![redis]
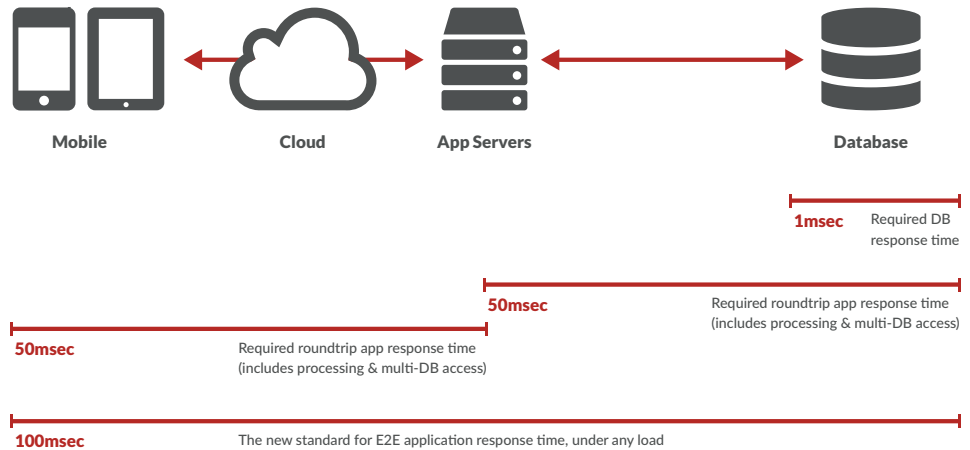
Redis for Mobile

The Most Responsive, Scalable and Highly Available Database for Mobile Applications

The success of mobile applications depends on an exceptional customer experience. Customer acquisition depends on flawless response times and user experiences that anticipate and fulfill wishes in the blink of an eye. With internet round-trip latencies in the 50 millisecond range, meeting user expectations for application responsiveness requires choosing a database that can handle extremely high throughput with sub-millisecond latencies under any load. Robust mobile architectures need databases that are highly available, immensely flexible, and can scale instantly.

| Mobile | Cloud | App Servers | Database |

1msec   Required DB response time

50msec   Required roundtrip app response time (includes processing & multi-DB access)

50msec   Required roundtrip app response time (includes processing & multi-DB access)

100msec   The new standard for E2E application response time, under any load

Redis is a popular choice for mobile application architectures supporting numerous use cases, such as personalized interactions, high volume messaging, user session management, game scores and leaderboards, customer engagement, custom pricing, user parameters caching, location based recommendations and high speed transactions.

Mobile Use Cases Powered by Redis

Personalized User Sessions:

Mobile applications get adopted faster and flourish when they react to user choices in real-time and present location- and/or behavior-based recommendations. Redis' extremely high throughput at sub-millisecond latencies with very little hardware makes it the most popular choice for processing real-time user session data. Redis data structures like Lists, Hash, Geo, Sets and Sorted Sets allow for incredible flexibility in analysis of user characteristics, such as preferences or location, and real-time presentation of custom offers, pricing and recommendations.

Redis' ability to act as a message queue, with publish/subscribe functionality that can scale to millions of messages/sec over a large number of connections without faltering—makes it an ideal choice for implementing complex mobile application functionality, including bid analyzers, trending items, etc. with simplicity and low ongoing overhead.

Intuit manages hundreds of thousands of user transactions on its mobile application for Quickbooks Self-Employed, with Redis as the backend database and for pub/sub.

![intuit logo]

"Only Redis could handle the volume and scale of processing we needed for our recommendations engine."

Ninad Divadkar
SOFTWARE ENGINEER, INTUIT

Gaming and e-Sports

Redis data structures like Sorted Sets, Hashes and Lists allow for impeccable game performance even with massive multi-player systems. Game counters, leaderboards and real-time scoring can be implemented with great simplicity in Redis—all while maintaining low latencies in game performance. With Redis' in-database analytic operations and support for Lua scripting, game developers accomplish extremely complicated calculations at very low latencies. Probabilistic data structures in Redis provide sophisticated estimates of events and analysis of game play that are critical for game developers.

Scopely, developer and publisher of popular mobile games such as Walking Dead and Yahtzee, streams billions of events to Redis per day and uses Redis' probabilistic data structures to estimate game play times, likelihood of cheating, player behavior and more. They do all of this extremely efficiently with minimal memory resources, while also using Redis to identify outliers and anomalies in order to characterize game issues and fix them quickly.

iTeam Network, a fantasy sports platform that is used by major e-sporting leagues, uses Redis extensively, both for computing scores in contests as well as for holding leaderboards, ranks and projected ranks.

Customer Engagement

Application stickiness is increased multi-fold by fostering engagement with customers' social networks. Social actions such as sharing purchases, ratings, opinions and following influencers, requires a highly responsive application built to handle complex social and messaging functionality with simplicity and low overhead. Redis powers social conversations, online chat and ratings systems for many of the world's top e-commerce websites and mobile applications because it handles complex functionality such as messaging, queues and lists with extraordinary ease at sub-millisecond latencies (even at extremely high volumes).

Twitch, the world's leading social video platform and community for gamers, has architected its web and mobile application for enormous scale, handling up to two million concurrent community users simultaneously. Its site-wide chat is powered by Redis, which easily handles over 400,000 users in a single chat channel.

Twitter's Periscope, the live streaming mobile video application that is now integrated into Twitter, uses Redis to meet all of its hot data needs. Every API in the Periscope infrastructure is powered by Redis, due to its low latencies and high throughput.

"Cost-effectiveness is key for us because we could have many free players. Redis is critical to our gaming infrastructure, and Redis helps us achieve seamless scaling and highly available Redis, effortlessly."

Avram Lyon
SENIOR SOFTWARE DEVELOPER AT SCOPELY

"Redis' performance has helped us build a highly scalable architecture, capable of handling very high volumes of players with extremely low latencies. Redis provides all the operational ease of use we need, including stress-free clustering, cross-region auto-failover and geo–redundancy."

Ben Stahlhood
PRESIDENT OF ENGINEERING
AT iTEAM NETWORK

"As an engineering team focused on high scale and high volume, Twitch wanted to spend minimal time on operations but required high availability and reliability for its Redis layer. Redis eliminated the need for Twitch to build operational expertise around running Redis in production."

"Redis' service requires the least amount of operational effort and delivers true high availability to our Redis deployment. It also delivers new Redis functionality with fewer delays than other services."

Mohammad Almalkawi
STAFF ENGINEER AT TWITTER

 redis

High-Speed Transactions

Retail, travel and e-commerce mobile applications rely on high-speed transactions for continued customer satisfaction and revenue growth. Redis plays a critical role as the database that responds in <1 ms with very few hardware resources, even as transactions scale to millions of operations/second.

HotelTonight, the popular hotel reservations app, uses Redis extensively to handle user requests and keep data up to date in real-time.

Stance.com, a pioneer of the modern retail shopping experience, architected a modern, high performance, responsive application using Redis from Redis to power its stock notification system. Redis fetches inventory information from the system of record and transmits it to requesting clients. Redis' latency stays consistently below 0.07 ms, even as requesting clients range from hundreds to thousands.

Hotel Tonight

"The flexibility around the kinds of data that can be stored in Redis make it easy to build custom logic that tracks and handles failures of different types of operations—from rapidly scheduling retries to failing over to alternative providers. Redis makes scaling Redis a breeze, minimizing overhead and reducing the number of specialty skills we need to maintain in-house."

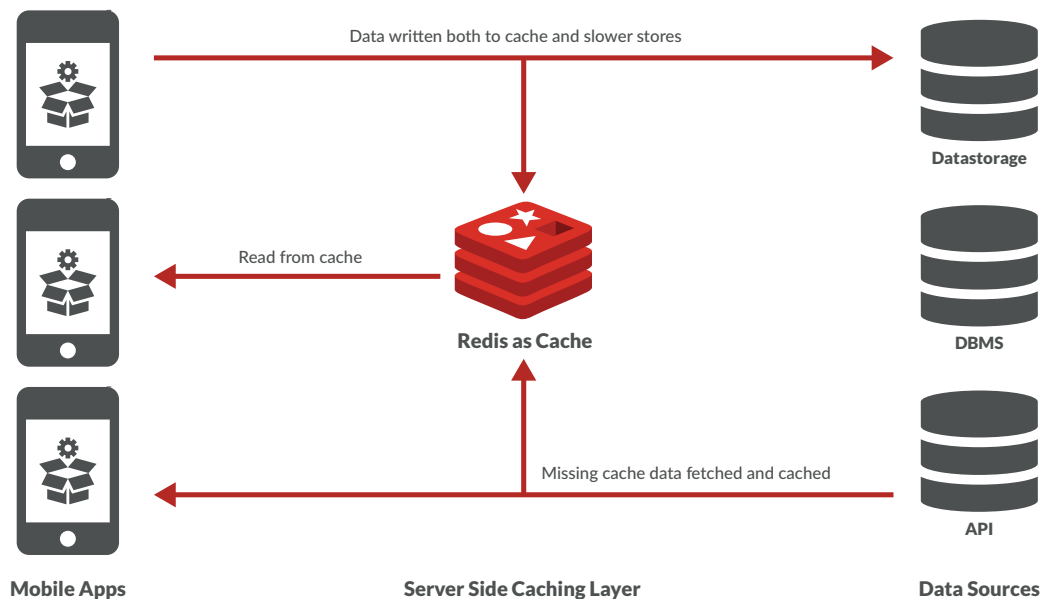**Chris Bailey**
CTO OF HOTELTONIGHT

STANCE

"Our stock notifier system has to simultaneously inform thousands of clients about inventory availability with sub-millisecond latencies. Only Redis can do this."

Andrew Spencer
DIRECTOR OF IT AT STANCE

Caching

Server side caching is often the smartest way mobile applications achieve extreme responsiveness for their users, with minimal resources and minimal overhead on expensive RDBMS databases. Redis is ideal for caching, not just because it is very fast, but because it includes features like data structure variety, customizable expiration, eviction, intelligent caching, request pipelining, data persistence and high availability. A highly available cache is critical to avoiding user experience issues during cache outages.

Data written both to cache and slower stores

Read from cache

Missing cache data fetched and cached

Redis as Cache

Datastorage

DBMS

API

Mobile Apps

Server Side Caching Layer

Data Sources

Grindr, a mobile social application, uses Redis caching to handle >100 million concurrent chat messages in 192 countries. With over 100,000 queries/second, the team relies on high performance, geographically distributed Redis to cater to its two million daily users.

"Our blazing fast mobile app is a testimony to the power of Redis. Redis gives us the ability to deliver high performance, low latency and a reliable user experience with a very low devops footprint."

Lukas Sliwka

CTO OF GRINDR
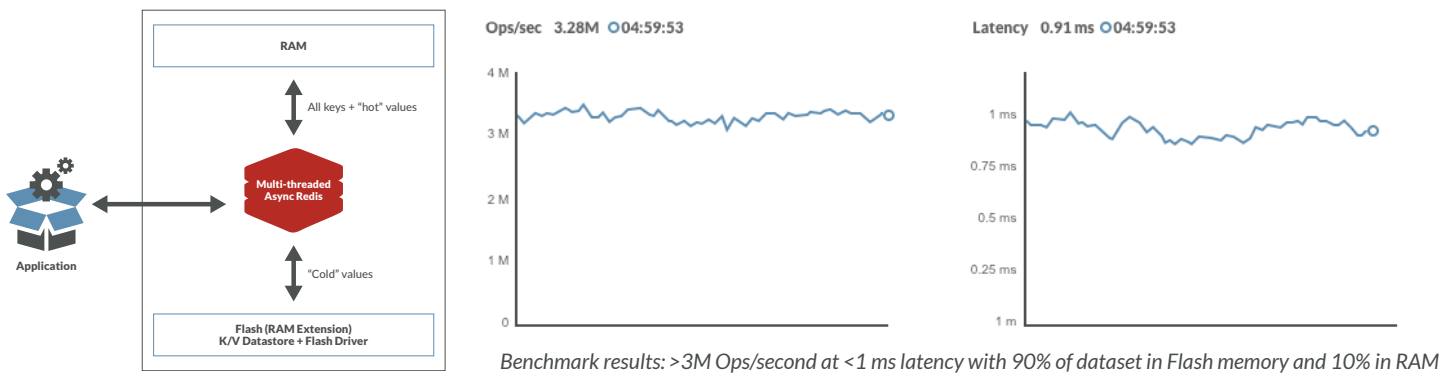
Real-time analytics

Mobile applications depend on real-time analytics such as session analysis, behavior-based recommendations, location-based offers, top trending items and spot promotions to encourage upsell and cross-sell. Redis data structures such as Geo, Sets, Sorted Sets and Hashes provide ideal building blocks for hybrid transaction and analytics use cases like these, simplifying application complexity and delivering superb performance with low effort. That's why Redis-based recommendation engines, bid analyzers and top trends are commonplace in mobile applications.

"We use Redis for real-time ad displays over our network because only Redis can handle the volume and scale of processing we need for our recommendations system."

Naor Yuval

ENGINEERING GROUP LEADER AT OUTBRAIN

Redis' proficiency at swift data processing enables it to accelerate analysis across a wide variety of data sets and data types, without requiring the deep data model and application changes that are characteristic of RDBMS based applications. With Redis on Flash (RLEC Flash), large dataset analysis at in-memory speeds becomes cost-effective. This is because Redis has added another layer of optimization where Flash can be used as an extension of RAM at a configurable ratio. This ensures the highest throughput and lowest latencies at a cost that can be fine-tuned based on the workload.

Benchmark results: >3M Ops/second at <1 ms latency with 90% of dataset in Flash memory and 10% in RAM
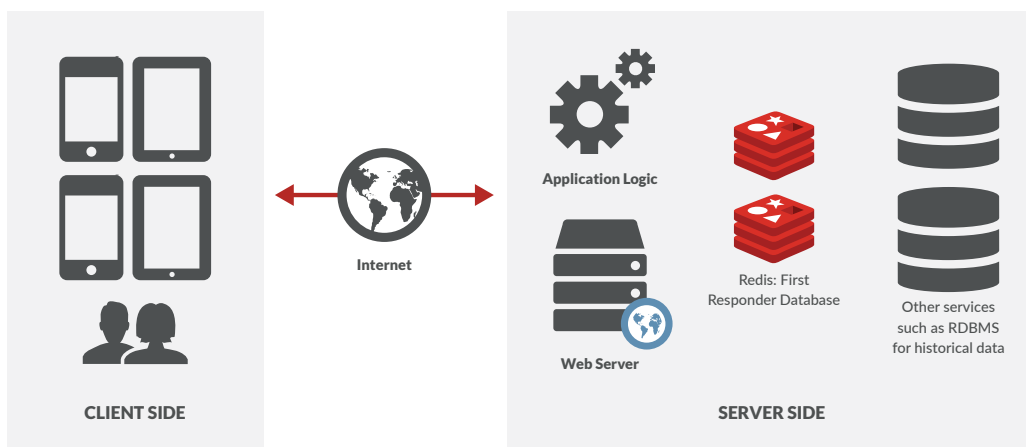
Redis Deployments for Mobile Enhanced by Redis

Performance is clearly a crucial factor for mobile applications, which need to be highly responsive under all conditions. Given the fickle nature of consumers and unpredictable demand, it's essential that this performance be delivered in the most cost effective manner. Benchmarked at >1.5 million operations per second at <1 ms latency on a single modest AWS EC2 instance, Redis' technology adds stable high performance and linear automatic scaling to Redis deployments – while reducing operational overhead and resource costs to bare minimums.
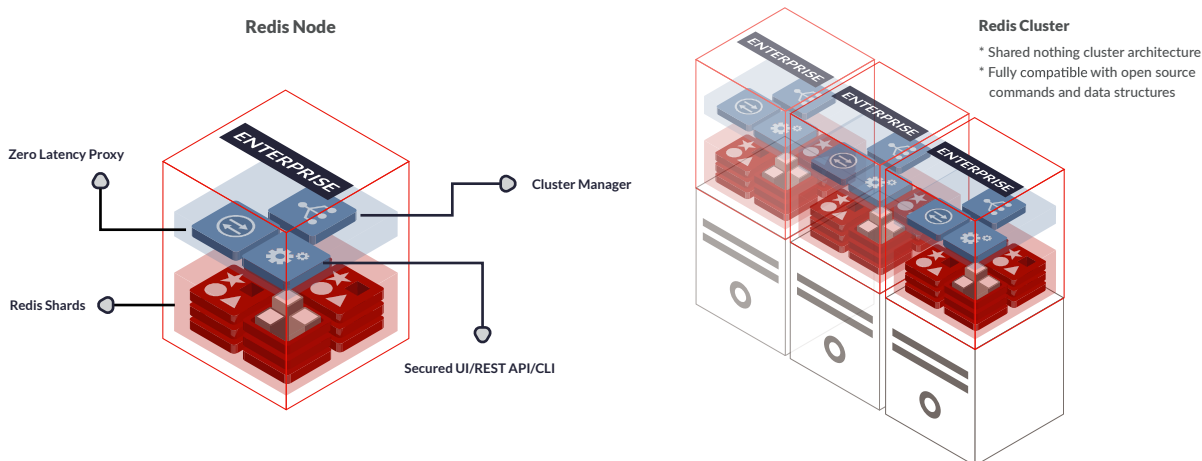
In mobile applications, downtime can directly impact revenue and the customer experience, making true high availability a vital factor in choosing the database for your architecture. Scaling to handle peaks in traffic led by explosive adoption of your application, must be non-disruptive and effortless. Redis is well-suited for these scenarios because it enhances Redis deployments with seamless, zero-downtime scaling and clustering, as well as world-class high availability. This includes persistence, cross rack/zone/region in-memory replication, instant automatic failover, backups and disaster recovery.

Mobile applications such as games, video, music or other entertainment demand very rapid time-to-market when it comes to new ideas and products, and the technology that underpins this must be hassle-free and flexible to deploy. Redis Labs' technology can be deployed on the cloud or PaaS of your choice as a fully managed service, called **Redis Cloud**, or deployed in your own datacenters, in VPCs or hybrid environments as downloadable software, called **Redis Enterprise Cluster (RLEC). RLEC** also allows you to run Redis on cost effective Flash memory as an extension of RAM, so you can process and analyze extremely large datasets with high throughput and extremely low latencies at up to 70% lower costs.

Application Logic

Internet

Web Server

Redis: First Responder Database

Other services such as RDBMS for historical data

CLIENT SIDE

SERVER SIDE

Typical Mobile Application Architecture

Redis' technology relieves customers of all operational hassle related to scaling, high availability and ongoing management of Redis, while including complete compatibility with the open source software.

Redis Node

Zero Latency Proxy

Cluster Manager

Redis Shards

Secured UI/REST API/CLI

Redis Cluster

* Shared nothing cluster architecture
* Fully compatible with open source commands and data structures

Next generation mobile applications rely on Redis due to its extreme throughput and low latencies, its versatility and simplicity of deployment, and broad community engagement. Redis has further enhanced Redis' attributes of performance, availability, and scale to handle the demanding unpredictable needs of mobile applications.

redis