Biztalk as Interoperability Tool to Application Integration in E-Government

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ABSTRACT

Interoperability means the ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable the sharing of information and knowledge. Interoperability between the different e-government will allow the government to deliver many services to citizens as one-stop-shop or one-portal and, share the data between the applications. In this paper we will present and explore Biztalk server 2006 as a tool to Integrate E-government Applications.

***Keywords**:* E-Government, Integration, Biztalk Serve, eGSK

1. Introduction

The problem with government offices is that they have limited hours, traditionally, citizens wanting to access a municipal service would have to visit a local office, stand in line and fill in a paper form. An employee would then enter the information from the form into the relevant back - end computer system. The data would be processed and some weeks later the citizen would receive a response to the request.

Now citizens can use services 24 hours a day, 7 days a week. With one password, they can use a lot of applications all with the same look and feel. It's very easy for them to communicate with the local government. Government wanted to shorten the waiting time and reduce the paperwork by providing citizens and businesses with more convenient access to services over the Internet. To do this, it needed to make electronic forms and services available from a single integrated source. Government portals provide integrated access through a single log-on to the services that are needed by each individual. To provide one-stop e-government services, the government needed to connect its front office to back - office applications running on a variety of different operating systems. We have a lot of software in our back office, from old UNIX applications to new Windows®- based solutions. We have to make all these back - office applications available to the front office, over the Web, to enable citizens to enter their own information and complete their transactions with the local government.

Many governments around the world attempt to satisfy new integration functionality requirements. As E- government is a recent area of investigation and the integration tools have a short history, the literature about government application integration (GAI) tools procurement is scarce. On the opposite, since more and more governments have the need to integrate their information systems, the most important software

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vendors of the market have begun to offer integration tools. In the market there is a diversity of enterprise application integration (EAI) tools that combine different technologies from integration like adapters, Application Programming Interface (APIs), message brokers, web services, screen wrappers, or XML-based integration systems.

Table 1: shows a list of the main tools vendors that propose to solve different problems of enterprise applications integration.

Vendors	EAI Tools
Microsoft	BizTalk Server 2006
IBM	WebSphere MQ
BEA Systems	BEA WebLogic
Oracle	Oracle Fusion Middleware
TIBCO	TIBCO BusinessWorks™, TIBCO BusinessWorks™ SmartMapper and TIBCO Adapters™

The tools focused on intra-organization integration are based on the so called middleware technologies; these are connectivity technologies that help the applications to abstract the complexity and heterogeneity of the communication networks, as well as the operating systems and the programming languages. EAI tools go beyond middleware, since they offer additional functionalities over the inferior levels of messages services transport and the translation services.

In this paper we will explore Biztalk Server 2006 as tool for e-government application integration, in section 2 we will review some e-government initiatives - around the world- to implement Biztalk Server 2006 as solution to integrate their applications, section 3 will give an overview about Biztalk Server 2006, finally we will conclude the use of Bizetalk in e-government.

2. E-government Initiatives

Microsoft Germany developed the E-Government Starter Kit (eGSK), as a platform based on the Microsoft BizTalk® Server 2006 integration engine. Microsoft Germany developed this technology specifically to meet the needs of public sector organisations that need to deploy electronic, inter-departmental, citizen-centric services. The eGSK enables the interoperability of data and functions across an organisation by creating XML-based applications and Web services that support automation.

Using the eGSK, every application is integrated into a central portal. As a result, employees in different areas of the organisation, including the call centre, have access to accurate, up-to-date data. The organisation also shares a single infrastructure for networking and security technologies.

The GoPro solution, GoPro.net, provides a consolidated view of all cases handled by local authorities. In doing so, it creates records for citizens from the minute they register for a public service to the time their query is resolved. Integrated with Microsoft Office SharePoint® Portal Server 2003, this solution ensures interoperability between each of the council's line-of-business applications, again using XML Web services.

Bringing transformational e-Government to life the Microsoft Connected Government Framework (CGF) provides local and regional government with the standards, tools and know-how to enable their IT environment to evolve and support a vision of truly seamless service delivery. The Microsoft CGF Integration Solution 2006 enables local authorities to deliver online services more effectively and securely using Government Connect.

Table 2: shows a list of initiatives to implement Biztalk Server 2006 as solution to integrate their applications:

Country	Industry	Customer Profile	Business Situation	Solution	Benefits
Romania	Public sector	Mehedinti District Council and 66 municipal authorities deliver public services—including registering land titles and issuing birth and marriage certificates—in the Mehedinti region of Romania.	Public services were delivered using time-consuming paper processes. The council decided to deploy new centralised systems to automate processes, reduce administration, and enhance services	The council deployed an IT infrastructure based on the eGSK, which supports integration of council functions and automates service delivery through multiple channels.	• Sets new standards of service. • Delivers open, transparent services. • Changes public perception. • Cuts implementation and operational costs.
United Kingdom	Local Government	Basingstoke and Deane Borough Council in the south east of England is only 40 miles from London. It serves a population of 152,000 people, of whom 92,000 live in Basingstoke itself, with the rest inhabiting the surrounding rural areas.	The council needed an enterprise application integration (EAI) solution that met its one - stop - shop contact centre' s requirements and also offered round - the - clock services to residents through the Web.	The council decided to use Northgate CRM software for the contact centre front office with Microsoft® BizTalk® Server 2006,	• Single contact number for citizens • Round - the - clock service availability • Contact centre productivity increases • Ongoing support from partners • Meets e-government targets
Germany Siegburg	Public sector	The City of Siegburg is responsible for providing a range of local services to the residents of Siegburg, located in the state of North Rhine-Westphalia, Germany	It needed to connect a multitude of back - office systems and applications to the front office in order to enable e - government and fully automated workflows.	It deployed (EGSK), specifically for public administrations that need to implement electronic inter - departmental services.	• Integrates front and back offices • 24/7 service delivery • Eliminates data re-entry • Shared costs and experience • Takes advantage of existing technology

U.K	Local Government	The Royal Borough of Kingston upon Thames council in the U.K. manages the local government services for approximately 160,000 residents.	Kingston council experienced difficulty managing the myriad calls for services it received from its residents.	Kingston selected Microsoft Dynamics® CRM, integrated with Microsoft® Office SharePoint® Server, and deployed a data hub using Microsoft BizTalk® Server to synchronize resident data across multiple systems.	• First-call resolutions improving to 80 percent • Call volume capacity increased 100 percent • Backlogs for service requests reduced or eliminated • Accountability and transparency increased
Thailand	Ministry of Industry	Thai Ministry of Industry under its modernization program provides anywhere, anytime access 75 provinces nationwide to its multi channels and E-Services	•Need to provide anywhere, anytime access to its country wide network real time •Need a Web-based applications for multi services under its ICT Modernization program •Need an integration from various systems •Prepare an organization to SOA.	•BizTalk Server 2006 to integrate with external agencies through web services as a middleware between and other sources. •SQL Server 2005 Integration Services from various systems such as DB2, Excel, and text to SQL Server.	• Rapid time to development • Increased Productivity • No reinvestment cost • Lower call and service center costs due to availability of information online • Extensible for system-to-system integration • •Become a leading organization in the country to ICT modernization.

Microsoft CGF Integration Solution 2006 comprises:

- Microsoft Windows Server™ 2003
- Microsoft BizTalk Server 2006
- Microsoft SQL Server® 2005
- Microsoft ISA Server 2004
- Microsoft Operations Manager 2005 (optional)
- Government Gateway Accelerator
- Government Connect Toolkit

3. Biztalk Server 2006 Overview

3.1 Introduction to Biztalk Server 2006

No application is an island. Whether we like it or not, tying systems together has become the norm. Yet connecting software is about more than just exchanging bytes. As organizations move toward a service-oriented world, the

real goal—creating effective business processes that unite separate systems into a coherent whole—comes within reach.

BizTalk Server 2006 supports this goal. It allows connecting diverse software, then graphically creating and modifying process logic that uses that software. The product also lets information workers monitor running processes, interact with trading partners, and perform other business-oriented tasks.

- The most important new additions in BizTalk Server 2006 are:
- Better support for deploying, monitoring, and managing applications.
- Significantly simpler installation.
- Improved capabilities for Business Activity Monitoring (BAM).

BizTalk Server 2006 also uses the latest releases of other Microsoft technologies. It's built on version 2.0 of the .NET Framework, for example, and its developer tools are hosted in Visual Studio 2005. For storage, the product can use SQL Server 2005, the latest version of Microsoft's flagship database product, or SQL Server 2000. BizTalk Server 2006 can also run on 64-bit Windows, taking advantage of the larger memory and other benefits this new generation of hardware offers.

3.2 What BizTalk Server 2006 Provides:

Combining different systems into effective business processes is a challenging problem. Accordingly, BizTalk Server 2006 includes a range of technologies. The figure below illustrates the product's major components.

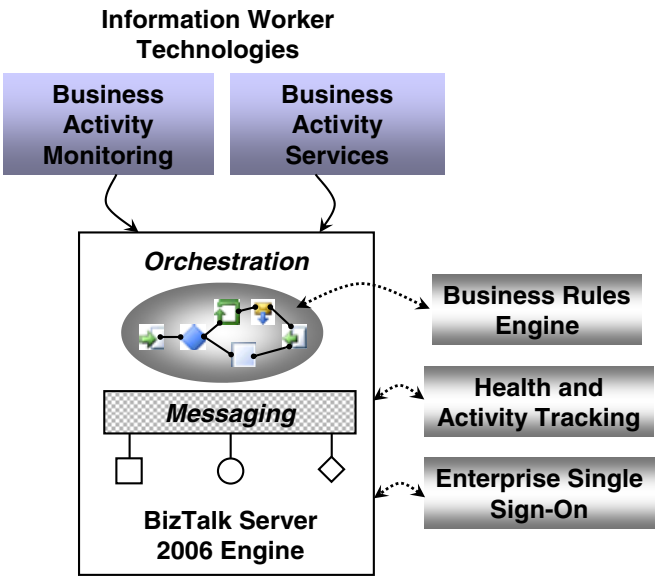

Figure 1: Information Worker Technology

As the figure 1 suggests, the heart of the product is the *BizTalk Server 2006 Engine*. The engine has two main parts:

- A *messaging* component that provides the ability to communicate with a range of other software. By relying on pluggable adapters for different kinds of communication, the engine can support a variety of protocols and data formats, including Web services and many others.
- Support for creating and running graphically-defined processes called *orchestrations*. Built on top

of the engine's messaging components, orchestrations implement the logic that drives all or part of a business process.

- Several other technologies can also be used in concert with the engine, including:
- A Business Rules Engine that allows evaluating complex sets of rules.
- A Health and Activity Tracking tool that lets developers and administrators monitor and manage the engine and the orchestrations it runs.
- An *Enterprise Single Sign-on* facility, providing the ability to map authentication information between Windows and non-Windows systems.
- On top of this foundation, BizTalk Server 2006 provides a group of technologies that address the more business-oriented needs of information workers. Those technologies are:
- Business Activity Monitoring, allowing information workers to monitor a running business process. The information is displayed in business rather than technical terms, and what gets displayed can be controlled directly by business people.
- Business Activity Services, allowing information workers to set up and manage interactions with trading partners.

All of these technologies are focused on solving the problems inherent in using a diverse set of software to support automated business processes. The next section examines how these solutions might look.

3.3 How BizTalk Server 2006 Is Used:

The great majority of modern business processes depend at least in part on software. While some of these processes are supported by a single application, many others rely on diverse software systems. This software has commonly been created at different times, on different platforms, and using different technologies. Given this, automating those business processes requires connecting diverse systems.

Addressing this challenge goes by various names: business process automation (BPA), business process management (BPM), and others. Whatever it's called, two scenarios are most important for application integration. One is connecting applications within a single organization, commonly referred to as *enterprise application integration (EAI)*. The other, called *business-to-business (B2B) integration*, connects applications in different organizations.

The figure 2 below shows a simple example of the core BizTalk Server 2006 engine applied to an EAI problem. In this scenario, an inventory application, perhaps running on an IBM mainframe, notices that the stock of an item is low and so issues a request to order more of that item. This request is sent to a BizTalk Server 2006 orchestration (step 1), which then issues a request to this organization's ERP application requesting a purchase order (step 2). The ERP application, which might be running on a Unix system, sends back the requested PO (step 3), and the BizTalk Server 2006 orchestration then informs a fulfillment application, perhaps built on Windows using the .NET Framework, that the item should be ordered (step 4).

In this example, each application communicates using a different protocol. Accordingly, the messaging component of the BizTalk Server 2006 engine must be able to talk with each application in its native communication style. Also, notice that no single application is aware of the complete business process. The intelligence required to coordinate all of the software involved is implemented in the BizTalk Server 2006 orchestration.

Connecting applications within an organization is important, but connecting applications that span organizations can have at least as much value. The figure 3 below shows a simple example of this kind of B2B integration. In this case, the purchasing organization at the top of the figure runs a BizTalk Server 2006 orchestration that interacts with two supplier organizations. Supplier A also uses BizTalk Server 2006, providing indirect access to

its Supply application. Supplier B uses an integration platform from another vendor, connecting to the purchasing organization's BizTalk Server 2006 orchestration using, say, Web services.

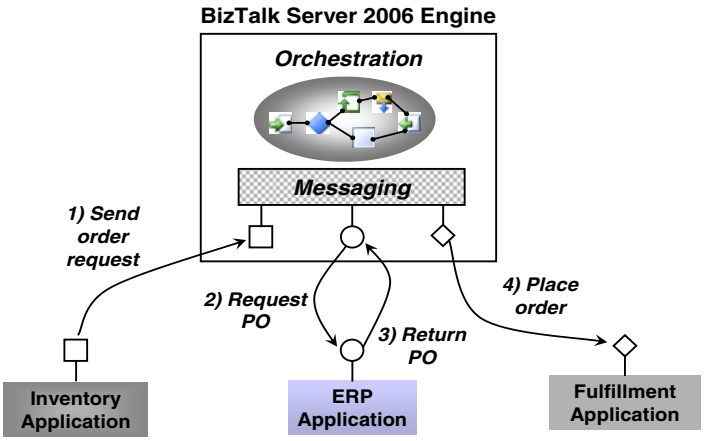

Figure 2: BizTalk Server 2006 Engine

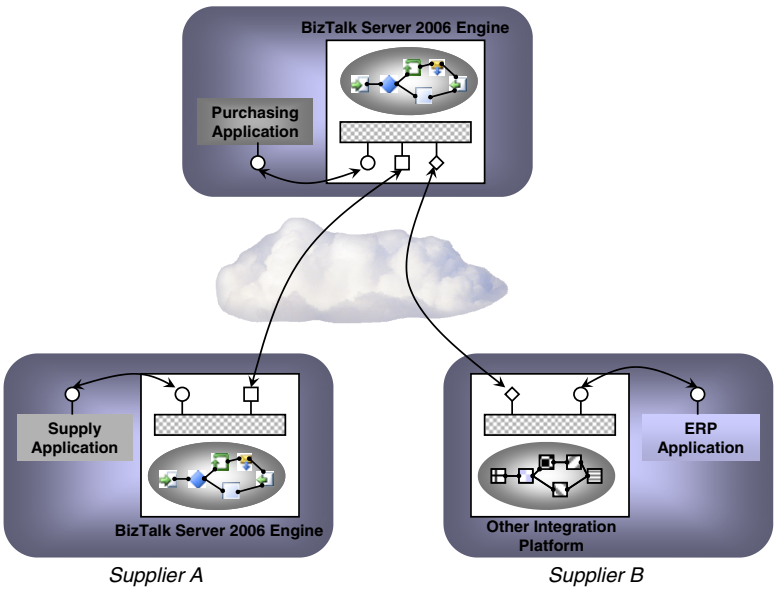

Figure 3: Integrated web service

Integrating existing applications, whether in a single company or across different organizations, into a single automated business process is a fundamental goal of BizTalk Server 2006. Once those automated processes exist, the product also gives business people, not just technicians, visibility into what's happening inside the process. In the complex and diverse world of enterprise software today, this kind of integration is a necessity for many organizations.

3.4 The BizTalk Server 2006 engine

To allow its users to create a business process that spans multiple applications, the BizTalk Server 2006 engine must provide two primary things: a way to specify and implement the logic driving that business process, and some mechanism for communicating between the applications the business process uses. The figure 4 below illustrates the main components of the engine that address these two problems.

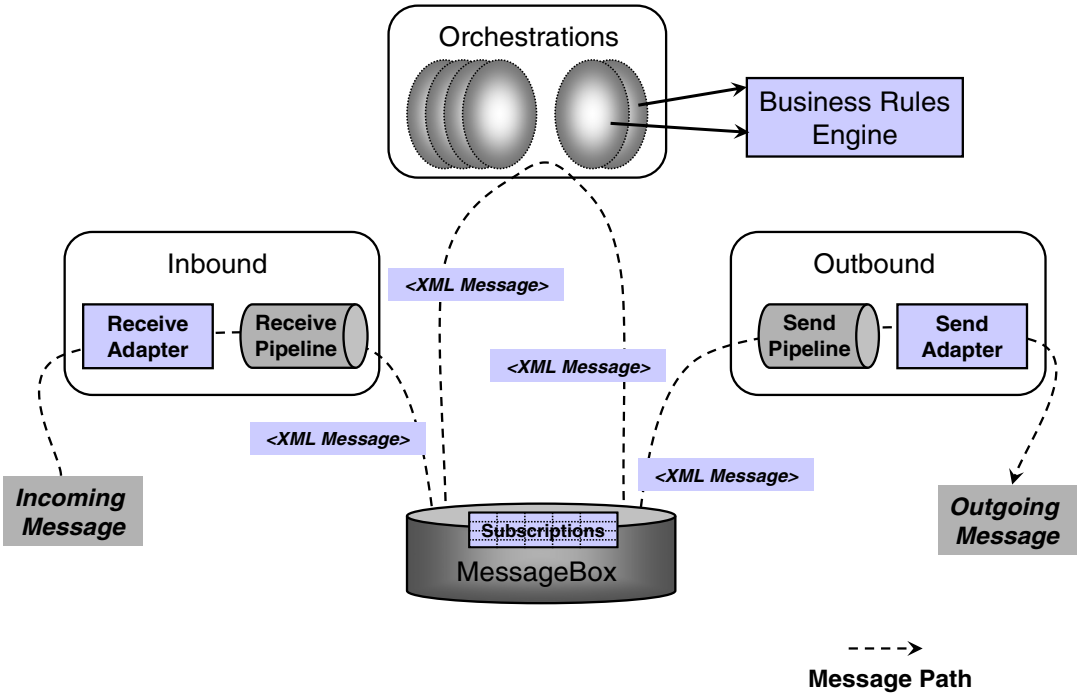

Figure 4: Main Components of the Engine

As the Figure 4 shows, a message is received via a *receive adapter*. Different adapters provide different communication mechanisms, so a message might be acquired by accessing a Web service, reading from a file, or in some other way. The message is then processed through a *receive pipeline*. This pipeline can contain various components that do things such as converting the message from its native format into an XML document, validating a message's digital signature, and more. The message is then delivered into a database called the *MessageBox*, which is implemented using SQL Server.

The logic that drives a business process is implemented as one or more orchestrations, each of which consists of executable code. These orchestrations aren't created by writing code in a language such as C#, however. Instead, a business analyst or (more likely) a developer uses an appropriate tool to graphically organize a defined group of *shapes* to express conditions, loops, and other behavior. Orchestrations can optionally use the Business Rules Engine, which provides a simpler and more easily modified way to express complex sets of rules in a business process.

Each orchestration creates *subscriptions* to indicate the kinds of messages it wants to receive. When an appropriate message arrives in the MessageBox, that message is dispatched to its target orchestration, which takes whatever action the business process requires. The result of this processing is typically another message, produced by the

orchestration and saved in the MessageBox. This message, in turn, is processed by a *send pipeline*, which may convert it from the internal XML format used by BizTalk Server 2006 to the format required by its destination, add a digital signature, and more. The message is then sent out via a *send adapter*, which uses an appropriate mechanism to communicate with the application for which this message is destined.

4. Concluding Remarks

The goal of BizTalk Server 2006 is to help organizations meet the challenges of creating automated business processes that rely on diverse systems. The product's foundation is the BizTalk Server 2006 engine, which provides core messaging and orchestration capabilities. Developers can also use the Business Rules Engine to address complex business scenarios, the Health and Activity Tracking tool to debug and examine BizTalk applications, and Enterprise Single Sign-On to create more secure environments. Information workers can use the product's Business Activity Monitoring support to get business-oriented information about a running process and Business Activity Services to work with trading partners. From its initial roots in EAI and B2B integration, BizTalk Server 2006 has grown into the foundation for supporting a range of business processes. As the change to a service-oriented world rolls on, BizTalk Server 2006 will continue to play an important part in e-government automation of business processes.

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