SYSTEM DESIGN - HOW TO APPROACH AND SOLVE SYSTEM DESIGN PROBLEMS?

Steps to be followed while approaching a system design problem.

1) Requirements and Clarifications:
Get proper requirements by asking questions to the interviewer and clarifying on what part of a system are we focusing on.

2) Capacity Estimation:
Keep below things in consideration.
(i) Traffic / Query per Second (QPS) - Per second how much data will be used for read/write operations.
(ii) Storage - How much storage will be needed.
(iii) Network bandwidth - how much traffic will be there in order to manage traffic (it gives clarity on adding load balancer, caching etc.)

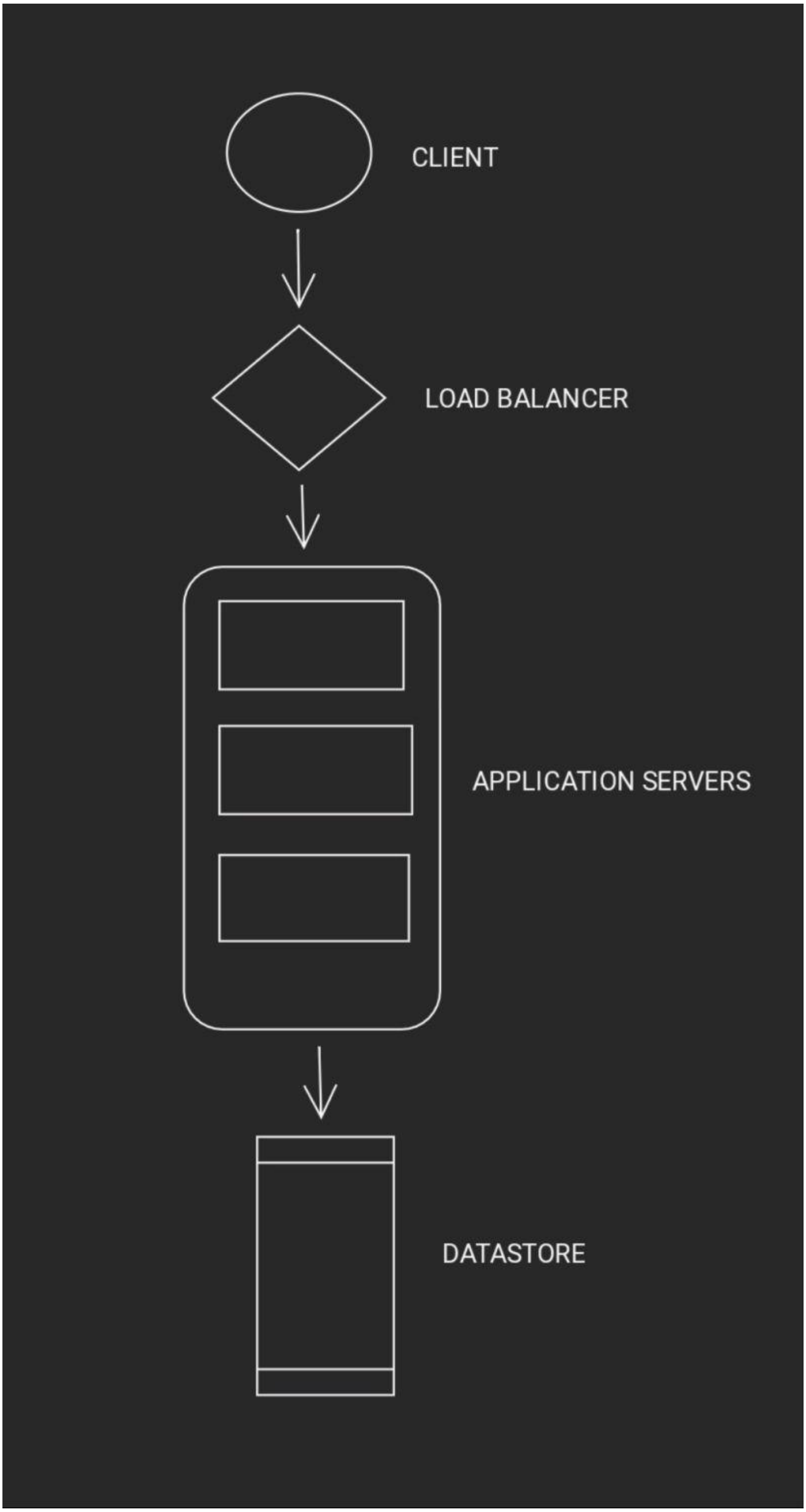
3) System Interface Definition :
Make API's definition on the functionality which we are trying to solve. This will ensure all requirements are properly understood and fulfilled.

4) Define Data Model:
Create Data model, this will give idea on how data will be flowed between components, What kind of storage will be needed, how to transport data ,encryption etc.

5) High Level Design:
Make blocks of core components of system.
E.g. client, load balancer, web server, application server, database, file storage etc

6) Detailed Design:
Deep drive into major functionality by trying to solve below points.
(i) Storage - How to distribute huge amount of data
(ii) Caching - At what layer cache needs to be added in order to speed up things.
(iii)Traffic - what all services needs load balancing

7) Identification and Resolving Bottlenecks :
Identity bottlenecks like
(i) Single point of failure - how to mitigate it
(ii) Replica of data - if few servers fail
(iii) Copies of Services - to avoid total system shutdown
(iv) How are we monitoring the performance of the services. Are there any alerts if services fails or degrades?


CLIENT
LOAD BALANCER
APPLICATION SERVERS
DATASTORE