

# MID-2 Assignment

## SECOND.CC

**Objective:** Implementing second.cc example in NS-3.30 and simulating the network with given parameters.

**Problem Statement:** Test second.cc in NS-3.30 using p2p, CSMA, and wireless networks and get the desired outputs for given parameters, simulating the network.

### Code:

```
#include "ns3/core-module.h"
#include "ns3/network-module.h"
#include "ns3/csma-module.h"
#include "ns3/internet-module.h"
#include "ns3/point-to-point-module.h"
#include "ns3/applications-module.h"
#include "ns3/ipv4-global-routing-helper.h"
```

```
// Default Network Topology
//
//      172.16.1.0
// n0 ----- n1  n2  n3  n4
// point-to-point |  |  |  |
//               =====
//               LAN 172.16.2.0
```

```
using namespace ns3;
```

```
NS_LOG_COMPONENT_DEFINE ("SecondScriptExample");
```

```
int
main (int argc, char *argv[])
{
    bool verbose = true;
```

```
uint32_t nCsm = 3;
```

```
CommandLine cmd;
```

```
cmd.AddValue ("nCsm", "Number of \"extra\" CSMA nodes/devices", nCsm);
```

```
cmd.AddValue ("verbose", "Tell echo applications to log if true", verbose);
```

```
cmd.Parse (argc,argv);
```

```
if (verbose)
```

```
{
```

```
    LogComponentEnable ("UdpEchoClientApplication", LOG_LEVEL_INFO);
```

```
    LogComponentEnable ("UdpEchoServerApplication", LOG_LEVEL_INFO);
```

```
}
```

```
nCsm = nCsm == 0 ? 1 : nCsm;
```

```
NodeContainer p2pNodes;
```

```
p2pNodes.Create (2);
```

```
NodeContainer csmaNodes;
```

```
csmaNodes.Add (p2pNodes.Get (1));
```

```
csmaNodes.Create (nCsm);
```

```
PointToPointHelper pointToPoint;
```

```
pointToPoint.SetDeviceAttribute ("DataRate", StringValue ("5Mbps"));
```

```
pointToPoint.SetChannelAttribute ("Delay", StringValue ("2ms"));
```

```
NetDeviceContainer p2pDevices;
```

```
p2pDevices = pointToPoint.Install (p2pNodes);
```

```
CsmaHelper csma;
```

```
csma.SetChannelAttribute ("DataRate", StringValue ("100Mbps"));
```

```
csma.SetChannelAttribute ("Delay", TimeValue (NanoSeconds (6560)));
```

```
NetDeviceContainer csmaDevices;
```

```
csmaDevices = csma.Install (csmaNodes);
```

```
InternetStackHelper stack;
```

```
stack.Install (p2pNodes.Get (0));
```

```
stack.Install (csmaNodes);
```

```

Ipv4AddressHelper address;
address.SetBase ("172.16.1.0", "255.255.255.0");
Ipv4InterfaceContainer p2pInterfaces;
p2pInterfaces = address.Assign (p2pDevices);

address.SetBase ("172.16.2.0", "255.255.255.0");
Ipv4InterfaceContainer csmaInterfaces;
csmaInterfaces = address.Assign (csmaDevices);

UdpEchoServerHelper echoServer (9);

ApplicationContainer serverApps = echoServer.Install (csmaNodes.Get (nCsmas));
serverApps.Start (Seconds (1.0));
serverApps.Stop (Seconds (10.0));

UdpEchoClientHelper echoClient (csmaInterfaces.GetAddress (nCsmas), 9);
echoClient.SetAttribute ("MaxPackets", UIntegerValue (2));
echoClient.SetAttribute ("Interval", TimeValue (Seconds (2.0)));
echoClient.SetAttribute ("PacketSize", UIntegerValue (2048));

ApplicationContainer clientApps = echoClient.Install (p2pNodes.Get (0));
clientApps.Start (Seconds (2.0));
clientApps.Stop (Seconds (10.0));

Ipv4GlobalRoutingHelper::PopulateRoutingTables ();

pointToPoint.EnablePcapAll ("second");
csma.EnablePcap ("second", csmaDevices.Get (1), true);

Simulator::Run ();
Simulator::Destroy ();
return 0;
}

```

## Output:

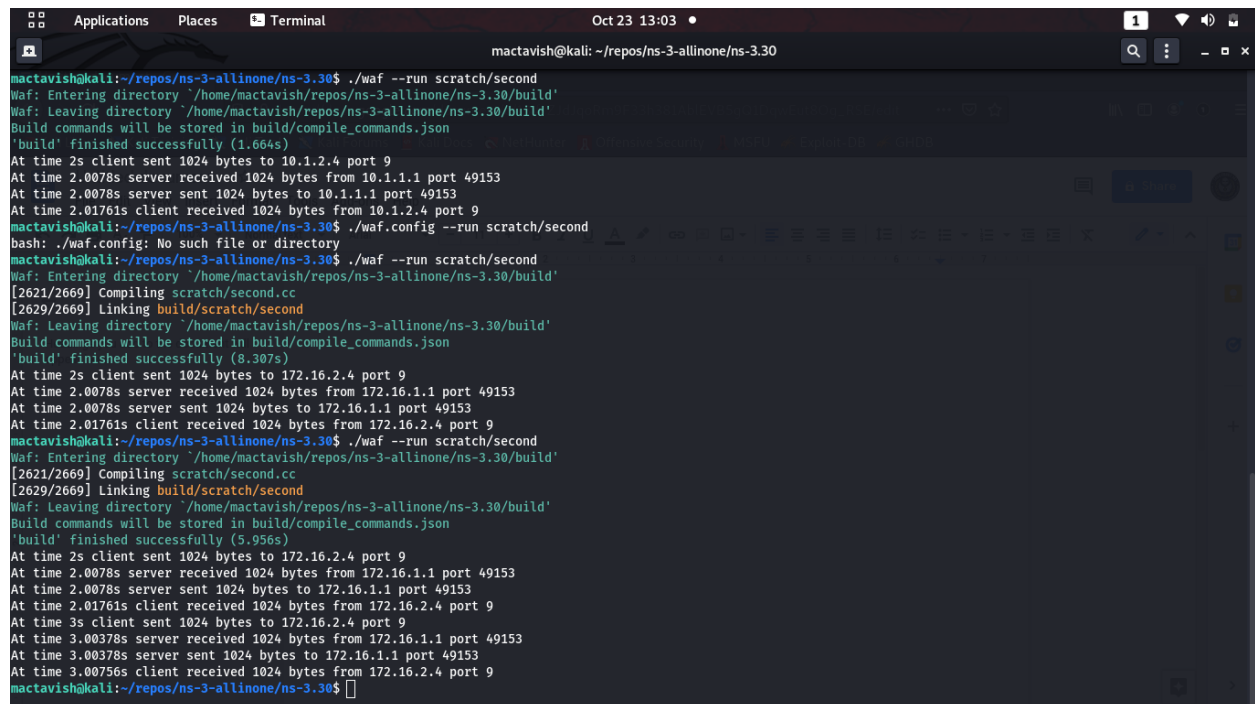
Default parameters:

- IP- 10.1.1.0 - 10.1.2.0
- Maximum Packets: 1
- Packet Size: 1024
- Interval: 1.0 seconds

Updated parameters:

- IP- 172.16.1.0 - 172.16.2.0
- Maximum Packets: 2
- Packet Size: 2048
- Interval: 2.0 seconds

## Default and updated Parameters



```
mactavish@kali: ~/repos/ns-3-allinone/ns-3.30
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/second
Waf: Entering directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Waf: Leaving directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (1.664s)
At time 2s client sent 1024 bytes to 10.1.2.4 port 9
At time 2.0078s server received 1024 bytes from 10.1.1.1 port 49153
At time 2.0078s server sent 1024 bytes to 10.1.1.1 port 49153
At time 2.01761s client received 1024 bytes from 10.1.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf.config --run scratch/second
bash: ./waf.config: No such file or directory
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/second
Waf: Entering directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
[2621/2669] Compiling scratch/second.cc
[2629/2669] Linking build/scratch/second
Waf: Leaving directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (8.307s)
At time 2s client sent 1024 bytes to 172.16.2.4 port 9
At time 2.0078s server received 1024 bytes from 172.16.1.1 port 49153
At time 2.0078s server sent 1024 bytes to 172.16.1.1 port 49153
At time 2.01761s client received 1024 bytes from 172.16.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/second
Waf: Entering directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
[2621/2669] Compiling scratch/second.cc
[2629/2669] Linking build/scratch/second
Waf: Leaving directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (5.956s)
At time 2s client sent 1024 bytes to 172.16.2.4 port 9
At time 2.0078s server received 1024 bytes from 172.16.1.1 port 49153
At time 2.0078s server sent 1024 bytes to 172.16.1.1 port 49153
At time 2.01761s client received 1024 bytes from 172.16.2.4 port 9
At time 3s client sent 1024 bytes to 172.16.2.4 port 9
At time 3.00378s server received 1024 bytes from 172.16.1.1 port 49153
At time 3.00378s server sent 1024 bytes to 172.16.1.1 port 49153
At time 3.00756s client received 1024 bytes from 172.16.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$
```

```
Applications  Places  Terminal  Oct 23 13:22  mactavish@kali: ~/repos/ns-3-allinone/ns-3.30

mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/second
Waf: Entering directory '/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
[2618/2669] Compiling scratch/second.cc
../scratch/second.cc: In function 'int main(int, char**)':
../scratch/second.cc:101:62: error: expected ')' before ';' token
101 |   echoClient.SetAttribute ("PacketSize", UIntegerValue (2048);
    |                                                              ^
    |                                                              )
    |                                                              )
Waf: Leaving directory '/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build failed
...> task in 'second' failed with exit status 1 (run with -v to display more information)
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/second
Waf: Entering directory '/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
[2621/2669] Compiling scratch/second.cc
[2629/2669] Linking build/scratch/second
Waf: Leaving directory '/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (5.965s)
At time 2s client sent 2048 bytes to 172.16.2.4 port 9
At time 2.00862s server received 2048 bytes from 172.16.1.1 port 49153
At time 2.00862s server sent 2048 bytes to 172.16.1.1 port 49153
At time 2.02013s client received 2048 bytes from 172.16.2.4 port 9
At time 4s client sent 2048 bytes to 172.16.2.4 port 9
At time 4.00542s server received 2048 bytes from 172.16.1.1 port 49153
At time 4.00542s server sent 2048 bytes to 172.16.1.1 port 49153
At time 4.0109s client received 2048 bytes from 172.16.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ wireshark p2p-1-0.pcap
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ wireshark p2p-1-0.pcap
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ls
AUTHORS      CONTRIBUTING.md  DLRsrpSInrStats.txt  LICENSE      scratch      test.py      ULPdcpStats.txt  utils      waf-tools
bindings     different.pcap   DLRxPhyStats.txt     Makefile     second-0-0.pcap  testpy-output  ULRlcStats.txt   utils.py    wscript
build        DLMacStats.txt  DLTxPhyStats.txt     __pycache__  second-1-0.pcap  testpy.suppl  ULRxPhyStats.txt  VERSION    wutils.py
CHANGES.html  DLPdcpStats.txt doc                 README.md    second-2-0.pcap  UInterferenceStats.txt  ULSInrStats.txt  waf        waf.bat
contrib      DLRlcStats.txt  examples             RELEASE_NOTES  src              ULMacStats.txt  ULTxPhyStats.txt
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ wireshark second-2-0.pcap
```

WireShark Simulation

ApplicationsPlaceswiresharkOct 23 13:23second-2-0.pcap

FileEditViewGoCaptureAnalyzeStatisticsTelephonyWirelessToolsHelp

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	00:00:00_00:00:00:03	Broadcast	ARP	64	Who has 172.16.2.4? Tell 172.16.2.1
2	0.000013	00:00:00_00:00:00:06	00:00:00_00:00:00:03	ARP	64	172.16.2.4 is at 00:00:00:00:00:06
3	0.000142	172.16.1.1	172.16.2.4	IPv4	1518	Fragmented IP protocol (proto=UDP 17, off=0, ID=0000) [Reassembled in ...
4	0.000203	172.16.1.1	172.16.2.4	UDP	614	49153 → 9 Len=2048
5	0.000215	00:00:00_00:00:00:06	Broadcast	ARP	64	Who has 172.16.2.1? Tell 172.16.2.4
6	0.000227	00:00:00_00:00:00:03	00:00:00_00:00:00:06	ARP	64	172.16.2.1 is at 00:00:00:00:00:03
7	0.000356	172.16.2.4	172.16.1.1	IPv4	1518	Fragmented IP protocol (proto=UDP 17, off=0, ID=0000) [Reassembled in ...
8	0.000415	172.16.2.4	172.16.1.1	UDP	614	9 → 49153 Len=2048
9	1.996117	172.16.1.1	172.16.2.4	IPv4	1518	Fragmented IP protocol (proto=UDP 17, off=0, ID=0001) [Reassembled in ...
10	1.997001	172.16.1.1	172.16.2.4	UDP	614	49153 → 9 Len=2048
11	1.997130	172.16.2.4	172.16.1.1	IPv4	1518	Fragmented IP protocol (proto=UDP 17, off=0, ID=0001) [Reassembled in ...
12	1.997191	172.16.2.4	172.16.1.1	UDP	614	9 → 49153 Len=2048

> Frame 1: 64 bytes on wire (512 bits), 64 bytes captured (512 bits)  
> Ethernet II, Src: 00:00:00\_00:00:00:03 (00:00:00:00:00:03), Dst: Broadcast (ff:ff:ff:ff:ff:ff)  
> Address Resolution Protocol (request)

0000ff ff ff ff ff ff 00 00 00 00 03 08 06 00 01 .....  
001008 00 06 04 00 01 00 00 00 00 03 ac 10 02 01 .....  
0020ff ff ff ff ff ff ac 10 02 04 00 00 00 00 00 .....  
003000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....

second-2-0.pcapPackets: 12 · Displayed: 12 (100.0%)Profile: Default

**Problems Faced:** The main challenge is operations in NS-3 as this is the one framework I was much confident about. Secondly, the codes given in the examples were quite difficult to understand.

**Conclusion:** Throughout this assignment,

## THIRD.CC

**Objective:** Implementing third.cc example in NS-3.30 and simulating the network with given parameters.

**Problem Statement:** Test third.cc in NS-3.30 using p2p, CSMA, and wireless networks and get the desired outputs for given parameters, simulating the network.

### Code:

```
#include "ns3/core-module.h"
#include "ns3/point-to-point-module.h"
#include "ns3/network-module.h"
#include "ns3/applications-module.h"
#include "ns3/mobility-module.h"
#include "ns3/csma-module.h"
#include "ns3/internet-module.h"
#include "ns3/yans-wifi-helper.h"
#include "ns3/ssid.h"

// Default Network Topology
//
//  Wifi 10.1.3.0
//      AP
//  *   *   *   *
//  |   |   |   | 10.1.1.0
// n5  n6  n7  n0 ----- n1  n2  n3  n4
//      point-to-point |   |   |   |
//                      =====
//                      LAN 10.1.2.0

using namespace ns3;

NS_LOG_COMPONENT_DEFINE ("ThirdScriptExample");

int
main (int argc, char *argv[])
{
    bool verbose = true;
```

```
uint32_t nCsma = 3;
uint32_t nWifi = 3;
bool tracing = false;
```

```
CommandLine cmd;
cmd.AddValue ("nCsma", "Number of \"extra\" CSMA nodes/devices", nCsma);
cmd.AddValue ("nWifi", "Number of wifi STA devices", nWifi);
cmd.AddValue ("verbose", "Tell echo applications to log if true", verbose);
cmd.AddValue ("tracing", "Enable pcap tracing", tracing);
```

```
cmd.Parse (argc,argv);
```

```
// The underlying restriction of 18 is due to the grid position
// allocator's configuration; the grid layout will exceed the
// bounding box if more than 18 nodes are provided.
```

```
if (nWifi > 18)
{
    std::cout << "nWifi should be 18 or less; otherwise grid layout exceeds the bounding box" <<
std::endl;
    return 1;
}
```

```
if (verbose)
{
    LogComponentEnable ("UdpEchoClientApplication", LOG_LEVEL_INFO);
    LogComponentEnable ("UdpEchoServerApplication", LOG_LEVEL_INFO);
}
```

```
NodeContainer p2pNodes;
p2pNodes.Create (2);
```

```
PointToPointHelper pointToPoint;
pointToPoint.SetDeviceAttribute ("DataRate", StringValue ("5Mbps"));
pointToPoint.SetChannelAttribute ("Delay", StringValue ("2ms"));
```

```
NetDeviceContainer p2pDevices;
p2pDevices = pointToPoint.Install (p2pNodes);
```

```
NodeContainer csmaNodes;
csmaNodes.Add (p2pNodes.Get (1));
```





```
    "DeltaX", DoubleValue (5.0),  
    "DeltaY", DoubleValue (10.0),  
    "GridWidth", UIntegerValue (3),  
    "LayoutType", StringValue ("RowFirst"));
```

```
mobility.SetMobilityModel ("ns3::RandomWalk2dMobilityModel",  
    "Bounds", RectangleValue (Rectangle (-50, 50, -50, 50)));  
mobility.Install (wifiStaNodes);
```

```
mobility.SetMobilityModel ("ns3::ConstantPositionMobilityModel");  
mobility.Install (wifiApNode);
```

```
InternetStackHelper stack;  
stack.Install (csmaNodes);  
stack.Install (wifiApNode);  
stack.Install (wifiStaNodes);
```

```
Ipv4AddressHelper address;
```

```
address.SetBase ("172.16.1.0", "255.255.255.0");  
Ipv4InterfaceContainer p2pInterfaces;  
p2pInterfaces = address.Assign (p2pDevices);
```

```
address.SetBase ("172.16.2.0", "255.255.255.0");  
Ipv4InterfaceContainer csmaInterfaces;  
csmaInterfaces = address.Assign (csmaDevices);
```

```
address.SetBase ("10.1.3.0", "255.255.255.0");  
address.Assign (staDevices);  
address.Assign (apDevices);
```

```
UdpEchoServerHelper echoServer (9);
```

```
ApplicationContainer serverApps = echoServer.Install (csmaNodes.Get (nCasma));  
serverApps.Start (Seconds (1.0));  
serverApps.Stop (Seconds (10.0));
```

```
UdpEchoClientHelper echoClient (csmaInterfaces.GetAddress (nCasma), 9);  
echoClient.SetAttribute ("MaxPackets", UIntegerValue (12));  
echoClient.SetAttribute ("Interval", TimeValue (Seconds (2.0)));
```

```
echoClient.SetAttribute ("PacketSize", UIntegerValue (2048));
```

```
ApplicationContainer clientApps =  
    echoClient.Install (wifiStaNodes.Get (nWifi - 1));  
clientApps.Start (Seconds (2.0));  
clientApps.Stop (Seconds (10.0));
```

```
Ipv4GlobalRoutingHelper::PopulateRoutingTables ();
```

```
Simulator::Stop (Seconds (10.0));
```

```
if (tracing == true)  
{  
    pointToPoint.EnablePcapAll ("third");  
    phy.EnablePcap ("third", apDevices.Get (0));  
    csma.EnablePcap ("third", csmaDevices.Get (0), true);  
}
```

```
Simulator::Run ();  
Simulator::Destroy ();  
return 0;  
}
```

## Output:

Default parameters:

- IP- 10.1.1.0 - 10.1.2.0
- Maximum Packets: 1
- Packet Size: 1024
- Interval: 1.0 seconds

Updated parameters:

- IP- 172.16.1.0 - 172.16.2.0
- Maximum Packets: 2
- Packet Size: 2048
- Interval: 2.0 seconds

## Default and updated Parameters

```
Applications  Places  Terminal  Oct 23 13:33  1  🔊  🌐  🖱️
mactavish@kali: ~/repos/ns-3-allinone/ns-3.30

mactavish@kali: ~/repos/ns-3-allinone/ns-3.30

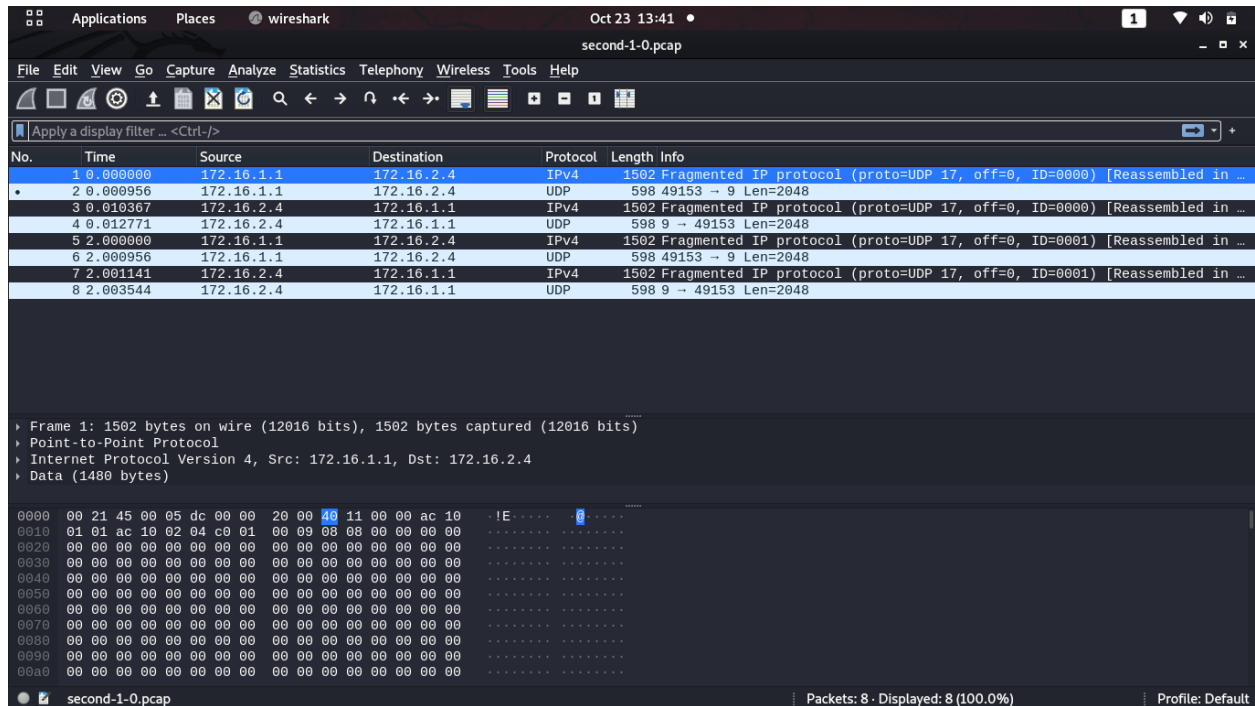
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/examples$ cd tutorial/
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/examples/tutorial$ ls
examples-to-run.py  fifth.cc  first.cc  first.py  fourth.cc  hello-simulator.cc  second.cc  second.py  seventh.cc  sixth.cc  third.cc  third.py  wscript
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/examples/tutorial$ cp third.cc ../../scratch/
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/examples/tutorial$ cd ..
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ cd scratch/
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ .waf --run scratch/third
.waf: command not found
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ ./waf --run scratch/third
bash: ./waf: No such file or directory
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ ./waf --run scratch/third.cc
bash: ./waf: No such file or directory
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ ls
first.cc  scratch-simulator.cc  second.cc  subdir  third.cc
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ ./waf --run scratch/third
bash: ./waf: No such file or directory
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ cd..
cd... command not found
mactavish@kali:~/repos/ns-3-allinone/ns-3.30/scratch$ cd ..
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/third
Waf: Entering directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
[2618/2671] Compiling scratch/third.cc
[2619/2671] Compiling scratch/second.cc
[2620/2671] Compiling scratch/subdir/scratch-simulator-subdir.cc
[2629/2671] Linking build/scratch/subdir/subdir
[2630/2671] Linking build/scratch/second
[2631/2671] Linking build/scratch/third
Waf: Leaving directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (7.185s)
At time 2s client sent 1024 bytes to 10.1.2.4 port 9
At time 2.01796s server received 1024 bytes from 10.1.3.3 port 49153
At time 2.01796s server sent 1024 bytes to 10.1.3.3 port 49153
At time 2.03364s client received 1024 bytes from 10.1.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$
```

```
Applications  Places  Terminal  Oct 23 13:59  1  🔊  🌐  🖱️
mactavish@kali: ~/repos/ns-3-allinone/ns-3.30

mactavish@kali: ~/repos/ns-3-allinone/ns-3.30

At time 2s client sent 1024 bytes to 10.1.2.4 port 9
At time 2.01796s server received 1024 bytes from 10.1.3.3 port 49153
At time 2.01796s server sent 1024 bytes to 10.1.3.3 port 49153
At time 2.03364s client received 1024 bytes from 10.1.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ./waf --run scratch/third
Waf: Entering directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
[2623/2671] Compiling scratch/third.cc
[2631/2671] Linking build/scratch/third
Waf: Leaving directory `/home/mactavish/repos/ns-3-allinone/ns-3.30/build'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (6.388s)
At time 2s client sent 2048 bytes to 172.16.2.4 port 9
At time 2.02013s server received 2048 bytes from 10.1.3.3 port 49153
At time 2.02013s server sent 2048 bytes to 10.1.3.3 port 49153
At time 2.03817s client received 2048 bytes from 172.16.2.4 port 9
At time 4s client sent 2048 bytes to 172.16.2.4 port 9
At time 4.00826s server received 2048 bytes from 10.1.3.3 port 49153
At time 4.00826s server sent 2048 bytes to 10.1.3.3 port 49153
At time 4.01586s client received 2048 bytes from 172.16.2.4 port 9
At time 6s client sent 2048 bytes to 172.16.2.4 port 9
At time 6.00826s server received 2048 bytes from 10.1.3.3 port 49153
At time 6.00826s server sent 2048 bytes to 10.1.3.3 port 49153
At time 6.0159s client received 2048 bytes from 172.16.2.4 port 9
At time 8s client sent 2048 bytes to 172.16.2.4 port 9
At time 8.00826s server received 2048 bytes from 10.1.3.3 port 49153
At time 8.00826s server sent 2048 bytes to 10.1.3.3 port 49153
At time 8.01595s client received 2048 bytes from 172.16.2.4 port 9
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ ls
AUTHORS      CONTRIBUTING.md  DLrsrpSinrStats.txt  LICENSE      scratch      test.py      ULPdcpStats.txt  utils      waf-tools
bindings    different.pcap   DLrxPhyStats.txt    Makefile     second-0-0.pcap  testpy-output  ULRlcStats.txt   utils.py   wscript
build        DLMacStats.txt  DLTxPhyStats.txt    _pycache_    second-1-0.pcap  testpy.suppl  ULRxPhyStats.txt  VERSION   wutils.py
CHANGES.html  DLPdcpStats.txt  doc                 README.md     second-2-0.pcap  ULInterferenceStats.txt  ULSinrStats.txt  waf
contrib      DLRlcStats.txt  examples            RELEASE_NOTES  src            ULMacStats.txt  ULTxPhyStats.txt  waf.bat
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$ wireshark third-1-0.pcap
mactavish@kali:~/repos/ns-3-allinone/ns-3.30$
```

## WireShark Simulation



**Problems Faced:** The main challenge is operations in NS-3 as this is the one framework I was much confident about. Secondly, the codes given in the examples were quite difficult to understand.

**Conclusion:** Throughout this assignment, I learned to use the NS-3 framework and simulate networks using NS-3 for some given parameters and using the examples that came preinstalled in NS-3 like second.cc and third.cc.

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