tondo

Couchbase

# Helping Cities Provide Cost-Saving Smart Services Using the Power of AI

**Tondo Smart** is a global leader in smart lighting and smart network infrastructures that are used to enable connected smart city applications. Tondo's AI-native Smart City management cloud enables cities to measure and manage lighting, temperature, and energy consumption citywide in real time while avoiding information overload from massive amounts of telemetry data.

## Challenges

- Required guaranteed availability to support always-on smart sensors and real-time monitoring and alerts
- Needed high scalability for a rapidly growing platform that supports hundreds of thousands of devices and massive volumes of real-time data
- Had to integrate easily with existing technologies and multiple cloud providers
- Wanted to optimize the efficiency of a small DevOps team

## Outcomes

- With Couchbase, Tondo's devices are always on and always connected
- Tondo can now scale quickly and easily to handle new customers and any amount of data without sacrificing performance or requiring downtime
- Couchbase works on AWS, Azure, and Google Cloud and is highly flexible for easy integration with modern tools and technologies
- Couchbase's SQL++ query language and developer-friendly tools let Tondo's DevOps team hit the ground running

**Industry**
- High Tech

**Customer application**
- Smart lighting and smart city enablement platform

**Use case**
- IoT data management

**Product**
- Couchbase Server

**Cloud partner**
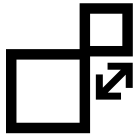- AWS
- Microsoft Azure
- Google Cloud

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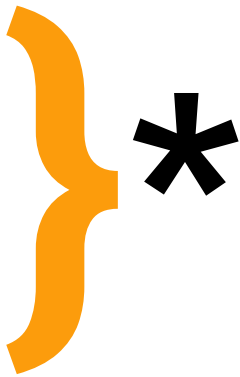**— Eliav Gnessin**, CTO, Tondo Smart

**Tondo Smart** is a global leader in smart lighting and smart network infrastructures that enable connected smart city applications. Tondo's always on AI-native Smart City management platform enables cities to track temperature, energy consumption, and other telemetry data in real time while avoiding information overload.

# THE CHALLENGE:
# Managing enormous volumes of data to provide real-time smart services

To help manage critical city infrastructure, Tondo's Smart City wireless network takes advantage of light poles that are ideally positioned across a city's streets, highways, parking lots, railways, public transit, and outside commercial buildings. At each light pole, Tondo uses sensors and devices to gather data and transmit it to smart applications that monitor and manage city services. The company's leading product is their Adaptive Smart Lighting system that automates the delivery of standards-compliant lighting levels based on best practices. The system can reduce operating costs of street and area lighting dramatically while improving how light impacts health and ecosystems.

"We work with highway authorities and municipalities to implement smart city infrastructure including smart sensors and smart lighting. Our platform enables customers to improve operational excellence throughout their cities," said Eliav Gnessin, Chief Technology Officer at Tondo Smart.

With controllers on light poles across approximately 40 cities, plus hundreds of thousands of managed devices, Tondo generates a staggering volume of real-time data every day. To meet the growing challenges of scalability and availability, the company needed a more robust infrastructure that could guarantee 100% uptime and provide customers with timely information and instant notifications.

"If something goes wrong, if an anomaly is detected, customers expect to get an immediate notification. This is critically important, but it's challenging to implement. You need to have a system that's robust enough to put that in place," said Gnessin.

# THE SOLUTION:
# A robust and reliable AI-powered platform that scales quickly and easily

Tondo is built on top of the Cloud-IQ Central Management System (CMS), which is an IoT platform used for managing all lighting, sensors, and connected devices on the Tondo Smart Network. Cloud-IQ provides robust reporting for energy usage, sensor data, and devices, and it can integrate easily with existing data warehouse and business analytics tools for roll-up and enterprise analytics.

"The IoT platform is all about scale – the ability to process huge amounts of telemetry data in real time to discover how the system is performing. We needed something that could handle tens of thousands of data points per second streaming into the system. We looked for a solution that gave us high performance, scalability, and uptime while also being easy for developers to work with. And we wanted the ability to run queries easily to boost the machine learning AI algorithms that we're running. We combined all our requirements and concluded that Couchbase was the database for us," said Gnessin.

Tondo uses Couchbase as the company's real-time database for AI, holding the last known state for the hundreds of thousands of devices in the system. The database runs on all major cloud providers, including AWS, Azure, and Google Cloud. Larger customers run their own instance of the Tondo Smart IoT platform, whereas smaller customers run on a public system managed by the Tondo team.

Couchbase's wide support for a variety of programming languages is another key benefit for Tondo. The company's DevOps team had used SQL and MySQL in the past, so they were instantly familiar with Couchbase's SQL++ query language. And because the team is relatively small, they needed to be able to add functionality and manage the platform easily. Couchbase came through with fast implementations, indefinite scalability, and SDKs that support Tondo's stack. For Couchbase workloads running on AWS, EC2 provides the flexibility essential for handling variable demand. Nodes can be configured on EC2 in a manner that best utilizes the resources of the database, based on the needs of the application. Tondo also leverages S3 object storage to keep data safe, available and accessible.

Tondo also moved from Couchbase Community Edition to Enterprise Edition to gain enhanced capabilities, optimize performance and in-memory indexing, and take advantage of professional support.

# THE RESULT:
## Operating costs are reduced by up to 60%

Tondo Smart is growing rapidly with the Smart Lighting system now deployed in around 40 cities where it's used to manage hundreds of thousands of units. This system helps decrease street and area lighting costs by as much as 50% on top of the LED replacement, and sensor and device operating costs by up to 60%.

The platform provides customers with data streaming from all their devices along with an online dashboard view of all their live devices. For example, the Israel Highway Authority has devices that send them temperature and energy

consumption data in real time from across their highway system. Another example is a system that uses AI-powered sensors at the entrance of parking lots to recognize each time a car enters so it can temporarily brighten the lighting.

Real-time device data streams into Couchbase where Tondo can find valuable insights for its customers. "We have pattern recognition algorithms that issue details for customers about the system's behavior," said Gnessin. "For example, if a couple of light controllers in a row are suddenly off, or if energy consumption is different from normal, we find these patterns by running AI algorithms on the real-time data stored within Couchbase."

If energy consumption patterns indicate a device is malfunctioning, someone is stealing electricity, or there is some other anomaly, the system triggers an alert for the customer. With Couchbase at the core, Tondo can guarantee its customers that the system will always be on and always be reliable.

Modern customer experiences need a flexible database platform that can power applications spanning from cloud to edge and everything in between. Couchbase's mission is to simplify how developers and architects develop, deploy and run modern applications wherever they are. We have reimagined the database with our fast, flexible and affordable cloud database platform Capella, allowing organizations to quickly build applications that deliver premium experiences to their customers – all with best-in-class price performance. More than 30% of the Fortune 100 trust Couchbase to power their modern applications. For more information, visit www.couchbase.com and follow us on X (formerly Twitter) @couchbase.