IoT Digital Twins as an Enabler for Manufacturing Industry

Case Studies

Industrial IoT Accelerator

Quick facts

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- Near end-to-end IoT solution enablement platform – from device connection to data visualization via custom, deployment-specific UI
- Scalable infrastructure for fast automated deployments
- Fully functional IoT backend and customer functionality for the device part
- Cloud agnostic and on-prem deployments
- High efficiency at peak loads used for high load systems

Key features:

- Core Agent to collect sensor data from devices
- Gateway for communication between devices and the backend
- Reflector for telemetry computation and storage
- Device registry (configuration, inventory, maintenance, and audit)
- Multi-tenancy backed by dynamic message schemas
- Over-the-air firmware updates and rollback mechanisms for corner cases
- A role-based access control using the Auth0 identity management system
- Session service (device KPIs, technical metrics, maintenance alerts, and analytics)
- Serverless AWS-based OTA updates solution

We've built a powerful IoT platform that enables fast and cost-effective IoT development and resilient, top-quality connectivity in the industrial sector.
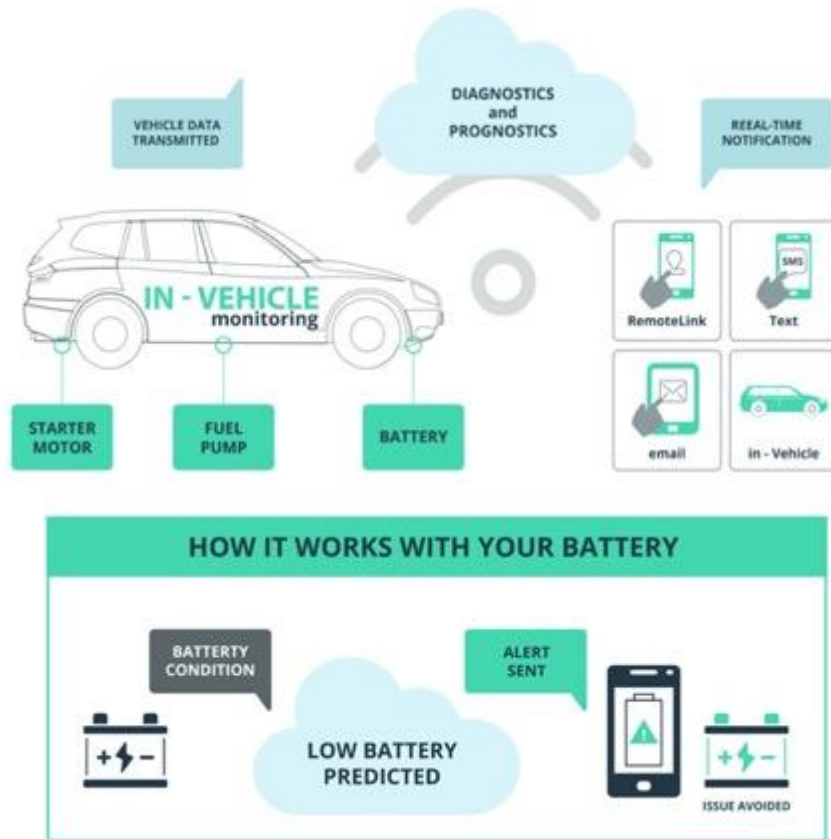
Technologies

Azure, C++ / Golang / Google Protocol Buffers / GraphQL / GRPC / InfluxDB / Jenkins / Kubernetes / MongoDB / OpenAPI / PostgreSQL / SQLite / WebSocket

Team

12+ FTE

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Predictive Maintenance Solution

Comprehensive monitoring system for car diagnostics and real-time notifications

- E2E predictive maintenance solution with online support based on Microsoft Azure cloud services to process requests for appointments and match drivers with nearby dealer service centers.

- In-car monitoring system to check the battery status and cloud-based ML algorithm to recognize starter motor malfunctions , drop of pressure in the fuel pump and end of a battery's service life

- Notification system to process all inputs and prepare advice to the driver

- Predicted car maintenance, supported remote diagnostics and improved vehicle safety

Our Client

Global dealer in cooperation with car manufacturer

Technologies

Python, C#, MSSQL, Azure, ML algorithms

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IoT Predictive Maintenance Solution for the Manufacturing Industry

We've built an intelligent monitoring platform for industrial predictive maintenance that prevents asset failure and ensures 100% equipment uptime

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- End-to-end development of a scalable IoT-powered platform from architecture and UI/UX design to implementation and roll-out (PoC, MVP, piloting, production, official product launch).

- Discovery phase and UI/UX approach: deep usability research, user personas & user roles, wireframes & flows, prototyping, architecture design, product development strategy, choice of technology, and business analysis.

- Edge computing system for capturing analog sensor signals on edge gateways, generating data on the condition of plant assets, and structuring this data for further analysis.

- Physics-based forecasting algorithms for accurate predictions: an algorithm manifesto with performance requirements for models to simplify their integration with the edge computing system.

- Integration of the IoT platform with industrial IoT systems and plant control systems.

- Set of dashboards for real-time visibility into asset conditions, supply chains, downtime loss prevention, financial savings, incident free production cycles, parts replacements, etc.

- Migration from on-premises data storage to the Azure cloud: DevOps integrations and infrastructure operations, which resulted in significant cost optimization in terms of hardware investments.

CASE STUDY

Our Client

A renowned inventor of novel technology platforms, providing its pioneering solutions to Fortune500 companies, startups, and government agencies
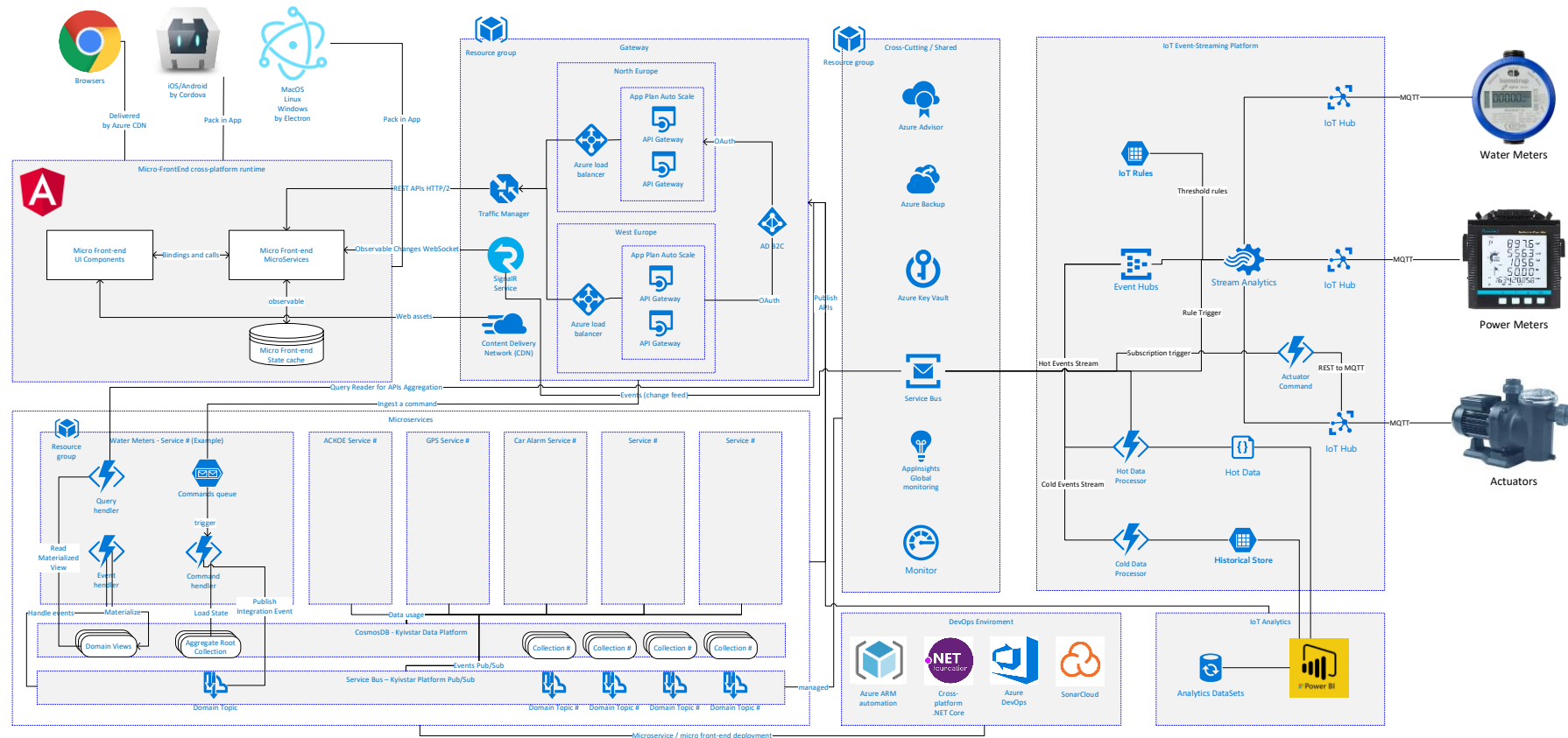
Technologies

C++ / Golang / GRPC / TimescaleDB / NATS / React TypeScript / Python / Azure / Kubernetes / PostgreSQL

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Intelligent IoT Platform for Utilities

We are helping our client accelerate innovation, and unlock new IoT-related business opportunities

Our Client

One of the largest Eastern European Holdings

Technologies

Azure IoT, MQTT, CoAP, EventHubs, CosmosDB, Angular, Node.JS, IoT Hub, TypeScript

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IoT Connectivity for Smart Exoskeletons

IoT platform for exoskeletons used in industrial sector

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- Secure and scalable infrastructure for on-premise deployments and multi-tenant scenarios
- Remote management of devices and their firmware updates
- Control and collection of telemetry from end devices and sensors
- Visualization of data and providing tools for analysis and AI-based prediction
- Predictive and preventative maintenance to resolve issues before they occur
- Application of ROS framework for IoT and robotic connectivity
- Programming embedded module in motor of exoskeletons

Our client

A software development company that delivers solutions for a European manufacturer who develops and builds exoskeletons for industrial use

Technologies

Kubernetes, Golang, C++, GRPC, InfluxDB, Redis, Postgres, Swagger/OpenAPI, GraphQL, MS Azure, ROS

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Advanced Structural Health Monitoring Solution for Bridges

We've contributed to building an Industrial Internet of Things solution making critical structures monitoring more accurate and cost- efficient

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- End-to-end development of an intelligent IoT solution that leverages fiber optic sensors to collect and return real-time information about structural health of bridges and buildings, enabling the assessment of asset condition and maintenance management

- Hundreds of sensors attached to a bridge's structure measure and estimate its key parameters including structural strain, thermal response, bending moments, shear/impact loads, vibration, and corrosion – all indicators of a bridge's structural health

- Real-time data on the bridge's performance is sent back to a remote single point for analysis based on physics-based system analytics and AI, which allows to accurately detect, identify, and map a range of different impacts on the bridge

- Significant cost savings when compared to standard monitoring technology achieved by reducing the need for routine scheduled checks on bridges usually conducted by an inspection engineer twice per year

Our Client

A state-owned enterprise which retains responsibility for all railway and tram lines, associated rail lands and other rail-related infrastructure, including more than 2,500 bridges, with focus on strategic asset management and supporting the delivery of better transport solutions

Technologies

Azure Serverless/ Functions
Phyton/ Azure IoT / Terraform

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