

The CAP Theorem

Computing

The trade-off every distributed system makes, stated precisely.

A distributed system cannot be simultaneously consistent and available while partitioned.

Consistency · Availability · Partition tolerance — pick 2

CP — consistent, partition-tolerant Refuse requests rather than serve stale data

Banking; most relational clusters.

AP — available, partition-tolerant Serve possibly stale data

DNS, shopping carts, Cassandra.

CA

Only on a single node

Networks partition; you cannot opt out.

THE COMMON MISTAKE

✗ **Reading it as a permanent choice between all three**

✓ **It is what happens during a partition**

Without a partition a system can be both consistent and available. CAP describes the failure mode, not normal operation.

PACELC extends it: else — when there is no partition, the trade is between latency and consistency.