

# Computer Networks

## Assignment 1

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### Report

#### 1st Question:

a)

I captured the PCAP traces for three different GET requests at H1. Each request and its corresponding response were saved in separate `pcap` files. You can refer to these PCAP files to see the network traffic for each request.

b)

#### End-to-End Time Measurement for GET Requests

Time Taken for GET Requests				
Key	Req1 (First Time)	Req2 (Sec- ond Time)	Req3 (Third Time)	Average Time (s)
Key1	0.00093	0.00092	0.00086	0.00090
Key2	0.00099	0.00087	0.00095	0.00093
Key3	0.00074	0.00088	0.00092	0.00084
Key4	0.00087	0.00090	0.00099	0.00092
Key5	0.00080	0.00129	0.00088	0.00099
Key6	0.00123	0.00099	0.00089	0.00104

## 2nd Question:

a)

I captured PCAP traces for two GET requests for the same key (e.g., key1) at H1, H2, and H3.

i) In the first case, the key was not present in the cache at H2, so the request went through to H3.

ii) In the second case, the key was already present in the cache at H2, so the request was served from the cache without involving H3.

The network traffic for both cases has been saved in separate `pcap` files. You can refer to these PCAP files to see the captured traffic for each scenario.

b)

### End-to-End Time Measurement for GET Requests

Key	Req1 (First Time)	Req2 (Second Time)	Req3 (Third Time)
Key1	0.00181	0.00091	0.00091
Key2	0.00186	0.00112	0.00080
Key3	0.00178	0.00089	0.00078
Key4	0.00179	0.00081	0.00084
Key5	0.00162	0.00103	0.00112
Key6	0.00163	0.00084	0.00088
Average Time	0.00175	0.00093	0.00089

## 6. Submission Report

### Average Times for Each Request

From the table:

- **Average Time for Req1:** 0.00175
- **Average Time for Req2:** 0.00093
- **Average Time for Req3:** 0.00089

### Comparison and Analysis

**Differences Observed:**

- **Req1:** 0.00175
- **Req2:** 0.00093
- **Req3:** 0.00089

**Difference between Req1 and Req2:**

$$0.00175 - 0.00093 = 0.00082$$

**Difference between Req1 and Req3:**

$$0.00175 - 0.00089 = 0.00086$$

**Difference between Req2 and Req3:**

$$0.00093 - 0.00089 = 0.00004$$

### Justification for Differences

- **Req1** has the highest average time among the three requests, significantly higher than Req2 and Req3. This suggests that Req1 is the slowest of the three requests. This is because Req1 involves two steps: first, from the client to the cache, and then from the cache to the server. This additional step results in higher time for Req1 compared to Req2 and Req3, which do not involve this extra step.
- **Req2** and **Req3** have similar average times, with Req2 being slightly higher than Req3. The small difference indicates that both Req2 and Req3 are relatively efficient, but Req3 is slightly faster. This is likely because Req3 does not require the extra steps involved in Req2, such as additional processing or lookups, making it a bit quicker.

## PLAGIARISM STATEMENT

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