

SCC-311 Distributed Systems

Coursework 3: Clustering & Scalability

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Summary

This report describes the Architecture and Design of a Distributed Auctioning System developed for SCC-311 (2020).

The system was expected to be developed with an active replication approach for fault tolerance as well as availability.

Architecture

The system was implemented using a **2-Tier – 3-Layer Architecture**.

Where **Layer** is defined as the logical segmentation and grouping of the application code¹ whereas **Tier** is defined as the physical separation of code, meaning a physical unit where the code runs².

The two Tiers in this architecture are:

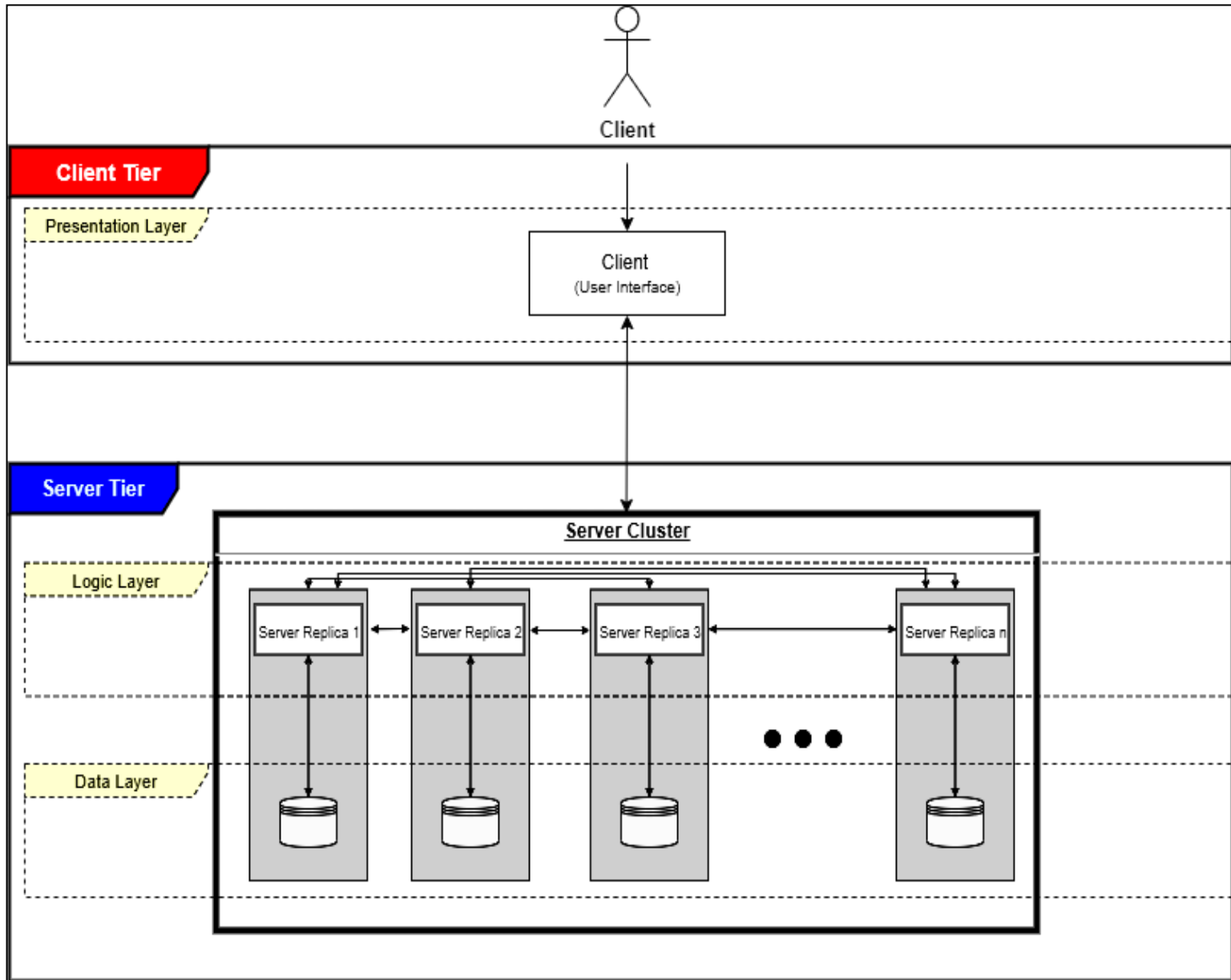
- **Client Tier** → **Contains:** Presentation Layer
- **Server Tier** → **Contains:** Logic Layer & Data Layer

The full architecture is displayed in the diagram below:

¹ <https://dotnettutorials.net/what-is-the-difference-between-layers-and-tiers/>

² <https://stackoverflow.com/questions/120438/whats-the-difference-between-layers-and-tiers#:~:text=In%20plain%20english%2C%20the%20Tier,where%20the%20code%20%2F%20process%20runs.>

Architecture Diagram



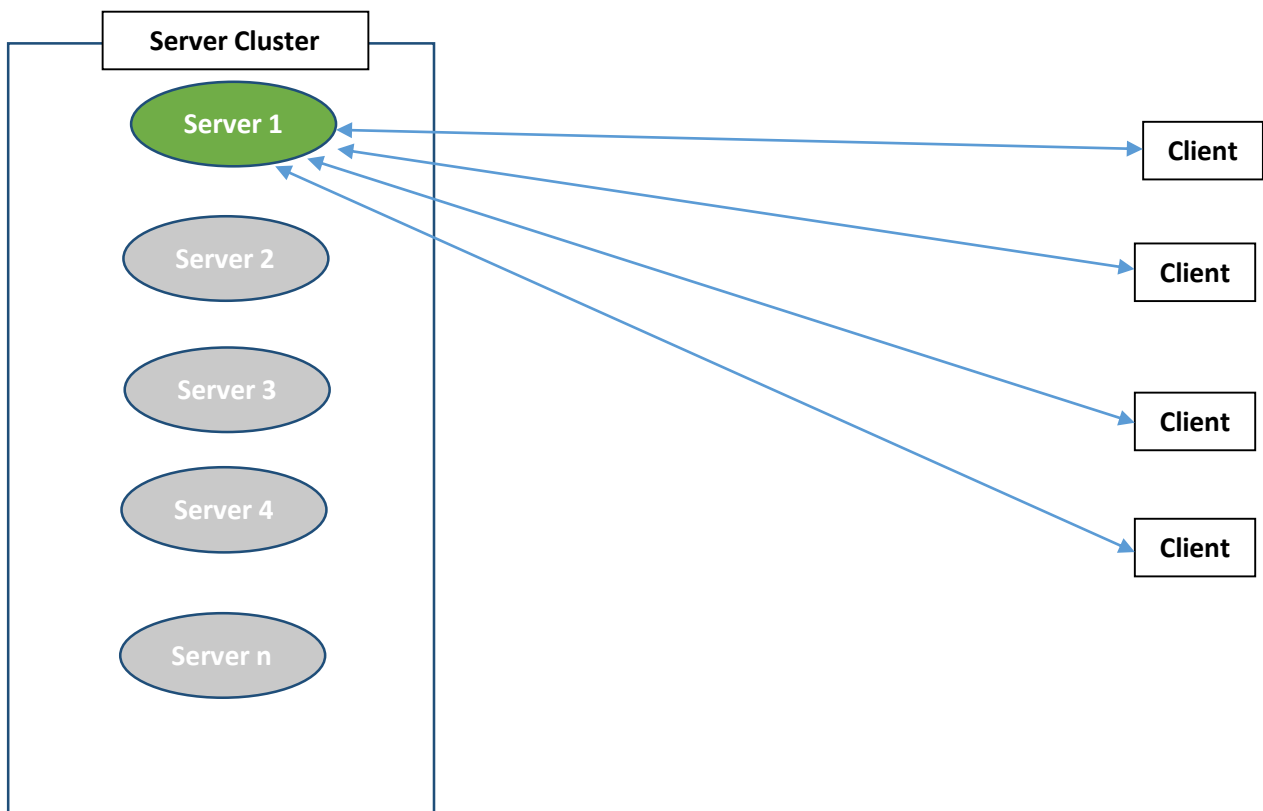
Server Cluster Design

For this implementation it was decided that an **Active-Passive High Availability Server Cluster** will be implemented.

High Availability (HA) clusters are a near optimal choice for high-traffic services such as this Auctioning System. A High Availability design ensures continuous and reliable performance of all critical processes of the service.

These clusters consist of multiple hosts (server Replicas) which are ready to start taking requests when the previously active Replica shuts down. This way, the system achieves a minimal down time in case of any failure.

An Active-Passive design means that a single server is taking all the workload while all others remain passive and wait to take over in case of a down time³.



³ <https://www.liquidweb.com/blog/what-is-server-cluster/>