

Optiva: Transforming the telecommunica tions industry

| DATA USAGE SUMMARY | | VOICE USAGE | |
|--------------------|--------|------------------------------|--------|
| DATA USAGE | 123 KB | MINUTE USAGE | 80 |
| TEXT USAGE | 180 | MINUTE CHARGE AND OTHER FEES | \$2.48 |



By leveraging Google Cloud Platform services such as Cloud Spanner, Optiva increases the data read/write speed of Optiva Charging Engine for telcos by 10x, delivering the most impact for the value and lowest T

About Optiva Inc.

Optiva Inc. leads the telecommunications industry and its innovative customers around the world by offering next-generation software solutions to leverage today's digital technologies. Its monetization products enable real-time billing, charging, policy management, and user experience critical to the growth and performance of over 100 telcos, including British Telecom, Claro, and Vodafone.

Industries: Technology

Location: Canada

**Google
Cloud
Results**

Achiev

- Reduces infrastructure costs by 10x by leveraging elasticity of cloud computing
- Scales reads and writes across unlimited nodes without loss of transactional consistency
- Removes dependency on traditional, enterprise relational databases by replacing services with Cloud Spanner, which supports moving to public cloud

increased
database
performance

Cloud Spanner (<https://cloud.google.com/spanner/>)
(<https://cloud.google.com/spanner/>),

Kubernetes Engine
(<https://cloud.google.com/kubernetes-engine/>)

Smartphone usage has exploded in recent years, especially in emerging markets such as India. Enabling Communication Service Providers (CSPs) to accurately charge for an increasing number of communication events – calling, texting, and data usage, commonly referred to as “transactions” – in real time is what Optiva Inc. (<http://www.optiva.com/>) (TSX: OPT) offers to its more than 100 customers with the Optiva Charging Engine™ solution.

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—Danielle Royston, CEO, Optiva

Optiva (formerly Redknee Solutions, Inc.) had been relying entirely upon an on-premises database solution to power its Charging Engine. As a CSP's transaction volume and user base grew, Optiva would often scale out by replicating the customer's entire infrastructure stack to new sites. For example, for its largest customer, Optiva managed six separate site deployments that mirrored each other, with one deployment for the urban areas the customer serves.

However, the strategy of scaling an on-premises infrastructure is costly to deploy, challenging to manage, and time consuming. “CSPs contend with notoriously low profit margins, so we started thinking about how we could help them reduce their costs, especially as the volume of mobile device usage grows,” says Danielle Royston, CEO of Optiva. “To get ahead of the competition, we needed to fundamentally disrupt our Optiva Charging Engine product by making it 10 times faster while also reducing costs 10-fold.

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Most large CSPs operate their own on-premises data centers. To operate a system such as Optiva's, CSPs have to capacity plan computing and database resources for anticipated usage – meaning investing in hardware and database configuration so on their peak days they can handle the volume of inbound call and data transactions.

With security, privacy, performance, and other concerns, most are highly reluctant to migrate a mission-critical application like subscriber charging to a service running on the public cloud. However, by not doing so, CSPs forfeit the huge advantage that elastic, auto-scaling compute capacity provides.

Before Cloud Spanner, most were also reluctant because there was not a transactional, relational database that could auto-scale, especially at the scale and speed required for subscriber charging. To make a case for such a radical shift in thinking, merely offering CSPs a performance boost of 2x or even 5x or cost savings of 20 to 30 percent with the public cloud wouldn't be enough motivation to get CSPs to migrate. It had to be 10x.

“To get CSPs on board, we had to offer a significant performance boost,” Danielle says. “With Cloud Spanner, we've been able to increase our database speeds by 10x, which besides the obvious improvement in performance now also offers elastic and dynamic scaling of the database in the public cloud.” Optiva has recently migrated its software

service to Cloud Spanner and [Google Cloud Platform](https://cloud.google.com/) (https://cloud.google.com/) (GCP) to take advantage of its performance as well as its secure-by-design infrastructure.

Moving past the chokepoint

The Optiva Charging Engine has traditionally run as an application layer on top of an on-premises, pre-configured clustered relational database with a cache architecture. In this configuration every node in the cluster can handle both reads and writes, improving performance. However, there is an inherent limit to the performance benefits since writes require locks across all the nodes in the cluster. Locks prevent reads from happening until the new data is written to the database, to help ensure that only the latest data can be read.

“It’s a serialized way of handling reads and writes, so that your reads don’t give you the wrong answer,” explains Samy Aboel-Nil, COO of [DevFactory](http://www.devfactory.com/) (http://www.devfactory.com/), Optiva’s IT software services partner. “But it creates a chokepoint because writes hold up other operations until they’re done and are slower than reads. When your application has a high degree of read and write demand on your database, everything takes longer.” Ultimately, with traditional database cluster scaling you will eventually hit a point of diminishing returns because of read/write contention.

Caching and synchronization of previously written data to speed database reads and writes isn't a good option in the CSP world, however. The constant, heavy volume of transactions can result in a read of cached data that's outdated, which in turn could have adverse financial consequences for the CSP, due to incorrect subscriber transaction data. As a result, Optiva was hitting a wall concerning database speed and scale — hence the need to find a new solution.

“Optiva chose Cloud Spanner because it offers real technical differentiation,” says Samy. “No other database system offers a truly distributed, scalable transactional architecture.”

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—*Samy Aboel-Nil, COO,
DevFactory*

Instead of a relational database architecture that can distribute reads but can't distribute writes due to an inherently monolithic architecture for meeting transactional serialization guarantees, Cloud Spanner reads and writes in a fully distributed manner. That's because it's inherently distributed and automatically shards and rebalances data. Cloud Spanner can scale reads and writes across unlimited nodes without loss of transactional consistency, thanks to the TrueTime API

(<https://cloud.google.com/spanner/docs/true-time-external-consistency>)

, a precise, distributed clock; the Google high-performance network; and the Cloud Spanner optimized database stack.

“The architecture of Cloud Spanner, which relies on TrueTime and the super-fast, world-class Google network that Cloud Spanner leverages, enables us to get past database chokepoints to deliver a 10x speed increase to our customers,” Samy says.

Getting the go-ahead

When Danielle suggested Optiva move to Cloud Spanner not long after joining the company as CEO, there was skepticism. “I went to our largest customer in India to show them what the Optiva Charging Engine could do running on Cloud Spanner. It was such a radical shift and disruptive approach that I predicted I’d either be kicked out after five minutes or they’d jump at the chance to start a Proof of Concept as soon as possible. They were really impressed with Cloud Spanner and chose the latter.”

Regarding speed, the Optiva customer in India, who has about 200 million subscribers, has been maxing out at about 50,000 Transactions Per Second (TPS) per site with the Optiva Charging Engine on-premises. The company is currently running a limited Proof of Concept with the Optiva Charging Engine on Cloud Spanner and GCP, aimed at achieving a 10x increase to 500,000 TPS.

At the same time, the customer in India has merged with another large India-based CSP with 200 million subscribers. The merger will make the resulting company one of the largest wireless carriers in the world with a total of 400 million subscribers. So the need to achieve a 10x increase in TPS is critical for the company.

Avoiding a huge infrastructure

To plan for network capacity, the telecommunications industry uses the Busy-Hour Call Attempts (BHCA) metric, which refers to the peak number of attempted calls in any given hour. CSPs often plan their network capacity by taking the BHCA metric into account, even though it's frequently three or four times greater than the average number of calls per hour.

"With Cloud Spanner and Google Cloud Platform, our customers don't have to build out and pay for a huge infrastructure to handle busy hour traffic spikes," Samy says. "We just scale up the database and the computing capacity with ease when we need to. It's like turning a knob."

Cloud Spanner is a relational database, so migrating to Cloud Spanner hasn't proven difficult for Optiva. "We didn't have to start over or re-implement our database schema," Samy explains. "The data types are fundamentally the same, and the way you query the database is the same."

Optiva just modeled its existing database schema in Cloud Spanner, let it write, load, and transform the data, then tested it by rewriting the most common queries. Right away, the Optiva team could see how fast Cloud Spanner is.

The Optiva Charging Engine application has been retooled to run in containers on Kubernetes and therefore can easily be run on-premises or in the cloud using [Google Kubernetes Engine](#)

(<https://cloud.google.com/kubernetes-engine/>) (GKE). The hybrid approach will make it easier to migrate CSPs to a GCP deployment as it will demonstrate to skeptical customers the product is cloud-ready.

“The ability in Google Cloud Platform and GKE to automatically scale compute, memory, and storage resources helps us reduce deployment and other costs by 10x, compared to the on-premise deployment model,” says Samy.

“As the telecom industry begins to adopt the public cloud, a solution like ours that’s 10x better in speed and cost is game changing. Previously, we were limited by our database choices. Cloud Spanner was exactly what we

needed to deliver those benefits to the marketplace. We're convinced it will give our customers and us amazing results."

—Danielle Royston, CEO, Optiva

Running the core business

Google has significantly helped DevFactory and Optiva throughout the process of developing, testing, and operating Cloud Spanner and GKE. "Google has even connected our development team with Cloud Spanner developers to answer our most technical questions," Samy says. "Google has been a great partner for us, all the way."

Being a Google Cloud Technology Partner, along with GCP services like Cloud Spanner, is proving transformative for Optiva. "The cloud is coming to the telecom industry, just like it has come to every other industry. We want to be the innovative leader driving the change," says Danielle. "As the telecom industry begins to adopt the public cloud, a solution like ours that's 10x better in speed and cost is game changing."

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