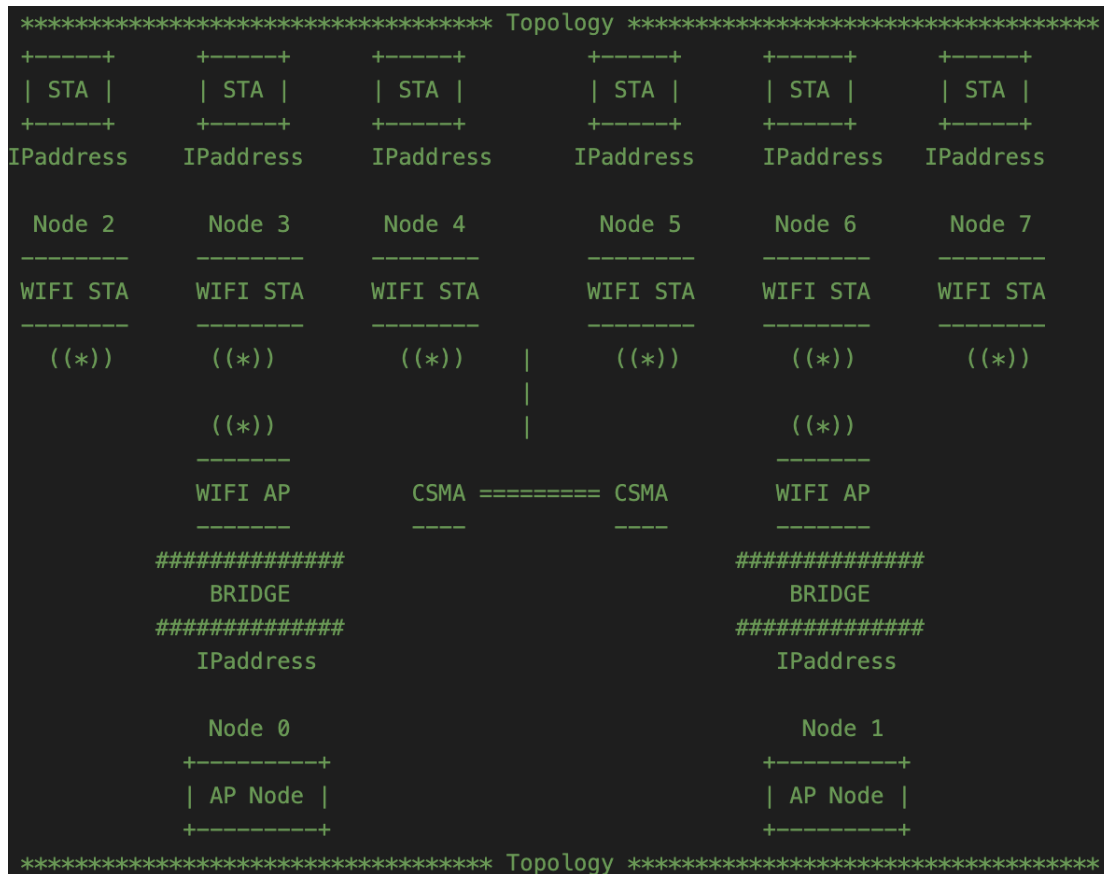


Project 1 Report

陳愉均

Topology



| | | | |
|--|--|---|---|
| <p>Node:0 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:3::1 2001:1::200:ff:fe00:3</p> <p>MAC: 00:00:00:00:00:00</p> | <p>Node:1 IP: 127.0.0.1</p> <p>IPv6: 2001:1::200:ff:fe00:7::1 fe80::200:ff:fe00:7</p> <p>MAC: 00:00:00:00:00:00</p> | <p>Node:2 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:4::1 2001:1::200:ff:fe00:4::1</p> <p>MAC: 00:00:00:00:00:00</p> | <p>Node:3 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:5::1 2001:1::200:ff:fe00:5::1</p> <p>MAC: 00:00:00:00:00:00</p> |
| <p>Node:4 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:6::1 2001:1::200:ff:fe00:6</p> <p>MAC: 00:00:00:00:00:00</p> | <p>Node:5 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:8::1 2001:1::200:ff:fe00:8</p> <p>MAC: 00:00:00:00:00:00</p> | <p>Node:6 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:9::1 2001:1::200:ff:fe00:9::1</p> <p>MAC: 00:00:00:00:00:00</p> | <p>Node:7 IP: 127.0.0.1</p> <p>IPv6: fe80::200:ff:fe00:a::1 2001:1::200:ff:fe00:a::1</p> <p>MAC: 00:00:00:00:00:00</p> |

p1-0-1.pcap

```
mmnet11_2@user:~/ns-allinone-3.33/ns-3.33$ tcpdump -nn -tt -r p1-0-1.pcap
reading from file p1-0-1.pcap, link-type EN10MB (Ethernet)
0.002000 IP6 :: > ff02::1:ff00:7: ICMP6, neighbor solicitation, who has 2001:1::200:ff:fe00:7, length 32
0.003000 IP6 :: > ff02::1:ff00:7: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:7, length 32
0.007000 IP6 :: > ff02::1:ff00:3: ICMP6, neighbor solicitation, who has 2001:1::200:ff:fe00:3, length 32
0.009000 IP6 :: > ff02::1:ff00:3: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:3, length 32
1.001000 IP6 fe80::200:ff:fe00:7 > ff02::2: ICMP6, router solicitation, length 16
1.001661 IP6 fe80::200:ff:fe00:6 > ff02::2: ICMP6, router solicitation, length 16
1.005182 IP6 fe80::200:ff:fe00:4 > ff02::2: ICMP6, router solicitation, length 16
1.006182 IP6 fe80::200:ff:fe00:5 > ff02::2: ICMP6, router solicitation, length 16
1.006182 IP6 fe80::200:ff:fe00:8 > ff02::2: ICMP6, router solicitation, length 16
1.007182 IP6 fe80::200:ff:fe00:a > ff02::2: ICMP6, router solicitation, length 16
1.008000 IP6 fe80::200:ff:fe00:3 > ff02::2: ICMP6, router solicitation, length 16
1.009182 IP6 fe80::200:ff:fe00:9 > ff02::2: ICMP6, router solicitation, length 16
2.002202 IP6 fe80::200:ff:fe00:8 > ff02::1:ff00:4: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:4, length 32
2.002606 IP6 fe80::200:ff:fe00:4 > fe80::200:ff:fe00:8: ICMP6, neighbor advertisement, tgt is fe80::200:ff:fe00:4, length 32
2.007544 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:8.49153: UDP, length 1024
2.009436 IP6 fe80::200:ff:fe00:9 > ff02::1:ff00:4: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:4, length 32
2.009840 IP6 fe80::200:ff:fe00:4 > fe80::200:ff:fe00:9: ICMP6, neighbor advertisement, tgt is fe80::200:ff:fe00:4, length 32
2.009936 IP6 fe80::200:ff:fe00:a > ff02::1:ff00:4: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:4, length 32
2.010385 IP6 fe80::200:ff:fe00:4 > fe80::200:ff:fe00:a: ICMP6, neighbor advertisement, tgt is fe80::200:ff:fe00:4, length 32
2.016679 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:9.49153: UDP, length 1024
2.019920 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:a.49153: UDP, length 1024
3.006385 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:8.49153: UDP, length 1024
3.009671 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:9.49153: UDP, length 1024
3.012506 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:a.49153: UDP, length 1024
4.005790 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:8.49153: UDP, length 1024
4.010214 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:9.49153: UDP, length 1024
4.011343 IP6 fe80::200:ff:fe00:4.1000 > fe80::200:ff:fe00:a.49153: UDP, length 1024
```

圖二、p1-0-1.pcap

p1-0-1.pcap 是根據 node 0 上的 AP 資料。如圖二所示， neighbor solicitation 是在監聽鄰近 nodes 的連結層位址，Router Solicitation 是在向 router 發出請求的訊息，當 host 的 interface 被啟動時，host 可以發送 RS message 要求 router 立即發佈訊息。接著在第 2 秒時，就可以看到封包由 server 端 node 2 (fe80::200:ff:fe00:4)傳送至 client 端 node 5 (ff02::1:ff00:8)；在將近第 3 秒時，封包由 node 2 陸續傳到 node 5(fe80::200:ff:fe00:8), node 6(fe80::200:ff:fe00:9), node 7(fe80::200:ff:fe00:a)

*程式內設定 node1 為 client 端、node0 為 server 端

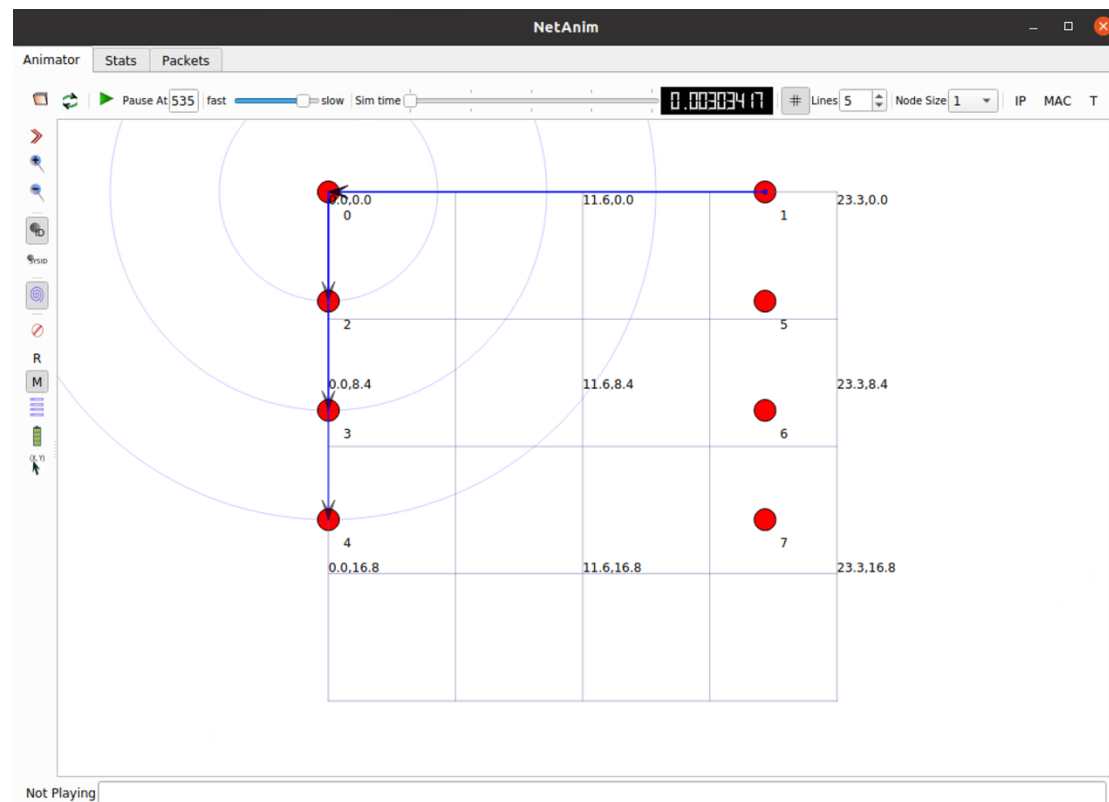
p1-1-1.pcap

```
chenyuchun@ubuntu:~/ns-allinone-3.33/ns-3.33$ tcpdump -nn -tt -r p1-1-1.pcap
reading from file p1-1-1.pcap, link-type EN10MB (Ethernet)
0.002000 IP6 :: > ff02::1:ff00:7: ICMP6, neighbor solicitation, who has 2001:1::200:ff:fe00:7, length 32
0.003000 IP6 :: > ff02::1:ff00:7: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:7, length 32
0.007000 IP6 :: > ff02::1:ff00:3: ICMP6, neighbor solicitation, who has 2001:1::200:ff:fe00:3, length 32
0.009000 IP6 :: > ff02::1:ff00:3: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:3, length 32
1.001000 IP6 fe80::200:ff:fe00:7 > ff02::2: ICMP6, router solicitation, length 16
1.001661 IP6 fe80::200:ff:fe00:6 > ff02::2: ICMP6, router solicitation, length 16
1.005182 IP6 fe80::200:ff:fe00:4 > ff02::2: ICMP6, router solicitation, length 16
1.006182 IP6 fe80::200:ff:fe00:8 > ff02::2: ICMP6, router solicitation, length 16
1.006183 IP6 fe80::200:ff:fe00:5 > ff02::2: ICMP6, router solicitation, length 16
1.007182 IP6 fe80::200:ff:fe00:a > ff02::2: ICMP6, router solicitation, length 16
1.008000 IP6 fe80::200:ff:fe00:3 > ff02::2: ICMP6, router solicitation, length 16
1.009182 IP6 fe80::200:ff:fe00:9 > ff02::2: ICMP6, router solicitation, length 16
2.002202 IP6 fe80::200:ff:fe00:8 > ff02::1:ff00:4: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:4, length 32
2.004406 IP6 fe80::200:ff:fe00:8.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
2.009436 IP6 fe80::200:ff:fe00:9 > ff02::1:ff00:4: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:4, length 32
2.009936 IP6 fe80::200:ff:fe00:a > ff02::1:ff00:4: ICMP6, neighbor solicitation, who has fe80::200:ff:fe00:4, length 32
2.013541 IP6 fe80::200:ff:fe00:9.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
2.015419 IP6 fe80::200:ff:fe00:a.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
3.003247 IP6 fe80::200:ff:fe00:8.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
3.004890 IP6 fe80::200:ff:fe00:9.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
3.006596 IP6 fe80::200:ff:fe00:a.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
4.003148 IP6 fe80::200:ff:fe00:8.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
4.004782 IP6 fe80::200:ff:fe00:9.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
4.006596 IP6 fe80::200:ff:fe00:a.49153 > fe80::200:ff:fe00:4.1000: UDP, length 1024
```

圖三、p1-1-1.pcap

p1-1-1.pcap 是根據 node 1 上的 AP 資料。在第 2~4 秒時，node 5, node 6, node 7 陸續將封包傳到 node 2。

NetAnim



圖六、NetAnim

依據 NetAnim 可以看到，當 client 端 AP (node 1)傳送封包到 server 端 AP (node 0)後，會運用無線網路的方式將封包傳送至 wlan 1 的 STA (node 2,3,4)中。接著 node 2,3,4 會再藉由 n0 和 n1，也是運用無線網路的方式將封包傳送到 node 5,6,7 中。