多媒體通訊系統
Lab 1: NS3 Simulator

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Installation - Prerequisites

- **Setup OS environment**
  - **Minimum requirement: 20GB of memory allocation and 2~4GB RAM allocation(less means slower)**
  - **Linux Ubuntu 20.04 LTS(https://www.ubuntu-tw.org/modules/tinyd0/)**
    Note: recommend to use virtual machine(eg. virtualbox) if your os is windows.
  - **Download vscode for writing codes(https://code.visualstudio.com/#alt-downloads)**

Installation - Prerequisites

- Install ns-3 specific dependencies

  $ sudo apt update && sudo apt upgrade -y

  $ sudo apt install build-essential git python3-setuptools castxml -y

  $ sudo apt install g++ pkg-config sqlite3 qt5-default -y

- Download ns-3 package and unzip it

  $ cd ~

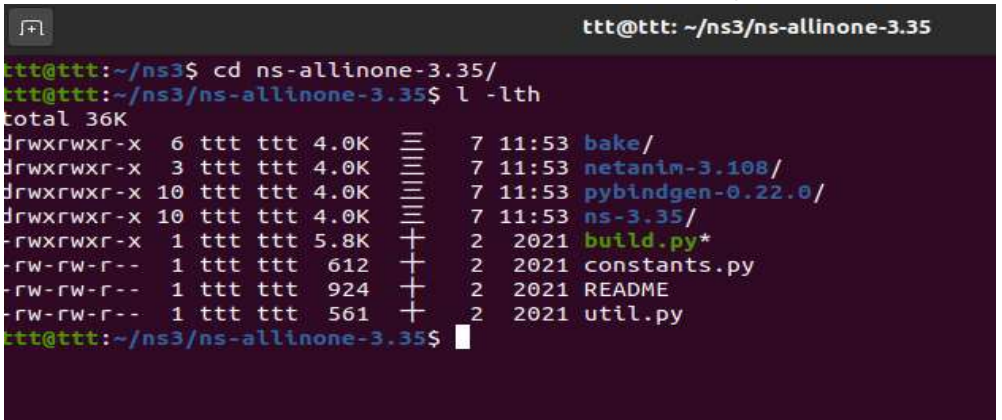
  $ mkdir ns3 && cd ns3

  $ wget https://www.nsnam.org/release/ns-allinone-3.35.tar.bz2

  $ tar xjf ns-allinone-3.35.tar.bz2

- Following above steps, if your change into the dir. ns-allinone-3.35, you should see a number of files and dirs

  $ cd ns-allinone-3.35/



Installation - Build & Validation

- Build ns-3 simulator with waf command

  $ cd ns3/ns-allinone-3.35/ns-3.35/

  $ ./waf configure --enable-tests --enable-examples

  $ ./waf build

- Validate the build

  $ ./waf check

- Test the simulator, the terminal should output ”Hello Simulator”

  $ ./waf --run hello-simulator

```
ttt@ttt:~/ns3/ns-allinone-3.35/ns-3.35$ ./waf --run hello-simulator
Waf: Entering directory `/home/ttt/ns3/ns-allinone-3.35/ns-3.35/build'
Waf: Leaving directory `/home/ttt/ns3/ns-allinone-3.35/ns-3.35/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (0.662s)
Hello Simulator
ttt@ttt:~/ns3/ns-allinone-3.35/ns-3.35$
```

Introduction - Overview

- NS-3 is free and open source discrete event network simulator
- Users can write in c++, with optional python interface for visualization and scripting
- Support different network layers
  - Applications: On/Off, Bulk transfer, HTTP, etc.
  - Transport: TCP, UDP
  - Network: IPv4, IPv6, routing
  - Physical: Ethernet, wifi, LTE, etc.
- Key abstractions
  - NetDevice: tx/rx over the channel
  - Channel: tx/rx medium b/w nodes
  - Application: create data flow
  - Helper: use to quickly configure above function