21CY681– Internet Protocol lab -10

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Title: Analyzing bit torrent and BHT protocols using wireshark

Open Wireshark in the background by choosing the appropriate interface.

3. 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**.

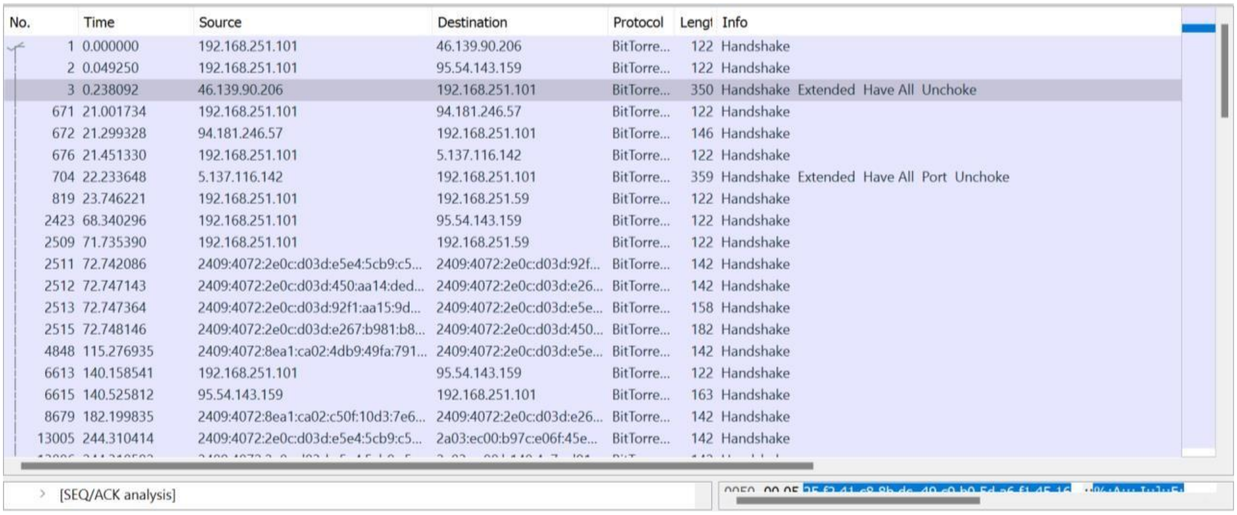
Once connected, a BitTorrent client downloads bits of the files in the torrent in small pieces, downloading all the data it can get. Once the BitTorrent client has some data, it can then begin to upload that data to other BitTorrent clients in the swarm. In this way, everyone downloading a torrent is 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

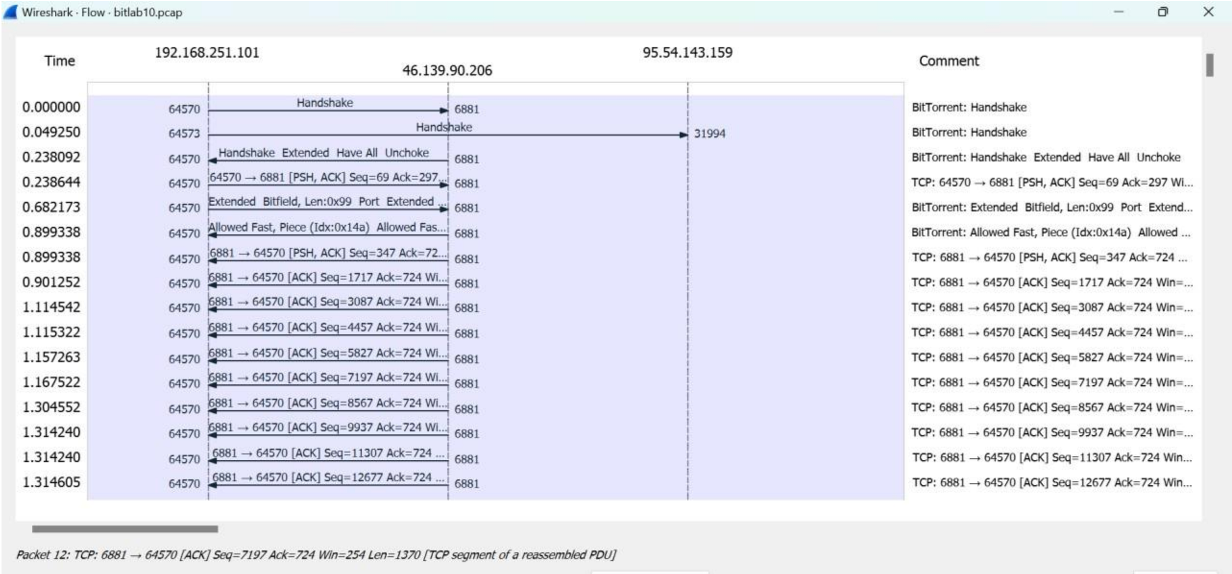
BITTORENT –



No.	Time	Source	Destination	Protocol	Lengt	Info
1	0.000000	192.168.251.101	46.139.90.206	BitTorre...	122	Handshake
2	0.049250	192.168.251.101	95.54.143.159	BitTorre...	122	Handshake
3	0.238092	46.139.90.206	192.168.251.101	BitTorre...	350	Handshake Extended Have All Unchoke
671	21.001734	192.168.251.101	94.181.246.57	BitTorre...	122	Handshake
672	21.299328	94.181.246.57	192.168.251.101	BitTorre...	146	Handshake
676	21.451330	192.168.251.101	5.137.116.142	BitTorre...	122	Handshake
704	22.233648	5.137.116.142	192.168.251.101	BitTorre...	359	Handshake Extended Have All Port Unchoke
819	23.746221	192.168.251.101	192.168.251.59	BitTorre...	122	Handshake
2423	68.340296	192.168.251.101	95.54.143.159	BitTorre...	122	Handshake
2509	71.735390	192.168.251.101	192.168.251.59	BitTorre...	122	Handshake
2511	72.742086	2409:4072:2e0c:d03d:e5e4:5cb9:c5...	2409:4072:2e0c:d03d:92f...	BitTorre...	142	Handshake
2512	72.747143	2409:4072:2e0c:d03d:450:aa14:ded...	2409:4072:2e0c:d03d:e26...	BitTorre...	142	Handshake
2513	72.747364	2409:4072:2e0c:d03d:92f1:aa15:9d...	2409:4072:2e0c:d03d:e5e...	BitTorre...	158	Handshake
2515	72.748146	2409:4072:2e0c:d03d:e267:b981:b8...	2409:4072:2e0c:d03d:450...	BitTorre...	182	Handshake
4848	115.276935	2409:4072:8ea1:ca02:4db9:49fa:791...	2409:4072:2e0c:d03d:e5e...	BitTorre...	142	Handshake
6613	140.158541	192.168.251.101	95.54.143.159	BitTorre...	122	Handshake
6615	140.525812	95.54.143.159	192.168.251.101	BitTorre...	163	Handshake
8679	182.199835	2409:4072:8ea1:ca02:c50f:10d3:7e6...	2409:4072:2e0c:d03d:e26...	BitTorre...	142	Handshake
13005	244.310414	2409:4072:2e0c:d03d:e5e4:5cb9:c5...	2a03:ec00:b97c:e06f:45e...	BitTorre...	142	Handshake

> [SEQ/ACK analysis]

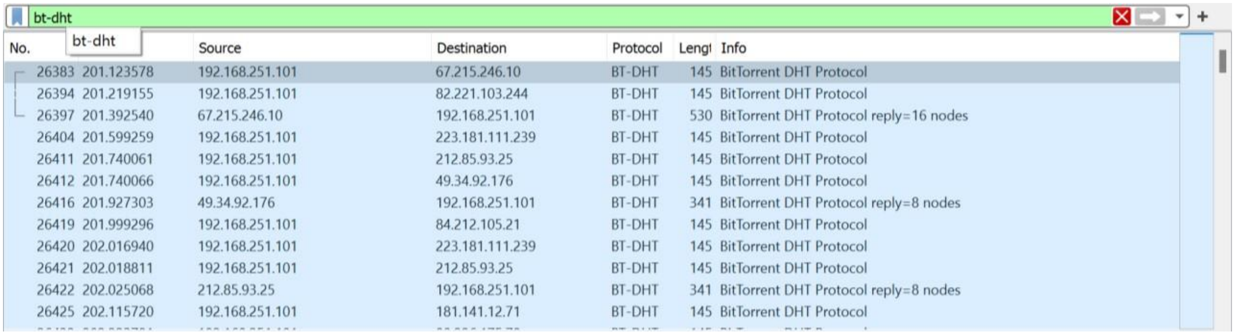
```
0050  00 05 25 f2 41 c8 8b dc 49 c0 b0 5d a6 f1 45 16
```



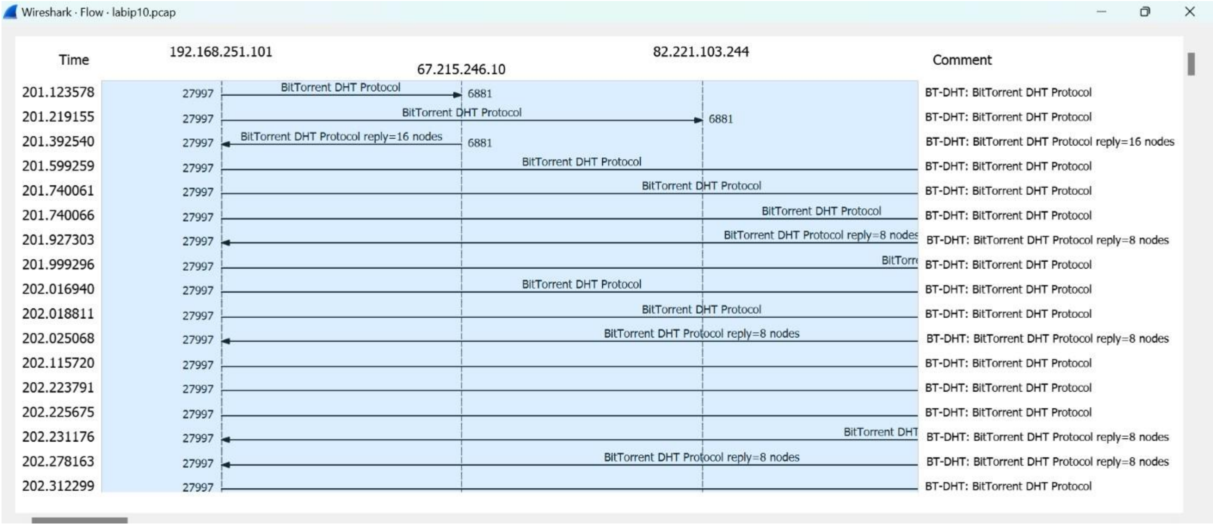
Time				Comment
0.000000	64570	Handshake	6881	BitTorrent: Handshake
0.049250	64573	Handshake	31994	BitTorrent: Handshake
0.238092	64570	Handshake Extended Have All Unchoke	6881	BitTorrent: Handshake Extended Have All Unchoke
0.238644	64570	64570 → 6881 [PSH, ACK] Seq=69 Ack=297...	6881	TCP: 64570 → 6881 [PSH, ACK] Seq=69 Ack=297 Wi...
0.682173	64570	Extended Bitfield, Len:0x99 Port Extended ...	6881	BitTorrent: Extended Bitfield, Len:0x99 Port Extend...
0.899338	64570	Allowed Fast, Piece (Idx:0x14a) Allowed Fas...	6881	BitTorrent: Allowed Fast, Piece (Idx:0x14a) Allowed ...
0.899338	64570	6881 → 64570 [PSH, ACK] Seq=347 Ack=72...	6881	TCP: 6881 → 64570 [PSH, ACK] Seq=347 Ack=724 ...
0.901252	64570	6881 → 64570 [ACK] Seq=1717 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=1717 Ack=724 Win=...
1.114542	64570	6881 → 64570 [ACK] Seq=3087 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=3087 Ack=724 Win=...
1.115322	64570	6881 → 64570 [ACK] Seq=4457 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=4457 Ack=724 Win=...
1.157263	64570	6881 → 64570 [ACK] Seq=5827 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=5827 Ack=724 Win=...
1.167522	64570	6881 → 64570 [ACK] Seq=7197 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=7197 Ack=724 Win=...
1.304552	64570	6881 → 64570 [ACK] Seq=8567 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=8567 Ack=724 Win=...
1.314240	64570	6881 → 64570 [ACK] Seq=9937 Ack=724 Wi...	6881	TCP: 6881 → 64570 [ACK] Seq=9937 Ack=724 Win=...
1.314240	64570	6881 → 64570 [ACK] Seq=11307 Ack=724 ...	6881	TCP: 6881 → 64570 [ACK] Seq=11307 Ack=724 Win...
1.314605	64570	6881 → 64570 [ACK] Seq=12677 Ack=724 ...	6881	TCP: 6881 → 64570 [ACK] Seq=12677 Ack=724 Win...

Packet 12: TCP: 6881 → 64570 [ACK] Seq=7197 Ack=724 Win=254 Len=1370 [TCP segment of a reassembled PDU]

DHT

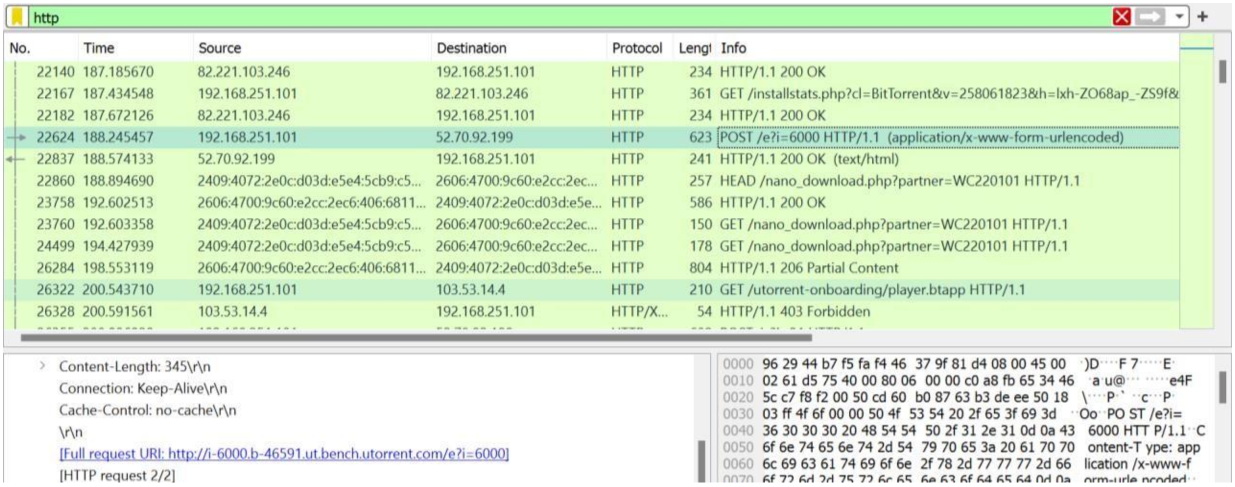


No.	bt-dht	Source	Destination	Protocol	Lengt	Info
26383	201.123578	192.168.251.101	67.215.246.10	BT-DHT	145	BitTorrent DHT Protocol
26394	201.219155	192.168.251.101	82.221.103.244	BT-DHT	145	BitTorrent DHT Protocol
26397	201.392540	67.215.246.10	192.168.251.101	BT-DHT	530	BitTorrent DHT Protocol reply=16 nodes
26404	201.599259	192.168.251.101	223.181.111.239	BT-DHT	145	BitTorrent DHT Protocol
26411	201.740061	192.168.251.101	212.85.93.25	BT-DHT	145	BitTorrent DHT Protocol
26412	201.740066	192.168.251.101	49.34.92.176	BT-DHT	145	BitTorrent DHT Protocol
26416	201.927303	49.34.92.176	192.168.251.101	BT-DHT	341	BitTorrent DHT Protocol reply=8 nodes
26419	201.999296	192.168.251.101	84.212.105.21	BT-DHT	145	BitTorrent DHT Protocol
26420	202.016940	192.168.251.101	223.181.111.239	BT-DHT	145	BitTorrent DHT Protocol
26421	202.018811	192.168.251.101	212.85.93.25	BT-DHT	145	BitTorrent DHT Protocol
26422	202.025068	212.85.93.25	192.168.251.101	BT-DHT	341	BitTorrent DHT Protocol reply=8 nodes
26425	202.115720	192.168.251.101	181.141.12.71	BT-DHT	145	BitTorrent DHT Protocol



Time				Comment
201.123578	27997	BitTorrent DHT Protocol	6881	BT-DHT: BitTorrent DHT Protocol
201.219155	27997	BitTorrent DHT Protocol	6881	BT-DHT: BitTorrent DHT Protocol
201.392540	27997	BitTorrent DHT Protocol reply=16 nodes	6881	BT-DHT: BitTorrent DHT Protocol reply=16 nodes
201.599259	27997	BitTorrent DHT Protocol		BT-DHT: BitTorrent DHT Protocol
201.740061	27997	BitTorrent DHT Protocol		BT-DHT: BitTorrent DHT Protocol
201.740066	27997	BitTorrent DHT Protocol		BT-DHT: BitTorrent DHT Protocol
201.927303	27997	BitTorrent DHT Protocol reply=8 nodes		BT-DHT: BitTorrent DHT Protocol reply=8 nodes
201.999296	27997	BitTorr		BT-DHT: BitTorrent DHT Protocol
202.016940	27997	BitTorrent DHT Protocol		BT-DHT: BitTorrent DHT Protocol
202.018811	27997	BitTorrent DHT Protocol		BT-DHT: BitTorrent DHT Protocol
202.025068	27997	BitTorrent DHT Protocol reply=8 nodes		BT-DHT: BitTorrent DHT Protocol reply=8 nodes
202.115720	27997			BT-DHT: BitTorrent DHT Protocol
202.223791	27997			BT-DHT: BitTorrent DHT Protocol
202.225675	27997			BT-DHT: BitTorrent DHT Protocol
202.231176	27997	BitTorrent DHT		BT-DHT: BitTorrent DHT Protocol reply=8 nodes
202.278163	27997	BitTorrent DHT Protocol reply=8 nodes		BT-DHT: BitTorrent DHT Protocol reply=8 nodes
202.312299	27997			BT-DHT: BitTorrent DHT Protocol

d. Tracker’s status.



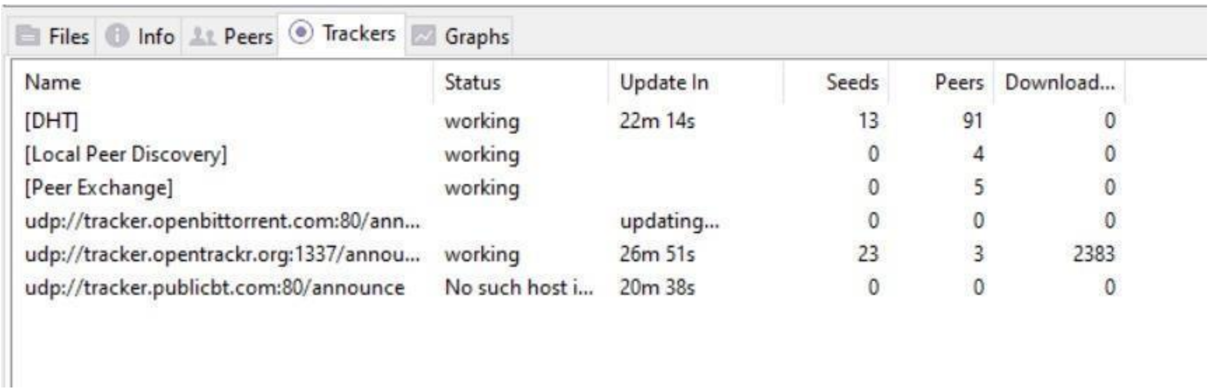
```
http

No.    Time        Source                          Destination                     Protocol  Lengt  Info
22140  187.185670  82.221.103.246                  192.168.251.101                 HTTP      234    HTTP/1.1 200 OK
22167  187.434548  192.168.251.101                 82.221.103.246                  HTTP      361    GET /installstats.php?cl=BitTorrent&v=258061823&h=lxh-ZO68ap_-ZS9f&
22182  187.672126  82.221.103.246                  192.168.251.101                 HTTP      234    HTTP/1.1 200 OK
22624  188.245457  192.168.251.101                 52.70.92.199                    HTTP      623    POST /e?i=6000 HTTP/1.1  (application/x-www-form-urlencoded)
22837  188.574133  52.70.92.199                    192.168.251.101                 HTTP      241    HTTP/1.1 200 OK  (text/html)
22860  188.894690  2409:4072:2e0c:d03d:e5e4:5cb9:c5...  2606:4700:9c60:e2cc:2ec...  HTTP      257    HEAD /nano_download.php?partner=WC220101 HTTP/1.1
23758  192.602513  2606:4700:9c60:e2cc:2ec6:406:6811...  2409:4072:2e0c:d03d:e5e...  HTTP     586    HTTP/1.1 200 OK
23760  192.603358  2409:4072:2e0c:d03d:e5e4:5cb9:c5...  2606:4700:9c60:e2cc:2ec...  HTTP      150    GET /nano_download.php?partner=WC220101 HTTP/1.1
24499  194.427939  2409:4072:2e0c:d03d:e5e4:5cb9:c5...  2606:4700:9c60:e2cc:2ec...  HTTP      178    GET /nano_download.php?partner=WC220101 HTTP/1.1
26284  198.553119  2606:4700:9c60:e2cc:2ec6:406:6811...  2409:4072:2e0c:d03d:e5e...  HTTP     804    HTTP/1.1 206 Partial Content
26322  200.543710  192.168.251.101                 103.53.14.4                     HTTP      210    GET /utorrent-onboarding/player.btapp HTTP/1.1
26328  200.591561  103.53.14.4                     192.168.251.101                 HTTP/X...  54    HTTP/1.1 403 Forbidden
```

```
  > Content-Length: 345\r\n
    Connection: Keep-Alive\r\n
    Cache-Control: no-cache\r\n
    \r\n
    [Full request URI: http://i-6000.b-46591.ut.bench.utorrent.com/e?i=6000]
    [HTTP request 2/2]
```

```
0000  96 29 44 b7 f5 fa f4 46  37 9f 81 d4 08 00 45 00   ·)D····F 7·····E·
0010  02 61 d5 75 40 00 80 06  00 00 c0 a8 fb 65 34 46   ·a·u@··· ·····e4F
0020  5c c7 f8 f2 00 50 cd 60  b0 87 63 b3 de ee 50 18   \····P·` ··c···P·
0030  03 ff 4f 6f 00 00 50 4f  53 54 20 2f 65 3f 69 3d   ··Oo··PO ST /e?i=
0040  36 30 30 30 20 48 54 54  50 2f 31 2e 31 0d 0a 43   6000 HTT P/1.1··C
0050  6f 6e 74 65 6e 74 2d 54  79 70 65 3a 20 61 70 70   ontent-T ype: app
0060  6c 69 63 61 74 69 6f 6e  2f 78 2d 77 77 77 2d 66   lication /x-www-f
0070  6f 72 6d 2d 75 72 6c 65  6e 63 6f 64 65 64 0d 0a   orm-urle ncoded··
```

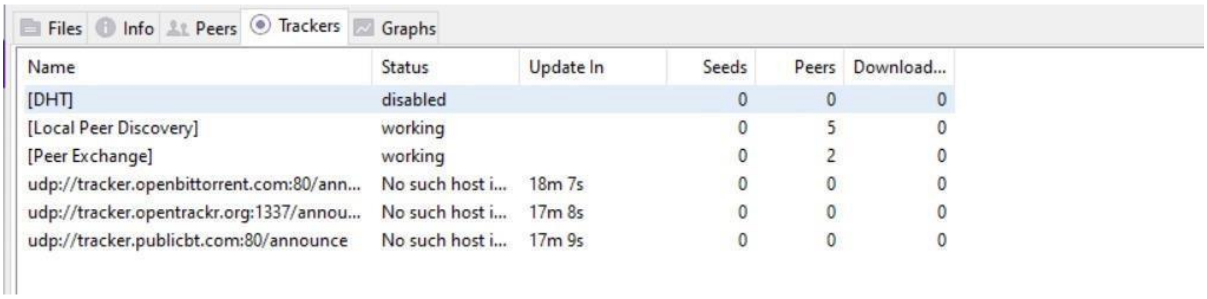
Here we can be able to see that the name of the tracker is i-6000.b- 46591.ut.bench.utorrent.com

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.

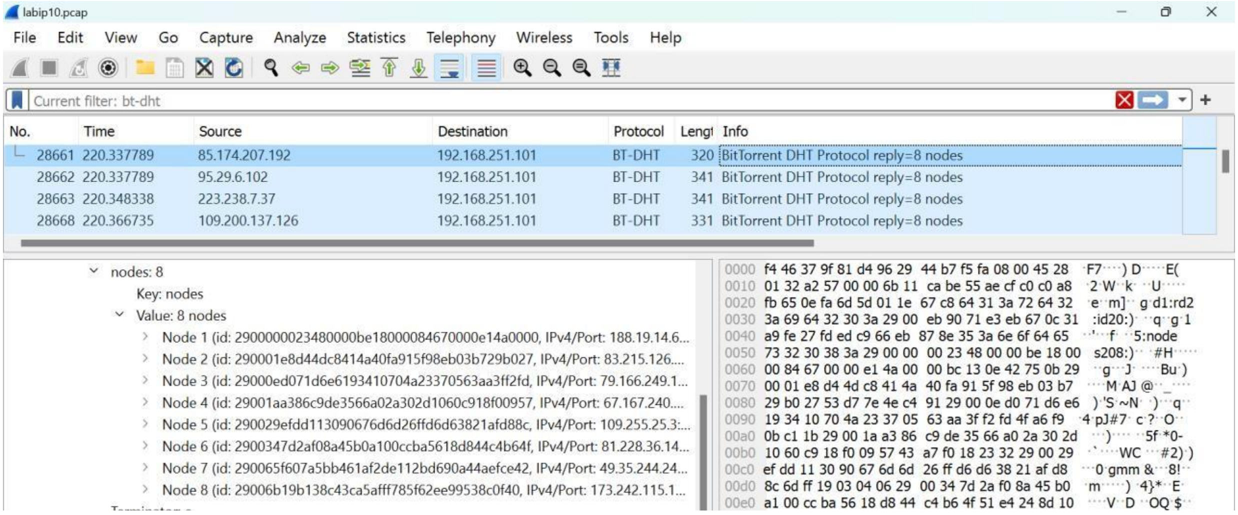


Name	Status	Update In	Seeds	Peers	Download...
[DHT]	disabled		0	0	0
[Local Peer Discovery]	working		0	5	0
[Peer Exchange]	working		0	2	0
udp://tracker.openbittorrent.com:80/ann...	No such host i...	18m 7s	0	0	0
udp://tracker.opentrackr.org:1337/annou...	No such host i...	17m 8s	0	0	0
udp://tracker.publicbt.com:80/announce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

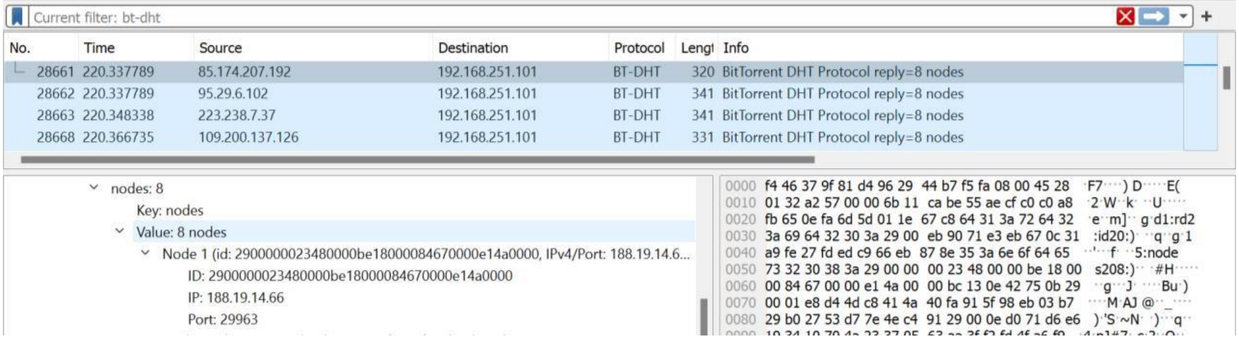


Current filter: bt-dht

```
No.    Time        Source           Destination      Protocol  Lengt Info
28661  220.337789  85.174.207.192   192.168.251.101  BT-DHT    320  BitTorrent DHT Protocol reply=8 nodes
28662  220.337789  95.29.6.102      192.168.251.101  BT-DHT    341  BitTorrent DHT Protocol reply=8 nodes
28663  220.348338  223.238.7.37     192.168.251.101  BT-DHT    341  BitTorrent DHT Protocol reply=8 nodes
28668  220.366735  109.200.137.126  192.168.251.101  BT-DHT    331  BitTorrent DHT Protocol reply=8 nodes
```

```
nodes: 8
    Key: nodes
    Value: 8 nodes
        Node 1 (id: 2900000023480000be18000084670000e14a0000, IPv4/Port: 188.19.14.6...
        Node 2 (id: 290001e8d44dc8414a40fa915f98eb03b729b027, IPv4/Port: 83.215.126....
        Node 3 (id: 29000ed071d6e6193410704a23370563aa3ff2fd, IPv4/Port: 79.166.249.1...
        Node 4 (id: 29001aa386c9de3566a02a302d1060c918f00957, IPv4/Port: 67.167.240....
        Node 5 (id: 290029efdd113090676d6d26ffd6d63821afd88c, IPv4/Port: 109.255.25.3:...
        Node 6 (id: 2900347d2af08a45b0a100ccba5618d844c4b64f, IPv4/Port: 81.228.36.14...
        Node 7 (id: 290065f607a5bb461af2de112bd690a44aefce42, IPv4/Port: 49.35.244.24...
        Node 8 (id: 29006b19b138c43ca5afff785f62ee99538c0f40, IPv4/Port: 173.242.115.1...
```

```
0000  f4 46 37 9f 81 d4 96 29  44 b7 f5 fa 08 00 45 28   ·F7···)D·····E(
0010  01 32 a2 57 00 00 6b 11  ca be 55 ae cf c0 c0 a8   ·2·W··k···U·····
0020  fb 65 0e fa 6d 5d 01 1e  67 c8 64 31 3a 72 64 32   ·e··m]··g·d1:rd2
0030  3a 69 64 32 30 3a 29 00  eb 90 71 e3 eb 67 0c 31   :id20:)···q··g·1
0040  a9 fe 27 fd ed c9 66 eb  87 8e 35 3a 6e 6f 64 65   ··'···f···5:node
0050  73 32 30 38 3a 29 00 00  00 23 48 00 00 be 18 00   s208:)···#H·····
0060  00 84 67 00 00 e1 4a 00  00 bc 13 0e 42 75 0b 29   ··g···J·····Bu·)
0070  00 01 e8 d4 4d c8 41 4a  40 fa 91 5f 98 eb 03 b7   ····M·AJ@··_····
0080  29 b0 27 53 d7 7e 4e c4  91 29 00 0e d0 71 d6 e6   )·'S·~N··)···q··
0090  19 34 10 70 4a 23 37 05  63 aa 3f f2 fd 4f a6 f9   ·4·pJ#7·c·?··O··
00a0  0b c1 1b 29 00 1a a3 86  c9 de 35 66 a0 2a 30 2d   ···)······5f·*0-
00b0  10 60 c9 18 f0 09 57 43  a7 f0 18 23 32 29 00 29   ·`····WC···#2)·)
00c0  ef dd 11 30 90 67 6d 6d  26 ff d6 d6 38 21 af d8   ···0·gmm&···8!··
00d0  8c 6d ff 19 03 04 06 29  00 34 7d 2a f0 8a 45 b0   ·m·····)·4}*··E·
00e0  a1 00 cc ba 56 18 d8 44  c4 b6 4f 51 e4 24 8d 10   ····V··D··OQ·$··
```



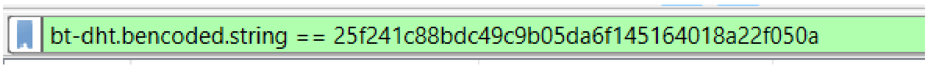
Current filter: bt-dht

```
No.    Time        Source           Destination      Protocol  Lengt Info
28661  220.337789  85.174.207.192   192.168.251.101  BT-DHT    320  BitTorrent DHT Protocol reply=8 nodes
28662  220.337789  95.29.6.102      192.168.251.101  BT-DHT    341  BitTorrent DHT Protocol reply=8 nodes
28663  220.348338  223.238.7.37     192.168.251.101  BT-DHT    341  BitTorrent DHT Protocol reply=8 nodes
28668  220.366735  109.200.137.126  192.168.251.101  BT-DHT    331  BitTorrent DHT Protocol reply=8 nodes
```

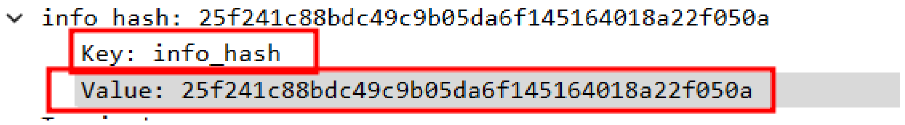
```
nodes: 8
    Key: nodes
    Value: 8 nodes
        Node 1 (id: 2900000023480000be18000084670000e14a0000, IPv4/Port: 188.19.14.6...
            ID: 2900000023480000be18000084670000e14a0000
            IP: 188.19.14.66
            Port: 29963
```

```
0000  f4 46 37 9f 81 d4 96 29  44 b7 f5 fa 08 00 45 28   ·F7···)D·····E(
0010  01 32 a2 57 00 00 6b 11  ca be 55 ae cf c0 c0 a8   ·2·W··k···U·····
0020  fb 65 0e fa 6d 5d 01 1e  67 c8 64 31 3a 72 64 32   ·e··m]··g·d1:rd2
0030  3a 69 64 32 30 3a 29 00  eb 90 71 e3 eb 67 0c 31   :id20:)···q··g·1
0040  a9 fe 27 fd ed c9 66 eb  87 8e 35 3a 6e 6f 64 65   ··'···f···5:node
0050  73 32 30 38 3a 29 00 00  00 23 48 00 00 be 18 00   s208:)···#H·····
0060  00 84 67 00 00 e1 4a 00  00 bc 13 0e 42 75 0b 29   ··g···J·····Bu·)
0070  00 01 e8 d4 4d c8 41 4a  40 fa 91 5f 98 eb 03 b7   ····M·AJ@··_····
0080  29 b0 27 53 d7 7e 4e c4  91 29 00 0e d0 71 d6 e6   )·'S·~N··)···q··
```

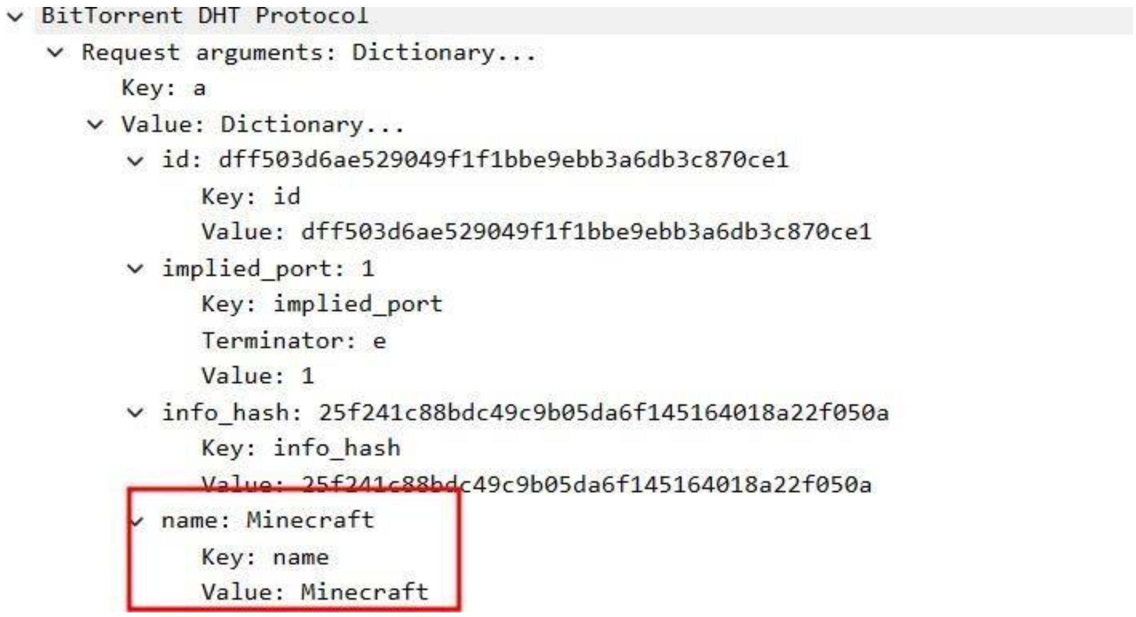
g. Try to identify the name of the file downloded



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



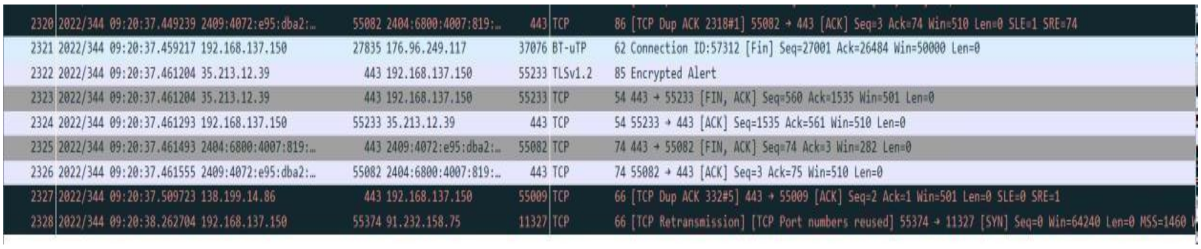
```
∨ info_hash: 25f241c88bdc49c9b05da6f145164018a22f050a
     Key: info_hash
     Value: 25f241c88bdc49c9b05da6f145164018a22f050a
```



```
∨ 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
```

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

5. 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.