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Key to Successful SOA Deployments: Application Performance Management

*Service-oriented architecture promises competitive advantage —
but only when SOA performance management challenges are met*

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About the Author

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Key to Successful SOA Deployments: Application Performance Management

A recent survey, *The State of Real-World SOA*, shows that service-oriented architecture is growing up fast and organizations are beginning to understand the performance management challenges SOA poses.

by Carol Weiszmann

For the better part of half a century, organizations have improved their performance, and their viability, by converting manual processes to automated processes.

In significant ways, the progression of these efforts has involved decoupling — decoupling software from hardware, decoupling systems from each other, decoupling data from processing engines, decoupling server instances from physical machines.

Today's service-oriented architecture philosophy is, among other things, another instance of decoupling — in this case to significantly improve the flexibility of information technology and make the organizations IT supports more agile and therefore more competitive.

The *State of Real-World SOA* survey, conducted in July and August of 2008 by InformationWeek, garnered 615 respondents from the United States, the United Kingdom, France, Germany, and Australia whose organizations are either deploying SOA applications or planning to. From them we learn that organizations of all sizes and from just about all industry sectors are committing to SOA.

Not toe-dipping. Committing: More than three-quarters of the survey's respondents have plans to run mission-critical SOA applications in a production environment (see Figure 1: SOA — Going Mission-Critical).

What SOA Can Deliver

So what are the survey's respondents committing to?

Definitions of SOA vary widely, but they ultimately come around to this: SOA enables the dynamic integration of automated functionality by ...

- replacing tightly-coupled software applications designed as an undifferentiated whole for a specific task ...
- ... with a plug-and-play software environment comprised of loosely-coupled, reusable services/components that work together to accomplish a specific task.

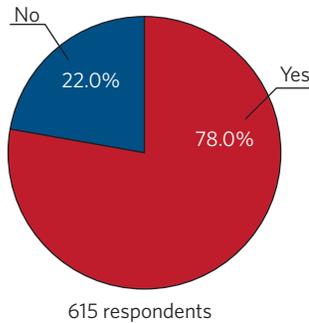
Reuse ... SOA accelerates software development cycles by enabling reuse of software code — especially code that has been written to be reusable (i.e., broken into many small templates/classes and methods/functions, and including good documentation of the code's purpose and how it can be reused).

The resulting portability and reusability of SOA services means new code development can be reduced, since existing assets that cost a lot of money to develop can be put to new uses. It adds up to more value for technology dollars spent.

It also enables faster adaptation of applications to changes in systems, usage patterns, etc., as well as conversion of legacy applications so these can be integrated with emerging IT platforms. Thus SOA applications also reduce unintended impacts on the rest of the IT environment because business processes can be adapted to changing conditions without altering core integration technology.

FIGURE 1: SOA – GOING MISSION-CRITICAL

Plans to run mission-critical SOA Applications in a production environment



... **And agility.** SOA brings flexibility to business automation by streamlining new software development, easing system interoperability, and providing a technology upgrade path that extends the value of investments in legacy systems.

All of this boosts business agility, which is critically important in a world in which the pace of change continues to accelerate. To stay competitive, organizations must manage the impact of change more quickly and with less cost. These days, competitive agility means making increasingly complex decisions closer to the point-of-transaction in real time using more and better data. It also means ensuring decisions are consistent and compliance-based.

Well-executed SOA leads to improvements in productivity and operational efficiency. Collaboration between people, teams, and organizations is more effective, so it's easier to develop new kinds of business products and services and bring them to market faster. And because decisions are better-informed and more timely, organizations become better able to keep their customers satisfied.

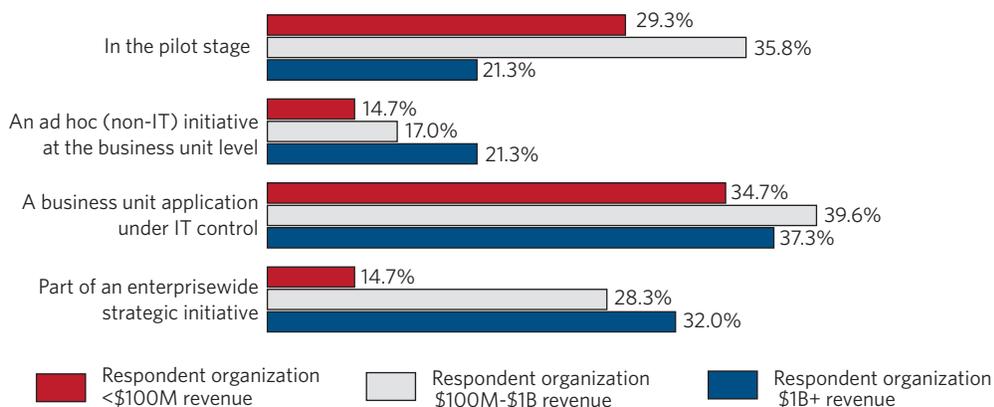
Strategic SOA?

The State of Real-World SOA survey suggests that those deploying SOA are still working out what it takes to actualize SOA's potential. Respondents' organizations are undertaking multiple types of SOA applications, as Figure 2 (Types of SOA Application Deployment by Organization Size) shows. But there's evidence of progression from business-unit SOA applications to SOA applications that are part of an enterprisewide strategic initiative.

There has been much media discussion about the virtues of beginning small with discrete

FIGURE 2: TYPES OF SOA APPLICATION DEPLOYMENT BY ORGANIZATION SIZE

Respondents whose organization has deployed an SOA application



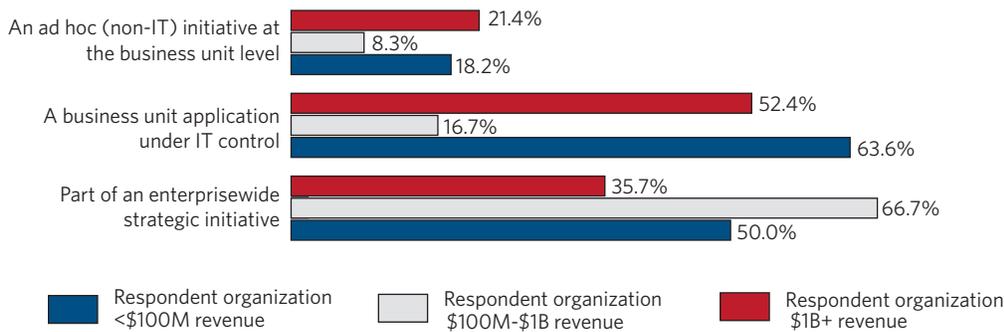
business-unit SOA apps that can do comparatively little damage if they fail. That advice has been taken to heart by respondents to *The State of Real-World SOA*. As Figure 2 shows, 35-to-40 percent of all those deploying SOA apps are doing so with business-unit initiatives that are under IT control. Yet they are already pushing SOA enterprisewide, and larger organizations are doing so to a notably greater extent than organizations with revenues below \$100 million.

It's clear that significant numbers of organizations are finding their SOA feet, so to speak. Thirty-two percent of respondents from the largest organizations (those with annual revenues exceeding \$1 billion) that have fielded SOA applications report deployment of SOA apps that are part of an enterprisewide initiative, as have 28 percent of respondents from organizations with \$100M-\$1B in annual revenues and almost 15 percent of those from organizations with yearly revenues under \$100 million.

A closer look at pilot-stage SOA application efforts (see Figure 3: Types of Planned SOA Application Deployment by Organization Size) shows this trend gathering momentum, especially at firms with revenues between \$100 million and \$1 billion, where almost 48 percent of respondent

FIGURE 3: TYPES OF PLANNED SOA APPLICATION DEPLOYMENT BY ORGANIZATION SIZE

Planned (Future) SOA Deployments: Respondents whose organization plans to deploy an SOA application.



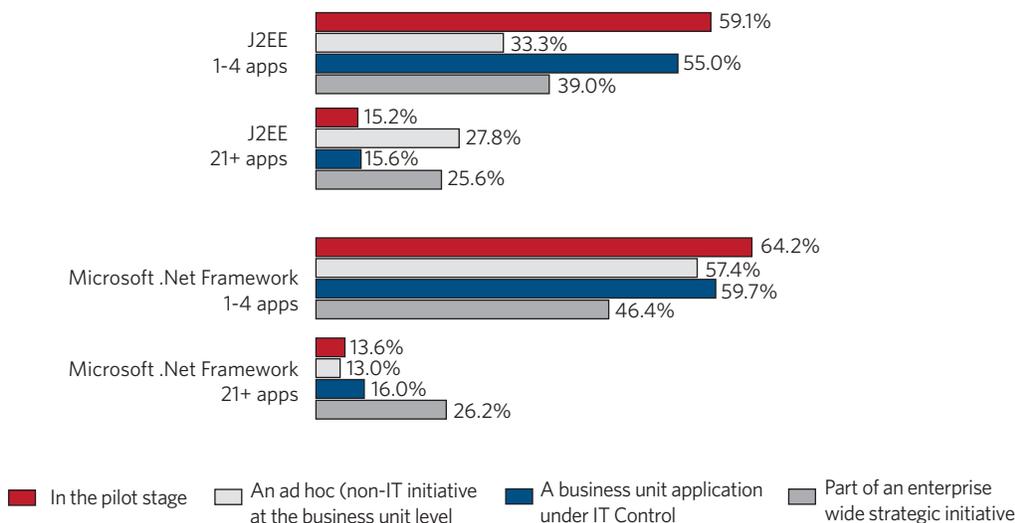
organizations occupy four industry sectors: financial services/banking, government, healthcare/medical, and insurance/HMOs.

The same movement toward strategic enterprisewide SOA applications is apparent as organizations undertake more SOA apps per .NET platform, a sign that .NET is gaining momentum as a SOA application platform. (See Figure 4: Types of SOA Application Deployment by Platform.)

“To reap the benefits of a SOA initiative, you need to be building at scale,” says Jeff Cobb, Senior Vice President of Product Strategy and Distinguished Engineer at CA Wily. “The IT environment is the first place this will happen, as IT is the place where scale is required because of the huge demand. Once SOA is built out in the enterprise, you’ll start seeing more unregulated consumption of services from other organizations outside of IT.”

FIGURE 4: TYPES OF SOA APPLICATION DEPLOYMENT BY PLATFORM

Platforms on which Production SOA Apps are currently deployed



The SOA Challenge: Satisfying Customers

But how do you know if you’re getting the business benefit of SOA?

Customer experience — good, bad, indifferent — is the gauge. The challenge, then, is to implement the right tools that monitor and measure the customer experience so that it’s possible to know how well SOA applications are delivering on their promise and intervene on application behavior when performance is inadequate.

That’s why respondents to *The State of Real-World SOA* survey overwhelmingly indicated

that knowing about an application failure before receiving a call from a dissatisfied customer is a very important capability (see Figure 5: What Matters to Organizations Committed to SOA).

Another customer-focused concern — setting proactive alerts that signal out-of-bounds performance conditions before customer SLAs are compromised — was tagged as very important by 50 percent of respondents whose organizations’ SOA applications are part of an enterprisewide strategic initiative.

The capabilities described in Figure 5 jibe closely with what SOA application performance management solutions must deliver, so it's hardly surprising that organizations deploying SOA applications would consider them important.

Why do these capabilities matter to organizations deploying SOA? Because without them operational IT staff lacks visibility into customers' SOA app experience, and a customer who is unhappy with an application's behavior or performance takes her business elsewhere.

Of course, most organizations use application performance management tools. These tools are more important than ever when it comes to monitoring and managing the performance of SOA apps, which are time-sensitive and volatile, since they're composed of mutable services/components from various sources that follow transaction paths decided on-the-fly at runtime based on business rules.

Unlike traditional applications, the features, composition, location, and communications of SOA apps are not predetermined. Because they change so dynamically, their impact on the performance of the overall application — and the impact of the overall application on the performance of the wider IT infrastructure — must be monitored and measured in entirely new ways.

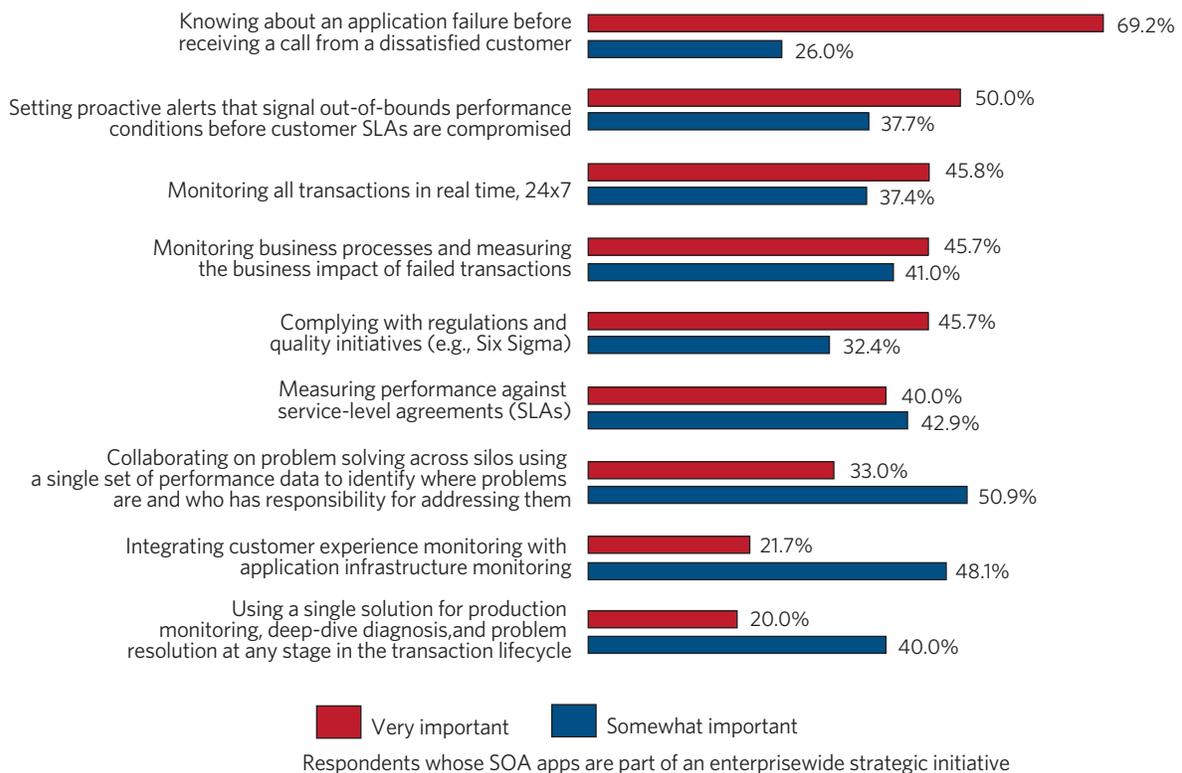
As Figure 4 shows, current SOA application deployments are modest — most organizations are fielding relatively few apps. But as these same organizations evolve from proof-of-SOA-concept to wider deployment of strategic SOA applications across the enterprise, their SOA application environment will become far more complex.

SOA-Oriented APM Lagging

If SOA is to deliver the business benefits it is capable of, then SOA services/components reuse — now limited (as evidenced by the survey's relatively low SOA app deployment-by-platform numbers) — will

FIGURE 5: WHAT MATTERS TO ORGANIZATIONS COMMITTED TO SOA

How important are these capabilities?



grow. Likewise, the impact on IT infrastructures of dynamically-adaptive SOA applications will grow. And the need to monitor, measure, and manage SOA application performance will become acute.

Results from *The State of Real-World SOA* survey carry intimations of the need for SOA-oriented application performance management capabilities (see Figure 6: Where SOA Meets Application Performance Concerns).

Top-of-mind for more than half of respondents are

- Application downtime is damaging our relationships with customers and
- Difficulties with problem resolution reduces productivity in our IT and line-of-business operations

The fact that 53 percent of those deploying SOA apps as part of an enterprisewide strategic initiative are seeing damage to customer relationships from application downtime is a sign that SOA is taking root in organizations — and that implementation of SOA-oriented APM capabilities is lagging SOA deployments.

This painpoint, as well as the others noted in Figure 6 (particularly struggles with problem resolution and collaboration, and poor web application performance), show why there’s a need for SOA-oriented APM solutions — and what will happen when these solutions are missing.

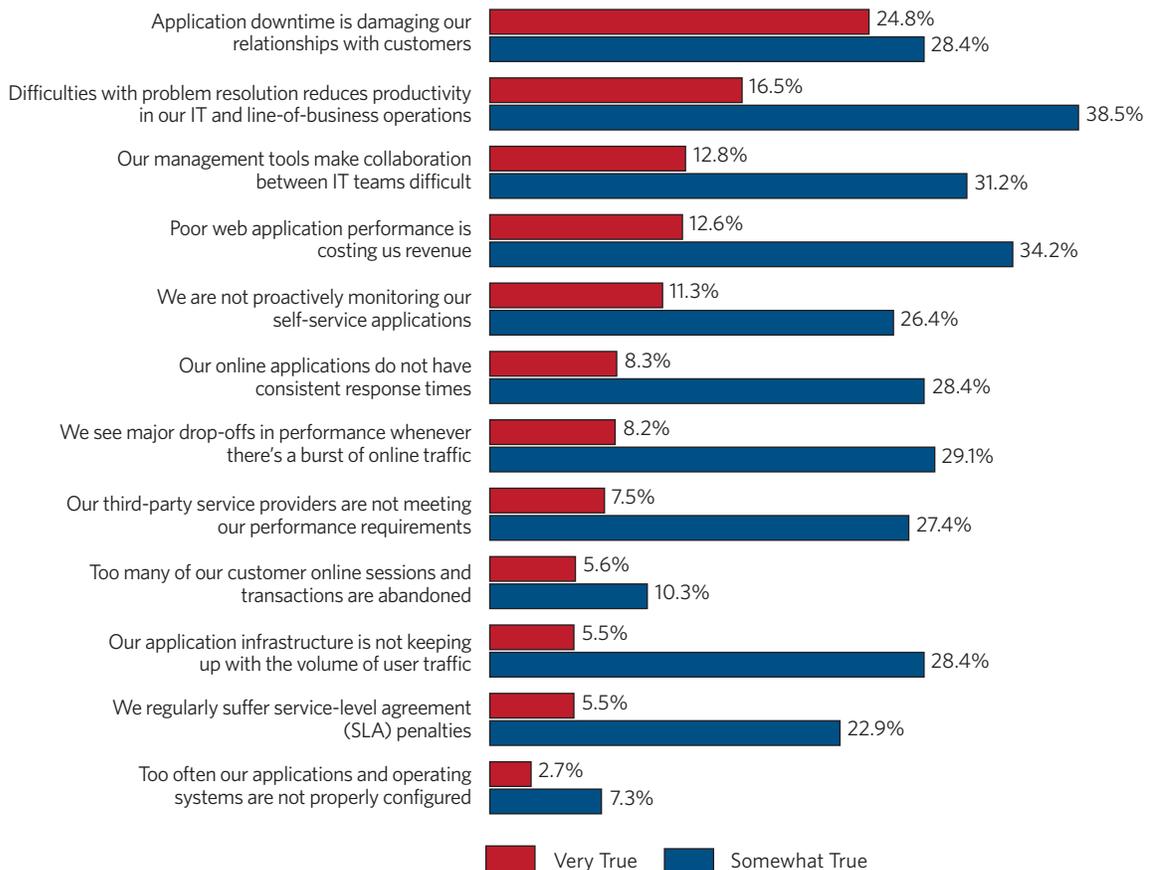
SOA Solution: A New Kind of Application Performance Management

To avoid chaos, the complexity of SOA applications — incipient now but looming ever large and closer — must be managed if they are to perform optimally. Two dynamics impact how that is being done. One is SOA architecture, which changes the way IT operations staff must manage performance. The other is the customer experience, which is becoming the final arbiter of application performance.

Seeing the entire SOA transaction path. Although the nature of SOA performance metrics is essentially the same as those that work in traditional, tightly-coupled application environments, the

FIGURE 6: WHERE SOA MEETS APPLICATION PERFORMANCE CONCERNS

How true are these issues for your organization?



challenges of following an SOA transaction and gathering SOA application performance measurements are much more difficult.

That's because managing services in a silo is not enough. It's good to know the service is slow, but then what? To solve the problem, you need to know what has caused the slowdown. Is it due to the message itself (which may, for instance, be malformed)? Is the slowdown being caused by the service implementation (perhaps because the app server is misconfigured)? Or does the problem lurk in backend connections (maybe the database connection pool is exhausted)? To know the answer — and to solve the problem — actual SOA app transaction flow must be monitored in real time.

Monitoring response time for a shared service/component alone is inadequate because this won't show the impact of a single SOA app on that shared service/component. Instead, the monitoring tool should acquire accurate performance metrics in the context of the specific SOA apps sharing the component.

Non-functional characteristics of an SOA app (call frequency, payload size) can affect performance, too — so it's important to monitor actual application traffic and have the means to analyze it from multiple points of view.

To ensure peak performance and availability of SOA applications, IT operations staff must be able to see the entire transaction path, end-to-end, including all integration points, services/components, applications, and connected back-end systems. This requires

- **Automatic discovery of services/components**, so staff doesn't waste time determining what to monitor.
- **Always-on performance and availability monitoring in production environments**, so that issues can be detected in real time before they impact the business — without imposing further overhead or latency onto the monitored systems.
- **Transaction visibility**, so all transactions can be monitored at the component level, 24/7, across multiple processes and applications. Thus IT staff can understand each service/component transaction in the context of individual transaction paths.
- **Root-cause analysis**, so information about SOA app transactions can be used to isolate underlying issues regardless of where these occur.
- **Live, customizable views into the entire multi-platform SOA services/component infrastructure**, so those with different responsibilities can view integrated performance data in accord with their roles and be assured that those with whom they collaborate are accessing the same dataset. This means more than merely the end of siloed apps. It means collaborative, team-oriented processes and best practices that not only help operations staff optimize performance but also point out to developers where design issues impact that performance.

New complexities need new solutions. *The State of Real-World SOA* survey indicates that movement toward these crucial capabilities lags organizations' commitment to deploying strategic, mission-critical SOA applications in a production environment. But the success of SOA applications depends on satisfied customers, and to keep customers satisfied, SOA-oriented application performance management solutions are essential.

SOA environments introduce new complexities into managing applications, services, and SLAs both within the organization and outside its firewall. As companies deploy mission-critical SOA applications, managing both the customer experience and performance and availability becomes paramount.

The good news is that in many organizations SOA is often a façade in front of traditional web application architectures. So much of what application performance management solutions monitor in traditional environments remains relevant in SOA environments. This means today's application performance management solutions can be enhanced to effectively manage SOA applications. ♦

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