CRATE.IO

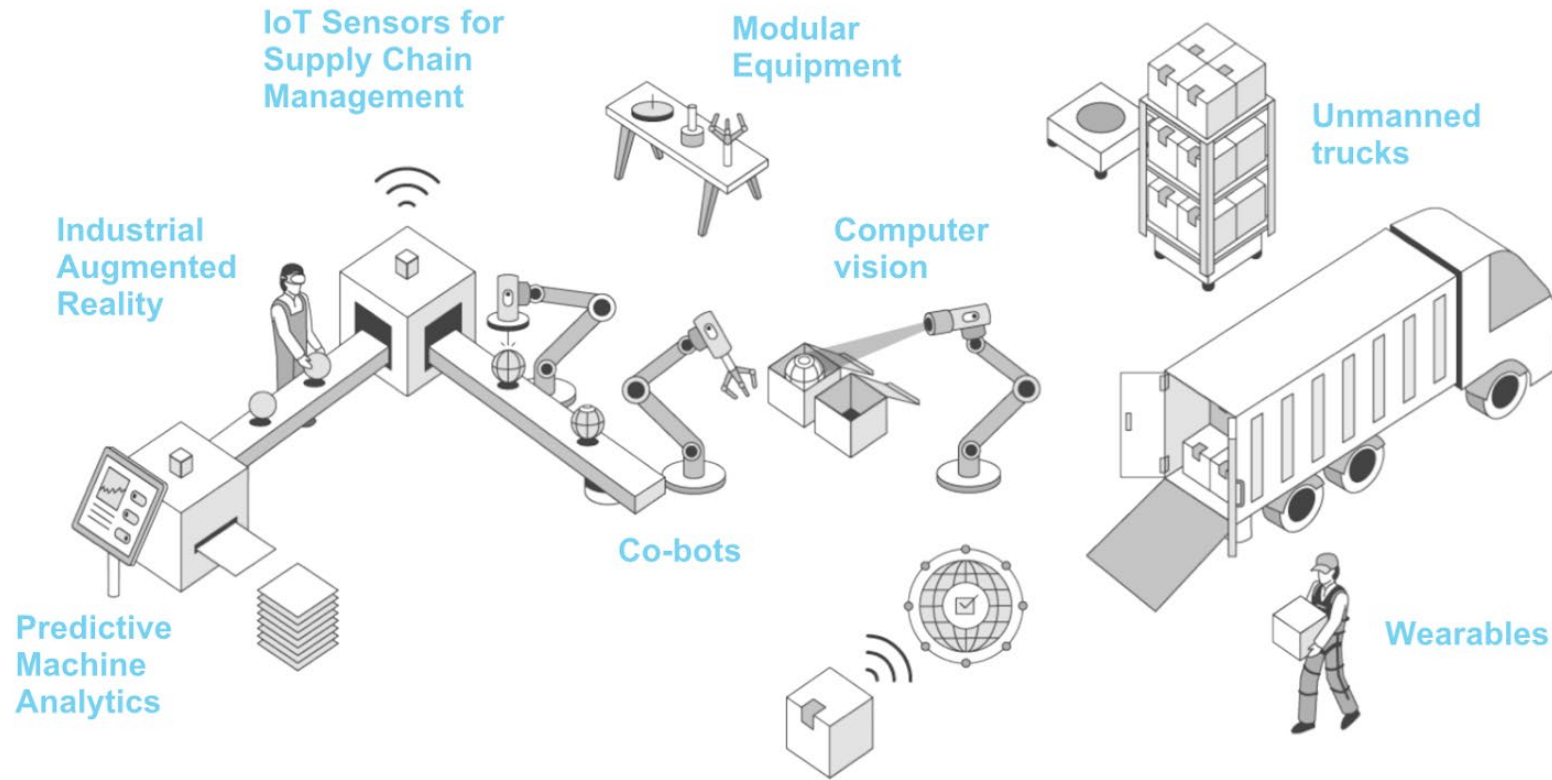**CrateDB**

The Database for IIoT & Manufacturing

Online, December 2020

IIot: Fostering Smart Factories

For Industry 4.0

IoT Sensors for
Supply Chain
Management

Modular
Equipment

Unmanned
trucks

Industrial
Augmented
Reality

Computer
vision

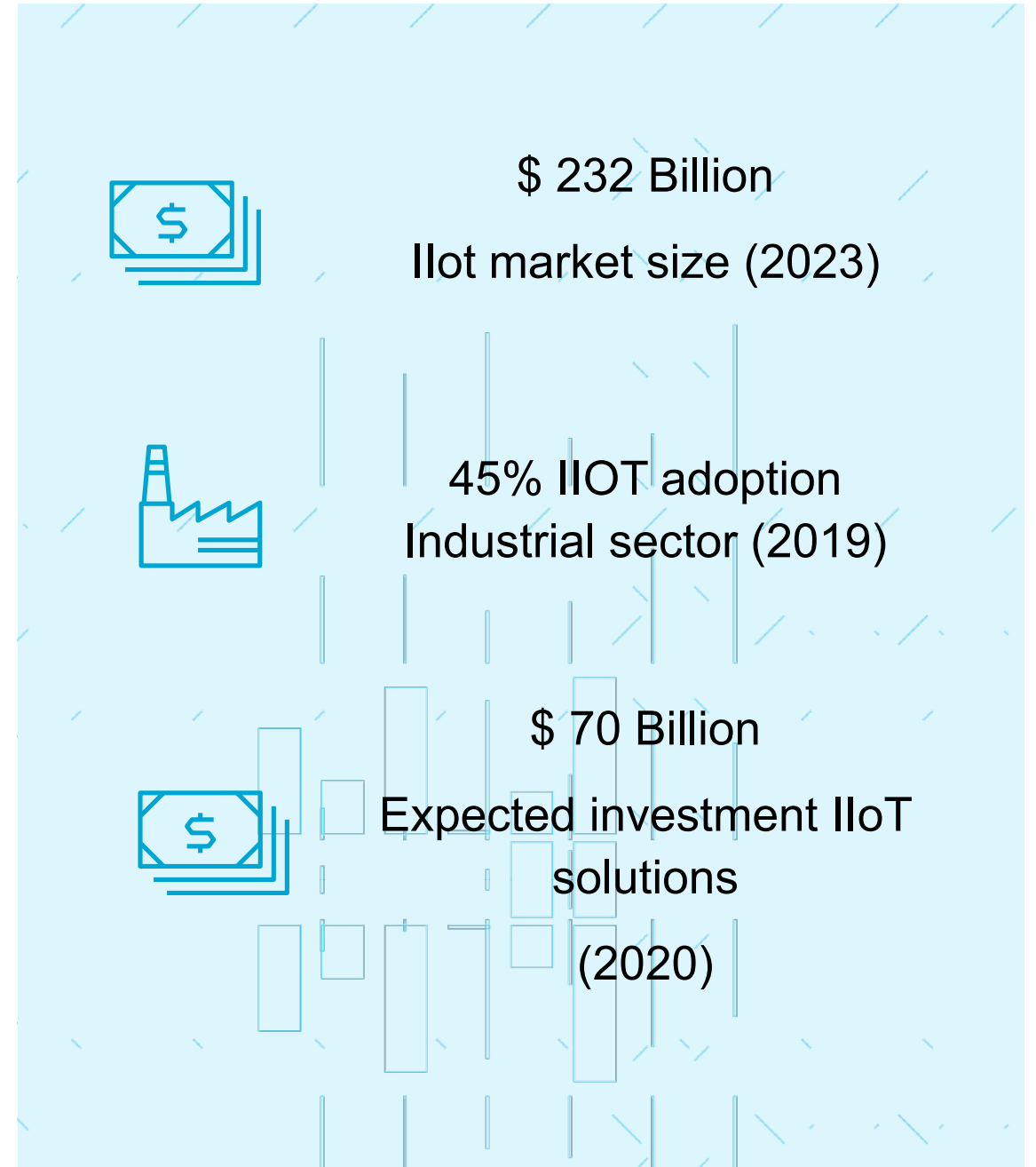Predictive
Machine
Analytics

Co-bots

Wearables

More than a buzzword, Industry 4.0 is a reality, and it is only possible thanks to real-time machine **data**, that enables lights-out manufacturing
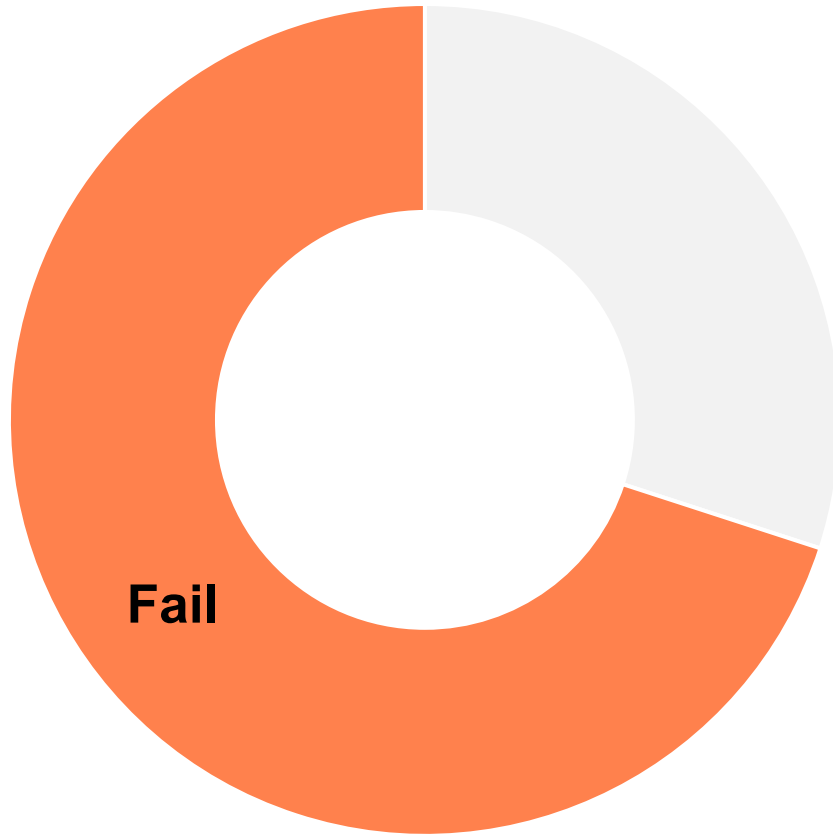
The Power Of IIoT

- Real-time monitoring of operations

- Process optimization

- Remote control

- Machine learning & AI

- Fast detection & correction of failures

- Data-based insights: business & technical benefits

$ 232 Billion

IIot market size (2023)

45% IIOT adoption
Industrial sector (2019)

$ 70 Billion

Expected investment IIoT
solutions

(2020)

But Over 70% Of IIoT Projects Fail

Fail

The primary causes of failure are:

- Lack of necessary skills

- Siloed and resistant corporate culture

- Data/IT infrastructure

According to industry surveys and reports from:

CISCO   McKinsey & Company   IDC   Microsoft   BAIN & COMPANY

Why Is Data So Difficult In The Industrial Sector?

- The shape and scale of IIoT data are very different than that of legacy and web-scale data, due to a massive variety of data sources, types, and end-points.

- Traditional databases and infrastructure technologies have not been built for the machine data world and for IIoT scale.

IIoT Projects Face Unique Challenges

Speed

- Traditional IoT database architectures do not support the sheer scale of industrial IoT, which is typically orders of magnitude larger in scale and complexity than other time series workloads, such as those found in IT systems monitoring.

Scalability

- Due to the massive volume and speed of data in an industrial environment, a database needs to be able to handle multiple time series queries per second, which is much faster than the top query speed of standard time series databases.

Hybrid Edge

- Most factories need the ability to deploy on premises (edge), as well as in the cloud, so they can make critical decisions in real time and enable analytics in situations where there is no reliable internet connectivity and/or where cloud connectivity is not necessary.

Traditional Data Bases Are Outpaced By The Machine Data World

	Legacy/Relational DB	Next-gen/Webscale DB	Digital X/IoT DB
The IT Environment	Mainframes, client server, workflow automation, enterprise-wide applications (e.g. ERP)	Internet, cloud, PC/mobile proliferation, open source, big data	Connected things, edge, convergence of OT & IT, interoperability, machines become users
Attributes of Data	- Volume: Low-medium - Velocity: Low - Variety: Low - Data normalized for a specific application	- Volume: High - Velocity: High - Variety: Low-medium - Mostly structured data; some unstructured	**Volume: Very high** **Velocity: High** **Variety: Very high** **Massive variety of data sources, types & end-points**
Key Benefits Required	- Consistency - Reliability - Standardization	- Availability & redundancy - Agile/fast app development - Support massive numbers of concurrent users	- Affordable unit-cost - Fast data ingestion and real-time analysis - Easily scaled to many locations/lines/machines - Operate at **cloud** and **edge**
Vendors	Oracle, IBM, Teradata, Sybase	Hadoop, MongoDB, Splunk, Microsoft, Amazon	**?**

Crate.io Products

CrateDB

Purpose-built to scale modern applications in a machine data world

Our Products

Managed datastore with ready to use services

CrateDB Cloud

- DBaaS fully managed
- Kubernetes based

Real-time IoT Database supporting standard SQL

CrateDB

- DB container
- Deploy anywhere
- Cloud & Edge

Ingest

Visualization

Managed

High Ingest

Default Tooling

Standard SQL

Real-time Query
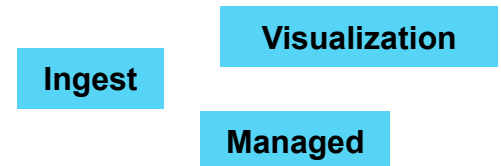
IIoT Deserves Its Own Database

CrateDB

Efficiency

- -70% TCO

- Driving IoT unit cost down

Performance

- 100x faster

- Adhoc real-time

- Multi petabyte scale

Simplicity

- Works any data

- Fully managed

- Pay-as-you-go model

Your Benefits

Powerful, fast, scalable and purpose-built for industrial IoT

Real-time decision making
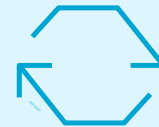Sub second data ingestion and real-time analysis across a large variety of data types

Cost effectiveness
Multiple data and database technologies to one, for TCO savings

Full Scalability
Built from bottom up as a share-nothing architecture and distributed scalable system
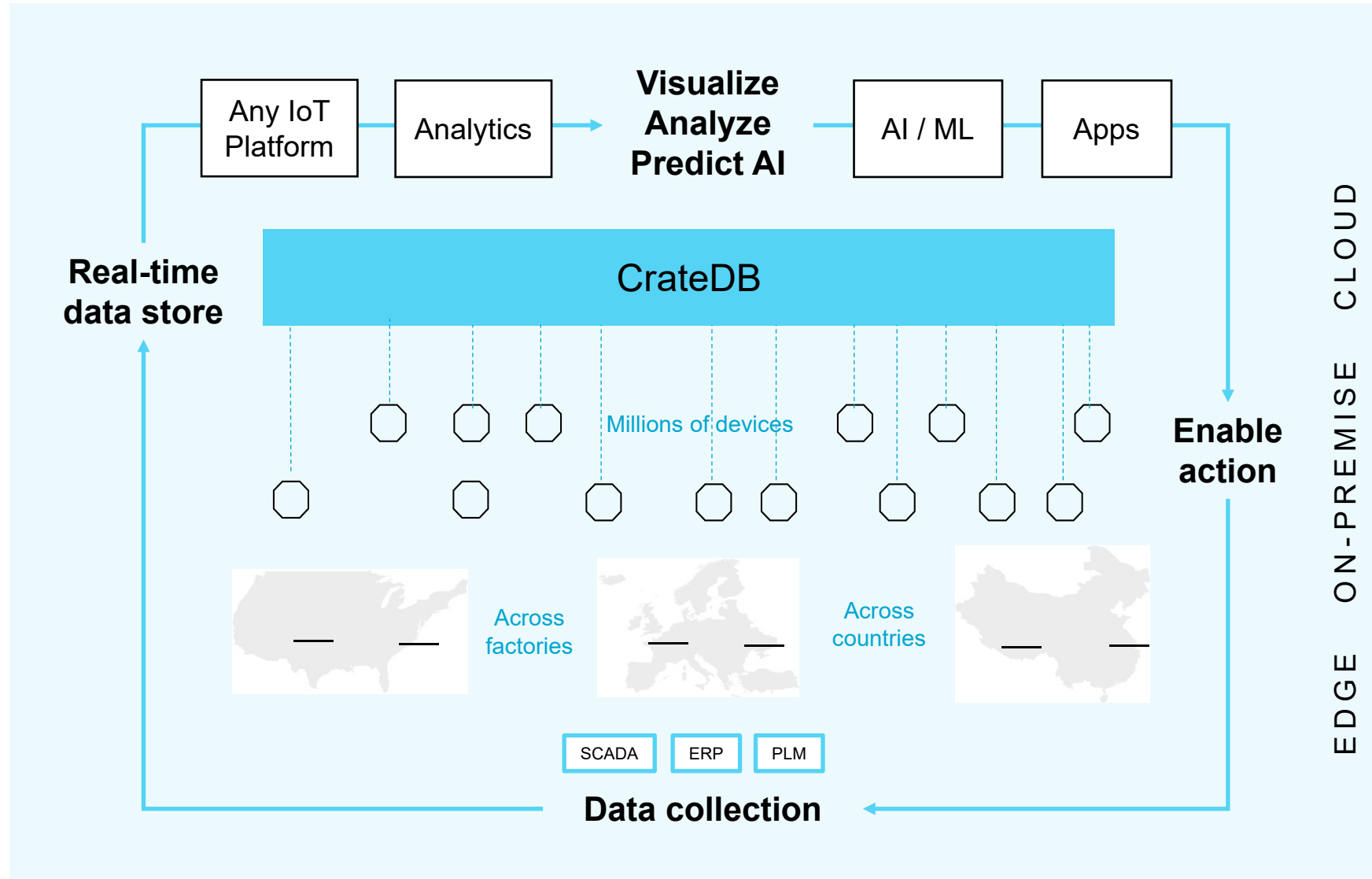
High Efficiency
Our architecture combines hardware optimization with a familiar SQL interface to ensure rapid use and minimal footprint

CrateDB

CrateDB: The Foundation For Your IIot Platform

Any IoT Platform → Analytics → **Visualize Analyze Predict AI** → AI / ML → Apps

Real-time data store

CrateDB

Millions of devices

Enable action

Across factories

Across countries

SCADA ERP PLM

Data collection

CLOUD

ON-PREMISE

EDGE

Data
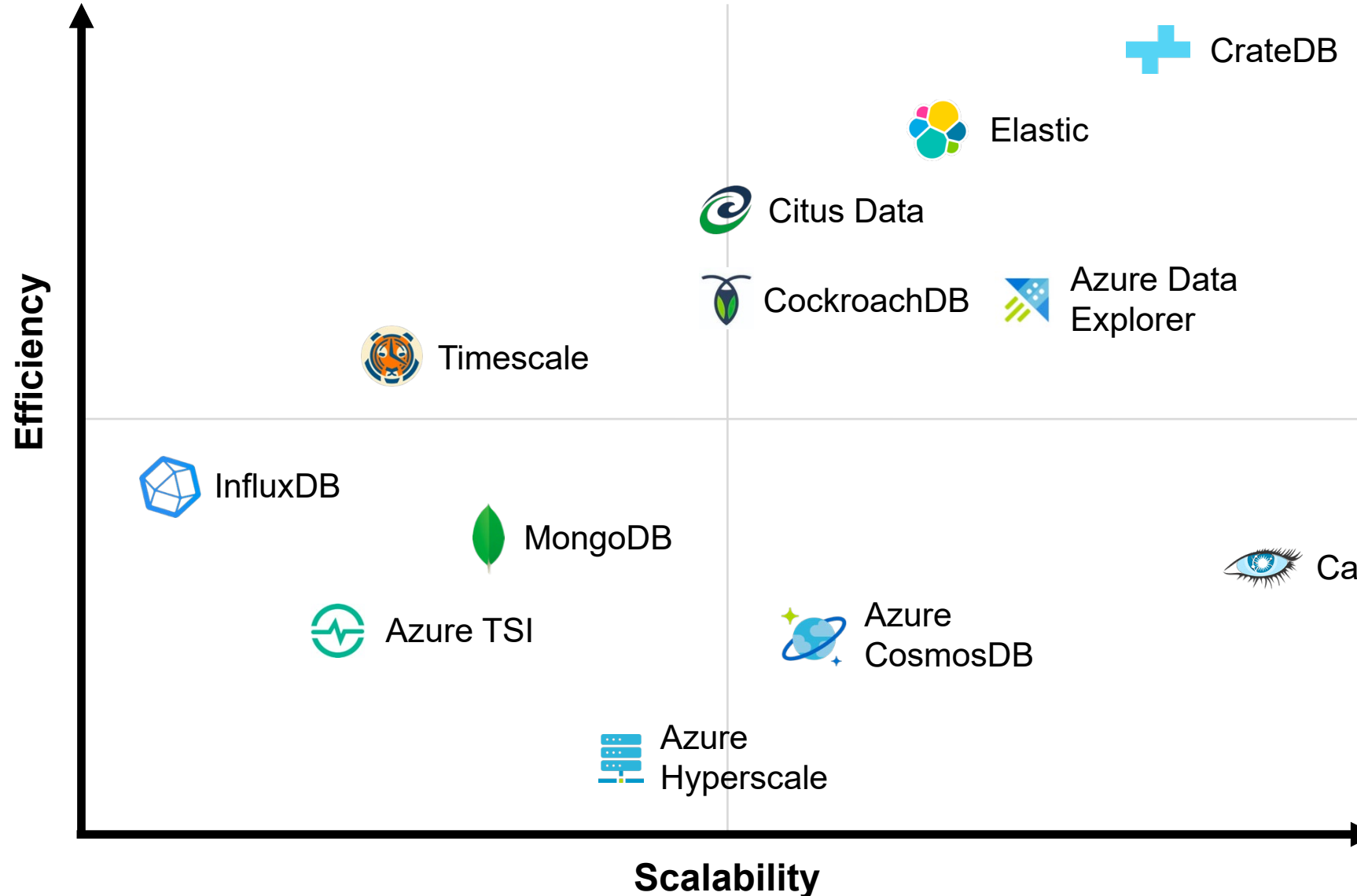Big data Real-time SQL

Information / Context
Industrial IoT Platform

Action / Impact
Data-driven Manufacturing Platform

Optimal For IIot And Machine Data Use Cases

Efficiency
- Ressource effectiveness (= hardware costs)
- Developer productivity / Required skill level
- Admin time / Oversight

Scalability
- Site / Power / Writes / Reads
- Number of clients / Concurrency

CrateDB

Elastic

Citus Data

CockroachDB

Azure Data Explorer

Timescale

InfluxDB

MongoDB

Cassandra

Azure TSI

Azure CosmosDB

Azure Hyperscale

Efficiency

Scalability

100+ Global Customers With Multiple Use Cases

Industrial IoT / Sensors

Security / Network Data

Purpose-built for machine data

Geospatial / Search

Realtime Log Analytics

Customer
Alpla

> "We can collect continuous production data, turn it into information in a digestible format and feed it back to floor for specific action. It's incredibly powerful. We can guide decision-making on the floor in the moment. And we capture huge volumes of raw data long term for advanced data science going forward."
>
> Philipp Lehner
> CFO, Alpla Group

ALPLA

World market leader in in rigid-plastic packaging manufacturing

$4BN
revenue

180
plants in 45 countries

20.000
employees

Use Case

- Improvement of OEE (up to 10%) on industry-leading levels of 90+%

- Reduction of waste and number of FTE per shift

- Sharing of expert knowledge using digital tools

- Increased transparency of machinery & process data

- Real-time, actionable information for shop floor

Challenges

- Billions of records from multiple systems

- A mix of more than 10.000 sensors & relational data

- Industrial time-series data at massive scale

- High data variety from sensor data, ERP, quality, images, videos

- EDGE requirements for data collection

Results

- Simplified stack - one central data store for IoT, ERP, and other data

- Massive scale (150 production lines live) growing 3x per year

- 60-70% TCO savings through CrateDB architecture

- CrateDB provides IoT data store with unlimited scale of raw & processed data to enable real time information & actionable insights

Customer McAfee

> "CrateDB's real-time SQL performance, simple scaling, and high availability make it a key element of our stack"
> Sekhar Sarukkai
> SVP Engineering

McAfee
Together is power.

Category leader for Cloud Access Security Broker (CASB)

$2.8BN
revenue

7.000
Employees

622 M
Endpoints managed

Use Case

- SaaS system monitors internet traffic for security risks
- Connected: 40% of Fortune 500, total of 700+ customers
- 3M+ end-users with concurrent real-time dashboards & analytics

Challenges

- Large volume of highly-concurrent queries ran too slow
- Original MySQL-ElasticSearch platform grew overly complex to run, difficult to maintain, with poor performance, and high operational costs
- Duplicated data storage, manual sharding, DBs syncing data
- Consolidate in huge master tables across 100s of database nodes

Results

- 20x faster, 75% lower cloud footprint (cost down)
- In production since 2016, massive year-on-year growth
- Clusters with several hundred database nodes in multiple clouds
- Handling 2-digit billions of network messages per day
- Real-time dashboards for 3M+ end users
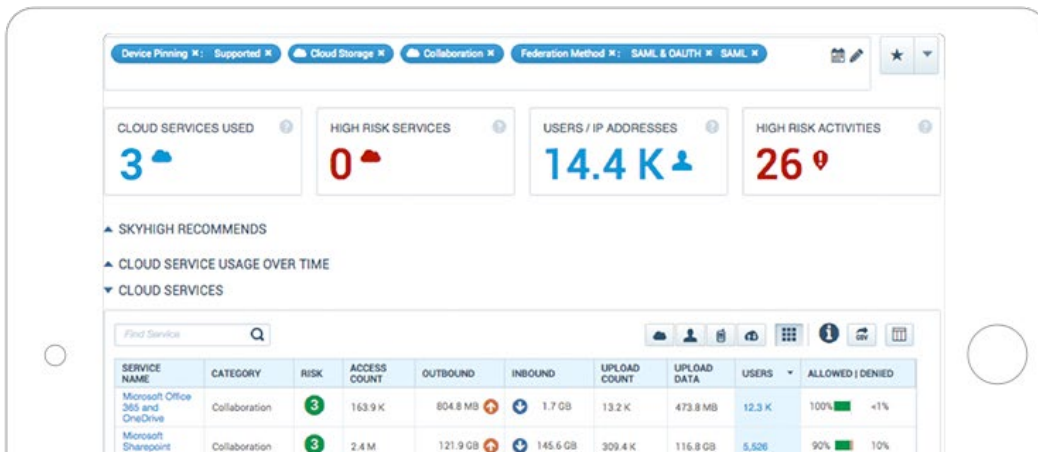
Similar Customers/Use Cases

Customer
Gantner Instruments
—

Hardware Producer for Industrial Sensors
- Automotive, Energy, Manufacturing and other sectors
- Use case: Store and query sensor data (temperature, acceleration and tension) at high speeds of 10kHz up to 1,000 channels
- Crate enables new services and business models by powering **Gantner-Cloud** as a scalable backend DB

Why Crate?
- Massive sensor data inflow with requirement for realtime alerting and functions. Enabling new business model of time series data services to their customers.

Gantner
instruments

High Performance IoT use-cases
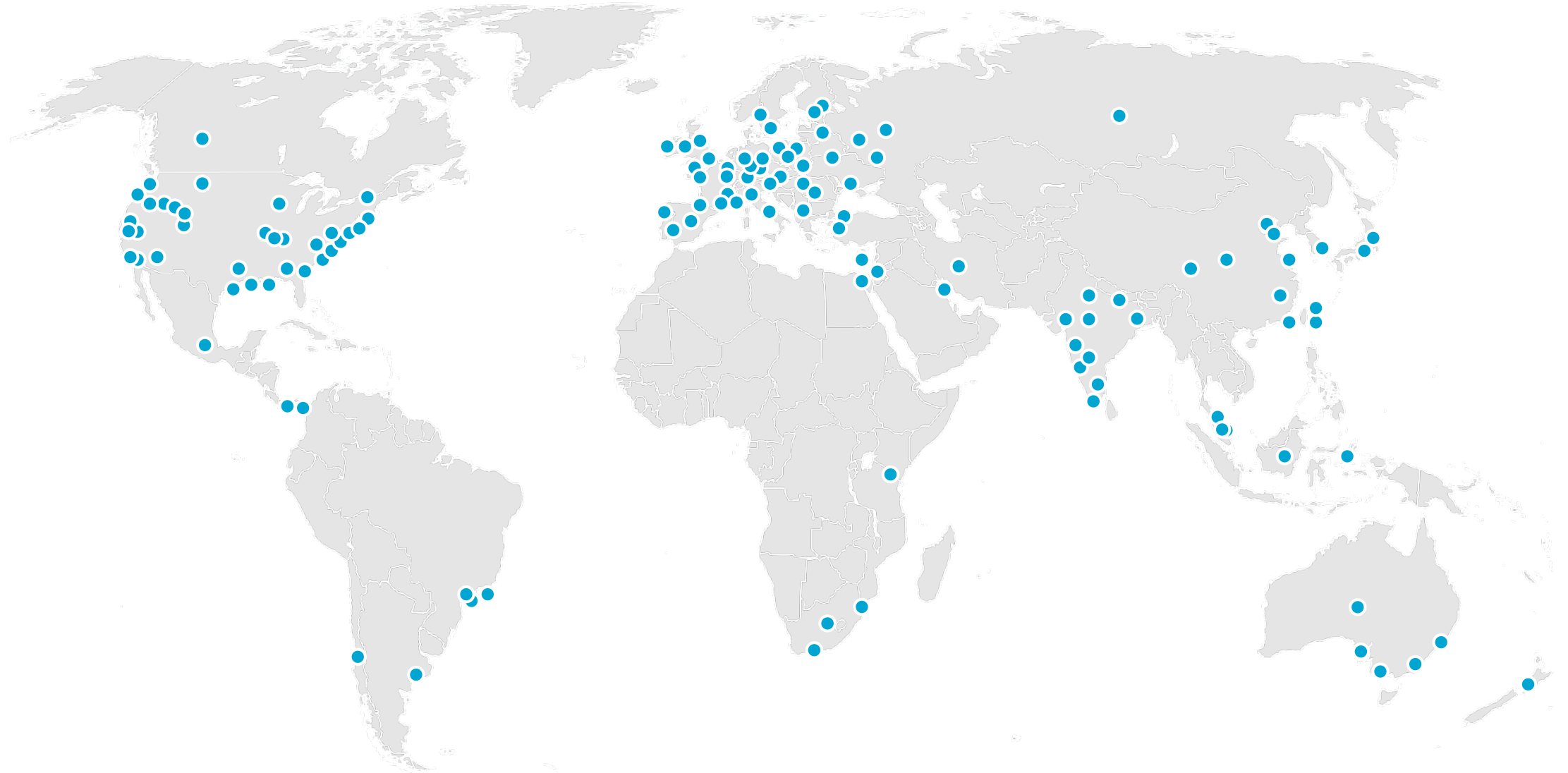

250,000
peak consumption records / per sec

"Dealing with sensor data CrateDB is the only database that gives us the speed, scalability and ease of use that our teams, customers and applications require."

Werner Ganahl, CEO

1.600+ Crate Clusters Running Globally

Recognized By Top Industry Players

Forbes

Gartner COOL VENDOR 2019

"The CrateDB Cloud for Azure IoT is a turnkey data layer, offered as a hosted cloud service on Azure, enabling faster development of IoT platforms and data-driven smart factories"

Louis Columbus
Forbes

"It helps to transform real-time machine data directly into action on the production floor in manufacturing environments"

Rick Franzosa,
Simon Jacobson,
Christian Titze, Scot Kim
Gartner

2019 IOT INNOVATOR BRONZE AWARD WINNER
IOTINNOVATOR.COM

Deloitte.

IoT Evolution

Business Wire
A Berkshire Hathaway Company

IoT INNOVATOR
INTERNET OF THINGS NEWS

About Us

Crate.io was founded in 2013 by Jodok Batlogg and Christian Lutz and has – since then – built a technology to revolutionize the way we deal with large amounts of data.

- Trusted by Tier 1 global industrial and manufacturing organizations, like ABB, Alpla, Rauch

- Offices in USA Francisco, Germany and Austria

- 7 years of experience developing technical architecture in IIoT and timeseries

CRATE.IO

Thank you!

Simon Potgieter, Senior Account Executive
simon@crate.io

https://crate.io