Wireshark Network Capture Analysis

Executive Summary

This Wireshark capture shows 205 packets over approximately 230 seconds of network activity on a 192.168.1.0/24 subnet. The traffic includes router announcements, ICMP ping tests, DNS resolution, and multicast communications.

Network Topology Identified

- **Router/Gateway**: 192.168.1.1 (MAC: 8c:13:e2:0f:c5:5b, NetlinkIct device)
- **Host** : 192.168.1.5 (PCSSystemtec device, MAC: xx:xx:xx:59:0d:34)
- **DNS Server**: 218.248.112.65
- **External Target**: 142.251.220.110 (Google server)

Detailed Analysis Steps

Step 1: Router Activity (Primary Traffic Pattern)

Packets: 1, 4-11, 14, 29, 34, 39-50, 54-71, 76-94, 98-106, 119-130, 133-153, 157-176, 178-198, 201-204

Pattern: Router broadcasts every ~5 seconds

- **Protocol 0xfffa frames**: Unknown proprietary protocol (likely router keepalive/status)
- **ARP Announcements**: Router announces its IP every 10 seconds
- **Purpose**: Network presence maintenance and connectivity verification

Step 2: DNS Resolution Sequence

Packets: 19-26 (Time: 22.395-22.439 seconds)

Process:

1. **Query A record**: 192.168.1.5 → DNS server for google.com
2. **Query AAAA record**: 192.168.1.5 → DNS server for google.com (IPv6)
3. **A response**: google.com = 142.251.220.110
4. **AAAA response**: google.com = 2404:6800:4007:82f::200e
5. **Reverse DNS**: PTR query for 142.251.220.110
6. **PTR response**: hkg07s52-in-f14.1e100.net

Step 3: ICMP Ping Test

Packets: 23-24, 27-28, 31-32, 35-36

Sequence:

- Source: 192.168.1.5 → Destination: 142.251.220.110 (Google)
- 4 ping requests with responses

- RTT measurements: ~17-18ms consistently
- All packets successful (TTL: 64 outbound, 117 inbound)

Step 4: ARP Resolution

Packets: 37-38 (Time: 27.509-27.511 seconds)

Process:

1. **ARP Request**: "Who has 192.168.1.1? Tell 192.168.1.5"
2. **ARP Reply**: "192.168.1.1 is at 8c:13:e2:0f:c5:5b"

Step 5: IGMP Multicast Management

Regular IGMP Queries: Packets 12, 51, 73, 96, 131, 154, 177, 199

- Router sends membership queries every 30 seconds
- Destination: 224.0.0.1 (All Systems multicast)

IGMP Reports: Various packets from 192.168.1.3

- Joins multicast groups:
    - 224.0.0.251 (mDNS)
    - 224.0.0.252 (Link-Local Multicast Name Resolution)
    - 239.255.255.250 (UPnP)
    - 239.255.102.18 (Unknown application-specific)

Step 6: mDNS Service Discovery

Packets: 107-118 (Time: 117.309-118.071 seconds)

Activity:

- computer announces "_dosvc._tcp.local" service
- Service runs on port 7680
- Both IPv4 and IPv6 announcements
- Cache flush operations for service updates

Key Observations

Traffic Volume Analysis

- **Router broadcasts**: ~70% of total traffic
- **Multicast/IGMP**: ~15% of traffic
- **Application traffic**: ~15% (DNS, ICMP, mDNS)

Security Considerations

- No encrypted traffic observed

- Clear text DNS queries
- Router using unknown protocol (0xfffa)
- Multiple multicast groups active

Performance Metrics

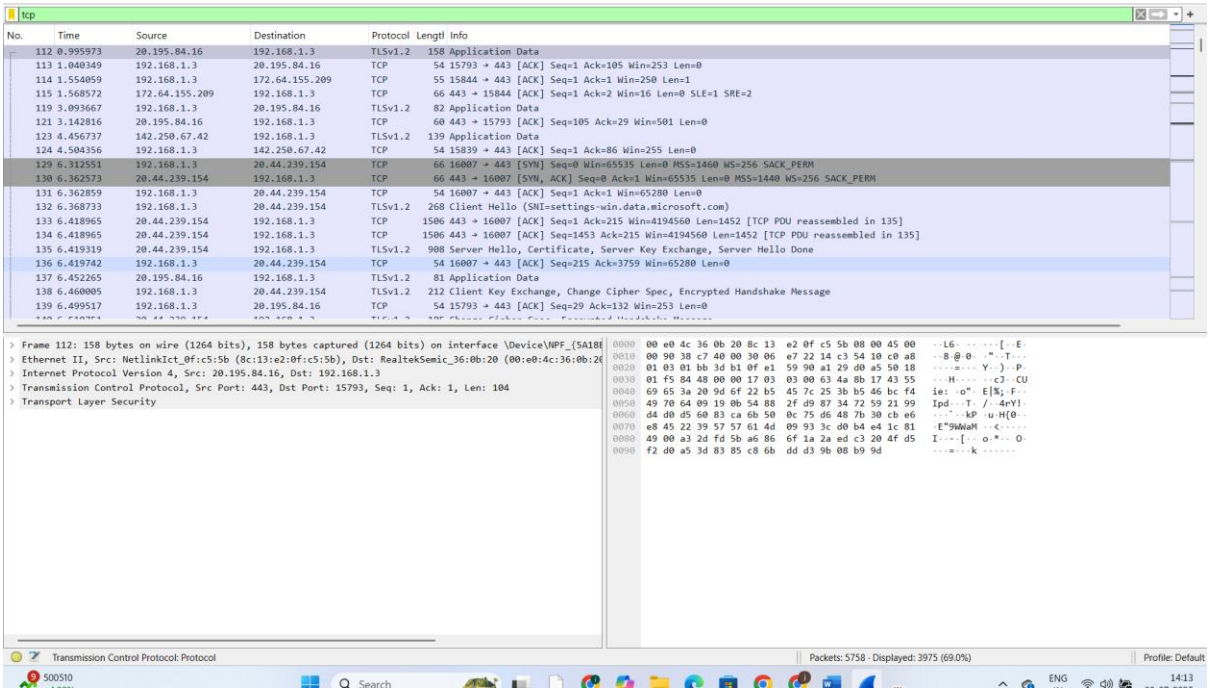
- **Ping latency**: Consistent 17-18ms to Google
- **DNS resolution**: Sub-50ms response times
- **Network stability**: Regular router announcements indicate stable infrastructure

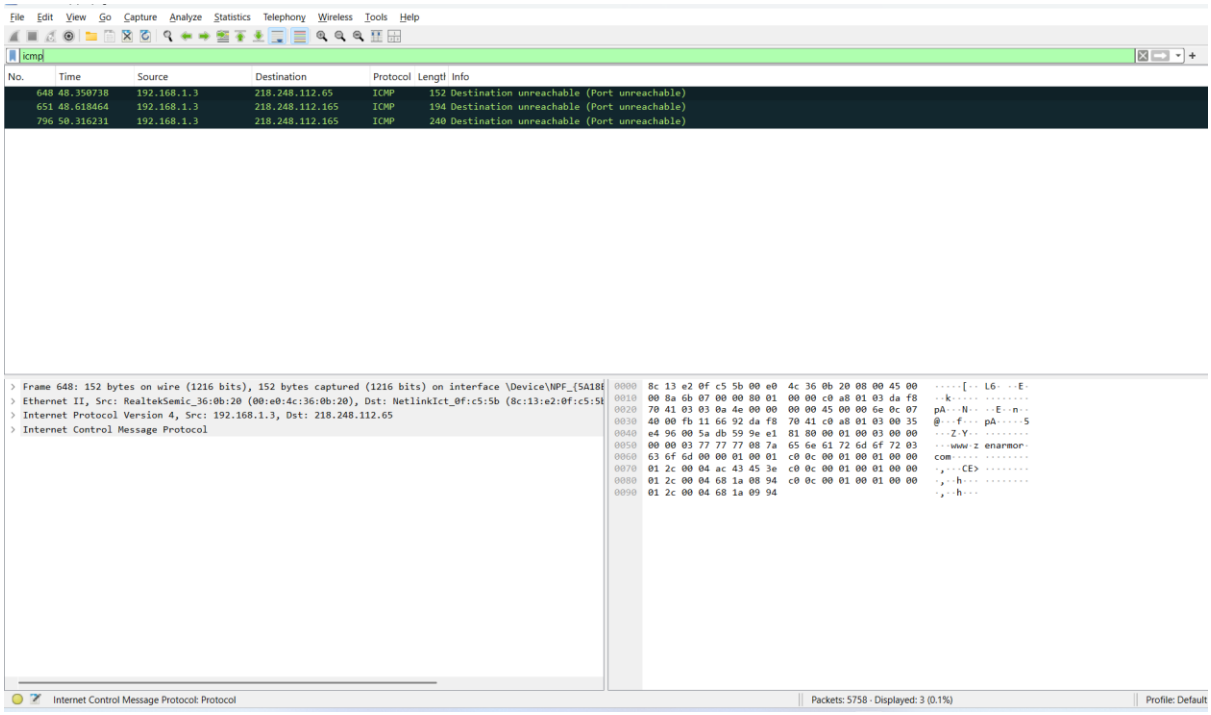
Protocol Distribution

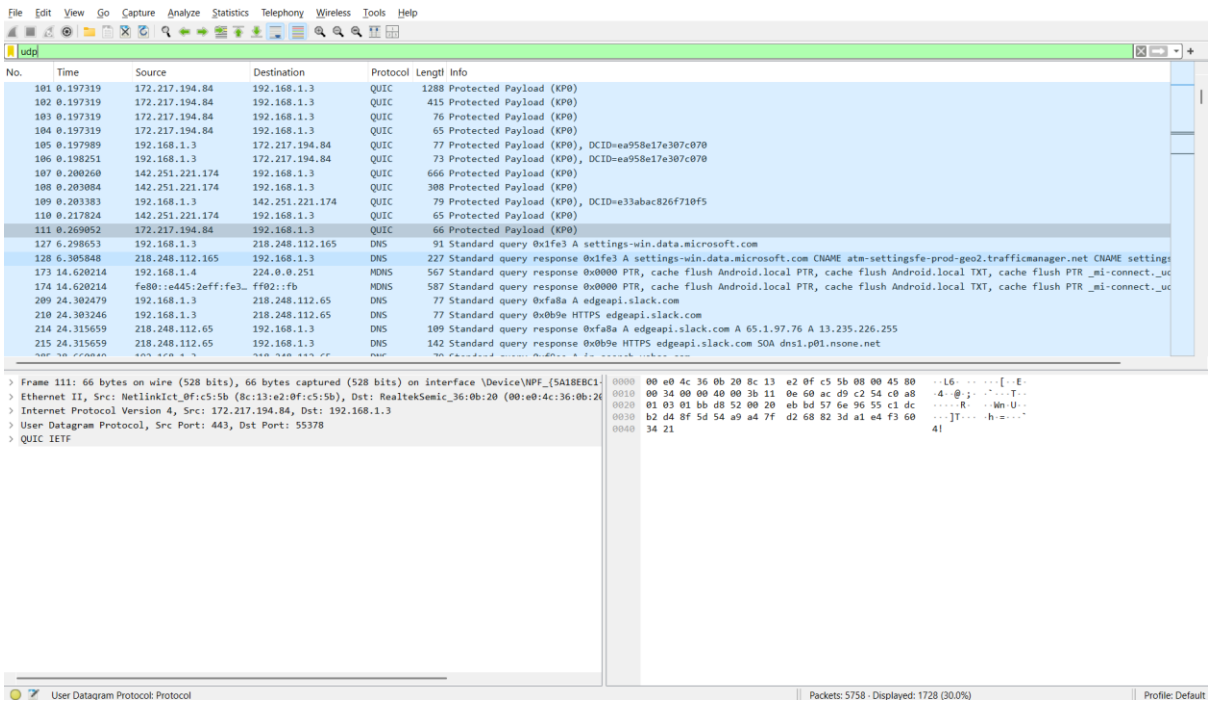
- **Unknown (0xfffa)**: 135 packets (66%)
- **ARP**: 26 packets (13%)
- **IGMP**: 21 packets (10%)
- **ICMP**: 8 packets (4%)
- **DNS**: 8 packets (4%)
- **mDNS**: 12 packets (6%)

Recommendations

1. **Monitor unknown protocol**: Investigate 0xfffa protocol purpose
2. **DNS security**: Consider DNS over HTTPS/TLS implementation
3. **Multicast optimization**: Review necessary multicast groups
4. **Traffic analysis**: Set up continuous monitoring for baseline establishment




File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
icmp
No. Time Source Destination Protocol Length Info
648 48.350738 192.168.1.3 218.248.112.65 ICMP 152 Destination unreachable (Port unreachable)
651 48.618464 192.168.1.3 218.248.112.165 ICMP 194 Destination unreachable (Port unreachable)
796 50.316231 192.168.1.3 218.248.112.165 ICMP 240 Destination unreachable (Port unreachable)
Frame 648: 152 bytes on wire (1216 bits), 152 bytes captured (1216 bits) on interface \Device\NPF_{5A18E
Ethernet II, Src: RealtekSemic_36:0b:20 (00:e0:4c:36:0b:20), Dst: NetlinkIct_0f:c5:5b (8c:13:e2:0f:c5:5
Internet Protocol Version 4, Src: 192.168.1.3, Dst: 218.248.112.65
Internet Control Message Protocol
0000 8c 13 e2 0f c5 5b 00 e0 4c 36 0b 20 08 00 45 00
0010 00 8a 6b 07 00 00 80 01 00 00 c0 a8 01 03 da f8
0020 70 41 03 03 0a 4e 00 00 00 00 45 00 00 6e 0c 07
0030 40 00 fb 11 66 92 da f8 70 41 c0 a8 01 03 00 35
0040 e4 96 00 5a db 59 9e e1 81 80 00 01 00 03 00 00
0050 00 00 03 77 77 77 08 7a 65 6e 61 72 6d 6f 72 03
0060 63 6f 6d 00 00 01 00 01 c0 0c 00 01 00 01 00 00
0070 01 2c 00 04 ac 43 45 3e c0 0c 00 01 00 01 00 00
0080 01 2c 00 04 68 1a 08 94 c0 0c 00 01 00 01 00 00
0090 01 2c 00 04 68 1a 09 94
Internet Control Message Protocol: Protocol
Packets: 5758 · Displayed: 3 (0.1%)
Profile: Default


File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
udp
No. Time Source Destination Protocol Length Info
101 0.197319 172.217.194.84 192.168.1.3 QUIC 1288 Protected Payload (KP0)
102 0.197319 172.217.194.84 192.168.1.3 QUIC 415 Protected Payload (KP0)
103 0.197319 172.217.194.84 192.168.1.3 QUIC 76 Protected Payload (KP0)
104 0.197319 172.217.194.84 192.168.1.3 QUIC 65 Protected Payload (KP0)
105 0.197989 192.168.1.3 172.217.194.84 QUIC 77 Protected Payload (KP0), DCID=ea958e17e307c070
106 0.198251 192.168.1.3 172.217.194.84 QUIC 73 Protected Payload (KP0), DCID=ea958e17e307c070
107 0.200260 142.251.221.174 192.168.1.3 QUIC 666 Protected Payload (KP0)
108 0.203084 142.251.221.174 192.168.1.3 QUIC 308 Protected Payload (KP0)
109 0.203383 192.168.1.3 142.251.221.174 QUIC 79 Protected Payload (KP0), DCID=e33abac826f710f5
110 0.217824 142.251.221.174 192.168.1.3 QUIC 65 Protected Payload (KP0)
111 0.269052 172.217.194.84 192.168.1.3 QUIC 66 Protected Payload (KP0)
127 6.298653 192.168.1.3 218.248.112.165 DNS 91 Standard query 0x1fe3 A settings-win.data.microsoft.com
128 6.305848 218.248.112.165 192.168.1.3 DNS 227 Standard query response 0x1fe3 A settings-win.data.microsoft.com CNAME atm-settingsfe-prod-geo2.trafficmanager.net CNAME settings
173 14.620214 192.168.1.4 224.0.0.251 MDNS 567 Standard query response 0x0000 PTR, cache flush Android.local PTR, cache flush Android.local TXT, cache flush PTR _mi-connect._uc
174 14.620214 fe80::e445:2eff:fe3… ff02::fb MDNS 587 Standard query response 0x0000 PTR, cache flush Android.local PTR, cache flush Android.local TXT, cache flush PTR _mi-connect._uc
209 24.302479 192.168.1.3 218.248.112.65 DNS 77 Standard query 0xfa8a A edgeapi.slack.com
210 24.303246 192.168.1.3 218.248.112.65 DNS 77 Standard query 0x0b9e HTTPS edgeapi.slack.com
214 24.315659 218.248.112.65 192.168.1.3 DNS 109 Standard query response 0xfa8a A edgeapi.slack.com A 65.1.97.76 A 13.235.226.255
215 24.315659 218.248.112.65 192.168.1.3 DNS 142 Standard query response 0x0b9e HTTPS edgeapi.slack.com SOA dns1.p01.nsone.net
Frame 111: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface \Device\NPF_{5A18EBC1
Ethernet II, Src: NetlinkIct_0f:c5:5b (8c:13:e2:0f:c5:5b), Dst: RealtekSemic_36:0b:20 (00:e0:4c:36:0b:2
Internet Protocol Version 4, Src: 172.217.194.84, Dst: 192.168.1.3
User Datagram Protocol, Src Port: 443, Dst Port: 55378
QUIC IETF
0000 00 e0 4c 36 0b 20 8c 13 e2 0f c5 5b 08 00 45 80
0010 00 34 00 00 40 00 3b 11 0e 60 ac d9 c2 54 c0 a8
0020 01 03 01 bb d8 52 00 20 eb bd 57 6e 96 55 c1 dc
0030 b2 d4 8f 5d 54 a9 a4 7f d2 68 82 3d a1 e4 f3 60
0040 34 21
User Datagram Protocol: Protocol
Packets: 5758 · Displayed: 1728 (30.0%)
Profile: Default