

FORUM
INDUSTRIA
DIGITALE

MECCATRONICA
E SOFTWARE
PER L'INDUSTRIA



**Rockwell
Automation**



L'evoluzione dei sistemi IIoT: Ispezioni Autonome con Robot Mobili

Alberto Pinzello - Rockwell Automation

Oreste Riccardo Natale - Mosaico Monitoraggio Integrato

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Agenda

- Why an IIOT / Industrial Data Platform
- Autonomous robotics for IIoT
- Autonomous inspections
- Autonomous sampling missions



Companies need data to solve challenging problems

Reliability Engineers



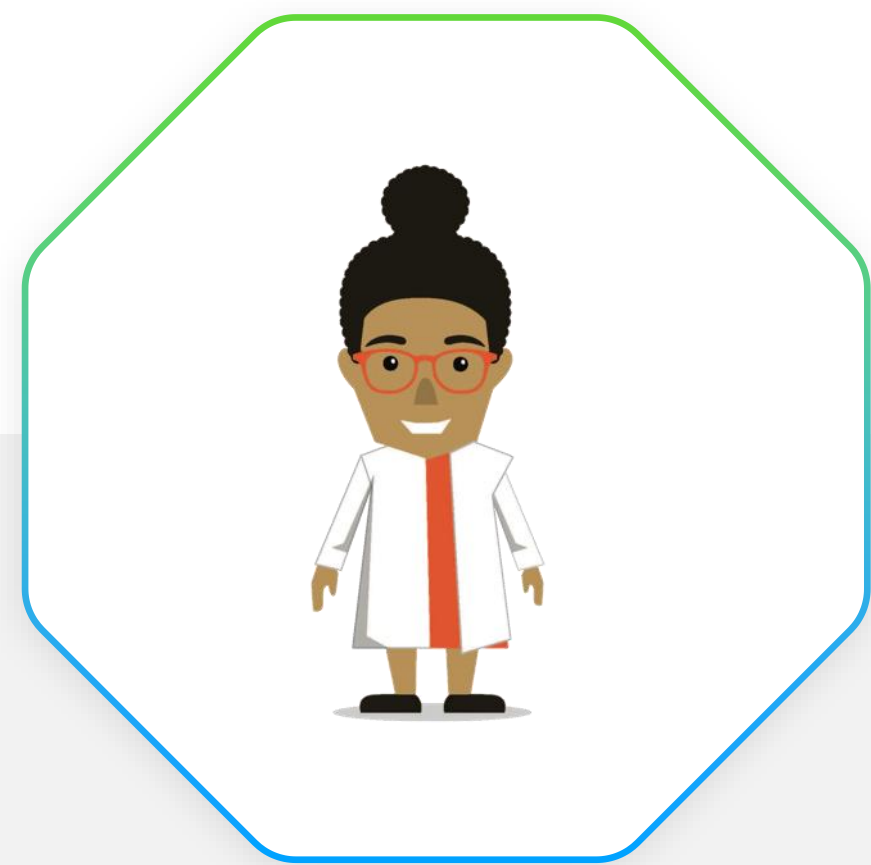
“What were the root causes of an equipment fault that led to unplanned downtime and how can I predict it?”

Process / Manufacturing Engineers



“What process variables or environmental factors contributed to lower-than-expected yields?”

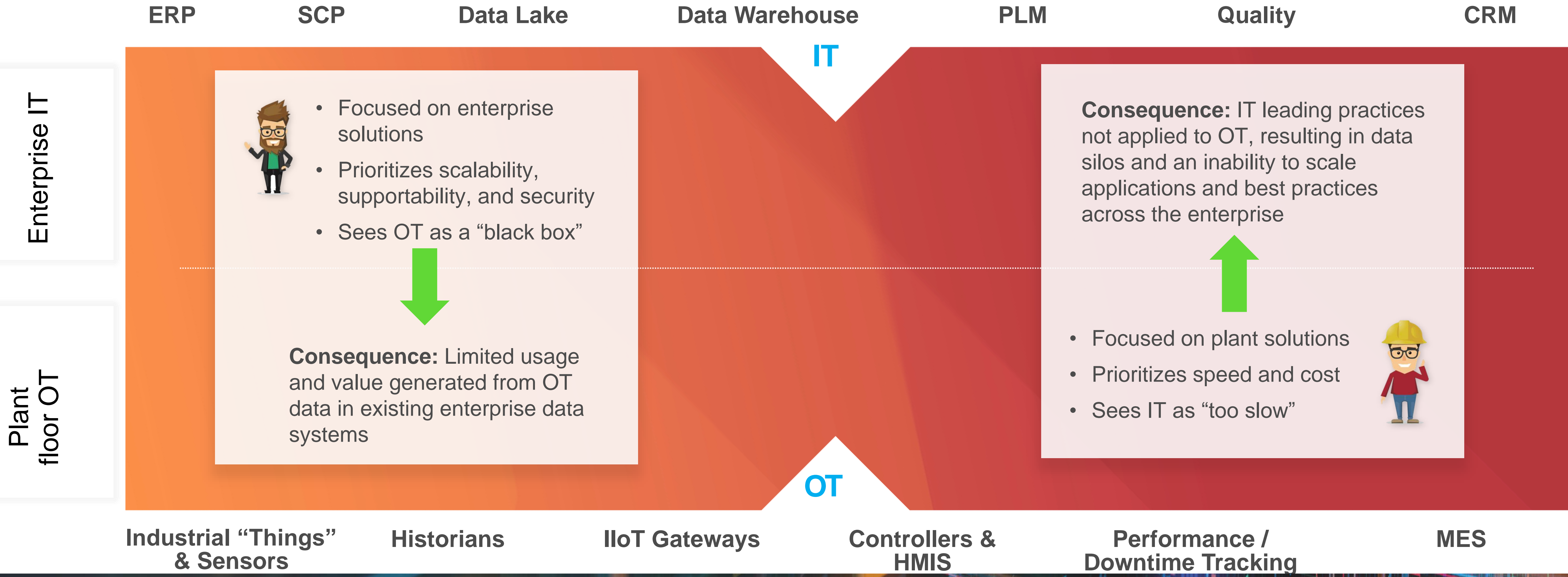
Data Scientists



“What are the critical factors to include in a predictive model to anticipate and avoid an out-of-specification finished product?”

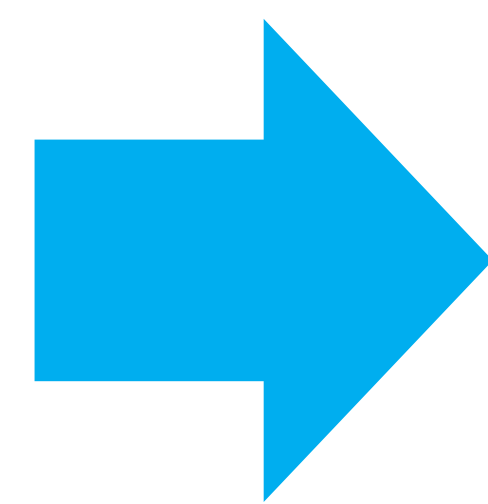
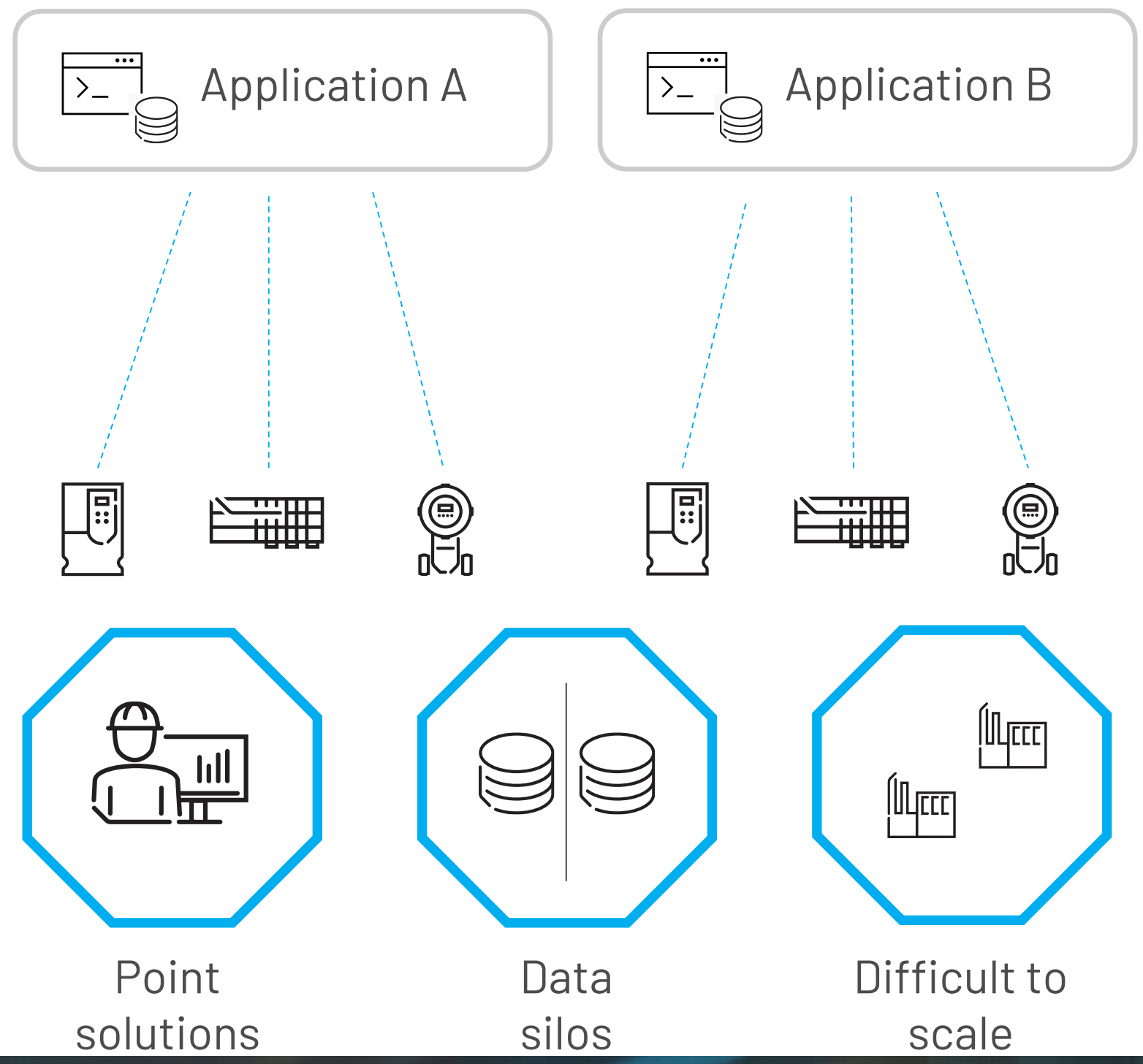
The IT/OT divide

Different perspectives, priorities and skills between IT and OT lead to the data and analytics challenges seen today

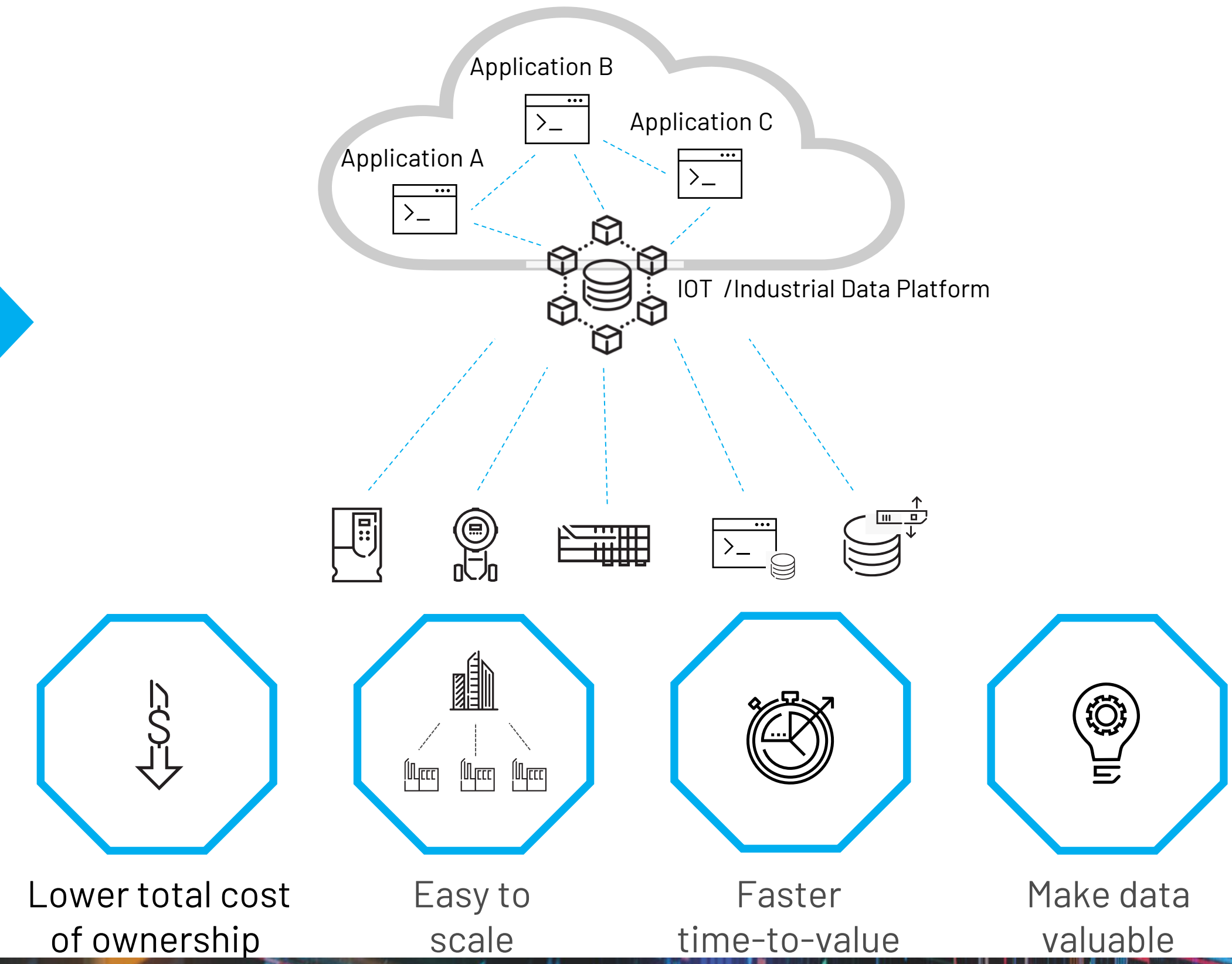


Unify data silos to accelerate digital transformation

Traditional Approach



Connected Enterprise



The data you need exists in many different types, structures ... and locations

Unstructured

- Engineering diagrams
- Work instructions
- SOPs
- Test and sampling records
- Images / Video

Relational

- Batch records
- MES data
- ERP data
- QMS data
- OEE

Time Series

- Real time values
- Sensor data
- Performance

Events

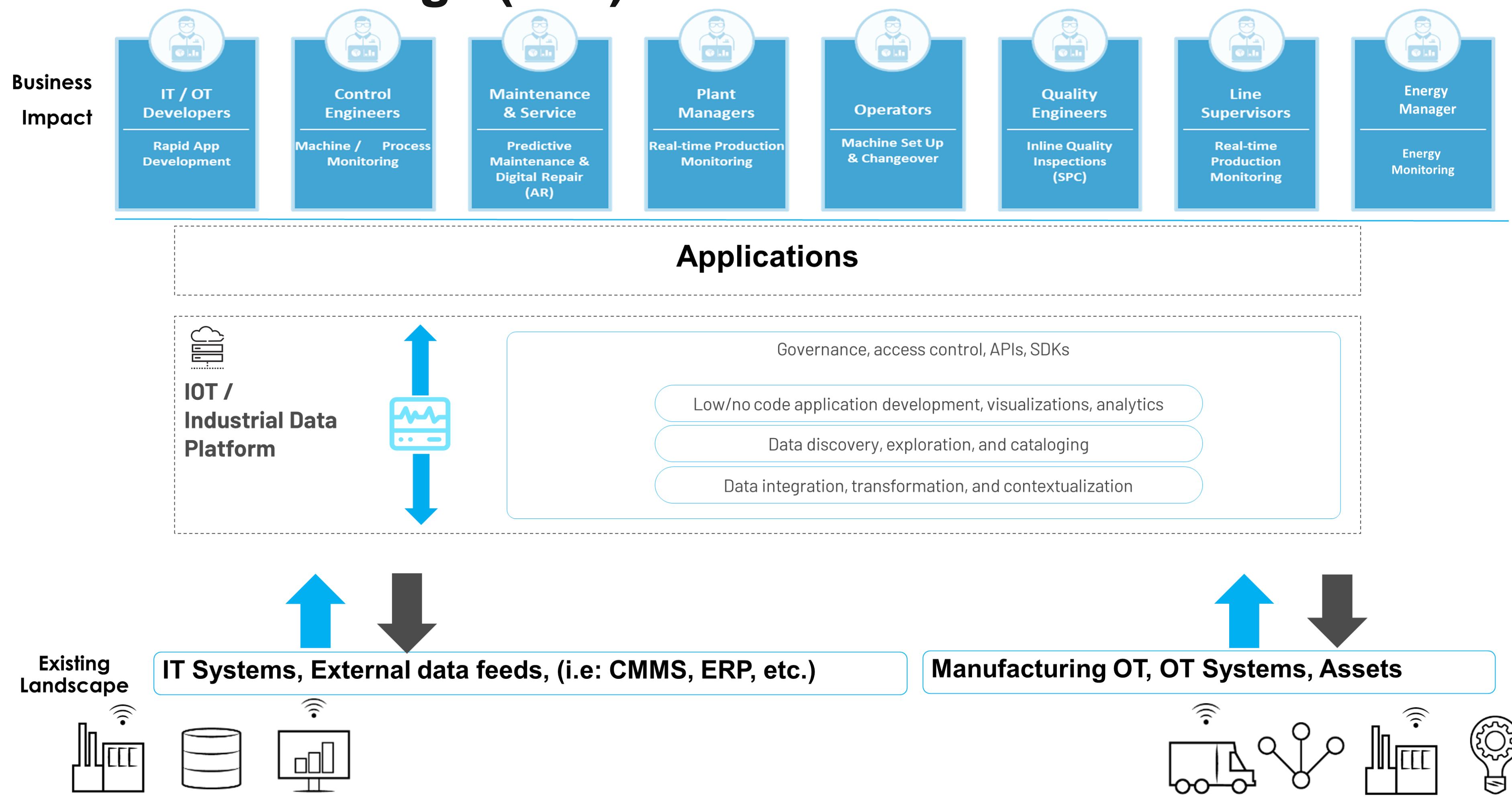
- Activity logs
- Maintenance records
- Alarms
- Work orders

Operate

Design

Maintain

Industrial Internet of Things (IIoT) / Industrial Data Platform



However, some data needed in the Industrial Data Platform are

- Geographically dislocated
- In restricted Areas
- Obtainable only with technically advanced devices, which large scale deployment may be unpractical
- Not reached or not reliably reachable with the information network either wired or wireless
- Complexity of the data to be retrieved require high end edge computing
- On site samples must be taken and brought back to the lab for analysis
- Samples can be potentially cross-contaminated by the operators themselves

Solution: Using an Autonomous Robot



Increased personnel safety



OPEX reduction – continuous operations



Extending the reach of data capture & analytics



Earlier detection of issues:

Quality

Maintenance

Leak detection



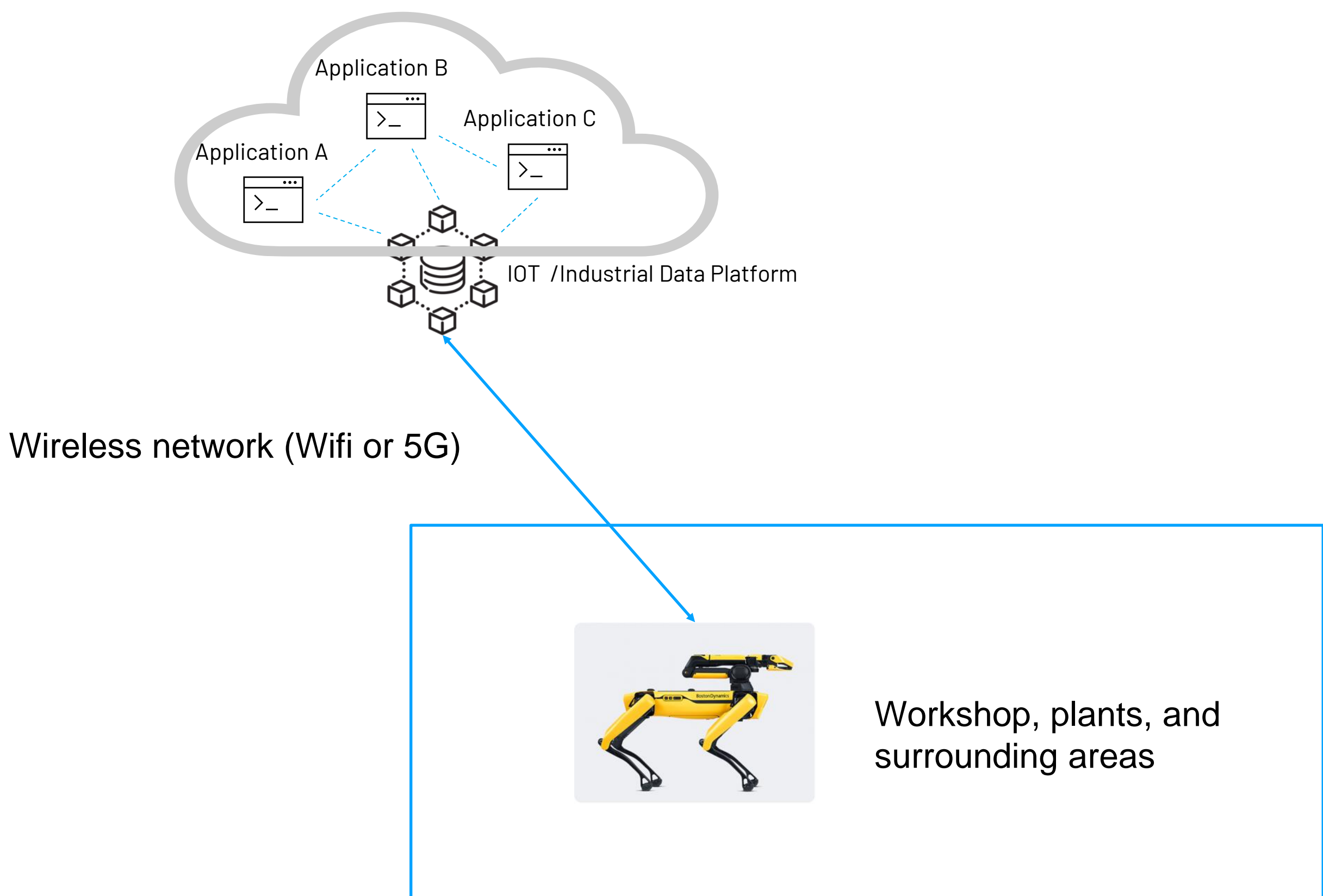
Reliability & consistency



Quadrupeds robots

- All terrain mobile autonomous robotic platform with configurable payload
- Can be easily integrated with the digital infrastructure

Indoor or outdoor autonomous inspections (industrial use case) - 1

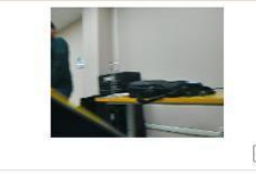








- Thermal inspections (temperature reading automatically transferred to the IIoT Platform)
- Visual inspections (gauge readings digitalized with AI Vision)
- Acoustic inspections (gas leaks)
- Visual inspections for hazards and safety nonconformities (using AI vision)
- Active custom payloads

Indoor or outdoor autonomous inspections (industrial use case) - 2

Benefits of the integration between the IIoT Platform and the autonomous robot:

- Data are collected reliably and with standard procedures
- Collected and pre-processed data reported directly into the information systems
- Inspection missions can be started periodically, manually or on events
- Autonomously react to event raised by PLCs governing the plant or the specific machines

| FREKI Application | | INDUSTRIA DIGITALE | |
|--|--|---|--|
| Battery (%) 68 | | Robot Status Position Coordinates (m) X_Position: 2.32 Y_Position: 5.3 Z_Position: 0.21 | |
| Real Time Camera  | | Robot Inspection Section Machine 1 Last Inspection: 2024-11-13 17:05:28 Surface Machine Temperature (°C): 42.23  | |
| | | Machine 2 Last Inspection: 2024-11-13 17:07:04 Surface Machine Temperature (°C): 41.97  | |
| Swab Section Swab 1:  Swab 2:  Swab 3:  | | Machine 3 Last Inspection: 2024-11-13 17:08:37 Surface Machine Temperature (°C): 41.73  | |

Live demo is available at the boot

The robot can navigate the workshop and surrounding areas avoiding unplanned static or moving obstacles following alternative routes

Autonomous sampling missions (healthcare use case) - 1

HAIs are recognized as a global public health problem with a growing cost and significant loss of workers' and patients' quality of life and trust.

Out of every 100 patients, 7 in high- and 15 in low-/middle-income countries (LMIC) will acquire at least one HAI, in acute care hospitals.

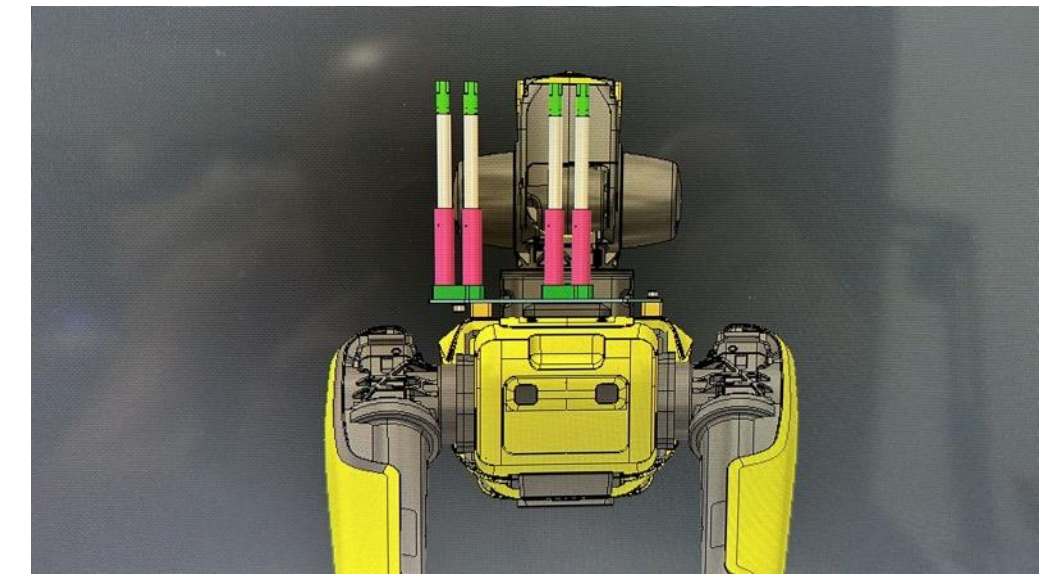
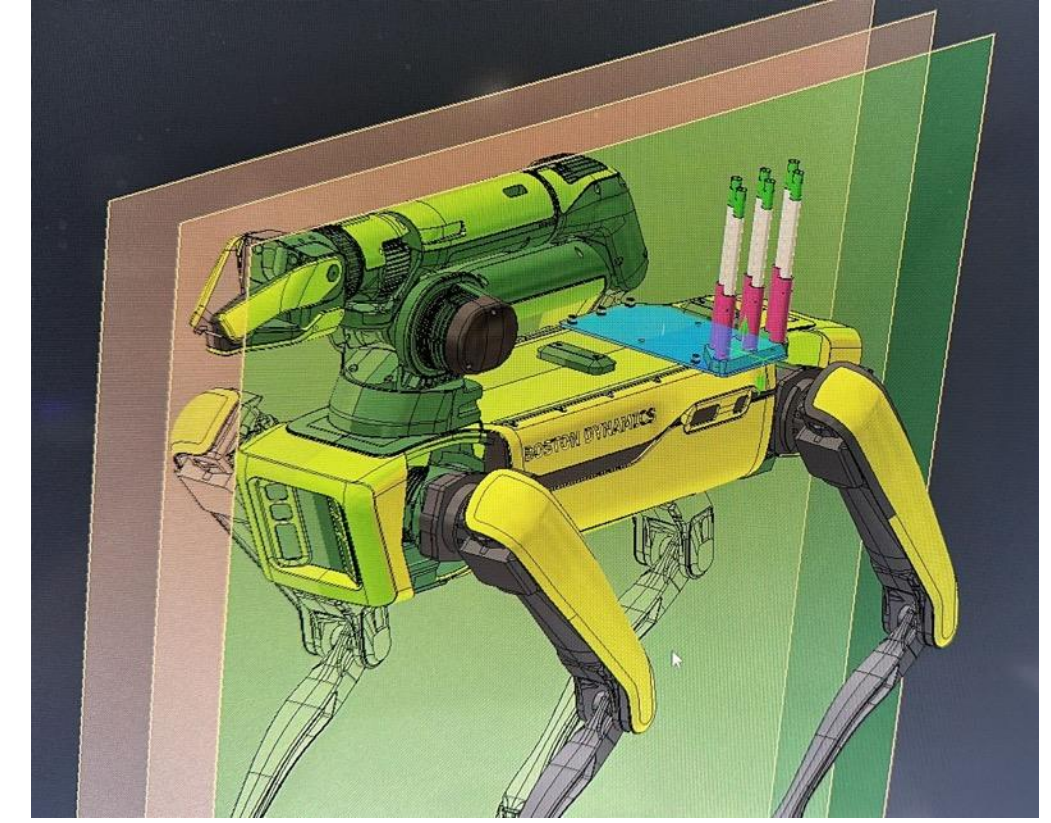
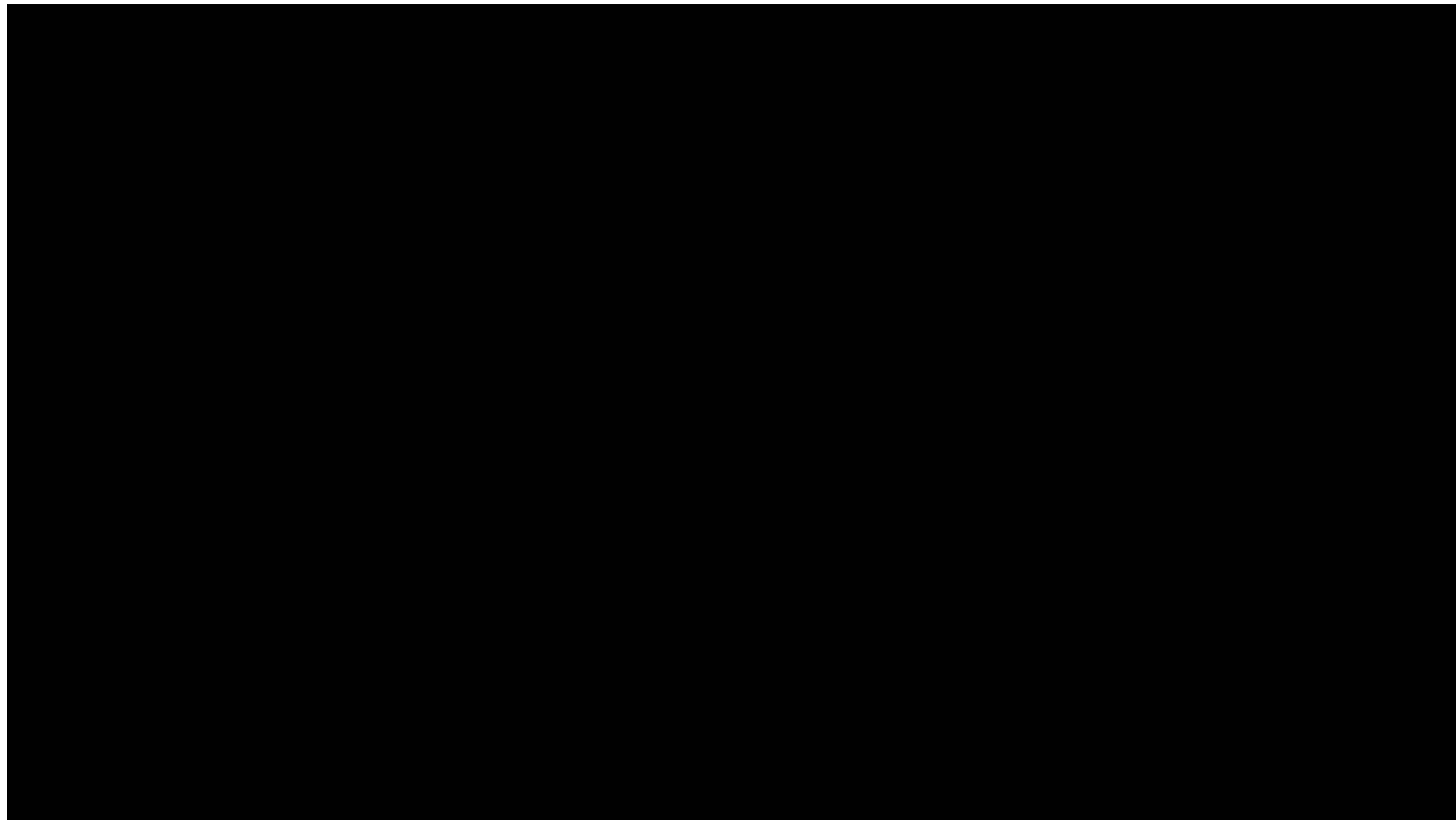
One in every 10 affected patients dies of HAI. 8.9 million HAIs occur every year in acute and long-term care facilities in EU/EEA.

Autonomous robotic sampling missions technology will enable a new HAI prevention service (i.e., nocturnal swabbing of critical areas) which will be detecting 99% of risky pathogens responsible for HAI.



Autonomous sampling missions (healthcare use case) - 2

Robot equipped with swab rack and programmed to use the 6-dof robotic arm to take surface samples with swab and bring them back to the lab for analysis



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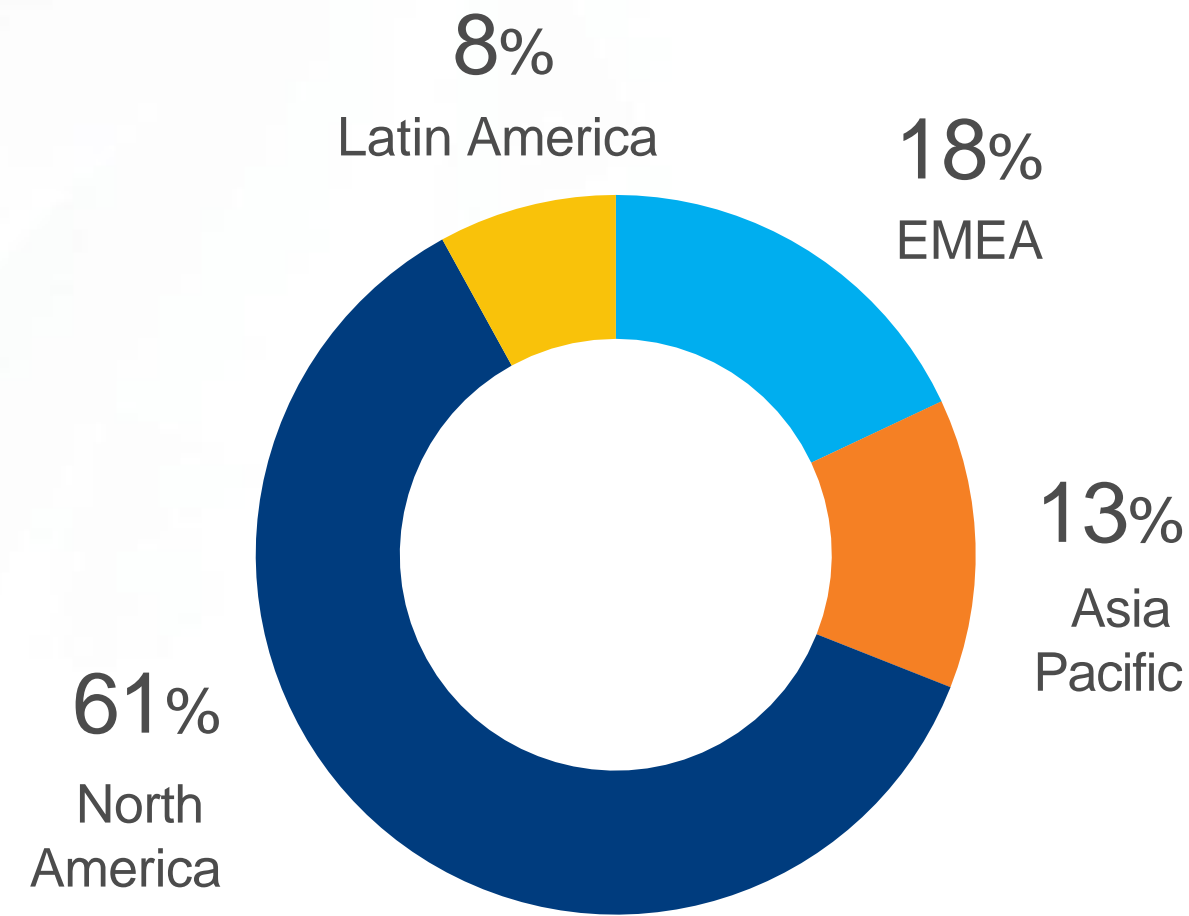
As the world's largest pure-play industrial automation and digital transformation company,

we are creating the future of industrial operations.

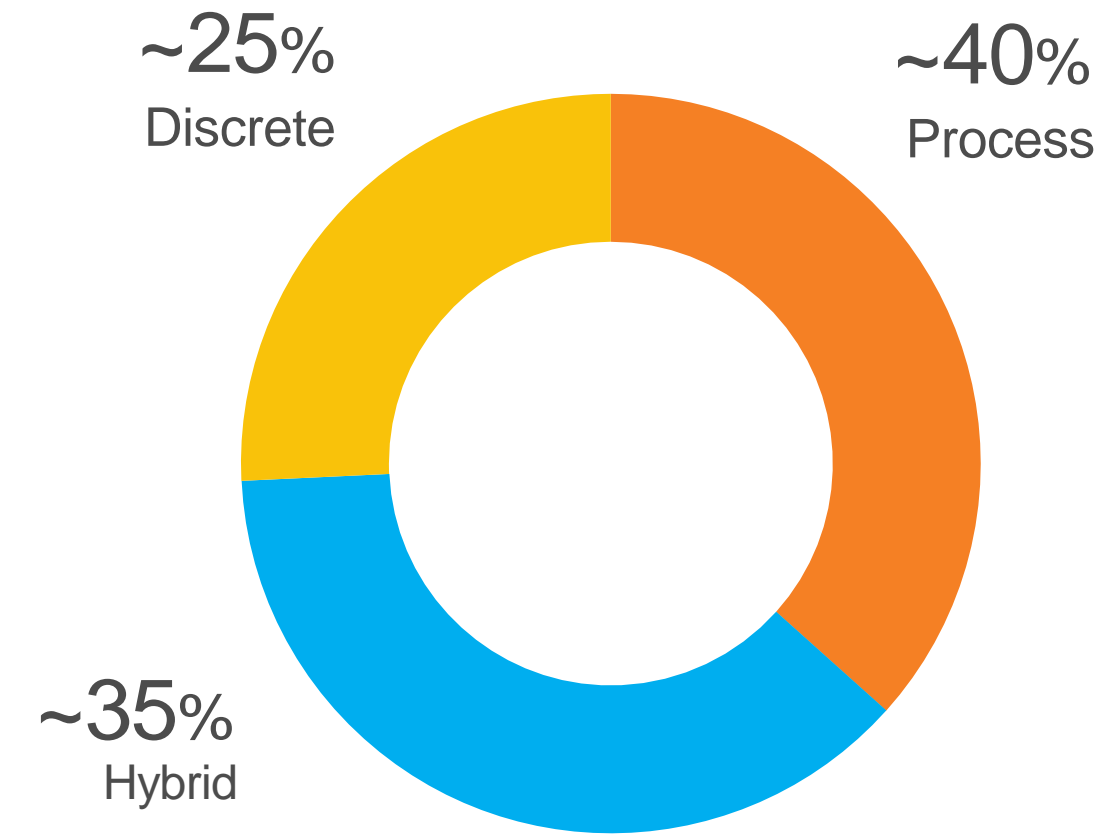
SERVING CUSTOMERS FOR 121 YEARS

AT A GLANCE

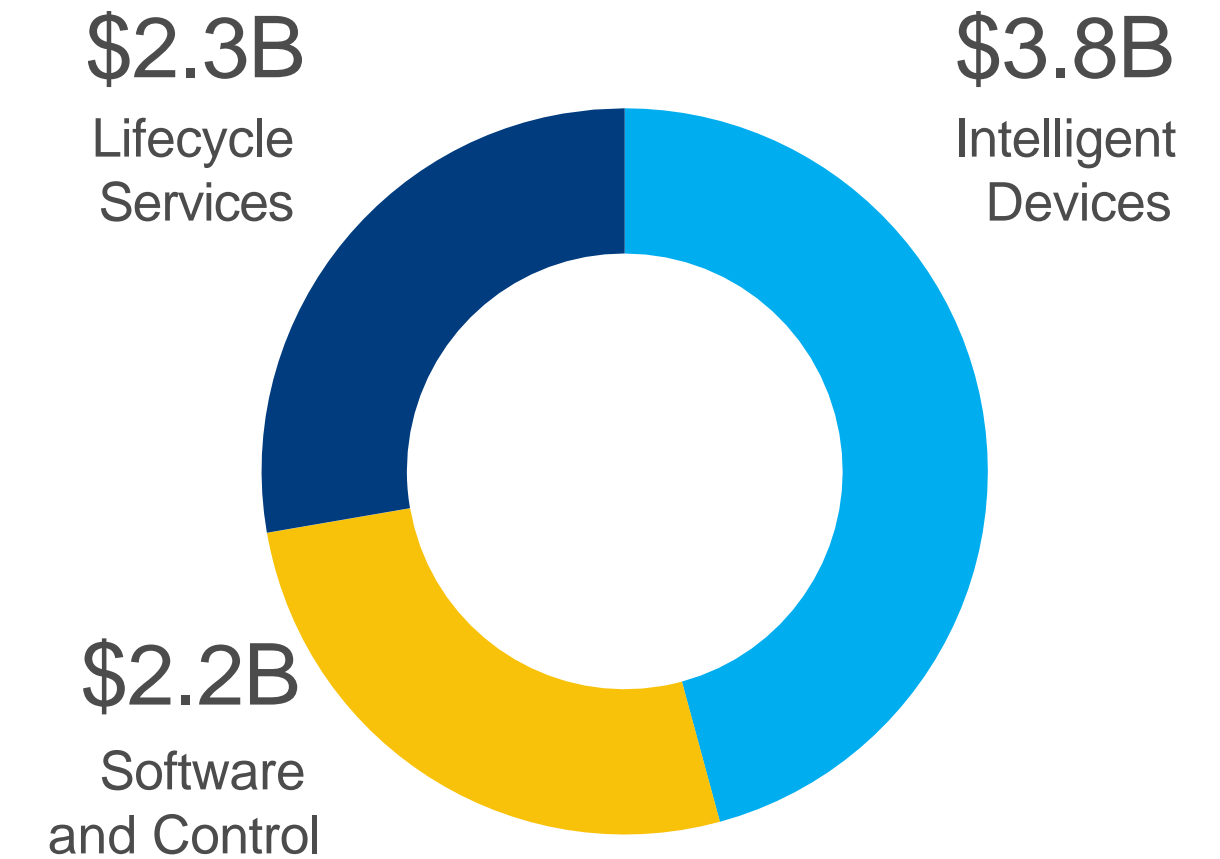
\$8.3B 2024 sales



BY REGION



BY INDUSTRY



BY SEGMENT

GLOBAL

100+ Number of countries

27k Employees: more than half outside the U.S.

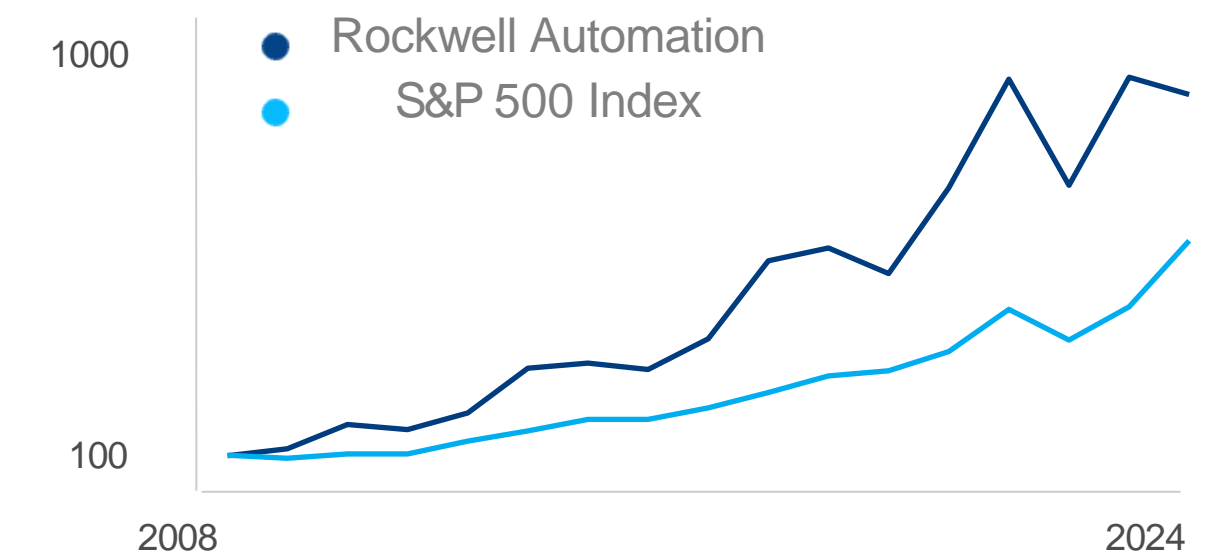


World's Most Ethical Companies



The 50 best places to work for innovators

Total shareowner return



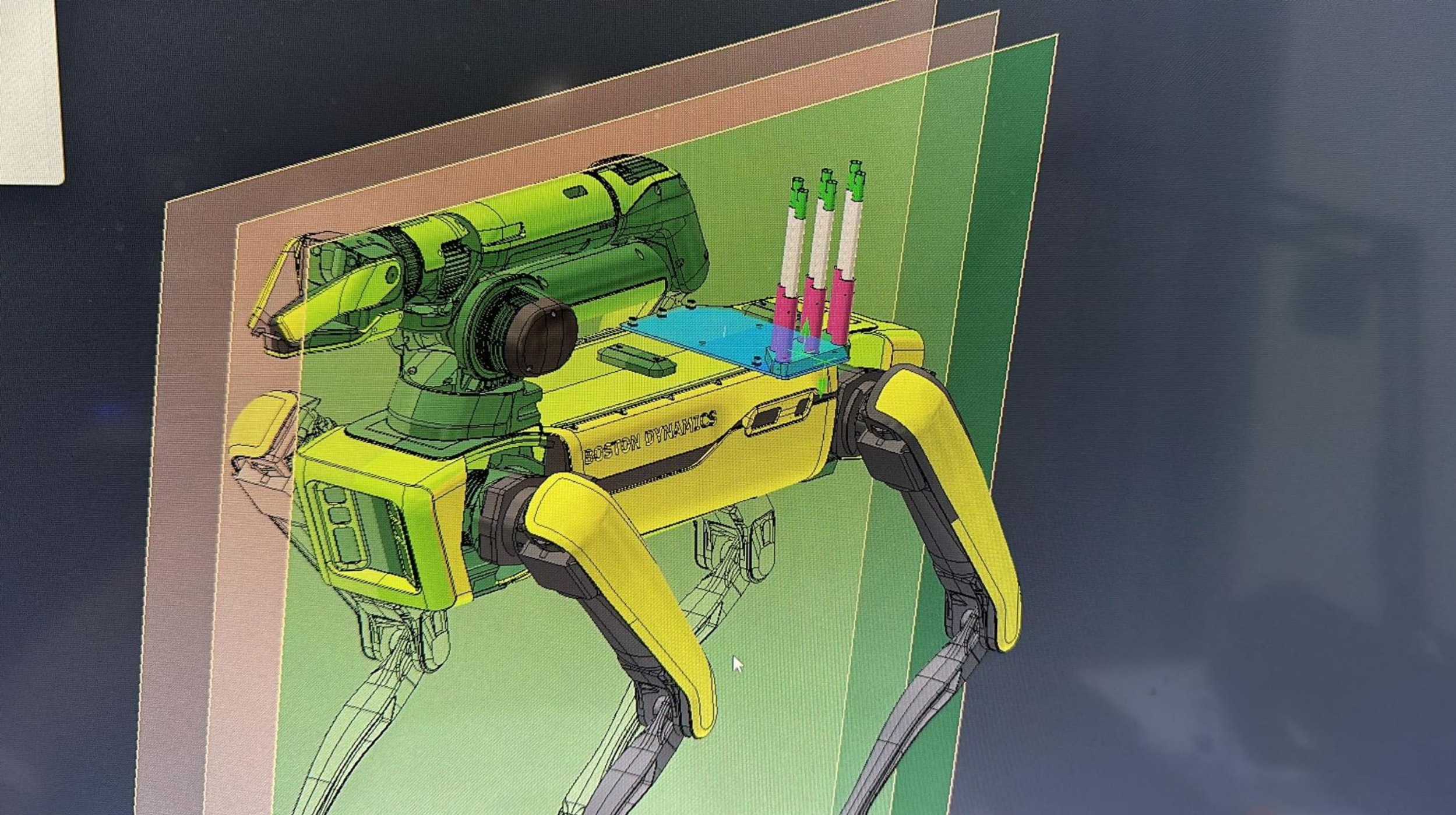
Contact:

Alberto Pinzello, Enterprise Software Sales Executive

alberto.pinzello@rockwellautomation.com

www.rockwellautomation.com





Design, supply and commissioning of integrated automation systems for:

- *New machines and plants*
- *Hub IIoT for industrial automation*
- *Hub IoT per l'automazione e IoT integration*
- *Augumented reality human machine interface*
- *Training application with AR*
- *Mobile autonomous robotics applicatios*

Process and manufacturing industry, healthcare



Contact:

Oreste Riccardo Natale, Fondatore e Amministratore

o.r.natale@mosaico-mi.it

www.mosaico-mi.it

www.linkedin.com/company/mosaico-iot/