



Couchbase SQL++

THE POWER OF SQL MEETS JSON FLEXIBILITY

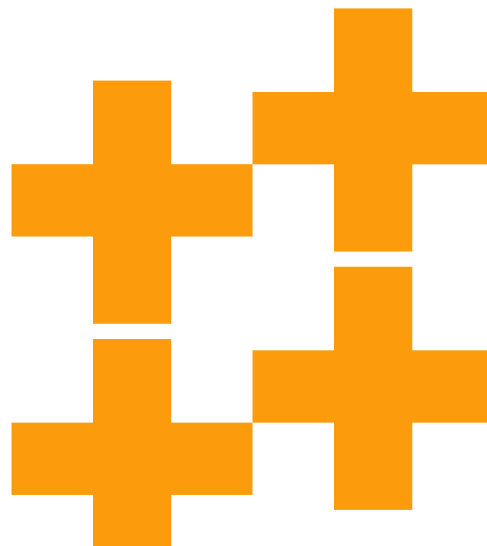
Key benefits

- Comprehensive and enhanced query language for JSON
- Unparalleled query performance with cost-based optimization, complex joins, predicates, text search, and aggregate evaluations in NoSQL
- Support for multi-statement SQL transactions and statement-level atomicity for bulk operations
- Visual Query Workbench for query execution, planning, visual explain, and monitoring
- Advanced index capability with array indexing, partitioning, and replica for high availability and scalability
- Query tuning with ADVISE index to ensure the best indexes for your query performance

Solve your toughest NoSQL adoption and production challenges

NoSQL databases were introduced to meet the high throughput and low-latency demands of modern web applications. But many NoSQL databases come with their own proprietary query language, which makes the migration of applications very expensive because the data access layer must be rewritten and developers need to be retrained.

Unlike other NoSQL databases, Couchbase's SQL++ query language provides the familiarity of SQL and gives developers a simpler path to migrate their applications. Other NoSQL databases also have limited support for advanced data access methods, such as joins, aggregations, and array processing, which forces applications to adopt a highly denormalized schema. SQL++ includes all join methods, giving applications the flexibility to adopt a schema that best reflects the business requirements.



Powerful queries and performance at scale

SQL++ gives application developers an expressive, powerful, and complete declarative language with industry-standard ANSI joins for querying, transforming, and manipulating JSON data—just like SQL. Developers can visualize and optimize complex query plans for large datasets and deliver the best performance at any scale to meet the demands of millions of users.



By combining the power of SQL with the flexibility of JSON, SQL++ allows developers to write ad hoc queries without limitations. Supporting all the SQL access methods (such as select, update, delete, merge, join, nest, unnest, group, sort, and other data manipulation functions) within a single query, developers can improve efficiency as they rapidly meet evolving business needs. Visual query plans help profile and optimize queries, and a built-in query optimizer helps select the most efficient execution plan that leverages available indexes. Multi-Dimensional Scaling (MDS) delivers predictable high performance by scaling query and index services as needed alongside other data platform services.

SQL++	Other NoSQL
<pre>SELECT ac.industry, SUM(CASE WHEN a.actvityType = 'Task' THEN 1 ELSE 0 END) task, SUM(CASE WHEN a.actvityType = 'Appointment' THEN 1 ELSE 0 END) appts FROM activity a INNER JOIN account ac ON a.accid = ac.id WHERE a.startDate BETWEEN '2018-10-01' AND '2018-12-31' GROUP BY ac.industry</pre>	<pre>db.activity.aggregate({ \$match: { startDate: { \$gt: '2018-10-01', \$lt: '2018-12-31' } } }, { \$lookup: { from: "account", localField: "accid", foreignField: "id", as: "account_docs" } }, { \$match: { "account_docs": { \$ne: [] } } }, { \$unwind: "\$account_docs" }, { \$project: { item: 1, task: { \$cond: { if: { \$eq: ["\$activityType", "Task"] }, then: 1, else: 0 } }, appt: { \$cond: { if: { \$eq: ["\$activityType", "Appointment"] }, then: 1, else: 0 } } } }, { \$group: { _id: "\$account_docs.industry", tasks: { \$sum: "\$task" }, appointments: { \$sum: "\$appt" } } } }) ;</pre>

Figure 1: Database operation on Couchbase using SQL++ are familiar to SQL users and much simpler than similar operations on other NoSQL platforms.



Key features

- Support ad hoc query on JSON using a declarative query language, just like SQL
- Leverage high-performance indexing and query that is highly available and linearly scalable to meet any business SLA
- Use a rich graphical user interface to perform query development with the Query Workbench and conveniently visualize query plans to profile and optimize queries
- Improve performance for even the most complex queries by using efficient cost based query optimizers for JSON to select the best indexes
- Use flex index to transparently leverage text indexes in SQL++ statements, including fuzzy text search with built-in search capability
- Apply array indexing to support fast access on nested array objects
- Ensure data integrity with SQL++ transactions, supporting all-or-nothing operations on multi-documents and multi-statements SQL++ DML
- Query from cloud to edge with Couchbase

UNMATCHED AGILITY AND FLEXIBILITY

Develop engaging applications with ease using a comprehensive and declarative query language for JSON. Developers can rapidly adapt to changing business requirements using a schemaless JSON document store.

UNPARALLELED PERFORMANCE AT ANY SCALE

A high-performance query engine with built-in optimizer and indexer enables millions of concurrent interactions with sub-millisecond latencies. Couchbase's multi-dimensional architecture leverages index partitioning to elastically scale data capacity, delivering accelerated query performance.

EASE OF MANAGEMENT

The premium user interface of the Query Workbench allows you to optimize queries by visually profiling the execution plan. Transparent partitioning and automatic replication of the indexes deliver high availability and performance for business-critical applications.

Learn more

To learn more, contact your Couchbase sales representative today or visit:

www.couchbase.com





Query, build, and evolve applications faster with SQL++ in Couchbase

```
SELECT h.name, h.address
FROM hotel h
  INNER JOIN airport a ON a.city=h.city
WHERE a.faa='LHR'
AND h.free_parking = true
```

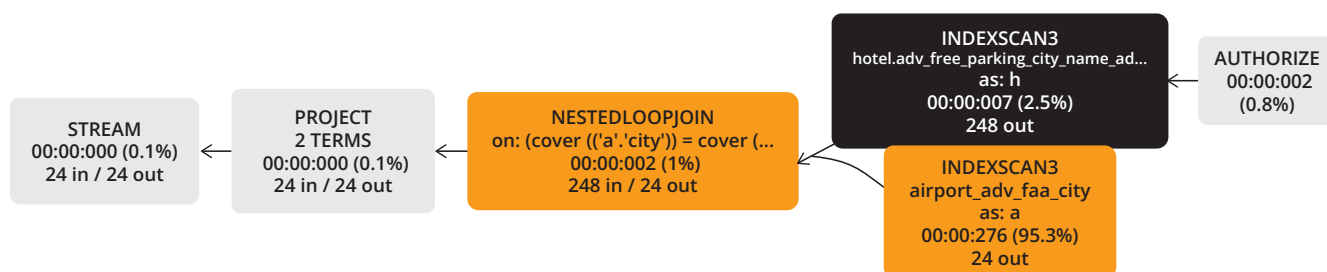


Figure 2: SQL++ query using JOIN, with the visual explain plan. The color scheme denotes the % time spent in each operation.

SQL++ support for ACID transactions

```
BEGIN TRANSACTION;
UPDATE customer
  SET balance = balance + 100 where cid = 4872;
UPDATE customer
  SET balance = balance - 100 where cid = 1924;
SELECT cid, name, balance
  FROM customer
  WHERE cid IN [4872, 1924] ;
COMMIT ;
```

Figure 3: SQL++ transactions support all or nothing, multi documents, multi statements SQL++ DML operations.





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architecture for online events

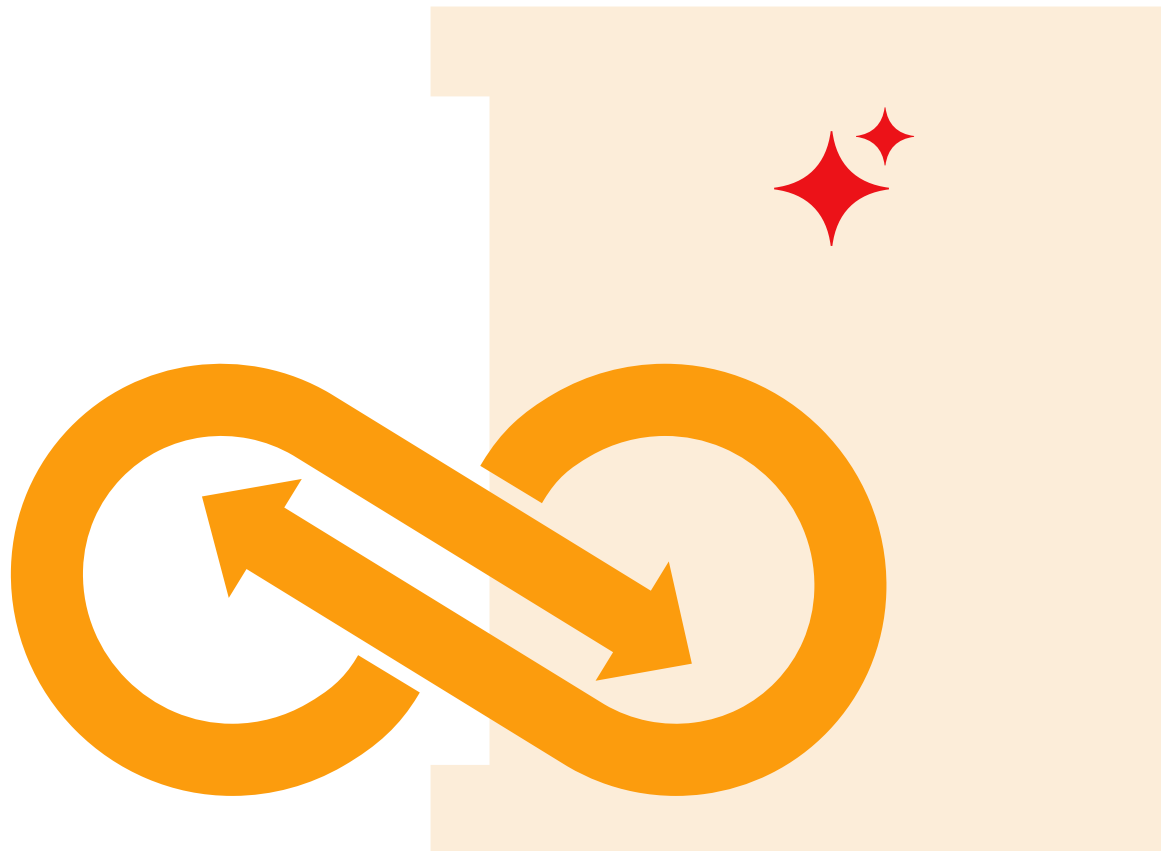


Big data analytics that tracks
ratings in 100+ countries



"When Couchbase introduced me to SQL++, we quickly realized that it
offers the flexibility to search with a language that looks 99% the same
as SQL. So for all developers, it was an easy transition."

— FIDENCIO GARRIDO, PRINCIPAL ENGINEER, DIRECTV



Modern customer experiences need a flexible database platform that can power applications spanning from cloud to edge and everything in between. Couchbase's mission is to simplify how developers and architects develop, deploy and consume modern applications wherever they are. We have reimagined the database with our fast, flexible and affordable cloud database platform Capella, allowing organizations to quickly build applications that deliver premium experiences to their customers—all with best-in-class price performance. More than 30% of the Fortune 100 trust Couchbase to power their modern applications.



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