

The trend toward open networks that allow integrated operation of different computer systems has spurred technological advances in desktop computers and networks. These, in turn, have contributed to business process re-engineering and the downsizing of information systems. In addition, information exchange through the Internet is steadily expanding among both businesses and individuals. In the field of mobile communications, use of car phones and portable cellular phones is growing worldwide. Toshiba is a leading provider of these and other information and communication systems for multimedia applications.

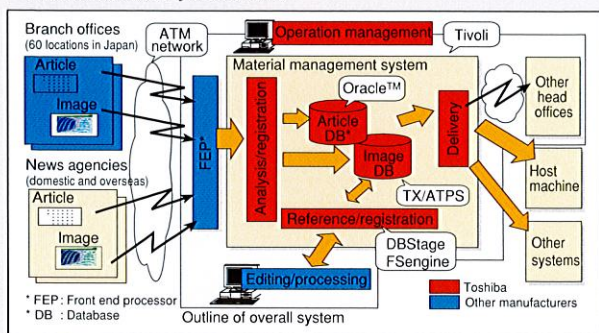
Material Management System for The Yomiuri Shimbun

In September 1997, The Yomiuri Shimbun Co. began full operation of a material management system that integrates collection and delivery of articles and images, as well as image processing, all of which had previously been carried out by separate systems. This multivendor system not only enables unified management and processing of the materials necessary for newspaper composition, including articles and images from four head offices, but also allows them to be sent to the company's multimedia systems, English-language newspaper and general database.

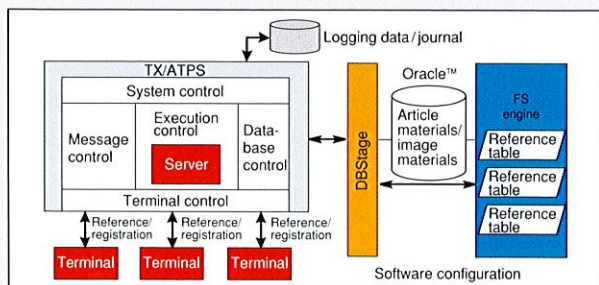
As managing company for this project, Toshiba oversaw arrangements for the entire system and developed core subsystems, including article and image databases and delivery. For development, Toshiba used new middleware such as TX/ATPS, Tivoli and high availability (HA), which are open technologies based on UNIX® (UX 7000), to improve data security and system reliability. The database uses Oracle™, FSEngine and DBStage to enable faster keyword searches.

"UNIX" is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

"Oracle" is a registered trademark of Oracle Corporation, Menlo Park, California, USA.



Outline of overall system



Software configuration

Overseas Model GS200W Global Network Server

As the first stage of its plan to expand sales of the GS series of PC servers to markets outside Japan, Toshiba introduced the GS200W server in the United States in March 1998. The GS200W is positioned as an entry-class server that offers the high availability of midrange-class models.

The domestic model offers technology for high reliability (ECC, RAID, hot swappable redundant power supplies); high performance (state-of-the-art MPU, Pentium®II/300MHz, maximum two CPUs); and expandability (maximum four hot swappable, internal 3.5-inch hard disk drives). For sales in the U.S., Toshiba America Information Systems, Inc. improved on the above by adding a new design, enhanced user accessibility and high-density mounting technology for a more compact product.

The U.S. model GS200W is superior to competing entry-class servers in size, redundant power supplies and the number of internal hot swappable hard disk drives.

"Pentium" is a registered trademark of Intel Corporation.



Overseas model GS200W global network server

Substation and Wide-Area Control System for Trans-Tokyo Bay Highway

Opened in December 1997, the Trans-Tokyo Bay Highway consists of a 10km tunnel and 5km bridge that connect Kawasaki in Kanagawa Prefecture with Kisarazu in Chiba Prefecture. Toshiba delivered a 66kV substation for the project and worked on the wide-area control system.

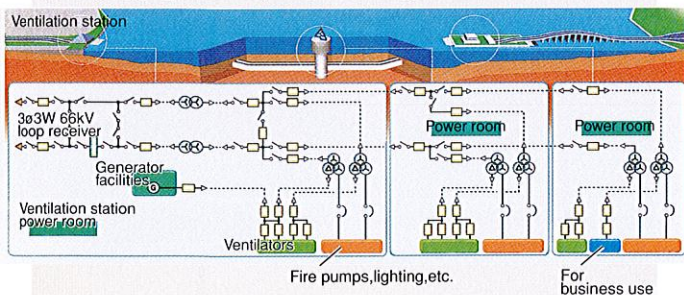
The substation receives power from a 66kV loop line, steps the voltage down to 22kV, then distributes it over two circuits to the ventilation station in Kawasaki and power room in Kisarazu. The power system is composed of individual blocks which can be shut down for maintenance without affecting the operation of the overall system. Primary substation equipment includes cubicle-type gas-insulated switchgear (C-GIS), a DII-type digital relay for the protective relay system, and MCR25 multi-relay for state-of-the-art switchgear used in the distribution system.

The PCS6000 process control system used to monitor these facilities is installed in each power room and connected with local transmission facilities inside the tunnel. The BUILDAC-GF system installed in the Kisarazu power room monitors operation of the substations. In addition, a wide-area control system in the Tokyo Second Operation Bureau of the Japan Highway Public Corporation carries out intensive monitoring of all tunnel facilities.

The wide-area control system is also used on key roads including the Tohoku and Joban highways and a major highway encircling Tokyo. Equipment for the Trans-Tokyo Bay Highway accounts for about 15,000 of the approximately 60,000 points controlled by this system. Information is displayed on an operator console composed of four 70-inch super projection systems and eight CRTs.



Control room



Power distribution system diagram

Development and In-Orbit Experimental Operation of MFD System

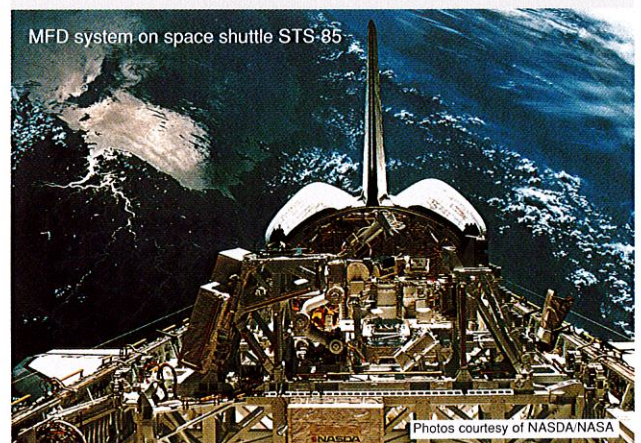
The Manipulator Flight Demonstration (MFD) system, developed by Toshiba under contract from the National Space Development Agency of Japan (NASDA), was



Astronaut Jan Davis operating MFD arm

launched on board space shuttle STS-85 from Kennedy Space Center of the National Aeronautics and Space Administration (NASA) in the United States on August 7, 1997 (10:41 local time, 23:41 Japan Standard Time). Experimental manual exchange of a dummy orbit replacement unit (ORU) by crew, opening and closing of the door by autonomous robot control, and remote control operation of the arm by ground command were all successful.

The purpose of the MFD project is to carry out in-orbit experimental operation of the small fine arm (SFA) of the Japanese Experimental Module Remote Manipulator System (JEMRMS) to collect essential data that can only be obtained under weightless conditions. Many fundamental technologies for future space robotics and dexterous manipulators were demonstrated and verified during this first MFD test in orbit, including compliance control (control of the force and torque applied by the robot arm), autonomous programmed control, safety features such as collision avoidance and tolerance, and ground control operations. The project also collected a wealth of data on robotics applications for the International Space Station (ISS).



MFD system on space shuttle STS-85

Photos courtesy of NASDA/NASA

DNCWARE Distributed Node Cooperation Software

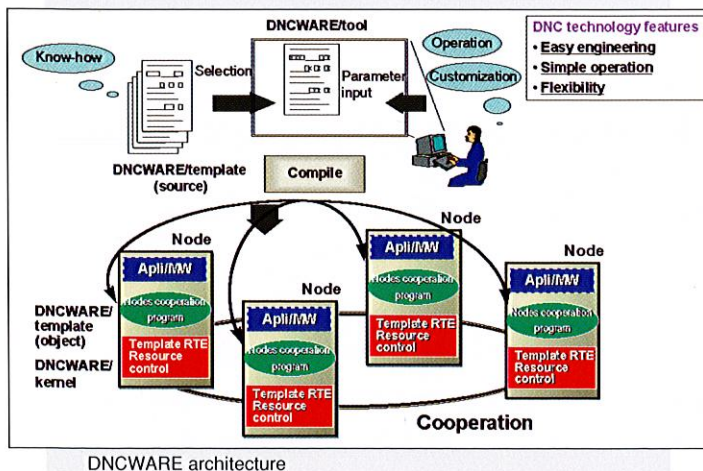
DNCWARE is a cluster software product for building a highly available, scalable system in a distributed computing environment. At present, Toshiba offers two DNCWARE products: DNCWARE for HA, which stands for high availability; and DNCWARE for OPS, which stands for Oracle® Parallel Server.

DNCWARE offers the following features:

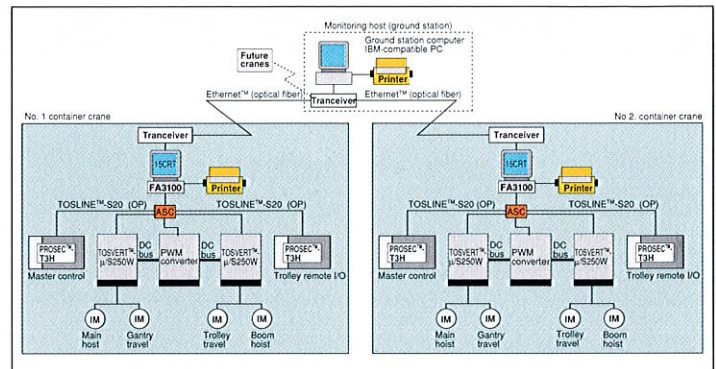
- Easy engineering: Cluster systems can be easily built by simply setting up parameters with DNCWARE/template technology.
- Simple operation: Users can use a World Wide Web (WWW) browser to easily build and maintain their cluster systems with DNCWARE/tool, a Java-based graphic user interface (GUI) tool.
- Flexibility: DNCWARE supports multiple platforms (UNIX®, Windows NT®), and can provide clustering in multivendor environments.

"Java" is a trademark or registered trademark of Sun Microsystems, Inc. in the U.S. and other countries.

"Windows NT" is a registered trademark of Microsoft Corporation.



Integrated Control System for Quayside Container Crane



System configuration of AC drive

Toshiba's integrated control system for quayside container cranes consists of a motor drive, PLC, crane management monitoring system (CMMS) and electronic anti-sway control. All control equipment uses state-of-the-art digital control technology and is interfaced through a high-speed LAN (TOSLINE™-S20).

Toshiba offers both AC and DC drives. The company's TOSVERT™-μ/S250W AC drive is available for panamax to super post-panamax cranes. The TOSVERT™-PS20W PWM common converter keeps the input power factor at almost 1.0, minimizes harmonic currents and regenerates motor braking power to the AC supply line.

The PROSECT™-T3H PLC consists of two high-speed processors and provides a user-friendly programming tool called T-PDS.

The FA3100 industrial personal computer is suitable for CMMS use, because it offers 24-hour operation, high speed and high performance using an Intel Pentium® processor with Windows NT®.

Toshiba's original electronic anti-sway control system improves handling efficiency and makes container terminals more competitive. The anti-sway control system can be easily added to an existing crane because the system is controlled by the PROSECT™-T3H PLC and is independent from the trolley drive panel.

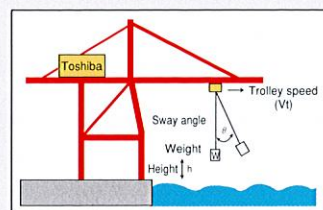
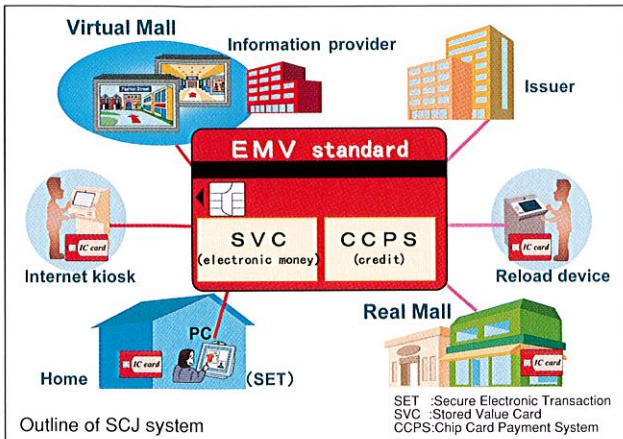


Image of anti-sway control

"Ethernet" is a registered trademark of Xerox Corporation.

Electronic Commerce Pilot Study



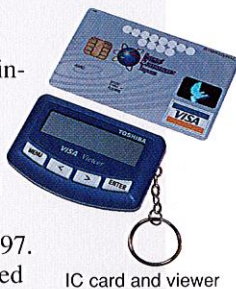
Outline of SCJ system

Smart Commerce Japan (SCJ), a consortium established to develop electronic commerce technology and managed primarily by Toshiba and Visa International, has launched test operation of in-store and in-cyberspace electronic commerce. The in-store electronic commerce (called “real mall”) pilot study began in Kobe, Japan in October 1997, followed by in-cyberspace electronic commerce (called “virtual mall”) in November 1997.

Secure and highly functional integrated circuit (IC) cards for both credit card and electronic money functions employ the EMV standard*.

This pilot study is a test of the world’s first combined system that allows use of an IC card to pay for goods both on the Internet and at actual stores. Equipment for the electronic commerce system has also been developed for the test.

The scale of the pilot study and equipment used is as follows: 30,000 IC cards; 30 reload devices (electronic money cash dispensers); 25,000 Visa viewers, (pocket-sized personal readers); 1,000 PC reader/writers with personal identification number (PIN) pads; 30 Internet kiosks (terminals for access to the virtual mall on the Internet); and approximately 1,000 retail terminals for IC credit and Visa cash transactions.



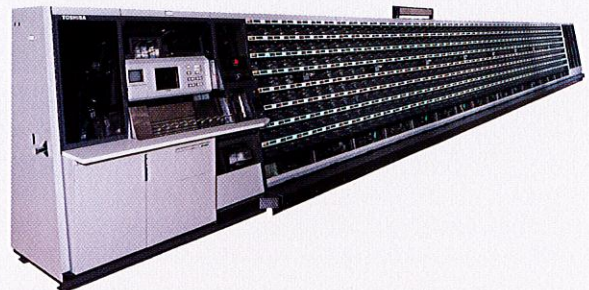
Reload device

* The EMV (Europay, MasterCard and Visa) standard refers to the specifications for IC card payment.

TT-200 OCR Letter-Sorting Machine for New Mail Handling System

A new seven-digit postal code system was introduced in Japan in February 1998. In anticipation of the major changes in mail sorting under the new system, Toshiba developed an optical character reader (OCR) letter-sorting machine in 1995. A trial machine was delivered to the Ministry of Posts and Telecommunications to verify its functions and capabilities using actual mail.

In 1997, Toshiba developed and delivered a new letter-sorting machine that incorporates improvements based on those test results. New features include improved address-reading capability, a large-sized display to facilitate system monitoring and reinforced video coding system operating functions.



TT-200 OCR letter-sorting machine with carrier sequence function