

Focus on

Understanding the architecture that transforms applications into business tasks—with help from two HP experts

IF YOU HAVEN'T YET IMPLEMENTED A SERVICE-ORIENTED architecture (SOA)—something that HP Integrity NonStop system users in various industries have already done successfully—then it's probably high on your list of things to look into. And with good reason: SOA has enormous potential to enhance business agility, protect existing IT investment, lower costs, and improve business outcomes.

For insight on SOA, we turned to Timothy Keefauver, director of HP's software product management organization, and Mike Zivkovic, recently retired director of strategy for HP's NonStop Enterprise Division. In their responses to our questions, they share their knowledge of SOA and highlight the important role that Integrity NonStop technology can play in this powerful, business-centric architecture.

Q: What is SOA?

A: At the highest level, service-oriented architecture is an intelligent approach to IT architecture—one that leverages existing assets and combines them with newly developed services to make an enterprise more adaptive in the face of constantly shifting business conditions. It represents a significant step forward in the drive to reduce the complexity of heterogeneous environments and remove barriers between business and IT.

SOA accomplishes this by building loosely coupled, reusable components, or "services," that encapsulate business processes. Because the services have well-defined, self-describing, standardized interfaces, they can be repurposed and recombined quickly and easily to create new functionality. These independent services can be accessed without knowledge of their underlying platform implementation. A given service has no pre-knowledge of the calling application, and the application does not need to know how the service actually performs its tasks. The services interoperate based on a formal contract that is independent of the underlying platform and programming language.

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environments, accommodating both existing and new business systems and processes. This architecture can work for the entire enterprise or for a single system or application.

As *CIO* magazine (2005) explained, "The idea behind services is simple: Technology should be expressed as a chunk of the business rather than as an arcane application such as ERP or CRM... Businesspeople can call for services in a language they understand, and IT can quickly link these with other services to form a workflow or, if need be, build a new application. These applications can be built quickly because complex, carefully designed interfaces allow developers to connect to the services without having to link directly to the code inside them. They don't even have to know how the service was built or in which type of language it was written."

Q: What are the key benefits of SOA?

A: SOA can help businesses respond more quickly and cost-effectively to changing market conditions, because it promotes reuse of services and simplifies the interconnection and effective utilization of existing IT assets. SOA is standards based and technology independent, making it a viable approach over the long term, and it greatly speeds time to market for new solutions and services. It leverages current business assets rather than replacing them and enables existing systems to work together more effectively.

Reuse of services—which boosts efficiency and lowers cost—is one of the main benefits of SOA. The modular services represent stable relationships between business functions that change infrequently, making it possible to greatly reduce the complexity of the IT infrastructure. Internal changes to the service modules are transparent to the exposed interfaces. This decoupling of IT changes and business changes allows rapid, independent innovation in both areas.

The direct benefit of reuse is the immediate avoidance of development and testing costs. And, as an organization moves more applications to SOA, the reuse benefits grow. While short-term savings typically fall in the 5 to 10 percent range, longer-term savings can reach 40 percent or more for an enterprise-wide deployment.

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Critical elements

HP offers all the critical elements for successful SOA implementation: end-to-end SOA services, choice in middleware vendors, HP OpenView SOA Manager, and world-class server and storage products. In addition to regular and secure Web servers, the following basic SOA modules run on Integrity NonStop systems:

- SOAP server
- SOAP client
- XML parsers
- XSLT translation

HP is the Worldwide Prime Integrator for Microsoft .NET; a Strategic Integrator for both BEA and SAP; and a member of Open Source.

Users of the NonStop Pathway environment should be glad to hear that HP provides tools that will enable them to expose any or all of their Pathway server classes as Web services, without having to write any code or modify any of the server-class code. And users of the Intel® Itanium® processor-based Integrity NonStop server get a significant boost in price/performance for Web services components. The increase in CPU power, combined with the HP Labs-developed Java™ Virtual Machine for Integrity servers, results in better than a 100 percent price/performance advantage over earlier generations of NonStop servers.

Enhanced integration is a related benefit. Today, applications are typically custom-integrated on a point-to-point basis, and each integration point requires development and testing. By contrast, SOA substantially reduces the number of integration points. By enabling existing applications to be easily used in new ways to support new business processes, information silos are eliminated and investment is preserved and leveraged.

With SOA, companies can adapt quickly to unexpected market changes. A virtualized infrastructure and service-enabled applications make it easier to reconfigure applications and processes, and reuse assets when changes occur. This flexibility can help the organization embrace change proactively as a strategy—for example, by facilitating mergers and acquisitions—while simultaneously reducing the impact of change on cost competitiveness and revenue forecasting. By organizing enterprise IT around services rather than applications, SOA delivers improved productivity, agility, and speed for both business and IT.

Q: *Should SOA be used only if the service will definitely be reused?*

A: No, because this limited view fails to recognize two key aspects of SOA. First, SOA is as much about good application structure as it is about reuse. Whether or not a service is packaged for network access, exposing an application using SOA-based principles makes the application easier to maintain and more adaptable to future requirements.

Second, it is risky to assume that you have a standalone application. The long-term trend is toward deeper integration across a wider variety of applications, and you can never be sure that a merger or new business initiative will not suddenly require a new level of application integration. Even if SOA does not play a major role at the heart of an application, it can play an important supporting role with legacy functions wrapped as services. Some level of SOA is generally applicable to most applications.

Q: *You mentioned that SOA has a solid foundation in industry standards. Why is this important?*

A: This feature really acts to “future proof” the SOA environment. The use of standard technologies—things like XML, SOAP, WSDL, and Open Source software—translates into lower cost of ownership, more available skills, and greater agility in the long term.

It’s worth noting the pivotal influence of the Internet on SOA. In the past, the lack of a standard way to represent a piece of software impeded the development and

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adoption of this approach. (Standards such as CORBA and DCOM have existed for a while, but never became global standards for a variety of reasons.) Thanks to the Internet, however, standards like HTML and HTTP now connect people all over the world. Organizations started thinking about how to use these same technologies to link computer systems, and this led to the development of Web services standards. The past few years have seen the near-universal adoption of Web services as the foundation for SOA development and implementation.

Q: What challenges are involved in implementing and maintaining an SOA environment?

A: One obvious and common challenge is managing services metadata, the critical “data about the data” that makes it possible to create concise and accurate interfaces. SOA-based environments can include many services that exchange messages to perform tasks. Depending on the design, a single application may generate millions of messages. Managing and providing information on how services interact is a complicated task.

Another challenge lies in providing appropriate levels of security. Applications that consume services, particularly those outside company firewalls, are more visible to external parties than traditional monolithic proprietary applications. The flexibility and reach of SOA can compromise security. In response to this challenge, a comprehensive, standardized suite of specifications to provide appropriate security is being developed by the industry.

Interoperability is an important aspect in SOA implementations. The Web Services Interoperability (WS-I) organization—an open industry organization chartered to promote Web services interoperability across platforms, operating systems, and programming languages—has developed tools to enforce compatibility. WS-I has also designed testing tools to help assess whether Web services conform with WS-I profile guidelines.

Finally, there is significant vendor “hype” concerning SOA that can create unrealistic expectations. Product stacks are still evolving, as early adopters test development

and production products in real-world environments. SOA does not *guarantee* reduced IT costs, improved systems agility, or faster time to market; however, successful SOA implementations can be expected to realize some or all of these benefits, depending on the quality and relevance of the system architecture and design.

Q: How do enterprises guide and control their SOA initiatives and programs?

A: This is the emerging discipline of SOA governance. Many organizations are attempting to transition from silo-oriented applications to agile, composite service providers and service consumers, and this transition requires that the “service” become the new unit of work. The IT organization must now manage these services across the entire life cycle, from inception through analysis, design, construction, testing, deployment, and production execution. At each stage, certain rules or policies must be carried out to ensure that the services provide value to the consumers. SOA governance is the discipline of creating, communicating, and enforcing all related policies.

These policies typically fall into three categories: *SOA portfolio governance* deals with the analysis and identification of potential services and consumers. *SOA asset governance* pertains to the use of policies with regard to assets that are created; for example, organizations often have policies related to the standards used to implement services. *SOA process governance* covers the steps that an organization should take to ensure that the SOA program achieves optimal economic benefit.

Q: What's an example of SOA in action?

A: In the NonStop and Integrity NonStop system environments, customers in several different industries have implemented SOA with great success. For example, a major hardware retailer uses Web services to send thousands of requests for customer transaction information to a central NonStop system—using XML and SOAP—from every cash register in more than 1,800 company stores. XML “tags” each purchased item with price, date,



SOA website

Learn more about how Integrity NonStop servers and SOA work together to enable a powerful business-centered architecture—visit HP's SOA website at www.hp.com/go/NonStopSOA. This dynamic site contains a variety of materials to satisfy the needs of business and technical users alike, including:

- Links to information regarding the basic Web services products mentioned in this article
- White papers and presentations on the “what, why, and how to” of SOA
- A discussion on why SOA is important and how Integrity NonStop software can be used to implement an SOA environment
- Information on implementing SOA services on Integrity NonStop servers

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credit card information, and similar data. The application stores this information and makes it available to the stores to support refund requests.

SOA has greatly shortened this customer's time to market for new services. In the past, the company issued a new POS release once a year on average; following the SOA implementation, it issued five major releases in an 18-month period. The NonStop system is now the transaction hub for the enterprise.

As this example illustrates, NonStop and Integrity NonStop system users can expose their existing applications using Web services to create an effective SOA environment, protecting and enhancing their existing investment. These customers can also develop new applications as “future proof” SOA services. Of course, new services deployed on the Integrity NonStop platform will have the fault-tolerant, scalable characteristics required to meet the most stringent service-level agreements of the enterprise.

Q: *How can an enterprise maximize the success of its SOA implementation?*

A: Forrester Research provides excellent guidance for doing SOA the right way. Key recommendations include: Adopt an evolutionary approach; let the pain drive SOA investments; and use street-level strategy to tie near-term implementation to a long-term vision.

Moving to SOA is not a single-point-in-time conversion project; it is an evolutionary migration that starts small and builds over time. Having an evolutionary culture and mindset in the organization is essential for delivering positive business value today and building tomorrow's strategic SOA.

Businesspeople don't care about SOA per se; they care about what IT can do to address their specific challenges. Therefore, discussions about SOA should concentrate on business “pain points.” This strong business focus ensures that the SOA strategy balances pragmatism and theory, that SOA investments have the right prioritization and timing, and that SOA delivers maximum value along the way. It also encourages strong executive backing for SOA investments.

Forrester suggests connecting projects to the vision by using a just-in-time approach to SOA implementation: Start with a lightweight strategy that outlines and structures the range of SOA issues, without deciding on specific answers to any of them—then turn the discussion to the “street level” of the real-world business solutions that are needed today. Connect the street level to the strategy

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by asking how each project can put in place pieces of tomorrow's vision, while still delivering net positive business value in the short term.

At the project level, SOA implementation focuses narrowly on the services delivered or used by the project, both now and in the future. The most important project-level SOA starting steps are to build services before buying infrastructure; concentrate first on service interface design; use WS-I profiles as an initial guide to Web services standards; and validate performance. [For more details on these steps, visit the recently launched website; see "SOA Website" sidebar.]

Q: Does HP offer services aimed specifically at the SOA environment?

A: Yes. HP has formalized its experience in SOA with seven consulting services. These services provide a full life cycle for SOA implementation, designed around a process of envisioning, mobilizing, and synchronizing business and IT requirements using a consistent methodology.

The services are:

- SOA Envisioning
- SOA Assessment
- SOA Governance and Architecture
- SOA Enablement
- SOA Service Development
- SOA Software Development
- SOA Management

HP provides a complete end-to-end approach to SOA, including management, security, governance, Web services, and SOA architecture capabilities.



Q: In summary, what should Integrity NonStop system customers know about SOA?

A: The Integrity NonStop server plays a key role in the provision of highly available, scalable SOA services, and it supports the necessary toolset to implement these services. Existing Integrity NonStop server applications can be readily exposed as SOA services; it's a way to modernize these applications and increase their value to the enterprise without having to redo them. In addition, new SOA services can easily be developed for the Integrity NonStop server.

It's a winning combination: Using the SOA approach with the HP Integrity NonStop server provides unparalleled business agility with the highest service levels. By transforming tightly coupled, single-use applications into flexible services—thereby eliminating complexity and high cost—SOA in the Integrity NonStop system environment goes a long way toward improving business outcomes across the board. ♦

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MIKE ZIVKOVIC led product strategy and planning activities for HP's NonStop Enterprise Division before his recent retirement. His career at HP began in 1996 with Tandem and Compaq. Zivkovic has more than 25 years of experience in the computer industry. His areas of expertise include application architectures, middleware, database and application servers, transaction processing, application messaging, and system integration.