



Industrial IoT

Webinar





Ben Corbett

Solutions Engineer, InfluxData

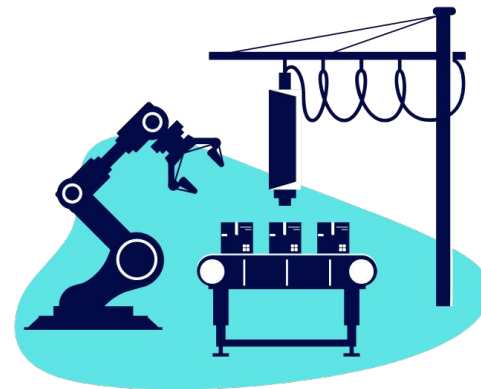
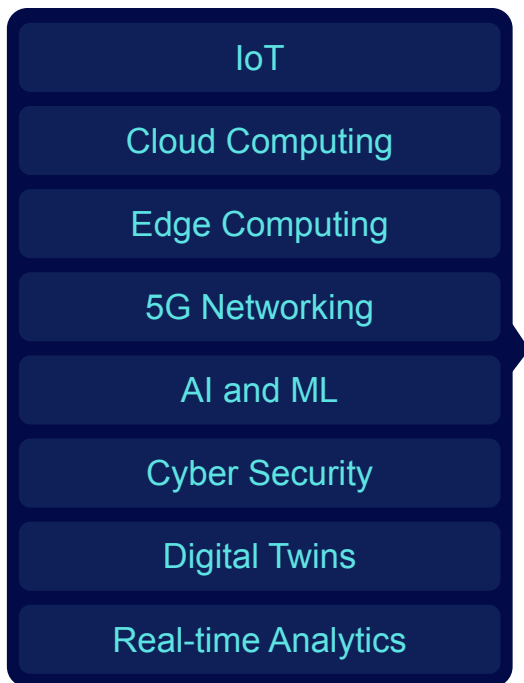
Agenda

- Industry 4.0 and Challenges
- InfluxDB 3.0 Overview
- InfluxDB for IIoT
- Use Cases

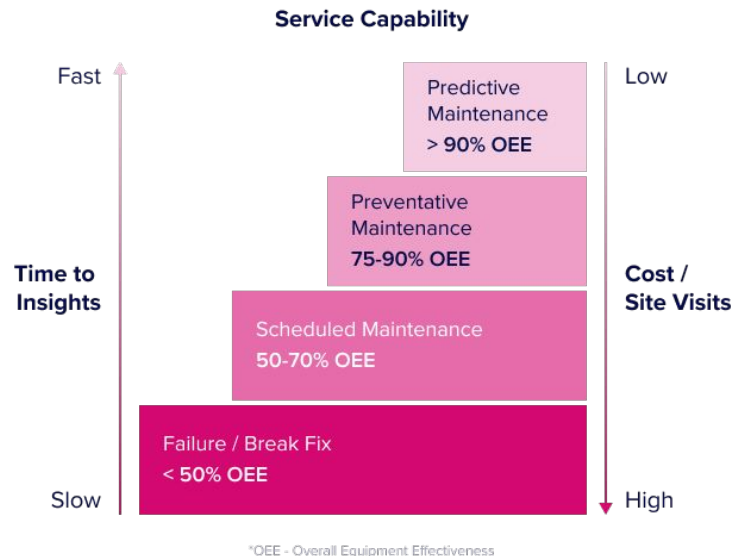
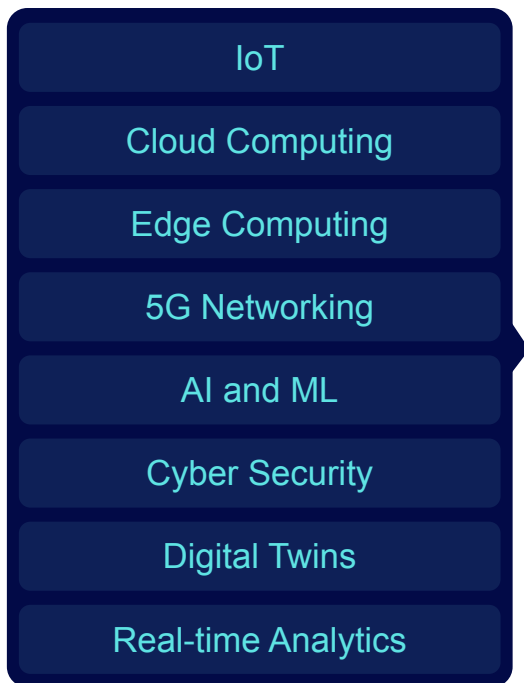


Industry 4.0 and Data Challenges

The Future of Industrial Data: Industry 4.0...



The Future of Industrial Data: Industry 4.0...



Operational Technology (OT) Goals

Reliability



Your assets become more reliable.

OEE
(Overall Equipment Effectiveness)

Production Efficiency



Find new ways to run with greater efficiency.

OE
(Operational Efficiency)

Optimization



Optimize performance to match demand

ROI
(Return On Investment)

Industrial sensors “speak” time series



2017-11-17 00:00:00.50	Temp: 129.4	Press: 0.50	Rot: 1,004.00	Part: 0.78
2017-11-17 00:00:01.00	Temp: 123.0	Press: 0.70	Rot: 1,106.00	Part: 0.54
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2017-11-17 00:00:06.00	Temp: 129.7	Press: 0.70	Rot: 1,130.00	Part: 0.67
2017-11-17 00:00:06.50	Temp: 120.4	Press: 0.70	Rot: 1,096.00	Part: 0.7



- Measuring change over time – status, performance, problems
- Events and activity encapsulated by time interval
- Time is often the magnifying glass for operation
- Term “historian” is apropos

Industrial IoT Use cases

Sensor Monitoring & Analytics

Real-Time analytics for IoT

Predictive Maintenance



Photo by Simon Kadula on Unsplash

100,000+
Sensors

1 Billion+
Datapoints

Nanosecond
Data Frequency

Billions of
Device Tags

Challenges with managing time series data

Massive Scale

Data is continuously arriving at high speed and volume

Real Time Action

Applications must analyze data within streams and act in real time

Data Cardinality

Higher number of tags collected cause high cardinality impacting performance

**Most tools
(including data historians) simply
cannot handle these challenges**

Relational
datastores are
not a fit for
purpose

- **Scale** – Cannot ingest large volumes of data in short time period
- **Slow queries** – Not architected for real-time querying
- **Lifecycle management** – Sharding & data retention are not built-in

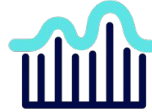
Data historians are not a fit for purpose

- **Cost** – Proprietary and expensive
- **Vendor Lock-in** – Windows-based and no simple, open API
- **Scalability** – Manual techniques for analysis

Use Cases - Time Series



Track + Monitor
application
infrastructure



Metrics from
everywhere



Warehouse IoT
Devices



Robotics and
Green Energy

Time series databases address a few major issues.

Ingest - A high amount of data streaming in at nano second precision

Compression - The ability to store this large data set without breaking the bank

Cardinality - The need to store wide rows, timestamped data with multiple values

Querying on Time - Instead of indexes or values, querying on time

What makes InfluxDB Special

Uniquely equipped for time series data



Scale

Designed to scale for large volumes of time series data

Distributed

Non-blocking high volume writes and reads

Availability

Write and read availability are prioritized

Management

Data lifecycle management with built-in data retention

Flexible

Schema on write

High performance at any scale



Unlimited

Data cardinality



Billions

Data points per second

InfluxDB 3.0: Columnar database for high performance & low cost



Real Time

Hot data in memory

*Sub-second responses
for recent data*

Optimized for low latency
analytical queries



Lowest cost storage

Cold data in object store

*Superior compression &
reduced TCO*

Optimized for lowest
cost long term storage



Unlimited Cardinality

Optimized writes & reads

*One datastore for all
time series data*

Optimized for ingest
scale & speed

InfluxDB 3.0: an Open Data Architecture

Flight

Transport columnar data at high speeds based on Arrow format

DataFusion

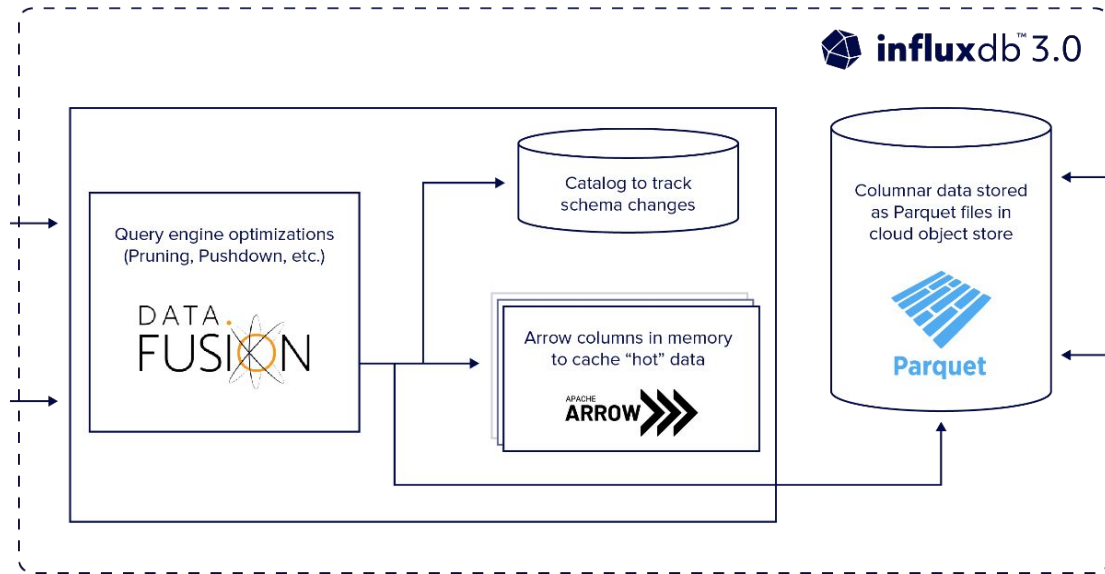
Fast query execution engine written in Rust

Arrow

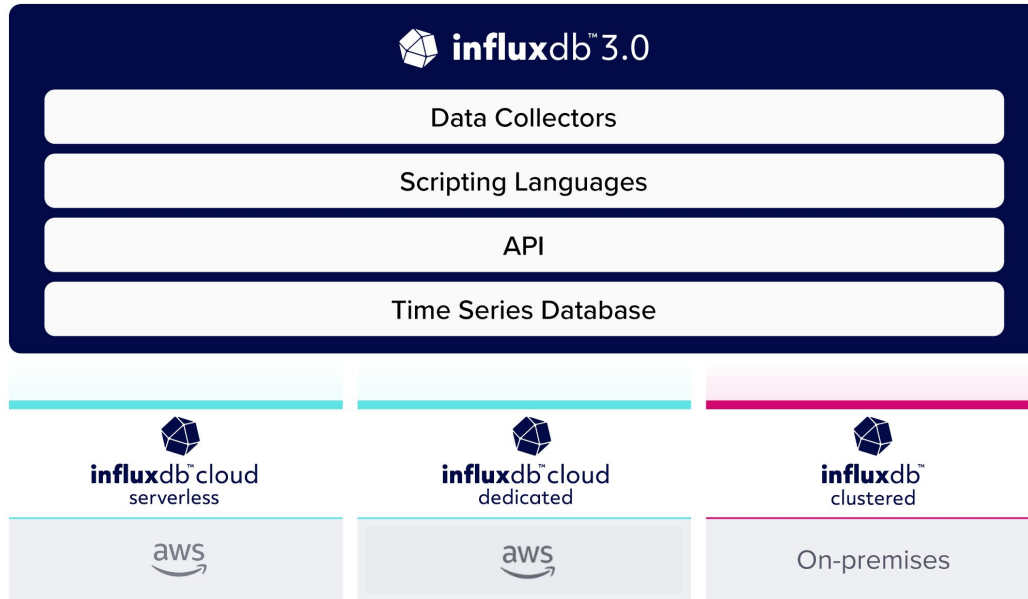
Optimized for running large analytical workloads

Parquet

Open column-oriented file format designed for efficient data storage and retrieval



InfluxDB 3.0: Run on cloud & on-premises



Cloud Serverless

- managed service for small & medium workloads

Cloud Dedicated

- managed service for large enterprise workloads

Clustered

- software for large enterprise workloads in self-managed environments

* We strongly encourage that customers evaluate the InfluxDB Edition that is desired for production

InfluxDB for Industrial IoT

Why InfluxDB for Industrial IoT?

- ✓ Get Real-time Insights
- ✓ Optimize OEE & Production
- ✓ Enable Predictive Maintenance
- ✓ Improve Profitability

Trusted by 1,900+ customers

Honeywell

CHAMPIONX

★ Heineken®

BTC

xylem

MAN

b Bboxx


IIoT Partnerships & Integrations

Applications



Grafana | Seeq | + a b | e a u | factory | Clarify | Apache Superset

Data Persistence



influxdb | Edge | Data Centre | Cloud

Middleware



telegraf™ | kepware® | HIVEMQ | HighByte | APACHE nifi | WinCC Open Architecture SIEMENS | Cogent DataHub™

Processes & Assets

ICS / SCADA | PLCs | Robotics | Sensors / Devices | Plants / Factories



io-base
value-added data

thingworx®

Ignition!
by inductive automation

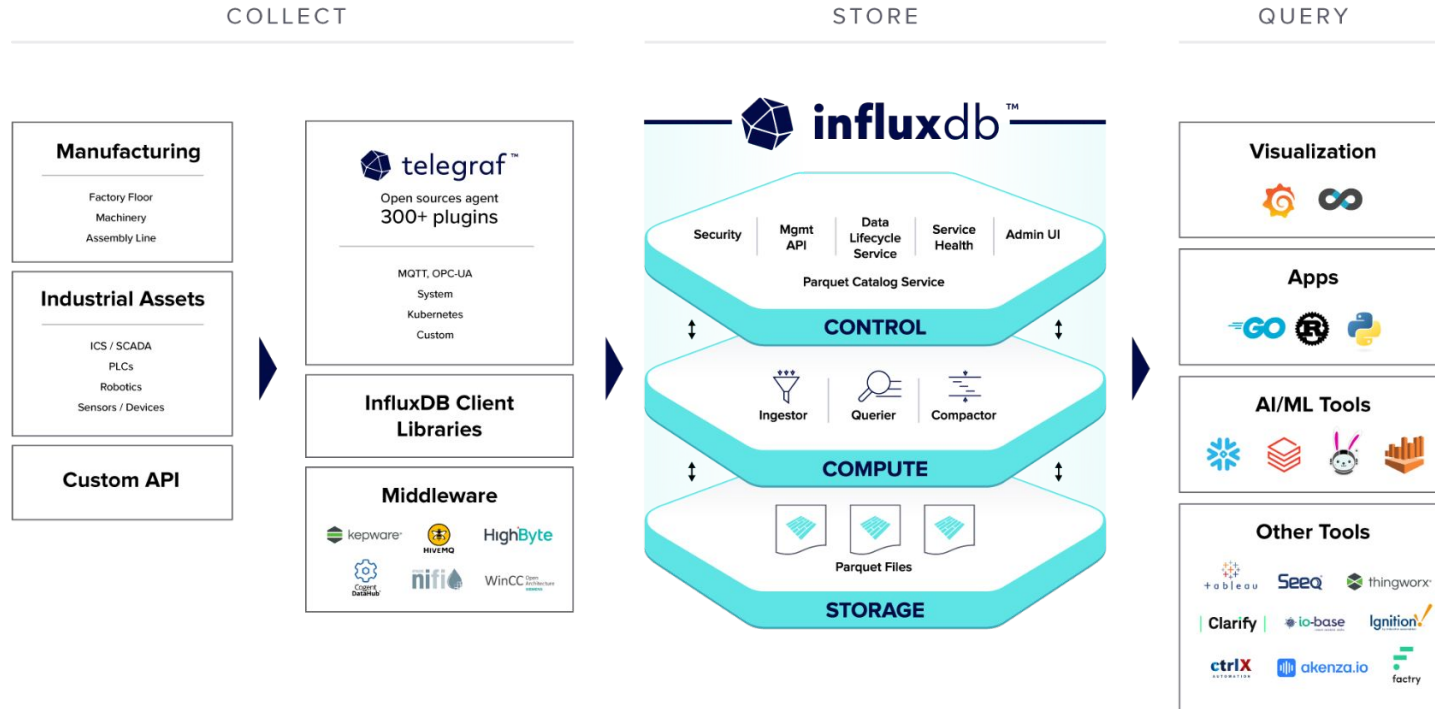
ctrlX
AUTOMATION

akenza.io

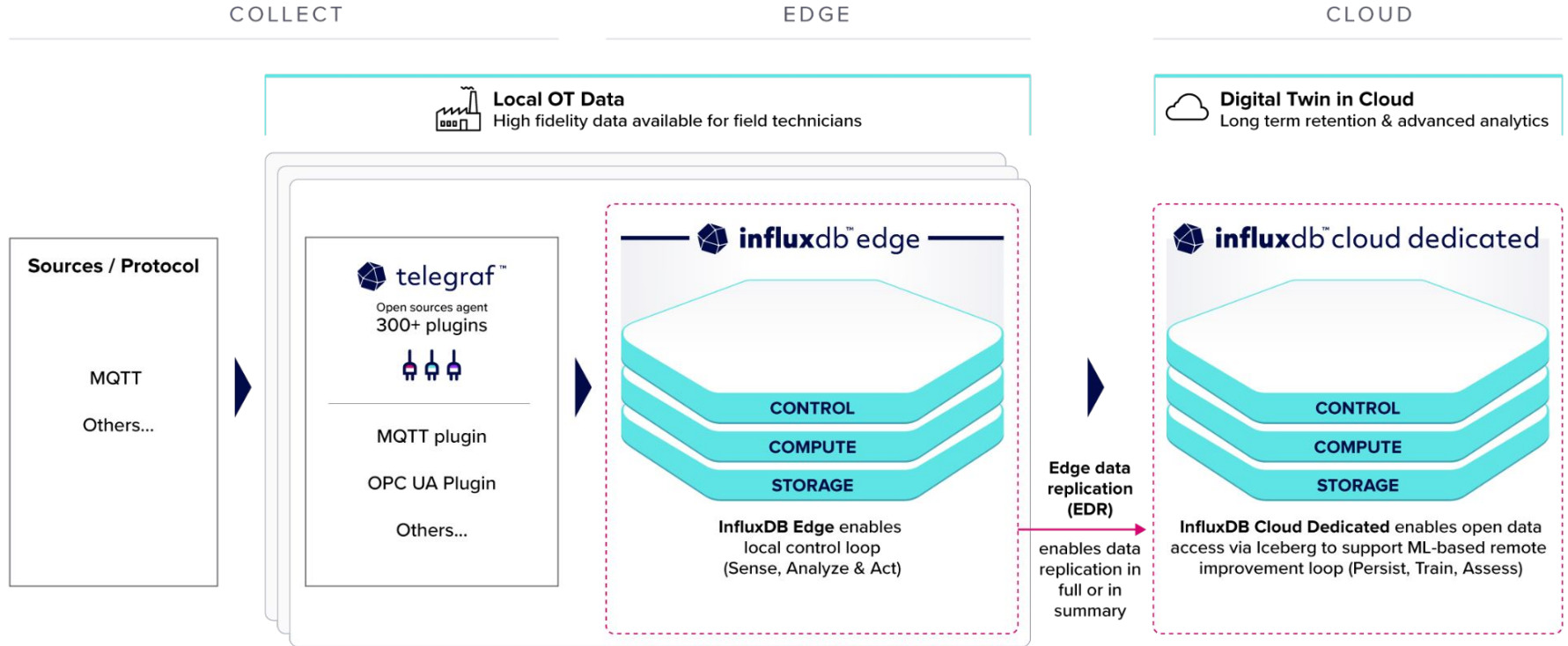
influxdb

Platforms

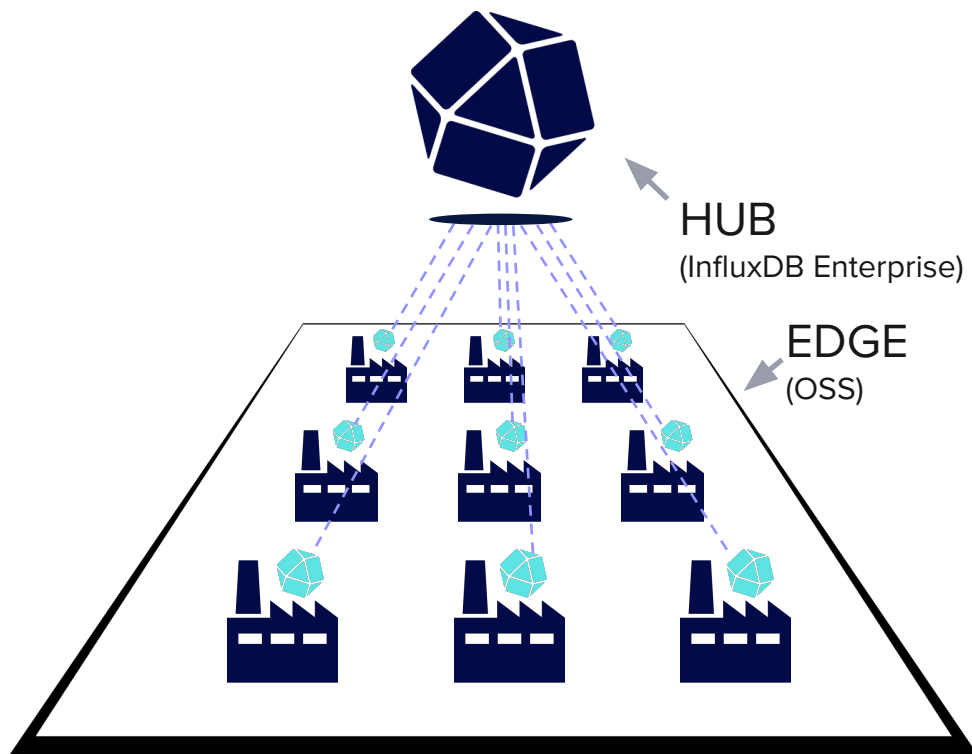
Reference IIoT Architecture with InfluxDB



Modern data historian use case



InfluxDB Edge Data Replication



- ✓ **Remove Data Silo's**

Avoid data scattering, discrepancies and maintenance issues

- ✓ **Data Access Simplified**

Replace data cherry picking with a 'single pane of glass' integration point for reporting and analytics workloads

- ✓ **Enhance Security**

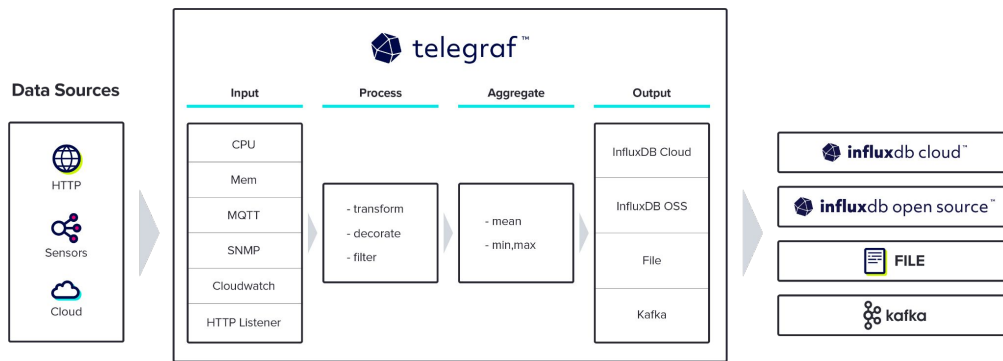
Remove bandwidth and firewall / security concerns with multiple connections to the edge / OT

- ✓ **Lightweight Edge**

Reduce the resource requirements of your edge instances to save on infrastructure spend and complexity

Telegraf Plugins

With our Open Source Telegraf Agent, Customers are able to Accelerate Time to Value by utilizing MQTT, OPC-UA or any of the 300+ plugins offered to collect metrics from their sensors, OT machines and devices, at granular frequencies.



Customer Use Case

Mining



Problem: Need more accessible data for incident analysis & maintenance optimization


- Monitoring of mobile and static assets across the Western Australia iron ore mines
- Mandate to provide more useful and accessible data to the business by the end of 2024 to optimize maintenance costs
- Drowning in data: 50+ analysts in HQ consuming data from numerous OEM siloed systems



InfluxDB Results

- Eliminated costs associated with using 3rd party OEM solutions, including integration fees.
- Able to scale data ingestion to support 1,300 assets and support real time alerts and operations
- Unlocked 8 new use cases that were never before possible including real time fuel monitoring (supporting their net zero goals).



 **Problem: performance and high-volume data handling required to power customer-facing dashboards and queries**

- Data collected from multiple sources - sensors, manufacturing systems, utilities, weather
- Customers rely on dashboards, alerts and advanced analytics to change operations
- Performance and ingestion limitations with InfluxDB OSS and PAYG Cloud Serverless

 **InfluxDB Results:**

- Realtime ingest/visualization of 35K values / second with capacity to increase customer base
- 6X query performance improvements over serverless
- DataFusion UDF - customer identified DF bug & made fix themselves, plans for more UDF's



Beverage Manufacturing



Problem: data silos made it impossible to uncover causes of increased cost per unit

- Too difficult to work with data from each of the machines used on the floor - over 2000 machines from 95 breweries.
- Evaluated AWS Timestream but it could not handle large query volume in a performant way.



InfluxDB Results

- Ingesting data from 95 breweries and over 2000 machines, on their way to 160 breweries
- Able to handle 400M+ queries / month
- Through improvements in power, packaging, cleaning and maintenance process, improved operational efficiency by 1% which translates into \$20M
- Influx plays a key role in hitting their next goal which is a 3% increase in operational efficiency



Demo

Useful Links

[InfluxDB 3.0](#)

[Request a Proof of Concept](#)

sales@influxdata.com



Problem: data historian and machine-specific monitoring tools can't handle data volume

- potential for millions of dollars in aircraft repair work, scrapped work, and delayed delivery due to tiny variations in conditions
- AVEVA Wonderware + machine-specific monitoring failed to keep up volume and query performance.
- Unable to provide the factory-wide view



InfluxDB results:

- Team is now monitoring more than 3000 parameters / second in one factory-wide view
- Met stringent security and compliance requirements for both commercial and military clients





TERēGA
SOLUTIONS

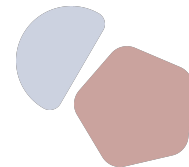


influxdb™

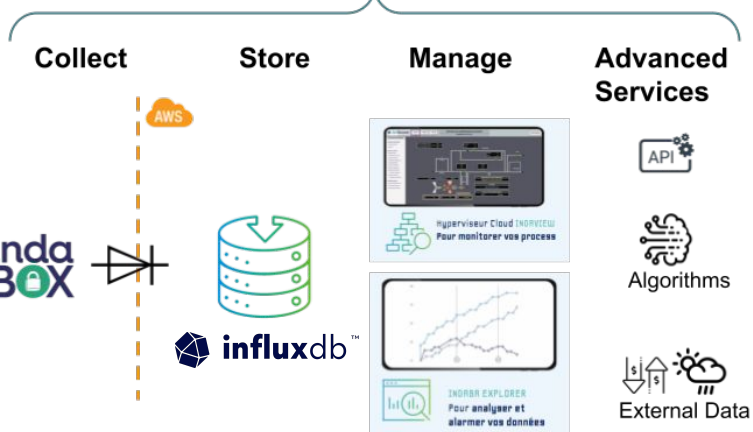


io-base
value-added data

IO-Base now



Secure, Performant, Agile, Industrial Data Twin platform



- Centralized master data
- Minimum onsite infrastructure: only collection/transmission - no maintenance
- Ease of data sharing
- Hardware / network agnostic
- Highest level of cyber-security



Non-hackable Industrial Site

Indabox

Secure data collection

inda
BOX
by TEREGA



secure
by design
bringing your existing
equipment online

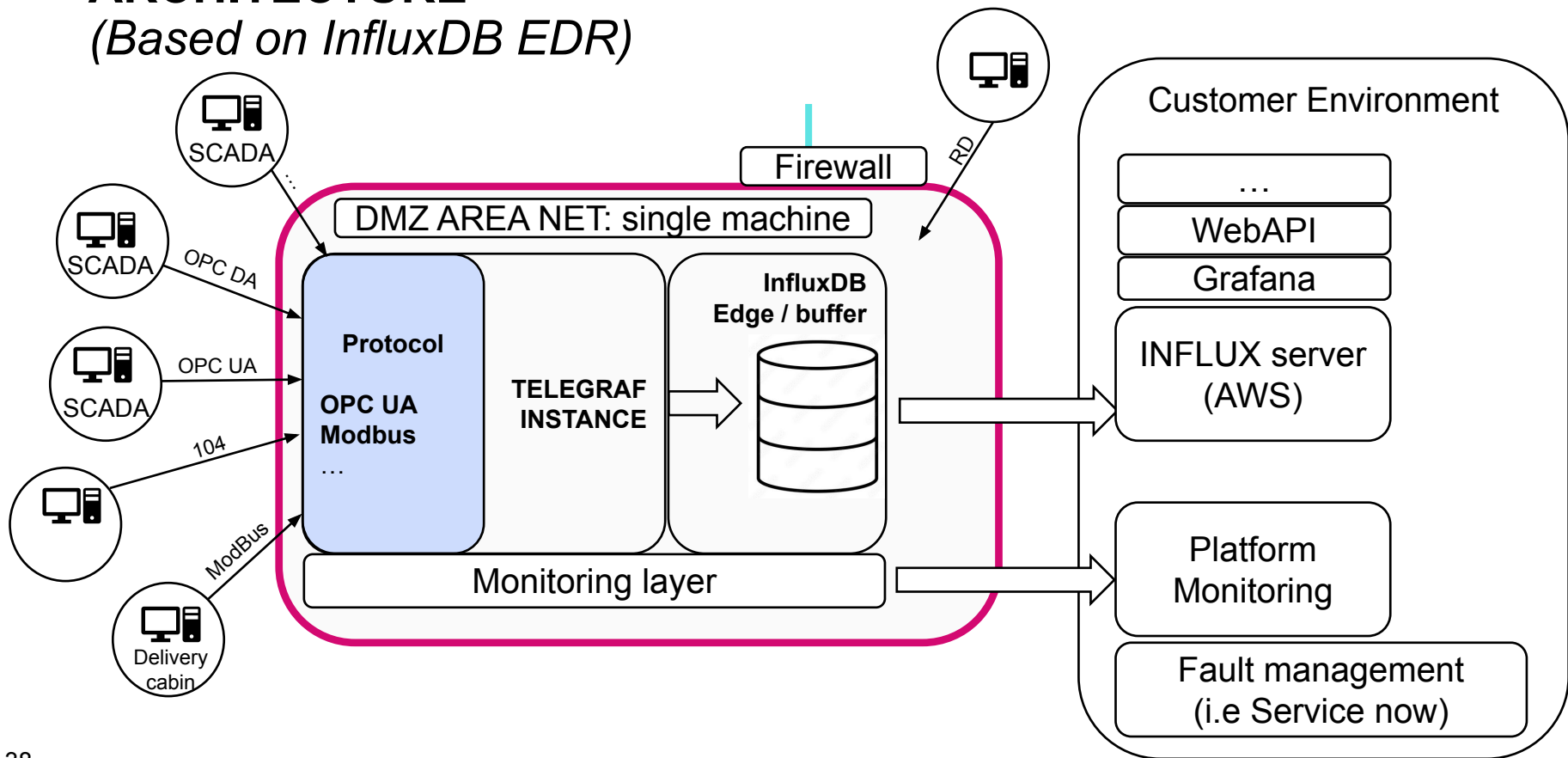




FTSE 500 Energy Company

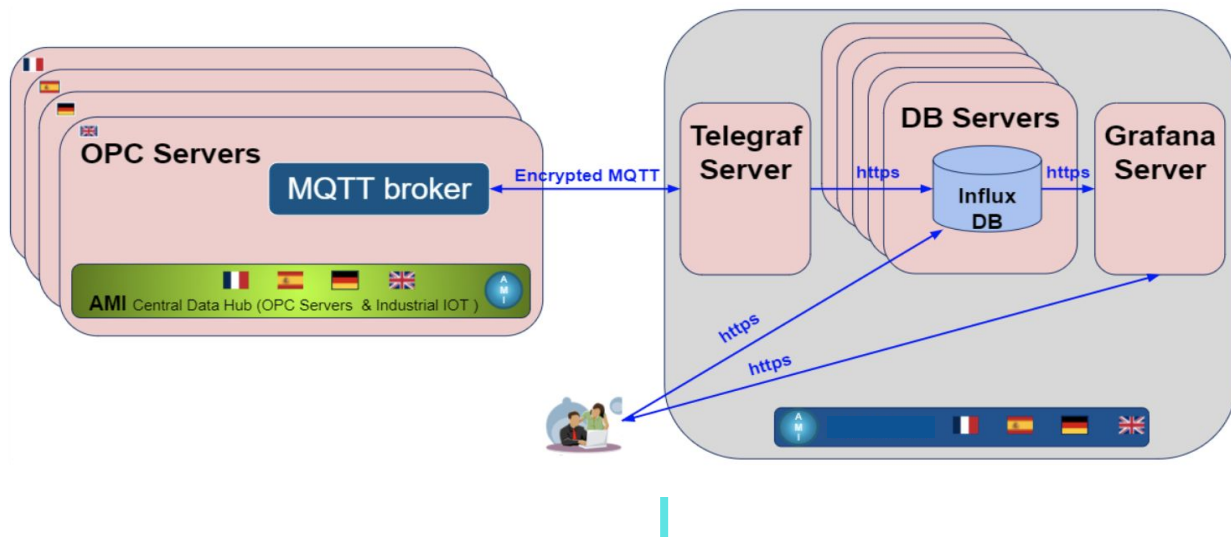
ARCHITECTURE

(Based on InfluxDB EDR)





FTSE 500 Aerospace Company



- Smart factory IIoT use case
- Globally distributed plant network
- with scalable MQTT-based ingestion architecture

Targeted Personas

Typical users

OT (Operational Technology) Engineers

OT Site Managers

IT Architects

IT Project Managers

DevOps Engineer

Software Engineer

'Newer' users

Data Scientists

Data Engineers

Business Analysts

Challenges

Operational Efficiency, Actionable Insights

Sustainability, Quality Control

Cost Efficiency

Connectivity, Accessibility, Data Siloes

Diversity of data sources, Inconsistent Schema

Data Volume, Dimensionality, Resolution

Business Outcomes

Improve OEE, Proactive Operations

Improve Energy Management, wastage, products & processes

Lower Cost of Storage, Lower TCO

'Single Pane of Glass', Durable & secure data capture/sync

Accelerate Time to Value

Real-time OT Monitoring

InfluxDB Capabilities

Automate Predictive Analytics & OT processes

Real-time analytical queries at scale

Interoperability with BI & data science tools

Compressed data storage on cloud object store

Zero retrieval cost to query historical data

Intelligent Edge with InfluxDB Edge

Edge Data Replication

Handle late data arrivals and duplicate data

Telegraf with 300+ plugins

Open & Flexible Data ingestion

Schema on Write

Purpose built for time series data

High speed writes & queries at scale

Unlimited data cardinality

Time Series Database Pros for IIoT

1. **Cloud-native, modern** and **open technology** supports the Industry 4.0 transition
 - a. Application versatility
 - b. Development agility
 - c. Easy integrations and ecosystem support (APIs, connectors, protocols, tools)
2. **Flexible query** language and **advanced analytics** capabilities
3. Excels in **real-time processing**
4. **Cost efficient** and scalable commercial model
5. **Scalability** and **storage efficiency**



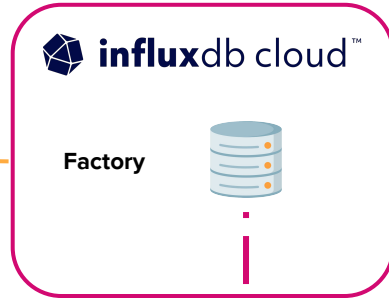
InfluxDB Addition Pro's for IIoT

1. Supports **massive scale**, incl. Unlimited cardinality
2. **Hybrid deployments** (edge, on-prem, cloud)
3. Edge Data Replication (**store-forward**) capabilities
4. Flexible **schema-on write**
5. Hot and cold **storage tiers**
6. Vast **community** and network of **integrations** and partners
7. Many more...

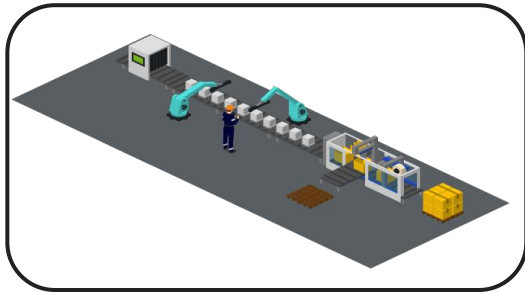




Grafana



Cloud



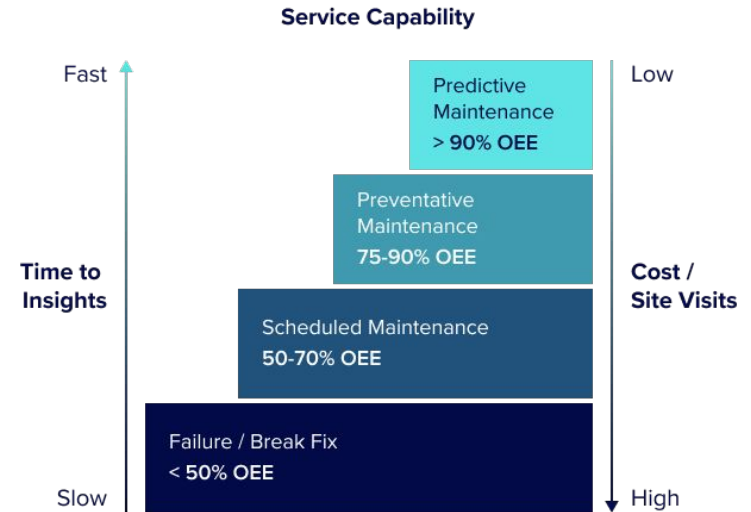
Broker



Telegraf

Edge

The Future of Industrial Data: Industry 4.0...

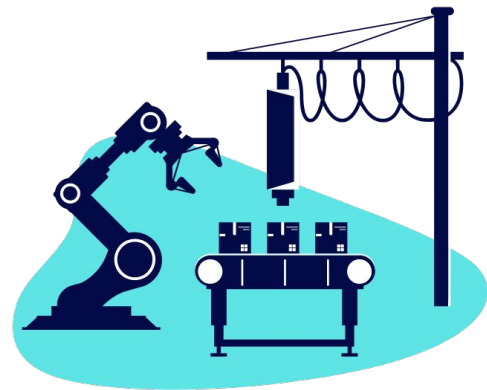


*OEE - Overall Equipment Effectiveness

The Future of Industrial Data: Industry 4.0...

- IoT
- Cloud computing
- Edge computing
- 5G networking
- AI and ML
- Cybersecurity
- Digital twins
- Real-time analytics

- ✓ Operational efficiency
- ✓ Data Analytics & insights
- ✓ Customization & flexibility
- ✓ Quality control
- ✓ Supply chain optimisation
- ✓ Workplace safety
- ✓ Connectivity & collaboration
- ✓ Energy & sustainability
- ✓ Cost controls & efficiency



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