



Database Systems Project

Freight Management System

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Problem Statement And Motivation

Freight Management System

It is a database system which manages shipments between warehouses spread across a vast geographical area. Freight management companies manage huge amounts of data keeping every detail of the shipment. Since it is a highly data intensive task we have introduced a distributed systems approach instead of a centralized one to solve this problem. A distributed database is a database that is not limited to one system, it is spread over different systems, i.e., on multiple computers or over a network of computers.

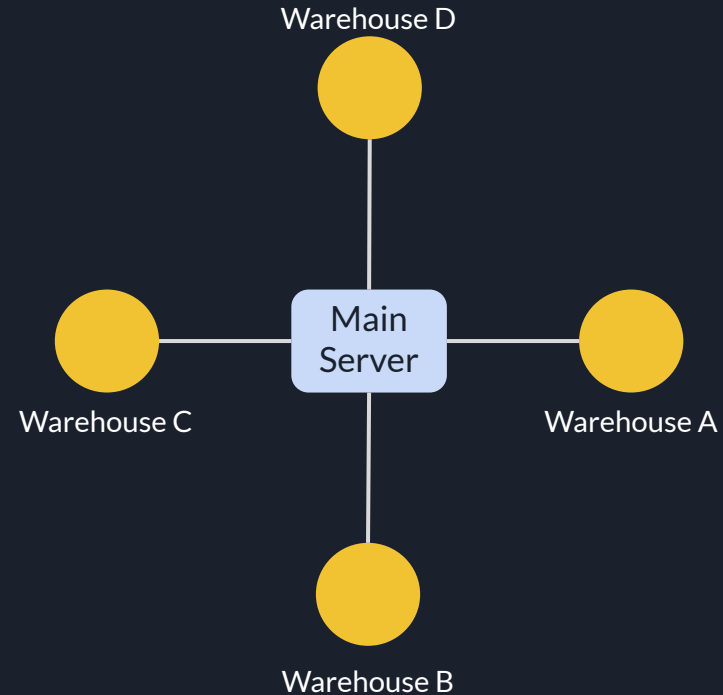
The motivation of using a distributed system in our project is to maintain a large database of a freight company. As the data grows it takes a lot of computation power to process the data, hence, we used fragmentation technique to distribute the data across warehouses.

Benefits of using distributed database system:

1. **Scalability**
2. **Security**
3. **Decentralized Processing**

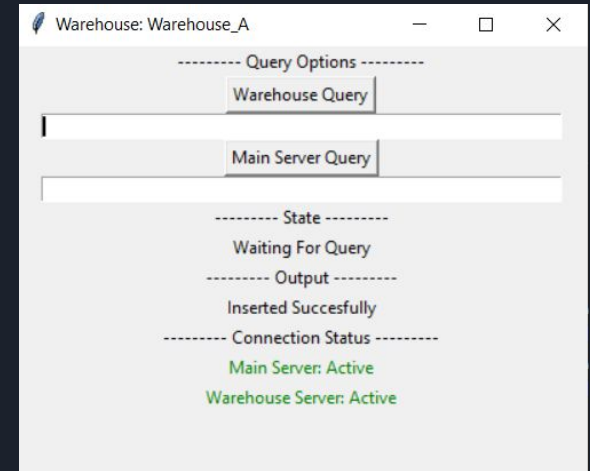
Implementation

- The Freight Management System consists of a main server, and one server for each warehouse. Each warehouse contains details of shipments in that warehouse, while the main server only retains partial critical information of these details using hybrid fragmentation.
- A user (employee) at each warehouse can perform the following queries:
 1. Querying its own database for information (Select query)
 2. Querying the Main server for information (Select query)
 3. Initiating a new shipment (updates both local and main server)
- The main server automatically analyses the new shipment and forwards it to the corresponding warehouse table.
- The warehouses cannot directly write to the main server but rather have to send the write request which may or may not be approved by the main server (for security reasons)



Novelty

1. Implementation of hybrid database system which takes the benefits of both the centralized database and distributed database to give us an easy way to manage the system.
2. Implementation of fault tolerance and concurrency of queries from scratch.
3. Scalable system : We can add new warehouse databases to our system by simply adding relevant connection information in the main server thus expanding the system.



Contribution

All three of us were equally involved in brainstorming the idea, planning and debugging.

- Kartik Sharma: Main server and SQL Remote Access setup
- Kshitij Aphale: Warehouse and Concurrency Implementation
- Azhar Khan: Warehouse, Architecture and schema design.

Warehouse A

Main Server

Warehouse B



THANK YOU