

Hitachi's Efforts towards Digitalization

December 5, 2018

Hitachi, Ltd.
Service & Platform Business Division Group
IoT & Cloud Service Business Division
General Manager

Tetsuhiko Hirata



Contents

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

1-1. Digital transformation





1-2. Overcome challenges with digital solutions



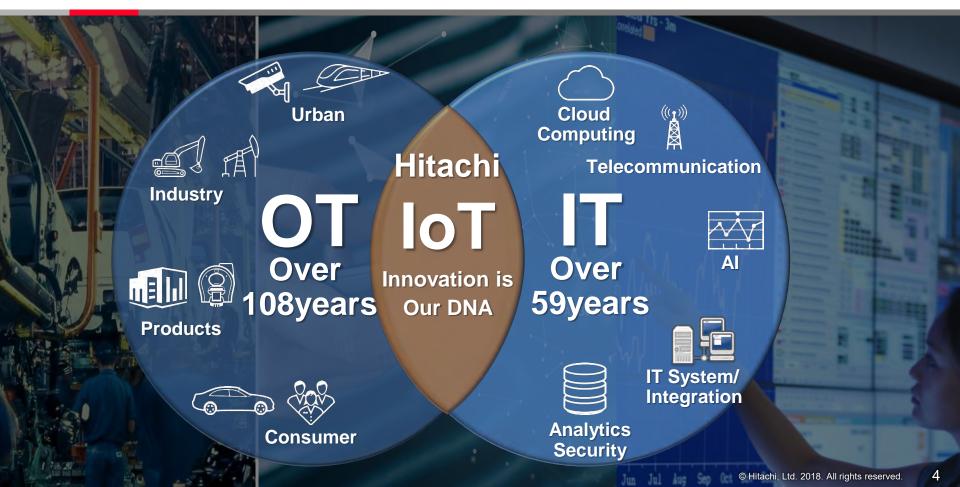
This is a chance for growth, even for traditional industries.

Digitalization allows us to increase operational efficiency and achieve innovation.



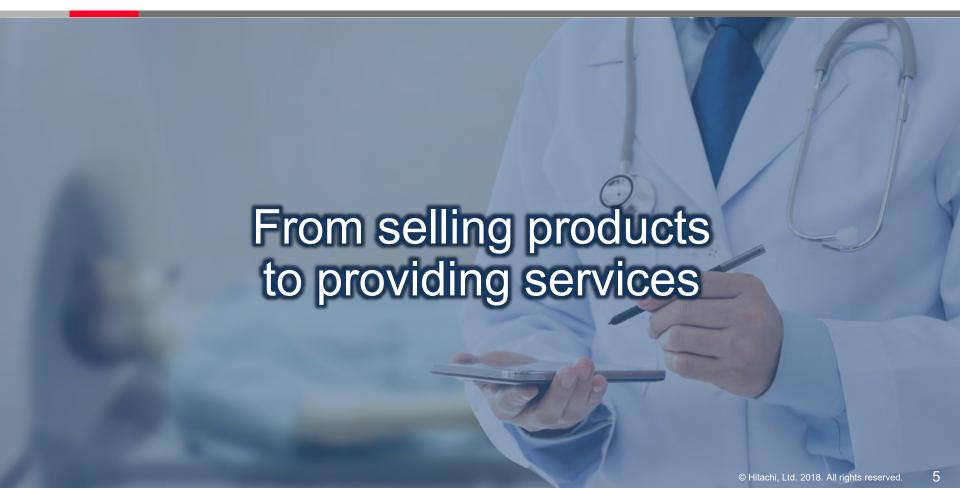
1-3. Hitachi's IoT Initiative





2-1. Hitachi's digitalization efforts (1)





2-1. From selling products to providing services (1) Goals





2-1. From selling products to providing services (2) Achieving goals

Digitalization



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

Product oriented: Selling a MRI



Maintenance prior to failure

Smooth examinations Less time and money required for repairs

Service oriented: Selling reliable examinations

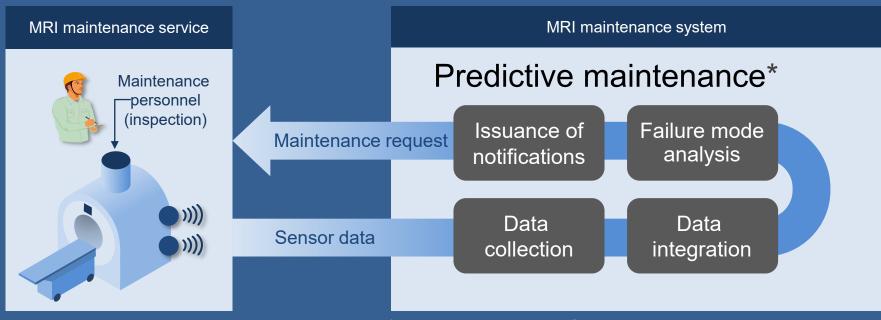
Creating a service from maintenance to ensure operational uptime

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.

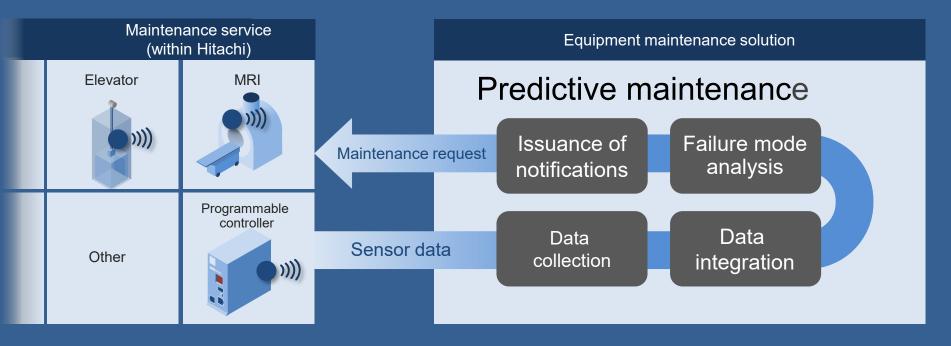


^{*}Predictive maintenance: System to ensure operational uptime





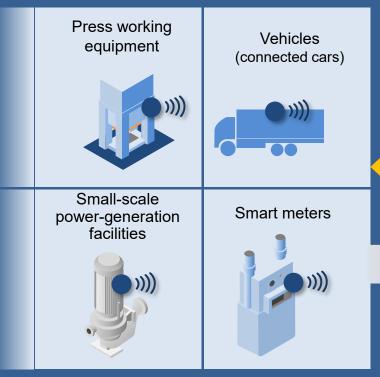
Extending predictive maintenance to other areas, such as elevators and programmable controllers

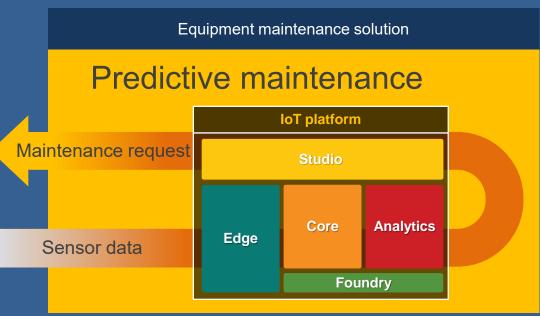


2-1. From selling products to providing services (5) Providing to customers



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





IoT: Internet of things

2-2. Hitachi's digitalization efforts (2)











2-2. Cost reductions in the manufacturing industry (2) Achieving goals



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

After of analysis

Visualization of production processes, and reduced costs

Digitalization

Production processes were visualized, and simulations were conducted.

Stop times for production lines were controlled based on the results.

Measures based on experience and intuition

Production lead times halved due to measures based on data

2-2. Cost reductions in the manufacturing industry (3) Structure of the solutions



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

Work site



Rinkai factory at the Hitachillocation Omika location

Employees scan their RFID cards and perform their work. Data on the work performed by the employees is fed back into the system.

RFID: Radio-frequency identification

High-efficiency production model of the Omika factory

Confirmation of work planning and assignment of personnel

Through the use of the factory simulation, personnel and component allocation for the next day is adjusted in consideration of the effect on other processes.

Work instructions to employees

Work changes accompanying personnel assignments are communicated to the employees by the group leader.





Work progress data

Check progress

The work improvement support system is used to identify production processes where work time is longer than usual.

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





Confirmation of work planning and assignment of personnel

Work instructions to employees

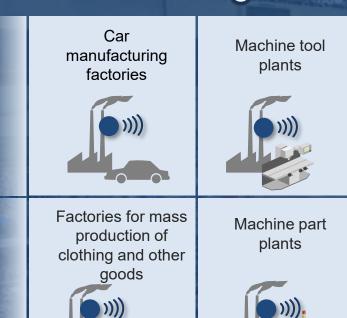


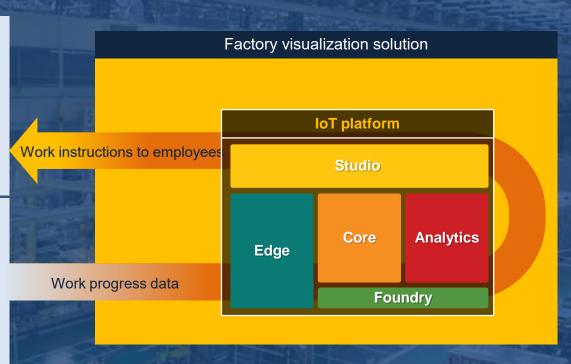
Work progress data

Check progress



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)





Field support system

The system receives an issued maintenance event and allocates maintenance personnel and maintenance components, dispatching them to the customer's location.

Dispatch of maintenance personnel



Issuance of a maintenance event when a threshold is exceeded



System integrating OT and IT

The remaining life is acquired from the equipment monitoring system, and the field support system is notified if a threshold is exceeded.



Acquisition of remaining life



Equipment monitoring system

Predicted values for remaining life are calculated by analyzing sensor data.

Acquisition of sensor data



3-2. Approach to a solution (2)





Dynamics 365

Dispatch of maintenance personnel



Issuance of a maintenance event when a threshold is exceeded





Acquisition of remaining life



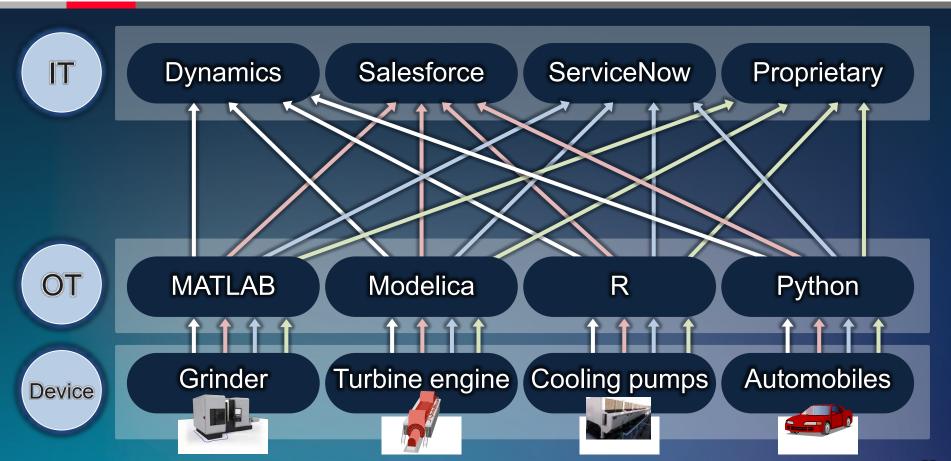


Acquisition of sensor data



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.

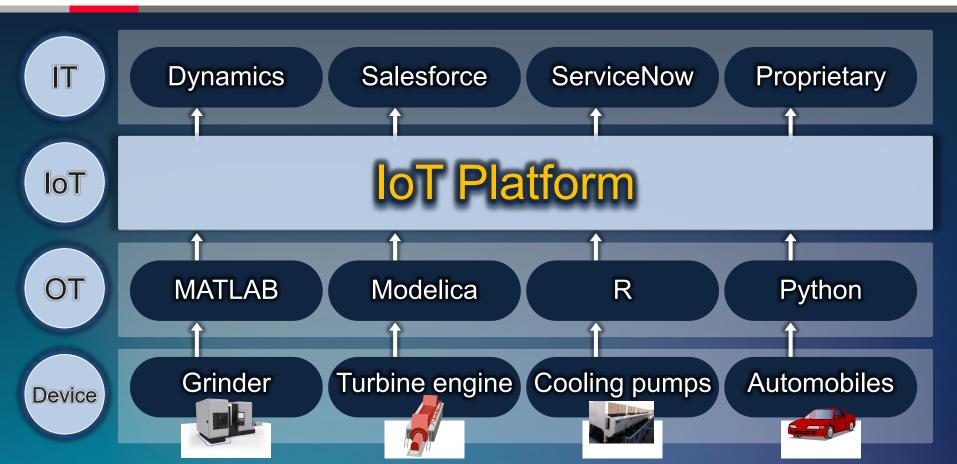
All combinations can be achieved by m + n implementations, by using a bridge between the OT systems and IT systems.

IoT Platform Standardization

Integrating OT and IT

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





Summary



- 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.

HITACHI Inspire the Next