



Smart Factory Solutions

Digital Manufacturing Platform powered by AWS

Client signature issue

A large German automotive company with complex manufacturing operations needed to improve operational performance and reduce costs. Implementing such a solution can be daunting, but critical to remain competitive today. Focus was set on four manufacturing pillars aiming to improve operational performance and reduce costs by increasing visibility, improving production & quality, and reducing unplanned downtime associated with running a smart factory.

Differentiators

- Experienced development team with deep knowledge of AWS and IOT stack
- In depth understanding of manufacturing processes paired with Analytics competence

Solution

- Smart Factory Fabric is a pre-configured suite of cloud-based IoT applications designed to accelerate smart factory transformations for companies with manufacturing operations.
- Powered by AWS IoT, Deloitte designed and built a suite of cloud applications and integrated services to deliver smart factory capabilities to industrial enterprises.

- Focus on DevOps and infrastructure-as-code for the realization of the solution to unroll it on other plants
- Deloitte's established industry blueprint: Smart Factory Fabric

Outcomes

- Improved Asset Efficiency: Optimized capacity and asset utilization and decrease changeover time and downtime
- Improved Process Efficiency: Decreased scrap rates and lead times, Increased fill rate and yield
- Reduce Costs: Lower labor, sourcing, inventory, maintenance, and warranty costs
- Improved Safety and Sustainability: Decreased safety incidents and environmental impact and increased employee satisfaction and sustainability practices

Deloitte's expertise in AWS and IoT enables the client to drive end-to-end Smart Factory innovation.





Key Features

Asset Track and Trace

Dynamically track work orders and parts through defined routes and optimize against work order schedules based on constraints (part, machine, or resource).

Machine Monitoring

Capture, analyze, and display critical machine performance data that allows operators to know machine status, receive proactive alerts and notifications, and improve overall equipment efficiency (OEE) performance.

Command Center

Drive the optimization of overall factory network capacity by providing a command center to visualize asset performance and cross-factory utilization.

Predictive Maintenance

Cloud-based and Edge-deployed AI/ML algorithms that are able to proactively sense and detect operating conditions that result in catastrophic failure upon deployment without the maintenance team having to build a knowledge base.

Quality Sensing

AI/ML algorithms that are able to proactively sense and detect quality degradation issues with the goal of catching quality escapes earlier in the process.

Advanced Worker Solutions

Align available workforce resources to production needs dynamically, allowing supervisors to manage and optimize for constraints, and view performance in real time.

Dynamic Scheduling

Interactive, real-time solutions that allows operations management to proactively identify issues where the current production schedule is inconsistent with the output capabilities of the asset(s) in the production.

Scope – Key Activities & Deliverables

- Edge Gateway component based on AWS Greengrass using Lambdas and Stream Manager and MQTT
- Device communication with OT Devices(Siemens S7) using OPC-UA and AWS Public cloud using Kinesis
- Deloitte designed and developed a serverless cloud architecture backend, frontend rewritten as a React Web application providing faster export of reports
- AWS blueprints with CDK for Serverless and EKS architectures; provided Infrastructure-as-Code appl.

Target Outcomes & Benefits

- New centralized service with configurable rule engine to validate incoming events
- More scalable and reliable architecture with better performance accessible via web
- Blueprints which speed up the use case ramp up phase on AWS development for different architectures

Target Outcomes & Benefits

- AWS IOT Stack (greengrass, IOT Core , MQTT) as well as AWS Lambda, Aurora , API-GW, S3 and Cognito
- OPC-UA, Siemens S7-1500
- React Webfronted
- Infrastructure-as-Code with Cloud Formation / AWS CDK (Typescript)
- Backend in Golang and Node.js
- GS1-EPCIS Electronic Product Code Information Services
- DevOps and Agile Development

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