있어 추가로 디스크 장착 ~ 용량 확장하려고 합니다.

사전정보

1. 현재 알람이 발생한 디스크 사용량 정보

```
$> df -Th /data
Filesystem              Type  Size  Used Avail Use% Mounted on
/dev/mapper/content_vg-content_lv xfs   3.6T   3.3T  346G  91% /data
```

흠.. 3.6T 디스크인데 3.3T사용하고 있어서 총 사용율 91%네요. $\pi^{\wedge}\pi$

2. 굴러다니는 디스크 500G짜리 를 하나 더 붙였습니다.

```
$> fdisk -l
...
Disk /dev/sdc: 500 GiB, 536870912000 bytes, 1048576000 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

3. vg 이름은 content_vg, lv 이름은 content_lv로 구성이 되어 있어요.

lvm 볼륨 확장

1. sdc 디스크를 pv 구성해줍니다. (저는 디스크 전체를 lvm으로 사용할꺼라 따로 파티션을 나누진 않았어요)

```
$> pvcreate /dev/sdc
Physical volume "/dev/sdc" successfully created.
```

2. pv 정보 확인

1. 확장 후

```
$> pvdisplay
--- Physical volume ---
PV Name               /dev/sdb
VG Name               content_vg
PV Size               <3.64 TiB / not usable <1.72 MiB
Allocatable          yes (but full)
PE Size              4.00 MiB
Total PE             953479
Free PE              0
Allocated PE         953479
PV UUID              QnstsS-xBJ0-Qv0l-RFan-SgaA-z3Fg-RJrZK8
```

2. 확장 전

```
$> pvdisplay
--- Physical volume ---
PV Name               /dev/sdb
VG Name               content_vg
PV Size               <3.64 TiB / not usable <1.72 MiB
Allocatable          yes (but full)
```

```

PE Size          4.00 MiB
Total PE         953479
Free PE          0
Allocated PE     953479
PV UUID          QnstsS-xBJ0-Qv0l-RFan-SgaA-z3Fg-RJrZK8

--- Physical volume ---
PV Name          /dev/sdc
VG Name          content_vg
PV Size          500.00 GiB / not usable 4.00 MiB
Allocatable      yes (but full)
PE Size          4.00 MiB
Total PE         127999
Free PE          0
Allocated PE     127999
PV UUID          Bsm9b5-DZTB-2iWr-6RH0-6uly-canP-SOhMeC

```

3. Volume Group 확장

```

$> vgextend content_vg /dev/sdc
Volume group "content_vg" successfully extended

```

1. 확장 전

```

$> vgdisplay
--- Volume group ---
VG Name          content_vg
System ID
Format           lvm2
Metadata Areas    1
Metadata Sequence No 5
VG Access         read/write
VG Status         resizable
MAX LV           0
Cur LV           1
Open LV           1
Max PV            0
Cur PV           1
Act PV            1
VG Size           <3.64 TiB
PE Size           4.00 MiB
Total PE          953479
Alloc PE / Size   943718 / <3.60 TiB
Free PE / Size    9761 / <38.13 GiB
VG UUID           liEZ8G-kbcL-l8MD-Ax6m-dWSZ-ZTCd-OvBWff

```

2. 확장 후

```

$> vgdisplay
--- Volume group ---
VG Name          content_vg
System ID
Format           lvm2
Metadata Areas    2
Metadata Sequence No 6
VG Access         read/write
VG Status         resizable
MAX LV           0
Cur LV           1
Open LV           1
Max PV            0
Cur PV           2
Act PV            2
VG Size           <4.13 TiB
PE Size           4.00 MiB
Total PE          1081478

```

Alloc PE / Size	943718 / <3.60 TiB
Free PE / Size	137760 / 538.12 GiB
VG UUID	liEZ8G-kbcL-l8MD-Ax6m-dWSZ-ZTCd-OvBWff

vg Size가 기존 3.64에서 500G를 확장했기 때문에 4.13T로 설정되었어요. lv를 확장하지 않은 상태이기 때문에 Alloc PE가 3.6T, Free PE가 538.12 Gib가 존재하고 있다고 알려주네요.

4. LV 확장

```
$> lvextend -l +100%FREE /dev/content_vg/content_lv
Size of logical volume content_vg/content_lv changed from <3.60 TiB (943718 extents) to <4.13 TiB (1081478 extents).
Logical volume content_vg/content_lv successfully resized.
```

남은 공간 모두를 사용할꺼라서 100%FREE라는 옵션을 넣어주면 됩니다.

1. 확장전

```
$> lvdisplay
--- Logical volume ---
LV Path                /dev/content_vg/content_lv
LV Name                 content_lv
VG Name                 content_vg
LV UUID                 fhlWVB-0zNY-IcfO-qhu2-iNqV-hk73-0Nwl0N
LV Write Access         read/write
LV Creation host, time container.igoni.kr, 2023-01-08 17:53:28 +0900
LV Status                available
# open                  1
LV Size                 <3.60 TiB
Current LE              943718
Segments                1
Allocation               inherit
Read ahead sectors      auto
- currently set to      256
Block device            253:0
```

2. 확장 후

```
$> lvdisplay
--- Logical volume ---
LV Path                /dev/content_vg/content_lv
LV Name                 content_lv
VG Name                 content_vg
LV UUID                 fhlWVB-0zNY-IcfO-qhu2-iNqV-hk73-0Nwl0N
LV Write Access         read/write
LV Creation host, time container.igoni.kr, 2023-01-08 17:53:28 +0900
LV Status                available
# open                  1
LV Size                 <4.13 TiB
Current LE              1081478
Segments                2
Allocation               inherit
Read ahead sectors      auto
- currently set to      256
Block device            253:0
```

자, 여기까지 진행되었으면 lvm 볼륨을 확장하는것까지 되었고요, 이제 파일시스템 확장을 할 겁니다. 여기까지만 진행되었다면, df -h 쳐도 용량이 늘진 않았어요..

1. 파일시스템 확장

```
$> xfs_growfs -d /dev/content_vg/content_lv
meta-data=/dev/mapper/content_vg-content_lv isize=512  agcount=4, agsize=241591808 blks
=               sectsz=512  attr=2, projid32bit=1
=               crc=1      finobt=1, sparse=1, rmapbt=0
=               reflink=1   bigtime=0 inobtcount=0
```

```
data    =          bsize=4096  blocks=966367232, imaxpct=5
        =          sunit=0    swidth=0 blks
naming  =version 2          bsize=4096  ascii-ci=0, ftype=1
log     =internal log      bsize=4096  blocks=471859, version=2
        =          sectsz=512  sunit=0  blks, lazy-count=1
realtime =none            extsz=4096  blocks=0, rtextents=0
data blocks changed from 966367232 to 1107433472
```

2. 파일시스템 용량 확장 확인 (3.6T -> 4.2T로 용량 증설)

```
$> df -Th /data
Filesystem              Type  Size  Used Avail Use% Mounted on
/dev/mapper/content_vg-content_lv xfs   4.2T  3.3T  881G   80% /data
```

Reference

- <https://m.blog.naver.com/hanajava/220779211465>
- <https://devinegrace.tistory.com/40>
- https://access.redhat.com/documentation/ko-kr/red_hat_enterprise_linux/9/html/managing_file_systems/assembly_increasing-the-size-of-an-xfs-file-system_managing-file-systems
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