A Fertile Land for Value Creation
― Hitachi Cloud ―

By providing computing resources as services, the cloud is emerging as a platform for creating value in ways that facilitate business growth and innovation in social infrastructure.
Amid this trend, Hitachi has restructured its cloud platform and the products and services that support it as the "Hitachi Cloud."
Based on the technologies it possesses by virtue of being an IT platform vendor, with products that feature high reliability, experience and know-how from the support of social infrastructure, and knowledge built up through the activities of its group companies, Hitachi is picking up the pace of its Social Innovation Business by supplying a cloud with high added value.

Working Toward Co-creation by Aggregating Information

The "cloud" is said to have become a trending term in the information technology (IT) field around 2006. The new concept of on-demand access to computing resources (such as computer processing and data storage) provided as a service via a network triggered a shift in the nature of IT assets toward being something that can be rented rather than owned, and attracted attention for such benefits as lower costs and reliable operation. Now, nine years later, the cloud is starting to be recognized as something more than just a way of providing computing resources as a service.

For this next generation of the cloud, Hitachi has developed a new cloud platform and supporting products and services that it has formalized as the "Hitachi Cloud." Naoki Ono (President of Cloud Services Division, Information & Telecommunication Systems Company, Hitachi, Ltd.), who manages the cloud service business, explains the background to this as follows.

"The cloud has rapidly risen in prominence as a business platform in recent times, increasingly

that helps quickly set up SaaS environments. Itself provided in the form of a service, the SaaS business platform provides the resources needed to offer an application program as a SaaS-style cloud service. The SaaS business platform utilizes know-how from another of Hitachi's cloud services, the TWX-21[*2] business media service, which provides a forum for business-to-business transactions over the Internet that has around 55,000 member companies spread across 24 countries and regions.

Mr. Ono also notes that, "In addition to business-to-business transactions, the service has also brought about advances in the role of the cloud as a place for member companies to do business by, for example, allowing them to hold discussions. In other words, it has become a recognized platform for co-creation. The true value of the cloud lies in facilitating things like co-creation and value creation through resource sharing and the aggregation of information within companies, groups, or communities. Furthermore, our aim is to make progress on turning the cloud into a platform for innovation in social infrastructures and other businesses by supplying Hitachi's practical business know-how in the form of a service."

Naoki Ono

being adopted for core applications. At Hitachi, we have drawn on our experience in social infrastructure and our other capabilities to supply highly reliable cloud services that support such mission critical areas. Meanwhile, there has also been growing use made of the public cloud, which can respond flexibly to changing user workloads. To satisfy customers' diverse needs, we have strengthened our collaboration with leading cloud vendors and offer a cloud environment that makes available the best combination of Hitachi's managed cloud[*1], the customer's private cloud, and our partners' public clouds."

Based around a federated cloud made up of these multiple clouds, which can be managed as a single unit, this newly formalized cloud platform also includes service integration to support tasks such as the development of business applications, and a software-as-a-service (SaaS) business platform

SNS: social networking service, GPS: global positioning system
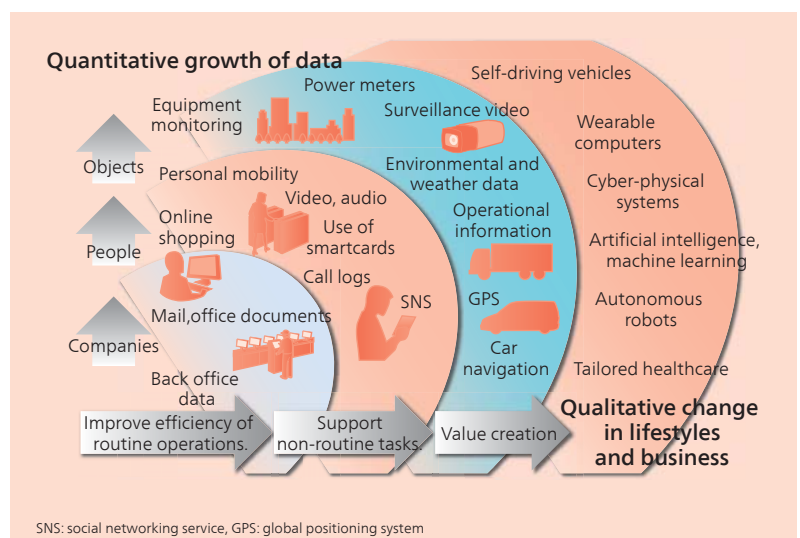
Hitachi's view of future trends in the use of information. The Hitachi Cloud acts as a platform supporting value creation amid these changes in business and society.

Maintenance depot for Class 395 high-speed trains in the UK. Work is proceeding on the use for predictive diagnosis of data collected from sensors fitted to the trains.

*1 A cloud service that provides public cloud resources and also added value such as design and implementation or operation and maintenance. The service can be adapted to suit the user's system, operational, and other requirements.
*2 TWX-21 is a trademark of Hitachi, Ltd.

Providing a Platform that Delivers Advances throughout Society

Living as we now do in the "information society," information has become an essential service for the functioning of society and the source of a variety of new value creation. As a platform that aggregates information, the cloud is recognized as having the potential to transform not only business but also the infrastructure of society.

For example, with the emergence of machine-to-machine (M2M) communications and the Internet of things (IoT), which link together a wide range of different objects via networks and enable optimal control through the sharing of sensor and other data, the cloud has already started to be used as a platform for aggregating the information generated by real-world objects so that it can be analyzed and put to use in the form of big data.

Toshiaki Tokunaga (President of Smart Information Systems Division, Information & Telecommunication Systems Company, Hitachi, Ltd.), who is in charge of the smart information business that uses IT to empower Hitachi's Social Innovation Business, expressed this as follows.

"One of the demonstration projects being undertaken by my division involves the predictive diagnosis of faults on rolling stock. When one of Hitachi's high-speed Class 395 trains used in the UK returns to the depot, the information from the server and several dozen sensors installed on each train is automatically collected using M2M com-

Toshiaki Tokunaga

munications and then analyzed on the cloud. This analysis can identify advance indications of a fault on a particular component based on knowledge built up over time. We believe that this will help improve service quality by replacing such parts before they fail to avoid problems such as timetable disruption or loss of utilization due to faults."

Sensor data cannot generate value on its own. Instead, the value for customers and for Hitachi itself lies in the knowledge acquired by analyzing large amounts of data. The practical business know-how of Hitachi and its partners contributes to this knowledge acquisition process.

Accordingly, the collection and analysis of big data for use as a resource for creating value is performed on a global cloud. Customers are given access to an environment that allows them to concentrate on value creation rather than spending time and effort building IT infrastructure.

As Mr. Tokunaga commented, "It is fair to say that the Hitachi Cloud is a true combination of IT and infrastructure, providing the platform on which we can realize our Social Innovation Business. The trend toward enhancing social infrastructures and other businesses as well as people's lifestyles by transforming various real-world activities and situations into data for analysis is only likely to become more pronounced in the future."

Given this situation, the aim of the Hitachi Cloud is to achieve innovation in social infrastructure and become a platform that delivers advances throughout society by acting as a reliable, high-quality, and secure IT platform for supporting essential information services, and by incorporating knowledge from data analysis into the provision of services.

Financial Services as Part of Social Infrastructure

Social innovation on a cloud platform is already taking place in a variety of fields. Payment services are one example.

In 2014, Hitachi acquired PRIZM PAYMENT SERVICES PRIVATE LIMITED, a major provider of payment services using automatic teller machines (ATMs) and point-of-sale (POS) systems in India. PRIZM PAYMENT SERVICES' business involves supplying financial institutions with a total ATM operation service that provides 24-hour/365-day ATM services and encompasses:

Value Underpinned by Technologies Honed Prior to the Cloud

Underpinning the value of the Hitachi Cloud in its role as a platform for value creation are IT platform technologies. Hiroyuki Kumazaki (President of IT Platform R & D Management Division, Information & Telecommunication Systems Company, Hitachi, Ltd.) leads the department responsible for developing these technologies.

"The cloud is built on IT resources such as servers, storage, and networks together with virtualization and administration technologies that overcome physical constraints to allow whoever wants to use the cloud to do so, whenever they want, and as much as they want. Having honed such technologies since before the emergence of the cloud, Hitachi is able to provide the cloud as a platform that is flexible and can be used with confidence. One could say that it is these capabilities of Hitachi that make possible the "ready-made cloud" in which individual cloud technologies are bundled together and delivered to customers in such a way that they can set up a private cloud simply by clicking the power switch.

Our current focus is on technology that simplifies the analysis on the cloud of a wide variety of M2M and other data. We intend to support innovation by supplying this technology in the form of tools for extracting knowledge from data."

Hiroyuki Kumazaki

ATMs; networking, air conditioning and other ancillary equipment; installation sites; and cash pickup, delivery, removal, and replenishment. PRIZM PAYMENT SERVICES also operates the White Label ATM (WLA) service under its own brand and is playing a part in extending the financial systems to places that are not covered by financial services. Although unfamiliar to Japan, it is estimated that about half of all ATMs in India are operated by payment services like these. The acquisition will enable a fusion between PRIZM PAYMENT SERVICES' strong customer base, which includes major financial institutions, its payment and cash handling systems, and Hitachi's financial sector IT services, which have the leading share of the Japanese ATM market.

Atsushi Hasegawa (President of Payment Services Division, Information & Telecommunication Systems Company, Hitachi, Ltd.) who manages the payment services business explains the significance of the merger of the two companies to the development of the financial sector in India as
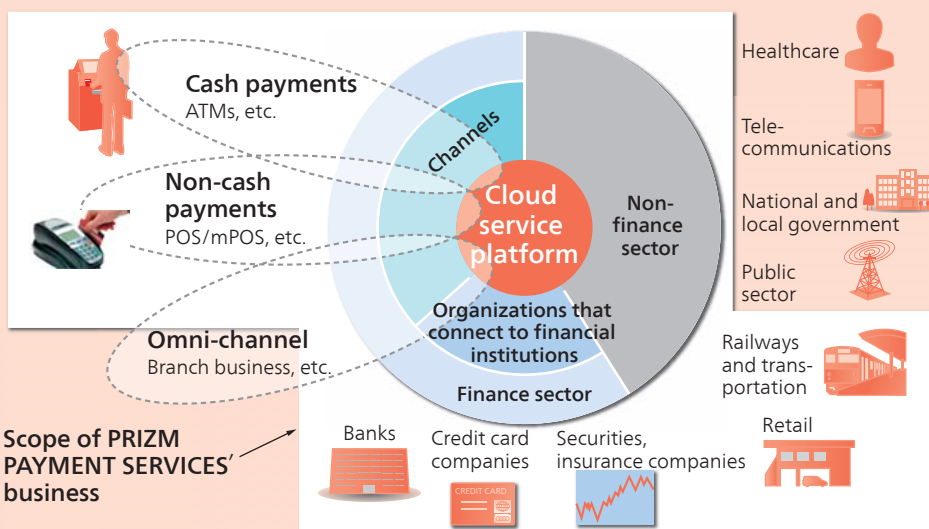
PRIZM PAYMENT SERVICES supplies payment services in India using ATMs, POS systems, and other methods. Its chain of services is supported by Hitachi's cloud.

Atsushi Hasegawa

Shop-front ATM in India. The provision of services takes account of special factors such as the local climate and the state of the electric power and telecommunications infrastructure.

follows.

"While India currently has about 200,000 ATMs, only about one-tenth as many as Japan per capita, this is expected to increase to 300,000 by 2016. Although only a low 35% (approximately) of people have a bank account, this proportion is expected to grow rapidly under the vigorous economic policies of Prime Minister Narendra Modi. PRIZM PAYMENT SERVICES plans to increase the number of its ATMs from about 32,000 now to 60,000 in 2016. As its payment services extend beyond ATMs to include credit cards and public transportation cards, we believe that PRIZM PAYMENT SERVICES can contribute to the spread and development of financial services by utilizing Hitachi technology and other know-how to provide customers with very convenient services for both cash and non-cash payments."

Underpinning these services is the Hitachi Cloud. By utilizing technologies built up from past work on social infrastructure, the Hitachi Cloud is maintaining the level of quality that is expected of the financial infrastructure, even in India with its difficulties in areas such as telecommunications and electric power. By linking to this cloud, financial institutions can improve convenience for users by utilizing PRIZM PAYMENT SERVICES' ATMs, POSs and other capabilities, and by making available all of their different payment channels.

Mr. Hasegawa notes, "Finance is an important part of the infrastructure that allows the public to live in safety and security. Its development is likely to bring major changes to the lifestyles and societies of the people of India. We intend to use India as a starting point for speeding up the global ex-

Yoshihiro Hayashi

pansion of our payment service business, and to press forward with social innovation through the development of financial services."

The Cloud as a "Cradle of Innovation"

Smart mobility services are another example of social innovation on a cloud platform. While transportation is an important part of the social infrastructure, it also faces a variety of challenges, including congestion, environmental problems, concern for people who find transportation difficult, and disaster countermeasures. To overcome these challenges, IT can speed up the building of transportation infrastructure that is conscious of the environment and that enables people to move around in safety and comfort.

Moves to make transportation infrastructure smarter have been focused around the automobile, which has been the main mode of transportation in the past. Typical examples include the Vehicle Information and Communication System (VICS), which utilizes sensor data to provide traffic congestion and other information, and electronic toll collection (ETC) systems.

Yoshihiro Hayashi (Vice President of Enterprise Solutions Division, Information & Telecommunication Systems Company, Hitachi, Ltd.), who works on the front lines of Hitachi's smart mobility services business, expresses the potential of this field as follows.

"If we make transportation even smarter and connect vehicles directly to the Internet or via smartphones, we can collect more information and put it to use. For example, by analyzing the prevalence of traffic regulation, event, and other keywords in social network services (SNSs) along with smartphone position information, it becomes possible to do things like predicting congestion with high accuracy or determine the most efficient route for a trip. In addition to services that keep map data updated in greater detail, this information can also be used to create services that assess driving characteristics that can be utilized for vehicle insurance and other purposes."

In the automotive field, automated driving is becoming a reality, with progress being made on the commercialization of driving safety support systems such as collision avoidance, automatic following of the vehicle ahead, and lane-keeping. Making automated driving safer will also require

Enhancements to the Cloud Based on the Symbiotic Autonomous Decentralized Systems Concept

Research and development is another important element underpinning the value of the Hitachi Cloud. Yuichi Yagawa (General Manager, Information Service Research Center, Yokohama Research Laboratory, Hitachi, Ltd.) manages research and development on information and control systems and information services.

"Clouds that handle a large amount of data with privacy implications need to maintain security. While virtualization, which logically partitions physical IT resources, can in itself be thought of as providing a secure environment, at the Yokohama Research Laboratory we are developing privacy-preserving information processing techniques that can rapidly search data in encrypted form, and supplying them as a technology that can maintain the safety and security of the cloud.

The Hitachi information and control system technologies used in social in-

frastructure are based on the "symbiotic autonomous decentralized systems" concept. This is a system technology for achieving higher levels of sophistication by having different types of systems work together in a coordinated manner to achieve their objectives. It represents a further enhancement of the autonomous decentralized system technologies that Hitachi has built up over many years in the information and control systems field. The federated cloud provided by Hitachi Cloud is an expression of this concept of optimizing overall performance through the loose integration of systems that have been optimized independently of each other. Interconnection is recognized as a difficult yet critical aspect of IT. We aim to continue supporting advances in this field by undertaking research and development that can realize the Hitachi Cloud concept of interconnecting different entities to create value."

Yuichi Yagawa

the exchange of information with external entities, leading to the implementation of functions such as the use of M2M communications between the vehicle and pedestrians' smartphones for risk avoidance.

Mr. Hayashi states, "Once sensor data from a diverse range of sources and SNS data generated by people is collected in the cloud, it can be analyzed and processed to provide useful content or trouble-free services that have not existed in the past. It is possible to achieve innovation in transportation infrastructure by integrating different elements that Hitachi possesses, including IT, car parts, navigation systems, and maps. Considering this in terms of the cloud, linking these to other social infrastructure information and knowledge aggregated in the cloud will lead not only to transportation becoming smarter, but also society as a whole. In this sense, the cloud can be described not only as a platform for social infrastructure, but also as a "cradle of innovation" that encourages interoperation and fusion and produces new value."

While the term "cloud" evokes the idea of something as elusive as a cloud in the sky, clouds are

also the source of the rain that nourishes all living things. Now that the cloud has moved on from the installation phase to actual utilization, one wonders what benefits it may bring to society. On the other side of the large Hitachi Cloud lies a new horizon of value creation.
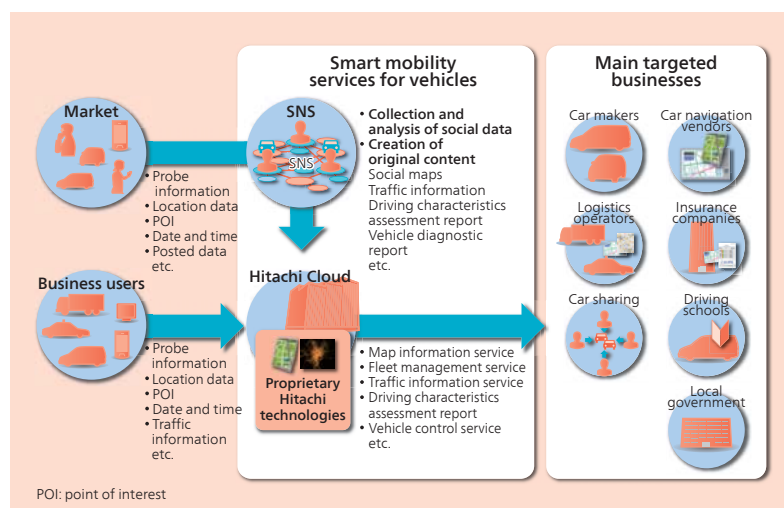
Overview of smart mobility services. These services combine social networks with proprietary Hitachi technologies that use location data.