

PROJECT 3 : EXECUTIVE SUMMARY

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1 Assignment Overview

The project revolves around setting up multiple server instances to improve scalability and performance. We plan to deploy five server instances, allowing clients to access any instance and utilize its features. However, having multiple server instances can lead to data inconsistency because each server maintains its own data store. To address this issue, we've implemented the 2 Phase Commit (2PC) protocol. This protocol ensures that all participating sites in a distributed transaction agree on whether to commit or abort the transaction, ensuring data integrity.

In addition to the 2PC protocol, we've incorporated load balancing and failover mechanisms. These features are crucial for managing high traffic loads and ensuring continuous operation even if individual servers experience downtime. The 2PC protocol plays a critical role in maintaining transactional integrity across the distributed network. While it guarantees that all database servers agree on committing a transaction to preserve ACID properties, it does introduce some overhead in terms of network communication and latency. However, these trade-offs are essential for ensuring reliable and consistent data handling in a distributed environment.

2 Technical Impression

During the implementation of the assignment, several key technical aspects stood out, showcasing both the challenges and the effectiveness of the solutions adopted. Setting up multiple server instances to enhance scalability and performance was a significant endeavor. It required careful consideration of resource allocation, communication protocols, and data synchronization mechanisms. The decision to implement the 2 Phase Commit (2PC) protocol was crucial in ensuring data consistency across the distributed network. However, integrating this protocol also introduced complexities, such as increased network communication and potential latency, which had to be carefully managed

to maintain system efficiency.

Replicating data across multiple servers was a challenging aspect of the project that required careful planning and implementation. Initially, I faced difficulties in ensuring that all replicas of the key-value store maintained consistent and up-to-date data. Synchronizing data across servers while maintaining performance and reliability was a significant struggle.

One of the key challenges was managing concurrent updates from multiple clients across different server instances. Ensuring that changes made on one server were properly propagated to all other replicas without introducing inconsistencies or conflicts was a complex task. I had to implement robust synchronization mechanisms, such as the 2 Phase Commit (2PC) protocol, to coordinate updates and ensure data integrity.