

Inter-enterprise Information Sharing Platform that Generates Value Through Cross-industry Use of Data

The novel coronavirus pandemic has brought major changes to public behavior and calls for companies to adopt a new set of values on which to base the operation of their businesses and services. Hitachi has long been working on ways of generating value through the sharing of data between companies and on the technologies for doing so. Following on from trialing ways of simplifying residential relocation procedures in partnership with KDDI Corporation and Sekisui House, Ltd., Hitachi proposed the establishment of a consortium to investigate how to create new value through collaboration on cross-industry data and has participated in its activities. This work has provided a means of engaging in service development and investigating topics predicated on the “new-normal” in this time of pandemic. This article presents examples of value created in the process of investigating information sharing, gives an overview of the inter-enterprise information sharing platform intended for this purpose, and describes how Hitachi is going about the enterprise application of blockchains, a core technology of the platform.

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1. Introduction

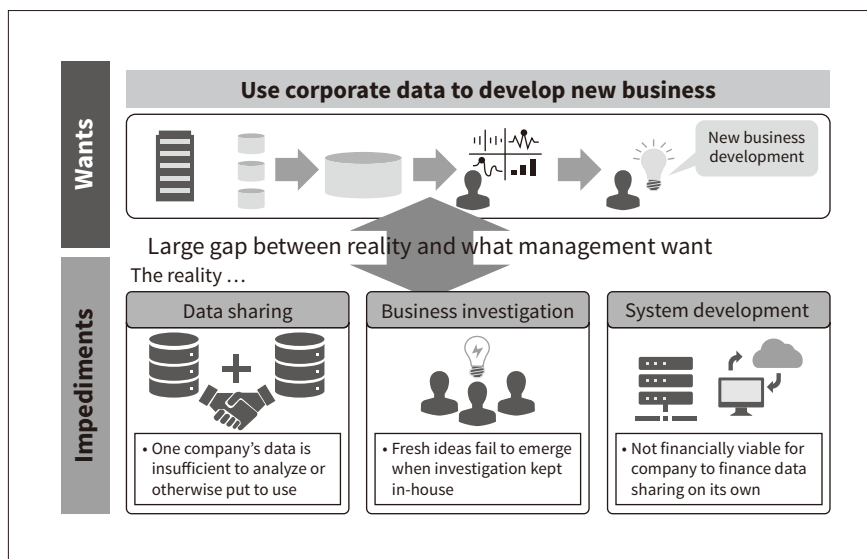
A lot of activity is taking place around the use of data in business, with many companies picking up the pace of their work in this area by establishing divisions dedicated to digital transformation in the hope of generating new corporate value or competitiveness⁽¹⁾. On the other hand, customer needs are diverse, and given the difficulty of generating value from the data and other resources available to individual companies, it is vital to adopt a philosophy of open innovation for sharing this data and resources in ways that transcend the barriers between companies (see **Figure 1**). Unfortunately, this is a difficult process that involves getting

the company's own data in order, identifying what resources are available elsewhere, and making contact with the relevant companies. There are also numerous other considerations to be taken into account, including how to maintain security when information is shared between companies and how to go about system interconnection.

In response, Hitachi proposed the establishment of a consortium of companies to accelerate the discussion of business ideas for open innovation and has participated in its activities⁽²⁾. Hitachi also plans to help expand these activities by developing the underlying technology for providing simple and secure access to information at different companies via an application programming interface (API) and making it available to the consortium from the second half of FY2020.

Figure 1 — What Companies Want from Data and What is Stopping Them

While progress is being made on getting in-house data in order, much remains to be done to foster open innovation.



2. Examples of Value Creation by Corporate Information Sharing

2. 1

Collaboration with KDDI and Sekisui House to Simplify Lease Agreement Process

One example of value creation by corporate information sharing is a one-stop shop business for handling the procedures associated with entering into a new property lease, using change of address information to arrange things like insurance, fixed-line connection, electricity, and gas.

Past practice in the real estate industry for arranging new lease agreements has been for the prospective customers to visit the agency and view candidate properties in the company of the agent. Unfortunately, the process asks a lot of both customers and the agency, including confirming the customer's identity at the agency and completing the various procedures for moving into a new residence. This creates a high pressure of work during busy periods and results in missed opportunities for dealing with other customers. If the process could be made more efficient, it would likely reduce agency workloads and free them up to engage with more customers during busy periods.

To address this issue, Hitachi partnered with KDDI Corporation and Sekisui House, Ltd. to look at what could be done. This led to a trial that commenced in 2019⁽³⁾. The trial demonstrated the potential for simplifying the process of identity verification as well as the provision of information for obtaining property viewing consent and the procedures associated with moving into a new residence, with this being achieved by means of a secure link between lease agreement information and the customer information from KDDI's au* -branded mobile telephony services

* au is a registered trademark of KDDI Corporation.

(subject to the person concerned consenting to use of the verification-of-identity information obtained by KDDI when they signed up for telecoms services) (see Figure 2).

It also highlighted the potential for utilizing lease agreement information to simplify the task of arranging for essential services such as insurance, electricity, gas, and telecoms, something that needs to be dealt with when moving into a new residence, and where past practice has been for the person moving house to themselves contact the various providers, submitting their personal details separately in each case.

Based on this idea, KDDI, Sekisui House, and Hitachi sought out other insurance and gas companies to participate in the venture and began joint work on simplifying not only real estate lease agreements but also the procedures associated with home contents insurance and the various infrastructural services that need to be arranged when moving house⁽⁴⁾.

2. 2

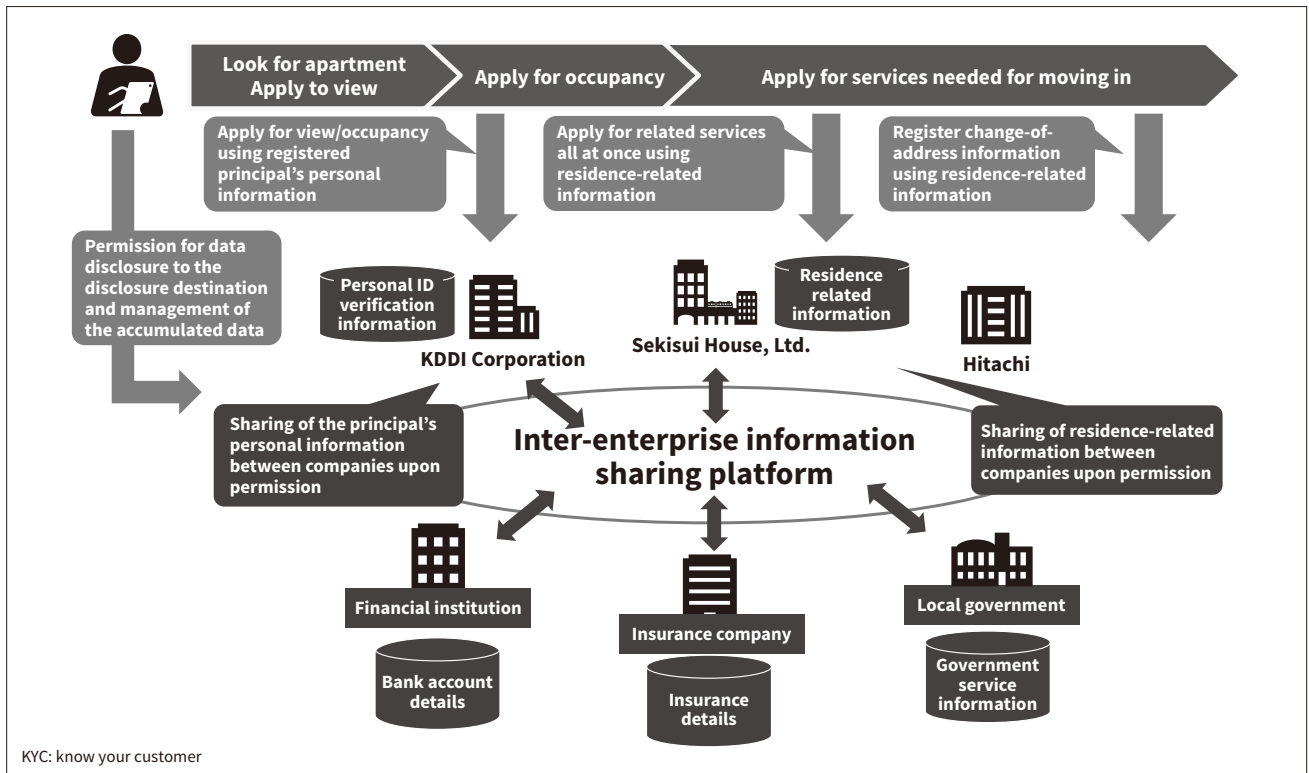
Information Sharing to Support 5G Base Station Deployment

Another opportunity that Hitachi has been exploring for itself involves the sharing of information between telecoms companies and others businesses in areas like real estate to facilitate the deployment of base stations for 5th-generation (5G) telecoms.

Japanese telecom companies began their 5G rollout in the spring of 2020 and between them the four network operators have plans to install more than 90,000 base stations in total by the end of FY2023⁽⁵⁾. Among the issues with base station installation is the time and cost caused by delays in surveying installation sites, obtaining construction consent, and performing base station installation. Another issue is that, as a consequence of the radio frequencies they use, 5G base stations have a very small cell radius compared

Figure 2 – Trial for Rental Property Viewing

This utilizes KYC information from telecom network operators to improve the efficiency of identity verification. When combined with smartlocks, it also enables customers to undertake viewings on their own, making the booking over a smartphone and visiting the property without a representative from the real estate company needing to be present.



to previous telecommunication systems and therefore more base stations need to be installed to provide area coverage⁽⁶⁾.

In the past, the practice by network operators of surveying installation sites without access to relevant information about buildings or their owners meant that a lot of time and effort was needed for this work. Accordingly, it should be possible to make the base station installation process more efficient and to shorten the associated procedures by sharing

property information between real estate and telecoms companies, subject to the owner's consent (see **Figure 3**). Making a rapid shift to 5G is one of the urgent challenges facing the Japanese government's Society 5.0⁽⁷⁾ vision for a human-centric "super-smart society" and Hitachi will help 5G achieve widespread adoption through its inter-enterprise information sharing platform.

Figure 3 – Overview of Support for 5G Base Station Deployment

The work of base station deployment can be made more efficient by having real estate companies that hold information about owners share this information with telecoms companies (subject to the owner's consent) or handle negotiations on their behalf.

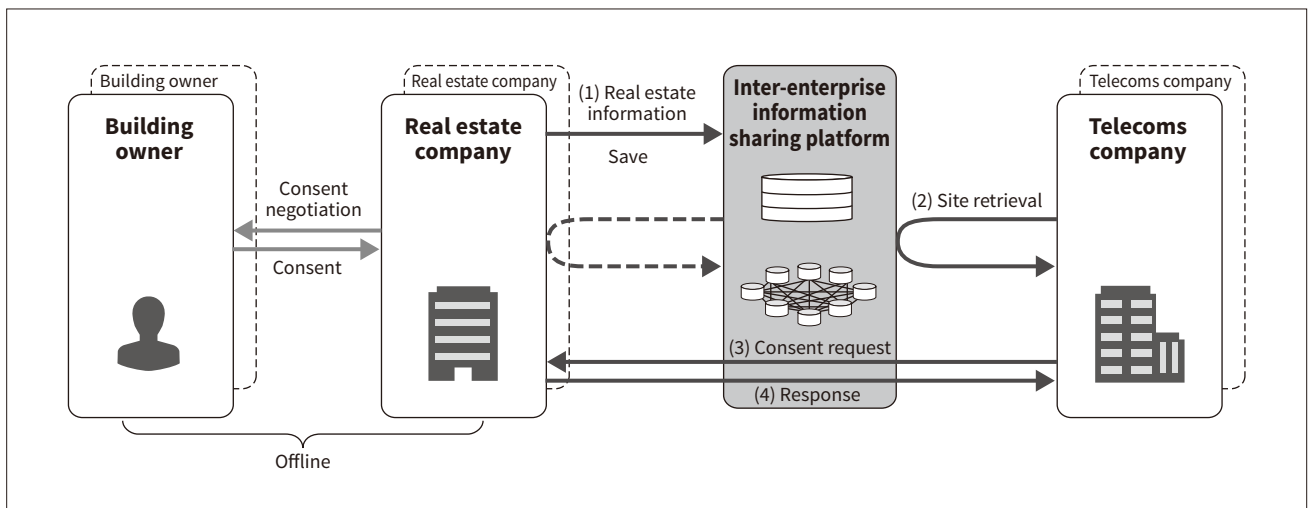
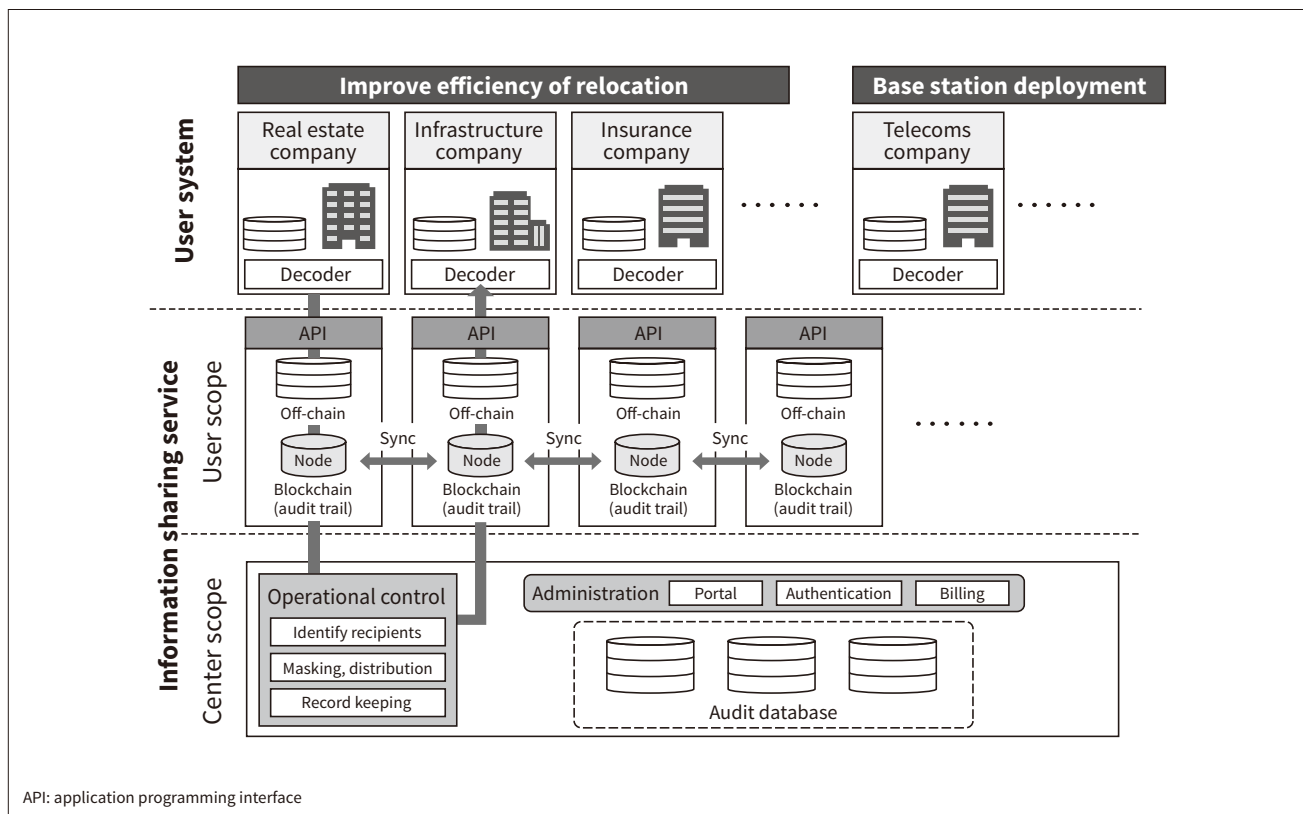


Figure 4 — Overview of Inter-enterprise Information Sharing Platform

Each user is granted a scope that encompasses an API, blockchain, and off-chain functions.



3. Technologies Used in Inter-enterprise Information Sharing Platform

3.1

Challenges for Corporate Information Sharing

What is required to generate the sort of value described above is some mechanism for the safe and secure sharing of information that is easy for companies to participate in. Four challenges to achieving information sharing are as follows.

(1) Secure exchange of data between multiple companies

A secure means of exchange is a prerequisite if companies are to share confidential information. This needs to ensure that data is not tampered with in the process of sharing it, to prevent unauthorized access, and to provide transparency regarding what legitimate data access has occurred. Moreover, this security needs to be maintained over the N-to-N relationships between companies that will exist as the number of participants grows.

(2) Privacy protection and compliance with legal protections for personal information

Along with encryption and anonymization to protect individual privacy, there is also a requirement for mechanisms such as the management of access, deletion, consent,

and ownership rights that are needed to comply with legal protections for personal information such as Japan's Act on the Protection of Personal Information and the European Union's General Data Protection Regulation (GDPR).

(3) Connectivity to allow companies to participate and collaborate quickly

Expanding the business requires ways of getting collaboration up and running quickly by reducing the technical hurdles and other barriers to entry by new participants (connectivity).

(4) Scalability to cope with new services and increasing numbers of participants

As the numbers of participants and services grow, scalability is needed to enable system resources to be added as required based on requirements such as the companies, data, and processing volumes involved.

The following sections describe the architecture and implementation practices adopted for the inter-enterprise information sharing platform to overcome these challenges.

3.2

Features of Inter-enterprise Information Sharing Platform

As shown in **Figure 4**, the inter-enterprise information sharing platform includes a blockchain platform for data exchange, a number of (off-chain) databases for personal information and contract information, and a web API

accessible by the participating companies. The features are as follows.

(1) Secure data exchange using blockchain

Blockchains provide a secure means of data sharing in which transaction data is shared between multiple nodes and validated by a process of mutual consent⁽⁸⁾. Hitachi chose to use a blockchain as a way to address the issue of secure N-to-N data exchange between multiple companies. In the inter-enterprise information sharing platform, transaction details are recorded in a blockchain when data submitted by a particular company is made available to others. The blockchain is also used as a basis for managing distribution of the data by its use in conjunction with the off-chain mechanisms described below to restrict access (including, for example, specifying the scope of availability or designating which companies are not to be granted access). Meanwhile, the blockchain characteristics of transparency and resistance to falsification mean that cost allocation can be done fairly on the basis of reliable evidence.

(2) Off-chain data management for privacy protection and compliance with legal protections for personal information

While resistance to falsification is one of the features of blockchains, as noted, another feature is that, once written, data cannot be erased. This means that a blockchain on its own cannot comply with the stipulations in Japan's Act on the Protection of Personal Information and the GDPR that grant people the right to have their information deleted on request⁽⁹⁾. There is also a requirement to encrypt or keep hidden confidential information, including at companies that receive information. The inter-enterprise information sharing platform overcomes this problem by storing confidential information off-chain, secured by encryption or other means, and only records the location of this data in the blockchain itself.

(3) Data sharing API that can be used without awareness of blockchain

Data exchange and other services are implemented on the inter-enterprise information sharing platform using a combination of blockchain executable code (smart contracts) and off-chain functions. However, requiring participating companies to have expertise in blockchain technology before they can connect to the platform and develop services would be a major impediment to use and prevent the business from scaling⁽¹⁰⁾. Instead, the inter-enterprise information sharing platform makes available a data sharing API that simplifies the secure sharing of information and does not require any knowledge of the underlying blockchain. That is, users can call the API via specified interfaces.

(4) Flexible server-less architecture based on container technology

A highly scalable and flexible architecture is essential for the sharing of information between large numbers of

companies or companies involved in services. The inter-enterprise information sharing platform has a server-less architecture using container technology for the blockchain nodes and other core components. This server-less configuration utilizing virtualization enables the system to scale out quickly and easily and means it can adapt in realtime to service expansion or increases in the number of participating companies. It also reduces the cost of node and infrastructure deployment compared to conventional on-premises practices, helping to keep down the cost of the service to participants. Use of this technology also enables rapid service rollout because it allows the resources allocated to each company to be managed as a set.

4. Conclusions

As in the examples given, data sharing holds the key to creating new services that span different companies and this has been successfully transformed into real businesses through the framework of activities to date. Given that there are few examples in Japan of enterprise systems currently in operation that make use of blockchains, this initiative involving large numbers of companies has the potential to be at the forefront of the field in terms of technology. The plan is to expand its scope by way of the NEXCHAIN Institute, with full commercial operation of a corporate information sharing service set to commence operation in the second half of FY2020. The companies participating in the initiative cover a wide range of industries, including insurance, gas, electricity, security, and advertising as of March 2020. Hitachi intends to expand these activities in the future, using the technology as a basis for contributing to business as an innovation partner for participating companies that are involved in social infrastructure.

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