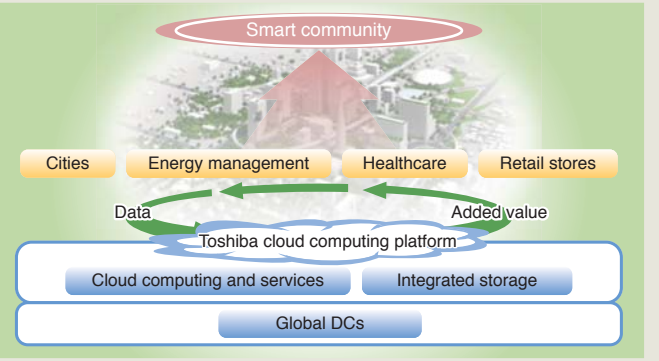
Global Cloud Computing Platform Services

The Toshiba Group, including its newly established businesses, is pursuing diverse smart community projects to provide solutions for global megatrends such as population growth, the advancement of the information society, and resource and energy problems.

To accommodate the unique requirements of various business sectors, we have developed global cloud computing platform services that provide flexible and highly available information and communication technology (ICT) resources.

Previously, our focus had been on improving efficiency by integrating data center (DC) resources and employing a single service-level agreement (SLA). In order to globally support various business sectors, we have enhanced our cloud computing platform as follows:



Overview of global cloud computing platform services

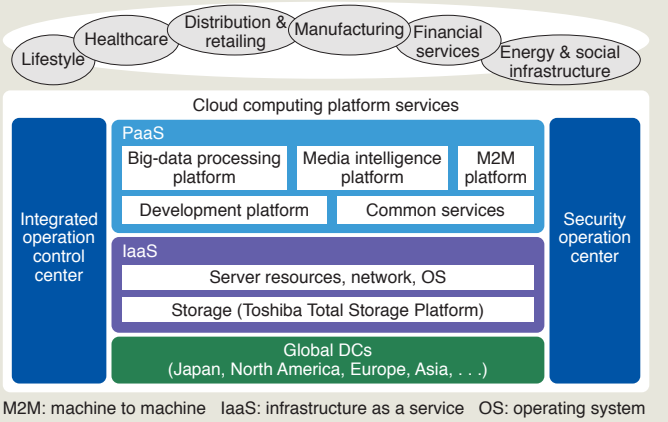
- Wide dispersion of resources
  An integrated operation center can now control and supervise all ICT resources throughout the world and support both DCs and end users, allowing applications and data to be dispersed over a wide area.
- Multiple SLAs
  Our platform provides templates for commonly used service scenarios and modular components, making it possible to respond flexibly to the needs of various systems and processes.
- Multiple cloud operators
  Because our platform is compliant with the industry's open cloud standards, it allows multiple systems to communicate easily across different cloud environments. Furthermore, we have established our own security operation center to reduce security risks.

The newly developed services have been released by our DC in North America (March 2013) and a newly established DC in Japan (November 2013). The services will also be made available from other DCs in Asia, Europe, and elsewhere.

Development of Cloud Computing Platform Services

Toshiba has developed highly reliable cloud computing platform services using its high-performance storage technologies, state-of-the-art servers, and high-availability software.

To provide cost-effective, high-speed storage services, the newly developed platform has hybrid storage that combines flash memory with hard disk drives (HDDs). We have established an integrated operation control center to deliver stable and agile utilization of applications and systems and to improve their levels of standardization and automation. In addition, a security operation center protects the cloud computing platform and applications running on it from potential security threats and various cyberattacks.



M2M: machine to machine IaaS: infrastructure as a service OS: operating system

Overview of cloud computing platform services

The newly developed cloud computing platform allows management standardization, common development environments, and application development standardization.

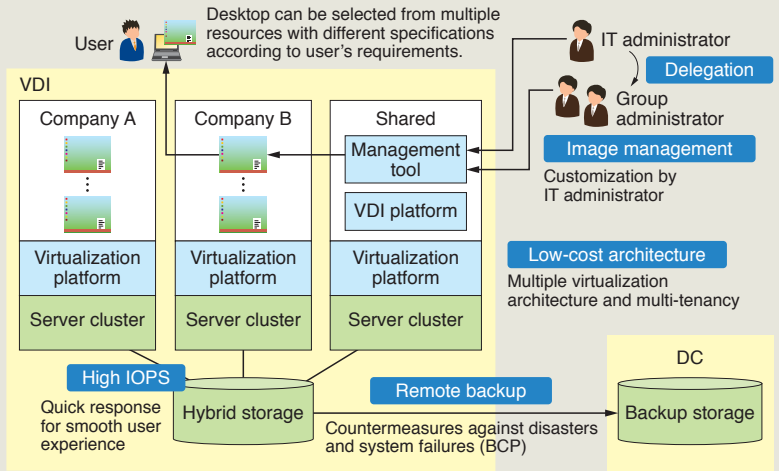
Furthermore, we are providing various common services in the form of "platform as a service" (PaaS) offerings, such as identity and log management. These PaaS offerings meet the requirements of "software as a service" (SaaS) developers including cost reduction, quality improvement, and swift application deployment.

Global Virtual Desktop Service for North American Market

Toshiba has launched the Global Virtual Desktop Service in North America as a flagship business-to-business (B2B) cloud computing service with the aim of achieving global service expansion in the future. The Global Virtual Desktop Service provides high-performance services at low cost by using hybrid storage that combines high-performance flash memory with high-capacity HDDs, as well as a multi-tenant architecture.

The advantages of this service include a flexible multipurpose service menu, highly reliable remote backup, and a user-friendly integrated management console for information technology (IT) administrators.

We will expand the service as a best-fit solution to meet the growing market demand for enhanced information security and business mobility.



VDI: virtual desktop infrastructure
IOPS: input/output operations per second
BCP: business continuity planning

Overview of Global Virtual Desktop Service for business use in North American market

New Hybrid Storage System Providing Optimal Balance between Performance and Capacity

Toshiba has released the Toshiba Total Storage Platform (TTSP), which achieves the optimal performance-capacity balance by means of hybrid storage combining flash memory with HDDs.

Our proprietary tiering technology combines the high-performance benefits of flash memory with the capacity benefits of HDDs.
It automatically stores frequently accessed data in the flash memory and moves less frequently accessed data to the HDDs. The percentage of flash memory utilization as a logical volume can be dynamically adjusted according to workload changes.

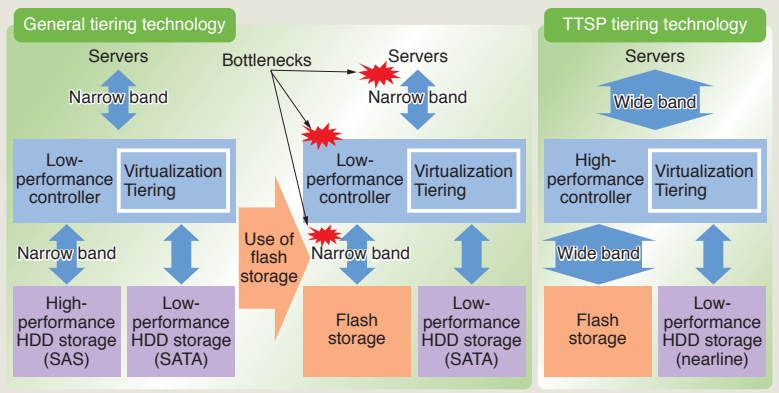
TTSP has a storage architecture that does not compromise the performance of flash memory, thus achieving a read/write performance of one million IOPS.

Storage incorporating Toshiba's proprietary storage technology

Flexible product lineup to meet various performance and capacity requirements

Dynamic volume management using storage tiering technology

Toshiba Total Storage Platform storage system



SAS: Serial Attached SCSI (Small Computer System Interface)
SATA: Serial Advanced Technology Attachment

Performance requirements for tiering flash storage

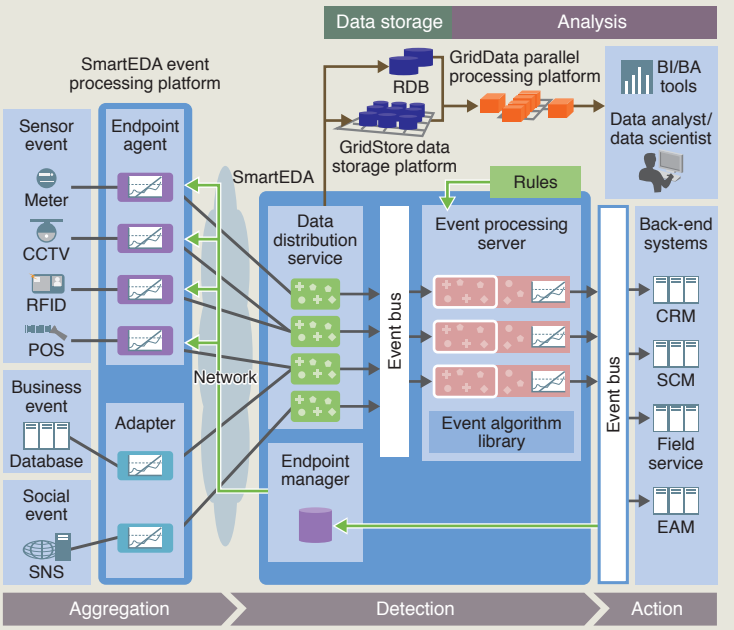
Integrated Big-Data Platform to Enhance Utilization of Big Data

The nonstop generation of unprecedentedly large volumes of data of various types has appeared as a trend in recent years. Innovative solutions are required to effectively process and utilize such big data.

In response to this situation, Toshiba Solutions Corporation has developed an integrated big-data platform that facilitates the appropriate handling of big data. The newly developed big-data platform makes it possible to store and retrieve petabytes of data at high speed, which is difficult to achieve with a conventional relational database management system (RDBMS). As a result, this platform provides a means of analyzing data that has not yet been tapped because of the existing limits on processing time and data volume. In addition, this platform makes it possible to detect early signs of, and predict the future occurrence of, events by identifying specific or abnormal patterns in large data sets, or changes in data in real time.

Consequently, the integrated big-data platform can accommodate various big-data applications such as failure prediction, risk prediction, customer navigation, power-saving navigation, supply and demand forecasting, and crime prevention.

1 petabyte: 10^{15} bytes



CCTV: closed-circuit television
RFID: radio-frequency identification
POS: point of sale
SNS: social networking service
RDB: relational database
BI: business intelligence
BA: business analytics
CRM: customer relationship management
SCM: supply chain management
EAM: enterprise asset management

Overview of integrated big-data platform architecture

Small Intelligent Gateway and Input/Output Devices for Smart Community and Industrial System Applications

In the field of supervisory and control systems for social infrastructure and industrial applications, there has recently been an accelerating shift from conventional on-premises systems to cloud systems. While on-premises software is mainly run on computers at the site of the organization concerned, cloud systems primarily run software on DC servers with “software as a service” (SaaS) and a scale-out architecture.

Gateway device I/O device

Gateway and I/O devices

In response to this shift, Toshiba Solutions Corporation has developed the following devices specifically designed for cloud applications: (1) a gateway device for linking a DC with client sites such as plants, buildings, and communities; and (2) an input/output (I/O) device for collecting data at client sites.

These devices provide features necessary to realize smart communities, including scale-out architecture, remote software upgrading, an intelligent function to ensure continued running in the event of network disconnection, and middleware for the development of distributed system applications.

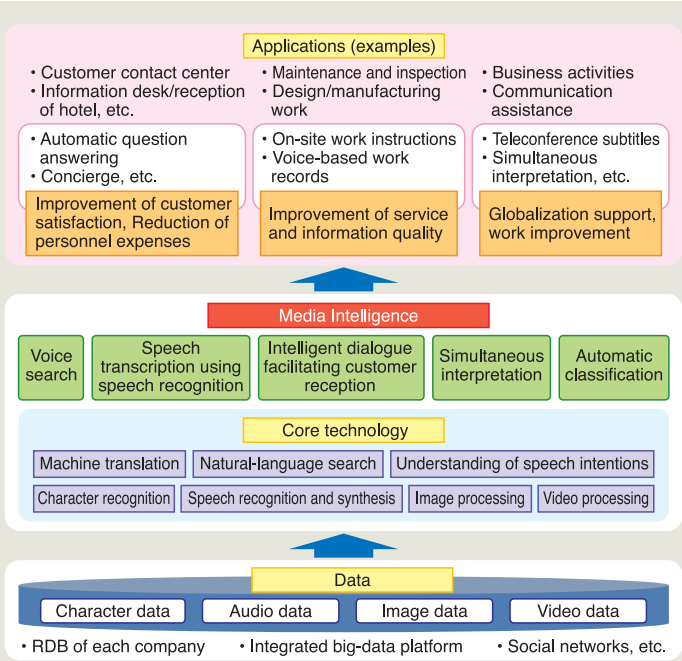
As a result, the newly developed devices allow centralized administration in a cloud DC, which helps to reduce initial and operating system costs. They also make it possible for cloud systems to offer high-value-added services such as interaction with other systems and big-data mining.

Media Intelligence Technologies

Toshiba Solutions Corporation is developing technologies for “media intelligence” (use of knowledge), as well as products using these technologies. Media intelligence combines voice synthesis, speech recognition, image recognition, and other forms of media processing with knowledge processing in order to understand and analyze the meanings possessed by such data.

We have released a speech synthesis engine, a voice recognition engine, and utility software that can be run not only on-premises at client sites but also in cloud platforms to provide various solutions and services. These products can be used to enhance conventional services and create new solutions.

In the future, we will develop simultaneous interpretation, intelligent dialogue, and other language-related technologies that incorporate machine translation and smart dialogue, as well as products using these technologies. Furthermore, we will develop media intelligence products that interact with a big-data platform to allow further knowledge storage and analysis.



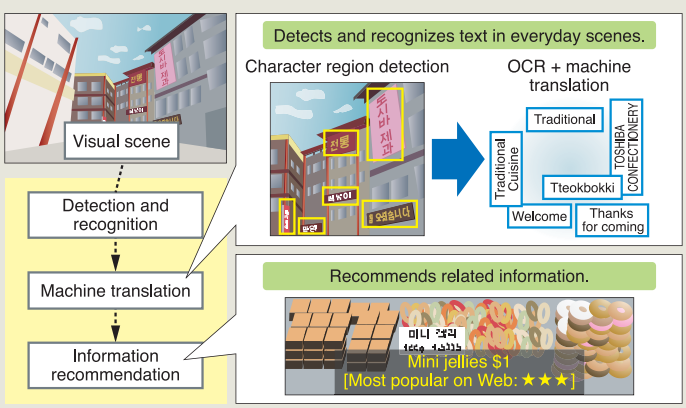
Configuration of Media Intelligence services integrating media- and knowledge-processing technologies

Multilanguage OCR Engine for 26 Languages

Toshiba Solutions Corporation has developed a multilanguage optical character recognition (OCR) software engine that supports 26 commonly used languages(*), including those using European alphabets such as Cyrillic and Greek and those of the East Asian region such as Japanese, Chinese, and Hangul. It can be extended to cover more than 150 languages with a slight enhancement.

At present, we are developing a “personal assistant” technology that supports character recognition in images of natural scenes using the newly developed OCR software. This technology is designed to provide users with convenient information. In a confectionery shop, for example, the personal assistant can be used to recognize the name of a candy if the user simply takes its image with a smartphone. The personal assistant accomplishes this by reading its tag with the OCR software. Additionally, it automatically searches for customer testimonials about that candy and shows them on the smartphone. Thus, it helps the user to find the most popular candy at the shop. Scene text recognition is the key to successful scene understanding because text in a scene image has significant information necessary for correct scene understanding.

We are also developing other major applications using the newly developed OCR software.



Example of application of multilanguage OCR engine

(*) Japanese, Chinese (simplified, traditional), Korean (Hangul), English, German, French, Spanish, Dutch, Italian, Portuguese, Russian, Greek, and 13 other European languages