IT Services

1 Rebar Inspection System Saves Labor in Inspection Tasks with Digital Measurement Technology

Hitachi Solutions, Ltd. promotes digital transformation (DX) in collaboration with companies in a variety of industries, one of which is construction. One task on a construction site is the inspection of rebar, requiring considerable time and effort for preparation, manual measurements, and creating reports. The Rebar Inspection System was jointly developed using Hitachi Solutions' special information technology and Sumitomo Mitsui Construction Co., Ltd.'s onsite expertise to help save on labor in rebar inspection tasks.

This system was adopted by the Ministry of Land, Infrastructure, Transport and Tourism's 2019 Project to Introduce and Utilise Innovative Technology to Dramatically Improve Productivity on Construction Sites, attaining the highest score, rank A. The use of general-purpose items making procurement easy and keeping costs low, and the use of an original algorithm to ensure sufficient inspection precision has been praised both inside and outside Japan, leading to the system receiving the Outstanding Tech Company Award at the 2022 ASOCIO Tech Excellence Awards, and the Winner at the JISA Awards 2022.

In the future, Hitachi Solutions aims to utilize the experience and knowhow gleaned from site construction efforts to contribute to DX in the construction industry. (Hitachi Solutions, Ltd.)
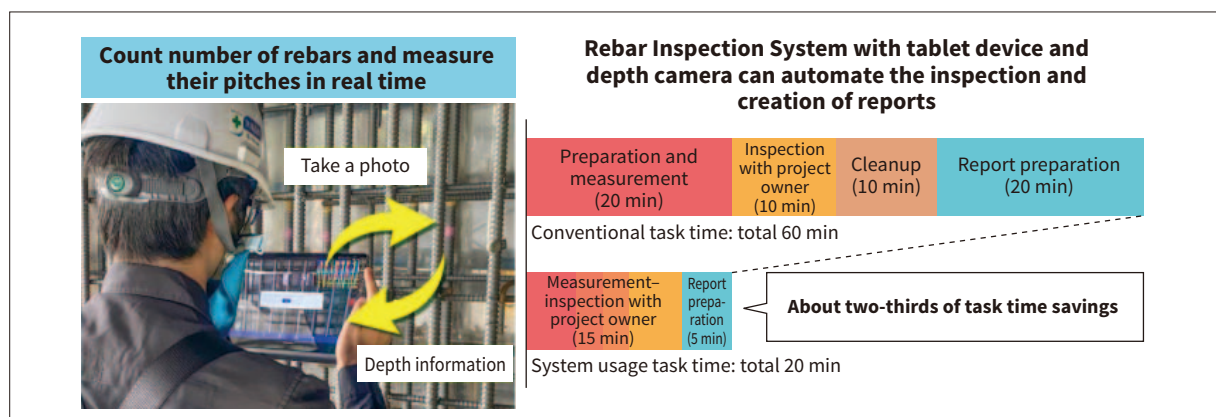
2 DX Lab.—Online Co-creation Space that Gives Shape to DX in Collaboration with Customers

The Hitachi Solutions DX Lab. (hereinafter, DX Lab.) is an online co-creation space for supporting customer DX promotion initiatives in this era of volatility, uncertainty, complexity, ambiguity (VUCA), where DX has grown ever more important in flexibly dealing with change.
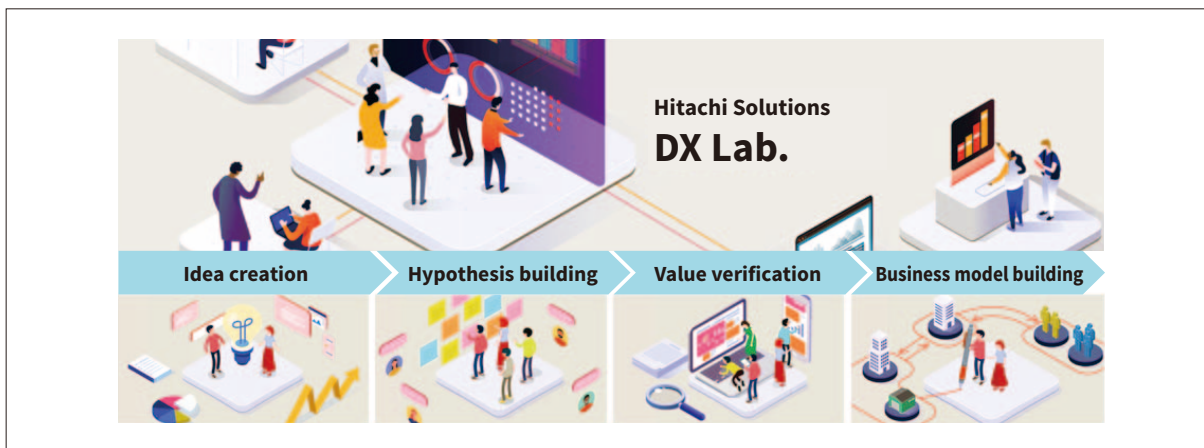
At the DX Lab., consultants collaborate with customers on their DX promotion initiatives, supporting the entire process from idea creation to business model building. Combining customer's business domain knowledge with Hitachi Solutions DX promotion knowledge and technical abilities makes it possible to promote customer DX in an efficient manner.

For example, when a customer is considering a new business, staff from the Hitachi Solutions business and sales divisions gather online to brainstorm based on the study theme, create a service hypothesis through a repeated process of verifying value and making corrections, and then organize a business model. After this last step, a roadmap is developed in view of the service improvement and the scale of the project so that a smooth transition can be made to the development and operation support environment.

The DX Lab. is already collaborating with multiple customers in the manufacturing and service industries, producing results through co-creation such as new services. In the future, Hitachi Solutions aims to offer the

Count number of rebars and measure their pitches in real time

Take a photo

Depth information

Rebar Inspection System with tablet device and depth camera can automate the inspection and creation of reports

| Preparation and measurement (20 min) | Inspection with project owner (10 min) | Cleanup (10 min) | Report preparation (20 min) |

Conventional task time: total 60 min

| Measurement–inspection with project owner (15 min) | Report preparation (5 min) |

About two-thirds of task time savings

System usage task time: total 20 min

1 Labor saving thanks to the Rebar Inspection System

2 DX Lab. support

service not only online, but as a hybrid co-creation venue including face-to-face meeting.
(Hitachi Solutions, Ltd.)

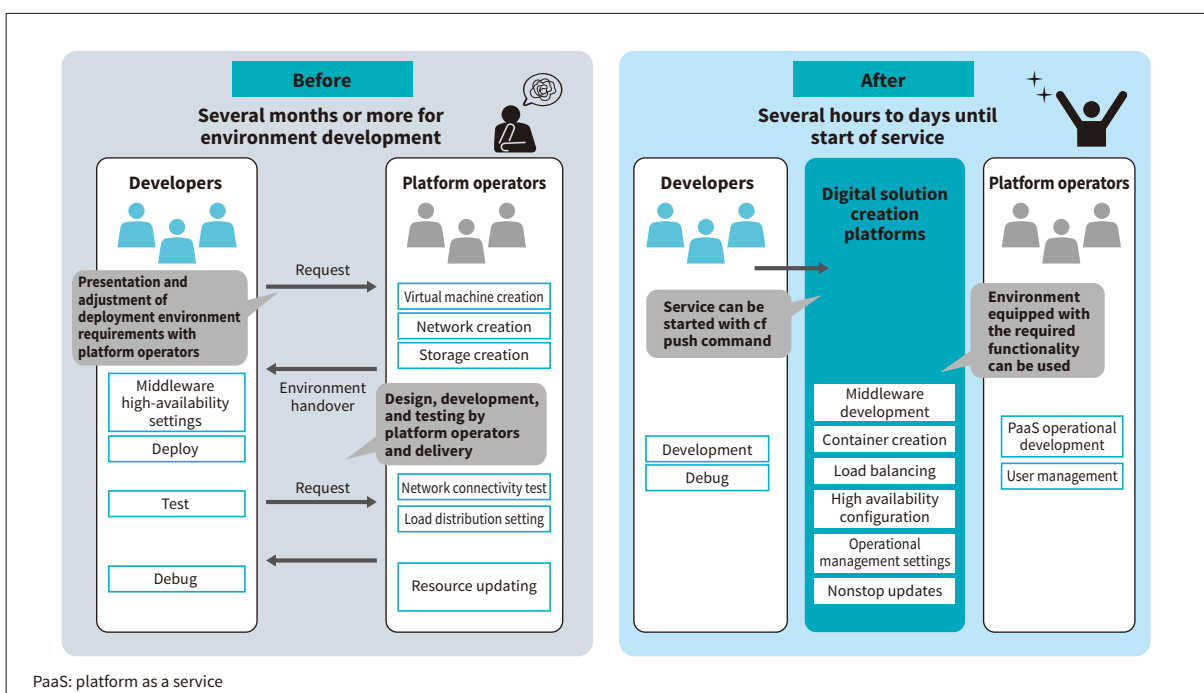## 3 Digital Solution Creation Platform for Promoting DX

The Hitachi Solutions digital solution creation platform is a co-creation service platform capable of repeatedly, quickly, and simply developing services required for DX promotion. The application developer simply prepares the source code and executes commands to automatically create, save, and launch containers[*1] so that users can access the application.

In a conventional system integration (SI) model, application environments are available for use after a process of various adjustments, design, development, and testing between the developer and the platform operator. On the other hand, the digital solution creation platform provides an environment for developing and operating applications by utilizing the VMware Tanzu[*2] software provided by VMware, Inc., which enables the automation and orchestration of Kubernetes[*2]. This frees the application developer from the process of going back and forth with the platform operator and from preparing an environment, and eliminates the need to apply patches and implement security measures, allowing them to focus on app development.
(Hitachi Solutions, Ltd.)

*1 Technology that provides a virtual software operating environment
*2 See the list of "Trademarks."

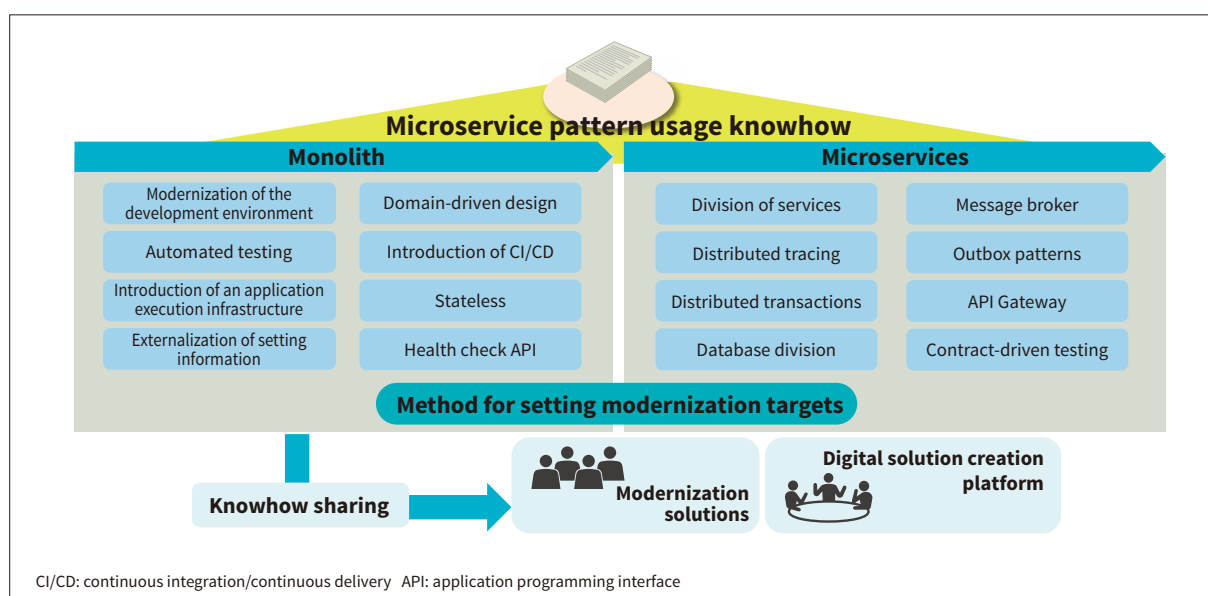**3** Digital solution creation platform

4 Development Method for Accelerating DX: Microservice Patterns

Key systems in DX acceleration are counted on to contribute to ensuring a company's competitive edge, and such systems require constant upgrades to maintain and improve their value. When aging systems, etc. make it impossible to do so, modernization with the goal of improving agility and streamlining operations is necessary, and microservices are one way to achieve this goal.

Microservices are complex architectures achieved through cross-cutting application and infrastructure environment design and development methods (microservice patterns), and it is important to formulate introduction strategies and to determine whether they are needed. In moving ahead with modernization, the introduction of microservice pattern components is effective even when selecting a monolithic architecture that provides overall functionality in a single application. With this in mind, Hitachi Solutions has organized in-house knowhow on how to set cost-effective modernization goals and how to introduce microservice patterns, and is supporting its customers through its digital solution creation platform and modernization solutions.
(Hitachi Solutions, Ltd.)

Microservice pattern usage knowhow

Monolith		Microservices	
Modernization of the development environment	Domain-driven design	Division of services	Message broker
Automated testing	Introduction of CI/CD	Distributed tracing	Outbox patterns
Introduction of an application execution infrastructure	Stateless	Distributed transactions	API Gateway
Externalization of setting information	Health check API	Database division	Contract-driven testing

Method for setting modernization targets

Knowhow sharing → Modernization solutions   Digital solution creation platform

CI/CD: continuous integration/continuous delivery   API: application programming interface

4 Microservice pattern usage guides and cooperative solutions