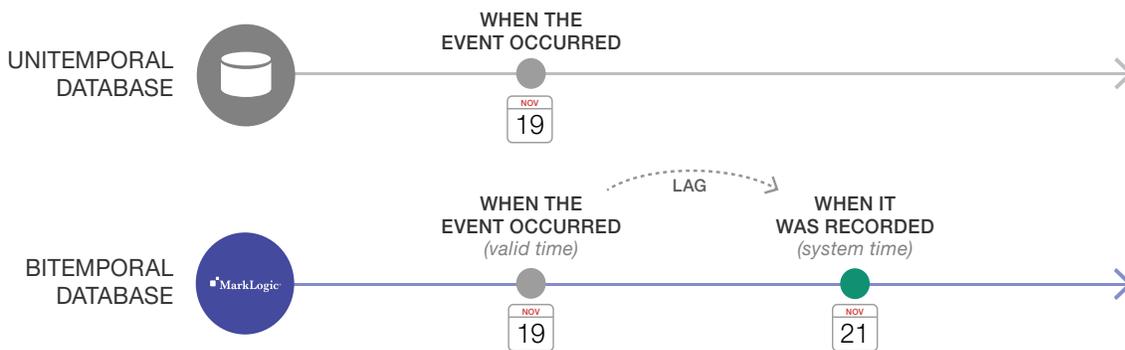


Bitemporal

What did you know and when did you know it? The MarkLogic® Bitemporal feature answers this critical question by tracking when events occurred (valid time) in combination with when they were recorded (system time). More powerful than a traditional unitemporal database, a bitemporal database allows you to query across valid and system time axes. You can go back in time and explore data, manage historical data across systems, ensure data integrity, and do complex bitemporal analysis with ease.



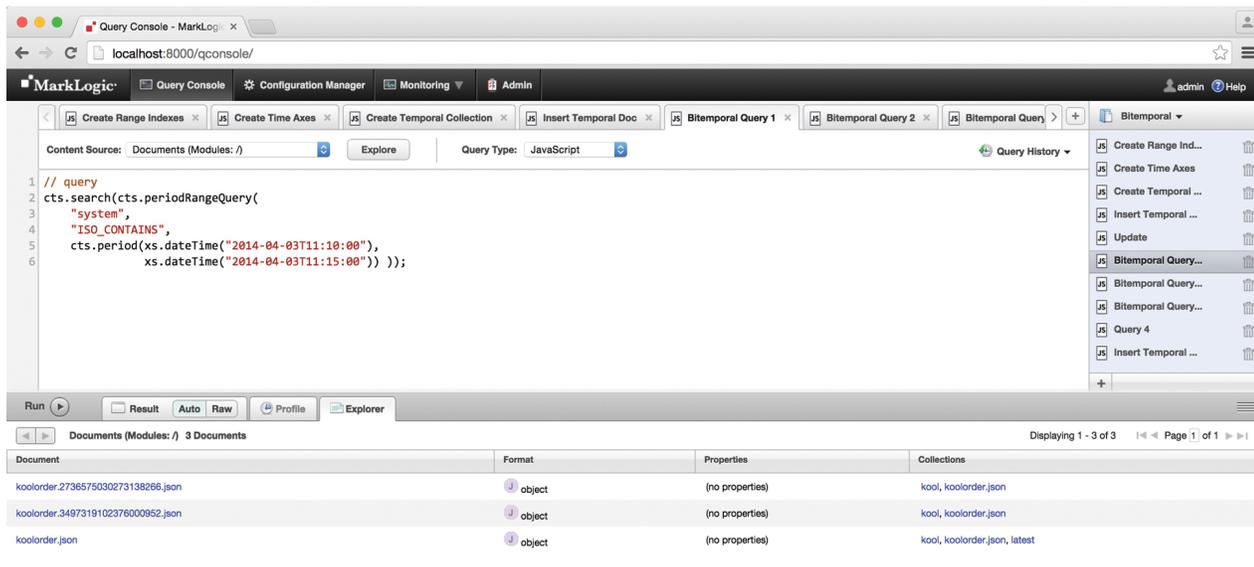
Timing is Everything

Getting an accurate picture of your business at different points-in-time used to be impossible, or very challenging at best. Bitemporal provides special support for the time dimension so that you can log transactions as they occur along both valid and system time axes. By querying along both axes, it is possible to answer new questions:

- What were my customer's credit ratings last Monday as I knew it last Friday?
- What was our position with that security before the trade was amended?
- What did our intelligence indicate before the investigation started?

The Only Enterprise NoSQL Database With Bitemporal

- **Insert, update (and never delete)** – Ingest temporal XML or JSON documents with references to valid time using the Temporal API or mlcp, and make changes without losing any data as new versions are added
- **Complex temporal queries** – Use the Search API to query the database along valid and temporal time axes. MarkLogic also supports Allen and SQL operators when comparing time periods
- **Adapt to changing schema** – Avoid worrying about the changing shape of the data over time. Unlike relational databases, MarkLogic is schema-agnostic and can easily capture the evolving schema
- **Combine Bitemporal and Tiered Storage** – Using Bitemporal requires more storage, and Tiered Storage makes it easy to migrate historical data to less expensive storage tiers, without losing your indexes or ability to query the data



How Bitemporal Works

Above is an example of a bitemporal query as viewed in Query Console. Bitemporal works by ingesting bitemporal documents that have range indexes for both valid and system time axes. The bitemporal documents are stored in protected collections controlled by security permissions. The initial document inserted into the database is kept and never changes, allowing you to track the provenance of information with full governance and immutability.

Bitemporal in Practice

- **Regulatory requirements** – Avoid the increasingly harsh downside consequences from not adhering to government and industry regulations, particularly in financial services and insurance
- **Audits** – Preserve the history of all your data, including the changes made to it, so that clear audits can be conducted without having to worry about lost data, data integrity, or cumbersome ETL processes with archived data
- **Investigations and Intelligence** – No more lost emails and no more missing information. Bitemporal databases never erase data, so it is possible to see exactly how data was updated based on what was known at the time

About MarkLogic

MarkLogic is the world's best database for integrating data from silos, providing an operational and transactional Enterprise NoSQL database platform that integrates data better, faster, with less cost. Visit www.marklogic.com for more information.