Precision. Productivity. Performance.

Elevate manufacturing efficiency in real-time with Cognizant's AI-driven (Overall Equipment Effectiveness) OEE optimization powered by AWS cloud

Manufacturers are under constant pressure to produce more, faster, without compromising on quality or increasing costs. By analyzing real-time metrics around availability, performance, and quality, they can drive actionable intelligence to improve equipment efficiency and overall productivity.

Cognizant's OEE Optimization solution, powered by AWS, enables factories to operate with unprecedented insight and precision.
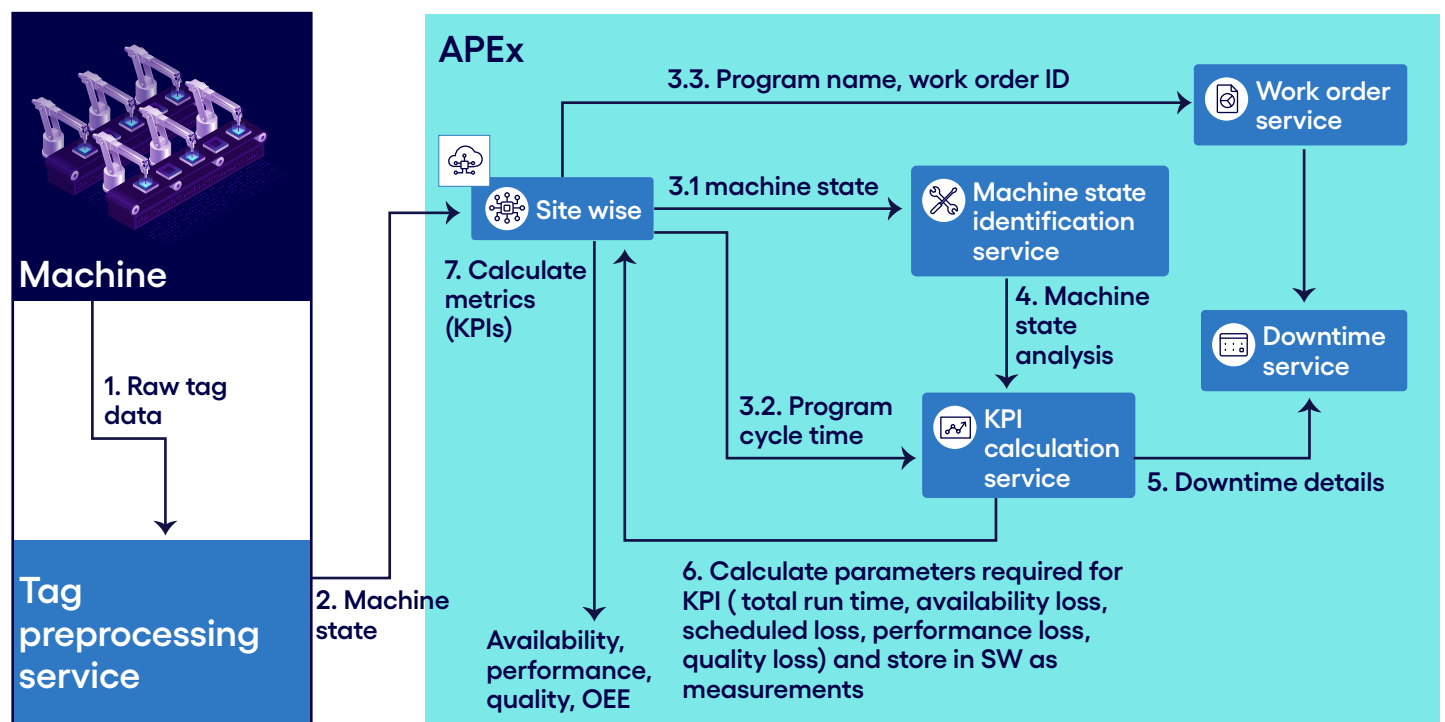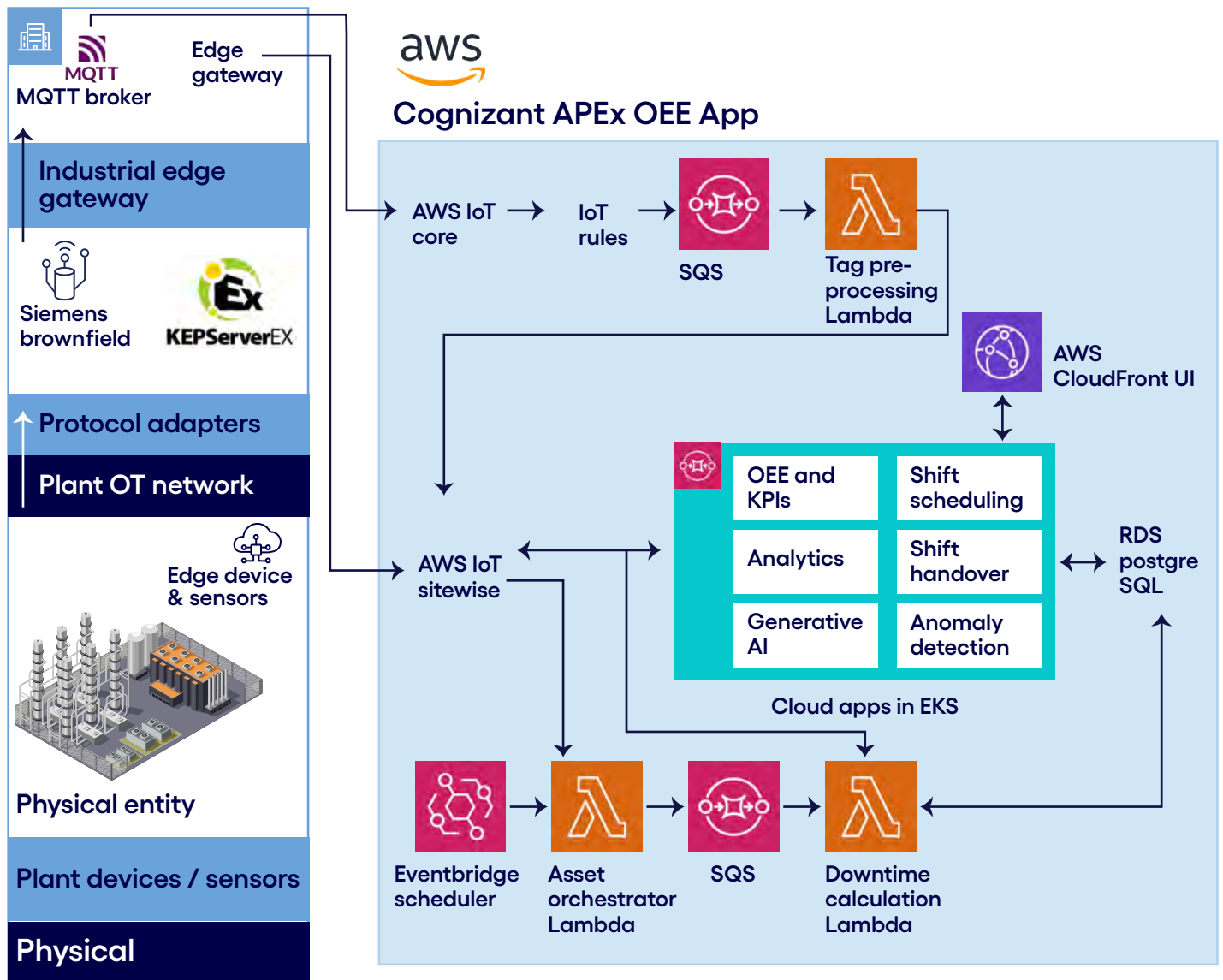
Whether the goal is leaner operations, reduced unplanned downtime, or improved product quality, the OEE Optimization solution serves as a powerful enabler of operational excellence and enterprise-wide digital maturity.

Solving today's manufacturing challenges

1 Operational inefficiencies

Identify and pro-actively eliminate hidden inefficiencies and bottlenecks in equipment performance

2 Downtime reduction

Monitor and predict equipment behavior to prevent costly unplanned halts

3 Quality control

Analyze production metrics in real-time to ensure consistency and minimize defects

Key highlights

- **Real-Time monitoring**
  Continuous visibility into equipment performance across all assets and production lines

- **Advanced analytics**
  Actionable insights through AI/ML models to detect anomalies and predict failures

- **Unified architecture**
  Scalable and flexible architecture using Unified Namespace (UNS) for seamless integration

- **Cloud-powered scalability**
  Deployed on AWS for enterprise-grade reliability, security, and scalability

- **Customizable dashboards**
  Role-based views for operators, engineers, and plant managers with KPI tracking

- **Proven RoI**
  Quantifiable business value with potential savings and productivity improvements validated by real use cases

Top diagram — Cognizant APEx OEE App architecture

Physical / Plant side:
- MQTT broker
- Edge gateway
- Industrial edge gateway
- Siemens brownfield
- KEPServerEX
- Protocol adapters
- Plant OT network
- Edge device & sensors
- Physical entity
- Plant devices / sensors
- Physical

AWS — Cognizant APEx OEE App:
- AWS IoT core → IoT rules → SQS → Tag pre-processing Lambda
- AWS CloudFront UI
- AWS IoT sitewise
- Cloud apps in EKS:
  - OEE and KPIs
  - Shift scheduling
  - Analytics
  - Shift handover
  - Generative AI
  - Anomaly detection
- RDS postgre SQL
- Eventbridge scheduler → Asset orchestrator Lambda → SQS → Downtime calculation Lambda

Bottom diagram — APEx

- Machine
  - 1. Raw tag data
  - Tag preprocessing service
  - 2. Machine state
- Site wise
  - 3.1 machine state → Machine state identification service
  - 3.3. Program name, work order ID → Work order service
  - 3.2. Program cycle time → KPI calculation service
  - 4. Machine state analysis
  - 5. Downtime details
  - Downtime service
  - 7. Calculate metrics (KPIs)
  - Availability, performance, quality, OEE
  - 6. Calculate parameters required for KPI (total run time, availability loss, scheduled loss, performance loss, quality loss) and store in SW as measurements

It's not just about monitoring machines, it's about **unlocking their full potential**

As manufacturers accelerate their digital transformation journeys, visibility, agility, and precision become non-negotiable. Cognizant's OEE Optimization solution on AWS cloud offers a clear pathway to smarter operations—combining real-time insights, advanced analytics, and scalable architecture to drive measurable improvements.

Use cases in action

Waste reduction

Identify and eliminate non-value-adding or wasteful activities in the production process to **improve efficiency and reduce costs**

Asset availability

Ensure that critical assets and equipment are available and operational when needed, **reducing delays, and improving productivity**

Unplanned downtime visibility

Understand root causes of equipment failures quickly with **granular insights**

Business impact

- **Cost savings** through improved visibility, enhanced OEE, and significant downtime reduction

- **Enhanced ability** to scale Industry 5.0 solutions across global facilities

- **Faster decision-making and intelligent resource planning** with real-time dashboards and analytics at hand

Real-world impact

Embraer – a leading global civil and military aircraft manufacturer

Challenge

Despite embracing Industry 4.0 and a large order backlog, Embraer **lacked real-time production visibility and an accurate OEE tracking system** across its facilities.

This limited its ability to identify improvement opportunities and scale digital solutions to optimize output and profits.

Solution

Cognizant assessed Embraer's operations and designed **a tailored OEE data model and a Unified Name Space (UNS) based architecture.**

The team established a compelling business case for transformation, supported by AWS cloud capabilities, identifying significant potential savings by addressing OEE under-reporting.

Outcome

$18M **potential savings** over two years, unlocked by Embraer as it gained comprehensive production visibility and accurate OEE measurement

The solution is now **a scalable blueprint for innovation** across all 10 manufacturing sites.

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Learn more about Cognizant and AWS partnership:
https://www.cognizant.com/us/en/services/cloud-solutions/aws-cloud/aws-smart-manufacturing-at-scale

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