

# Introduction to Computer Networks: Wifi Implementation Report

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## 1 Set up the network simulation

With the experience of doing the first project, I am able to complete this part much faster than the first time. In fact, there is an example code `wifi-tcp.cc` in the folder `examples/wireless`. This code has nearly the same configuration as our expectation, so I just modified this code to our topology and deleted some unnecessary codes. Besides `pcap`, I also use `flow monitor` to help understand the flow situation.

## 2 Something about rate control algorithm

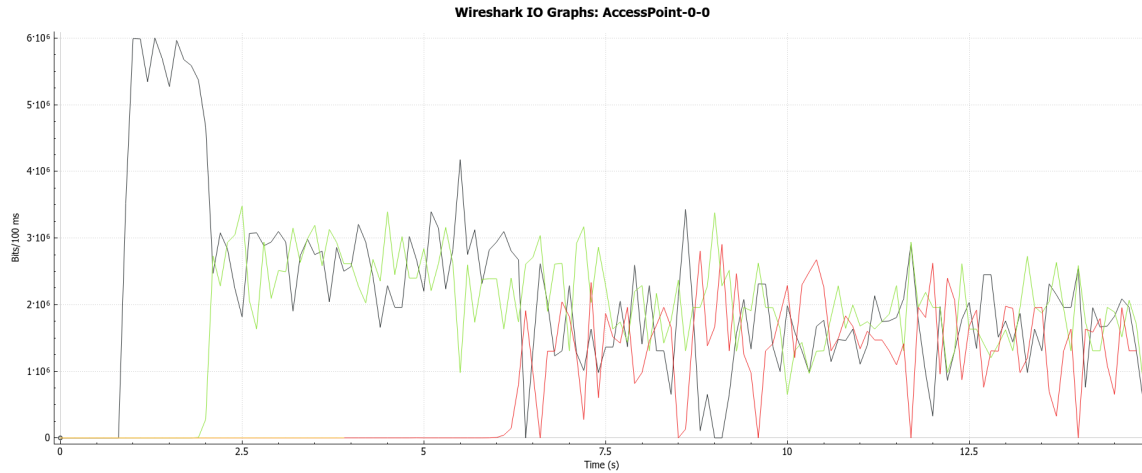
During the project, we found that `ArfWifiManager` cannot support 802.11n standard. More precisely, there is a message said “`WifiRemoteStationManager selected does not support HT rates`”. I looked up the source code and found that `ArfWifiManager` didn't support HT rate. In fact, all rate control algorithms except `ConstantRateWifiManager` support standard 802.11n. Due to these problems, I didn't complete the design for an improved rate control algorithm.

```
xudongwang@xudongwang-ThinkPad-X1-Carbon-4th: ~/Documents/ns-allinone-3.27/ns-3.27
contrib      Station3-3-0.pcap  wifi-implementation
doc          Station4-4-0.pcap  wifi-implementation.flowmonitor
examples     test.py           wscript
LICENSE     testpy.sup        wutils.py
Makefile     utils            wutils.pyc
xudongwang@xudongwang-ThinkPad-X1-Carbon-4th:~/Documents/ns-allinone-3.27/ns-3.2
7$ ./waf --run wifi-implementation
Waf: Entering directory `/home/xudongwang/Documents/ns-allinone-3.27/ns-3.27/bui
ld'
[ 981/2561] Compiling scratch/wifi-implementation.cc
[2523/2561] Linking build/scratch/wifi-implementation
Waf: Leaving directory `/home/xudongwang/Documents/ns-allinone-3.27/ns-3.27/buil
d'
Build commands will be stored in build/compile_commands.json
'build' finished successfully (4.083s)
msg="WifiRemoteStationManager selected does not support HT rates", file=../src/w
ifi/model/arf-wifi-manager.cc, line=277
terminate called without an active exception
Command ['/home/xudongwang/Documents/ns-allinone-3.27/ns-3.27/build/scratch/wifi
-implementation'] terminated with signal SIGIOT. Run it under a debugger to get
more information (./waf --run <program> --command-template="gdb --args %s <args>
").
xudongwang@xudongwang-ThinkPad-X1-Carbon-4th:~/Documents/ns-allinone-3.27/ns-3.2
7$
```

### 3 Outcomes and Conclusion

#### 3.1 Pcap statistics and analysis

I plot the statistics of the throughput generated during simulation as below:



In this chart, the black line refers to node 1's throughput, the green one is for node 2, the red one is for node 3, and the yellow one (lying at the bottom) for node 4. We can see that although node 3 began to send data at the 3rd second, it didn't set up a successful connection before the 6th second. Node 4 didn't have even a chance to send a byte of data (in my pcap statistics, I found that node 4 only sent 4 packets to set up the connection).

The throughput of the Access Point is stable and keeps between 40Mbps and 50Mbps except a few seconds at the beginning.

#### 3.2 Flow statistics figure

The flow information is showed at the table below:

Node	Average Throughput (Mbps)	Packet Loss Rate (%)
AP	45.10	0.00
1	19.95	0.00
2	18.55	0.00
3	9.23	0.00
4	0.00	0.00