

**Balluff Strategy for the UK with 4IR**

**WELCOME**



# BALLUFF – A GLOBAL PROMISE

We represent progress – from the spaetzle press to a complete portfolio for industrial automation



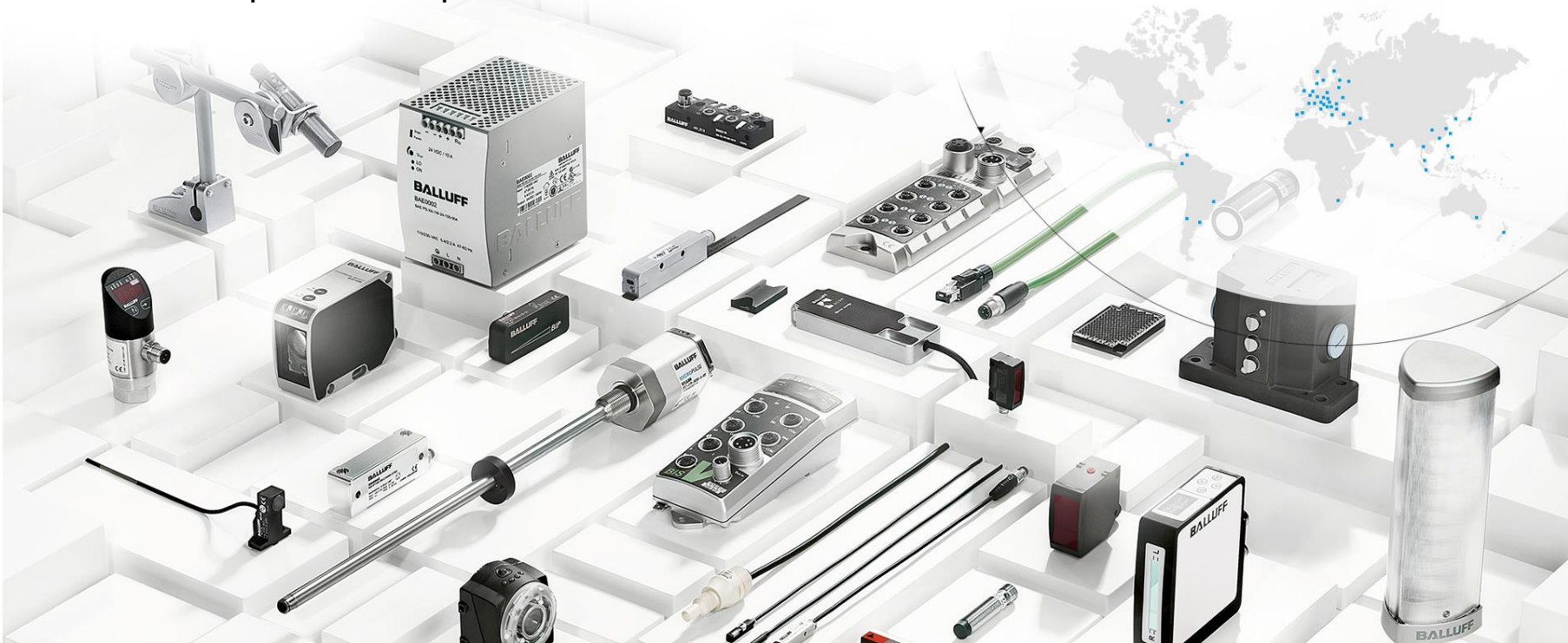
1921



2017

# BALLUFF – A GLOBAL PROMISE

We offer a comprehensive portfolio for industrial automation



# SMART SENSOR NETWORKS FOR INDUSTRY 4.0

Motivation

Flexibility (Lot Size 1)

Efficiency

Balluff Value

Predictive  
Maintenance

Parameterisation

Recipe Changes

Quality  
Assurance

Condition  
Monitoring

Format Changes

Traceability

Asset  
Management

Security

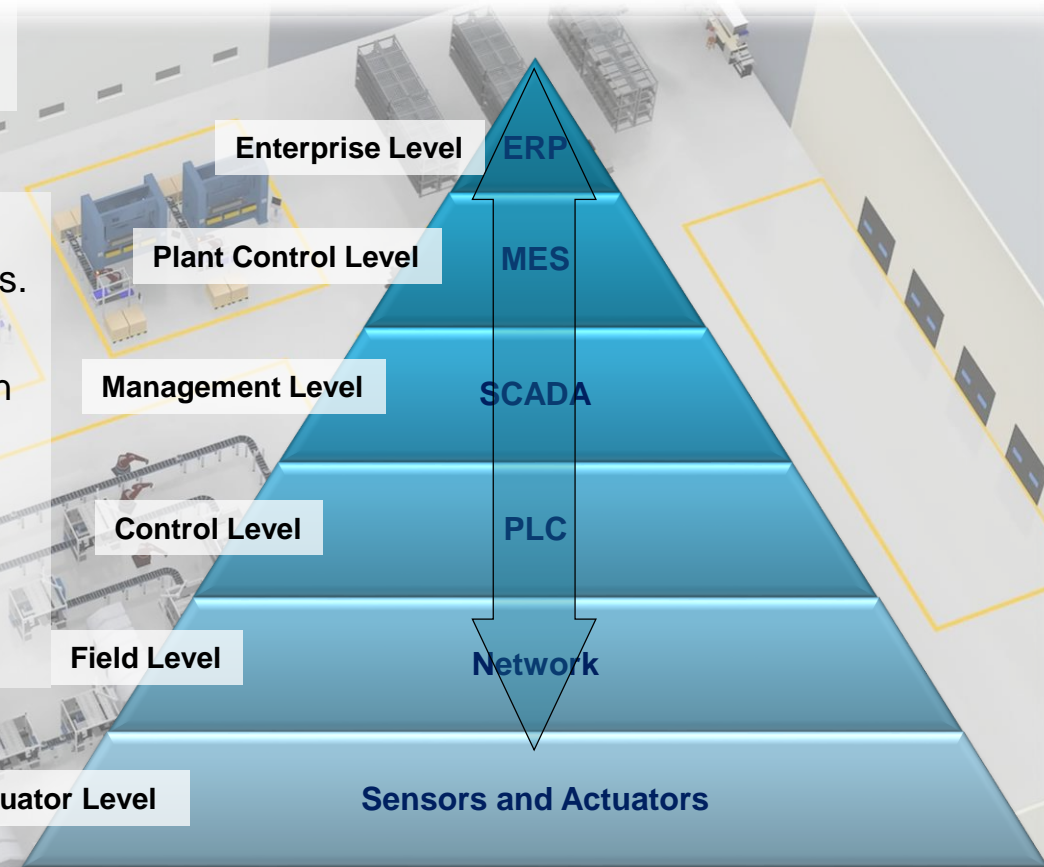
Network  
Management

Location  
Management

Analytics

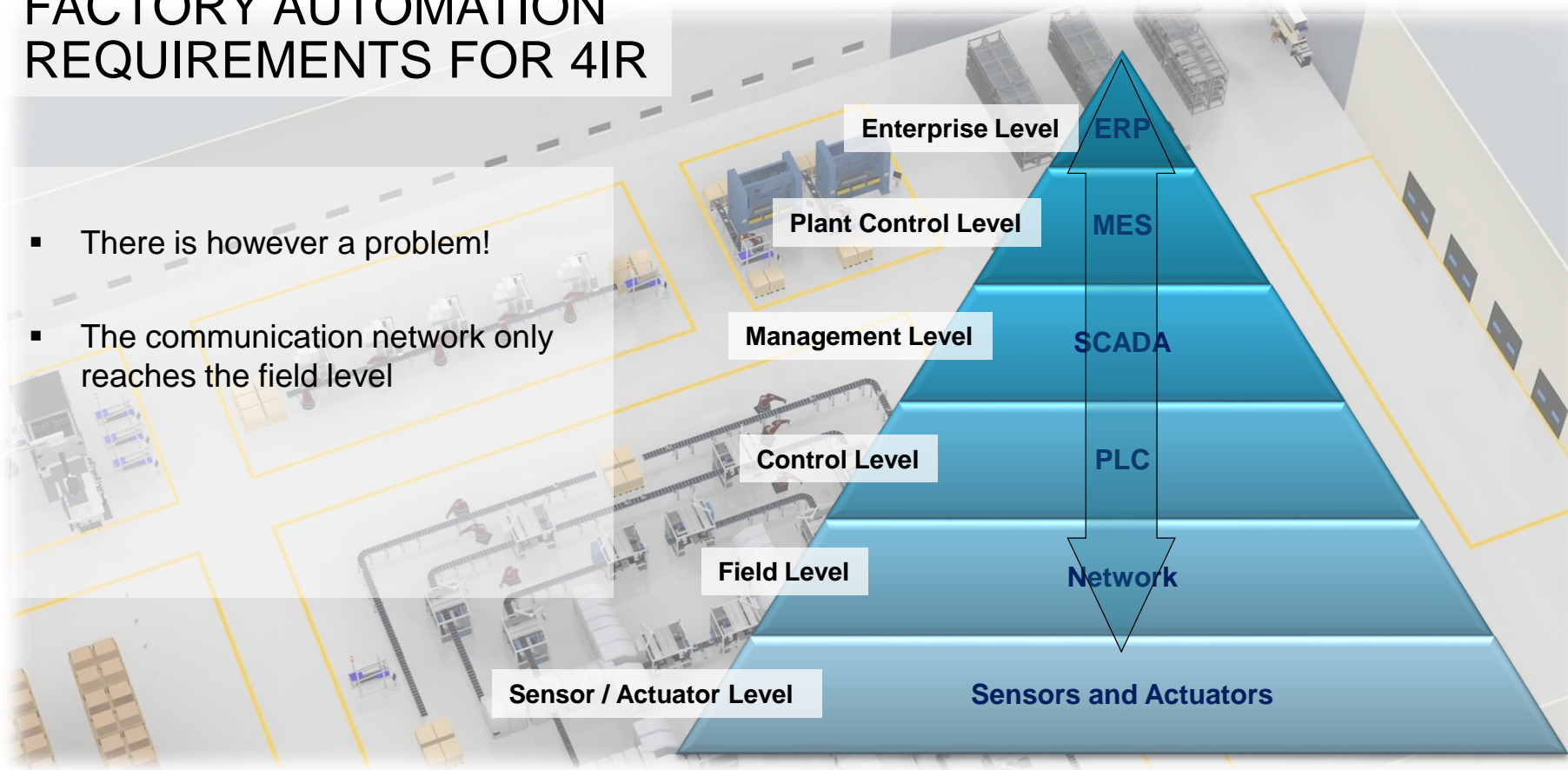
# FACTORY AUTOMATION REQUIREMENTS FOR 4IR

- intelligent sensors, actuators and devices.
- seamless integration and communication between all levels
- high-performance interfaces: i.e Ethernet

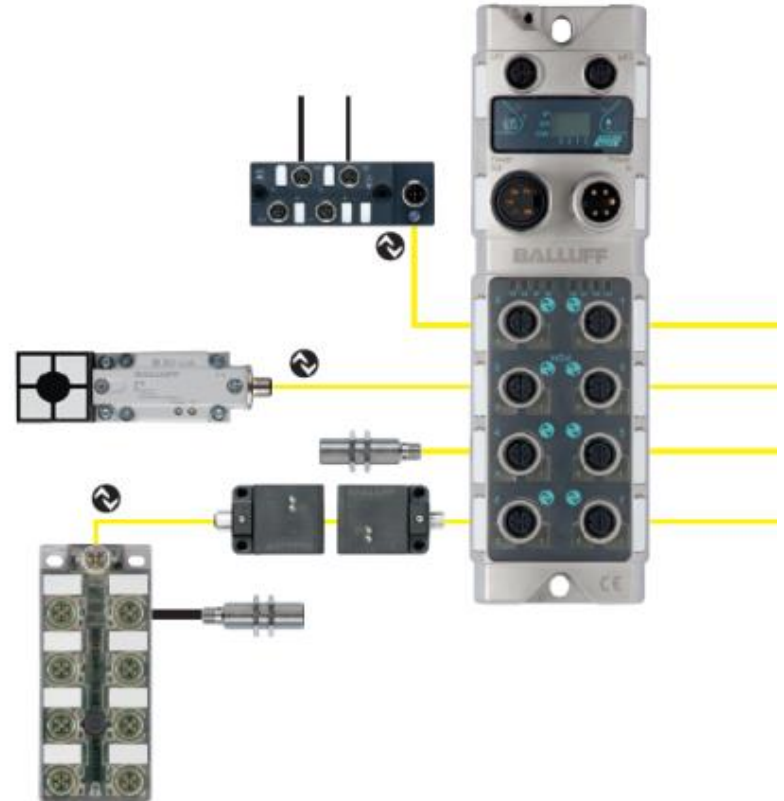


# FACTORY AUTOMATION REQUIREMENTS FOR 4IR

- There is however a problem!
- The communication network only reaches the field level



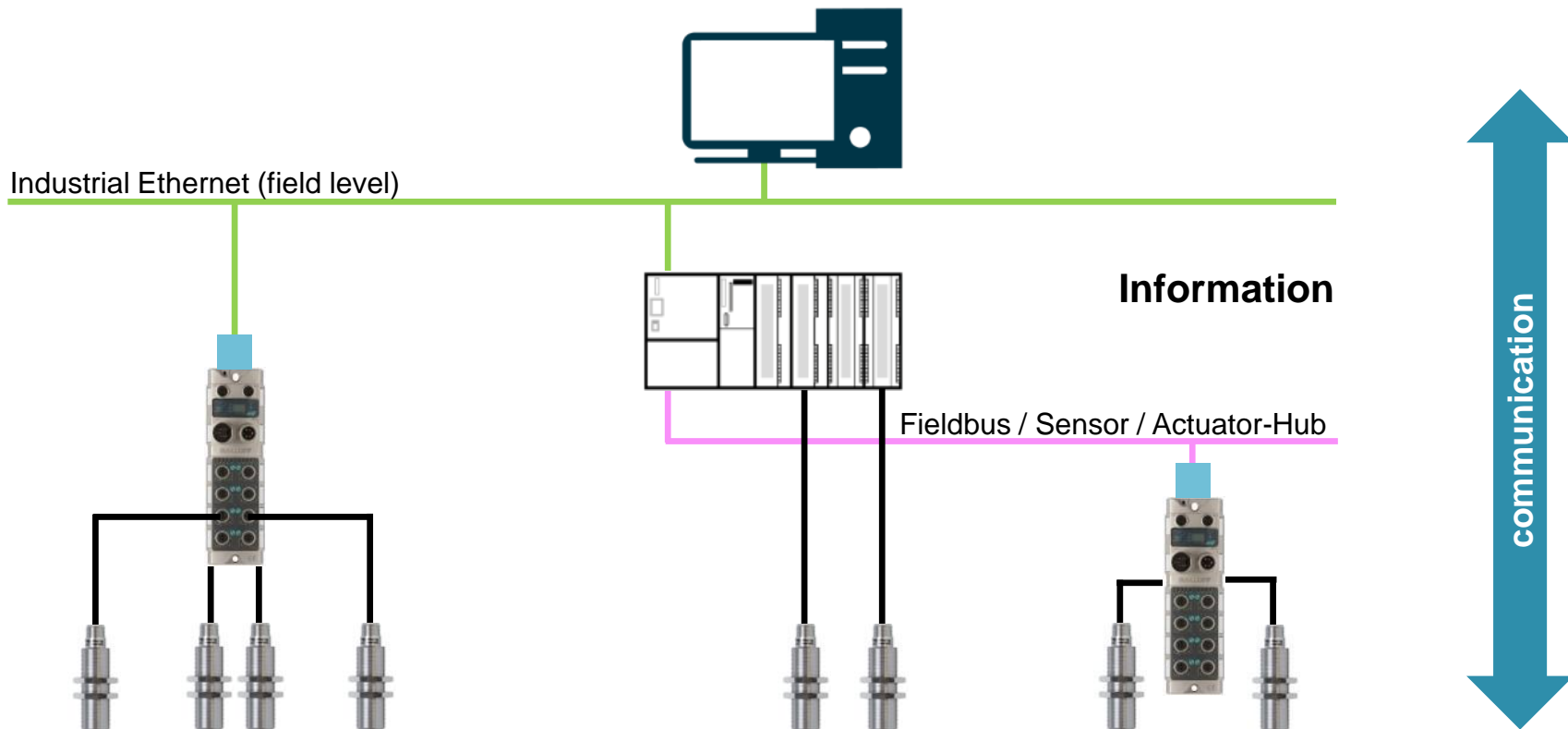
# IO-Link



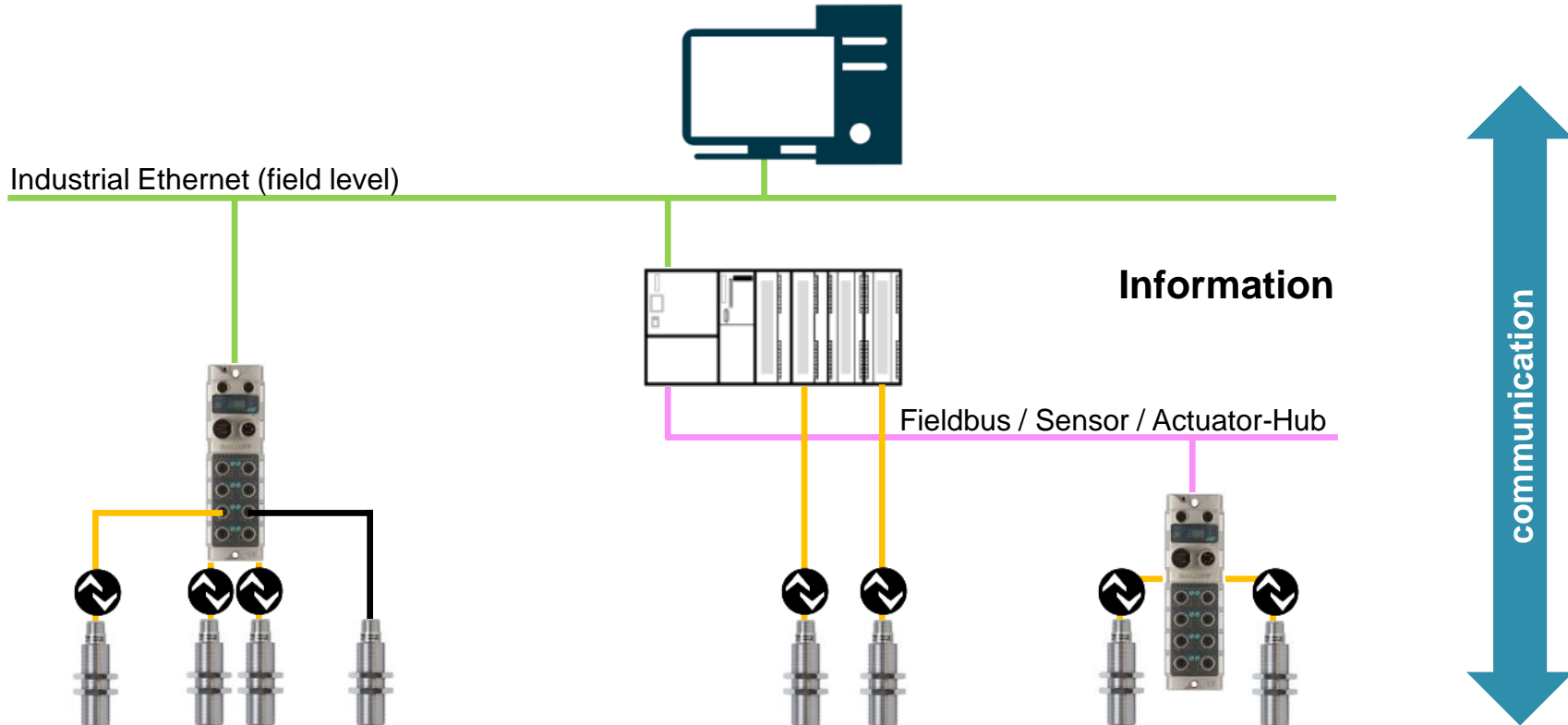


# WHAT IS IO-LINK?

# COMMUNICATION PRIOR TO IO-LINK



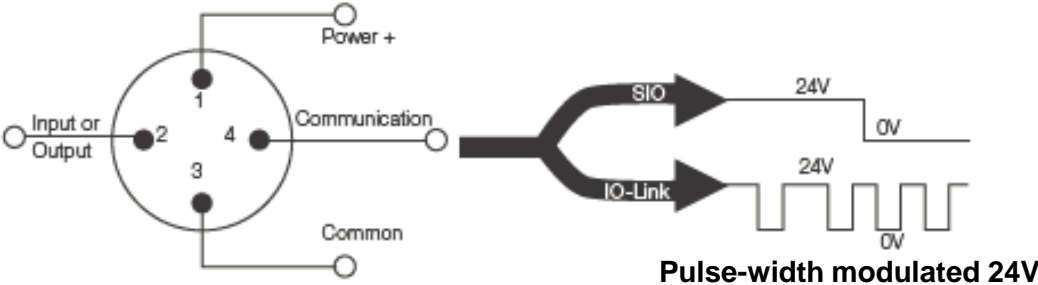
# COMMUNICATION WITH IO-LINK



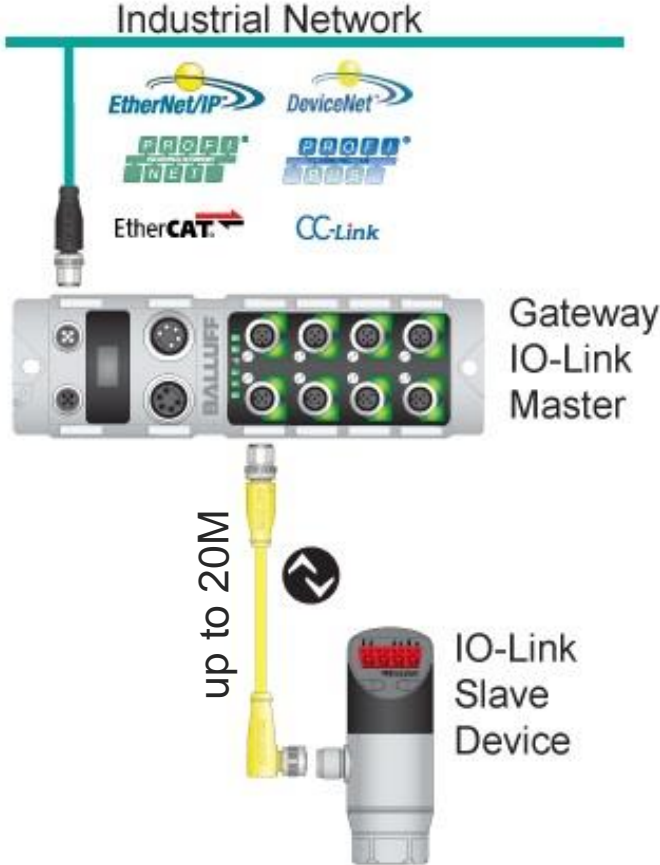
# NOT ANOTHER BUS SYSTEM!

- point to point communications protocol from the field level to the sensor and actuator level.

M12 4wire connection - Power & Communication



Baud rates: 4.8 kBit/s (COM1), 38.4 kBit/s (COM2), 230,4 kBits/s (COM3)



## AN OPEN STANDARD



- standard - IEC 61131-9
- network neutral
- a common communication standard

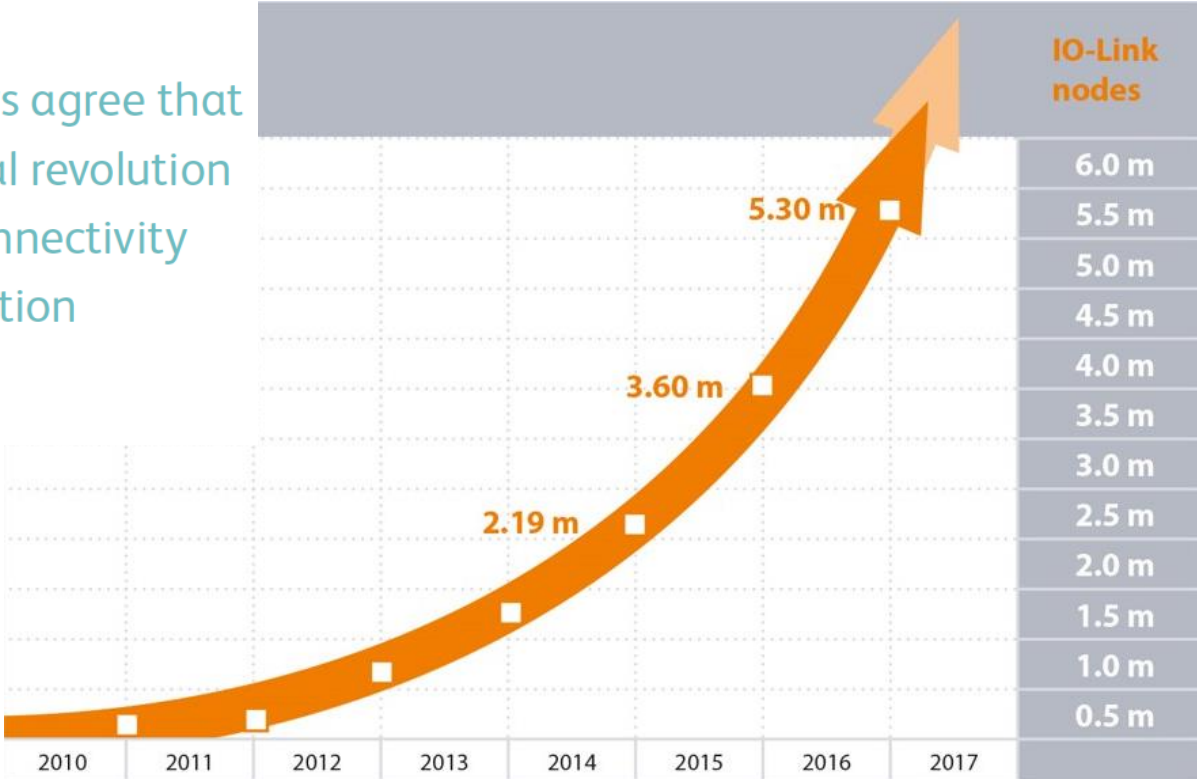
# IO-LINK ENABLING 4IR - STATISTICS



96%

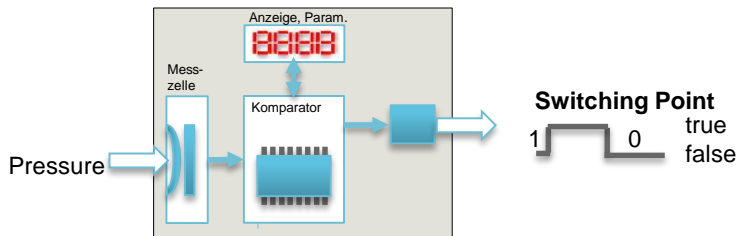
of manufacturers agree that the 4th industrial revolution will be about connectivity and communication

EEF Business Environment Survey 2016

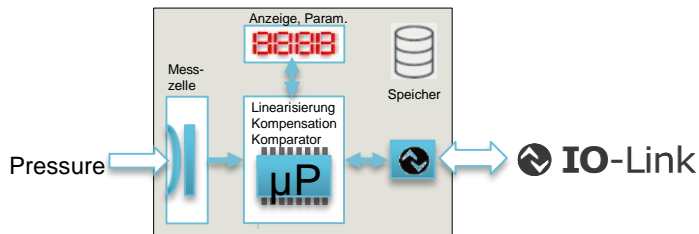


# IO-LINK ENABLING 4IR

# WHAT IS THE DIFFERENCE BETWEEN SIMPLE AND SMART DEVICES?

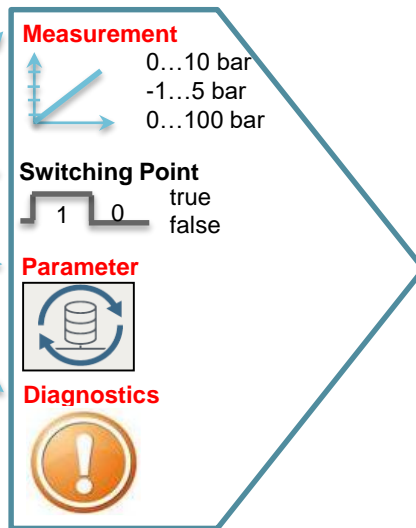


Simple Device



Smart Device with IO-Link

Example:  
Pressure sensor

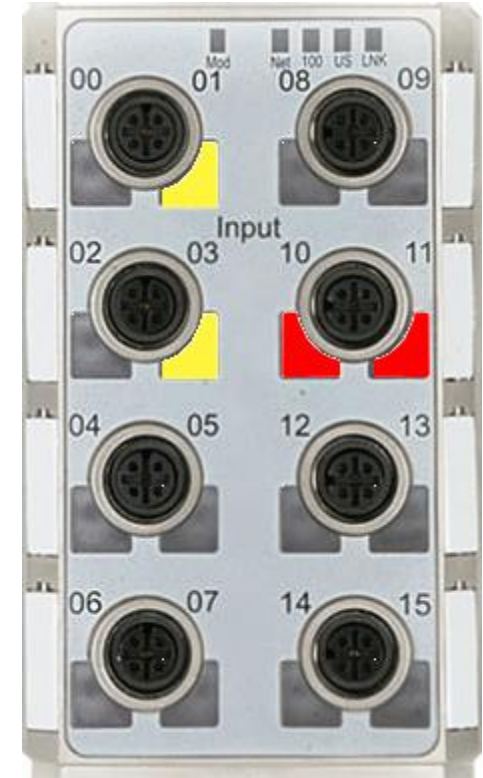


- Much more data – data is knowledge!
- Sensors can adapt to product / process.
- Sensors can self diagnose



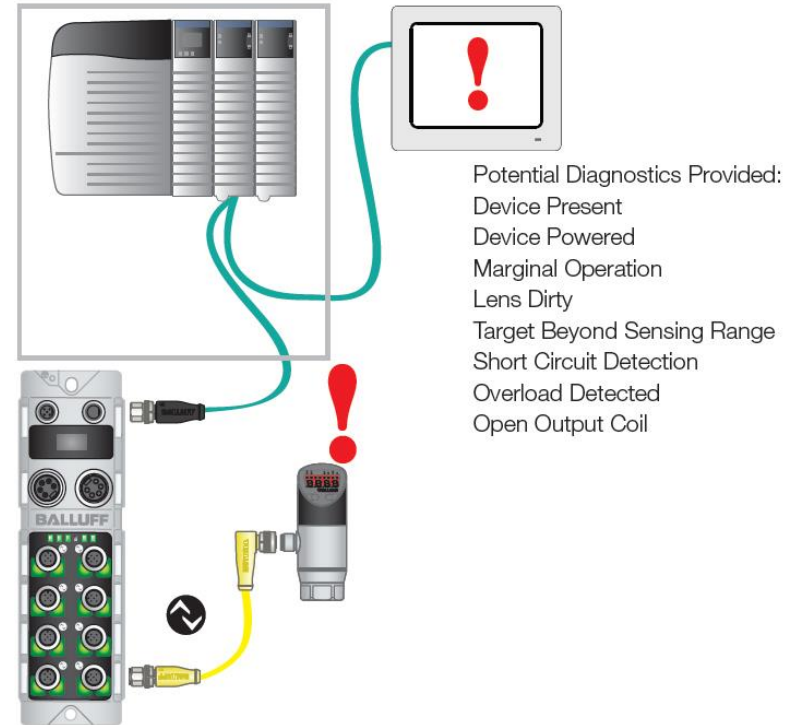
# MINIMISE DOWNTIME THROUGH ADVANCED DIAGNOSTICS

- Short circuit – LED for each I/O port
- Sensor/actuator undervoltage LED for each I/O port
- Network communication status LED on module
- HW and SW Version viewable in display



# ADVANCED DIAGNOSTICS / PREDICTIVE MAINTENANCE

- More data from sensors that form part of the control system.
- Additional data from sensors installed specifically to monitor the condition of the production equipment.



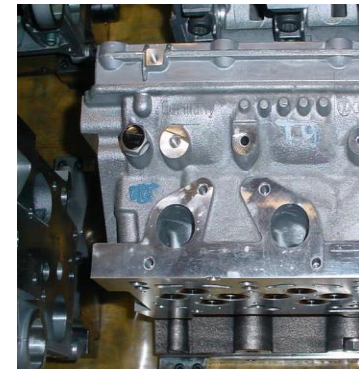
Potential Diagnostics Provided:

- Device Present
- Device Powered
- Marginal Operation
- Lens Dirty
- Target Beyond Sensing Range
- Short Circuit Detection
- Overload Detected
- Open Output Coil

**Identify & Solve Problems Faster!**

# FLEXIBLE MANUFACTURING: PART TRACKING OF ENGINE BLOCK

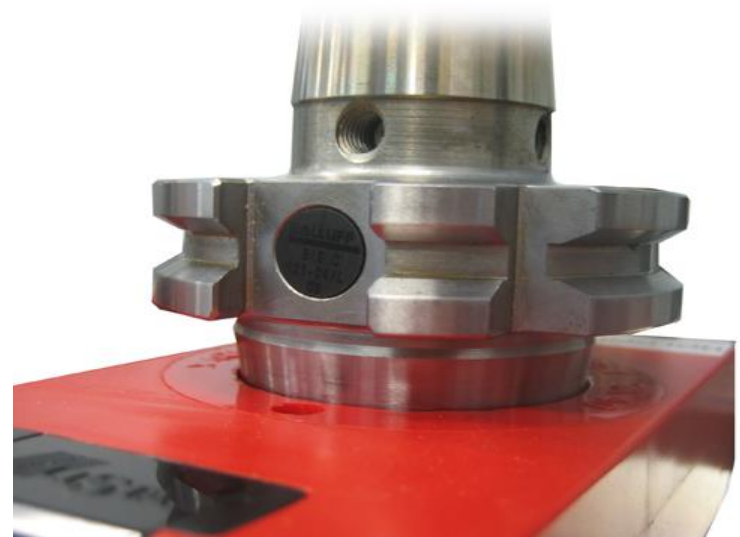
- head/block type – flexible manufacturing
- supplier
- max machining speed
- quality data
- all OPs ok/nok - rework tracking



# PREDICTIVE MAINTAINANCE: ASSET TRACKING

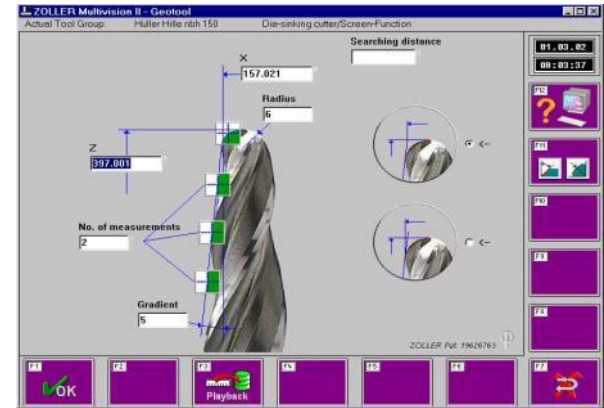
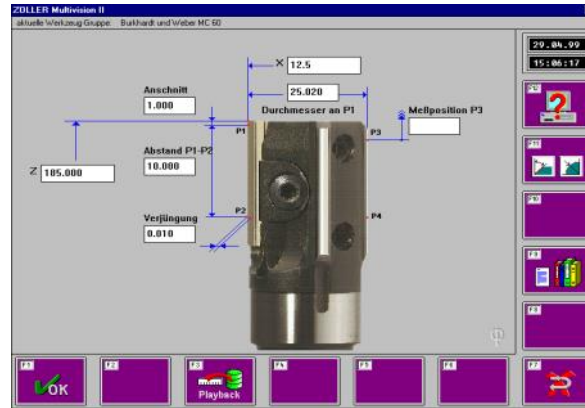
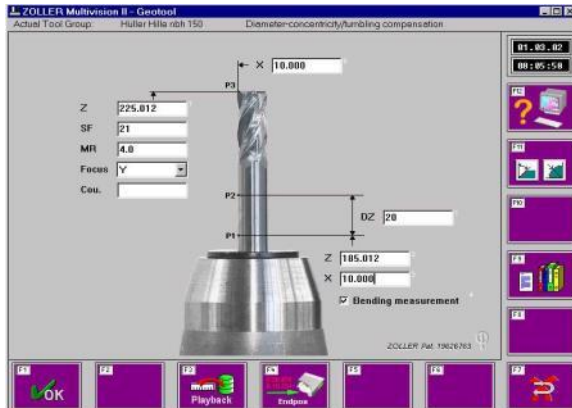
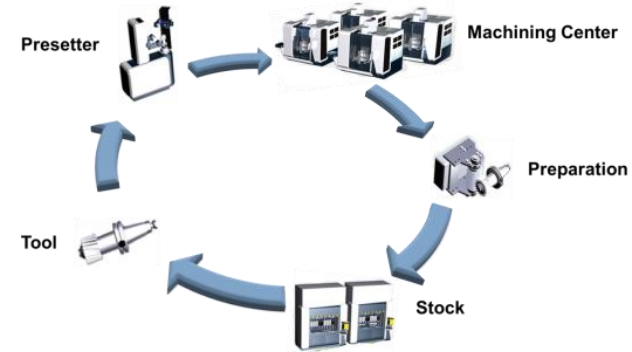
Machine tools:

Offset measurements (from presetter), setup parameters, optimal utilisation, and tool pocket matching.

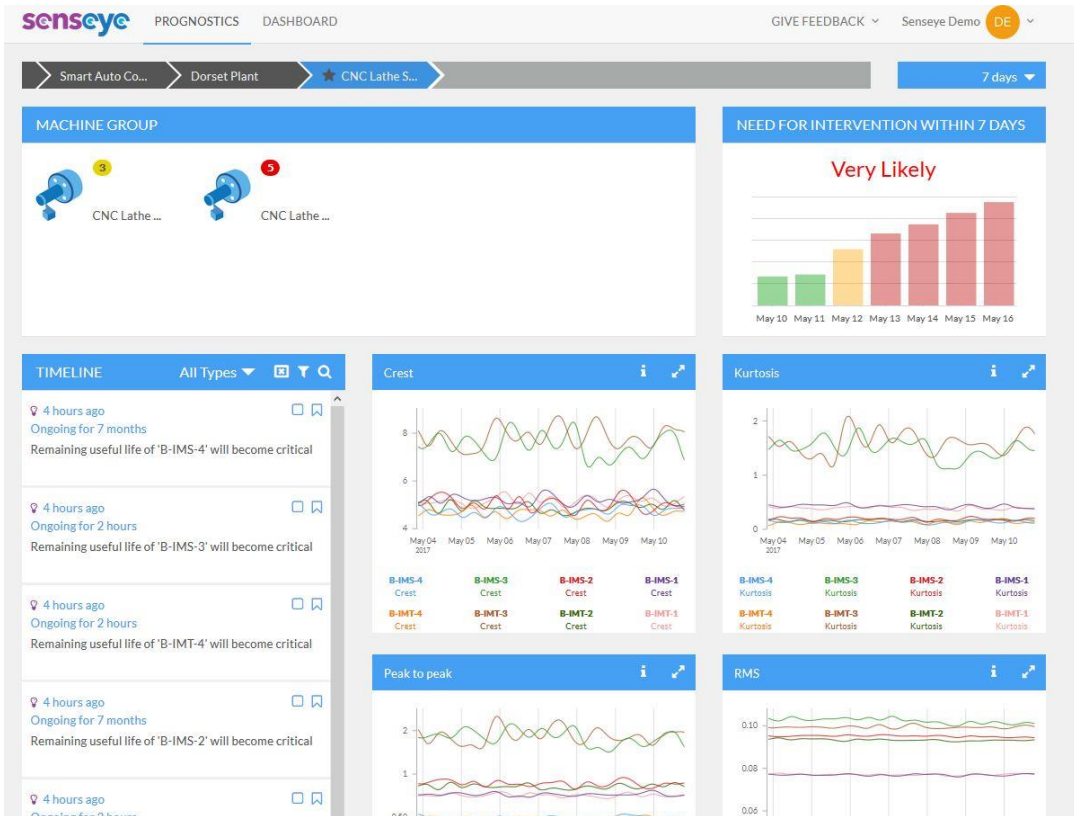


# PREDICTIVE MAINTENANCE: TOOL MANAGEMENT

- Paperless tool ID
- Optimal tool utilization
- Electronic data transmission
- Quality assurance



# PROGNOSIS



- Condition monitoring  $\Rightarrow$  predictive maintenance.
- Data analytics  $\Rightarrow$  production optimisation  $\Rightarrow$  machine learning

# SUMMARY – HOW TO START YOUR DIGITALIZATION JOURNEY

- Specify your network architecture to facilitate communication from the sensor and actuator layer.
- Collect more data utilising smart sensors and RFID connected via intelligent networks but start small – find something out – gather some more data – be agile!
- Answer the question why you are embarking on this journey and what you are hoping to achieve.

**THANK YOU FOR YOUR  
ATTENTION!**

**If there are any questions, please  
feel free to contact me.**

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# BALLUFF A GLOBAL PROMISE.



*innovating automation*