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MachineLogix for Smart Factory

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Manufacturing Industry: Enabling real-time visibility into machine performance

A solution for smart factory that connects machines at the shop floor and uses cognitive services to detect, in real time, anomalies and faults, and drives insights to take decisions for managing process variations and disturbances at a machine level.

CHALLENGES

Manufacturing machines (for example CNC) at the shop floor experience constant process variations and disturbances because of dynamic changes contributed by machine condition, operator training and competency levels, material properties, product features, operational requirements, or order sequence change. These lead to high variation in performance levels of the machines, resulting in significant production-related losses and costs (CAPEX and OPEX)

IDEAL SOLUTION

A connected machine linked with a virtual and digital machine model provides real-time visibility and insight into the machine's performance. It also helps drive decision intelligence for automating workflows to readjust a machine's operating parameters, re-configure a machine's process plans, and optimize a machine's performance (Productivity, Quality, Cost).

DESIRED OUTCOMES

Real-time visibility into a machine and operational risk identification, evaluation, and corrective and preventive actions

Increase transparency between Production supervisor, Maintenance personal, Quality inspectors keeping Production performance on the track, as planned

Improved OEE, ROA

MachineLogix for Smart Factory Solution

MachineLogix is the foundation block for the development and implementation of a Smart Factory. It provides interfaces to connect with the Manufacturing Execution Systems (MES) for implementation of paperless manufacturing and other applications such as process quality, smart e-kanban, predictive maintenance, etc. The solution is extended to create machine digital twins for closed-loop performance across the life cycle of the asset.

Improve OEE

Real-time visibility into OEE

Insights into losses due to downtime, quality, or speed loss of a machine because of various factors e.g. engaging early in-time operators, engaging supervisors/managers to prevent and avoid situation leading to excess scrap, machine break down, lower productivity, or high energy consumption

Improve ROA

Energy, quality, productivity aware, predictive performance optimization of a machine to maximize the throughput, improve utilization and availability, and reduce the cost of ownership

Azure Integration Benefits

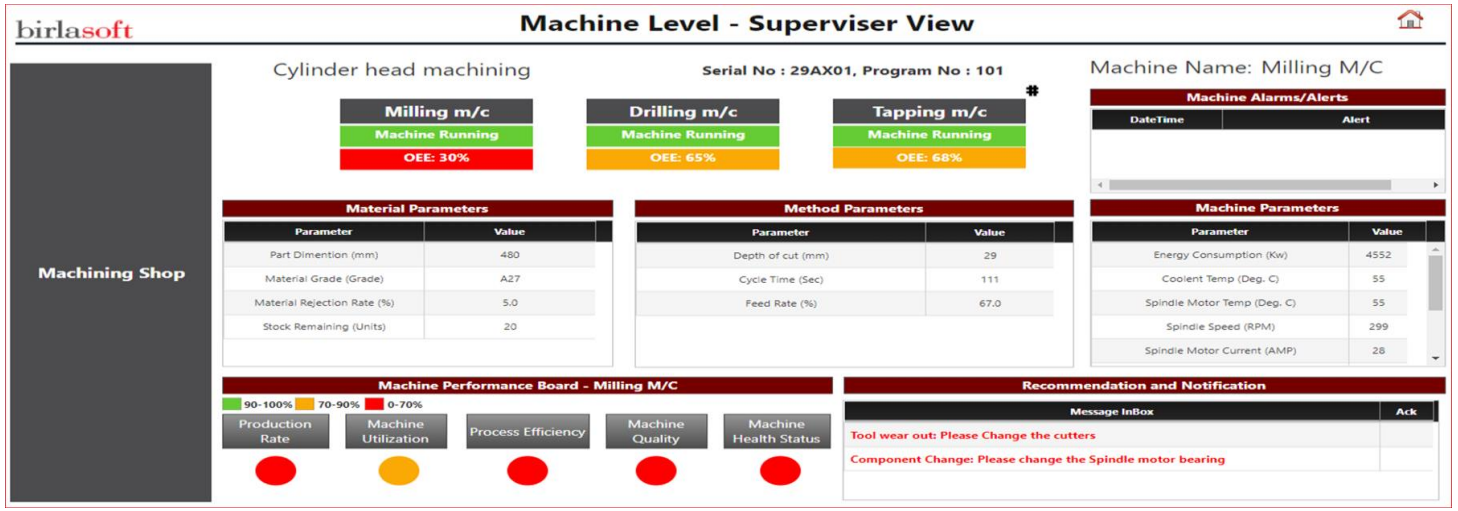
- Ease of integrating and connecting different machines using IoT Hub. Interoperability interface support for OPC UA, MQTT, MTConnect, etc.
- AI/ML services for anomaly detection, dynamic root cause, predictive analysis, edge, and decision intelligence
- Time series services for process parameter trend analysis and insights
- Seamless connectivity with multiple machines across factories with a secured, extendable, extensible platform

MachineLogix Solution Function and Features

- Real-time OEE visualization
- Reporting dashboards to view the status (over time) of the machine for a single day, or drill down for a detailed view
- Analyze OEE, MTBF/MTTR, energy consumptions, process & machine, tools parameters, part quality, historical and real-time trends for fault detection, identification, diagnostics
- Quality aware, maintenance aware, WIP bottleneck warning and immediate attention alerts and notifications by correlation heatmaps to rapidly discover hidden relationships between production parameters and quality, speed loss and downtime issues
- Insights to bring focus to the reasons for the most frequent downtimes to help avoid negative impact to the business
- Asset utilization and downtime statistics to help maximize usage of the asset at the right time
- Asset health index estimation and evaluation to trigger CBM schedule

Real-time performance monitoring and Analysis

Anomaly detection and Exception Handling



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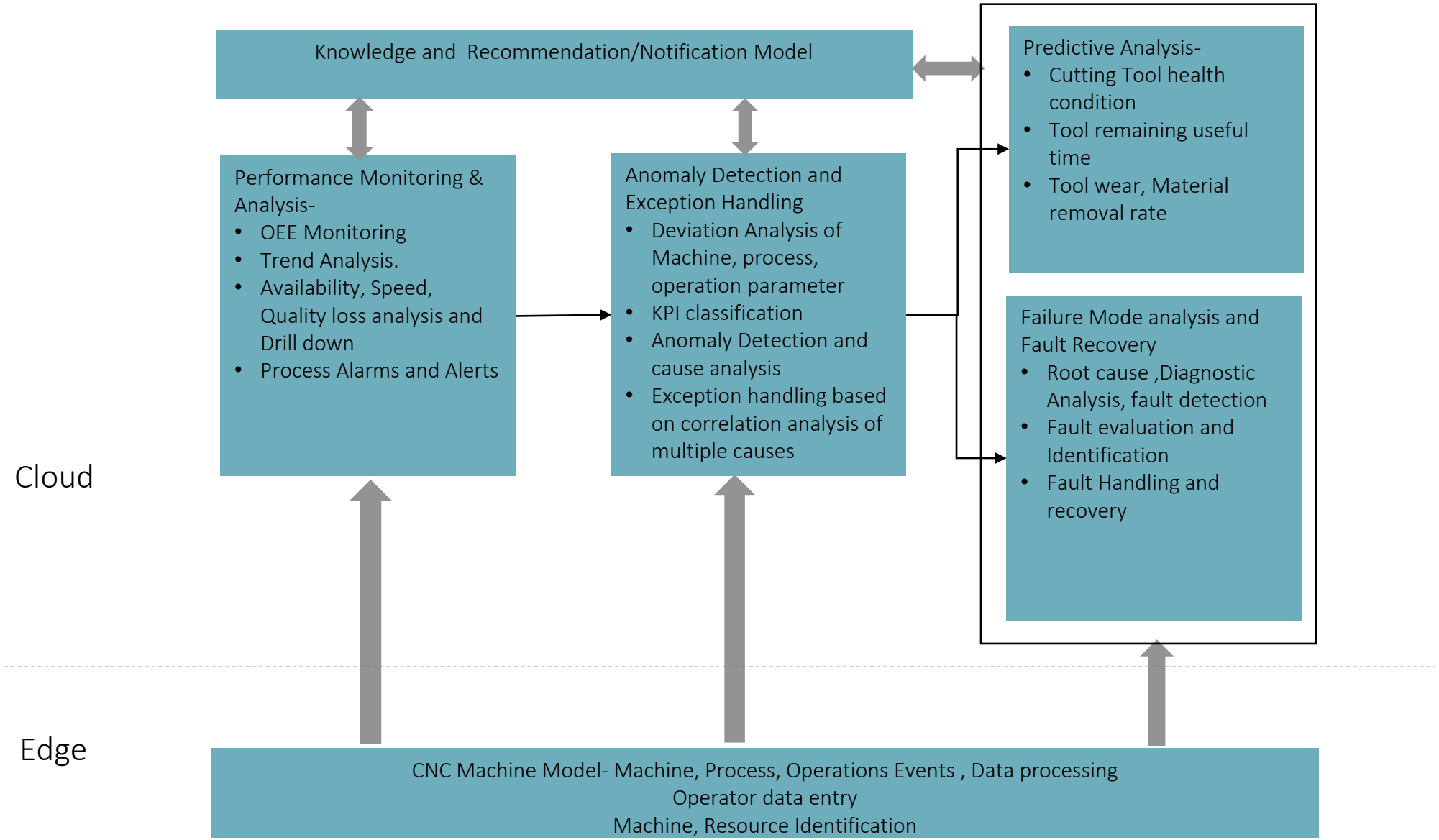
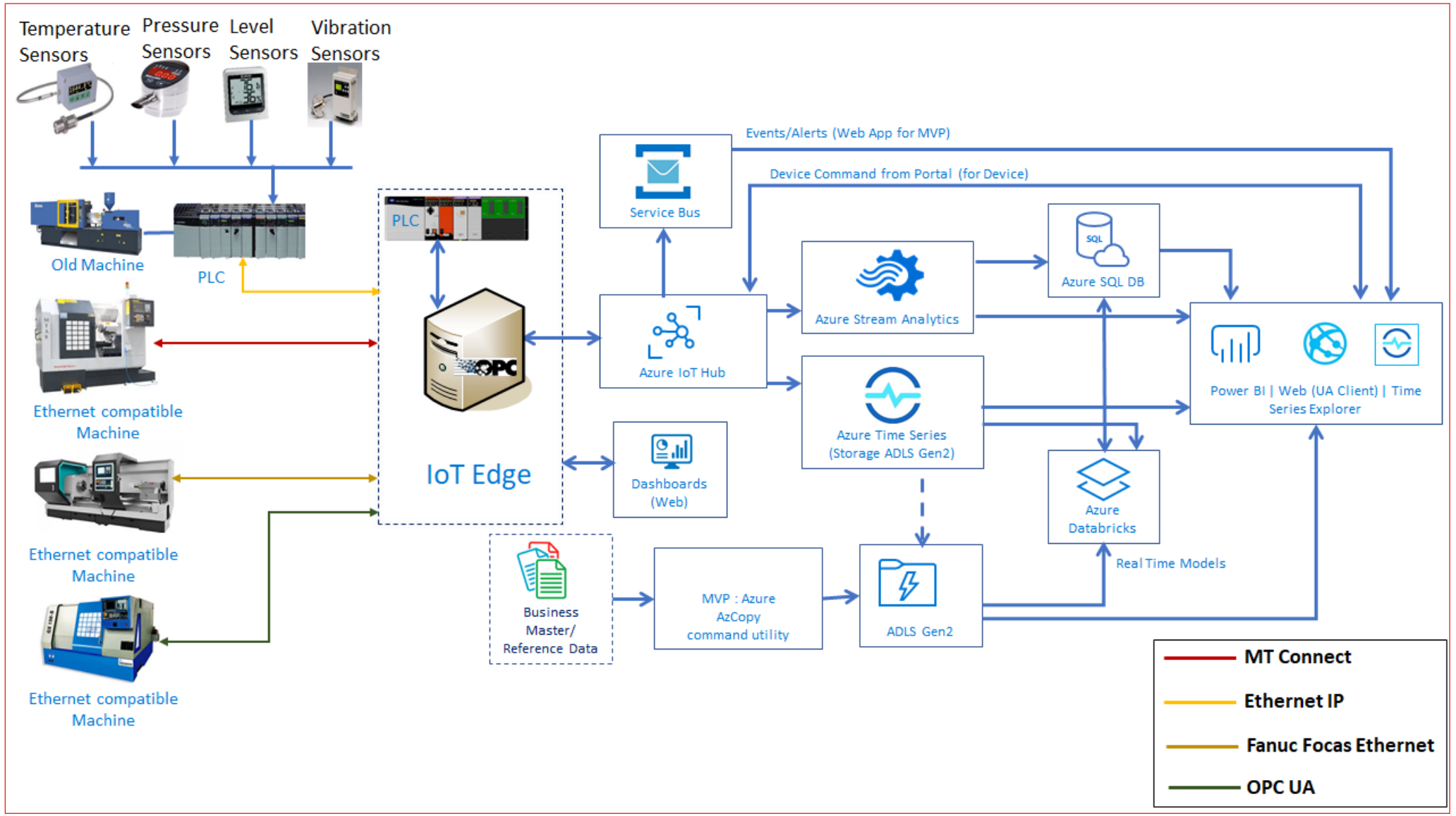
Function Blocks



MachineLogix Solution Architecture Diagram



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Birlasoft MachineLogix + Microsoft Azure Cloud + Azure IoT + Azure Cognitive Services

Using Microsoft Azure native services, such as Azure IoT Hub, Azure Stream Analytics, Azure Cognitive Services, Azure DB, Azure resources (VMs, network, etc.), and other Azure services, Birlasoft provides a robust, agile, extensible and secure platform for enabling connected machines on shop floors.

AZURE RESOURCES

Microsoft Azure services help significantly speed up the creation of solution components. Microsoft Pay-As-You-Go model keeps the development and hosting costs as low as possible. At the same time, all the services ensure high availability and on-demand scalability.

AZURE IoT

Enable highly secure and reliable communication between edge device and IoT hub

AZURE STREAM ANALYTICS

Bring real-time insights and analytics capabilities closer to manufacturing shop floor

AZURE COGNITIVE SERVICES

Azure Cognitive Services for vehicle routing, scheduling and usage patterns using metric devisor and personalisor

AZURE DB

Azure Database for intelligent, scalable, relational database service built for the cloud

AZURE TIME SERIES INSIGHT

Azure Time Series Insights is a fully managed analytics, storage, and visualization service for managing IoT-scale time-series data in the cloud.

Connect with us for a demo of Birlasoft MachineLogix solution for Smart Factory

Call for more information: +1 415 975 1742

Ask a question via email: digital@birlasoft.com

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