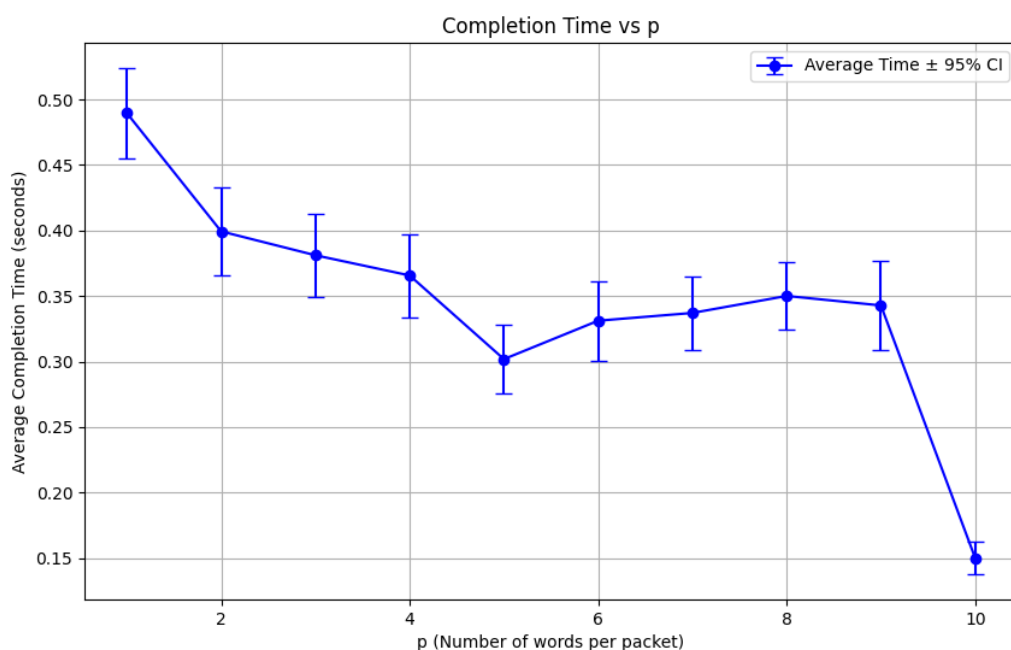


Question 1: Word Counting Client

Aim: To understand server-client behaviour with increasing p (words per packets).

Analysis:

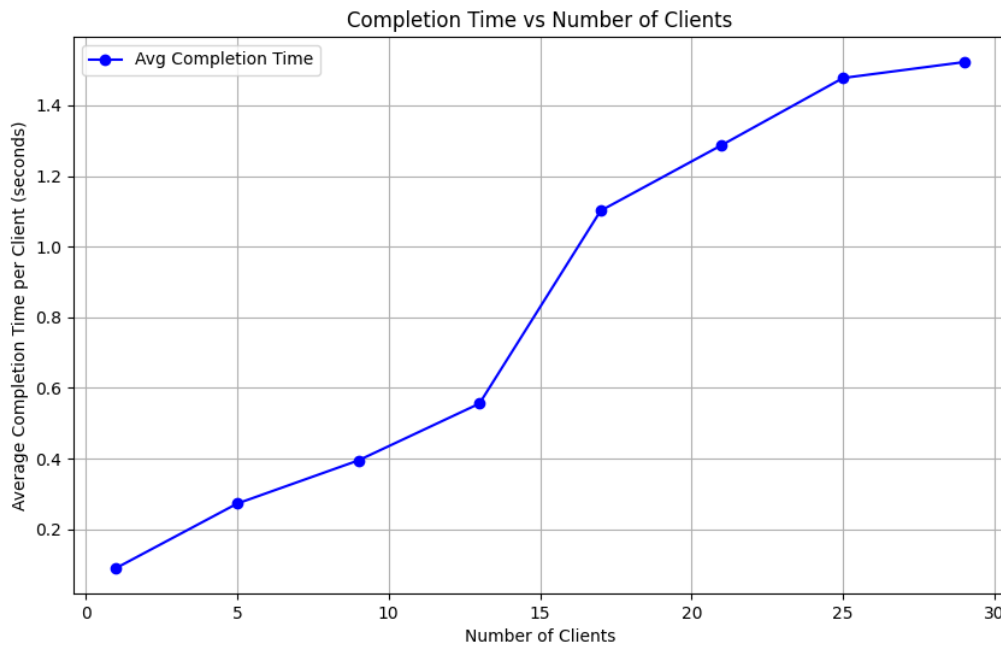
- With the increase in p (words per packet) , the completion time decreases. This is due to the fact that the larger packets reduce the number of times the communication between host and server is made and hence reducing communication overhead as fewer packets are needed to be sent in totality.
- As we have observed that the time heavily depends upon transmission (i.e. communication overhead), the Network Bandwidth increase certainly is going to increase the speed of transmission and certainly improve the performance.
- The number of requests would reduce if k (no. of words served per request) is increased which again lowers the communication overhead.



Question 2: Concurrent Word Counting Clients

Aim: To understand server-client behaviour with increasing p (words per packets).

Analysis:



- As the number of clients grows, the average completion time rises. This indicates that the system faces greater delays as more clients attempt to interact with the server at the same time.
- The relationship between the number of clients and completion time seems non-linear, meaning the system takes increasingly longer to handle additional clients. For instance, the jump in completion time from 20 to 30 clients is significantly larger compared to the increase from 0 to 10 clients.

Potential Reasons for this behaviour:

- As the number of connected clients increases, the server likely becomes overwhelmed, resulting in longer processing times for each client. Its capacity to manage simultaneous requests may diminish, leading to greater delays.
- If the server relies on multiple threads or processes to handle client connections, there may be a limit to how efficiently it can manage many connections at once, especially as the client count rises.

Conclusion:

The rise in completion time as the number of clients increases suggests a decline in system performance under heavier load. This behavior is common in systems with limited resources, such as CPU, memory, or network bandwidth, which must be shared among multiple clients.