

How to Monitor Progress of (Copy/Backup/Compress) Data using 'pv' Command

Aaron Kili | Last Updated: July 14, 2023 | Read Time: 4 mins | [Linux Commands](#) | [27 Comments](#)

When making backups, and [copying/moving large files](#) on your Linux system, you may want to monitor the progress of an ongoing operation. Many terminal tools do not have the functionality to allow you to view progress information when a command is running in a pipe.

You might also like:

- [Advanced Copy Command – Shows Progress While Copying Large Files in Linux](#)
- [Progress – Show Progress for \(cp, mv, dd, tar\) Commands in Linux](#)
- [How to Copy Files and Directories in Linux \[14 cp Command Examples\]](#)

```
tecmint OpenSuse # pv opensuse.vdi > /tmp/opensuse.vdi
1.02e+03MB 0:00:03 [1.32MB/s] [=====>] 46% ETA 0:00:03
1.02e+03MB 0:00:06 [ 628kB/s] [=====>] 47% ETA 0:00:06
1.02e+03MB 0:00:07 [ 268kB/s] [=====>] 47% ETA 0:00:07
2.11GB 0:00:55 [38.8MB/s] [=====>] 100%
tecmint OpenSuse #
```

Monitor Progress of (Copy/Backup/Tar) Files using 'pv' Command in Linux



Show Copy/Backup/Tar File Progress Bar in Linux

In this article, we shall look at an important Linux/Unix command called **pv** – Pipe Viewer.

Pv is a terminal-based tool that allows you to monitor the progress of data that is being sent through a pipe. When using the **pv** command, it gives you a visual display of the following information:

- The time that has elapsed.
- The percentage completed includes a progress bar.
- Shows current throughput rate.
- The total data transferred.
- and the ETA (estimated Time).

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How to Install pv Command in Linux?

The **pv** command is not installed by default on most Linux distributions, therefore you can install it by following the steps below.

Install pv on RHEL-based Linux

First, you need to turn on the [EPEL repository](#) and then run the following [yum](#) or [dnf](#) command to install it.

```
# yum install pv
OR
# dnf install pv
```

Install pv on Debian-based Linux

```
$ sudo apt-get install pv
```

Install pv on Other Linux Distributions

```
$ sudo emerge -a pv           [On Gentoo Linux]
$ sudo apk add pv             [On Alpine Linux]
$ sudo pacman -S pv           [On Arch Linux]
$ sudo zypper install pv      [On OpenSUSE]
```

How Do I Use pv Command in Linux?

pv is mostly used with other programs which lack the ability to monitor the progress of an ongoing operation. You can use it, by placing it in a pipeline between two processes, with the appropriate options available.

The standard input of pv will be passed through to its standard output and progress (output) will be printed on standard error. It has a similar behavior to the [cat command](#) in Linux.

The syntax of the pv command is as follows:

```
$ pv file
$ pv options file
$ pv file > filename.out
$ pv options | command > filename.out
$ comand1 | pv | command2
```

The options used with `pv` are divided into three categories, display switches, output modifiers and general options.

Pv Display Modifiers Options

Some options are under display modifiers.

- To turn on the display bar, use the `-p` option.
- To view the elapsed time, use the `--timer` option.
- To turn on the ETA timer which tries to guess how long it will take before the completion of an operation, use the `--eta` option. The guess is based on previous transfer rates and the total data size.
- To turn on a rate counter use the `--rate` option.
- To display the total amount of data transferred so far, use the `--bytes` option.
- To display progress information of integer percentage instead of visual indication, use the `-n` option. This can be good when using `pv` with the `dialog` command to show progress in a dialog box.

Pv Display Modifiers Options

Some options are under output modifiers.


- To wait until the first byte is transferred before displaying progress information, use the `--wait` option.
- To assume the total amount of data to be transferred is `SIZE` bytes when computing percentage and ETA, use `--size SIZE` option.
- To specify seconds between updates, use the `--interval SECONDS` option.
- Use `--force` option to force an operation. This option forces `pv` to display visuals when standard error is not a terminal.
- The general options are `--help` to display usage information and `--version` to display version information.

Pv Command with Examples in Linux

1. When no option is included, `pv` commands run with the default `-p`, `-t`, `-e`, `-r` and `-b` options.

For example, to copy the `opensuse.vdi` file to `/tmp/opensuse.vdi`, run this command and watch the progress bar in the screencast.

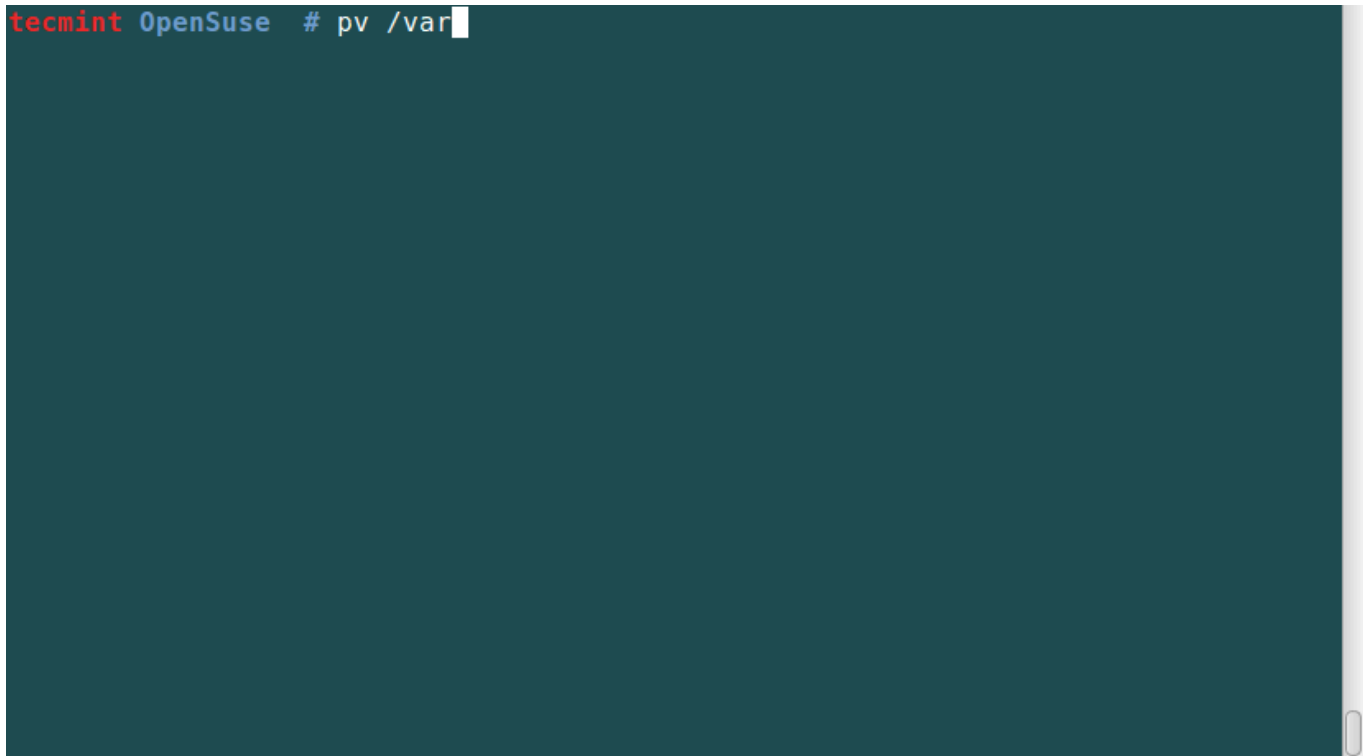
```
# pv opensuse.vdi > /tmp/opensuse.vdi
```



```
tecmin OpenSuse # pv opensuse.vv
```

2. To make a zip file from your `/var/log/syslog` file, run the following command.


```
# pv /var/log/syslog | zip > syslog.zip
```



```
tecmin OpenSuse # pv /var
```

3. To count the number of lines, words, and bytes in the `/etc/hosts` file while showing the progress bar only, run this command below.

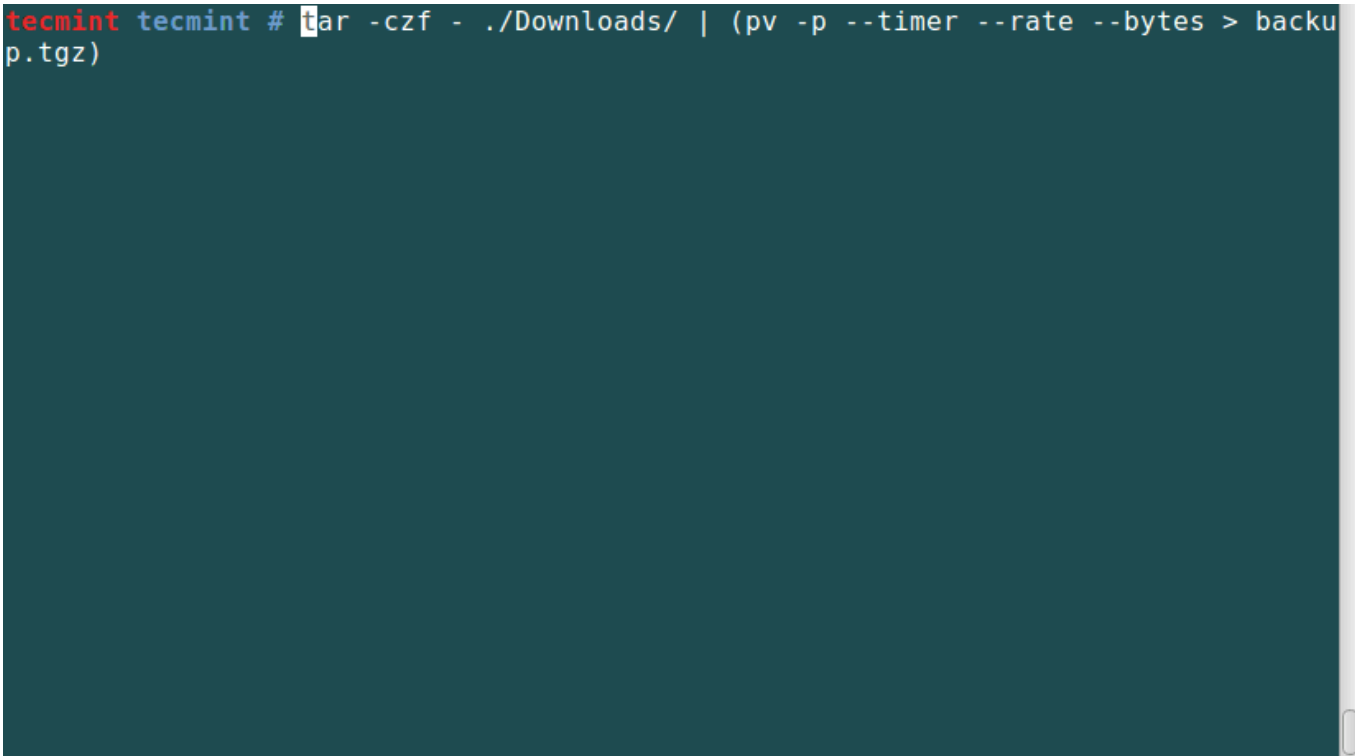
```
# pv -p /etc/hosts | wc
```



```
tecmin etc # pv -p
```

4. Monitor the progress of creating a backup file using the [tar utility](#).

```
# tar -czf - ./Downloads/ | (pv -p --timer --rate --bytes > backup.tgz)
```



A terminal window with a dark teal background. The prompt is 'tecmin tecmint #'. The command entered is 'tar -czf - ./Downloads/ | (pv -p --timer --rate --bytes > backup.tgz)'. The command is partially highlighted with a blue selection box.

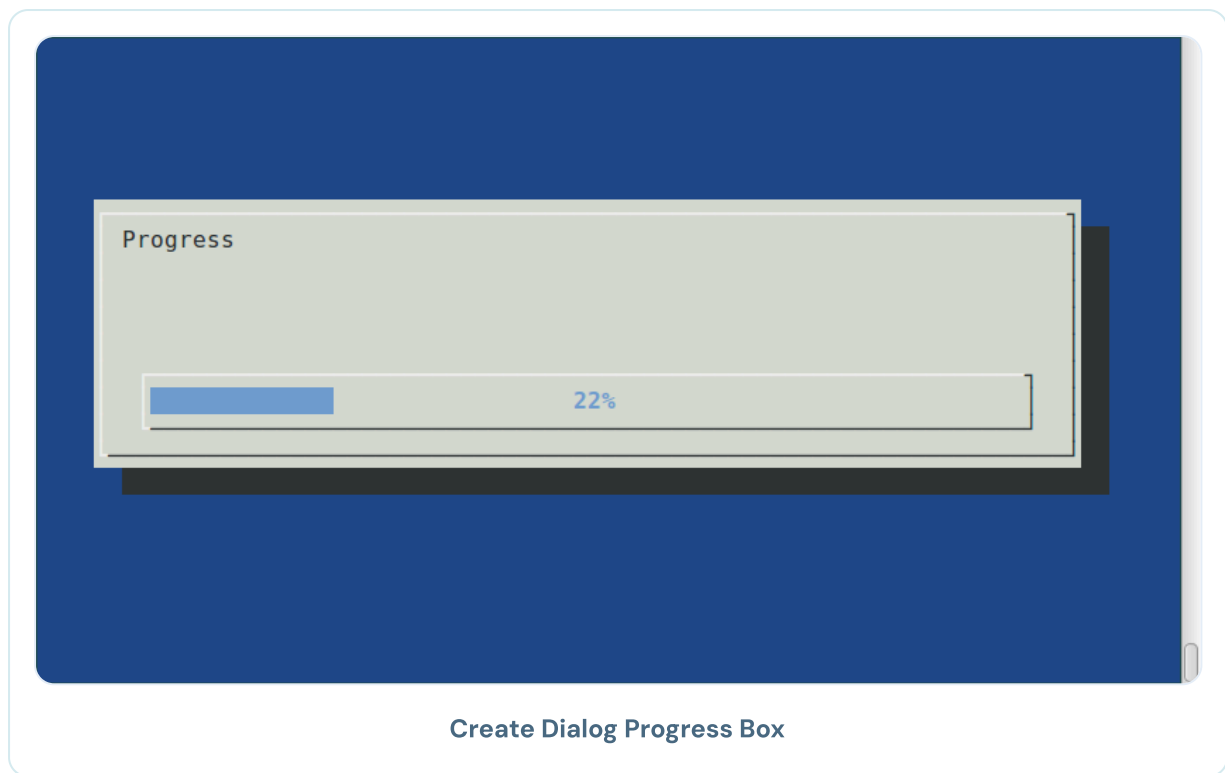
5. In the example, we use the dd command to write the ISO file to the USB flash drive:

```
# dd if=debian-10.11.0-amd64-DVD-1.iso | pv | dd of=/dev/sda bs=4M
```

6. Using pv and dialog terminal-based tool together to create a dialog progress bar as follows.

```
# tar -czf - ./Documents/ | (pv -n > backup.tgz) 2>&1 | dialog --gauge "Pro
```





Summary

This is a good terminal-based tool that you can use with tools that do not have the ability, to monitor the progress of operations such as coping/moving/backing up files, for more options check man pv.

I hope you find this article helpful and you can post a comment if you have any ideas to add about using the pv command. And if you get any errors while using it, you can as well leave a comment.

Related Linux Commands:

- [21 Tar Command Examples in Linux](#)
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Aaron Kili

Aaron Kili is a Linux and F.O.S.S enthusiast, an upcoming Linux SysAdmin, web developer, and currently a content creator for TecMint who loves working with computers and strongly believes in sharing knowledge.

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```
tecmin@tecmin ~/testing $ find . -type f \( -name "*.txt" -o -  
name "*.sh" -o -name "*.c" \)  
./emails.txt  
./script-1.sh  
./header.c  
./examples.txt  
./script.sh  
./expenses.txt
```

Find Multiple Filenames (File Extensions) Using 'find' Command in Linux

How to Search Files by Name or Extension Using find Command



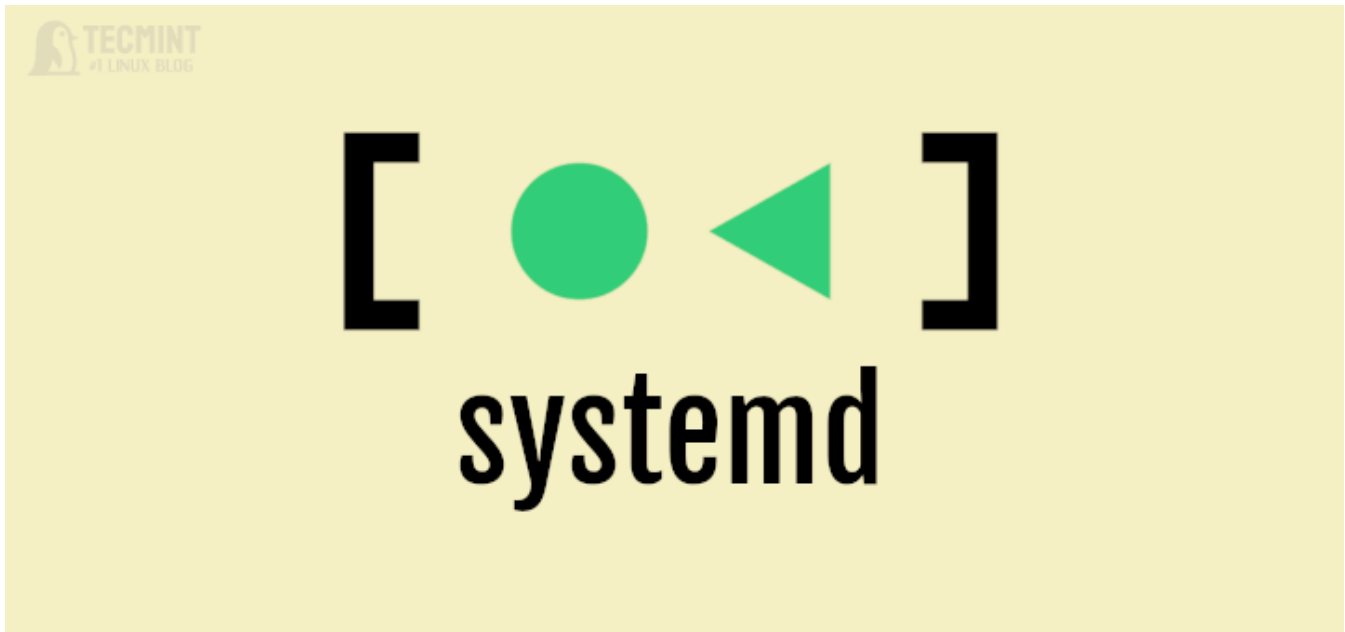
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```
TecMint.com
ravi@TecMint:~/glibc-2.39/build$
ravi@TecMint:~/glibc-2.39/build$ ../configure --prefix=/usr/local/glibc-2.39
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for gcc... gcc
checking for suffix of object files... o
checking whether the compiler supports GNU C... yes
checking whether gcc accepts -g... yes
checking for gcc option to enable C11 features... none needed
checking for g++... g++
checking whether the compiler supports GNU C++... yes
checking whether g++ accepts -g... yes
checking for g++ option to enable C++11 features... none needed
checking whether g++ can link programs... yes
checking for sysdeps preconfigure fragments... aarch64 alpha arc arm csky hppa i386 loong
arch m68k microblaze checking for grep that handles long lines and -e... /usr/bin/grep
checking for egrep... /usr/bin/grep -E
mips nios2 orlk powerpc riscv s390 sh checking for grep that handles long lines and -e...
(cached) /usr/bin/grep
```

How to Install and Run Multiple glibc Libraries in Linux

 **27 Comments**

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Tom

June 24, 2024 at 2:09 pm

I actually cannot understand why tracking progress is not a default crucial feature of every tool made for Linux. You always need workarounds like ``pv`` (pipe viewer) and other existing solutions.

By the way, I dislike that many basic features in Linux require writing your own code or searching for one on the internet. The problem is, I have to analyze that code first because I don't want to run any code without knowing what it does. It's a total waste of user time.

[Reply](#)

Admin



Ravi Saive

June 24, 2024 at 2:15 pm

@Tom,

It can be frustrating when basic features like progress tracking aren't built into Linux tools by default. Using tools like ``pv`` helps, but I agree, having more built-in functionalities would be more convenient.

The need to write or analyze code for basic tasks can indeed feel like a waste of time.

[Reply](#)



red

April 6, 2020 at 5:28 am

Can you explain `pv` with `cp` command? I can't seem to get it working.

[Reply](#)**kk**

June 10, 2018 at 7:54 am

Is there any reason why pv might slow things down? See example below:

```
time pigz -dk MYSQL_BACKUP_2018-06-08-17\26\15.sql.gz | mysql -pmetatest
```

Warning: Using a password on the command line interface can be insecure.

```
real 0m29.868s
```

```
user 0m5.108s
```

```
sys 0m2.020s
```

```
time pv MYSQL_BACKUP_2018-06-08-17\26\15.sql.gz | pigz -d | mysql -pmetatest
```

Warning: Using a password on the command line interface can be insecure.

```
215MiB 0:01:16 [2.81MiB/s]
```

```
[=====
===>] 100%
```

```
real 1m16.837s
```

```
user 0m13.868s
```

```
sys 0m2.392s
```

[Reply](#)**Aaron Kili**

June 11, 2018 at 8:58 pm

@kk

This is quite interesting! We have to investigate this further, to come up with a solid conclusion. Many thanks for sharing this concern.

[Reply](#)

xrkr

September 8, 2018 at 11:33 am

Hello Aaron/Kk,

Was there any conclusion? We observed a similar lag while using pv command to transfer the files over the p2p network. The pv command didn't return to the command prompt quickly while over the LAN it was quick.

[Reply](#)

Ronald Trumpet

November 3, 2017 at 9:47 pm

>> On FreeBSD Linux

Nice joke.

[Reply](#)



Aaron Kili

November 6, 2017 at 11:23 am

@Ronald

Oops, nice catch, we will correct it as soon as possible.

[Reply](#)

gosh

August 27, 2016 at 6:29 pm

Formating hard disk with dd command using pv:

```
# dd if=/dev/zero | pv -pbtr -s 120033041920 | dd of=/dev/sdX
```

note: 120033041920 bytes is exact size of the disk, get your with **fdisk -l**
sdX is the disk you want to dd, change X with your letter- a, b, c...

[Reply](#)

Admin



Ravi Saive

August 29, 2016 at 12:33 pm

@Gosho,

Thanks for the useful tip about dd command with pv, sounds great, will create a short article on same. Else, you can also create a short 300 words article on same, if you want we will publish the article under you name in Tecmint..

[Reply](#)

Yoander

June 8, 2016 at 8:05 pm

please could you tell us what is the meaning of: -t, -e, -r and -b options?

[Reply](#)

Admin

**Ravi Saive**

June 9, 2016 at 11:11 am

@Yoander,

To know about those options, I suggest you to read man pages of pv command as shown:

```
# man pv
```

[Reply](#)**Alagirisamy**

March 28, 2016 at 4:57 pm

I am getting the below error while copying 4 Gb files from workstation to pendrive

```
[root@crack home]# ls
```

```
Alagiri CentOS-7-x86_64-DVD-1602-01.iso Dvois lost+found
```

```
[root@crack home]# pv CentOS-7-x86_64-DVD-1602-01.iso >
```

```
/media/ammu/CentOS-7-x86_64-DVD-1602-01.iso
```

```
pv: write failed: File too
```

large=====

=====>] 97% ETA 0:00:26

You have new mail in /var/spool/mail/root

[Reply](#)

Admin



Ravi Saive

March 29, 2016 at 11:29 am

@Alagirisamy,

I think pv not able to read if files are larger while copying, let me report to the author of pv command, it seems to me a bug...

[Reply](#)

gekO

July 6, 2016 at 9:21 pm

Are you sure that your pendrive is not formatted on fat32 and the error is caused by limitations of it?

[Reply](#)



Aaron Kili K

July 7, 2016 at 12:45 pm

@gekO

If that is not the case, as you have pointed out, then, it is probably a bug.

[Reply](#)**R**

December 30, 2015 at 10:31 pm

New version of coreutils (8.24) adding a status progress to dd tool:

Usage on Xubuntu 15.10:

Open terminal shell and type these commands:

```
wget http://ftp.gnu.org/pub/gnu/coreutils/coreutils-8.24.tar.xz
```

```
tar -xf coreutils-8.24.tar.xz
```

```
cd coreutils-8.24
```

```
./configure && make -j $(nproc)
```

Run dd as root:

```
sudo ./dd if=/dev/sdc of=/dev/sda conv=noerror status=progress
```

You will see: Bytes, Seconds and Velocity (Bytes/seconds)

To check versions of dd:

Native:

```
dd -version
```

New (cd coreutils-8.24/src):

```
./dd -version
```

[Reply](#)

**Ravi Saive**

December 31, 2015 at 10:57 am

@Robson,

Thanks for sharing the tip with us, hope it will help other fellow readers..

[Reply](#)**tom-erik**

January 7, 2016 at 1:18 pm

Thanks for the tip

[Reply](#)**Tobi**

October 9, 2015 at 11:12 pm

Check the network speed between two computers with 'netcat' and without utilizing a harddisk:

At the first computer do a:

```
netcat -l -p 1234 | pv > /dev/null
```

Then go to the second computer and type:

```
cat /dev/zero | pv | netcat ip_of_first_computer 1234
```

Helped me to identify slow network switches.

[Reply](#)

Admin

**Ravi Saive**

October 10, 2015 at 10:57 am

@Tobi,

Thanks for the tip, hope we will include this tip in our upcoming [Linux Tricks and Tips](#) series....:)

[Reply](#)**Emiliano**

October 7, 2015 at 1:41 am

Another GREAT use of "pv" is using it with "dd".
works great for me.

```
dd if=/dev/sda1 | pv | dd of=/home/user/backup.iso
```

Definitely it's a "must" for "dd". This process always take a long time to finish.

Great article.

[Reply](#)

Admin

**Ravi Saive**

October 7, 2015 at 11:33 am

@Emiliano,

Thanks for the tip on pv with dd, hope it useful to other readers....:)

[Reply](#)**Josmell Jimenez**

October 5, 2015 at 8:22 pm

Excellent as always, great and easy explanation for every newbie and advanced linux user.

Keep it up!

[Reply](#)**Aaron Kili K**

October 6, 2015 at 2:55 pm

@Josmell Jimenez thanks for appreciating.

[Reply](#)**Jon Loveless**

October 4, 2015 at 8:23 pm

excellent tutorial on pv. I loved the video examples. It just doesn't any more clear than that! thanks.

[Reply](#)

**Aaron Kili K**

October 5, 2015 at 2:53 pm

@Jon Loveless thank you, you will always get such on Tecmint.

[Reply](#)

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