Which topology seems to offer the lowest latency under light load (1 client)? How about query throughput under high load (9 clients)? Please compare the data transfer performance between topologies, including centralized and decentralized. Plot your data in figures graphically.

1. Lowest Latency Under Light Load (1 Client):

- Under light load with only one client, a centralized system offers the lowest latency since it has lower communication overhead and simpler routing through a single point of control.

2. Query Throughput Under High Load (9 Clients):

- The star topology, with a distributed index and a central peer, offers the best query throughput under high load. The distributed index allows for parallel processing of queries, and the central peer can coordinate and distribute queries efficiently.

3. Data Transfer Performance Comparison:

- Data transfer performance can vary significantly depending on the size of the dataset, the network topology, and the load. Here's a general comparison:

1. Centralized System: In a centralized system, data transfer performance is efficient for small to moderate datasets. However, it faces scalability issues with large datasets or high loads due to a single point of control

2. Star Topology (Distributed Index): The star topology offers better scalability and data transfer performance, especially for queries and transfers, due to its distributed nature. It's suitable for handling a larger number of clients and data.

3. 2D-Mesh Topology: The 2D-mesh topology offers distributed processing and is beneficial for data transfer performance for large datasets. It's especially advantageous when dealing with concurrent requests from multiple clients.

What do you observe on the transfer of data between small and large files?

1. Centralized System:

Small Files (10KB): The centralized system handles small file transfers efficiently due to low latency and minimal network overhead. Small files can be transferred quickly, and the centralized index can respond promptly.

Large Files (100MB): Transferring large files in a centralized system experiences performance issues. The central index becomes a bottleneck, leading to slower transfers. Handling concurrent large file transfers

2.Star Topology (Distributed Index):

Small Files (10KB): The star topology with a distributed index can handle small file transfers well. The central peer can efficiently coordinate the transfer of small files, and the distributed nature helps manage concurrent requests.

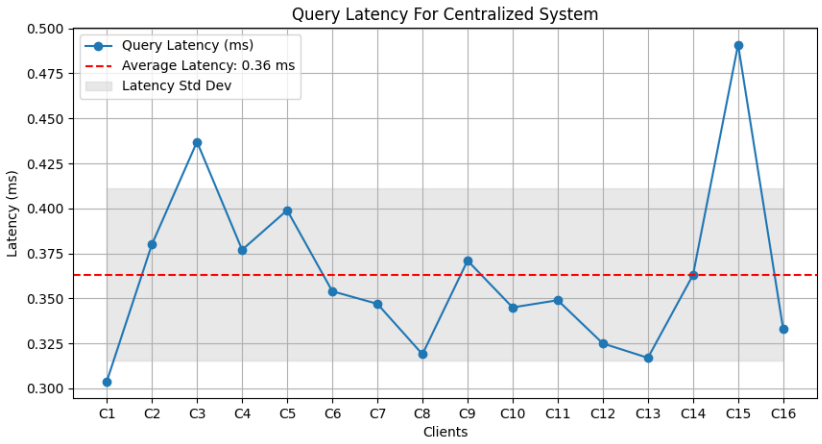
Large Files (100MB): Transferring large files in this topology is more manageable than in a centralized system. The distributed index and the central peer can efficiently distribute and coordinate the transfer of large files, potentially improving performance.

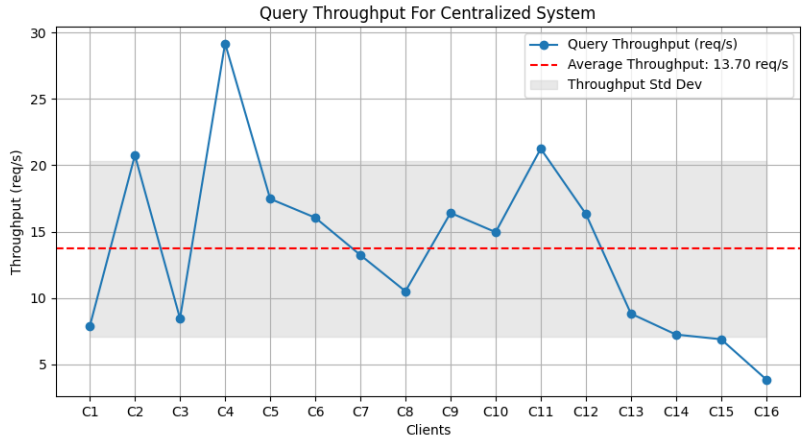
3. 2D-Mesh Topology (Distributed Index):

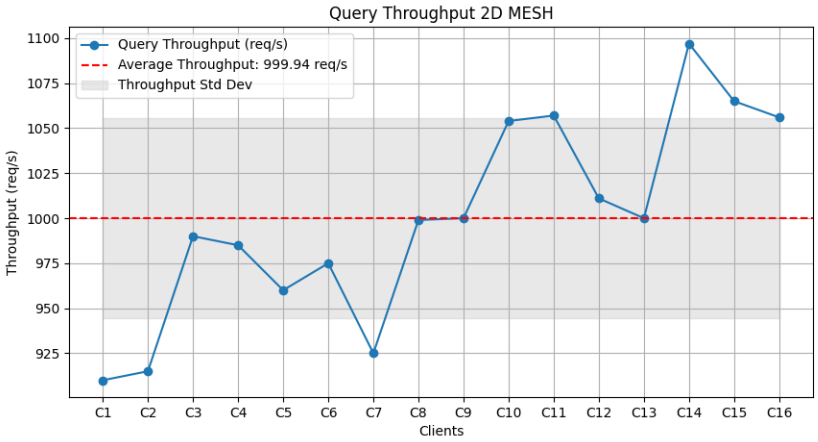
Small Files (10KB): The 2D-mesh topology can perform really well for small file transfers. Its distributed nature allows for efficient handling of small files across the grid of peers, greatly improving response times.

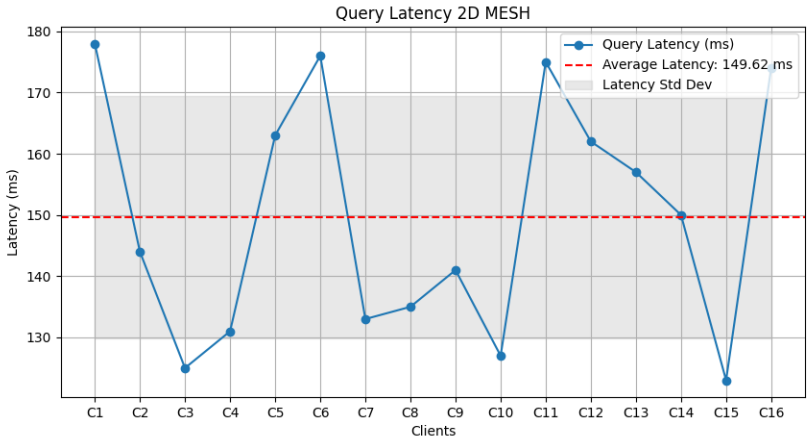
Large Files (100MB): This topology is well-suited for large file transfers due to its distributed nature. With multiple peers working in parallel, it can handle concurrent transfers of large files efficiently.

In summary, Distributed topologies, such as the star topology and the 2D-mesh topology with distributed indexes, are generally better suited for handling both small and large file transfers compared to a centralized system.




Query Throughput For Centralized System
Query Throughput (req/s)
Average Throughput: 13.70 req/s
Throughput Std Dev
Throughput (req/s)
Clients
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16


Query Throughput 2D MESH
Query Throughput (req/s)
Average Throughput: 999.94 req/s
Throughput Std Dev
Throughput (req/s)
Clients
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16


Query Latency 2D MESH
Query Latency (ms)
Average Latency: 149.62 ms
Latency Std Dev
Latency (ms)
Clients
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16

STAR topology: