

Expanded Research Proposal:

**Connecting Small and Medium Sized
Enterprises Together in the Value Chain
With Web Services and QuickBooks**

Mark Varner

MIS 598

varner@iastate.edu

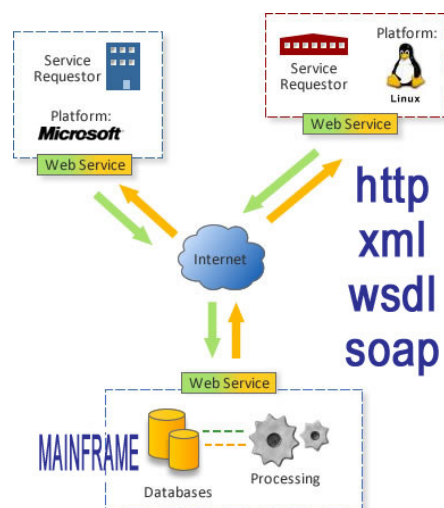
4/15/2010

Introduction

Many business information systems are virtual islands isolated from partners up and down the value chain. Larger enterprises are already connected because they can pressure business partners to adapt communication protocols in order to play the game. But Small and Medium sized Enterprises (SMEs) do not have this leverage. This disparity creates a competitive disadvantage for SMEs.

Without the ability to communicate in real time to value chain partners, SMEs cannot run their operations as efficiently as larger enterprises.

This disparity increases operating costs and reduces profits for SMEs. To solve the problem, SMEs need to build bridges with value chain partners using a computing method known as Web Services. Web Services involve the transmission of standardized data between diverse systems using HTTP, XML, SOAP & WSDL protocols.



Web Services can connect multiple application on diverse operating systems

Web Services communicate in simple web protocols to create data connections between diverse applications. They are loosely coupled, standardized communications that overcome the interoperability issues of modern information systems. Web Services also promote reusability, which greatly reduces design time and improves functionality. With Web Services; islands can now communicate with other islands. However, very few SMEs use web services to communicate.

Is there a future for interoperability and communication between SMEs on the value chain if they refuse to adopt Web Services? Are there techniques and methodologies available for SMEs today that will allow them to implement this computing paradigm?

To evaluate this question we must first know more about the specific field of Web Services and the more general study of Service Oriented Architecture (SOA).

SOA Defined

Service Oriented Architecture (SOA) promotes the idea that IT applications are service providers and consumers acting together to support the overall business goals of an organization. SOA defines a system in which a group of related software components with an autonomous nature carry out a given business process. These components can communicate with each other inside the same enterprise and with other services outside the enterprise. In theory SOA enhances reusability, flexibility, and reduces design time for business projects. The idea has gained significance in recent years due to the emergence

of new technologies based on open standards that allow different systems to communicate.

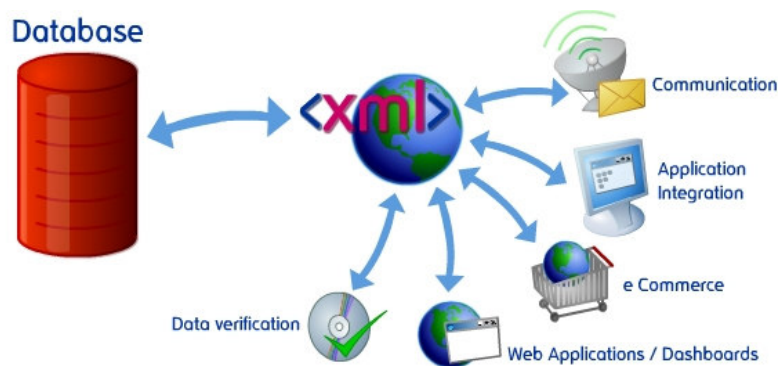
The principles of SOA require that the services should be clearly defined by a published interface contract, have network addressable endpoints, are dynamically discoverable and usable, and emphasize interoperability. It's typically better to use a service that already exists rather than to build a new service that exactly matches a project's needs. Designers should always consider whether the services they are building could have value to the organization beyond the scope of the individual project. If so, they should design the service for reuse by concentrating on getting the granularity right and by adopting corporate data models that enable process flow. Granularity refers to the level of abstraction in the process. If a process performs a very specific task; it is said to be of high granularity. If the process performs a general task; it is said to be of low granularity.

Services are offered at a business level of abstraction which renders the interface as a business handshake or contract. The contract is a mechanism that allows systems to be formalized. Currently SOA is providing well-defined contracts with which other systems or applications can interact and significantly decrease the dependency on coding. In this process, legacy and new applications are "wrapped" using the contracts, and they become the provider of some service. The process of wrapping the legacy application into a service

allows for what is known as "loose coupling" of services. Literally "loose coupling" means everyone can talk to everyone regardless of network, computer, or OS.

Delivering Value

The purpose of SOA is to cost-effectively deliver solutions that generate business value. Service oriented architecture does this by promoting the use of flexible and sharable mini-applications. These miniature applications, can be pieced together to form a larger application or process. My research indicates that SOA delivers value through reduced coding, process sharing, and enhanced functionality. All of these characteristics can either lower development costs or increase the payoff from software development.



Web Services connect diverse databases to remote application via HTTP

SOA and Web Services

Web Services currently represent the best technology for implementing SOA. But not all web services are service-oriented. Typically a service is defined as exchanging and processing information. So there must be a request and response action involved in the web service for it to be considered an SOA component. Any web service that simply "pushes" information, like news or weather, is not by nature a component of SOA.

Web Services provide a necessary standards-based implementation that makes interoperability feasible. The tools that make this possible are WSDL, SOAP, XML, and HTTP. In general terms the HTTP provides the transport mechanism for this system to operate. While the WSDL defines the requirements of the service during construction, and the SOAP packages the XML messages that volley back and forth between the service provider and consumer.

WSDL (Web Service Definition Language)

The WSDL file gives the developer of a Web Service consuming application all of the information necessary to invoke a Web Service. WSDL provides a description of service the interface contract. The WSDL also gives self-description aspect to the Web Services. WSDL is an XML-based grammar used to define a contract provided by the Web. WSDL provides a means to describe the basic format of a Web Service request message or invocation and the format of a subsequent response message from the Web Service.

SOAP (Simple Object Access Protocol)

Web Services are invoked using SOAP messages. SOAP, which is defined using XML, is a standard for transmitting messages across the Internet. SOAP facilitates application-to-application interoperation between multiple processing points. SOAP messages contain header information about the communication channel and a body containing the business-oriented content.

XML (Extensible Markup Language)

XML is the technology that underpins it all. Since XML is text based, it can be

read by virtually any machine on any platform giving a high degree of interoperability. WSDL and SOAP are XML based.

HTTP (Hypertext Transfer Protocol)

The HTTP protocol, while not the only protocol available, is the most widely used. HTTP is commonly used by nearly all network and OS configurations. SOAP provides a platform independent protocol for sending XML messages across this HTTP wire.

Dot Net and SOA

Although Web Services can be created on any platform; Microsoft's .NET framework is heavily geared towards the creation of Web Services. It provides a number of tools and features through which a Web Service can be quickly and easily built. A lot of the complexity of generating the necessary SOAP messages, for example, is hidden from developers. Through the utilization of special attribute tags, a method can be marked as a Web Method, available to be serialized over the wire. Because Microsoft .NET framework offers a high degree of native XML support, it is well suited to building Web Services. The framework will also automatically generate the WSDL required.

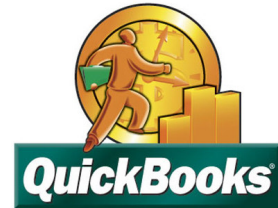
Statement of Problem

Even though Web Services have the potential to connect SMEs up and down the value chain to help them achieve higher interoperability and greater efficiency, few SMEs choose to implement this solution. How can SMEs compete with Larger Enterprises if they refuse to adopt automated communication

methods in their value chain? Can SMEs ever profit by connecting value chain partners using Web Services? What techniques and methodologies are available for SMEs to increase profitability using this emerging paradigm?

Is QuickBooks the answer?

More SMEs use QuickBooks than any other business accounting and inventory management system.



QuickBooks can read XML if configured properly on a web server. The QuickBooks Web Connector acts as a go-between applications allowing qbXML (QuickBooks XML) to pass data between a Web-based application and QuickBooks financial software.

This means; there is a widely used methodology that can be implemented. So why don't SMEs implement Web Services immediately? Perhaps SMEs do not see compelling reasons to open up their systems.

Is it profitable for SMEs to communicate up and down the value chain with Web Services? Is the QuickBooks Methodology the most logical solution to gain early traction as this new computing paradigm arises? Building a multi-functional application that creates value for your company is a challenge for any IT department. However the underlying business case and return can be worth while.

Purpose of the Study

Can an informational campaign combined with a real world demonstration affect the attitudes SME executives have toward integrating their value chain with Web Services?

The purpose of my study is to measure current attitudes and usages regarding Web Services for SMEs, to present the same SMEs with valuable information and a functioning demonstration of this new computing paradigm, and to once again measure the attitudes of SME toward Web Service implementation. To accomplish this goal, we first need to develop a system using QuickBooks, Microsoft Web Server, and Web Services.



Connecting QuickBooks to Web Services

Once this system is operational, then a sample of SMEs will need to be established. Using membership information from 4 Iowa business associations, we will send out invitations to 1000 companies, asking them to participate in this study. Businesses would qualify to be in the study if they currently use

QuickBooks, have less than 100 employees, and reside in Central Iowa. Our goal is to find 10 interested SMEs to participate in this study.

Then the surveys will be sent out to establish a baseline of current attitudes concerning the connection of value chain partners using QuickBooks and Web Services.

Next a personal visit will be scheduled to demonstrate the capabilities of integrating Web Services into their value chain. This will include an information segment on the cost saving benefits of Web Service integration and an actual demonstration of the QuickBooks Web Service integration.

When the presentation is complete, the participants will be left with an informational packet to help them with their integration, and they will be asked a few short questions to measure any changes in their attitudes toward supply chain integration using Web Services.

Limitations

This study has potential weakness because it takes a narrow approach, focusing on SMEs that only use QuickBooks financial management software. However, after examining other alternative methods for SMEs to connect, QuickBooks is the most heavily used financial accounting software in America.

The study may also be flawed in its survey by asking questions about attitudes toward Web Services. Attitudes are subjective and will differ widely between individuals. In fact two individuals at the same company may hold extremely different attitudes regarding the exact same situation. We plan to

reduce this effect by surveying three people at each firm for the initial baseline. Then we will return to survey the same three people after they view the demonstration and informational campaign regarding Web Services.

We will also measure changes in attitudes based on individuals – not for companies. The baseline will be taken based on individual attitudes and the follow-up survey will measure the same individual attitudes again. Each participant will be surveyed twice in this study. Changes in attitude will be measured for individuals based on their previous survey results.

Another potential for a flawed study is the small number of SMEs involved in this study. Due to time and resource limitation, there will most likely be less than ten SMEs involved in this study. We will try to reduce the effects of a small sample by using solid statistical models and by administering a sound quantitative survey. Efforts will also be made to increase the sample size. By showing up at the participant's location, the probability of involving a larger sample is increased. Requiring participants to attend at a remote location involves the coordination of many business schedules and will likely reduce participation. By actively seeking out participants in an "onsite" survey and demonstration, we hope to experience increased participation.

references

- Alor-Hernandez, G., & Aguilar-Lasserre, A. (2009). A Hybrid Architecture for E-Procurement, Computational Collective Intelligence, Social Networks And Multiagent Systems 5796: 685-696.
- Sun, C., & Rossing, R., & Sinnema, M. (2010). Modeling and managing the variability of Web service-based systems, Journal Of Systems And Software 83 (3): 502-516
- Boukadi, K., & Ghedira, C., & Vincent, L., (2008) An Aspect oriented approach for context-aware Service Domain adapted to e-business , Advanced Information Systems Engineering, Proceedings 5074: 64-78
- QuickBooks Web Connector Programmer's Guide (2007) QuickBooks SDK: 7-37