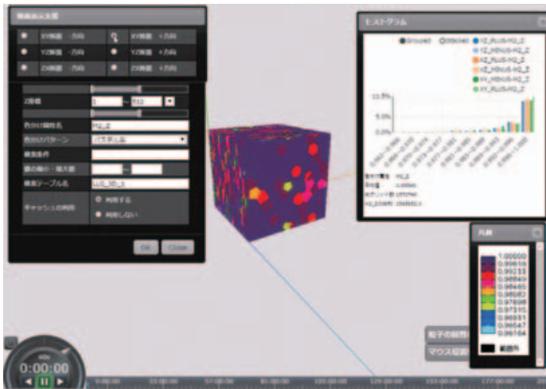


Public Sector Systems



1 3D representation of magnetic structure simulation data in magnetic material

1 Magnetic Material Database Visualization System

The magnetic material database visualization system is used to provide detailed analysis at nano-level accuracies for large volumes of simulation data and quantum beam experiment^{*1} data for magnetic structures inside magnetic materials and to display 3D representations in a web browser.

Because micro-size material composition and structure are analyzed at the nano-level in magnetic material development, the amount of data per material type is approximately 15 billion entries, which reaches a size of 7 terabytes (TB). Because considerable time is required to analyze and visualize large volumes of data, previously, analysis could be conducted only using average values and other estimated statistical quantities. With this system, however, the high-speed data access software Hitachi Advanced Data Binder Platform^{*2}, data integration and analysis platform software Pentaho, and the Hitachi Solutions geographical information system were used to enable rapid processing and visualization of data, and to enable the prediction and identification of factors leading to high performance

in magnetic materials. In addition, the data from quantum beam experiments can be analyzed and visualized to assess whether a certain magnetic material has the same magnetic structure as the simulation. This enables pre-experiment simulations and studies for higher efficiency in material development by reducing the number of experiments and related costs.

Looking ahead, this system will be used to enable more efficient development of new magnetic materials such as high-performance magnets for next-generation automobile motors in electric and hybrid vehicles.

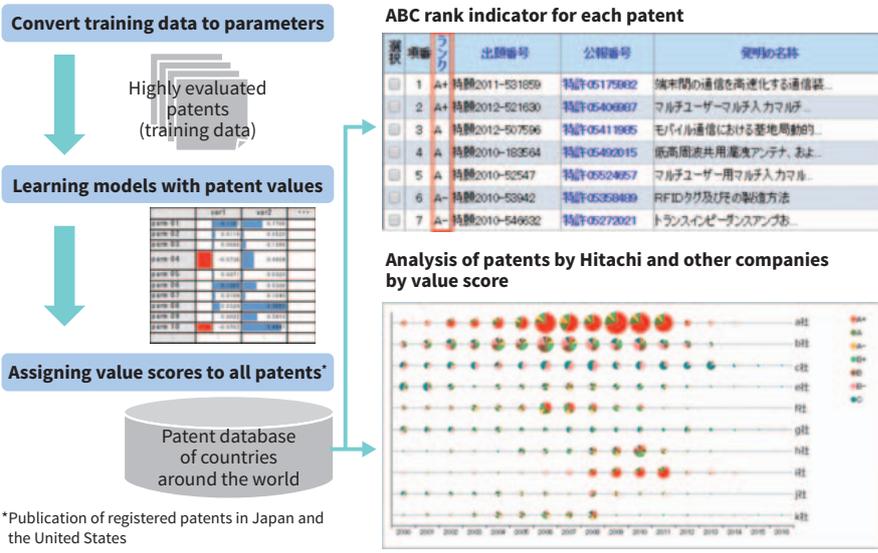
*1 Experiments where neutron and other beams are fired into materials to identify the atomic and molecular structures of the target material.

*2 Using the results of the “Development of the Fastest Database Engine for the Era of Very Large Database and Experiment and Evaluation of Strategic Social Services Enabled by the Database Engine Project” (Principal researcher: Masaru Kitsuregawa, Professor of the University of Tokyo and Director General of the National Institute of Informatics), which was supported by the Japanese Cabinet Office’s Funding Program for World-Leading Innovative R&D on Science and Technology.

2 Machine Learning for Higher-efficiency Intellectual Property Analysis

When making investment decisions in product development, intellectual property analysis is conducted using intellectual property information in the target technological field. For example, comparison of the number of patents, such as the number of patent applications and patents with valid rights, can be an indicator of how strong one company is in a given technology relative to other companies.

Hitachi’s Intellectual Property Database Search Service is an advanced patent search service available in Japan and over 90 countries worldwide. Recently, to provide a more advanced technical indicator for each company,



2 Overview of value scores in a patent search service

Hitachi has started using a value score as a new element for all patents in Japan and the United States. This value score for patents was calculated using a model of supervised machine learning. The training data in this model is information where highly evaluated patent bibliographies, main texts, and other sources from the general public are converted into numerical values. Whereas intellectual property analysis was previously conducted only by comparing the number of patents among different companies, adding this value element will enable more advanced comparisons.

Using the acquired knowledge, Hitachi also plans to provide new value to meet user needs, such as an auto-suggest feature for key technology information.

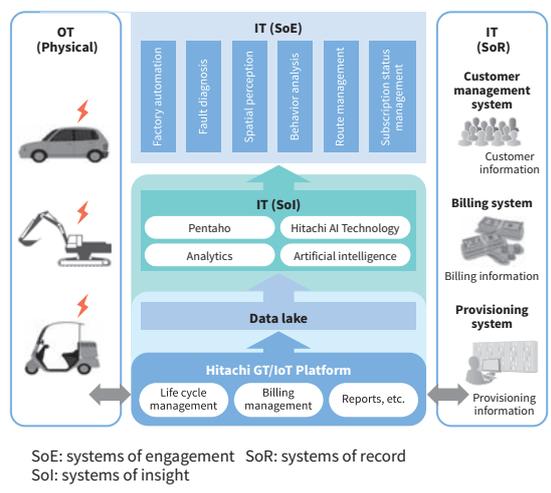
develop new services and solutions that create new value for the business.

The Hitachi Global Telecommunication for IoT Platform (GT/IoT Platform) enables centralized management of subscription information, billing information, reporting information, and other data from individual IoT devices. Hitachi GT/IoT Platform also allows coordination with machine data through operational technology (OT), and business data through IT.

The platform is currently scheduled for launch during FY2018. In the future, Hitachi GT/IoT Platform is expected to be used to collect a wide range of different information (data lake) and to utilize AI and analytics to support the development of new solutions that will contribute to the expansion of customers' businesses.

3 Hitachi Global Telecommunication for IoT Platform

Companies that are expanding their businesses globally are usually faced with problems such as centralized management of devices. Therefore, Hitachi is committed to innovating such business models using Internet of Things (IoT) technology. Using IoT technology, various devices from different regions can be centralized over an Internet connection, thus enabling a wide variety of information to be collected from these devices. This kind of information can be analyzed to boost productivity and to



3 Hitachi GT/IoT Platform architecture