STORJ

How CockroachDB is helping us do the impossible with global cloud storage

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What do I mean by impossible?

Agenda

Who we are and what we do

Our database requirements

How does CockroachDB stack up?

Success stories

Wrap up

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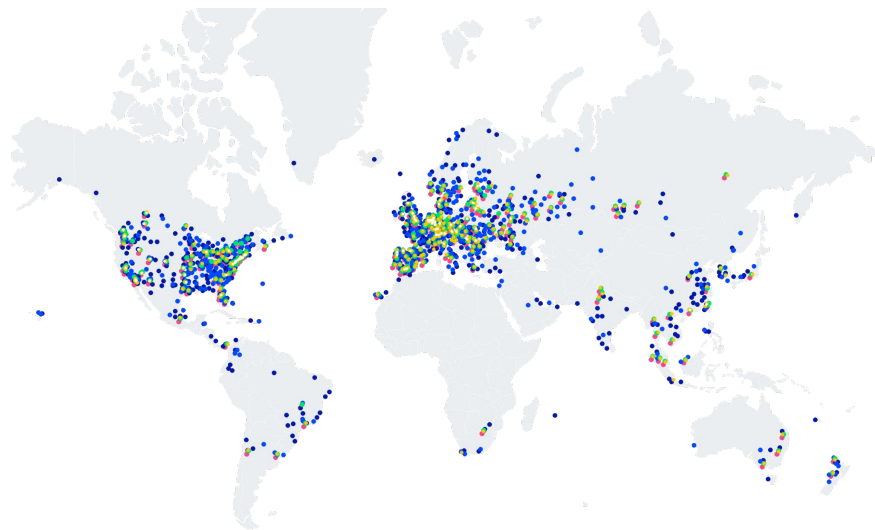# A new model for cloud storage

Storj object storage is fundamentally different

- ✓ Unlocks stranded capacity across the enterprise

- ✓ Security/privacy-first architecture

- ✓ Works with existing heterogeneous hardware

- ✓ High durability, availability

- ✓ CDN-like performance

- ✓ Minimal carbon footprint

- ✓ Simple, scalable pricing

Storj has 3 key elements

Nodes

Tens of thousands of shared hard drives store data on the network, without access to any complete file or usable data
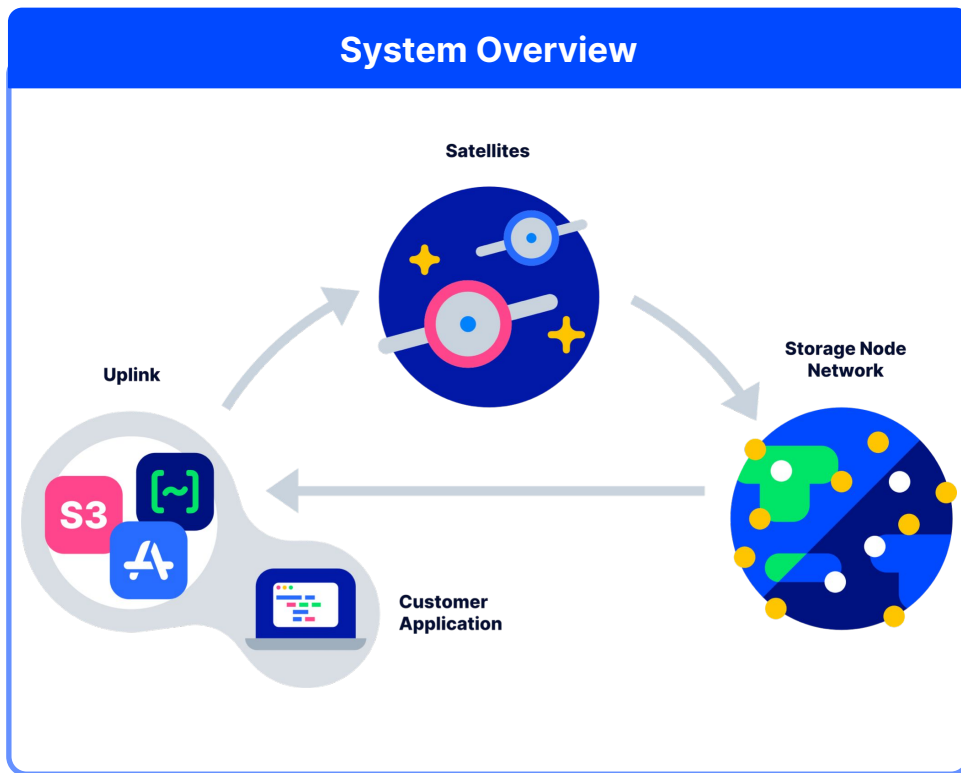
Applications

Demand

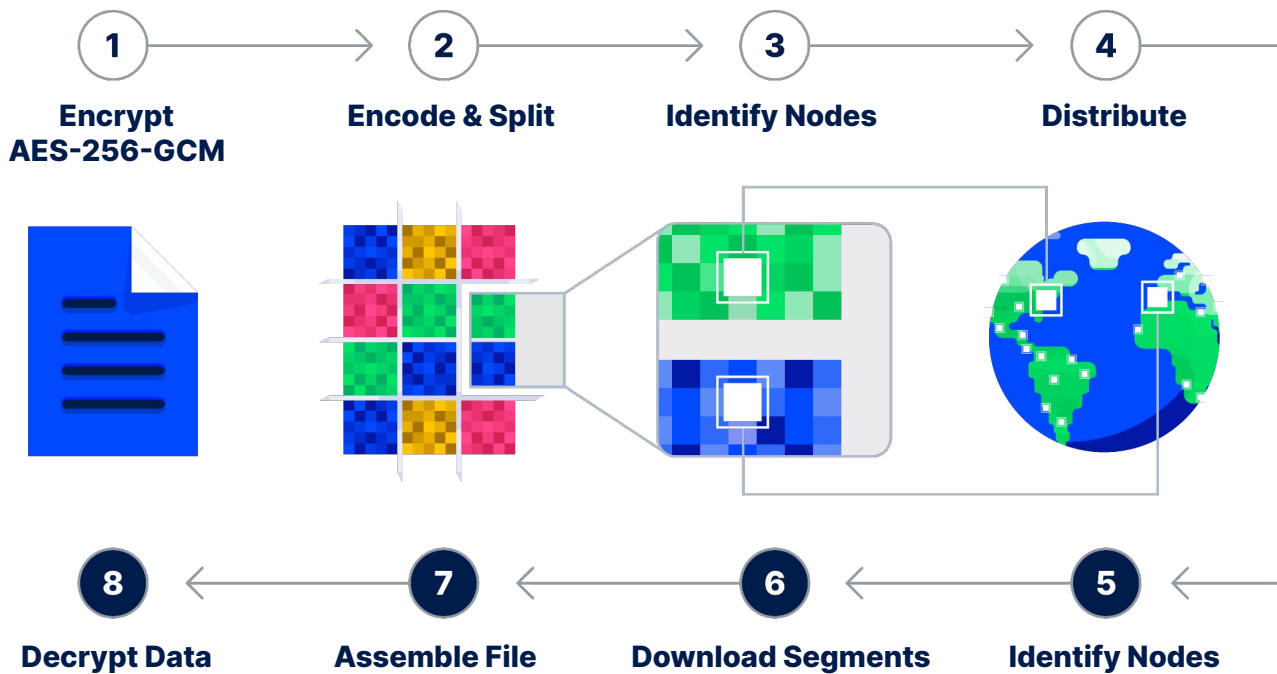Client applications store encrypted and encoded files split into pieces and stored across a distributed network

Satellites

Network

The network enables applications to store data, ensures data reliability, manages access controls and data audit/repair

System Overview

Satellites

Uplink

Storage Node Network

Customer Application

S3

Storj uses encryption and erasure encoding to distribute data keeping it durable and available

1 → **2** → **3** → **4**

Encrypt AES-256-GCM — **Encode & Split** — **Identify Nodes** — **Distribute**

8 ← **7** ← **6** ← **5**

Decrypt Data — **Assemble File** — **Download Segments** — **Identify Nodes**

Live Upload Demo

- Upload every 6 seconds
- See locations of where files are stored in real-time!

https://demo.storj.dev/

Agenda

- Who we are and what we do

- **Our database requirements**

- How does CockroachDB stack up?

- Success stories

- Wrap up

Designing our metadata orchestrator:
early goals

Horizontal scalability

Performance

Strong consistency

Designing our metadata orchestrator:
What ended up making the decision

Postgres wire compatibility

Open source and on prem option

How established is it?

Agenda

How did CockroachDB stack up (as of 2019)?

	Traditional RDBMS (Postgres)	Sharded RDBMS (Citus)	NoSQL (Cassandra)	Spanner	CockroachDB	Yugabyte + YSQL	TiDB
Horizontally scalable	NO	KINDA	YES	YES	YES	YES	YES
Good performance	YES	YES	YES	YES	YES	YES	YES
Strong consistency	Failover?	Failover?	NO	YES	YES	YES	YES
PG wire compatible	YES	YES	NO	NEW	YES	YES	MySQL
Open source / on prem	YES	YES	YES	NO	YES	YES	YES
Established history	YES	YES	YES	YES	MATURING	NEW	NEW

Agenda

Success stories

storage: Make Put handle WriteTooOldError more like CPut #38668

⑂ Merged **craig** merged 2 commits into `cockroachdb:master` from `bdarnell:defer-write-too-old` ⧉ on Jul 9, 2019

💬 Conversation 18   ⦾ Commits 2   ▣ Checks 0   ⊡ Files changed 18

bdarnell commented on Jul 3, 2019   Member ···

Reviewers

andreima

knz

nvanbens

kvserver: deadlock in protectedts error message #66759

⊘ Closed   **tbg** opened this issue on J

⧉ **tbg** mentioned this issue on Jul 14, 2021

sql/kv: implement lock_timeout session variable #67513   ⊘ Closed

⧉ **tbg** mentioned this issue on Mar 16, 2022

tbg commented on Jun 23, 20   **kvserver: add generalized circuit-breaking to catch, e.g., mutex deadlocks** #77366   ⊙ Open

Describe the problem

⧉ **erikgrinaker** mentioned this issue on Jan 18

#61610 introduced a deadlock   **kvserver: Raft stalls during remote node startup** #95433   ⊘ Closed

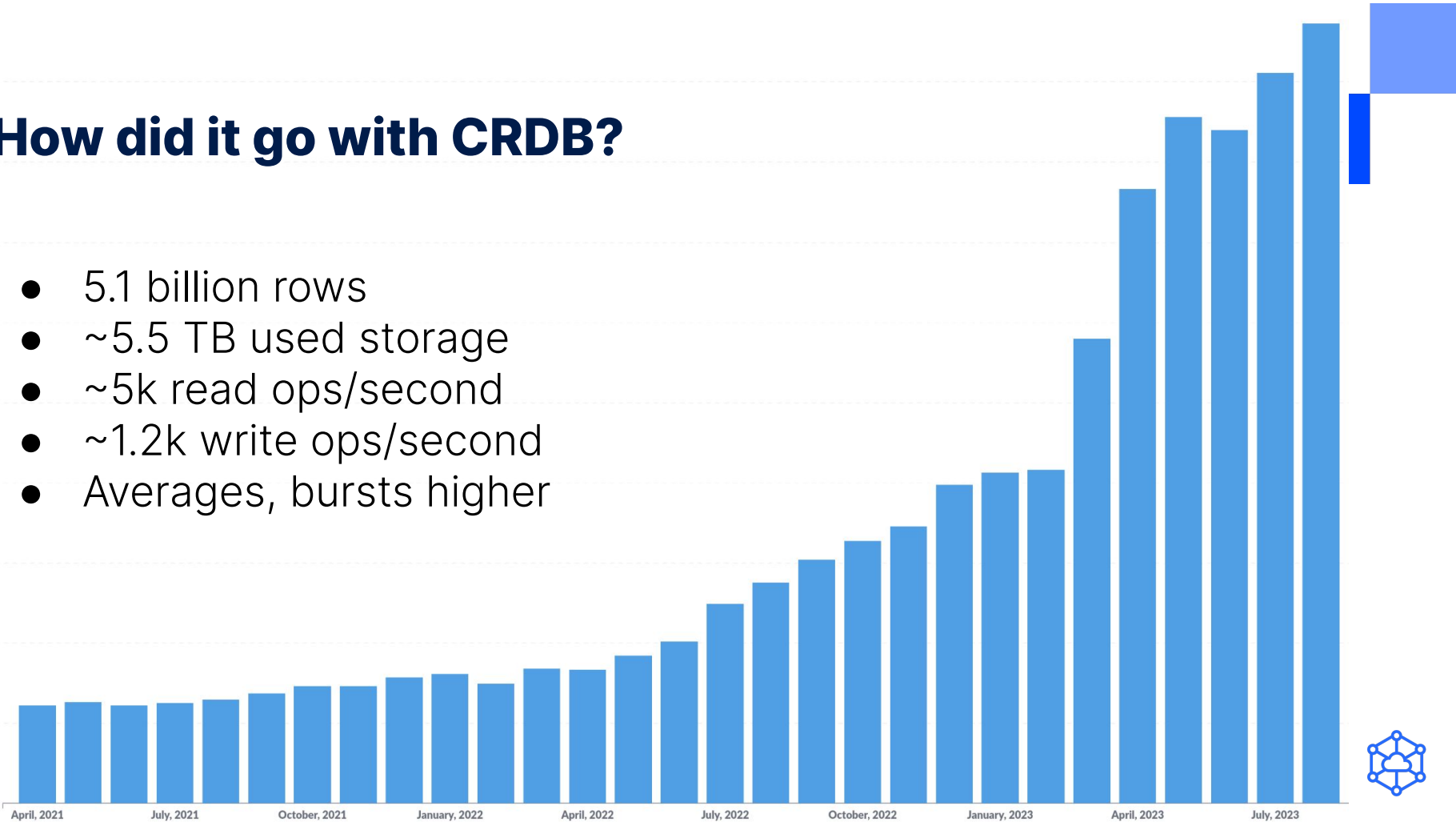while already holding (*Repli

Success stories

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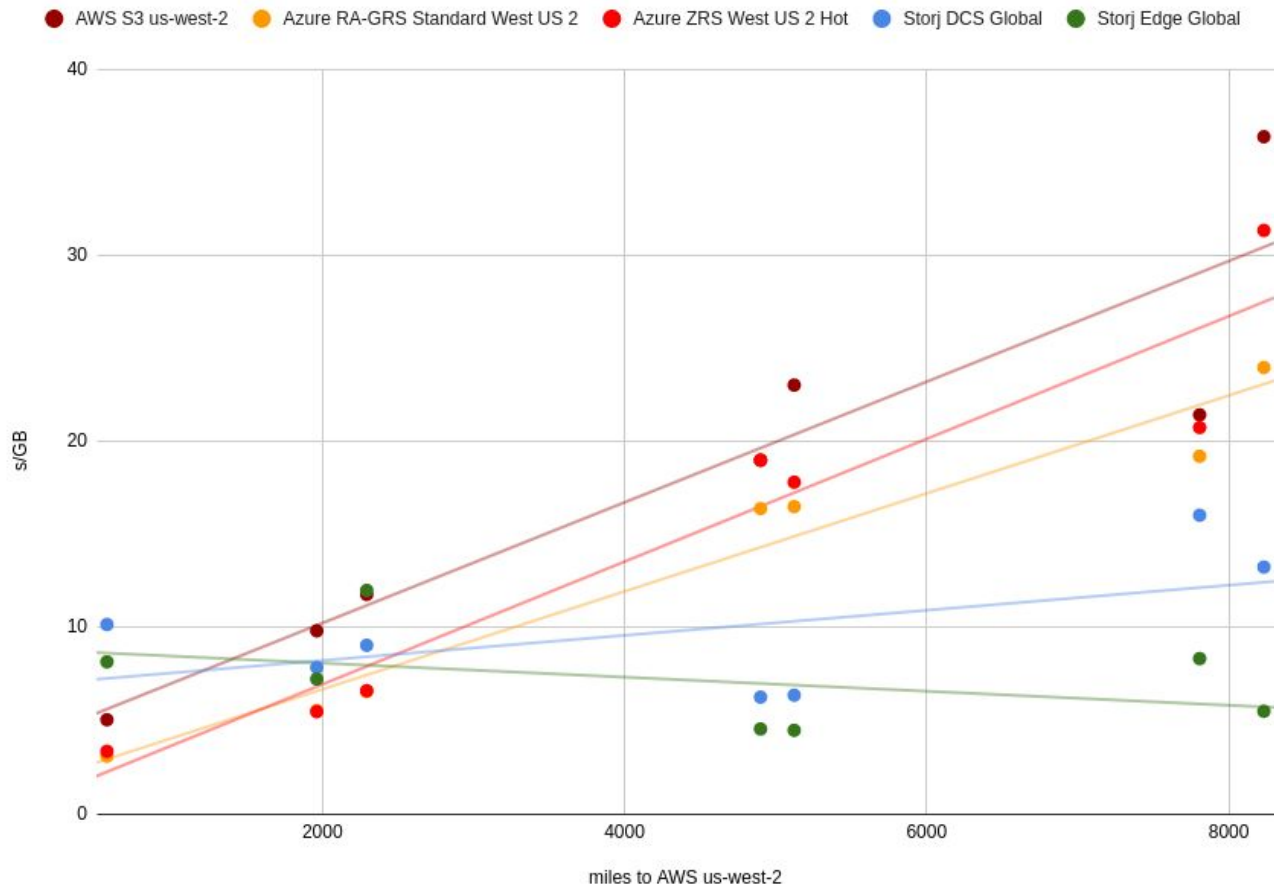How does CockroachDB stack up?

Success stories

Wrap up

How did it go with CRDB?

- 5.1 billion rows
- ~5.5 TB used storage
- ~5k read ops/second
- ~1.2k write ops/second
- Averages, bursts higher

This IS the impossible

CockroachDB met and exceeded our early goals

Horizontal scalability

Performance

Strong consistency

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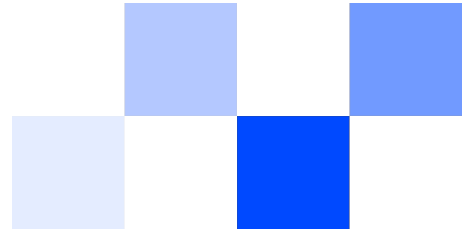
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Final thoughts