# SOA (Service Oriented Architecture) Platform Product Series “ActiveGlobe Process Convergence”

YAGI Shinjiro, SAITOH Tsutomu, TACHIBANA Makoto

**Abstract**

This paper introduces ActiveGlobe Process Convergence, an SOA (Service Oriented Architecture) platform product series to support the creation of SOA-based systems, and particularly, ActiveGlobe BizEngine/BPEL, business process execution engine, and ActiveGlobe WebOTX, service execution platform, which are the core products of the group.

**Keywords**

SOA (Service Oriented Architecture), system integration, business process

## 1. Introduction

Flexibility in rapidly changing business environments is an important factor required of enterprise information systems. In this scenario, the SOA (Service Oriented Architecture) is attracting attention as a design aid for enterprise systems in the form of a set of services equipped with standard interfaces. The ActiveGlobe Process Convergence is a platform product series for use in the creation of efficient SOA-based systems. This paper is intended to introduce ActiveGlobe Process Convergence and its core products including the ActiveGlobe BizEngine/BPEL, business process execution engine and ActiveGlobe WebOTX, service execution platform.

## 2. ActiveGlobe Process Convergence

The ActiveGlobe Process Convergence is a key SOA product that provides functions from SOA process modeling to systems development, administration, monitoring and analysis. **Fig. 1** shows the outline of ActiveGlobe Process Convergence.

ActiveGlobe Process Convergence includes products that achieve the following functions.

**1) Integrated User Interface**
The ActiveGlobe Business Portal implements interface integration for information sharing, process system utilization and human task management.

**2) Business Process Integration**
The ActiveGlobe BizEngine integrates services in the business process and speeds up actions against changes in the business environment of enterprise systems.

**3) Security Integration**
The ActiveGlobe SECUREMASTER ensures secure service access with a single sign-on operation.

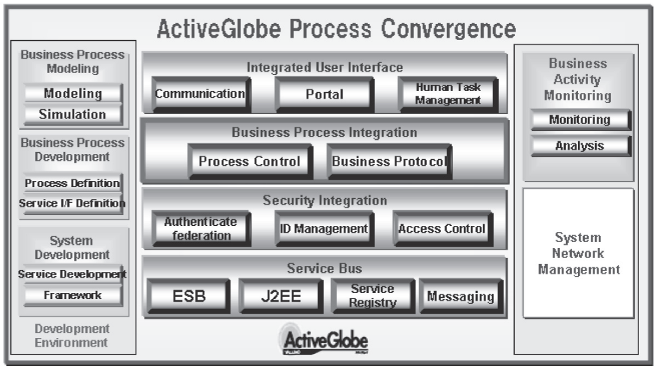

Fig. 1 Outline of ActiveGlobe Process Convergence.

**4) Service Bus**
The ActiveGlobe WebOTX flexibly links job systems to achieve the creation of systems based on the effective utilization of existing assets.

**5) Development Environment**
The ActiveGlobe System Director reduces systems development time by means of the seamless implementation of business process modeling, process development and system development.

**6) Business Activity Monitoring**
The WebSAM speeds up measures against problems by surveying the business process execution status, detecting problems early on and notifying these according to rank.

These products enable ActiveGlobe Process Convergence to implement a high-reliability, high-performance SOA system that can utilize existing systems while continuing to improve the business process.

## 3. Business Process Execution Engine ActiveGlobe BizEngine/BPEL

ActiveGlobe BizEngine/BPEL is a business process execution engine that enables business execution processes by linking multiple web services both inside and between enterprises.

A business process that can flexibly modify business flow, which consists of a combination of standardized services is an important element of SOA. WS-BPEL 2.0 is a standard established by OASIS, which is an XML and web service standard organization, as a language for use in definitions of the business process. It can define complicated business processes by linking services inside and outside the enterprise environment thanks to the advanced expression capability that is made possible by the following functions.

**1) Abundant Process Control**

The various process control functions; including sequential execution, concurrent execution, repeated execution and restart of a stopped process according to the time or event makes it possible to define even very complicated business processes.

**2) Exception Processing and Compensation Processing**

If an exception occurs in a business process that extends across multiple systems, it has traditionally been necessary to execute complicated processing in order to return the system to a stable condition. However, WS-BPEL 2.0 can define independent exceptions and compensation processing operations. It can easily define and execute processing in case of an exception (roll-back processing) even with widely extending business processes extending across multiple systems.

**3) Matching a Received Message and a Requesting Process**

When a response message is received after an asynchronous service call, it has traditionally been necessary to execute complicated processing to match the received message and the requesting process. WS-BPEL 2.0 is capable of automatic matching between the response message and the process waiting for that message, so it can be used easily in executing multi-system waiting time processing operations.

The ActiveGlobe BizEngine/BPEL is the first product released from a Japanese vendor to comply with WS-BPEL 2.0 that is capable of executing business process operations defined by WS-BPEL 2.0. In addition, as a result of the use of NEC's original intermediate code system, it is being credited with a higher execution performance rating than competitors' systems. **Fig. 2** shows an example of business process execution using BizEngine/BPEL.

The ActiveGlobe BizEngine/BPEL offers a plug-in for the ActiveGlobe System Director Developer's Studio, which is an Eclipse-based development environment, as an environment for supporting the development of business processes.

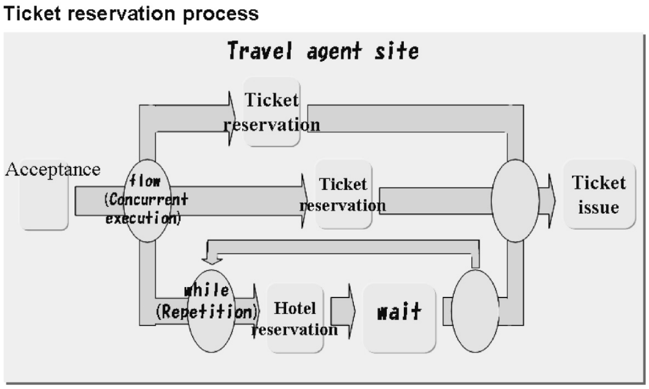

Fig. 2 Example of business process execution using BizEngine/BPEL.

While the process definition with WS-BPEL 2.0 is complicated because it offers advanced functions, this developmental support environment reduces the user's burden in the area of business process design thanks to the following functions.

- Process design function that may be used to design the WS-BPEL process definitions graphically.
- Template function that allows the created business process to be added as a reusable template.
- Verification function of the interface (WSDL) structure, WS-I compliance, the validity of the created business structure and the possibility of its execution on the BizEngine/BPEL.

## 4. Service Execution Platform ActiveGlobe WebOTX

ActiveGlobe WebOTX is a service execution platform for use in the efficient development of enterprise applications that comply with the J2EE-1.4 Java specification for basic job systems.

J2EE 1.4 is the standard established by Sun Microsystems for use in Java standard platforms for servers, and includes various specifications including the EJB-2.1, Servlet 2.4 and JSP 2.0. Among them, the most characteristic are the specifications defining the integration of web services that form the core products of  SOA, such as the JAX-RPC 1.1, JAXR 1.0, SAAJ 1.2 and WSEE 1.1.

The integration of web service engines enables a web service client to call the EHB directly. The ActiveGlobe Web OTX offers a developmental environment to enable the integration of the EJB and web services in a consistent progression from development to operation. This enables the business logic developed with the EJB to be usefully applied to SOA system com-

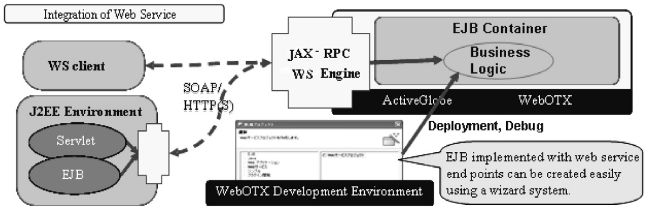
Integration of Web Service
WS client
J2EE Environment
Servlet
EJB
SOAP/
HTTP(S)
JAX - RPC
WS Engine
EJB Container
Business
Logic
ActiveGlobe
WebOTX
Deployment, Debug
WebOTX Development Environment
EJB implemented with web service end points can be created easily using a wizard system.

Fig. 3 Integration of Web services.

ponents. **Fig. 3** shows the integration of Web services.

The SOA performs system linkages using web services, and it is required to increase the speeds of the web service engines so as to perform the above processing rapidly. This function is achieved with a performance level which is among the highest in the industry by completely renewing the XML analysis processors that form are core components of the web service engines.

ActiveGlobe WebOTX provides service execution platforms incorporating autonomous operation that enables stable operations even under heavy loads by means of automatic system delay detection and automatic tuning according to the actual operational situation.

Traditional system delay detection functions have been accompanied by the following problems:

- The opportunities for use are limited because the accuracy tends to deteriorate, for example, when the transaction execution time under normal operational conditions varies.
- Major operations are necessary because intervention by the administrator is required.

On the other hand, the automatic system delay detection function of the ActiveGlobe WebOTX can detect the system delay in any transaction with high accuracy by learning the normal operational data, collating the actual data with the learned normal operational data and analyzing the overall condition statistically according to the variance in execution time between transactions (**Fig. 4**). As it makes autonomous judgments according to the system operation situation, it can detect system delays without the administrator's intervention and thereby reduces the system operation costs.

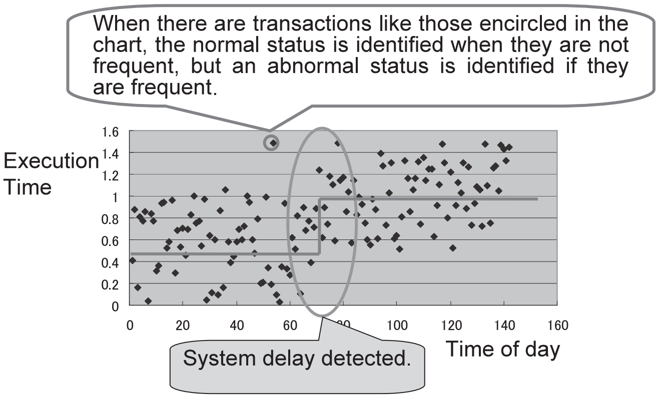

Fig. 4 System delay detection.

## 5. Conclusion

In the above, we introduced the ActiveGlobe Process Convergence, a platform product series for use in the efficient creation of SOA-based systems, and its core products, which are the ActiveGlobe BizEngine/BPEL business process execution engine and the ActiveGlobe WebOTX service execution platform.

In the future, we are planning to further enhance the linkages between the ActiveGlobe Process Convergence products and their SOA key functions such as the ESB (Enterprise Service Bus) function.

## Authors' Profiles

**YAGI Shinjiro**
**Engineering Manager,**
**Ubiquitous Software Division,**
**Systems Software Operations Unit,**
**NEC Corporation**

**SAITOH Tsutomu**
**Assistant Manager,**
**Ubiquitous Software Division,**
**Systems Software Operations Unit,**
**NEC Corporation**

**TACHIBANA Makoto**
**Technical staff,**
**Ubiquitous Software Division,**
**Systems Software Operations Unit,**
**NEC Corporation**

**●The details about this paper can be seen at the following.**
**Related URL : http://www.sw.nec.co.jp/ActiveGlobe/**
**ProcessConvergence.html**