



HITACHI
Inspire the Next

Hitachi's Efforts towards Digitalization

December 5, 2018

Hitachi, Ltd.

Service & Platform Business Division Group

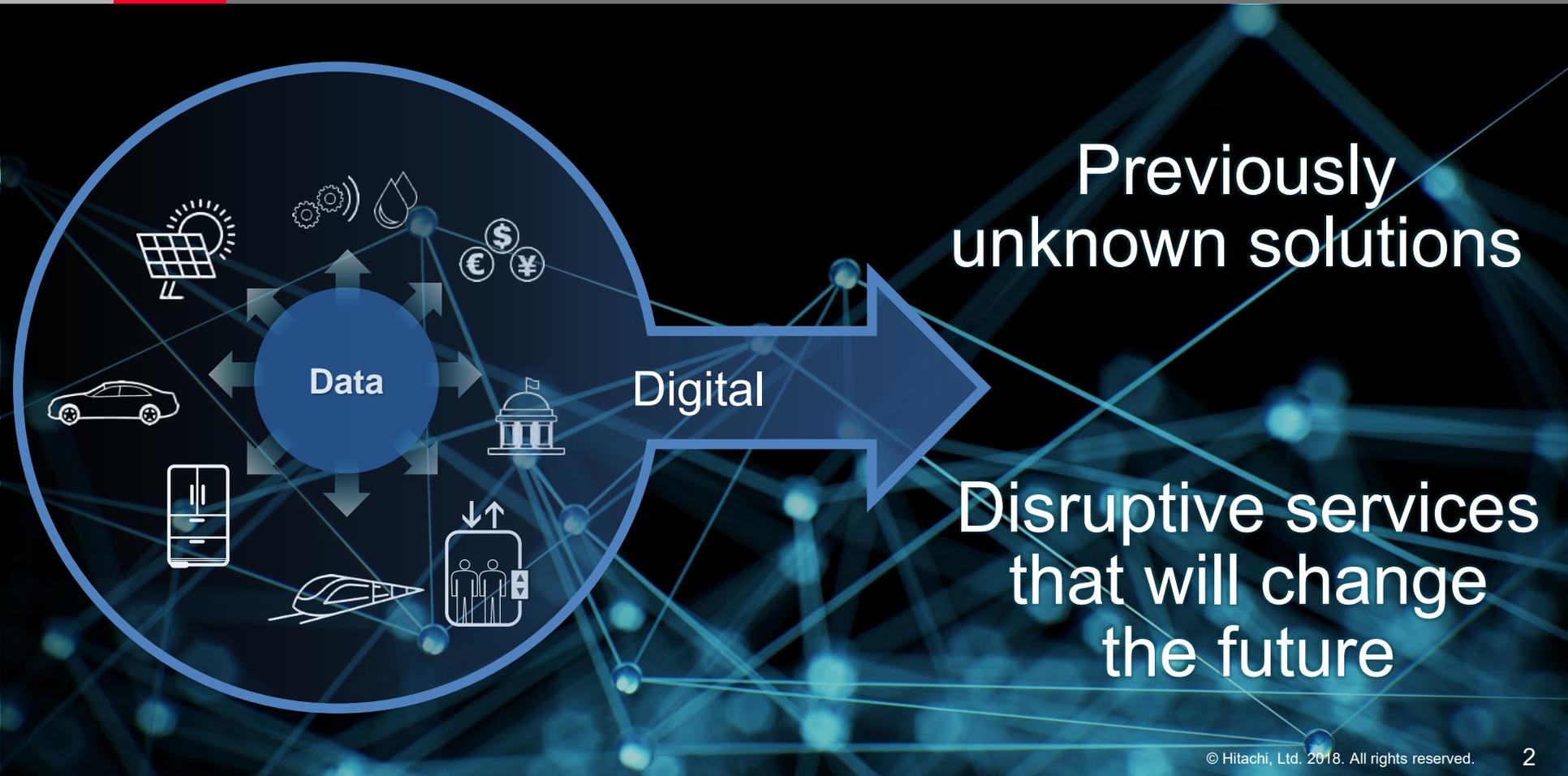
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Contents

1. Impact of Digitalization
2. Efforts Towards Digitalization
3. IoT Platform Solution



Previously
unknown solutions

Disruptive services
that will change
the future

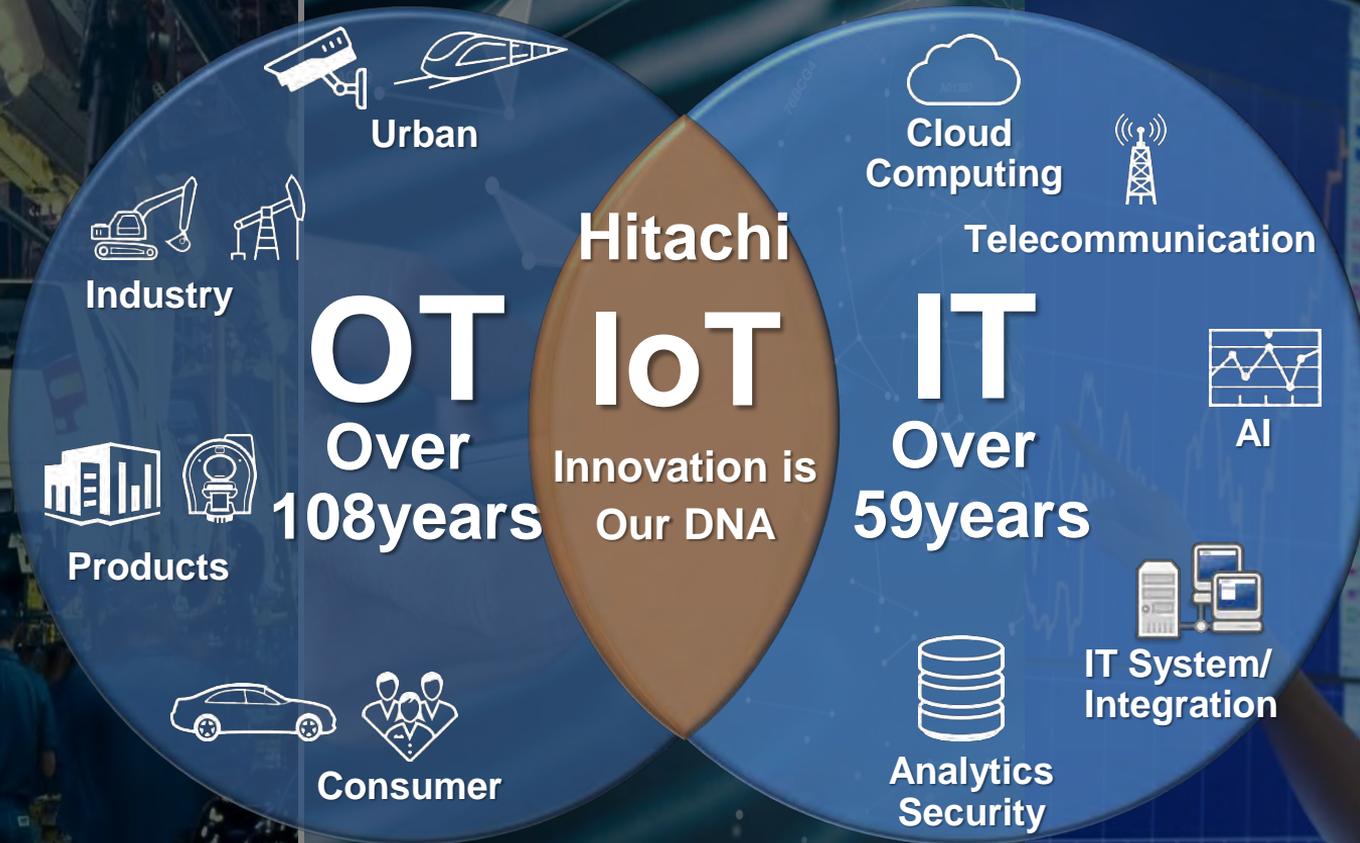
1-2. Overcome challenges with digital solutions

This is a chance for growth, even for traditional industries.

Digitalization allows us to increase operational efficiency and achieve innovation.



1-3. Hitachi's IoT Initiative





**From selling products
to providing services**

Maintenance division for medical equipment at Hitachi

We want to avoid sudden failures in examination equipment, and provide more reliable support.

Before

MRI sales and maintenance are separate.

- If equipment suddenly fails...

Changes to examination schedules
Greater burden on physicians (hospitals) and patients

- Difficult repairs

Identifying the cause of the failure and procuring components requires time and money.

MRI: Magnetic resonance imaging

Digitalization

After

Continuous support after MRI delivery

- Maintenance prior to failure

Smooth examinations
Less time and money required for repairs

Product oriented: Selling a MRI

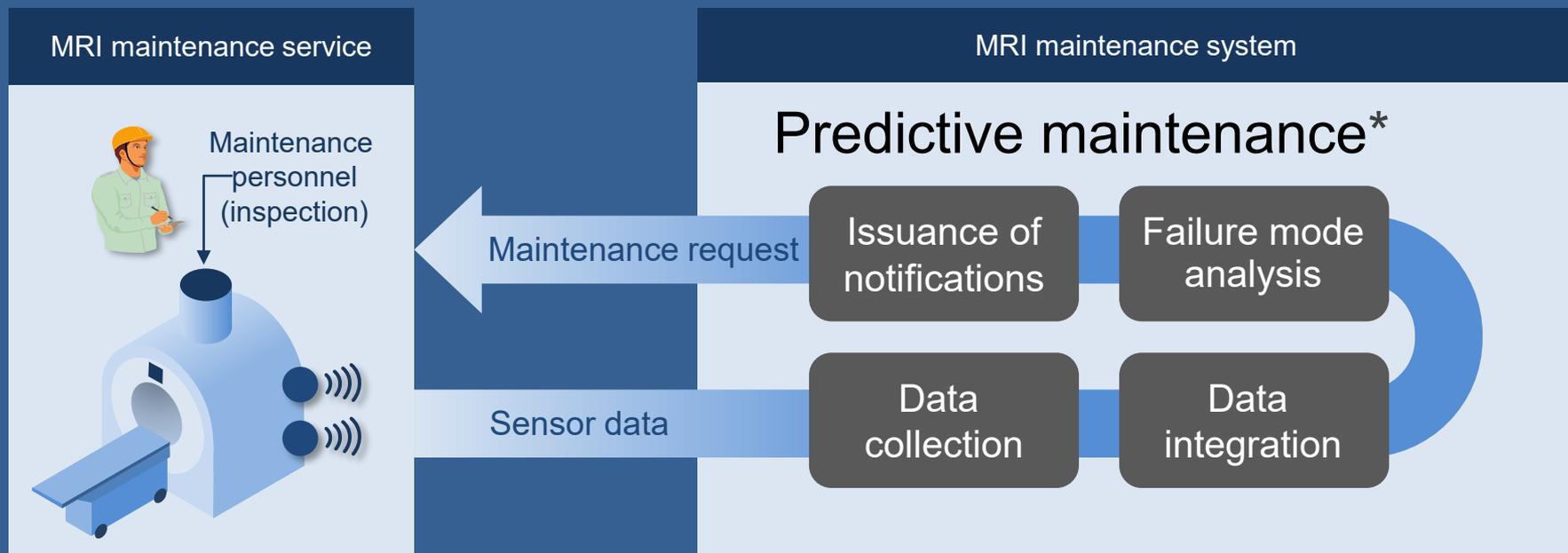
Service oriented: Selling reliable examinations

Creating a service from maintenance to ensure operational uptime

2-1. From selling products to providing services (3) Structure of the solutions

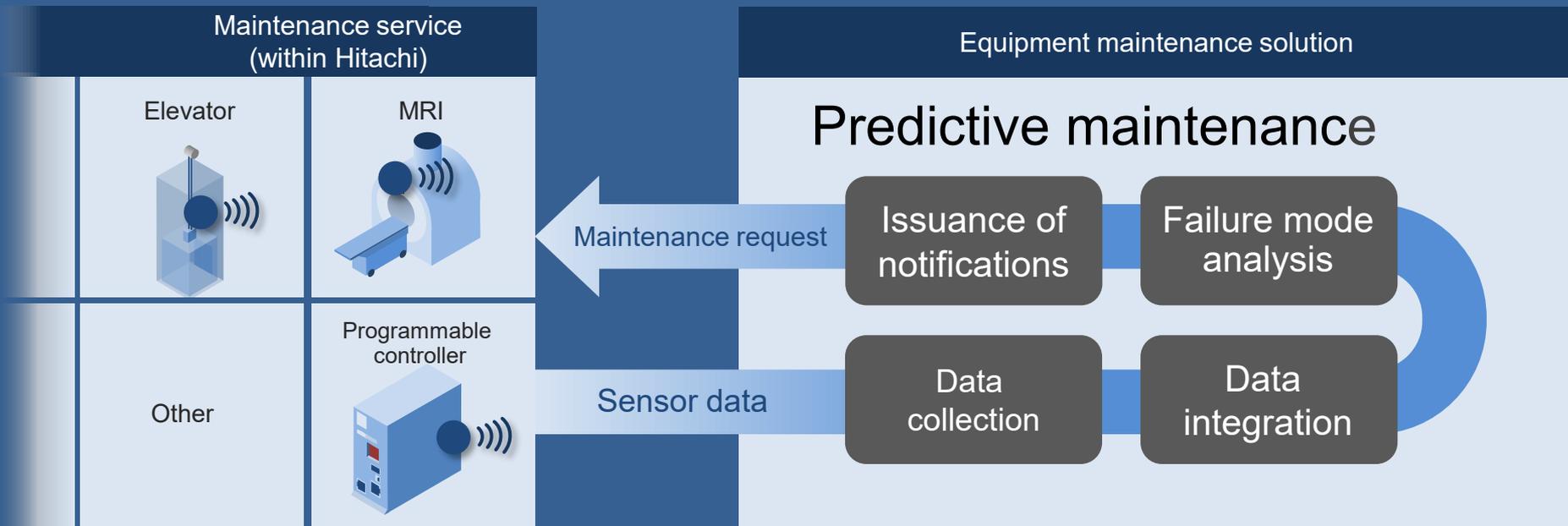
Predict failures based on remote status monitoring and failure mode analysis, and request maintenance in advance.

Outcome: Operational uptime of the equipment is increased, which improves the efficiency of examinations.

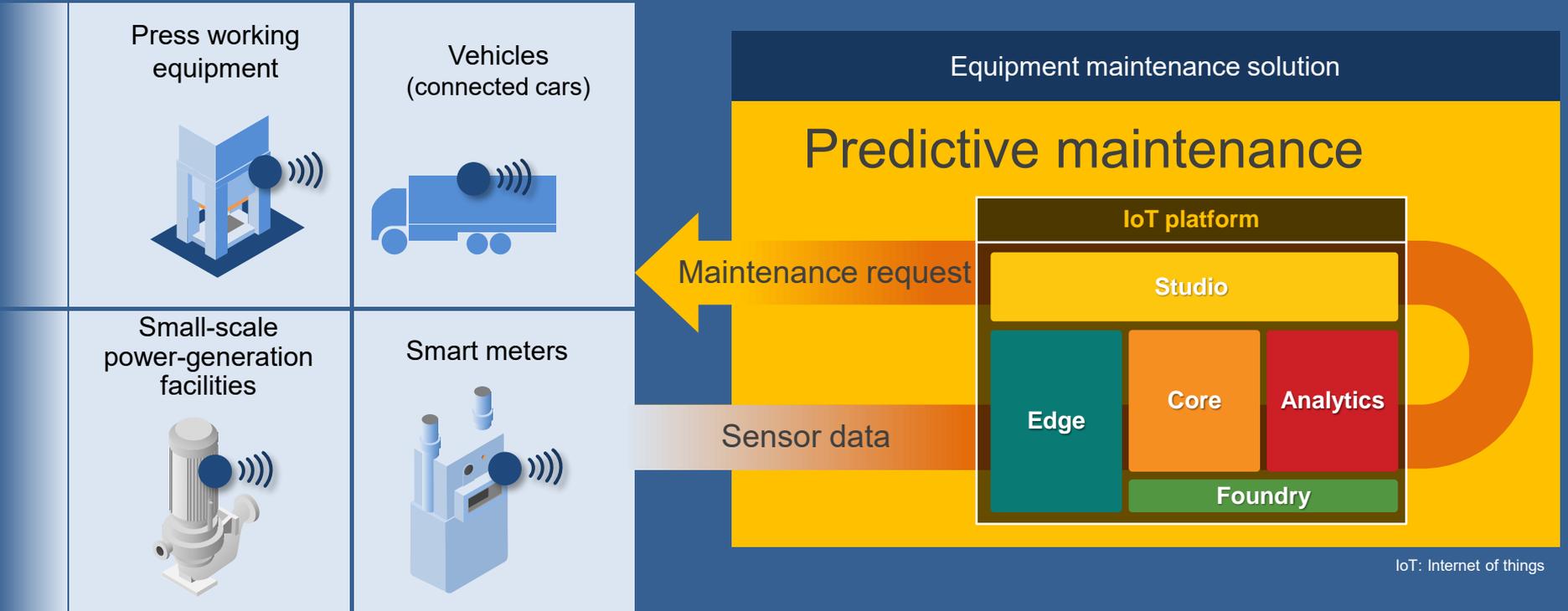


*Predictive maintenance: System to ensure operational uptime

Extending predictive maintenance to other areas, such as elevators and programmable controllers



Enabling the use of solutions for a wide range of devices, such as automobiles and smart meters



Relentless cost reductions in the manufacturing industry



At Hitachi manufacturing sites
Through efficient production planning,
**we want to meet strict deadlines
and reduce costs.**

Before

Costs were high because of complicated production planning that resulted from small-scale production of many different goods

- Production lines stopped frequently due to accidents
- Long production lead times

Measures based on experience and intuition

Digitalization

After

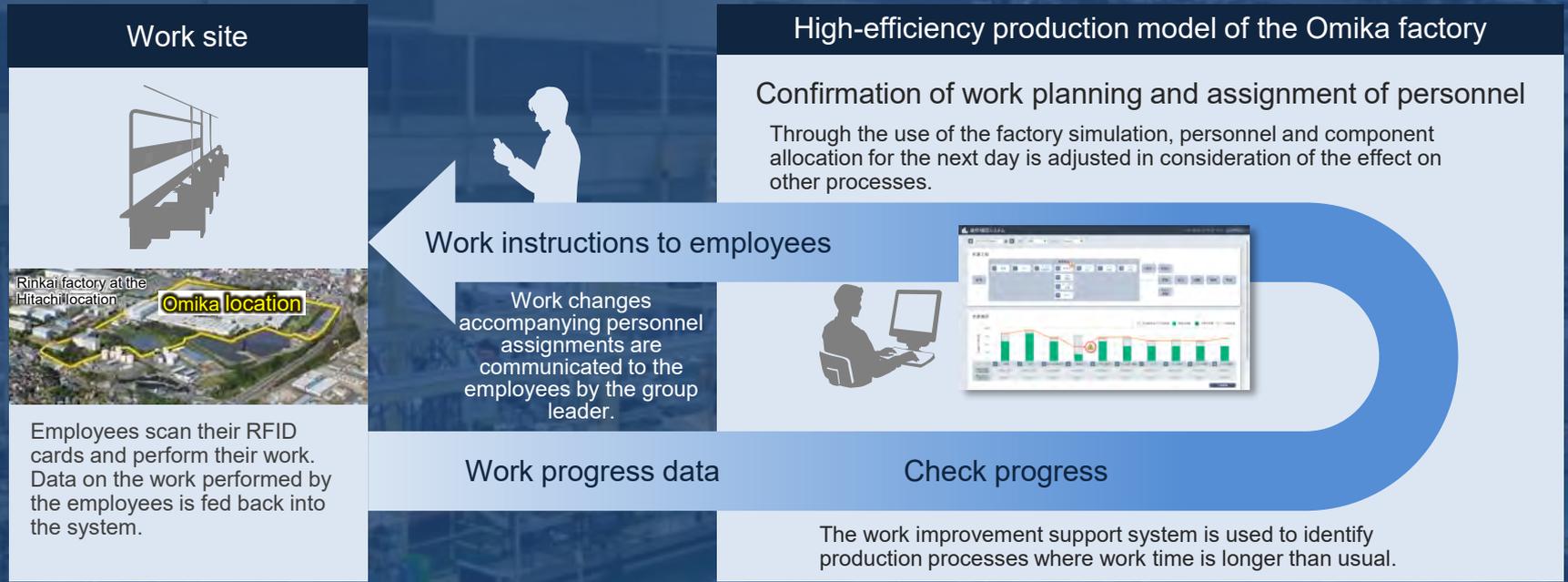
Visualization of production processes, and reduced costs

Production processes were visualized, and simulations were conducted.
Stop times for production lines were controlled based on the results.

Production lead times halved due to measures based on data

Production plans and actual data from the manufacturing site were visualized, leading to real-time solutions.

Outcome: Reduction in inventory assets, reduction in overall cost prices, and improved energy efficiency



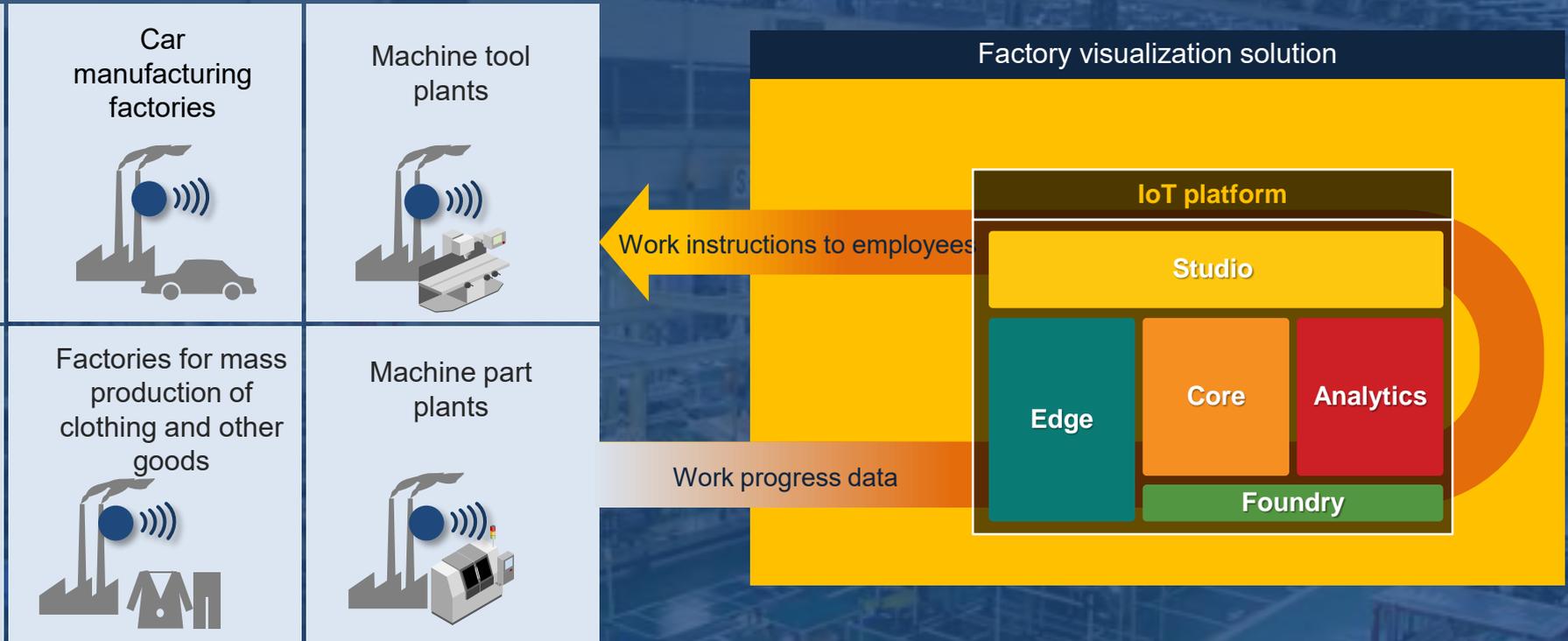
RFID: Radio-frequency identification

Using the high-efficiency production model makes it possible to check daily for whether the results are deviating from the plan, and to determine what measures to put in place.

Promoting visualization at other factories within Hitachi

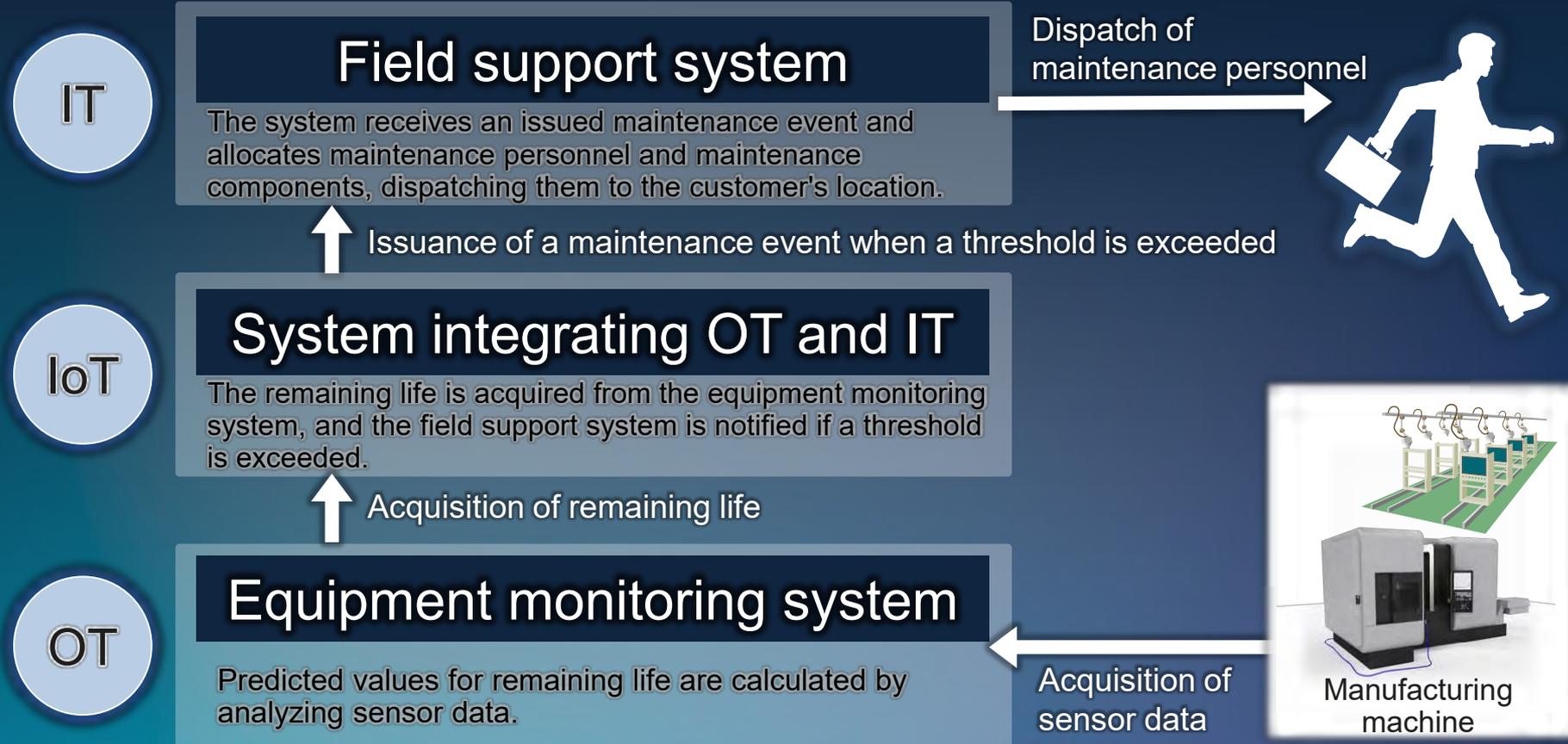


Enabling solutions for various customer factories

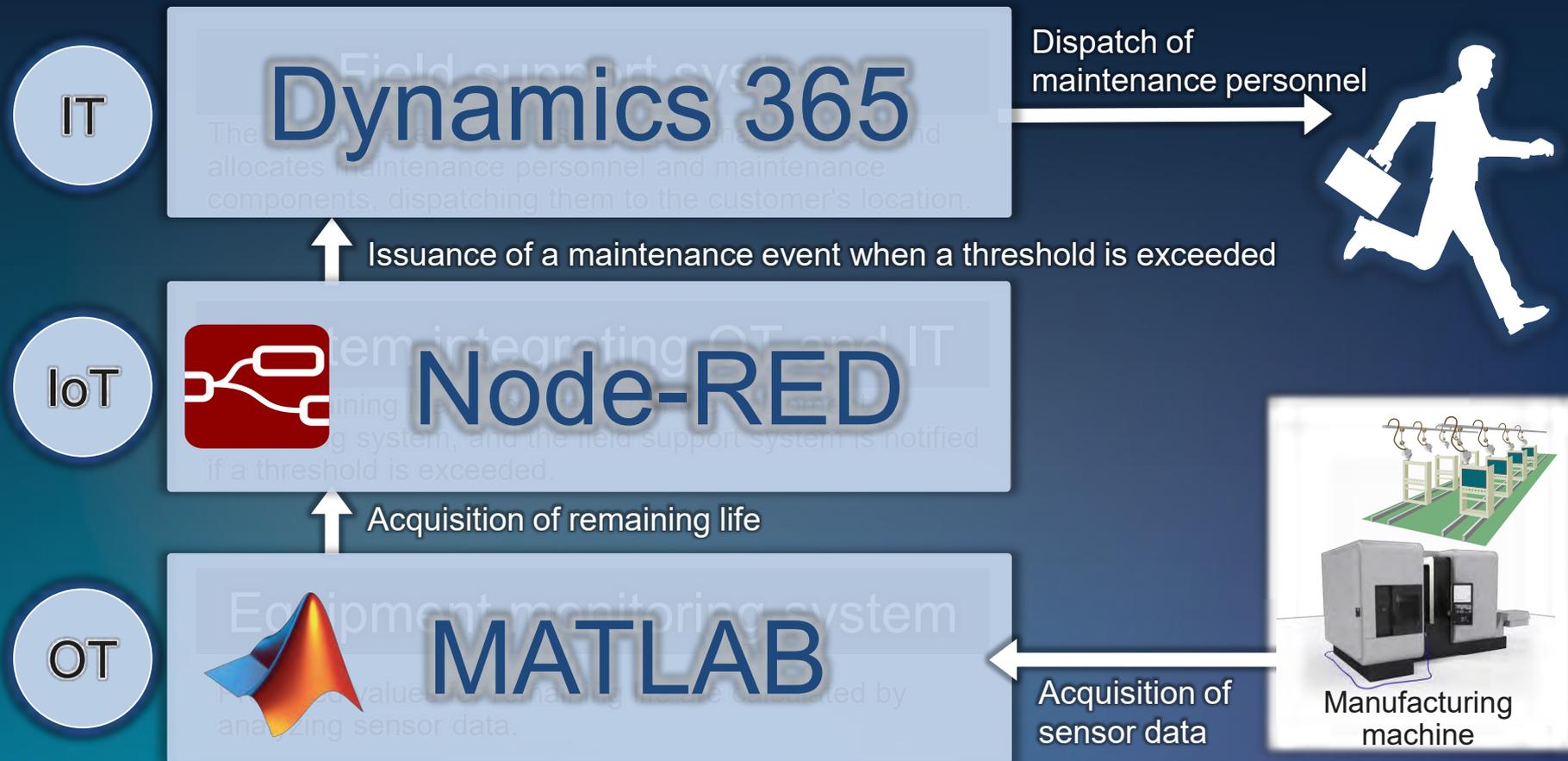


Construction of IoT platform that took the manufacturing line as an example

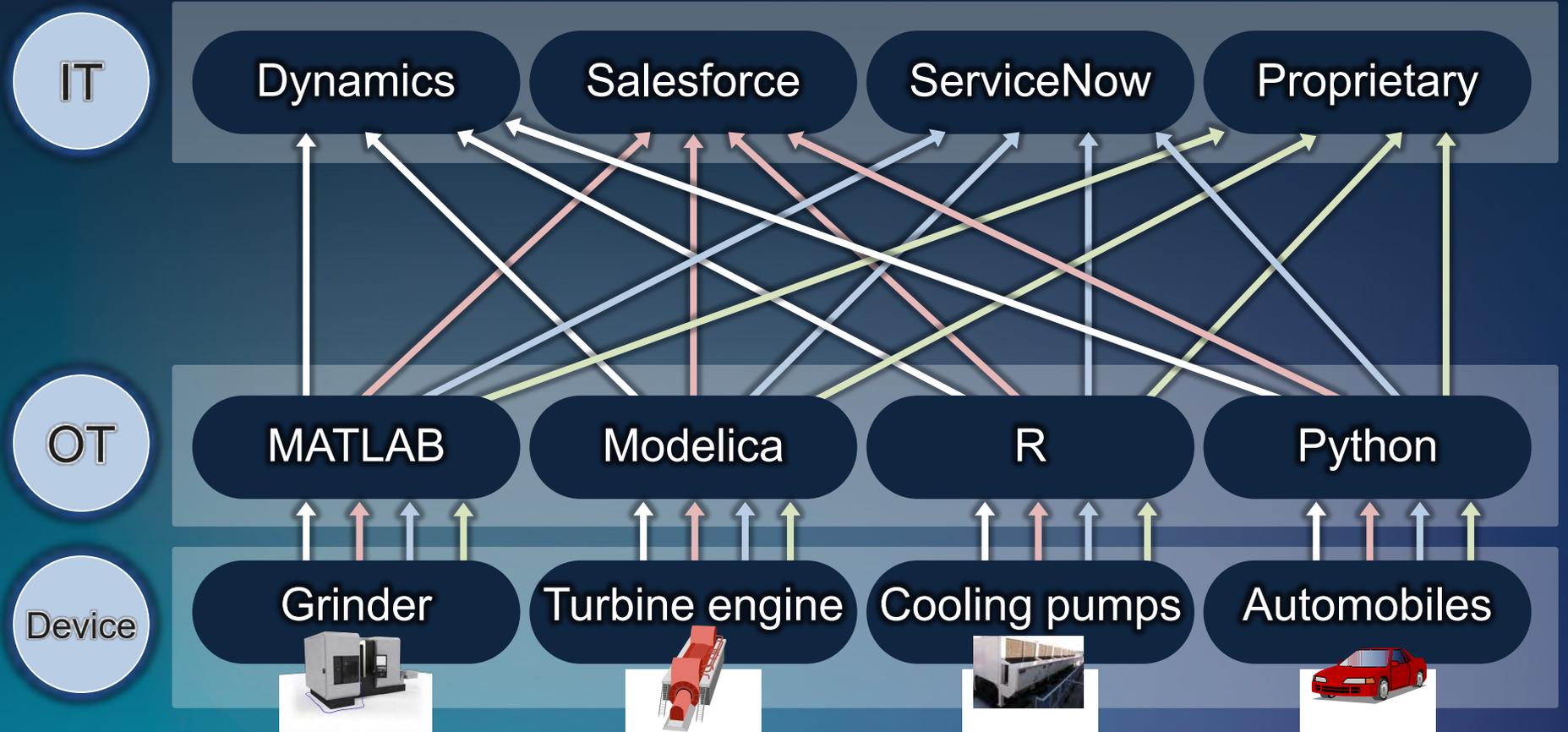
3-2. Approach to a solution (1)



3-2. Approach to a solution (2)



3-3. Complexity of wo systems configuration



IT systems must be integrated with various OT systems
(such as MATLAB, Modelica, R, and Python)

Challenge The data sent from the OT systems is in various different formats, so IT systems must be modified for each of the OT systems with which integration is desired.

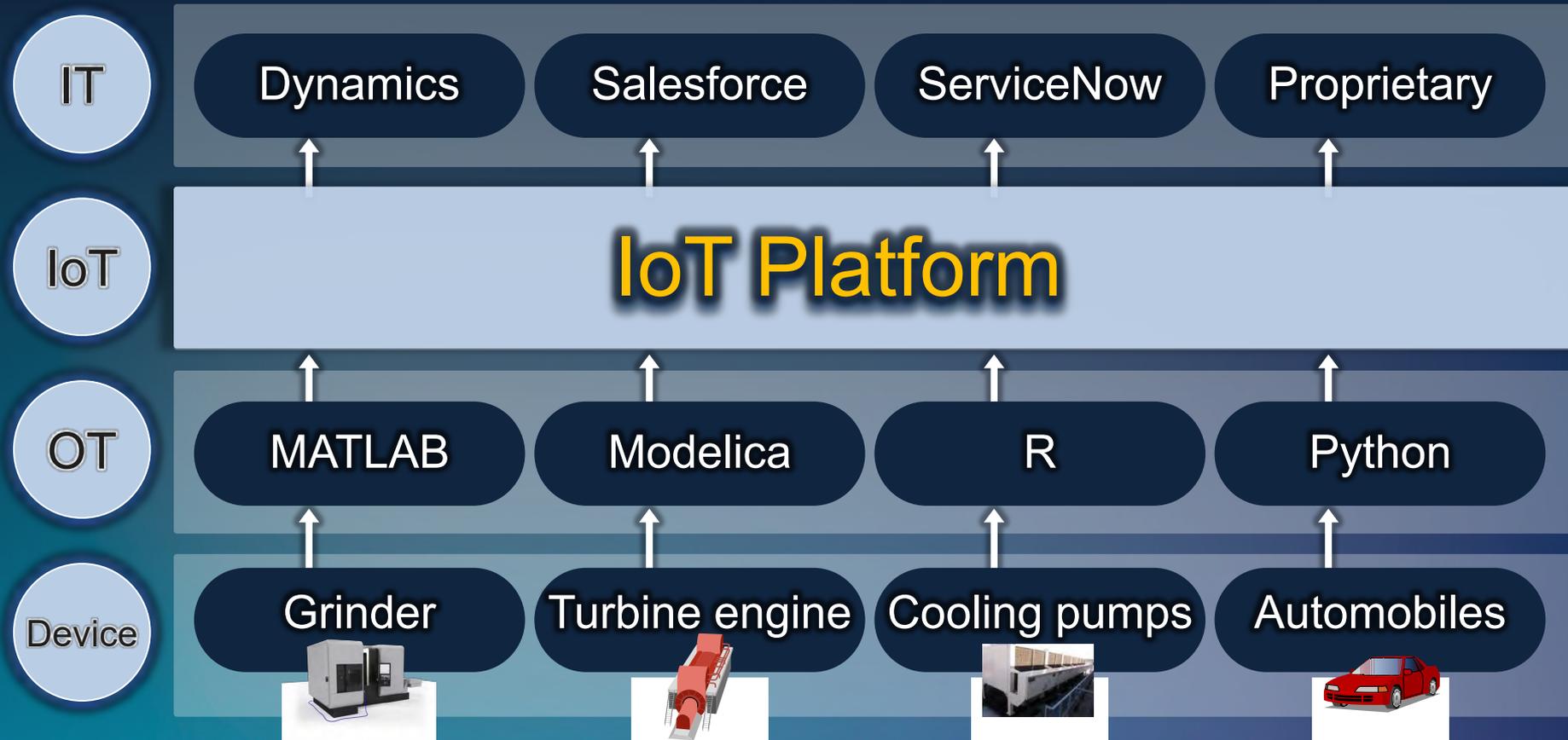
For m OT systems and n IT systems, companies don't want to provide implementations for $m \times n$ combinations.

All combinations can be achieved by $m + n$ implementations, by using a bridge between the OT systems and IT systems.

IoT Platform Standardization

Integrating OT and IT

3-6. IoT Platform to integrate OT and IT systems



- Hitachi is currently promoting efforts to digitalize both internally and externally.
- The core is in IoT platform of Lumada when embodying it.
- Going to the activity even better by promoting in conjunction with the standardization.

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