Intelligente Pneumatik mit AVENTICS-Produkten von Emerson

Smart Pneumatics with AVENTICS-products from Emerson

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EMERSON.

Broad range of components offered within Industrial Pneumatics (2016)

Compressed air preparation and accessories

AS3 with AF1

Valves, valve systems, and fieldbus applications
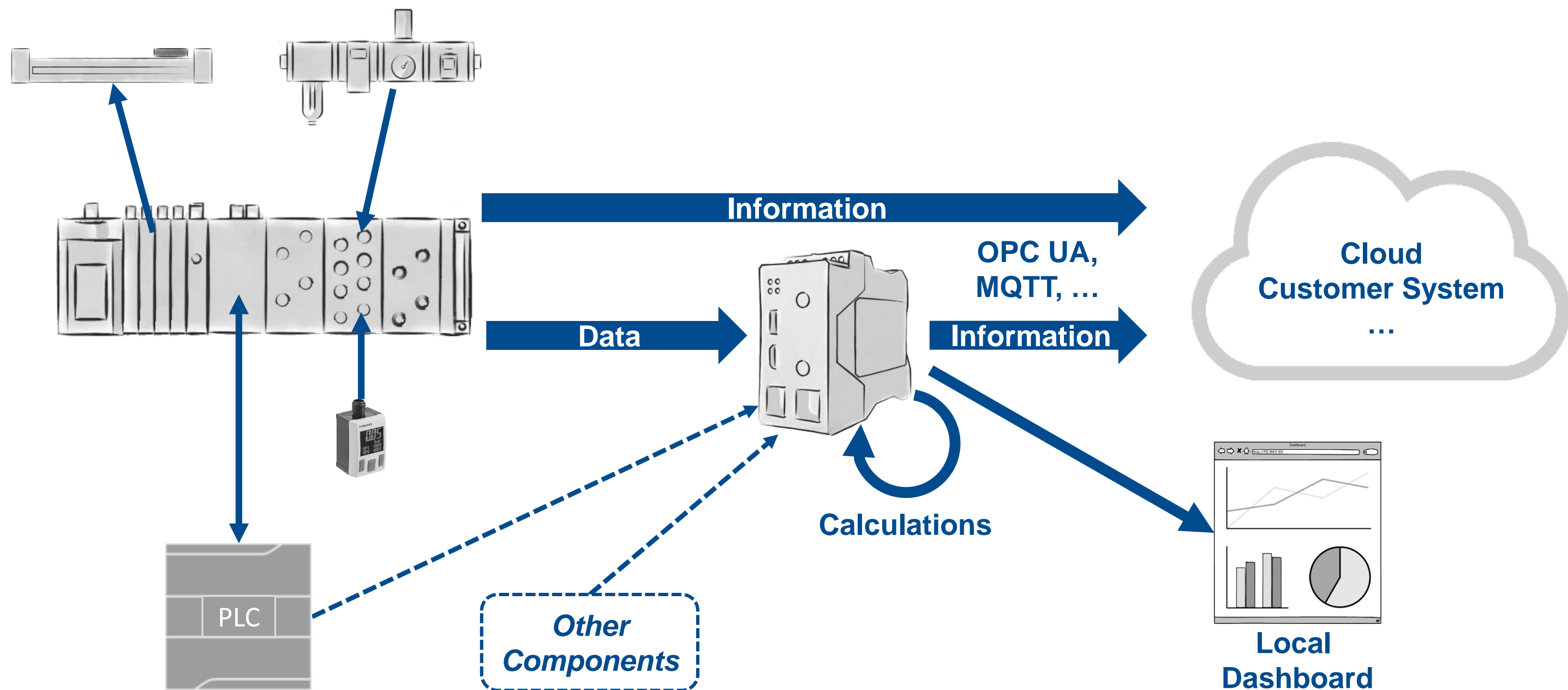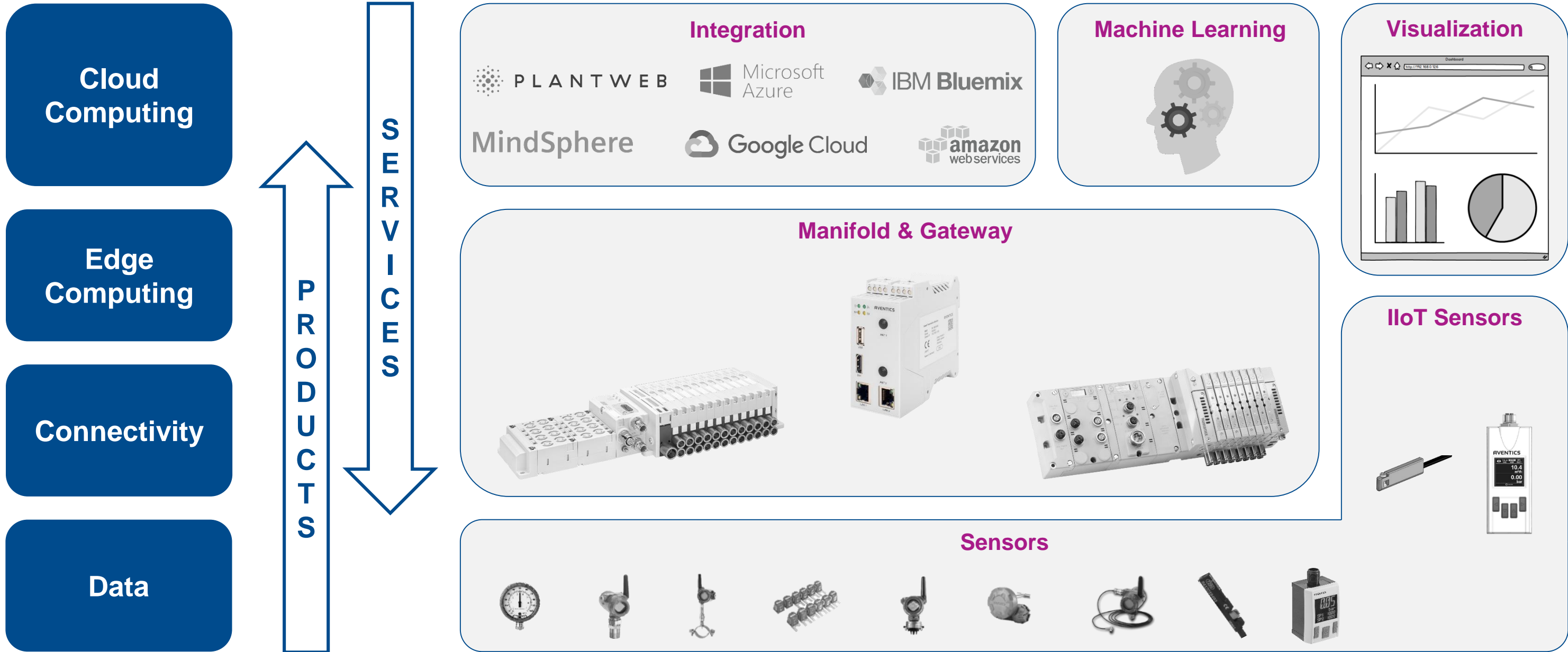
ED02

AV06

Cylinders and sensors

RTC

PRA

Intelligent Pneumatic (today)

Information

Data

OPC UA, MQTT, …

Information

Calculations

Cloud Customer System …

PLC

Other Components

Local Dashboard

Intelligent Pneumatic with IIoT Ecosystem

Cloud Computing

Edge Computing

Connectivity

Data

SERVICES

PRODUCTS

Integration

PLANTWEB

Microsoft Azure

IBM Bluemix

MindSphere

Google Cloud

amazon web services

Machine Learning

Visualization

Manifold & Gateway

IIoT Sensors

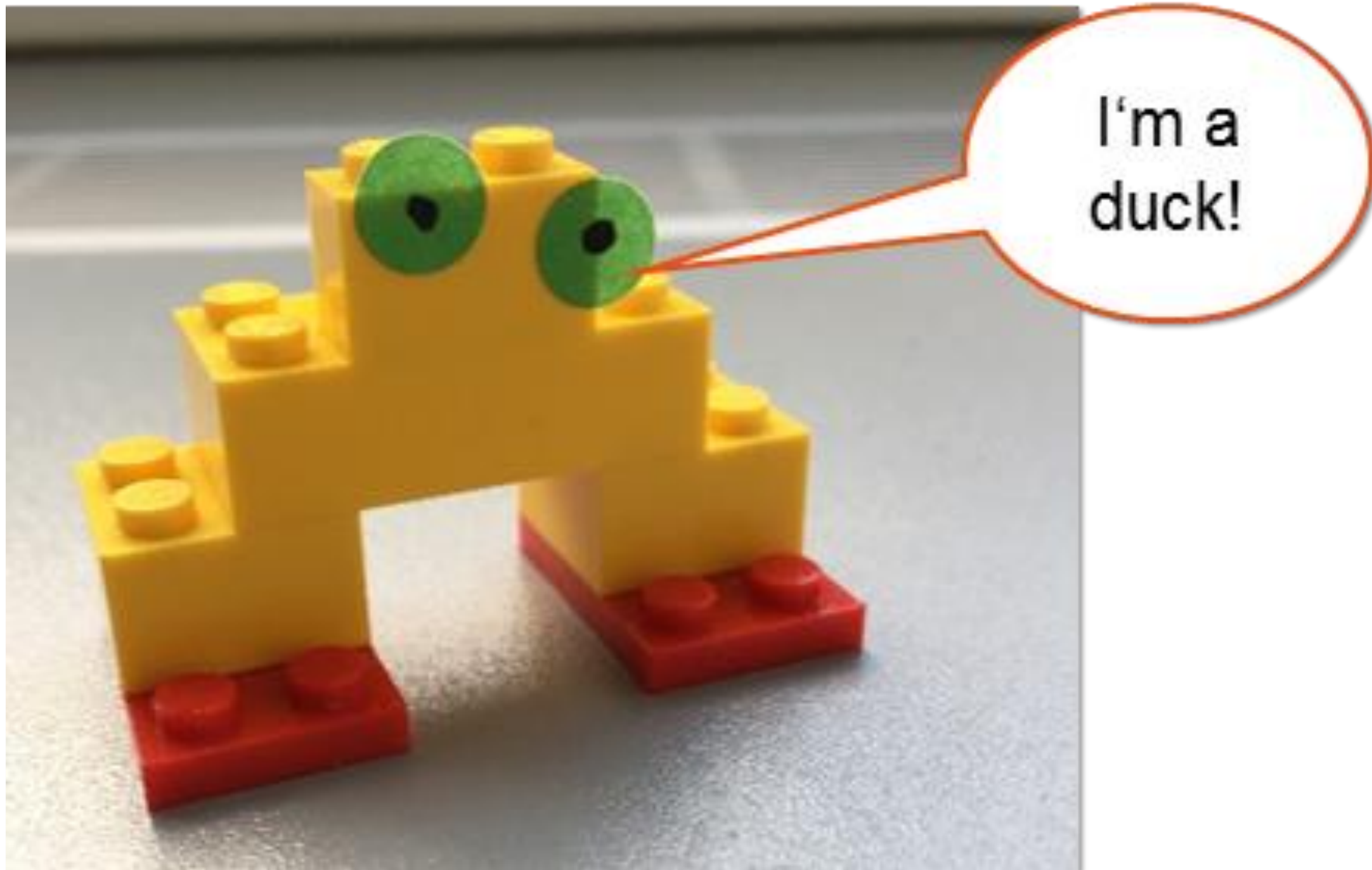## Sensors

Data have a value?

Unorganized data

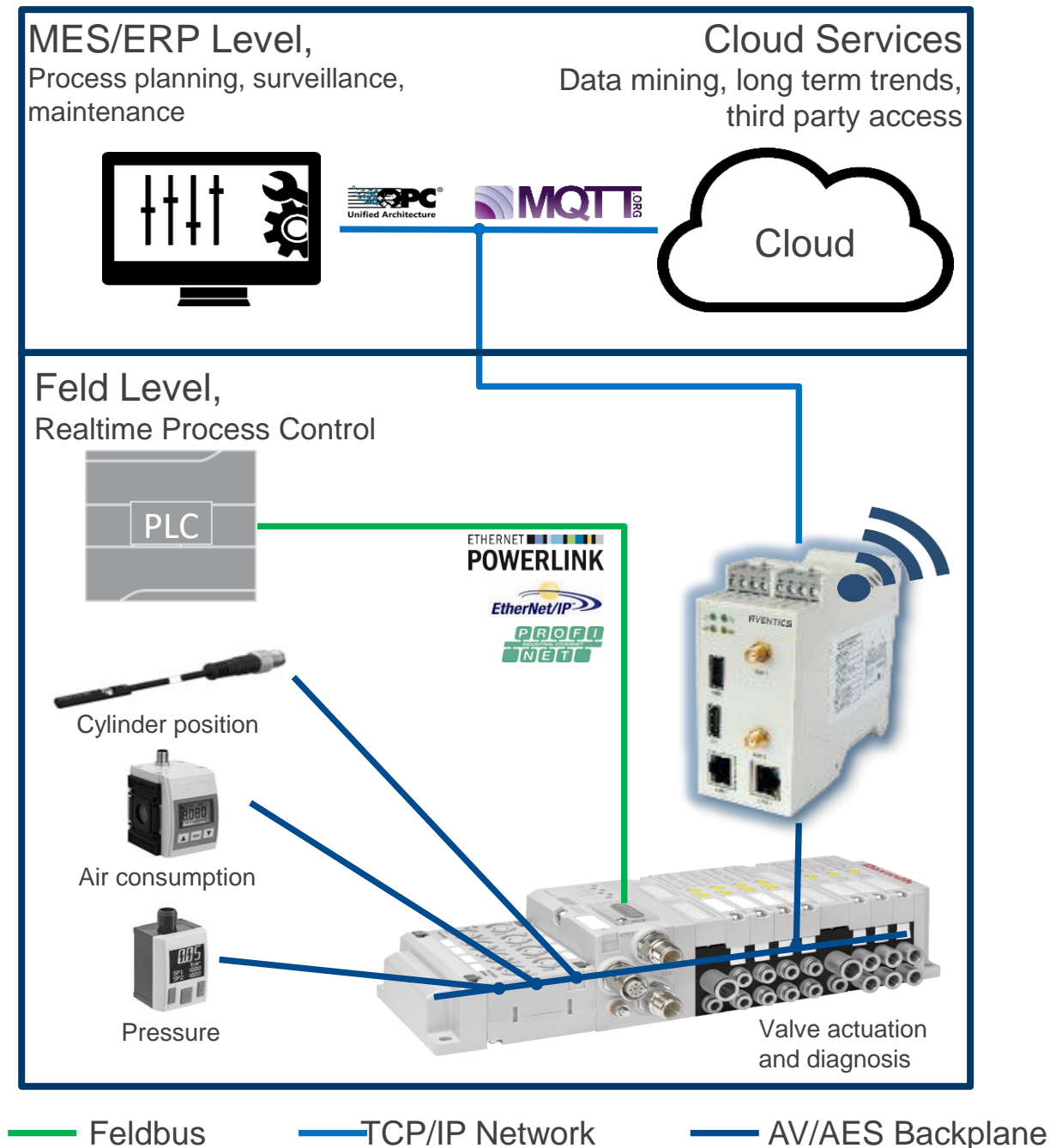# Data Science and Cloud Computing

Structurized data

Information

Information is needed

	Data	Information
	1010101 **0001110** **0011001** **1100110** **0010100** **1001010**	
Meaning	Data are raw, unorganized and need to be analyzed. Data must be seen in their context.	When data are processed, organized, structurised or presented in their context, they become useful information.
Example	A simple airflow sensor only shows an actual value.	When the airflow is integrated over time and compared with historic values leakage can be detected.

Intelligent Pneumatic

SD5000
Flow Sensor

PE5
Pressure - Sensor

Energy Efficiency

RTC
Rodless Cylinder

AV03
Valve Unit with Profinet Fieldbus and Modular IOs

Condition Monitoring

ST4-2P
Two Position Sensors

Lifecycle

Smart Pneumatic Monitor

Intelligent Pneumatic

MES/ERP Level,
Process planning, surveillance, maintenance

Cloud Services
Data mining, long term trends, third party access

Cloud

Feld Level,
Realtime Process Control

PLC

ETHERNET
POWERLINK
EtherNet/IP
PROFI NET

Cylinder position

Air consumption

Pressure

Valve actuation and diagnosis

——— Feldbus   ——— TCP/IP Network   ——— AV/AES Backplane

**Advanced Valve and Electronic System AES is the base**
- Fieldbus system to connect with PLC
- Smart Pneumatic Monitor for analytics

Edge computing
- Implementation of OPC-UA server and other open standards
- Control-independent availability of additional data points
  - Diagnostics
  - Usage statistics
  - Product support
- Preprocessing and enrichment of local data to create information
  - Lifetime data
  - Optimization of energy efficiency
  - Event timing and correlation
  - Threshold monitoring
  - Pneumatic specific information

Next step

- Every component has an open interface
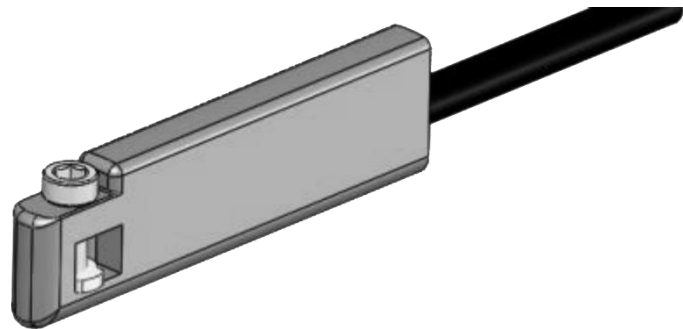
Endposition Sensor
- IO-Link
- Integrated distance measurement
- Integrated acceleration sensor

Airflow Sensor
- OPC UA
- MQTT
- REST
- IO-Link
- Logging
- Integrated value analysis

Target: Efficient Analytics

- Easy indicators show the status of the different components
- At the first sight the user isn't interested in details and it also will be to much for one dashboard
- What are the necessary parameters to define the fitness of e.g. a cylinder?
- It is possible to create a fitness indicator with sensors or data which exists anyway?
- **No extra costs**
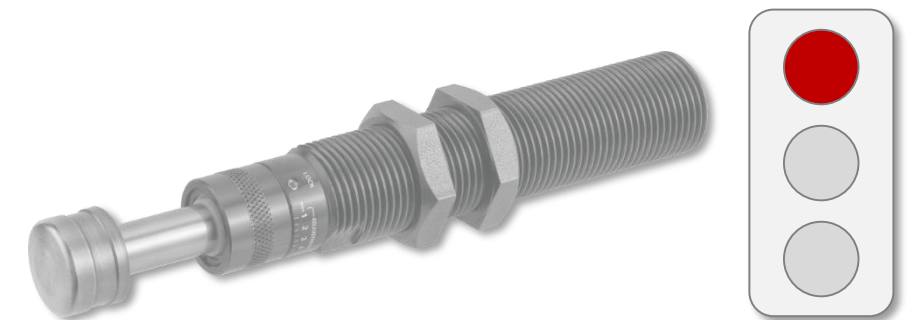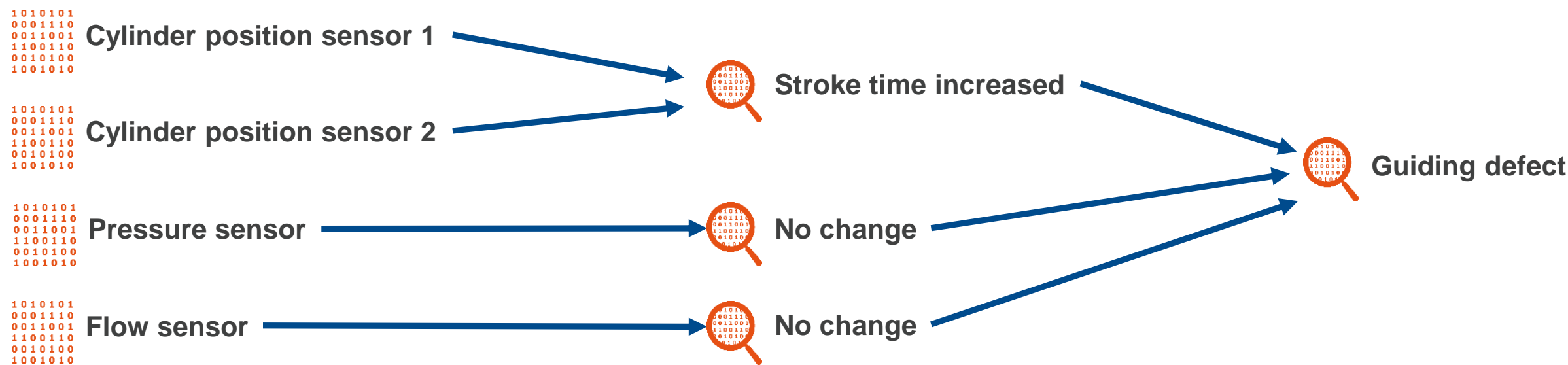
Second information level
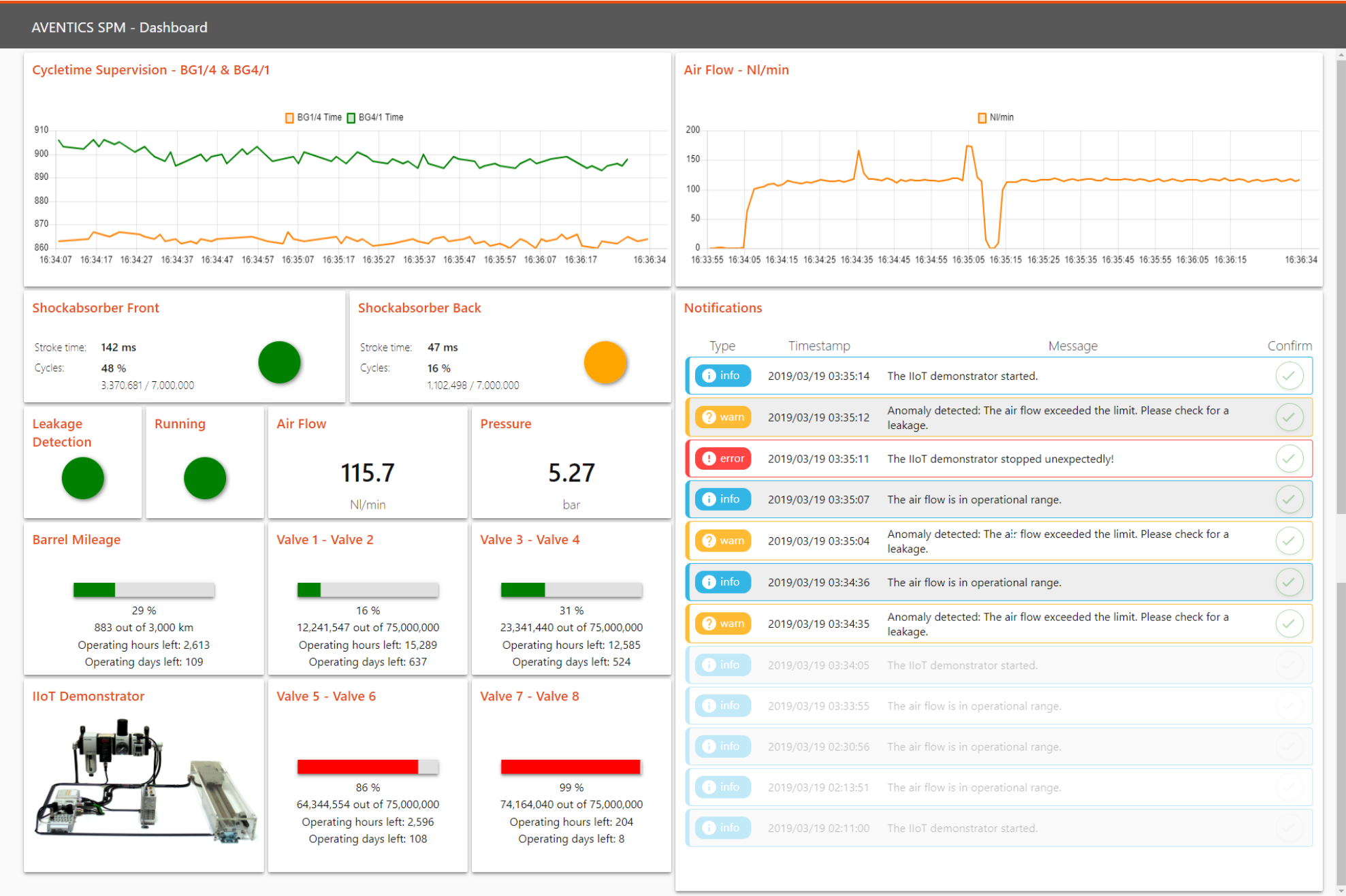
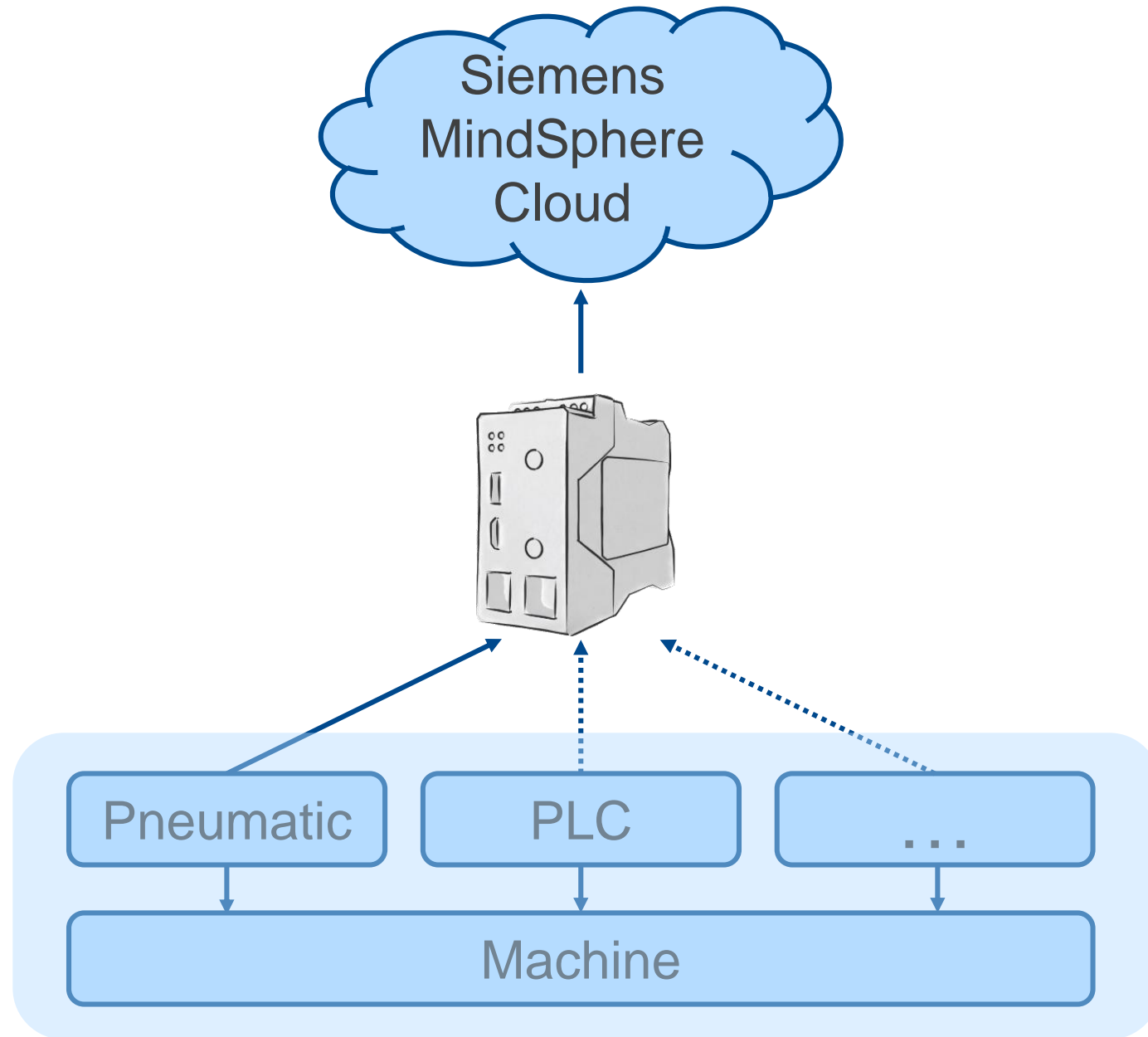# Monitoring the wear (not only pneumatic)

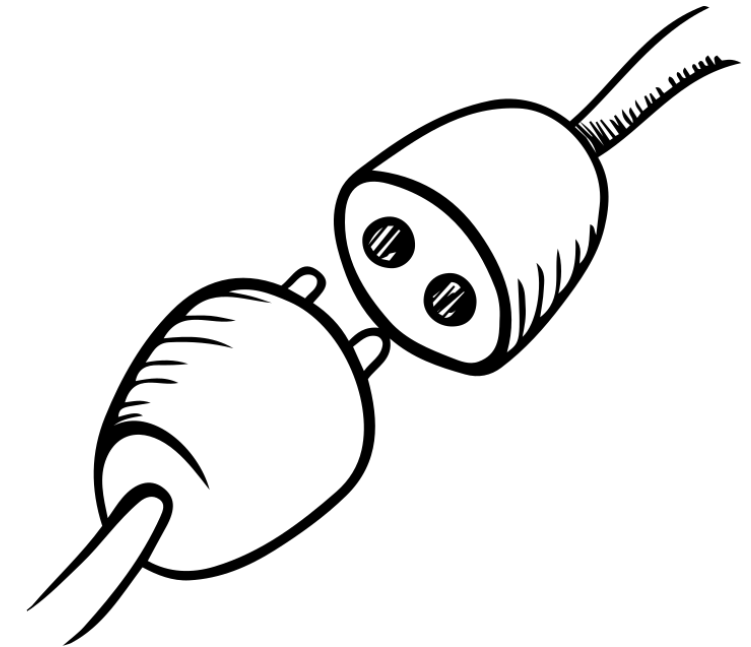- **Allert: Guided pneumatic axes movement is slowing down**

- **Drill down analytics Service to plan maintenance**

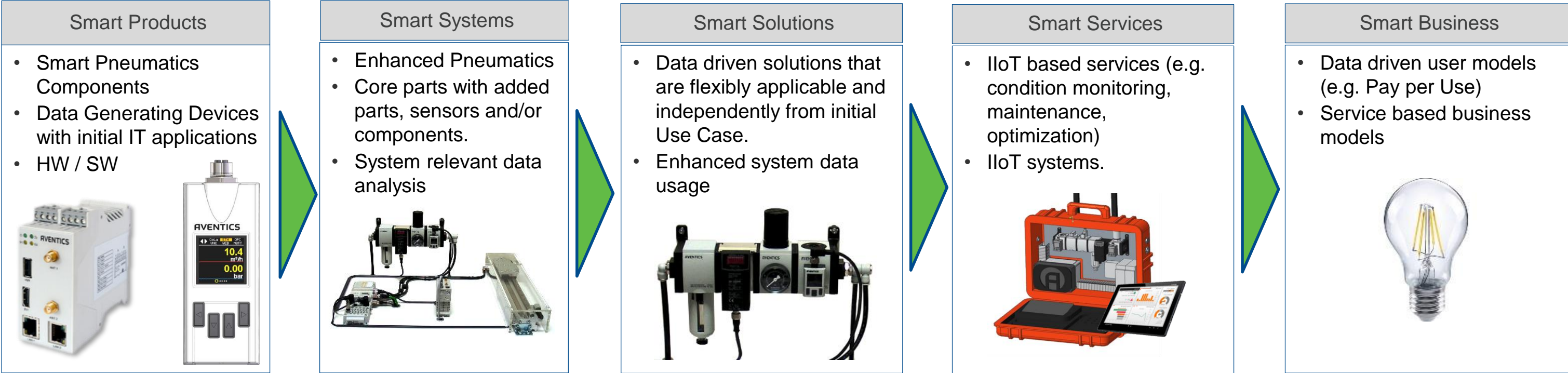# Cloud Connection Siemens MindSphere

🎯 Integrate all data into Siemens MindSphere Cloud

🎯 Integrate non pneumatic components

🎯 New business model - Pay by use

Information is the driver

Smart Products	Smart Systems	Smart Solutions	Smart Services	Smart Business
• Smart Pneumatics Components • Data Generating Devices with initial IT applications • HW / SW	• Enhanced Pneumatics • Core parts with added parts, sensors and/or components. • System relevant data analysis	• Data driven solutions that are flexibly applicable and independently from initial Use Case. • Enhanced system data usage	• IIoT based services (e.g. condition monitoring, maintenance, optimization) • IIoT systems.	• Data driven user models (e.g. Pay per Use) • Service based business models

Thank you very much!

Questions?

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EMERSON