Expanding the size of your WSL2 Virtual Hard Disk

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WSL 2 uses a Virtual Hard Disk (VHD) to store your Linux files. In WSL 2, a VHD is represented on your Windows hard drive as a .vhdx file.

The WSL 2 VHD uses the ext4 file system. This VHD automatically resizes to meet your storage needs and has an initial maximum size of 256GB. If the storage space required by your Linux files exceeds this size you may need to expand it. If your distribution grows in size to be greater than 256GB, you will see errors stating that you've run out of disk space. You can fix this error by expanding the VHD size.

Pre-Requisites

- Terminate all WSL instances using the command:

```
wsl --shutdown
```

- Finding your distribution installation package name ('PackageFamilyName'):
  - Using PowerShell (where 'distro' is your distribution name) enter the command:
  - Get-AppxPackage -Name "" | Select PackageFamilyName

```
Get-AppxPackage -Name "*Ubuntu*" | Select PackageFamilyName
```

Sample Output

```
PS C:\Users\vvadlamu> Get-AppxPackage -Name "*Ubuntu*" | Select PackageFamilyName
PackageFamilyName
-----------------
CanonicalGroupLimited.Ubuntu16.04onWindows_79rhkp1fndgsc
CanonicalGroupLimited.Ubuntu18.04onWindows_79rhkp1fndgsc
```

- Path to VHDX File will be `%LOCALAPPDATA%\Packages\${PackageFamilyName}\LocalState\ext4.vhdx`

Note: PackageFamilyName can be taken from the previous command.

There are 2 Steps involved for Increasing the Existing VHDX Size from 256GB to more siz.

- Step1 : Need to increase the VHDX Size . This is done using 'diskpart'
- Step2: After increasing the VHDX size its necessary to expand the filesystem. This is done by 'resize2fs'

Step 1: Increasing the VHDX Size.

1. To enter into the DiskPart run the following Command.

Command:

```
diskpart
```

Sample Output:

```
C:\WINDOWS\system32>diskpart
Microsoft DiskPart version 10.0.19041.964
Copyright (C) Microsoft Corporation.
On computer: IND6R0JVP2
```

1. Selecting VDISK of the Distro for which we need to Increase the Size in the DiskPart console.

Command:

```
Select vdisk file=%LOCALAPPDATA%\Packages\CanonicalGroupLimited.Ubuntu18.04onWindows_79rhkp1fndgsc\LocalState\ext4.vhdx
```

Note: In the below command, We're using the Ubuntu 18.04 to Increase the VHDX Size

Sample Output:

```
DISKPART> Select vdisk file=%LOCALAPPDATA%\Packages\CanonicalGroupLimited.Ubuntu18.04onWindows_79rhkp1fndgsc\LocalState\
DiskPart successfully selected the virtual disk file.
```

1. Getting the details of the current selected VDISK.

Command:

```
detail vdisk
```

Sample Output:

```
DISKPART> detail vdisk
Device type ID: 0 (Unknown)
Vendor ID: {00000000-0000-0000-0000-000000000000} (Unknown)
State: Added
Virtual size:  256 GB
Physical size: 4429 MB
Filename: C:\Users\CDSID\AppData\Local\Packages\CanonicalGroupLimited.Ubuntu18.04onWindows_79rhkp1fndgsc\LocalState\ext
Is Child: No
Parent Filename:
Associated disk#: Not found.
```

1. Expanding the VDISK Size from default Size(256 GB) to More Size.

Command:

```
expand vdisk maximum=512000
```

Note: In the above command We're increasing the VHDX Size to ~512GB

Sample Output:

```
DISKPART> expand vdisk maximum=512000
100 percent completed
DiskPart successfully expanded the virtual disk file.
```

1. Checking Details on the Increased Size:

Command:

```
detail vdisk
```

Note: In the below output, you can find the increased size of the VHDX Size.

Sample Output:

```
DISKPART> detail vdisk
Device type ID: 0 (Unknown)
Vendor ID: {00000000-0000-0000-0000-000000000000} (Unknown)
State: Added
Virtual size:  500 GB
Physical size: 4433 MB
Filename: C:\Users\vvadlamu\AppData\Local\Packages\CanonicalGroupLimited.Ubuntu18.04onWindows_79rhkp1fndgsc\LocalState\
Is Child: No
Parent Filename:
Associated disk#: Not found.
```

1. Exit the Disk Part.

Command:

```
exit
```

Sample Output:

```
DISKPART> exit
Leaving DiskPart...
```

Step 2: Expanding the File System.

1. Launch your WSL distribution, and get the Exiting Size of the Partitions. *Command:*

```
df -h
```

Sample Output:

```
vvadlamu@IND6R0JVP2:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda        251G  4.3G  234G   2% /
tmpfs           1.5G     0  1.5G   0% /mnt/wsl
tools           365G  278G   87G  77% /init
none            1.5G     0  1.5G   0% /dev
none            1.5G  8.0K  1.5G   1% /run
none            1.5G     0  1.5G   0% /run/lock
none            1.5G     0  1.5G   0% /run/shm
none            1.5G     0  1.5G   0% /run/user
tmpfs           1.5G     0  1.5G   0% /sys/fs/cgroup
C:\             365G  278G   87G  77% /mnt/c
D:\             100G   46G   55G  46% /mnt/d
```

1. Make WSL aware that it can expand its file system's size by running these commands from your WSL distribution command line.

Command:

```
sudo mount -t devtmpfs none /dev
mount | grep ext4
```

Note:

- You may see this message in response to the first mount command: "/dev: none already mounted on /dev." This message can safely be ignored.

Sample Output:

```
vvadlamu@IND6R0JVP2:~$ sudo mount -t devtmpfs none /dev
[sudo] password for vvadlamu:
mount: /dev: none already mounted on /dev.
vvadlamu@IND6R0JVP2:~$ mount | grep ext4
/dev/sda on / type ext4 (rw,relatime,discard,errors=remount-ro,data=ordered)
```

1. Resizing the Disk to the Increased Size. *Command:*

```
sudo resize2fs /dev/sdX 512000M
```

Note:

- Copy the name of this entry, which will look like: /dev/sdX (with the X representing any other character) from the above command.
- In this case the Value of X is a

Sample Output:

```
vvadlamu@IND6R0JVP2:~$ sudo resize2fs /dev/sda 512000M
resize2fs 1.44.1 (24-Mar-2018)
```

```
Filesystem at /dev/sda is mounted on /; on-line resizing required
old_desc_blocks = 32, new_desc_blocks = 63
The filesystem on /dev/sda is now 131072000 (4k) blocks long.
```

Important: If the output is resize2fs command not found. You may need to install resize2fs. Command to install resize2fs

```
sudo apt install resize2fs
```

1. Check the New Size of the Partitions. *Command:*

```
df -h
```

Sample Output:

```
vvadlamu@IND6R0JVP2:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda        492G  4.4G  465G   1% /
tmpfs           1.5G     0  1.5G   0% /mnt/wsl
tools           365G  278G   87G  77% /init
none            1.5G     0  1.5G   0% /dev
none            1.5G  8.0K  1.5G   1% /run
none            1.5G     0  1.5G   0% /run/lock
none            1.5G     0  1.5G   0% /run/shm
none            1.5G     0  1.5G   0% /run/user
tmpfs           1.5G     0  1.5G   0% /sys/fs/cgroup
C:\             365G  278G   87G  77% /mnt/c
D:\             100G   46G   55G  46% /mnt/d
```

References:

1. https://docs.microsoft.com/en-us/windows/wsl/vhd-size

You can use `devNext --help` or `devNext <command> --help` for more options/help

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