



Edge-to-Cloud CNC Machine Condition Monitoring Solution

Reference Architecture

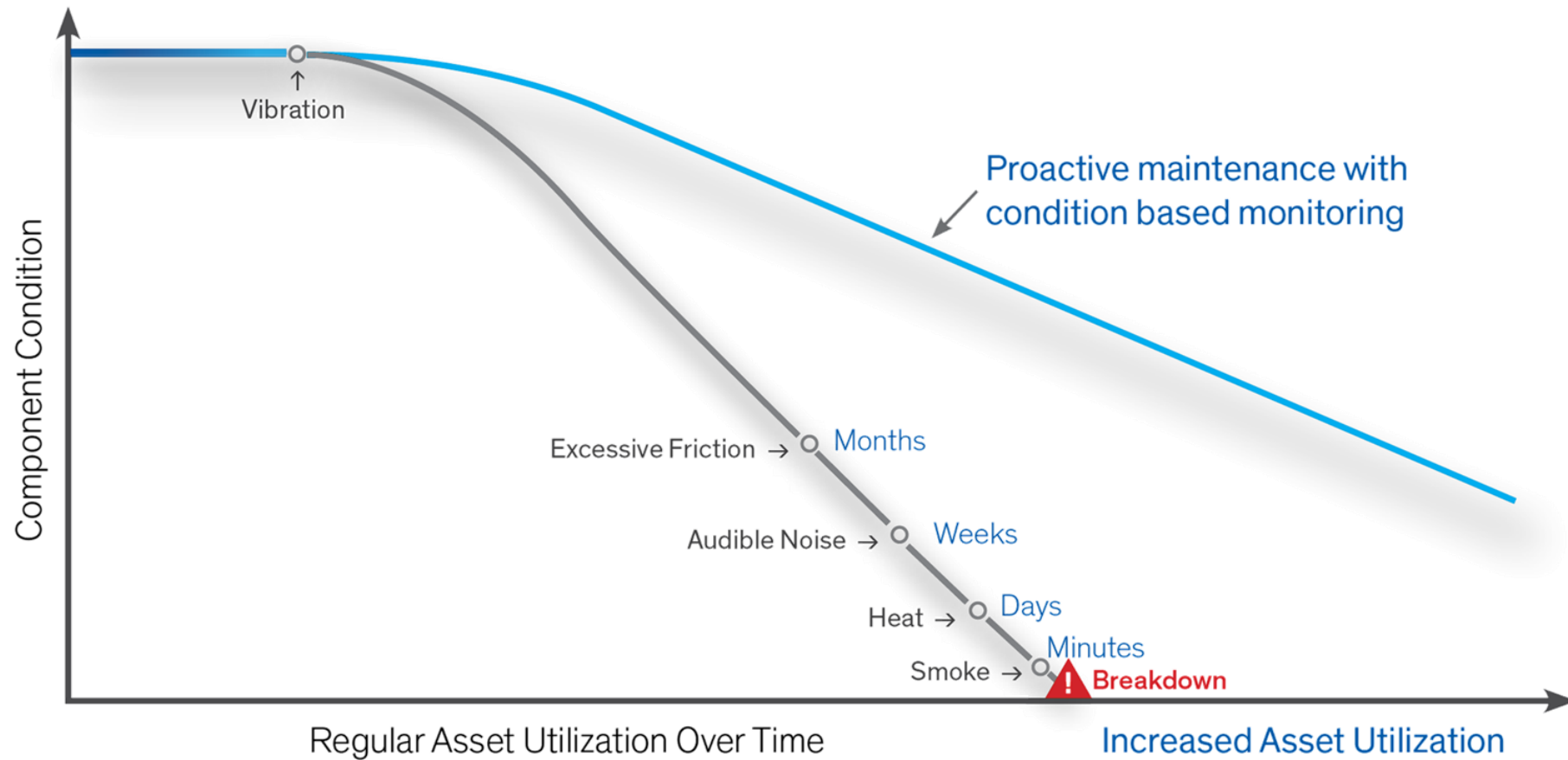


CNC Machinery Maintenance Challenges

- Production losses due to unplanned downtime
- Monitoring remote/inaccessible machinery and plants
- Manual, resource-intensive diagnostic maintenance drills
- Monitoring condition of complex/hazardous equipment
- Reactive maintenance processes
- Inability to diagnose and predict imminent equipment failure



Prevent Unwanted Downtime and Extend Asset Life with Proactive Maintenance Approaches



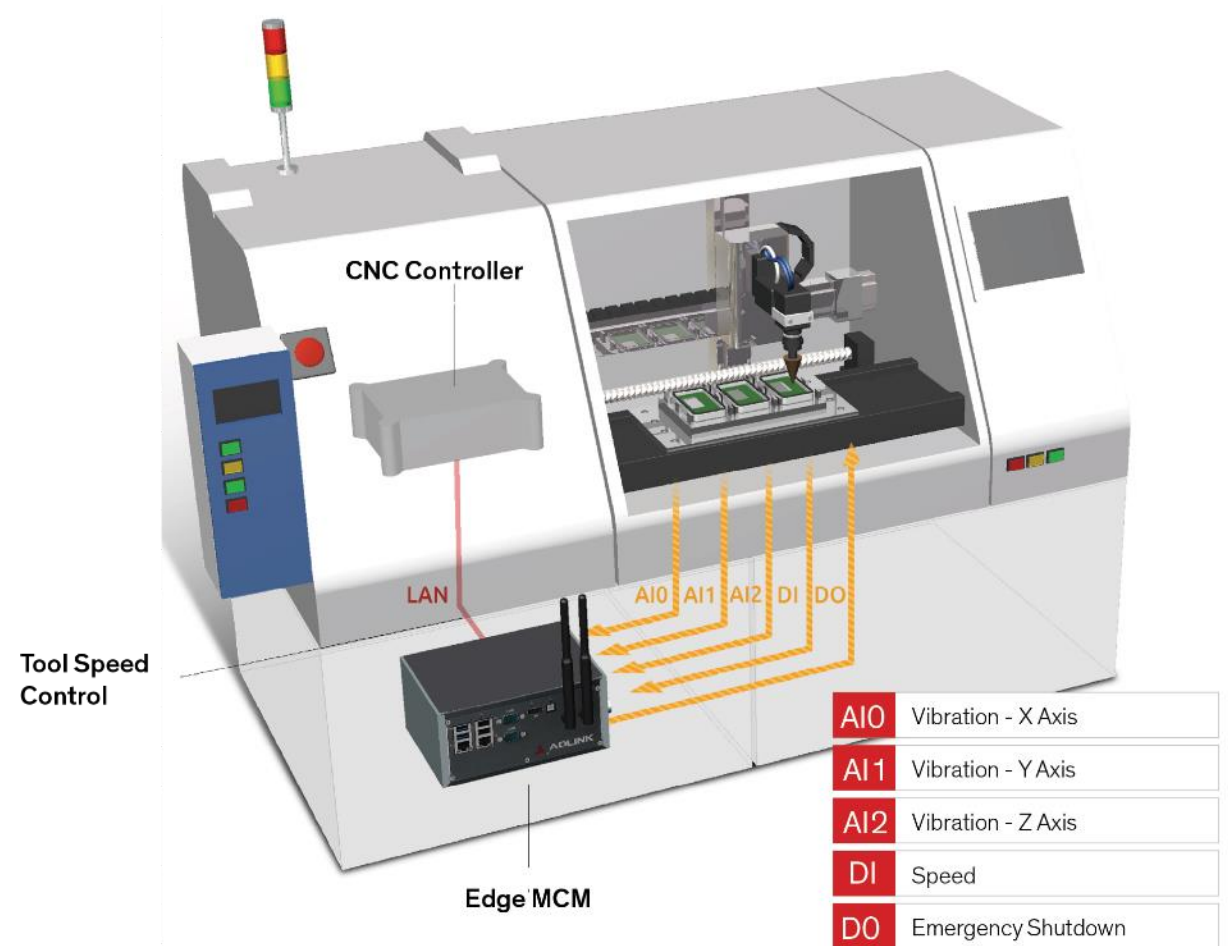
Condition-based monitoring enables an automated approach to proactive maintenance

Edge-to-Cloud CNC Machine Condition-Based Monitoring Solution

Automates machine condition monitoring

A single system with bundled capabilities for acquiring and analyzing vibration data for proactive CNC machine maintenance

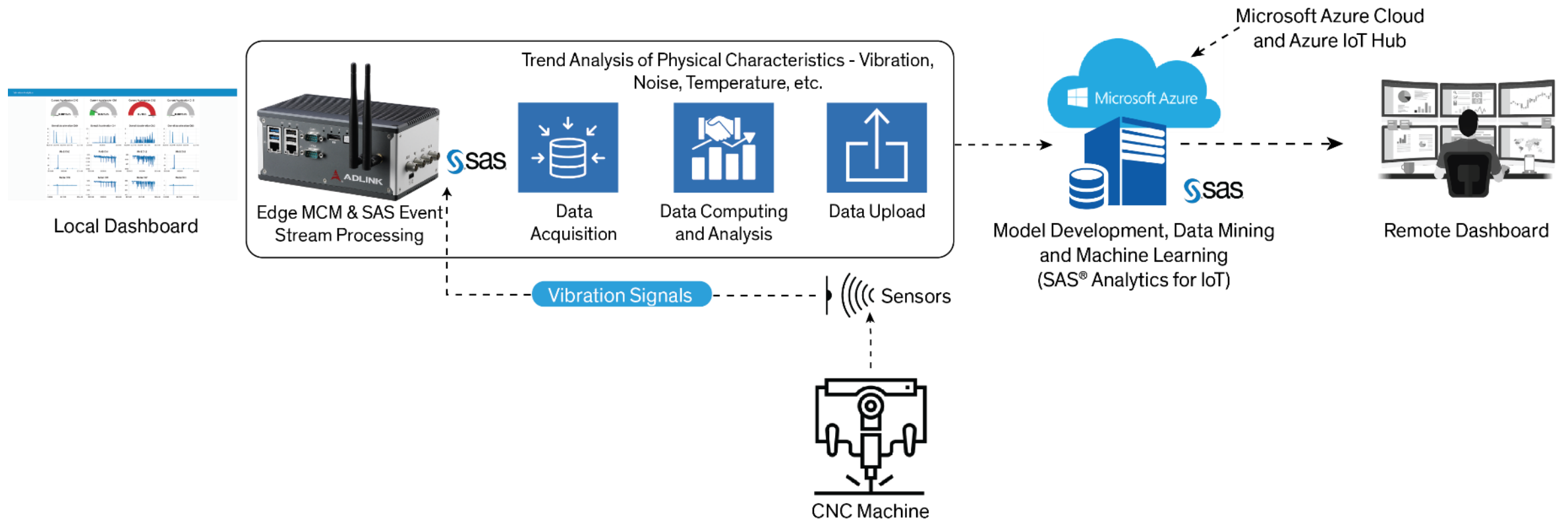
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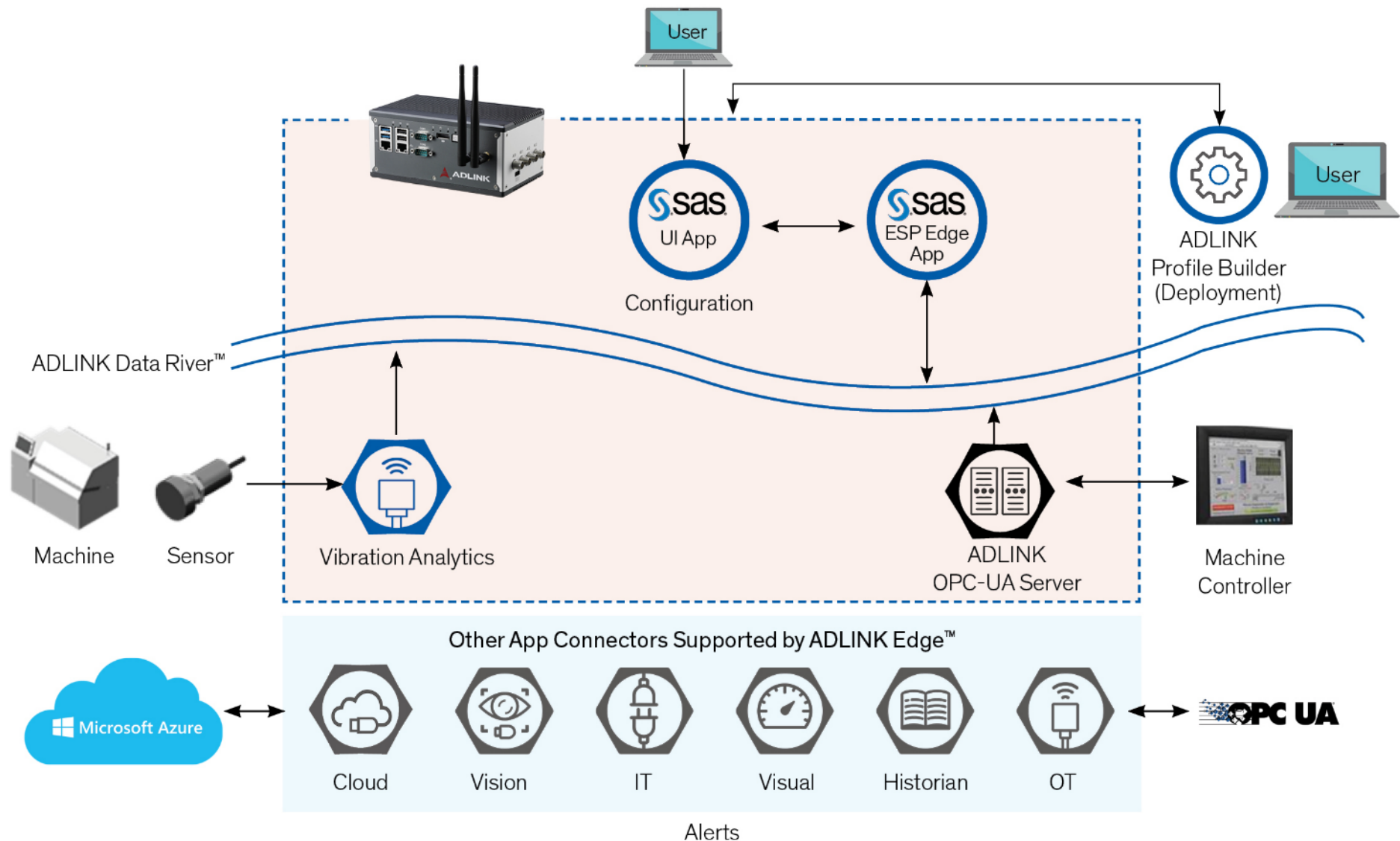
How the Solution Works

The Edge MCM quick start is a comprehensive data acquisition and analysis system

- The system tracks many operating conditions including vibration, acoustics, and misalignment
- The collected data undergoes real-time analysis right at the edge (machine) for alerts and actions
- Data is also aggregated at the cloud-level for analysis and predictive insights



High-Level Solution Overview



Solution Components

Decisions can be automated, trusted, and analytically driven



ADLINK Edge® MCM (Machine Condition Monitoring) Platform

Intel Atom® x7-E3950 Processor-Based Machine Condition Monitoring Platform with ADLINK Edge® IoT Middleware enabling real-time streaming connectivity and the transfer of operational data between devices to any cloud analytics database



SAS® Event Stream Processing (ESP)

Streaming analytics and machine learning capabilities uncover insights from events and are used to make real-time, intelligent decisions



Microsoft Azure for Cloud Computing (optional)

Cloud computing service created by Microsoft for building, testing, deploying, and managing applications



Azure IoT Hub for Device and Data Management (optional)

Managed service to enable bi-directional communication between IoT devices and Azure



SAS® Analytics for IoT (optional)

Descriptive and predictive modeling provide insights that drive better decision making

ADLINK, SAS®, and Microsoft Azure make it easy to run your data, analytics and AI workloads in the cloud and at the edge

Quick Start Solution: Edge MCM with SAS

Simple, turn-key, and on-premise solution for immediate value

- Power on and immediately visualize sensor data to identify trends and anomalies
- No code needed, pre-configured by ADLINK, SAS, and Arrow
- Connects, transitions and supports vibration data that can be used by SAS to create ML models
- Analyze data for insights that lead to optimized maintenance plans and maximized machine uptime

Quick Start components

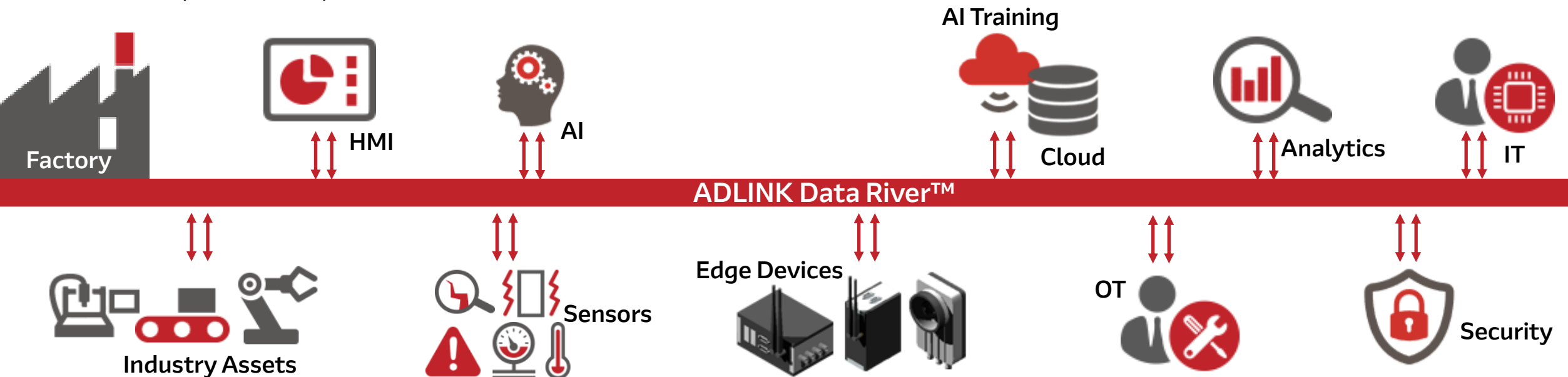
- ADLINK MCM-100 hardware
- ADLINK Edge IoT Middleware Platform
 - SAS® ESP for Edge Computing
 - ADLINK Vibration Analytics
 - SAS vibration models for CBM
 - ADLINK OPC-UA Server

ADLINK Data River™

Enabling the ability to plug in modular SW and HW anywhere at the Edge

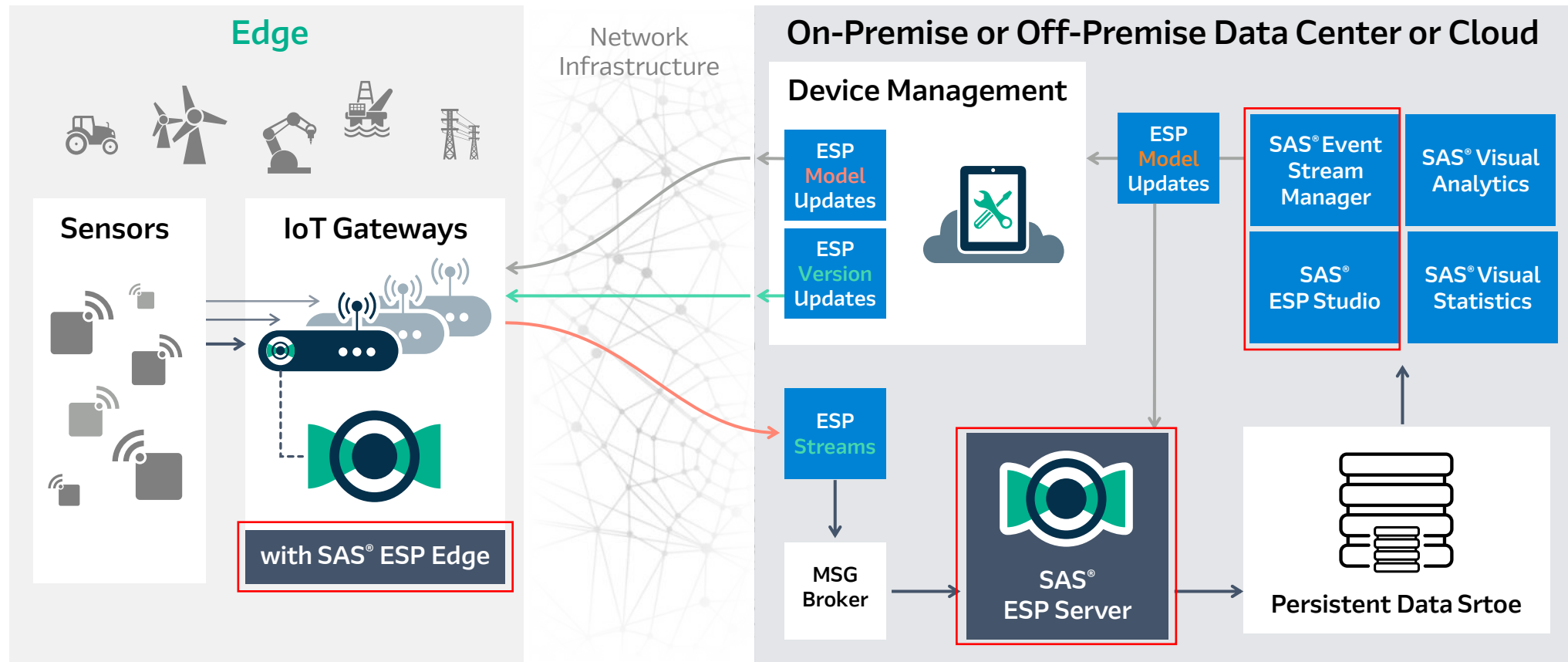
A data sharing platform that delivers the right data to the right place at the right time

- Seamless integration and extensibility by means of automatic discovery enabling true plug-and-play
- Freedom to move any data anywhere – North, South, and East-West
- Re-use and combine existing SW and HW modules to build completely new solutions
- High-performing, fault-tolerant, scalable, and secure
- Based on proven and open DDS standard

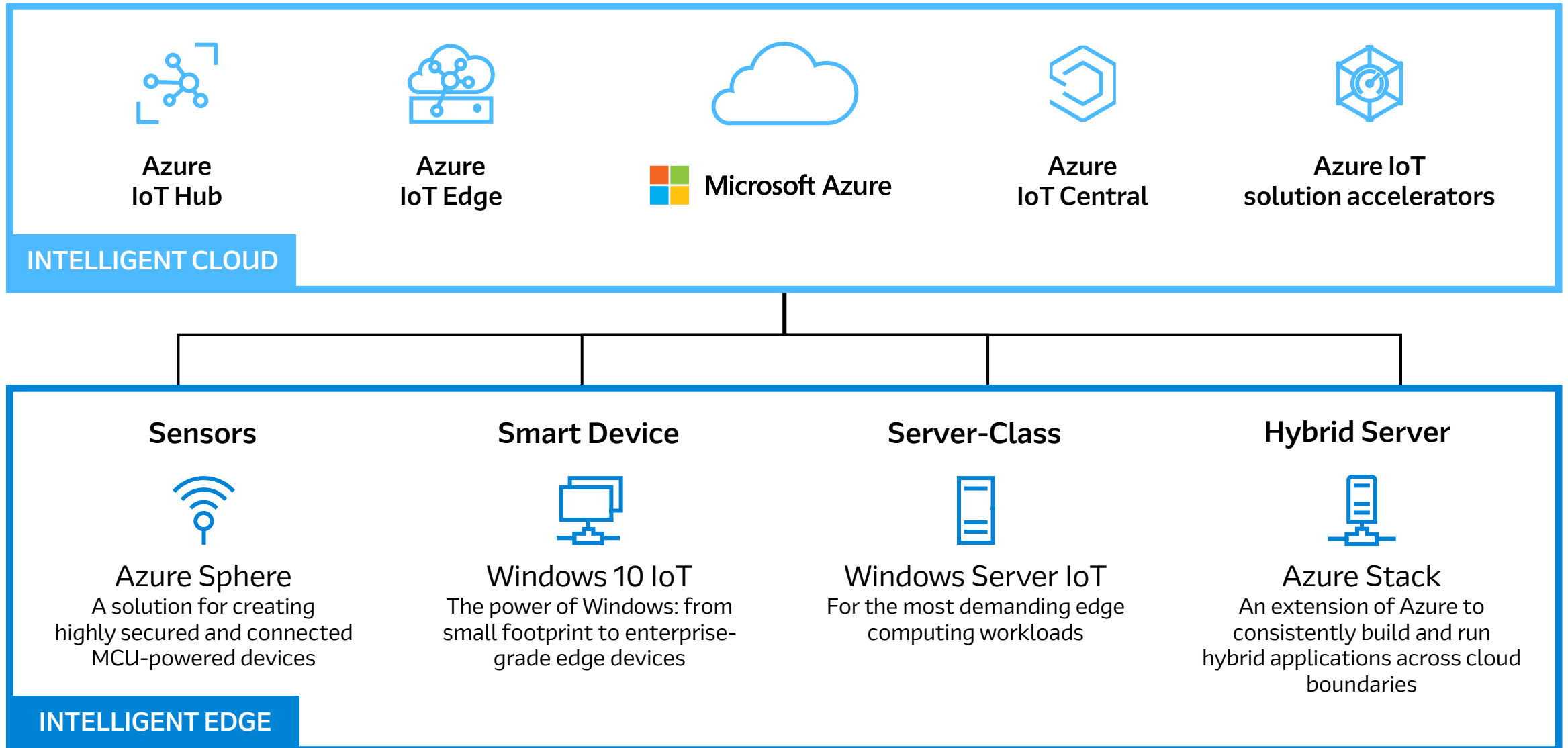


SAS® Event Stream Processing: Streaming Analytics

Reference architecture | edge to (enterprise) core

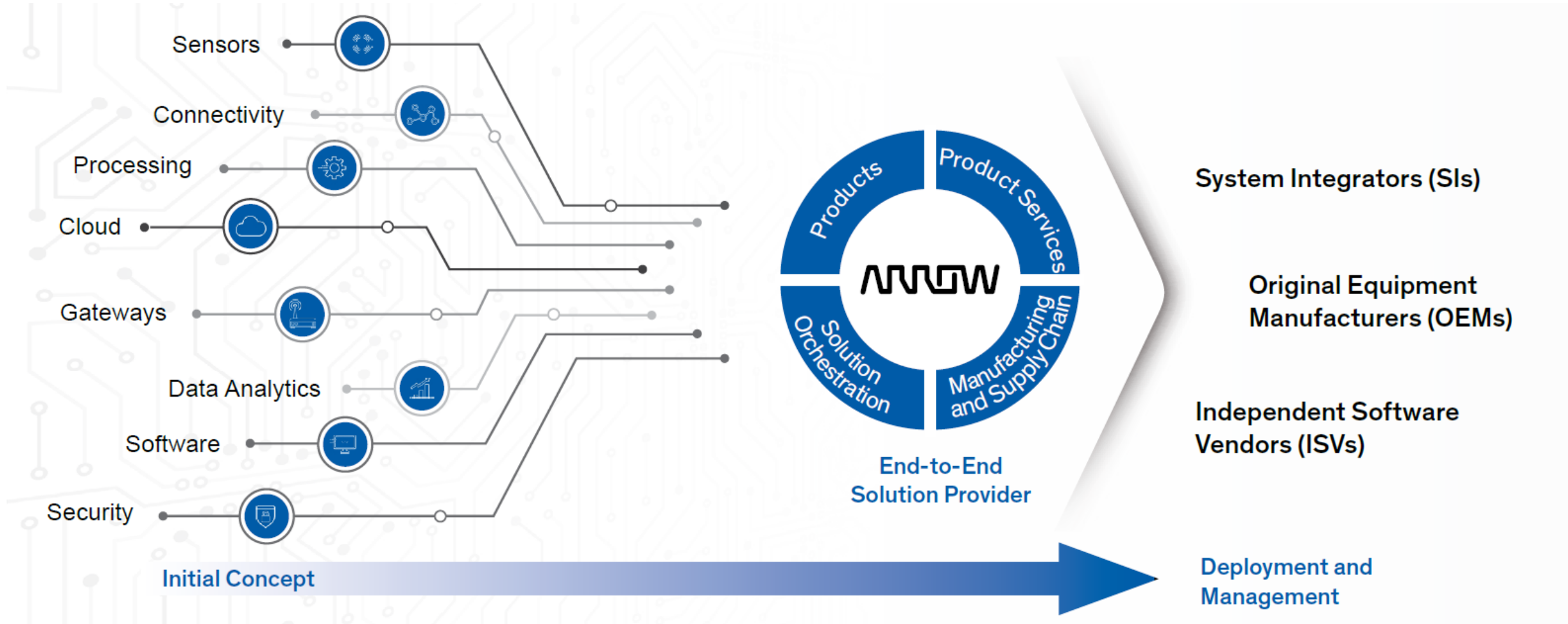


Comprehensive Microsoft IoT Platform



Arrow Services

Integrating diverse technology to bring connected products to market faster



Arrow Services for CNC Condition-Based Monitoring

Leverage an extensive ecosystem, products, services portfolio, expertise, and scale



ADLINK hardware
and software
customization



Microsoft cloud
engineering



SAS® data analytics
and modeling



Installation and
deployments at
scale

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