



## Six critical IT operations questions for a successful SOA deployment.

*There's a lot of talk about service-oriented architecture (SOA). Organizations eagerly anticipate the increased development flexibility it can bring as well as its promise to speed business innovation. Much less discussed is the importance of the IT operations department to SOA success. To fully capitalize on the value of SOA, IT operations must work with the enterprise SOA team to define standards that will ensure efficient implementation, management and operation. This paper presents six questions IT operations should ask the enterprise architecture team before making the leap to a more dynamic, SOA-based environment.*



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### SOA is no passing fad

According to IBM's most recent CEO study, most CEOs regard innovation as the lifeblood of their businesses.<sup>1</sup> It's not surprising, then, that many organizations are increasingly adopting SOA as part of their efforts to enable innovation. SOA-based initiatives have the potential to drive costs down and service quality up, while also improving business flexibility. As a result, organizations are able to reallocate portions of their IT budgets to new projects designed to enable innovation.

In a recent Forrester survey, close to 70 percent of enterprises worldwide reported that they are planning to increase their SOA usage over the next 12 to 24 months.<sup>2</sup> The main driver of this trend is the improved application and business flexibility that an SOA promises. That promise is based on the notion of "loose-coupling," which states that certain elements in an IT environment, such as an application interface, can be separated from an application implementation. By taking advantage of this, business application developers and IT operations staff can make changes to the environment without necessarily affecting either the interface or the clients and end users. Leveraging this simple notion has huge potential to lower the time and cost of making changes to the environment and to introduce superior levels of flexibility.

The advantage of a service-oriented architecture is clear, and it translates into some very real benefits. For example, it can:

- Lower the cost of integration by using standards-based interfaces
- Enable the reuse of application components in dynamic, new ways
- Allow IT to compose new processes from existing services
- Enable organizations to extend services to new groups of users such as key business allies, additional customers and suppliers
- Improve business impact analysis because the enterprise services can be monitored and managed in the business context.

For SOA-based initiatives to be effective, however, IT operations must implement the architecture with an eye toward long-term use and support. That is because service-oriented architectures often:

- Expose functionality within a single monolithic application as a set of reusable services—all of which need to be managed—that can then be combined into composite applications
- Introduce services as an intermediate layer to the environment, along with new dependencies and relationships

- Add software and hardware technologies that need to be managed, such as service registries, the enterprise service bus (ESB) and XML appliances
- Make it challenging to replicate problems in situations where IT operations may not own the end-to-end infrastructure, especially after the service has been introduced into a production environment.

### **Realizing value by making SOA environments operational**

Managing an SOA environment involves all the same disciplines as managing traditional IT environments—for example, application monitoring, security, event management, problem and bottleneck isolation, performance management, configuration and change management, and service level agreement (SLA) measurement and reporting. However these activities must be reoriented to include services as key objects to be managed. With SOA-based projects, it is vital to view these services as top-priority managed resources and to recognize their relationships to business processes as well as to the underlying components and systems that support them.

It is important to recognize that the term “service” can have two meanings. In traditional IT operations environments, a service can refer to a capability that IT operations delivers and supports—such as user on-boarding and provisioning—or it can refer to a more coarsely grained business function such as e-mail. In the context of SOA and technologies such as Web services, the notion of a service is more finely grained and typically refers to a specific application function. These unique functions are then integrated to build multiple composite applications. This paper will focus on the more finely grained SOA-based definition of services.

By teaming with enterprise architects *before* they design an SOA environment, IT operations can dramatically improve the IT environment’s effectiveness and manageability from the start. But if SOA implementation has already begun, teaming with enterprise architects at any point in time can still provide benefits.

To that end, we are posing the following six questions, which can be used as a discussion guide to facilitate collaboration between IT operations and the enterprise architecture team.

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### 1. How will the enterprise architecture team *design* SOA-based services that improve manageability without increasing service management costs?

By anticipating operational considerations in the planning and design stages, organizations can avoid additional management and maintenance costs and increased network loads. Early in the transition to SOA-based applications, IT operations must ensure that SOA-based services are designed for manageability. IT operations should:

- Understand the business application performance requirement
- Determine where SOA management processes can be automated for improved performance
- Be aware of the service infrastructure dependencies and the service-to-service dependencies
- Make sure that service management considerations are included throughout the development lifecycle
- Warrant that services meet information, security and privacy requirements
- Confirm that the design incorporates performance, capacity and availability requirements
- Ensure that composite applications are designed so that they can be monitored.

By its very nature, an SOA environment introduces new managed object types into the IT landscape—so it's important to weigh the effect of these new elements and disciplines on IT management processes during the design phase.

#### Helpful IBM tools

- *IBM SOA Infrastructure Consulting Services – infrastructure strategy and planning for SOA*—assesses your current IT environment to help you understand the effect of an SOA project on your IT infrastructure and service management; helps develop a clear SOA strategy  
[ibm.com/services/us/index.wss/offering/its/a1028540](http://ibm.com/services/us/index.wss/offering/its/a1028540)
- *IBM SOA Infrastructure Consulting Services – infrastructure architecture and design for SOA*—recommends SOA infrastructure improvements, transition roadmaps and tooling to help optimize service quality and enhance application and information integration  
[ibm.com/services/us/index.wss/offering/its/a1027778](http://ibm.com/services/us/index.wss/offering/its/a1027778)
- *IBM IT Management Consulting Services – service management design*—helps develop the IT service management processes required in a service-oriented management architecture  
[ibm.com/services/us/index.wss/offering/its/a1025776](http://ibm.com/services/us/index.wss/offering/its/a1025776)

## 2. How will the development team incorporate *security, access compliance and audit controls*?

SOA-based services involve composite applications with service-to-service dependencies. To enhance traditional resource-centric security for dynamic SOA environments, an organization should add an identity-focused security layer, called trust management, to the environment, as well as a message-focused security layer. At the same time, it must ensure that all of this remains auditable. To manage this, IT operations should ensure that it will be able to:

- Identify the scope of IT configurations required to realize and implement business compliance objectives
- Identify a service request and propagate identities across multiple domains of trust
- Securely transmit the request across a heterogeneous environment
- Enforce the appropriate access control and define limits on what one can do
- Protect against attacks and measure operational security risk
- Report whether it has met goals and complied with regulations.

### Helpful IBM tools

- *SOA application security assessment and implementation services from IBM*—offer a comprehensive review of application security requirements and potential vulnerabilities, along with deployment recommendations on eliminating or reducing exposures  
[ibm.com/services/security](http://ibm.com/services/security)
- *IBM Tivoli® Federated Identity Manager*—offers an efficient and effective way to manage and provision user identities across the SOA environment and provide a robust identity assurance and trust management solution  
[ibm.com/software/tivoli/products/federated-identity-mgr](http://ibm.com/software/tivoli/products/federated-identity-mgr)
- *Tivoli Compliance Insight Manager*—offers a robust dashboard and reporting engine through which to view Tivoli Federated Identity Manager data as well as virtually all related security data  
[ibm.com/software/tivoli/products/compliance-insight-mgr](http://ibm.com/software/tivoli/products/compliance-insight-mgr)
- *IBM WebSphere® DataPower® XML Security Gateway XS40 Appliance*—intercepts, parses, validates, filters and decrypts the Web service request, thereby providing more reliable, security-rich and scalable hardware policy enforcement and XML threat protection  
[ibm.com/software/integration/datapower/xs40](http://ibm.com/software/integration/datapower/xs40)
- *IBM SOA Integration Services for connectivity and reuse – design and implementation services for WebSphere DataPower SOA appliances*—assists in design and deployment to efficiently use IBM WebSphere DataPower technology  
[ibm.com/services/us/index.wss/offering/its/a1025582](http://ibm.com/services/us/index.wss/offering/its/a1025582)

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### 3. How will IT operations *monitor* the end-to-end environment to *detect, isolate and fix services problems*, including composite applications that have service-to-service dependencies?

Once the IT operations team isolates the problem, the actual fix is usually fairly straightforward. However, because SOA-based environments introduce a new layer of abstraction, problems can be more difficult to find and isolate. The management system must be able to dynamically discover services, reconcile them with a system of record, such as a registry, and then isolate problems and perform root-cause analysis. Because the messaging infrastructure and other middleware take on increasing importance, the end-to-end application management has to:

- Recognize this new layer
- Dynamically discover new services and reconcile them with a system of record
- Understand the relationships between the services layer and the underlying component and messaging layers
- Understand when a problem in the infrastructure or application layer affects a service above it
- Know when a service is down and determine the root cause.

When IT operations is able to monitor and manage IT resources and services from a real-time business outcome perspective, it can align IT operations with business priorities. As a result, IT operations can streamline business processes and optimize resources to help manage costs, increase efficiency to manage productivity and increase revenue, and help ensure service availability to enhance customer satisfaction—rather than simply focus on technology.

### Helpful IBM tools

- *Tivoli Composite Application Manager Family of products*—provides an integrated set of specialized application management tools to help identify service and application problems proactively and enable IT operations to isolate root causes and fix them quickly  
[ibm.com/software/tivoli/products/composite-application-mgr-basic-websphere](http://ibm.com/software/tivoli/products/composite-application-mgr-basic-websphere)
- *SOA Integration Services – design and implementation for Tivoli Composite Application Manager*—helps you ensure that all design and configuration considerations required for a successful Tivoli Composite Application Manager implementation have been captured and deployed  
[ibm.com/services/us/index.wss/offerfamily/gts/a1027700](http://ibm.com/services/us/index.wss/offerfamily/gts/a1027700)
- *IBM Rational® Tester for SOA Quality and Rational Performance Extension Tester for SOA Quality*—provide automated regression and functional testing for GUI-less Web services and performance testing for Web service-based applications  
[ibm.com/software/awdtools/tester/soa/index.html](http://ibm.com/software/awdtools/tester/soa/index.html)
- *IBM IT Lifecycle Management and Governance Services – service management implementation – Accelerator for Service Management for Problem Determination*—delivers an affordable, prepackaged service for deployment of process and technology for determining the root cause of problems in complex IT environments  
[ibm.com/services/us/index.wss/offering/its/a1025763](http://ibm.com/services/us/index.wss/offering/its/a1025763)

#### **4. How will IT operations ensure that the environment has the flexibility to *adapt and track changes* if trending shows that the environment is in trouble?**

Because SOA-based initiatives mean more flexibility, IT has to deal with more things changing at a faster pace. Since most organizations cannot increase their head count to do this, they need to implement tools that can automate IT processes and make existing staff more productive. IT operations must ensure that it can:

- Deal with change management in an SOA world where flexibility is the goal
- Administer availability and release management
- Keep track of what's changed in order to quickly identify where a problem is and fix it.

Because SOA environments can have an effect on organizations, including processes and tooling, IT operations needs enhanced approaches and tools for release, change and configuration management.

#### **Helpful IBM tools**

- *Tivoli Change and Configuration Management Database*—enables IT operations to implement change management controls and put proactive IT Infrastructure Library® processes into practice to maintain service levels  
[ibm.com/software/tivoli/products/ccmdb](http://ibm.com/software/tivoli/products/ccmdb)
- *Tivoli Application Dependency Discovery Manager*—dynamically discovers elements and configurations in your IT environment and creates dependency relationships that can be tracked over time; is used to populate the change and configuration management database  
[ibm.com/software/tivoli/products/taddm](http://ibm.com/software/tivoli/products/taddm)
- *IBM IT Lifecycle Management and Governance Services – service management implementation*—develops a specialized project plan and statement of work to rapidly deploy Tivoli Application Dependency Discovery Manager and Tivoli Change and Configuration Management Database  
[ibm.com/services/us/index.wss/offering/its/a1025763](http://ibm.com/services/us/index.wss/offering/its/a1025763)



## 6. How does IT operations know it has the right virtualization infrastructure in place to support SOA?

Because SOA-based services are virtualized and dynamic, organizations need to adjust and fine-tune their infrastructures to meet changing capacity requirements. IT operations can quickly balance service workloads by spreading work across available servers and storage resources and quickly provisioning new resources as needed.

There is a high level of synergy between SOA-based implementations and traditional virtualization. They both increase business flexibility and improve responsiveness to rapidly changing business requirements. To make sure it has the right end-to-end, virtualized environment, IT operations should:

- Have services workload virtualization, along with supporting technologies
- Have the right server and storage virtualization technologies and a flexible infrastructure design
- Dynamically adjust the infrastructure to manage capacity
- Have the right capacity and know-how to manage that capacity more dynamically in order to respond to the flexible nature of an SOA environment.

Virtualization is key to exploiting the benefits of SOA. Server, storage and network virtualization will enable business and IT workload balancing, thereby increasing the quality of service management.

### Helpful IBM tools

- *IBM SOA Infrastructure Consulting Services – infrastructure strategy and planning for SOA – infrastructure readiness for SOA*—assesses the infrastructure, and

*then recommends SOA infrastructure improvements, transition roadmaps and tooling to help optimize service quality and enhance application and information integration*

[ibm.com/services/us/index.wss/offering/its/a1028540](http://ibm.com/services/us/index.wss/offering/its/a1028540)

- *IBM Application Infrastructure Services – Web infrastructure optimization and virtualization*—provides design and implementation services for building cost-effective, virtualized application server environments  
[ibm.com/services/us/index.wss/offering/its/a1027385](http://ibm.com/services/us/index.wss/offering/its/a1027385)
- *Tivoli Dynamic Workload Broker*—enables IT operations to intelligently manage cross-enterprise workloads and resources from a central point across heterogeneous operating environments  
[ibm.com/software/tivoli/products/dynamic-workload-broker/index.html](http://ibm.com/software/tivoli/products/dynamic-workload-broker/index.html)
- *WebSphere Extended Deployment*—delivers enhanced quality of service (QoS) through centralized workload management, application virtualization and management of large data volumes  
[ibm.com/software/webservers/appserv/extend](http://ibm.com/software/webservers/appserv/extend)
- *IBM Application Infrastructure Services – Web infrastructure optimization and virtualization – design and implementation services for WebSphere Extended Deployment*—helps clients design and implement WebSphere Extended Deployment software with reduced risk, complexity and time to market, thereby enabling a more rapid return on their investment  
[ibm.com/services/us/index.wss/offering/its/a1027385](http://ibm.com/services/us/index.wss/offering/its/a1027385)

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### **The potential benefits of an SOA environment far outweigh the challenges—and understanding and planning for IT operational requirements can increase the odds of success**

Although this paper has focused on the many challenges involved in SOA services management, it's important to reiterate the many good reasons forward-looking organizations are adopting SOA in the first place. SOA services management can:

- Act as a unifying force between IT and business
- Offer greater reusability across and beyond the enterprise than traditional IT environments
- Provide more flexible connections between services and the business processes they support
- Provide flexible business processes that give companies the ability to innovate and thrive in today's business world.

While traditional service application connections were “hard coded” and depended on the application in which they resided, SOA services are linked dynamically and flexibly. This means they can be challenging to manage. But advanced planning and close collaboration between IT operations and architecture—in conjunction with IBM's expertise, tools and ability to bring the two worlds together—can make it a whole lot easier. And, if you've already started an SOA deployment, IBM can provide SOA diagnostic services to help you analyze your environment and make necessary improvements.

**For more information**

To learn more about IBM's views and capabilities regarding SOA service management, contact your IBM representative or visit:

**ibm.com/soa**



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Route 100  
Somers, NY 10589  
U.S.A.

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- 1 IBM, Expanding the Innovation Horizon: The Global CEO Study 2006, March 2006.
  - 2 Forrester Research, Planned SOA Usage Grows Faster Than Actual SOA Usage, Randy Heffner, February 28, 2007.