Framework for WWW-Based and Distributed Objects System

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OVERVIEW: The popularity of the Internet (and intranet) has yielded many business systems based on the WWW (World Wide Web). Electronic Commerce (EC) is the most common example and includes such services as Internet shopping, and business-to-business commerce. Distributed objects technology CORBA (Common Object Request Broker Architecture) is used as the client-server system platform. A framework for a WWW-based and distributed objects system is a platform for constructing business systems based on the WWW and distributed objects. It provides the necessary facilities and sets of “application skeletons” that are program fragments for interfacing with the facilities for building distributed objects systems that are compatible with the WWW. The framework reduces development cost for the WWW-based and distributed objects system.

INTRODUCTION
ACCORDING to the globally spread availability of the Internet and an intranet, WWW is a popular means of browsing the internet and business intranet systems. In recent years, distributed objects technology has been a key issue as a platform for client server systems. Distributed objects technology is based on CORBA (Common Object Request Broker Architecture)* which is a standard specification defined by OMG (Object Management Group). It includes ORB (Object Request Broker) which is an inter-object communication facility, and object services, such as transaction services and so on.

This paper introduces a framework for a WWW-based and distributed objects system which is a platform for constructing business systems based on the WWW and distributed objects. It has been developed as one of application frameworks in the “Network Objectplaza.”

COORDINATION FOR WWW AND DISTRIBUTED OBJECTS
Hitachi, Ltd. has already proposed system solutions for coordinating distributed objects with the WWW for EC systems. These systems are applied to Internet shopping, Internet banking, business-to-business commerce, and so on. The facilities of such a system are as follows. General business systems for the WWW let end users interface with server systems through WWW browsers and client programs that are invoked via the browsers. Then, the server systems accept HTTP (Hyper Text Transfer Protocol) requests, perform operations for these requests, and return responses using HTTP. Hitachi solutions for EC enable the server application programs to be built as distributed objects invoked via ORB1).

The solutions include two facilities. As Fig. 1 shows, they are the WWW page generator and the WWW CORBA gateway. The WWW page generator generates WWW pages specified by template files for the pages. By invoking specified distributed objects via ORB, it can get data that is to be inserted on the pages, or it can update databases in response to the end user’s operations. The WWW CORBA gateway enables client application programs to invoke the server application programs using distributed object methods.

FRAMEWORK FOR A WWW-BASED AND DISTRIBUTED OBJECTS SYSTEM
The WWW and distributed object coordination facilities can be applied not only to EC systems but also to various business systems that are based on the WWW. They are core facilities for the framework for WWW-based and distributed objects system (FWDO).

FWDO determines an architecture for a business

* CORBA is a standard specification for the development of distributed applications established by the Object Management Group, an international non-profit foundation.
system based on WWW and distributed objects and provides the necessary facilities for such systems and program fragments for interfacing with the facilities. Fig. 2 shows the architecture for business systems constructed using FWDO.

Facilities

FWDO facilities are categorized as follows.

Inter-system glue services

This is the set of facilities necessary for distributed objects to make communication via WWW, collaborate with legacy systems, and operate databases. It includes...

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**Fig. 1—Coordination for WWW and Distributed Objects.**

Server application programs can be constructed as distributed objects and can operate on requests through WWW and WWW page generation.

**Fig. 2—Framework for WWW-Based and Distributed Object System.**

This framework provides facilities and program fragments for interfacing with the facilities so that application programmers can focus on their business logic.
the WWW and distributed objects coordination facilities that are stated above as well as the following facilities. The object session facility controls delivery of requests via WWW to distributed objects. It dispatches requests that belong to the same WWW session to the same object. The legacy gateway facility provides adapters to communicate with various legacy systems. The RDB (Relational Database) access facility provides call interfaces that are sufficiently abstract and common among various RDB products.

Middleware Objects

This is the set of distributed objects that implement operations necessary for systems to provide information to end users through the WWW mechanism. It includes a user authentication facility that authenticates end users accessing the server systems, the contents selection facility that determines the contents to be shown in WWW pages to the specific end user, and so on. The contents selection facility selects the contents and enables the WWW page generator to change the WWW page contents according to the end user’s attributes. They are implemented as distributed objects which can be invoked by the WWW page generator via ORB.

Application Skeleton

FWDO provides the program fragments necessary for interfacing with FWDO facilities. They are called “application skeletons.” The application skeletons show how to plug FWDO facilities into the business systems. Application programmers can put such skeletons into their programs and customize them to meet their systems’ specific requirements.

Advantages

FWDO reduces the development cost for business systems that are based on WWW and distributed objects. By implementing their server programs as distributed objects based on FWDO, application programmers can:

(1) make their server application programs compatible with WWW browsers and client programs through the WWW mechanism.
(2) make a thread of distributed objects so that a specific end user can be served without knowledge of the mechanisms of the WWW, distributed objects, and threads.
(3) make their server systems to provide services that are dynamically customized for each end user.

CONCLUSIONS

The framework for WWW-based and distributed objects system can be used as a platform for business systems that use WWW and distributed objects based on CORBA. We are planning another framework for coordinating distributed objects with work-flow facilities.

REFERENCE


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