

Solution Services
Software
Hardware
Network Systems
Image and Information Equipment
Communication Devices

Information Systems

Electronics

Power Systems

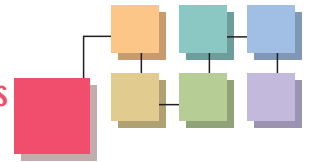
Industrial Systems

Healthcare Systems/Biotechnology

Consumer Products

Research & Development

Information Systems



Innovative Traceability Solution for Supply Chain Management

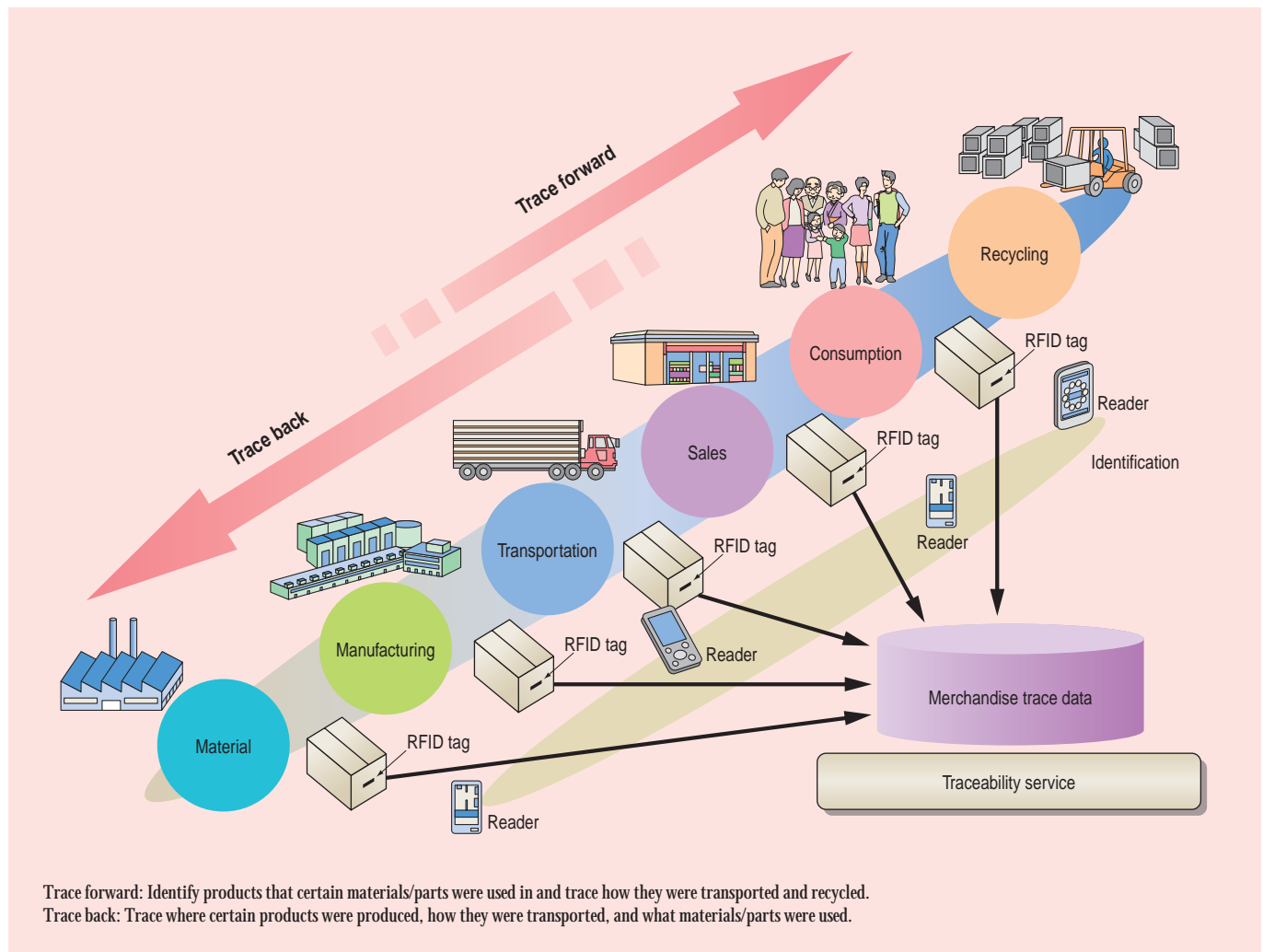
People want a society that is safer and want to avoid damaging the environment. In Japan, the demand for greater food safety has been increasing with a series of scandals. Several laws for recycling home appliances and automobiles were established to protect the environment, and the Pharmaceutical Affairs Law was also revised to improve the safety of medicine.

With the intense competition between companies, businesses must increase their efficiency and innovate a style of supply chain management, for instance understand real-time stock status and utilize it in the manufacturing management, improvement of customer service and so on, that goes beyond the companies and a type of industry business.

Hitachi's Traceability Solution supports businesses from the three angles of corporate management, society, and life. By using unique IDs to discriminate between items of merchandise, the Traceability Solution's systems can specify when and where the items were turned out, how they were transported, and where they are now and will be sent in the future.

The Traceability Solution is a total business solution based on a traceability system and provides consultations, system integration and system management. Our solution applies a traceability system using RFID (radio-frequency identification) to the entire supply chain and traces the histories of various items of merchandise from production to transportation, sales, and recycling. The result is improved efficiency in management.

Hitachi provides RFID-related products like μ (mu)-chips and μ -chip readers. To expand the use of RFID, the price of RFID tags must be reduced and international standards for the use of RFID must be established. Since August 2004, Hitachi has been driving the "HIBIKI Project" invested by the Ministry of Economy, Trade and Industry of Japan. The goal of the "HIBIKI Project" is to develop the technology to produce inlets (RFID devices), which are low cost and interoperable to international standards of RFID, within two years. Thus Hitachi is working to create traceability solutions using RFID.



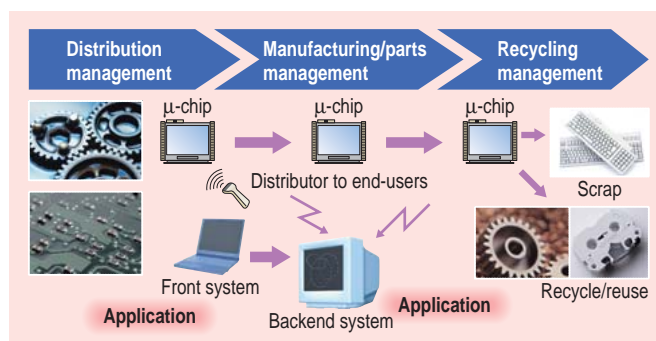
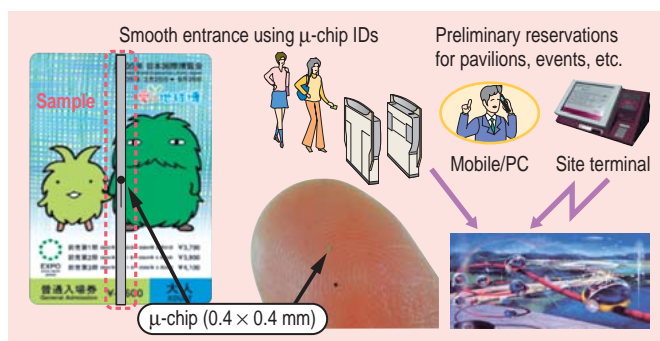
Traceability solutions using RFID

μ-chip Opening Wider Possibilities in RFID Solutions

μ-chips are 0.4-mm square RFID (radio-frequency identification) IC chips that use signals in the range around 2.45 GHz. The very small chips can be used in a variety of applications, such as the 2005 World Exposition, Aichi, Japan admission tickets, seals for labeling papers, PET laminated type and even for metal. Each μ-chip has a unique 128-bit ROM ID number with no duplication or unwanted data rewrites, enabling item-level tracking and tracing through the manufacturing, distribution, recycling, and authentication security systems. Such a characteristic makes the μ-

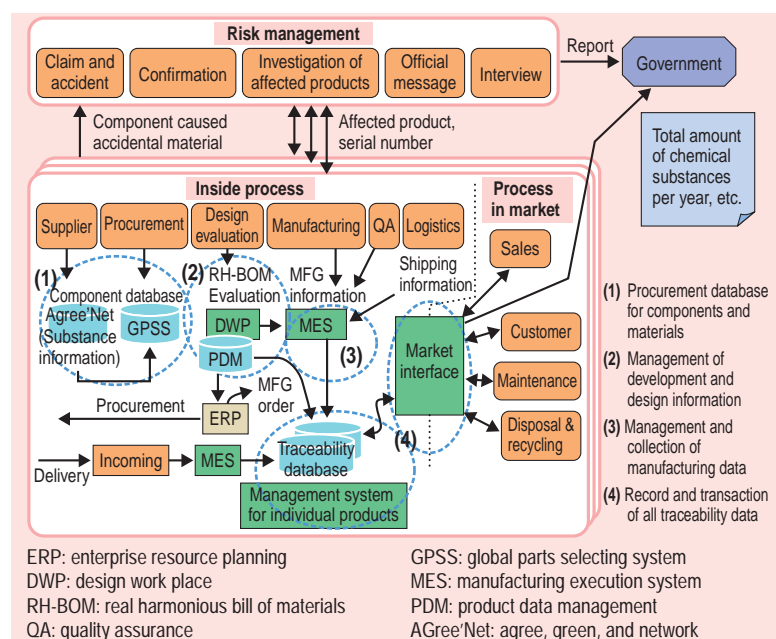
chip particularly suited to extending quality control through manufacturing, repair, returns, and recalls. The application of the chips can be controlled and data can be managed in a backend system, which can be customized based on each customer's needs and environment.

Working closely with Hitachi group companies, local teams, and partners, Mu-Solutions Division provides full support for RFID devices and develops the applications and solutions not only to resolve customers' problems but also to expand the possibilities.



Ticketing system for the 2005 World Exposition, Aichi, Japan (left) and product life-cycle management (right)

Manufactured Product Tracing System for Ecology and Product Life-cycle Management



Concept of Eco & PLM project

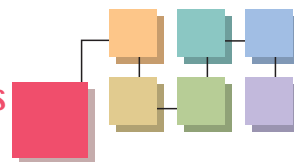
New environmental laws, such as the EU RoHS, have recently taken effect all over the world. This means that manufacturers must carefully manage chemical substances used because assuring the quality of products is their duty. Because of this, we launched the Ecology and Product Life-Cycle Management (Eco & PLM) project to manage manufactured products. The result was a system called Real Harmonious Bill of Materials (RH-BOM) that manages the manufactured product log.

RH-BOM can trace product life-cycle information from the manufacturing process to the maintenance disposal of each object. The operation processing of RH-BOM is executed using the RH-BOM Computing Platform.

[Main features of RH-BOM Computing Platform]

- (1) All data processed are stored in memory.
- (2) All data are processed at the same time.
- (3) The architecture tends to limit the memory volume used.

RH-BOM will become the basis of quality assurance and the core of information management by analyzing huge manufacturing results.



Launching New Business Solution in Education Market: Introducing Digi class. and Digi learning. into China

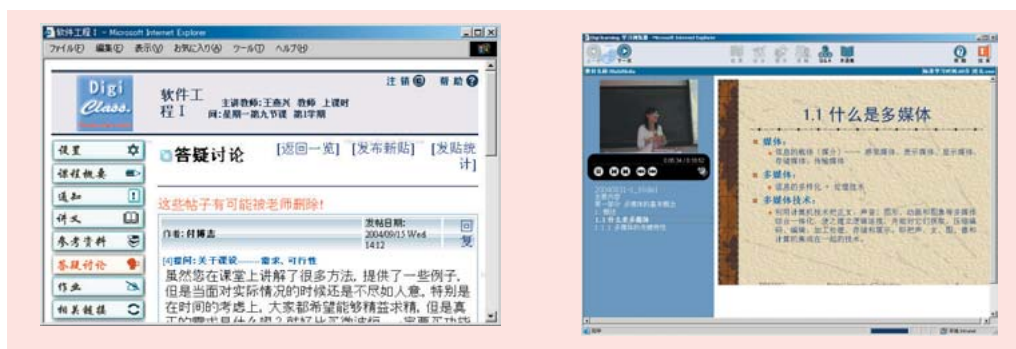
In China, there is a growing demand to introduce information technology into higher education and the in-house training of businesses to make education more efficient and to reduce its cost. To fulfill these business needs, Hitachi has developed education support products called "Digi class." and "Digi learning." Digi class. is a Chinese localized version of Hitachi's IT's class.^{†1} where teachers and students can communicate by using the class information on a website. Digi learning. is a Chinese localized version of HIPLUS^{†2}, which is an e-learning solution. To localize the products, Hitachi had expert assistance from the professors and students of Beijing University of Technology in investigating marketability, making alterations, and

implementing functions specific to the Chinese market. Hitachi Beijing Tech Information Systems Co., Ltd. started providing these solutions in October 2004 to universities and businesses in China.

^{†1} IT's class. is a product of Hitachi Government & Public Corporation System Engineering, Ltd.

^{†2} HIPLUS (Hitachi performance and learning upgrade support system) is a product of Hitachi Electronics Services Co., Ltd.

Digi class. screen image (left) and
Digi learning. screen image (right)

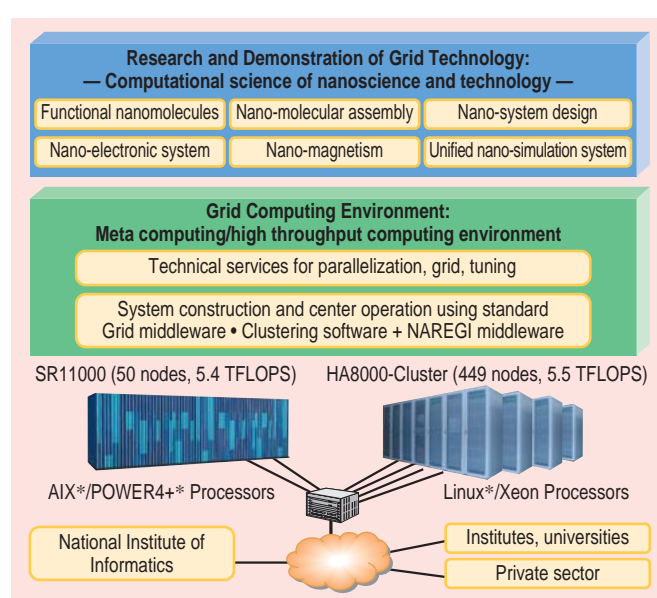


Constructing and Running Grid Computing System: Institute for Molecular Science

The Ministry of Education, Culture, Sports, Science and Technology is working on the National Research Grid Initiative (NAREGI). The objective of the project is to research and develop software technology for a grid computing environment in Japan, and the Ministry plans to deploy it in the private sector in a few years. In the NAREGI, the technology developed is applied, tested, and evaluated in the nanoscience field. The Institute for Molecular Science (IMS) has a major part in the project: to demonstrate the utility of a grid computing environment for nanoscience.

The computer system for demonstrating the system's utility was constructed at the IMS. The system consists of a Hitachi Super Technical Server SR11000 and a large scale PC cluster that uses Hitachi Advanced Server HA8000s as computing nodes. As the initial software infrastructure, Hitachi installed the standard grid middleware Globus Toolkit*, UNICORE^{†1}, and SCore^{†2}, which are open cluster softwares for PC clusters, and integrated them as a science grid computing environment. The system is now being used for both nanoscience calculations and research and development for the NAREGI project.

The grid middleware developed in the NAREGI is being installed into the IMS system for the demonstration, according to their development schedule. The system will provide an advanced grid computing environment.



Grid computing system

* See "Trademarks" on page 86.

^{†1} UNICORE grid middleware* was developed as part of the UNICORE Project and UNICORE PLUS Project.

^{†2} SCore was originally developed by the Real World Computing Partnership.

IT Assessment Services for Visualization and Diagnosis of Enterprise IT Capabilities

IT (Information technology) has become one of the key factors in business success. The IT leaders of companies must properly align IT strategy with business strategy. As the first step toward achieving this, enterprises should visualize, diagnose, and recognize their current IT capabilities. Hitachi has developed the following IT assessment services to support these activities. The services comprehensively evaluate the current IT utilization, analyze strengths and weaknesses in IT capabilities, find correlations and clarify causes of weaknesses, and finally, provide action plans to solve the problems.

(1) Balanced IT Utilization Assessment Service

Hitachi's Balanced IT Utilization Assessment is a health checkup of IT utilization using a balanced scorecard framework. It evaluates IT usage from four perspectives and focuses on corporate IT vision and strategy. For vision and strategy, an enterprise is evaluated on its establishment of IT strategy and the positive commitments of its CEO/CIO. From a financial perspective, the TCO (total cost of ownership) is investigated, and IT investment and employees' cost-consciousness are assessed. From a user services perspective, the focus is placed on customers who use IT services. Views on IT service performance from users' standpoints and users' IT literacy are evaluated. From an IT process perspective, the quality of IT processes is evaluated based on several de-facto standards for IT management such as COBIT*, CMMI*, and ITIL*. From an HR and growth perspective, the characteristics of the IT department staff and the infrastructure for development of their skills are assessed.

(2) TCO Analysis Service

The TCO Analysis Service provides evaluations specifically on the TCO of enterprise IT. Each enterprise is benchmarked against similar companies in Hitachi's database of abundant case studies. Problems are defined through discussion and comparison, leading to recommendations for improvement. In addition, the effects of

carrying out the recommendations are forecasted.

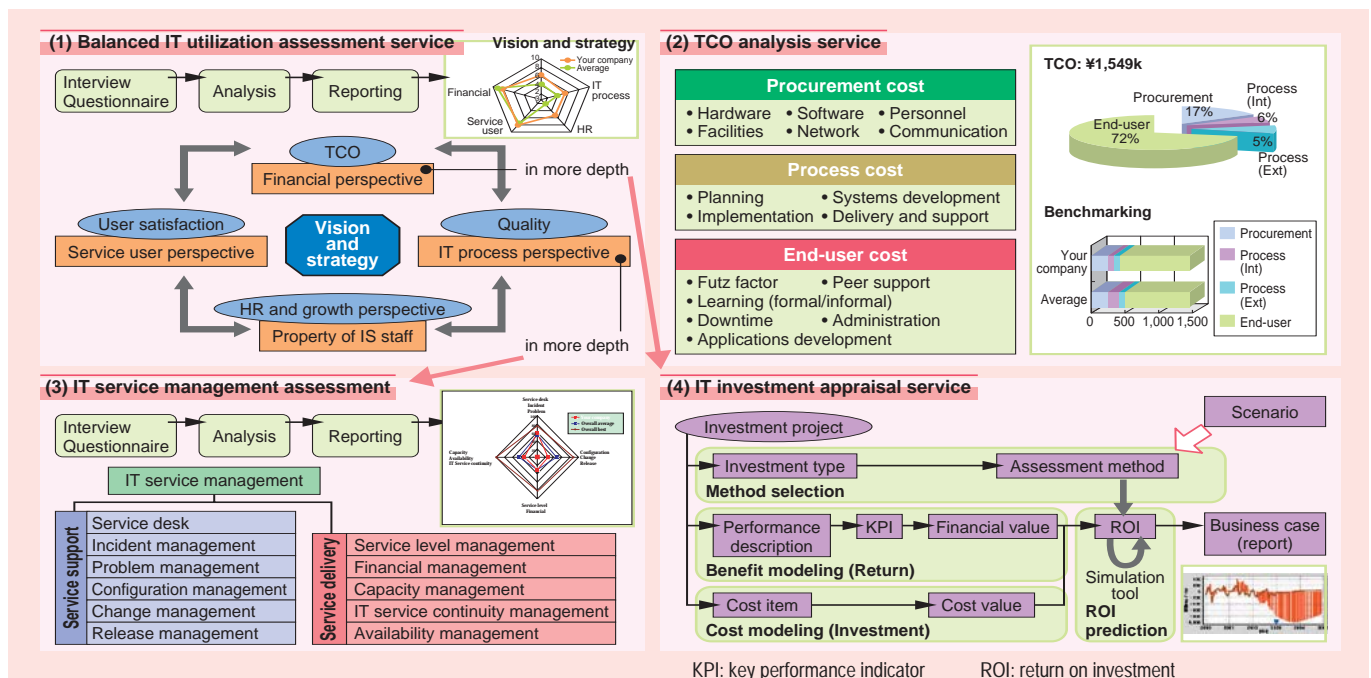
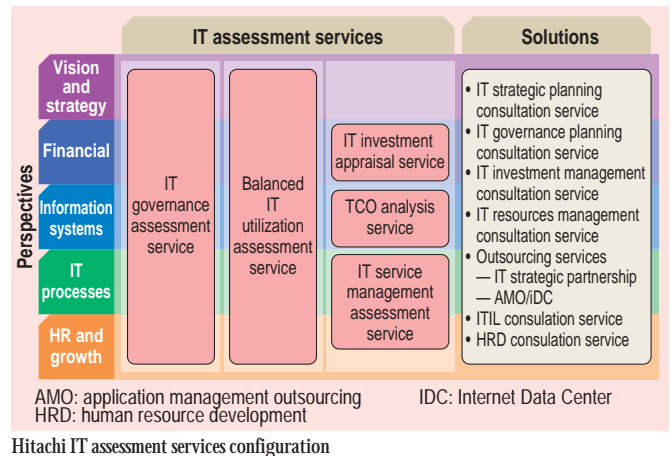
(3) IT Service Management Assessment Service

In enterprise IT operations, the process of providing service should be properly managed. Above all, providing the optimal service to businesses at an appropriate cost is important. Hitachi's IT Service Management Assessment Service is based on ITIL, the best practice framework for IT service management. In this assessment, an enterprise's IT service is comprehensively evaluated, challenging problems are defined, and recommendations are provided.

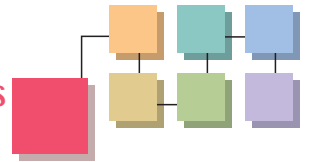
(4) IT Investment Appraisal Service

Hitachi's IT Investment Appraisal Service evaluates and visualizes the economic effects of IT investments. It also provides a common language among the three stakeholders of IT investments (management, end-user department, and IT department) to improve communication and support the establishment of effective IT investment strategy.

* See "Trademarks" on page 86.



Overview of IT assessment services and their relationships



Maximizing the Value of Customers' Brands: Hitachi Application Server, a Collaborative E-business Platform

With Internet technology in everyday use, high reliability and performance are indispensable for web systems such as online shopping sites. To meet such market needs, Hitachi released Hitachi Application Server^{†1} Version 6 in April 2004 as "Collaborative E-business" platform to support enterprises pursue maximum value by making enterprises and people flexibly collaborate with each other. Hitachi Application Server supports Hitachi's service platform concept^{†2}, and serves as the core application development and runtime environment. The middleware maximizes the value of customers' businesses by providing an infrastructure that enables effective information sharing across an organization.

Hitachi Application Server Version 6 features significantly improved reliability for J2EE* (Java* 2 Platform, Enterprise Edition)^{†3} systems by incorporating Hitachi's online technology, which has been refined over some decades, and performs stable processing of jobs for mission-critical systems even when the load on the system is high. In addition, Hitachi Application Server provides a portal-based collaboration infrastructure that facilitates cross-functional knowledge sharing across an organization, bringing about new ideas. It also provides an enterprise portal solution in cooperation with Yahoo Japan Corporation. These features will

help customers improve their businesses by using IT in their mission-critical environments.

In December 2004, Hitachi enhanced Hitachi Application Server and released V6.5. Performance has been significantly improved, and the *N:1* high availability feature minimizes the standby server cluster configuration. V6.5 can detect a system slowdown caused by errors such as infinite loops in programs and automatically take action to recover. Hitachi Application Server V6.5 enriches the SOA (service oriented architecture) solution Hitachi provides by introducing an asynchronous messaging product to Hitachi Application Server family. Using this product, an enterprise can flexibly and reliably integrate new web services-based systems with existing systems, for instance. Hitachi Application Server accelerates the adaptation of enterprise systems to dynamic changes in business plans and customer needs.

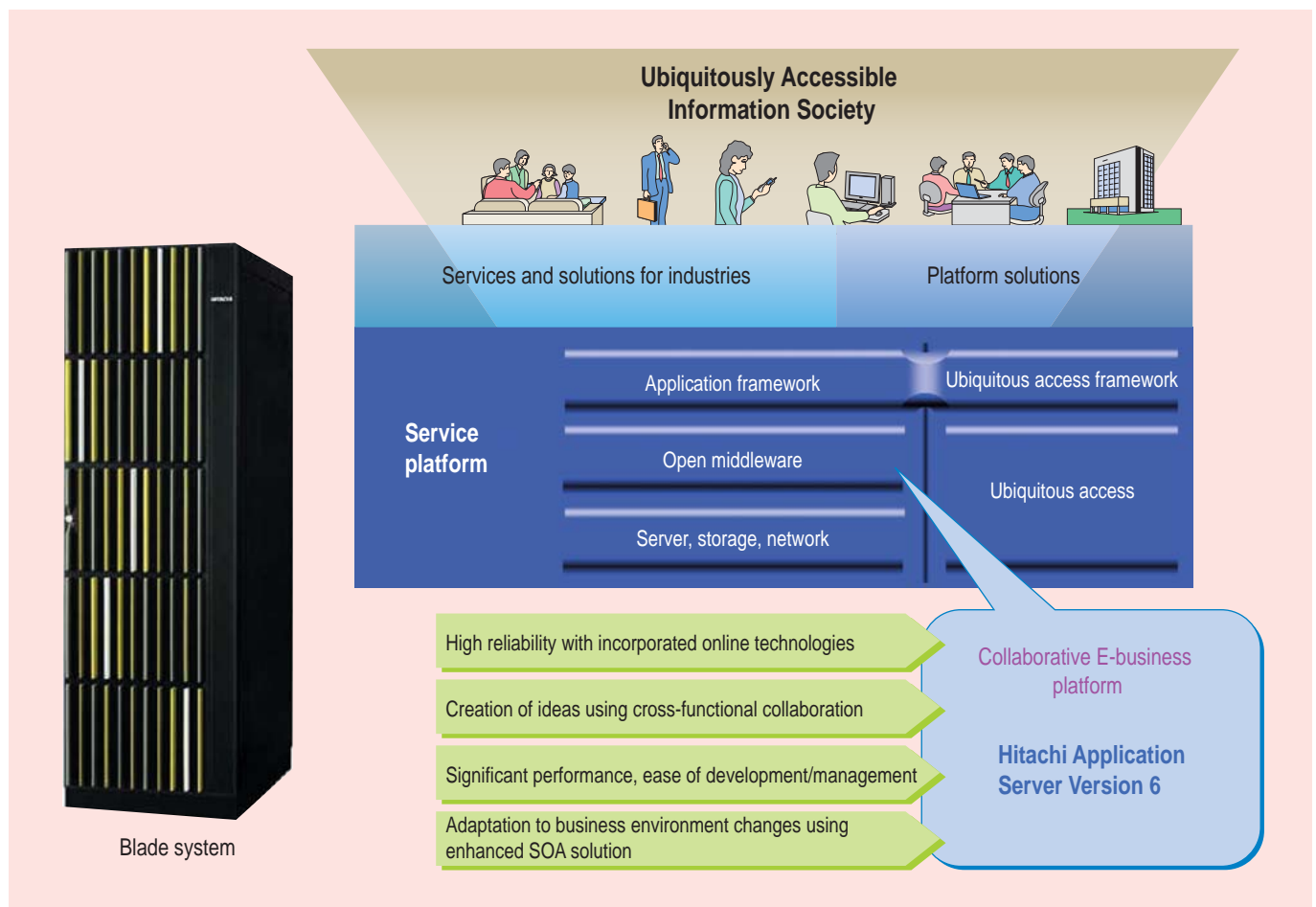
Hitachi Application Server will maximize the value of customers' brands with these application-centric technologies.

* See "Trademarks" on page 86.

^{†1} Hitachi Application Server is called "Cosminexus" in Japan.

^{†2} Hitachi's service platform concept is called "Harmonious Computing" in Japan.

^{†3} J2EE defines the series of Java based standard for developing enterprise applications/systems.



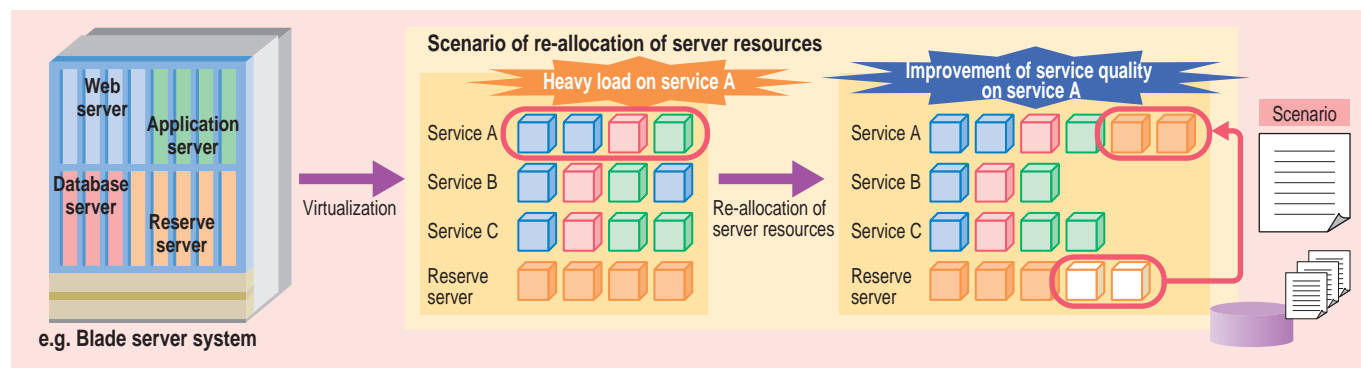
Position of Hitachi Application Server in Hitachi's service platform concept

Job Management Partner 1 Version 7i: Moving Toward Management of Autonomous IT Systems that React to Business Changes

Because the business environment has been changing rapidly in recent years, corporate information systems must have the flexibility to keep up with new corporate strategies and the ability to maintain high service quality 24 hours per day and 365 days per year. Therefore, businesses need autonomous IT systems, which adapt themselves to business changes through system operation life-cycle in both daily operations and long-term capacity planning, and these systems need to be managed.

The latest edition of Hitachi's Job Management Partner 1 allows

users to pre-define policy scenarios that compensate for system failures or heavy loads on systems and to enable those policy scenarios to be carried out automatically. For example, a system could be automatically restored after a failure, or server and storage resources could be allocated or re-allocated to meet business needs. The enhancements lighten the administrator's workload, help companies reduce operational management costs, and help achieve a high return on investment with efficient IT system resource usage.



Scenario of re-allocation of server resources

Cluster Technology with High Cost-performance for Database Management Systems

Information systems are lifelines, so they must be available as much as possible. They must also have a low total cost of ownership, and this cost can be reduced by effectively using server resources.

The scalable database management system "HiRDB" has high availability and high scalability with a shared-nothing architecture, which has independent disks on each node. The system has gained long-term experience, mainly in mission-critical business fields.

In addition to the conventional switch-over facility with one reserved standby node, HiRDB Version 7 provides a new switch-over facility: an active-active cluster without reserved standby nodes.

[Technical features]

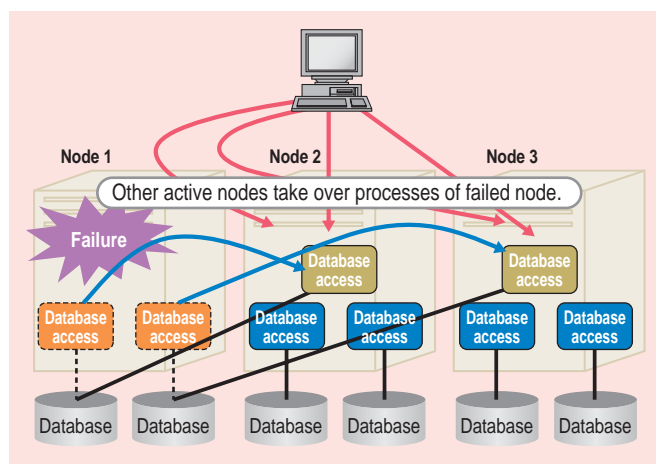
- (1) If a node fails, other active nodes will take over its processes.
- (2) If a node fails, distributed multiple nodes will take over its processes.
- (3) Normally, all nodes are working without reserved standby nodes.

[Derived User Advantages]

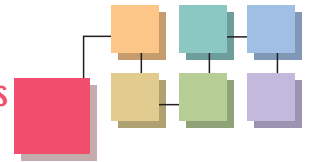
- (1) A switch-over takes mere seconds.

(2) The load balance among nodes is maintained if a node fails, even on the shared-nothing architecture.

(3) Normally, server resources are used effectively, yielding high cost-performance.



Mechanism of distribution process if node fails



Enterprise Blade System

Hitachi believes that an IT system should automatically adapt to the requirements of radically changing business environments. A product that focuses on the vital core needs of our customers' businesses should: cross the framework boundaries of existing servers, storage, and network products; eliminate burdens such as construction, implementation, and maintenance that emerge in complicated large scale systems; and offer the diversity and flexibility of an open system. These qualities are found in Hitachi's new integrated service platform, the Enterprise Blade System.

The Enterprise Blade System is a server, storage, and network integrated product inheriting its core expertise from our line of highly reliable mainframe platforms, bound together by our management software solutions. Hitachi's platform will adapt to and accommodate our customers' ever-changing business environments, focusing on the core of their businesses and ROI (return on investment).

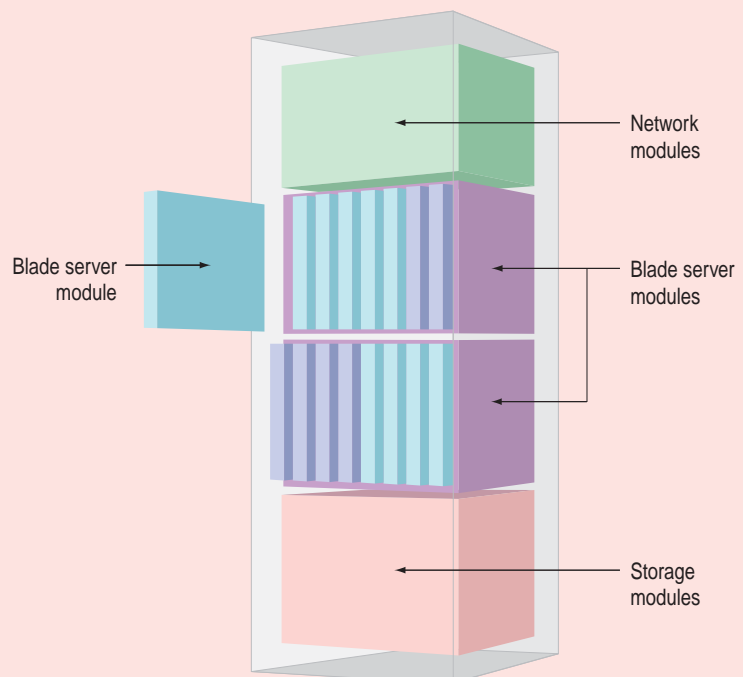
Together with the growing needs of your business, the Enterprise Blade System can expand server, storage, and network hardware resources and support configuration changes with our management middleware solutions. Since resources are modularized, initial configurations for deployment and future expansion can be implemented quickly and with minimal cost. Thanks to the inte-

grated network platform, network configuration changes and network expansion can be supported through our management software. Storage is shared entirely within the system, so the existing resources can easily be used for expansion and support of any new business. A DB (database) layer is also integrated for expansion flexibility of mission-critical data.

The Enterprise Blade System can also provide easy and customer-friendly operation management in the enterprise area. In terms of performance improvement, it supports up to an 8-way SMP (symmetric multiprocessor) on the IPF (Itanium processor family) server module. Transaction recovery with a standby server and high-speed switch-over for hot standby secure the reliability and availability of the system.

Its excellent performance and many available features make the Enterprise Blade System well-suited for any environment, from small department office systems to large back-end ones.

The Enterprise Blade System adds value to the customer's business by considering and accommodating unexpected business changes and growth.



Enterprise blade system overview

Enterprise Server Series for Powerful Support of Mission-critical Work



Enterprise server with 64-bit architecture based on CMOS processors (left) and enterprise server with POWER processor (right)

This enterprise server series has the high reliability and high availability needed for mission-critical systems. The series uses Hitachi's proprietary programs that users already have and makes new business possible.

The high-end/mid-range server in this server series uses Hitachi's Virtual-Storage Operating System 3 (which provides the main support for mission-critical work), featuring a 64-bit architecture based on CMOS (complementary metal-oxide semiconductor) processors. This server can expand the scale of on-line operations, accelerate batch processing, and process data at high speeds on a large scale. In addition, this server offers high reliability, security, and database/storage management functions required for back-end servers, such as disaster recovery, encryption, etc.

The other server in this series uses the POWER processor as an instruction processor. This server supports Hitachi's proprietary operating systems (Virtual-Storage Operating Systems 1 and K) using Hitachi's emulation technology. Moreover, Hitachi provides a hybrid system in which one of Hitachi's proprietary operating systems and AIX work together using partitioning technology.

New Super Technical Server

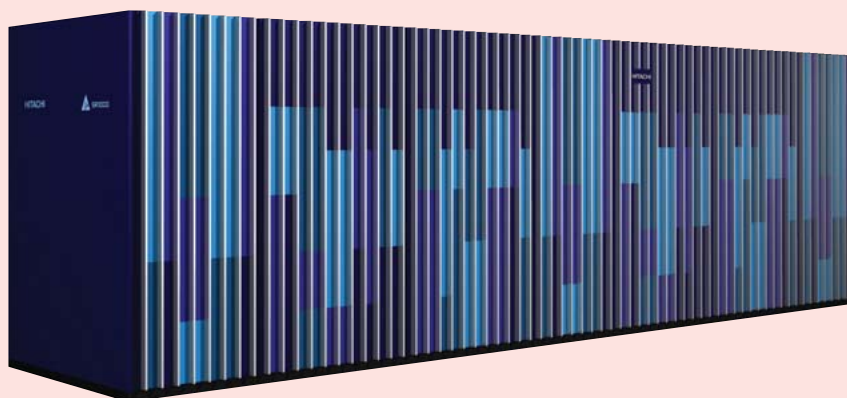
Hitachi has added model J1 to the Super Technical Server series, with greatly enhanced computational power. This new model has outstanding system balance due to combining high performance processors with high-speed inter-node network.

Model J1 uses the newest POWER5* (1.9 GHz) processor, which was jointly developed under a strategic alliance between Hitachi and IBM. Each processing node is a symmetric multiple processor consisting of 16 POWER5 processors. Model J1 can be configured using 4 to 512 nodes according to user requirements. The maximum configuration has a processing capability of a world-class 62.2 TFLOPS. Compared to its predecessor, model H1, the performance of the maximum configuration of model J1 is improved by 2.2-fold.

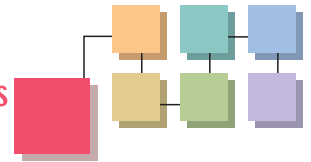
Besides fluid analysis, crash analysis,

weather forecasting, etc., model J1 can also deliver high performance in new application fields, such as nanotechnology, biotechnology, and environmental simulation. It can also be applied to grid computing for scientific and technical calculations.

* See "Trademarks" on page 86.



Super Technical Server model J1
(32-node configuration)



Enterprise UNIX Server Series

From high-end server 595 to entry server 520, the five new enterprise servers equipped with the newest POWER5 processors were added to Hitachi's lineup of enterprise UNIX* servers, which use the AIX operating system and were designed for and mission-critical marketplaces. The new servers have improved performance due to the POWER5 processor.

The enterprise server 595, which can support up to 64 processors, is a high-end enterprise UNIX server. The 595 uses the POWER5 processor with a clock rate of 1.65 or 1.9 GHz and supports a memory capacity of 2 terabytes. Compared with its predecessor, the enterprise server 690, the 595 is improved threefold.

The new servers equipped with the POWER5 processor have an enhanced hardware resource visualization function and on-demand function in addition to improved performance. Micro-partitioning is a new feature of dynamic LPARs (logical partitions) that enhances the hardware resource visualization function. Dynamic LPARs can dynamically allocate system resources in two or more partitions, and until now, one processor was the smallest unit that could be allocated. However, micro-partitioning makes possible the allocation of a logical unit of 1/10 of a processor. Moreover, the servers support LAN visualization that enables the LAN adaptor to be shared and enables high-speed communication between partitions, and the servers support storage visualization that enables storage to be shared between partitions. By supporting these hardware resource visualization functions, more effective use of hardware resources is possible, so the total cost of ownership of the system is reduced.

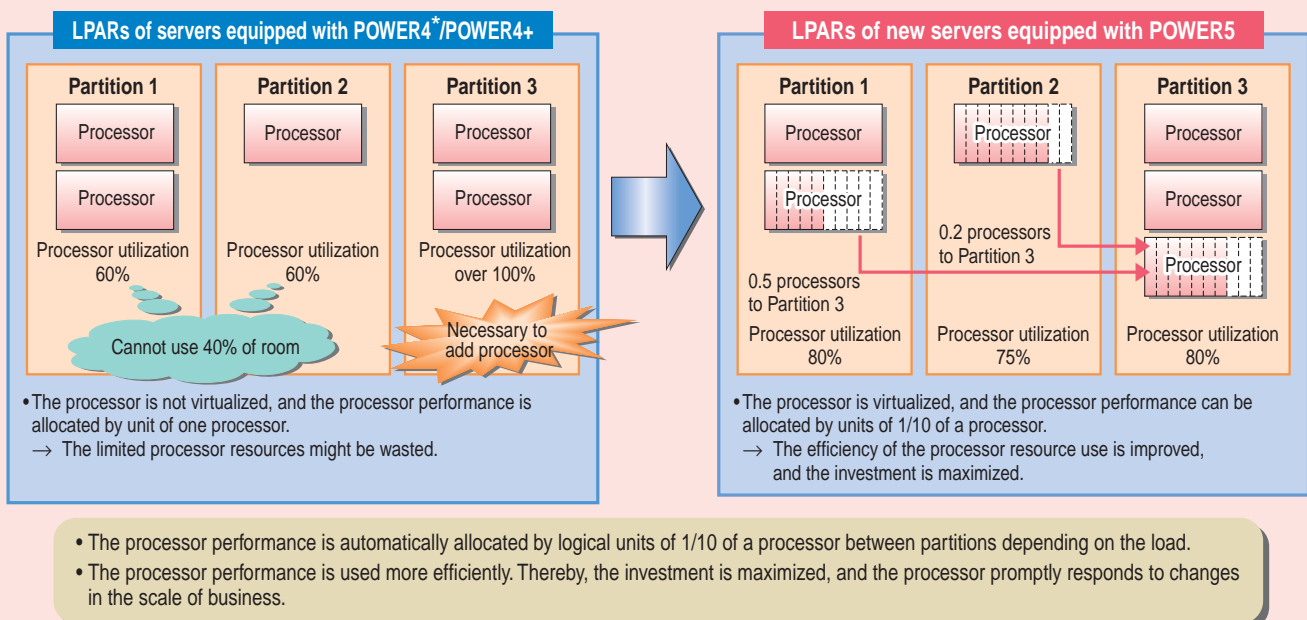
To enhance the on-demand function, reserve capacity on demand is supported as a new feature in addition to the capacity upgrade on demand supported in the past. Thereby, the processing perfor-

mance of the system can be temporarily reinforced when the load of the business is heavier, and the efficiency of the investment in the hardware can be improved.

* See "Trademarks" on page 86.



Enterprise server 595



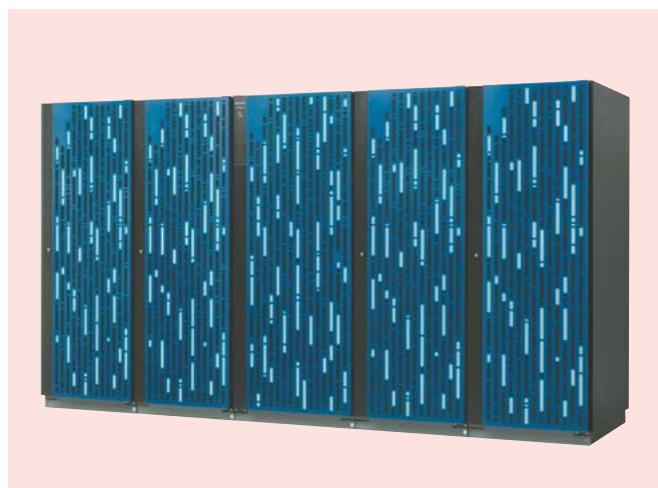
Hitachi's Enterprise Disk Array with Single Point of Management Across Multiple Storage Platforms

Hitachi has developed the "DLCM (data life-cycle management) solution" for efficient data management that corresponds to the changing value of data over time by perceiving data as having a life-cycle through its creation, usage, storage, and deletion. Hitachi provides an enterprise disk array as the core platform for the DLCM solution.

Hitachi's enterprise disk array provides new functionality that surpasses the functional range provided by previous enterprise storage products. These functions are: a "Universal Volume Manager," the first-ever external storage connection function to have realized virtualization technology on the disk array itself, a "Virtual Partition Manager," a virtual private storage function that provides storage space for the sole use of each application, and a "Universal Replicator," a universal replication function with enhanced capability for disaster recovery.

Hitachi's enterprise disk array also realizes best-of-its-class processing performance and capacity expansion as a simple storage device. The third generation Universal Star Network architecture, which adopts crossbar switch technology, realizes 3.5 times higher database transaction performance than the previous model with the maximum transaction processing speed of 2,000,000 IOPS (input/output per second) by dramatically enhancing the internal data transfer capabilities.

Furthermore, the array supports up to 1,152 disk drives at maximum configuration. Internal storage capacity can be expanded seamlessly to a maximum of 332 Tbyte by using 300-Gbyte disk drives.



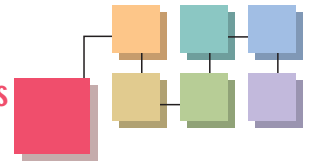
Hitachi's enterprise disk array with single point of management across multiple storage platforms

Hitachi's Midrange Disk Array Series: Platform for Data Life-cycle Management Solution



Modular disk array with SATA disk drives

The need is growing for a storage solution that stores data efficiently and safely for a long period of time, in accordance with the value of data, which changes over time. To fulfill such needs, Hitachi introduced its modular disk array series as the platform for the total storage solution "DLCM solution." This modular disk array can be equipped with large capacity and low bit cost SATA drives. This storage system can have both online and near-line storage in one system when configured with both SATA drives and the current high-performance Fibre Channel disk drives. This modular disk array with SATA drives uses Hitachi's original data/disk protection method and data copy functions. They can be used for disk-to-disk backups and storing archival data, enabling multi-tiered storage architecture in data centers. Furthermore, data protection using the write-once, read-many function, "Open LDEV Guard," and data archive services were added to provide customers with a storage solution well-adapted to the life-cycle of data.



Hitachi HiCommand Suite Enhanced to Simplify Storage Management, Business Continuity

Hitachi's customers have proven the benefits of consolidating storage into highly available, intelligent storage systems shared over storage area networks. Yet that consolidation has not eliminated the challenges large organizations face from the continuing rapid growth in storage capacity and infrastructure complexity. Those challenges include:

- (1) Managing increasing storage capacity with the same or fewer IT engineers.
- (2) Efficiently matching the requirements of applications to a tier of storage with the appropriate performance, availability, functionality, and cost.
- (3) Ensuring availability despite a complex storage infrastructure.
- (4) Keeping staff trained on the wide range of device-specific management tools and tactical storage resource management tools required to use the various components of the storage network.
- (5) Improving storage infrastructure to more quickly respond to new opportunities.

The rapidly maturing Hitachi HiCommand Storage Area Management Suite Version 4.0 provides a full range of capabilities for handling these challenges by greatly simplifying management of heterogeneous storage environments in the following ways:

(1) Application Management

HiCommand delivers application-to-spindle capacity and performance management for the most common messaging, database, and file server platforms, including Oracle*, Microsoft* SQL Server, Sybase*, Microsoft Exchange Server, and Windows* and UNIX file servers.

(2) Operations Management

HiCommand offers fast, efficient solutions that automate complicated manual administrative tasks such as installing Host Bus Adapters, managing World Wide Names, identifying and upgrading out-of-date firmware, cleaning unnecessary files off file servers, finding new capacity that can be reached by any application, provisioning new capacity, and diagnosing "it's slow" help desk calls.

(3) Data Management

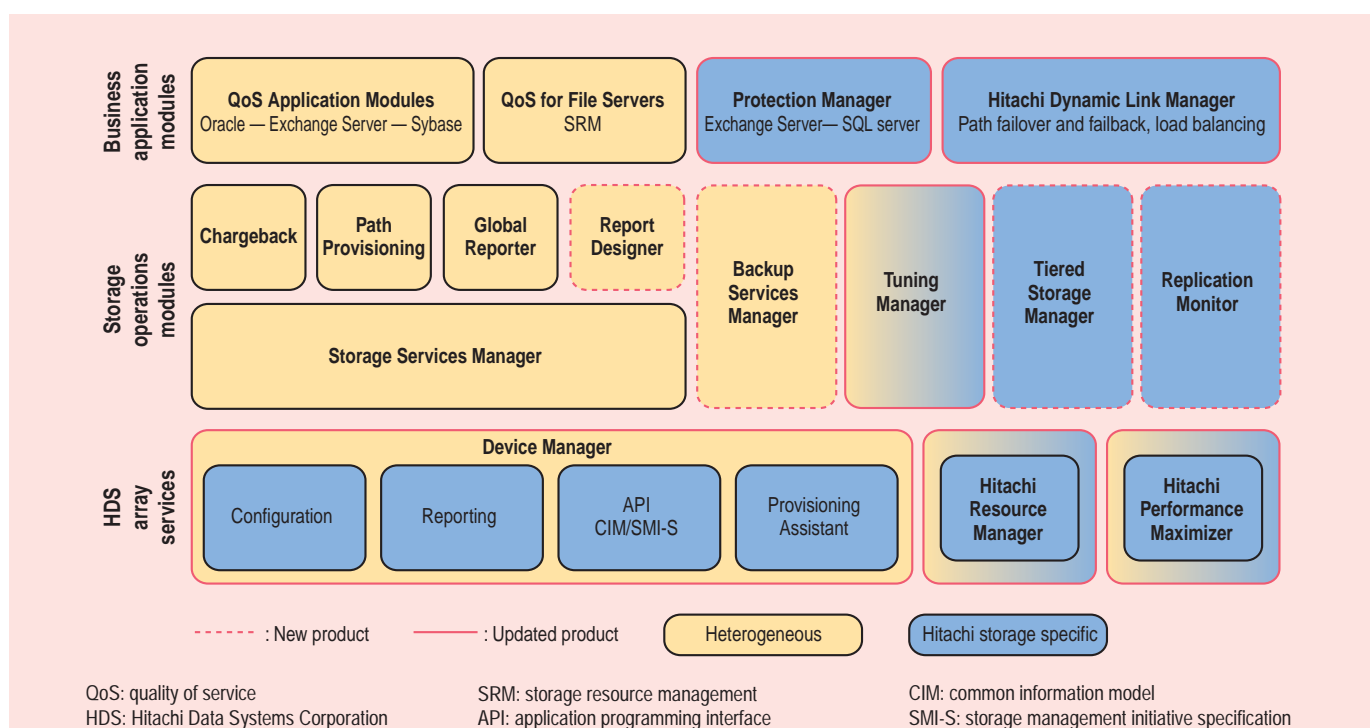
HiCommand provides a full toolkit to move application data between tiers of storage. The unique HiCommand Tiered Storage Manager simplifies the management of classes of data and moves data between tiers without disrupting applications.

In addition to the Tiered Storage Manager, another major new capability of Version 4.0 is the HiCommand Backup Services Manager. By managing all aspects of backup and restoration, going all the way back into tape libraries and including predictive analysis of tape consumption needs, the Backup Services Manager greatly simplifies backup and restoration and boosts success rates for greater protection of data.

Another new module, the HiCommand Replication Monitor, simplifies the configuration and administration of Hitachi's best of breed replication software, used by many large financial organizations and other businesses with an absolute need to protect data.

With these improvements, the HiCommand Suite delivers quantifiable benefits by lowering the total cost of providing the Application Optimized Storage solution with higher availability and optimal performance for the critical applications that drive business processes.

* See "Trademarks" on page 86.



New LCOS Rear Projection Display

Hitachi has released a new type of rear projection display using LCOS (liquid crystal on silicon) panels. The display is aimed at a market segment where Hitachi has a consistent competitive advantage: it is intended to be used 24 hours a day and 365 days a year in a mission-critical environment. It is equipped with a new LCOS device combined with Hitachi's display technologies, natural color reproduction technology, black stripe screen technology, optical beam control technology, etc. This LCOS rear projection display is a core product in Hitachi's Ubiquitous Business Solutions and is sure to satisfy a variety of crucial customer needs.

[Main features]

(1) High definition, high resolution and high quality

The narrower spaces between LCOS pixels compared to those of a transmission LCD (liquid crystal display) or digital micromirror device make it possible to display high-definition, very smooth silky images.

(2) Flicker-free moving image

The thinner alignment layer of LCOS displays compared to a transmission LCD or the new fast driving circuit contributes to quick response time of LCOS

displays: less than 16.7 ms. This is fast enough to be flicker-free and friendly to the eyes.

(3) Low running cost

The LCOS has a long life because of its high lightfastness and polarizer that need not be replaced. Thanks to these LCOS and polarizer advantages, the cost of running an LCOS rear projection display is less than half that of Hitachi's current transmission LCD rear projection display models.



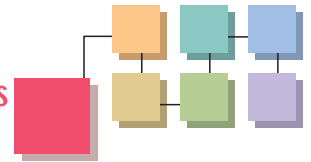
70-inch 2 × 2 LCOS video wall (left) and LCOS optical engine (right)

Business-purpose, 55-V High-fidelity Plasma Display

Hitachi has released a 55-V (visual) high-fidelity plasma display that can be used as a monitor in communications at exhibitions and other events, in waiting rooms, conference rooms, and other crowded places. This 55-inch large visual size high-fidelity information display uses an e-ALIS (extended alternating lighting of surfaces) panel, which alternately addresses odd- and even-numbered lines and then illuminates all lines at a time to display an image. Although the screen is 55-inch large visual size, the model has one of the industry's highest pixel densities with about 1.05-million pixels (1,366 horizontally by 768 vertically), and one of the industry's top-ranking panel luminance levels at 1,000 cd/m². Moreover, the model has a unique high-image-quality advanced DIPP (digital image pixel processor) made using the essence of high technology, and reproduces various video signals vividly, clearly, and impressively.



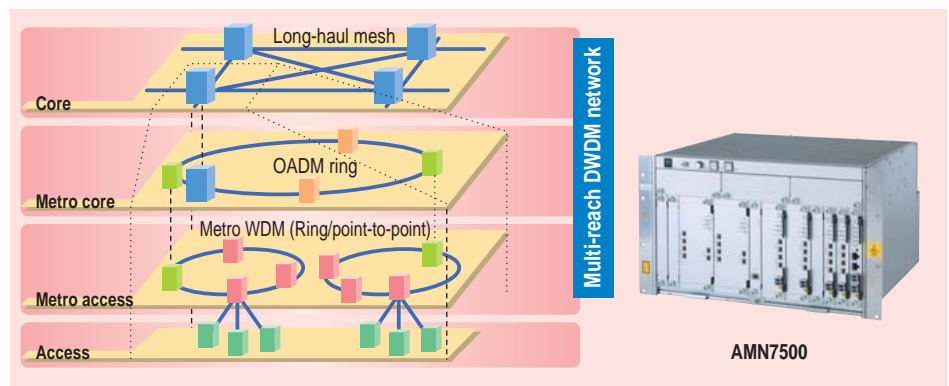
55-V high-definition plasma display



Advanced Optical Transport Platform for Multi-reach DWDM Networks

Hitachi offers AMN7500, an advanced optical transport platform, for multi-reach DWDM (dense wavelength division multiplexing) networks as an infrastructure for broadband networks and the ubiquitous information society. In particular, FTTx [fiber to the x (x = H: home, P: premises, etc.)] data traffic in access area networks is increasing rapidly. Ultra-high capacity and flexible optical transport systems are indispensable to satisfy changing traffic demands and the various network sizes of metro access area (tens of km), metro core (hundreds of km), and core (thousands of km) long-haul lines. The AMN7500 universal platform, as a multi-reach DWDM or OADM (optical add/drop multiplexing) system, uses an appropriate combination of optical amplifiers and dispersion compensation to make various networks whose topologies are point-to-point, linear, ring, and mesh. The variety of possible transponder/multiplexer user interfaces are GbE, 10 GbE (WAN-PHY/LAN-PHY), OC-3 (STM-1)/OC-12 (STM-4)/OC-48 (STM-16)/OC-192 (STM-64), and OC-

768 (STM-256). The maximum wavelength is 32 to 80 with full-band tunable transponders. An ITU-T G.709-compliant OTN (optical transport network) overhead-processing function is used for an optical path management and an efficient FEC (forward error correction). A reliable, carrier-class optical transport solution is provided with high-density and compact shelves which are mounted in a 19-inch rack with full front access.



Multi-reach DWDM networks using AMN7500 advanced optical transport platform

10-Gbit/s CWDM System for Metro Access Networks

The AMN6200 is a CWDM (coarse wavelength division multiplexing) system that provides high-capacity transmission for Internet services and data storage of Metro/Access Area Network. The AMN6200 reduces the cost of running a network since it can accommodate up to eight lines of Gbit-Ethernet* and/or 10-Gbit-Ethernet signals in one fiber.

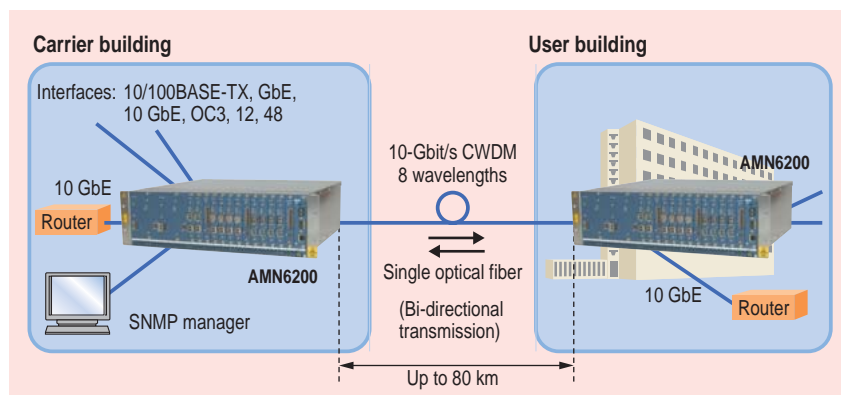
The transmission distance has been extended to maximum of 80 km (from 10-50 km in the conventional model) without using dispersion compensating fiber or optical amplifiers, by using error correction function and high dispersion durability to 10-Gbit Ethernet interface cards.

The line-up of user interfaces are 10/100BASE-TX, 1000BASE-X, 10GBASE-R, and OC-3 (STM-1)/OC-12 (STM-4)/OC-48 (STM-16), by using pluggable optical modules, which make the system setup flexible. The universal card slots are also flexible, allowing any line card to be mounted to any slot.

The AMN6200 has a compact design and up to four 8-wavelength multiplexing system is mountable within a 3U (unit=44.45 mm) 19-inch rack.

The AMN6200 also has management functions that use general protocols such as Telnet and SNMP (simple network management protocol), and supports prompt diagnosis using performance monitoring and loopback function.

* See "Trademarks" on page 86.



Example of 10-Gbit/s CWDM system configuration

AMN1500 High Speed Optical Access System

The rapid spread of broadband applications, such as video transport services, requires larger bandwidth and more economical access to network systems compared to current systems that have mainly 10- to 100-Mbit/s user interfaces. To meet these requirements, Hitachi has developed a next-generation gigabit passive optical network system, the AMN1500, based on the IEEE 802.3 standard.

The AMN1500 provides gigabit access in a wide variety of environments (network providers, service providers, business customers, and consumers). The system consists of an OLT (optical line terminal) installed in a central office and ONUs (optical network units) located in end-user premises. The OLT can control each ONU via a shared fiber, and it also controls user traffic between the OLT and ONUs to optimize the efficiency of network access.

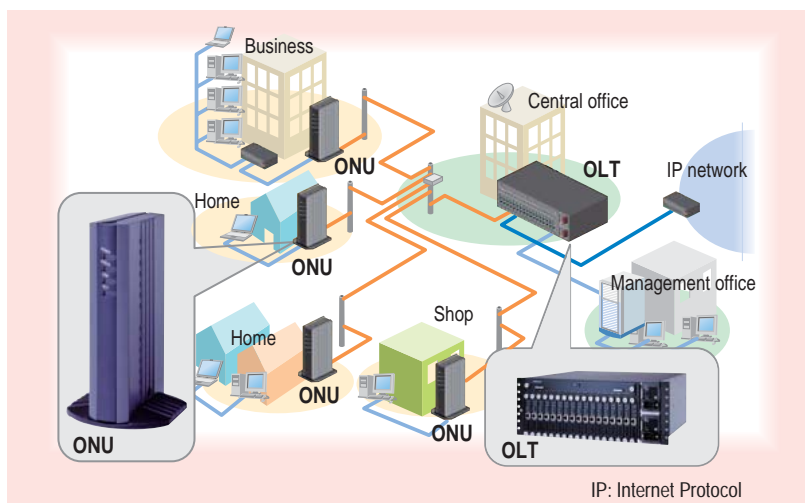
[Main features]

- (1) The cost of access line infrastructures is reduced by using shared access fiber links with up to 32 ONUs.
- (2) Optical line terminals can accommodate up to 512 ONUs per 4RU-size 19-inch rack.
- (3) Bi-directional traffic is supported at the desired bit rate of up to 1 Gbit/s, depending on traffic volume.

ume.

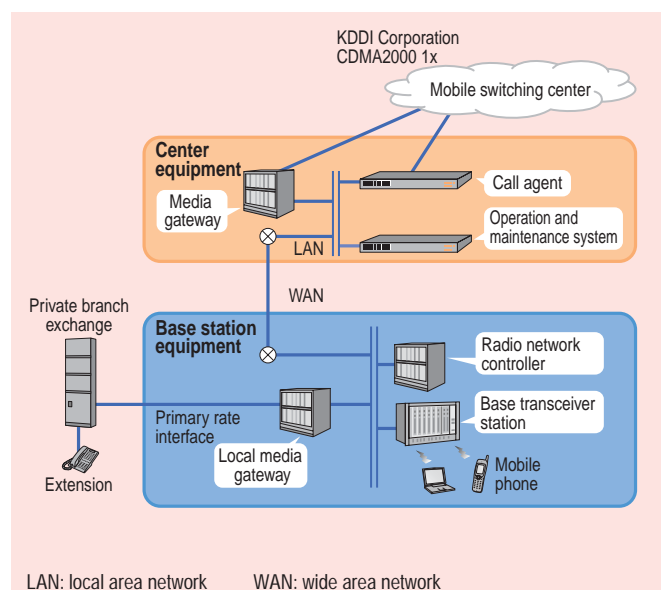
(4) A dynamic bandwidth allocation function that takes user traffic into account efficiently multiplexes upstream user traffic.

(5) Traffic queuing and filtering control is based on user priority and connection labels.



AMN1500 high-speed optical access system

Mobile Centrex System for KDDI's "Office Wise" Service



Office Wise configuration

Hitachi, Ltd. has installed the Office Wise* service that KDDI Corporation began offering in November 2004. This service provides Internet protocol Centrex features or "mobile Centrex," through mobile phones. The system is composed of central equipment, which is located within the au* corporate infrastructure, and the base station equipment, which is located in a customer's facilities. It allows customers to use mobile phones as extensions in their offices.

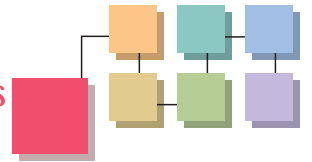
[Main functions]

(1) Office Wise uses public mobile phone technology: CDMA2000 1X. Therefore, customers can use the standard au mobile phones—cdmaOne, CDMA 1X, and CDMA 1X WIN—as extensions. The base station equipment also works as a base station of the au public mobile network.

(2) Calls can be made to the extension lines of existing PBX networks.

(3) Office Wise uses Internet-based telephony, which offers voice transmission using voice over Internet protocol for all communications except radio. It also can provide packet data communications.

* See "Trademarks" on page 86.



10-Gigabit Ethernet Optical Module



Optical module that meets XENPAK MSA

Because of the rapidly expanding Internet infrastructure, the demand for 10 GbE (10-Gigabit Ethernet) optical modules has been increasing. The market requires modules that cover a wide range of transmission distances from 300 m to 80 km and are front panel pluggable, low cost, and compact. XENPAK MSA (multi-source agreement) modules are widely used in Internet protocol network systems. In addition to 1,310-nm 10-km and 1,550-nm 40-km XENPAK modules, Opnext, Inc. covers the XENPAK portfolio and has developed two XENPAK modules:

(1) A 1,550-nm 80-km DWDM (dense wavelength division multiplexing) XENPAK module that uses an integrated laser modulator transmitter and avalanche photodiode receiver. The wavelength stability is ± 100 pm, which enables 100-GHz spacing DWDM operations.

(2) An 850-nm 300-m multi-mode fiber XENPAK module that uses a vertical cavity surface emitting laser and GaAs photodiode.

Using these Opnext XENPAK modules, a system vendor can easily design 10GBASE-SR, -LR, -ER, -ZR and -DWDM that have the same electric interfaces including digital optical diagnostics and form factor.

XMD MSA-compliant TOSA/ROSA Modules

Increasing demand for transmission capacity for data and Internet traffic motivated the development of a 10-Gbit/s light transmission module that is small, low cost, and has low power consumption. To meet this demand, Opnext, Inc. made a multi-source agreement with seven vendors in February 2004 to establish compatible sources of 10-Gbit/s TOSAs/ROSAs (transmitter/receiver optical subassemblies). This agreement is called the XMD MSA (10-Gbit/s miniature device multi-source agreement), and is meant to establish compatible TOSAs/ROSAs with common optical and electrical interfaces and characteristics to lower costs and give customers consistent products.

Opnext, Inc. has developed an MSA-compliant TOSA/ROSA with a so-called TO-can package of less than 6 mm ϕ and an FPC (flexible printed circuit) board. A 1,310-nm directly modulated DFB LD (distributed feedback laser diode) operating at 0 to 85°C without a cooler is used in the TOSA. Because the laser diode chip has a frequency of 20 GHz and the brand-new TOSA design, it has an extremely high mask margin ($>20\%$). In the ROSA, a new low voltage photodiode is used, which enables operation using a single 3.3-V power supply with <19 -dBm sensitivity.



TOSA (above) and ROSA modules (below)