

REPORT REPRINT

NuoDB points its NewSQL database architecture at hybrid and cloud workloads

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Database player NuoDB has set its sights on the cloud, even hybrid cloud, primarily because its database architecture matches up well with the distributed nature of the cloud.

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NewSQL database player NuoDB, which refers to itself as offering an elastic SQL database, is rolling out version 3.0 of its database. The new release includes support for additional cloud platforms; enhanced distributed environment capabilities, such improved availability; and performance updates. The company is also driving an OEM partner strategy, and has started to see an uptick in hybrid operational and analytical workloads.

THE 451 TAKE

Scaling a relational database and, more recently, the ability for enterprises to smoothly migrate to the cloud are needs in the market. These needs are particularly acute for organizations that have legacy SQL applications that are seeing growth or need to be able to accommodate growth in the future, and the ability to handle hybrid operational and analytical workloads is starting to pick up. Given that it has a scalable architecture that also maintains SQL and ACID compliance, NuoDB targets a number of challenges and needs occurring in the market. The company may not hold the profile of some of its peers, but that can be attributed to its OEM partnering strategy. Regardless, the company's database appears to be well positioned, but the company will need to continue to grow its customer base.

CONTEXT

NuoDB is part of a collection of database vendors that we have categorized as NewSQL, a term 451 Research coined in 2011. While this term represents a broad category, NuoDB refers to itself as providing an elastic SQL database, which is a nod to company's ability to provide a scale-out architecture while providing SQL and ACID compliance. The company was founded in 2010, although its initial database release didn't launch until 2013. NuoDB is based in Cambridge, Massachusetts, and was founded by Jim Starkey and Barry Morris, the latter of whom currently serves as executive chairman at NuoDB.

On the business front, NuoDB reports customers in the 'dozens' and more than 70 employees that reside in the US, as well as the company's UK and Ireland locations. Current funding remains the same since our previous coverage at \$55m.

NuoDB's customer count could be a bit misleading. The company points out that it has OEM agreements with the majority of its customers. As such, NuoDB is often embedded within an application that could potentially serve many end users.

PRODUCTS

NuoDB's approach to branding its database as an elastic SQL database emphasizes an architecture that splits the transactional processing from the storage layer. The transactional processing engine is an in-memory engine that handles all of the transactional components, such as processing SQL queries and maintaining ACID compliance. The storage manager, on the other hand, ensures that the data remains durable, particularly if there is not enough space in the cache.

While NuoDB can run on a single host, the benefit of splitting the transactional engine from the storage manager enables scaling, including the ability to scale both processes separately. For instance, a single server can handle the transactional processing while a separate server can handle the storage, thus creating two independent points of failure. Furthermore, organizations have the option to set up multiple separate transactional engines and storage managers based on expected growth, user concurrency or any number of factors related to an organization's SLAs. Management also points out that scaling is a relatively straightforward exercise that can be done with no disruption on the current system, mainly because NuoDB automatically distributes and syncs the data once a new node has been added.

NuoDB maintains that its sweet spot is transactional processing, and with its elastic capabilities, this works well for organizations that are maintaining legacy SQL applications. However, the company also continues to see hybrid workload scenarios where organizations are increasingly looking to carry out some basic analytics on a transaction. And with NuoDB's split processing and storage management capabilities, it means that separate nodes can be set up for either transactions or analytics, eliminating any processing bleed-over that might occur.

However, in addition to some of the practical advantages of scaling a transactional system, NuoDB is making a strong positioning push to the cloud because its architecture is ideally suited for the distributed nature of cloud processing. As such, a big part of NuoDB's marketing is geared toward driving organizations' efforts to migrate to the cloud. And while transitioning a legacy SQL application from on-premises to the cloud is never completely devoid of challenges, NuoDB maintains that its architecture – and the fact that it maintains SQL compliance – is particularly well suited for the task.

In September 2017, NuoDB released version 3.0 of its database. Updates include support for Microsoft Azure and Google Cloud Platform. The company also entered into a partnership and certification program with Red Hat, which entails providing support for Red Hat Atomic Host, Red Hat Enterprise Linux and Red Hat OpenShift.

NuoDB continues to push capabilities for distributed environments, and can now handle active-active-active deployment scenarios across three zones, where before it could handle deployments across two zones. There is also added support for XA, as an external resource, coordinating via XA transactions.

Performance updates in 3.0 include automating optimizations of transactions across a distributed environment, particularly when transaction load may shift from one datacenter to another. Furthermore, improvements for SQL queries for write-intensive workloads have been added. In internal tests comparing NuoDB 2.6 with NuoDB 3.0, the company claims there can be a 10-30% performance improvement, excluding any hardware updates.

COMPETITION

As an SQL database with ACID capabilities, NuoDB naturally competes with traditional relational database vendors such as Oracle, IBM and Microsoft, as well as open source products such as MySQL and PostgreSQL. Oracle recently announced Oracle 18c, and the company is also preparing to release 18c with autonomous capabilities for OLTP workloads in 2018. Furthermore, Oracle points to its RAC (Real Application Clusters) technology for scaling. IBM and Microsoft cover transactional workloads with Db2 (recently rebranded) and SQL Server, respectively. NuoDB is also part of the NewSQL family of databases, so peer competitors in this space include VoltDB, Clustrix, Fauna and Cockroach Labs.

NoSQL databases, which often tout scaling, flexible data models and low latency, could also be considered competitors, although SQL support is somewhat limited and ACID compliance varies greatly among the various NoSQL databases. Regardless, potential competitors include MongoDB, DataStax, Redis Labs, Aerospike and FairCom.

NuoDB notes its ability to handle operational as well as analytical workloads. We've seen a recent uptick in these workloads, which we refer to as hybrid operational and analytical processing (HOAP). The traditional relational database vendors that leverage in-memory engines for analytics processing address HOAP workloads. Many NoSQL vendors noted previously are also capable of HOAP workloads. There are vendors targeting this area specifically that are worth identifying. These vendors include MemSQL, Actian with its Actian X offering, SAP HANA and InterSystems with its IRIS Data Platform. Splice Machine and Esgyn leverage Hadoop and open source tools to address HOAP workloads. Even the in-memory data grid/cache providers (such as Pivotal, GridGain and GigaSpaces) are increasingly being positioned for a combination of operational and analytical workloads.

SWOT ANALYSIS

STRENGTHS

NuoDB offers an SQL-based and ACID-compliant database that can scale linearly, making it a good fit for those that are looking to scale but don't want to give up SQL skills or to have to rewrite legacy SQL applications.

WEAKNESSES

The company's sweet spot is primarily doing transactional workloads, which means long-running analytical workloads and even big-data workloads will need to be covered by different systems.

OPPORTUNITIES

NuoDB is ideally suited for those organizations looking to move to the cloud, particularly those that have specific SQL-based applications that they may not want to (or have the resources to) rewrite for a different database model. This is further aided by the fact that NuoDB also offers support for multiple cloud platforms.

THREATS

While the company offers an SQL database with distributed scaling capabilities, it sees significant competition from the traditional SQL vendors, as well as a host of NoSQL vendors that, while they generally don't provide SQL support, do promote scaling and performance capabilities.