COL334/672 Computer Network

Assignment-3 Setup

We strongly recommend you follow the guidelines to setup your own hands-on environment before doing the assignment 3. The environment includes the virtual machine software, e.g., VirtualBox, Ubuntu (version - 20.04.2) and NS3 (version – 3.29) with which you can work on the assignment.

Virtual Machine Software:

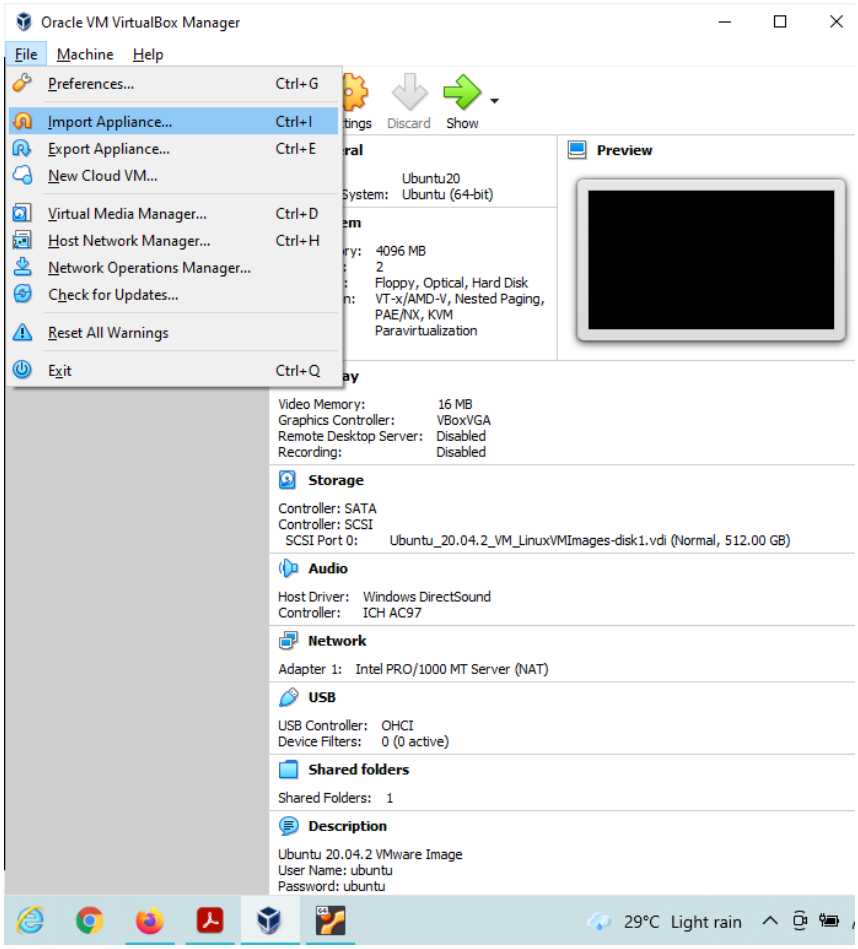
VirtualBox is open-source and completely free software. It can be downloaded from (https://www.virtualbox.org/wiki/Downloads). Go to the download page and choose the appropriate installation package according to your host operating system and install it to your system.

Operating System:

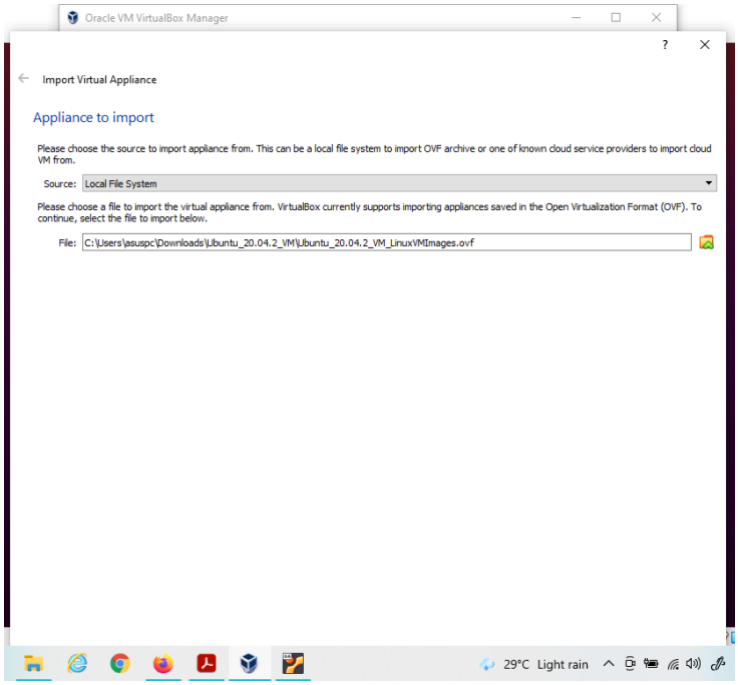
A pre-built Ubuntu 20.04 Oracle VM application (OVA) can be downloaded from here (3.11 GB).
(https://csciitd-my.sharepoint.com/:u:/g/personal/csz208507_iitd_ac_in/EeX8skV5qeRNiwYVd--lYXkB1oj1GEal7FLs9E4y6OUxAA?e=GpTzXk)
Note – You can install any ubuntu version >= 14 for this assignment.

You can host the Ubuntu image using VirtualBox by performing the following steps:

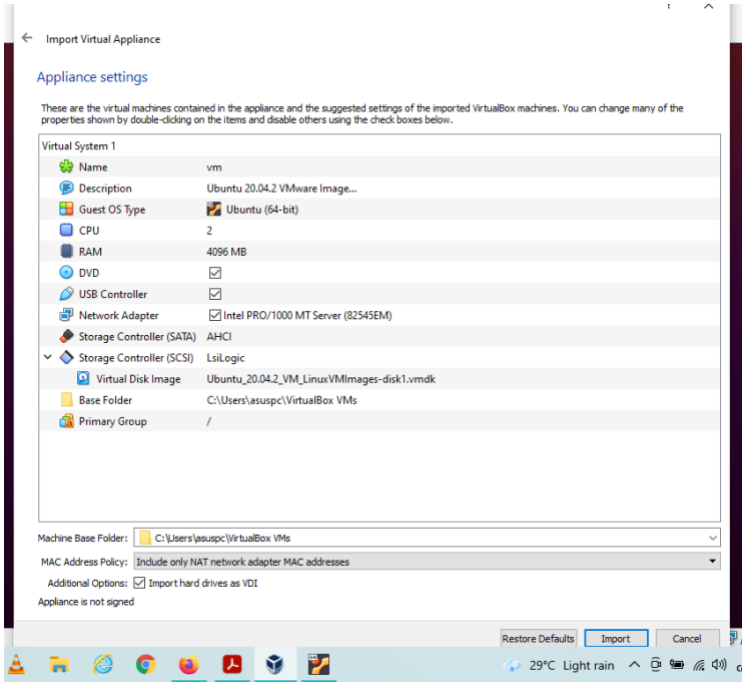
1. Install VirtualBox player using the downloaded installer. (https://www.virtualbox.org/wiki/Downloads)
2. Launch the VirtualBox player.
3. Select File and Import Appliance.



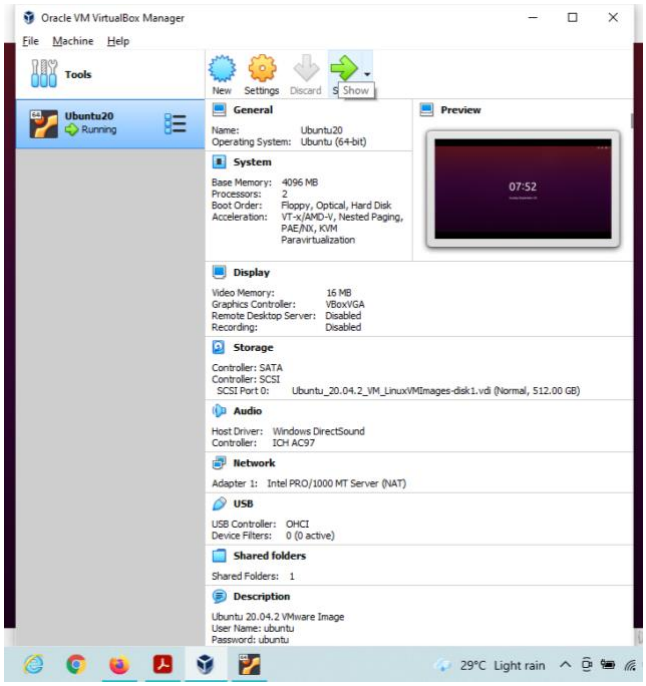
4. Select your OVA file in the import box and then click next.



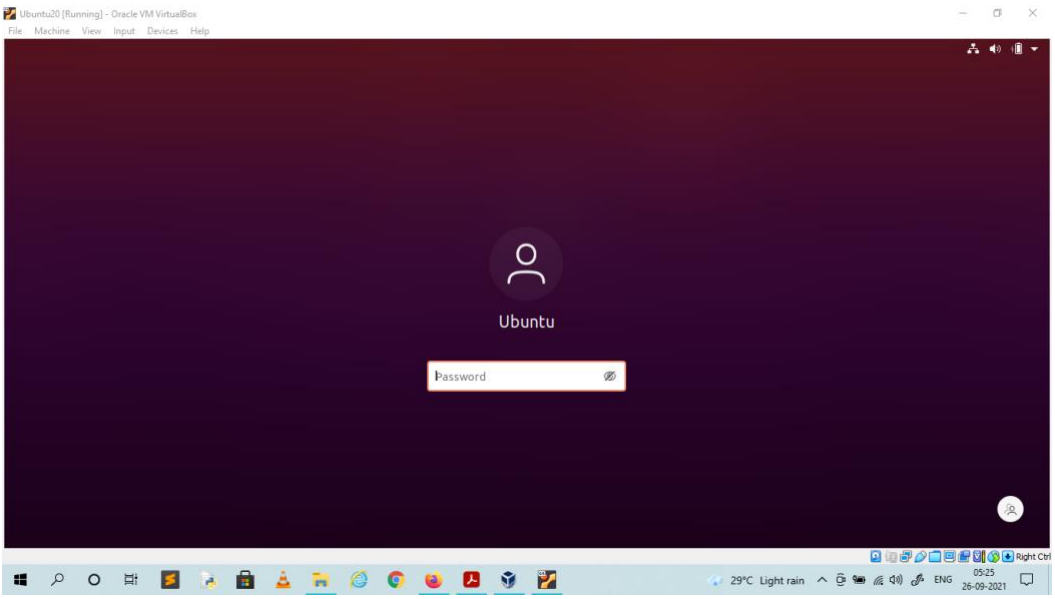
5. Verify the setting and then click Import.



6. Select the virtual machine that is imported in the step4 and start it (using show button).



7. Log in the system. Please note that the default password in the same as the username.
Username: ubuntu
Password: ubuntu

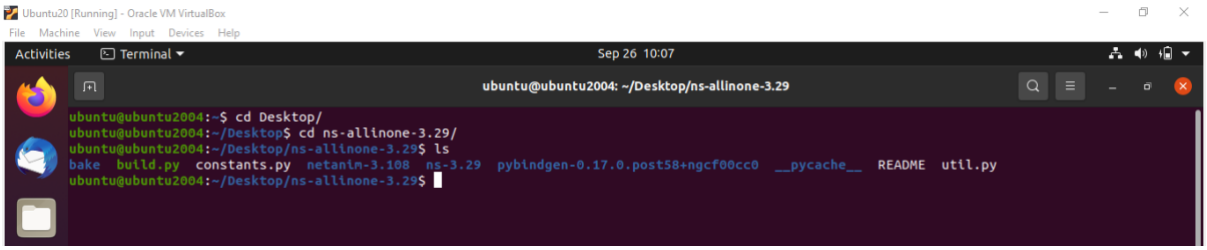


NS3 – Network Simulator

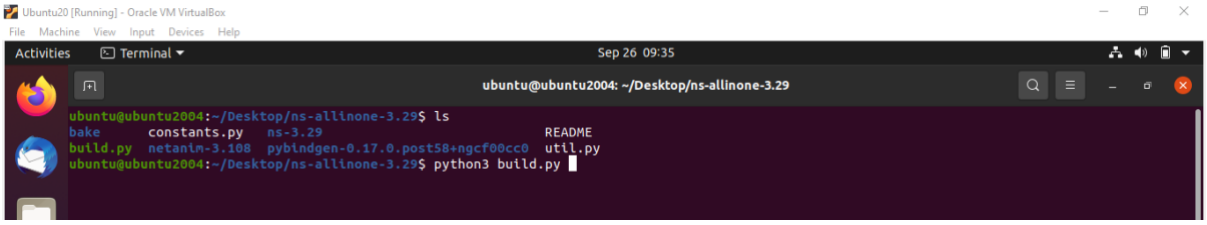
NS-3 is a discrete-event network simulator for Internet Systems, targeted primarily for research and education use. ns-3 is free, open-source software, licensed under the GNU GPLv2 license, and maintained by a worldwide community. Refer this link (https://www.nsnam.org/releases/ns-3-29/documentation) for documentation of ns-3-29.

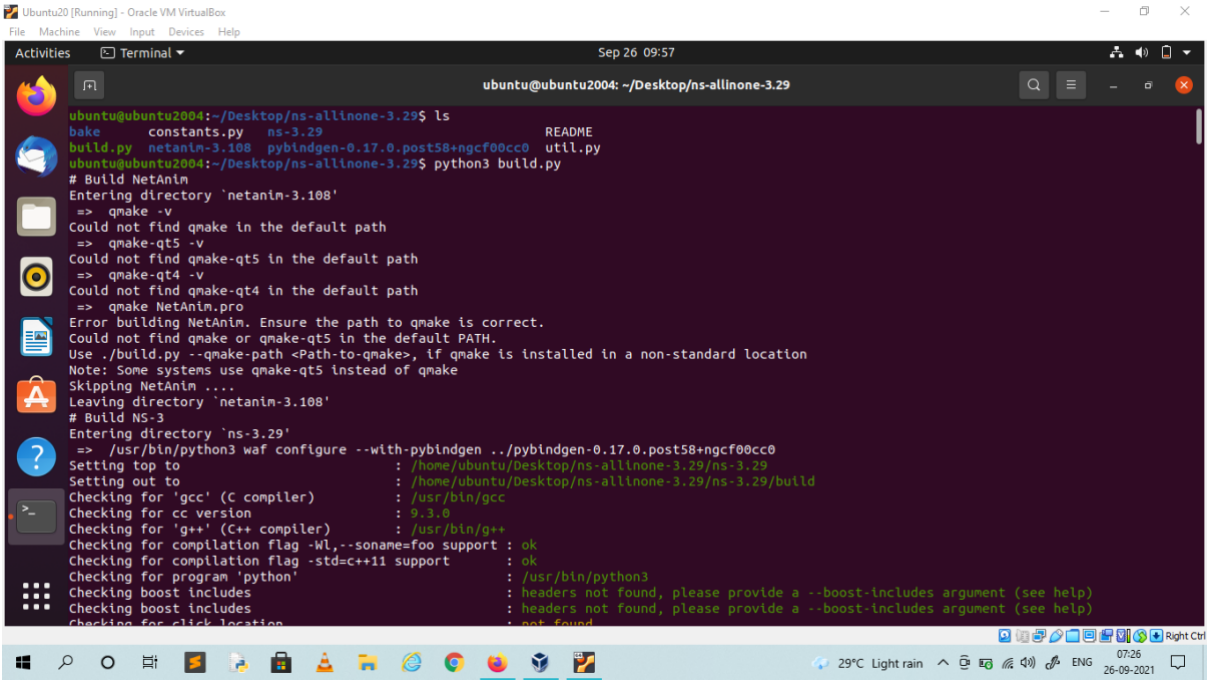
You can install the ns-3 using the following steps:

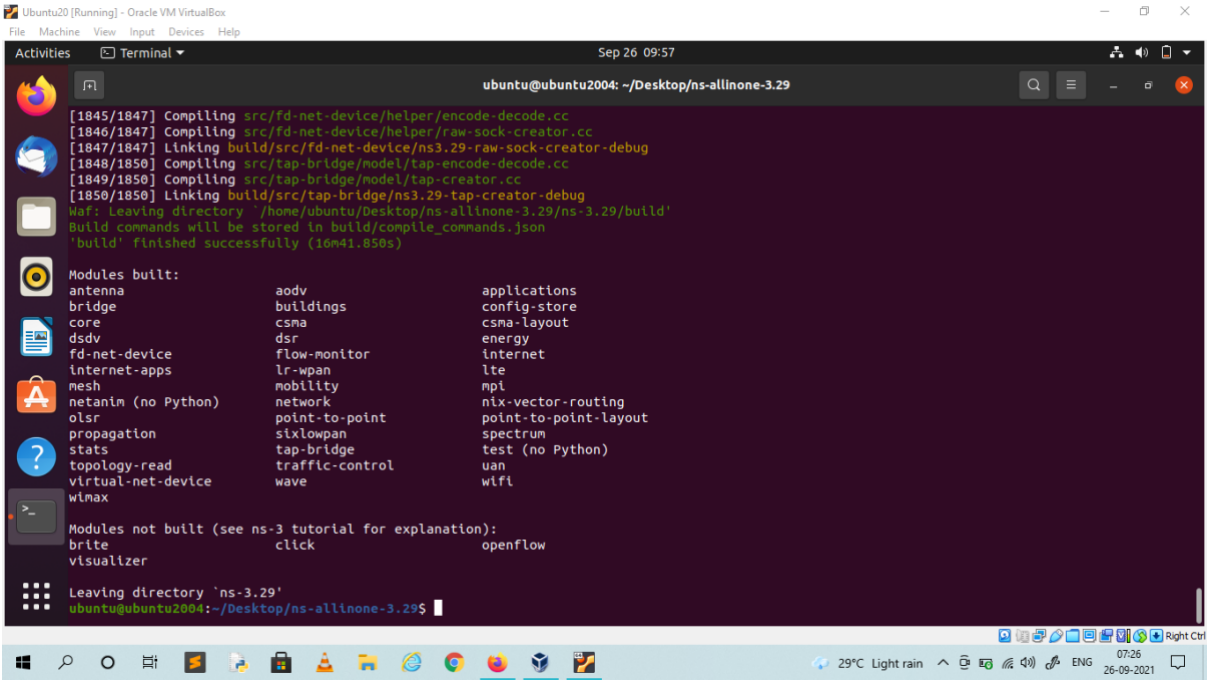
1. Login in the ubuntu system.
2. Download the ns-3 setup from here . We are going to use version 3.29 of ns-3. (Please stick to the specified version for assignment 3. All the evaluation will be done using ns-3-29).
3. Extract the ns-3 setup and open the ns-3 extracted folder in the terminal.



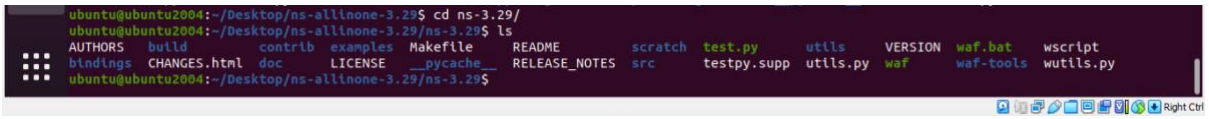
4. Build all the modules required by ns-3 by using the following command. (python**3 build.py**)





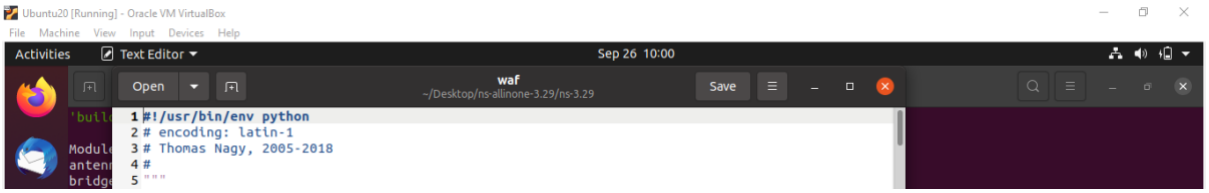


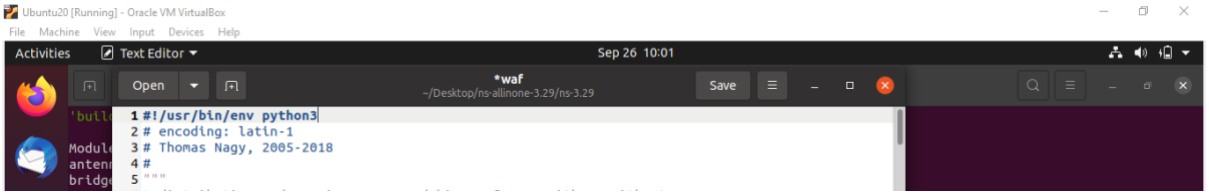
5. After building the modules go to ns-3.29 folder.



6. Update the "**waf**" file so that it can run python3. To edit the file use "gedit" command. (**gedit waf**)

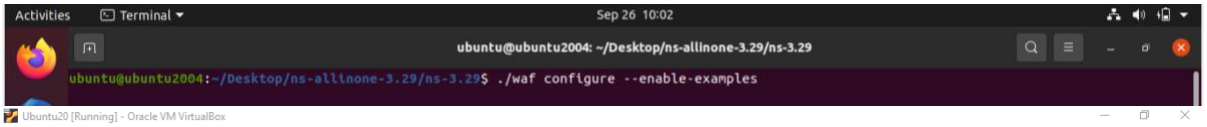
Change the first line of the code i.e.
#!/usr/bin/env python
TO
#!/usr/bin/env python3

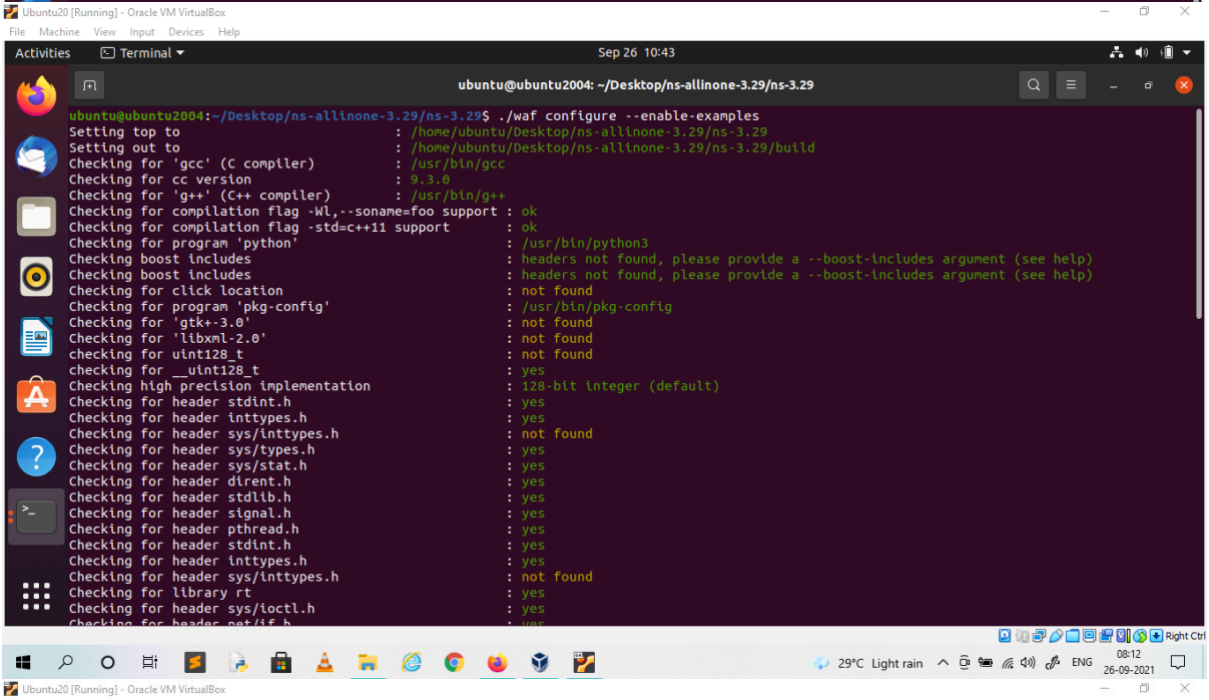


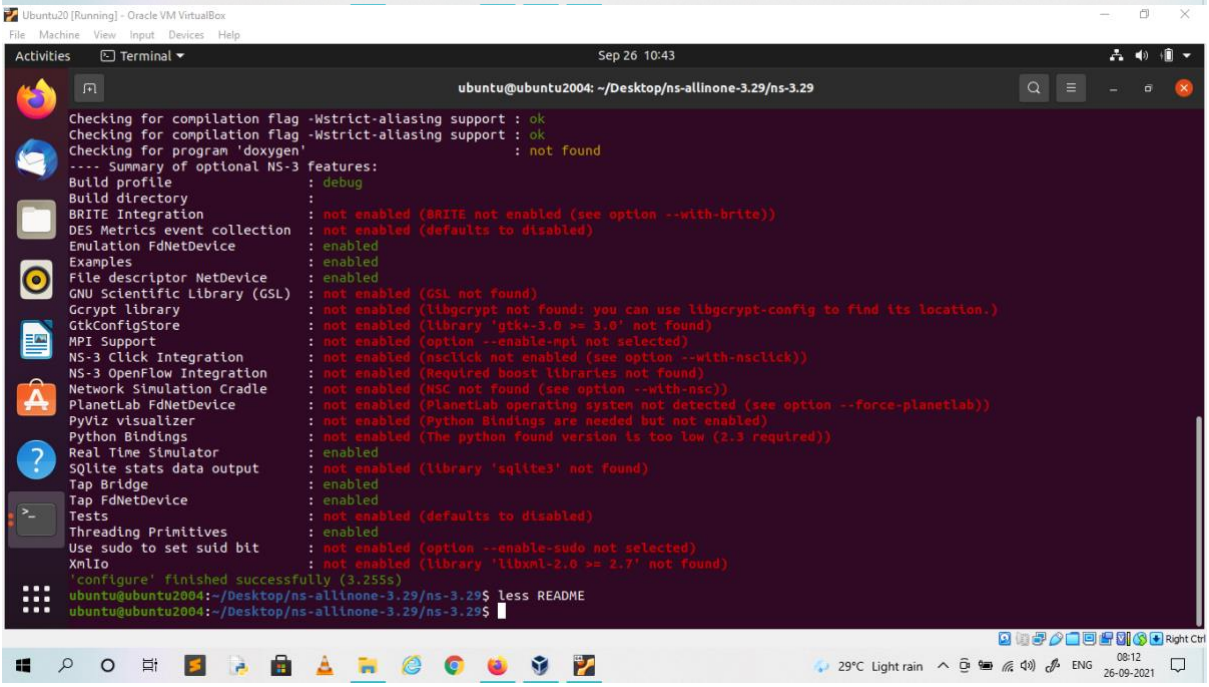


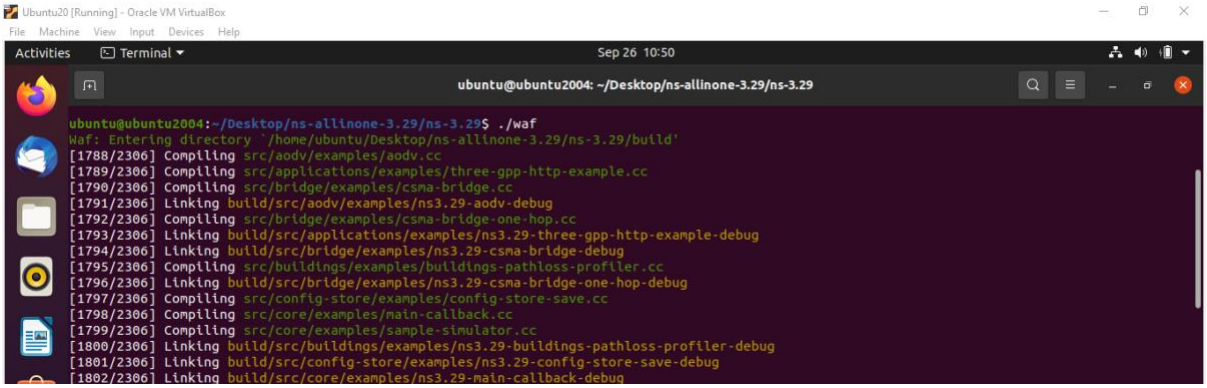
Save the file (ctrl+s) and close the gedit text editor.

7. Building ns-3 using the command (./waf configure --enable-examples) followed by (./waf) command.


Activities
Terminal
Sep 26 10:02
ubuntu@ubuntu2004: ~/Desktop/ns-allinone-3.29/ns-3.29
ubuntu@ubuntu2004:~/Desktop/ns-allinone-3.29/ns-3.29$ ./waf configure --enable-examples


Ubuntu20 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Sep 26 10:43
ubuntu@ubuntu2004: ~/Desktop/ns-allinone-3.29/ns-3.29
ubuntu@ubuntu2004:~/Desktop/ns-allinone-3.29/ns-3.29$ ./waf configure --enable-examples
Setting top to : /home/ubuntu/Desktop/ns-allinone-3.29/ns-3.29
Setting out to : /home/ubuntu/Desktop/ns-allinone-3.29/ns-3.29/build
Checking for 'gcc' (C compiler) : /usr/bin/gcc
Checking for cc version : 9.3.0
Checking for 'g++' (C++ compiler) : /usr/bin/g++
Checking for compilation flag -Wl,--soname=foo support : ok
Checking for compilation flag -std=c++11 support : ok
Checking for program 'python' : /usr/bin/python3
Checking boost includes : headers not found, please provide a --boost-includes argument (see help)
Checking boost includes : headers not found, please provide a --boost-includes argument (see help)
Checking for click location : not found
Checking for program 'pkg-config' : /usr/bin/pkg-config
Checking for 'gtk+-3.0' : not found
Checking for 'libxml-2.0' : not found
Checking for uint128_t : not found
Checking for __uint128_t : yes
Checking high precision implementation : 128-bit integer (default)
Checking for header stdint.h : yes
Checking for header inttypes.h : yes
Checking for header sys/inttypes.h : not found
Checking for header sys/types.h : yes
Checking for header sys/stat.h : yes
Checking for header dirent.h : yes
Checking for header stdlib.h : yes
Checking for header signal.h : yes
Checking for header pthread.h : yes
Checking for header stdint.h : yes
Checking for header inttypes.h : yes
Checking for header sys/inttypes.h : not found
Checking for library rt : yes
Checking for header sys/ioctl.h : yes
Right Ctrl
29°C Light rain
ENG
08:12
26-09-2021


Ubuntu20 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Sep 26 10:43
ubuntu@ubuntu2004: ~/Desktop/ns-allinone-3.29/ns-3.29
Checking for compilation flag -Wstrict-aliasing support : ok
Checking for compilation flag -Wstrict-aliasing support : ok
Checking for program 'doxygen' : not found
---- Summary of optional NS-3 features:
Build profile : debug
Build directory :
BRITE Integration : not enabled (BRITE not enabled (see option --with-brite))
DES Metrics event collection : not enabled (defaults to disabled)
Emulation FdNetDevice : enabled
Examples : enabled
File descriptor NetDevice : enabled
GNU Scientific Library (GSL) : not enabled (GSL not found)
Gcrypt library : not enabled (libgcrypt not found: you can use libgcrypt-config to find its location.)
GtkConfigStore : not enabled (library 'gtk+-3.0 >= 3.0' not found)
MPI Support : not enabled (option --enable-mpi not selected)
NS-3 Click Integration : not enabled (nsclick not enabled (see option --with-nsclick))
NS-3 OpenFlow Integration : not enabled (Required boost libraries not found)
Network Simulation Cradle : not enabled (NSC not found (see option --with-nsc))
PlanetLab FdNetDevice : not enabled (PlanetLab operating system not detected (see option --force-planetlab))
PyViz visualizer : not enabled (Python Bindings are needed but not enabled)
Python Bindings : not enabled (The python found version is too low (2.3 required))
Real Time Simulator : enabled
SQlite stats data output : not enabled (library 'sqlite3' not found)
Tap Bridge : enabled
Tap FdNetDevice : enabled
Tests : not enabled (defaults to disabled)
Threading Primitives : enabled
Use sudo to set suid bit : not enabled (option --enable-sudo not selected)
XmlIo : not enabled (library 'libxml-2.0 >= 2.7' not found)
'configure' finished successfully (3.255s)
ubuntu@ubuntu2004:~/Desktop/ns-allinone-3.29/ns-3.29$ less README
ubuntu@ubuntu2004:~/Desktop/ns-allinone-3.29/ns-3.29$
Right Ctrl
29°C Light rain
ENG
08:12
26-09-2021



8. Read “README” file for further assistance to run your custom code.

Note – There are other ways possible to install ns-3.29 and we are not going to deduct marks for that until and unless your ns-3 version is correct.