IOT Innovation framework for Multi Edge to Cloud services

Flexible and scalable one size fits all multi protocol, intelligent Edge solution for connecting things to the cloud. With comprehensive services for full automation of things

REPLY
CONCEPT

Microsoft

Agenda
What you can expect today.

- **Digital transformation** – the challenges

- IOT enables the **future ready enterprise** – business value by connecting things

- **Solution architecture**

- **References**

- **Contact**

Challenges to become a data-driven company

Cross domain preventions from starting to connect assets and things to become digital native.

REPLY CONCEPT

Fragmentation	Manufacturers need a customized platform for easy access to data related to equipment status and health across their production environments. Platforms and services are fragmented.
NO one stop shop solution	There is no flexible, easy to integrate full size solution on the market which can scale from PoC to fully connected products on a global scale.
Unpredictable costs	Cost along the whole way are unpredictable, from plan to build to run a solution to connect assets to the cloud. Often specialized headcount is needed as well.
Lack of automation	Today the 100% automated connected product is a vision. Human interaction or manual steps within a highly automated environment describes status quo.
Data	Availability of data across sources and systems, data format (unstructured, unformatted operational data), insufficient infrastructure for analytics, "accidental architecture" evolved instead of engineered.

New business models require rock solid use cases

KPI´s ensure overall profitability.

Customer business value

(I)IoT - data driven products / the digital transformation of enterprises following financial drivers across all business verticals:

- ↓ Costs
- ↑ Revenues
- ↑ Efficiency
- ↑ Quality
- ↑ Resilience
- ↑ Sustainability
- ↑ Security
- ↓ Time2Market
- ↑ Customer Satisfaction

KPI´s

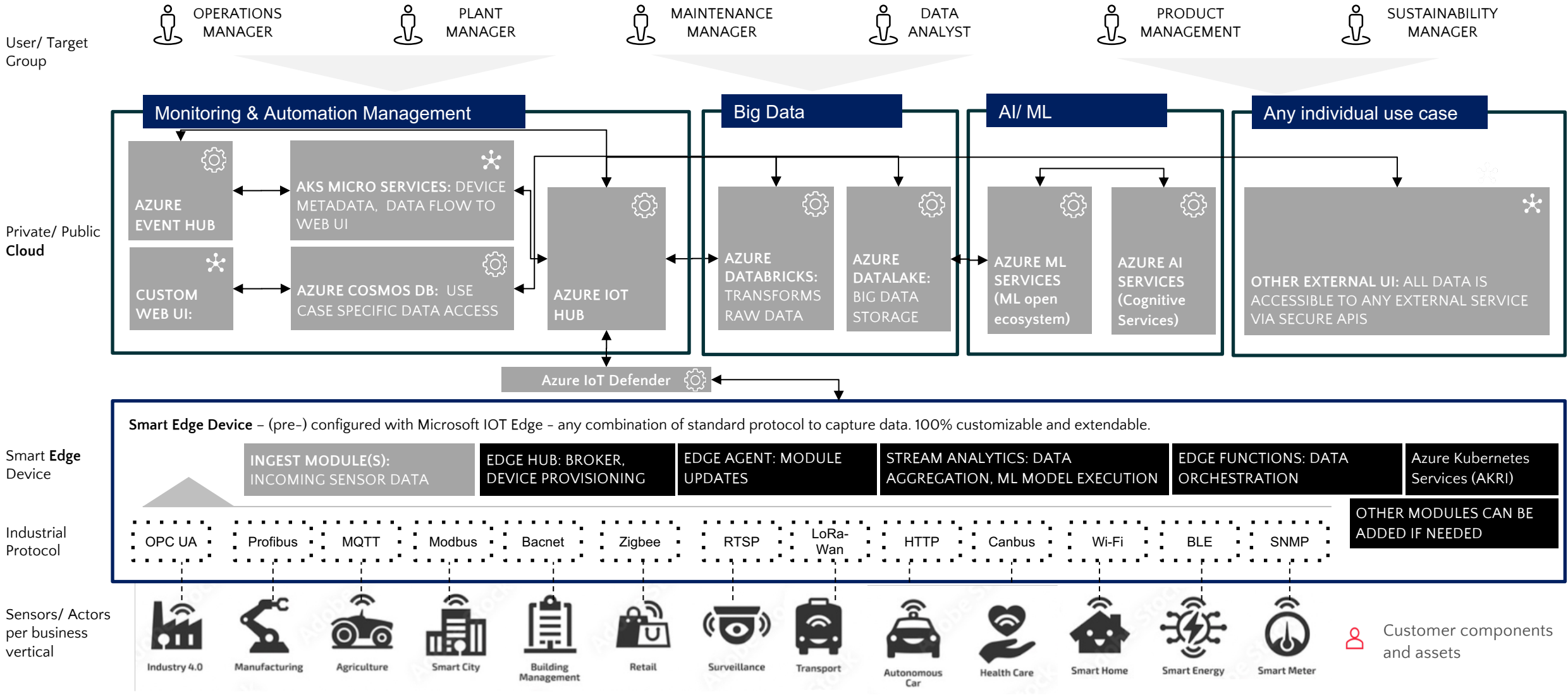## Fulfil business case by cross vertical use cases

- **Increase in OEE:** Independent of factory digitalization or managing connected products, all companies **reduce** massively the **cost** due to transparency in equipment efficiency (processes, runtime, broken assets, etc.)
- **Revenue: New revenues sources** based on data driven products (additionally) to legacy product portfolio in order to fulfill a best-in-class customer experience and matching global demand in **remotely** manageable products.
- **Efficiency: Boost** efficiency across all product production steps and along a complete **product lifecycle** based on real time data (uplift in go2market or incident fixing time (**SLA**) by having transparency about product status).
- **Quality:** Product quality **enhancements** are unleased by data providing insights.
- **Resilience**: All data related to production process and operations help better planning, reporting calculation **return of invested capital per asset** and to link operation costs (OPEX).
- **Sustainability**: An integration of customer, OEM and suppliers along the entire supply chain for data exchange became a global game changer in competitive markets. Real time data and transparency enable early warnings or to react on unusual behaviour quickly in order to **avoid downtimes or shortages**.
- **Security:** With connected products and production, system **security** and **safety for humans** and **assets** can be enhanced as real time system data helps to detect attacks, unusual behaviour or unplanned downtimes quickly. **Fix rates/ SLA´s** will improve and uptime increases (**profitability goes up**).
- **Time2Market: Real data** and **synthetic data** massively helping to increase time to market in **product development process** due to the analytical bases.
- **Customer Satisfaction:** Connected products are turning into state of the art and mark paradigm shift in product development as "all digital" is key and new starting point for customer decisions.

IOT Multi Edge to Cloud Innovation Framework

Reference Architecture – from shop floor to the top floor

REPLY CONCEPT

User/ Target Group

OPERATIONS MANAGER · PLANT MANAGER · MAINTENANCE MANAGER · DATA ANALYST · PRODUCT MANAGEMENT · SUSTAINABILITY MANAGER

Private/ Public Cloud

Monitoring & Automation Management

- AZURE EVENT HUB
- AKS MICRO SERVICES: DEVICE METADATA, DATA FLOW TO WEB UI
- CUSTOM WEB UI:
- AZURE COSMOS DB: USE CASE SPECIFIC DATA ACCESS
- AZURE IOT HUB

Big Data

- AZURE DATABRICKS: TRANSFORMS RAW DATA
- AZURE DATALAKE: BIG DATA STORAGE

AI/ ML

- AZURE ML SERVICES (ML open ecosystem)
- AZURE AI SERVICES (Cognitive Services)

Any individual use case

- OTHER EXTERNAL UI: ALL DATA IS ACCESSIBLE TO ANY EXTERNAL SERVICE VIA SECURE APIS

Azure IoT Defender

Smart Edge Device

Smart Edge Device – (pre-) configured with Microsoft IOT Edge – any combination of standard protocol to capture data. 100% customizable and extendable.

- INGEST MODULE(S): INCOMING SENSOR DATA
- EDGE HUB: BROKER, DEVICE PROVISIONING
- EDGE AGENT: MODULE UPDATES
- STREAM ANALYTICS: DATA AGGREGATION, ML MODEL EXECUTION
- EDGE FUNCTIONS: DATA ORCHESTRATION
- Azure Kubernetes Services (AKRI)
- OTHER MODULES CAN BE ADDED IF NEEDED

Industrial Protocol

OPC UA · Profibus · MQTT · Modbus · Bacnet · Zigbee · RTSP · LoRa-Wan · HTTP · Canbus · Wi-Fi · BLE · SNMP

Sensors/ Actors per business vertical

Industry 4.0 · Manufacturing · Agriculture · Smart City · Building Management · Retail · Surveillance · Transport · Autonomous Car · Health Care · Smart Home · Smart Energy · Smart Meter

Customer components and assets

Customer component | Azure service | Partner component

References
End-to-end IoT solutions based on Microsoft services

Digital Truck Platform

Cloud Platform, Remote Services, FOTA

- New generation of fork lift is permanently connected to the digital truck platform
- Device authentication and remote device provisioning service for full automation
- Features on demand/ Campaign management implemented
- Remote maintenance for service organisation
- Flexible backend structure allows scale and adaption of new device types quickly
- Mobile workforce uses device independent UI for best in class UX

Software defined controller + Cloud Platform

Firmware, Cloud Platform, FOTA

- Key management, sensitive data storage, license management, device provisioning
- Requirements engineering and preparation of the specification for the firmware for the next generation of software defined controllers
- FW development for the Danfoss product family
- Cloud Platform development based on Microsoft services
- Firmware over the air (FOTA) device provisioning service
- Backend to provide other parties with data (any kind of structure)

Vehicle Telematics Platform

Cloud Platform, App + Edge Hardware

- Serverless telematics platform based on Microsoft Azure for B2B2C target group
- Integration of vehicle data/ information via OBD 2 edge device as plug and ply solution
- Integration of other external data providers (3rd party API)
- BMW car connect API in use
- Mobile app visualizing the car status, trip history, communication between car owner and workshop, and more
- Several additional end user functions like Driver´s Logbook

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