*What is the CAP theorem?*

*The CAP theorem says that a distributed system can deliver only two of three desired characteristics: consistency, availability and partition tolerance (the ‘C,’ ‘A’ and ‘P’ in CAP).*

*Three distributed system characteristics to which the CAP theorem refers.*

* *Consistency - Consistency means that all clients see the same data at the same time, no matter which node they connect to. For this to happen, whenever data is written to one node, it must be instantly forwarded or replicated to all the other nodes in the system before the write is deemed ‘successful.’*
* *Availability - Availability means that any client making a request for data gets a response, even if one or more nodes are down. Another way to state this—all working nodes in the distributed system return a valid response for any request, without exception.*
* *Partition tolerance - A partition is a communications break within a distributed system—a lost or temporarily delayed connection between two nodes. Partition tolerance means that the cluster must continue to work despite any number of communication breakdowns between nodes in the system.*

*Databases often sit at the center of the CAP problem. Microservices often rely on NoSQL databases, since they're designed to scale horizontally and support distributed application processes. And, partition tolerance is a "must have" in these types of systems because they are so sensitive to failure.*

*You can certainly design these kinds of databases for consistency and partition tolerance, or even for availability and partitioning. But designing for consistency and availability just isn't an option.*