

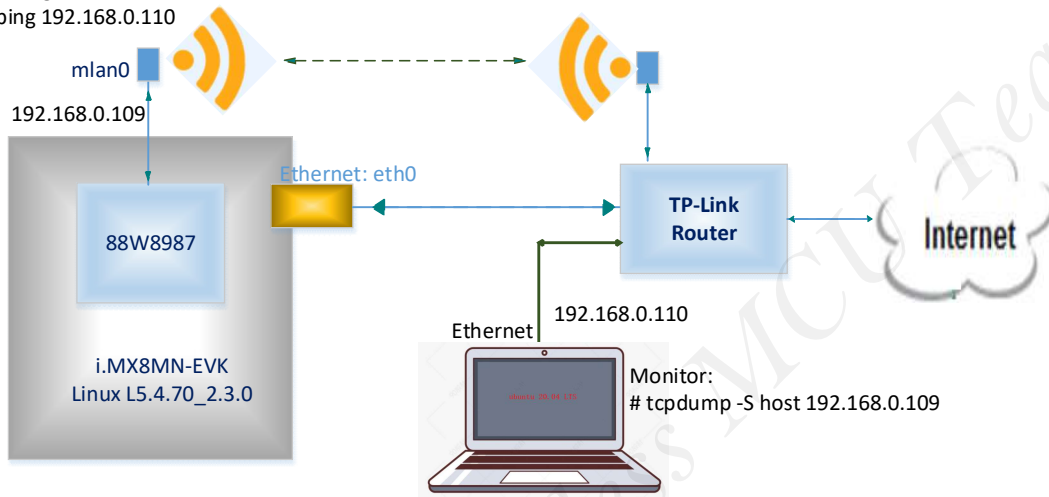
Using tcpdump tool to capture packets From 88W8987 WIFI

Using mlan0 for the test

1. Diagram For the Test

Sending:

```
# ping 192.168.0.110
```



2. Beginning to Test

(1) Starting i.MX8MN-EVK board

- Loading Linux driver for 88W8987

```
root@imx8mnevk:~# modprobe moal mod_para=nxp/wifi_mod_para.conf
Configuring Access Point:
root@imx8mnevk:~# wpa_passphrase SSID SSID_PASSWD >> /etc/wpa_supplicant.conf
Starting to connect Access Point:
root@imx8mnevk:~# wpa_supplicant -d -B -i mlan0 -c /etc/wpa_supplicant.conf -Dnl80211
Getting IP address from AP:
root@imx8mnevk:~# udpcpc -i mlan0
root@imx8mnevk:~# ifconfig
.....
mlan0    Link encap:Ethernet  HWaddr 20:4e:f6:20:98:f1
         inet addr:192.168.0.109  Bcast:192.168.0.255  Mask:255.255.255.0
         UP BROADCAST RUNNING MULTICAST DYNAMIC  MTU:1500  Metric:1
         RX packets:5165 errors:0 dropped:0 overruns:0 frame:0
         TX packets:1163 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:789898 (771.3 KiB)  TX bytes:102923 (100.5 KiB)
.....
```

(2) Starting Ubuntu 20.04 LTS

Running tcpdump command:

```
weidong@ubuntu:~/Desktop$ sudo tcpdump -S host 192.168.0.109
```

(3) Running ping command on i.MX8MN-EVK board

```
root@imx8mnevk:~# ping 192.168.0.110
```

[note]

Test it for 10 minutes.

(4) Monitoring logs on ubuntu 20.04 platform

```
weidong@ubuntu:~/Desktop$ sudo tcpdump -S host 192.168.0.109
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on ens33, link-type EN10MB (Ethernet), capture size 262144 bytes
18:39:00.075413 IP 192.168.0.109 > 224.0.0.251: igmp v2 report 224.0.0.251
18:39:05.195960 IP 192.168.0.109 > 224.0.0.252: igmp v2 report 224.0.0.252
18:39:22.130758 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 1, length 64
18:39:22.130837 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 1, length 64
18:39:23.231313 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 2, length 64
18:39:23.231367 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 2, length 64
18:39:24.133340 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 3, length 64
18:39:24.133408 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 3, length 64
18:39:25.134183 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 4, length 64
18:39:25.134239 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 4, length 64
18:39:26.135488 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 5, length 64
18:39:26.135556 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 5, length 64
18:39:27.137168 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 6, length 64
18:39:27.137188 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 6, length 64
18:39:27.211350 ARP, Request who-has ubuntu tell 192.168.0.109, length 46
18:39:27.211373 ARP, Reply ubuntu is-at 00:0c:29:a9:84:0d (oui Unknown), length 28
18:39:27.294248 ARP, Request who-has 192.168.0.109 tell ubuntu, length 28
18:39:27.295832 ARP, Reply 192.168.0.109 is-at 20:4e:f6:20:98:f1 (oui Unknown), length 46
18:39:28.139122 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 7, length 64
18:39:28.139191 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 7, length 64
18:39:29.140054 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 8, length 64
18:39:29.140138 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 8, length 64
18:39:30.142009 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 9, length 64
18:39:30.142122 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 9, length 64
18:39:31.144469 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 10, length 64
18:39:31.144523 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 10, length 64
18:39:32.145955 IP 192.168.0.109 > ubuntu: ICMP echo request, id 3, seq 11, length 64
18:39:32.146042 IP ubuntu > 192.168.0.109: ICMP echo reply, id 3, seq 11, length 64
.....
1406 packets captured
1406 packets received by filter
0 packets dropped by kernel
```

(5) Logs on i.mx8mn-evk board

```
root@imx8mnevk:~# ping 192.168.0.110
.....
64 bytes from 192.168.0.110: icmp_seq=632 ttl=64 time=2.48 ms
64 bytes from 192.168.0.110: icmp_seq=633 ttl=64 time=2.29 ms
64 bytes from 192.168.0.110: icmp_seq=634 ttl=64 time=2.00 ms
64 bytes from 192.168.0.110: icmp_seq=635 ttl=64 time=2.04 ms
64 bytes from 192.168.0.110: icmp_seq=636 ttl=64 time=2.27 ms
64 bytes from 192.168.0.110: icmp_seq=637 ttl=64 time=2.63 ms
64 bytes from 192.168.0.110: icmp_seq=638 ttl=64 time=3.30 ms
64 bytes from 192.168.0.110: icmp_seq=639 ttl=64 time=1.46 ms
64 bytes from 192.168.0.110: icmp_seq=640 ttl=64 time=1.31 ms
64 bytes from 192.168.0.110: icmp_seq=641 ttl=64 time=1.56 ms
64 bytes from 192.168.0.110: icmp_seq=642 ttl=64 time=2.58 ms
64 bytes from 192.168.0.110: icmp_seq=643 ttl=64 time=1.64 ms
64 bytes from 192.168.0.110: icmp_seq=644 ttl=64 time=2.30 ms
64 bytes from 192.168.0.110: icmp_seq=645 ttl=64 time=2.54 ms
64 bytes from 192.168.0.110: icmp_seq=646 ttl=64 time=2.87 ms
64 bytes from 192.168.0.110: icmp_seq=647 ttl=64 time=2.26 ms
64 bytes from 192.168.0.110: icmp_seq=648 ttl=64 time=2.50 ms
64 bytes from 192.168.0.110: icmp_seq=649 ttl=64 time=2.51 ms
64 bytes from 192.168.0.110: icmp_seq=650 ttl=64 time=2.37 ms
64 bytes from 192.168.0.110: icmp_seq=651 ttl=64 time=2.33 ms
64 bytes from 192.168.0.110: icmp_seq=652 ttl=64 time=2.60 ms
64 bytes from 192.168.0.110: icmp_seq=653 ttl=64 time=2.42 ms
64 bytes from 192.168.0.110: icmp_seq=654 ttl=64 time=2.55 ms
64 bytes from 192.168.0.110: icmp_seq=655 ttl=64 time=2.49 ms
64 bytes from 192.168.0.110: icmp_seq=656 ttl=64 time=2.32 ms
64 bytes from 192.168.0.110: icmp_seq=657 ttl=64 time=1.60 ms
64 bytes from 192.168.0.110: icmp_seq=658 ttl=64 time=5.50 ms
64 bytes from 192.168.0.110: icmp_seq=659 ttl=64 time=2.27 ms
64 bytes from 192.168.0.110: icmp_seq=660 ttl=64 time=2.63 ms
64 bytes from 192.168.0.110: icmp_seq=661 ttl=64 time=1.61 ms
64 bytes from 192.168.0.110: icmp_seq=662 ttl=64 time=1.99 ms
64 bytes from 192.168.0.110: icmp_seq=663 ttl=64 time=2.13 ms
^C
--- 192.168.0.110 ping statistics ---
663 packets transmitted, 663 received, 0% packet loss, time 662989ms
rtt min/avg/max/mdev = 1.085/2.632/102.332/4.504 ms
```

3. Changing tcpdump parameter and continue to test

- On ubuntu 20.04 LTS

```
weidong@ubuntu:~/Desktop$ sudo tcpdump -i any udp host 192.168.0.109 -xx -tt
```

- On i.MX8MN-EVK

```
root@imx8mnevk:~# ping 192.168.0.110
```

Then logs on ubuntu 20.04 LTS

```
weidong@ubuntu:~/Desktop$ sudo tcpdump -i any host 192.168.0.109 -xx -tt
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode listening on any, link-
type LINUX_SLL (Linux cooked v1), capture size 262144 bytes
```

.....

```
620617883.851373 IP ubuntu > 192.168.0.109: ICMP echo reply, id 4, seq 6, length 64
```

```
0x0000: 0004 0001 0006 000c 29a9 840d 0000 0800
0x0010: 4500 0054 a8a5 0000 4001 4fd8 c0a8 006e
0x0020: c0a8 006d 0000 f8e0 0004 0006 bc85 af5f
0x0030: 0000 0000 d85c 0400 0000 0000 1011 1213
0x0040: 1415 1617 1819 1a1b 1c1d 1e1f 2021 2223
0x0050: 2425 2627 2829 2a2b 2c2d 2e2f 3031 3233
0x0060: 3435 3637
```

```
1620617883.920707 ARP, Request who-has ubuntu tell 192.168.0.109, length 46
```

```
0x0000: 0000 0001 0006 204e f620 98f1 0000 0806
0x0010: 0001 0800 0604 0001 204e f620 98f1 c0a8
0x0020: 006d 0000 0000 0000 c0a8 006e 0000 0000
0x0030: 0000 0000 0000 0000 0000 0000 0000
```

```
1620617883.920799 ARP, Reply ubuntu is-at 00:0c:29:a9:84:0d (oui Unknown), length 28
```

```
0x0000: 0004 0001 0006 000c 29a9 840d 0000 0806
0x0010: 0001 0800 0604 0002 000c 29a9 840d c0a8
0x0020: 006e 204e f620 98f1 c0a8 006d
```

```
1620617884.095258 ARP, Request who-has 192.168.0.109 tell ubuntu, length 28
```

```
0x0000: 0004 0001 0006 000c 29a9 840d 0000 0806
0x0010: 0001 0800 0604 0001 000c 29a9 840d c0a8
0x0020: 006e 0000 0000 0000 c0a8 006d
```

```
1620617884.097286 ARP, Reply 192.168.0.109 is-at 20:4e:f6:20:98:f1 (oui Unknown), length 46
```

```
0x0000: 0000 0001 0006 204e f620 98f1 0000 0806
0x0010: 0001 0800 0604 0002 204e f620 98f1 c0a8
0x0020: 006d 000c 29a9 840d c0a8 006e 0000 0000
0x0030: 0000 0000 0000 0000 0000 0000 0000
```

```
1620617884.852432 IP 192.168.0.109 > ubuntu: ICMP echo request, id 4, seq 7, length 64
```

Using Ethernet On i.MX8MN-EVK Board To Test

1. Enabling eth0 and disabling wlan0

```
root@imx8mnevk:~# ifconfig eth0 up
[12469.258247] Atheros 8031 ethernet 30be0000.ethernet-1:00: attached PHY driver [Atheros 8031
ethernet] (mii_bus:phy_addr=30be0000.ethernet-1:00, irq=POLL)
root@imx8mnevk:~# [12471.325293] fec 30be0000.ethernet eth0: Link is Up - 1Gbps/Full - flow control
rx/tx
[12471.333093] IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
root@imx8mnevk:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:04:9f:06:da:96
          inet addr:192.168.0.112  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::204:9fff:fe06:da96/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST DYNAMIC  MTU:1500  Metric:1
          RX packets:374 errors:0 dropped:0 overruns:0 frame:0
          TX packets:130 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:48605 (47.4 KiB)  TX bytes:17745 (17.3 KiB)

root@imx8mnevk:~# ifconfig wlan0 down
[12653.222980] wlan: Received disassociation request on wlan0, reason: 3
[12653.229455] wlan: REASON: (Deauth) Sending STA is leaving (or has left) IBSS or ESS
```

2. Run tcpdump command on ubuntu 20.04 LTS

```
weidong@ubuntu:~/Desktop$ sudo tcpdump -i any udp host 192.168.0.109 -xx -tt
```

3. Run ping command on i.MX8MN-EVK

```
root@imx8mnevk:~# ping 192.168.0.110
PING 192.168.0.110 (192.168.0.110) 56(84) bytes of data.
.....
64 bytes from 192.168.0.110: icmp_seq=15 ttl=64 time=3.01 ms
64 bytes from 192.168.0.110: icmp_seq=16 ttl=64 time=1.89 ms
64 bytes from 192.168.0.110: icmp_seq=17 ttl=64 time=3.75 ms
64 bytes from 192.168.0.110: icmp_seq=18 ttl=64 time=2.79 ms
64 bytes from 192.168.0.110: icmp_seq=19 ttl=64 time=1.71 ms
^C
--- 192.168.0.110 ping statistics ---
19 packets transmitted, 19 received, 0% packet loss, time 18029ms
rtt min/avg/max/mdev = 1.711/2.711/4.929/0.764 m
```

Logs on ubuntu 20.04

```
weidong@ubuntu:~/Desktop$ sudo tcpdump -i any host 192.168.0.112 -xx -tt
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on any, link-type LINUX_SLL (Linux cooked v1), capture size 262144 bytes
1620621372.138687 ARP, Request who-has ubuntu tell 192.168.0.112, length 46
  0x0000:  0001 0001 0006 0004 9f06 da96 0000 0806
  0x0010:  0001 0800 0604 0001 0004 9f06 da96 c0a8
  0x0020:  0070 0000 0000 0000 c0a8 006e 0000 0000
  0x0030:  0000 0000 0000 0000 0000 0000 0000
1620621372.138731 ARP, Reply ubuntu is-at 00:0c:29:a9:84:0d (oui Unknown), length 28
  0x0000:  0004 0001 0006 000c 29a9 840d 0000 0806
  0x0010:  0001 0800 0604 0002 000c 29a9 840d c0a8
  0x0020:  006e 0004 9f06 da96 c0a8 0070
1620621372.140191 IP 192.168.0.112 > ubuntu: ICMP echo request, id 8, seq 1, length 64
  0x0000:  0000 0001 0006 0004 9f06 da96 0000 0800
  0x0010:  4500 0054 3552 4000 4001 8328 c0a8 0070
  0x0020:  c0a8 006e 0800 7fa7 0008 0001 5c93 af5f
  0x0030:  0000 0000 a689 0700 0000 0000 1011 1213
  0x0040:  1415 1617 1819 1a1b 1c1d 1e1f 2021 2223
  0x0050:  2425 2627 2829 2a2b 2c2d 2e2f 3031 3233
  0x0060:  3435 3637
1620621372.140201 IP ubuntu > 192.168.0.112: ICMP echo reply, id 8, seq 1, length 64
  0x0000:  0004 0001 0006 000c 29a9 840d 0000 0800
  0x0010:  4500 0054 fbe5 0000 4001 fc94 c0a8 006e
  0x0020:  c0a8 0070 0000 87a7 0008 0001 5c93 af5f
  0x0030:  0000 0000 a689 0700 0000 0000 1011 1213
  0x0040:  1415 1617 1819 1a1b 1c1d 1e1f 2021 2223
  0x0050:  2425 2627 2829 2a2b 2c2d 2e2f 3031 3233
  0x0060:  3435 3637
1620621373.140587 IP 192.168.0.112 > ubuntu: ICMP echo request, id 8, seq 2, length 64
  0x0000:  0000 0001 0006 0004 9f06 da96 0000 0800
  0x0010:  4500 0054 35c6 4000 4001 82b4 c0a8 0070
  0x0020:  c0a8 006e 0800 34a1 0008 0002 5d93 af5f
  0x0030:  0000 0000 f08e 0700 0000 0000 1011 1213
  0x0040:  1415 1617 1819 1a1b 1c1d 1e1f 2021 2223
  0x0050:  2425 2627 2829 2a2b 2c2d 2e2f 3031 3233
  0x0060:  3435 3637
1620621373.140694 IP ubuntu > 192.168.0.112: ICMP echo reply, id 8, seq 2, length 64
  0x0000:  0004 0001 0006 000c 29a9 840d 0000 0800
  0x0010:  4500 0054 fc4c 0000 4001 fc2d c0a8 006e
  0x0020:  c0a8 0070 0000 3ca1 0008 0002 5d93 af5f
  0x0030:  0000 0000 f08e 0700 0000 0000 1011 1213
  0x0040:  1415 1617 1819 1a1b 1c1d 1e1f 2021 2223
  0x0050:  2425 2627 2829 2a2b 2c2d 2e2f 3031 3233
  0x0060:  3435 3637
.....
^C
43 packets captured
43 packets received by filter
0 packets dropped by kernel
weidong@ubuntu:~/Desktop$
```

[Summary]

Whether it is using wlan0 or ethernet to test and capture data packets, there will always be a similar log on the host side:

1620621372.138731 ARP, Reply ubuntu is-at 00:0c:29:a9:84:0d (oui Unknown), length 28

The log is related to the linux routing and ARP mechanism, it is not an error. It's not a wireless network error.

From the above test, you can find the summary given at the end of the command:

```
-----  
43 packets captured  
43 packets received by filter  
0 packets dropped by kernel  
-----  
and  
-----  
--- 192.168.0.110 ping statistics ---  
19 packets transmitted, 19 received, 0% packet loss, time 18029ms  
rtt min/avg/max/mdev = 1.711/2.711/4.929/0.764 ms  
-----
```

This shows that there are no errors in the communication.

NXP CAS-TIC wireless MCU team

Weidong Sun

05/10/2021