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Making SOA Operational: Establishing the Link between a Service Oriented Architecture and Service Management

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A HURWITZ WHITE PAPER

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Introduction: Planning for SOA Service Management from the Start

Organizations are moving to a more flexible business approach to leveraging software assets through Service Oriented Architecture. As they adopt this approach, IT executives have increased their focus on one of the primary measures of a successful implementation, establishing a consistent and predictable level of service. In order to achieve this goal, organizations recognize they need to match this new architectural approach with a consistent and comprehensive strategy for service management.

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SOA is an approach to the building of applications that implements business processes as software services. These business services consist of a set of loosely coupled components, often existing IT assets or pieces of assets, assembled to support a well-defined business task. This results in flexible IT systems that allow businesses to leverage existing assets and easily accommodate the inevitable changes experienced by a dynamic business. In the process, these newly formed business services cross a number of different IT systems, effectively breaking down the organizational silos that formed around conventional IT systems.

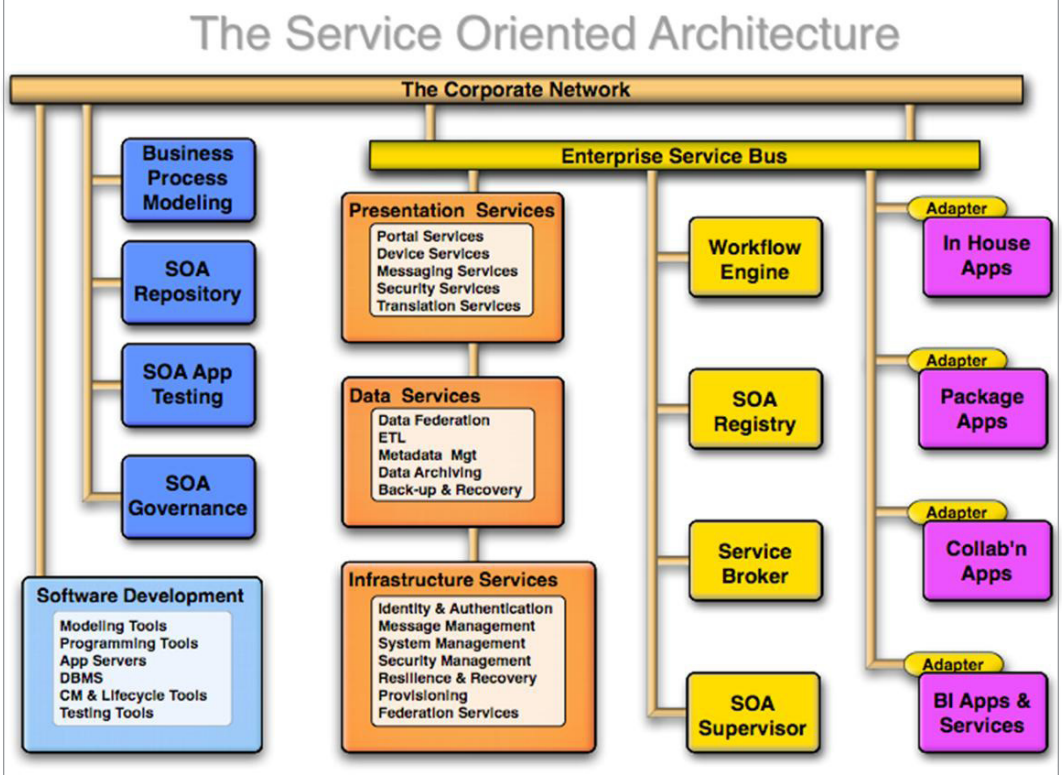
This ability to traverse functional silos allows for the streamlining of business processes. It creates challenges, however, in managing services as they cross various IT silos, both infrastructure silos like servers, storage, and networks, databases, and application silos like Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Supply Chain Management (SCM) and financial systems.

For example, the customer account manager, the product operations manager, and the supply chain manager for a consumer products manufacturer all need similar customer and product information to make business decisions. Prior to implementing a SOA, each manager often needed to use manual processes to supplement the information under their primary control with information about customers and products that was the primary responsibility of another department. Now that the CRM, ERP, and SCM applications rely on shared business services such as "update customer account address", each of the business managers has access to consistent and accurate information about customers and products. This consistency will only be maintained moving

forward if there is a clear understanding among all users of the customer and product information about the governance of these data and the associated business services. There needs to be a well-established approach to creating, changing, sharing, accessing, and paying for the business services in order to maintain clarity and consistency across the enterprise.

Many infrastructure components are required if a company expects to be able to establish a high level of consistency and reliability across the existing information silos of a business. Figure 1 provides an overview of the infrastructure and service requirements for SOA. This includes components ranging from the ability to model processes, to testing, locating, sharing, and regulating business services. A service management plan must be put in place in order to manage the complexity of this architecture and meet the expectations of the business.

Figure 1. The Service Oriented Architecture



Source: Service Oriented Architecture For Dummies, Wiley 2007

When organizations include a strategy for service management in their SOA roadmaps, they are in a better position to anticipate and control some of the complexity that arises from managing a SOA environment. While businesses are in many different phases of their SOA implementations, ranging from early pilots to more fully developed enterprise production deployments, all share the same needs for service management. One of the benefits of SOA is that companies can start with small projects, such as establishing a new partner web service interface, and then expand. However, even in the earliest stages of a SOA implementation, organizations will begin to codify and reuse key business services. A service management strategy will ensure that these business services can be tested, changed, secured, and monitored in an orderly and repeatable way.

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Service Management: A Holistic View

The IT infrastructure is complicated, consisting of many different pieces, any of which can fail. In addition, workloads get out of balance and cause performance to degrade to unacceptable levels. Managing the IT infrastructure can be very complex. The solution is IT service management, which enables IT support personnel to see into what is occurring in the IT infrastructure, identify problems, correct failures, rebalance workloads, and take other steps to ensure the IT infrastructure is delivering the anticipated level of service in a repeatable way, often defined by specific service level agreements (SLA) .

IT operations management traditionally focused on managing specific systems as standalone environments. These efforts tended to focus on firefighting—fixing whatever problem was most immediately threatening service delivery. Only rarely was IT able to perform proactive management that addressed the entire IT infrastructure and resolved potential problems before they began to impact other systems and overall service levels. Today organizations recognize that this approach to managing each application and each instance resource domain as standalone environments isn't working.

Service management is the process of consistently managing the delivery and ongoing usage of business services. It provides a way of integrating people, process, technology, and information to ensure predictable service quality at the business level. Often it is accompanied by changes in process management as well as changes in the organizational culture.

Specifically, service management enables organizations to manage a set of services as a complete unit of work. In this way service management breaks down the silos across business units so they can be viewed holistically and managed as a single unit. It also allows the organization to change and modify these sets of components without disrupting how the business operates.

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Service management in SOA actually can become quite complex. Here's why. Many services can be operating at the same time as various services call on other services to perform their tasks. Different applications will call on the same services and use them in different combinations. SOA service management, therefore, must go beyond simply identifying and correcting component failures and imbalances as they occur. SOA management must orchestrate this swirl of activity throughout the entire SOA environment, ensuring that every service meets its service level expectations. In this regard, SOA service management strives to be proactive from the start.

To be proactive SOA management must take a holistic view. It must have visibility into the full SOA environment in real time, understand the various SLAs that apply at every point, and be prepared to take action in anticipation of problems rather than wait for error messages, failure alerts, or angry calls from the application users. Only a holistic approach makes proactive SOA management possible.

Operational SOA: the Convergence of SOA and Service management

Business agility, a key benefit of SOA adoption, taps the best of both SOA and service management. It brings together the holistic management of business services with the management of corporate infrastructure for the dual purpose of focusing on managing systems as they exist within departments and on managing the shared services across the company.

The result is a common business service approach that forms the foundation of both SOA and service management. This convergence produces operational SOA.

To achieve operational SOA, organizations need to manage IT itself as a set of well defined services across the traditional silos; applications, servers, storage,

and networks. This enables the entire SOA environment to be managed as one, holistically.

Organizations start by monitoring service levels and identifying faults and failures. But they can't stop there. They also need automated fault management, remediation and automatic provisioning. Finally, for truly effective SOA orchestration, organizations need continuous, real time, automated performance modeling and optimization. Management reporting informs senior management of the status of the various IT and SOA services and compliance with SLAs.

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SOA and service management convergence is not simply a technology initiative that applies the right tools in the right places. It also addresses organizational issues and changes within the business culture. Roles, responsibilities, and reporting assignments may all need to be adjusted. New lines of communications will need to be opened. DBAs, for example, may find themselves communicating with network administrators. Storage and server administrators may find themselves collaborating to meet SLAs. In addition, there is increasing collaboration between the business and IT to create service levels in context with business requirements and priorities. While businesses often expect to have perfect service and availability for their online services, they are often unaware of the costs and challenges faced within IT operations. For example, business management might want to achieve 100 percent uptime for their applications only to discover later that the costs are prohibitive. When business leaders and IT operations meet in advance of deployment and even development they can come to an understanding of the cost/benefit issues early. Organizational issues like these are just some of the challenges facing operational SOA.

Overcoming the Challenges of Operational SOA

Beyond the organizational challenges managers intent on implementing operational SOA face other challenges. These include:

- SOA service degradation—service performance falters to an extent that jeopardizes compliance with the applicable SLA
- Inability to scale service management—widespread acceptance and adoption of SOA services overwhelms the organization's ability to

manage and orchestrate the use of services throughout the environment

- Lack of visibility into the SOA operational environment—the inability to identify what is happening in the SOA environment in a timely way
- Lack of management tools—unable to see into the SOA environment or take actions to correct problems and imbalances due to lack of appropriate tools
- Lack of metrics—no effectively defined and agreed upon metrics, which results in the inability to determine where, when, and to what extent SLAs are being met

These challenges should be familiar to IT managers. They are the same challenges managers face when managing the traditional IT infrastructure. However, the SOA environment complicates these challenges in ways the traditional IT infrastructure does not.

For example, SOA-based services are widely shared. In time a given service will be used by many applications. Each will use it as part of a different sequence of services. It does not take long for the same services to be used repeatedly in different ways by different applications, often at the same time. This can be further complicated when each application has a different service level commitment. The management and orchestration of many services across a large enterprise can quickly become mind-boggling without automated tools designed specifically for the SOA services challenge.

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Similarly, once a service is published in the enterprise's directory of SOA production services, managers will not necessarily know which applications are using the service or how they are using them. Application developers throughout the enterprise will be encouraged to reuse the services. Again, it won't take long before the usage of a given service moves beyond what any individual can track.

This challenge becomes further compounded when SOA services are freely combined to create new composite applications that depend on the effective coordination of multiple services to perform their tasks. Each application has different needs in terms of performance and availability. Services are calling upon other services which are calling on yet more services while the management challenges continually mount.

Under such circumstances, changing a service involves serious consideration. Since every SOA service is a black box a change to the inner workings of a service will not usually impact the other services and applications that use it. However, a change could impact the service's performance, which, in turn, might impact service levels under certain circumstances. These implications need to be recognized and considered.

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Planning for Operational SOA

If operational SOA is to be successful, it must be planned for from the start and designed into the SOA initiative at the outset. As noted above, trying to retrofit service management onto SOA as it is about to be rolled out or, often the case, after the impact of problems have already begun being felt, is more difficult and more costly to achieve. Furthermore, what results is unlikely to be as effective as service management planned from the start. In addition, considerable ill will likely will result from any retrofitting effort.

The hardest part of planning for service management at the start is remembering to do it. In their enthusiasm, those initiating an SOA project often are so intent on identifying and designing SOA services they don't think about the operational management aspects.

Here is what to include in the initial planning for SOA service management. First, think through the roles and responsibilities. Responsibility for managing the operational SOA environment will have to fall on individuals. Identify those people at the outset, enlist their input, and secure their buy in.

Second, make service management part of your initial SOA pilots. Certainly these will be small and not present much in the way of service management challenges. Nonetheless, it is effective to include management consideration even here as a way of testing your management plans. At the same time, it will provide an opportunity to verify the service management roles and responsibilities you initially identified.

Third, pilots provide an opportunity to inventory the current management tools and assess their suitability to the challenges of operational SOA. If the tools aren't suitable, begin looking for more appropriate tools.

Best Practices for SOA Service Management

A set of best practices for SOA service management have emerged based on the experiences of SOA production rollouts to date.

1. Create a cross-enterprise SOA Center of Excellence team consisting of IT operations, IT applications development, IT SOA management, and business managers to understand the goals of the organization both from the business content and IT performance perspectives.
2. Create a lifecycle approach from planning to development to deployment and operations that will incorporate governance and best practices for SOA and Service Management.
3. Develop a common language to enable IT and the business to effectively communicate the rules and policies encompassing key business processes.
4. Create an appropriate approach to SOA that matches the ability of the organization to meet SLAs and day-to-day operational goals.
5. Within the context of the SOA Center of Excellence, establish communications, roles and responsibilities for everyone who will play a role in the SOA environment, including the service management team.
6. Anticipate service management problems areas by modeling various use cases.
7. Determine technical, operational, and business metrics that indicate progress toward achieving the desired service levels and pinpoint problem areas to be addressed.

Following these best practices will help businesses to create a bridge between IT and the business and enable the business to improve its ability to anticipate and respond to change. Through the convergence of SOA and service management—in effect establishing a synergy between SOA and management—businesses can respond to change while they continue to deliver applications that meet expected service levels.

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About Hurwitz & Associates

Hurwitz & Associates is a consulting, research and analyst firm that focuses on the customer benefits derived when advanced and emerging software technologies are used to solve business problems. The firm's research concentrates on understanding the business value of software technologies, such as Service Oriented Architecture and Web services, and how they are successfully implemented within highly distributed computing environments. Additional information on Hurwitz & Associates can be found at www.hurwitz.com.