

# Performance at Scale. Still SQL.

Large financial services institutions have many requirements when selecting a database to prepare for future success, specifically the ability to:

- Rapidly ingest large amounts of transactional data
- Efficiently access very large historical tables
- Use relational models for flexible indexing and queries
- Operate in cloud or on-premise

To meet these requirements, these organizations require a first-class distributed SQL database built for the cloud to deliver solutions that provide the scalability, reliability, and performance.

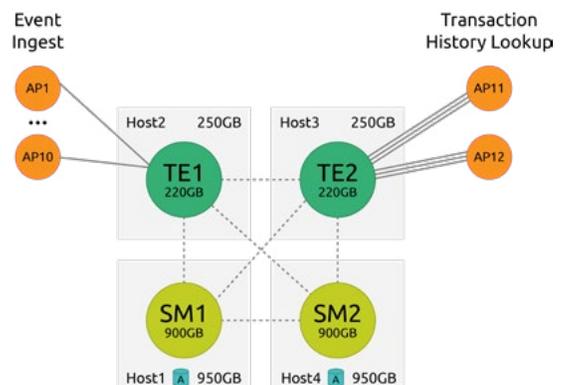
## Testing the Waters

Financial services organizations have a long history of adopting new technologies to perform the complex analysis necessary to identify financial crimes. To evaluate the capabilities of NuoDB's cloud native SQL database, a major global bank requested a proof-of-concept (PoC) for an operational data store in their financial crime detection and analysis section. This data store was a central repository for both detection and subsequent analysis operations, and as such had stringent requirements to support a high volume of aggregate INSERT operations representing all monetary transactions across the bank. It also needed to support various real-time queries for historical and operational account information, as well as flexible multi-account historical data retrieval.

## The Environment

To evaluate database capabilities, NuoDB set up a test environment with the following parameters:

- Four hosts in the bank's public cloud platform environment dedicated to databases servers
  - Two hosts dedicated to Transaction Engines (TEs) instances to separate workloads (ingest and read) in order to maximize benefits of TE in-memory processing.
  - Two hosts allocated to managing redundant Storage Managers (SMs) to enable non-stop database operation in case of failure.
- Application clients for Ingest workloads allocated on 10 individual hosts.
- Application written in Python and single-threaded.
- Transaction History client written in Java and multi-threaded, utilizing a JDBC connection pool to manage multiple concurrent connections to the database.



All tests were initially run against a single TE, including all concurrent tests, to validate the absence of internal locking and demonstrate the performance of a single TE system.

## Results & Observations

Conclusion	Comments	Impact
All tests exceeded requirements	All seven tests ran faster than required	NuoDB is ideally suited to FinCrime ODS
NuoDB performance remains consistent as the database grows	Analysis of results and NuoDB database metrics show the performance will scale linearly to tens of terabytes (TB)	The performance results can be safely extrapolated to databases of 20TB and beyond.
Use of Table Partitions maximizes the INSERT rates over time	Peak INSERT / UPDATE performance achieved with proper partition configuration	Can adjust optimal database configuration to smaller or larger underlying compute resources
Querying over multiple partitions does not materially impact performance	Low overhead for querying data over multiple partitions	Can adjust partition size and count to optimize INSERT, UPDATE, and management operations such as partition move
Benefits of SSD on Cloud	Beneficial for cold-data queries	4x cost buys 20x performance

Tests were run by the bank on their own public cloud environment to evaluate the NuoDB database capabilities. **All results exceeded the required targets.**

All tests run on the NuoDB environment for an operational data store in the Financial Crime detection and analysis section of a major global bank exceeded requirements. NuoDB's test results illustrate performance consistency as the database scaled and queried over multiple partitions.

The NuoDB distributed SQL database offers unique capabilities that traditional relational databases cannot. When migrating mission critical applications to the cloud, NuoDB provides the reliable, consistent, secure, and scalable SQL database financial services enterprises require.

Learn more at: [www.nuodb.com/financial-services](http://www.nuodb.com/financial-services)



Call us at:  
+1 617 500 0001



Email us at:  
[info@nuodb.com](mailto:info@nuodb.com)



Visit us at:  
[www.nuodb.com](http://www.nuodb.com)

