Southern University of Science and Technology
Computer Networking Lab Report

唐润哲 11710418

■ *Introduction:*

Homework#1:

1. Compare packet switch and circuit switch under the following scenario. Suppose you would like to deliver a message of x bit. There are k links from the source to destination.The propagation delay of each link is d second, the transmission rate is b bit/second. The circuit setup time under circuit switch is s second. Under packet switch network, when the packet length is p bit, the queue delay in every node can be neglected. Please calculate the condition, under which the delay of packet switch is smaller than that of the circuit switch.
2. Calculate the overall delay of transmitting a 1000KB file under the following circumstance.The overall delay is defined as the time from the starting point of the transmission until the arrival of the last bit to the destination. RTT is assumed to be 100ms, one packet is 1KB (1024B) size. The handshaking process costs 2RTT before transmitting the file.
    1) Transmission bandwidth is 1.5Mb/s, the packets can be continuously transmitted.
    2) Transmission bandwidth is 1.5Mb/s, but when one packet is transmitted, the next packet should wait for 1 RTT (waiting for the acknowledgement of the receiver) before being transmitted.
    3) Transmission bandwidth is infinite, i.e. transmission delay is 0. After every 1 RTT, as many

as 20 packets can be transmitted.

3. List six access technologies. Classify each of them as home access, enterprise access, or wide-area mobile access.

4. 1) List five nonproprietary Internet applications and the application-layer protocols that they use.

   2) What information is used by a process running on one host to identify a process running on another host?

Assignment#3.1、

- Using cURL make GET request to http://httpbin.org/get
- Using cURL make POST request to http://httpbin.org/post
  - Using curl -v to inspect the interaction
  - Using Wireshark to capture the packet cURL sent.
- Write your report.
  - What did you get via cURL?
  - What are the meaning of fields in your request and response headers?
  - Is the packet captured by Wireshark capture correspond to the cURL request?

■ *Procedure and Result:*

■ *Homework#1*

➢ Q1:

Circuit switch delay $t_{circuit} = s + \frac{b}{x} + k \times d$

Packet switch delay $t_{packet} = \frac{b}{x} + \frac{(b-1)\times p}{b} + k \times d$

So, when $t_{packet} < t_{circuit}$, namely $s > (k-1) \times \frac{p}{b}$, the delay of packet switch is smaller than that of the circuit switch

➢ Q2:

■ Q2.1

$$packet\ number = \frac{file\ size}{one\ packet\ size} = \frac{1000kB}{1kB} = 1000, RTT = 100ms$$

$$Overall\ delay\ = 2 \times RTT + packet\ number \times transmission\ delay + \frac{1}{2}RTT$$

$$= 2.5 \times 100ms + 1000 \times \frac{1kB}{1.5MB/s}$$

$$= 2.5 \times 100ms + 1000 \times \frac{1kB}{1.5MB/s}$$

$$= 901.04ms$$

■ Q2.2

$$Overall\ delay\ = 2 \times RTT + packet\ number \times \ (transmission\ delay + \frac{1}{2}RTT)\ + \frac{1}{2}RTT$$

$$= 2.5 \times 100ms + 1000 \times \left(\frac{1kB}{1.5MB/s} + 0.5 * 100ms\right)$$

$$= 50250.65ms$$

■ Q2.3

$$Overall\ delay\ = 2 \times RTT + \frac{packet\ number}{20/RTT}$$

$$= 2 \times 100ms + \frac{1000}{20/100ms} = 5200ms$$

- **Q3:**
  - Home access: Dial-up modem over telephone line
    Hybrid fiber-coaxial cable
    Digital subscriber Line
  - Enterprise access: 10000 Mbps switched Ethernet
  - Wide-area mobile access: 3G, 4G, 5G

- **Q4:**
  - **Q4.1**
    - ✓ web: HTTP/HTTPS
    - ✓ e-mail: IMAP/SMTP
    - ✓ remote desktop: RDP
    - ✓ File transfer: FTP
    - ✓ remote access: SSH/TELNET
  - **Q4.2**

IP address of the destination host , port number of the destination socket

■ *Assignment#3.1*

➢ Q1(GET):

```
C:\Users\Administrator>curl -v http://httpbin.org/get
*   Trying 3.222.220.121...
* TCP_NODELAY set
* Connected to httpbin.org (3.222.220.121) port 80 (#0)
> GET /get HTTP/1.1
> Host: httpbin.org
> User-Agent: curl/7.55.1
> Accept: */*
>
< HTTP/1.1 200 OK
< Access-Control-Allow-Credentials: true
< Access-Control-Allow-Origin: *
< Content-Type: application/json
< Date: Tue, 24 Sep 2019 12:21:22 GMT
< Referrer-Policy: no-referrer-when-downgrade
< Server: nginx
< X-Content-Type-Options: nosniff
< X-Frame-Options: DENY
< X-XSS-Protection: 1; mode=block
< Content-Length: 202
< Connection: keep-alive
<
{
  "args": {},
  "headers": {
    "Accept": "*/*",
    "Host": "httpbin.org",
    "User-Agent": "curl/7.55.1"
  },
  "origin": "116.6.234.143, 116.6.234.143",
  "url": "https://httpbin.org/get"
}
* Connection #0 to host httpbin.org left intact
```

Fig.1 CMD.GET

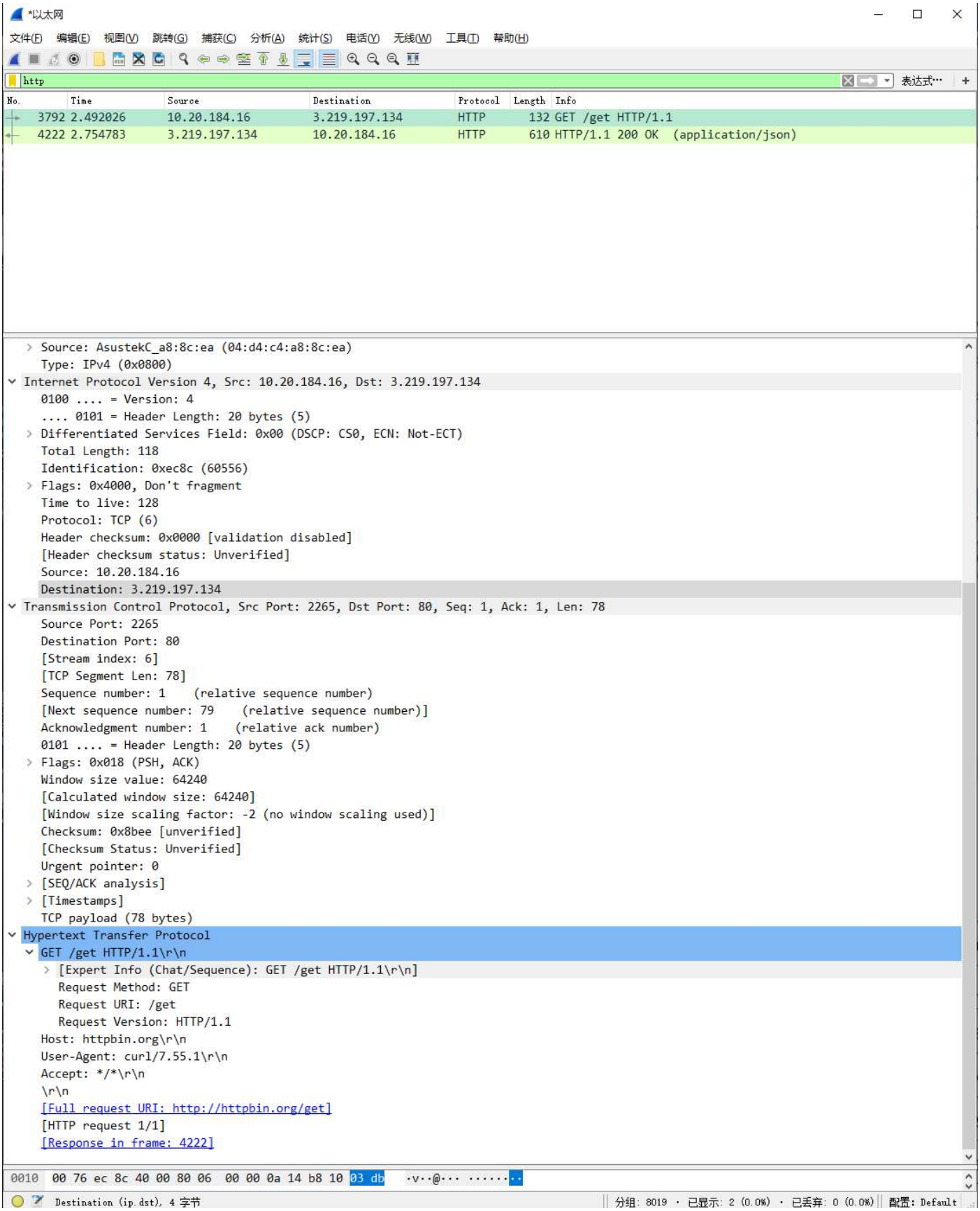

Fig.2 WireShark.GET

Information catched by wirshark,which is the same with cmd:

Type of request	GET
Source ip address/port	10.20.184.16:2265
Destination ip address/port	3.219.197.134:80
Protocol	TCP
Host	httpbin.org
User_agent	curl/7.55.1

(request)

Status Code	200
Content type	Application/json
Server	nginx
Content length	202

(response)

- **Q2:**

```
C:\Users\Administrator>curl -v http://httpbin.org/post
*   Trying 3.222.220.121...
* TCP_NODELAY set
* Connected to httpbin.org (3.222.220.121) port 80 (#0)
> GET /post HTTP/1.1
> Host: httpbin.org
> User-Agent: curl/7.55.1
> Accept: */*
>
< HTTP/1.1 405 METHOD NOT ALLOWED
< Access-Control-Allow-Credentials: true
< Access-Control-Allow-Origin: *
< Allow: POST, OPTIONS
< Content-Type: text/html
< Date: Tue, 24 Sep 2019 13:13:32 GMT
< Referrer-Policy: no-referrer-when-downgrade
< Server: nginx
< X-Content-Type-Options: nosniff
< X-Frame-Options: DENY
< X-XSS-Protection: 1; mode=block
< Content-Length: 178
< Connection: keep-alive
<
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 Final//EN">
<title>405 Method Not Allowed</title>
<h1>Method Not Allowed</h1>
<p>The method is not allowed for the requested URL.</p>
* Connection #0 to host httpbin.org left intact
```

Fig.3 CMD.POST

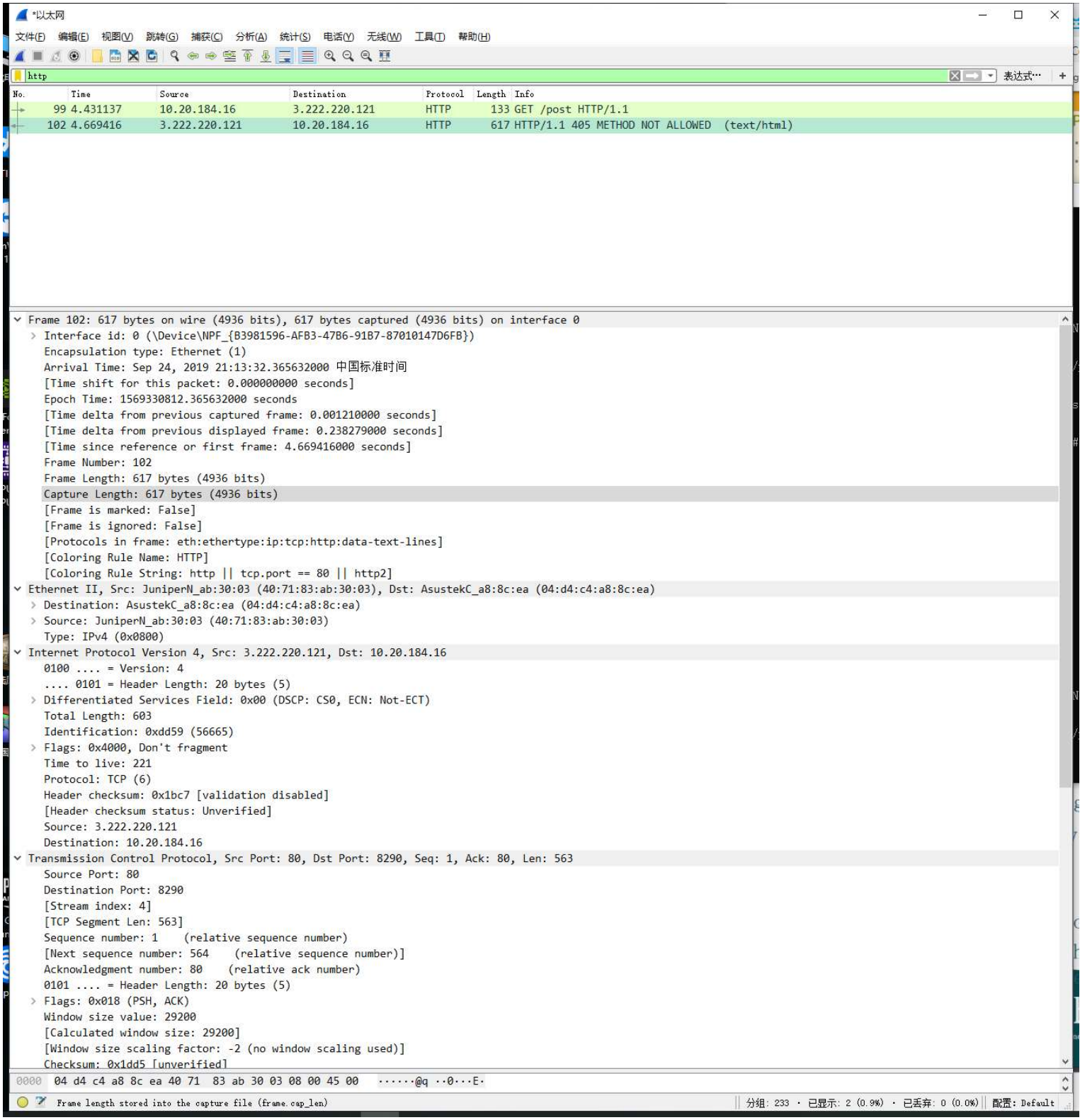

Fig.4 WireShark.POST

Information catched by wirshark,which is the same with cmd:

Type of request	POST
Source ip address/port	10.20.184.16:8290
Destination ip address/port	3.222.220.121:80
Protocol	TCP
Host	httpbin.org
User_agent	curl/7.55.1

(request)

Status Code	405
Content type	Text/html
Server	nginx
Content length	178

(response)

- **Q1/Q2:**

I use curl to download file from the website.

What I find is that when using methods "GET" and" POST" ,the protocol is the same —— "TCP" ,as well as host and user agent.However the response information is quite different. Method" GET" use Application/json to transfer file. On Contrast,Method" POST" use test/html.So,they are essentially the same beacuse they are both based the protocol "TCP".