

Test environment

1. One Windows VPS provisioned in the Vultr (<https://www.vultr.com/>) London data center, with Zoom and Wireshark manually installed.

IP: 78.141.228.20



Server Information

78.141.228.20

London

Created 5 minutes ago

2. My personal computer in Shanghai

IP: 180.167.204.122

IP	Location
180.167.204.122	China Shanghai

3. Zoom datacenter setting in my UVic Zoom account

Free account (my personal account) cannot change this setting

Transit Data

Meetings/webinars data center

Include all data center regions to provide the best experience for participants joining from all regions. Opting out of data center regions may limit CRC, Dial-in, Call Me, and Invite by Phone options for participants joining from those regions.

- | | |
|---------------------------------------------------|---------------------------------------------------|
| <input checked="" type="checkbox"/> Australia | <input checked="" type="checkbox"/> India |
| <input checked="" type="checkbox"/> Brazil | <input checked="" type="checkbox"/> Ireland |
| <input checked="" type="checkbox"/> Canada | <input checked="" type="checkbox"/> Japan |
| <input checked="" type="checkbox"/> China | <input checked="" type="checkbox"/> Mexico |
| <input checked="" type="checkbox"/> Germany | <input checked="" type="checkbox"/> Netherlands |
| <input checked="" type="checkbox"/> Hong Kong SAR | <input checked="" type="checkbox"/> Singapore |
| | <input checked="" type="checkbox"/> United States |

Test 1

1. On London, start a Zoom meeting using UVic Netlink ID

It connects to a server: 193.123.148.38:8801, udp

(8801 is the port of Zoom media routing service)

<https://panlab.cs.uvic.ca/web3/viewtopic.php?f=102&t=8788&p=108185&hilit=8801#p108185>

5

The screenshot shows a Wireshark capture of network traffic. The main pane displays a list of packets, with packet 2798 selected. The packet list pane shows the following details:

No.	Time	Source	Destination	Protocol	Length	Info
2798	110.288496	193.123.148.38	78.141.228.20	UDP	123	57847 → 8801 Len=81

The packet details pane for the selected packet shows:

- Frame 2798: 123 bytes on wire (984 bits), 123 bytes captured (984 bits) on interface \Device\NPF_{F5837FF7-8CE9-496E-A870-B04709646E81}, id 0
- Ethernet II, Src: 56:00:03:67:59:5c (56:00:03:67:59:5c), Dst: fe:00:03:67:59:5c (fe:00:03:67:59:5c)
- Internet Protocol Version 4, Src: 193.123.148.38, Dst: 78.141.228.20
- User Datagram Protocol, Src Port: 57847, Dst Port: 8801
- Source Port: 57847
- Destination Port: 8801
- Length: 89
- Checksum: 0x88ae [unverified]
- [Checksum Status: Unverified]
- [Stream index: 1]

The packet bytes pane shows the raw data in hexadecimal and ASCII:

```
0000 fe 00 03 67 59 5c 00 03 67 59 5c 00 00 45 00  ...gYV...gY\E-
0010 00 6d 91 83 00 00 80 11 00 00 4e 8d e4 14 c1 7b  m.....N...{
0020 94 26 e1 f7 22 61 00 59 88 ae 03 00 00 00 2a 00  &..aY.....*
0030 11 54 e3 00 71 84 16 01 05 40 34 2e 11 35 02 94  T..q...@4.5..
0040 0f c2 05 31 80 99 9e f4 bc c6 de 91 33 a8 46 70  ...1.....3:Fp
0050 f6 34 bf e3 8a cb 42 69 33 6f fb 45 24 49 10 b3  -4...Bi 3o:ESI..
0060 85 6e fd 00 d8 52 be 6e b6 38 38 fc 0c 1b 03 26  .n..R.n 88...&
0070 4b b7 14 27 52 4b 6a a6 e3 d7 00  K...RKj... ..
```

And 193.123.148.38 is one IP from Oracle Cloud which is one provider for Zoom

<https://tools.keycdn.com/geo?host=193.123.148.38>

LOCATION	
City	Ashburn
Region	Virginia (VA)
Postal code	20147
Country	United States (US)
Continent	North America (NA)
Metro code	511
Coordinates	39.018 (lat) / -77.539 (long)
Time	2021-06-10 05:37:34 (America/New_York)
NETWORK	
IP address	193.123.148.38
Hostname	193.123.148.38
Provider	ORACLE-BMC-31898
ASN	31898

- On Shanghai, join the above meeting using my personal Zoom ID
- It creates a P2P connection between Shanghai and London
- 192.168.1.108 is the local IP of my computer
- 78.141.228.20 is the IP of VPS in London
- 180.167.204.122 is the public IP of my computer in Shanghai

Wireshark on Shanghai:

No.	Time	Source	Destination	Protocol	Length	Info
9143	28.000327	192.168.1.108	78.141.228.20	UDP	107	53082 → 7519 Len=65
9148	28.739756	78.141.228.20	192.168.1.108	UDP	107	7519 → 53082 Len=65
9153	28.782665	192.168.1.108	78.141.228.20	UDP	1137	53082 → 7519 Len=1095
9163	28.847431	192.168.1.108	78.141.228.20	UDP	930	53082 → 7519 Len=888
9165	28.945669	192.168.1.108	78.141.228.20	UDP	1044	53082 → 7519 Len=1002
9182	28.998856	192.168.1.108	78.141.228.20	UDP	741	53082 → 7519 Len=699
9188	29.073984	78.141.228.20	192.168.1.108	UDP	476	7519 → 53082 Len=434
9189	29.073992	78.141.228.20	192.168.1.108	UDP	107	7519 → 53082 Len=65
9190	29.074327	192.168.1.108	78.141.228.20	UDP	108	53082 → 7519 Len=66
9196	29.108704	192.168.1.108	78.141.228.20	UDP	724	53082 → 7519 Len=682
9197	29.108750	192.168.1.108	78.141.228.20	UDP	723	53082 → 7519 Len=681
9198	29.108751	192.168.1.108	78.141.228.20	UDP	755	53082 → 7519 Len=713
9201	29.174876	192.168.1.108	78.141.228.20	UDP	1015	53082 → 7519 Len=973
9208	29.253483	78.141.228.20	192.168.1.108	UDP	1049	7519 → 53082 Len=1007
9209	29.253491	78.141.228.20	192.168.1.108	UDP	1049	7519 → 53082 Len=1007
9210	29.253494	78.141.228.20	192.168.1.108	UDP	1049	7519 → 53082 Len=1007
9211	29.254897	78.141.228.20	192.168.1.108	UDP	1049	7519 → 53082 Len=1007
9212	29.254903	78.141.228.20	192.168.1.108	UDP	1049	7519 → 53082 Len=1007
9213	29.254906	78.141.228.20	192.168.1.108	UDP	1049	7519 → 53082 Len=1007
9214	29.254908	78.141.228.20	192.168.1.108	UDP	1048	7519 → 53082 Len=1006
9215	29.254911	78.141.228.20	192.168.1.108	UDP	1048	7519 → 53082 Len=1006

> Frame 9201: 1015 bytes on wire (8120 bits), 1015 bytes captured (8120 bits) on interface en0, id 0

> Ethernet II, Src: Apple_7d:4f:f5 (a0:78:17:7d:4f:f5), Dst: Netgear_6b:9b:40 (78:d2:94:6b:9b:40)

> Internet Protocol Version 4, Src: 192.168.1.108, Dst: 78.141.228.20

> User Datagram Protocol, Src Port: 53082, Dst Port: 7519

> Data (973 bytes)

Wireshark on London:

No.	Time	Source	Destination	Protocol
27128	470.949456	78.141.228.20	180.167.204.122	UDP
27129	470.998795	180.167.204.122	78.141.228.20	UDP
27143	471.300707	78.141.228.20	180.167.204.122	UDP
27144	471.300734	78.141.228.20	180.167.204.122	UDP
27145	471.311651	78.141.228.20	180.167.204.122	UDP
27146	471.311693	78.141.228.20	180.167.204.122	UDP
27151	471.507637	180.167.204.122	78.141.228.20	UDP
27152	471.518500	78.141.228.20	180.167.204.122	UDP
27153	471.518535	78.141.228.20	180.167.204.122	UDP
27154	471.518550	78.141.228.20	180.167.204.122	UDP
27155	471.518574	78.141.228.20	180.167.204.122	UDP
27156	471.518593	78.141.228.20	180.167.204.122	UDP
27157	471.518606	78.141.228.20	180.167.204.122	UDP
27158	471.518618	78.141.228.20	180.167.204.122	UDP
27159	471.518630	78.141.228.20	180.167.204.122	UDP
27170	472.245124	78.141.228.20	180.167.204.122	UDP
27171	472.245180	78.141.228.20	180.167.204.122	UDP
27172	472.245240	78.141.228.20	180.167.204.122	UDP
27173	472.245260	78.141.228.20	180.167.204.122	UDP
27174	472.245280	78.141.228.20	180.167.204.122	UDP
27175	472.245296	78.141.228.20	180.167.204.122	UDP
27176	472.245311	78.141.228.20	180.167.204.122	UDP
27177	472.245324	78.141.228.20	180.167.204.122	UDP

> Frame 2798: 123 bytes on wire (984 bits), 123 bytes captured (984 bits) on interface en0

> Ethernet II, Src: 56:00:03:67:59:5c (56:00:03:67:59:5c), Dst: fe:00:03:67:59:5c (fe:00:03:67:59:5c)

> Internet Protocol Version 4, Src: 78.141.228.20, Dst: 193.123.148.38

> User Datagram Protocol, Src Port: 57847, Dst Port: 8801

- Source Port: 57847
- Destination Port: 8801
- Length: 89
- Checksum: 0x88ae [unverified]
- [Checksum Status: Unverified]
- [Stream index: 1]

There are some related discussions on Reddit:

https://www.reddit.com/r/sysadmin/comments/fk3qqw/zoom_is_it_p2p_or_cloud_server_based_technology/fkr0bv5?utm_source=share&utm_medium=web2x&context=3

I have contacted Zoom Support and they said that Zoom does support p2p only when there are 2 participants in meeting.

I repeated this procedure several times using the same network setup, P2P connection is not initiated every time and cannot find a pattern of it.

Besides, I also tried the above tests from VPS provisioned in Australia and Singapore. When P2P connection is not established, it still connects to Zoom US data centers, even though Zoom has data centers in Australia and Singapore.

Below is a traceroute result from Singapore to one of Zoom server

```
C:\Users\Administrator>tracert 193.123.30.9
Tracing route to 193.123.30.9 over a maximum of 30 hops

  1  *      *      *      Request timed out.
  2  22 ms 20 ms 19 ms 45.32.98.129      // still Singapore
  3  *      *      *      Request timed out.
  4  *      *      *      Request timed out.
  5  182 ms 158 ms 151 ms et-0-0-3-1.cr5-sin1.ip4.gtt.net
[103.232.18.41]
  6  184 ms 185 ms 184 ms ae12.cr3-phx1.ip4.gtt.net
[89.149.186.54]
  7  179 ms 180 ms 179 ms 140.91.195.6
  8  *      *      *      Request timed out.
  9  *      *      *      Request timed out.
 10 *      *      *      Request timed out.
 11 *      *      *      Request timed out.
 12 *      *      *      Request timed out.
 13 *      *      *      Request timed out.
 14 *      *      *      Request timed out.
 15 *      *      *      Request timed out.
```