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## Background

The concept of a service-oriented architecture arose from a need. Back when IT departments had only a few monolithic applications to deal with—accounting, ERP and HR—integration between those applications was point-to-point, comprised of custom-coded links. It was labor-intensive but effective.

Over time, though, a bird’s nest of connections evolved, which resulted in an architecture that was not designed but instead was an “accident” of disparate point-to-point connections, infamously known as the “accidental architecture.” The increasingly complex and convoluted set of connections meant IT had a hard time adding anything new to the mix, which created friction with business executives anxious to take advantage of evolving, Internet-enabled opportunities.

Enter SOA. Service-oriented architecture (SOA) is designed to simplify the process of creating connections between users and applications by turning common requests into reusable services. With SOA, a well-used business request such as “get customer record” can be encoded as a service that can be reused by different groups of developers when needed. An organization can create a set of reusable services that can be employed to both integrate and create new composite applications that are composed of services.

With SOA, the application development process is cheaper and faster, and the business is more agile. For instance, when OnStar, the online mobile service vendor and an SOA veteran, wants to create a new service, “they start out with 30 percent or more of the new application already done,” says Bruce Tierney, director of product marketing for Oracle SOA Suite.

SOA is a key remedy to help relieve the brittleness and complexity of multiple redundant

connections. Two developments helped ensure optimum implementation of SOA. The first was the evolution of best practices in connection with SOA, in particular the use of a center of excellence (CoE) to oversee the architecture and enforce standards. The second was the development of the shared services infrastructure, in particular the enterprise service bus, which is a critical tool in enterprise application integration.

## The Evolution of the Cloud

Although the cloud has seemingly burst onto both the IT environment and the popular consciousness, cloud computing has been evolving as a process for some time. Significant focus has been placed on securing services across the cloud, but there is another challenge that has not yet made headline news but is critically important for businesses to be aware of before they evolve their on-premise infrastructure into the hybrid cloud.

Individual business groups, frustrated with the pace at which IT can add new Internet-based business initiatives, are increasingly looking to empower their workers by reaching out to cloud service providers for specific functionality without the delays or concerns (possibly very justified) that IT might introduce.

For instance, a sales group might want to use a CRM application that’s offered in the SaaS model. The business manager goes directly to the CEO, who, under pressure to deliver immediate results and impressed by the manager’s ambition, signs off on the project.

The problem with this scenario occurs when the IT organization is bypassed, ignoring internal best practices and potentially violating security practices. In the short run, this might not be noticed.

But the cloud gives every indication of being a long-term trend, an actual paradigm



*A cloud SLA is a contract, not a guarantee.*

shift in computing. What's evolving is a hybrid model of corporate computing, where organizations employ an elastic model with the ability to vary the deployment of internal IT services and external services in the cloud. And although the potential benefits are massive, there are challenges inherent in this hybrid model.

First, there are potential problems related to performance and reliability. The challenge is to maintain adequate quality of service despite dealing with relatively unknown third parties and IT infrastructure external to the organization. In terms of cloud services providers, reputation or even experience may not be enough.

Earlier this year, Amazon suffered an outage of its storage service that lasted for five days. In the eyes of the customer, the company relying on the cloud provider will take the blame and the company in turn will blame the internal IT department for not managing this issue better, despite the quality of the service-level agreement (SLA).

Secondly, and perhaps most obviously, security is a major challenge. Security is still the main reason many IT managers hesitate to move aggressively into the cloud. As with performance, security measures are spelled out in the SLA with the cloud provider. But an SLA is a contract, not a guarantee.

The service provider model presents its own security problems. "If an attack enters my on-premise infrastructure from the cloud, how do I know and how do I stop the attack?" asks Oracle's Tierney. Once again, while the service provider may be the cause of a security compromise, IT will take the blame.

Finally, there is the issue of governance in the hybrid cloud. For IT, governance is something of a loaded word, but in the context of the hybrid cloud architecture, it's an even more critical concept than in the on-premise world. That's

because the hybrid cloud represents a potentially significant expansion in infrastructure heterogeneity by introducing new protocols, standards and proprietary formats across all of your new cloud partners that are now an integral part of your network, according to Oracle's Tierney.

For instance, when dealing with cloud services providers, IT managers are very dependent on SLAs. That means IT must be involved in the SLA process to ensure conformance and standardization. Also, IT must be cognizant of the work being done in connection with the various cloud services employed across the organization, which may include infrastructure-as-a-service (IaaS) and platform-as-a-service (PaaS).

"You don't want developers to simply create something and put it out on the cloud without governance and without the oversight by some form of a center of excellence," says Tierney. "Otherwise, organizations will return to the pre-SOA world of redundant functionality interconnected in the legacy style of point-to-point chaos."

As a result, what emerges if IT is not actively engaged with all cloud service partnerships is an "accidental SOA cloud architecture." The challenges represented by the hybrid cloud model are

SOA challenges: connectivity, standardization, and agility.

To address these challenges, what is needed is a combination of a cultural shift in the role of IT from technology enablement based on business requests into a role of business partner as well as an SOA platform that looks ahead, that anticipates and addresses the problems related to merging the infrastructures of the enterprise and the cloud.

#### **Oracle and SOA**

When it comes to infrastructure and middleware, one of the most familiar and trusted names is Oracle. Gartner, the respected IT research organizations, scores Oracle in the "Leaders" category in its "Magic Quadrant"

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*Addressing the challenges of the hybrid cloud requires a cultural shift for IT as well as a forward-looking SOA platform.*

comparison reports in all four categories: “SOA Governance,” “Application Infrastructure for Systematic Application Integration Projects,” “Application Infrastructure for Systematic SOA-Style Application Projects,” and “Shared SOA Interoperability Infrastructure Projects.” That last one deals directly with the challenges represented in the accidental SOA cloud architecture.

The Oracle SOA Suite takes a unified approach to SOA implementation. It incorporates several significant components and features, such as an enterprise service bus, adapters to other applications, and real-time complex event processing. Uniquely, Oracle employs a common management and monitoring environment to orchestrate the SOA process and track instances end-to-end across applications. Oracle also layers a business-process management (BPM) suite on top of its SOA suite.

Oracle has incorporated many features that address problems associated with the accidental SOA cloud architecture:

- The Service Result Cache feature helps with performance and reliability by caching, or holding, repetitively accessed service result data. This means enterprise applications will be able to get at the data they need most of the time even if a cloud service provider may be suffering a performance problem or be offline entirely.
- Oracle Enterprise Gateway (OEG) is deployed in the DMZ to secure connectivity when interacting with cloud service providers. OEG intercepts and interprets service requests, and blocks malicious attacks such as XML bombs and SOAP attacks at the perimeter of the shared services infrastructure.
- The Oracle SOA Governance solution is a combination of Oracle Enterprise Repository and Oracle Service Registry. It provides a communication channel to exchange metadata and service information automatically, as well as

providing the analytics and feedback needed for centralized control across shared services and the hybrid cloud.

### Next Steps and Best Practices

The hybrid cloud model—and if steps are not taken to prevent it, the accidental SOA cloud architecture—are only now emerging and evolving in organizations. Nonetheless, there are several next steps and best practices related to these developments that IT managers should take to ensure they are not the victims of an accidental SOA cloud architecture.

**Step One. Strong Center of Excellence:** “A strong CoE is critical,” says Oracle’s Tierney. The CoE is the virtual team of architects and other stakeholders who will determine what are acceptable architectural practices. It’s important that the CoE (or CoEs, as some organizations

employ multiple global teams) is viable, effective, and recognized within the organization. Otherwise, the expansion into a more distributed hybrid cloud infrastructure will result in management chaos, an inability to evaluate ROI and increased complexity.

**IT must take the initiative to get executive buy-in in this evolving hybrid cloud model or risk being marginalized initially and blamed later.**

– Bruce Tierney, Oracle

**Step Two. Executive Buy-in:** “Make sure the accidental SOA cloud architecture is understood at the executive level,” says

Oracle’s Tierney. That means executive buy-in for the fact that IT is an approver of all major cloud initiatives, including being involved in or signing off on all SLAs. It means making CXOs aware of the fact that there is a process in place for architecture decisions, and that the cloud is simply an extension of that. This isn’t only about standards and architectures. IT must take the initiative to get executive buy-in in this evolving hybrid cloud model or risk being marginalized initially and blamed later.

**Step Three. Technology:** “It’s important to have a service-oriented architecture in place before you move to the cloud,” says Tierney. Though few companies will shift quickly over to 100-percent SOA, the aggressive introduction of the cloud brings urgency to the SOA model.

"It's beneficial to have things broken down to smaller bite-sized services," Tierney says, which makes SOA a necessary precursor to an optimal hybrid cloud.

Another important point about the SOA horse before the cloud cart: "As you form partnerships with cloud vendors, it's important that you have a low barrier to exit," Tierney says. "You want the flexibility to pull back or to move to another cloud vendor. One of the key tenants to SOA is that there are no direct connections between applications. Likewise, you don't want it to be difficult to replace the connections to your various cloud service providers. You want loose coupling between you and your service providers."

**Step Four. Business Process Management:** BPM is the next wave following on SOA. "We layer business process management on top of SOA, using the same set of application adapters, database adapters," Tierney points out. BPM can be a great benefit to the emergence and development of the hybrid cloud. And once you get executive buy-in for your COE, you could

create a business process around cloud-service requests, approval, and confirmation, Tierney advises. "This ensures that IT is a key player in that decision-making process," he says.

#### **Don't Let Your Cloud Be an Accident**

The service-oriented architecture emerged because it was needed to overcome the spaghetti-like connections that evolved between applications within most corporate enterprise IT organizations. The same redundant and complex connectivity process is taking place as cloud computing services make their way into intricate, well-planned enterprise IT architectures. It's incumbent on IT managers to stay ahead of this developing trend or risk losing status as executive decision-makers and being held accountable for cloud service provider problems downstream.

SOA itself can help. What's needed is a combination of urgency by IT to ensure they proactively avoid the accidental SOA cloud architecture and for IT to leverage an SOA toolset and vendor well-suited for the hybrid cloud model. Oracle SOA Suite fits that bill.

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