**CAP theorem** states that **a** [**distributed system**](https://www.educative.io/blog/distributed-systems-considerations-tradeoffs) **can only provide two of three properties simultaneously**: **consistency**, **availability**, and **partition tolerance**.

* **Consistency**
  + **In a consistent system, all nodes see the same data simultaneously**. If we perform a read operation on a consistent system, it should return the value of the most recent write operation. **The read should cause all nodes to return the same data**. All users see the same data at the same time, regardless of the node they connect to. When **data is written to a single node, it is then replicated across the other nodes** in the system.
* **Availability**
  + When availability is present in a distributed system, it means that the **system remains operational all of the time**. Every request will get a response regardless of the individual state of the nodes. This means that the **system will operate even if there are multiple nodes down**. Unlike a consistent system, there’s **no guarantee that the response will be the most recent write operation**.
* **Partition tolerance**
  + **When a distributed system encounters a partition, it means that there’s a break in communication between nodes**. If a system is partition-tolerant, the **system does not fail, regardless of whether messages are dropped or delayed between nodes** within the system. To have partition tolerance, the **system must replicate records across combinations of nodes and networks** to keep the system up through intermittent outages.





