MIDDLEWARE ARCHITECTURE

Assignment 1

The Visionaries

20020317 – D.P.P.L DISSANAYAKE

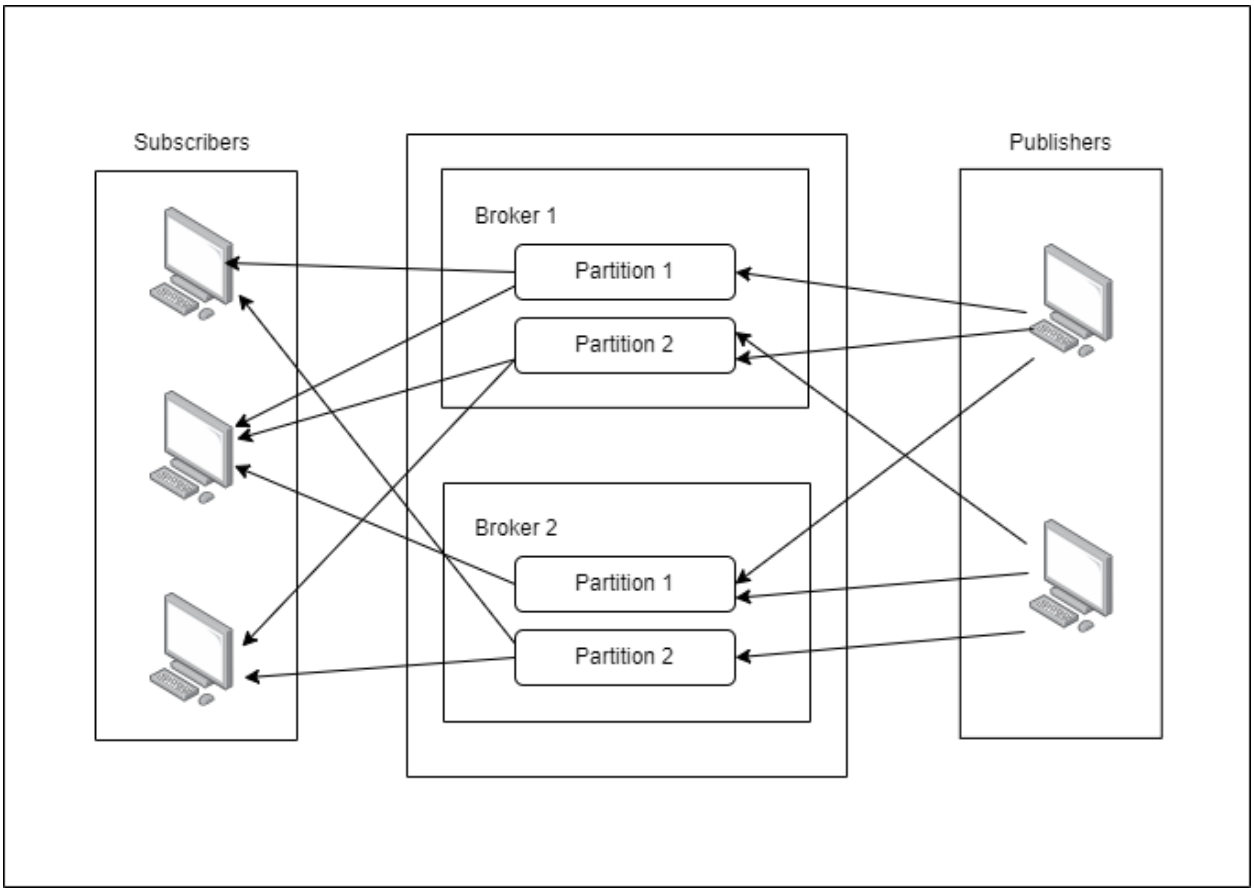
20020742 – M.D.M.N PERERA

20020708 - U.K.D.K NETHMINI

20020163 - B.C.R.N.P BANDARAADHIKARAM

20020831-K.A.D.S. RATHNAWARDHANA

Task 4: Enhance the Architecture to Gain Improvement in Availability and Reliability



Our current Pub/Sub application operates on a single server node, which negatively affects its availability and reliability. To address this issue, we propose a robust distributed design that enhances fault tolerance and ensures uninterrupted communication even if a server fails.

In the new architecture, a central intermediary called a broker facilitates communication between publishers and subscribers, following a broker-based Pub/Sub approach. Multiple copies of this broker are hosted across various server nodes, introducing redundancy, and distributing the workload. This broker efficiently transfers messages from publishers to the appropriate subscribers.

By decentralizing the system and deploying multiple broker instances, we can eliminate the vulnerability of a single point of failure. This design guarantees continuous communication even if some servers experience issues. To ensure high availability and data integrity, we can implement techniques for fault detection and data replication across servers.

The proposed distributed design brings substantial improvements to our current system. Firstly, the introduction of multiple broker instances enhances fault tolerance and minimizes the risk of communication breakdowns due to server failures. Workload distribution becomes more balanced as each server node hosting a broker manages client connections and topic subscriptions.

Moreover, employing asynchronous communication methods further enhances the performance and responsiveness of our Pub/Sub system. The utilization of a load balancer optimizes resource allocation and prevents overloading of specific nodes. Sharing topics and replicating broker states lead to data redundancy and improved resource utilization, ultimately boosting reliability.

To ensure the system's health and scalability, we can integrate monitoring and auto-scaling systems, allowing the system to adjust its capacity based on the load. In conclusion, the proposed distributed Pub/Sub architecture provides a dependable messaging system capable of withstanding server failures and maintaining uninterrupted user communication.