

# TOSHIBA REVIEW

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### Utilization of Information Technology in Thermal Power Plants

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## Special Reports-1

### IT Platform Services

#### \*IT Platform Services Supporting Strategic Information Systems

BANNAI Akira

#### \*Concept and Service Menu of IT Platform Services

IWASAKI Motokazu TANAKA Hiroshi SUENAGA Tsukasa

The rapid progress of information technology (IT) and variety of requirements for IT systems have made IT platforms more complex. High-level know-how is therefore necessary in order to integrate and maintain the optimal platform for the user.

Toshiba provides IT platform services to support the system life cycle, including system diagnosis, consulting, integration, operation, and maintenance.

#### \*Web Platform Services

FUNAKI Ryoichi WATANABE Shigeki

With the rapid advances in Internet-based technologies, Web systems are becoming a fundamental infrastructure in e-business and corporate information systems. Success in building a Web system requires a broad knowledge in various fields, including Internet standards and technologies (J2EE, XML, Web services, etc.) and application development techniques (UML, frameworks, development methodologies, etc.). Moreover, Web systems consist of various components, including Web servers, application servers, and database servers. This complex structure makes knowledge and experience a critical factor in identifying causes of errors and performance problems.

Toshiba is providing customers with Web platform services, integrating our expertise and experience in building Web systems, together with the latest technologies, into a convenient series of services.

#### \*IT Platform Diagnosis and Evaluation Services

SAKAI Yasuyuki SATO Ryoji

In today's world, when practical utilization of information technology (IT) is directly linked to business opportunities, degradation in the performance of an information system has a significant impact on business operations and productivity. Sound operation and enhancement of information systems and their maintenance are therefore becoming important management issues.

To realize the optimal system life cycle, early discovery of problems and the implementation of appropriate countermeasures are required. These are achieved by performing periodical diagnosis of the IT platform on which the system is based.

#### \*Computer and Storage Platform Services

KOTOYA Shuhei FUSE Shinichi NAKAGAWA Manabu

Toshiba's computer and storage platform service provides consulting, planning, design, installation, construction, and maintenance services for computer platforms, including computers, storage devices, operating systems, and middleware, throughout the system life cycle. By periodically utilizing this service, users and system integrators can obtain the appropriate platform for their needs.

#### \*System Management Services

YAMADA Hiroya HANAI Katsuyuki

Toshiba provides total services required for system management solutions. These services consist of system planning and design, system configuration and deployment, and system operation and maintenance. The customer's problems are solved by utilizing these system management services in a cycle.

#### \*Security Platform Services

SHINDOH Kiyoshi KOBAYASHI Hidehiko

One of the information technology platform services is the security platform service. If 10 people are asked the meaning of the word security, 10 different replies can be expected. When a security platform is being examined, examination not only of the functions of individual solutions but also from a comprehensive viewpoint is required.

Toshiba provides total security solutions based on an understanding of the actual information system.

#### \*IT Platform Operation/Monitoring/Maintenance Services

KOBAYASHI Yoshiaki SATO Ryoji

Toshiba provides the Remote Operation Management Service and the Platform Maintenance Service as high-added-value operation/monitoring/maintenance services. By utilizing these services, reductions in system operation management costs and mitigation of risk from damage caused by delays in abnormality recovery can be attained.

## Special Reports-2

### Utilization of Information Technology in Thermal Power Plants

#### \*Thermal Power Plants in the Global Era

KAWAI Kensuke

#### \*Application of IT Solutions to Life Cycle of Thermal Power Plants

FUKUDA Hiroshi

Global demand for the construction of thermal power plants is expected to show constant growth in the environment of power trading deregulation. In the case of power plants constructed overseas, low cost and a short delivery time are strong requirements in addition to operation in remote areas. For plant operation, flexible operation is required according to power demand, which is decided in the power market. On the other hand, the number of employees for operation and maintenance is on a downward trend due to the reduction of operating costs.

In the environment described above, various information technology (IT) solutions are being applied to execute "speedy engineering," manage information at construction sites, support the commercial operations of customers, and plan appropriate maintenance schemes, throughout the life cycle of thermal power plants.

#### \*Utilization of Information Technology in Thermal Power Plant Engineering

YAMAKI Masahiko TASHIRO Yutaka TACHI Ryuichi

This paper provides an update on the recent progress made in applying information technology to thermal power plant engineering, including 3D CAD, Web-based document sharing, and virtual private network technology, in order to remain abreast of the recent developments in fast-track engineering. The direction of integration to further enhance customer satisfaction is also described.

#### \*Proactive Approach to Information Technology in Thermal Power Plant Erection and Commissioning

IWASHITA Suelo YAMAMOTO Kenichi

In order to build an advanced thermal power plant within a shorter construction time, one of the important factors is to shorten both the erection work period and site commissioning period. Toshiba has been making continuous efforts in this area with a variety of measures. By adopting recently developed information technology at a site construction office, we have achieved the target of better performance and shorter periods. The laying of temporary LAN cables between our site construction office and the client's power station facilitates information sharing and at the same time concentrates Toshiba's collective strength by establishing a support system. The site engineers are fully supported by the engineers at head office and designers in factories using an ISDN line.

We have also introduced a broadband service aiming at improved safety, quality, and schedule keeping in erection work and site commissioning. Good results have been achieved with such a service connecting a site system with the main office database.

#### \*Plant Operation Support Services Based on Information Technology

OKAZAKI Mitsuyoshi ASATSU Seiichi MINOWA Masanori

The operating environment of thermal power plants has become increasingly severe in recent years due to the decline in power demand and the deregulation of electric utilities. Especially in the case of plants with non-base-load operation, budgets for operation and maintenance are being reduced every year. Moreover, in units with a low utilization rate, the number of people engaged in operation and maintenance are being reduced to a minimum in order to achieve greater economy.

In response to these conditions, Toshiba has developed and begun to offer new plant operation support services based on information technology, making full use of our design and manufacturing know-how and construction experience.

#### \*Maintenance Planning Applying Risk-Based Maintenance

AKIKUNI Yasunari FUJIYAMA Kazunari

Due to the liberalization of the electric power industry with the revision of the Electric Utility Law, electric power companies have been trying to reduce the price of electric power in recent years by cutting down facility maintenance expenses and renewal costs through accurate plant condition assessment.

To support these efforts by electric power companies, we are developing new maintenance planning systems for optimizing costs and reliability in addition to the current diagnostic systems. A practical system is now in service applying risk-based maintenance, which has been recently attracting attention as an effective means of management.

#### \*Application of Latest C&I Technologies to Thermal Power Plants

TSURUMI Hajime MITO Noriyuki NISHIYAMA Hidenobu

This paper describes the TOSMAP-DS™ distributed control system for thermal power plants, in which state-of-the-art information technology is employed. In the case of application to control and instrumentation (C&I) renovation in an existing thermal power plant, an integrated monitoring and control system for plural units is realized in order to meet customer requirements such as centralization of plant operations and plant rationalization. In the case of application to new plant construction, unmanned operation is achieved using the latest information technology for C&I systems.

The application of information technology to enterprise resource planning and remote maintenance services will become increasingly important from now on.

## Feature Articles

#### \*"the SENZOHKO" Model GR-NF424K Nonfluorocarbon, Energy-Saving Refrigerator

SAEKI Tomoyasu YOSHIOKA Takahiro HORIE Munehiro

Efforts to solve global environmental problems are now being made worldwide. It is of great importance to prevent ozone layer depletion and global warming due to the use of refrigerant and thermal insulation substances, especially in the case of household refrigerators.

In January 2002, Toshiba became the first company in Japan to develop a nonfluorocarbon refrigerator, adopting a hydrocarbon system refrigerant instead. Following this achievement, in order to reduce the amount of unused and scrapped food materials, which is estimated to be valued at approximately 30,000 yen (approx. \$US 245) per year per household, we developed the model GR-NF424K nonfluorocarbon, energy-saving refrigerator named "the SENZOHKO." This refrigerator is equipped with the "HIKARI PLASMA & ION" unit to maintain food freshness, as well as the "ORIRUN DANA" slide-down shelf, an epoch-making device located at the top of the refrigeration compartment of large refrigerators.

#### \*MAGNIA™ 3300 Entry Class High-Performance IA Server

KAJIHARA Shigehiro WATAKABE Takeshi NAITO Kenichi

Toshiba has developed a high-performance Xeon™ 2Way compact Intel® architecture (IA) server, the MAGNIA™ 3300. This server has the three major features of high performance, high reliability, and high expandability, and comes in chassis for either pedestal or rack mounting.

To achieve high performance and high expandability and high expandability of cooling system for chassis design. The simulation model was improved by repeated experiments. The server also achieves high reliability by hot swappable RAID and an original server management method, as well as a low cost of ownership for setup and daily operation. These features make the MAGNIA™ 3300 an ideal solution as an entry class server.

#### \*Application of Nonmetallic Thrust Bearing to Pumped Storage

KUBOTA Kazumasa ARAI Hidetada NAMBATA Satoshi UNO Shuetsu

There have been high expectations that reliable thrust bearing operation and elimination of the need for high-pressure-oil lifting devices could be achieved by applying nonmetallic thrust bearings to hydro generator-motor for pumped storage. In June 1999, nonmetallic thrust bearings were applied to a hydro generator-motor for pumped storage for the first time in Japan, after undergoing analysis of thrust bearing characteristics for application difficulties and model tests.

We have analyzed the bearing operation data over a period of about three years (1999-2002). As a result, the high reliability of the nonmetallic thrust bearing has been proven, and it has been verified that the high-pressure-oil lifting device can be eliminated and that maintenance can be simplified.

## Toshiba Technologies for the New Century

### 21. e-Marketing Technologies to Realize e-CRM