HLD (High Level Design) Fundamentals

There are 4 major factors to consider for HLD. They are ->

[1] Availability -
    * Definition: "The time for which the service is accessible to the clients."
    * It is measured in the terms of percentage often referred as the number of nines such as
      9 means 90% availability, 99 means 99% availability, 999 means 99.9% availability, 9999 means 99.99% availability
      and 99999 means 99.999% availability etc.
    * Formula:
              ((Up Time) / ((Up Time) + (Down Time))) * 100

              Up Time: The total time a system is operational and functioning as expected.
              Down Time: The total time for which the system is unavailable (due to maintenance, failures or other reasons).

    * Additional Info: https://www.geeksforgeeks.org/system-design/availability-in-system-design/

[2] Reliability -
    * Definition: "The probability that a system will perform its intended function without failure over a specified period of time under stated conditions."
    * MTBF (Mean Time Between Failures) is a key metric.

[3] Maintainability -
    * Definition: "The ease and speed with which a system can be modified, repaired, or restored."
    * MTTR (Mean Time To Repair) is a key metric.

[4] Scalability -
    * Definition: "Increasing the capacity of the service."
    * There are 2 types of scaling. They are -
      <4.1> Vertical Scaling -- Increasing the computational capacity of a machine (by adding more ram and more powerful processor).
      <4.2> Horizontal Scaling -- Adding more machines / servers to the service to fulfill the requests.

CAP Theorem: https://www.geeksforgeeks.org/dbms/the-cap-theorem-in-dbms/