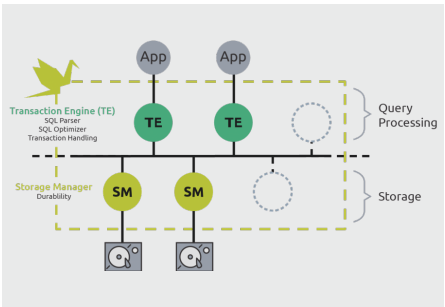
CASE STUDY

Finance Industry
Solution Focus Area

Expanding Cloud SQL Database Solutions with Google, Intel, and NuoDB

How Google Cloud Platform, Intel® Optane™, and NuoDB together enable enterprises to move critical transaction processing workloads to the cloud for scalability, performance, and cost advantages



Executive Summary

Businesses want the benefit of cloud computing, but they also need the right solution for migrating their transactional workloads and their legacy SQL databases. The combination of Google's industry-leading cloud infrastructure and services (Google Cloud Platform), Intel® Optane™ DC Persistent Memory, and NuoDB's innovative distributed SQL database addresses these requirements. Enterprises, including those in regulated sectors such as banking and other financial services, can now move their SQL databases and applications cost-effectively to the cloud, scaling performance while respecting regulations and assuring business continuity.

Regulation and competition driving cloud migration

Many sectors are experiencing a dramatic increase in data storage and computational needs. The financial services industry (FSI) is a prime example. An evolving regulatory framework and new disruptive forces in the market like FinTech companies are pushing established banks to reengineer their IT capabilities to remain competitive and compliant. The paradigm for banking is changing as competition now comes not just from other FSI providers, but from a new breed of digital-only players in the market.

Over the last 5 or so years, moving 'Big Data' workloads to cloud has become an established model. The prominent cloud providers, such as Google Cloud, are well suited for running large analytical workloads at a fraction of the cost of running them on-premise. Products such as BigQuery are positioned to serve these types of workloads and moving these analytical workloads to Google Cloud in this regard can immediately start to deliver value to FSI customers.

The next exciting opportunity to leverage the economies of cloud comes from moving business-critical transactional systems. These are typically the systems and applications that run the bank and/or make money for the bank; examples are payments processing, credit card processing, mortgage applications, fraud prevention, and financial crime prevention. Historically, these systems have run on premise on single-server database technologies. Moving these to the cloud has often been either too costly to consider, or too technically challenging to attempt – monolithic database architectures that rely on high-fidelity hardware do not function well in a commodity cloud world.

For any viable cloud solution, portability and optionality will also be essential attributes, for banks as for many other enterprises. Regulations will oblige banks to use a multi-cloud model to ensure resilience. They will therefore avoid cloud service providers or offerings that restrict them from moving data and apps to other providers (which would negate portability). They will favour solutions that can be adapted to their individual requirements (optionality), instead of "one-size-fits-all" cloud offerings.

The need to break free of on-premise database limitations

Numerous national and international enterprises including one of the world's leading banks are looking to cloud solutions like Google Cloud Platform (GCP) for a transformative impact on their business.

For the moment however, they are still tied to the on-premises legacy database systems at the core of their operations. These legacy systems are failing to support the growing demand for agility. They are becoming one of the biggest obstacles to transformation. The database management systems are often tightly integrated with business systems, increasing complexity and causing the accumulation of technical debt.

The big question for banks and other businesses is "How do we bring about the level of transformation that we need, but in a way that does not negatively impact business continuity and agility?" For a migration to the cloud, maintaining familiarity with tools and safeguarding ease of change are crucial factors. Whether for transactional or analytic workloads, it is paramount that adoption of cloud database technology is simple, seamless, and compliant.

Cloud database opportunities and requirements

Moving significant data workloads to Google Cloud Platform (GCP) provides opportunities for customers to benefit from attractive, cost-effective services. Migrating databases is a crucial way to move these workloads to GCP. It is also essential that businesses can obtain the right transactional and analytical solutions.

Today, many of these data workloads and their associated systems of records are still running on-premise with legacy technologies and old commercial models. Their owners want to move to cloud native technologies and services with dynamic and elastic service models. Meanwhile, new business models and changing operational cultures like the adoption of DevOps, will make it even more important to ensure ease of change through like-for-like tools and business continuity while harnessing the power of the cloud.

Two important features of a suitable cloud database solution for enterprises in regulated sectors and elsewhere are:

- Compatibility/compliance with current on-premise information security standards, including self-management of data encryption keys.
- An assurance of portability of databases that is credible for regulators and viable for business continuity.

The Google-Intel-NuoDB solution

NuoDB's distributed SQL technology on Google Cloud's infrastructure and services, powered by Intel® Optane™ DC Persistent Memory, gives enterprises a suitable solution for moving their transactional workloads and legacy SQL databases to the cloud.

- NuoDB is an in-memory, cloud native SQL database that meets the requirements above for online transaction processing (OLTP) and more. NuoDB is elastic, resilient, and scalable, while offering full SQL capabilities. Its in-memory computing technology gives the Intel® Xeon® Scalable processor more data to compute, faster.
- As an in-memory technology, Intel® Optane™ Data Centre Persistent Memory Modules (DCPMM) increase the performance and capacity of NuoDB while offering attractively priced solutions to customers. Intel® Optane™ DC Persistent Memory technology can scale the use of in-memory computing (IMC), while still offering reliability and persistency of data.
- Google Cloud Platform offers cost-effective compute consumption agreements with an international network of data centres to meet requirements like data geo-localisation and sovereignty. It offers rapid deployment of resources: for example, virtual machine set-up in seconds in GCP instead of days or even weeks on-premise. GCP also offers a panoply of other services to assist with digital transformation.

Google Cloud with NuoDB's unique distributed SQL solution powered by Intel's data-centric technologies offers enterprises the possibility of accelerating their move to cloud and realising the business benefits sooner.

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Examples of scalability

Together, Google Cloud Platform, Intel® Optane™ DC Persistent Memory, and NuoDB distributed SQL database solution offer multiple dimensions of scalability. Besides the overall data centre elasticity of GCP, the in-memory capability of NuoDB can be multiplied by an order of magnitude by increasing the amount of Intel® Optane™ DC memory modules, but without sacrificing cost-effectiveness.

The following are examples of operational systems in the financial domain benefitting from this in-memory scalability:

Financial Crime Investigations

- 250GB of memory allows processing of 40 million transactions per day
- 3TB of memory increases processing to 400 million transactions per day

Credit Card Processing

- 250GB enables servicing of 1 million accounts with 5 million transactions per day
- 3TB increases levels of service to 10 million accounts with 50 million transactions per day

Core Banking

- 250GB allows processing of 5 million accounts (per day)
- 3TB raises the level of processing to handle 50 million accounts (per day)

Scaling out instead of scaling up becomes simple. Using additional Intel® Optane™ DC persistent memory modules does not require any change in NuoDB or GCP system architecture. As total memory increases, performance continues to rise too.

Solution summary

Customers can migrate their SQL databases to the cloud simply, quickly, and reliably, confident that the Google Cloud Platform running NuoDB distributed SQL technology powered by Intel's latest generation technologies including Intel® Optane™ DC persistent memory will continue to meet their needs now and into the future. They can bring their largest and most critical applications to GCP, leverage microservice architectures, and get significant business and technological benefits. Core banking, credit and debit card processing, fraud detection, regulatory compliance, and mainframe off-loading are just some examples of possible migrations.

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