

# Improved Customer Experience through Enhanced Real-Time Billing and Charging Systems



## About Nokia Networks

Nokia Networks delivers applications that help Telcos and communications service providers (CSPs) maximize revenue and reduce customer churn in this highly competitive industry. The team needed to build new applications to take advantage of structural changes in the dynamics of the industry.

## Accuracy and Integration Challenges Nokia Networks had to Solve

With the explosion of streaming data and edge data-centric applications, the Nokia Networks legacy solutions were struggling to keep up. As a result, innovation was suffering, and customer satisfaction was declining. In addition, application commoditization was leading to a lack of differentiation and emerging competitors were offering consumers more contemporary services. The firm believed that the newer entrants were simply not encumbered by legacy systems nor siloed data.

More specifically, for the Telcos Nokia Networks was looking to service with large, installed base of users and large amount of historical user data, there were limitations. Their billing systems had issues of questionable accuracy due to a variety of dynamic inputs (arrays of new services and devices), an inability to quickly change plans as user demands shifted, and a lack of integration with other key systems.

## BENEFITS WITH AEROSPIKE

- Ability to quickly create and manage differentiated data plans based on real-time information
- Economically scale with the ebb and flow of new shared data plans and sponsored data promotions
- Provide real-time subscriber notifications about data usage
- Per-account routing rules with edge systems
- Traffic shaping to implement account policies
- Predictable, sub-millisecond latency and high throughput
- 5-9's availability; reliable, failure-resistant system
- Cross data center replication (XDR) support
- Dramatic TCO savings over in-memory platforms such as Oracle TimesTen

- **Real-time data at volume:** The billing system has to be able to process data at volume as it gets generated by digital services in real-time, else, it will be a lost opportunity.
- **Lack of integration promotes customer inaccuracies:** The billing system's inability to integrate with other key applications results in an incomplete, or worse, inaccurate awareness of their customers; which is a key driver of dissatisfaction, which can result in increased churn rates.

## The Plan

The Nokia team knew that to remain competitive in both the short and long term, they needed to set themselves apart with an updated real-time billing and charging system. By capturing and leveraging the growing data sets of user data in real-time they could make timely and relevant offers to customers, build, deploy and integrate modern applications that can manage and execute on extremely large data sets in real time, and finally, create an environment for user self-provisioning.

## Non-Aerospike options evaluated

The team at Nokia Networks had evaluated options including Oracle TimesTen and a homegrown database, "Datablitz", which was internally developed for high-performance shared memory applications that can survive failures or organize large amounts of data with features suited to many applications.

It was found that Oracle TimesTen had scale and expense issues and proved to be hardware-intensive, which in turn would lead to drive up costs. Datablitz was turning out to be expensive and resource-intensive, was hard to maintain and was deemed an inefficient use of internal development talent when a superior commercial version was available.

## A New Data Platform with Aerospike

Nokia Networks leveraged Aerospike's NoSQL database to provide speed at scale underneath new real-time billing and charging applications designed to capitalize on real-time inputs from the edges of the user experience. These newly written, modern applications built on Aerospike, enable carriers to cater to the unique characteristics of their customers based on real-time information about usage patterns, subscriber preferences, needs, and lifestyles.

*"The ability to offer self-service capabilities to customers lets service providers proactively target specific customer segments to deliver contextual, personalized offers to subscribers. Doing this in real time allows us to increase service uptake and reduce churn more effectively, compared to traditional methods based on historical data."*

### Application Capabilities realized with Aerospike:

- Quickly create and manage differentiated data plans based on real-time information
- Economically scale with the ebb and flow of new shared data plans and sponsored data promotions
- Provide real-time subscriber notifications about data usage
- Per-account routing rules with edge systems
- Traffic shaping to implement account policies
- Accessible user provisioning applications (self-serve and through support personnel)

### Infrastructure Results with Aerospike:

- Predictable, sub-millisecond latency and high throughput
- 5-9's availability; reliable, failure-resistant system
- Cross data center replication (XDR) support
- Dramatic TCO savings over in-memory platforms such as Oracle TimesTen via Flash-based storage to enable fast data center build outs

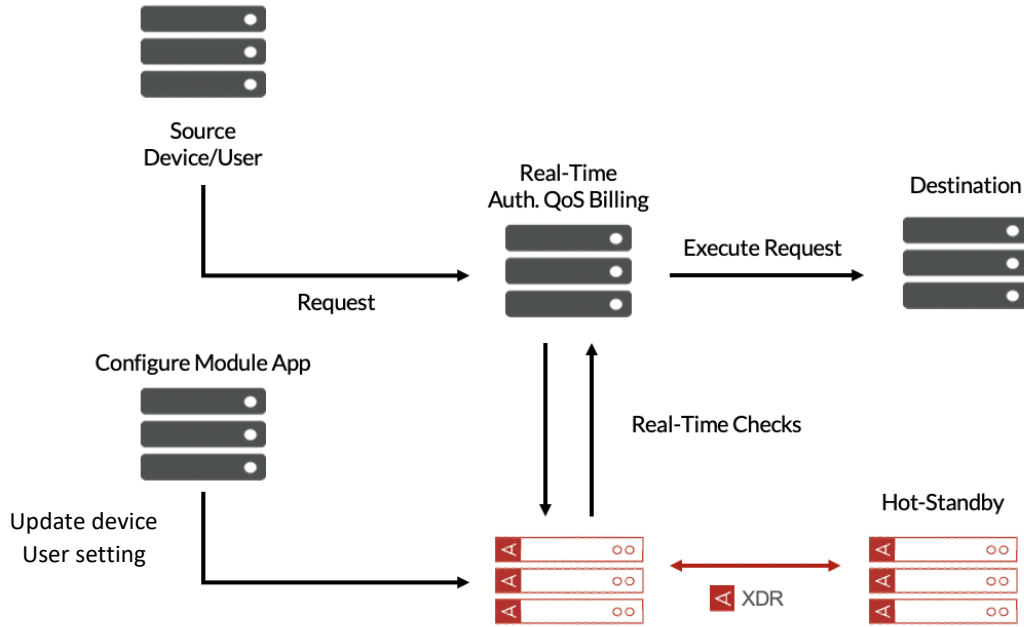


Figure 1: A user's mobile activity results in timely and relevant information and offers back to the user enhancing Quality of Service, Customer Experience and enabling new revenue opportunities.

### Driving forces behind platform decision

- TBs of data
- 10-100M objects
- 10-200K TPS

### Key Factors in Selecting Aerospike

- Clustered system
- Predictable low latency at high throughput
- Highly-available and reliable on failure
- Cross data center (XDR) support

## Real-time Billing App in-call processing requirements met with Aerospike:

- Predictable low latency to enable several reads/writes per transaction
- High throughput scaling up from the current 10-15k TPS
- Reliability for mission critical in-call billing services
- Easy schema changes with no downtime
- in-memory processing; 128GB DRAM not Flash
- Ability to scale blade servers up or down within rack
- Ability to support 2 clusters within a datacenter for reliability
- Synchronize clusters across data centers for disaster recovery

## Real-time Online Charging app requirements met with Aerospike:

- Increased reliability and easy to build and maintain
- Ability to estimate how much time is available based on cash balance and keep monitoring and reducing balance based on usage.
- Ability to recharge the balance based on the remaining balance
- Provide less than 10ms latency, 2000 TPS, on 10 million records
- Provide genuine Strong Consistency
- 100% uptime

## Conclusion

Aerospike's high-performance NoSQL data platform makes it possible for Telco service providers and CSPs to build next generation applications that offer a clear point of differentiation, a key imperative in a highly competitive and fast evolving market.

The differentiations can provide advantages around relevant new product offerings and an enhanced customer experience, two critical components of increasing revenues and reducing churn.

Aerospike offers the only flash-optimized in-memory NoSQL database that delivers predictable high performance for mission-critical, high-scale applications such as real-time usage and billing systems.

### About Aerospike

Aerospike is the global leader in next-generation, hyperscale data solutions. Aerospike enterprises overcome seemingly impossible data bottlenecks to compete and win with a fraction of the infrastructure complexity and cost of legacy NoSQL databases. Aerospike's patented Hybrid Memory Architecture™ delivers an unbreakable competitive advantage by unlocking the full potential of modern hardware, delivering previously unimaginable value from vast amounts of data at the edge, to the core and in the cloud. Aerospike empowers customers to instantly fight fraud; dramatically increase shopping cart size; deploy global digital payment networks; and deliver instant, one-to-one personalization for millions of customers. Aerospike customers include Airtel, Banca d'Italia, Nielsen, PayPal, Snap, Verizon Media and Wayfair. The company is headquartered in Mountain View, Calif., with additional locations in London; Bengaluru, India; and Tel Aviv, Israel.

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