

## Service Oriented Architectures

Service Oriented Architecture (SOA) is a technology architecture that has gained mass appeal throughout the IT industry. The basic promise of an SOA is the development of re-usable services that abstract the capabilities of underlying IT applications. Each of these services should represent an atomic business transaction and be constructed such that any set of services can be assembled regardless of implementation to create a service oriented business application (SOBA). The allure of having a well defined, self-documenting set of services that represent atomic business transactions that can easily be assembled into business applications is powerful.

The value of a SOA isn't just in the reduced development costs associated with re-usability, the real value of a SOA is to be able to respond to business needs, and changing business conditions with unprecedented agility. With a properly formed SOA, business applications can be quickly assembled and rolled out for business use in weeks, not the months or years of traditional application development or deployment projects.

While an SOA doesn't require the underlying services to be web services, the typical SOA is being created using web services as the underlying technology choice. A Web service is a software system designed to support interoperable machine-to-machine interaction over a network. It has an interface described in a machine-processable format (specifically WSDL). Other systems interact with the Web service in a manner prescribed by its description using SOAP-messages, typically conveyed using HTTP with an XML serialization in conjunction with other Web-related standards. SOAP (Simple Object Access Protocol) is a lightweight protocol for exchange of information in a decentralized, distributed environment. It is an XML based protocol that consists of three parts:

1. an envelope that defines a framework for describing what is in a message and how to process it
2. a set of encoding rules for expressing instances of application-defined data types
3. a convention for representing remote procedure calls and responses

A web service is self-documenting, with the documentation being provided in Web Services Description Language (WSDL). WSDL is an XML-based language used to define Web services and describe how to access them.

## SOA and the Mainframe

The mainframe remains the bedrock of many IT shops. Over 70% of the world's data is on a mainframe. Legacy systems represent trillions of dollars in assets, and there are hundreds of millions of lines of code still running on mainframes today. There is so much of the business process still locked in the mainframe that there are 40 million terminals in use today allow business users access to mainframe applications through a trusty 3270, 5250 or VT

interface. Therefore, any enterprise-wide SOA implementation strategy certainly needs to not only include mainframes, but should start with a plan for how to move these most critical systems into a SOA

Mainframes represent one of the most challenging systems to move to SOA. The challenges mainframes present can be classified into three categories. First is the challenge of comprehending what re-usable business services can and should be exposed from the mainframe. Having identified candidate services, the challenge then becomes configuring those services appropriately so that they are accessible from the SOA platform. Finally, great care must be taken to ensure that this well-documented mainframe access point does not create a security risk.

SOA is all about creating re-usable services that mirror business processes. The ideal size of a service is an atomic business action, so that any conceivable business process can be created by assembling the appropriate atomic business actions. The first step in creating a SOA is to identify these atomic business actions and encapsulate those services. However, mainframe systems tend to be monolithic and provide no immediate or easy way of identify appropriate services. The applications often house millions of lines of COBOL code that have evolved over years – perhaps including decades' worth of incremental change and enhancement. Finding a skilled resource to discover potential services in this mountain of code doesn't just mean finding someone who knows COBOL, it's finding anyone who has any idea of what the program actually does. The people that originally deployed, wrote or enhanced it often have moved on to different roles, up the organization, out of company or the workforce. That leaves a couple of options: either train someone by walking through the programs, or buy a code-analyzing tool to create reports in order to assist in the process. Of course, this only provides a feel for what the business could be using the mainframe for, not what parts of the code are actually used, or how business users may be using or abusing the system.

The real answer to what business processes are encapsulated and utilized in the mainframe lies with the user community. However, most IT staffs don't even know who's using the mainframe, much less how they are using it. Uncovering these business processes from the user community has been achieved either anecdotally by the business owner who is screaming the loudest or systematically through a long and expensive engagement with a consulting group to do a comprehensive set of as-is and to-be sessions to provide a set of business process maps.

The anecdotal method is the tried and true methodology of IT: the business screams, a project is initiated, business requirements are dutifully collected from a small, hopefully representative set of business users. Several steps through the SDLC later, a service is born. Of course, the service was conceived in a near vacuum of true requirements from an SOA perspective. The requirement was limited in scope to what was needed for the immediate project, and the user group limited to a few representative users, which invariably don't represent all of the capability required, or used, or how it's used by users in other locations.

The result is an incomplete service doomed to either a life of slow expensive incremental re-work, better known as incremental enhancements, or the service is orphaned while another better service is designed with the benefit of hindsight. Usually after the third or fourth duplicate service is created, enough knowledge is accumulated to provide a proper re-usable service.

In contrast to the incremental method of service creation and re-definition, the process of performing a comprehensive business process analysis will provide the requirements and knowledge to construct a proper service the first time around. The challenge in the study is to ensure a comprehensive examination of the current business processes, and systems use in the entire organization. As the scope of the analysis grows to include business process exceptions, end of month, end of quarter, end of year processes, as well as all territories and classes of users, the costs of the study will continue to rise. In sharp contrast to the anecdotal method of service creation and re-definition where the costs accumulate over time, the decision for the analysis scope must be made up front, and the trade-off between completeness and cost must be made.

Considering the challenge and costs of documenting the requirement for a reusable service taken with the cold statistic that even when a project is coded exactly to requirements, nearly 30 percent of projects fail because the business provided incorrect or incomplete requirements. It's no wonder that so many SOA projects are slow to get far off the ground. Rather than conducting expensive interviews in the as-is study, or incremental re-work and the associated duplication of costs in re-working a service multiple times, the ideal method for comprehending what the business process users are following is to monitor and analyze the every day interaction between the users and the mainframe assets.

### **OpenConnect's Solution**

OpenConnect's Solution captures and exploits the latent business process knowledge exercised daily in your enterprise to allow you to improve and securely extend business processes to achieve immediate ROI with virtually no risk.

Comprehend observes all user interactions with mainframe assets in a secure non-invasive environment. Comprehend constantly analyzes and learns based upon these observations to create a detailed understanding of the underlying applications and real-world use patterns. This application use-map creates the ability to immediately identify atomic business actions, as well as determine usage pattern of those business actions. This provides the ability to create a comprehensive business process map based on an analysis of all users' business actions with the mainframe.

Configure leverages this business process knowledge to allow any developer without mainframe experience to automatically create appropriate SOA services based upon either Screen Logic Interfaces (SLI) or advanced direct access methods using CICS Web Support (CWS).

Connect allows for highly scalable, run-time access to the mainframe with unparalleled security. Whether this access is through SLI or CWS, Connect allows for access administration to the service based on end-user credentials or source IP, time-of-day, as well as the transaction within the service being invoked.

### **Creating services with the Solution**

Creating services starts with comprehension. Installing Comprehend is as easy as finding a place on your TCP/IP network to monitor the TN3270 traffic. Point Comprehend at the mainframe that you want to comprehend, and the system starts to monitor, analyze and learn based on the collected observations of your business users mainframe activity.

Comprehension starts with understanding business user activity at the panel and field level. Through observation with thousands of user interactions with the same mainframe panel, Comprehend is able to determine how users are using each panel in the mainframe. What are labels versus fields, the field datatype, what are input versus output fields, how often and in what combinations are users modifying each field.

Comprehension extends far beyond just the panel. Comprehend illustrates the business processes within the mainframe by providing the analysis of where users are spending their time, what the navigation paths are through the mainframe and how often are each of the paths executed.

Comprehend captures all of the TN3270 traffic on the network, regardless of source. All of this data is encrypted and stored, providing a powerful capability to audit individual users activity on the mainframe. This information allows for the service architect to examine data conditions that forced the mainframe application down different code paths, providing the complete analysis and discovery power.

Having targeted the re-usable services through the business process discovery makes service configuration quick and easy. The system has already learned what are inputs, outputs, as well as the datatypes and common use of the screens. The service architect needs to simply decide what to expose to the service level, and publish the service. Connect takes the configured service and creates a secure connection to the mainframe. All communication is encrypted, and access tightly controlled.

### **Solution Value**

#### **Maximum Return On Investment (ROI)**

By understanding how users are using the system, development efforts can be focused and targeted at improving high use transaction paths, and pathways that lead to high incidents of error transactions. This maximizes productivity gains, training cost reductions and system improvement efforts.

### **Reduced Costs**

Determining appropriate re-useable transactions and creating services is automatic and painless for the SOA service developer. Leveraging the thousands of man-years of knowledge in the Comprehend knowledge vault, a service developer alone without mainframe knowledge or support can quickly create an appropriate service by examining observed transactions.

### **Reduced risk in your SOA migration**

Instead of relying on a couple of man-months of business analysts time to ensure your service captures all expected conditions, leveraging the thousands of man years knowledge in the business process repository ensures that services capture all of the expected outcomes and transaction paths encapsulated by the service.

### **High Security System (Risk – Reduced Potential of Security Issues)**

Opening up your mainframe through a service that relies solely on user authentication in the portal could create tremendous security concerns. Connect reduces the risk of security breach through to your mainframe assets through your SOA.

## **Next Steps**

OpenConnect's Solution is the only solution that is able to automatically capture thousands of Man-Years knowledge to target services for maximum ROI, while lowering costs and risks associated with your transition to a SOA. Configure exploits the comprehension of your mainframe applications to empower your Java developer to quickly and confidently create appropriate services quick and risk-free by selecting existing transaction sets, and creating the service will full visibility to all potential transaction outcomes eliminating unknown errors at runtime.

OpenConnect is offering a unique service which allows you to fully quantify the value that a SOA project can bring to your business. discoverNow is a short assessment which combines the software capabilities within the entire Solution with our experienced professional services staff to develop a quantified ROI based upon your systems and your users. Comprehend identifies the business processes and quantifies their use. Configure is used to deploy a set of services and with Connect the productivity benefits are realized. The result, a quantified ROI containing actual productivity gains, as well as estimates of training cost reductions and other cost factors for your complete SOA project.

For over 20 years, OpenConnect has consistently led the market with innovations to connect the mainframe to evolving technology architectures, OpenConnect helps the world's largest and most complex organizations comprehend, configure and securely connect to their mainframe applications and data, saving time and money, improving return on legacy

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investments while minimizing the risks of extending and enhancing legacy systems into contemporary ones.

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