Hitachi Data Processing and Distribution Service for Telematics

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OVERVIEW: The rapidly advancing automotive sector is showing interest in enhancing services that use big data. Work is proceeding on how to make use of the diverse telematics data held by vehicle manufacturers and others, with growing demand for highly reliable platform services for utilizing this information that provide easy ways of working with information across different business areas. In response, Hitachi has established its data processing and distribution service for telematics. The service uses Hitachi data centers to analyze and process a variety of vehicle information acquired by vehicle manufacturers through telematics based on contracts with vehicle owners, and then distribute this information to companies that wish to use it in accordance with their contractual arrangement with the vehicle manufacturer. This provides a basis for creating new services and helps improve the overall level of convenience in society.

INTRODUCTION

WITH interest in big data from a wide range of different sectors, there are also growing moves in the telematics sector aimed at analyzing and utilizing large quantities of traffic and other information for business or public purposes. This includes information on traffic volumes and congestion, such as "probe information" (data on vehicle use) collected from vehicles. However, the service providers wanting access to this probe and other information are many and varied, including, for example, companies that provide services to car owners, suppliers of energy services such as home energy management systems (HEMSs), and tourism and other service operators. For each of these organizations to develop and implement their own systems is not practical.

Hitachi has launched its data processing and distribution service for telematics to collect, store, and process probe information received from vehicles, regardless of the vehicle model or manufacturer, and to provide information such as records of vehicle use to telematics operators.

This article describes Hitachi data processing and distribution service for telematics that performs structural analysis and processing of probe information and other data collected from vehicles to make it suitable for use by service providers such as non-life insurance companies.

HITACHI'S APPROACH TO BIG DATA SERVICES

A variety of fields are showing interest in the utilization of big data, with a number of initiatives being pursued. Based on know-how in a variety of fields and partnerships built up over time with different industries and companies, Hitachi is working on big data services that operate across a large number of different industries (see Fig. 1).

Background

Greater use is being made of information technology (IT) in machinery and business operations across all industries, with information such as sensor or customer data being utilized in business. However, because this information is collected independently by different companies or departments and applied to specific applications, business initiatives that involve combining or otherwise integrating data are difficult to implement.

Hitachi has an extensive track record of work in a wide range of different business sectors. In the energy sector, for example, Hitachi is developing energy management systems that manage distribution systems or distributed power generation, give access to information on carbon dioxide (CO_2), and coordinate demands. Similarly, for the equipment management sector, Hitachi is developing analysis services that support preventative and other maintenance. The
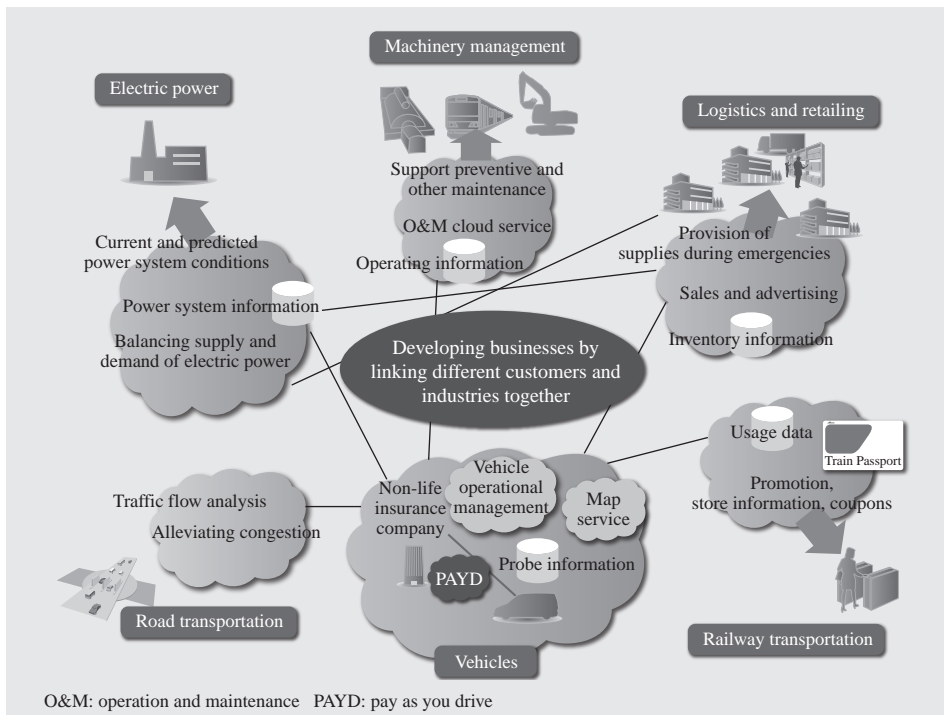
Fig. 1—Hitachi's Planned Big Data Services.
Hitachi is deploying big data services in fields such as electric power, machinery management, and marketing. It intends to create new businesses in the future by linking these data together.

objective is to add to the value that big data provides to different industries and service providers by allowing them to share and use data among themselves.

Data Services for Telematics Industry

Interest in the utilization of telematics data as a form of big data has also arisen in connection with the provision of new added-value services that complement safe and comfortable vehicle travel. However, there is a data acquisition cost associated with the collection and utilization of telematics data from vehicles. Also required are mechanisms for collecting the data. Establishing these separately for each company or service is impractical.

Hitachi is working on the development of services for appropriately hosting the telematics data held by vehicle manufacturers, and that utilize its own technology, know-how, and channels to provide efficient methods for the integrated use of this data across different applications.

HITACHI DATA PROCESSING AND DISTRIBUTION SERVICE FOR TELEMATICS
Service Overview

The data processing and distribution service for telematics launched by Hitachi is a cloud-based service that receives vehicle big data (records of vehicle use and other data collected by telematics communication units) from vehicle manufacturers, subjects it to structured analysis and other processing,

and then distributes it to companies that want to use it for the development of new services (see Fig. 2).

The service has been adopted as the integration system for utilizing data collected from Nissan LEAF[*1] electric vehicles (EVs) sold by Nissan Motor Co., Ltd. in the car insurance scheme introduced by Sompo Japan Insurance Inc. in July 2013. This is a pay-as-you-drive (PAYD) scheme in which policy holders pay for insurance based on their actual distance driven. In addition to this PAYD data delivery service, other services introduced by Hitachi in October 2013 provide probe information files and a probe information application programming interface (API) (see Fig. 3).

These services centrally receive and store the probe information collected by vehicle manufacturers from different regions and types of vehicles, and then convert it to the data formats required for distribution to the participating systems and services. By storing this collected probe information in a database and providing an API for accessing it, Hitachi operates a global service that provides participating service providers with easy access to this probe information.

Service Features

The service can be provided globally through a system built in the cloud. It includes a multilingual help desk with support available in Japanese, English,

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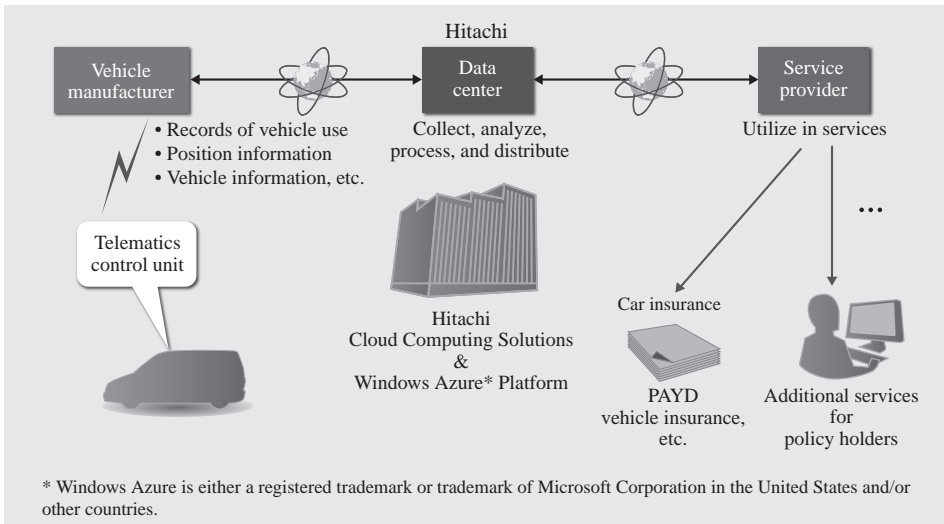*1 Nissan LEAF is a trademark of Nissan Motor Co., Ltd.

Fig. 2—Overview of Hitachi Data Processing and Distribution Service for Telematics.
This overview of how the service integrates shows the processes from collection of probe information (records of vehicle use and other information) from vehicle manufacturers through to its use by service providers.

and Chinese, is able to maintain 24-hour-a-day system operation, and can link to service providers in Japan and overseas.

The intention is to provide the following forms of added value to vehicle manufacturers, associated service providers, and others.

(1) Development of services using probe information API

An API is provided for extracting specified data based on different search criteria from the accumulated historic probe information. Service providers can use this API to operate services that use probe information.

(2) Use of probe information by vehicle manufacturer

Structural analysis is necessary for systems to use probe information. Hitachi supports the analysis of probe information by vehicle manufacturers through
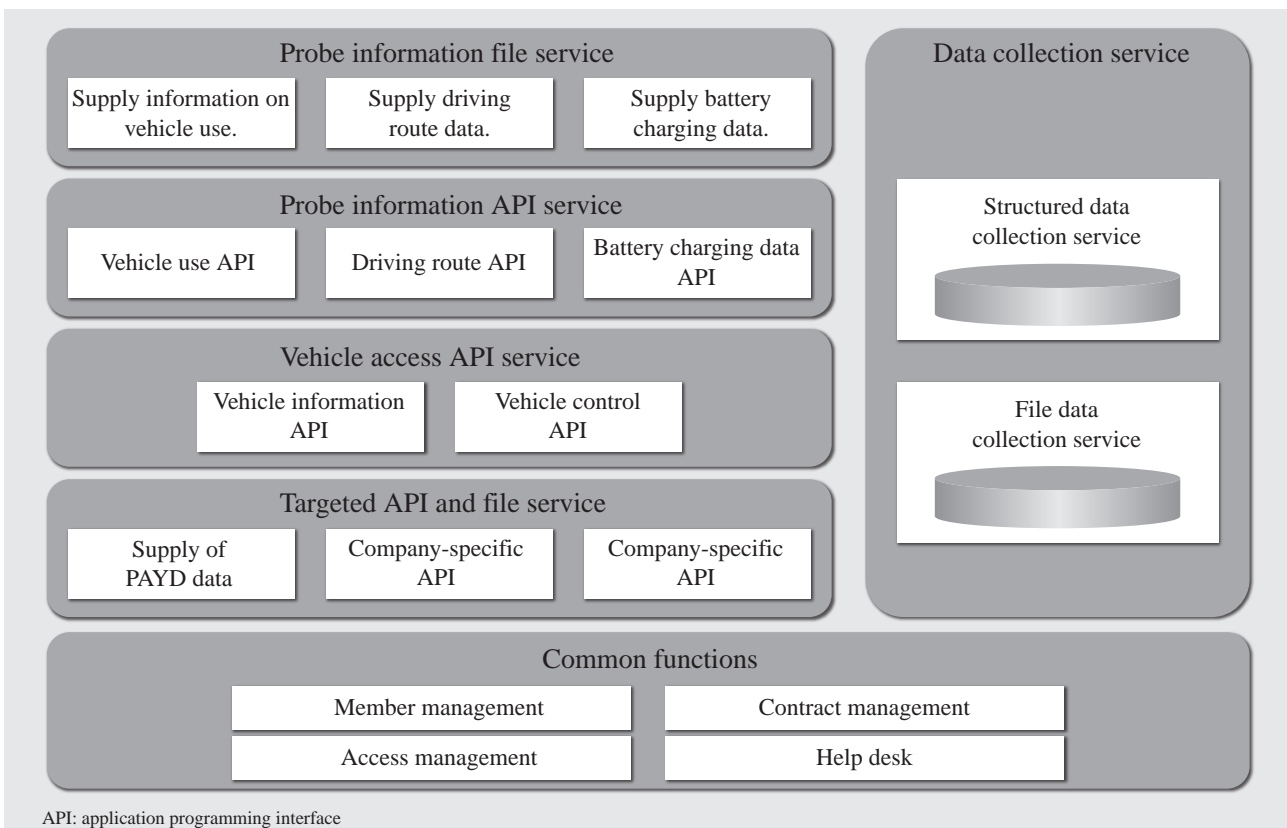

Fig. 3—Service Structure.
Hitachi data processing and distribution service for telematics has this structure.

providing file-based integrations for probe information that has undergone this structural analysis.

(3) Use of vehicle access API to improve convenience for vehicle owners

This uses an API for accessing vehicle information in realtime to provide service operators with added value such as tracking of stolen vehicles or battery charging control.

(4) Control of information supplied to each service operator

The vehicle manufacturer can control which data to make available to each service operator. It is possible to restrict each operator to only the minimum data they require, such as operators who only use speed data or charging data, for example.

(5) Storage of required data only

The service can limit collection of the various data contained in probe information to only those items used by services. This minimizes the potentially high costs of big data collection.

(6) Conditional processing of data

The service can process and deliver data based on the requirements of service providers.

IMPROVING SECURITY OF PERSONAL INFORMATION

Probe information includes the vehicle's identification number (VIN). Combined with other information, the VIN can be used to identify individuals. Although Hitachi does not keep information that could link VINs to individuals, it does treat VINs as personal information. The following functions are also provided for safeguarding personal information.

(1) Data use permission function

This ensures that only VIN data approved by the vehicle owner can be used, and only for specific applications. Data for which permission has not been obtained cannot be used.

(2) Encryption of personal information

Personal information is stored by the service in encrypted form. The data can be supplied to service providers in encrypted form.

(3) Communication encryption

Encrypted communication is used to distribute data. Data is protected by the use of secure sockets layer/transport layer security (SSL/TLS) and secure shell (SSH) when sent via the internet, and by security architecture for internet protocol (IPsec) when sent via virtual private network (VPN).

(4) Internal data storage network

Probe information and associated analysis results are collected and stored on an internal network with no direct access from outside. Hitachi has also installed intrusion detection system (IDS) for a demilitarized zone (DMZ) to monitor unauthorized access.

FUTURE SERVICE EXPANSION

Hitachi data processing and distribution service for telematics currently includes a service that supplies
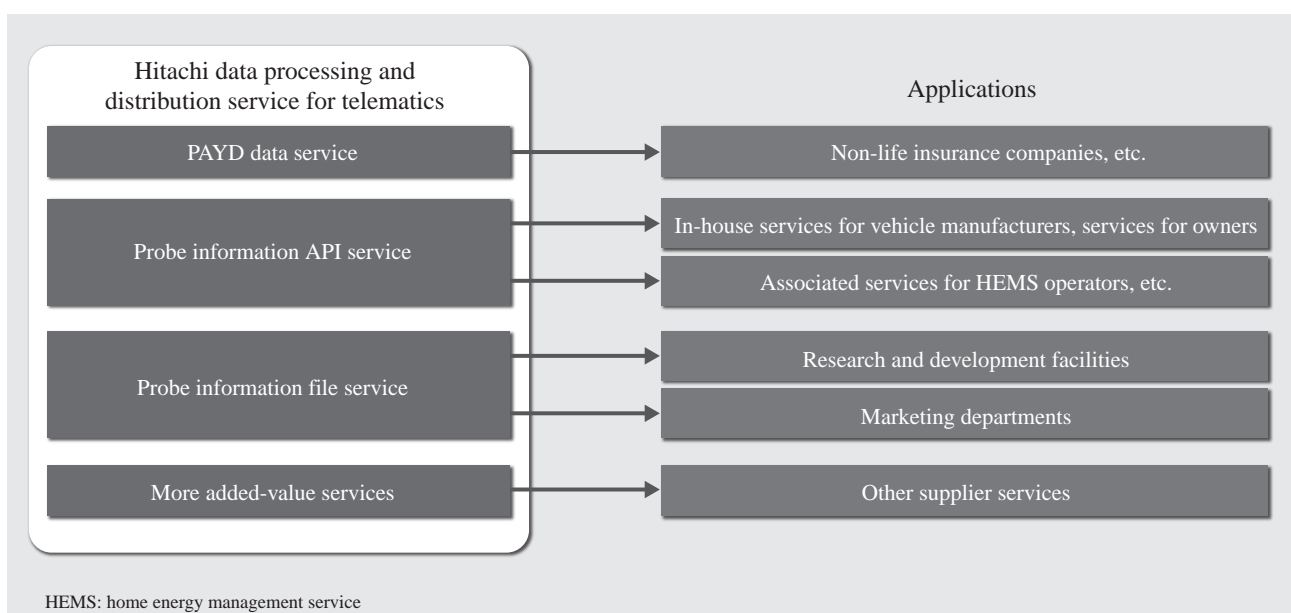

HEMS: home energy management service

Fig. 4—Future Service Expansion.
Hitachi is considering the progressive introduction of new services, such as services for HEMS operators.

PAYD data to insurers and a service that provides the probe information API.

In the future, Hitachi intends to expand into a series of new services, such as a service for HEMS operators that integrates with HEMSs to support the use of EVs for energy storage or the use of household batteries, and a data integration service that supplies data to marketing departments or research and development facilities that use probe information in product or new business development.

In addition to the processing and distribution of probe information, Hitachi is also considering services that integrate with other services such as logistics or operational management, or new cross-domain services that work in conjunction with other industries, such as telecommunications operators (see Fig. 4).

CONCLUSIONS

This article has described Hitachi data processing and distribution service for telematics that performs structural analysis and processing of probe information and other data collected from vehicles to make it suitable for use by service providers such as car insurance companies.

Hitachi is helping to raise the overall level of convenience in society by strengthening links with vehicle manufacturers and associated service providers to create new services.

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