

CockroachDB vs Google Cloud Spanner

At Cockroach Labs, we are solely focused on the delivery of a feature-rich distributed SQL database. We know that consumers have a choice, which is why we monitor what our peers are building and delivering to ensure we achieve this goal.

This is a summary of some of the key points of concern for CockroachDB relative to Google Cloud Spanner. We try our hardest to be fair and complete in our analysis, but also understand we are not experts in the competing solution. Please take this comparison as a guide for you to consider our database against others and not as the ultimate truth.

Google Cloud Spanner is a pioneer of the distributed SQL movement and helped inspire much of the core architecture of CockroachDB. Key differences in approach exist, however, particularly with respect to technical decisions for a SQL API and the way time is managed within a cluster.

//Hybrid and multi-cloud deployments

With Spanner you are tied to only the explicit GCP compute instances they offer (and this is somewhat limited). You cannot deploy a spanner instance in a hybrid or multi-cloud configuration and are tied to the GCP environment only.

//Multi-region simplicity & granular control

With Spanner, deployment of a multi-region application incurs a wholly new pricing structure, requires significant operations overhead and has no granular control for data residency.

//Granular geo-partitioning

Multi-region for Spanner means the entire database lives in each region and you cannot control down to the row level for explicit survival/latency/compliance goals for particular (row-based) data.

//Single control plane for k8s

If you are deploying an app on any K8s (including GKE and Anthos) you cannot deploy Spanner in these environments. You can only use it as a service from these deployments. This increases complexity and operational overhead.

//Spatial Data Types

Spanner does not offer support for spatial data types.

//Global availability/limited multi region options

Spanner instances have only limited availability in Central and South America.

	Google Cloud Spanner	CockroachDB
Database Horizontal Scale Increase storage and transactional capacity by adding more instances/nodes	Node based, automated for both reads and writes	Node based, automated for both reads and writes
Database Load Balancing (internal) Locate data across multiple instances/nodes based on optimization criteria for balancing load	Detailed options to optimize for storage, compute and latency efficiency	Detailed options to optimize for storage, compute and latency efficiency
Failover Provide access to backup data upon failure	Fully automated for both reads and writes	Fully automated for both reads and writes
Automated Repair and RTO Repair the database after failure and the time it takes for the database to come back online	Automated Repair RTO <10 sec	Automated Repair RTO <10 sec
Distributed Reads Reliably read data in any instance/node of the database	Yes	Yes
Distributed Transactions Allow for acid writes across multiple instances/nodes	Yes	Yes, and extensions for parallel commits
Database Isolation Levels Transaction isolation levels allowed for writes in the database	Guaranteed Consistent Default: Serializable Highest: Serializable	Guaranteed Consistent Default: Serializable Highest: Serializable
Potential data issues (default) Possible data issues at default isolation level	None	None
SQL Compliance with standard SQL	Yes, with some limitations	Yes - Wire compatible with PostgreSQL
Database Schema Changes Modify database schema across all tables	Online, Active, Dynamic	Online, Active, Dynamic
Cost Based Optimization Optimize query execution using analytics	Yes	Yes
Data Geo-partitioning Tie data to an instance/node to comply with regulations or optimize access latency	No	Yes, Row level
Upgrade Method Upgrade the database software	Online, Rolling	Online, Rolling
Multi-region Deploy a single database across multiple regions	Yes, but not for writes	Yes for both reads and writes
Hybrid and Multi-cloud Deploy a single database across multiple cloud providers or on-prem	No	Yes