

Homework #1 Solution

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Network Administration

1 Internet model

1.1 (10%)

DHCP belongs to application layer.

IP belongs to network layer.

1.2 (20%)

DNS translates the domain name www.youtube.com into its IP address.

HTTP transfers web contents between clients(browser) and servers.

1.3 (bonus 20%)

Transport layer: QUIC provides host-to-host connectivity at the Transport Layer like TCP does.

Session layer: QUIC provides ability to establish secure sessions between clients and servers, and is more efficient than TLS over TCP.

Presentation layer: QUIC reduces and compresses data in HTTP headers.

2 IP

2.1 (10%)

According to RFC 1918, ranges of private IPs are 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16.

2.2 (20%)

IPv6 network has ability of stateless address configuration, but IPv4 doesn't.

IPv6 has a simplified header format, and thus has better routing speed than IPv4.

2.3 (20%)

Network interface controller cards, router, DNS server, etc.

3 Wireshark (20%)

You should use the following display filter

```
ip.src == 140.112.8.116 && http
```

The exported .pcapng file should contain HTTP responses from 140.112.8.116, but not request sent and packets for other application protocols.

System Administration

1 Shell Scripts

See the class website.

2 Shared Folders and Files

```
1 # file: project_shared_folder
2 # owner: student1
3 # group: student
4 user::rwx
5 user:student1:rwx
6 user:student2:rwx
7 user:student3:rwx
8 user:ta1:r-x
9 user:ta2:r-x
10 group:prof:r-x
11 group:---
12 mask:rwx
13 other:---
```