



Solution Brief

Caching for Hybrid Cloud

Build faster, simpler, unified hybrid
cloud applications with Redis Enterprise



Redis Enterprise can be used as a cache in hybrid cloud environments to improve performance, increase resilience, support business expansion, or enable application modernization. Redis Enterprise's ability to deploy anywhere and provide unified real-time data, simplified architectures, and consolidated operations make it the ideal caching solution for hybrid cloud architectures.

What is a hybrid cloud architecture?

A hybrid cloud environment is one in which applications are hosted both on-premises (or a private cloud) as well as one or more public clouds. Typically, hybrid cloud environments distribute services between these environments to connect workloads and applications hosted in on-premises to those in the cloud.

Why do organizations pursue hybrid cloud?

Hybrid cloud architecture is incredibly widespread. In fact, **over 80% of enterprises operate hybrid cloud technology stacks**. Some of the benefits and use-cases that drive hybrid cloud adoption are:

- **Flexibility:** Allows organizations to keep portions of their tech stack on-premises when needed, while still providing the freedom to benefit from innovative services offered by cloud providers.
- **Additional resilience:** Hosting applications on-premises as well as in the cloud provides additional resilience against cloud failures, on-premises outages, and regional disasters.
- **Lower costs:** Enables organizations to take advantage of the hosting option that is most cost-effective. Workloads that have a steady state and require a fixed and predictable amount of infrastructure may cost less when hosted on-premises, whereas the cloud provides stronger cost-efficiency when demand is variable and elastic.

- **Geographic scale:** Applications hosted on-premises can be replicated into the cloud to support business growth in new geographic regions.
- **Empowers modernization:** Cloud migration often isn't a simple or clean process. Entire technology stacks can't be moved in the flick of a switch. Rather, companies typically phase into a cloud environment while reducing their footprint on-premises. A hybrid cloud approach is utilized when businesses undergo this phased migration process and can protect business continuity during migration.

Key hybrid cloud challenges

- **Latency:** Data incurs latency as it travels. This is true for data traveling from on-premises to cloud environments. Network latency is often a major challenge for hybrid cloud applications - especially if data travels between distant regions.
- **Data fragmentation:** Data fragmentation is a common issue when applications or a technology stack are distributed across multiple deployment environments. Application components hosted in disparate environments often struggle with siloed data.
- **Complexity:** Hosting multiple services in separate environments may lead to architectural and operational complexity. Each environment and the services hosted in it bring unique data use cases and data models, each of which may require its own databases or data management solution to support.

Why cache in hybrid cloud environments?

Caching plays a key role in hybrid cloud architectures because it enables low-latency applications. Redis Enterprise can be employed in a hybrid cloud architecture to power real-time user experiences by providing applications with sub-millisecond access to data that is held in-memory.

But in order to maintain speed, caches need to be located near the users or services that access their data. Otherwise, even applications that utilize caching will fall victim to the network latency that often plagues hybrid cloud architectures.

In order to maintain real-time performance, caches are replicated across cloud and on-premises deployment environments to ensure that data stored in-memory is close to its consumers.

Unified hybrid cloud caching with Redis Enterprise

Redis Enterprise provides a flexible caching solution that can be deployed wherever applications are hosted. Data from a database in one environment can be cached to a Redis Enterprise cluster that is then replicated to Redis Enterprise clusters hosted in additional environments. This approach ensures that cached data can be shared globally while also providing local latency.

Redis Enterprise has two primary approaches to replication: **Active-Passive Replication** and **Active-Active Geo Distribution**.



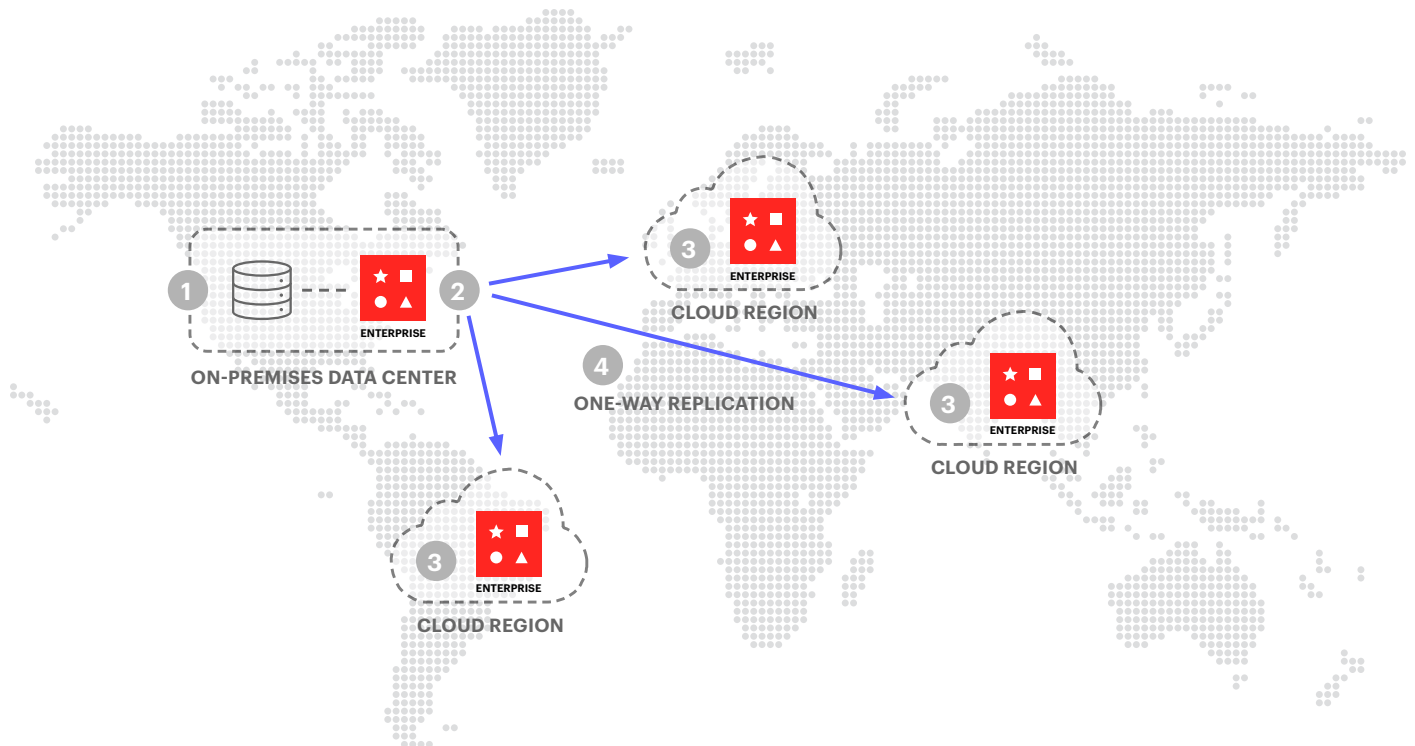
Caching with Active-Passive Replication

Active-Passive Replication solves the problem of having siloed data that must be stored close to the user or application that needs to consume it. It enables global distribution of **reads** with local latency.

It is an excellent choice for distributing data to support read-heavy workloads across hybrid cloud environments or provide a warm standby for additional resilience. Active-Passive Replication provides one way replication, where a single primary cache is replicated to other read-only caches.

A hybrid cloud cache using Active-Passive Replication:

1. A database resides on premises acting as a persistent system of record
2. A primary Redis Enterprise cache for the primary database is hosted on premises
3. Additional Redis Enterprise clusters are deployed in various cloud regions
4. Data is replicated from the primary Redis Enterprise cache that's hosted on-premises to various replicas hosted across the globe in the cloud, to provide local sub-millisecond latency



Caching with Active-Active Geo Distribution

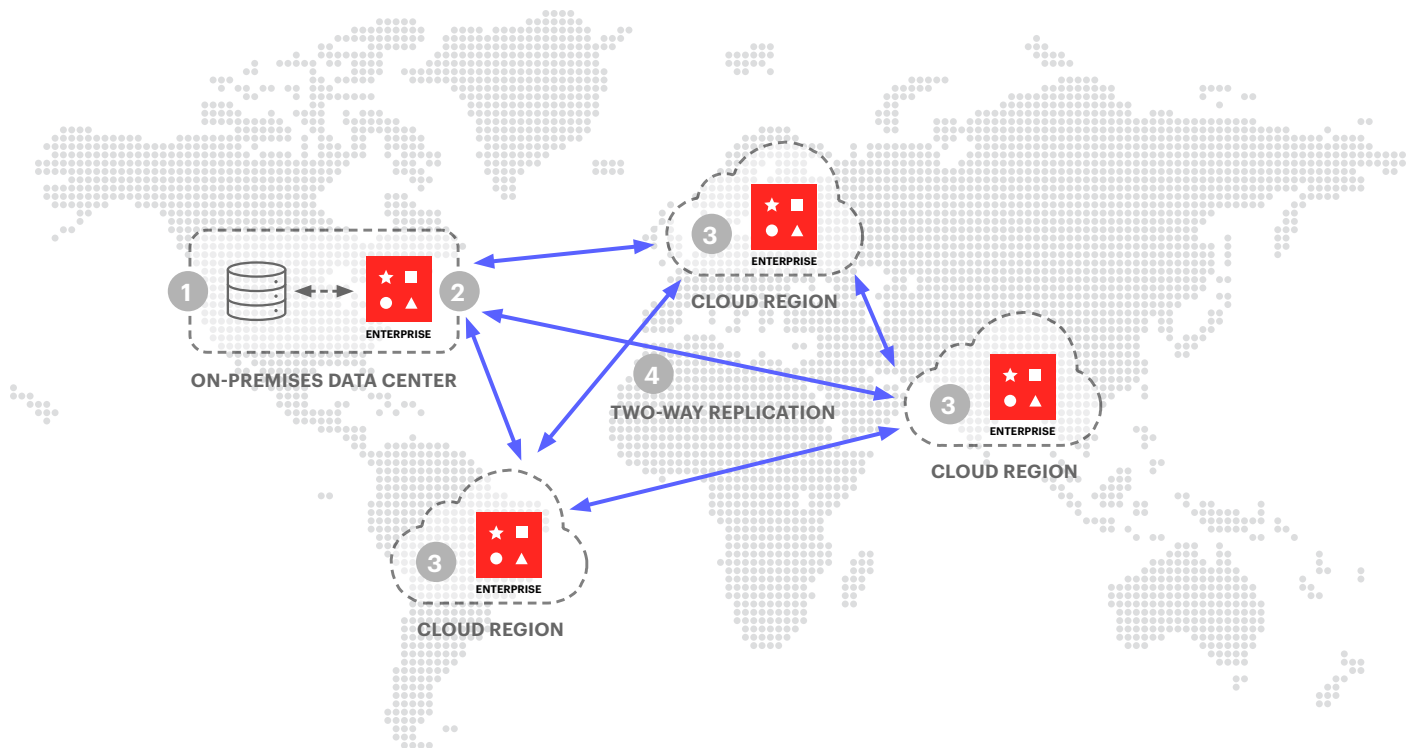
Active-Active Geo Distribution also solves the problem of siloed data, but goes even further than Active-Passive Replication, allowing for global distribution of data to support **reads and writes** with local latency and data consistency. Active-Active Geo Distribution provides truly distributed data across geographies or deployment environments.

Each cache acts as a primary cache, accepting reads and writes as data is synced between the Redis Enterprise caches with strong eventual consistency. This means the state of the data is eventually reconciled, regardless of the order of update events that reach each replica. Active-Active Geo Distribution

provides an incredibly resilient approach to disaster recovery that ensures 99.999% availability (under 30 seconds a month) in the event of an outage.

A hybrid cloud cache using Active-Active Geo Distribution:

1. A primary database resides on premises in a relational database
2. A Redis Enterprise cache for the primary database is hosted on premises
3. Additional Redis Enterprise caches are deployed in various cloud regions
4. Each Redis Enterprise cache acts as a primary cache, receiving reads and writes and replicating data to all other caches for a unified hybrid cloud data layer



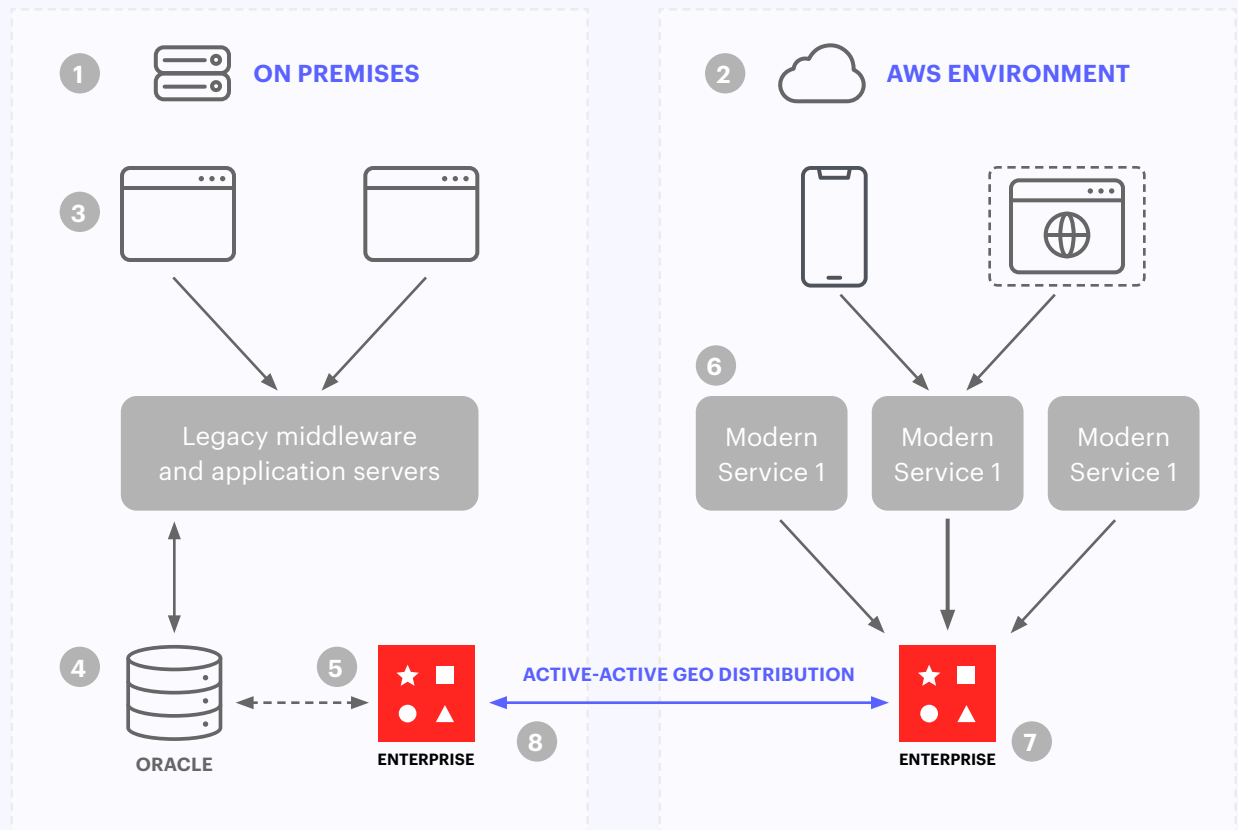
Customer case study: Hybrid cloud caching with Redis Enterprise to enable application modernization

A hybrid cloud architecture is often the key to removing barriers in application replatforming or modernization. Caching between cloud and on-premises environments plays a key role in a phased approach to cloud migration or application modernization.

By storing data in-memory and replicating between deployment environments, caching enables on-premises legacy application data to be accessed by more modern cloud-native workloads in real-time. Hybrid caching to support application modernization allows organizations to pursue this months-long or years-long process while continuing to support their legacy applications.

A large retail customer had an on-premises environment that hosted legacy applications, their middleware, and an Oracle database that stored their application data. They were phasing workloads and applications out of the on-premises environment and replatforming into cloud-native microservices applications hosted in AWS.

Caching data held on-premises and replicating it to the new cloud environment was critical to operating efficiently in both environments. It allowed data that was held in their legacy database to be cached into Redis Enterprise and replicated into a cluster in their new cloud environment. Redis Enterprise's Active-Active Geo Distribution synchronized data between the on-premises and cloud environment in real-time, enabling reads and writes in both environments with data consistency.



Explore how a Redis Enterprise customer's hybrid cloud cache supported application modernization:

1. The on-premises environment contains a number of legacy applications that still serve customers, but have not yet been migrated to AWS for modernization
2. The AWS environment is the destination for workloads that have been moved to the cloud using a phased migration approach
3. There are a number of aging production applications still in use and hosted in the on-premises environment.
4. The on-premises environment also hosts an Oracle database that contains data needed by **both** the on-premises legacy applications as well as the modernized cloud applications
5. Data is cached from the Oracle database into a local Redis Enterprise cluster hosted on-premises
6. A few microservices applications have already been phased out of the on-prem environment and moved into AWS to be modernized, including new mobile and web interfaces for their flagship application
7. A Redis Enterprise cache is hosted in AWS to provide real-time data with local latency to the new cloud-based applications
8. Active-Active Geo Distribution synchronizes data between the on-premises and cloud environments enabling real-time reads and writes in both environments with data consistency

Redis Enterprise benefits:

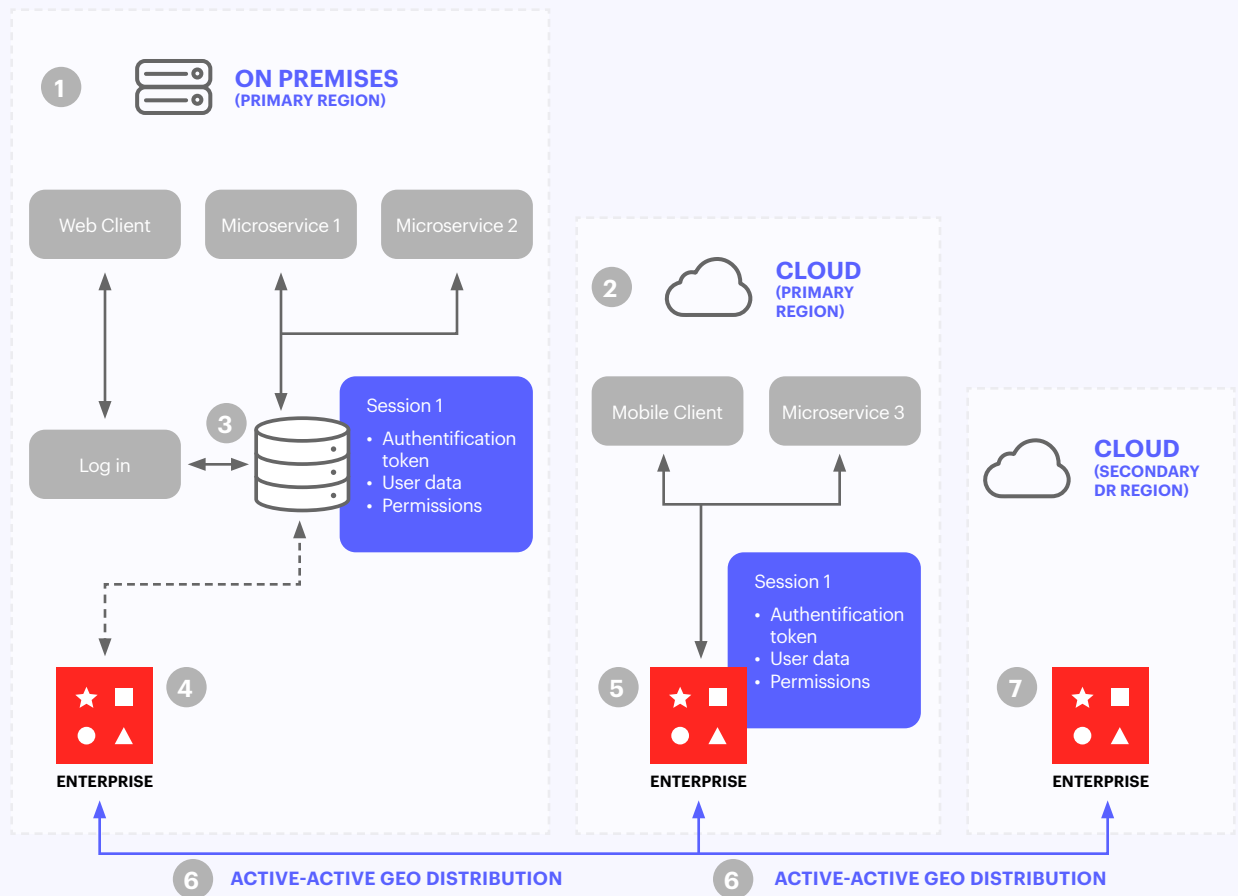
- Using Redis Enterprise as a hybrid cache enabled the customer to modernize their technology stack over a period of months, without a months-long disruption to mission-critical legacy applications. Because of Active-Active Geo Distribution, legacy applications hosted on-premises and new modern cloud applications were both able to access and process data without impacting the user experiences.
- Using Redis Enterprise as a cache between the on-premises and cloud environments allowed for sub-millisecond latency with copies of cached in-memory close to users for real-time application experiences regardless of the hosting environment.
- Redis Enterprise's ability to be deployed as a single caching solution in both environments enabled the customer to greatly simplify their hybrid cloud architecture.



Customer case study: Hybrid cloud caching with Redis Enterprise to power consistent, resilient, and responsive cross-platform user sessions

As noted, over 80% of enterprises have hybrid cloud architectures. Caching with Redis Enterprise is a powerful way to provide low-latency data to applications and technology stacks that host some components on-premises and others in the cloud.

A financial services customer had an online banking application that was built partially on-premises and partially in the cloud. The services and data that powered its web application were hosted on-premises while a newer mobile application had been built and hosted in the cloud. The customer used Redis Enterprise as a cache to share critical user session data between both environments in real-time. This ensured that if a customer's computer lost power or they wanted to continue a session from their mobile phone there was no interruption to the user experience.



Explore how a Redis Enterprise customer's hybrid cloud cache bridged the gap between its web and mobile user experiences:

1. The on-premises environment hosts the microservices and data responsible for a customer's web application
2. A cloud environment in the same region hosts the microservices responsible for the customer's mobile application
3. When a user logs into the web application, critical session data (authentication data, user data, permissions) is persisted into a primary data service
4. Session data is cached from the primary data service into a Redis Enterprise cluster hosted on-premises
5. A second Redis Enterprise cluster hosted in the cloud powers the mobile application
6. Redis Enterprise's Active-Active Geo Distribution enables two-way replication of cached data between the on-premises environment and the cloud environment
7. Session data is replicated to a third environment hosting a Redis Enterprise cluster to ensure that there is no interruption to user sessions in the event of regional failure

Redis Enterprise benefits:

- Redis Enterprise's Active-Active Geo Distribution powered truly unified real-time user sessions. It ensured that data held in-memory was consistent, regardless of which environment (cloud or on-premises) was receiving reads and writes based on user activity.
- Active-Active Geo Distribution also allowed for more resilient applications, with a highly distributed network of primary Redis Enterprise caches available to receive application traffic at any given time, close to where users were located.
- Redis Enterprise's ability to be deployed in both environments as a single caching solution enabled a simplified hybrid cloud architecture and operations.

Cache with Redis Enterprise for faster, simpler, and unified hybrid cloud applications

Using Redis Enterprise as a cache in hybrid environments empowers modernization by providing businesses with the flexibility to move workloads between their on-premises and cloud environments while supporting current operations.

It frees businesses to host portions of their technology stack where there is a best fit: on-premises for additional control of sensitive data or to support legacy applications, in the cloud to take advantage of innovative new cloud services, and across environments or geographies for more resilient applications.

Using Redis Enterprise as a cache makes hybrid cloud environments:

- **Faster:** Power faster hybrid cloud applications using Redis Enterprise as a hybrid cloud cache. Redis Enterprise provides sub-millisecond latency at up to 200 million operations per second and can replicate data for both reads and writes to ensure that cached data is always available close to its end users.
- **Simpler:** Redis Enterprise can be deployed wherever applications are hosted, eliminating the need for disparate caching solutions in each individual cloud or on-premises. Consolidating caches into a single service eliminates the architectural and operational complexity that a piecemeal approach brings.
- **Unified:** Data consistency between environments is a critical challenge in distributed architectures like hybrid cloud. Redis Enterprise's Active-Active Geo Distribution allows for truly unified hybrid cloud data. Cached data can be read or written to from any environment and replicated to all other Redis Enterprise caches with consistency.

But that's not all...

Redis Enterprise brings real-time speed for all your hybrid cloud data needs.

Redis Enterprise can also be used to extend real-time performance to a number of hybrid cloud use cases beyond caching. This includes enabling real-time search and streams as well as acting as a time-series or in-memory primary database.

Want to learn more about hybrid cloud caching?

Read the definitive guide to caching with Redis. **Download the Caching at Scale with Redis ebook.**

[Download now](#)

Read our **Strategic Data Flexibility white paper** to discover how Redis Enterprise unifies data across deployment environments and use-cases into a single real-time data platform.

[Read the white paper](#)

