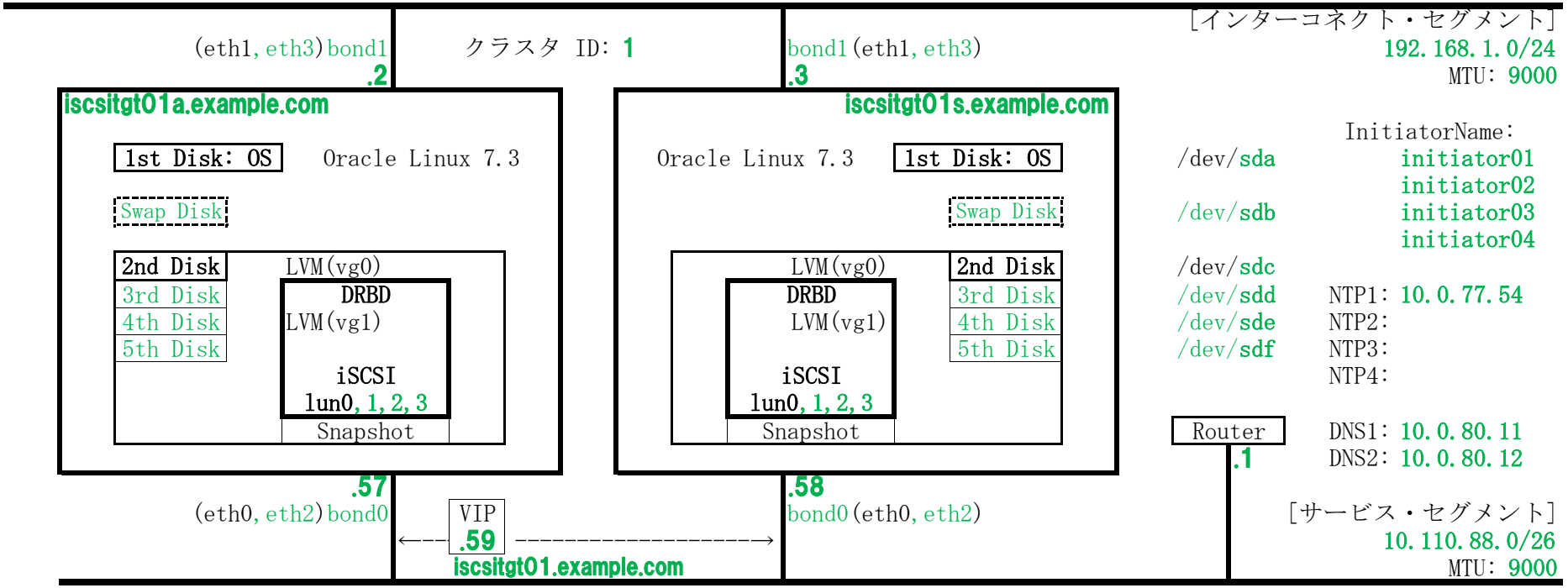
Ver.1.20 2016/12/17

[Check]

【想定するサーバのスペックとネットワーク構成】

CPU: 2Core 以上
Memory: 2GB 以上　※ この手順書では、 2GB にて例示
DVD ドライブ: 1台
HDD 1: 8GB 以上 (1st Disk, OS 用)　※ この手順書では、 40GB にて例示
HDD 2: 1GB 以上 (swap 用)　※ この手順書では、 1GB にて例示
HDD 3: 1GB 以上 (2nd Disk, データ用)　※ この手順書では、100GB にて例示
HDD 4: 1GB 以上 (3rd Disk, データ用)　※ この手順書では、100GB にて例示
HDD 5: 1GB 以上 (4th Disk, データ用)　※ この手順書では、100GB にて例示
HDD 6: 1GB 以上 (5th Disk, データ用)　※ この手順書では、100GB にて例示
NIC 1: 1Gbps 以上、サービス用セグメント (IBM Bluemix(SoftLayer) では Private VLAN) へ接続
NIC 2: 1Gbps 以上、インターコネクト用セグメント (IBM Bluemix(SoftLayer) では Public VLAN) へ接続
NIC 3: 1Gbps 以上、サービス用セグメント (IBM Bluemix(SoftLayer) では Private VLAN) へ接続
NIC 4: 1Gbps 以上、インターコネクト用セグメント (IBM Bluemix(SoftLayer) では Public VLAN) へ接続



※ 当文書内で緑色にした部分は、環境に合わせて読み替えたり、カスタマイズ（名前を変えたり、実行するしないを選択）

○ する部分を表します。ただし、日付や注目していない UUID 等は除きます。

※ IBM Bluemix(SoftLayer) のベアメタルサーバで NIC を冗長化した場合、
「NIC 1 (eth0)」と「NIC 3 (eth2)」、「NIC 2 (eth1)」と「NIC 4 (eth3)」が LAG で束ねられています。
※ 本手順書では、LAG の設定がない前提としますが、LAG 対応させるための設定方法は注記しておきます。
※ IBM Bluemix(SoftLayer) の仮想サーバは、ベアメタルサーバと比較して、主に以下の相違点があります。
・「NIC 3」と「NIC 4」を追加できません。
・MTU は 1500 までしかサポートされません。
・ローカルストレージのデバイス名が異なります。

○ 【共有ストレージの構成】

○ /dev/sdc LVM 物理ボリューム
○ /dev/sdd LVM 物理ボリューム
○ /dev/sde LVM 物理ボリューム
○ /dev/sdf LVM 物理ボリューム
○ vg0 LVM ボリュームグループ
○ /dev/vg0/lv-drbd0 LVM 論理ボリューム (DRBD 用ブロックデバイスとして使用)
○ /dev/drbd0 DRBD リソース (LVM 物理ボリュームとして使用)
○ vg1 DRBD 上のボリュームグループ (「vg」+「クラスタ ID」)
○ /dev/vg1/lv-lun0000 DRBD 上の LVM 論理ボリューム (LUN としてエクスポート)
○ /dev/vg1/lv-lun0001 DRBD 上の LVM 論理ボリューム (LUN としてエクスポート)
○ /dev/vg1/lv-lun0002 DRBD 上の LVM 論理ボリューム (LUN としてエクスポート)
○ /dev/vg1/lv-lun0003 DRBD 上の LVM 論理ボリューム (LUN としてエクスポート)

○ 【OS のインストールと初期設定】

○ インストーラを DVD ドライブにセットし、サーバを起動します。

a,s # V834394-01.iso (Oracle Linux 7.3)

○ インストーラの起動メニューが表示されたら60秒以内に「Tab」キーを押下します。

a,s # Tab

○ 起動オプションを以下のように編集し、「Enter」キーを押下します。

a,s # vmlinuz … rd.live.check quiet
a,s # ↓
a,s # vmlinuz … net.ifnames=0 biosdevname=0 selinux=0 vconsole.keymap=jp106

※ 英語キーボードとして認識されている状態なので、「=」を入力するには「^」を押下します。

○ anaconda の「Welcome」画面が出てきたら「Ctrl + Alt + F3」キーを押下し、シェルに移行します。

a,s # Ctrl + Alt + F3
[anaconda root@localhost /]#

○ HDD の情報を確認します。

a,s fdisk -l | grep ^Disk | sort
Disk /dev/mapper/live-base: 2147 MB, 2147483648 bytes, 4194304 sectors
Disk /dev/mapper/live-rw: 2147 MB, 2147483648 bytes, 4194304 sectors
Disk /dev/sda: 42.9 GB, 17179869184 bytes, 33554432 sectors
Disk /dev/sdb: 1073 MB, 1073741824 bytes, 2097152 sectors
Disk /dev/sdc: 107.4 GB, 107374182400 bytes, 209715200 sectors
Disk /dev/sdd: 107.4 GB, 107374182400 bytes, 209715200 sectors
Disk /dev/sde: 107.4 GB, 107374182400 bytes, 209715200 sectors
Disk /dev/sdf: 107.4 GB, 107374182400 bytes, 209715200 sectors

○ パーティションを作成します。

a,s fdisk -H 64 -S 32 /dev/sda
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.

```
1090        Be careful before using the write command.
1100
1110        Device does not contain a recognized partition table
1120        Building a new DOS disklabel with disk identifier 0x2a058c02.
1130
1140 a,s    Command (m for help): o
1150        Building a new DOS disklabel with disk identifier 0xc9c2368a.
1160
1170 a,s    Command (m for help): n
1180        Partition type:
1190           p   primary (0 primary, 0 extended, 4 free)
1200           e   extended
1210 a,s    Select (default p): [Enter]
1220        Using default response p
1230 a,s    Partition number (1-4, default 1): [Enter]
1240 a,s    First sector (2048-83886079, default 2048): [Enter]
1250        Using default value 2048
1260 a,s    Last sector, +sectors or +size{K,M,G} (2048-83886079, default 83886079): +500M
1270        Partition 1 of type Linux and of size 500 MiB is set
1280
1290 a,s    Command (m for help): a
1300        Selected partition 1
1310
1320 a,s    Command (m for help): n
1330        Partition type:
1340           p   primary (1 primary, 0 extended, 3 free)
1350           e   extended
1360 a,s    Select (default p): [Enter]
1370        Using default response p
1380 a,s    Partition number (2-4, default 2): [Enter]
1390 a,s    First sector (1026048-83886079, default 1026048): [Enter]
1400        Using default value 1026048
1410 a,s    Last sector, +sectors or +size{K,M,G} (1026048-83886079, default 83886079): [Enter]
1420        Using default value 83886079
1430        Partition 2 of type Linux and of size 39.5 GiB is set
1440
1450 a,s    Command (m for help): p
1460
1470        Disk /dev/sda: 42.9 GB, 42949672960 bytes, 83886000 sectors
1480        Units = sectors of 1 * 512 = 512 bytes
1490        Sector size (logical/physical): 512 bytes / 512 bytes
```

```
1500        I/O size (minimum/optimal): 512 bytes / 512 bytes
1510        Disk label type: dos
1520        Disk identifier: 0xc9c2368a
1530
1540           Device Boot      Start         End      Blocks   Id  System
1550        /dev/sda1   *        2048     1026047      512000   83  Linux
1560        /dev/sda2         1026048    83886079    41430016   83  Linux
1570
1580 a,s    Command (m for help): w
1590        The partition table has been altered!
1600
1610        Calling ioctl() to re-read partition table.
1620        Syncing disks.
1630
1640 a,s    fdisk -H 64 -S 32 /dev/sdb
1650        Welcome to fdisk (util-linux 2.23.2).
1660
1670        Changes will remain in memory only, until you decide to write them.
1680        Be careful before using the write command.
1690
1700        Device does not contain a recognized partition table
1710        Building a new DOS disklabel with disk identifier 0x2a058c02.
1720
1730 a,s    Command (m for help): o
1740        Building a new DOS disklabel with disk identifier 0xb3afd860.
1750
1760 a,s    Command (m for help): n
1770        Partition type:
1780           p   primary (0 primary, 0 extended, 4 free)
1790           e   extended
1800 a,s    Select (default p): [Enter]
1810        Using default response p
1820 a,s    Partition number (1-4, default 1): [Enter]
1830 a,s    First sector (2048-2097151, default 2048): [Enter]
1840        Using default value 2048
1850 a,s    Last sector, +sectors or +size{K,M,G} (2048-2097151, default 2097151): [Enter]
1860        Using default value 2097151
1870        Partition 1 of type Linux and of size 1023 MiB is set
1880
1890 a,s    Command (m for help): t
1900        Selected partition 1
```

```
1910 a,s    Hex code (type L to list all codes): 82
1920        Changed type of partition 'Linux' to 'Linux swap / Solaris'
1930
1940 a,s    Command (m for help): p
1950
1960        Disk /dev/sdb: 1073 MB, 1073741824 bytes, 2097152 sectors
1970        Units = sectors of 1 * 512 = 512 bytes
1980        Sector size (logical/physical): 512 bytes / 512 bytes
1990        I/O size (minimum/optimal): 512 bytes / 512 bytes
2000        Disk label type: dos
2010        Disk identifier: 0xb3afd860
2020
2030           Device Boot      Start         End      Blocks   Id  System
2040        /dev/sdb1            2048     2097151     1047552   82  Linux swap / Solaris
2050
2060 a,s    Command (m for help): w
2070        The partition table has been altered!
2080
2090        Calling ioctl() to re-read partition table.
2100        Syncing disks.
2110
2120 a,s    fdisk -l | grep /dev/ | sort
2130        /dev/sda1   *        2048     1026047      512000   83  Linux
2140        /dev/sda2         1026048    83886079    41430016   83  Linux
2150        /dev/sdb1            2048     2097151     1047552   82  Linux swap / Solaris
2160        Disk /dev/mapper/live-base: 2147 MB, 2147483648 bytes, 4194304 sectors
2170        Disk /dev/mapper/live-rw: 2147 MB, 2147483648 bytes, 4194304 sectors
2180        Disk /dev/sda: 42.9 GB, 42949672960 bytes, 83886080 sectors
2190        Disk /dev/sdb: 1073 MB, 1073741824 bytes, 2097152 sectors
2200        Disk /dev/sdc: 107.4 GB, 107374182400 bytes, 209715200 sectors
2210        Disk /dev/sdd: 107.4 GB, 107374182400 bytes, 209715200 sectors
2220        Disk /dev/sde: 107.4 GB, 107374182400 bytes, 209715200 sectors
2230        Disk /dev/sdf: 107.4 GB, 107374182400 bytes, 209715200 sectors
2240
2250   ○    「Ctrl + Alt + F6」キーを押下し、anaconda の「welcome」画面に戻ります。
2260
2270 a,s    # Ctrl + Alt + F6
2280
2290   ○    「English (United States)」が選択されていることを確認し、「Continue」を選択します。
2300
2310 a,s    # Continue
```

○ 「DATE & TIME」を選択し、「Asia / Tokyo」を選択します。

```
a,s  # DATE & TIME: Asia / Tokyo
```

○ 「KEYBOARD」を選択し、「Japanese (OADG 109A)」のみ選ばれているように選択します。

```
a,s  # KEYBOARD: Japanese (OADG 109A)
```

○ 「INSTALLATION DESTINATION」を選択し、以下のように設定します。

```
       デバイス名  FS    MountPoint ラベル
a,s  # /dev/sda1  xfs  /boot     /boot
a,s  # /dev/sda2  xfs  /         /
a,s  # /dev/sdb1  swap           swap
```

○ 「Begin Install」を選択します。

```
a,s  # Begin Install
```

○ 「ROOT PASSWORD」を選択し、パスワードを設定します。

```
a,s  # ROOT PASSWORD: ********
```

○ 「Reboot」ボタンが表示されるのを待ち、「Reboot」を選択します。

```
a,s  # Reboot
```

○ 再起動処理中に Eject されたインストーラをDVDドライブから取り外します。

```
a,s  # Eject DVD
```

○ 再起動完了後、コンソールにてログインします。

```
     Oracle Linux Server 7.3
     Kernel 4.1.12-61.1.18.el7uek.x86_64 on an x86_64

a,s  localhost login: root
a,s  Password: ********
     [root@localhost ~] #
```

○ MAC アドレスを確認します。

a,s
```
ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 00:0c:29:08:b8:5f brd ff:ff:ff:ff:ff:ff
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 00:0c:29:08:b8:41 brd ff:ff:ff:ff:ff:ff
4: eth2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 00:0c:29:08:b8:4b brd ff:ff:ff:ff:ff:ff
5: eth3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
    link/ether 00:0c:29:08:b8:55 brd ff:ff:ff:ff:ff:ff
```

○ MAC アドレスをもとに、 LAN ケーブルの結線(組み合わせ)を設計通りに修正します。

※ この後の手順で、NIC デバイス名の方を入れ替えても構いません。

○ IP アドレスを一時的に設定します。

a
```
ip addr add 10.110.88.57/26 dev eth0
```

s
```
ip addr add 10.110.88.58/26 dev eth0
```

※ デバイス名が意図するものとずれている場合、デバイス名は適宜変更する必要があります。

○ 必要に応じて、デフォルトゲートウェイを一時的に設定します。

```
ip route add default via 10.110.88.1
```

○ root にて、ssh でログインします。

a
```
ssh root@10.110.88.57
The authenticity of host '10.110.88.57 (10.110.88.57)' can't be established.
ECDSA key fingerprint is 95:bc:49:71:b2:a3:dd:ab:63:ad:35:e4:fe:4d:fc:82.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.110.88.57' (ECDSA) to the list of known hosts.
```

```
3140    a   root@10.110.88.57's password: ********
3150        Last login: Sat Oct 29 18:33:24 2016
3160
3170    s   ssh root@10.110.88.58
3180        The authenticity of host '10.110.88.58 (10.110.88.58)' can't be established.
3190        ECDSA key fingerprint is 8f:f6:81:0f:44:e1:83:d5:0a:9d:3f:90:7c:3e:93:73.
3200    s   Are you sure you want to continue connecting (yes/no)? yes
3210        Warning: Permanently added '10.110.88.58' (ECDSA) to the list of known hosts.
3220    s   root@10.110.88.58's password: ********
3230        Last login: Sat Oct 29 18:33:24 2016
3240
3250  ○     ストレージの情報を確認します。
3260
3270 a,s    fdisk -l | grep /dev/ | sort
3280        /dev/sda1   *        2048     1026047      512000   83  Linux
3290        /dev/sda2         1026048    83886079    41430016   83  Linux
3300        /dev/sdb1            2048     2097151     1047552   82  Linux swap / Solaris
3310        Disk /dev/sda: 42.9 GB, 42949672960 bytes, 83886080 sectors
3320        Disk /dev/sdb: 1073 MB, 1073741824 bytes, 2097152 sectors
3330        Disk /dev/sdc: 107.4 GB, 107374182400 bytes, 209715200 sectors
3340        Disk /dev/sdd: 107.4 GB, 107374182400 bytes, 209715200 sectors
3350        Disk /dev/sde: 107.4 GB, 107374182400 bytes, 209715200 sectors
3360        Disk /dev/sdf: 107.4 GB, 107374182400 bytes, 209715200 sectors
3370
3380 a,s    blkid
3390        /dev/sda2: LABEL="/" UUID="6fa3bde3-dc77-461d-8ae4-5a6ea5efba4c" TYPE="xfs"
3400        /dev/sda1: LABEL="/boot" UUID="11b16718-fa37-4aed-baff-2b643304e705" TYPE="xfs"
3410        /dev/sdb1: LABEL="swap" UUID="d561d285-585b-4790-9690-1b55598de94b" TYPE="swap"
3420
3430 a,s    cat /etc/fstab
3440        #
3450        # /etc/fstab
3460        # Created by anaconda on Fri Nov 25 11:55:06 2016
3470        #
3480        # Accessible filesystems, by reference, are maintained under '/dev/disk'
3490        # See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
3500        #
3510        UUID=6fa3bde3-dc77-461d-8ae4-5a6ea5efba4c /                       xfs     defaults        0 0
3520        UUID=11b16718-fa37-4aed-baff-2b643304e705 /boot                   xfs     defaults        0 0
3530        UUID=d561d285-585b-4790-9690-1b55598de94b swap                    swap    defaults        0 0
3540
```

○ キーボード、ロケールの情報を確認します。

```
a,s  cat /etc/vconsole.conf
     KEYMAP="jp-OADG109A"
     FONT="latarcyrheb-sun16"

a,s  cat /etc/locale.conf
     LANG="en_US.UTF-8"

a,s  localectl status
        System Locale: LANG=en_US.UTF-8
            VC Keymap: jp-OADG109A
           X11 Layout: jp
          X11 Variant: OADG109A
```

○ タイムゾーンの情報を確認します。

```
a,s  cat /etc/adjtime
     0.0 0 0.0
        0
     UTC

a,s  hwclock --debug
     hwclock from util-linux 2.23.2
     Using /dev interface to clock.
     Last drift adjustment done at 0 seconds after 1969
     Last calibration done at 0 seconds after 1969
     Hardware clock is on UTC time
     Assuming hardware clock is kept in UTC time.
     Waiting for clock tick...
     ...got clock tick
     Time read from Hardware Clock: 2016/11/25 04:31:00
     Hw clock time : 2016/11/25 04:31:00 = 1480048260 seconds since 1969
     Fri 25 Nov 2016 01:31:00 PM JST  -0.239477 seconds

a,s  ls -l /etc/localtime
     lrwxrwxrwx 1 root root 32 Nov 25 11:58 /etc/localtime -> ../usr/share/zoneinfo/Asia/Tokyo

a,s  timedatectl status
           Local time: Fri 2016-11-25 13:31:44 JST
       Universal time: Fri 2016-11-25 04:31:44 UTC
```

```
3960               RTC time: Fri 2016-11-25 04:31:43
3970              Time zone: Asia/Tokyo (JST, +0900)
3980            NTP enabled: n/a
3990        NTP synchronized: no
4000         RTC in local TZ: no
4010              DST active: n/a
4020
4030   ○    kdump の設定を確認します。
4040
4050 a,s    systemctl is-enabled kdump.service
4060        enabled
4070
4080 a,s    kdumpctl status
4090        Kdump is operational
4100
4110   ○    SELinux を無効化します。
4120
4130 a,s    sed -i -e 's/^SELINUX=.*$/SELINUX=disabled/' /etc/sysconfig/selinux
4140
4150             ※  カーネルパラメータで無効化していますが、運用上紛らわしいので設定ファイルも変更します。
4160
4170   ○    SELinux の設定を確認します。
4180
4190 a,s    grep -v ^# /etc/sysconfig/selinux
4200        SELINUX=disabled
4210        SELINUXTYPE=targeted
4220
4230 a,s    getenforce
4240        Disabled
4250
4260   ○    管理者用一般ユーザを作成します。
4270
4280 a,s    sed -i -e 's/^CREATE_MAIL_SPOOL=.*$/CREATE_MAIL_SPOOL=no/' /etc/default/useradd
4290
4300 a,s    groupadd -g 1000 admin
4310 a,s    useradd -g admin -G wheel -u 1000 admin
4320 a,s    echo 'password' | passwd --stdin admin
4330        Changing password for user admin.
4340        passwd: all authentication tokens updated successfully.
4350
4360 a,s    id admin
```

```
4370         uid=1000(admin) gid=1000(admin) groups=1000(admin),10(wheel)
4380
4390    ○    wheel グループのユーザがパスワードなしで sudo コマンドを使えるように設定します。
4400
4410 a,s     echo '%wheel ALL=(ALL) NOPASSWD: ALL' > /etc/sudoers.d/wheel
4420
4430    ○    管理者用一般ユーザにて、ssh でログインします。
4440
4450     a   ssh admin@10.110.88.57
4460     a   admin@10.110.88.57's password: ********
4470
4480     s   ssh admin@10.110.88.58
4490     s   admin@10.110.88.58's password: ********
4500
4510    ○    wheel グループのユーザのみが su コマンドを使えるように設定します。
4520
4530 a,s     sudo sed -i -e '/^#auth.*required.*pam_wheel.so use_uid$/ s/#//' /etc/pam.d/su
4540 a,s     echo "SU_WHEEL_ONLY yes" | sudo tee -a /etc/login.defs
4550
4560    ○    root アカウントでのパスワード認証による ssh 接続を禁止します。
4570
4580 a,s     sudo sed -i -e 's/^#PermitRootLogin .*$/PermitRootLogin without-password/' /etc/ssh/sshd_config
4590 a,s     sudo systemctl restart sshd
4600
4610    ○    参照・監視用一般ユーザを作成します。
4620
4630 a,s     sudo groupadd -g 1001 monitor
4640 a,s     sudo useradd -g monitor -u 1001 monitor
4650 a,s     echo 'password' | sudo passwd --stdin monitor
4660         Changing password for user monitor.
4670         passwd: all authentication tokens updated successfully.
4680
4690 a,s     id monitor
4700         uid=1001(monitor) gid=1001(monitor) groups=1001(monitor)
4710
4720    ○    NIC のデバイス名をバス情報に基づいて固定します。
4730
4740 a,s     sudo cp /dev/null /etc/udev/rules.d/70-persistent-net.rules
4750 a,s     NUM=0
4760 a,s     while :
4770 a,s     do
```

```
4780 a,s      ip addr show eth$NUM > /dev/null 2>&1 || break
4790 a,s      BUS=$(ethtool -i eth$NUM | grep bus-info | awk '{print $2}')
4800 a,s      cat << EOF | sudo tee -a /etc/udev/rules.d/70-persistent-net.rules
4810 a,s    SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", KERNELS=="$BUS", ATTR{type}=="1", NAME="eth$NUM"
4820 a,s    EOF
4830 a,s      NUM=$((NUM+1))
4840 a,s    done
4850        SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", KERNELS=="0000:04:00.0", ATTR{type}=="1", NAME="eth0"
4860        SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", KERNELS=="0000:0b:00.0", ATTR{type}=="1", NAME="eth1"
4870        SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", KERNELS=="0000:13:00.0", ATTR{type}=="1", NAME="eth2"
4880        SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", KERNELS=="0000:1b:00.0", ATTR{type}=="1", NAME="eth3"
4890
4900            ※  このファイルを編集して、NIC デバイス名を入れ替えても構いません。
4910            ※  KERNELS=="<バス情報>" を ATTR{address}=="<MAC アドレス>" に入れ替えても構いません。
4920
4930    ○   OS 起動時のカーネルパラメータを変更します。
4940
4950 a,s    sudo sed -i -e '/^GRUB_CMDLINE_LINUX=/ s/ *biosdevname=[^ "]*//' /etc/default/grub
4960 a,s    sudo sed -i -e '/^GRUB_CMDLINE_LINUX=/ s/ *net¥.ifnames=[^ "]*//' /etc/default/grub
4970 a,s    sudo sed -i -e '/^GRUB_CMDLINE_LINUX=/ s/rhgb quiet/ipv6.disable=1 sysrq_always_enabled=1 log_buf_len=16777216/' /etc/default/grub
4980 a,s    echo 'kernel.sysrq = 1' | sudo tee -a /etc/sysctl.d/99-sysctl.conf
4990 a,s    sudo grub2-mkconfig -o /boot/grub2/grub.cfg
5000        Generating grub configuration file ...
5010        Found linux image: /boot/vmlinuz-4.1.12-61.1.18.el7uek.x86_64
5020        Found initrd image: /boot/initramfs-4.1.12-61.1.18.el7uek.x86_64.img
5030        Found linux image: /boot/vmlinuz-3.10.0-514.el7.x86_64
5040        Found initrd image: /boot/initramfs-3.10.0-514.el7.x86_64.img
5050        Found linux image: /boot/vmlinuz-0-rescue-06dccd866dbd479b8a41b818455151b2
5060        Found initrd image: /boot/initramfs-0-rescue-06dccd866dbd479b8a41b818455151b2.img
5070        done
5080
5090        ※  「net.ifnames=0」「biosdevname=0」があると、前項の udev 設定が機能しません。
5100        ※  IPv6 を無効化しています。
5110
5120    ○   NIC を設定します。
5130
5140 a,s    BOND0_BONDING_OPTS="resend_igmp=1 updelay=0 use_carrier=1 miimon=100 downdelay=0 xmit_hash_policy=0"
5150 a,s    BOND0_BONDING_OPTS="$BOND0_BONDING_OPTS primary_reselect=0 fail_over_mac=0 arp_validate=0"
5160 a,s    BOND0_BONDING_OPTS="$BOND0_BONDING_OPTS mode= active-backup primary=eth0"                    ※  LAG(LACP) の場合は「mode=802.3ad」
5170 a,s    BOND0_BONDING_OPTS="$BOND0_BONDING_OPTS lacp_rate=0 arp_interval=0 ad_select=0"
5180 a,s
```

```
5190 a, s    BOND1_BONDING_OPTS="resend_igmp=1 updelay=0 use_carrier=1 miimon=100 downdelay=0 xmit_hash_policy=0"
5200 a, s    BOND1_BONDING_OPTS="$BOND1_BONDING_OPTS primary_reselect=0 fail_over_mac=0 arp_validate=0"
5210 a, s    BOND1_BONDING_OPTS="$BOND1_BONDING_OPTS mode= active-backup primary=eth1"                ※  LAG(LACP) の場合は「mode=802.3ad」
5220 a, s    BOND1_BONDING_OPTS="$BOND1_BONDING_OPTS lacp_rate=0 arp_interval=0 ad_select=0"
5230 a, s
5240 a, s    cat << EOF | sudo tee /etc/sysconfig/network-scripts/ifcfg-bond0
5250 a, s    DEVICE=bond0
5260 a, s    NAME=bond0
5270 a, s    TYPE=Bond
5280 a, s    UUID=$(uuidgen)
5290 a, s    BONDING_OPTS="$BOND0_BONDING_OPTS"
5300 a, s    BONDING_MASTER=yes
5310 a, s    ONBOOT=yes
5320 a, s    BOOTPROTO=none
5330 a, s    DEFROUTE=yes
5340 a, s    PEERDNS=no
5350 a, s    PEERROUTES=no
5360 a, s    IPV4_FAILURE_FATAL=yes
5370 a, s    IPV6INIT=no
5380 a, s    IPV6_AUTOCONF=no
5390 a, s    IPV6_DEFROUTE=no
5400 a, s    IPV6_PEERDNS=no
5410 a, s    IPV6_PEERROUTES=no
5420 a, s    IPV6_FAILURE_FATAL=no
5430 a, s    EOF
5440 a, s
5450 a, s    cat << EOF | sudo tee /etc/sysconfig/network-scripts/ifcfg-bond1
5460 a, s    DEVICE=bond1
5470 a, s    NAME=bond1
5480 a, s    TYPE=Bond
5490 a, s    UUID=$(uuidgen)
5500 a, s    BONDING_OPTS="$BOND1_BONDING_OPTS"
5510 a, s    BONDING_MASTER=yes
5520 a, s    ONBOOT=yes
5530 a, s    BOOTPROTO=none
5540 a, s    DEFROUTE=no
5550 a, s    PEERDNS=no
5560 a, s    PEERROUTES=no
5570 a, s    IPV4_FAILURE_FATAL=yes
5580 a, s    IPV6INIT=no
5590 a, s    IPV6_AUTOCONF=no
```

```
5600 a,s    IPV6_DEFROUTE=no
5610 a,s    IPV6_PEERDNS=no
5620 a,s    IPV6_PEERROUTES=no
5630 a,s    IPV6_FAILURE_FATAL=no
5640 a,s    EOF
5650 a,s
5660 a,s    cat << EOF | sudo tee /etc/sysconfig/network-scripts/ifcfg-eth0
5670 a,s    DEVICE=eth0
5680 a,s    NAME=eth0
5690 a,s    TYPE=Ethernet
5700 a,s    UUID=$(uuidgen)
5710 a,s    MASTER=bond0
5720 a,s    SLAVE=yes
5730 a,s    ONBOOT=yes
5740 a,s    MTU=9000
5750 a,s    EOF
5760 a,s
5770 a,s    cat << EOF | sudo tee /etc/sysconfig/network-scripts/ifcfg-eth2
5780 a,s    DEVICE=eth2
5790 a,s    NAME=eth2
5800 a,s    TYPE=Ethernet
5810 a,s    UUID=$(uuidgen)
5820 a,s    MASTER=bond0
5830 a,s    SLAVE=yes
5840 a,s    ONBOOT=yes
5850 a,s    MTU=9000
5860 a,s    EOF
5870 a,s
5880 a,s    cat << EOF | sudo tee /etc/sysconfig/network-scripts/ifcfg-eth1
5890 a,s    DEVICE=eth1
5900 a,s    NAME=eth1
5910 a,s    TYPE=Ethernet
5920 a,s    UUID=$(uuidgen)
5930 a,s    MASTER=bond1
5940 a,s    SLAVE=yes
5950 a,s    ONBOOT=yes
5960 a,s    MTU=9000
5970 a,s    EOF
5980 a,s
5990 a,s    cat << EOF | sudo tee /etc/sysconfig/network-scripts/ifcfg-eth3
6000 a,s    DEVICE=eth3
```

```
6010 a,s    NAME=eth3
6020 a,s    TYPE=Ethernet
6030 a,s    UUID=$(uuidgen)
6040 a,s    MASTER=bond1
6050 a,s    SLAVE=yes
6060 a,s    ONBOOT=yes
6070 a,s    MTU=9000
6080 a,s    EOF
6090 a,s
6100    a   # for Active
6110    a   cat << EOF | sudo tee -a /etc/sysconfig/network-scripts/ifcfg-bond0
6120    a   IPADDR=10.110.88.57
6130    a   PREFIX=26
6140    a   GATEWAY=10.110.88.1
6150    a   DNS1=10.0.80.11
6160    a   DNS2=10.0.80.12
6170    a   DOMAIN=example.com
6180    a   MTU=9000
6190    a   EOF
6200    a
6210    a   cat << EOF | sudo tee -a /etc/sysconfig/network-scripts/ifcfg-bond1
6220    a   IPADDR=192.168.1.2
6230    a   PREFIX=24
6240    a   MTU=9000
6250    a   EOF
6260    a
6270    s   # for Stand-by
6280    s   cat << EOF | sudo tee -a /etc/sysconfig/network-scripts/ifcfg-bond0
6290    s   IPADDR=10.110.88.58
6300    s   PREFIX=26
6310    s   GATEWAY=10.110.88.1
6320    s   DNS1=10.0.80.11
6330    s   DNS2=10.0.80.12
6340    s   DOMAIN=example.com
6350    s   MTU=9000
6360    s   EOF
6370    s
6380    s   cat << EOF | sudo tee -a /etc/sysconfig/network-scripts/ifcfg-bond1
6390    s   IPADDR=192.168.1.3
6400    s   PREFIX=24
6410    s   MTU=9000
```

```
6420    s   EOF
6430
6440    ○   NIC オフロード機能を無効化します。
6450
6460 a, s   cat << 'EOF' | sudo tee /etc/NetworkManager/dispatcher.d/00-ethertool
6470 a, s   #!/bin/sh
6480 a, s   if [ "$2" == "up" ]; then
6490 a, s     if [ "${1:0:3}" == "eth" ]; then
6500 a, s       ethtool -K $1 ¥
6510 a, s         rx off ¥
6520 a, s         tx off ¥
6530 a, s         sg off ¥
6540 a, s         tso off ¥
6550 a, s         ufo off ¥
6560 a, s         gso off ¥
6570 a, s         gro off ¥
6580 a, s         lro off ¥
6590 a, s         rxvlan off ¥
6600 a, s         txvlan off ¥
6610 a, s         ntuple off ¥
6620 a, s         rxhash off ¥
6630 a, s         highdma off ¥
6640 a, s         rx-vlan-filter off ¥
6650 a, s         tx-gso-robust off ¥
6660 a, s         tx-fcoe-segmentation off ¥
6670 a, s         fcoe-mtu off ¥
6680 a, s         tx-nocache-copy off ¥
6690 a, s         loopback off ¥
6700 a, s         rx-fcs off ¥
6710 a, s         rx-all off
6720 a, s       #ethtool -K $1 vlan-challenged off tx-lockless off netns-local off
6730 a, s       ethtool -G $1 rx 4096 tx 4096 rx-jumbo 2048
6740 a, s     fi
6750 a, s   fi
6760 a, s   EOF
6770 a, s   sudo chmod 755 /etc/NetworkManager/dispatcher.d/00-ethertool
6780
6790            ※  「VMXNET 3」「e1000e」「igb」「ixgbe」でのみ動作確認しました。
6800            ※  NIC のリンク速度、duplex モードを設定したい場合はこのスクリプトに組み込みます。
6810
6820    ○   hosts を設定します。
```

```
6830
6840 a,s    cat << 'EOF' | sudo tee /etc/hosts
6850 a,s    127.0.0.1       localhost localhost.localdomain localhost4 localhost4.localdomain4
6860 a,s    ::1             localhost localhost.localdomain localhost6 localhost6.localdomain6
6870 a,s    10.110.88.57    iscsitgt01a.example.com iscsitgt01a
6880 a,s    10.110.88.58    iscsitgt01s.example.com iscsitgt01s
6890 a,s    10.110.88.59    iscsitgt01.example.com iscsitgt01
6900 a,s    192.168.1.2     iscsitgt01a-ic.example.com iscsitgt01a-ic
6910 a,s    192.168.1.3     iscsitgt01s-ic.example.com iscsitgt01s-ic
6920 a,s    EOF
6930
6940   ○    hostname を設定します。
6950
6960    a   sudo hostnamectl set-hostname iscsitgt01a.example.com
6970
6980    s   sudo hostnamectl set-hostname iscsitgt01s.example.com
6990
7000   ○    不要なログ出力を抑止します。
7010
7020 a,s    cat << 'EOF' | sudo tee /etc/rsyslog.d/ignore-systemd-session-slice.conf
7030 a,s    if $programname == "systemd" and ($msg contains "Created slice user-" or $msg contains "Removed slice user-" or $msg contains "Starting user-" or $msg contains "Started Session " or $msg contains "Starting Session " or $msg contains "Stopping user-") then stop
7040 a,s    EOF
7050 a,s
7060 a,s    cat << 'EOF' | sudo tee /etc/rsyslog.d/ignore-chronyd-selected-source.conf
7070 a,s    if $programname == "chronyd" and $msg contains "Selected source " then stop
7080 a,s    EOF
7090 a,s
7100 a,s    sudo systemctl restart rsyslog
7110
7120   ○    yum リポジトリを設定します。
7130
7140 a,s    cat << 'EOF' | sudo tee /etc/yum.repos.d/media.repo
7150 a,s    [media]
7160 a,s    name=media
7170 a,s    baseurl=file:///mnt
7180 a,s    gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
7190 a,s    gpgcheck=1
7200 a,s    enabled=0
7210 a,s
7220 a,s    [media-mysql]
7230 a,s    name=media-mysql
```

```
7240 a,s    baseurl=file:///mnt/addons/Mysql
7250 a,s    gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
7260 a,s    gpgcheck=1
7270 a,s    enabled=0
7280 a,s
7290 a,s    [media-ha]
7300 a,s    name=media-ha
7310 a,s    baseurl=file:///mnt/addons/HighAvailability
7320 a,s    gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
7330 a,s    gpgcheck=1
7340 a,s    enabled=0
7350 a,s
7360 a,s    [media-rs]
7370 a,s    name=media-rs
7380 a,s    baseurl=file:///mnt/addons/ResilientStorage
7390 a,s    gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
7400 a,s    gpgcheck=1
7410 a,s    enabled=0
7420 a,s    EOF
7430
7440            ※  インストール・メディアを利用可能にします。
7450
7460 a,s    sudo sed -i -e 's/^/#/' /etc/yum.repos.d/public-yum-ol7.repo
7470
7480            ※  インターネット接続していないとエラーとなるリポジトリを無効化します。
7490
7500    ○   以下のインストーラを DVD ドライブにセットします。
7510
7520 a,s    # V834394-01.iso (Oracle Linux 7.3)
7530
7540    ○   インストーラをマウントします。
7550
7560 a,s    sudo mount /dev/cdrom /mnt
7570        mount: /dev/sr0 is write-protected, mounting read-only
7580
7590    ○   どのような環境でも共通して導入しておいた方がよいと思われる標準パッケージをインストールします。
7600
7610 a,s    sudo yum -y --disablerepo=¥* --enablerepo=media,media-mysql install ¥
7620 a,s     @development ¥
7630 a,s     @base ¥
7640 a,s     OpenIPMI ¥
```

```
7650 a, s     aide ¥
7660 a, s     crash ¥
7670 a, s     dos2unix ¥
7680 a, s     dropwatch ¥
7690 a, s     dstat ¥
7700 a, s     expect ¥
7710 a, s     filebench ¥
7720 a, s     freeipmi-bmc-watchdog ¥
7730 a, s     freeipmi-ipmidetectd ¥
7740 a, s     ftp ¥
7750 a, s     fuse ¥
7760 a, s     fuse-devel ¥
7770 a, s     haproxy ¥
7780 a, s     hdparm ¥
7790 a, s     iotop ¥
7800 a, s     ipmitool ¥
7810 a, s     iptables-services ¥
7820 a, s     iptraf-ng ¥
7830 a, s     iptstate ¥
7840 a, s     ipvsadm ¥
7850 a, s     iscsi-initiator-utils ¥
7860 a, s     keepalived ¥
7870 a, s     kernel-uek-devel ¥
7880 a, s     kernel-uek-doc ¥
7890 a, s     latrace ¥
7900 a, s     lftp ¥
7910 a, s     libuuid-devel ¥
7920 a, s     lm_sensors ¥
7930 a, s     logwatch ¥
7940 a, s     lrzsz ¥
7950 a, s     ltrace ¥
7960 a, s     net-snmp-utils ¥
7970 a, s     nmap ¥
7980 a, s     openssl-devel ¥
7990 a, s     oprofile ¥
8000 a, s     pax ¥
8010 a, s     perf ¥
8020 a, s     prelink ¥
8030 a, s     screen ¥
8040 a, s     sg3_utils ¥
8050 a, s     snapper ¥
```

```
8060 a,s     telnet ¥
8070 a,s     tmpwatch ¥
8080 a,s     trace-cmd ¥
8090 a,s     tree ¥
8100 a,s     x86info
8110
8120   ○   インターネットと接続可能な端末で以下のコマンドを実行する等して、必要なパッケージを収集します。
8130
8140     o curl -O https://oss.oracle.com/ol7/debuginfo/kernel-uek-debuginfo- 4.1.12-61.1.18.el7uek.x86_64.rpm
8150     o curl -O https://oss.oracle.com/ol7/debuginfo/kernel-uek-debuginfo-common- 4.1.12-61.1.18.el7uek.x86_64.rpm
8160
8170   ○   収集したパッケージをホームディレクトリにコピーし、確認します。
8180
8190 a,s   scp xxxx@yyy:kernel-uek-debuginfo-4.1.12-61.1.18.el7uek.x86_64.rpm .
8200 a,s   scp xxxx@yyy:kernel-uek-debuginfo-common-4.1.12-61.1.18.el7uek.x86_64.rpm .
8210
8220 a,s   ls -l *.rpm
8230       -rw-rw-r-- 1 admin admin 382756108 Dec 15 12:06 kernel-uek-debuginfo-4.1.12-61.1.18.el7uek.x86_64.rpm
8240       -rw-rw-r-- 1 admin admin  52360420 Dec 15 12:08 kernel-uek-debuginfo-common-4.1.12-61.1.18.el7uek.x86_64.rpm
8250
8260 a,s   file *.rpm
8270       kernel-uek-debuginfo-4.1.12-61.1.18.el7uek.x86_64.rpm:        RPM v3.0 bin i386/x86_64 kernel-uek-debuginfo-4.1.12-61.1.18.el7uek
8280       kernel-uek-debuginfo-common-4.1.12-61.1.18.el7uek.x86_64.rpm: RPM v3.0 bin i386/x86_64 kernel-uek-debuginfo-common-4.1.12-61.1.18.el7uek
8290
8300   ○   カーネルのデバッグ情報をインストールします。
8310
8320 a,s   sudo yum -y --disablerepo=¥* --enablerepo=media localinstall kernel-uek-debuginfo-*.rpm
8330 a,s   sudo mkdir /opt/packages/
8340 a,s   sudo mv kernel-uek-debuginfo-*.rpm /opt/packages/
8350
8360   ○   インストーラをアンマウントします。
8370
8380 a,s   sudo umount /mnt
8390
8400   ○   インストーラをDVDドライブから取り外します。
8410
8420 a,s   # Eject DVD
8430
8440   ○   NTP を設定します。
8450
8460 a,s   cat << 'EOF' | sudo tee /etc/chrony.conf
```

```
8470 a,s    server 10.0.77.54 iburst
8480 a,s    # server ***.***.***.*** iburst
8490 a,s    # server ***.***.***.*** iburst
8500 a,s    # server ***.***.***.*** iburst
8510 a,s
8520 a,s    # Use public servers from the pool.ntp.org project.
8530 a,s    # Please consider joining the pool (http://www.pool.ntp.org/join.html).
8540 a,s
8550 a,s    # Ignore stratum in source selection.
8560 a,s    stratumweight 0
8570 a,s
8580 a,s    # Record the rate at which the system clock gains/losses time.
8590 a,s    driftfile /var/lib/chrony/drift
8600 a,s
8610 a,s    # Enable kernel RTC synchronization.
8620 a,s    rtcsync
8630 a,s
8640 a,s    # In first three updates step the system clock instead of slew
8650 a,s    # if the adjustment is larger than 10 seconds.
8660 a,s    makestep 10 3
8670 a,s
8680 a,s    # Allow NTP client access from local network.
8690 a,s    #allow 192.168/16
8700 a,s
8710 a,s    # Listen for commands only on localhost.
8720 a,s    bindcmdaddress 127.0.0.1
8730 a,s    #bindcmdaddress ::1
8740 a,s
8750 a,s    # Serve time even if not synchronized to any NTP server.
8760 a,s    #local stratum 10
8770 a,s
8780 a,s    keyfile /etc/chrony.keys
8790 a,s
8800 a,s    # Specify the key used as password for chronyc.
8810 a,s    commandkey 1
8820 a,s
8830 a,s    # Generate command key if missing.
8840 a,s    generatecommandkey
8850 a,s
8860 a,s    # Disable logging of client accesses.
8870 a,s    noclientlog
```

```
8880 a,s
8890 a,s    # Send a message to syslog if a clock adjustment is larger than 0.5 seconds.
8900 a,s    logchange 0.5
8910 a,s
8920 a,s    logdir /var/log/chrony
8930 a,s    #log measurements statistics tracking
8940 a,s    EOF
8950 a,s
8960 a,s    cat << 'EOF' | sudo tee /etc/sysconfig/chronyd
8970 a,s    OPTIONS="-4"
8980 a,s    EOF
8990
```

9000 ○ 不要なサービスを無効化します。

```
9010
9020 a,s    sudo systemctl disable dmraid-activation.service
9030 a,s    sudo systemctl disable firewalld.service
9040 a,s    sudo systemctl disable mdmonitor.service
9050 a,s    sudo systemctl disable postfix.service
9060
```

9070 ※ 仮想環境の場合は、「lm_sensors.service」も無効化します。
9080 ※ 仮想環境の場合は、「smartd.service」も無効化します。RAID コントローラが対応していない場合も無効化します。

```
9090
```

9100 ○ 必要なサービスを有効化します。

```
9110
9120 a,s    sudo systemctl enable psacct.service
9130
```

9140 ○ iSCSI イニシエータ関連サービスの自動起動を無効化します。

```
9150
9160 a,s    sudo systemctl disable iscsi.service
9170        Removed symlink /etc/systemd/system/sysinit.target.wants/iscsi.service.
9180
9190 a,s    sudo systemctl disable iscsid.socket
9200        Removed symlink /etc/systemd/system/sockets.target.wants/iscsid.socket.
9210
9220 a,s    sudo systemctl disable iscsiuio.socket
9230        Removed symlink /etc/systemd/system/sockets.target.wants/iscsiuio.socket.
9240
```

9250 ○ IPv6 無効化に伴う不具合を解消するための設定変更を行います。

```
9260
9270 a,s    sudo sed -i -e 's/^#AddressFamily .*$/AddressFamily inet/' /etc/ssh/sshd_config
9280 a,s    sudo sed -i -e 's/^inet_interfaces .*$/inet_interfaces = 127.0.0.1/' /etc/postfix/main.cf
```

```
9290 a,s    sudo sed -i -e 's/^inet_protocols .*$/inet_protocols = ipv4/' /etc/postfix/main.cf
9300
9310 a,s    sudo sed -i -e 's/^udp6/#udp6/' -e 's/^tcp6/#tcp6/' /etc/netconfig
9320
9330   ○    再起動します。
9340
9350 a,s    sudo reboot
9360
9370   ○    管理者用一般ユーザにて、ssh でログインします。
9380
9390    a   ssh admin@10.110.88.57
9400    a   admin@10.110.88.57's password: ********
9410
9420    s   ssh admin@10.110.88.58
9430    s   admin@10.110.88.58's password: ********
9440
9450   ○    カーネル起動パラメータを確認します。
9460
9470 a,s    cat /proc/cmdline
9480        BOOT_IMAGE=/vmlinuz-4.1.12-61.1.18.el7uek.x86_64 root=UUID=657f59aa-f627-4096-9970-9238b234ef00 ro crashkernel=auto selinux=0 ipv6.disable=1
9490
9500            ※  「crashkernel」の値は、搭載メモリサイズに応じて自動的に固定値へ変更される場合があります。
9510
9520   ○    ネットワーク設定を確認します。
9530
9540 a,s    ip addr show
9550        1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
9560            link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
9570            inet 127.0.0.1/8 scope host lo
9580        2: eth0: <BROADCAST,MULTICAST,SLAVE,UP,LOWER_UP> mtu 9000 qdisc mq master bond0 state UP qlen 1000
9590            link/ether 00:0c:29:08:b8:5f brd ff:ff:ff:ff:ff:ff
9600        3: eth1: <BROADCAST,MULTICAST,SLAVE,UP,LOWER_UP> mtu 9000 qdisc mq master bond1 state UP qlen 1000
9610            link/ether 00:0c:29:08:b8:41 brd ff:ff:ff:ff:ff:ff
9620        4: eth2: <BROADCAST,MULTICAST,SLAVE,UP,LOWER_UP> mtu 9000 qdisc mq master bond0 state UP qlen 1000
9630            link/ether 00:0c:29:08:b8:5f brd ff:ff:ff:ff:ff:ff
9640        5: eth3: <BROADCAST,MULTICAST,SLAVE,UP,LOWER_UP> mtu 9000 qdisc mq master bond1 state UP qlen 1000
9650            link/ether 00:0c:29:08:b8:41 brd ff:ff:ff:ff:ff:ff
9660        6: bond0: <BROADCAST,MULTICAST,MASTER,UP,LOWER_UP> mtu 9000 qdisc noqueue state UNKNOWN
9670            link/ether 00:0c:29:08:b8:5f brd ff:ff:ff:ff:ff:ff
9680            inet 10.110.88.57/26 brd 10.110.88.63 scope global bond0
9690        7: bond1: <BROADCAST,MULTICAST,MASTER,UP,LOWER_UP> mtu 9000 qdisc noqueue state UNKNOWN
```

```
9700            link/ether 00:0c:29:08:b8:41 brd ff:ff:ff:ff:ff:ff
9710            inet 192.168.1.2/24 brd 192.168.0.255 scope global bond1
9720
9730            ※  IPv6 のリンクローカルアドレスが存在しないことも確認します。
9740
9750 a,s    cat /proc/net/bonding/bond0
9760        Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)
9770
9780        Bonding Mode: fault-tolerance (active-backup)
9790        Primary Slave: eth0 (primary_reselect always)
9800        Currently Active Slave: eth0
9810        MII Status: up
9820        MII Polling Interval (ms): 100
9830        Up Delay (ms): 0
9840        Down Delay (ms): 0
9850
9860        Slave Interface: eth0
9870        MII Status: up
9880        Speed: 10000 Mbps
9890        Duplex: full
9900        Link Failure Count: 0
9910        Permanent HW addr: 00:0c:29:08:b8:5f
9920        Slave queue ID: 0
9930
9940        Slave Interface: eth2
9950        MII Status: up
9960        Speed: 10000 Mbps
9970        Duplex: full
9980        Link Failure Count: 0
9990        Permanent HW addr: 00:0c:29:08:b8:4b
10000       Slave queue ID: 0
10010
10020 a,s   cat /proc/net/bonding/bond1
10030       Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)
10040
10050       Bonding Mode: fault-tolerance (active-backup)
10060       Primary Slave: eth1 (primary_reselect always)
10070       Currently Active Slave: eth1
10080       MII Status: up
10090       MII Polling Interval (ms): 100
10100       Up Delay (ms): 0
```

```
Down Delay (ms): 0

Slave Interface: eth1
MII Status: up
Speed: 10000 Mbps
Duplex: full
Link Failure Count: 0
Permanent HW addr: 00:0c:29:08:b8:41
Slave queue ID: 0

Slave Interface: eth3
MII Status: up
Speed: 10000 Mbps
Duplex: full
Link Failure Count: 0
Permanent HW addr: 00:0c:29:08:b8:55
Slave queue ID: 0
```

※ ボンディング設定時は、このコマンドで個々の NIC の MAC アドレスを確認できます。

※ LAG(LACP) の場合、以下のように表示されます。

```
cat /proc/net/bonding/bond1
Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)

Bonding Mode: IEEE 802.3ad Dynamic link aggregation
Transmit Hash Policy: layer2 (0)
MII Status: up
MII Polling Interval (ms): 100
Up Delay (ms): 0
Down Delay (ms): 0

802.3ad info
LACP rate: slow
Min links: 0
Aggregator selection policy (ad_select): stable
Active Aggregator Info:
        Aggregator ID: 1
        Number of ports: 1
        Actor Key: 13
        Partner Key: 1
        Partner Mac Address: 00:00:00:00:00:00
```

```
10520
10530               Slave Interface: eth1
10540               MII Status: up
10550               Speed: 10000 Mbps
10560               Duplex: full
10570               Link Failure Count: 0
10580               Permanent HW addr: 00:0c:29:8b:ff:e8
10590               Slave queue ID: 0
10600               Aggregator ID: 1
10610               Actor Churn State: none
10620               Partner Churn State: churned
10630               Actor Churned Count: 0
10640               Partner Churned Count: 1
10650               details actor lacp pdu:
10660                   system priority: 0
10670                   port key: 13
10680                   port priority: 255
10690                   port number: 1
10700                   port state: 205
10710               details partner lacp pdu:
10720                   system priority: 65535
10730                   oper key: 1
10740                   port priority: 255
10750                   port number: 1
10760                   port state: 3
10770
10780               Slave Interface: eth3
10790               MII Status: up
10800               Speed: 10000 Mbps
10810               Duplex: full
10820               Link Failure Count: 0
10830               Permanent HW addr: 00:0c:29:8b:ff:fc
10840               Slave queue ID: 0
10850               Aggregator ID: 2
10860               Actor Churn State: churned
10870               Partner Churn State: churned
10880               Actor Churned Count: 1
10890               Partner Churned Count: 1
10900               details actor lacp pdu:
10910                   system priority: 0
10920                   port key: 13
```

```
10930                   port priority: 255
10940                   port number: 2
10950                   port state: 197
10960               details partner lacp pdu:
10970                   system priority: 65535
10980                   oper key: 1
10990                   port priority: 255
11000                   port number: 1
11010                   port state: 3
11020
11030    a  ip route show
11040       default via 10.110.88.1 dev bond0  proto static  metric 300
11050       10.110.88.0/26 dev bond0  proto kernel  scope link  src 10.110.88.57  metric 300
11060       192.168.1.0/24 dev bond1  proto kernel  scope link  src 192.168.0.2  metric 300
11070
11080    s  ip route show
11090       default via 10.110.88.1 dev bond0  proto static  metric 300
11100       10.110.88.0/26 dev bond0  proto kernel  scope link  src 10.110.88.58  metric 300
11110       192.168.1.0/24 dev bond1  proto kernel  scope link  src 192.168.0.3  metric 300
11120
11130 a,s  cat /etc/resolv.conf
11140       # Generated by NetworkManager
11150       search example.com
11160       nameserver 10.0.80.11
11170       nameserver 10.0.80.12
11180
11190   ○  hostname 設定を確認します。
11200
11210    a  hostnamectl status
11220          Static hostname: iscsitgt01a.example.com
11230                Icon name: computer-vm
11240                  Chassis: vm
11250               Machine ID: d7806eba789047baa165a57149c83843
11260                  Boot ID: b5b36a3403dd403aad4656d2f7f9e7aa
11270           Virtualization: vmware
11280         Operating System: Oracle Linux Server 7.3
11290              CPE OS Name: cpe:/o:oracle:linux:7:2:server
11300                   Kernel: Linux 4.1.12-61.1.18.el7uek.x86_64
11310             Architecture: x86-64
11320
11330    s  hostnamectl status
```

```
11340          Static hostname: iscsitgt01s.example.com
11350                Icon name: computer-vm
11360                  Chassis: vm
11370               Machine ID: b325c1c5d682439a91a65f7cfc317b20
11380                  Boot ID: a419d4d1ef00452f93da10a227365aca
11390           Virtualization: vmware
11400         Operating System: Oracle Linux Server 7.3
11410              CPE OS Name: cpe:/o:oracle:linux:7:2:server
11420                   Kernel: Linux 4.1.12-61.1.18.el7uek.x86_64
11430             Architecture: x86-64
11440
```

○ NIC のオフロード設定を確認します。

```
11460
11470 a,s    ethtool -k eth0
11480        Features for eth0:
11490        rx-checksumming: off
11500        tx-checksumming: off
11510                tx-checksum-ipv4: off [fixed]
11520                tx-checksum-ip-generic: off
11530                tx-checksum-ipv6: off [fixed]
11540                tx-checksum-fcoe-crc: off [fixed]
11550                tx-checksum-sctp: off [fixed]
11560        scatter-gather: off
11570                tx-scatter-gather: off
11580                tx-scatter-gather-fraglist: off [fixed]
11590        tcp-segmentation-offload: off
11600                tx-tcp-segmentation: off
11610                tx-tcp-ecn-segmentation: off [fixed]
11620                tx-tcp6-segmentation: off
11630        udp-fragmentation-offload: off [fixed]
11640        generic-segmentation-offload: off
11650        generic-receive-offload: off
11660        large-receive-offload: off
11670        rx-vlan-offload: off
11680        tx-vlan-offload: off
11690        ntuple-filters: off [fixed]
11700        receive-hashing: off
11710        highdma: off
11720        rx-vlan-filter: on [fixed]
11730        vlan-challenged: off [fixed]
11740        tx-lockless: off [fixed]
```

```
11750         netns-local: off [fixed]
11760         tx-gso-robust: off [fixed]
11770         tx-fcoe-segmentation: off [fixed]
11780         tx-gre-segmentation: off [fixed]
11790         tx-ipip-segmentation: off [fixed]
11800         tx-sit-segmentation: off [fixed]
11810         tx-udp_tnl-segmentation: off [fixed]
11820         fcoe-mtu: off [fixed]
11830         tx-nocache-copy: off
11840         loopback: off [fixed]
11850         rx-fcs: off [fixed]
11860         rx-all: off [fixed]
11870         tx-vlan-stag-hw-insert: off [fixed]
11880         rx-vlan-stag-hw-parse: off [fixed]
11890         rx-vlan-stag-filter: off [fixed]
11900         l2-fwd-offload: off [fixed]
11910         busy-poll: off [fixed]
11920         hw-switch-offload: off [fixed]
11930
11940 a,s     ethtool -k eth1
11950 a,s     ethtool -k eth2
11960 a,s     ethtool -k eth3
11970
11980 a,s     ethtool -g eth0
11990         Ring parameters for eth0:
12000         Pre-set maximums:
12010         RX:             4096
12020         RX Mini:        0
12030         RX Jumbo:       2048
12040         TX:             4096
12050         Current hardware settings:
12060         RX:             4032
12070         RX Mini:        0
12080         RX Jumbo:       2048
12090         TX:             4096
12100
12110             ※  搭載メモリサイズに応じて結果が異なります。
12120
12130 a,s     ethtool -g eth1
12140 a,s     ethtool -g eth2
12150 a,s     ethtool -g eth3
```

○ NTP の状態を確認します。

a,s
```
systemctl status chronyd.service -l
```

```
● chronyd.service - NTP client/server
   Loaded: loaded (/usr/lib/systemd/system/chronyd.service; enabled; vendor preset: enabled)
   Active: active (running) since Fri 2016-11-25 15:23:28 JST; 17min ago
  Process: 601 ExecStartPost=/usr/libexec/chrony-helper update-daemon (code=exited, status=0/SUCCESS)
  Process: 576 ExecStart=/usr/sbin/chronyd $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 583 (chronyd)
   CGroup: /system.slice/chronyd.service
           └583 /usr/sbin/chronyd -4

Nov 25 15:23:28 iscsitgt01a.example.com systemd[1]: Starting NTP client/server...
Nov 25 15:23:28 iscsitgt01a.example.com chronyd[584]: chronyd version 2.1.1 starting (+CMDMON +NTP +REFCLOCK +RTC +PRIVDROP +DEBUG +ASYNCDNS +IPV6 +SECHASH)
Nov 25 15:23:28 iscsitgt01a.example.com chronyd[584]: Generated key 1
Nov 25 15:23:28 iscsitgt01a.example.com systemd[1]: Started NTP client/server.
Nov 25 15:23:35 iscsitgt01a.example.com chronyd[584]: Selected source 10.0.77.54
```

a,s
```
chronyc sources
```

```
210 Number of sources = 1
MS Name/IP address         Stratum Poll Reach LastRx Last sample
===============================================================================
^* 10.0.77.54                    1   10   377   217   -177us[ -161us] +/- 4360us
```

a,s
```
timedatectl status
```

```
      Local time: Fri 2016-11-25 15:43:54 JST
  Universal time: Fri 2016-11-25 06:43:54 UTC
        RTC time: Fri 2016-11-25 06:43:54
       Time zone: Asia/Tokyo (JST, +0900)
     NTP enabled: yes
NTP synchronized: yes
 RTC in local TZ: no
      DST active: n/a
```

○ 自動起動するサービスを確認します。

a,s
```
systemctl list-unit-files | grep enabled | LANG=C sort
```

```
NetworkManager-dispatcher.service           enabled
NetworkManager.service                      enabled
abrt-ccpp.service                           enabled
```

```
12570       abrt-oops.service                                 enabled
12580       abrt-vmcore.service                               enabled
12590       abrt-xorg.service                                 enabled
12600       abrtd.service                                     enabled
12610       atd.service                                       enabled
12620       auditd.service                                    enabled
12630       autovt@.service                                   enabled
12640       chronyd.service                                   enabled
12650       crond.service                                     enabled
12660       dbus-org.freedesktop.NetworkManager.service       enabled
12670       dbus-org.freedesktop.nm-dispatcher.service        enabled
12680       default.target                                    enabled
12690       dm-event.socket                                   enabled
12700       getty@.service                                    enabled
12710       irqbalance.service                                enabled
12720       kdump.service                                     enabled
12730       libstoragemgmt.service                            enabled
12740       lm_sensors.service                                enabled       ※  仮想環境の場合、不要
12750       lvm2-lvmetad.socket                               enabled       ※  LVM を利用しない場合、lvmetad を利用しない場合、不要
12760       lvm2-lvmpolld.socket                              enabled       ※  LVM を利用しない場合、lvmpolld を利用しない場合、不要
12770       lvm2-monitor.service                              enabled       ※  LVM を利用しない場合、不要
12780       microcode.service                                 enabled
12790       multi-user.target                                 enabled
12800       psacct.service                                    enabled
12810       remote-fs.target                                  enabled
12820       rngd.service                                      enabled
12830       rpcbind.socket                                    enabled       ※  nfs を利用しない場合、不要
12840       rsyslog.service                                   enabled
12850       runlevel2.target                                  enabled
12860       runlevel3.target                                  enabled
12870       runlevel4.target                                  enabled
12880       smartd.service                                    enabled       ※  仮想環境、RAID コントローラ未対応の場合、不要
12890       sshd.service                                      enabled
12900       sysstat.service                                   enabled
12910       systemd-readahead-collect.service                 enabled
12920       systemd-readahead-drop.service                    enabled
12930       systemd-readahead-replay.service                  enabled
12940       tuned.service                                     enabled
12950       vmtoolsd.service                                  enabled       ※  ESXi で動かす場合のみ必要
12960
```

12970 ○ 設定ファイルをバックアップします。

```
12980
12990 a, s      sudo cp -a /etc{,~}
13000
13010
```

13020 ○ 【iSCSI Target クラスタのインストールと初期設定】
13030
13040 ○ 以下のインストーラを DVD ドライブにセットします。
13050
13060 a,s # V834394-01.iso (Oracle Linux 7.3)
13070
13080 ○ インストーラをマウントします。
13090
13100 a,s sudo mount /dev/cdrom /mnt
13110 mount: /dev/sr0 is write-protected, mounting read-only
13120
13130 ○ 当該 OS で必要となる標準パッケージをインストールします。
13140
13150 a,s sudo yum -y --disablerepo=¥* --enablerepo=media,media-mysql,media-ha install ¥
13160 a,s fence-agents-ipmilan ¥
13170 a,s omping ¥
13180 a,s pcs ¥
13190 a,s rubygem-abrt ¥
13200 a,s targetcli
13210
13220 ○ インターネットと接続可能な端末で以下のコマンドを実行する等して、必要なパッケージを収集します。
13230
13240 o curl -O http://elrepo.org/linux/elrepo/el7/x86_64/RPMS/drbd84-utils- 8.9.6-1.el7.elrepo.x86_64.rpm
13250
13260 ○ 収集したパッケージをホームディレクトリにコピーし、確認します。
13270
13280 a,s scp xxxx@yyy:drbd84-utils-8.9.6-1.el7.elrepo.x86_64.rpm .
13290
13300 a,s ls -l *.rpm
13310 -rw-rw-r-- 1 admin admin 410308 Nov 25 16:10 drbd84-utils-8.9.6-1.el7.elrepo.x86_64.rpm
13320
13330 a,s file *.rpm
13340 drbd84-utils-8.9.6-1.el7.elrepo.x86_64.rpm: RPM v3.0 bin i386/x86_64 drbd84-utils-8.9.6-1.el7.elrepo
13350
13360 ○ drbd 管理ツールをインストールします。Oracle 社サポート外のパッケージです。
13370
13380 a,s sudo yum -y --disablerepo=¥* --enablerepo=media localinstall drbd84-utils-*.rpm
13390 a,s sudo mv drbd84-utils-*.rpm /opt/packages/
13400 a,s sudo chmod 644 /usr/lib/systemd/system/drbd.service
13410
13420 ○ インストーラをアンマウントします。

```
13430
13440 a, s    sudo umount /mnt
13450
13460   ○     インストーラをDVDドライブから外します。
13470
13480 a, s    # Eject DVD
13490
13500   ○     追加インストールしたパッケージの設定をバックアップします。
13510
13520 a, s    sudo cp -a /etc{,~}/bash_completion.d/drbdadm
13530 a, s    sudo cp -a /etc{,~}/corosync
13540 a, s    sudo cp -a /etc{,~}/dbus-1/system.d/corosync-signals.conf
13550 a, s    sudo cp -a /etc{,~}/drbd.conf
13560 a, s    sudo cp -a /etc{,~}/drbd.d
13570 a, s    sudo cp -a /etc{,~}/ha.d
13580 a, s    sudo cp -a /etc{,~}/libreport/events.d/ruby_event.conf
13590 a, s    sudo cp -a /etc{,~}/logrotate.d/corosync
13600 a, s    sudo cp -a /etc{,~}/logrotate.d/pacemaker
13610 a, s    sudo cp -a /etc{,~}/logrotate.d/pcsd
13620 a, s    sudo cp -a /etc{,~}/pam.d/pcsd
13630 a, s    sudo cp -a /etc{,~}/sysconfig/corosync
13640 a, s    sudo cp -a /etc{,~}/sysconfig/corosync-notifyd
13650 a, s    sudo cp -a /etc{,~}/sysconfig/crm_mon
13660 a, s    sudo cp -a /etc{,~}/sysconfig/pacemaker
13670 a, s    sudo cp -a /etc{,~}/sysconfig/pcsd
13680 a, s    sudo cp -a /etc{,~}/target
13690 a, s    sudo cp -a /etc{,~}/xen
13700 a, s    sudo cp -a /etc/passwd   /etc~/passwd_$(date +%Y%m%d_%H%M%S)
13710 a, s    sudo cp -a /etc/passwd-  /etc~/passwd-_$(date +%Y%m%d_%H%M%S)
13720 a, s    sudo cp -a /etc/shadow   /etc~/shadow_$(date +%Y%m%d_%H%M%S)
13730 a, s    sudo cp -a /etc/shadow-  /etc~/shadow-_$(date +%Y%m%d_%H%M%S)
13740 a, s    sudo cp -a /etc/group    /etc~/group_$(date +%Y%m%d_%H%M%S)
13750 a, s    sudo cp -a /etc/group-   /etc~/group-_$(date +%Y%m%d_%H%M%S)
13760 a, s    sudo cp -a /etc/gshadow  /etc~/gshadow_$(date +%Y%m%d_%H%M%S)
13770 a, s    sudo cp -a /etc/gshadow- /etc~/gshadow-_$(date +%Y%m%d_%H%M%S)
13780 a, s
13790   ○     カーネルパラメータを設定します。
13800
13810 a, s    cat << 'EOF' | sudo tee /etc/sysctl.d/tgt.conf
13820 a, s    net.core.netdev_max_backlog = 250000
13830 a, s    net.core.optmem_max = 16777216
```

```
13840 a,s    net.core.rmem_default = 16777216
13850 a,s    net.core.rmem_max = 16777216
13860 a,s    net.core.wmem_default = 16777216
13870 a,s    net.core.wmem_max = 16777216
13880 a,s    net.ipv4.tcp_mem = 39363 209944 314904
13890 a,s    net.ipv4.tcp_rmem = 8192 87380 16777216
13900 a,s    net.ipv4.tcp_wmem = 8192 65536 16777216
13910 a,s    net.ipv4.tcp_no_metrics_save = 1
13920 a,s    net.ipv4.tcp_sack = 0
13930 a,s    net.ipv4.tcp_timestamps = 0
13940 a,s    EOF
13950
13960   ○    再起動します。
13970
13980 a,s    sudo reboot
13990
14000   ○    管理者用一般ユーザにて、ssh でログインします。
14010
14020    a   ssh admin@10.110.88.57
14030    a   admin@10.110.88.57's password: ********
14040
14050    s   ssh admin@10.110.88.58
14060    s   admin@10.110.88.58's password: ********
14070
14080   ○    カーネルパラメータを確認します。
14090
14100 a,s    sysctl -a 2> /dev/null | egrep 'net¥.core¥..*mem|net¥.core¥.netdev_m|net¥.ipv4¥.tcp_.*mem|net¥.ipv4¥.tcp_no_|net¥.ipv4¥.tcp_sa|net¥.ipv4¥.tcp_ti'
14110        net.core.netdev_max_backlog = 250000
14120        net.core.optmem_max = 16777216
14130        net.core.rmem_default = 16777216
14140        net.core.rmem_max = 16777216
14150        net.core.wmem_default = 16777216
14160        net.core.wmem_max = 16777216
14170        net.ipv4.tcp_mem = 39363        209944  314904
14180        net.ipv4.tcp_no_metrics_save = 1
14190        net.ipv4.tcp_rmem = 8192        87380   16777216
14200        net.ipv4.tcp_sack = 0
14210        net.ipv4.tcp_timestamps = 0
14220        net.ipv4.tcp_wmem = 8192        65536   16777216
14230
14240   ○    LVM の設定を変更します。
```

```
14250
14260 a, s    sudo sed -i -e 's/obtain_device_list_from_udev =.*$/obtain_device_list_from_udev = 0/' /etc/lvm/lvm.conf
14270 a, s    sudo sed -i -e 's/use_blkid_wiping =.*$/use_blkid_wiping = 0/' /etc/lvm/lvm.conf
14280 a, s    sudo sed -i -e 's/use_lvmetad =.*$/use_lvmetad = 0/' /etc/lvm/lvm.conf
14290 a, s    sudo sed -i -e 's/use_lvmpolld =.*$/use_lvmpolld = 0/' /etc/lvm/lvm.conf
14300 a, s    sudo sed -i -e 's/write_cache_state =.*$/write_cache_state = 0/' /etc/lvm/lvm.conf
14310 a, s    sudo sed -i -e 's/readahead =.*$/readahead = "none"/' /etc/lvm/lvm.conf
14320 a, s    sudo patch --ignore-whitespace /etc/lvm/lvm.conf << 'EOF'
14330 a, s    diff -upr /etc/lvm/lvm.conf /etc/lvm/lvm.conf.new
14340 a, s    --- /etc/lvm/lvm.conf   2015-11-21 12:01:29.000000000 +0900
14350 a, s    +++ /etc/lvm/lvm.conf.new       2016-09-21 07:52:14.164259555 +0900
14360 a, s    @@ -139,6 +139,7 @@ devices {
14370 a, s            #
14380 a, s            # This configuration option has an automatic default value.
14390 a, s            # filter = [ "a|.*/|" ]
14400 a, s    +filter = ["r|vg.*|", "a|sd.*|", "a|drbd.*|", "r|.*|"]
14410 a, s
14420 a, s            # Configuration option devices/global_filter.
14430 a, s            # Limit the block devices that are used by LVM system components.
14440 a, s    EOF
14450 a, s    sudo systemctl stop lvm2-lvmetad.socket
14460 a, s    sudo systemctl stop lvm2-lvmpolld.socket
14470 a, s    sudo systemctl disable lvm2-lvmetad.socket
14480 a, s    sudo systemctl disable lvm2-lvmpolld.socket
14490 a, s    sudo rm -f /etc/lvm/cache/.cache
14500 a, s    sudo cp -a /etc/lvm/lvm.conf /etc~/lvm/lvm.conf_$(date +%Y%m%d_%H%M%S)
14510
14520   ○     LVM の設定変更を初期化 RAM ディスクに反映します。
14530
14540 a, s    for i in /boot/initramfs-*
14550 a, s    do
14560 a, s      KVER=$(echo $i | sed -n 's%/boot/initramfs-¥(.*¥).img%¥1%p')
14570 a, s      if echo $KVER | grep -q -v rescue; then
14580 a, s        if echo $KVER | grep -q -v kdump; then
14590 a, s          sudo dracut --force /boot/initramfs-$KVER.img $KVER;
14600 a, s        fi
14610 a, s      fi
14620 a, s    done
14630
14640   ○     LVM 物理ボリュームを作成します。
14650
```

```
14660 a,s    sudo pvcreate /dev/sdc
14670          Physical volume "/dev/sdc" successfully created
14680
14690 a,s    sudo pvcreate /dev/sdd
14700          Physical volume "/dev/sdd" successfully created
14710
14720 a,s    sudo pvcreate /dev/sde
14730          Physical volume "/dev/sde" successfully created
14740
14750 a,s    sudo pvcreate /dev/sdf
14760          Physical volume "/dev/sdf" successfully created
14770
14780   ○    LVM ボリュームグループを作成します。
14790
14800 a,s    sudo vgcreate -s 4M vg0 /dev/sdc /dev/sdd /dev/sde /dev/sdf
14810          Volume group "vg0" successfully created
14820
14830   ○    LVM 論理ボリュームを作成します。
14840
14850 a,s    sudo lvcreate --name lv-drbd0 --extents 90%FREE vg0
14860          Logical volume "lv-drbd0" created.
14870
14880   ○    LVM の状態を確認します。
14890
14900 a,s    sudo pvs
14910          PV         VG   Fmt  Attr PSize   PFree
14920          /dev/sdc   vg0  lvm2 a--  100.00g      0
14930          /dev/sdd   vg0  lvm2 a--  100.00g      0
14940          /dev/sde   vg0  lvm2 a--  100.00g      0
14950          /dev/sdf   vg0  lvm2 a--  100.00g 40.00g
14960
14970 a,s    sudo vgs
14980          VG   #PV #LV #SN Attr   VSize   VFree
14990          vg0    4   1   0 wz--n- 399.98g 40.00g
15000
15010 a,s    sudo lvs
15020          LV       VG   Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
15030          lv-drbd0 vg0  -wi-a----- 359.98g
15040
15050   ○    DRBD の設定ファイルを作成します。
15060
```

```
15070 a,s    cat /etc/drbd.conf
15080        # You can find an example in  /usr/share/doc/drbd.../drbd.conf.example
15090
15100        include "drbd.d/global_common.conf";
15110        include "drbd.d/*.res";
15120
15130 a,s    cat << 'EOF' | sudo tee /etc/drbd.d/global_common.conf
15140 a,s    global {
15150 a,s      usage-count no;
15160 a,s    }
15170 a,s    common {
15180 a,s      handlers {
15190 a,s        pri-on-incon-degr "/usr/lib/drbd/notify-pri-on-incon-degr.sh; /usr/lib/drbd/notify-emergency-reboot.sh; echo 1 > /proc/sys/kernel/sysrq; echo b > /proc/sysrq-trigger; reboot -f";
15200 a,s        local-io-error "/usr/lib/drbd/notify-io-error.sh; /usr/lib/drbd/notify-emergency-shutdown.sh; echo 1 > /proc/sys/kernel/sysrq; echo o > /proc/sysrq-trigger; halt -f";
15210 a,s        fence-peer "/usr/lib/drbd/crm-fence-peer.sh";
15220 a,s        before-resync-target "/usr/lib/drbd/snapshot-resync-target-lvm.sh -p 4";
15230 a,s        after-resync-target "/usr/lib/drbd/unsnapshot-resync-target-lvm.sh; /usr/lib/drbd/crm-unfence-peer.sh";
15240 a,s      }
15250 a,s      startup {
15260 a,s    #wfc# wfc-timeout 10;
15270 a,s    #wfc# degr-wfc-timeout 10;
15280 a,s    #wfc# outdated-wfc-timeout 10;
15290 a,s      }
15300 a,s      disk {
15310 a,s        on-io-error detach;
15320 a,s        fencing resource-only;
15330 a,s        al-extents 6433;
15340 a,s        c-plan-ahead 20;
15350 a,s        c-delay-target 100;
15360 a,s        c-fill-target 0;
15370 a,s        c-max-rate 100M;
15380 a,s        c-min-rate 1M;
15390 a,s      }
15400 a,s      net {
15410 a,s        protocol C;
15420 a,s        max-buffers 128k;
15430 a,s        sndbuf-size 0;
15440 a,s        rcvbuf-size 0;
15450 a,s        cram-hmac-alg sha1;
15460 a,s        shared-secret "password";
15470 a,s        congestion-fill 100M;
```

```
15480 a,s       congestion-extents 2000;
15490 a,s       csums-alg md5;
15500 a,s       verify-alg md5;
15510 a,s       use-rle yes;
15520 a,s     }
15530 a,s   }
15540 a,s   EOF
15550 a,s   sudo cp -a /etc/drbd.d/global_common.conf /etc~/drbd.d/global_common.conf_$(date +%Y%m%d_%H%M%S)
15560 a,s
15570 a,s   cat << 'EOF' | sudo tee /etc/drbd.d/r0.res
15580 a,s   resource r0 {
15590 a,s     volume 0 {
15600 a,s       device /dev/drbd0;
15610 a,s       disk /dev/vg0/lv-drbd0;
15620 a,s       meta-disk internal;
15630 a,s     }
15640 a,s     on iscsitgt01a.example.com {
15650 a,s       address 192.168.1.2:7788;
15660 a,s     }
15670 a,s     on iscsitgt01s.example.com {
15680 a,s       address 192.168.1.3:7788;
15690 a,s     }
15700 a,s   }
15710 a,s   EOF
15720
15730   ○   DRBD リソースを初期化します。
15740
15750 a,s   sudo drbdadm create-md r0
15760       initializing activity log
15770       NOT initializing bitmap
15780       Writing meta data...
15790       New drbd meta data block successfully created.
15800
15810   ○   targetcli から exit する際に自動的に設定を save する挙動を無効化します。
15820
15830 a,s   sudo targetcli set global auto_save_on_exit=false
15840       Warning: Could not load preferences file /root/.targetcli/prefs.bin.
15850       Parameter auto_save_on_exit is now 'false'.
15860
15870   ○   targetcli から target を追加する際に自動的に portal が作成される挙動を無効化します。
15880
```

```
15890 a,s    sudo targetcli set global auto_add_default_portal=false
15900        Parameter auto_add_default_portal is now 'false'.
15910
15920   ○    targetcli コマンドのデフォルト設定を確認します。
15930
15940 a,s    sudo targetcli get global
15950        GLOBAL CONFIG GROUP
15960        ==================
15970        auto_add_default_portal=false
15980        ----------------------------
15990        If true, adds a portal listening on all IPs to new targets.
16000
16010        auto_add_mapped_luns=true
16020        -------------------------
16030        If true, automatically create node ACLs mapped LUNs after creating a new target LUN or a new node ACL
16040
16050        auto_cd_after_create=false
16060        --------------------------
16070        If true, changes current path to newly created objects.
16080
16090        auto_enable_tpgt=true
16100        ---------------------
16110        If true, automatically enables TPGTs upon creation.
16120
16130        auto_save_on_exit=false
16140        -----------------------
16150        If true, saves configuration on exit.
16160
16170        color_command=cyan
16180        ------------------
16190        Color to use for command completions.
16200
16210        color_default=none
16220        ------------------
16230        Default text display color.
16240
16250        color_keyword=cyan
16260        ------------------
16270        Color to use for keyword completions.
16280
16290        color_mode=true
```

```
16300       ---------------
16310       Console color display mode.
16320
16330       color_parameter=magenta
16340       -----------------------
16350       Color to use for parameter completions.
16360
16370       color_path=magenta
16380       ------------------
16390       Color to use for path completions
16400
16410       export_backstore_name_as_model=true
16420       -----------------------------------
16430       If true, the backstore name is used for the scsi inquiry model name.
16440
16450       logfile=/root/.targetcli/log.txt
16460       --------------------------------
16470       Logfile to use.
16480
16490       loglevel_console=info
16500       ---------------------
16510       Log level for messages going to the console.
16520
16530       loglevel_file=debug
16540       -------------------
16550       Log level for messages going to the log file.
16560
16570       prompt_length=30
16580       ----------------
16590       Max length of the shell prompt path, 0 for infinite.
16600
16610       tree_max_depth=0
16620       ----------------
16630       Maximum depth of displayed node tree.
16640
16650       tree_round_nodes=true
16660       ---------------------
16670       Tree node display style.
16680
16690       tree_show_root=true
16700       -------------------
```

```
16710         Whether or not to display tree root.
16720
16730         tree_status_mode=true
16740         ---------------------
16750         Whether or not to display status in tree.
16760
16770   ○     不要なログ出力を抑止します。
16780
16790 a, s    cat << 'EOF' | sudo tee /etc/rsyslog.d/ignore-lio.conf
16800 a, s    if $programname == "kernel" and $msg contains "MODE SENSE: unimplemented page/subpage:" then stop
16810 a, s    EOF
16820 a, s    sudo systemctl restart rsyslog
16830
16840   ○     LIO のリソース・エージェントを作成します。
16850
16860 a, s    cat << 'EOF_LIO' | sudo tee /usr/lib/ocf/resource.d/heartbeat/LIO
16870 a, s    #!/bin/bash
16880 a, s    #
16890 a, s    #     LIO OCF RA. manages iSCSI target LIO.
16900 a, s    #
16910 a, s    #   (c) 2009-2010 Florian Haas, Dejan Muhamedagic,
16920 a, s    #                 and Linux-HA contributors
16930 a, s    #
16940 a, s    #      modified by Katsuaki Hamada (hamada@pc-office.net), 10 Dec 2016
16950 a, s    #
16960 a, s    # This program is free software; you can redistribute it and/or modify
16970 a, s    # it under the terms of version 2 of the GNU General Public License as
16980 a, s    # published by the Free Software Foundation.
16990 a, s    #
17000 a, s    # This program is distributed in the hope that it would be useful, but
17010 a, s    # WITHOUT ANY WARRANTY; without even the implied warranty of
17020 a, s    # MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
17030 a, s    #
17040 a, s    # Further, this software is distributed without any warranty that it is
17050 a, s    # free of the rightful claim of any third person regarding infringement
17060 a, s    # or the like.  Any license provided herein, whether implied or
17070 a, s    # otherwise, applies only to this software file.  Patent licenses, if
17080 a, s    # any, provided herein do not apply to combinations of this program with
17090 a, s    # other software, or any other product whatsoever.
17100 a, s    #
17110 a, s    # You should have received a copy of the GNU General Public License
```

```
17120 a,s   # along with this program; if not, write the Free Software Foundation,
17130 a,s   # Inc., 59 Temple Place - Suite 330, Boston MA 02111-1307, USA.
17140 a,s   #
17150 a,s
17160 a,s   ######################################################################
17170 a,s   # Initialization:
17180 a,s   : ${OCF_FUNCTIONS_DIR=${OCF_ROOT}/lib/heartbeat}
17190 a,s   . ${OCF_FUNCTIONS_DIR}/ocf-shellfuncs
17200 a,s
17210 a,s   # Lockfile, used for selecting a target ID
17220 a,s   LOCKFILE=${HA_RSCTMP}/target.lock
17230 a,s   ######################################################################
17240 a,s
17250 a,s   meta_data() {
17260 a,s           cat <<END
17270 a,s   <?xml version="1.0"?>
17280 a,s   <!DOCTYPE resource-agent SYSTEM "ra-api-1.dtd">
17290 a,s   <resource-agent name="LIO" version="1.0">
17300 a,s   <version>0.9</version>
17310 a,s
17320 a,s   <longdesc lang="en">
17330 a,s   Manages iSCSI target LIO. An iSCSI target is a collection of SCSI Logical
17340 a,s   Units (LUs) exported via a daemon that speaks the iSCSI protocol.
17350 a,s   </longdesc>
17360 a,s   <shortdesc lang="en">iSCSI target export agent</shortdesc>
17370 a,s
17380 a,s   <parameters>
17390 a,s   <parameter name="iqn" required="0" unique="1">
17400 a,s   <longdesc lang="en">
17410 a,s   The target iSCSI Qualified Name (IQN). Should follow the conventional
17420 a,s   iqn.yyyy-mm.&lt;reversed domain name&gt;[:identifier] syntax.
17430 a,s   </longdesc>
17440 a,s   <shortdesc lang="en">iSCSI target IQN</shortdesc>
17450 a,s   <content type="string" />
17460 a,s   </parameter>
17470 a,s   </parameters>
17480 a,s
17490 a,s   <actions>
17500 a,s   <action name="start" timeout="10" />
17510 a,s   <action name="stop" timeout="10" />
17520 a,s   <action name="status" timeout="10" interval="10" depth="0" />
```

```
17530 a, s    <action name="monitor" timeout="10" interval="10" depth="0" />
17540 a, s    <action name="meta-data" timeout="5" />
17550 a, s    <action name="validate-all" timeout="10" />
17560 a, s    </actions>
17570 a, s    </resource-agent>
17580 a, s    END
17590 a, s    }
17600 a, s
17610 a, s    ######################################################################
17620 a, s
17630 a, s    LIO_usage() {
17640 a, s      cat <<END
17650 a, s    usage: $0 {start|stop|status|monitor|validate-all|meta-data}
17660 a, s
17670 a, s    Expects to have a fully populated OCF RA-compliant environment set.
17680 a, s    END
17690 a, s    }
17700 a, s
17710 a, s    LIO_start() {
17720 a, s      LIO_monitor
17730 a, s      [ $? = $OCF_SUCCESS ] && return $OCF_SUCCESS
17740 a, s      /usr/bin/timeout 3 /usr/bin/targetctl restore
17750 a, s      LIO_monitor
17760 a, s    }
17770 a, s
17780 a, s    LIO_stop() {
17790 a, s      LIO_monitor
17800 a, s      [ $? -eq $OCF_NOT_RUNNING ] && return $OCF_SUCCESS
17810 a, s      /usr/bin/timeout 3 /usr/bin/targetctl clear
17820 a, s      rc=$?
17830 a, s      [ $rc -eq 0 ] && return $OCF_SUCCESS
17840 a, s      [ -e /etc/ha.d/noreboot ] && return $rc
17850 a, s      echo 1 > /proc/sys/kernel/sysrq
17860 a, s      echo s > /proc/sysrq-trigger
17870 a, s      echo u > /proc/sysrq-trigger
17880 a, s      echo c > /proc/sysrq-trigger
17890 a, s      /sbin/reboot -f
17900 a, s      return $rc
17910 a, s    }
17920 a, s
17930 a, s    LIO_monitor() {
```

```
17940 a,s     for i in /sys/kernel/config/target/iscsi/iqn.*
17950 a,s     do
17960 a,s       [ -d $i ] && [ $(cat $i/tpgt_1/enable) -eq 1 ] && return $OCF_SUCCESS
17970 a,s     done
17980 a,s     return $OCF_NOT_RUNNING
17990 a,s   }
18000 a,s
18010 a,s   LIO_validate() {
18020 a,s     if ! ocf_is_probe; then
18030 a,s       # Do we have all required binaries?
18040 a,s       check_binary targetctl
18050 a,s     fi
18060 a,s     return $OCF_SUCCESS
18070 a,s   }
18080 a,s
18090 a,s   case $1 in
18100 a,s     meta-data)  meta_data; exit $OCF_SUCCESS;;
18110 a,s     usage|help) LIO_usage; exit $OCF_SUCCESS;;
18120 a,s   esac
18130 a,s
18140 a,s   # Everything except usage and meta-data must pass the validate test
18150 a,s   LIO_validate
18160 a,s
18170 a,s   case $__OCF_ACTION in
18180 a,s     start)          LIO_start;;
18190 a,s     stop)           LIO_stop;;
18200 a,s     monitor|status) LIO_monitor;;
18210 a,s     reload)         ocf_log err "Reloading..."; LIO_start;;
18220 a,s     validate-all)   ;;
18230 a,s     *)              LIO_usage; exit $OCF_ERR_UNIMPLEMENTED;;
18240 a,s   esac
18250 a,s   rc=$?
18260 a,s   ocf_log debug "${OCF_RESOURCE_INSTANCE} $__OCF_ACTION : $rc"
18270 a,s   exit $rc
18280 a,s   EOF_LIO
18290 a,s   sudo chmod 755 /usr/lib/ocf/resource.d/heartbeat/LIO
18300
```

18310 ○ VIP に関するリソース・エージェント (IPaddr2) の名前を変更します。

18320

```
18330 a,s   sed -e 's/IPaddr2/VIP/g' /usr/lib/ocf/resource.d/heartbeat/IPaddr2 | sudo tee /usr/lib/ocf/resource.d/heartbeat/VIP > /dev/null
18340 a,s   sudo chmod 755 /usr/lib/ocf/resource.d/heartbeat/VIP
```

```
18350
18360          ※  LVM, LIO, VIP リソース・エージェント名文字数を統一し、「sudo pcs status」等の実行結果を見やすくします。
18370          ※  サポート問い合わせ時は、IPaddr2 を上記のコマンドで変更している点を伝えないと話が通じないものと思われます。
18380
18390    ○     pcs の利用環境を整えます。
18400
18410 a,s      echo 'password' | sudo passwd --stdin hacluster
18420          Changing password for user hacluster.
18430          passwd: all authentication tokens updated successfully.
18440
18450 a,s      sudo cp -a /etc/shadow    /etc~/shadow_$(date +%Y%m%d_%H%M%S)
18460 a,s      sudo cp -a /etc/shadow-   /etc~/shadow-_$(date +%Y%m%d_%H%M%S)
18470
18480 a,s      sudo usermod -a -G haclient admin
18490
18500 a,s      id admin
18510          uid=1000(admin) gid=1000(admin) groups=1000(admin),10(wheel),189(haclient)
18520
18530 a,s      sudo usermod -a -G haclient monitor
18540
18550 a,s      id monitor
18560          uid=1001(monitor) gid=1001(monitor) groups=1001(monitor),189(haclient)
18570
18580 a,s      sudo cp -a /etc/group    /etc~/group_$(date +%Y%m%d_%H%M%S)
18590 a,s      sudo cp -a /etc/group-   /etc~/group-_$(date +%Y%m%d_%H%M%S)
18600
18610 a,s      sudo systemctl start pcsd
18620 a,s      sudo systemctl enable pcsd
18630          Created symlink from /etc/systemd/system/multi-user.target.wants/pcsd.service to /usr/lib/systemd/system/pcsd.service.
18640
18650    ○     Corosync のサービス設定を変更します。
18660
18670 a,s      sed -e 's/^#Restart=on-failure.*$/Restart=on-failure/' ¥
18680 a,s       -e 's/^#RestartSec=.*$/RestartSec=70/' ¥
18690 a,s       -e 's%^#ExecStartPre=/sbin/modprobe softdog soft_margin=.*$%ExecStartPre=/sbin/modprobe softdog soft_margin=6%' ¥
18700 a,s       /usr/lib/systemd/system/corosync.service | sudo tee /etc/systemd/system/corosync.service
18710          [Unit]
18720          Description=Corosync Cluster Engine
18730          ConditionKernelCommandLine=!nocluster
18740          Requires=network-online.target
18750          After=network-online.target
```

```
18760
18770       [Service]
18780       ExecStart=/usr/share/corosync/corosync start
18790       ExecStop=/usr/share/corosync/corosync stop
18800       Type=forking
18810
18820       # The following config is for corosync with enabled watchdog service.
18830       #
18840       #  When corosync watchdog service is being enabled and using with
18850       #  pacemaker.service, and if you want to exert the watchdog when a
18860       #  corosync process is terminated abnormally,
18870       #  uncomment the line of the following Restart= and RestartSec=.
18880       Restart=on-failure
18890       #  Specify a period longer than soft_margin as RestartSec.
18900       RestartSec=70
18910       #  rewrite according to environment.
18920       ExecStartPre=/sbin/modprobe softdog soft_margin=6
18930
18940       [Install]
18950       WantedBy=multi-user.target
18960
18970           ※  カーネル内のソフトウェア watchdog 機能を有効化します。
18980           ※  Corosync プロセス障害検知時間を6秒以内とします。
18990
19000 a,s   cat /etc/sysconfig/corosync
19010       # Corosync init script configuration file
19020
19030       # COROSYNC_INIT_TIMEOUT specifies number of seconds to wait for corosync
19040       # initialization (default is one minute).
19050       COROSYNC_INIT_TIMEOUT=60
19060
19070       # COROSYNC_OPTIONS specifies options passed to corosync command
19080       # (default is no options).
19090       # See "man corosync" for detailed descriptions of the options.
19100       COROSYNC_OPTIONS=""
19110
19120   ○   Pacemaker のサービス設定を変更します。
19130
19140 a,s   sed -e "s%^# ExecStopPost=/bin/sh -c 'pidof crmd || killall -TERM corosync'$%ExecStopPost=/bin/sh -c 'pidof crmd || killall -TERM corosync'%" ¥
19150 a,s    /usr/lib/systemd/system/pacemaker.service | sudo tee /etc/systemd/system/pacemaker.service
19160       [Unit]
```

```
19170       Description=Pacemaker High Availability Cluster Manager
19180
19190       After=dbus.service
19200       After=basic.target
19210       After=syslog.service
19220       After=network.target
19230       After=corosync.service
19240
19250       Requires=dbus.service
19260       Requires=basic.target
19270       Requires=corosync.service
19280       # if you use crm_mon, uncomment the line below.
19290       # Wants=crm_mon.service
19300
19310       [Install]
19320       WantedBy=multi-user.target
19330
19340       [Service]
19350       Type=simple
19360       KillMode=process
19370       NotifyAccess=main
19380       EnvironmentFile=-/etc/sysconfig/pacemaker
19390       EnvironmentFile=-/etc/sysconfig/sbd
19400       SuccessExitStatus=100
19410
19420       ExecStart=/usr/sbin/pacemakerd -f
19430
19440       # If pacemakerd doesn't stop, its probably waiting on a cluster
19450       # resource.  Sending -KILL will just get the node fenced
19460       SendSIGKILL=no
19470
19480       # If we ever hit the StartLimitInterval/StartLimitBurst limit and the
19490       # admin wants to stop the cluster while pacemakerd is not running, it
19500       # might be a good idea to enable the ExecStopPost directive below.
19510       #
19520       # Although the node will likely end up being fenced as a result so its
19530       # not on by default
19540       #
19550       # ExecStopPost=/usr/bin/killall -TERM crmd attrd fenced cib pengine lrmd
19560
19570       # If you want Corosync to stop whenever Pacemaker is stopped,
```

```
19580       # uncomment the next line too:
19590       #
19600       ExecStopPost=/bin/sh -c 'pidof crmd || killall -TERM corosync'
19610
19620       # Uncomment this for older versions of systemd that didn't support
19630       # TimeoutStopSec
19640       # TimeoutSec=30min
19650
19660       # Pacemaker can only exit after all managed services have shut down
19670       # A HA database could conceivably take even longer than this
19680       TimeoutStopSec=30min
19690       TimeoutStartSec=60s
19700
19710       # Restart options include: no, on-success, on-failure, on-abort or always
19720       Restart=on-failure
19730
19740       # crm_perror() writes directly to stderr, so ignore it here
19750       # to avoid double-logging with the wrong format
19760       StandardError=null
19770
19780       # if you use crm_mon, uncomment the line below.
19790       # ExecStopPost=/bin/sh -c 'systemctl status crm_mon >/dev/null && systemctl stop crm_mon'
19800
19810           ※  Pacemaker サービス停止時に Corosync サービスを停止します。
19820
19830 a,s   sudo sed -i -e 's/^# PCMK_fail_fast=.*$/PCMK_fail_fast=yes/' /etc/sysconfig/pacemaker
19840 a,s   sudo cp -a /etc/sysconfig/pacemaker /etc~/sysconfig/pacemaker_$(date +%Y%m%d_%H%M%S)
19850 a,s   cat /etc/sysconfig/pacemaker
19860       # For non-systemd based systems, prefix export to each enabled line
19870
19880       # Turn on special handling for CMAN clusters in the init script
19890       # Without this, fenced (and by inference, cman) cannot reliably be made to shut down
19900       # PCMK_STACK=cman
19910
19920       #==#==# Variables that control logging
19930
19940       # Enable debug logging globally or per-subsystem
19950       # Multiple subsystems may me listed separated by commas
19960       # eg. PCMK_debug=crmd,pengine
19970       # PCMK_debug=yes|no|crmd|pengine|cib|stonith-ng|attrd|pacemakerd
19980
```

```
19990       # Send INFO (and higher) messages to the named log file
20000       # Additional messages may also appear here depending on any configured debug and trace settings
20010       # By default Pacemaker will inherit the logfile specified in corosync.conf
20020       # PCMK_logfile=/var/log/pacemaker.log
20030
20040       # Specify an alternate syslog target for NOTICE (and higher) messages
20050       # Use 'none' to disable - not recommended
20060       # The default value is 'daemon'
20070       # PCMK_logfacility=none|daemon|user|local0|local1|local2|local3|local4|local5|local6|local7
20080
20090       # Send all messages up-to-and-including the configured priority to syslog
20100       # A value of 'info' will be far too verbose for most installations and 'debug' is almost certain to send you blind
20110       # The default value is 'notice'
20120       # PCMK_logpriority=emerg|alert|crit|error|warning|notice|info|debug
20130
20140       # Log all messages from a comma-separated list of functions
20150       # PCMK_trace_functions=function1,function2,function3
20160
20170       # Log all messages from a comma-separated list of files (no path)
20180       # Supports wildcards eg. PCMK_trace_files=prefix*.c
20190       # PCMK_trace_files=file.c,other.h
20200
20210       # Log all messages matching comma-separated list of formats
20220       # PCMK_trace_formats="Sent delete %d"
20230
20240       # Log all messages from a comma-separated list of tags
20250       # PCMK_trace_tags=tag1,tag2
20260
20270       # Dump the blackbox whenever the message at function and line is printed
20280       # eg. PCMK_trace_blackbox=te_graph_trigger:223,unpack_clone:81
20290       # PCMK_trace_blackbox=fn:line,fn2:line2,...
20300
20310       # Enable blackbox logging globally or per-subsystem
20320       # The blackbox contains a rolling buffer of all logs (including info+debug+trace)
20330       # and is written after a crash, assertion failure and/or when SIGTRAP is received
20340       #
20350       # The blackbox recorder can also be enabled for Pacemaker daemons at runtime by
20360       # sending SIGUSR1 (or SIGTRAP), and disabled by sending SIGUSR2
20370       #
20380       # Multiple subsystems may me listed separated by commas
20390       # eg. PCMK_blackbox=crmd,pengine
```

```
20400       # PCMK_blackbox=yes|no|crmd|pengine|cib|stonith-ng|attrd|pacemakerd
20410
20420       #==#==# Advanced use only
20430
20440       # Enable this for compatibility with older corosync (prior to 2.0)
20450       # based clusters which used the nodes uname as its uuid also
20460       # PCMK_uname_is_uuid=no
20470
20480       # Specify an alternate location for RNG schemas and XSL transforms
20490       # Mostly only useful for developer testing
20500       # PCMK_schema_directory=/some/path
20510
20520       # Enable this for rebooting this machine at the time of process (subsystem) failure
20530       PCMK_fail_fast=yes
20540
20550       #==#==# Pacemaker Remote
20560       # Use a custom directory for finding the authkey.
20570       # PCMK_authkey_location=/etc/pacemaker/authkey
20580       #
20590       # Specify a custom port for Pacemaker Remote connections
20600       # PCMK_remote_port=3121
20610
20620       #==#==# IPC
20630
20640       # Force use of a particular class of IPC connection
20650       # PCMK_ipc_type=shared-mem|socket|posix|sysv
20660
20670       # Specify an IPC buffer size in bytes
20680       # Useful when connecting to really big clusters that exceed the default 20k buffer
20690       # PCMK_ipc_buffer=20480
20700
20710       #==#==# Profiling and memory leak testing
20720
20730       # Variables for running child daemons under valgrind and/or checking for memory problems
20740       # G_SLICE=always-malloc
20750       # MALLOC_PERTURB_=221 # or 0
20760       # MALLOC_CHECK_=3     # or 0,1,2
20770       # PCMK_valgrind_enabled=yes
20780       # PCMK_valgrind_enabled=cib,crmd
20790       # PCMK_callgrind_enabled=yes
20800       # PCMK_callgrind_enabled=cib,crmd
```

```
20810       # VALGRIND_OPTS="--leak-check=full --trace-children=no --num-callers=25 --log-file=/var/lib/pacemaker/valgrind-%p
20820        --suppressions=/usr/share/pacemaker/tests/valgrind-pcmk.suppressions --gen-suppressions=all"
20830
20840           ※  Pacemaker の内部プロセス障害をノード障害として扱うようにします。
20850
20860   ○   Pacemaker のリソース設定スクリプトを作成します。
20870
20880 a, s   cat << 'EOF' | sudo tee /etc/ha.d/crm.sh
20890 a, s   #!/bin/bash
20900 a, s   pcs property set batch-limit=30
20910 a, s   pcs property set cluster-delay=60
20920 a, s   pcs property set cluster-recheck-interval=15min
20930 a, s   pcs property set crmd-finalization-timeout=30min
20940 a, s   pcs property set crmd-integration-timeout=3min
20950 a, s   pcs property set crmd-transition-delay=0s
20960 a, s   pcs property set dc-deadtime=20s
20970 a, s   pcs property set default-action-timeout=20
20980 a, s   pcs property set election-timeout=2min
20990 a, s   pcs property set enable-acl=true --force
21000 a, s   pcs property set enable-startup-probes=true
21010 a, s   pcs property set is-managed-default=true
21020 a, s   pcs property set load-threshold=80%
21030 a, s   pcs property set maintenance-mode=false
21040 a, s   pcs property set migration-limit=-1
21050 a, s   pcs property set no-quorum-policy=ignore
21060 a, s   pcs property set node-action-limit=0
21070 a, s   pcs property set node-health-green=0
21080 a, s   pcs property set node-health-red=-INFINITY
21090 a, s   pcs property set node-health-strategy=none
21100 a, s   pcs property set node-health-yellow=0
21110 a, s   pcs property set notification-agent=/dev/null
21120 a, s   pcs property set pe-error-series-max=100
21130 a, s   pcs property set pe-input-series-max=100
21140 a, s   pcs property set pe-warn-series-max=100
21150 a, s   pcs property set placement-strategy=default
21160 a, s   pcs property set remove-after-stop=false
21170 a, s   pcs property set shutdown-escalation=20min
21180 a, s   pcs property set start-failure-is-fatal=true
21190 a, s   pcs property set startup-fencing=true
21200 a, s   pcs property set stonith-action=reboot
21210 a, s   pcs property set stonith-enabled=false
```

```
21220 a, s    pcs property set stonith-timeout=60
21230 a, s    pcs property set stop-all-resources=false
21240 a, s    pcs property set stop-orphan-actions=true
21250 a, s    pcs property set stop-orphan-resources=true
21260 a, s    pcs property set symmetric-cluster=true
21270 a, s
21280 a, s    pcs resource defaults resource-stickiness=200 migration-threshold=2
21290 a, s
21300 a, s    pcs acl role create write-access description="Full access" write xpath /cib
21310 a, s    pcs acl role create read-only description="Read access to cluster" read xpath /cib
21320 a, s
21330 a, s    pcs acl user create admin write-access
21340 a, s    pcs acl user create monitor read-only
21350 a, s
21360 a, s    pcs resource create p_drbd_r0 ocf:linbit:drbd ¥
21370 a, s      params drbd_resource=r0 ¥
21380 a, s      op start                            timeout=240 ¥
21390 a, s      op monitor interval=10 role=Master timeout=20 ¥
21400 a, s      op monitor interval=20 role=Slave  timeout=20 ¥
21410 a, s      op notify                           timeout=90 ¥
21420 a, s      op stop                             timeout=100 ¥
21430 a, s      op promote                          timeout=90 ¥
21440 a, s      op demote                           timeout=90
21450 a, s
21460 a, s    pcs resource master ms_drbd_r0 p_drbd_r0 ¥
21470 a, s      meta master-max=1 master-node-max=1 clone-max=2 ¥
21480 a, s      clone-node-max=1 notify=true target-role=Started ¥
21490 a, s      is-managed=true
21500 a, s
21510 a, s    pcs resource create p_lvm ocf:heartbeat:LVM ¥
21520 a, s      params volgrpname=vg1 ¥
21530 a, s      op start              timeout=30 ¥
21540 a, s      op monitor interval=5 timeout=10 ¥
21550 a, s      op stop               timeout=30
21560 a, s
21570 a, s    pcs resource create p_lio ocf:heartbeat:LIO ¥
21580 a, s      op start              timeout=10 ¥
21590 a, s      op monitor interval=5 timeout=5 ¥
21600 a, s      op stop               timeout=10
21610 a, s
21620 a, s    pcs resource create p_vip ocf:heartbeat:VIP ¥
```

```
21630 a,s     params ip=10.110.88.59 cidr_netmask=26 nic=bond0 iflabel=1 arp_interval=200 arp_count=5 ¥
21640 a,s     op start              timeout=20 ¥
21650 a,s     op monitor interval=5 timeout=10 ¥
21660 a,s     op stop               timeout=20
21670 a,s
21680 a,s   pcs resource group add g_tgt p_lvm p_lio p_vip
21690 a,s
21700 a,s   pcs constraint location add lc_tgt g_tgt iscsitgt01a.example.com 100
21710 a,s
21720 a,s   pcs constraint colocation add g_tgt ¥
21730 a,s     ms_drbd_r0 INFINITY with-rsc-role=Master
21740 a,s
21750 a,s   pcs constraint order promote ms_drbd_r0 then start p_lvm
21760 a,s   EOF
21770 a,s   sudo chmod 755 /etc/ha.d/crm.sh
21780 a,s   sudo cp -a /etc{,~}/ha.d/crm.sh
21790
21800       ※  ここからの作業は、Active 機と Stand-by 機が連動して動作していく前提の操作となります。
21810
21820   ○   Active 機と Stand-by 機の間の疎通を確認します。
21830
21840 a,s   ping -c 1 -M do -s 8972 10.110.88.57 || echo Error
21850       PING 10.110.88.57 (10.110.88.57) 8972(9000) bytes of data.
21860       8980 bytes from 10.110.88.57: icmp_seq=1 ttl=64 time=0.136 ms
21870
21880       --- 10.110.88.57 ping statistics ---
21890       1 packets transmitted, 1 received, 0% packet loss, time 0ms
21900       rtt min/avg/max/mdev = 0.136/0.136/0.136/0.000 ms
21910
21920 a,s   traceroute -F 10.110.88.57 8972
21930       traceroute to 10.110.88.57 (10.110.88.57), 30 hops max, 8972 byte packets
21940        1  iscsitgt01a.example.com (10.110.88.57)  0.303 ms  0.265 ms  0.256 ms
21950
21960 a,s   ping -c 1 -M do -s 8972 10.110.88.58 || echo Error
21970 a,s   traceroute -F 10.110.88.58 8972
21980
21990 a,s   ping -c 1 -M do -s 8972 192.168.1.2 || echo Error
22000 a,s   traceroute -F 192.168.1.2 8972
22010
22020 a,s   ping -c 1 -M do -s 8972 192.168.1.3 || echo Error
22030 a,s   traceroute -F 192.168.1.3 8972
```

22040
22050 ○ Active 機で ssh 鍵を作成し、Stand-by 機にコピーします。
22060
22070 a ssh-keygen -q -f ~/.ssh/id_rsa -N ""
22080 a mv -f ~/.ssh/id_rsa.pub ~/.ssh/authorized_keys
22090 a scp -pr .ssh/ iscsitgt01s:
22100 The authenticity of host 'iscsitgt01s (10.110.88.58)' can't be established.
22110 ECDSA key fingerprint is cf:3a:39:91:fc:c9:ac:5c:4e:16:38:72:97:88:28:b2.
22120 a Are you sure you want to continue connecting (yes/no)? yes
22130 Warning: Permanently added 'iscsitgt01s,10.110.88.58' (ECDSA) to the list of known hosts.
22140 a admin@iscsitgt01s's password: ********
22150 id_rsa 100% 1679 1.6KB/s 00:00
22160 authorized_keys 100% 411 0.4KB/s 00:00
22170 known_hosts 100% 186 0.2KB/s 00:00
22180
22190 ○ Active 機と Stand-by 機で、ssh 鍵を root アカウント用にコピーします。
22200
22210 a,s sudo cp -a .ssh/ /root/
22220 a,s sudo chown -R root:root /root/.ssh
22230
22240 ○ Active 機と Stand-by 機でほぼ同時に DRBD サービスを起動します。
22250
22260 a,s sudo systemctl start drbd.service
22270
22280 ○ Stand-by 機で DRBD の状態をワッチします。
22290
22300 s watch cat /proc/drbd
22310 Every 2.0s: cat /proc/drbd Fri Nov 25 16:35:43 2016
22320
22330 version: 8.4.5 (api:1/proto:86-101)
22340 srcversion: 1AEFF755B8BD61B81A0AF27
22350 0: cs:Connected ro:Secondary/Secondary ds:Inconsistent/Inconsistent C r-----
22360 ns:0 nr:0 dw:0 dr:0 al:0 bm:0 lo:0 pe:0 ua:0 ap:0 ep:1 wo:f oos:377459420
22370
22380 ○ Active 機で DRBD の初期同期を開始します。
22390
22400 a sudo drbdadm primary --force all
22410
22420 ○ Stand-by 機で DRBD の状態を確認します。
22430
22440 Every 2.0s: cat /proc/drbd Fri Nov 25 16:36:21 2016

```
22450
22460       version: 8.4.5 (api:1/proto:86-101)
22470       srcversion: 1AEFF755B8BD61B81A0AF27
22480        0: cs:SyncTarget ro:Secondary/Primary ds:Inconsistent/UpToDate C r-----
22490           ns:0 nr:0 dw:0 dr:355856 al:0 bm:0 lo:0 pe:0 ua:0 ap:0 ep:1 wo:f oos:377103564
22500               [>....................] sync'ed:  0.1% (368264/368612)M
22510               finish: 0:52:57 speed: 118,616 (118,616) want: 102,400 K/sec
22520
22530       ※  この状態でも、Active 機側で作業を続行できます。今回は、初期同期の完了を待つことにします。
22540
22550       Every 2.0s: cat /proc/drbd                              Fri Nov 25 17:44:37 2016
22560
22570       version: 8.4.5 (api:1/proto:86-101)
22580       srcversion: 1AEFF755B8BD61B81A0AF27
22590        0: cs:Connected ro:Secondary/Primary ds:UpToDate/UpToDate C r-----
22600           ns:0 nr:0 dw:0 dr:377459420 al:0 bm:0 lo:0 pe:0 ua:0 ap:0 ep:1 wo:f oos:0
22610
22620       ※  「自機/対向機」がともに「UpToDate/UpToDate」となっているのが正常な状態です。
22630
22640   ○   Active 機で DRBD デバイス上に LVM を構成します。
22650
22660    a  sudo pvcreate /dev/drbd0
22670         Physical volume "/dev/drbd0" successfully created
22680
22690    a  sudo vgcreate -s 4M vg1 /dev/drbd0
22700         Volume group "vg1" successfully created
22710
22720    a  sudo lvcreate --name lv-lun0000 --extents 90%VG vg1
22730         Logical volume "lv-lun0000" created.
22740
22750    a  sudo lvcreate --name lv-lun0001 --extents 2%VG vg1
22760         Logical volume "lv-lun0001" created.
22770
22780    a  sudo lvcreate --name lv-lun0002 --extents 2%VG vg1
22790         Logical volume "lv-lun0002" created.
22800
22810    a  sudo lvcreate --name lv-lun0003 --extents 2%VG vg1
22820         Logical volume "lv-lun0003" created.
22830
22840    a  sudo pvs
22850         PV         VG   Fmt  Attr PSize   PFree
```

```
  /dev/drbd0 vg1  lvm2 a--  359.97g 14.40g
  /dev/sdc1  vg0  lvm2 a--  100.00g     0
  /dev/sdd1  vg0  lvm2 a--  100.00g     0
  /dev/sde1  vg0  lvm2 a--  100.00g     0
  /dev/sdf1  vg0  lvm2 a--  100.00g 40.00g

a sudo vgs
  VG   #PV #LV #SN Attr   VSize   VFree
  vg0    4   1   0 wz--n- 399.98g 40.00g
  vg1    1   4   0 wz--n- 359.97g 14.40g

a sudo lvs
  LV         VG   Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
  lv-drbd0   vg0  -wi-ao---- 359.98g
  lv-lun0000 vg1  -wi-a----- 323.97g
  lv-lun0001 vg1  -wi-a-----   7.20g
  lv-lun0002 vg1  -wi-a-----   7.20g
  lv-lun0003 vg1  -wi-a-----   7.20g
```

○ Active 機で、targetcli から状態を確認します。

```
a sudo targetcli ls /
o- / ......................................................................... [...]
  o- backstores .............................................................. [...]
  | o- block .................................... [Storage Objects: 0]
  | o- fileio ................................... [Storage Objects: 0]
  | o- pscsi .................................... [Storage Objects: 0]
  | o- ramdisk .................................. [Storage Objects: 0]
  o- iscsi ............................................................ [Targets: 0]
  o- loopback ......................................................... [Targets: 0]
```

○ Active 機で、IQN を定義します。

```
a sudo targetcli /iscsi create iqn.2016-09.com.example:iscsitgt01-0000
  Created target iqn.2016-09.com.example:iscsitgt01-0000.
  Created TPG 1.

a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1 set attribute default_cmdsn_depth = 128
  Parameter default_cmdsn_depth is now '128'.

a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1 set parameter MaxConnections = 1
```

```
23270       Parameter MaxConnections is now '1'.
23280
23290   a   sudo targetcli /iscsi create iqn.2016-09.com.example:iscsitgt01-0001
23300       Created target iqn.2016-09.com.example:iscsitgt01-0001 .
23310       Created TPG 1.
23320
23330   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1 set attribute default_cmdsn_depth = 128
23340       Parameter default_cmdsn_depth is now '128'.
23350
23360   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1 set parameter MaxConnections = 1
23370       Parameter MaxConnections is now '1'.
23380
23390   a   sudo targetcli /iscsi create iqn.2016-09.com.example:iscsitgt01-0002
23400       Created target iqn.2016-09.com.example:iscsitgt01-0002 .
23410       Created TPG 1.
23420
23430   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1 set attribute default_cmdsn_depth = 128
23440       Parameter default_cmdsn_depth is now '128'.
23450
23460   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1 set parameter MaxConnections = 1
23470       Parameter MaxConnections is now '1'.
23480
23490   a   sudo targetcli /iscsi create iqn.2016-09.com.example:iscsitgt01-0003
23500       Created target iqn.2016-09.com.example:iscsitgt01-0003 .
23510       Created TPG 1.
23520
23530   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1 set attribute default_cmdsn_depth = 128
23540       Parameter default_cmdsn_depth is now '128'.
23550
23560   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1 set parameter MaxConnections = 1
23570       Parameter MaxConnections is now '1'.
23580
23590   a   sudo targetcli ls /
23600       o- / ......................................................................... [...]
23610         o- backstores .............................................................. [...]
23620         | o- block .................................................. [Storage Objects: 0]
23630         | o- fileio ................................................. [Storage Objects: 0]
23640         | o- pscsi .................................................. [Storage Objects: 0]
23650         | o- ramdisk ................................................ [Storage Objects: 0]
23660         o- iscsi ........................................................ [Targets: 4]
23670         | o- iqn.2016-09.com.example:iscsitgt01-0000 ..................... [TPGs: 1]
```

```
  | | o- tpg1 ..................................... [no-gen-acls, no-auth]
  | |   o- acls ..................................................... [ACLs: 0]
  | |   o- luns ..................................................... [LUNs: 0]
  | |   o- portals ............................................... [Portals: 0]
  | o- iqn.2016-09.com.example:iscsitgt01-0001 ..................... [TPGs: 1]
  | | o- tpg1 ..................................... [no-gen-acls, no-auth]
  | |   o- acls ..................................................... [ACLs: 0]
  | |   o- luns ..................................................... [LUNs: 0]
  | |   o- portals ............................................... [Portals: 0]
  | o- iqn.2016-09.com.example:iscsitgt01-0002 ..................... [TPGs: 1]
  | | o- tpg1 ..................................... [no-gen-acls, no-auth]
  | |   o- acls ..................................................... [ACLs: 0]
  | |   o- luns ..................................................... [LUNs: 0]
  | |   o- portals ............................................... [Portals: 0]
  | o- iqn.2016-09.com.example:iscsitgt01-0003 ..................... [TPGs: 1]
  |   o- tpg1 ..................................... [no-gen-acls, no-auth]
  |     o- acls ..................................................... [ACLs: 0]
  |     o- luns ..................................................... [LUNs: 0]
  |     o- portals ............................................... [Portals: 0]
  o- loopback ....................................................... [Targets: 0]
```

○ Active 機で、ACL（アクセス許可リスト）にイニシエータ名を登録します。必要に応じて CHAP 認証情報も紐付けします。

```
a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls create iqn.2016-09.com.example:initiator01
Created Node ACL for iqn.2016-09.com.example:initiator01

a  sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth userid=iscsiuser01
Parameter userid is now 'iscsiuser01'.

a  sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth password='password-user01'
Parameter password is now 'password-user01'.

a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls create iqn.2016-09.com.example:initiator01
Created Node ACL for iqn.2016-09.com.example:initiator01

a  sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth userid=iscsiuser01
Parameter userid is now 'iscsiuser01'.

a  sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth password='password-user01'
Parameter password is now 'password-user01'.
```

```
24090   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls create iqn.2016-09.com.example:initiator01
24100       Created Node ACL for iqn.2016-09.com.example:initiator01
24110
24120   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth userid=iscsiuser01
24130       Parameter userid is now 'iscsiuser01'.
24140
24150   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth password='password-user01'
24160       Parameter password is now 'password-user01'.
24170
24180   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls create iqn.2016-09.com.example:initiator01
24190       Created Node ACL for iqn.2016-09.com.example:initiator01
24200
24210   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth userid=iscsiuser01
24220       Parameter userid is now 'iscsiuser01'.
24230
24240   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator01 set auth password='password-user01'
24250       Parameter password is now 'password-user01'.
24260
24270
24280   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls create iqn.2016-09.com.example:initiator02
24290       Created Node ACL for iqn.2016-09.com.example:initiator02
24300
24310   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth userid=iscsiuser02
24320       Parameter userid is now 'iscsiuser02'.
24330
24340   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth password='password-user02'
24350       Parameter password is now 'password-user02'.
24360
24370   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls create iqn.2016-09.com.example:initiator02
24380       Created Node ACL for iqn.2016-09.com.example:initiator02
24390
24400   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth userid=iscsiuser02
24410       Parameter userid is now 'iscsiuser02'.
24420
24430   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth password='password-user02'
24440       Parameter password is now 'password-user02'.
24450
24460   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls create iqn.2016-09.com.example:initiator02
24470       Created Node ACL for iqn.2016-09.com.example:initiator02
24480
24490   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth userid=iscsiuser02
```

```
24500       Parameter userid is now 'iscsiuser02'.
24510
24520   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth password='password-user02'
24530       Parameter password is now 'password-user02'.
24540
24550   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls create iqn.2016-09.com.example:initiator02
24560       Created Node ACL for iqn.2016-09.com.example:initiator02
24570
24580   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth userid=iscsiuser02
24590       Parameter userid is now 'iscsiuser02'.
24600
24610   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator02 set auth password='password-user02'
24620       Parameter password is now 'password-user02'.
24630
24640
24650   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls create iqn.2016-09.com.example:initiator03
24660       Created Node ACL for iqn.2016-09.com.example:initiator03
24670
24680   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth userid=iscsiuser03
24690       Parameter userid is now 'iscsiuser03'.
24700
24710   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth password='password-user03'
24720       Parameter password is now 'password-user03'.
24730
24740   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls create iqn.2016-09.com.example:initiator03
24750       Created Node ACL for iqn.2016-09.com.example:initiator03
24760
24770   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth userid=iscsiuser03
24780       Parameter userid is now 'iscsiuser03'.
24790
24800   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth password='password-user03'
24810       Parameter password is now 'password-user03'.
24820
24830   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls create iqn.2016-09.com.example:initiator03
24840       Created Node ACL for iqn.2016-09.com.example:initiator03
24850
24860   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth userid=iscsiuser03
24870       Parameter userid is now 'iscsiuser03'.
24880
24890   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth password='password-user03'
24900       Parameter password is now 'password-user03'.
```

```
24910
24920   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls create iqn.2016-09.com.example:initiator03
24930       Created Node ACL for iqn.2016-09.com.example:initiator03
24940
24950   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth userid=iscsiuser03
24960       Parameter userid is now 'iscsiuser03'.
24970
24980   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator03 set auth password='password-user03'
24990       Parameter password is now 'password-user03'.
25000
25010
25020   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls create iqn.2016-09.com.example:initiator04
25030       Created Node ACL for iqn.2016-09.com.example:initiator04
25040
25050   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth userid=iscsiuser04
25060       Parameter userid is now 'iscsiuser04'.
25070
25080   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth password='password-user04'
25090       Parameter password is now 'password-user04'.
25100
25110   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls create iqn.2016-09.com.example:initiator04
25120       Created Node ACL for iqn.2016-09.com.example:initiator04
25130
25140   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth userid=iscsiuser04
25150       Parameter userid is now 'iscsiuser04'.
25160
25170   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth password='password-user04'
25180       Parameter password is now 'password-user04'.
25190
25200   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls create iqn.2016-09.com.example:initiator04
25210       Created Node ACL for iqn.2016-09.com.example:initiator04
25220
25230   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth userid=iscsiuser04
25240       Parameter userid is now 'iscsiuser04'.
25250
25260   a     sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth password='password-user04'
25270       Parameter password is now 'password-user04'.
25280
25290   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls create iqn.2016-09.com.example:initiator04
25300       Created Node ACL for iqn.2016-09.com.example:initiator04
25310
```

```
25320 a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth userid=iscsiuser04
25330     Parameter userid is now 'iscsiuser04'.
25340
25350 a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/acls/iqn.2016-09.com.example:initiator04 set auth password='password-user04'
25360     Parameter password is now 'password-user04'.
25370
25380 a   sudo targetcli ls /
25390     o- / ..................................................................... [...]
25400       o- backstores ......................................................... [...]
25410       | o- block ............................................ [Storage Objects: 0]
25420       | o- fileio ........................................... [Storage Objects: 0]
25430       | o- pscsi ............................................ [Storage Objects: 0]
25440       | o- ramdisk .......................................... [Storage Objects: 0]
25450       o- iscsi ....................................................... [Targets: 4]
25460       | o- iqn.2016-09.com.example:iscsitgt01-0000 ....................... [TPGs: 1]
25470       | | o- tpg1 ........................................... [no-gen-acls, no-auth]
25480       | |   o- acls ..................................................... [ACLs: 4]
25490       | |   | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 0]
25500       | |   | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 0]
25510       | |   | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 0]
25520       | |   | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 0]
25530       | |   o- luns ..................................................... [LUNs: 0]
25540       | |   o- portals ............................................... [Portals: 0]
25550       | o- iqn.2016-09.com.example:iscsitgt01-0001 ....................... [TPGs: 1]
25560       | | o- tpg1 ........................................... [no-gen-acls, no-auth]
25570       | |   o- acls ..................................................... [ACLs: 4]
25580       | |   | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 0]
25590       | |   | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 0]
25600       | |   | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 0]
25610       | |   | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 0]
25620       | |   o- luns ..................................................... [LUNs: 0]
25630       | |   o- portals ............................................... [Portals: 0]
25640       | o- iqn.2016-09.com.example:iscsitgt01-0002 ....................... [TPGs: 1]
25650       | | o- tpg1 ........................................... [no-gen-acls, no-auth]
25660       | |   o- acls ..................................................... [ACLs: 4]
25670       | |   | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 0]
25680       | |   | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 0]
25690       | |   | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 0]
25700       | |   | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 0]
25710       | |   o- luns ..................................................... [LUNs: 0]
25720       | |   o- portals ............................................... [Portals: 0]
```

```
  | o- iqn.2016-09.com.example:iscsitgt01-0003 ..................... [TPGs: 1]
  |   o- tpg1 ........................................... [no-gen-acls, no-auth]
  |     o- acls ..................................................... [ACLs: 4]
  |     | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 0]
  |     | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 0]
  |     | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 0]
  |     | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 0]
  |     o- luns ..................................................... [LUNs: 0]
  |     o- portals ............................................... [Portals: 0]
  o- loopback ..................................................... [Targets: 0]
```

○ Active 機で、バックエンド・デバイスを指定し、IQN に紐付けます。

```
a sudo targetcli /backstores/block create name=lun0000 dev=/dev/vg1/lv-lun0000
  Created block storage object lun0000 using /dev/vg1/lv-lun0000.

a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/luns create /backstores/block/lun0000
  Created LUN 0.
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator04
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator03
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator02
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator01


a sudo targetcli /backstores/block create name=lun0001 dev=/dev/vg1/lv-lun0001
  Created block storage object lun0001 using /dev/vg1/lv-lun0001.

a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/luns create /backstores/block/lun0001
  Created LUN 0.
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator04
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator03
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator02
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator01


a sudo targetcli /backstores/block create name=lun0002 dev=/dev/vg1/lv-lun0002
  Created block storage object lun0002 using /dev/vg1/lv-lun0002.

a sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/luns create /backstores/block/lun0002
  Created LUN 0.
  Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator04
```

```
26140       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator03
26150       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator02
26160       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator01
26170
26180
26190   a   sudo targetcli /backstores/block create name=lun0003 dev=/dev/vg1/lv-lun0003
26200       Created block storage object lun0003 using /dev/vg1/lv-lun0003.
26210
26220   a   sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/luns create /backstores/block/lun0003
26230       Created LUN 0.
26240       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator04
26250       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator03
26260       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator02
26270       Created LUN 0->0 mapping in node ACL iqn.2016-09.com.example:initiator01
26280
26290   a   sudo targetcli ls /
26300       o- / ......................................................................... [...]
26310         o- backstores .............................................................. [...]
26320         | o- block .................................... [Storage Objects: 4]
26330         | | o- lun0000 ......... [/dev/vg1/lv-lun0000 (324.0GiB) write-thru activated]
26340         | | o- lun0001 ........... [/dev/vg1/lv-lun0001 (7.2GiB) write-thru activated]
26350         | | o- lun0002 ........... [/dev/vg1/lv-lun0002 (7.2GiB) write-thru activated]
26360         | | o- lun0003 ........... [/dev/vg1/lv-lun0003 (7.2GiB) write-thru activated]
26370         | o- fileio ................................... [Storage Objects: 0]
26380         | o- pscsi .................................... [Storage Objects: 0]
26390         | o- ramdisk .................................. [Storage Objects: 0]
26400         o- iscsi ............................................ [Targets: 4]
26410         | o- iqn.2016-09.com.example:iscsitgt01-0000 ..... [TPGs: 1]
26420         | | o- tpg1 ..................................... [no-gen-acls, no-auth]
26430         | |   o- acls ..................................... [ACLs: 4]
26440         | |   | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 1]
26450         | |   | | o- mapped_lun0 ..... [lun0 block/lun0000 (rw)]
26460         | |   | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 1]
26470         | |   | | o- mapped_lun0 ..... [lun0 block/lun0000 (rw)]
26480         | |   | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 1]
26490         | |   | | o- mapped_lun0 ..... [lun0 block/lun0000 (rw)]
26500         | |   | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 1]
26510         | |   |   o- mapped_lun0 ..... [lun0 block/lun0000 (rw)]
26520         | |   o- luns ..................................... [LUNs: 4]
26530         | |   | o- lun0 ..... [block/lun0000 (/dev/vg1/lv-lun0000)]
26540         | o- iqn.2016-09.com.example:iscsitgt01-0001 ..... [TPGs: 1]
```

```
26550         | | o- tpg1 ..................................... [no-gen-acls, no-auth]
26560         | |   o- acls ................................................... [ACLs: 4]
26570         | |   | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 1]
26580         | |   | | o- mapped_lun0 ..................... [lun0 block/lun0001 (rw)]
26590         | |   | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 1]
26600         | |   | | o- mapped_lun0 ..................... [lun0 block/lun0001 (rw)]
26610         | |   | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 1]
26620         | |   | | o- mapped_lun0 ..................... [lun0 block/lun0001 (rw)]
26630         | |   | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 1]
26640         | |   |   o- mapped_lun0 ..................... [lun0 block/lun0001 (rw)]
26650         | |   o- luns ................................................... [LUNs: 1]
26660         | |   | o- lun0 ..................... [block/lun0001 (/dev/vg1/lv-lun0001)]
26670         | o- iqn.2016-09.com.example:iscsitgt01-0002 ..................... [TPGs: 1]
26680         | | o- tpg1 ..................................... [no-gen-acls, no-auth]
26690         | |   o- acls ................................................... [ACLs: 4]
26700         | |   | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 1]
26710         | |   | | o- mapped_lun0 ..................... [lun0 block/lun0002 (rw)]
26720         | |   | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 1]
26730         | |   | | o- mapped_lun0 ..................... [lun0 block/lun0002 (rw)]
26740         | |   | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 1]
26750         | |   | | o- mapped_lun0 ..................... [lun0 block/lun0002 (rw)]
26760         | |   | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 1]
26770         | |   |   o- mapped_lun0 ..................... [lun0 block/lun0002 (rw)]
26780         | |   o- luns ................................................... [LUNs: 1]
26790         | |   | o- lun0 ..................... [block/lun0002 (/dev/vg1/lv-lun0002)]
26800         | o- iqn.2016-09.com.example:iscsitgt01-0003 ..................... [TPGs: 1]
26810         |   o- tpg1 ..................................... [no-gen-acls, no-auth]
26820         |     o- acls ................................................... [ACLs: 4]
26830         |     | o- iqn.2016-09.com.example:initiator01 ..... [Mapped LUNs: 1]
26840         |     | | o- mapped_lun0 ..................... [lun0 block/lun0003 (rw)]
26850         |     | o- iqn.2016-09.com.example:initiator02 ..... [Mapped LUNs: 1]
26860         |     | | o- mapped_lun0 ..................... [lun0 block/lun0003 (rw)]
26870         |     | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 1]
26880         |     | | o- mapped_lun0 ..................... [lun0 block/lun0003 (rw)]
26890         |     | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 1]
26900         |     |   o- mapped_lun0 ..................... [lun0 block/lun0003 (rw)]
26910         |     o- luns ................................................... [LUNs: 1]
26920         |     | o- lun0 ..................... [block/lun0003 (/dev/vg1/lv-lun0003)]
26930         |     o- portals ............................................. [Portals: 0]
26940       o- loopback ..................................................... [Targets: 0]
26950
```

○ Active 機で、IQN に portal を作成します。

a
```
sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0000/tpg1/portals create 10.110.88.59 3260
Using default IP port 3260
Created network portal 10.110.88.59:3260.
```

a
```
sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0001/tpg1/portals create 10.110.88.59 3260
Using default IP port 3260
Created network portal 10.110.88.59:3260.
```

a
```
sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0002/tpg1/portals create 10.110.88.59 3260
Using default IP port 3260
Created network portal 10.110.88.59:3260.
```

a
```
sudo targetcli /iscsi/iqn.2016-09.com.example:iscsitgt01-0003/tpg1/portals create 10.110.88.59 3260
Using default IP port 3260
Created network portal 10.110.88.59:3260.
```

a
```
sudo targetcli ls /
o- / ......................................................................... [...]
  o- backstores .............................................................. [...]
  | o- block .................................................. [Storage Objects: 4]
  | | o- lun0000 ......... [/dev/vg1/lv-lun0000 (324.0GiB) write-thru activated]
  | | o- lun0001 ........... [/dev/vg1/lv-lun0001 (7.2GiB) write-thru activated]
  | | o- lun0002 ........... [/dev/vg1/lv-lun0002 (7.2GiB) write-thru activated]
  | | o- lun0003 ........... [/dev/vg1/lv-lun0003 (7.2GiB) write-thru activated]
  | o- fileio ................................................. [Storage Objects: 0]
  | o- pscsi .................................................. [Storage Objects: 0]
  | o- ramdisk ................................................ [Storage Objects: 0]
  o- iscsi ............................................................ [Targets: 4]
  | o- iqn.2016-09.com.example:iscsitgt01-0000 ....................... [TPGs: 1]
  |   o- tpg1 ........................................... [no-gen-acls, no-auth]
  |     o- acls ...................................................... [ACLs: 4]
  |     | o- iqn.2016-09.com.example:initiator01 ............... [Mapped LUNs: 4]
  | |   | | o- mapped_lun0 ............................ [lun0 block/lun0000 (rw)]
  | |   | o- iqn.2016-09.com.example:initiator02 ............... [Mapped LUNs: 1]
  | |   | | o- mapped_lun0 ............................ [lun0 block/lun0000 (rw)]
  | |   | o- iqn.2016-09.com.example:initiator03 ............... [Mapped LUNs: 1]
  | |   | | o- mapped_lun0 ............................ [lun0 block/lun0000 (rw)]
  | |   | o- iqn.2016-09.com.example:initiator04 ............... [Mapped LUNs: 1]
  | |   |   o- mapped_lun0 ............................ [lun0 block/lun0000 (rw)]
```

```
| |   o- luns ..................................................... [LUNs: 1]
| |   | o- lun0 ..................... [block/lun0000 (/dev/vg1/lv-lun0000)]
| |   o- portals ............................................... [Portals: 1]
| |     o- 10.110.88.59:3260 ........................................... [OK]
| o- iqn.2016-09.com.example:iscsitgt01-0001 ..................... [TPGs: 1]
| | o- tpg1 ....................................... [no-gen-acls, no-auth]
| |   o- acls ..................................................... [ACLs: 4]
| |   | o- iqn.2016-09.com.example:initiator01 ............. [Mapped LUNs: 1]
| |   | | o- mapped_lun0 ......................... [lun0 block/lun0001 (rw)]
| |   | o- iqn.2016-09.com.example:initiator02 ............. [Mapped LUNs: 1]
| |   | | o- mapped_lun0 ......................... [lun0 block/lun0001 (rw)]
| |   | o- iqn.2016-09.com.example:initiator03 ............. [Mapped LUNs: 1]
| |   | | o- mapped_lun0 ......................... [lun0 block/lun0001 (rw)]
| |   | o- iqn.2016-09.com.example:initiator04 ............. [Mapped LUNs: 1]
| |   |   o- mapped_lun0 ......................... [lun0 block/lun0001 (rw)]
| |   o- luns ..................................................... [LUNs: 1]
| |   | o- lun0 ..................... [block/lun0001 (/dev/vg1/lv-lun0001)]
| |   o- portals ............................................... [Portals: 1]
| |     o- 10.110.88.59:3260 ........................................... [OK]
| o- iqn.2016-09.com.example:iscsitgt01-0002 ..................... [TPGs: 1]
| | o- tpg1 ....................................... [no-gen-acls, no-auth]
| |   o- acls ..................................................... [ACLs: 4]
| |   | o- iqn.2016-09.com.example:initiator01 ............. [Mapped LUNs: 1]
| |   | | o- mapped_lun0 ......................... [lun0 block/lun0002 (rw)]
| |   | o- iqn.2016-09.com.example:initiator02 ............. [Mapped LUNs: 1]
| |   | | o- mapped_lun0 ......................... [lun0 block/lun0002 (rw)]
| |   | o- iqn.2016-09.com.example:initiator03 ............. [Mapped LUNs: 1]
| |   | | o- mapped_lun0 ......................... [lun0 block/lun0002 (rw)]
| |   | o- iqn.2016-09.com.example:initiator04 ............. [Mapped LUNs: 1]
| |   |   o- mapped_lun0 ......................... [lun0 block/lun0002 (rw)]
| |   o- luns ..................................................... [LUNs: 1]
| |   | o- lun0 ..................... [block/lun0002 (/dev/vg1/lv-lun0002)]
| |   o- portals ............................................... [Portals: 1]
| |     o- 10.110.88.59:3260 ........................................... [OK]
| o- iqn.2016-09.com.example:iscsitgt01-0003 ..................... [TPGs: 1]
|   o- tpg1 ....................................... [no-gen-acls, no-auth]
|     o- acls ..................................................... [ACLs: 4]
|     | o- iqn.2016-09.com.example:initiator01 ............. [Mapped LUNs: 1]
|     | | o- mapped_lun0 ......................... [lun0 block/lun0003 (rw)]
|     | o- iqn.2016-09.com.example:initiator02 ............. [Mapped LUNs: 1]
|     | | o- mapped_lun0 ......................... [lun0 block/lun0003 (rw)]
```

```
27780         |      | o- iqn.2016-09.com.example:initiator03 ..... [Mapped LUNs: 1]
27790         |      |  o- mapped_lun0 ..... [lun0 block/lun0003 (rw)]
27800         |      | o- iqn.2016-09.com.example:initiator04 ..... [Mapped LUNs: 1]
27810         |      |   o- mapped_lun0 ..... [lun0 block/lun0003 (rw)]
27820         |      o- luns ..... [LUNs: 1]
27830         |      | o- lun0 ..... [block/lun0003 (/dev/vg1/lv-lun0003)]
27840         |      o- portals ..... [Portals: 1]
27850         |        o- 10.110.88.59:3260 ..... [OK]
27860         o- loopback ..... [Targets: 0]
27870
27880   a   ss -ant | grep LISTEN.¥*3260
27890       LISTEN     0      256    10.110.88.59:3260                  *:*
27900
27910   ○   Active 機で、設定ファイルに設定を保存し、Stand-by 機にコピーします。
27920
27930   a   sudo targetcli saveconfig
27940       Last 10 configs saved in /etc/target/backup.
27950       Configuration saved to /etc/target/saveconfig.json
27960
27970   a   sudo scp -p /etc/target/saveconfig.json iscsitgt01s:/etc/target/saveconfig.json
27980       saveconfig.json                               100%   11KB  11.0KB/s   00:00
27990
28000   ○   Active 機で、設定ファイルを確認します。
28010
28020   a   sudo cat /etc/target/saveconfig.json
28030       {
28040         "fabric_modules": [],
28050         "storage_objects": [
28060           {
28070             "attributes": {
28080               "block_size": 512,
28090               "emulate_3pc": 1,
28100               "emulate_caw": 1,
28110               "emulate_dpo": 0,
28120               "emulate_fua_read": 0,
28130               "emulate_fua_write": 1,
28140               "emulate_model_alias": 1,
28150               "emulate_rest_reord": 0,
28160               "emulate_tas": 1,
28170               "emulate_tpu": 0,
28180               "emulate_tpws": 0,
```

```
28190             "emulate_ua_intlck_ctrl": 0,
28200             "emulate_write_cache": 0,
28210             "enforce_pr_isids": 1,
28220             "force_pr_aptpl": 0,
28230             "is_nonrot": 0,
28240             "max_unmap_block_desc_count": 1,
28250             "max_unmap_lba_count": 8192,
28260             "max_write_same_len": 65535,
28270             "optimal_sectors": 2048,
28280             "pi_prot_format": 0,
28290             "pi_prot_type": 0,
28300             "queue_depth": 128,
28310             "unmap_granularity": 2048,
28320             "unmap_granularity_alignment": 0
28330           },
28340           "dev": "/dev/vg1/lv-lun0003",
28350           "name": "lun0003",
28360           "plugin": "block",
28370           "readonly": false,
28380           "write_back": false,
28390           "wwn": "03880f22-4ca1-48e8-b6e5-cf303af79ade"
28400         },
28410         {
28420           "attributes": {
28430             "block_size": 512,
28440             "emulate_3pc": 1,
28450             "emulate_caw": 1,
28460             "emulate_dpo": 0,
28470             "emulate_fua_read": 0,
28480             "emulate_fua_write": 1,
28490             "emulate_model_alias": 1,
28500             "emulate_rest_reord": 0,
28510             "emulate_tas": 1,
28520             "emulate_tpu": 0,
28530             "emulate_tpws": 0,
28540             "emulate_ua_intlck_ctrl": 0,
28550             "emulate_write_cache": 0,
28560             "enforce_pr_isids": 1,
28570             "force_pr_aptpl": 0,
28580             "is_nonrot": 0,
28590             "max_unmap_block_desc_count": 1,
```

```
            "max_unmap_lba_count": 8192,
            "max_write_same_len": 65535,
            "optimal_sectors": 2048,
            "pi_prot_format": 0,
            "pi_prot_type": 0,
            "queue_depth": 128,
            "unmap_granularity": 2048,
            "unmap_granularity_alignment": 0
          },
          "dev": "/dev/vg1/lv-lun0002",
          "name": "lun0002",
          "plugin": "block",
          "readonly": false,
          "write_back": false,
          "wwn": "9c5e3ced-aea8-46d5-89a8-c5944a1d4cd3"
        },
        {
          "attributes": {
            "block_size": 512,
            "emulate_3pc": 1,
            "emulate_caw": 1,
            "emulate_dpo": 0,
            "emulate_fua_read": 0,
            "emulate_fua_write": 1,
            "emulate_model_alias": 1,
            "emulate_rest_reord": 0,
            "emulate_tas": 1,
            "emulate_tpu": 0,
            "emulate_tpws": 0,
            "emulate_ua_intlck_ctrl": 0,
            "emulate_write_cache": 0,
            "enforce_pr_isids": 1,
            "force_pr_aptpl": 0,
            "is_nonrot": 0,
            "max_unmap_block_desc_count": 1,
            "max_unmap_lba_count": 8192,
            "max_write_same_len": 65535,
            "optimal_sectors": 2048,
            "pi_prot_format": 0,
            "pi_prot_type": 0,
            "queue_depth": 128,
```

```
            "unmap_granularity": 2048,
            "unmap_granularity_alignment": 0
          },
          "dev": "/dev/vg1/lv-lun0001",
          "name": "lun0001",
          "plugin": "block",
          "readonly": false,
          "write_back": false,
          "wwn": "5a7d4ce5-206e-40f2-a22f-b143637136ab"
        },
        {
          "attributes": {
            "block_size": 512,
            "emulate_3pc": 1,
            "emulate_caw": 1,
            "emulate_dpo": 0,
            "emulate_fua_read": 0,
            "emulate_fua_write": 1,
            "emulate_model_alias": 1,
            "emulate_rest_reord": 0,
            "emulate_tas": 1,
            "emulate_tpu": 0,
            "emulate_tpws": 0,
            "emulate_ua_intlck_ctrl": 0,
            "emulate_write_cache": 0,
            "enforce_pr_isids": 1,
            "force_pr_aptpl": 0,
            "is_nonrot": 0,
            "max_unmap_block_desc_count": 1,
            "max_unmap_lba_count": 8192,
            "max_write_same_len": 65535,
            "optimal_sectors": 2048,
            "pi_prot_format": 0,
            "pi_prot_type": 0,
            "queue_depth": 128,
            "unmap_granularity": 2048,
            "unmap_granularity_alignment": 0
          },
          "dev": "/dev/vg1/lv-lun0000",
          "name": "lun0000",
          "plugin": "block",
```

```
            "readonly": false,
            "write_back": false,
            "wwn": "117473ae-68c7-44cd-b665-f7ad42bf1bd0"
          }
        ],
        "targets": [
          {
            "fabric": "iscsi",
            "tpgs": [
              {
                "attributes": {
                  "authentication": 0,
                  "cache_dynamic_acls": 0,
                  "default_cmdsn_depth": 128,
                  "default_erl": 0,
                  "demo_mode_discovery": 1,
                  "demo_mode_write_protect": 1,
                  "fabric_prot_type": 0,
                  "generate_node_acls": 0,
                  "login_timeout": 15,
                  "netif_timeout": 2,
                  "prod_mode_write_protect": 0,
                  "t10_pi": 0
                },
                "enable": true,
                "luns": [
                  {
                    "index": 0,
                    "storage_object": "/backstores/block/lun0003"
                  }
                ],
                "node_acls": [
                  {
                    "attributes": {
                      "dataout_timeout": 3,
                      "dataout_timeout_retries": 5,
                      "default_erl": 0,
                      "nopin_response_timeout": 30,
                      "nopin_timeout": 15,
                      "random_datain_pdu_offsets": 0,
                      "random_datain_seq_offsets": 0,
```

```
29830                 "random_r2t_offsets": 0
29840               },
29850               "chap_password": "password-user04",
29860               "chap_userid": "iscsiuser04",
29870               "mapped_luns": [
29880                 {
29890                   "index": 0,
29900                   "tpg_lun": 0,
29910                   "write_protect": false
29920                 }
29930               ],
29940               "node_wwn": "iqn.2016-09.com.example:initiator04"
29950             },
29960             {
29970               "attributes": {
29980                 "dataout_timeout": 3,
29990                 "dataout_timeout_retries": 5,
30000                 "default_erl": 0,
30010                 "nopin_response_timeout": 30,
30020                 "nopin_timeout": 15,
30030                 "random_datain_pdu_offsets": 0,
30040                 "random_datain_seq_offsets": 0,
30050                 "random_r2t_offsets": 0
30060               },
30070               "chap_password": "password-user03",
30080               "chap_userid": "iscsiuser03",
30090               "mapped_luns": [
30100                 {
30110                   "index": 0,
30120                   "tpg_lun": 0,
30130                   "write_protect": false
30140                 }
30150               ],
30160               "node_wwn": "iqn.2016-09.com.example:initiator03"
30170             },
30180             {
30190               "attributes": {
30200                 "dataout_timeout": 3,
30210                 "dataout_timeout_retries": 5,
30220                 "default_erl": 0,
30230                 "nopin_response_timeout": 30,
```

```
                    "nopin_timeout": 15,
                    "random_datain_pdu_offsets": 0,
                    "random_datain_seq_offsets": 0,
                    "random_r2t_offsets": 0
                  },
                  "chap_password": "password-user02",
                  "chap_userid": "iscsiuser02",
                  "mapped_luns": [
                    {
                      "index": 0,
                      "tpg_lun": 0,
                      "write_protect": false
                    }
                  ],
                  "node_wwn": "iqn.2016-09.com.example:initiator02"
                },
                {
                  "attributes": {
                    "dataout_timeout": 3,
                    "dataout_timeout_retries": 5,
                    "default_erl": 0,
                    "nopin_response_timeout": 30,
                    "nopin_timeout": 15,
                    "random_datain_pdu_offsets": 0,
                    "random_datain_seq_offsets": 0,
                    "random_r2t_offsets": 0
                  },
                  "chap_password": "password-user01",
                  "chap_userid": "iscsiuser01",
                  "mapped_luns": [
                    {
                      "index": 0,
                      "tpg_lun": 0,
                      "write_protect": false
                    }
                  ],
                  "node_wwn": "iqn.2016-09.com.example:initiator01"
                }
              ],
              "parameters": {
                "AuthMethod": "CHAP,None",
```

```
                "DataDigest": "CRC32C,None",
                "DataPDUInOrder": "Yes",
                "DataSequenceInOrder": "Yes",
                "DefaultTime2Retain": "20",
                "DefaultTime2Wait": "2",
                "ErrorRecoveryLevel": "0",
                "FirstBurstLength": "65536",
                "HeaderDigest": "CRC32C,None",
                "IFMarkInt": "2048~65535",
                "IFMarker": "No",
                "ImmediateData": "Yes",
                "InitialR2T": "Yes",
                "MaxBurstLength": "262144",
                "MaxConnections": "1",
                "MaxOutstandingR2T": "1",
                "MaxRecvDataSegmentLength": "8192",
                "MaxXmitDataSegmentLength": "262144",
                "OFMarkInt": "2048~65535",
                "OFMarker": "No",
                "TargetAlias": "LIO Target"
              },
              "portals": [
                {
                  "ip_address": "10.110.88.59",
                  "iser": false,
                  "port": 3260
                }
              ],
              "tag": 1
            }
          ],
          "wwn": "iqn.2016-09.com.example:iscsitgt01-0003"
        },
        {
          "fabric": "iscsi",
          "tpgs": [
            {
              "attributes": {
                "authentication": 0,
                "cache_dynamic_acls": 0,
                "default_cmdsn_depth": 128,
```

```
      "default_erl": 0,
      "demo_mode_discovery": 1,
      "demo_mode_write_protect": 1,
      "fabric_prot_type": 0,
      "generate_node_acls": 0,
      "login_timeout": 15,
      "netif_timeout": 2,
      "prod_mode_write_protect": 0,
      "t10_pi": 0
    },
    "enable": true,
    "luns": [
      {
        "index": 0,
        "storage_object": "/backstores/block/lun0002"
      }
    ],
    "node_acls": [
      {
        "attributes": {
          "dataout_timeout": 3,
          "dataout_timeout_retries": 5,
          "default_erl": 0,
          "nopin_response_timeout": 30,
          "nopin_timeout": 15,
          "random_datain_pdu_offsets": 0,
          "random_datain_seq_offsets": 0,
          "random_r2t_offsets": 0
        },
        "chap_password": "password-user04",
        "chap_userid": "iscsiuser04",
        "mapped_luns": [
          {
            "index": 0,
            "tpg_lun": 0,
            "write_protect": false
          }
        ],
        "node_wwn": "iqn.2016-09.com.example:initiator04"
      },
      {
```

```
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
        "random_datain_pdu_offsets": 0,
        "random_datain_seq_offsets": 0,
        "random_r2t_offsets": 0
      },
      "chap_password": "password-user03",
      "chap_userid": "iscsiuser03",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator03"
    },
    {
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
        "random_datain_pdu_offsets": 0,
        "random_datain_seq_offsets": 0,
        "random_r2t_offsets": 0
      },
      "chap_password": "password-user02",
      "chap_userid": "iscsiuser02",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
```

```
      "node_wwn": "iqn.2016-09.com.example:initiator02"
    },
    {
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
        "random_datain_pdu_offsets": 0,
        "random_datain_seq_offsets": 0,
        "random_r2t_offsets": 0
      },
      "chap_password": "password-user01",
      "chap_userid": "iscsiuser01",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator01"
    }
  ],
  "parameters": {
    "AuthMethod": "CHAP,None",
    "DataDigest": "CRC32C,None",
    "DataPDUInOrder": "Yes",
    "DataSequenceInOrder": "Yes",
    "DefaultTime2Retain": "20",
    "DefaultTime2Wait": "2",
    "ErrorRecoveryLevel": "0",
    "FirstBurstLength": "65536",
    "HeaderDigest": "CRC32C,None",
    "IFMarkInt": "2048~65535",
    "IFMarker": "No",
    "ImmediateData": "Yes",
    "InitialR2T": "Yes",
    "MaxBurstLength": "262144",
    "MaxConnections": "1",
```

```
                "MaxOutstandingR2T": "1",
                "MaxRecvDataSegmentLength": "8192",
                "MaxXmitDataSegmentLength": "262144",
                "OFMarkInt": "2048~65535",
                "OFMarker": "No",
                "TargetAlias": "LIO Target"
              },
              "portals": [
                {
                  "ip_address": "10.110.88.59",
                  "iser": false,
                  "port": 3260
                }
              ],
              "tag": 1
            }
          ],
          "wwn": "iqn.2016-09.com.example:iscsitgt01-0002"
        },
        {
          "fabric": "iscsi",
          "tpgs": [
            {
              "attributes": {
                "authentication": 0,
                "cache_dynamic_acls": 0,
                "default_cmdsn_depth": 128,
                "default_erl": 0,
                "demo_mode_discovery": 1,
                "demo_mode_write_protect": 1,
                "fabric_prot_type": 0,
                "generate_node_acls": 0,
                "login_timeout": 15,
                "netif_timeout": 2,
                "prod_mode_write_protect": 0,
                "t10_pi": 0
              },
              "enable": true,
              "luns": [
                {
                  "index": 0,
```

```
32700                 "storage_object": "/backstores/block/lun0001"
32710               }
32720             ],
32730             "node_acls": [
32740               {
32750                 "attributes": {
32760                   "dataout_timeout": 3,
32770                   "dataout_timeout_retries": 5,
32780                   "default_erl": 0,
32790                   "nopin_response_timeout": 30,
32800                   "nopin_timeout": 15,
32810                   "random_datain_pdu_offsets": 0,
32820                   "random_datain_seq_offsets": 0,
32830                   "random_r2t_offsets": 0
32840                 },
32850                 "chap_password": "password-user04",
32860                 "chap_userid": "iscsiuser04",
32870                 "mapped_luns": [
32880                   {
32890                     "index": 0,
32900                     "tpg_lun": 0,
32910                     "write_protect": false
32920                   }
32930                 ],
32940                 "node_wwn": "iqn.2016-09.com.example:initiator04"
32950               },
32960               {
32970                 "attributes": {
32980                   "dataout_timeout": 3,
32990                   "dataout_timeout_retries": 5,
33000                   "default_erl": 0,
33010                   "nopin_response_timeout": 30,
33020                   "nopin_timeout": 15,
33030                   "random_datain_pdu_offsets": 0,
33040                   "random_datain_seq_offsets": 0,
33050                   "random_r2t_offsets": 0
33060                 },
33070                 "chap_password": "password-user03",
33080                 "chap_userid": "iscsiuser03",
33090                 "mapped_luns": [
33100                   {
```

```
                    "index": 0,
                    "tpg_lun": 0,
                    "write_protect": false
                  }
                ],
                "node_wwn": "iqn.2016-09.com.example:initiator03"
              },
              {
                "attributes": {
                  "dataout_timeout": 3,
                  "dataout_timeout_retries": 5,
                  "default_erl": 0,
                  "nopin_response_timeout": 30,
                  "nopin_timeout": 15,
                  "random_datain_pdu_offsets": 0,
                  "random_datain_seq_offsets": 0,
                  "random_r2t_offsets": 0
                },
                "chap_password": "password-user02",
                "chap_userid": "iscsiuser02",
                "mapped_luns": [
                  {
                    "index": 0,
                    "tpg_lun": 0,
                    "write_protect": false
                  }
                ],
                "node_wwn": "iqn.2016-09.com.example:initiator02"
              },
              {
                "attributes": {
                  "dataout_timeout": 3,
                  "dataout_timeout_retries": 5,
                  "default_erl": 0,
                  "nopin_response_timeout": 30,
                  "nopin_timeout": 15,
                  "random_datain_pdu_offsets": 0,
                  "random_datain_seq_offsets": 0,
                  "random_r2t_offsets": 0
                },
                "chap_password": "password-user01",
```

```
      "chap_userid": "iscsiuser01",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator01"
    }
  ],
  "parameters": {
    "AuthMethod": "CHAP,None",
    "DataDigest": "CRC32C,None",
    "DataPDUInOrder": "Yes",
    "DataSequenceInOrder": "Yes",
    "DefaultTime2Retain": "20",
    "DefaultTime2Wait": "2",
    "ErrorRecoveryLevel": "0",
    "FirstBurstLength": "65536",
    "HeaderDigest": "CRC32C,None",
    "IFMarkInt": "2048~65535",
    "IFMarker": "No",
    "ImmediateData": "Yes",
    "InitialR2T": "Yes",
    "MaxBurstLength": "262144",
    "MaxConnections": "1",
    "MaxOutstandingR2T": "1",
    "MaxRecvDataSegmentLength": "8192",
    "MaxXmitDataSegmentLength": "262144",
    "OFMarkInt": "2048~65535",
    "OFMarker": "No",
    "TargetAlias": "LIO Target"
  },
  "portals": [
    {
      "ip_address": "10.110.88.59",
      "iser": false,
      "port": 3260
    }
  ],
```

```
            "tag": 1
          }
        ],
        "wwn": "iqn.2016-09.com.example:iscsitgt01-0001"
      },
      {
        "fabric": "iscsi",
        "tpgs": [
          {
            "attributes": {
              "authentication": 0,
              "cache_dynamic_acls": 0,
              "default_cmdsn_depth": 128,
              "default_erl": 0,
              "demo_mode_discovery": 1,
              "demo_mode_write_protect": 1,
              "fabric_prot_type": 0,
              "generate_node_acls": 0,
              "login_timeout": 15,
              "netif_timeout": 2,
              "prod_mode_write_protect": 0,
              "t10_pi": 0
            },
            "enable": true,
            "luns": [
              {
                "index": 0,
                "storage_object": "/backstores/block/lun0000"
              }
            ],
            "node_acls": [
              {
                "attributes": {
                  "dataout_timeout": 3,
                  "dataout_timeout_retries": 5,
                  "default_erl": 0,
                  "nopin_response_timeout": 30,
                  "nopin_timeout": 15,
                  "random_datain_pdu_offsets": 0,
                  "random_datain_seq_offsets": 0,
                  "random_r2t_offsets": 0
```

```
      },
      "chap_password": "password-user04",
      "chap_userid": "iscsiuser04",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator04"
    },
    {
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
        "random_datain_pdu_offsets": 0,
        "random_datain_seq_offsets": 0,
        "random_r2t_offsets": 0
      },
      "chap_password": "password-user03",
      "chap_userid": "iscsiuser03",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator03"
    },
    {
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
```

```
            "random_datain_pdu_offsets": 0,
            "random_datain_seq_offsets": 0,
            "random_r2t_offsets": 0
          },
          "chap_password": "password-user02",
          "chap_userid": "iscsiuser02",
          "mapped_luns": [
            {
              "index": 0,
              "tpg_lun": 0,
              "write_protect": false
            }
          ],
          "node_wwn": "iqn.2016-09.com.example:initiator02"
        },
        {
          "attributes": {
            "dataout_timeout": 3,
            "dataout_timeout_retries": 5,
            "default_erl": 0,
            "nopin_response_timeout": 30,
            "nopin_timeout": 15,
            "random_datain_pdu_offsets": 0,
            "random_datain_seq_offsets": 0,
            "random_r2t_offsets": 0
          },
          "chap_password": "password-user01",
          "chap_userid": "iscsiuser01",
          "mapped_luns": [
            {
              "index": 0,
              "tpg_lun": 0,
              "write_protect": false
            }
          ],
          "node_wwn": "iqn.2016-09.com.example:initiator01"
        }
      ],
      "parameters": {
        "AuthMethod": "CHAP,None",
        "DataDigest": "CRC32C,None",
```

```
                "DataPDUInOrder": "Yes",
                "DataSequenceInOrder": "Yes",
                "DefaultTime2Retain": "20",
                "DefaultTime2Wait": "2",
                "ErrorRecoveryLevel": "0",
                "FirstBurstLength": "65536",
                "HeaderDigest": "CRC32C,None",
                "IFMarkInt": "2048~65535",
                "IFMarker": "No",
                "ImmediateData": "Yes",
                "InitialR2T": "Yes",
                "MaxBurstLength": "262144",
                "MaxConnections": "1",
                "MaxOutstandingR2T": "1",
                "MaxRecvDataSegmentLength": "8192",
                "MaxXmitDataSegmentLength": "262144",
                "OFMarkInt": "2048~65535",
                "OFMarker": "No",
                "TargetAlias": "LIO Target"
              },
              "portals": [
                {
                  "ip_address": "10.110.88.59",
                  "iser": false,
                  "port": 3260
                }
              ],
              "tag": 1
            }
          ],
          "wwn": "iqn.2016-09.com.example:iscsitgt01-0000"
        }
      ]
    }
    {
      "fabric_modules": [],
      "storage_objects": [
        {
          "attributes": {
            "block_size": 512,
            "emulate_3pc": 1,
```

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35570             "emulate_caw": 1,
35580             "emulate_dpo": 0,
35590             "emulate_fua_read": 0,
35600             "emulate_fua_write": 1,
35610             "emulate_model_alias": 1,
35620             "emulate_rest_reord": 0,
35630             "emulate_tas": 1,
35640             "emulate_tpu": 0,
35650             "emulate_tpws": 0,
35660             "emulate_ua_intlck_ctrl": 0,
35670             "emulate_write_cache": 0,
35680             "enforce_pr_isids": 1,
35690             "force_pr_aptpl": 0,
35700             "is_nonrot": 0,
35710             "max_unmap_block_desc_count": 1,
35720             "max_unmap_lba_count": 8192,
35730             "max_write_same_len": 65535,
35740             "optimal_sectors": 2048,
35750             "pi_prot_format": 0,
35760             "pi_prot_type": 0,
35770             "queue_depth": 128,
35780             "unmap_granularity": 2048,
35790             "unmap_granularity_alignment": 0
35800           },
35810           "dev": "/dev/vg1/lv-lun0003",
35820           "name": "lun0003",
35830           "plugin": "block",
35840           "readonly": false,
35850           "write_back": false,
35860           "wwn": "1ade2d3a-db39-4880-8e80-59d51ca87c60"
35870         },
35880         {
35890           "attributes": {
35900             "block_size": 512,
35910             "emulate_3pc": 1,
35920             "emulate_caw": 1,
35930             "emulate_dpo": 0,
35940             "emulate_fua_read": 0,
35950             "emulate_fua_write": 1,
35960             "emulate_model_alias": 1,
35970             "emulate_rest_reord": 0,
```

```
            "emulate_tas": 1,
            "emulate_tpu": 0,
            "emulate_tpws": 0,
            "emulate_ua_intlck_ctrl": 0,
            "emulate_write_cache": 0,
            "enforce_pr_isids": 1,
            "force_pr_aptpl": 0,
            "is_nonrot": 0,
            "max_unmap_block_desc_count": 1,
            "max_unmap_lba_count": 8192,
            "max_write_same_len": 65535,
            "optimal_sectors": 2048,
            "pi_prot_format": 0,
            "pi_prot_type": 0,
            "queue_depth": 128,
            "unmap_granularity": 2048,
            "unmap_granularity_alignment": 0
          },
          "dev": "/dev/vg1/lv-lun0002",
          "name": "lun0002",
          "plugin": "block",
          "readonly": false,
          "write_back": false,
          "wwn": "50907dc1-06ff-4e27-877a-b68ffe949fd7"
        },
        {
          "attributes": {
            "block_size": 512,
            "emulate_3pc": 1,
            "emulate_caw": 1,
            "emulate_dpo": 0,
            "emulate_fua_read": 0,
            "emulate_fua_write": 1,
            "emulate_model_alias": 1,
            "emulate_rest_reord": 0,
            "emulate_tas": 1,
            "emulate_tpu": 0,
            "emulate_tpws": 0,
            "emulate_ua_intlck_ctrl": 0,
            "emulate_write_cache": 0,
            "enforce_pr_isids": 1,
```

```
      "force_pr_aptpl": 0,
      "is_nonrot": 0,
      "max_unmap_block_desc_count": 1,
      "max_unmap_lba_count": 8192,
      "max_write_same_len": 65535,
      "optimal_sectors": 2048,
      "pi_prot_format": 0,
      "pi_prot_type": 0,
      "queue_depth": 128,
      "unmap_granularity": 2048,
      "unmap_granularity_alignment": 0
    },
    "dev": "/dev/vg1/lv-lun0001",
    "name": "lun0001",
    "plugin": "block",
    "readonly": false,
    "write_back": false,
    "wwn": "9a5889d7-4176-4e58-874e-46a15f47dc58"
  },
  {
    "attributes": {
      "block_size": 512,
      "emulate_3pc": 1,
      "emulate_caw": 1,
      "emulate_dpo": 0,
      "emulate_fua_read": 0,
      "emulate_fua_write": 1,
      "emulate_model_alias": 1,
      "emulate_rest_reord": 0,
      "emulate_tas": 1,
      "emulate_tpu": 0,
      "emulate_tpws": 0,
      "emulate_ua_intlck_ctrl": 0,
      "emulate_write_cache": 0,
      "enforce_pr_isids": 1,
      "force_pr_aptpl": 0,
      "is_nonrot": 0,
      "max_unmap_block_desc_count": 1,
      "max_unmap_lba_count": 8192,
      "max_write_same_len": 65535,
      "optimal_sectors": 2048,
```

```
            "pi_prot_format": 0,
            "pi_prot_type": 0,
            "queue_depth": 128,
            "unmap_granularity": 2048,
            "unmap_granularity_alignment": 0
          },
          "dev": "/dev/vg1/lv-lun0000",
          "name": "lun0000",
          "plugin": "block",
          "readonly": false,
          "write_back": false,
          "wwn": "b77302c8-9db8-4889-8353-b0493cababe5"
        }
      ],
      "targets": [
        {
          "fabric": "iscsi",
          "tpgs": [
            {
              "attributes": {
                "authentication": 0,
                "cache_dynamic_acls": 0,
                "default_cmdsn_depth": 128,
                "default_erl": 0,
                "demo_mode_discovery": 1,
                "demo_mode_write_protect": 1,
                "fabric_prot_type": 0,
                "generate_node_acls": 0,
                "login_timeout": 15,
                "netif_timeout": 2,
                "prod_mode_write_protect": 0,
                "t10_pi": 0
              },
              "enable": true,
              "luns": [
                {
                  "index": 0,
                  "storage_object": "/backstores/block/lun0003"
                }
              ],
              "node_acls": [
```

```
        {
          "attributes": {
            "dataout_timeout": 3,
            "dataout_timeout_retries": 5,
            "default_erl": 0,
            "nopin_response_timeout": 30,
            "nopin_timeout": 15,
            "random_datain_pdu_offsets": 0,
            "random_datain_seq_offsets": 0,
            "random_r2t_offsets": 0
          },
          "chap_password": "password-user04",
          "chap_userid": "iscsiuser04",
          "mapped_luns": [
            {
              "index": 0,
              "tpg_lun": 0,
              "write_protect": false
            }
          ],
          "node_wwn": "iqn.2016-09.com.example:initiator04"
        },
        {
          "attributes": {
            "dataout_timeout": 3,
            "dataout_timeout_retries": 5,
            "default_erl": 0,
            "nopin_response_timeout": 30,
            "nopin_timeout": 15,
            "random_datain_pdu_offsets": 0,
            "random_datain_seq_offsets": 0,
            "random_r2t_offsets": 0
          },
          "mapped_luns": [
            {
              "index": 0,
              "tpg_lun": 0,
              "write_protect": false
            }
          ],
          "node_wwn": "iqn.2016-09.com.example:initiator03"
```

```
37620                 },
37630                 {
37640                   "attributes": {
37650                     "dataout_timeout": 3,
37660                     "dataout_timeout_retries": 5,
37670                     "default_erl": 0,
37680                     "nopin_response_timeout": 30,
37690                     "nopin_timeout": 15,
37700                     "random_datain_pdu_offsets": 0,
37710                     "random_datain_seq_offsets": 0,
37720                     "random_r2t_offsets": 0
37730                   },
37740                   "chap_password": "password-user02",
37750                   "chap_userid": "iscsiuser02",
37760                   "mapped_luns": [
37770                     {
37780                       "index": 0,
37790                       "tpg_lun": 0,
37800                       "write_protect": false
37810                     }
37820                   ],
37830                   "node_wwn": "iqn.2016-09.com.example:initiator02"
37840                 },
37850                 {
37860                   "attributes": {
37870                     "dataout_timeout": 3,
37880                     "dataout_timeout_retries": 5,
37890                     "default_erl": 0,
37900                     "nopin_response_timeout": 30,
37910                     "nopin_timeout": 15,
37920                     "random_datain_pdu_offsets": 0,
37930                     "random_datain_seq_offsets": 0,
37940                     "random_r2t_offsets": 0
37950                   },
37960                   "chap_password": "password-user01",
37970                   "chap_userid": "iscsiuser01",
37980                   "mapped_luns": [
37990                     {
38000                       "index": 0,
38010                       "tpg_lun": 0,
38020                       "write_protect": false
```

```
                    }
                  ],
                  "node_wwn": "iqn.2016-09.com.example:initiator01"
                }
              ],
              "parameters": {
                "AuthMethod": "CHAP,None",
                "DataDigest": "CRC32C,None",
                "DataPDUInOrder": "Yes",
                "DataSequenceInOrder": "Yes",
                "DefaultTime2Retain": "20",
                "DefaultTime2Wait": "2",
                "ErrorRecoveryLevel": "0",
                "FirstBurstLength": "65536",
                "HeaderDigest": "CRC32C,None",
                "IFMarkInt": "2048~65535",
                "IFMarker": "No",
                "ImmediateData": "Yes",
                "InitialR2T": "Yes",
                "MaxBurstLength": "262144",
                "MaxConnections": "1",
                "MaxOutstandingR2T": "1",
                "MaxRecvDataSegmentLength": "8192",
                "MaxXmitDataSegmentLength": "262144",
                "OFMarkInt": "2048~65535",
                "OFMarker": "No",
                "TargetAlias": "LIO Target"
              },
              "portals": [
                {
                  "ip_address": "10.110.88.59",
                  "iser": false,
                  "port": 3260
                }
              ],
              "tag": 1
            }
          ],
          "wwn": "iqn.2016-09.com.example:iscsitgt01-0003"
        },
        {
```

```
      "fabric": "iscsi",
      "tpgs": [
        {
          "attributes": {
            "authentication": 0,
            "cache_dynamic_acls": 0,
            "default_cmdsn_depth": 128,
            "default_erl": 0,
            "demo_mode_discovery": 1,
            "demo_mode_write_protect": 1,
            "fabric_prot_type": 0,
            "generate_node_acls": 0,
            "login_timeout": 15,
            "netif_timeout": 2,
            "prod_mode_write_protect": 0,
            "t10_pi": 0
          },
          "enable": true,
          "luns": [
            {
              "index": 0,
              "storage_object": "/backstores/block/lun0002"
            }
          ],
          "node_acls": [
            {
              "attributes": {
                "dataout_timeout": 3,
                "dataout_timeout_retries": 5,
                "default_erl": 0,
                "nopin_response_timeout": 30,
                "nopin_timeout": 15,
                "random_datain_pdu_offsets": 0,
                "random_datain_seq_offsets": 0,
                "random_r2t_offsets": 0
              },
              "chap_password": "password-user04",
              "chap_userid": "iscsiuser04",
              "mapped_luns": [
                {
                  "index": 0,
```

```
                    "tpg_lun": 0,
                    "write_protect": false
                  }
                ],
                "node_wwn": "iqn.2016-09.com.example:initiator04"
              },
              {
                "attributes": {
                  "dataout_timeout": 3,
                  "dataout_timeout_retries": 5,
                  "default_erl": 0,
                  "nopin_response_timeout": 30,
                  "nopin_timeout": 15,
                  "random_datain_pdu_offsets": 0,
                  "random_datain_seq_offsets": 0,
                  "random_r2t_offsets": 0
                },
                "mapped_luns": [
                  {
                    "index": 0,
                    "tpg_lun": 0,
                    "write_protect": false
                  }
                ],
                "node_wwn": "iqn.2016-09.com.example:initiator03"
              },
              {
                "attributes": {
                  "dataout_timeout": 3,
                  "dataout_timeout_retries": 5,
                  "default_erl": 0,
                  "nopin_response_timeout": 30,
                  "nopin_timeout": 15,
                  "random_datain_pdu_offsets": 0,
                  "random_datain_seq_offsets": 0,
                  "random_r2t_offsets": 0
                },
                "chap_password": "password-user02",
                "chap_userid": "iscsiuser02",
                "mapped_luns": [
                  {
```

```
                    "index": 0,
                    "tpg_lun": 0,
                    "write_protect": false
                  }
                ],
                "node_wwn": "iqn.2016-09.com.example:initiator02"
              },
              {
                "attributes": {
                  "dataout_timeout": 3,
                  "dataout_timeout_retries": 5,
                  "default_erl": 0,
                  "nopin_response_timeout": 30,
                  "nopin_timeout": 15,
                  "random_datain_pdu_offsets": 0,
                  "random_datain_seq_offsets": 0,
                  "random_r2t_offsets": 0
                },
                "chap_password": "password-user01",
                "chap_userid": "iscsiuser01",
                "mapped_luns": [
                  {
                    "index": 0,
                    "tpg_lun": 0,
                    "write_protect": false
                  }
                ],
                "node_wwn": "iqn.2016-09.com.example:initiator01"
              }
            ],
            "parameters": {
              "AuthMethod": "CHAP,None",
              "DataDigest": "CRC32C,None",
              "DataPDUInOrder": "Yes",
              "DataSequenceInOrder": "Yes",
              "DefaultTime2Retain": "20",
              "DefaultTime2Wait": "2",
              "ErrorRecoveryLevel": "0",
              "FirstBurstLength": "65536",
              "HeaderDigest": "CRC32C,None",
              "IFMarkInt": "2048~65535",
```

```
                "IFMarker": "No",
                "ImmediateData": "Yes",
                "InitialR2T": "Yes",
                "MaxBurstLength": "262144",
                "MaxConnections": "1",
                "MaxOutstandingR2T": "1",
                "MaxRecvDataSegmentLength": "8192",
                "MaxXmitDataSegmentLength": "262144",
                "OFMarkInt": "2048~65535",
                "OFMarker": "No",
                "TargetAlias": "LIO Target"
              },
              "portals": [
                {
                  "ip_address": "10.110.88.59",
                  "iser": false,
                  "port": 3260
                }
              ],
              "tag": 1
            }
          ],
          "wwn": "iqn.2016-09.com.example:iscsitgt01-0002"
        },
        {
          "fabric": "iscsi",
          "tpgs": [
            {
              "attributes": {
                "authentication": 0,
                "cache_dynamic_acls": 0,
                "default_cmdsn_depth": 128,
                "default_erl": 0,
                "demo_mode_discovery": 1,
                "demo_mode_write_protect": 1,
                "fabric_prot_type": 0,
                "generate_node_acls": 0,
                "login_timeout": 15,
                "netif_timeout": 2,
                "prod_mode_write_protect": 0,
                "t10_pi": 0
```

```
        },
        "enable": true,
        "luns": [
          {
            "index": 0,
            "storage_object": "/backstores/block/lun0001"
          }
        ],
        "node_acls": [
          {
            "attributes": {
              "dataout_timeout": 3,
              "dataout_timeout_retries": 5,
              "default_erl": 0,
              "nopin_response_timeout": 30,
              "nopin_timeout": 15,
              "random_datain_pdu_offsets": 0,
              "random_datain_seq_offsets": 0,
              "random_r2t_offsets": 0
            },
            "chap_password": "password-user04",
            "chap_userid": "iscsiuser04",
            "mapped_luns": [
              {
                "index": 0,
                "tpg_lun": 0,
                "write_protect": false
              }
            ],
            "node_wwn": "iqn.2016-09.com.example:initiator04"
          },
          {
            "attributes": {
              "dataout_timeout": 3,
              "dataout_timeout_retries": 5,
              "default_erl": 0,
              "nopin_response_timeout": 30,
              "nopin_timeout": 15,
              "random_datain_pdu_offsets": 0,
              "random_datain_seq_offsets": 0,
              "random_r2t_offsets": 0
```

```
      },
      "chap_password": "password-user03",
      "chap_userid": "iscsiuser03",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator03"
    },
    {
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
        "random_datain_pdu_offsets": 0,
        "random_datain_seq_offsets": 0,
        "random_r2t_offsets": 0
      },
      "chap_password": "password-user02",
      "chap_userid": "iscsiuser02",
      "mapped_luns": [
        {
          "index": 0,
          "tpg_lun": 0,
          "write_protect": false
        }
      ],
      "node_wwn": "iqn.2016-09.com.example:initiator02"
    },
    {
      "attributes": {
        "dataout_timeout": 3,
        "dataout_timeout_retries": 5,
        "default_erl": 0,
        "nopin_response_timeout": 30,
        "nopin_timeout": 15,
```

```
                "random_datain_pdu_offsets": 0,
                "random_datain_seq_offsets": 0,
                "random_r2t_offsets": 0
              },
              "chap_password": "password-user01",
              "chap_userid": "iscsiuser01",
              "mapped_luns": [
                {
                  "index": 0,
                  "tpg_lun": 0,
                  "write_protect": false
                }
              ],
              "node_wwn": "iqn.2016-09.com.example:initiator01"
            }
          ],
          "parameters": {
            "AuthMethod": "CHAP,None",
            "DataDigest": "CRC32C,None",
            "DataPDUInOrder": "Yes",
            "DataSequenceInOrder": "Yes",
            "DefaultTime2Retain": "20",
            "DefaultTime2Wait": "2",
            "ErrorRecoveryLevel": "0",
            "FirstBurstLength": "65536",
            "HeaderDigest": "CRC32C,None",
            "IFMarkInt": "2048~65535",
            "IFMarker": "No",
            "ImmediateData": "Yes",
            "InitialR2T": "Yes",
            "MaxBurstLength": "262144",
            "MaxConnections": "1",
            "MaxOutstandingR2T": "1",
            "MaxRecvDataSegmentLength": "8192",
            "MaxXmitDataSegmentLength": "262144",
            "OFMarkInt": "2048~65535",
            "OFMarker": "No",
            "TargetAlias": "LIO Target"
          },
          "portals": [
            {
```

```
                    "ip_address": "10.110.88.59",
                    "iser": false,
                    "port": 3260
                  }
                ],
                "tag": 1
              }
            ],
            "wwn": "iqn.2016-09.com.example:iscsitgt01-0001"
          },
          {
            "fabric": "iscsi",
            "tpgs": [
              {
                "attributes": {
                  "authentication": 0,
                  "cache_dynamic_acls": 0,
                  "default_cmdsn_depth": 128,
                  "default_erl": 0,
                  "demo_mode_discovery": 1,
                  "demo_mode_write_protect": 1,
                  "fabric_prot_type": 0,
                  "generate_node_acls": 0,
                  "login_timeout": 15,
                  "netif_timeout": 2,
                  "prod_mode_write_protect": 0,
                  "t10_pi": 0
                },
                "enable": true,
                "luns": [
                  {
                    "index": 0,
                    "storage_object": "/backstores/block/lun0000"
                  }
                ],
                "node_acls": [
                  {
                    "attributes": {
                      "dataout_timeout": 3,
                      "dataout_timeout_retries": 5,
                      "default_erl": 0,
```

```
41720                     "nopin_response_timeout": 30,
41730                     "nopin_timeout": 15,
41740                     "random_datain_pdu_offsets": 0,
41750                     "random_datain_seq_offsets": 0,
41760                     "random_r2t_offsets": 0
41770                   },
41780                   "chap_password": "password-user04",
41790                   "chap_userid": "iscsiuser04",
41800                   "mapped_luns": [
41810                     {
41820                       "index": 0,
41830                       "tpg_lun": 0,
41840                       "write_protect": false
41850                     }
41860                   ],
41870                   "node_wwn": "iqn.2016-09.com.example:initiator04"
41880                 },
41890                 {
41900                   "attributes": {
41910                     "dataout_timeout": 3,
41920                     "dataout_timeout_retries": 5,
41930                     "default_erl": 0,
41940                     "nopin_response_timeout": 30,
41950                     "nopin_timeout": 15,
41960                     "random_datain_pdu_offsets": 0,
41970                     "random_datain_seq_offsets": 0,
41980                     "random_r2t_offsets": 0
41990                   },
42000                   "chap_password": "password-user03",
42010                   "chap_userid": "iscsiuser03",
42020                   "mapped_luns": [
42030                     {
42040                       "index": 0,
42050                       "tpg_lun": 0,
42060                       "write_protect": false
42070                     }
42080                   ],
42090                   "node_wwn": "iqn.2016-09.com.example:initiator03"
42100                 },
42110                 {
42120                   "attributes": {
```

```
                "dataout_timeout": 3,
                "dataout_timeout_retries": 5,
                "default_erl": 0,
                "nopin_response_timeout": 30,
                "nopin_timeout": 15,
                "random_datain_pdu_offsets": 0,
                "random_datain_seq_offsets": 0,
                "random_r2t_offsets": 0
              },
              "chap_password": "password-user02",
              "chap_userid": "iscsiuser02",
              "mapped_luns": [
                {
                  "index": 0,
                  "tpg_lun": 0,
                  "write_protect": false
                }
              ],
              "node_wwn": "iqn.2016-09.com.example:initiator02"
            },
            {
              "attributes": {
                "dataout_timeout": 3,
                "dataout_timeout_retries": 5,
                "default_erl": 0,
                "nopin_response_timeout": 30,
                "nopin_timeout": 15,
                "random_datain_pdu_offsets": 0,
                "random_datain_seq_offsets": 0,
                "random_r2t_offsets": 0
              },
              "chap_password": "password-user01",
              "chap_userid": "iscsiuser01",
              "mapped_luns": [
                {
                  "index": 0,
                  "tpg_lun": 0,
                  "write_protect": false
                }
              ],
              "node_wwn": "iqn.2016-09.com.example:initiator01"
```

```
                }
              ],
              "parameters": {
                "AuthMethod": "CHAP,None",
                "DataDigest": "CRC32C,None",
                "DataPDUInOrder": "Yes",
                "DataSequenceInOrder": "Yes",
                "DefaultTime2Retain": "20",
                "DefaultTime2Wait": "2",
                "ErrorRecoveryLevel": "0",
                "FirstBurstLength": "65536",
                "HeaderDigest": "CRC32C,None",
                "IFMarkInt": "2048~65535",
                "IFMarker": "No",
                "ImmediateData": "Yes",
                "InitialR2T": "Yes",
                "MaxBurstLength": "262144",
                "MaxConnections": "1",
                "MaxOutstandingR2T": "1",
                "MaxRecvDataSegmentLength": "8192",
                "MaxXmitDataSegmentLength": "262144",
                "OFMarkInt": "2048~65535",
                "OFMarker": "No",
                "TargetAlias": "LIO Target"
              },
              "portals": [
                {
                  "ip_address": "10.110.88.59",
                  "iser": false,
                  "port": 3260
                }
              ],
              "tag": 1
            }
          ],
          "wwn": "iqn.2016-09.com.example:iscsitgt01-0000"
        }
      ]
    }
```

○　Active 機で、LIO の設定をクリアします。

```
42950
42960  a  sudo targetctl clear
42970
42980  a  sudo targetcli ls /
42990     o- / ......................................................................... [...]
43000       o- backstores .............................................................. [...]
43010       | o- block .................................................. [Storage Objects: 0]
43020       | o- fileio ................................................. [Storage Objects: 0]
43030       | o- pscsi .................................................. [Storage Objects: 0]
43040       | o- ramdisk ................................................ [Storage Objects: 0]
43050       o- iscsi ................................................................ [Targets: 0]
43060       o- loopback ............................................................. [Targets: 0]
43070
43080  ○  Active 機で、DRBD 上の LVM ボリュームグループを非活性化します。
43090
43100  a  sudo vgchange -a n vg1
43110       0 logical volume(s) in volume group "vg1" now active
43120
43130  a  sudo lvs
43140       LV       VG   Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
43150       lv-drbd0 vg0  -wi-ao---- 359.98g
43160       lv-lun0  vg1  -wi------- 323.97g
43170       lv-lun1  vg1  -wi-------   7.20g
43180       lv-lun2  vg1  -wi-------   7.20g
43190       lv-lun3  vg1  -wi-------   7.20g
43200
43210  ○  Active 機で、DRBD リソースを secondary 化 (デモート) します。
43220
43230  a  sudo drbdadm secondary all
43240
43250  ○  Stand-by 機で、DRBD の状態を確認し、「Ctrl + C」を押下してワッチを停止します。
43260
43270     Every 2.0s: cat /proc/drbd                                  Fri Nov 25 22:23:08 2016
43280
43290     version: 8.4.5 (api:1/proto:86-101)
43300     srcversion: 1AEFF755B8BD61B81A0AF27
43310  s   0: cs:Connected ro:Secondary/Secondary ds:UpToDate/UpToDate C r-----
43320         ns:0 nr:228 dw:228 dr:377459420 al:0 bm:0 lo:0 pe:0 ua:0 ap:0 ep:1 wo:f oos:0
43330
43340  ○  Active 機と Stand-by 機で、drbd.service を停止します。
43350
```

```
43360 a,s    sudo systemctl stop drbd.service
43370
43380 a,s    cat /proc/drbd
43390        cat: /proc/drbd: No such file or directory
43400
43410   ○    Active 機で、Corosync の認証を設定し、起動します。
43420
43430    a   sudo pcs cluster auth iscsitgt01a.example.com iscsitgt01s.example.com 10.110.88.57 10.110.88.58 ¥
43440    a    192.168.1.2 192.168.1.3 -u hacluster -p 'password' --force
43450        iscsitgt01s.example.com: Authorized
43460        iscsitgt01a.example.com: Authorized
43470        10.110.88.58: Authorized
43480        192.168.1.2: Authorized
43490        192.168.1.3: Authorized
43500        10.110.88.57: Authorized
43510
43520    a   sudo cat /var/lib/pcsd/tokens
43530        {
43540          "format_version": 2,
43550          "data_version": 4,
43560          "tokens": {
43570            "10.110.88.57": "77189e9e-3be0-40ce-b81e-3e5e6525e885",
43580            "10.110.88.58": "9e3f4ae9-b15e-49c9-b6ee-eb8c1b91783a",
43590            "192.168.1.2": "53da862f-ad22-445b-8887-add50d385736",
43600            "192.168.1.3": "4f78d9c6-34a4-4486-8ba1-e69f0d4e1257",
43610            "iscsitgt01a.example.com": "002cd1c0-2ab2-4a4c-a1a7-4bf14b61b822",
43620            "iscsitgt01s.example.com": "1a9981a9-04e6-461b-b904-c5df8b4c9815"
43630          }
43640        }
43650
43660    a   sudo pcs cluster setup --name iscsitgt01 10.110.88.57,192.168.1.2 10.110.88.58,192.168.1.3 ¥
43670    a    --transport=udp --rrpmode=passive -u hacluster -p 'password' --force
43680        Shutting down pacemaker/corosync services...
43690        Redirecting to /bin/systemctl stop  pacemaker.service
43700        Redirecting to /bin/systemctl stop  corosync.service
43710        Killing any remaining services...
43720        Removing all cluster configuration files...
43730        10.110.88.57: Succeeded
43740        10.110.88.58: Succeeded
43750        Synchronizing pcsd certificates on nodes 10.110.88.57, 10.110.88.58...
43760        10.110.88.57: Success
```

```
43770       10.110.88.58: Success
43780
43790       Restaring pcsd on the nodes in order to reload the certificates...
43800       10.110.88.57: Success
43810       10.110.88.58: Success
43820
43830   a   cat /etc/corosync/corosync.conf
43840       totem {
43850           version: 2
43860           secauth: off
43870           cluster_name: iscsitgt01
43880           transport: udp
43890           rrp_mode: passive
43900       }
43910
43920       nodelist {
43930           node {
43940               ring0_addr: 10.110.88.57
43950               ring1_addr: 192.168.1.2
43960               nodeid: 1
43970           }
43980
43990           node {
44000               ring0_addr: 10.110.88.58
44010               ring1_addr: 192.168.1.3
44020               nodeid: 2
44030           }
44040       }
44050
44060       quorum {
44070           provider: corosync_votequorum
44080           two_node: 1
44090       }
44100
44110       logging {
44120           to_logfile: yes
44130           logfile: /var/log/cluster/corosync.log
44140           to_syslog: yes
44150       }
44160
44170   a   sudo pcs cluster start --all
```

```
44180       10.110.88.57: Starting Cluster...
44190       10.110.88.58: Starting Cluster...
44200
44210   a   sudo pcs status corosync
44220       Membership information
44230       ----------------------
44240           Nodeid      Votes Name
44250                1          1 10.110.88.57 (local)
44260                2          1 10.110.88.58
44270
44280   a   sudo pcs status
44290       Cluster name: iscsitgt01
44300       WARNING: no stonith devices and stonith-enabled is not false
44310       WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
44320       Stack: corosync
44330       Current DC: iscsitgt01a.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
44340       Last updated: Fri Nov 25 22:26:31 2016          Last change: Fri Nov 25 22:26:26 2016 by hacluster via crmd on  iscsitgt01a.example.com
44350
44360       2 nodes and 0 resources configured
44370
44380       Online: [ iscsitgt01a.example.com  iscsitgt01s.example.com ]
44390
44400       No resources
44410
44420       Daemon Status:
44430         corosync: active/disabled
44440         pacemaker: active/disabled
44450         pcsd: active/enabled
44460
44470           ※  「Current DC」が表示されるまで、何回か実行します。20秒以上かかるものと思われます。
44480           ※  「Current DC」については、どちらが選ばれていてもあまり意味のある情報ではないので気にしないでください。
44490           ※  「WARNING」について、前者は後で対応します。後者は pcs のバグ（RRP mode 未対応）なので無視してください。
44500
44510   ○   Active 機と Stand-by 機で、Corosync の状態とプロセスを確認します。
44520
44530   a   sudo corosync-cfgtool -s
44540       Printing ring status.
44550       Local node ID 1
44560       RING ID 0
44570               id      = 10.110.88.57
44580               status  = ring 0 active with no faults
```

```
44590       RING ID 1
44600               id      = 192.168.1.2
44610               status  = ring 1 active with no faults
44620
44630    s  sudo corosync-cfgtool -s
44640       Printing ring status.
44650       Local node ID 2
44660       RING ID 0
44670               id      = 10.110.88.58
44680               status  = ring 0 active with no faults
44690       RING ID 1
44700               id      = 192.168.1.3
44710               status  = ring 1 active with no faults
44720
44730 a,s   ps -ef | egrep '[c]orosync|[p]acemaker'
44740       root      27483      1  0 22:26 ?        00:00:02 corosync
44750       root      27499      1  0 22:26 ?        00:00:00 /usr/sbin/pacemakerd -f
44760       haclust+  27500  27499  0 22:26 ?        00:00:00 /usr/libexec/pacemaker/cib
44770       root      27501  27499  0 22:26 ?        00:00:00 /usr/libexec/pacemaker/stonithd
44780       root      27502  27499  0 22:26 ?        00:00:00 /usr/libexec/pacemaker/lrmd
44790       haclust+  27503  27499  0 22:26 ?        00:00:00 /usr/libexec/pacemaker/attrd
44800       haclust+  27504  27499  0 22:26 ?        00:00:00 /usr/libexec/pacemaker/pengine
44810       haclust+  27505  27499  0 22:26 ?        00:00:00 /usr/libexec/pacemaker/crmd
44820
44830  ○    Active 機で、クラスタにリソースを登録します。
44840
44850    a  sudo /etc/ha.d/crm.sh
44860       Adding ms_drbd_r0 p_lvm (kind: Mandatory) (Options: first-action=promote then-action=start)
44870
44880  ○    Active 機で、状態を確認します。
44890
44900    a  sudo pcs status
44910       Cluster name: iscsitgt01
44920       WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
44930       Stack: corosync
44940       Current DC: iscsitgt01a.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
44950       Last updated: Fri Nov 25 22:31:49 2016          Last change: Fri Nov 25 22:31:30 2016 by root via cibadmin on iscsitgt01s.example.com
44960
44970       2 nodes and 5 resources configured
44980
44990       Online: [ iscsitgt01a.example.com iscsitgt01s.example.com ]
```

```
45000
45010       Full list of resources:
45020
45030        Master/Slave Set: ms_drbd_r0 [p_drbd_r0]
45040            p_drbd_r0  (ocf::linbit:drbd):     FAILED iscsitgt01a.example.com (unmanaged)
45050            p_drbd_r0  (ocf::linbit:drbd):     FAILED iscsitgt01s.example.com (unmanaged)
45060        Resource Group: g_tgt
45070            p_lvm      (ocf::heartbeat:LVM):   Stopped
45080            p_lio      (ocf::heartbeat:LIO):   Stopped
45090            p_vip      (ocf::heartbeat:VIP):   Stopped
45100
45110       Failed Actions:
45120       * p_drbd_r0_stop_0 on iscsitgt01a.example.com 'not configured' (6): call=6, status=complete, exitreason='none',
45130           last-rc-change='Sat Oct 29 18:33:24 2016', queued=0ms, exec=24ms
45140       * p_lvm_start_0 on iscsitgt01a.example.com 'unknown error' (1): call=11, status=complete, exitreason='Volume group
45150        [vg1] does not exist or contains error!   Volume group " vg1" not found',
45160           last-rc-change='Sat Oct 29 18:33:24 2016', queued=0ms, exec=101ms
45170       * p_drbd_r0_stop_0 on iscsitgt01s.example.com 'not configured' (6): call=6, status=complete, exitreason='none',
45180           last-rc-change='Sat Oct 29 18:33:24 2016', queued=0ms, exec=23ms
45190       * p_lvm_start_0 on iscsitgt01s.example.com 'unknown error' (1): call=15, status=complete, exitreason='Volume group
45200        [vg1] does not exist or contains error!   Volume group " vg1" not found',
45210           last-rc-change='Tue Oct 29 18:33:24 2016', queued=0ms, exec=190ms
45220
45230       Daemon Status:
45240         corosync: active/disabled
45250         pacemaker: active/disabled
45260         pcsd: active/enabled
45270
45280   ○   Active 機で、リソースのエラー情報をクリアします。
45290
45300    a  sudo pcs resource cleanup
45310       Waiting for 1 replies from the CRMd. OK
45320
45330   ○   Active 機で、状態を確認します。
45340
45350    a  sudo pcs status
45360       Cluster name: iscsitgt01
45370       WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
45380       Stack: corosync
45390       Current DC: iscsitgt01a.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
45400       Last updated: Fri Nov 25 22:35:07 2016          Last change: Fri Nov 25 22:31:30 2016 by hacluster via crmd on iscsitgt01s.example.com
```

```
45410
45420       2 nodes and 5 resources configured
45430
45440       Online: [ iscsitgt01a.example.com  iscsitgt01s.example.com ]
45450
45460       Full list of resources:
45470
45480        Master/Slave Set: ms_drbd_r0 [p_drbd_r0]
45490            Masters: [ iscsitgt01a.example.com ]
45500            Slaves: [ iscsitgt01s.example.com ]
45510        Resource Group: g_tgt
45520            p_lvm      (ocf::heartbeat:LVM):   Started iscsitgt01a.example.com
45530            p_lio      (ocf::heartbeat:LIO):   Started iscsitgt01a.example.com
45540            p_vip      (ocf::heartbeat:VIP):   Started iscsitgt01a.example.com
45550
45560       Daemon Status:
45570         corosync: active/disabled
45580         pacemaker: active/disabled
45590         pcsd: active/enabled
45600
45610   ○   Active 機と Stand-by 機で、設定情報を保存します。
45620
45630 a,s   sudo pcs config | sudo tee /etc/ha.d/crm.conf
45640       Cluster Name: iscsitgt01
45650       Corosync Nodes:
45660        10.110.88.57 10.110.88.58
45670       Pacemaker Nodes:
45680        iscsitgt01a.example.com  iscsitgt01s.example.com
45690
45700       Resources:
45710        Master: ms_drbd_r0
45720         Meta Attrs: master-node-max=1 clone-max=2 clone-node-max=1 master-max=1 notify=true target-role=Started is-managed=true
45730         Resource: p_drbd_r0 (class=ocf provider=linbit type=drbd)
45740          Attributes: drbd_resource=r0
45750          Operations: start interval=0s timeout=240 (p_drbd_r0-start-interval-0s)
45760                      monitor interval=10 role=Master timeout=20 (p_drbd_r0-monitor-interval-10)
45770                      monitor interval=20 role=Slave timeout=20 (p_drbd_r0-monitor-interval-20)
45780                      notify interval=0s timeout=90 (p_drbd_r0-notify-interval-0s)
45790                      stop interval=0s timeout=100 (p_drbd_r0-stop-interval-0s)
45800                      promote interval=0s timeout=90 (p_drbd_r0-promote-interval-0s)
45810                      demote interval=0s timeout=90 (p_drbd_r0-demote-interval-0s)
```

```
 Group: g_tgt
  Resource: p_lvm (class=ocf provider=heartbeat type=LVM)
   Attributes: volgrpname=vg1
   Operations: start interval=0s timeout=30 (p_lvm-start-interval-0s)
               monitor interval=5 timeout=10 (p_lvm-monitor-interval-5)
               stop interval=0s timeout=30 (p_lvm-stop-interval-0s)
  Resource: p_lio (class=ocf provider=heartbeat type=LIO)
   Operations: start interval=0s timeout=10 (p_lio-start-interval-0s)
               monitor interval=5 timeout=5 (p_lio-monitor-interval-5)
               stop interval=0s timeout=10 (p_lio-stop-interval-0s)
  Resource: p_vip (class=ocf provider=heartbeat type=VIP)
   Attributes: ip=10.110.88.59 cidr_netmask=26 nic=bond0 iflabel=1 arp_interval=200 arp_count=5
   Operations: start interval=0s timeout=20 (p_vip-start-interval-0s)
               monitor interval=5 timeout=10 (p_vip-monitor-interval-5)
               stop interval=0s timeout=20 (p_vip-stop-interval-0s)

Stonith Devices:
Fencing Levels:

Location Constraints:
  Resource: g_tgt
    Enabled on: iscsitgt01a.example.com (score:100) (id:lc_tgt)
Ordering Constraints:
  promote ms_drbd_r0 then start p_lvm (kind:Mandatory) (id:order-ms_drbd_r0-p_lvm-mandatory)
Colocation Constraints:
  g_tgt with ms_drbd_r0 (score:INFINITY) (with-rsc-role:Master) (id:colocation-g_tgt-ms_drbd_r0-INFINITY)
Ticket Constraints:

Alerts:
 No alerts defined

Resources Defaults:
 resource-stickiness: 200
 migration-threshold: 2
Operations Defaults:
 No defaults set

Cluster Properties:
 batch-limit: 30
 cluster-delay: 60
 cluster-infrastructure: corosync
```

```
46230         cluster-name: iscsitgt01
46240         cluster-recheck-interval: 15min
46250         crmd-finalization-timeout: 30min
46260         crmd-integration-timeout: 3min
46270         crmd-transition-delay: 0s
46280         dc-deadtime: 20s
46290         dc-version: 1.1.15-11.el7-e174ec8
46300         default-action-timeout: 20
46310         election-timeout: 2min
46320         enable-acl: true
46330         enable-startup-probes: true
46340         have-watchdog: false
46350         is-managed-default: true
46360         load-threshold: 80%
46370         maintenance-mode: false
46380         migration-limit: -1
46390         no-quorum-policy: ignore
46400         node-action-limit: 0
46410         node-health-green: 0
46420         node-health-red: -INFINITY
46430         node-health-strategy: none
46440         node-health-yellow: 0
46450         notification-agent: /dev/null
46460         pe-error-series-max: 100
46470         pe-input-series-max: 100
46480         pe-warn-series-max: 100
46490         placement-strategy: default
46500         remove-after-stop: false
46510         shutdown-escalation: 20min
46520         start-failure-is-fatal: true
46530         startup-fencing: true
46540         stonith-action: reboot
46550         stonith-enabled: false
46560         stonith-timeout: 60
46570         stop-all-resources: false
46580         stop-orphan-actions: true
46590         stop-orphan-resources: true
46600         symmetric-cluster: true
46610
46620       Quorum:
46630         Options:
```

```
46640
46650 a,s   sudo cp -a /etc{,~}/ha.d/crm.conf
46660
46670  ○    Active 機で、スイッチオーバ（手動フェイルオーバ）させます。
46680
46690   a   sudo pcs resource move g_tgt
46700       Warning: Creating location constraint cli-ban-g_tgt-on-iscsitgt01a.example.com with a score of -INFINITY for resource g_tgt on
46710        node iscsitgt01a.example.com.
46720       This will prevent g_tgt from running on iscsitgt01a.example.com until the constraint is removed. This will be the case even if
46730        iscsitgt01a.example.com is the last node in the cluster.
46740
46750  ○    Active 機で、状態を確認します。
46760
46770   a   sudo pcs status
46780       Cluster name: iscsitgt01
46790       WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
46800       Stack: corosync
46810       Current DC: iscsitgt01a.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
46820       Last updated: Fri Nov 25 22:45:12 2016          Last change: Fri Nov 25 22:44:04 2016 by root via crm_resource on iscsitgt01a.example.com
46830
46840       2 nodes and 5 resources configured
46850
46860       Online: [ iscsitgt01a.example.com iscsitgt01s.example.com ]
46870
46880       Full list of resources:
46890
46900        Master/Slave Set: ms_drbd_r0 [p_drbd_r0]
46910            Masters: [ iscsitgt01s.example.com ]
46920            Slaves: [ iscsitgt01a.example.com ]
46930        Resource Group: g_tgt
46940            p_lvm      (ocf::heartbeat:LVM):   Started iscsitgt01s.example.com
46950            p_lio      (ocf::heartbeat:LIO):   Started iscsitgt01s.example.com
46960            p_vip      (ocf::heartbeat:VIP):   Started  iscsitgt01s.example.com
46970
46980       Daemon Status:
46990         corosync: active/disabled
47000         pacemaker: active/disabled
47010         pcsd: active/enabled
47020
47030            ※  「p_vip」のノードが変わるまで、何回か実行します。
47040
```

○ Active 機で、設定変更を確認します。

a
```
diff <(grep -v last-lrm-refresh /etc/ha.d/crm.conf) <(sudo pcs config | grep -v last-lrm-refresh)
40a41
>     Disabled on: iscsitgt01a.example.com (score:-INFINITY) (role: Started) (id:cli-ban-g_tgt-on-iscsitgt01a.example.com)
```

○ Active 機で、設定変更を元に戻します。

a
```
sudo pcs resource clear g_tgt
```
a
```
diff <(grep -v last-lrm-refresh /etc/ha.d/crm.conf) <(sudo pcs config | grep -v last-lrm-refresh)
```

○ Active 機でリソースが起動した状態でない場合のみ、スイッチバック（フェイルバック）させます。

a
```
sudo pcs resource move g_tgt; sleep 5; sudo pcs resource clear g_tgt
Warning: Creating location constraint cli-ban-g_tgt-on-iscsitgt01s.example.com with a score of -INFINITY for resource g_tgt on
 node iscsitgt01s.example.com.
This will prevent g_tgt from running on iscsitgt01s.example.com until the constraint is removed. This will be the case even if
 iscsitgt01s.example.com is the last node in the cluster.
```

○ Active 機で、状態を確認します。

a
```
sudo pcs status
Cluster name: iscsitgt01
WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
Stack: corosync
Current DC: iscsitgt01a.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
Last updated: Fri Nov 25 22:48:03 2016          Last change: Fri Nov 25 22:47:34 2016 by root via crm_resource on iscsitgt01a.example.com

2 nodes and 5 resources configured

Online: [ iscsitgt01a.example.com iscsitgt01s.example.com ]

Full list of resources:

 Master/Slave Set: ms_drbd_r0 [p_drbd_r0]
     Masters: [ iscsitgt01a.example.com ]
     Slaves: [ iscsitgt01s.example.com ]
 Resource Group: g_tgt
     p_lvm      (ocf::heartbeat:LVM):   Started iscsitgt01a.example.com
     p_lio      (ocf::heartbeat:LIO):   Started iscsitgt01a.example.com
     p_vip      (ocf::heartbeat:VIP):   Started iscsitgt01a.example.com
```

```
47460
47470       Daemon Status:
47480         corosync: active/disabled
47490         pacemaker: active/disabled
47500         pcsd: active/enabled
47510
47520   ○   Active 機で、設定変更を確認します。
47530
47540    a  diff <(grep -v last-lrm-refresh /etc/ha.d/crm.conf) <(sudo pcs config | grep -v last-lrm-refresh)
47550
47560   ○   Active 機と Stand-by 機で、状態を記録します。
47570
47580 a,s   sudo pcs status | sudo tee /etc/ha.d/crm.status
47590       Cluster name: iscsitgt01
47600       WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
47610       Stack: corosync
47620       Current DC: iscsitgt01a.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
47630       Last updated: Fri Nov 25 22:49:57 2016          Last change: Fri Nov 25 22:47:34 2016 by root via crm_resource on iscsitgt01a.example.com
47640
47650       2 nodes and 5 resources configured
47660
47670       Online: [ iscsitgt01a.example.com iscsitgt01s.example.com ]
47680
47690       Full list of resources:
47700
47710        Master/Slave Set: ms_drbd_r0 [p_drbd_r0]
47720            Masters: [ iscsitgt01a.example.com ]
47730            Slaves: [ iscsitgt01s.example.com ]
47740        Resource Group: g_tgt
47750            p_lvm      (ocf::heartbeat:LVM):   Started iscsitgt01a.example.com
47760            p_lio      (ocf::heartbeat:LIO):   Started iscsitgt01a.example.com
47770            p_vip      (ocf::heartbeat:VIP):   Started  iscsitgt01a.example.com
47780
47790       Daemon Status:
47800         corosync: active/disabled
47810         pacemaker: active/disabled
47820         pcsd: active/enabled
47830
47840 a,s   sudo cp -a /etc{,~}/ha.d/crm.status
47850
47860   ○   Active 機で、クラスタを停止します。
```

```
47870
47880    a   sudo pcs cluster stop --all
47890        10.110.88.57: Stopping Cluster (pacemaker)...
47900        10.110.88.58: Stopping Cluster (pacemaker)...
47910        10.110.88.58: Stopping Cluster (corosync)...
47920        10.110.88.57: Stopping Cluster (corosync)...
47930
47940    ○   Active 機と Stand-by 機で、再起動します。
47950
47960 a,s    sudo reboot
47970
47980    ○   Active 機と Stand-by 機へ、管理者用一般ユーザにて、ssh でログインします。
47990
48000    a   ssh admin@10.110.88.57
48010    a   admin@10.110.88.57's password: ********
48020
48030    s   ssh admin@10.110.88.58
48040    s   admin@10.110.88.58's password: ********
48050
48060    ○   Active 機で、クラスタを起動します。
48070
48080    a   sudo pcs cluster start --all
48090        10.110.88.57: Starting Cluster...
48100        10.110.88.58: Starting Cluster...
48110
48120    ○   Active 機で、状態を確認します。
48130
48140    a   sudo pcs status
48150        Cluster name: iscsitgt01
48160        WARNING: corosync and pacemaker node names do not match (IPs used in setup?)
48170        Stack: corosync
48180        Current DC: iscsitgt01s.example.com (version 1.1.15-11.el7-e174ec8) - partition with quorum
48190        Last updated: Fri Nov 25 23:06:32 2016          Last change: Fri Nov 25 23:06:30 2016 by root via crm_resource on iscsitgt01s.example.com
48200
48210        2 nodes and 5 resources configured
48220
48230        Online: [ iscsitgt01a.example.com iscsitgt01s.example.com ]
48240
48250        Full list of resources:
48260
48270         Master/Slave Set: ms_drbd_r0 [p_drbd_r0]
```

```
48280           Masters: [ iscsitgt01a.example.com ]
48290           Slaves: [ iscsitgt01s.example.com ]
48300        Resource Group: g_tgt
48310           p_lvm      (ocf::heartbeat:LVM):   Started iscsitgt01a.example.com
48320           p_lio      (ocf::heartbeat:LIO):   Started iscsitgt01a.example.com
48330           p_vip      (ocf::heartbeat:VIP):   Started  iscsitgt01a.example.com
48340
48350       Daemon Status:
48360         corosync: active/disabled
48370         pacemaker: active/disabled
48380         pcsd: active/enabled
48390
```

48400 ○ 【Munin のインストールと初期設定】
48410
48420 ○ 以下のインストーラを DVD ドライブにセットします。
48430
48440 a,s # V834394-01.iso (Oracle Linux 7.3)
48450
48460 ○ インストーラをマウントします。
48470
48480 a,s sudo mount /dev/cdrom /mnt
48490 mount: /dev/sr0 is write-protected, mounting read-only
48500
48510 ○ インターネットと接続可能な端末で以下のコマンドを実行する等して、必要なパッケージを収集します。
48520
48530 o curl -O http://yum.oracle.com/repo/OracleLinux/OL7/optional/latest/x86_64/getPackage/perl-Crypt-DES-2.05-20.el7.x86_64.rpm
48540 o curl -O http://yum.oracle.com/repo/OracleLinux/OL7/optional/latest/x86_64/getPackage/perl-File-Copy-Recursive-0.38-14.el7.noarch.rpm
48550 o curl -O http://yum.oracle.com/repo/OracleLinux/OL7/optional/latest/x86_64/getPackage/perl-Taint-Runtime-0.03-19.el7.x86_64.rpm
48560 o curl -O http://yum.oracle.com/repo/OracleLinux/OL7/optional/latest/x86_64/getPackage/perl-XML-DOM-1.44-19.el7.noarch.rpm
48570 o curl -O http://yum.oracle.com/repo/OracleLinux/OL7/optional/latest/x86_64/getPackage/perl-XML-RegExp-0.04-2.el7.noarch.rpm
48580 o curl -O http://yum.oracle.com/repo/OracleLinux/OL7/optional/latest/x86_64/getPackage/rrdtool-perl-1.4.8-9.el7.x86_64.rpm
48590 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/m/munin-2.0.25-11.el7.noarch.rpm
48600 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/m/munin-common-2.0.25-11.el7.noarch.rpm
48610 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/m/munin-node-2.0.25-11.el7.noarch.rpm
48620 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Cache-Cache-1.06-12.el7.noarch.rpm
48630 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Email-Date-Format-1.002-15.el7.noarch.rpm
48640 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-HTML-Template-2.95-1.el7.noarch.rpm
48650 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-IO-Multiplex-1.13-6.el7.noarch.rpm
48660 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-IPC-ShareLite-0.17-12.el7.x86_64.rpm
48670 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Log-Dispatch-2.41-1.el7.1.noarch.rpm
48680 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Log-Dispatch-FileRotate-1.19-13.el7.noarch.rpm
48690 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Log-Log4perl-1.42-2.el7.noarch.rpm
48700 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-MIME-Lite-3.030-1.el7.noarch.rpm
48710 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-MIME-Types-1.38-2.el7.noarch.rpm
48720 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Mail-Sender-0.8.23-1.el7.noarch.rpm
48730 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Mail-Sendmail-0.79-21.el7.noarch.rpm
48740 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Net-CIDR-0.18-1.el7.noarch.rpm
48750 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Net-SNMP-6.0.1-7.el7.noarch.rpm
48760 o curl -O https://dl.fedoraproject.org/pub/epel/7/x86_64/p/perl-Net-Server-2.007-2.el7.noarch.rpm
48770
48780 ○ 収集したパッケージをホームディレクトリにコピーし、確認します。
48790
48800 a,s scp xxxx@yyy:perl-Crypt-DES-2.05-20.el7.x86_64.rpm .

```
48810 a,s    scp xxxx@yyy:perl-File-Copy-Recursive-0.38-14.el7.noarch.rpm .
48820 a,s    scp xxxx@yyy:perl-Taint-Runtime-0.03-19.el7.x86_64.rpm .
48830 a,s    scp xxxx@yyy:perl-XML-DOM-1.44-19.el7.noarch.rpm .
48840 a,s    scp xxxx@yyy:perl-XML-RegExp-0.04-2.el7.noarch.rpm .
48850 a,s    scp xxxx@yyy:rrdtool-perl-1.4.8-9.el7.x86_64.rpm .
48860 a,s    scp xxxx@yyy:munin-2.0.25-11.el7.noarch.rpm .
48870 a,s    scp xxxx@yyy:munin-common-2.0.25-11.el7.noarch.rpm .
48880 a,s    scp xxxx@yyy:munin-node-2.0.25-11.el7.noarch.rpm .
48890 a,s    scp xxxx@yyy:perl-Cache-Cache-1.06-12.el7.noarch.rpm .
48900 a,s    scp xxxx@yyy:perl-Email-Date-Format-1.002-15.el7.noarch.rpm .
48910 a,s    scp xxxx@yyy:perl-HTML-Template-2.95-1.el7.noarch.rpm .
48920 a,s    scp xxxx@yyy:perl-IO-Multiplex-1.13-6.el7.noarch.rpm .
48930 a,s    scp xxxx@yyy:perl-IPC-ShareLite-0.17-12.el7.x86_64.rpm .
48940 a,s    scp xxxx@yyy:perl-Log-Dispatch-2.41-1.el7.1.noarch.rpm .
48950 a,s    scp xxxx@yyy:perl-Log-Dispatch-FileRotate-1.19-13.el7.noarch.rpm .
48960 a,s    scp xxxx@yyy:perl-Log-Log4perl-1.42-2.el7.noarch.rpm .
48970 a,s    scp xxxx@yyy:perl-MIME-Lite-3.030-1.el7.noarch.rpm .
48980 a,s    scp xxxx@yyy:perl-MIME-Types-1.38-2.el7.noarch.rpm .
48990 a,s    scp xxxx@yyy:perl-Mail-Sender-0.8.23-1.el7.noarch.rpm .
49000 a,s    scp xxxx@yyy:perl-Mail-Sendmail-0.79-21.el7.noarch.rpm .
49010 a,s    scp xxxx@yyy:perl-Net-CIDR-0.18-1.el7.noarch.rpm .
49020 a,s    scp xxxx@yyy:perl-Net-SNMP-6.0.1-7.el7.noarch.rpm .
49030 a,s    scp xxxx@yyy:perl-Net-Server-2.007-2.el7.noarch.rpm .
49040
49050 a,s    ls -l *.rpm
49060        -rw-rw-r-- 1 admin admin 204328 Nov 25 23:11 munin-2.0.25-11.el7.noarch.rpm
49070        -rw-rw-r-- 1 admin admin  93672 Nov 25 23:12 munin-common-2.0.25-11.el7.noarch.rpm
49080        -rw-rw-r-- 1 admin admin 408204 Nov 25 23:12 munin-node-2.0.25-11.el7.noarch.rpm
49090        -rw-rw-r-- 1 admin admin  93340 Nov 25 23:12 perl-Cache-Cache-1.06-12.el7.noarch.rpm
49100        -rw-rw-r-- 1 admin admin  19920 Nov 25 23:11 perl-Crypt-DES-2.05-20.el7.x86_64.rpm
49110        -rw-rw-r-- 1 admin admin  17524 Nov 25 23:12 perl-Email-Date-Format-1.002-15.el7.noarch.rpm
49120        -rw-rw-r-- 1 admin admin  23164 Nov 25 23:11 perl-File-Copy-Recursive-0.38-14.el7.noarch.rpm
49130        -rw-rw-r-- 1 admin admin  77780 Nov 25 23:12 perl-HTML-Template-2.95-1.el7.noarch.rpm
49140        -rw-rw-r-- 1 admin admin  25616 Nov 25 23:12 perl-IO-Multiplex-1.13-6.el7.noarch.rpm
49150        -rw-rw-r-- 1 admin admin  31004 Nov 25 23:12 perl-IPC-ShareLite-0.17-12.el7.x86_64.rpm
49160        -rw-rw-r-- 1 admin admin  84300 Nov 25 23:12 perl-Log-Dispatch-2.41-1.el7.1.noarch.rpm
49170        -rw-rw-r-- 1 admin admin  25232 Nov 25 23:12 perl-Log-Dispatch-FileRotate-1.19-13.el7.noarch.rpm
49180        -rw-rw-r-- 1 admin admin 433560 Nov 25 23:12 perl-Log-Log4perl-1.42-2.el7.noarch.rpm
49190        -rw-rw-r-- 1 admin admin  60212 Nov 25 23:12 perl-Mail-Sender-0.8.23-1.el7.noarch.rpm
49200        -rw-rw-r-- 1 admin admin  29540 Nov 25 23:12 perl-Mail-Sendmail-0.79-21.el7.noarch.rpm
49210        -rw-rw-r-- 1 admin admin  98316 Nov 25 23:12 perl-MIME-Lite-3.030-1.el7.noarch.rpm
```

```
49220         -rw-rw-r-- 1 admin admin  39184 Nov 25 23:12 perl-MIME-Types-1.38-2.el7.noarch.rpm
49230         -rw-rw-r-- 1 admin admin  19640 Nov 25 23:12 perl-Net-CIDR-0.18-1.el7.noarch.rpm
49240         -rw-rw-r-- 1 admin admin 213136 Nov 25 23:12 perl-Net-Server-2.007-2.el7.noarch.rpm
49250         -rw-rw-r-- 1 admin admin 105348 Nov 25 23:12 perl-Net-SNMP-6.0.1-7.el7.noarch.rpm
49260         -rw-rw-r-- 1 admin admin  22496 Nov 25 23:11 perl-Taint-Runtime-0.03-19.el7.x86_64.rpm
49270         -rw-rw-r-- 1 admin admin 141504 Nov 25 23:11 perl-XML-DOM-1.44-19.el7.noarch.rpm
49280         -rw-rw-r-- 1 admin admin  10628 Nov 25 23:11 perl-XML-RegExp-0.04-2.el7.noarch.rpm
49290         -rw-rw-r-- 1 admin admin  42864 Nov 25 23:11 rrdtool-perl-1.4.8-9.el7.x86_64.rpm
49300
49310 a, s    file *.rpm
49320         munin-2.0.25-11.el7.noarch.rpm:                 RPM v3.0 bin noarch munin-2.0.25-11.el7
49330         munin-common-2.0.25-11.el7.noarch.rpm:          RPM v3.0 bin noarch munin-common-2.0.25-11.el7
49340         munin-node-2.0.25-11.el7.noarch.rpm:            RPM v3.0 bin noarch munin-node-2.0.25-11.el7
49350         perl-Cache-Cache-1.06-12.el7.noarch.rpm:        RPM v3.0 bin noarch perl-Cache-Cache-1.06-12.el7
49360         perl-Crypt-DES-2.05-20.el7.x86_64.rpm:          RPM v3.0 bin i386/x86_64 perl-Crypt-DES-2.05-20.el7
49370         perl-Email-Date-Format-1.002-15.el7.noarch.rpm: RPM v3.0 bin noarch perl-Email-Date-Format-1.002-15.el7
49380         perl-File-Copy-Recursive-0.38-14.el7.noarch.rpm: RPM v3.0 bin noarch perl-File-Copy-Recursive-0.38-14.el7
49390         perl-HTML-Template-2.95-1.el7.noarch.rpm:       RPM v3.0 bin noarch perl-HTML-Template-2.95-1.el7
49400         perl-IO-Multiplex-1.13-6.el7.noarch.rpm:        RPM v3.0 bin noarch perl-IO-Multiplex-1.13-6.el7
49410         perl-IPC-ShareLite-0.17-12.el7.x86_64.rpm:      RPM v3.0 bin i386/x86_64 perl-IPC-ShareLite-0.17-12.el7
49420         perl-Log-Dispatch-2.41-1.el7.1.noarch.rpm:      RPM v3.0 bin noarch perl-Log-Dispatch-2.41-1.el7.1
49430         perl-Log-Dispatch-FileRotate-1.19-13.el7.noarch.rpm: RPM v3.0 bin noarch perl-Log-Dispatch-FileRotate-1.19-13.el7
49440         perl-Log-Log4perl-1.42-2.el7.noarch.rpm:        RPM v3.0 bin noarch perl-Log-Log4perl-1.42-2.el7
49450         perl-Mail-Sender-0.8.23-1.el7.noarch.rpm:       RPM v3.0 bin noarch perl-Mail-Sender-0.8.23-1.el7
49460         perl-Mail-Sendmail-0.79-21.el7.noarch.rpm:      RPM v3.0 bin noarch perl-Mail-Sendmail-0.79-21.el7
49470         perl-MIME-Lite-3.030-1.el7.noarch.rpm:          RPM v3.0 bin noarch perl-MIME-Lite-3.030-1.el7
49480         perl-MIME-Types-1.38-2.el7.noarch.rpm:          RPM v3.0 bin noarch perl-MIME-Types-1.38-2.el7
49490         perl-Net-CIDR-0.18-1.el7.noarch.rpm:            RPM v3.0 bin noarch perl-Net-CIDR-0.18-1.el7
49500         perl-Net-Server-2.007-2.el7.noarch.rpm:         RPM v3.0 bin noarch perl-Net-Server-2.007-2.el7
49510         perl-Net-SNMP-6.0.1-7.el7.noarch.rpm:           RPM v3.0 bin noarch perl-Net-SNMP-6.0.1-7.el7
49520         perl-Taint-Runtime-0.03-19.el7.x86_64.rpm:      RPM v3.0 bin i386/x86_64 perl-Taint-Runtime-0.03-19.el7
49530         perl-XML-DOM-1.44-19.el7.noarch.rpm:            RPM v3.0 bin noarch perl-XML-DOM-1.44-19.el7
49540         perl-XML-RegExp-0.04-2.el7.noarch.rpm:          RPM v3.0 bin noarch perl-XML-RegExp-0.04-2.el7
49550         rrdtool-perl-1.4.8-9.el7.x86_64.rpm:            RPM v3.0 bin i386/x86_64 rrdtool-perl-1.4.8-9.el7
49560
49570    ○    Munin をインストールします。Oracle 社サポート外のパッケージです。
49580
49590 a, s    sudo yum -y --disablerepo=¥* --enablerepo=media install httpd
49600 a, s    sudo yum -y --disablerepo=¥* --enablerepo=media localinstall munin-*.rpm perl-*.rpm rrdtool-perl-*.rpm
49610 a, s    sudo mv munin-*.rpm perl-*.rpm rrdtool-perl-*.rpm /opt/packages/
49620
```

○ インストーラをアンマウントします。

```
a, s  sudo umount /mnt
```

○ インストーラをDVDドライブから外します。

```
a, s  # Eject DVD
```

○ 追加インストールしたパッケージの設定をバックアップします。

```
a, s  sudo cp -a /etc{,~}/cron.d/munin
a, s  sudo cp -a /etc{,~}/fonts
a, s  sudo cp -a /etc{,~}/httpd
a, s  sudo cp -a /etc{,~}/logrotate.d/httpd
a, s  sudo cp -a /etc{,~}/logrotate.d/munin
a, s  sudo cp -a /etc{,~}/logrotate.d/munin-node
a, s  sudo cp -a /etc{,~}/munin
a, s  sudo cp -a /etc{,~}/sysconfig/htcacheclean
a, s  sudo cp -a /etc{,~}/sysconfig/httpd
a, s  sudo cp -a /etc/passwd   /etc~/passwd_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/passwd-  /etc~/passwd-_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/shadow   /etc~/shadow_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/shadow-  /etc~/shadow-_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/group    /etc~/group_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/group-   /etc~/group-_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/gshadow  /etc~/gshadow_$(date +%Y%m%d_%H%M%S)
a, s  sudo cp -a /etc/gshadow- /etc~/gshadow-_$(date +%Y%m%d_%H%M%S)
```

○ DRBD, LIO に関するプラグインを作成します。

```
a, s  cat << 'EOF' | sudo tee /usr/share/munin/plugins/drbd
a, s  #!/usr/bin/perl
a, s  #%# family=auto
a, s  #%# capabilities=autoconf
a, s  # http://www.drbd.org/en/doc/users-guide-84/ch-admin#s-performance-indicators
a, s
a, s  use strict;
a, s  my $file="/proc/drbd";
a, s  my $store = {};
a, s  my $rid;
a, s
```

```
50040 a,s    &crunch;
50050 a,s    &display;
50060 a,s
50070 a,s    sub display{
50080 a,s      if ($ARGV[0] and $ARGV[0] eq "config"){
50090 a,s        print "graph_title DRBD¥n";
50100 a,s        print "graph_category DRBD¥n";
50110 a,s        print "graph_info Graph DRBD¥n";
50120 a,s        print "graph_vlabel Graph DRBD (Bytes/sec)¥n";
50130 a,s        print "graph_scale yes¥n";
50140 a,s        print "graph_args --base 1024 --lower-limit 0¥n";
50150 a,s        print "graph_period second¥n";
50160 a,s        print "graph_height 200¥n";
50170 a,s        print "graph_width 400¥n";
50180 a,s        print "graph_printf %7.2lf¥n";
50190 a,s        foreach my $key ( keys %$store ){
50200 a,s          my $drbdname = 'drbd'.$key;
50210 a,s          print $drbdname."dr.label $drbdname Disk Read¥n";
50220 a,s          print $drbdname."dw.label $drbdname Disk Write¥n";
50230 a,s          print $drbdname."ns.label $drbdname Network Send¥n";
50240 a,s          print $drbdname."nr.label $drbdname Network Receive¥n";
50250 a,s          print $drbdname."os.label $drbdname Out of Sync¥n";
50260 a,s          print $drbdname."dr.cdef ".$drbdname."dr,1024,*¥n";
50270 a,s          print $drbdname."dw.cdef ".$drbdname."dw,1024,*¥n";
50280 a,s          print $drbdname."ns.cdef ".$drbdname."ns,1024,*¥n";
50290 a,s          print $drbdname."nr.cdef ".$drbdname."nr,1024,*¥n";
50300 a,s          print $drbdname."os.cdef ".$drbdname."os,1024,*¥n";
50310 a,s          print $drbdname."dr.min 0¥n";
50320 a,s          print $drbdname."dw.min 0¥n";
50330 a,s          print $drbdname."ns.min 0¥n";
50340 a,s          print $drbdname."nr.min 0¥n";
50350 a,s          print $drbdname."os.min 0¥n";
50360 a,s          print $drbdname."dr.type DERIVE¥n";
50370 a,s          print $drbdname."dw.type DERIVE¥n";
50380 a,s          print $drbdname."ns.type DERIVE¥n";
50390 a,s          print $drbdname."nr.type DERIVE¥n";
50400 a,s          print $drbdname."os.type DERIVE¥n";
50410 a,s        }
50420 a,s        exit 0;
50430 a,s      }
50440 a,s      foreach my $key ( keys %$store ){
```

```
50450 a,s       my $drbdname = 'drbd'.$key;
50460 a,s       print $drbdname."dw.value ".$store->{$key}->{'dw'}."¥n";
50470 a,s       print $drbdname."dr.value ".$store->{$key}->{'dr'}."¥n";
50480 a,s       print $drbdname."ns.value ".$store->{$key}->{'ns'}."¥n";
50490 a,s       print $drbdname."nr.value ".$store->{$key}->{'nr'}."¥n";
50500 a,s       print $drbdname."os.value ".$store->{$key}->{'os'}."¥n";
50510 a,s     }
50520 a,s   }
50530 a,s
50540 a,s   sub crunch{
50550 a,s     open (IN, $file) || die "Could not open $file for reading: $!";
50560 a,s     if ($ARGV[0] and $ARGV[0] eq "autoconf"){
50570 a,s       close (IN);
50580 a,s       print "yes¥n";
50590 a,s       exit 0;
50600 a,s     }
50610 a,s     while (<IN>){
50620 a,s       next if /version:|GIT-hash:/;
50630 a,s       chomp;
50640 a,s       my ($drbd) = $_ =~ /^¥s+(¥d):/;
50650 a,s       $rid = $drbd if $drbd =~ /¥d/;
50660 a,s       my ($ns) = $_ =~ /ns:(¥d*)/;  $store->{ $rid }->{'ns'} = $ns if $ns ne undef;
50670 a,s       my ($nr) = $_ =~ /nr:(¥d*)/;  $store->{ $rid }->{'nr'} = $nr if $ns ne undef;
50680 a,s       my ($dw) = $_ =~ /dw:(¥d*)/;  $store->{ $rid }->{'dw'} = $dw if $dw ne undef;
50690 a,s       my ($dr) = $_ =~ /dr:(¥d*)/;  $store->{ $rid }->{'dr'} = $dr if $dr ne undef;
50700 a,s       my ($os) = $_ =~ /oos:(¥d*)/; $store->{ $rid }->{'os'} = $os if $os ne undef;
50710 a,s     }
50720 a,s     close (IN);
50730 a,s   }
50740 a,s
50750 a,s   exit 0;
50760 a,s   EOF
50770 a,s   sudo chmod 755 /usr/share/munin/plugins/drbd
50780 a,s
50790 a,s   cat << 'EOF' | sudo tee /usr/share/munin/plugins/drbd_al
50800 a,s   #!/usr/bin/perl
50810 a,s   #%# family=auto
50820 a,s   #%# capabilities=autoconf
50830 a,s   # http://www.drbd.org/en/doc/users-guide-84/ch-admin#s-performance-indicators
50840 a,s
50850 a,s   use strict;
```

```
50860 a,s    my $file="/proc/drbd";
50870 a,s    my $store = {};
50880 a,s    my $rid;
50890 a,s
50900 a,s    &crunch;
50910 a,s    &display;
50920 a,s
50930 a,s    sub display{
50940 a,s      if ($ARGV[0] and $ARGV[0] eq "config"){
50950 a,s        print "graph_title DRBD (Activity Log)¥n";
50960 a,s        print "graph_category DRBD¥n";
50970 a,s        print "graph_info Graph DRBD (Activity Log)¥n";
50980 a,s        print "graph_vlabel Graph DRBD (Activity Log)¥n";
50990 a,s        print "graph_scale yes¥n";
51000 a,s        print "graph_args --base 1024 --lower-limit 0¥n";
51010 a,s        print "graph_period second¥n";
51020 a,s        print "graph_height 200¥n";
51030 a,s        print "graph_width 400¥n";
51040 a,s        print "graph_printf %7.2lf¥n";
51050 a,s        foreach my $key ( keys %$store ){
51060 a,s          my $drbdname = 'drbd'.$key;
51070 a,s          print $drbdname."al.label $drbdname Activity log¥n";
51080 a,s          print $drbdname."al.min 0¥n";
51090 a,s    #       print $drbdname."al.type DERIVE¥n";
51100 a,s        }
51110 a,s        exit 0;
51120 a,s      }
51130 a,s      foreach my $key ( keys %$store ){
51140 a,s        my $drbdname = 'drbd'.$key;
51150 a,s        print $drbdname."al.value ".$store->{$key}->{'al'}."¥n";
51160 a,s      }
51170 a,s    }
51180 a,s
51190 a,s    sub crunch{
51200 a,s      open (IN, $file ) || die "Could not open $file for reading: $!";
51210 a,s      if ($ARGV[0] and $ARGV[0] eq "autoconf"){
51220 a,s        close (IN);
51230 a,s        print "yes¥n";
51240 a,s        exit 0;
51250 a,s      }
51260 a,s      while (<IN>){
```

```
51270 a, s       next if /version:|GIT-hash:/;
51280 a, s       chomp;
51290 a, s       my ($drbd) = $_ =~ /^¥s+(¥d):/;
51300 a, s       $rid = $drbd if $drbd =~ /¥d/;
51310 a, s       my ($al) = $_ =~ /al:(¥d*)/; $store->{ $rid }->{'al'} = $al if $al ne undef;
51320 a, s     }
51330 a, s     close (IN);
51340 a, s   }
51350 a, s
51360 a, s   exit 0;
51370 a, s   EOF
51380 a, s   sudo chmod 755 /usr/share/munin/plugins/drbd_al
51390 a, s
51400 a, s   cat << 'EOF' | sudo tee /usr/share/munin/plugins/drbd_ext
51410 a, s   #!/usr/bin/perl
51420 a, s   #%# family=auto
51430 a, s   #%# capabilities=autoconf
51440 a, s   # http://www.drbd.org/en/doc/users-guide-84/ch-admin#s-performance-indicators
51450 a, s
51460 a, s   use strict;
51470 a, s   my $file="/proc/drbd";
51480 a, s   my $store = {};
51490 a, s   my $rid;
51500 a, s
51510 a, s   &crunch;
51520 a, s   &display;
51530 a, s
51540 a, s   sub display{
51550 a, s     if ($ARGV[0] and $ARGV[0] eq "config"){
51560 a, s       print "graph_title DRBD (Ext)¥n";
51570 a, s       print "graph_category DRBD¥n";
51580 a, s       print "graph_info Graph DRBD (Ext)¥n";
51590 a, s       print "graph_vlabel Graph DRBD (Ext)¥n";
51600 a, s       print "graph_scale yes¥n";
51610 a, s       print "graph_args --base 1024 --lower-limit 0¥n";
51620 a, s       print "graph_period second¥n";
51630 a, s       print "graph_height 200¥n";
51640 a, s       print "graph_width 400¥n";
51650 a, s       print "graph_printf %7.2lf¥n";
51660 a, s       foreach my $key ( keys %$store ){
51670 a, s         my $drbdname = 'drbd'.$key;
```

```
51680 a,s         print $drbdname."bm.label $drbdname Bit Map¥n";
51690 a,s         print $drbdname."lo.label $drbdname Local count¥n";
51700 a,s         print $drbdname."pe.label $drbdname Pending¥n";
51710 a,s         print $drbdname."ua.label $drbdname UnAcknowledged¥n";
51720 a,s         print $drbdname."ap.label $drbdname Application Pending¥n";
51730 a,s         print $drbdname."ep.label $drbdname Epochs¥n";
51740 a,s       }
51750 a,s       exit 0;
51760 a,s     }
51770 a,s     foreach my $key ( keys %$store ){
51780 a,s       my $drbdname = 'drbd'.$key;
51790 a,s       print $drbdname."bm.value ".$store->{$key}->{'bm'}."¥n";
51800 a,s       print $drbdname."lo.value ".$store->{$key}->{'lo'}."¥n";
51810 a,s       print $drbdname."pe.value ".$store->{$key}->{'pe'}."¥n";
51820 a,s       print $drbdname."ua.value ".$store->{$key}->{'ua'}."¥n";
51830 a,s       print $drbdname."ap.value ".$store->{$key}->{'ap'}."¥n";
51840 a,s       print $drbdname."ep.value ".$store->{$key}->{'ep'}."¥n";
51850 a,s     }
51860 a,s   }
51870 a,s
51880 a,s   sub crunch{
51890 a,s     open (IN, $file ) || die "Could not open $file for reading: $!";
51900 a,s     if ($ARGV[0] and $ARGV[0] eq "autoconf"){
51910 a,s       close (IN);
51920 a,s       print "yes¥n";
51930 a,s       exit 0;
51940 a,s     }
51950 a,s     while (<IN>){
51960 a,s       next if /version:|GIT-hash:/;
51970 a,s       chomp;
51980 a,s       my ($drbd) = $_ =~ /^¥s+(¥d):/;
51990 a,s       $rid = $drbd if $drbd =~ /¥d/;
52000 a,s       my ($bm) = $_ =~ /bm:(¥d*)/; $store->{ $rid }->{'bm'} = $bm if $bm ne undef;
52010 a,s       my ($lo) = $_ =~ /lo:(¥d*)/; $store->{ $rid }->{'lo'} = $lo if $lo ne undef;
52020 a,s       my ($pe) = $_ =~ /pe:(¥d*)/; $store->{ $rid }->{'pe'} = $pe if $pe ne undef;
52030 a,s       my ($ua) = $_ =~ /ua:(¥d*)/; $store->{ $rid }->{'ua'} = $ua if $ua ne undef;
52040 a,s       my ($ap) = $_ =~ /ap:(¥d*)/; $store->{ $rid }->{'ap'} = $ap if $ap ne undef;
52050 a,s       my ($ep) = $_ =~ /ep:(¥d*)/; $store->{ $rid }->{'ep'} = $ep if $ep ne undef;
52060 a,s     }
52070 a,s     close (IN);
52080 a,s   }
```

```
52090 a,s
52100 a,s    exit 0;
52110 a,s    EOF
52120 a,s    sudo chmod 755 /usr/share/munin/plugins/drbd_ext
52130 a,s
52140 a,s    cat << 'EOF' | sudo tee /usr/share/munin/plugins/lio_read
52150 a,s    #!/bin/sh
52160 a,s    #%# family=auto
52170 a,s    #%# capabilities=autoconf
52180 a,s
52190 a,s    if [ "$1" = "autoconf" ]; then
52200 a,s      if [ -d /sys/kernel/config/target/iscsi/iqn.*/tpgt_1 ]; then
52210 a,s        echo yes
52220 a,s      else
52230 a,s        echo 'no (no iscsi target)'
52240 a,s      fi
52250 a,s      exit 0
52260 a,s    fi
52270 a,s    if [ "$1" = "config" ]; then
52280 a,s      echo 'graph_title LIO (Read)'
52290 a,s      echo 'graph_category LIO'
52300 a,s      echo 'graph_info Graph LIO (Read)'
52310 a,s      echo 'graph_vlabel Graph LIO (Bytes/sec)'
52320 a,s      echo 'graph_scale yes'
52330 a,s      echo 'graph_args --base 1024 --lower-limit 0'
52340 a,s      echo 'graph_period second'
52350 a,s    #  echo 'graph_height 200'
52360 a,s    #  echo 'graph_width 400'
52370 a,s      echo 'graph_printf %7.2lf'
52380 a,s
52390 a,s      TGT_=
52400 a,s      INI_=
52410 a,s      for i in $(echo /sys/kernel/config/target/iscsi/iqn.*/tpgt_1/acls/iqn.*/*/statistics/scsi_auth_intr/read_mbytes | LANG=C sort)
52420 a,s      do
52430 a,s        TGT=$(echo $i | cut -d/ -f7)
52440 a,s        INI=$(echo $i | cut -d/ -f10)
52450 a,s        LUN=$(echo $i | cut -d/ -f11)
52460 a,s        if [ "$TGT_" = "$TGT" ]; then
52470 a,s          if [ "$INI_" = "$INI" ]; then
52480 a,s            :
52490 a,s          else
```

```
52500 a,s           INI_=$INI
52510 a,s           INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
52520 a,s         fi
52530 a,s       else
52540 a,s         TGT_=$TGT
52550 a,s         TGT_F=$(echo $TGT | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
52560 a,s         INI_=$INI
52570 a,s         INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
52580 a,s         for j in $(echo /sys/kernel/config/target/iscsi/$TGT/tpgt_1/lun/*/statistics/scsi_tgt_port/read_mbytes | LANG=C sort)
52590 a,s         do
52600 a,s           LUN_=$(echo $j | cut -d/ -f10)
52610 a,s           echo ${TGT_F}$LUN_.label $(echo $TGT | cut -d: -f2) ¥($LUN_¥) Read
52620 a,s           echo ${TGT_F}$LUN_.cdef ${TGT_F}$LUN_,1048576,¥*
52630 a,s           echo ${TGT_F}$LUN_.min 0
52640 a,s           echo ${TGT_F}$LUN_.type DERIVE
52650 a,s         done
52660 a,s       fi
52670 a,s       echo ${TGT_F}${INI_F}$LUN.label $(echo $TGT | cut -d: -f2) - $(echo $INI | cut -d: -f2) ¥($LUN¥) Read
52680 a,s       echo ${TGT_F}${INI_F}$LUN.cdef ${TGT_F}${INI_F}$LUN,1048576,¥*
52690 a,s       echo ${TGT_F}${INI_F}$LUN.min 0
52700 a,s       echo ${TGT_F}${INI_F}$LUN.type DERIVE
52710 a,s     done
52720 a,s     exit 0
52730 a,s   fi
52740 a,s
52750 a,s   TGT_=
52760 a,s   INI_=
52770 a,s   for i in $(echo /sys/kernel/config/target/iscsi/iqn.*/tpgt_1/acls/iqn.*/*/statistics/scsi_auth_intr/read_mbytes | LANG=C sort)
52780 a,s   do
52790 a,s     TGT=$(echo $i | cut -d/ -f7)
52800 a,s     INI=$(echo $i | cut -d/ -f10)
52810 a,s     LUN=$(echo $i | cut -d/ -f11)
52820 a,s     if [ "$TGT_" = "$TGT" ]; then
52830 a,s       if [ "$INI_" = "$INI" ]; then
52840 a,s         :
52850 a,s       else
52860 a,s         INI_=$INI
52870 a,s         INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
52880 a,s       fi
52890 a,s     else
52900 a,s        TGT_=$TGT
```

```
52910 a,s         TGT_F=$(echo $TGT | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
52920 a,s         INI_=$INI
52930 a,s         INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
52940 a,s         for j in $(echo /sys/kernel/config/target/iscsi/$TGT/tpgt_1/lun/*/statistics/scsi_tgt_port/read_mbytes | LANG=C sort)
52950 a,s         do
52960 a,s           LUN_=$(echo $j | cut -d/ -f10)
52970 a,s           echo -n "${TGT_F}$LUN_.value "
52980 a,s           cat $j
52990 a,s         done
53000 a,s       fi
53010 a,s       echo -n "${TGT_F}${INI_F}$LUN.value "
53020 a,s       cat $i
53030 a,s     done
53040 a,s
53050 a,s     exit 0;
53060 a,s     EOF
53070 a,s     sudo chmod 755 /usr/share/munin/plugins/lio_read
53080 a,s
53090 a,s     cat << 'EOF' | sudo tee /usr/share/munin/plugins/lio_write
53100 a,s     #!/bin/sh
53110 a,s     #%# family=auto
53120 a,s     #%# capabilities=autoconf
53130 a,s
53140 a,s     if [ "$1" = "autoconf" ]; then
53150 a,s       if [ -d /sys/kernel/config/target/iscsi/iqn.*/tpgt_1 ]; then
53160 a,s         echo yes
53170 a,s       else
53180 a,s         echo 'no (no iscsi target)'
53190 a,s       fi
53200 a,s       exit 0
53210 a,s     fi
53220 a,s     if [ "$1" = "config" ]; then
53230 a,s       echo 'graph_title LIO (Write)'
53240 a,s       echo 'graph_category LIO'
53250 a,s       echo 'graph_info Graph LIO (Write)'
53260 a,s       echo 'graph_vlabel Graph LIO (Bytes/sec)'
53270 a,s       echo 'graph_scale yes'
53280 a,s       echo 'graph_args --base 1024 --lower-limit 0'
53290 a,s       echo 'graph_period second'
53300 a,s     #  echo 'graph_height 200'
53310 a,s     #  echo 'graph_width 400'
```

```
53320 a,s     echo 'graph_printf %7.2lf'
53330 a,s
53340 a,s     TGT_=
53350 a,s     INI_=
53360 a,s     for i in $(echo /sys/kernel/config/target/iscsi/iqn.*/tpgt_1/acls/iqn.*/*/statistics/scsi_auth_intr/write_mbytes | LANG=C sort)
53370 a,s     do
53380 a,s       TGT=$(echo $i | cut -d/ -f7)
53390 a,s       INI=$(echo $i | cut -d/ -f10)
53400 a,s       LUN=$(echo $i | cut -d/ -f11)
53410 a,s       if [ "$TGT_" = "$TGT" ]; then
53420 a,s         if [ "$INI_" = "$INI" ]; then
53430 a,s           :
53440 a,s         else
53450 a,s           INI_=$INI
53460 a,s           INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
53470 a,s         fi
53480 a,s       else
53490 a,s          TGT_=$TGT
53500 a,s          TGT_F=$(echo $TGT | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
53510 a,s          INI_=$INI
53520 a,s          INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
53530 a,s          for j in $(echo /sys/kernel/config/target/iscsi/$TGT/tpgt_1/lun/*/statistics/scsi_tgt_port/write_mbytes | LANG=C sort)
53540 a,s          do
53550 a,s            LUN_=$(echo $j | cut -d/ -f10)
53560 a,s            echo ${TGT_F}$LUN_.label $(echo $TGT | cut -d: -f2) ¥($LUN_¥) Write
53570 a,s            echo ${TGT_F}$LUN_.cdef ${TGT_F}$LUN_,1048576,¥*
53580 a,s            echo ${TGT_F}$LUN_.min 0
53590 a,s            echo ${TGT_F}$LUN_.type DERIVE
53600 a,s          done
53610 a,s       fi
53620 a,s       echo ${TGT_F}${INI_F}$LUN.label $(echo $TGT | cut -d: -f2) - $(echo $INI | cut -d: -f2) ¥($LUN¥) Write
53630 a,s       echo ${TGT_F}${INI_F}$LUN.cdef ${TGT_F}${INI_F}$LUN,1048576,¥*
53640 a,s       echo ${TGT_F}${INI_F}$LUN.min 0
53650 a,s       echo ${TGT_F}${INI_F}$LUN.type DERIVE
53660 a,s     done
53670 a,s     exit 0
53680 a,s   fi
53690 a,s
53700 a,s   TGT_=
53710 a,s   INI_=
53720 a,s   for i in $(echo /sys/kernel/config/target/iscsi/iqn.*/tpgt_1/acls/iqn.*/*/statistics/scsi_auth_intr/write_mbytes | LANG=C sort)
```

```
53730 a,s   do
53740 a,s     TGT=$(echo $i | cut -d/ -f7)
53750 a,s     INI=$(echo $i | cut -d/ -f10)
53760 a,s     LUN=$(echo $i | cut -d/ -f11)
53770 a,s     if [ "$TGT_" = "$TGT" ]; then
53780 a,s       if [ "$INI_" = "$INI" ]; then
53790 a,s         :
53800 a,s       else
53810 a,s         INI_=$INI
53820 a,s         INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
53830 a,s       fi
53840 a,s     else
53850 a,s        TGT_=$TGT
53860 a,s        TGT_F=$(echo $TGT | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
53870 a,s        INI_=$INI
53880 a,s        INI_F=$(echo $INI | tr "[:upper:]" "[:lower:]" | sed -e 's/-/_/g' -e 's![^a-z0-9_]!!g')
53890 a,s        for j in $(echo /sys/kernel/config/target/iscsi/$TGT/tpgt_1/lun/*/statistics/scsi_tgt_port/write_mbytes | LANG=C sort)
53900 a,s        do
53910 a,s          LUN_=$(echo $j | cut -d/ -f10)
53920 a,s          echo -n "${TGT_F}$LUN_.value "
53930 a,s          cat $j
53940 a,s        done
53950 a,s     fi
53960 a,s     echo -n "${TGT_F}${INI_F}$LUN.value "
53970 a,s     cat $i
53980 a,s   done
53990 a,s
54000 a,s   exit 0;
54010 a,s   EOF
54020 a,s   sudo chmod 755 /usr/share/munin/plugins/lio_write
54030 a,s
```

54040 ○ 有効化されている不要なプラグインを無効化します。

54050

```
54060 a,s   sudo rm /etc/munin/plugins/postfix_mail*
54070 a,s   sudo rm /etc/munin/plugins/fw_packets
54080
```

54090 ○ Munin の稼働状況をグラフ化するプラグインを有効化します。

54100

```
54110 a,s   cat << 'EOF' | sudo tee /etc/munin/plugin-conf.d/munin-node
54120 a,s   [diskstats]
54130 a,s   user munin
```

```
54140 a,s
54150 a,s    [iostat_ios]
54160 a,s    user root
54170 a,s
54180 a,s    [munin_*]
54190 a,s    user munin
54200 a,s    EOF
54210 a,s    cat << 'EOF' | sudo tee -a /etc/munin/plugin-conf.d/munin-node
54220 a,s
54230 a,s    [http_loadtime]
54240 a,s    env.target http://127.0.0.1/server-status
54250 a,s    env.requisites true
54260 a,s    EOF
54270 a,s    cat << 'EOF' | sudo tee /etc/httpd/conf.d/status.conf
54280 a,s    <IfModule mod_status.c>
54290 a,s        ExtendedStatus On
54300 a,s        <Location /server-status>
54310 a,s            SetHandler server-status
54320 a,s            Order deny,allow
54330 a,s            Deny from all
54340 a,s            Allow from 127.0.0.1
54350 a,s        </Location>
54360 a,s    </IfModule>
54370 a,s    EOF
54380 a,s    sudo ln -s '/usr/share/munin/plugins/apache_accesses' '/etc/munin/plugins/apache_accesses'
54390 a,s    sudo ln -s '/usr/share/munin/plugins/apache_processes' '/etc/munin/plugins/apache_processes'
54400 a,s    sudo ln -s '/usr/share/munin/plugins/apache_volume' '/etc/munin/plugins/apache_volume'
54410 a,s    sudo ln -s '/usr/share/munin/plugins/http_loadtime' '/etc/munin/plugins/http_loadtime'
54420 a,s    sudo ln -s '/usr/share/munin/plugins/munin_stats' '/etc/munin/plugins/munin_stats'
54430 a,s    sudo ln -s '/usr/share/munin/plugins/munin_update' '/etc/munin/plugins/munin_update'
54440 a,s    sudo ln -s '/usr/share/munin/plugins/iostat' '/etc/munin/plugins/iostat'
54450 a,s    sudo ln -s '/usr/share/munin/plugins/iostat_ios' '/etc/munin/plugins/iostat_ios'
54460
54470   ○    ネットワーク統計の詳細情報をグラフ化するプラグインを有効化します。
54480
54490 a,s    sudo ln -s '/usr/share/munin/plugins/netstat_multi' '/etc/munin/plugins/netstat_multi'
54500
54510   ○    DRBD の稼働状況をグラフ化するプラグインを有効化します。
54520
54530 a,s    sudo ln -s '/usr/share/munin/plugins/drbd' '/etc/munin/plugins/drbd'
54540 a,s    sudo ln -s '/usr/share/munin/plugins/drbd_al' '/etc/munin/plugins/drbd_al'
```

```
54550 a,s   sudo ln -s '/usr/share/munin/plugins/drbd_ext' '/etc/munin/plugins/drbd_ext'
54560
54570   ○   Munin にホスト名を登録します。
54580
54590 a,s   sudo sed -i -e "s/^host_name .*¥$/host_name $(uname -n)/" /etc/munin/munin-node.conf
54600 a,s   sudo sed -i -e "s/^¥¥[localhost/[$(uname -n)/" /etc/munin/munin.conf
54610
54620   ○   PrivateTmp 機能を無効化します。
54630
54640 a,s   sudo sed -i -e 's/^PrivateTmp=.*$/PrivateTmp=false/' /usr/lib/systemd/system/munin-node.service
54650 a,s   sudo systemctl daemon-reload
54660
54670   ○   ベーシック認証設定を行います。
54680
54690 a,s   sudo htpasswd -c -b /etc/munin/munin-htpasswd munin 'password'
54700 a,s   sudo htpasswd -b /etc/munin/munin-htpasswd admin 'password'
54710 a,s   sudo htpasswd -b /etc/munin/munin-htpasswd monitor 'password'
54720
54730   ○   LIO の稼働状況をグラフ化するプラグインを有効化します。
54740
54750 a,s   sudo ln -s '/usr/share/munin/plugins/lio_read' '/etc/munin/plugins/lio_read'
54760 a,s   sudo ln -s '/usr/share/munin/plugins/lio_write' '/etc/munin/plugins/lio_write'
54770
54780   ○   Active 機で、Munin 関連サービスを自動起動するように変更し、起動します。
54790
54800    a  sudo systemctl enable munin-node.service
54810    a  sudo systemctl enable httpd.service
54820    a  sudo systemctl start munin-node.service
54830    a  sudo systemctl start httpd.service
54840
54850   ○   数十分待ってから、ブラウザでアクセスし、動作を確認します。
54860
54870    a  # http://10.110.88.57/munin
54880
54890   ○   リソースをスイッチオーバします。
54900
54910    a  sudo pcs resource move g_tgt; sleep 5; sudo pcs resource clear g_tgt
54920
54930   ○   Stand-by 機で、Munin 関連サービスを自動起動するように変更し、起動します。
54940
54950    s  sudo systemctl enable munin-node.service
```

```
54960    s  sudo systemctl enable httpd.service
54970    s  sudo systemctl start munin-node.service
54980    s  sudo systemctl start httpd.service
54990
55000    ○  数十分待ってから、ブラウザでアクセスし、動作を確認します。
55010
55020    s  # http://10.110.88.58/munin
55030
55040    ○  リソースをスイッチバックします。
55050
55060    a  sudo pcs resource move g_tgt; sleep 5; sudo pcs resource clear g_tgt
55070
55080    ○  LIO の統計情報を定期保存する設定を行います。
55090
55100 a, s  sudo mkdir -p /etc/lio
55110 a, s  sudo mkdir -p /var/log/lio/
55120 a, s
55130 a, s  cat << 'EOF' | sudo tee /etc/lio/save
55140 a, s  #!/bin/sh
55150 a, s  FILE=/dev/shm/lio-$(date +%Y%m%d%H%M)
55160 a, s  for i in $(find /sys/kernel/config/target ! -type d | LANG=C sort)
55170 a, s   do echo [$i]; cat $i; echo; done > $FILE 2> /dev/null
55180 a, s  gzip $FILE
55190 a, s  mv $FILE.gz /var/log/lio/
55200 a, s  EOF
55210 a, s  sudo chmod 755 /etc/lio/save
55220 a, s
55230 a, s  cat << 'EOF' | sudo tee /etc/lio/statistics
55240 a, s  #!/bin/sh
55250 a, s  FILE=/dev/shm/lio-statistics-$(date +%Y%m%d%H%M)
55260 a, s  YYYYMMDD=$(echo $FILE | sed -e 's/^.*¥([0-9][0-9][0-9][0-9][0-9][0-9][0-9][0-9]¥)[0-9][0-9][0-9][0-9]$/¥1/')
55270 a, s  for i in $(for k in /sys/kernel/config/target/{core/*/*/,iscsi/*/{fabric_,tpgt_1/{acls/*/{fabric_,*/},lun/*/}}}statistics; do echo $k; done | LANG=C sort)
55280 a, s   do for j in $(find $i ! -type d | LANG=C sort); do echo [$j]; cat $j; echo; done; done > $FILE 2> /dev/null
55290 a, s  gzip $FILE
55300 a, s  mkdir -p /var/log/lio/$YYYYMMDD/
55310 a, s  mv $FILE.gz /var/log/lio/$YYYYMMDD/
55320 a, s  EOF
55330 a, s  sudo chmod 755 /etc/lio/statistics
55340 a, s
55350 a, s  cat << 'EOF' | sudo tee /etc/cron.d/lio
55360 a, s  59 * * * * root nice -n 19 /etc/lio/save
```

```
55370 a,s     * * * * * root nice -n 19 /etc/lio/statistics
55380 a,s     58 23 * * * root nice -n 19 /bin/find /var/log/lio -mtime +365 -print0 | xargs -0 rm -rfv 2> /dev/null
55390 a,s     EOF
55400
```

当文書で紹介した構成で初期構築をご希望の方は、メール(mailto: si@pc-office.net)にてお問い合わせください。
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既に動いている CentOS を置き換えるインストールの場合、ヒアリング事項を弊社で調査して提示することも可能です。
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代理で問い合わせを行うという前提を取らさせていただくことになります。費用はご相談ください。

サーバの調達・CE作業費用、OS 等のライセンス費用、サブスクリプション費用等はすべて別料金となります。

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MySQL や PostgreSQL、Oracle の冗長構成構築サービスも鋭意開発中です。商品開発に関するリクエストがあればお知らせください。
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