

# Compile FUNWAVE on Windows 10 ( via Linux Subsystem )

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## 1 Preface

The FUNWAVE code is developed with UNIX based operation systems (Linux and OSX). It used to be easy to compile With Microsoft Windows, but after the MPI feature was introduced in FUNWAVE, people found difficulties when compiling with Windows OS. Now, owing to a new feature of Windows 10, called **Windows Subsystem for Linux**, the FUNWAVE code can be compiled with Windows 10 without annoying compling rules for windows. The Linux subsystem allows the users to run Linux command in Windows OS. In some sense, the Linux subsystem is similar to the virtual machine approach, but it is much easier and much more power than the virtual machine in the following aspects:

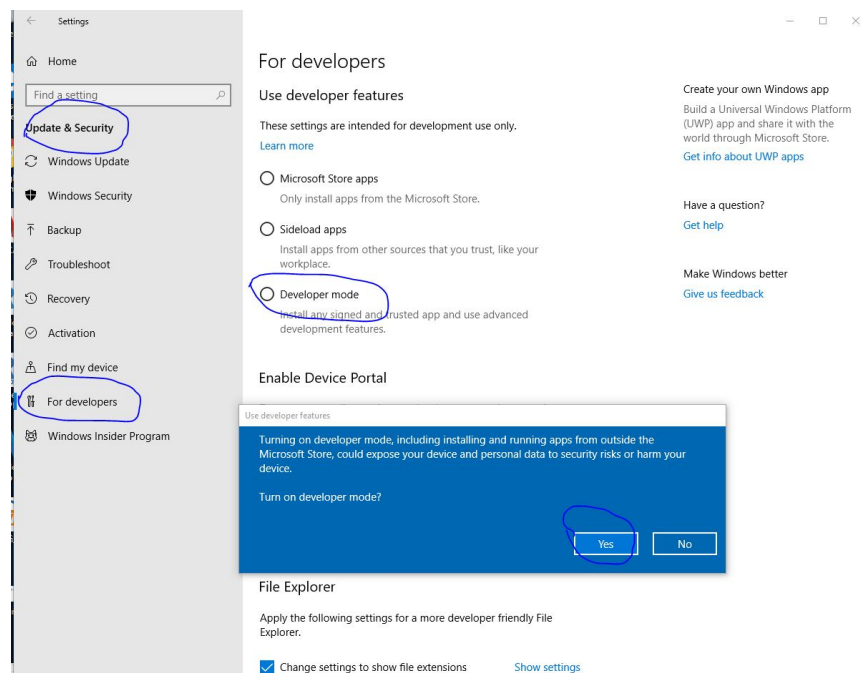
- fantastic connection between Windows and Linux. You can log in to the Linux subsystem by simply type bash in windows command window, Besides, one can get access and write files to **any** files using the bash commends,

- No limitation of CPU and RAM. Unlike the virtual machine, Linux system can use all CPU and RAM of the PC without any restriction.

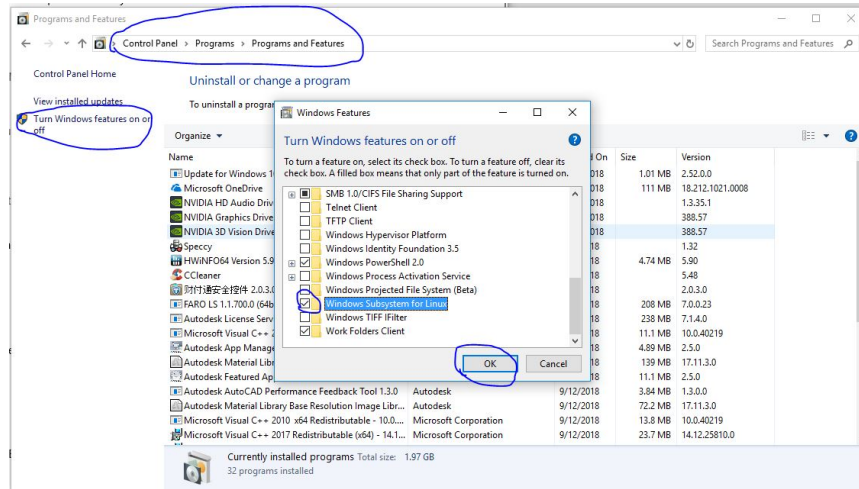
## 2 Install Linux Subsystem for Windows 10

Make sure you have installed Windows 10 and logged in with your Microsoft account.

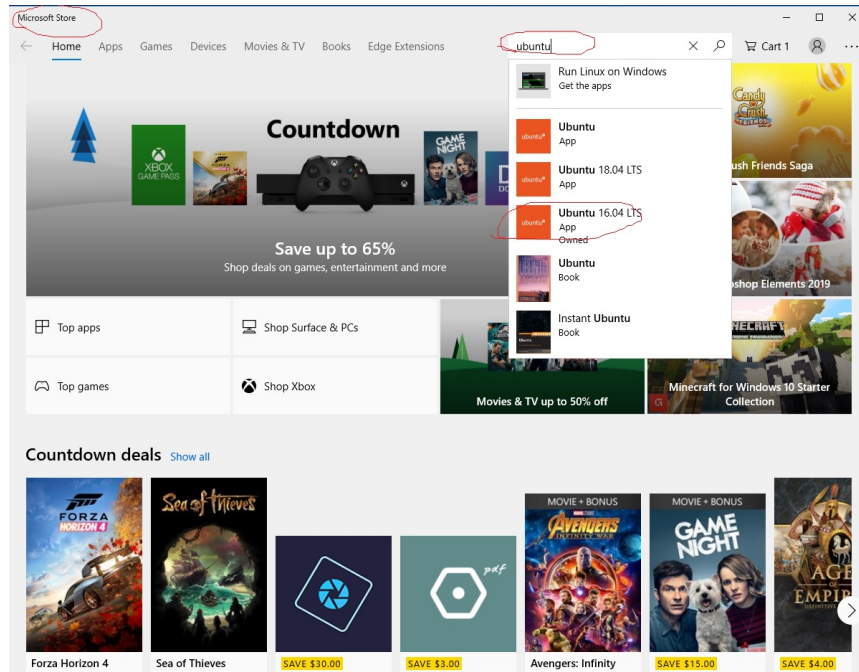
The first step is to enable the **Developer mode** in windows settings



Then turn on **Windows Subsystem for Linux** in *Control Panel*



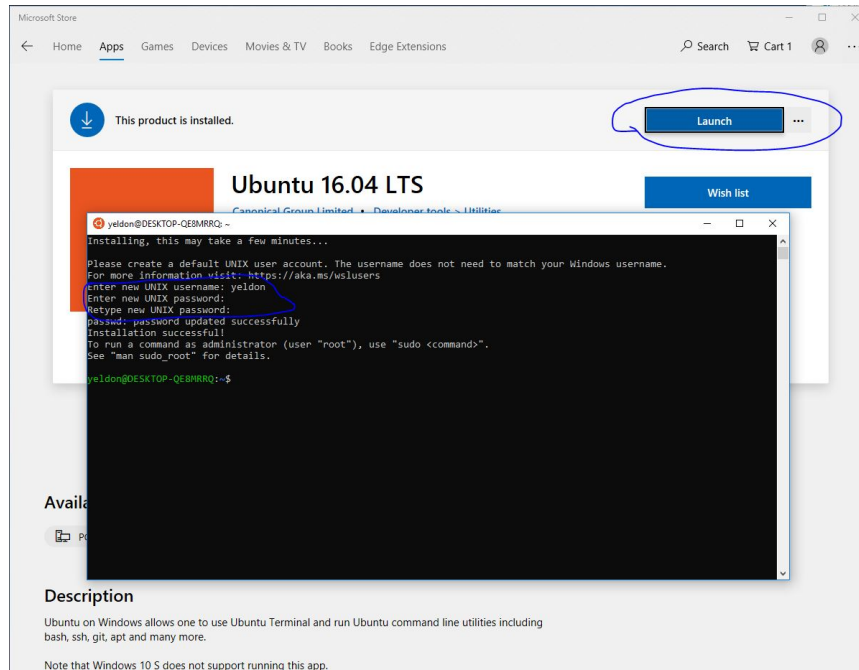
Now Download a Linux distribution in *Microsoft Store*. Personally I prefer Ubuntu 16.04 LTS.



After install, you should be able to launch the linux subsystem.

### 3 Get ready with Linux Subsystem

The first time one launch the Linux subsystem, it takes a couple minutes to initialization. After the initialization, one would be requested to set the username and password.



type the following commands then you are all set

```
sudo apt update
sudo apt upgrade
sudo apt install make
sudo apt install gfortran
sudo apt install mpich
```

If you are in China, I would remommed you to change the apt source to the Chinese host.

### 4 Compile and run FUNWAVE

To lanch the linux subsystem, you can simply run "bash" in *windows command window*, then you are in the real Linux.

It should be noted that you may not get access to all folder. If so, try to get the permission.

```

yeldon@DESKTOP-QE8MR9Q /mnt/c/Users/yzt9z/Downloads/FUNWAVE-TVD-master/src
Microsoft Windows [Version 10.0.17134.471]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\yzt9z>bash
yeldon@DESKTOP-QE8MR9Q:/mnt/c/Users/yzt9z$ ls
ls: cannot read symbolic link 'Application Data': Permission denied
ls: cannot read symbolic link 'Cookies': Permission denied
ls: cannot read symbolic link 'Local Settings': Permission denied
ls: cannot read symbolic link 'My Documents': Permission denied
ls: cannot read symbolic link 'NetHood': Permission denied
ls: cannot read symbolic link 'PrintHood': Permission denied
ls: cannot read symbolic link 'Recent': Permission denied
ls: cannot read symbolic link 'SendTo': Permission denied
ls: cannot read symbolic link 'Start Menu': Permission denied
ls: cannot read symbolic link 'Templates': Permission denied
Application Data  Local Settings  NTUSER.DAT[8abe95f7-3dcb-11e8-a9d9-7cf90913f50].TM.blf  PrintHood  Recent
Favorites        Links            NTUSER.DAT[8abe95f7-3dcb-11e8-a9d9-7cf90913f50].TM.Container000000000000000001.regtrans-ms  Saved Games  Searches
Application Data  Local Settings  NTUSER.DAT[8abe95f7-3dcb-11e8-a9d9-7cf90913f50].TM.Container000000000000000002.regtrans-ms  SendTo       Start Menu
Contacts          MicrosoftEdgeBackups  ntuser.dat.LOG1  Templates
Cookies           Music            ntuser.dat.LOG2  Videos
Desktop           My Documents    ntuser.ini
Documents         NetHood         NTUSER.DAT
Downloads         NTUSER.DAT

yeldon@DESKTOP-QE8MR9Q:/mnt/c/Users/yzt9z$ sudo ls
[sudo] password for yeldon:
3D Objects        Favorites        NTUSER.DAT[8abe95f7-3dcb-11e8-a9d9-7cf90913f50].TM.blf  PrintHood  Recent
AppData          Links            NTUSER.DAT[8abe95f7-3dcb-11e8-a9d9-7cf90913f50].TM.Container000000000000000001.regtrans-ms  Saved Games  Searches
Application Data  Local Settings  NTUSER.DAT[8abe95f7-3dcb-11e8-a9d9-7cf90913f50].TM.Container000000000000000002.regtrans-ms  SendTo       Start Menu
Contacts          MicrosoftEdgeBackups  ntuser.dat.LOG1  Templates
Cookies           Music            ntuser.dat.LOG2  Videos
Desktop           My Documents    ntuser.ini
Documents         NetHood         NTUSER.DAT
Downloads         NTUSER.DAT
yeldon@DESKTOP-QE8MR9Q:/mnt/c/Users/yzt9z$ cd Downloads/
yeldon@DESKTOP-QE8MR9Q:/mnt/c/Users/yzt9z/Downloads$ ls
desktop.ini

```

With the example *vessel<sub>flatbottom</sub>* and set process number as 4, typing  
 make  
 mpirun -np 4 ./funwave\_vessel

The code will be running in the linux sunsystem. You do not have to worry about the communication between Linux and Windows, as you can see, as you run the code in Linux, you can get real-time access to the data files generated by the Linux executive.

```

root@DESKTOP-GE3MRRQ: /mnt/c:/Users/yjts/Downloads/FUNWAVE-TVD-master/
0.8027e+01 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
0.1220e-18 0.2453e+08 0.4652e-05 -0.4021e-05 0.6307e-06 0.6694e-06
MaxTotalU Phase5 Froude WetDryMass
0.7227e-06 0.9905e+01 0.7294e-07 0.0000e+00
PRINTING FILE NO. 8 TIME/TOTAL: 8.027 / 50.000
----- STATISTICS -----
TIME DT
0.9036e+01 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
0.2846e-18 0.2453e+08 0.4289e-05 -0.5317e-05 0.6685e-06 0.6522e-06
MaxTotalU Phase5 Froude WetDryMass
0.7961e-06 0.9905e+01 0.8038e-07 0.0000e+00
PRINTING FILE NO. 9 TIME/TOTAL: 9.036 / 50.000
----- STATISTICS -----
TIME DT
0.1005e+02 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
-0.4777e-18 0.2453e+08 0.4479e-05 -0.4537e-05 0.6447e-06 0.7811e-06
MaxTotalU Phase5 Froude WetDryMass
0.8800e-06 0.9905e+01 0.8895e-07 0.0000e+00
PRINTING FILE NO. 10 TIME/TOTAL: 10.046 / 50.000
----- STATISTICS -----
TIME DT
0.1101e+02 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
0.1599e-18 0.2453e+08 0.4489e-05 -0.5432e-05 0.7346e-06 0.7011e-06
MaxTotalU Phase5 Froude WetDryMass
0.8436e-06 0.9905e+01 0.8518e-07 0.0000e+00
PRINTING FILE NO. 11 TIME/TOTAL: 11.005 / 50.000
----- STATISTICS -----
TIME DT
0.1201e+02 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
-0.1030e-17 0.2453e+08 0.4569e-05 -0.4072e-05 0.7774e-06 0.7799e-06
MaxTotalU Phase5 Froude WetDryMass
0.8925e-06 0.9905e+01 0.9011e-07 0.0000e+00
PRINTING FILE NO. 12 TIME/TOTAL: 12.015 / 50.000
----- STATISTICS -----
TIME DT
0.1302e+02 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
0.7098e-18 0.2453e+08 0.4973e-05 -0.5109e-05 0.7874e-06 0.7187e-06
MaxTotalU Phase5 Froude WetDryMass
0.8715e-06 0.9905e+01 0.8895e-07 0.0000e+00
PRINTING FILE NO. 13 TIME/TOTAL: 13.024 / 50.000
----- STATISTICS -----
TIME DT
0.1403e+02 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
0.3524e-18 0.2453e+08 0.5123e-05 -0.5825e-05 0.7322e-06 0.6977e-06
MaxTotalU Phase5 Froude WetDryMass
0.8085e-06 0.9905e+01 0.9072e-07 0.0000e+00
PRINTING FILE NO. 14 TIME/TOTAL: 14.034 / 50.000
----- STATISTICS -----
TIME DT
0.1504e+02 0.5048e-01
MassVolume Energy MaxEta MinEta Max U Max V
0.9182e-18 0.2453e+08 0.6709e-05 -0.5350e-05 0.8086e-06 0.7809e-06
MaxTotalU Phase5 Froude WetDryMass
0.1025e-05 0.9905e+01 0.1035e-06 0.0000e+00
PRINTING FILE NO. 15 TIME/TOTAL: 15.044 / 50.000
----- STATISTICS -----

```