

Datasheet

Hazelcast In-Memory Computing

The Hazelcast Platform features a high-speed, cloud-native in-memory data store for building real-time, intelligent applications. hazelcast.com/products/in-memory-computing

Feature Summary

- **In-Memory Data Store.** Fast, scalable, cloud-native (Kubernetes + containers), fault-tolerant, in-memory object and JSON store with parallel application execution and strong data consistency mode.
- **Programming languages.** Java, .NET, Node.js, C++, Go, Python, Scala.
- **Integrations.** Spring, Apache Tomcat, Apache Spark, Apache Kafka, and more; see the Hazelcast Connector Hub for the up-to-date list.
- **SQL querying.** Query/update data using industry-standard SQL.
- **Management Center.** Administration UI for per-node statistics, JMX APIs, REST APIs. Limited to 3 nodes for the open source version.

The Hazelcast Platform lets you build real-time, intelligent applications with the unique integration of in-memory computing and stream processing. The in-memory data store can be used as a high-speed data store for reference data to enrich streaming data, or it can be used with other applications to accelerate data accesses. Hazelcast is an open source software platform, but is also available in a commercial edition ("Enterprise") that adds more enterprise-ready capabilities, as well as a managed cloud service, Hazelcast Cloud Enterprise.

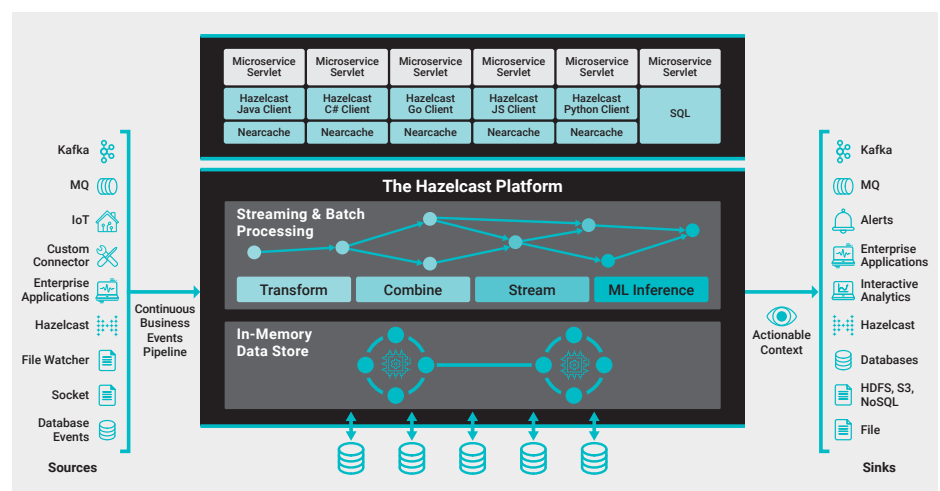
Why Use Hazelcast In-Memory Computing

The Hazelcast in-memory computing capability helps you build high-speed applications via two main capabilities:

Fast access to data. With its in-memory data object and JSON store, your applications can read and write data much faster than possible with disk-based databases. Writing to storage media is often a bottleneck in large-scale systems, and using the in-memory speed of Hazelcast will avoid that constraint and accelerate your overall application performance.

Parallel execution of application code. Hazelcast provides a framework for easily running application code that is automatically distributed across all nodes in a cluster. Each instance performs work on the local in-memory data, thus tackling a large-scale data processing job in smaller parts while taking advantage of the collective power of all the CPUs.

The Hazelcast Platform provides a fast data store integrated with a stream processing engine.



Hazelcast is very easy to use, and you can get started by simply linking its compact library in your application. If you run multiple instances of your application on different nodes in a network, each instance will broadcast to identify the other instances and will automatically form a cluster for you. You can

Feature Summary for Enterprise Version

- **Built-in security.** LDAP, Kerberos, x.509 certificates, role-based access controls, TLS/SSL, x.509, data-at-rest encryption.
- **WAN Replication.** Efficiently replicate data to a remote cluster.
- **Automatic Failover.** Clients automatically switch to the secondary cluster if the primary cluster is down.
- **Tiered Storage.** Store larger volumes of reference data within the single integrated platform.
- **High-Density Memory Store.** Manage more RAM (up to 200 GB) by using off-heap memory to avoid garbage collection pauses. Support for Intel Optane as a cost-effective alternative to DRAM.
- **Persistence.** Stores in-memory data to disk which can be used to quickly repopulate the data store after node shutdowns.
- **Rolling Upgrades.** Allows upgrade of Hazelcast software in a cluster one node at a time without downtime.
- **Blue/Green Deployment Support.** Enables easy client switchover in a dual-cluster upgrade strategy.
- **PaaS Support.** OpenShift, VMware Tanzu (formerly Pivotal Cloud Foundry).

Comprehensive security suite
in the Hazelcast Platform

also run Hazelcast in client-server mode and submit application code as a job, which will get distributed to all nodes and then run in parallel.

Hazelcast is also very reliable with its high availability and disaster recovery (HA/DR) features. It replicates data across the cluster to safeguard against data loss should there be a hardware failure. It also provides WAN Replication (Enterprise version only) to efficiently copy data to a remote cluster for your disaster recovery strategy (as well as your geo-distribution strategy).

Architecture

Hazelcast was built from the ground up as a cloud-native, in-memory data platform for environments that require high performance, scale, elasticity, and fault tolerance. It runs well in containerized environments orchestrated by Kubernetes. It supports an API familiar to many application developers to simplify the deployment of high-performance systems.

Data objects. Hazelcast supports a wide variety of data objects in its in-memory store, including:

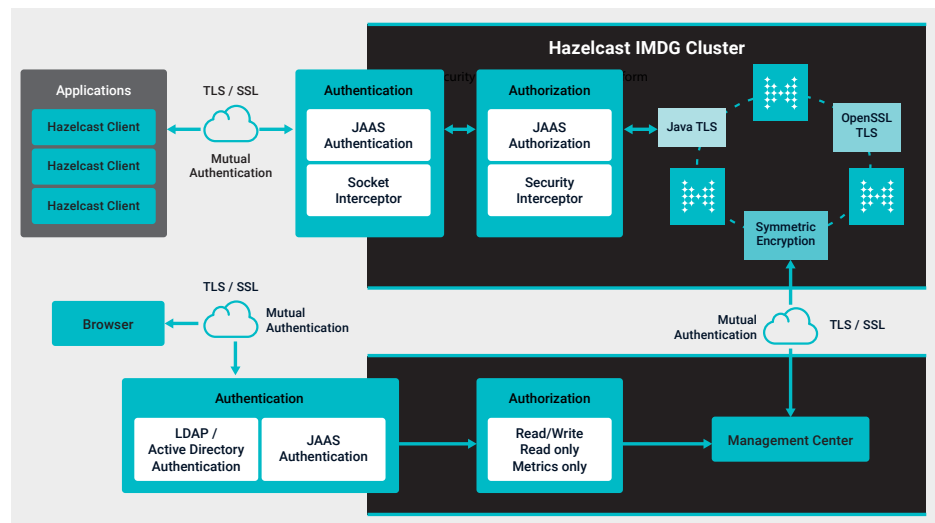
- | | | |
|---|--------------------|--------------|
| ■ Cache (Hazelcast JCache implementation) | ■ IAtomicLong | ■ MultiMap |
| ■ Cardinality Estimator | ■ IAtomicReference | ■ PN Counter |
| ■ Event Journal | ■ ICountDownLatch | ■ Queue |
| ■ FencedLock | ■ ISemaphore | ■ Ringbuffer |
| ■ FlakedGenerator | ■ List | ■ Set |
| | ■ Map | |

Performance at scale. Hazelcast has run numerous benchmarks over the years to ensure the performance that customers need, as well as to demonstrate superior speed over comparable technologies. Published benchmarks are available [here](#).

SQL support. Use industry-standard SQL to query and update in-memory data stored for high-speed analytics. Leverage indexes to rapidly query on attributes in addition to keys.

Intel Optane support (Enterprise version only). Hazelcast takes advantage of Optane PMem as a high-scale, cost-effective alternative to DRAM, as well as a fast non-volatile store for persistent data to enable fast restarts.

Built-in security (Enterprise version only). Hazelcast offers a comprehensive security framework that includes support for Java Authentication and Authorization Service (JAAS), pluggable authentication (including LDAP and Kerberos out-of-the-box), role-based access controls, encryption of data-in-motion via TLS/SSL with minimal performance impact, x.509 certificates for client identity or mutual authentication, encryption for persisted data-at-rest; key rotation, and additional security APIs for advanced security controls.



Advantages

- **Fast.** Runs more operations per second versus other comparable in-memory technologies.
- **Scalable.** Easily scales by adding more nodes; no complex pre-planning or manual intervention.
- **Easy.** Can be deployed in embedded mode in apps or as a client-server installation and offers an easy API for building sophisticated distributed apps.
- **Reliable.** Runs zero-downtime deployments with safeguards against data loss and data duplication, even upon node failure.
- **Secure.** Offers a full security suite to protect your data from unauthorized access.

Example Use Cases

- **Digital integration hub / high-performance data layer.** Database acceleration, mobile/web application acceleration, mainframe optimization.
- **Payment processing.** Fraud detection, payment settlement processing.
- **E-commerce.** Real-time inventory management, online product catalog, m-commerce app acceleration.
- **Microservices optimization.** Microservices communications/messaging, state management.
- **Caching.** Cache-as-a-service, database caching.
- **Analytics.** Real-time ingestion and indexing, real-time querying.

WAN Replication (Enterprise version only). Hazelcast efficiently replicates data to a remote cluster for disaster recovery (DR), geo-distribution, or multi-cloud strategies; supports active-active or active-passive topologies. **Automatic Failover** lets clients automatically switch to the secondary cluster should the first cluster become inaccessible.

Tiered Storage (separate license fee). Larger volumes of data, beyond sizes that can be stored in-memory, are now available as reference data to add more valuable context to actionable data.

Hazelcast offers the following editions:

Hazelcast Platform – Open Source	Hazelcast Platform – Enterprise
<ul style="list-style-type: none"> ■ In-Memory Data Store ■ Stream Processing ■ Other Key Capabilities Include: <ul style="list-style-type: none"> – SQL Support – Machine Learning Inference Runner – CP Subsystem ■ Management Center on 3-Node Clusters 	<ul style="list-style-type: none"> ■ All Capabilities in Hazelcast Open Source ■ Professional Support ■ Full Lifecycle Operator (for OpenShift) ■ Business Continuity <ul style="list-style-type: none"> – WAN Replication – Automatic Failover – Persistence – Lossless Cluster Restart ■ Lower Administrative Risk <ul style="list-style-type: none"> – Blue/Green Deployment – Rolling Upgrades – Unlimited Management Center ■ Scale <ul style="list-style-type: none"> – High-Density Memory Store – Intel Optane PMem support ■ Security Suite <ul style="list-style-type: none"> – JAAS-Based Security Controls – Encryption – Role-Based Access Controls – LDAP/Kerberos Integration ■ Tiered Storage (available as a separately licensed add-on)

All Enterprise capabilities are included in Hazelcast Cloud Enterprise.

To get started with Hazelcast, visit <https://hazelcast.com/get-started>.