Social Infrastructure
▶ **Solution Services**

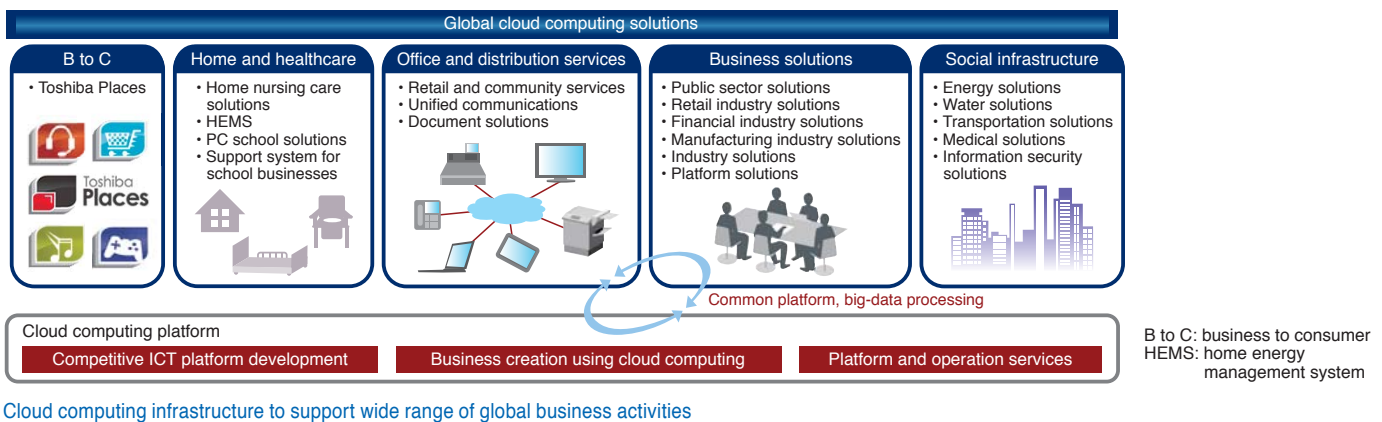## Approach to Cloud Computing and Solutions Business

Toshiba is making continuous efforts to introduce a cross-departmental approach in order to provide information and communication technology (ICT) platforms optimized for global business activities, develop competitive ICT solutions based on core technologies of the Toshiba Group, and create and promote a variety of cloud computing business activities toward realizing smart communities.

Specifically, we are taking the initiative in developing the following core technologies:

- a state-of-the-art flash storage system with input/output (I/O) capabilities more than 10 times faster than conventional technologies

- a big-data processing platform consisting of a database system with data storage capacity on the order of petabytes (peta: 10^{15}), the capability to scale out to more than 1 000 servers, and a complex event processing system to provide high performance when processing huge amounts of information from sensors

- a proxy re-encryption scheme to store and share data securely, including on the Internet.

Cloud computing is a technology indispensable for business development not only in the industrialized world but also in developing countries. From the viewpoint of global business deployment, we are aiming to evolve information platforms to support social infrastructures and smart communities through the expansion of ICT infrastructures, cloud computing platforms, and solution services.

Global cloud computing solutions

B to C	Home and healthcare	Office and distribution services	Business solutions	Social infrastructure
· Toshiba Places	· Home nursing care solutions · HEMS · PC school solutions · Support system for school businesses	· Retail and community services · Unified communications · Document solutions	· Public sector solutions · Retail industry solutions · Financial industry solutions · Manufacturing industry solutions · Industry solutions · Platform solutions	· Energy solutions · Water solutions · Transportation solutions · Medical solutions · Information security solutions

Common platform, big-data processing

Cloud computing platform

Competitive ICT platform development	Business creation using cloud computing	Platform and operation services

B to C: business to consumer
HEMS: home energy management system

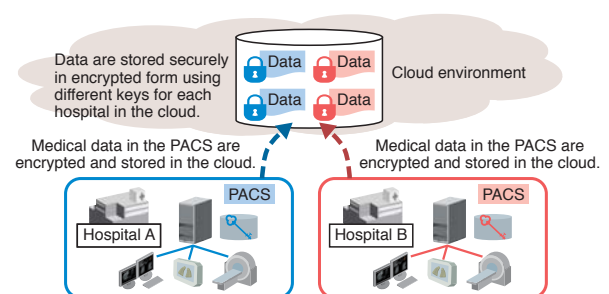**Cloud computing infrastructure to support wide range of global business activities**

Secure Data Archive Data Management Service for Medical and Healthcare Market

A secure data archive is a data management service that safely stores critical data including medical data, which are conventionally stored in on-premises systems, in the cloud. Toshiba has developed a highly secure mechanism to store and encrypt data in cloud-based storage with a robustness of 99.999 999 999% (referred to as "eleven-nine").

This product is provided as a software development kit (SDK) to be embedded in applications, or an application running on Windows® software. Taking advantage of the high reliability and large capacity of cloud-based storage, the secure data archive data management service not only offers data backup but also avoids the risk of data loss in the event of a disaster.

As this service complies with the guidelines of Japan's Ministry of Economy, Trade and Industry for the external storage of medical data, Toshiba Medical Systems Corporation has adopted it for its picture archiving and

Data are stored securely in encrypted form using different keys for each hospital in the cloud. / Cloud environment

Medical data in the PACS are encrypted and stored in the cloud.

Hospital A / Hospital B / PACS

Overview of secure data archive data management service

communication system (PACS) as an optional external storage service and has already delivered it to a number of hospitals.

Furthermore, the secure data archive can be developed into two types of services: a network camera recording service and a medical image communication service. These services can help doctors to improve their skills and review their treatment policies.

Windows is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.
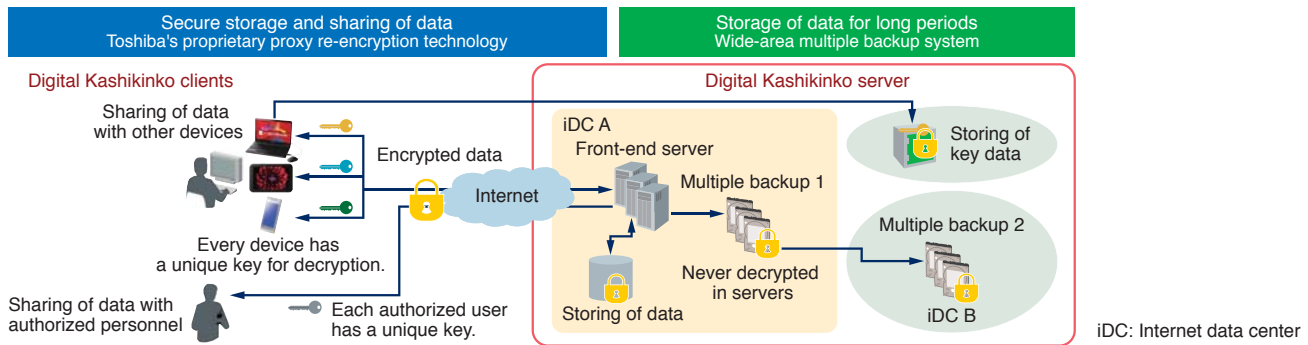
Online Cloud Storage Service Targeting Consumers

Toshiba has developed a highly reliable and secure cloud storage (online data storage) platform capable of holding personal data securely for long periods, featuring both a wide-area multiple backup system and a proxy re-encryption technology. We have applied this platform to our paid service for consumers named "Digital Kashikinko" (*kashikinko* is a Japanese word meaning "safe-deposit box").

Digital Kashikinko offers users extremely reliable data safekeeping with a non-stressful response time by utilizing real-time data replication and scheduled data backup of multiple, geographically separated data centers to avoid the risk of data loss in the event of a disaster. Users can encrypt data before uploading them using our proprietary proxy re-encryption technology, and data stored in this service cannot be decrypted by unauthorized users due to the system's high level of data protection. Furthermore, data exchanges between users are only permitted for personnel authorized by the main user.

Digital Kashikinko is a user-friendly, high-security data-sharing system for storing the valuable data of individuals, such as photos, insurance policies, and so on. We are also planning to launch this service in overseas markets in the near future.

Overview of Digital Kashikinko online cloud storage service targeting consumers

ACBioMeister™ Secure Online Biometric Authentication Solution

Toshiba Solutions Corporation has launched ACBioMeister™, the world's first secure online biometric authentication solution(*) compliant with the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) 24761:2009 standard specifying the Authentication Context for Biometrics (ACBio). ACBio is a supplementary technology for biometrics that was invented by us and internationally standardized under our leadership, designed to solve technical issues related to biometrics in the open network environment and to allow biometrics to be used even on the Internet. ACBio realizes secure and privacy-conscious online biometric authentication without the need for users to enroll and send their biometric data to authentication servers over the network, both for registration and authentication.

With the combination of ACBioMeister™ and biometric authentication products using an embedded camera on smart devices such as smartphones and tablets, biometric authentication with ACBio is now being applied to authentication in real systems for remote access to corporate internal networks and is also planned for use in authentication in various online services.

(∗) As of August 2012 (as researched by Toshiba Solutions Corporation)
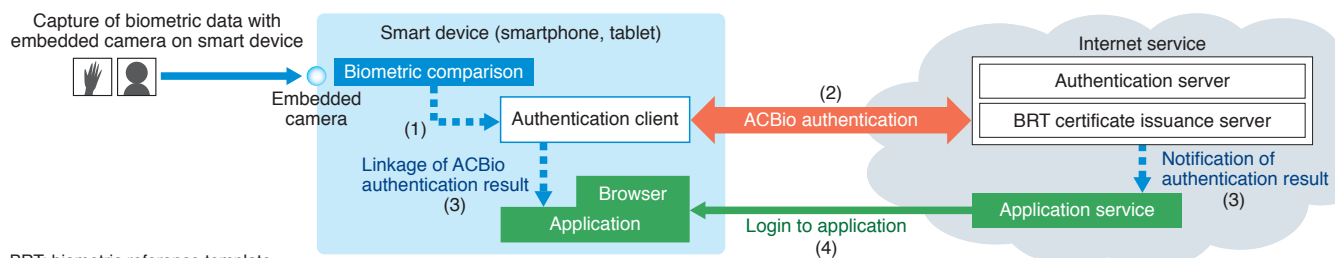
Outline of ACBioMeister™

PQTMeister™ Quality Control and Traceability Solution for High-Tech and Automobile Industries

Quality is an important factor in determining corporate image in the automobile and other industries. With the increasing awareness of safety and security, it is critical for manufacturers to provide prompt and appropriate measures against problems caused by defective products. In the event of a problem, it is essential to reduce the time required for investigation by rapidly identifying products to be recalled from the lot and manufacturing numbers and clarifying the causes and countermeasures.

Toshiba Solutions Corporation has developed PQTMeister™, a quality control and traceability solution for high-tech and automobile industries, which provides a tracing system for manufacturers. PQTMeister™ can minimize risks so as to prevent damage to a corporation's reputation, and also minimize financial losses by clarifying the necessary countermeasures in the event of a problem. With these features, PQTMeister™ strongly supports the improvement of corporate values.
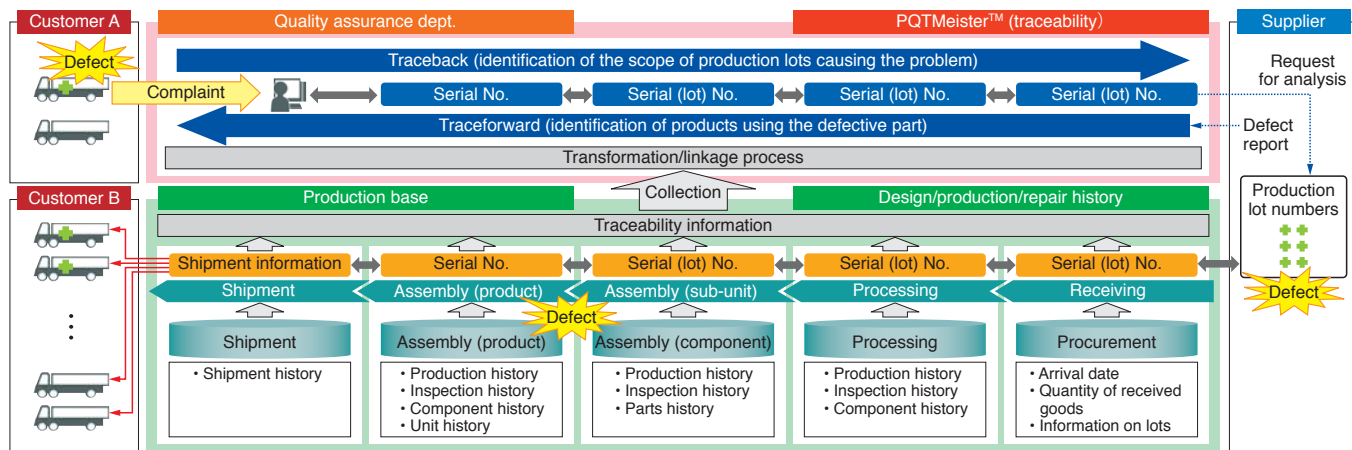

Overview of application of PQTMeister™

LADOCSuite™ Warehouse Management System for Global Logistics

Toshiba Solutions Corporation has developed LADOCSuite™, a warehouse management system (WMS) that easily handles global logistics at low cost through multilingualization and cloud services, based on physical distribution know-how cultivated by the Toshiba Group over many years.

English, Japanese, and Chinese languages are supported as a standard feature, and other languages can be added within a short period by means of a language dictionary system. As well as the basic WMS functions, LADOCSuite™ provides a vehicle dispatching function to control the dispatch of cargos and vehicles without the need for a separate transportation management system. LADOCSuite™ is capable of performing jobs that differ from warehouse to warehouse simply by changing the parameters, thus reducing the cost of application development.

LADOCSuite™ offers strategic logistics to users, allowing them to dramatically improve their business competitiveness.
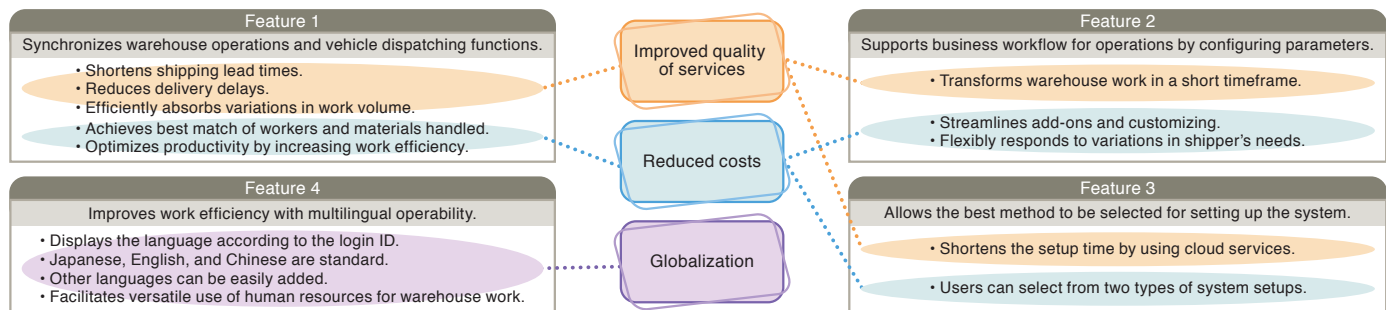
ID: identification

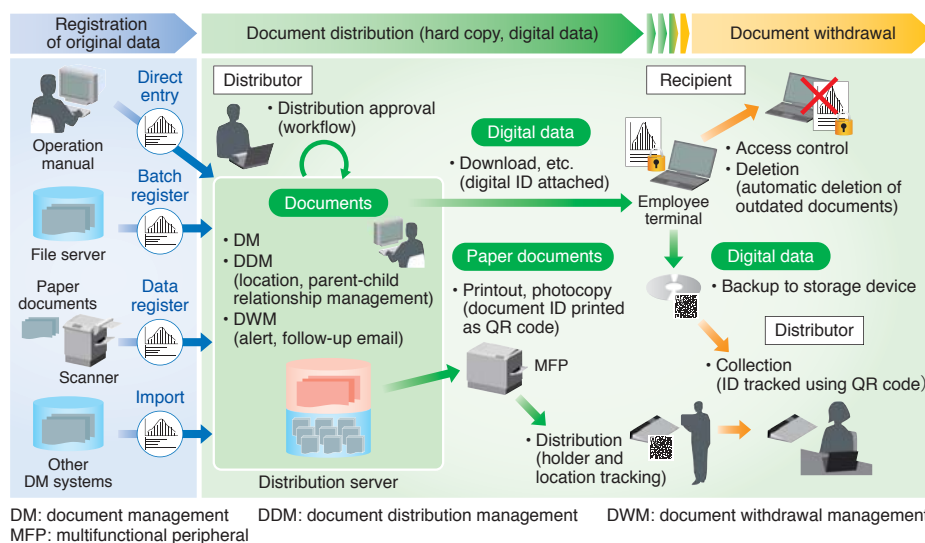Concept and features of LADOCSuite™

47

inforester™ Controlled Document Distribution and Tracking Solution

As documents including both masters and their copies are used in various forms, such as physical papers, digital files, and other media, across company departments, it is crucial to properly track and control these documents. To cite two examples, the use of an outdated operation manual in the manufacturing industry could result in a serious accident including personal injury, while in the pharmaceutical industry and other strictly regulated industries, the use of inappropriate standard operating procedures (SOPs) could possibly be considered an illegal act.

To deal with these problems, Toshiba Solutions Corporation has developed inforester™, a controlled document distribution and tracking solution for the manufacturing industry to track all documents distributed in various forms. In this solution, a unique identification (ID) is issued and attached to each document when it is distributed or a copy of it is made. Holders of the documents and their locations are also recorded in a distribution server. Furthermore, this solution offers tracking of the "parent-child relationship" between an original (parent) document and copied (child)

documents, and the status of these documents recording whether they have been withdrawn or deleted. It also handles document permission control. A user's permission to, for example, make a copy or view a document is given not only according to the user's authority but also the time and place in which the action is to be taken.

inforester™ assists users in controlling all documents circulating in their organization, to ensure that the right document is at the right point of use at the right time. It also helps users to achieve better management of SOPs and to be constantly prepared for inspections and audits.

DM: document management   DDM: document distribution management   DWM: document withdrawal management
MFP: multifunctional peripheral

Outline of inforester™

OCR2000i Model 3500 Suitable for Handling Large Batches of Various Types of Sheets

Toshiba Solutions Corporation has developed the OCR2000i model 3500 optical character reader (OCR) system, suitable for handling large batches of various types of sheets. It is ideal for data entry operations in financial-sector institutions such as banks and insurance companies, as well as the distribution industry. This model can read at a speed of 200 sheets per minute[*1], which is the fastest class among desktop type OCR systems in Japan[*2].

To meet operating needs for reading oversized sheets, this model supports the use of 458 mm-long sheets (longer than A3), and can also be configured to support 630 mm-long sheets (1.5 times the length of A3) as an option.

Color scanning and highly efficient feeding and paper

OCR2000i model 3500 desktop type OCR

handling technologies allow this model to read various types of sheets including multicolor sheets, thin sheets such as non-carbon copy paper, thick sheets such as postcards, and clear folders.

(*1) When recognizing 300 handwritten numeric characters (30 characters × 10 lines) on one A4 (landscape) sheet

(*2) As of October 2012 (as researched by Toshiba Solutions Corporation)