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CTO



Spanner: SQL adatbázis a Gmail alatt



What is Cloud Spanner?



	CLOUD SPANNER	TRADITIONAL RELATIONAL	TRADITIONAL NON-RELATIONAL
Schema	✓ Yes	✓ Yes	✗ No
SQL	✓ Yes	✓ Yes	✗ No
Consistency	✓ Strong	✓ Strong	✗ Eventual
Availability	✓ High	✗ Failover	✓ High
Scalability	✓ Horizontal	✗ Vertical	✓ Horizontal
Replication	✓ Automatic	🔄 Configurable	🔄 Configurable

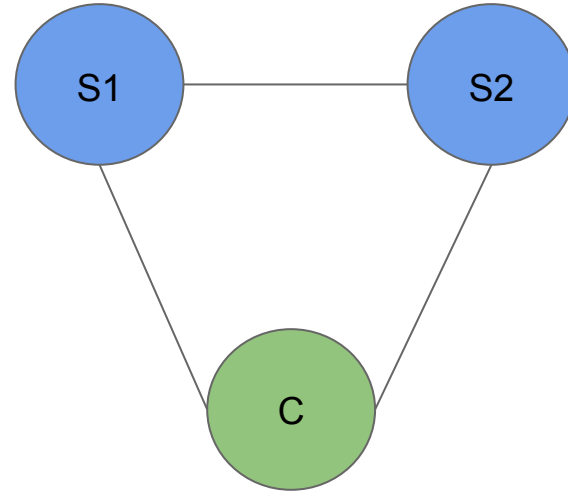
Some users of Spanner



Google play

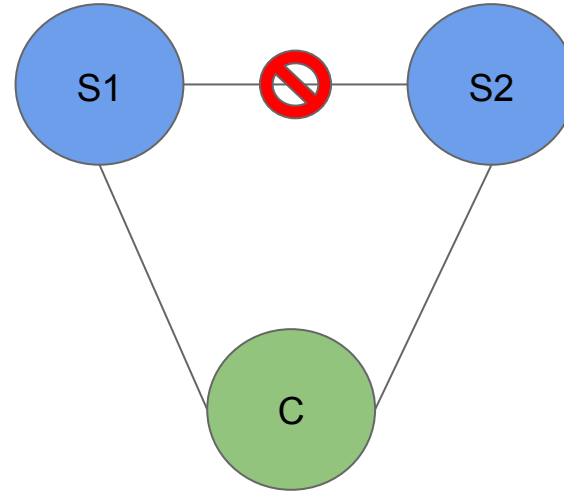
CAP theorem

- Consistency
- Availability
- Partition tolerance



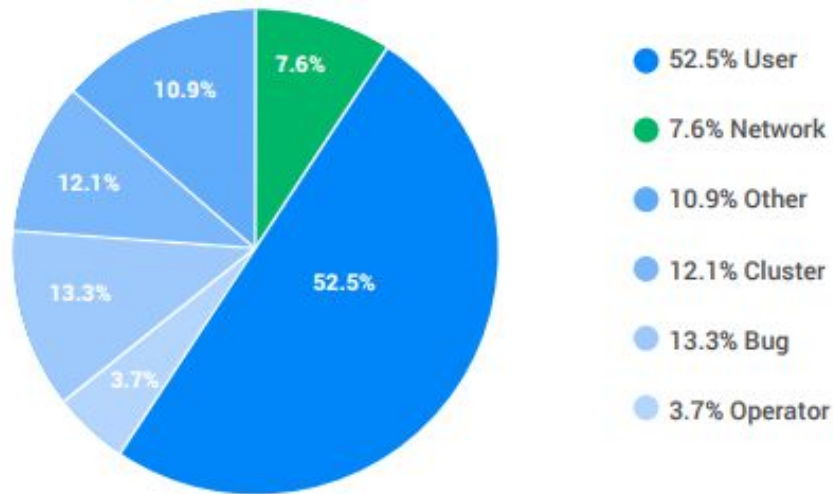
CAP theorem

- Consistency
- Availability
- Partition tolerance



Effectively CA

- ~~100% availability~~
- Partitions are rare
- It is a problem only during partitions



<https://research.google.com/pubs/pub45855.html>

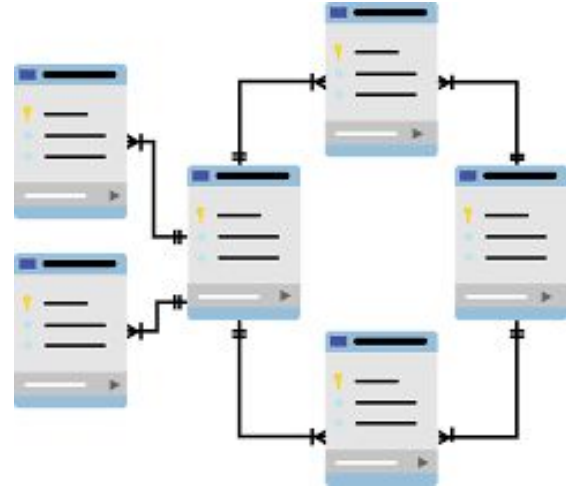
Computation

- Nodes
- ~10k reads/s
- ~2k writes/s



Data model

- Splits
- Interleaved tables
- Strongly typed



Data model

```
CREATE TABLE Singers (  
    SingerId INT64 NOT NULL,  
    FirstName STRING(1024),  
    LastName STRING(1024),  
    SingerInfo BYTES(MAX),  
    ) PRIMARY KEY (SingerId);
```

```
CREATE TABLE Albums (  
    SingerId INT64 NOT NULL,  
    AlbumId INT64 NOT NULL,  
    AlbumTitle STRING(MAX),  
    ) PRIMARY KEY (SingerId, AlbumId),  
    INTERLEAVE IN PARENT Singers ON DELETE CASCADE;
```

Truetime

- Time interval
- GPS signals
- Atomic clocks



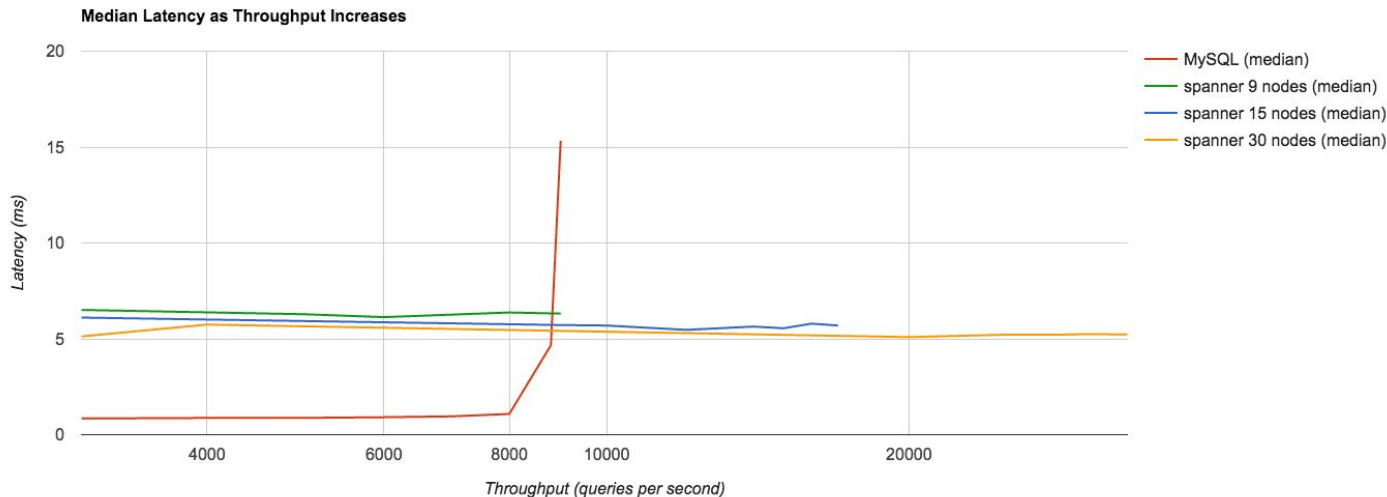
Snapshot reads

- Read consistent state of the recent past
- Consistent backups



Disadvantages

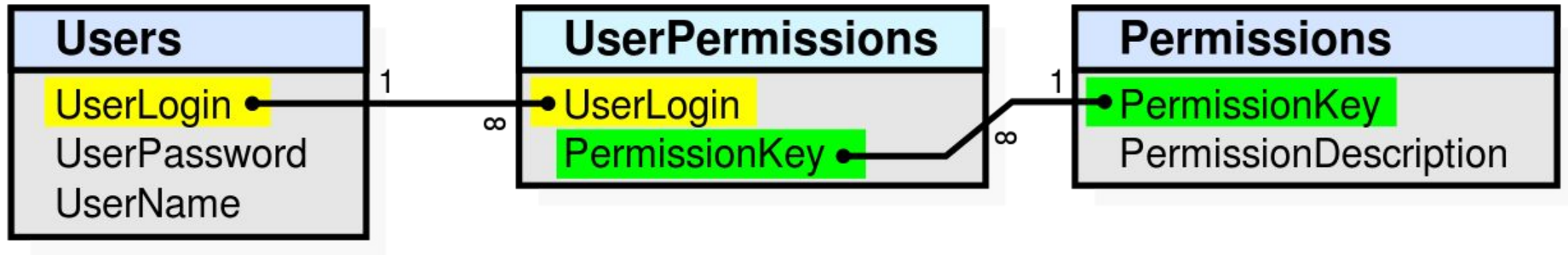
Latency under low load (6-12 vs 1-2ms)



<https://quizlet.com/blog/quizlet-cloud-spanner>

Disadvantages

No foreign keys or constraints



Disadvantages

Vendor lock-in



Case study: AODOCS

- Document management system
- Thousands of customers including Google
- Developed on GCP
- Fully managed components
- 30 TB datastore

Goal

- Reduce cost by moving technical data
- Use it for new features



Links

- <https://cloud.google.com/spanner/>
- <https://cloud.google.com/spanner/docs/concepts/>
- <https://research.google.com/pubs/pub45855.html>
- <https://cloudplatform.googleblog.com/2017/02/inside-Cloud-Spanner-and-the-CAP-Theorem.html>
- <https://cloudplatform.googleblog.com/2017/02/introducing-Cloud-Spanner-a-global-database-service-for-mission-critical-applications.html>
- <https://www.cockroachlabs.com/blog/living-without-atomic-clocks/>
- <https://www.nuodb.com/techblog/google-cloud-spanner-nuodb-comparison-distributed-acid-compliant-databases>
- <https://quizlet.com/blog/quizlet-cloud-spanner>

A group of men are gathered on a rooftop terrace, likely at a company event. They are wearing casual clothing, and some are wearing dark blue t-shirts with a white logo. The terrace has a white railing, and buildings are visible in the background. A teal overlay covers the entire image.

Questions?



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