Total System Operations and Management for Network Computing Environment

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OVERVIEW: The architecture of enterprise information systems is evolving toward WWW (World Wide Web) centered intranet. System operations and management solutions for the architecture are required for expansion and for reducing total cost of ownership. Hitachi, Ltd. developed total system operations and management software products “Job Management Partner 1, JP1” as solutions for these trends. JP1 features the following: (1) WWW based integrated viewers operability is increased which enables them to monitor and manipulate remotely; (2) Seamless operations for batch job and automatic system operation are developed for heterogeneous environments such as UNIX*1 and Windows NT*2; and (3) Application program interface is provided for customization by using user programs in order to develop the execution of JP1’s functions and central monitoring. Hitachi, Ltd. will develop the management software for application programs in network computing environments using new technologies such as CORBA (Common Object Request Broker Architecture)*3 and Java*4. The management software will have the same features as the current management software such as automatic job scheduling and monitoring.

INTRODUCTION
THE architecture of enterprise information systems is evolving toward WWW (World Wide Web) centered intranet. System operations and management solutions for the architecture are required for expansion and for reducing total cost of ownership.

This paper shows technical trends regarding network and system management that are related to Internet technology and describes total system operations and management towards these trends using Hitachi’s management software products “Job Management Partner 1 (JP 1)” as an example.

This paper also presents total system operations and management In network computing environments.

TECHNICAL TRENDS OF NETWORK AND SYSTEM MANAGEMENT
Generally there are two trends in network and system management technology: One is the development of operations and management support functions for new systems based on new information technologies; the other is the development of efficient operations and management support functions for legacy systems using new information technologies.

The former manages enterprise information systems based on the Internet, intranet, and extranet. With regard to Internet technologies, one of the most important issues is guaranteeing the quality of service. Therefore, developing management functions are important.

The latter distributes management functions based on Internet technologies which are independent of platforms. There are two approaches. One is based on WWW technology in which a specification called WBEM (Web-Based Enterprise Management) is to be standardized. The other is based on Java technology in which a specification called JMAPI (Java Management API) is also to be standardized.

*1: UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.
*2: Windows NT is a registered trademark of Microsoft Corp. in the U.S. and other countries.
*3: CORBA (Common Object Request Broker Architecture) is a standard for distributed objects that are being developed by the Object Management Group (OMG).
*4: Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries.
The basic technology for developing a network computing environment is based on a technology called CORBA (Common Object Request Broker Architecture). Interest in managing the CORBA environment itself and managing the distributed application systems on the CORBA is increasing. Integration of CORBA based management system and legacy management system is also important.

On the other hand, focusing on the reduction of TCO (Total Cost of Ownership) is more important than focusing on the departmental distributed operations in regard to enterprise information systems based on client server system environments. Moreover, increasing the usability of system operations and management is necessary for an integrated management framework because it enables unified operations for a variety of management functions.

**REALIZATION OF TOTAL SYSTEM OPERATIONS AND MANAGEMENT**

Hitachi’s JP1 provides a variety of management functions as shown in Table 1. Its integrated management framework enables unified operations for the functions shown in Fig. 1. This chapter shows the
development of total system operations and management.

Integrate Management Framework

JP1’s integrated management framework provides the following basic functions for operations and monitoring as well as unifies operations for a wide variety of operations like job operations and software distribution.

(1) WWW browser based integrated management

Monitoring and operations for a variety of JP1’s management functions are integrated in WWW browser. By using WWW browser (Fig. 2), hierarchical menus for operations are provided which enable executions of management functions and monitoring of operations state in remote machines.

(2) Centralized management of failure information

Failure caused by identification can be eased by centralized monitoring of events. This indicates that failures occur in distributed systems and centralized management of log information in database.

(3) Application program interface for customization

Using an application program interface for customization enables user programs to execute jobs, obtain references of execution results, and monitor abnormal events detected by JP1 centrally.

Seamless Operations for UNIX and Windows NT

The following job operations support functions can be possible in UNIX and Windows NT coexisting systems (Fig. 3).

(1) Seamless coordination of job automatic execution, print service, and backup operation.

(2) Batch job entry in UNIX server from PC client.

(3) Both UNIX server and PC server can execute and monitor batch jobs, control electric power on/off automatically on a specified date and time, control electric power-off after working and/or automatically stopping the other machines, etc.

Application Management

Coordination between JP1 and SAP AG’s ERP (Enterprise Resource Planning) application program “R/3”*5 enables job operations such as entry and monitoring of R/3 jobs, automatic execution of R/3 jobs, and scheduled automatic backup of database in R/3 system for mission critical tasks.

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*5: R/3 is a registered trademark of SAP AG.
Fig. 3—Unified Operations for UNIX and Windows NT Coexisting Systems. Hitachi’s JP1 enables seamless operations of batch job executions and automatic operations for UNIX and Windows NT coexisting systems.

Fig. 4—Integrated System Management for Distributed Object Environment. Integrated system operations and management can be developed by exchanging management information between management system for distributed object environments and legacy management systems using gateway.
Problem Management
Failure information such as abnormality of jobs and printers detected by JPI can be reported as trouble tickets by using Remedy Inc.’s helpdesk tool. This feature decreases the amount of time between failure occurrence and recovery compared with reporting failures by telephone.

OPERATIONS AND MANAGEMENT FOR NETWORK COMPUTING ENVIRONMENT
This chapter describes the operations and management for distributed application systems suitable for Internet based on distributed object technology “CORBA” and object oriented language “Java.”

Operations and Management for CORBA Environment
Necessary operations and management functions for distributed application systems based on CORBA are the same as the ones for legacy application systems such as monitoring and automatic job execution. Next generation enterprise information system will be based on CORBA. However, coexistence with legacy architecture will be required. Therefore, total system operations and management will be developed by exchanging management information between management systems for distributed object environments and legacy management systems using gateway (Fig. 4).

Operations and Management for Java Environment
In a typical network computing environment based on Java, Java application programs and/or Java applets for WWW (World Wide Web) will be distributed from server to clients based on the need for execution. Push type operations which send Java application programs automatically from server to clients without the client’s request when the specified programs are changed will be useful in total system operations and management.

CONCLUSIONS
This paper presented the necessary features for total system operations and management such as (1) increase efficiency of operability by “integrated view” using WWW browser which enables monitoring and operation centrally, (2) seamless operations like batch job execution and automatic operations are developed for heterogeneous environments consisting of UNIX, Windows NT, etc., and (3) application program interface for customization is provided using Hitachi’s JPI as an example. This paper also showed the relation between operations and management for distributed application systems based on CORBA and Java which are the basic technologies for a network computing environment and total system operations and management.

In the future, Hitachi will enable the same operations regarding JPI’s monitoring and automatic job scheduling for distributed application systems in network computing environments based on new technologies such as CORBA and Java.

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