Performance Comparison: HTTP Request Response Times for Q4 and Q5

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Disclaimer:-All the times mentioned below are in ms

1 Introduction

This report aims to compare the HTTP request response times from two datasets, labeled as Q4 and Q5. Each dataset records response times for three sequential requests (Req1, Req2, and Req3) for different keys. We compare the performance across these datasets and discuss possible reasons for any observed differences.

HTTP request response time is a critical performance metric in network and web systems. It helps measure the time taken by the system to respond to a client's request, affecting the overall quality of service and user experience. In this analysis, we aim to pinpoint which dataset performs better and suggest potential causes for performance differences.

2 Data Tables

The following tables represent the HTTP request response times for Q4 and Q5:

Key	Req1 (first time)	Req2 (second time)	Req3 (third time)	Average Time
Key1	0.725985	0.898838	0.122094	0.582306
Key2	1.477005	1.895905	0.462604	1.278504
Key3	0.735998	1.019001	0.123191	0.626063
Key4	0.719070	1.786947	0.123811	0.876609
Key5	1.122952	0.167084	1.283169	0.857735
Key6	0.833035	0.953197	1.222134	1.002789

Table 1: Response Times for Q4

Key	Req1 (first time)	Req2 (second time)	Req3 (third time)
Key1	5.784035	2.200127	1.153946
Key2	0.797033	0.959873	0.773191
Key3	0.938892	0.775099	0.721216
Key4	1.219034	0.808001	0.775099
Key5	0.859022	1.051903	0.715017
Key6	0.986814	0.654936	0.703812

Table 2: Response Times for Q5

3 Comparison

This section compares the performance for Req1, Req2, and Req3 between the two tables, Q4 and Q5. The analysis will provide insight into which dataset performed better for each request type and discuss potential reasons for the observed differences.

3.1 Req1 Comparison

- **Q4:** For Req1, response times range from 0.719070 seconds (Key4) to 1.477005 seconds (Key2).

- **Q5:** Req1 times range from 0.797033 seconds (Key2) to 5.784034 seconds (Key1).

- **Analysis:** Q4 performs significantly better for Req1 than Q5, particularly for Key1, where the response time is much lower in Q4 (0.725985 seconds) compared to Q5 (5.784035 seconds). The performance disparity may be due to system load during the first request in Q5, leading to longer processing times. Another potential reason could be cache misses or slow server-side initialization in Q5, causing a bottleneck in response times for the first request.

3.2 Req2 Comparison

- **Q4:** Req2 times in Q4 range from 0.167084 seconds (Key5) to 1.895905 seconds (Key2).

- **Q5:** Req2 times in Q5 range from 0.654936 seconds (Key6) to 2.200126 seconds (Key1).

- **Analysis:** In Req2, Q5 performs better for certain keys such as Key2 and Key3, but Key1 shows significantly slower performance in Q5. The large gap for Key1 in Q5 could indicate a network issue or server congestion. Additionally, the caching system may have kicked in for other keys, improving performance over Q4 in some cases. The better performance for some keys in Q5 could be attributed to more efficient handling of sequential requests, indicating improvements in server-side optimizations during repeated requests.

3.3 Req3 Comparison

- **Q4:** Req3 times in Q4 range from 0.122094 seconds (Key1) to 1.283169 seconds (Key5).

- **Q5:** Req3 times in Q5 range from 0.703812 seconds (Key6) to 1.153946 seconds (Key1).

- **Analysis:** Q4 generally has lower Req3 response times, particularly for Key1 (0.122094 seconds) compared to Q5 (1.153946 seconds). However, for Key5, Q5 (0.715017 seconds) performs better than Q4 (1.283169 seconds). This difference could be due to different caching mechanisms employed by the system. Since Req3 is the final request, performance improvements may also be attributed to reused resources and previously cached data, as seen with Key5 in Q5.

4 Possible Reasons for Performance Differences

The following factors could explain the observed differences between the two datasets:

- **Caching Efficiency:** Q4 appears to handle caching better, especially for Req1 and Req3. It is possible that Q5 uses a different caching strategy, which only kicks in after the first request, causing the longer initial request times in Req1.

- **System Load and Network Latency:** The Q5 dataset could have been recorded during a period of higher system load or network latency, which would explain the significantly higher response times for Req1 across all keys, especially Key1.

- **Server-Side Optimization:** The Q4 system might be more optimized for handling multiple sequential requests, which is evident from its better overall performance in Req1 and Req3. Q5, on the other hand, could be using a different server configuration, resulting in slower initial responses and improved performance only after caching and optimization mechanisms kick in.

- **I/O Bottlenecks:** I/O operations, such as database or disk access, could be causing delays in Q5. If Q5 is dependent on a slower data source, this could account for the slower performance in Req1.

- **Network Issues:** If Q5 was tested under different network conditions (e.g., slower connection or packet loss), this could cause longer response times, especially for the initial requests.

5   Final Analysis and Recommendations

From the comparison, it is evident that Q4 generally performs better than Q5, particularly for the first and third requests (Req1 and Req3). The slower performance in Q5, especially for Req1, could be due to network conditions, server load, or suboptimal caching strategies. On the other hand, Q5 exhibits better performance in some cases during Req2, suggesting possible server-side optimizations for repeated requests.

Recommendations:

- Investigate and improve the caching strategy in Q5 to reduce the response time for Req1.

- Conduct tests during periods of lower network load or server demand to isolate the impact of system load.

- Consider implementing a more efficient I/O handling mechanism in Q5 to reduce latency in all requests.

By addressing these issues, it may be possible to bring the performance of Q5 in line with Q4, or even surpass it, particularly for Req1 and Req3.

6   PLAGIARISM STATEMENT

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