

In His Name



Sharif University of Technology
Department of Computer Engineering

Operating Systems

Working with Linux fio Command
&
Expanding Disk Size on VMware Virtual Machine

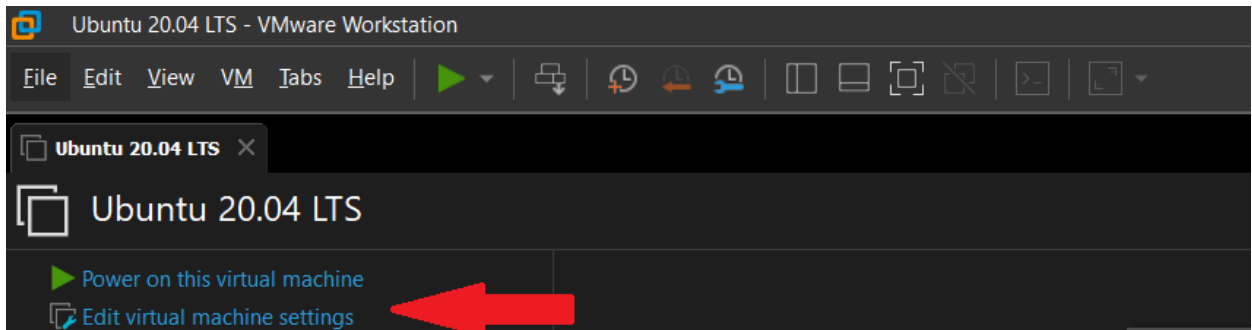
Dr. Hossein Asadi

CE424

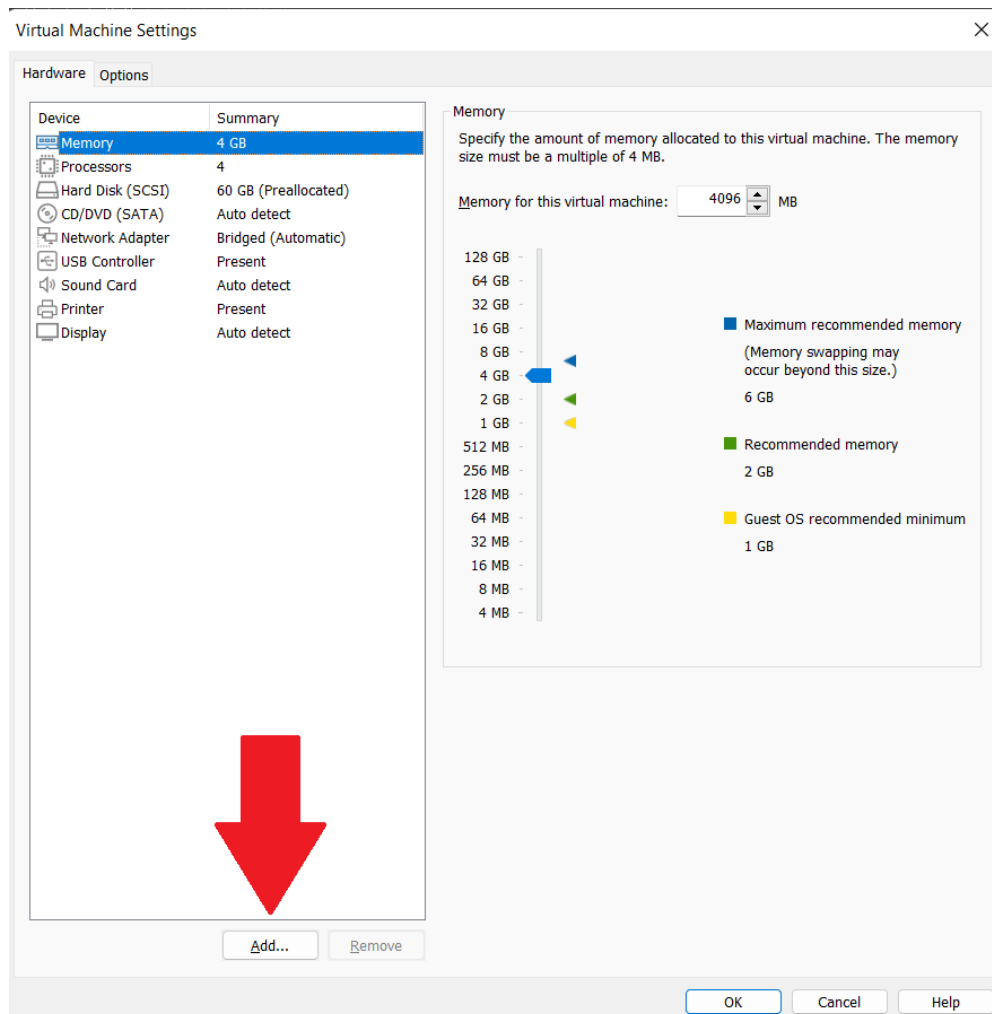
Fall 2022

• Expanding Disk Size on VMware

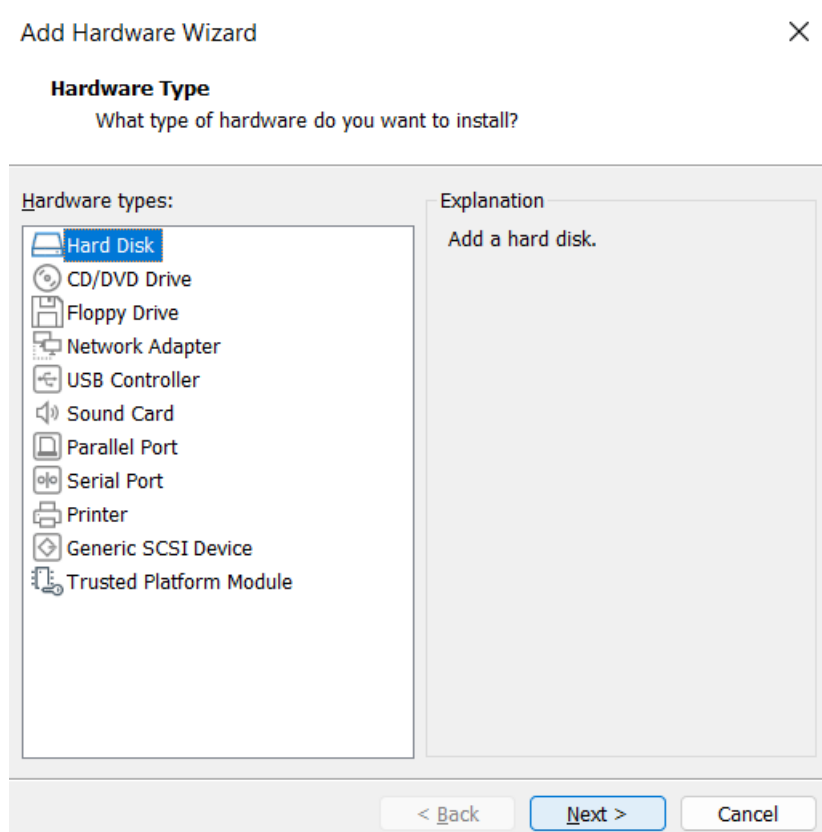
- 1) Power off your virtual machine.
- 2) Select 'Edit virtual machine settings'.



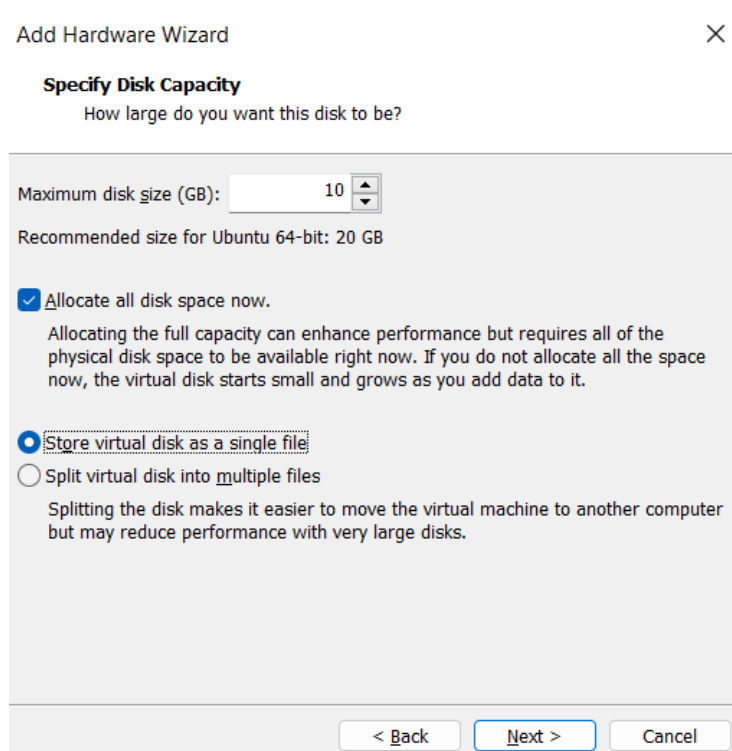
- 3) Select 'Add' button on the opened window.

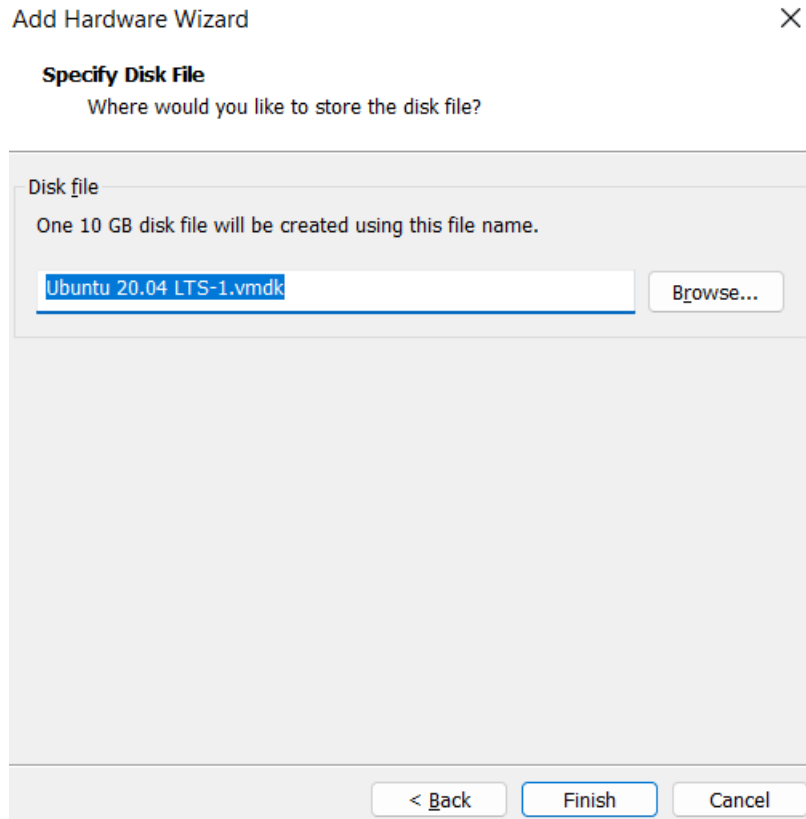


4) Select 'Hard Disk' and click 'Next'.

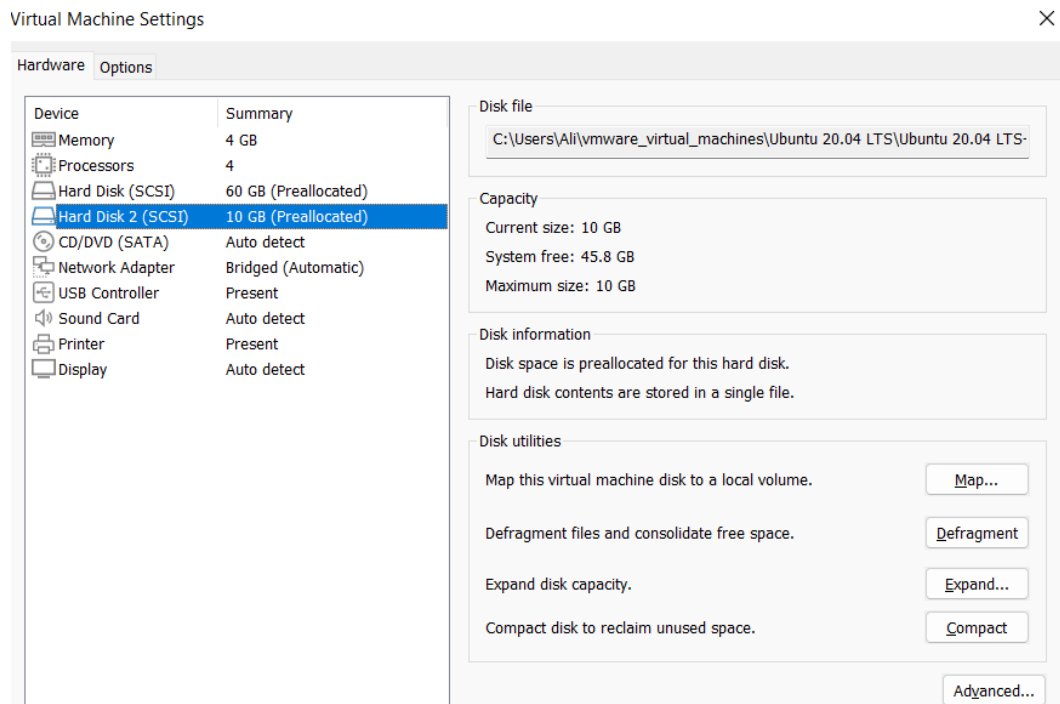


5) Select 'Next' in upcoming windows. At last, you must enter the amount of disk size in GB and give it a name and finish.





6) As you can see, a new hard drive is added to your hardware list.



7) Power on your VM.

8) Type 'lsblk -f' in the terminal and see the changes made to your drives list. A new drive is added to the list.

```
ali@ali-virtual-machine:~$ lsblk -f
NAME        FSTYPE  LABEL  UUID                                FSAVAIL  FSUSE%  MOUNTPOINT
loop0       squashfs                                0         100%    /snap/core18/1988
loop1       squashfs                                0         100%    /snap/gnome-3-34-1804/66
loop2       squashfs                                0         100%    /snap/gtk-common-themes/1514
loop3       squashfs                                0         100%    /snap/snapd/11036
loop4       squashfs                                0         100%    /snap/snap-store/518
sda
├─sda1      ext4      cb6d34e0-007f-4d3d-84ed-3e48ede1c6ef  805.5M    8%    /boot
├─sda2
├─sda5      swap      bdc122d9-c993-435b-bbe0-49d90131d9cd          [SWAP]
├─sda6      ext4      f8c06aee-80b9-45a3-aa63-a58ffa2da1f0   29.1G    15%    /
└─sda7      ext4      45aead91-6c86-49b7-8eb9-365c4541ec36   16.5G    1%    /home
sdb
sr0
ali@ali-virtual-machine:~$ |
```

***** The output does not show any info like mountpoint, size or UUID. This is because it's not formatted by any filesystem and works on the block level.**

- **Installing fio Command**

```
~$ sudo apt install fio
```

- **Executing Random Write with fio**

```
~$ sudo fio --filename=/dev/sdb --direct=1 --rw=randwrite --bs=4k  
--ioengine=libaio --iodepth=4 --numjobs=5 --group_reporting --  
io_size=1G --size=5G --name=iops-test-job --eta-newline=1 --  
output=random-write.txt
```

- **Important fio Command Options**

--filename

A name given to the file that fio builds and uses to read/write data. Its name is based on the job name, thread number, and file number.

***Be careful with the path given to this parameter. The drive of the path must be working on the **block level**. Otherwise, can damage your drive or delete the filesystem and all of your data!

--direct

Refers to the direct I/O mechanism. If the value is set to true, uses non-buffered I/O.

--rw

Type of I/O pattern. Accepted values are: read, write, trim, randread, randwrite, randtrim, rw(readwrite), randrw.

--bs

The block size in bytes, used for I/O units. Default: 4096 (4k). A single value applies to reads, writes, and trims. Comma-separated values may be specified for reads and writes.

`--numjobs`

Creates the specified number of clones of the job. Each clone of the job is spawned as an independent **thread** or **process**. May be used to set up a larger number of threads/processes doing the same thing. Each thread is reported separately.

`--size`

The total size of file I/O for each thread of this job. Fio will run until this many bytes have been transferred, unless runtime is limited by other options (such as runtime, for instance, or increased/decreased by `io_size`). If `size=20%` is given, fio will use 20% of the full size of the given files or devices.

`--io_size`

With this option, it is possible to define just the amount of I/O that fio should do. For instance, if the size is set to 20GB and `io_size` is set to 5GB, fio will perform I/O within the first 20GB but exit when 5GB has been done. The opposite is also possible - if the size is set to 20GB, and `io_size` is set to 40GB, then fio will do 40GB of I/O within the 0 to 20GB region.

`--runtime`

Tells fio to terminate processing after the specified period of time. It can be quite hard to determine for how long a specified job will run, so this parameter is handy to cap the total runtime to a given time. When the unit is omitted, the value is set to seconds.

Good Luck!