21CY681– Internet Protocol lab

ASSIGNMENT -10

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Title: Analyzing bittorent and bht protocols using wireshark

Date of Assignment provided: 10/12/2022

3. Open Wireshark in the background by choosing the appropriate interface.

4. Then open your torrent file and start the download at least 20%. Stop the capture and document the answers to the following questions:

a. Give a detailed study about the working of BitTorrent in your downloading scenario.

BitTorrent peer-to-peer (P2P) protocol **finds users with files other users want and then downloads pieces of the files from those users simultaneously**.

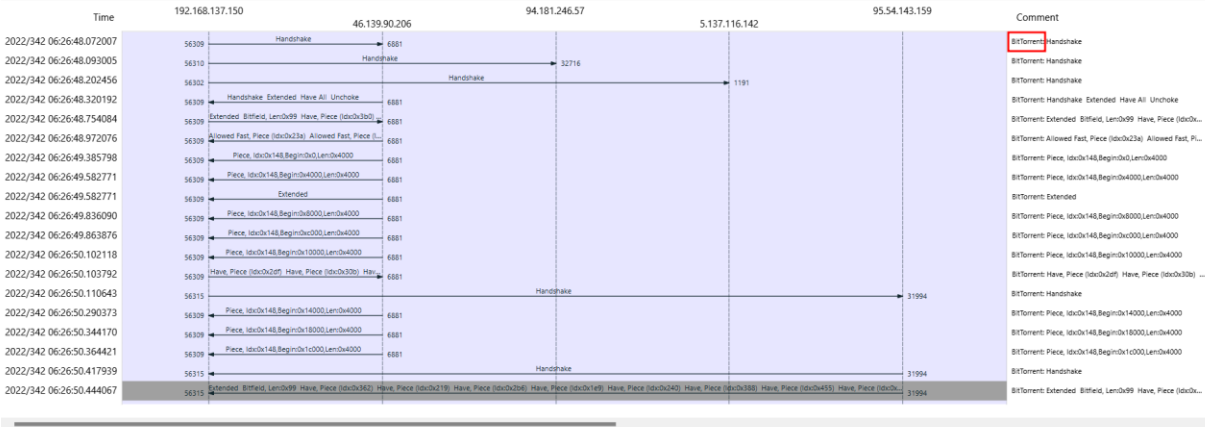
Once connected, a BitTorrent client downloads bits of the files in the torrent in small pieces, downloading all the data it can get. Once the BitTorrent client has some data, it can then begin to upload that data to other BitTorrent clients in the swarm. In this way, everyone downloading a torrent is also uploading the same torrent. This speeds up everyone's download speed.

b. Working of BitTorrent.

BitTorrent is a peer-to-peer protocol, which means that the computers in a BitTorrent "swarm" (a group of computers downloading and uploading the same torrent) transfer data between each other without the need for a central server.

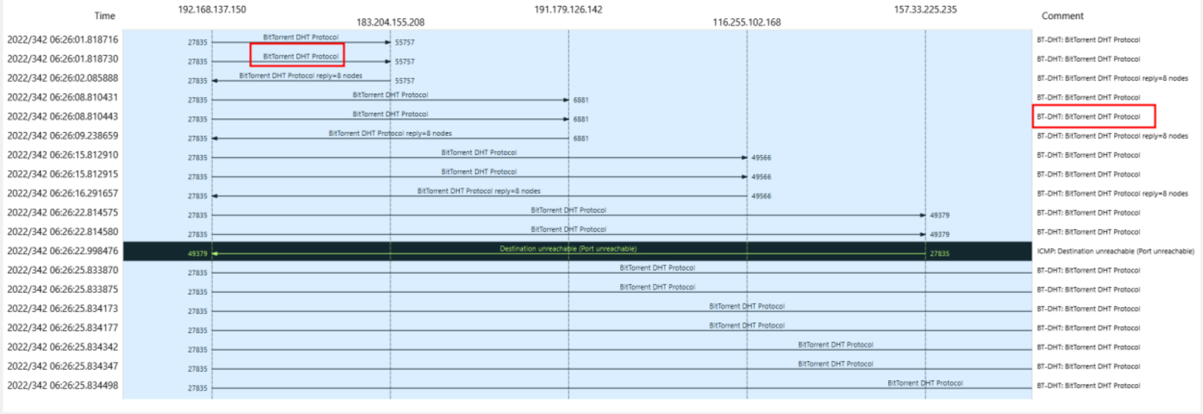
c. Protocol Level Analysis

BITTORENT –



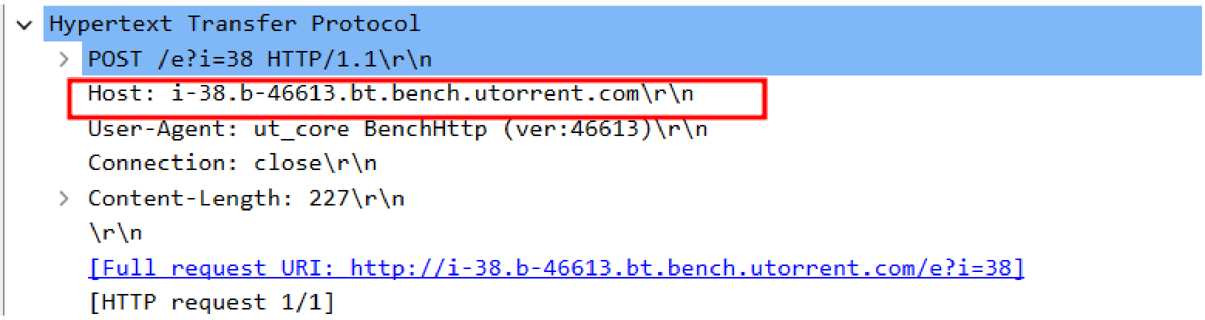
```
Time                        192.168.137.150  46.139.90.206  94.181.246.57  5.137.116.142  95.54.143.159  Comment
2022/342 06:26:48.072007    56309 -> 6881     Handshake                                                   BitTorrent: Handshake
2022/342 06:26:48.093005    56310 -> 32716    Handshake                                                   BitTorrent: Handshake
2022/342 06:26:48.202456    56302 -> 1191     Handshake                                                   BitTorrent: Handshake
2022/342 06:26:48.320192    56309 <- 6881     Handshake  Extended  Have All  Unchoke                      BitTorrent: Handshake  Extended  Have All  Unchoke
2022/342 06:26:48.754084    56309 -> 6881     Extended  Bitfield, Len:0x99  Have, Piece (Idx:0x3b0) ...   BitTorrent: Extended  Bitfield, Len:0x99  Have, Piece (Idx:0x...
2022/342 06:26:48.972076    56309 <- 6881     Allowed Fast, Piece (Idx:0x23a)  Allowed Fast, Piece (I...  BitTorrent: Allowed Fast, Piece (Idx:0x23a)  Allowed Fast, Pi...
2022/342 06:26:49.385798    56309 <- 6881     Piece, Idx:0x148,Begin:0x0,Len:0x4000                       BitTorrent: Piece, Idx:0x148,Begin:0x0,Len:0x4000
2022/342 06:26:49.582771    56309 <- 6881     Piece, Idx:0x148,Begin:0x4000,Len:0x4000                    BitTorrent: Piece, Idx:0x148,Begin:0x4000,Len:0x4000
2022/342 06:26:49.582771    56309 <- 6881     Extended                                                    BitTorrent: Extended
2022/342 06:26:49.836090    56309 <- 6881     Piece, Idx:0x148,Begin:0x8000,Len:0x4000                    BitTorrent: Piece, Idx:0x148,Begin:0x8000,Len:0x4000
2022/342 06:26:49.863876    56309 <- 6881     Piece, Idx:0x148,Begin:0xc000,Len:0x4000                    BitTorrent: Piece, Idx:0x148,Begin:0xc000,Len:0x4000
2022/342 06:26:50.102118    56309 <- 6881     Piece, Idx:0x148,Begin:0x10000,Len:0x4000                   BitTorrent: Piece, Idx:0x148,Begin:0x10000,Len:0x4000
2022/342 06:26:50.103792    56309 -> 6881     Have, Piece (Idx:0x2df)  Have, Piece (Idx:0x30b)  Hav...    BitTorrent: Have, Piece (Idx:0x2df)  Have, Piece (Idx:0x30b)  ...
2022/342 06:26:50.110643    56315 -> 31994    Handshake                                                   BitTorrent: Handshake
2022/342 06:26:50.290373    56309 <- 6881     Piece, Idx:0x148,Begin:0x14000,Len:0x4000                   BitTorrent: Piece, Idx:0x148,Begin:0x14000,Len:0x4000
2022/342 06:26:50.344170    56309 <- 6881     Piece, Idx:0x148,Begin:0x18000,Len:0x4000                   BitTorrent: Piece, Idx:0x148,Begin:0x18000,Len:0x4000
2022/342 06:26:50.364421    56309 <- 6881     Piece, Idx:0x148,Begin:0x1c000,Len:0x4000                   BitTorrent: Piece, Idx:0x148,Begin:0x1c000,Len:0x4000
2022/342 06:26:50.417939    56315 <- 31994    Handshake                                                   BitTorrent: Handshake
2022/342 06:26:50.444067    56315 <- 31994    Extended  Bitfield, Len:0x99  Have, Piece (Idx:0x362)  Have, Piece (Idx:0x219)  Have, Piece (Idx:0x2b6)  Have, Piece (Idx:0x1e9)  Have, Piece (Idx:0x240)  Have, Piece (Idx:0x388)  Have, Piece (Idx:0x455)  Have, Piece (Idx:0x...   BitTorrent: Extended  Bitfield, Len:0x99  Have, Piece (Idx:0x...
```

DHT -



Time			Comment
2022/342 06:26:01.818716	27835 → 55757	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:01.818730	27835 → 55757	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:02.085888	27835 ← 55757	BitTorrent DHT Protocol reply=8 nodes	BT-DHT: BitTorrent DHT Protocol reply=8 nodes
2022/342 06:26:08.810431	27835 → 6881	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:08.810443	27835 → 6881	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:09.238659	27835 ← 6881	BitTorrent DHT Protocol reply=8 nodes	BT-DHT: BitTorrent DHT Protocol reply=8 nodes
2022/342 06:26:15.812910	27835 → 49566	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:15.812915	27835 → 49566	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:16.291657	27835 ← 49566	BitTorrent DHT Protocol reply=8 nodes	BT-DHT: BitTorrent DHT Protocol reply=8 nodes
2022/342 06:26:22.814575	27835 → 49379	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:22.814580	27835 → 49379	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:22.998476	49379 ← 27835	Destination unreachable (Port unreachable)	ICMP: Destination unreachable (Port unreachable)
2022/342 06:26:25.833870	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:25.833875	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:25.834173	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:25.834177	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:25.834342	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:25.834347	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol
2022/342 06:26:25.834498	27835	BitTorrent DHT Protocol	BT-DHT: BitTorrent DHT Protocol

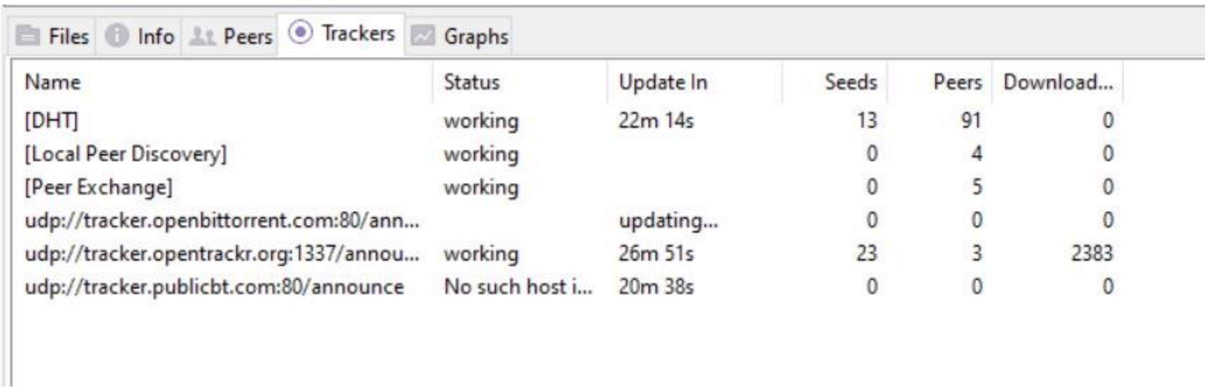
d. Tracker’s status.



```
∨ Hypertext Transfer Protocol
   > POST /e?i=38 HTTP/1.1\r\n
     Host: i-38.b-46613.bt.bench.utorrent.com\r\n
     User-Agent: ut_core BenchHttp (ver:46613)\r\n
     Connection: close\r\n
   > Content-Length: 227\r\n
     \r\n
     [Full request URI: http://i-38.b-46613.bt.bench.utorrent.com/e?i=38]
     [HTTP request 1/1]
```

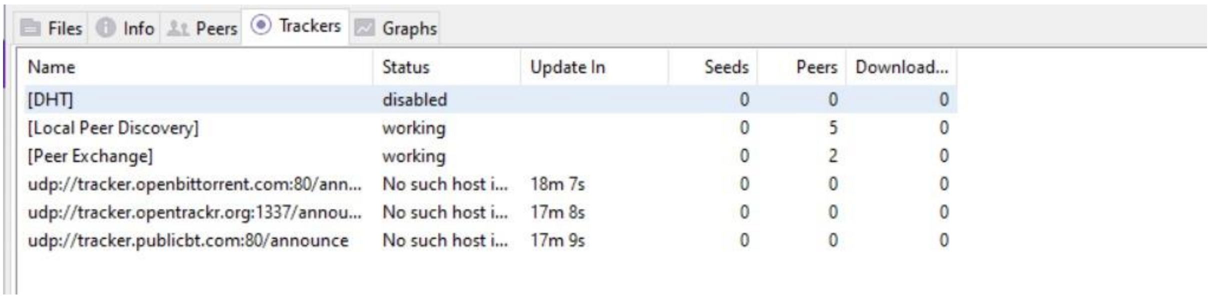
Here we can be able to see that the name of the tracker is i-38.b-46613.bt.bench.utoorent.com

e. DHT status



Name	Status	Update In	Seeds	Peers	Download...
[DHT]	working	22m 14s	13	91	0
[Local Peer Discovery]	working		0	4	0
[Peer Exchange]	working		0	5	0
udp://tracker.openbittorrent.com:80/ann...		updating...	0	0	0
udp://tracker.opentrackr.org:1337/annou...	working	26m 51s	23	3	2383
udp://tracker.publicbt.com:80/announce	No such host i...	20m 38s	0	0	0

Here we can see that while downloading the torrent file the DHT status is set to working.

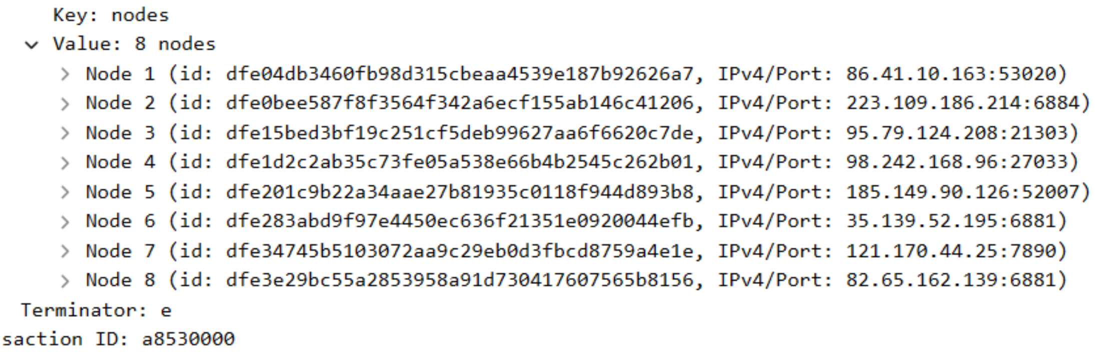


Name	Status	Update In	Seeds	Peers	Download...
[DHT]	disabled		0	0	0
[Local Peer Discovery]	working		0	5	0
[Peer Exchange]	working		0	2	0
udp://tracker.openbittorrent.com:80/ann...	No such host i...	18m 7s	0	0	0
udp://tracker.opentrackr.org:1337/annou...	No such host i...	17m 8s	0	0	0
udp://tracker.publicbt.com:80/announce	No such host i...	17m 9s	0	0	0

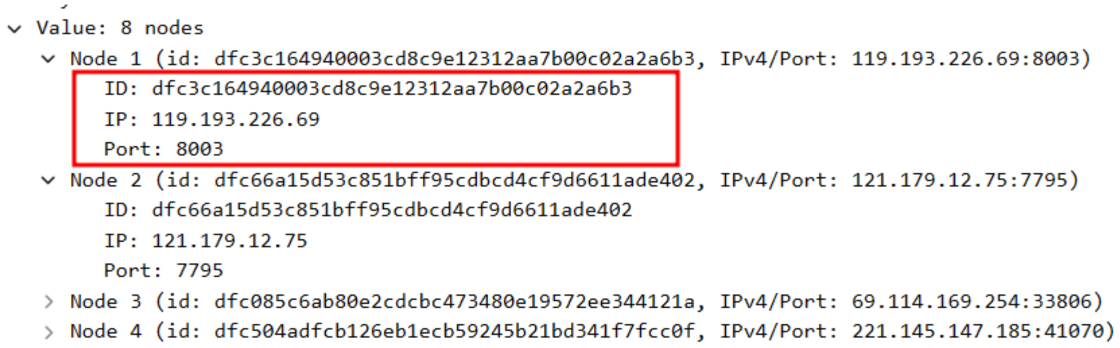
Here while seeding the DHT status is set as disabled.

f. Identify other peers involved in the communication

From the below screenshot we can see that there are sevreral nodes which represents a peer and it sip address and port number is shown

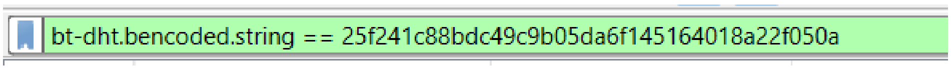


```
    Key: nodes
  ⌄ Value: 8 nodes
    › Node 1 (id: dfe04db3460fb98d315cbeaa4539e187b92626a7, IPv4/Port: 86.41.10.163:53020)
    › Node 2 (id: dfe0bee587f8f3564f342a6ecf155ab146c41206, IPv4/Port: 223.109.186.214:6884)
    › Node 3 (id: dfe15bed3bf19c251cf5deb99627aa6f6620c7de, IPv4/Port: 95.79.124.208:21303)
    › Node 4 (id: dfe1d2c2ab35c73fe05a538e66b4b2545c262b01, IPv4/Port: 98.242.168.96:27033)
    › Node 5 (id: dfe201c9b22a34aae27b81935c0118f944d893b8, IPv4/Port: 185.149.90.126:52007)
    › Node 6 (id: dfe283abd9f97e4450ec636f21351e0920044efb, IPv4/Port: 35.139.52.195:6881)
    › Node 7 (id: dfe34745b5103072aa9c29eb0d3fbcd8759a4e1e, IPv4/Port: 121.170.44.25:7890)
    › Node 8 (id: dfe3e29bc55a2853958a91d730417607565b8156, IPv4/Port: 82.65.162.139:6881)
 Terminator: e
saction ID: a8530000
```

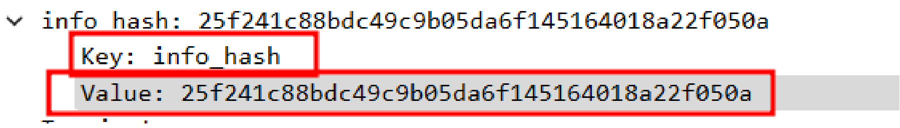


```
  ⌄ Value: 8 nodes
    ⌄ Node 1 (id: dfc3c164940003cd8c9e12312aa7b00c02a2a6b3, IPv4/Port: 119.193.226.69:8003)
         ID: dfc3c164940003cd8c9e12312aa7b00c02a2a6b3
         IP: 119.193.226.69
         Port: 8003
    ⌄ Node 2 (id: dfc66a15d53c851bff95cdbcd4cf9d6611ade402, IPv4/Port: 121.179.12.75:7795)
         ID: dfc66a15d53c851bff95cdbcd4cf9d6611ade402
         IP: 121.179.12.75
         Port: 7795
    › Node 3 (id: dfc085c6ab80e2cdcbc473480e19572ee344121a, IPv4/Port: 69.114.169.254:33806)
    › Node 4 (id: dfc504adfcb126eb1ecb59245b21bd341f7fcc0f, IPv4/Port: 221.145.147.185:41070)
```

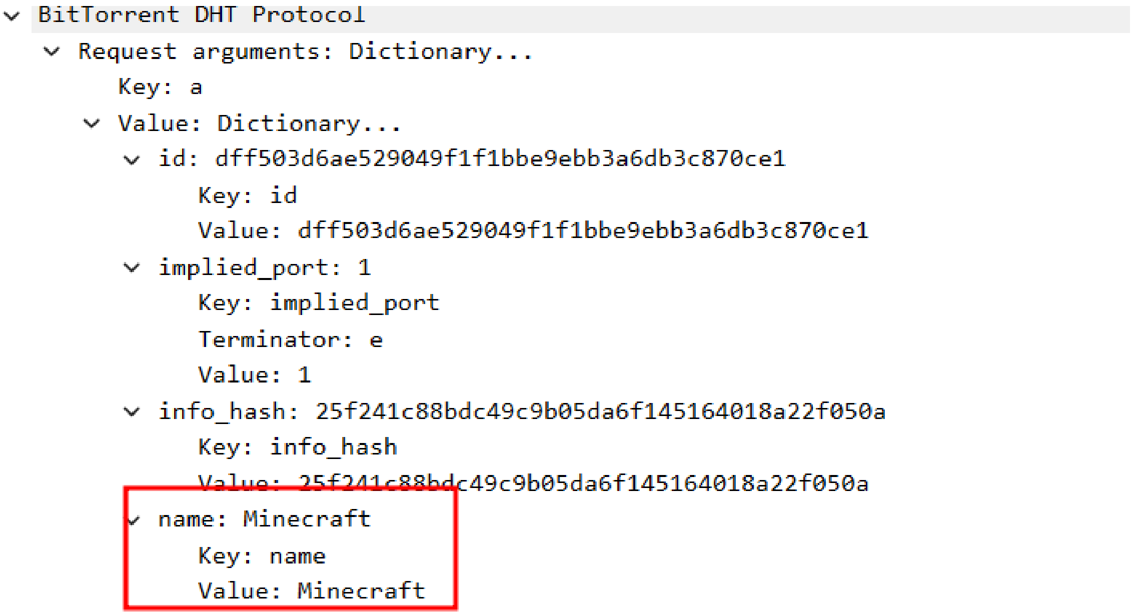
g. Try to identify the name of the file downloded



```
bt-dht.bencoded.string == 25f241c88bdc49c9b05da6f145164018a22f050a
```



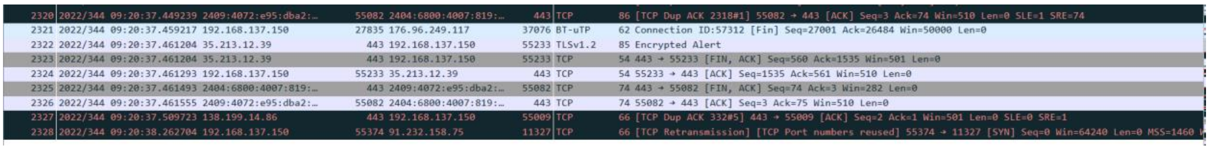
```
⌄ info_hash: 25f241c88bdc49c9b05da6f145164018a22f050a
      Key: info_hash
      Value: 25f241c88bdc49c9b05da6f145164018a22f050a
```



```
⌄ BitTorrent DHT Protocol
   ⌄ Request arguments: Dictionary...
        Key: a
      ⌄ Value: Dictionary...
         ⌄ id: dff503d6ae529049f1f1bbe9ebb3a6db3c870ce1
              Key: id
              Value: dff503d6ae529049f1f1bbe9ebb3a6db3c870ce1
         ⌄ implied_port: 1
              Key: implied_port
              Terminator: e
              Value: 1
         ⌄ info_hash: 25f241c88bdc49c9b05da6f145164018a22f050a
              Key: info_hash
              Value: 25f241c88bdc49c9b05da6f145164018a22f050a
         ⌄ name: Minecraft
              Key: name
              Value: Minecraft
```

5. Try to export the 20% of data you have captured as traffic in Wireshark while downloading files in Torrent.

6. After the Download completes and when it starts seeding, open the Wireshark and analyze the information being transferred in that traffic. Document the difference in Network traffic.



```
2320 2022/344 09:20:37.449239 2409:4072:e95:dba2:…   55082 2404:6800:4007:819:…   443 TCP      86 [TCP Dup ACK 2318#1] 55082 → 443 [ACK] Seq=3 Ack=74 Win=510 Len=0 SLE=1 SRE=74
2321 2022/344 09:20:37.459217 192.168.137.150        27835 176.96.249.117       37076 BT-uTP   62 Connection ID:57312 [Fin] Seq=27001 Ack=26484 Win=50000 Len=0
2322 2022/344 09:20:37.461204 35.213.12.39             443 192.168.137.150      55233 TLSv1.2  85 Encrypted Alert
2323 2022/344 09:20:37.461204 35.213.12.39             443 192.168.137.150      55233 TCP      54 443 → 55233 [FIN, ACK] Seq=560 Ack=1535 Win=501 Len=0
2324 2022/344 09:20:37.461293 192.168.137.150        55233 35.213.12.39           443 TCP      54 55233 → 443 [ACK] Seq=1535 Ack=561 Win=510 Len=0
2325 2022/344 09:20:37.461493 2404:6800:4007:819:…     443 2409:4072:e95:dba2:… 55082 TCP      74 443 → 55082 [FIN, ACK] Seq=74 Ack=3 Win=282 Len=0
2326 2022/344 09:20:37.461555 2409:4072:e95:dba2:…   55082 2404:6800:4007:819:…   443 TCP      74 55082 → 443 [ACK] Seq=3 Ack=75 Win=510 Len=0
2327 2022/344 09:20:37.509723 138.199.14.86            443 192.168.137.150      55009 TCP      66 [TCP Dup ACK 332#5] 443 → 55009 [ACK] Seq=2 Ack=1 Win=501 Len=0 SLE=0 SRE=1
2328 2022/344 09:20:38.262704 192.168.137.150        55374 91.232.158.75        11327 TCP      66 [TCP Retransmission] [TCP Port numbers reused] 55374 → 11327 [SYN] Seq=0 Win=64240 Len=0 MSS=1460
```

Here we didn’t get any packets for seeding. Since there wasn’t any seeding done by our system.