

Distributed Systems Profoundness

Brewer's CAP Theorem

Eric Brewer observed following while working with Distributed Systems.

“Any distributed system can give any two of three guarantees: Consistency, Availability and Partition Tolerance.”

It can be seen as three sides of a triangle but from any corner, you are able to experience only two sides.

Consistency

Various consistency levels ranging from ‘Strong’ to ‘Eventual’ are lead different complexities and timings as per the adaptation of approaches. It is in use per nature of applications. For example banking solutions i.e. money transactions are bound to have strong consistency.

Availability

Denial of service (DoS) is not accepted at all but many applications need 24x7 up front availability. Downtime can incur huge loss of revenue in service, hence system availability must be 99.99 or more considered strong availability. Know that this is one of the reasons for having data centers across continents and replication factor minimum 3.

Partition Tolerance

“Failure is a norm” - It has been accepted as matter of fact that distributed system components are bound to fail. Either service, disk, node or network. The data and processing have to be distributed with intelligent architectural solutions supporting back up plans/ auto recovery strategies in place to let performance must not be compromised. It is called partition tolerance.

P.s.

ACID Vs BASE

Online Transaction Processing (OLTP) - RDBMS systems are required to achieve ACID properties for the transaction. Here, A-Atomicity, Consistency (Strong level), Isolation and Durability are all of them are highest priority and at the same level of importance.

While, BASE-Basically Available Soft State Eventual Consistent, are types of applications where system can live with eventual consistency nature.

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