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Product Manager

Cloud Spanner

Google Cloud

What is tricky with many databases?

1

Scale

Vertical scaling
Sharding

2

Operations

HW breakdowns
SW upgrades
End-of-life
Tweaking
Rebuild indexes

3

Replication

Read only replicas
Disaster recovery replicas

4

Transactions

Strong consistency

Cloud Spanner

Relational semantics

Schemas, ACID transactions, SQL

+

Horizontal scale

99.999% SLA, fully managed, and scalable

Confidential and proprietary

What workloads fit Cloud Spanner best?

01

Sharded RDBMS

Manually sharding is difficult. People do it to achieve scale. Cloud Spanner gives you relational data and scale.

02

Scalable relational data

Cloud Spanner is a scalable relational database. Instead of moving to NoSQL, move from one relational database to a more scalable relational database.

03

Manageability/HA

Cloud Spanner is highly automated. Schema changes and patching are all online operations. Cloud Spanner does not have any planned downtime and comes with up to a 99.999% availability SLA.

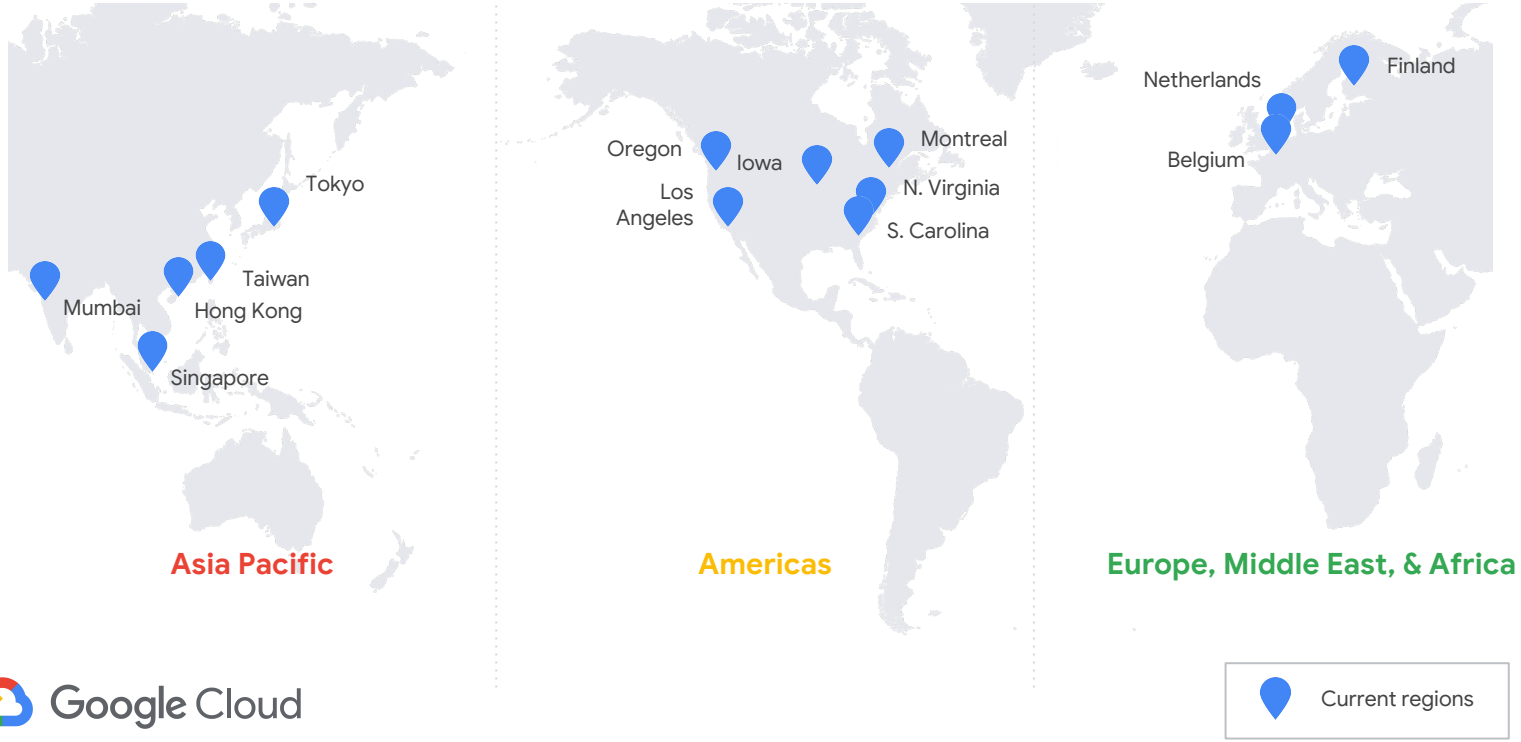
04

Multi-region

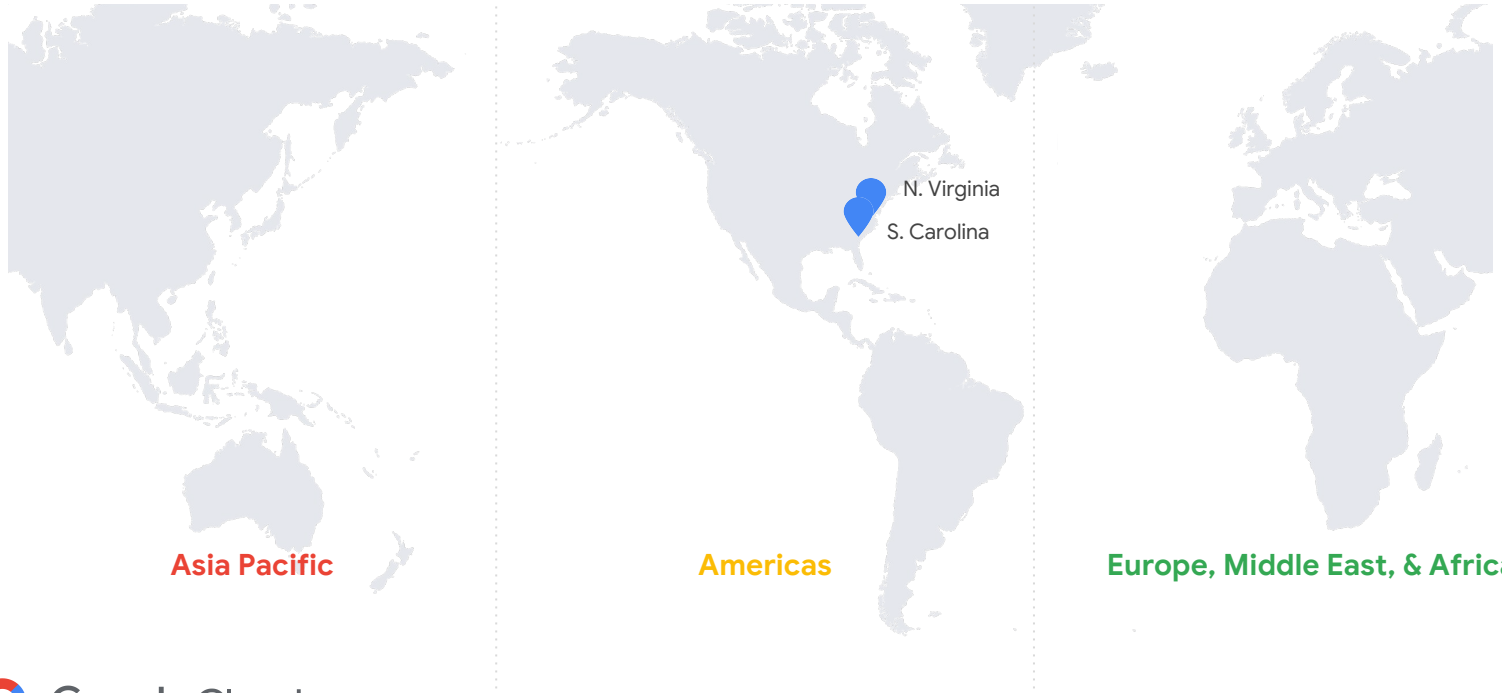
Write once and have Cloud Spanner automatically replicate your data to multiple regions.

Most customers use regional instances, but multi-region is there if you need it.

Most commonly used: regional configurations



Multi-region configuration (nam3)



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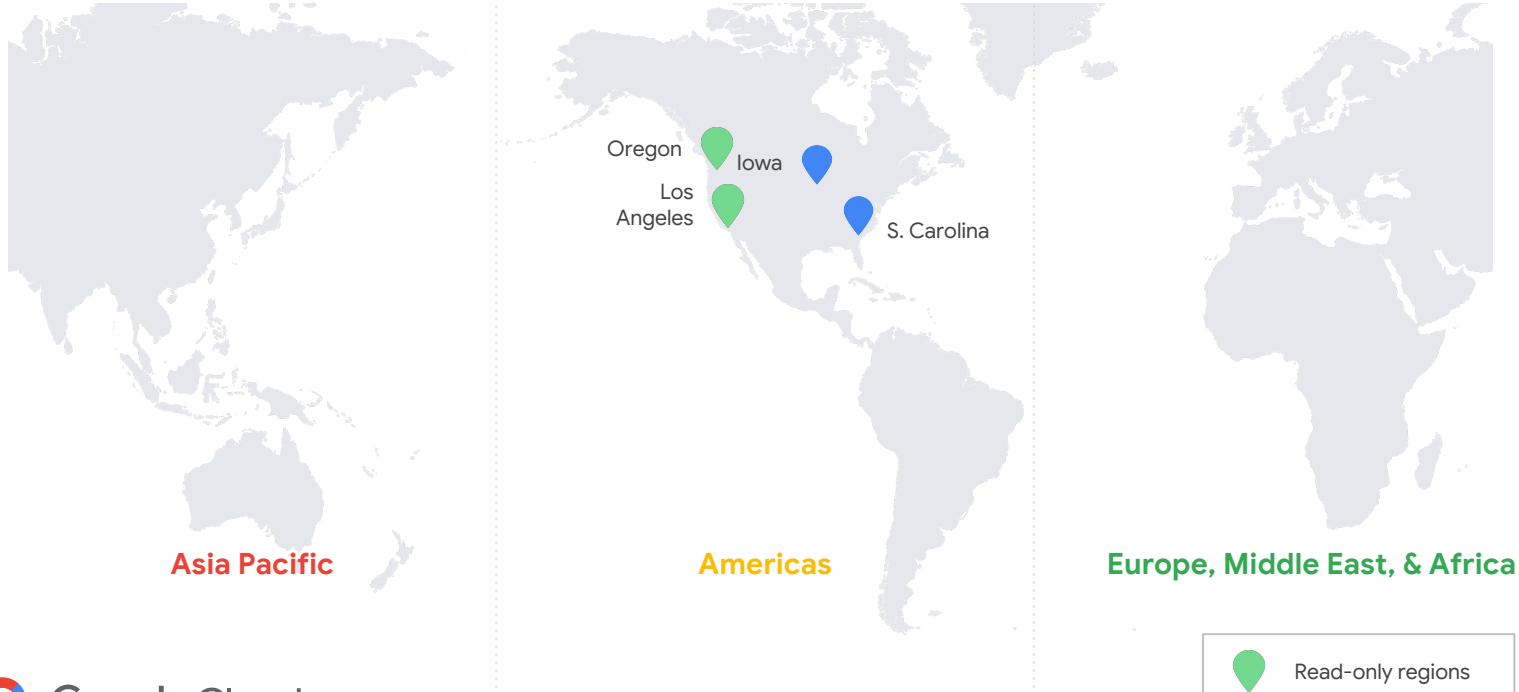
Multi-region configuration (nam6)



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Multi-region configuration (eur3)

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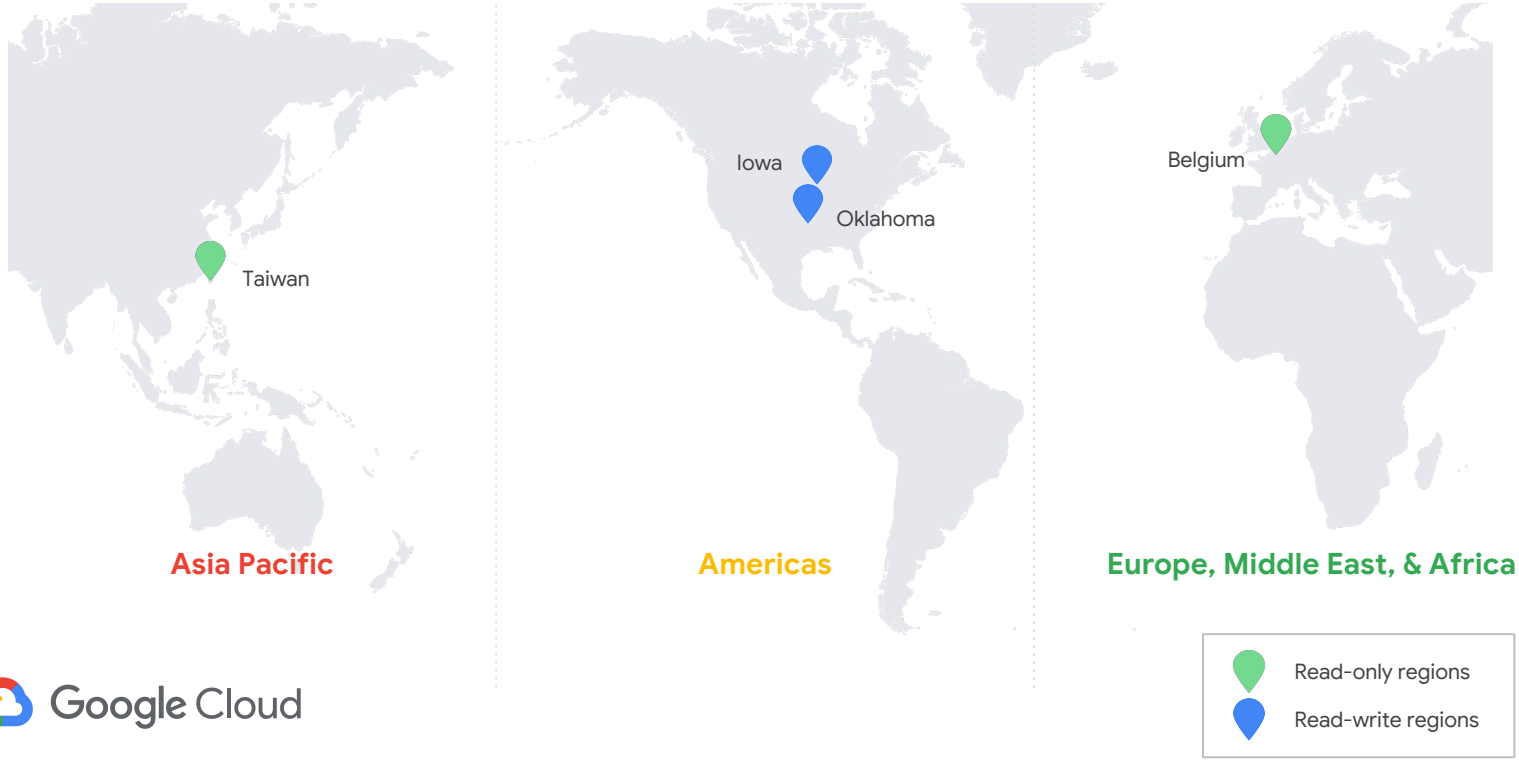
Multi-region configuration (nam-eur-asia1)



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When Cloud Spanner fits less well

1. Lift and shift
2. Lots of in-database business logic (triggers, stored procedures)
3. Compatibility needed
4. App is very sensitive to very low latency (micro/nano/low single digit ms)

Common misconceptions

Fully managed – yes, really!

- No messing with tablespaces
- No software patching
- No upgrades
- No downtime
- No index rebuilds
- No resharding
- Dynamically scalable (up and down) within seconds

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Common misconceptions

External (strong) consistency – yes, really!

- Low-latency synchronous replication — data is available on commit
- True ACID database
- How is this possible? Through Google's private high-speed redundant global network and Cloud Spanner's optimized stack

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Common issues

Key choice in tables and indexes

- Sequential- or timestamp-based keys can cause hotspots limiting performance
- Random UUIDs or hashes distribute data better

Lack of: Triggers, stored procedures, and check constraints

- Not Null constraint exists, Keys are Unique, Unique column values via Indexes.

Foreign key constraints and on-delete cascades only with parent-child interleaved tables

No sequence generation for keys

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Common issues

Indexes are tables too

- Same constraints for index keys
- Querying non-covering index is a table join

Primary key is the ROWID

- Uniquely identifies the row
- Used to determine where the row is in the storage

Backup and DR

- Managed export / import
- One hour of historical data snapshots
- System-managed backup coming soon

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How Cloud Spanner works

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Architecture overview

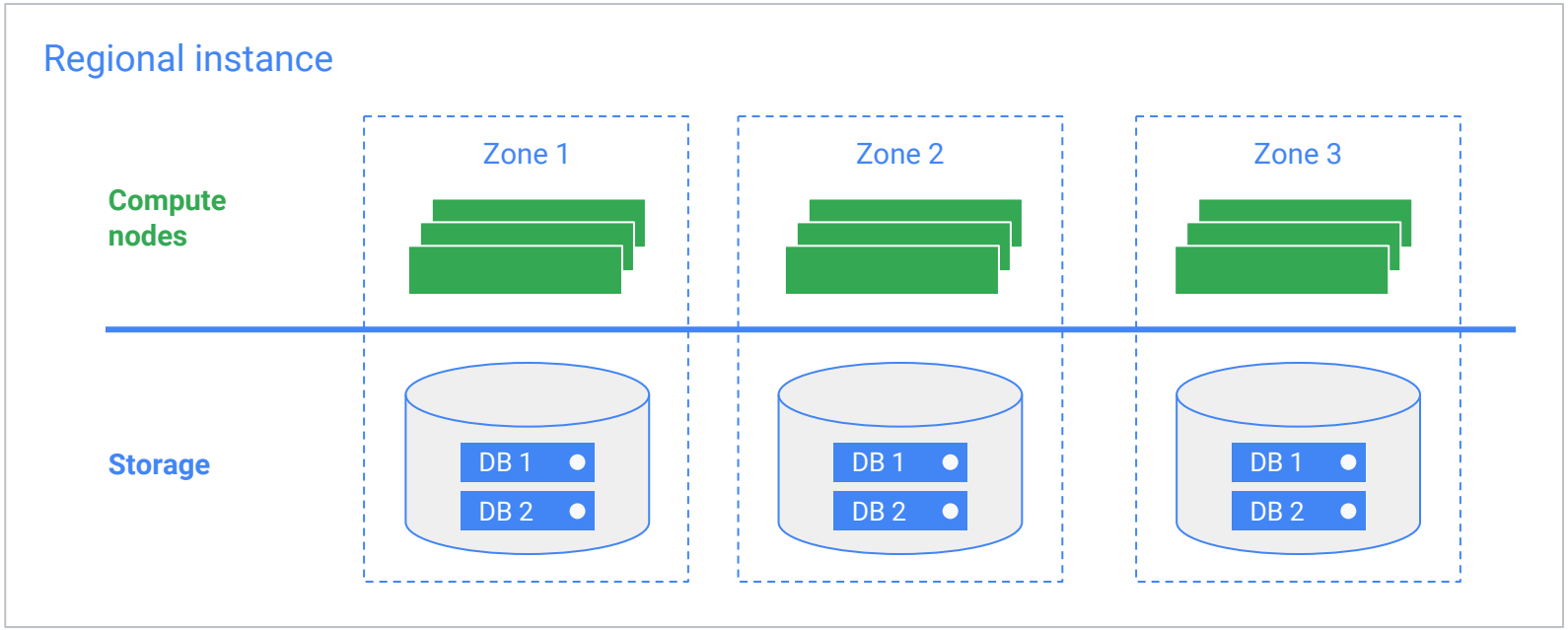

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Table splits

KeyRange	Split ID	
[-∞,3]	0	Node A
[4,224]	1	
[225,712]	2	
[713,717]	3	Node B
[718,1265]	4	
[1725,1997]	5	
[1998,2456]	6	Node C
[1998,2456]	7	
[2457,∞]	8	

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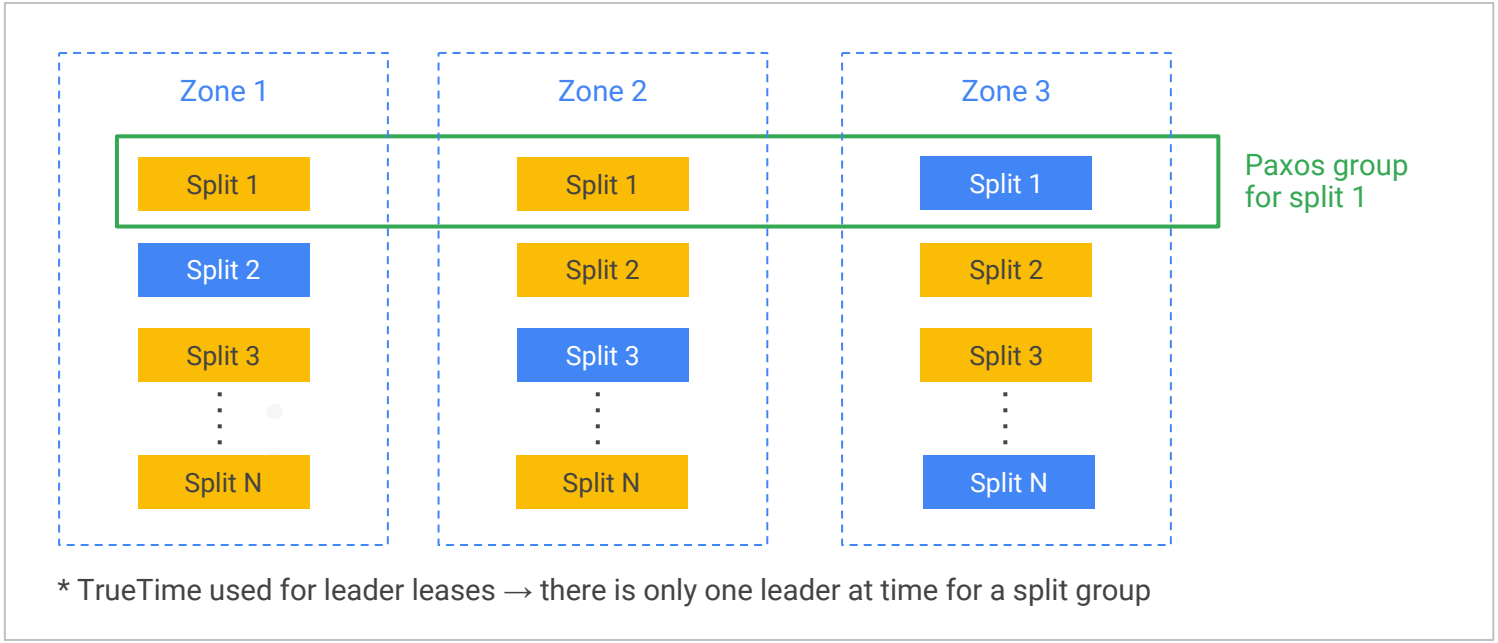
Table splits



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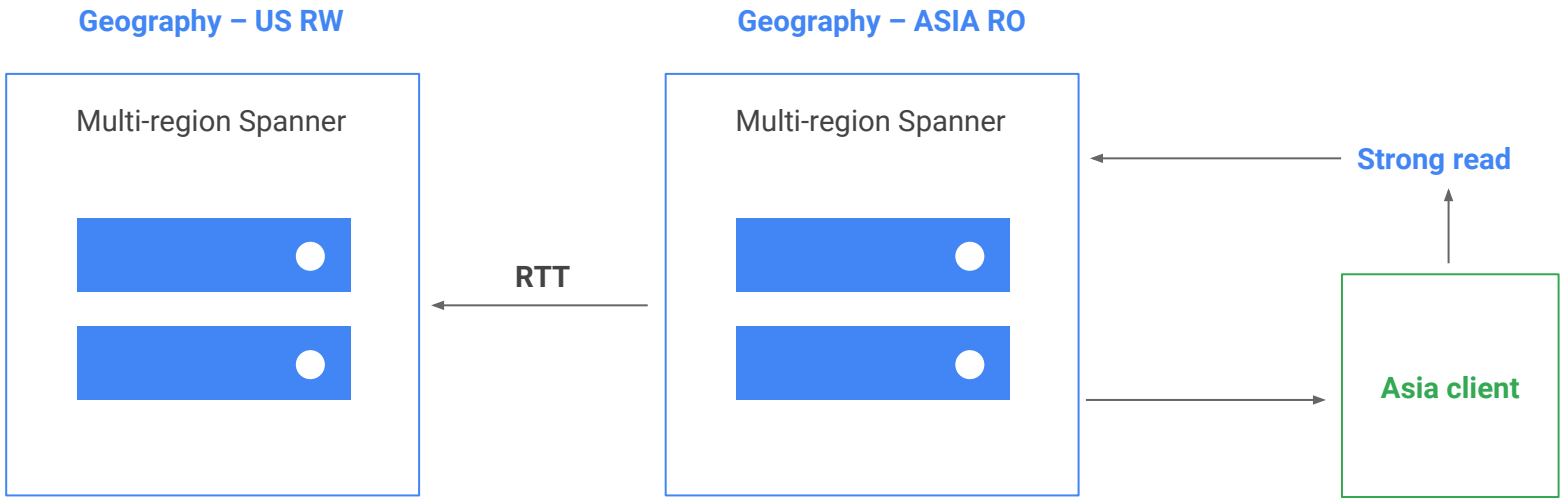
Multi-region strong read request



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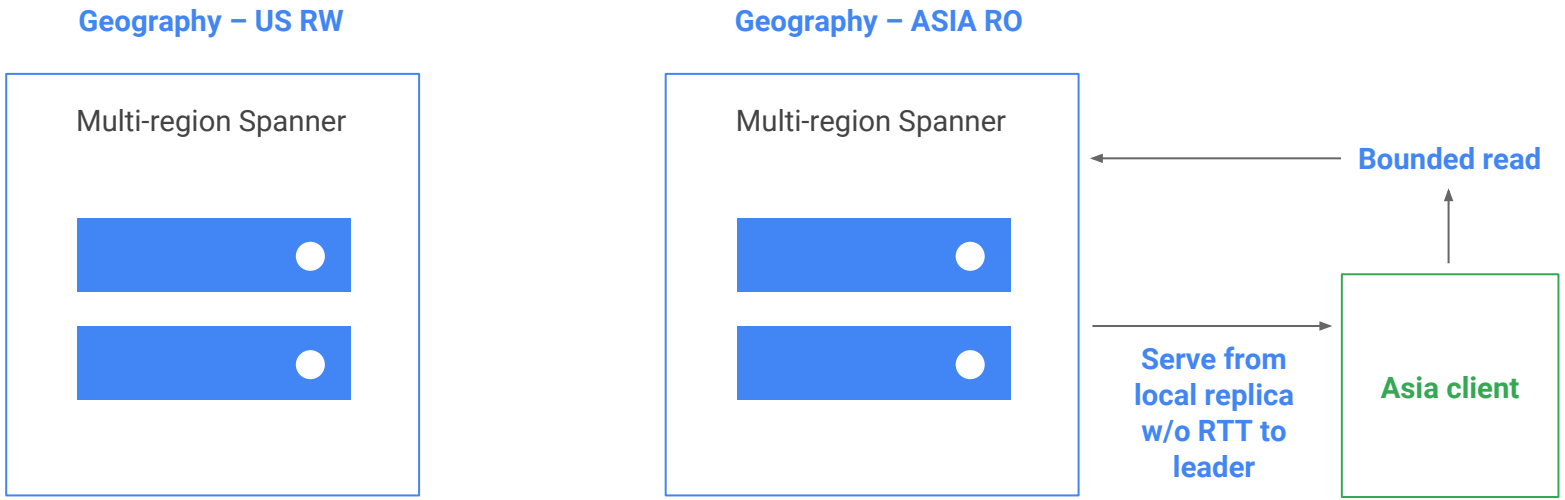
Multi-region stale/bounded read request



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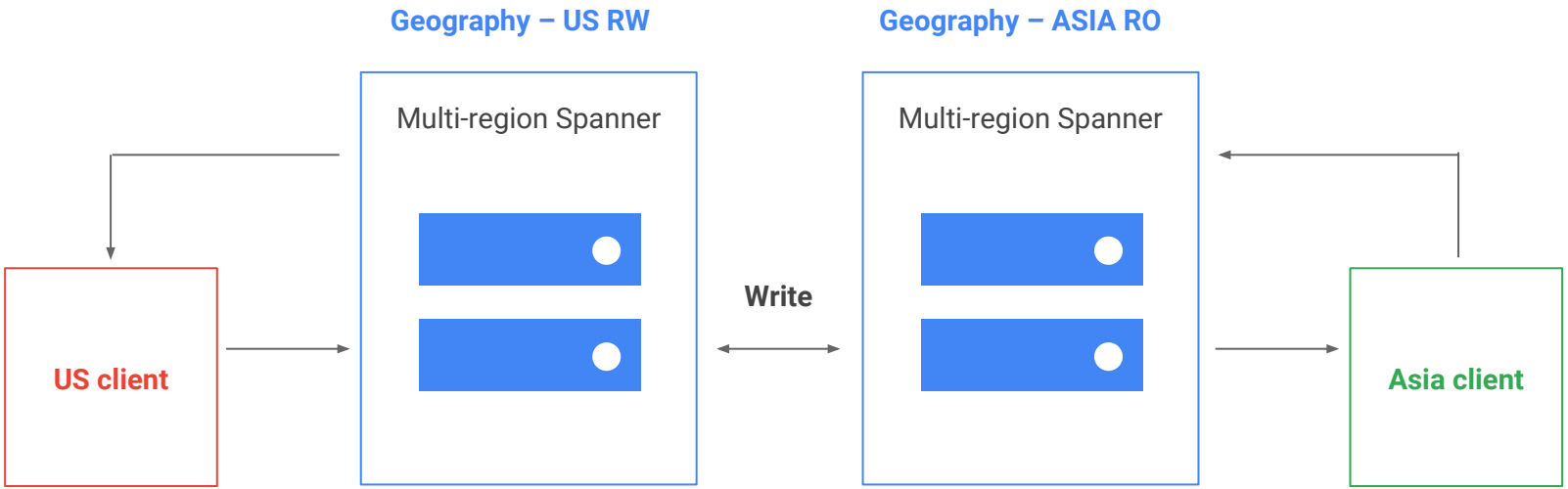
Multi-region write request



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Portfolio of fully managed services

Great apps run on great databases.

In-memory	Non-relational		Relational		Object	Warehouse
Cloud Memorystore	**Cloud Firestore**	**Cloud Bigtable**	**Cloud SQL**	**Cloud Spanner**	**Cloud Storage**	**BigQuery**
Managed Redis	Serverless, document database service	Wide-column database service	Managed MySQL & PostgreSQL	Scalable relational database service	Object storage, data lake	Enterprise data warehouse

Confidential and proprietary

Q&A

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Thank you

More info
cloud.google.com/spanner

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