How to make disk image with dd on Linux or Unix

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11 comments

How do I create disk image using dd command? How do I perform disk cloning from a live Linux cd for backup or recovery purpose?

You can easily use the dd command for making an image of a partition or an entire hard disk drive. Let us see how to make disk image with dd command on your Linux or Unix machine.

Tutorial details	
Difficulty level	Easy
Root privileges	Yes
Requirements	Linux or Unix terminal
Category	Backup Management
Prerequisites	dd command
OS compatibility	*BSD • Linux • Unix • macOS
Est. reading time	4 minutes

What is a dd disk image?

Disk cloning is nothing but a mere process of creating an image of an entire disk. This can be useful for copying disks, backups, recovery and more. The dd command is easy to use tool for making such clones on your Linux, BSD, macOS or Unix-like systems.

WARNING! These examples may crash your computer if executed. The nixCraft or author is not responsible for data loss. You should be very careful when using the dd command; it can destroy data. Remember the input file order (`if=`) and output file (`of=`). Typically we boot from a live USB or DVD and create disk images. However, if you have multiple disks, it is possible to do it online.

How to clone an entire hard disk

The syntax is as follow to make disk image with dd:

```
dd if=/dev/input/DEVICE-HERE of=/dev/OUTPUT/DEVICE-HERE bs=64K
conv=noerror,sync
```

To clone /dev/sdc (250G) to /dev/sdd (250G) in Linux, enter:

```
# dd if=/dev/sdc of=/dev/sdd bs=64K conv=noerror,sync
```

In this example, I am going to clone /dev/ada0 (250G) to /dev/adb0 (250G) in
FreeBSD and make an image using dd. For example:

```
# dd if=/dev/ada0 of=/dev/adb0 bs=64K conv=noerror,sync
```

Where,

1. `if=/dev/file` : Input device/file.

2. `of=/dev/file` : Output device/file.

3. `bs=64k` : Sets the block size to 64k. You can use 128k or any other value.

4. `conv=noerror` : Tell dd to continue operation, ignoring all read errors.

5. `sync` : Add input blocks with zeroes if there were any read errors, so data offsets
   stay in sync.

How to clone a partition and make disk image with dd

To clone /dev/sdc1 to /dev/sdd1 with dd and create an image, enter:

```
# dd if=/dev/sdc1 of=/dev/sdd1 bs=128K conv=noerror,sync
```

Sample outputs:

```
15874+0 records in

15873+0 records out

1040252928 bytes transferred in 3.805977 secs (273320858 bytes/sec)
```

Making disk image with dd using live CD/DVD or USB pen drive

You can boot from a live cd or USB pen drive. Once booted, make sure no partitions are mounted from the source hard drive disk. You can store disk image on an external USB disk. The syntax is as follows

```
dd if=/dev/INPUT/DEVICE-NAME-HERE conv=sync,noerror bs=64K | gzip -c >
/path/to/my-disk.image.gz
```

In this example, create disk image for /dev/da0 i.e. cloning /dev/da0 and save in the current directory:

```
# dd if=/dev/da0 conv=sync,noerror bs=128K | gzip -c > centos-core-7.gz
```
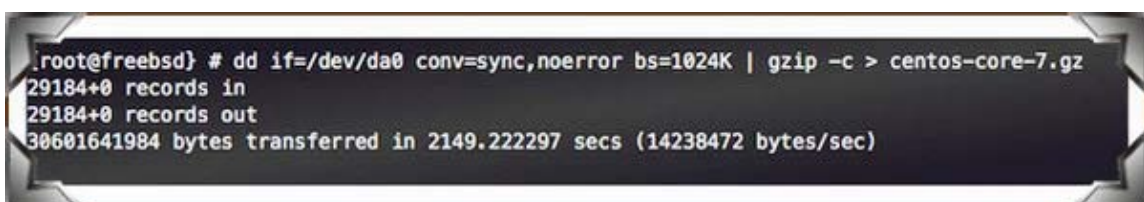

Fig.01: dd command in action

The above command just cloned the entire hard disk, including the MBR, bootloader, all partitions, UUIDs, and data.

How to restore system (dd image)

The syntax is:

```
# gunzip -c IMAGE.HERE-GZ | dd of=/dev/OUTPUT/DEVICE-HERE
```

For example:

```
# gunzip -c centos-core-7.gz | dd of=/dev/da0
```

Tip #1: Not enough disk space locally? Use the remote box

You can send the image through ssh and save it on the remove box called server1.cyberciti.biz:

```
# dd if=/dev/da0 conv=sync,noerror bs=128K | gzip -c | ssh
vivek@server1.cyberciti.biz dd of=centos-core-7.gz
```

Tip #2: See progress while making an image with dd

You need to use GNU/BSD dd with coreutils version 8.24 as follows (pass the `status=progress` to the dd):

```
# dd if=/dev/sdc1 of=/dev/sdd1 bs=128K conv=noerror,sync status=progress
```


gdd (GNU DD) in action with progress bar running on MacOS X

Tip #3: Save extra information

- See how to save and restore MBR only.

- Not a fan of dd? See top 6 open source disk cloning and imaging software.

- Want to deal with corrupted disk under Linux or UNIX? Try the ddrescue command.

Summing up

I hope this quick tutorial helps someone with disk and partition cloning under Linux and making disk images with the dd command. For more info see the following manual pages using the man command or help command:

```
$ man dd
```

About the author: Vivek Gite is the founder of nixCraft, the oldest running blog about Linux and open source. He wrote more than 7k+ posts and helped numerous readers to master IT topics. Join the nixCraft community via RSS Feed, Email Newsletter or follow on Twitter.

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