

NSC HW 6

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HTTP/2 Under the Packet-dropping Condition

```
p4@p4:/home/p4/tutorials/exercises/http_drop# python3 demo/http_2_0_server_demo.py
Server is running on 10.0.1.1:8080
Connection established with 10.0.2.2:57206
root@p4:/home/p4/tutorials/exercises/http_drop# ./target/file_07.txt begin
./target/file_08.txt begin
./target/file_06.txt begin
./target/file_07.txt end
./target/file_08.txt end
./target/file_06.txt end
root@p4:/home/p4/tutorials/exercises/http_drop# ls -al target/
total 1084
drwxrwxr-x 2 p4 p4 4096 May 23 03:01 .
drwxrwxr-x 9 p4 p4 4096 May 23 02:57 ..
-rw-r--r-- 1 root root 0 May 23 03:01 file_06.txt
-rw-r--r-- 1 root root 1100000 May 23 03:01 file_07.txt
-rw-r--r-- 1 root root 0 May 23 03:01 file_08.txt
root@p4:/home/p4/tutorials/exercises/http_drop#
```

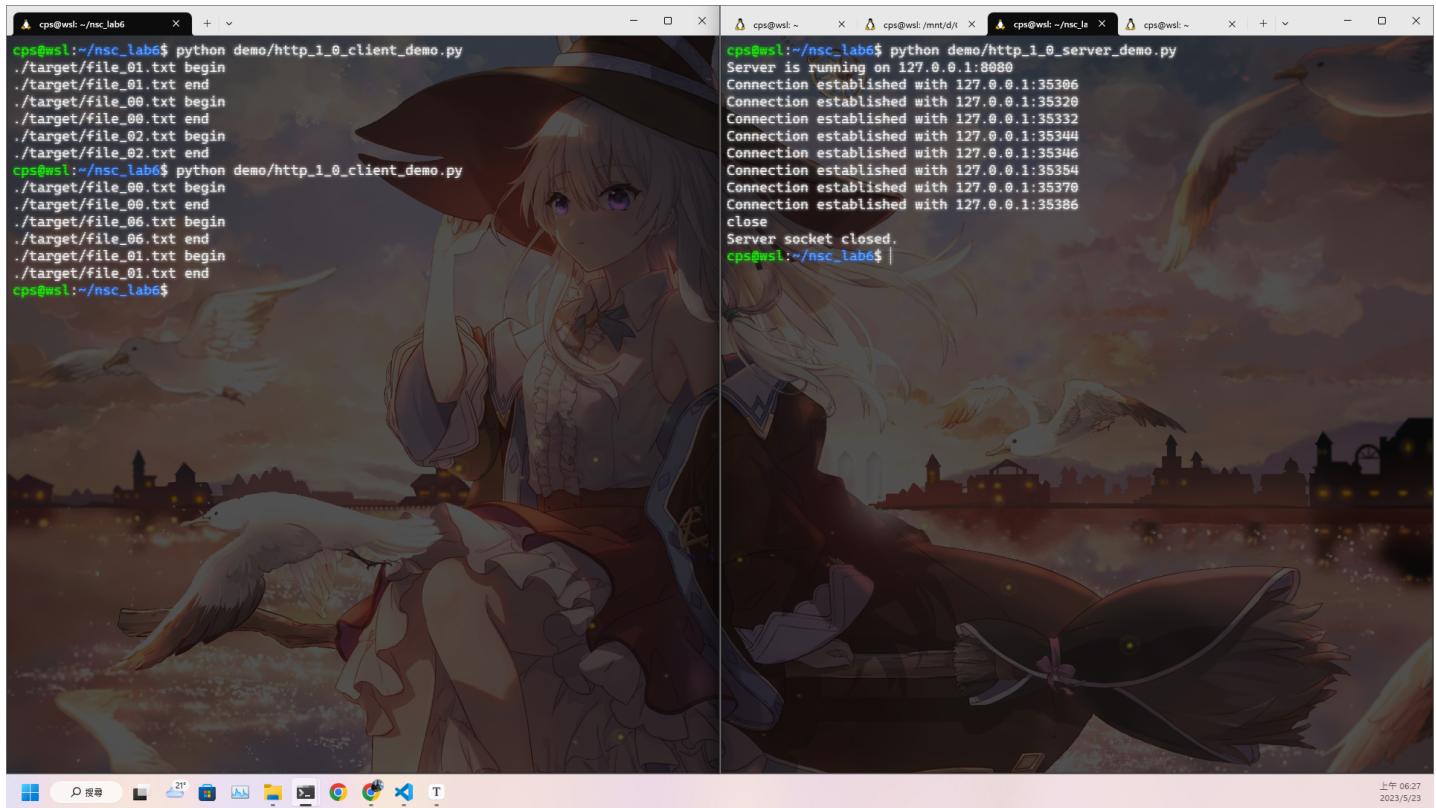
測試結果如上圖，stream ID = 1 應該會是去要隨機三個檔案位置出來，然後 stream ID = 3, 5, 7 在此次測試中分別為 file 07, 08, 06，而此環境會將 stream ID = 5 的 header 封包丟掉，因此 stream ID = 5 的物件應該不會成功送達，然後因為 HTTP 2.0 底下使用 TCP，而 TCP 會幫忙排好順序再回傳給我們，並 CK 已經完整接收到的位置，因此其中一個沒收到，會卡住在其之後的所有東西，即使其已送達，也會卡著不 ACK 和回傳，因此我們同樣也收不到 stream ID = 7 的物件。根據 `ls -al target/` 的結果可以看到，確實 file 08, 06 大小為 0，沒有成功傳送。

HTTP/3 Under the Packet-dropping Condition

測試結果如上圖，stream ID = 1 應該會是去要隨機三個檔案位置出來，然後 stream ID = 3, 5, 7 在此次測試中分別為 file 00, 04, 01，而我們在 http 3.0 client 調用 QUIC 時，指定了 `client_socket.drop(5)`，因此 stream ID = 5 的物件應該不會成功送達，而此次底層使用的是 QUIC，其每個 stream 是獨立檢索、回傳、ACK 的，且其機制，若中間一個封包掉了，不會因此卡住告知對面後面的已送達，因此當 5 之後的物件收完了，就會先回傳，QUIC 則繼續等 5 丟掉的封包送達。根據 `ls -al target/` 的結果可以看到，確實只有 file 04 大小為 0，沒有成功傳送。

另外 QUIC 使用上會有一些問題，當一端關掉 socket 時沒有告知對面的手段，因此 server 沒有判斷 client 已經關閉的方法，此時再開一個 client 會撞到 assert INIT packet，另外傳送上可能會大量先收到某特定 stream 的封包，且傳輸較慢，因此不能設置 timeout，且偶爾可能發生一些奇怪不明原因的問題，其中若遺失的是 request，可以發現等待 server 收到會等非常久，所以若發現 server 的 output start handle... 沒有全部出來，可以重試一次，放著等，是會傳完，但真的頗久，沒特別去看都會覺得是哪裡寫爛了。

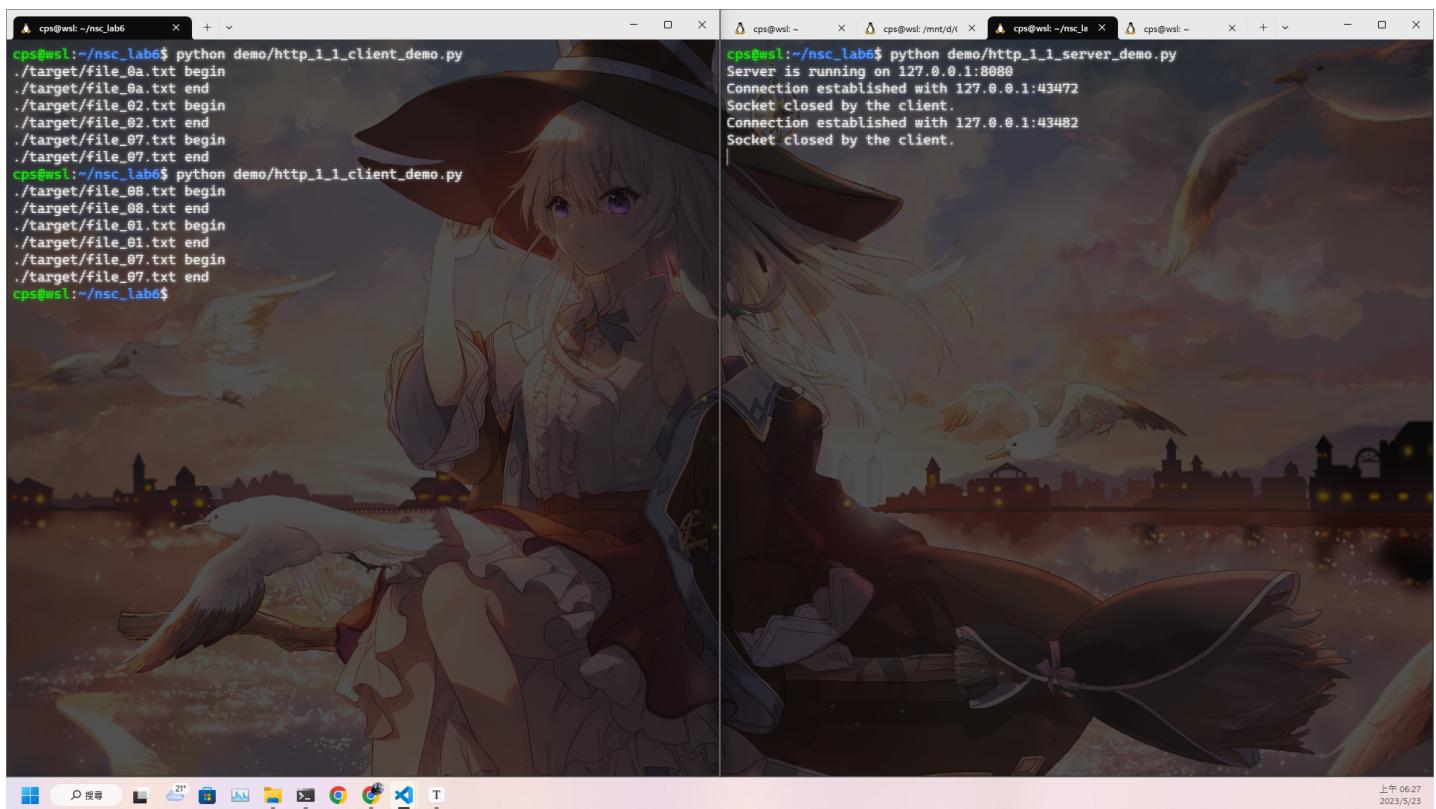
HTTP/1.0



```
cps@wsl:~/nsc_lab6$ python demo/http_1_0_client_demo.py
./target/file_01.txt begin
./target/file_01.txt end
./target/file_00.txt begin
./target/file_00.txt end
./target/file_02.txt begin
./target/file_02.txt end
cps@wsl:~/nsc_lab6$ python demo/http_1_0_client_demo.py
./target/file_00.txt begin
./target/file_00.txt end
./target/file_06.txt begin
./target/file_06.txt end
./target/file_01.txt begin
./target/file_01.txt end
cps@wsl:~/nsc_lab6$
```

```
cps@wsl:~$ python demo/http_1_0_server_demo.py
Server is running on 127.0.0.1:8080
Connection established with 127.0.0.1:35306
Connection established with 127.0.0.1:35320
Connection established with 127.0.0.1:35332
Connection established with 127.0.0.1:35344
Connection established with 127.0.0.1:35346
Connection established with 127.0.0.1:35354
Connection established with 127.0.0.1:35370
Connection established with 127.0.0.1:35386
close
Server socket closed.
cps@wsl:~/nsc_lab6$ |
```

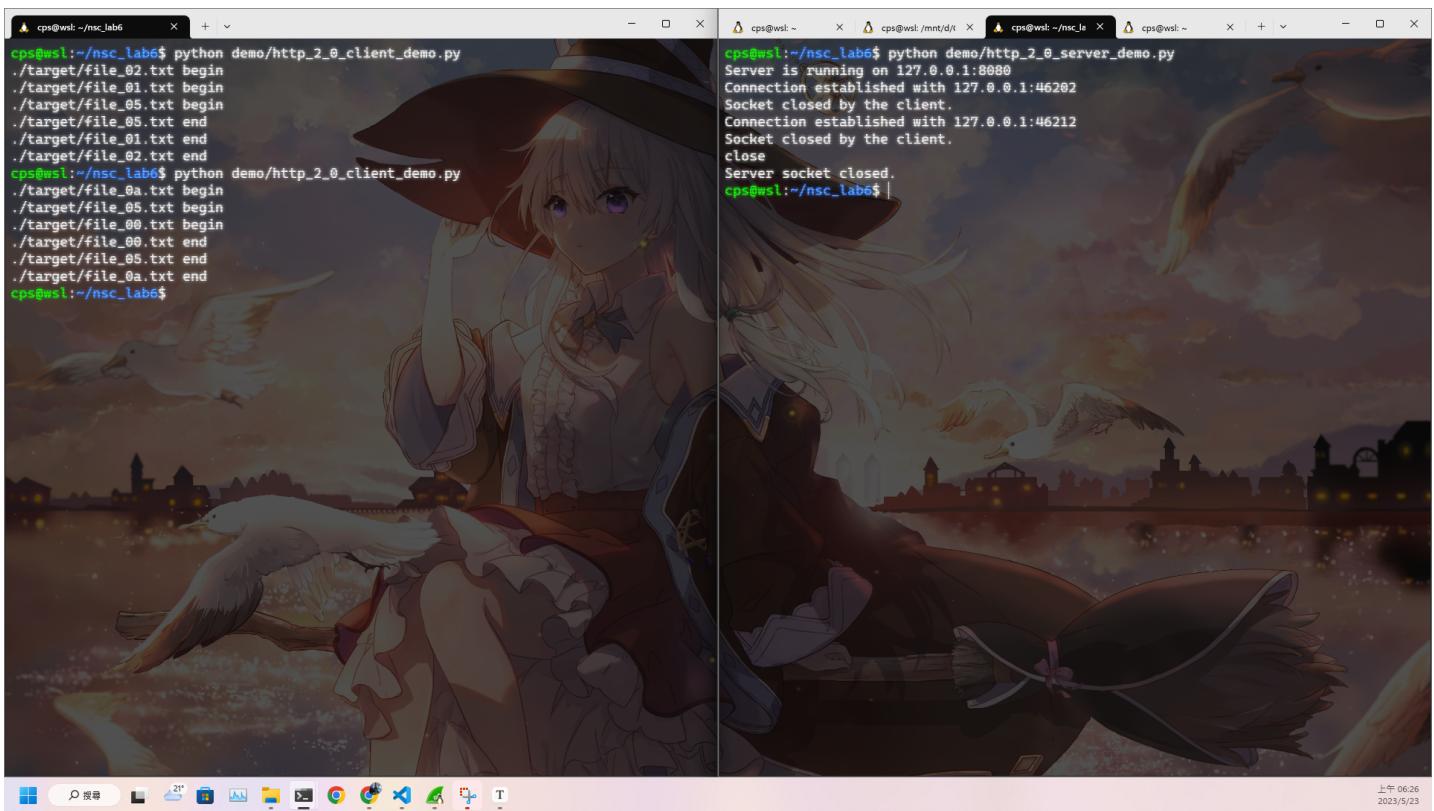
HTTP/1.1



```
cps@wsl:~/nsc_lab6$ python demo/http_1_1_client_demo.py
./target/file_0a.txt begin
./target/file_0a.txt end
./target/file_02.txt begin
./target/file_02.txt end
./target/file_07.txt begin
./target/file_07.txt end
cps@wsl:~/nsc_lab6$ python demo/http_1_1_client_demo.py
./target/file_08.txt begin
./target/file_08.txt end
./target/file_01.txt begin
./target/file_01.txt end
./target/file_07.txt begin
./target/file_07.txt end
cps@wsl:~/nsc_lab6$
```

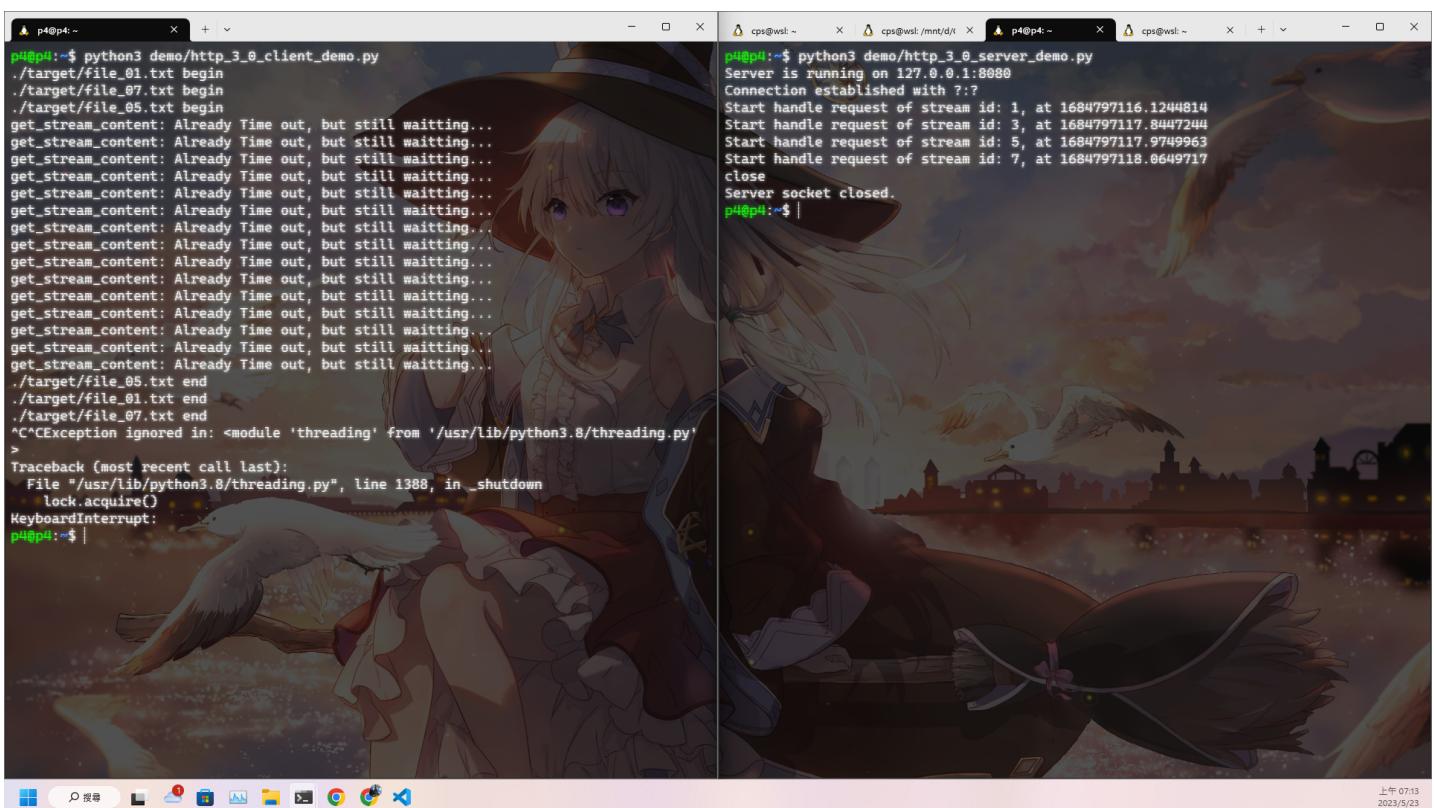
```
cps@wsl:~$ python demo/http_1_1_server_demo.py
Server is running on 127.0.0.1:8080
Connection established with 127.0.0.1:43472
Socket closed by the client.
Connection established with 127.0.0.1:43482
Socket closed by the client.
|
```

HTTP/2.0



```
cps@wsl:~/nsc_lab6$ python demo/http_2_0_client_demo.py
./target/file_02.txt begin
./target/file_01.txt begin
./target/file_05.txt begin
./target/file_05.txt end
./target/file_01.txt end
./target/file_02.txt end
cps@wsl:~/nsc_lab6$ python demo/http_2_0_client_demo.py
./target/file_04.txt begin
./target/file_05.txt begin
./target/file_00.txt begin
./target/file_00.txt end
./target/file_05.txt end
./target/file_04.txt end
cps@wsl:~/nsc_lab6$ python demo/http_2_0_server_demo.py
Server is running on 127.0.0.1:8080
Connection established with 127.0.0.1:46202
Socket closed by the client.
Connection established with 127.0.0.1:46212
Socket closed by the client.
close
Server socket closed.
cps@wsl:~/nsc_lab6$ |
```

HTTP/3.0



```
p4@p4:~$ python3 demo/http_3_0_client_demo.py
./target/file_01.txt begin
./target/file_07.txt begin
./target/file_05.txt begin
get_stream_content: Already Time out, but still waitting...
.^CCEException ignored in: <module 'threading' from '/usr/lib/python3.8/threading.py'>
>
Traceback (most recent call last):
  File "/usr/lib/python3.8/threading.py", line 1388, in _shutdown
    lock.acquire()
KeyboardInterrupt:
p4@p4:~$ |
p4@p4:~$ python3 demo/http_3_0_server_demo.py
Server is running on 127.0.0.1:8080
Connection established with ?:?
Start handle request of stream id: 1, at 1684797116.1244814
Start handle request of stream id: 3, at 1684797117.8447244
Start handle request of stream id: 5, at 1684797117.9749963
Start handle request of stream id: 7, at 1684797118.0649717
close
Server socket closed.
p4@p4:~$ |
```