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Networking

Command line tasks

Linux System

1. **mkdir**
2. **cd cli_assignment**
3. **touch stuff.txt**
4. **cat >> stuff.txt**
5. **wc -lwm stuff.txt**
6. **nano stuff.txt**
7. **mkdir draft**
8. **mv stuff.txt draft**
9. **cd draft , touch .secret.txt**
10. **cp -r draft final**
11. **mv draft draft.remove**
12. **mv draft.remove final**
13. **ls -l**
14. **zcat NASA_access_log_Aug95.gz**
15. **gunzip NASA_access_log_Aug95.gz**
16. **mv NASA_access_log_Aug95 logs.txt**
17. **mv logs.txt cli_assignment**
18. **head -n 100 cli_assignment/logs.txt**
19. **head -n 100 cli_assignment/logs.txt > logs_top_100.txt**
20. **tail -n 100 cli_assignment/logs.txt**
21. **tail -n 100 cli_assignment/logs.txt > logs_bottom_100.txt**
22. **cat logs_top_100.txt logs_bottom_100.txt > logs_snapshot.txt**
23. **echo "malemajo: This is a great assignment" >> logs_snapshot.txt**
24. **less cli_assignment/logs.txt**
25. **cut -d '%' -f 1 marks.csv | tail -n +2 > cli_assignment/student_names.txt**
26. **cut -d '%' -f 4 marks.csv | tail -n +2 | sort -n > sorted_subject_3_marks.txt**
27. **awk -F % 'NR>1 {sum+=$2; count++} END {if (count > 0) print sum/count; else print "NA"}' marks.csv**
28. **awk -F % 'NR>1 {sum+=$2; count++} END {if (count > 0) print sum/count; else print "NA"}' marks.csv > cli_assignment/done.txt**
29. **mv cli_assignment/done.txt cli_assignment/final/**
30. **mv cli_assignment/final/done.txt cli_assignment/final/average.txt**

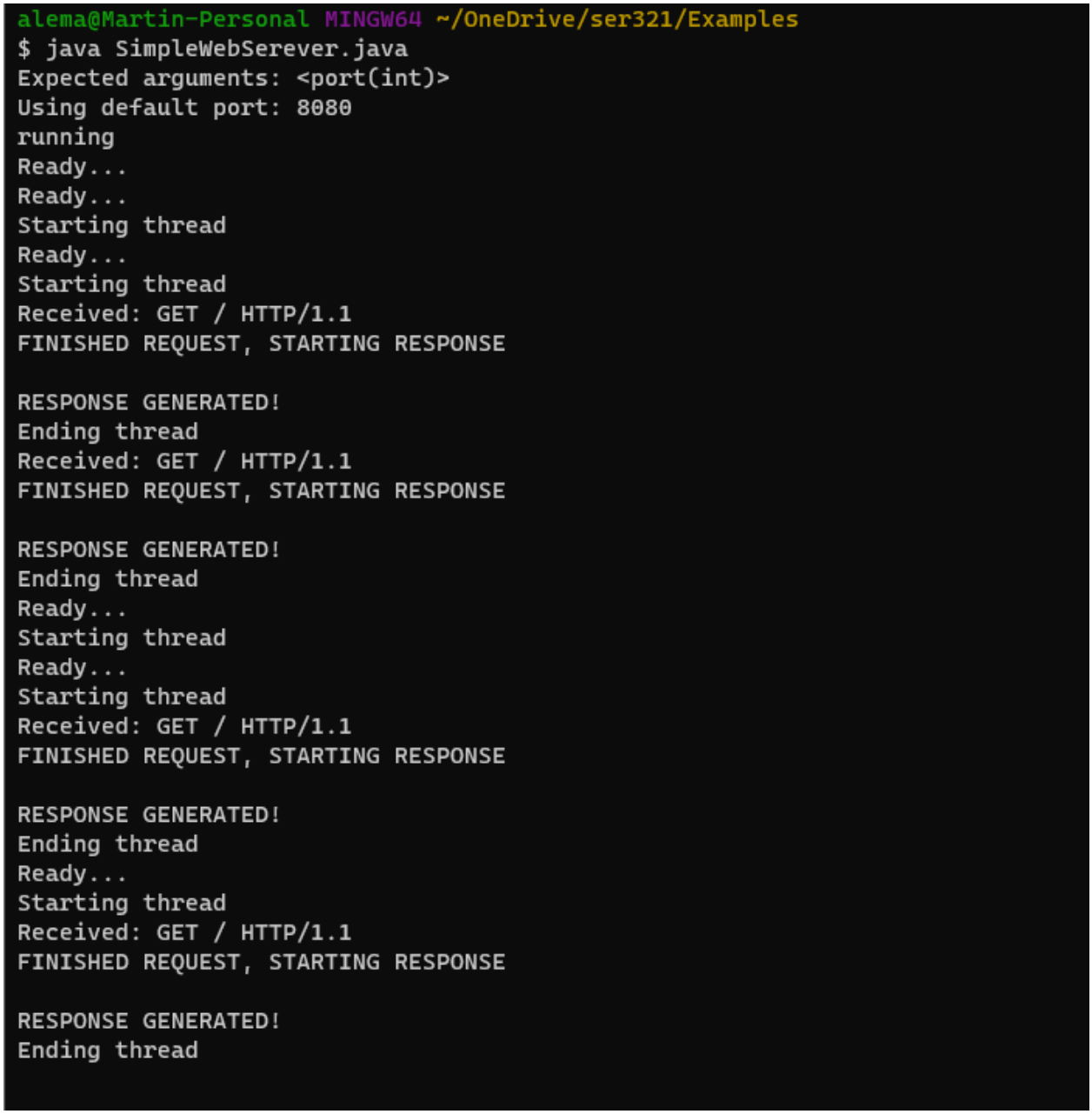
Setup a GitHub repo to submit your assignments

GITHUB LINK: https://github.com/malemajo/ser321-fall23-B-malemajo

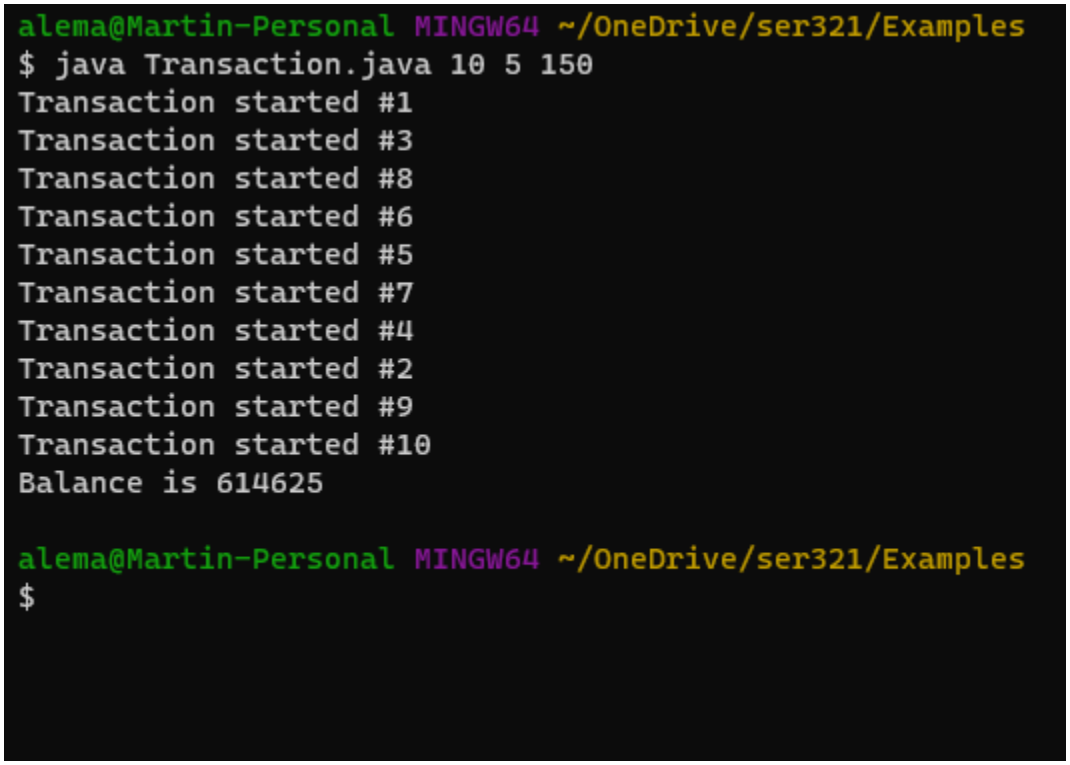
Running examples

1. SimpleWebServer

   A simple Java web server that infinitely waits for incoming requests on a default port or a port provided as a command line argument and creates a separate thread to handle the request. After sending a response it ends the thread.



2. Transaction
   A multithreaded Java application that synchronizes access to the deposit and getBalance methods of the Transaction class.

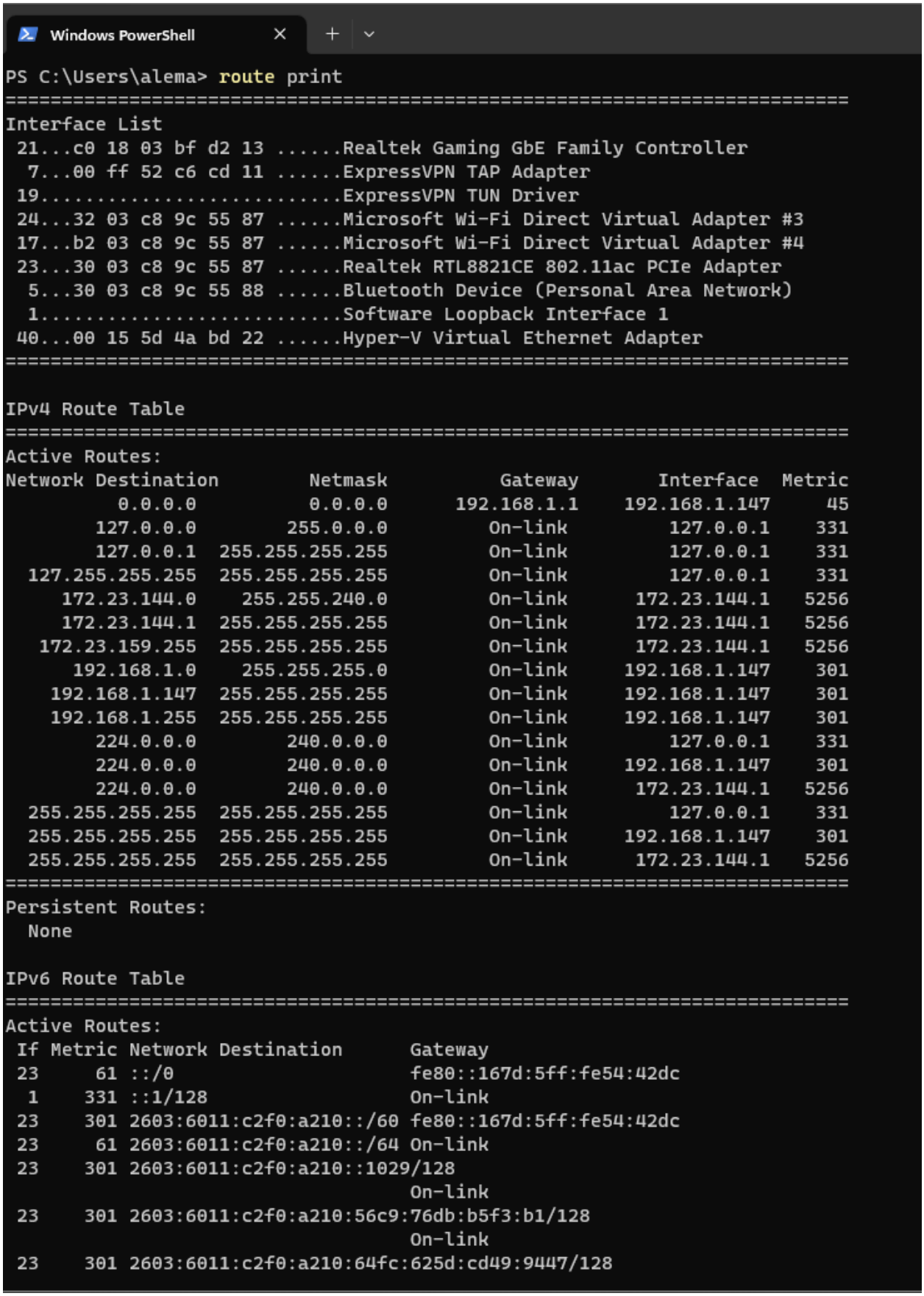


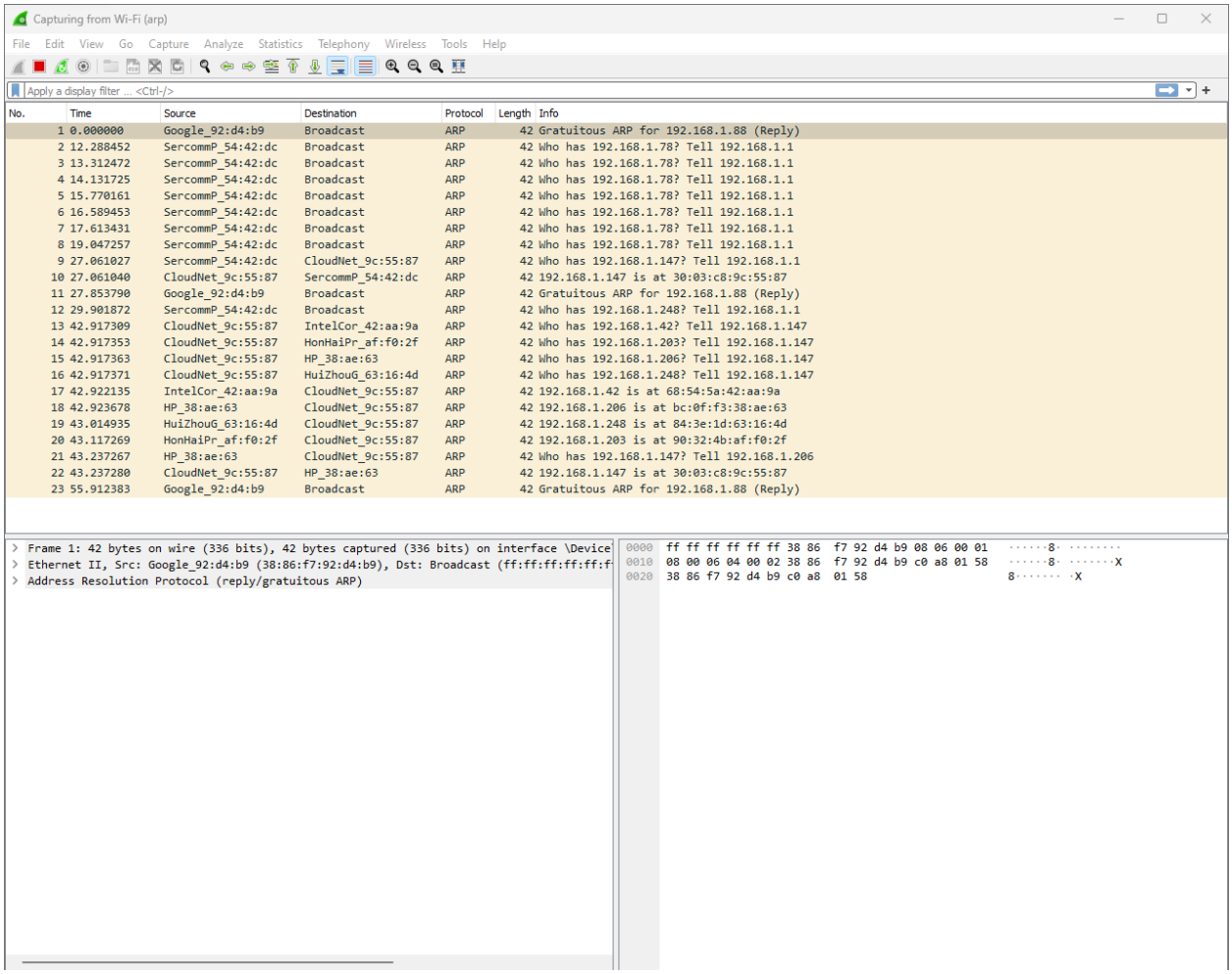
3. **JSON**
   A java program that reads a json string, converts it into JSONObject and uses getString and getJSONobject methods to access some values. It also creates a JSONArray and puts some value into int and later writes the result to a file names.json.

Set up your second system

1. I used DigitalOcean Droplets as my Second Remote Computer.
2. https://youtu.be/gFMzPpiyEeU

Capture a Trace


Windows PowerShell
PS C:\Users\alema> route print
===
Interface List
 21...c0 18 03 bf d2 13 ......Realtek Gaming GbE Family Controller
  7...00 ff 52 c6 cd 11 ......ExpressVPN TAP Adapter
 19...........................ExpressVPN TUN Driver
 24...32 03 c8 9c 55 87 ......Microsoft Wi-Fi Direct Virtual Adapter #3
 17...b2 03 c8 9c 55 87 ......Microsoft Wi-Fi Direct Virtual Adapter #4
 23...30 03 c8 9c 55 87 ......Realtek RTL8821CE 802.11ac PCIe Adapter
  5...30 03 c8 9c 55 88 ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
 40...00 15 5d 4a bd 22 ......Hyper-V Virtual Ethernet Adapter
===
IPv4 Route Table
===
Active Routes:
Network Destination Netmask Gateway Interface Metric
0.0.0.0 0.0.0.0 192.168.1.1 192.168.1.147 45
127.0.0.0 255.0.0.0 On-link 127.0.0.1 331
127.0.0.1 255.255.255.255 On-link 127.0.0.1 331
127.255.255.255 255.255.255.255 On-link 127.0.0.1 331
172.23.144.0 255.255.240.0 On-link 172.23.144.1 5256
172.23.144.1 255.255.255.255 On-link 172.23.144.1 5256
172.23.159.255 255.255.255.255 On-link 172.23.144.1 5256
192.168.1.0 255.255.255.0 On-link 192.168.1.147 301
192.168.1.147 255.255.255.255 On-link 192.168.1.147 301
192.168.1.255 255.255.255.255 On-link 192.168.1.147 301
224.0.0.0 240.0.0.0 On-link 127.0.0.1 331
224.0.0.0 240.0.0.0 On-link 192.168.1.147 301
224.0.0.0 240.0.0.0 On-link 172.23.144.1 5256
255.255.255.255 255.255.255.255 On-link 127.0.0.1 331
255.255.255.255 255.255.255.255 On-link 192.168.1.147 301
255.255.255.255 255.255.255.255 On-link 172.23.144.1 5256
===
Persistent Routes:
None
IPv6 Route Table
===
Active Routes:
If Metric Network Destination Gateway
23 61 ::/0 fe80::167d:5ff:fe54:42dc
1 331 ::1/128 On-link
23 301 2603:6011:c2f0:a210::/60 fe80::167d:5ff:fe54:42dc
23 61 2603:6011:c2f0:a210::/64 On-link
23 301 2603:6011:c2f0:a210::1029/128
On-link
23 301 2603:6011:c2f0:a210:56c9:76db:b5f3:b1/128
On-link
23 301 2603:6011:c2f0:a210:64fc:625d:cd49:9447/128


Capturing from Wi-Fi (arp)
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
No. Time Source Destination Protocol Length Info
1 0.000000 Google_92:d4:b9 Broadcast ARP 42 Gratuitous ARP for 192.168.1.88 (Reply)
2 12.288452 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
3 13.312472 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
4 14.131725 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
5 15.770161 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
6 16.589453 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
7 17.613431 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
8 19.047257 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.78? Tell 192.168.1.1
9 27.061027 SercommP_54:42:dc CloudNet_9c:55:87 ARP 42 Who has 192.168.1.147? Tell 192.168.1.1
10 27.061040 CloudNet_9c:55:87 SercommP_54:42:dc ARP 42 192.168.1.147 is at 30:03:c8:9c:55:87
11 27.853790 Google_92:d4:b9 Broadcast ARP 42 Gratuitous ARP for 192.168.1.88 (Reply)
12 29.901872 SercommP_54:42:dc Broadcast ARP 42 Who has 192.168.1.248? Tell 192.168.1.1
13 42.917309 CloudNet_9c:55:87 IntelCor_42:aa:9a ARP 42 Who has 192.168.1.42? Tell 192.168.1.147
14 42.917353 CloudNet_9c:55:87 HonHaiPr_af:f0:2f ARP 42 Who has 192.168.1.203? Tell 192.168.1.147
15 42.917363 CloudNet_9c:55:87 HP_38:ae:63 ARP 42 Who has 192.168.1.206? Tell 192.168.1.147
16 42.917371 CloudNet_9c:55:87 HuiZhouG_63:16:4d ARP 42 Who has 192.168.1.248? Tell 192.168.1.147
17 42.922135 IntelCor_42:aa:9a CloudNet_9c:55:87 ARP 42 192.168.1.42 is at 68:54:5a:42:aa:9a
18 42.923678 HP_38:ae:63 CloudNet_9c:55:87 ARP 42 192.168.1.206 is at bc:0f:f3:38:ae:63
19 43.014935 HuiZhouG_63:16:4d CloudNet_9c:55:87 ARP 42 192.168.1.248 is at 84:3e:1d:63:16:4d
20 43.117269 HonHaiPr_af:f0:2f CloudNet_9c:55:87 ARP 42 192.168.1.203 is at 90:32:4b:af:f0:2f
21 43.237267 HP_38:ae:63 CloudNet_9c:55:87 ARP 42 Who has 192.168.1.147? Tell 192.168.1.206
22 43.237280 CloudNet_9c:55:87 HP_38:ae:63 ARP 42 192.168.1.147 is at 30:03:c8:9c:55:87
23 55.912383 Google_92:d4:b9 Broadcast ARP 42 Gratuitous ARP for 192.168.1.88 (Reply)
Frame 1: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device
Ethernet II, Src: Google_92:d4:b9 (38:86:f7:92:d4:b9), Dst: Broadcast (ff:ff:ff:ff:ff:f
Address Resolution Protocol (reply/gratuitous ARP)
0000 ff ff ff ff ff ff 38 86 f7 92 d4 b9 08 06 00 01
0010 08 00 06 04 00 02 38 86 f7 92 d4 b9 c0 a8 01 58
0020 38 86 f7 92 d4 b9 c0 a8 01 58