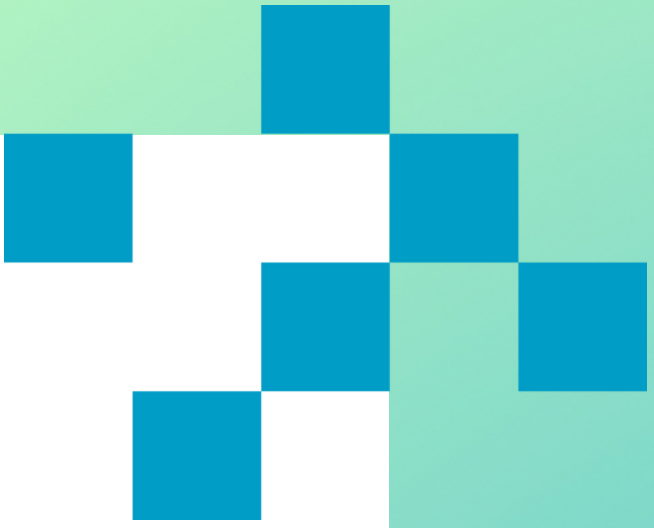
CrateDB



Industrial IoT
in 2023 and beyond

White Paper

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Industrial IoT in 2023 and beyond

We are on the brink of a new industrial revolution, with more devices than ever before that are digitized, connected, and empowered to collect and share data.

Also known as the industrial internet or Industry 4.0, the industrial internet of things (IIoT) uses the power of smart machines and real-time analytics, combined with enabling technologies like machine learning and edge computing, to transform manufacturing and industrial processes.

The number of IoT devices is expected to reach 30.9 billion by 2025, representing a key opportunity for businesses in every sector, from agriculture to healthcare and manufacturing. By gathering real-time data from sensor-based tools, industrial IoT allows businesses across the globe to optimize their operations and make informed decisions that drive growth and efficiency.

Imagine a smart factory in which machinery and production systems can identify bottlenecks before they happen and alert workers when machines need predictive maintenance. Or a mine with IoT sensors throughout the underground shafts to warn miners of toxic gas and low-oxygen areas. Or even a farm that uses IoT technology to maximize crop yields by monitoring light, humidity, temperature, and soil conditions.

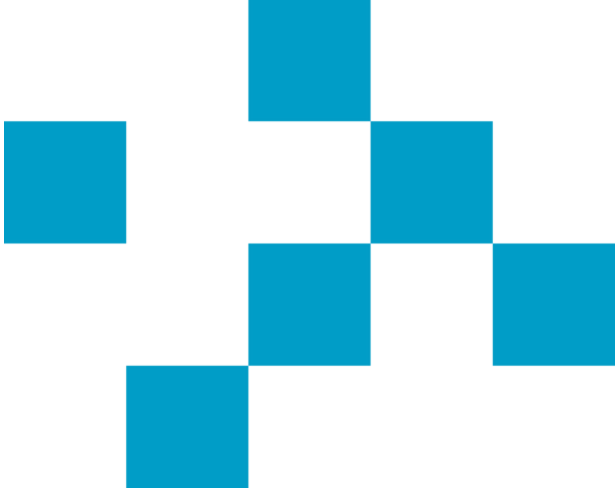
In this whitepaper, we will explore three real-life use cases demonstrating the power of IoT technology.

Industrial IoT Use Cases

IoT-Powered concrete manufacturing with Thomas Concrete Group

Predictive maintenance with SPGo! By PETROMIN

IoT climate control systems with Roomonitor and CrateDB



IoT-Powered Concrete Manufacturing with Thomas Concrete Group

Thomas Concrete Group is one of the leading manufacturers of concrete, with over 150 concrete plants and 2,100 employees.

They use IoT technology powered by the CrateDB database to monitor their concrete pouring and curing processes, ensuring that their commercial and private customers receive high-quality, ready-mixed and prefabricated concrete.

Concrete Pouring

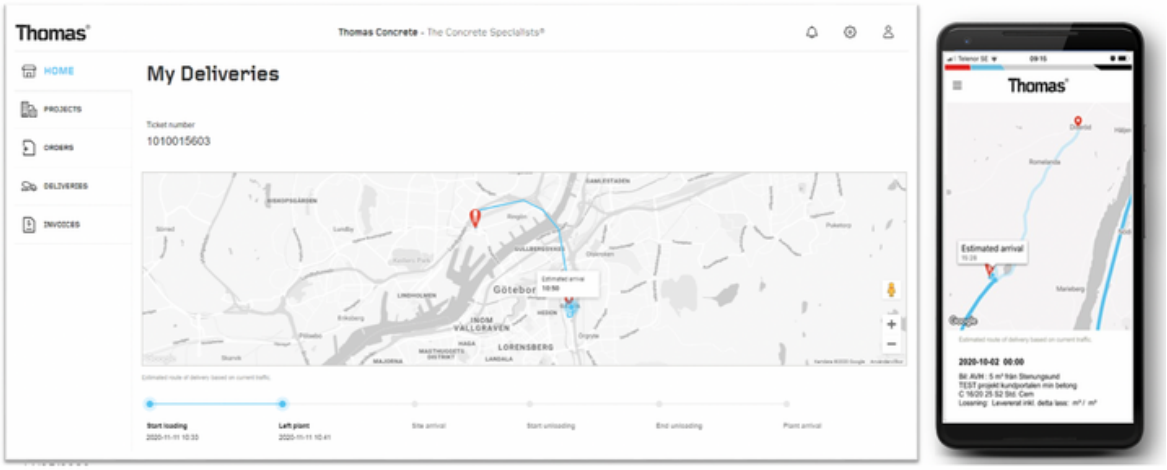
Thomas Concrete Group uses IoT technology to track the movement of their concrete delivery trucks, allowing construction managers to prepare for the concrete pouring process.

Concrete pouring is a critical moment in construction because the concrete sets and hardens quickly, making it difficult to make corrections or adjustments once it has been poured.

If the concrete is not poured properly, it can lead to issues such as cracking and uneven settling, which result in higher costs for repairs, replacement, and labor.

Concrete Pouring

With CrateDB, tracking information is displayed in an online portal and mobile app, so construction managers know precisely when the concrete truck will arrive at the construction site and can set themselves up for success.



In the online portal, the customer can follow the exact position of the concrete truck in Google Maps, getting information about the estimated time of arrival

Concrete Curing

Concrete curing is the process of allowing freshly placed concrete to set and harden. Proper curing is essential for the overall quality of the concrete and its long-term durability.

If concrete is not properly cured, it is more vulnerable to surface wear, moisture and chemical penetration, shrinkage, and other issues that negatively impact its strength and service life.

The curing process for concrete is complex because it involves controlling the temperature and moisture conditions of the concrete over an extended period, often in outdoor environments where the concrete is exposed to changing weather conditions.

Thomas Concrete Group uses CrateDB to track the curing process of concrete in real-time and places digital sensors inside the concrete to measure the temperature and send the data to CrateDB.

The data flows into software developed by Thomas Concrete Group to monitor the concrete's temperature and calculate its concrete strength. By closely monitoring the curing process with IoT technology, Thomas Concrete Group can ensure the concrete is properly cured and meets the required standards for strength and durability.

Thanks to this service, there's no need for Thomas customers to be on-site to check the status of the concrete curing. They can instead monitor the process remotely, using the online portal or the mobile app

Predictive Maintenance With SPGo! By PETROMIN

SPGo! is part of PETROMIN and uses IoT-based predictive maintenance to help businesses improve the efficiency and profitability of their mining operations.

Predicting potential issues with critical equipment was a largely unsolved problem in the mining industry, but SPGo!’s new solution, powered by CrateDB, has changed all that.

Safety inspections in mines tend to be complex, manual, and tiring.

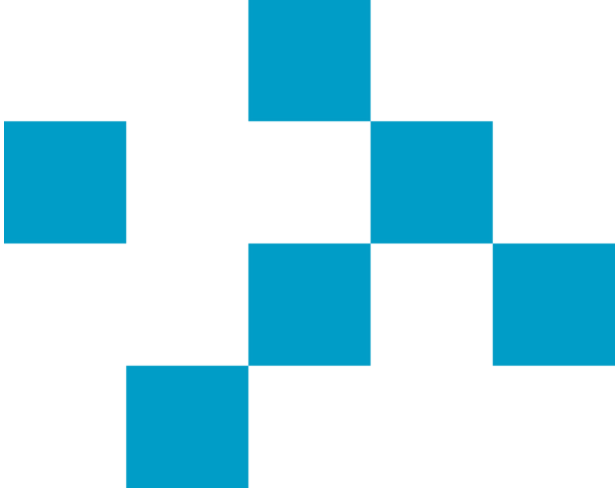
Usually, an inspector walks along the leash with thermal guns measuring and recording the temperature of the poles via photographs and paper.
This is understandably problematic as mineral conveyor belts range from 1 to 15 kilometers.

SPGo! uses more than 40,000 sensors to monitor mining material conveyor belts in real-time, producing 760 million records per day that are stored in the CrateDB database. That’s more than 8000 records per second.

IoT solution uses predictive maintenance to prevent unscheduled stops, which would otherwise interrupt mining operations.

Sensors identify sources of potential failures and proactively trigger them during scheduled plant shutdowns, increasing the performance and service life of the machinery and improving the return on investment of costly mining equipment.

> “The performance offered by other alternatives did not meet our needs and once we decided on CrateDB we realized that a crucial part of the implementation of our services had already been met and, above all, with very good results
>
> Nixon Monge Calle
> Head of IT Development and Projects



IoT climate control systems with Roomonitor and CrateDB

Roomonitor uses IoT technology running on the CrateDB database to monitor and control air conditioning in the hospitability industry.

Using IoT sensors to monitor noise and temperature, Roomonitor tracks whether air conditioning (AC) units are on and functioning, windows and doors are open and if the room is currently occupied with guests.

Based on these inputs, customers can remotely control room settings, improving energy efficiency and guest comfort. Roommonitor reduces energy usage by more than 50%, enabling hotel owners, property managers, and hosts to avoid wasteful use and high costs. It is currently deployed in thousands of locations, in 17 cities across Europe, ranging from by-owner vacation rentals to large hotels

> “Our success depends on our ability to give property managers real-time insight to monitor air conditioning costs and tenant comfort. If that data is unavailable to use for any reason, our solution is ineffective.
> We needed a database purpose-built for IoT, and CrateDB was the best solution.”
>
> Ignacio Suarez, CEO at Roomonitor

Why the Right Database is Critical for IoT Use Cases

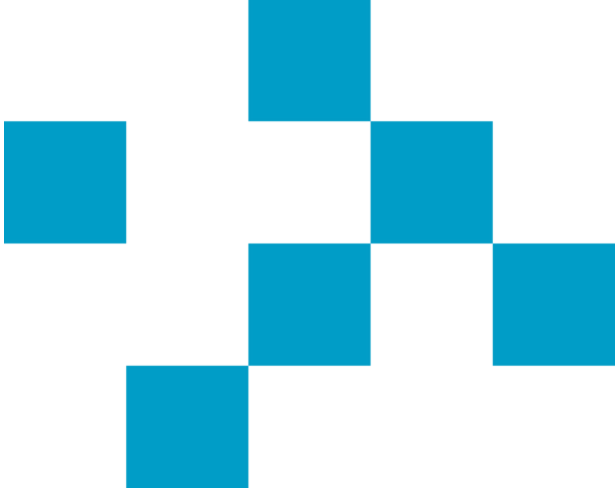
Selecting a database that meets your business needs is essential for several key reasons:

IoT infrastructure needs a fast, scalable, and secure database to support it.

IoT devices generate a high volume and velocity of data which must be collected, stored, and analyzed in real-time. CrateDB allows you to handle millions of data points per second and attain fast linearly scalable data ingestion.

IoT systems must be able to operate 24/7 with high availability.

Data must be consistently available without any single point of failure. CrateDB provides built-in data replication and cluster rebalancing to ensure non-stop performance.



Your IoT database needs to run at the edge and in the cloud.

IoT architecture is typically composed of three main types of components: IoT devices with sensors and actuators, edge servers, and a cloud-based data center. CrateDB runs anywhere for efficient processing at the edge or in the cloud.

IoT projects often require advanced data analysis and visualization.

CrateDB provides fast, robust time series, ad-hoc queries during data ingestion, geospatial, and text search features that can support advanced data analysis.

IoT devices can generate a wide variety of data types.

The ability to handle dynamic data structures and adapt quickly is essential for IoT systems. CrateDB enables you to add and query new sensor data structures using dynamic schema.

Why CrateDB: A Database Designed for IoT

CrateDB is the leading database for IoT solutions, from industrial internet to connected cars to wearables.

Built to ingest and manage massive amounts of data from diverse sources, CrateDB can process millions of IoT data points per second, making it easier than ever to work with sensor data at scale. CrateDB also:

- Integrates with Kafka, Grafana, Node-RED, and other popular IoT stack software
- Runs anywhere for efficient processing at the edge or in the cloud
- Built-in data replication and cluster rebalancing to ensure uninterrupted operations

Interested in Learning More About Industrial IoT?

The adoption of IoT has accelerated over the past few years due to the prevalence of 5G, pandemic-induced remote working, and technological advancements facilitating the deployment of connecting devices. Today, industrial IoT represents an exciting opportunity for businesses to improve their operations, drive digitalization, and gain a competitive edge.

Interested in learning more about how CrateDB supports IoT? Get in touch with our experts today for a free consultation.

Try CrateDB Cloud for FREE