BTRFS as root (LVM and raid)

To setup BTRFS on 2 disc, first setup complete system for one disc, then connect 2nd disc and:

1. clone partition layout to 2nd disc
2. add 2nd disc to btrfs
3. rebalance btrfs
4. install grub on 2nd disc
5. configure system to start with degraded disc, include btrfs tools in initramfs

/dev/sdb partitioning

1. /dev/sdb
    1. 1MB free space + alignment
    2. /dev/sdb1 LVM
        1. /dev/disc2/swap2 (4GB)
        2. /dev/disc2/btrfs2 (80GB)
        3. /dev/disc2/pool2 (rest)

NOTE: Compare exact bytes size of 1st and 2nd disc, and adapt partition sizes to smaller disc!
http://serverfault.com/questions/279571/lvm-dangers-and-caveats

Grub on GPT Grub on GPT requires some reserved space to embed itself (core.img) on disc. Otherwise error will be shown:

```
grub-install: warning: this GPT partition label contains no BIOS Boot
Partition; embedding won't be possible.
grub-install: error: embedding is not possible, but this is required for
RAID and LVM install.
```

Small 2MiB partition with flag `bios_grub` is enough. Partition can be located everywhere on disc within 2TiB.

```
apt-get install parted lvm2

parted /dev/sdb
mklabel gpt
mkpart primary ext2 0 2MiB
set 1 bios_grub on
mkpart primary ext2 3MiB -1MiB
set 2 lvm on
```

```
pvcreate /dev/sdb2
lvmdiscscan

vgcreate disc2 /dev/sdb2
lvcreate -L 4GB -n swap2 disc2
lvcreate -L 80GB -n btrfs2 disc2
```

```
lvcreate -l 100%FREE -n pool2 disc2
```

Btrfs setup

NOTE: Create subvolumes for things which shouldn't be included in snapshot of parent volume. Like some /var/../cache, etc

https://wiki.archlinux.org/index.php/Snapper#Suggested_filesystem_layout

```
mkfs.btrfs /dev/disc2/btrfs2
mount -o noatime,compress=lzo,defaults /dev/disc2/btrfs2 /mnt
cd /mnt
btrfs subvolume create @
btrfs subvolume create @/@root
btrfs subvolume create @/@home
btrfs subvolume create @/@var
btrfs subvolume create @/@var/log
btrfs subvolume create @snapshots

btrfs subvolume list /mnt
btrfs subvolume set-default 259 /mnt # set to @/@root id
cd ..
umount /mnt

mkdir /mnt/{home,var,root}
mount -o noatime,compress=lzo,defaults,subvol=@/@root /dev/disc2/btrfs2
/mnt/root
mount -o noatime,compress=lzo,defaults,subvol=@/@home /dev/disc2/btrfs2
/mnt/home
mount -o noatime,compress=lzo,defaults,subvol=@/@var /dev/disc2/btrfs2
/mnt/var

# mount old disc in /mnt/sda1, etc

cp -ax /mnt/sda1/. /mnt/root
# or
# rsync -avxHAXP --numeric-ids /mnt/sda1/ /mnt/root/

cat /proc/mounts >> /mnt/root/etc/fstab
# edit /mnt/root/etc/fstab
```

Install grub loader

```
grub-install --recheck --root-directory=/mnt/root /dev/sdb
```

or

```
mount -t proc none /mnt/root/proc
mount -o bind /dev /mnt/root/dev
```

```
mount -t sysfs sys /mnt/root/sys
mount -o bind /mnt/var /mnt/root/var

chroot /mnt/root /bin/bash
grub-install --recheck /dev/sdb
update-grub
exit
```

umount /mnt/root/{proc,sys,dev,var} umount /mnt/{var,home,root} sync reboot </code>

Encrypted /dev/disc2/pool2 (btrfs)

```
apt-get install cryptsetup
```

Fill with random data https://niziak.spox.org/wiki/linux:fs:luks#fill_with_random_data

```
cryptsetup luksFormat --cipher aes-xts-plain64 --key-size 256 --hash sha256
--verify-passphrase --use-random /dev/disc2/pool2
cryptsetup luksOpen /dev/disc2/pool2 cryptpool
mkfs.btrfs /dev/mapper/cryptpool
mount -o noatime,compress=no /dev/mapper/cryptpool /mnt
```

Create subvolumes:

```
cd /mnt
btrfs subvolume create @pool
...
```

Copy data to `/mnt` Add fstab entry

/etc/fstab

```
/dev/mapper/cryptpool   /POOL        btrfs    noauto,nofail,x-
systemd.device-timeout=60,noatime,defaults,compress=no,subvol=@pool
0    0
```

https://btrfs.wiki.kernel.org/index.php/SysadminGuide#Btrfs_on_top_of_dmcrypt

Add 2nd disc

See BTRFS on multiple devices