"WebOTX," Service Execution Infrastructure for the Next-Generation Era

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Abstract

As we advance toward the NGN era, the development of enterprise information systems seems likely to increase in importance to an even higher level than ever by supporting further enhancements in enterprise competitiveness. The next-generation service execution infrastructure WebOTX has renewed the product lineup supporting the development of enterprise information systems by providing a rapid service developing environment, high-speed processing of large volumes of information and execution infrastructures that improve reliability. This paper is intended to introduce the product strategy for the next-generation service execution infrastructure WebOTX and to outline its latest solutions.

Keywords

services, NGN, ubiquitous, mobile, SOA, SIP, speech recognition, speech synthesis, RFID, application server

1. Introduction

The NGN (Next Generation Network) is expected to affect businesses that utilize it at the same time as improving network quality in the context of the various new business opportunities that are currently becoming available. These include; the expansion of consumer-oriented services making use of ubiquitous devices, the activation of network communities, the rise of businesses making use of massive amounts of generated real-time information, and the utilization of VoIP communications. It is essential for an enterprise that wishes to survive in such a greatly changing business environment to prepare enterprise information systems to effectively support its business activities as well as to enhance its management foundations.

This paper discusses our strategy for the enhancement of service execution infrastructure products that are designed to support the enterprise information systems of the NGN era.

2. The Role of the Service Execution Infrastructure

Enterprise information systems of today are not built on single computer systems, they feature various complicated aspects, which include transactions management of database servers, data linkage between multiple systems, placement/management of multiple applications and load distribution using cluster systems. The service execution infrastructure is the middleware for facilitating such system constructions by help-

ing to condense the complex execution environment.

NEC has commercialized WebOTX, which is a Java based application servers. Thanks to our endeavors in providing availability and reliability improvements, our products have been adopted to support the infrastructures of many systems, including ones both in the governmental/public and financial domains.

Now that the NGN age has begun, changes in the competition environments of enterprises are increasing in severity as shown in **Fig. 1**, and it is now essential that the service execution infrastructures quickly incorporate the latest technologies in their enterprise systems. In order to meet these new chal-
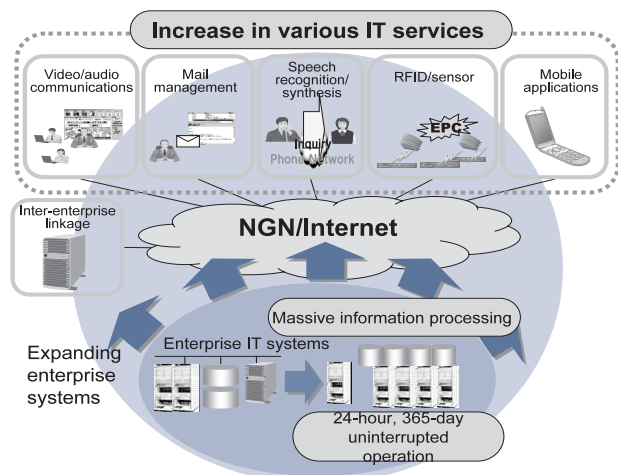

Fig. 1 Changes in environment surrounding enterprises.

lenges, we have expanded the service execution infrastructures within the context of the three target areas described below.

(1) Rapid Service Development

Multimedia services, NGN, RFID, mobile devices, and other new technologies, information categories, devices and networks are being introduced one after another. Any enterprise that does not want to miss a business opportunity should integrate these innovations into its business systems before its competitors do so. It is also expected that the system development based on service-oriented architecture (SOA) must be a consideration in the overall optimization of business systems. WebOTX supports the business innovations of enterprises by providing the middleware for quickly incorporating the latest technologies such as the NGN service construction and RFID/sensor utilization infrastructures, speech recognition and speech synthesis into enterprise systems and by enhancing system development environments based on the use of SOA.

(2) High-Speed Processing of Large Volumes of Information

It has become essential to improve the efficiency and competitiveness of business activities in order to obtain large amounts of information from sensor devices such as RFID sensors and mobile terminals in real time and to utilize them effectively. In addition, the trend toward an increase in information generated by enterprises is also backing the need for the efficient processing of large amounts of information. In order to deal with this new information environment, WebOTX provides an infrastructure for the high-speed processing of vast amounts of information. It achieves this by supporting the efficiency of enterprise activities with timely acquisition and effective use of information.

(3) A Highly Reliable Execution Infrastructure

Enterprise information systems are currently involved at all activity levels in every enterprise and to such a degree that it is no exaggeration to say that enterprise information systems are now synonymous with the enterprise activities themselves. An information system shutdown event is equivalent to a stoppage of enterprise activities, which in turn also exerts a critical loss on society as a whole. In addition to its traditional highly reliable technology WebOTX introduces a fault recovery technique for communications systems by providing a stable service infrastructure. This has been done in order to improve the reliability of enterprise information systems in the NGN era.

3. Product Strategies Aimed at the NGN Era

In order to achieve the above targets, the service execution infrastructure WebOTX features a renewed production lineup (**Fig. 2**). In particular it has enhanced SIP capability, and provided new service components for RFID, speech recognition and mobile applications so that enterprise systems may speedily introduce the latest technologies.

In the following sections, we will introduce the product lineup and strategies of WebOTX by focusing on its enhanced functions.

3.1 SIP Compatibility

The SIP (Session Initiation Protocol) is the protocol for initiating, changing and finalizing sessions of IP phone and multimedia communications, which is adopted as the basic call control system for NGN. In addition to the traditional HTTP, WebOTX introduces the WebOTX SIP Application Server (WebOTX SIP AP Server) as the server product for use in the construction of SIP-based services.

The WebOTX SIP AP Server supports SIP Servlet 1.0 (JSR116), which is the standard for implementing SIP-based communication services on the Java platform. For example, it allows the management of IP phone session on the Java platform. As the SIP Servlet is implemented on the same Java Servlet infrastructure as the HTTP Servlet, it can easily develop job services by fusing web applications and SIP applications, e.g. in order to control SIP terminals from a web applica-
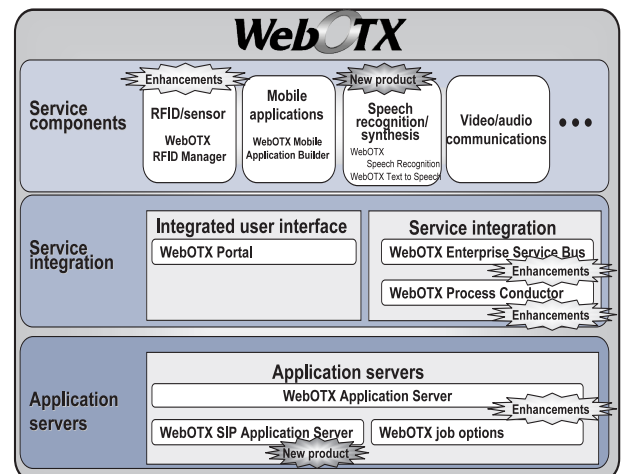

Fig. 2 Product lineup of service execution infrastructure WebOTX.

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tion.

In addition to guarantee a stable connection with SIP proxy servers from NEC, such as the IP telephony server UNIVERGE SV7000, the function for the virtualization of the SIP proxy server is also provided. This virtualization makes it possible to utilize the extended functions of the SIP proxy server at the connection destination without in any way modifying the application. It is expected to thus improve the portability of SIP-based applications and to promote conventional application reuse.

3.2 RFID Management

RFID is attracting attention as a tool for the surveillance of real world situations that can be applied in many business contexts. However, there are some problems that remain to be solved before applications can be developed, such as differences in reader/writer specifications between vendors and the need for the preparation of a common data to support systems linkages. The infrastructure product that solves these issues and covers the process from construction through administration of the RFID system is the WebOTX RFID Manager.

The WebOTX RFID Manager is the first product released from a Japanese vendor that complies with the standards established by EPCglobal, the RFID standardization organization. This makes it possible to build SCM systems utilizing RFID on a global scale by absorbing the differences in the many reader/ writer tag specifications of the mainly Japanese vendors. The application developers can thus develop systems efficiently by using the common API (web service) independently and without device constraints. When this development environment is integrated with the WebOTX Application Server, it is possible to support the entire application-related process from the development to the debugging stage.

3.3 Speech Recognition/Synthesis

The advance of integration of web applications and VoIP has increased the importance of technologies for handling voice communications in a similar manner as for data.

WebOTX Speech Recognition is a speech recognition solution that is capable of converting speech into text at a high recognition rates. Unlike the traditional voice recognition at the word level, it recognizes the spoken language and converts it into text. A high recognition rate is achieved thanks to the use of language models that store conversation patterns and additionally by the use of acoustic models. This technology can be used effectively for the conversion of voices into texts

e.g., in the creation of reception records of contact centers, as well as in a large variety of applications including the extraction of keywords from conversations.

WebOTX Text to Speech is an engine for the synthesis of voice with text. It employs the corpus method to reproduce natural voices and to synthesize high-quality voices with a wide frequency band using high bit rates. It can be applied to existing automatic interactive voice response systems as well as to wide applications including traffic information guidance and disaster information broadcasting.

3.4 Service Bus Enhancements

More and more enterprises are introducing the concept of SOA aiming at constructing business systems with high extendibility and linkages with regacy systems. The function for implementing loose linkages between services by virtualizing the service locations and protocols is called the Enterprise Service Bus (ESB).

The WebOTX ESB is the first commercial ESB product that complies with JBI 1.0 (Java Business Integration 1.0 JSR208), which will be the ESB standard of the future. Open-source JBI-compliant components are already available, and utilization of open technologies and provision of components by third parties are expected for the future.

Most of the ESB overheads are occupied by message conversion processing. WebOTX ESB adopts a unique XML fast analysis technology in order to significantly improve the throughput (to a maximum of about 3 times the throughput of competitor products).

3.5 Application Server Enhancements

The WebOTX Application Server is a J2EE 1.4-compatible web application server that has been proven over a wide range from small-scale web systems to large-scale mission-critical systems. This product features enhancements that offer the higher reliability that is tuned to the needs of a core product of the service execution infrastructure of the NGN era.

The WebOTX Application Server is the first product in the world that has acquired compliance with both the WS Reliability and WS Reliable Messaging specifications. These are the main standards for high-reliability messaging of web services. With the standard API abstracting both standards, it becomes possible to develop applications without being concerned about the standards used by the other parties of communications.

An autonomous operation function is also offered that can

deal effectively with load variations. In an environment in which the loads of business applications are distributed among clustered servers, this function enables autonomous server extensions at the job level by monitoring server loads, statistically identifying increases in specific job application loads and dynamically altering the job allocation at the load balancer. Adjustment of the server monitoring intervals according to the load situation makes this function capable of dealing appropriately with sudden load increases.

4. Conclusion

The service execution infrastructure WebOTX contributes to the business innovations of enterprises by supporting the implementation of enterprise information systems with high values, high reliability and high performances that are tuned to the NGN era. In the future, we will advance the preparation of service components that implement the latest technologies and will endeavor to further improve the reliability and performance standards of our products.

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