Smart testing

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Bologna 07 November 2023

IRS Ingegneria Ricerca Sistemi

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- IRS: mission & vision
- Digital Twin
- Machine learning
- Industry 5.0

IRS: mission & vision

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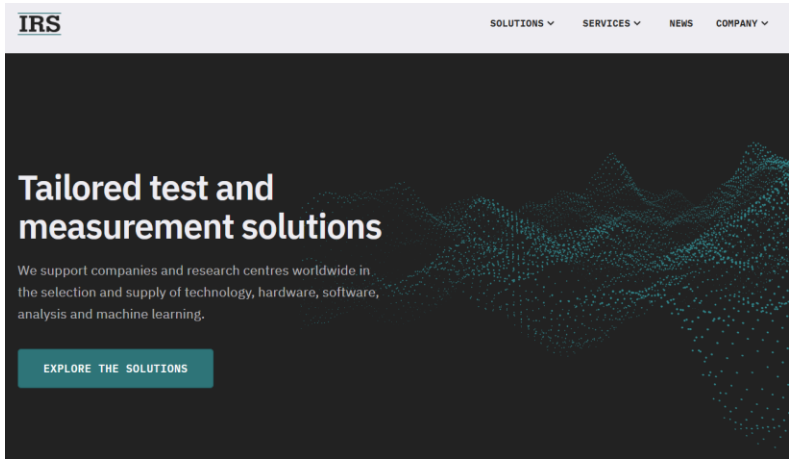
IRS: mission & vision

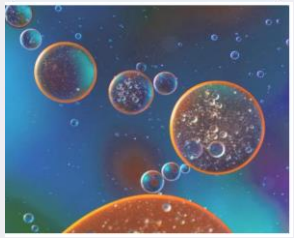


Household appliances

We provide test systems to develop, test and manufacture small and large appliances

HVAC

We develop solutions for functional validation and normative testing of HVAC components and machines



Automotive

We develop innovative test systems for automotive components

Structural Monitoring

We provide solutions for monitoring historical and contemporary structures

Industry 5.0

We provide the tools to create value through enabling technologies

IRS offices @ AT Invest innovation center Padova

More than 70 people
5 locations in
3 European countries

IRS offices @ Polo tecnologico Alto Adriatico Pordenone

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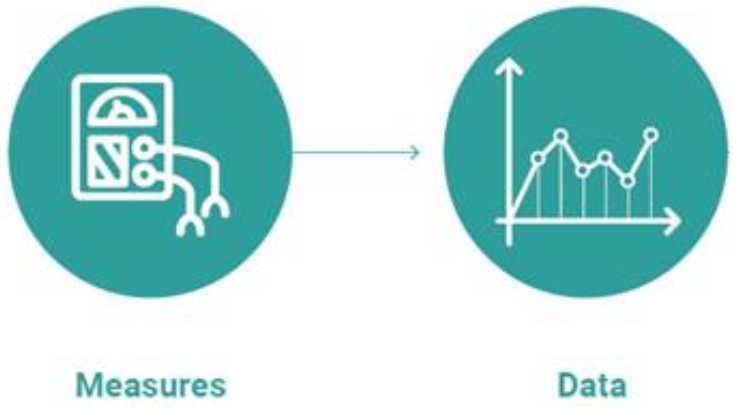
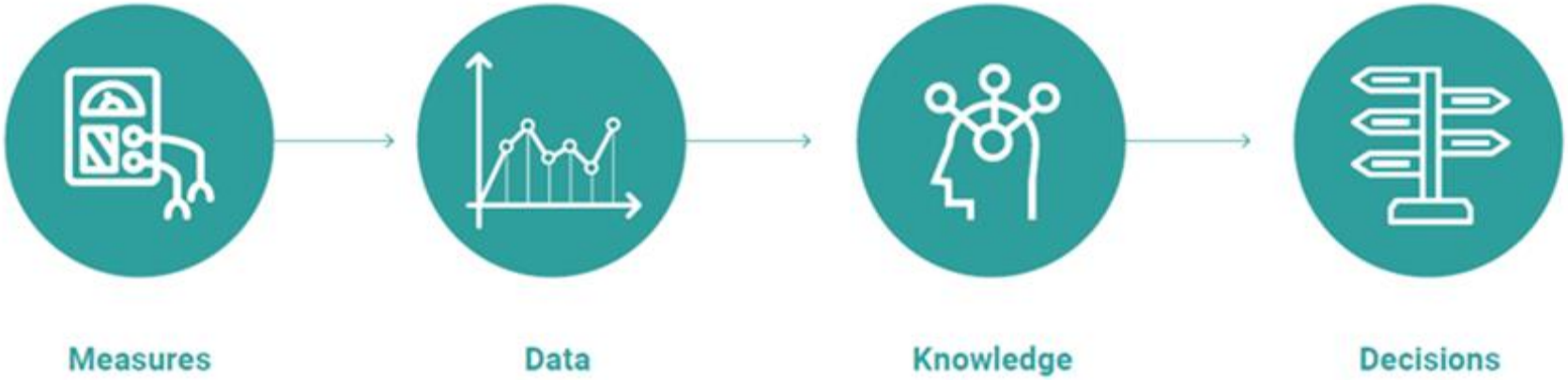
Why?



Can it be done better?

Why?



It can be done better.

How?

Innovation.

Increase customer value generation going beyond traditional solutions.

IRS: mission & vision

Our mission and vision

Deliver augmented measurement, test and control solutions. IRS aims to be the company leader in development, manufacturing and delivery of test, measurement and control systems. IRS systems translate into value for customers thanks to technological innovation, advanced modeling and design as well as professional production and after sale services.

Increase customer value generation going beyond traditional solutions. We enable our clients to increase their value generation, going beyond traditional monitoring and control solutions, by providing self-intelligent subsystems for embedded industrial applications at a highly competitive cost of ownership.

Client focus

Innovation

We are uncovering a better ways of developing solutions and systems. Through our agile organization we have come to get efficiency, flexibility and customer satisfaction. Agile principles we apply are:

Customer first

Value driven iterative system developments

Customers, developers and testers continuous interaction

Continuous attention to technical excellence and good design

Team work

Efficiency

Customized solutions

- End of line Test system
- Quality Control
- Systems for laboratories R&D, validation, certification
- Life test (HALT)
- Structural Monitoring systems
- Real-time & embedded systems

Innovation products and vertical solutions

- Test bench for standard test (HecsyS, McKinley, ..)
- Reconfigurable systems for HMS (StructuralX)
- Standard core system for electrical measurements , chiller test, etc (chillerVIEW, MeetBoard, MeetBOX, PVBB)
- Electronic board for signal conditioning

Main contractor

- complete turn-key systems
- End-of-line Test system
- Climatic chamber for HVAC test
- Complete machine for life test, HALT
- Advanced control system (HPTC, HIL, RCP)

Digital Twin

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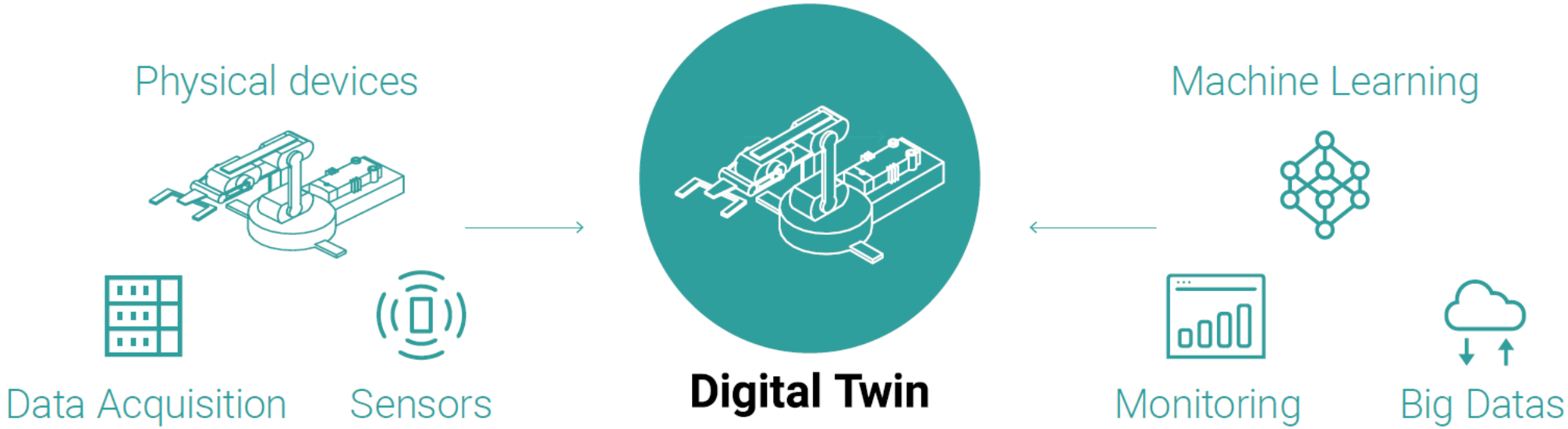
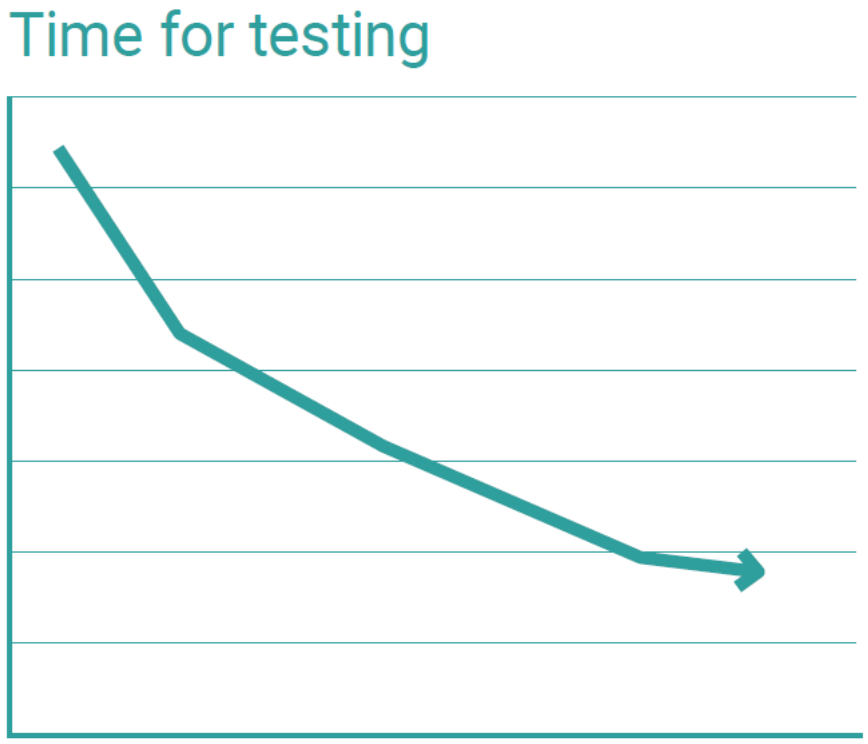
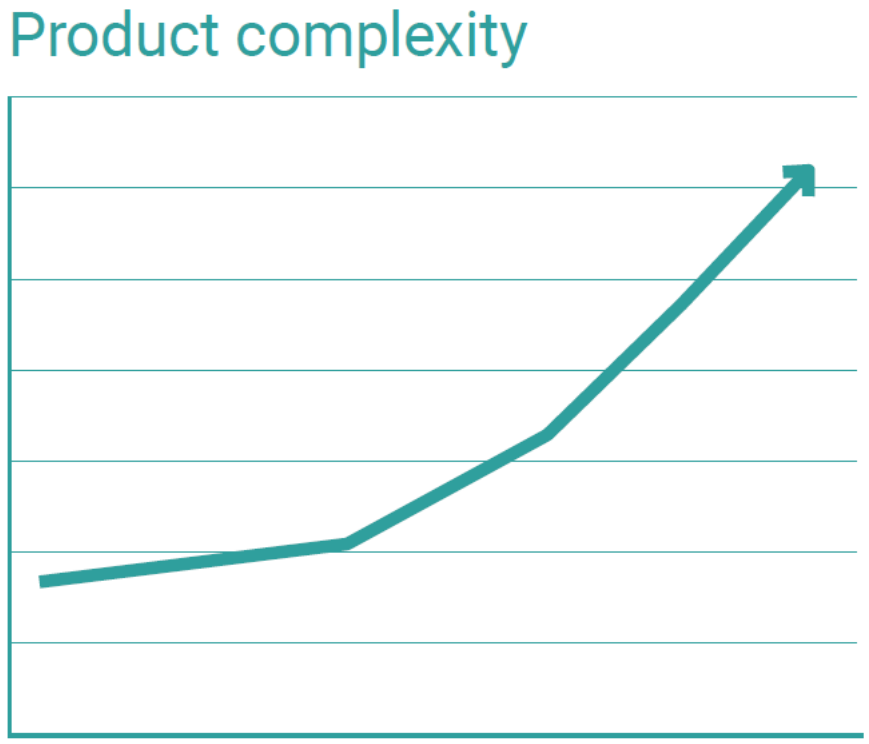


It is a bridge between the physical and digital world.





Testing challenge

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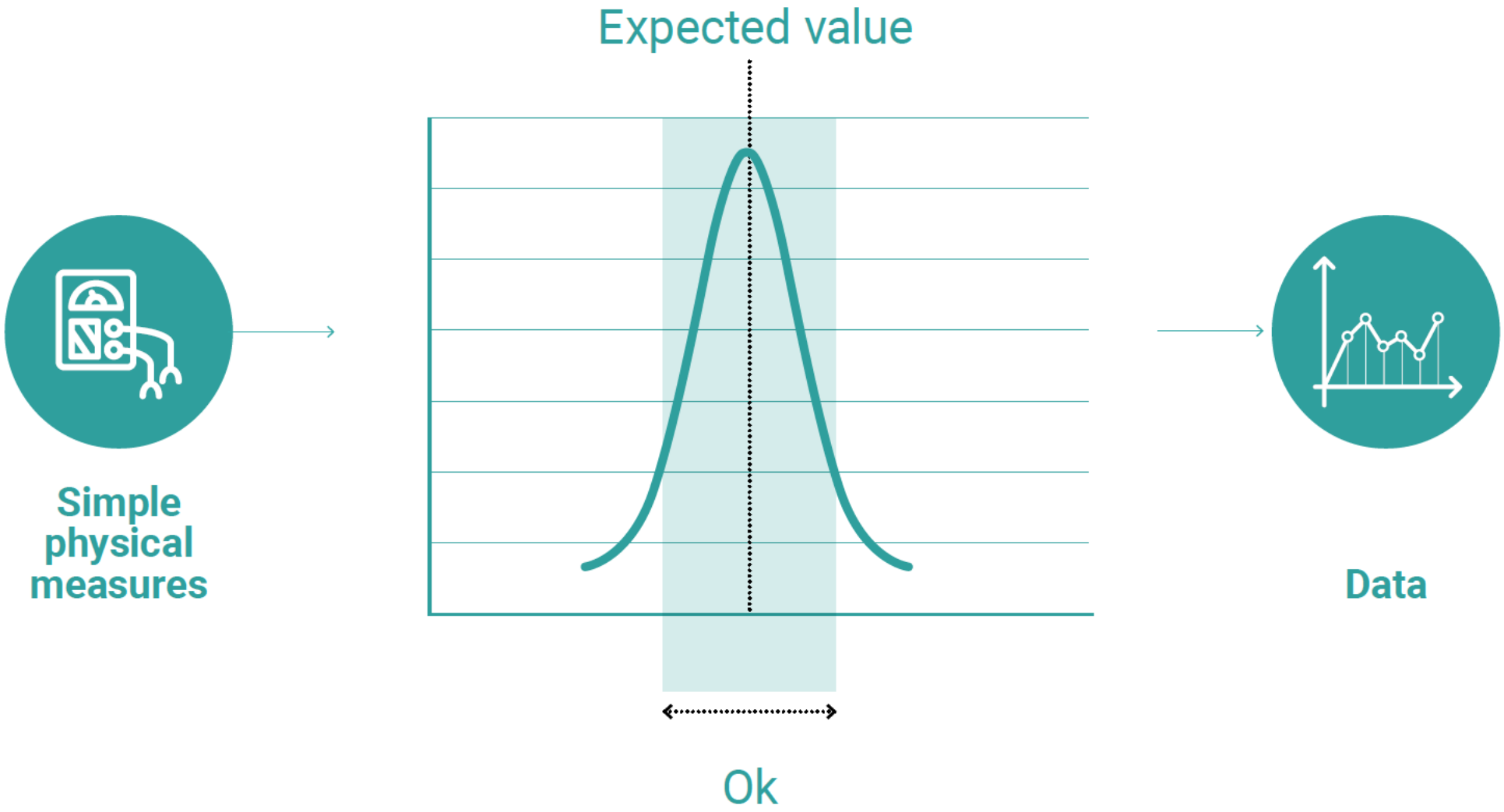
/// Testing challenge



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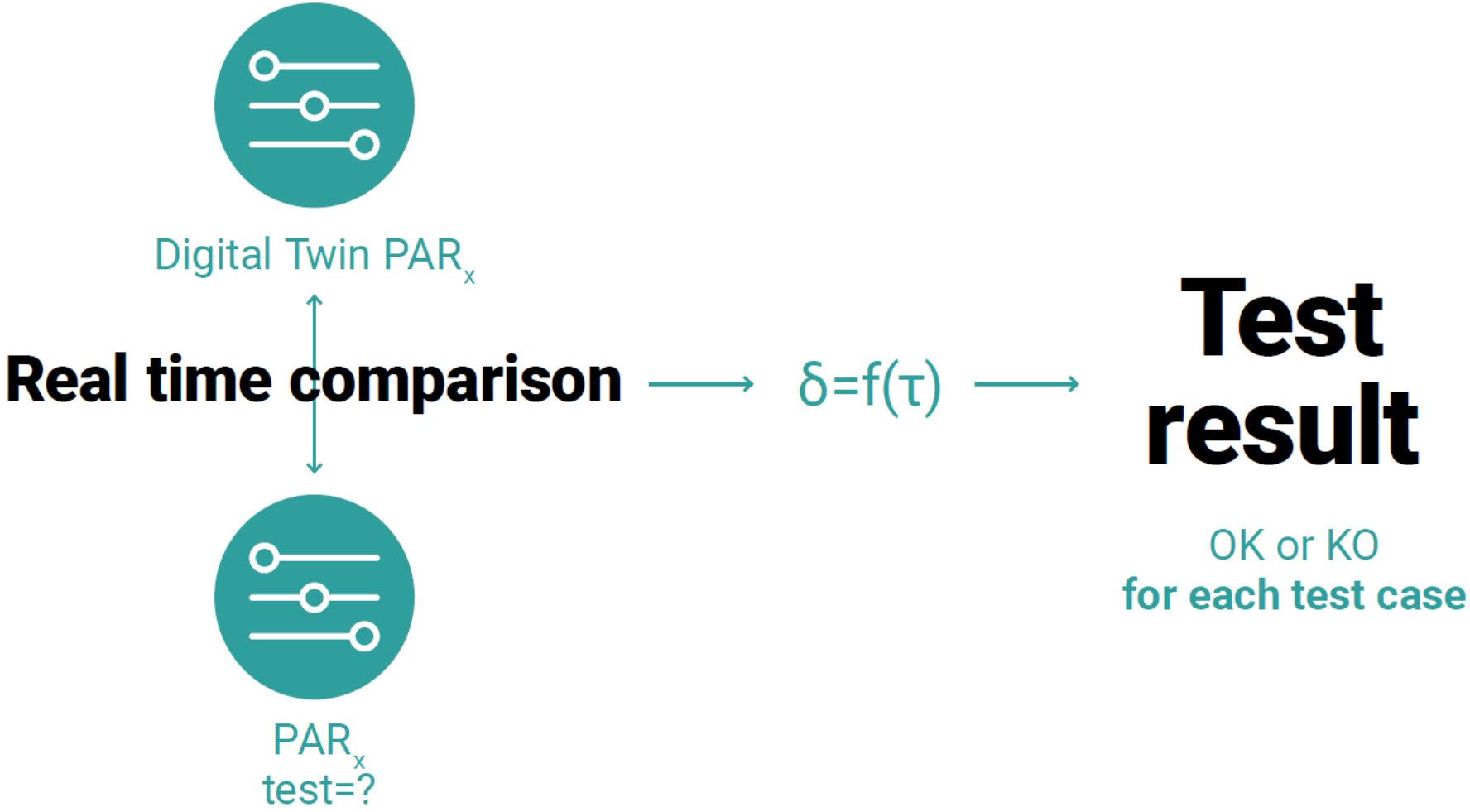
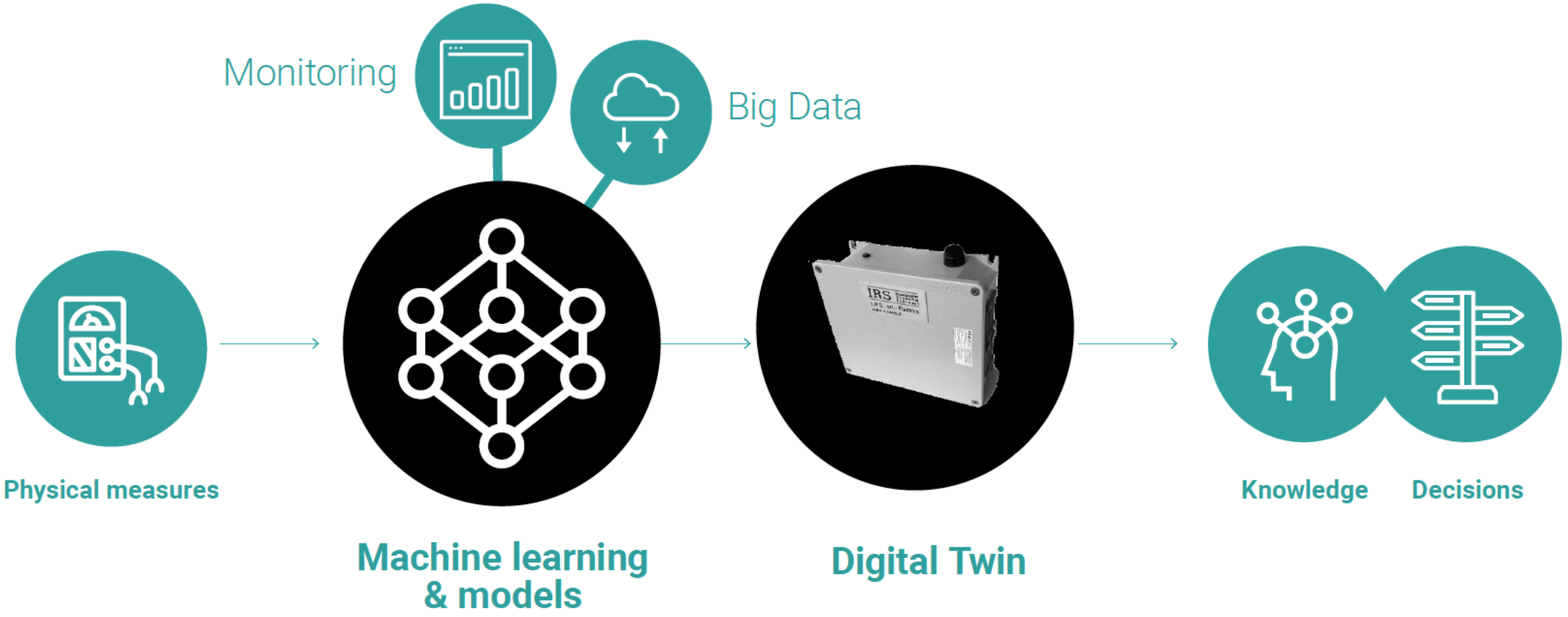
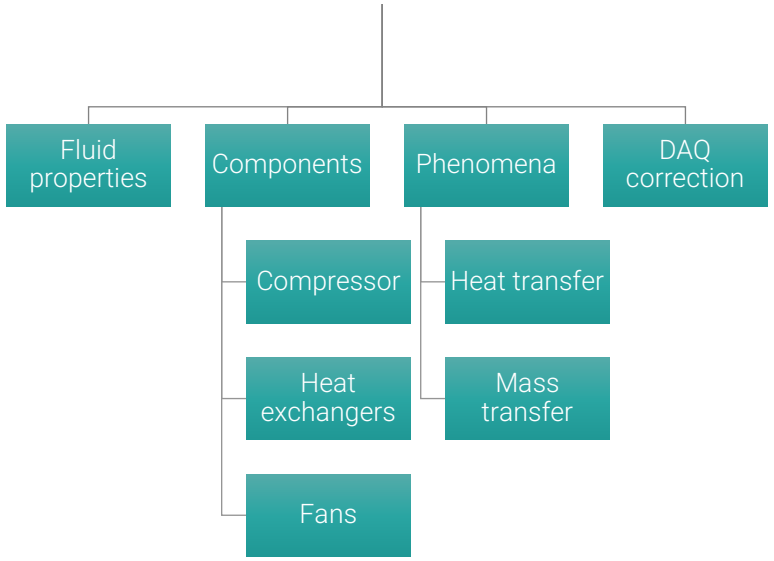
/// Better testing with Digital Twin



Creating an embedded Digital Twin

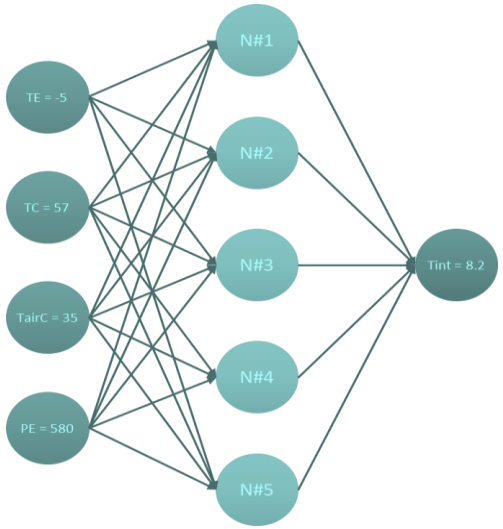


Physical Model



Models for Embedded Digital Twin

Machine Learning



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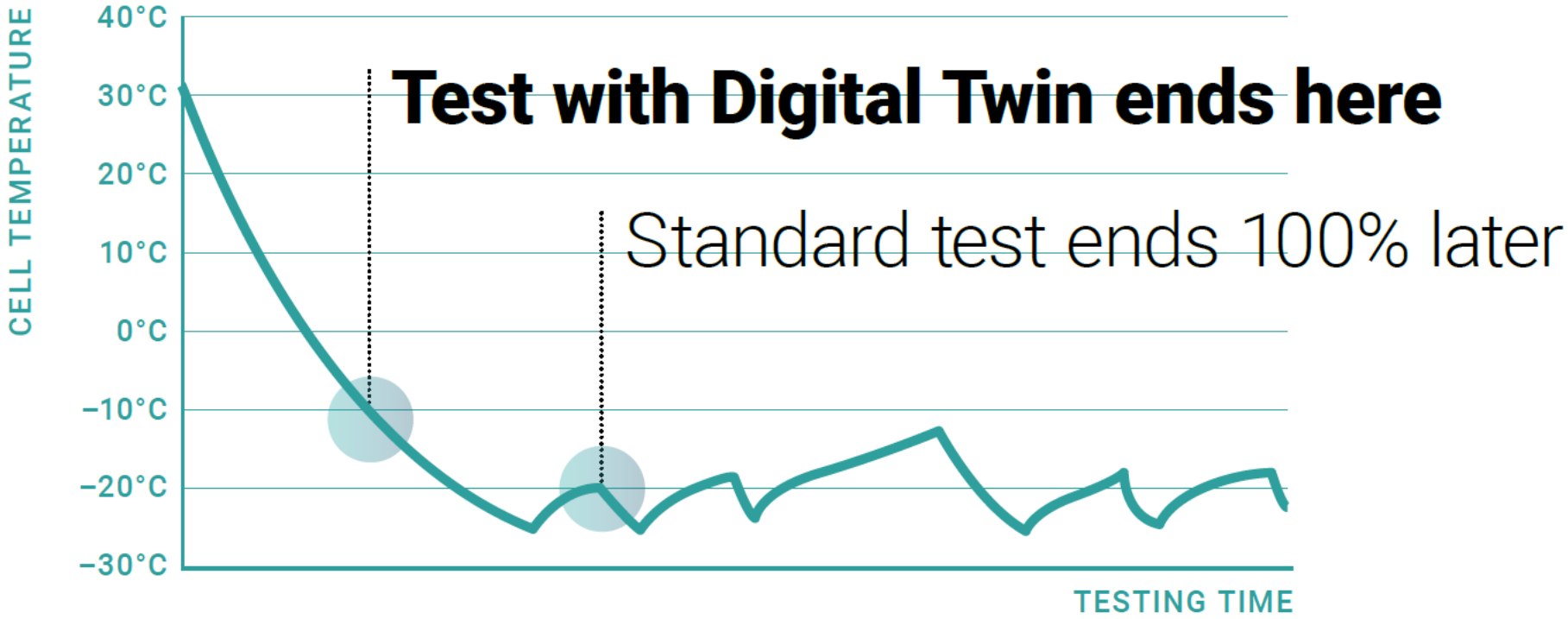
Embedded Digital Twin
Shorter testing time.

Shorter testing time



Shorter testing time

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Embedded Digital Twin better accuracy and quality.

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Closer acceptance threshold

Better software parameters to threshold

Better accuracy and quality

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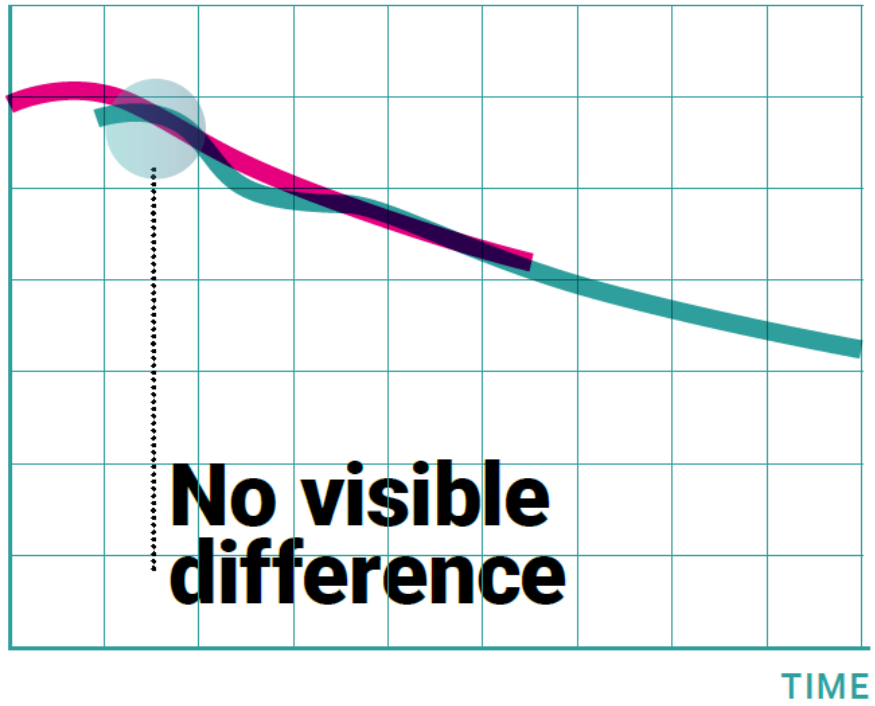
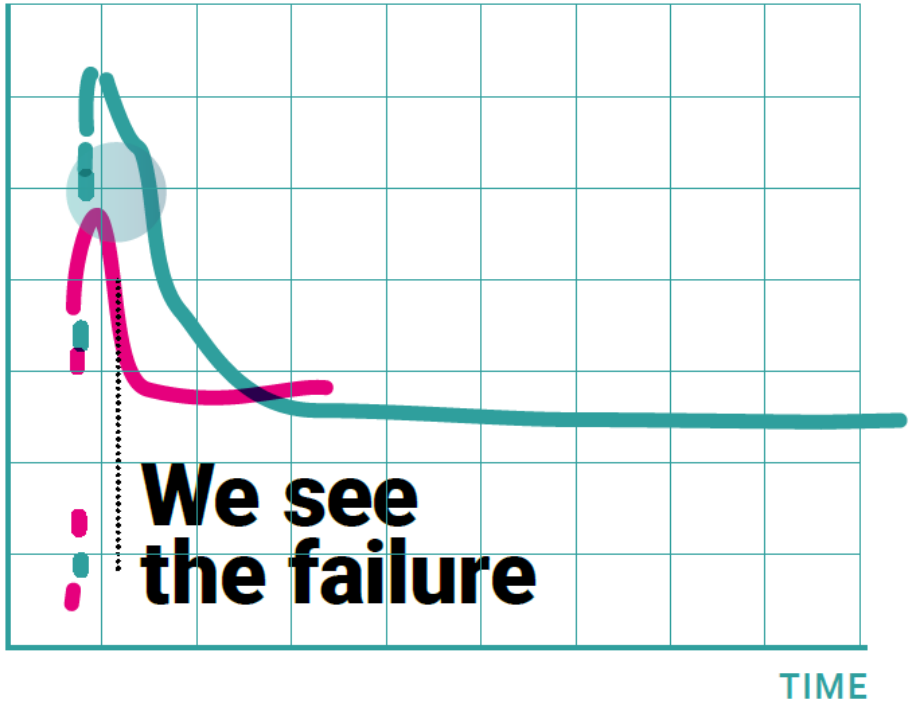
Temperature



COP efficiency by Digital Twin



Better accuracy and quality

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Embedded Digital Twin testing in unfeasable conditions

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Limited physical testing

Set conditions

Digital Twin

Extended virtual testing

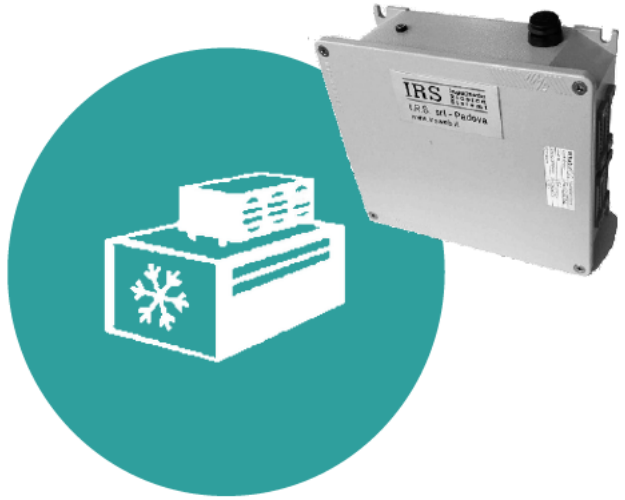
Virtual conditions
As set by standards

Limited physical testing

Monitoring conditions and production test cannot fully test the device

Digital Twin

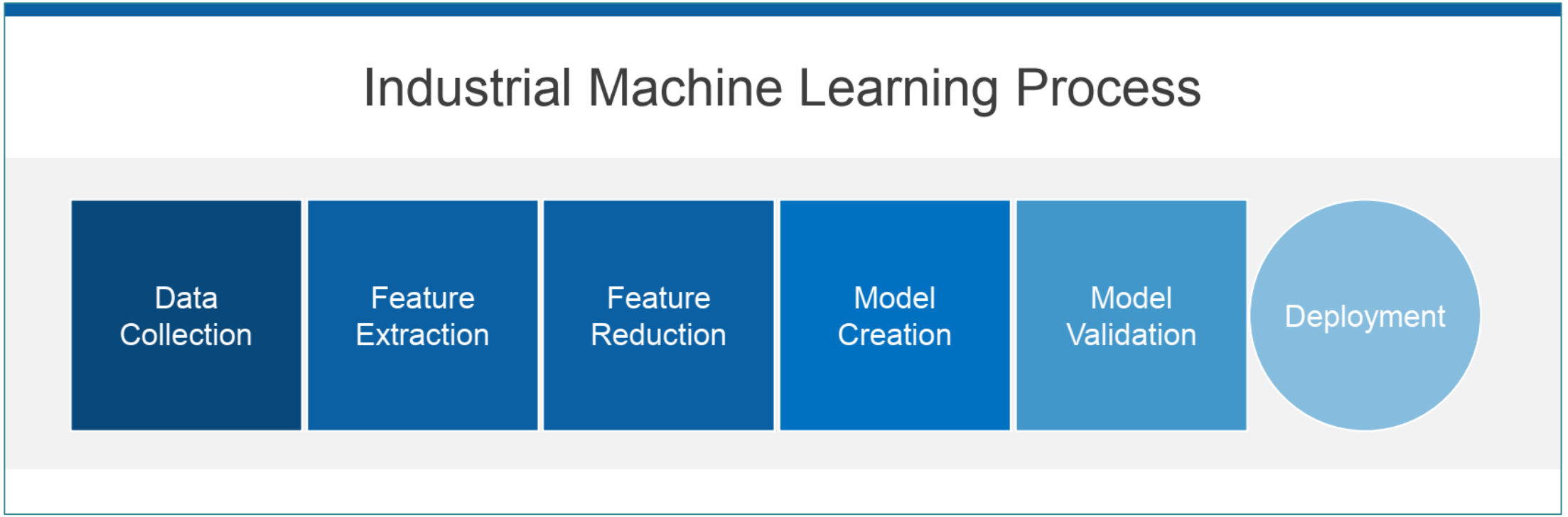
Extended virtual testing



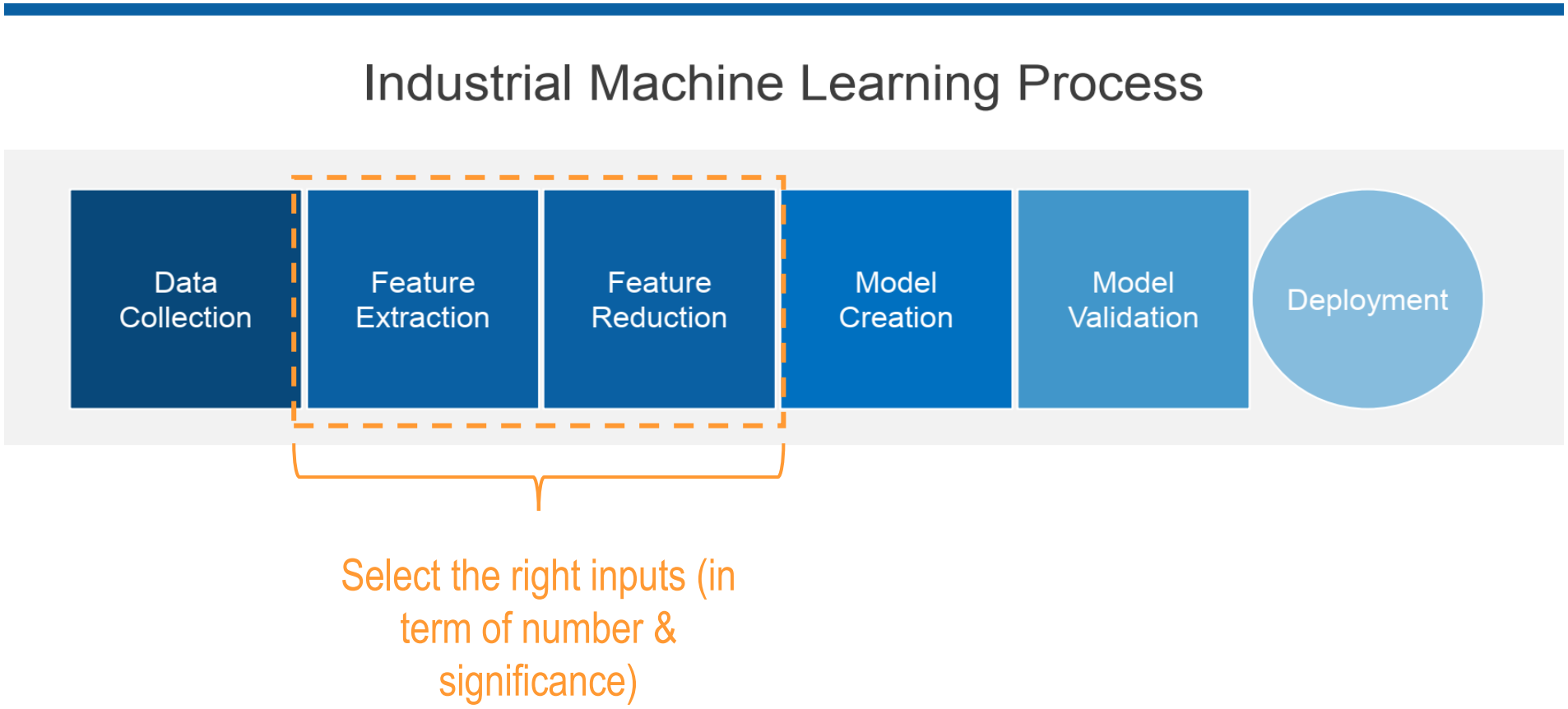
Thanks to digital twin virtual conditions are tested & device health predicted

Machine learning

Machine learning is a method of data analysis that automates analytical model building. It is a branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention (https://www.sas.com/en_us/insights/analytics/machine-learning.html)

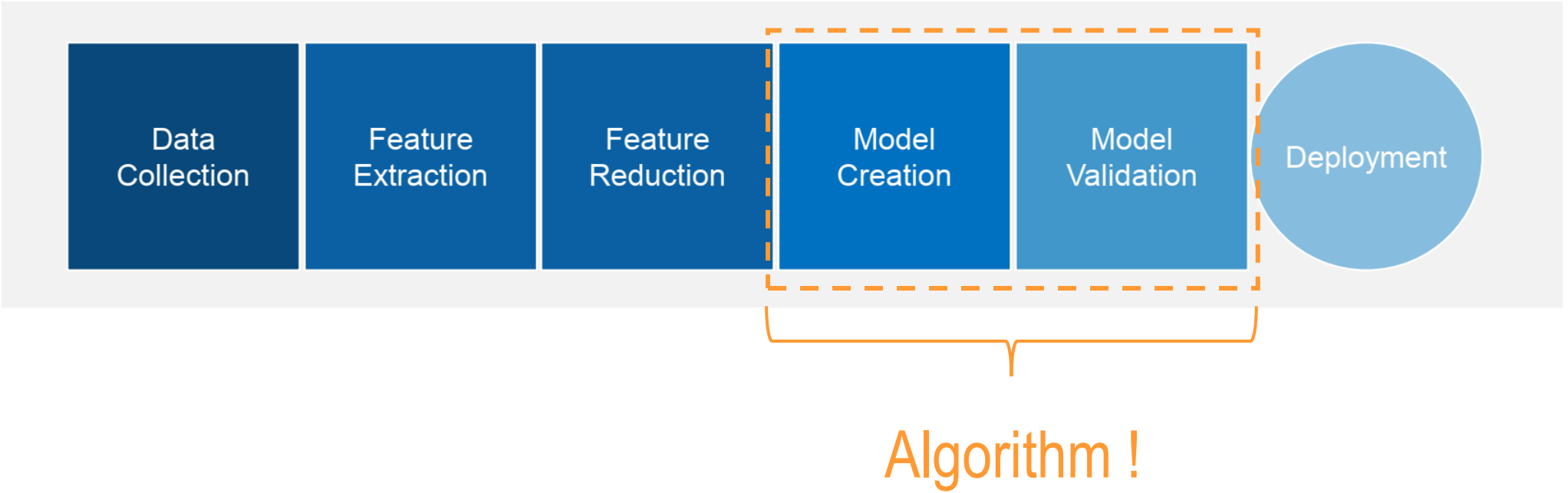


Features are individual independent variables that act as the input in your system. Prediction models use features to make predictions. New features can also be obtained from old features using a method known as ‘feature engineering’. More simply, you can consider one column of your data set to be one feature. Sometimes these are also called attributes. And the number of features are called dimensions.



Machine learning uses two types of techniques: **supervised learning**, which trains a model on known input and output data so that it can predict future outputs, and **unsupervised learning**, which finds hidden patterns or intrinsic structures in input data.

Industrial Machine Learning Process



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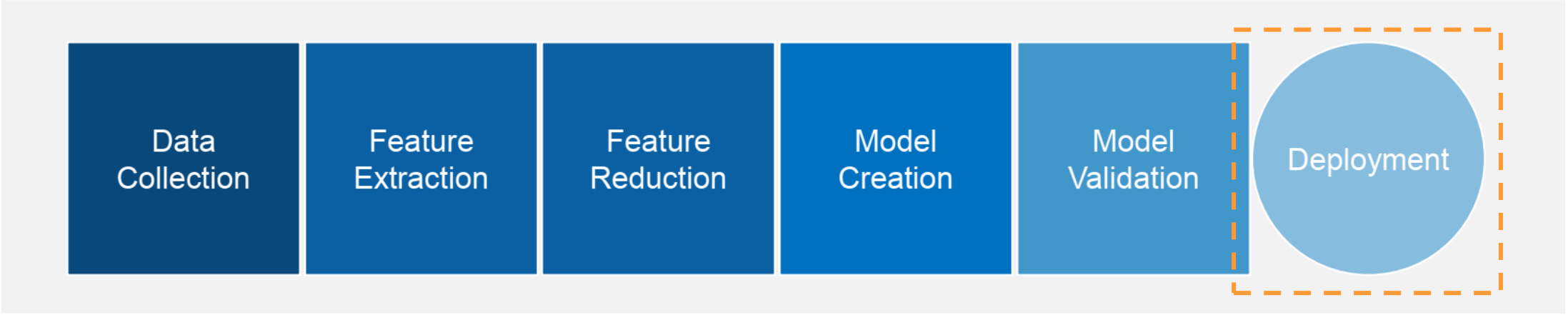
Industrial Machine Learning Process

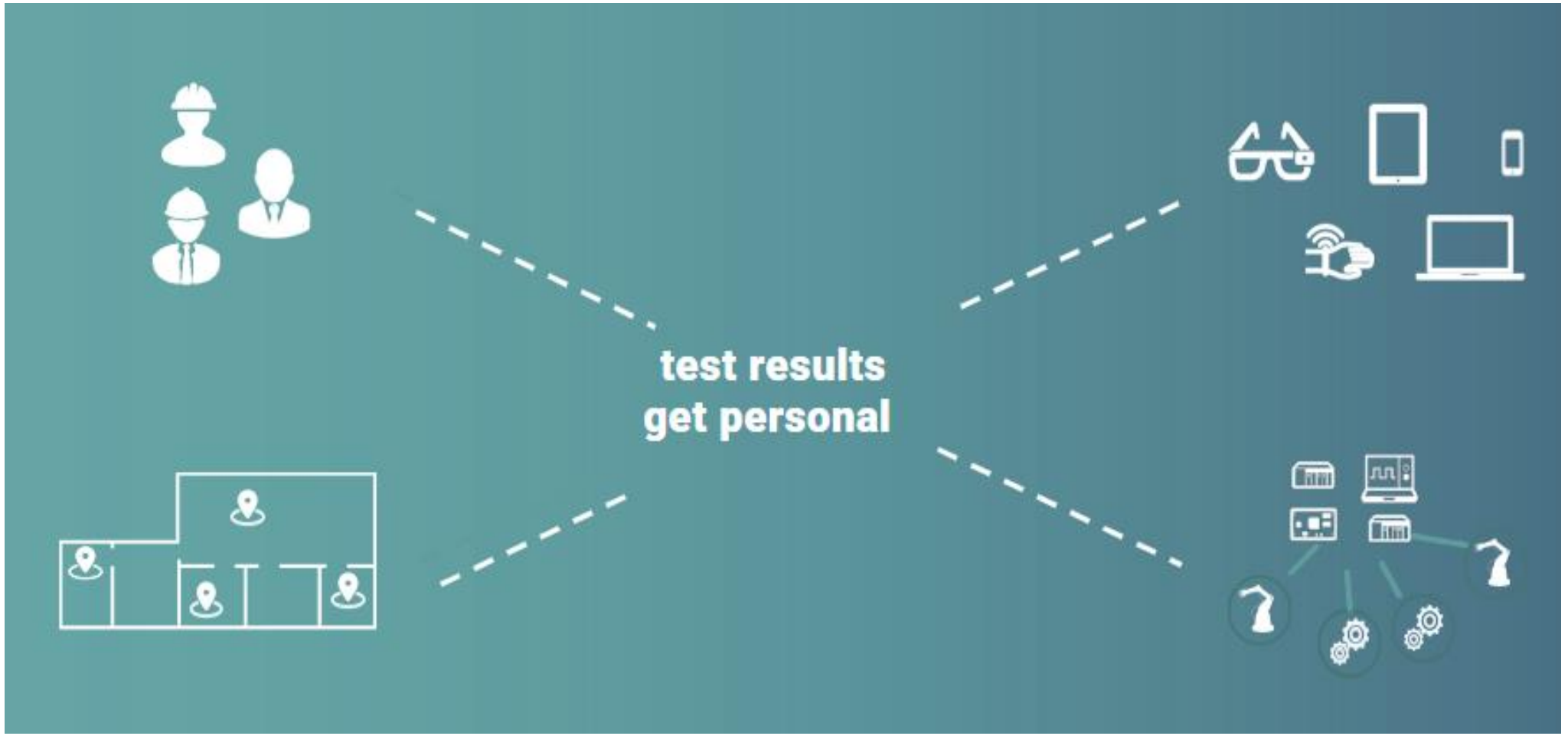


Model @ work

Identification of patterns, trends or anomalies in a big amount of data

Very low human effort to reach a result

Industry 5.0


test results
get personal

test results get personal

Personal Device Interface

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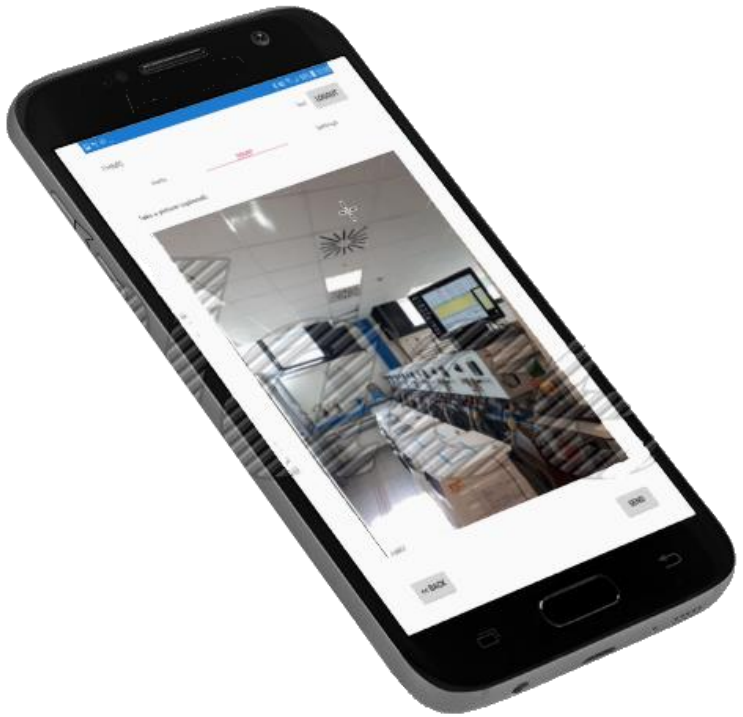

Product & Issue multimedia tracking app for tablet and smartphone

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Personal Notification Platform and Apps

Thank you!

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