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SECURITY

# *Infrastructure Basics for Real-World Integrations*

The tools and platforms available for application integration are varied and must be deployed with the big picture in mind. But with guidance on the right tools and strategies, successful deployment is within reach.

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# Monitoring the Course of APIs

IT WAS QUITE a ride for acronyms as SOA middleware transmogrified over the last decade. The rise of Representational State Transfer (REST), cloud computing application programming interfaces (APIs), enterprise service buses (ESBs) and open source software (OSS) brought on profound change, and technology leaders had to go with the flow. Each of these is among topics treated in this application integration handbook.

In these pages you will learn about [REST APIs](#), which are favored when rich, UI-based applications or mobile integration is part of the scope. You will get a view on the new need for [companywide standard practices](#) for cloud integration project success. What's more, you will learn about [integration connectors for the cloud](#), which may, if not carefully designed, lead to a higher chance of lock-in than some older options.

Efforts are under way to increase cloud integration standardization around various APIs. The hope is that users can build their own management interfaces. That could lead to freedom to move cloud integrations in-house or to other providers. These are not issues that will be resolved overnight. But be assured that contributors and staff will continue to closely monitor the course forward in the webpages of SearchSOA.com. ■

JACK VAUGHAN  
*Editor in Chief, SearchSOA.com*



# Application Integration Presents No Shortage of Hurdles for Businesses

APPLICATION INTEGRATION IS a fast-evolving framework. With APIs now spanning far beyond the confines of the business, integrating existing applications with newer ones—including mobile apps—is more important than ever. And enterprise service buses, seen by some as a panacea, don't necessarily replace the hard work.

The integration challenges of 2005 are not the same challenges of 2013, said Dimitri Sirota, co-founder and chief strategy officer at Layer 7 in Vancouver, British Columbia. Increasingly, the No. 1 integration challenge facing businesses is not stitching together data and apps inside the enterprise, he explained. It's integrating information inside the enterprise with applications and services outside the enterprise.

“Whereas the ESB emerged to address internal integration via Web services, enterprises are now looking for a unified approach for integrating internal information assets with applications and services outside the enterprise, whether driven by partner, mobile or cloud initiatives,” he said. [ESBs](#) will need to evolve into Internet service buses, where integration is not parsed from identity and security, Sirota said, since integration over the Internet will demand that identity and security be baked in.

## INTEGRATION DIFFICULTIES ABOUND

Companies are embracing ESBs, but they are doing so cautiously, said Jeff Genender, founder and chief technology officer of Savoir Technologies Inc., an open source consulting firm in Evergreen, Colo. “People are afraid of the term *ESB*, perhaps because of the way IBM and others tried to turn it into an integration platform,” he said.

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But mobile access can change all that. In Sirota's view, the big issue is integration. As enterprises look to make internal information assets like SAP and SharePoint available to mobile developers and mobile apps, they'll need consistent, mobile-friendly APIs on the back end.

This mobile back-end problem is complicated by the need to address some of the security, management and cloud orchestration challenges that are particular to mobile. For instance, he said, "it is not enough to just take an internal application and convert it to a [REST API-based service](#) to address the mobile integration. Internal identity frameworks also need to be 'mobilized' to support mobile-friendly token styles like OAuth and HMAC [hash-based message authentication code]." Similarly, application security needs to be updated from Web and HTML security models to API, XML and JSON styles that can also accommodate newer, mobile-driven streaming API protocols like WebSockets, Sirota said.

Still, many businesses favor REST APIs, especially when rich, UI-based applications are involved, said Asankha C. Perera, founder and chief technology officer of AdroitLogic in Singapore. "Although we still work with SOAP-based services, most of the newer services being implemented by enterprises are based on REST," he said.

### **OPEN SOURCE TO THE RESCUE?**

Perera, whose company develops the open source enterprise service bus UltraESB, believes an ESB plays a major role in a SOA and will be a key factor of any successful implementation.

"An ESB offers many capabilities, such as routing, transformation, orchestration or throttling, and allows the users to integrate custom code as well easily into the interactions facilitated," he said. But some older ESBs, developed primarily for [SOAP messaging](#), may have trouble making the shift to REST.

Businesses get more than just cost savings with open source, Perera said. AdroitLogic works with senior architects from big businesses who want to follow the source code. "This level of visibility assures them of the quality



of the architecture, code and unit testing and also paves the way for them to participate in the ongoing development of the products by ideas, feature suggestions as well as code contributions,” he said. That’s why “large companies are not afraid of using open source.”

“We are also seeing enterprises that use our ESB as a component of their larger platform,” he added, “and are then using other tools and technologies to deploy and manage it.”

Returning to his concern about the state of ESBs, Sirota said an ongoing challenge is that without a new Internet service bus approach to integration—one that builds identity, security and externally facing orchestrations into social, cloud and mobile services—integration will fail to accommodate newer drivers like mobile and cloud access. “APIs represent the vehicle for enabling these external APIs,” he said. “But without security, management and external orchestration, it will not be enough to make outside facing integration safe and reliable.” —*Alan R. Earls*

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# A Different Animal, SaaS Apps Require New Integration Strategies, Tools

WHEN COMPANIES NEED to integrate their in-house applications and Software as a Service applications, old tools and ad hoc methods won't stand up to challenges in orchestration, security and data transformation. Old ways die hard, however, so many organizations are behind the curve on enterprise-SaaS app integration, analysts say.

What do organizations have to do to make on-premises and cloud applications play well together? Software integration experts reveal why traditional software integration approaches fail and which new tools and strategies work.

Application integration got lost in the "cloud rush," said Benoit Lheureux, an analyst at Gartner Inc. in Stamford, Conn. Hustling to catch up with virtualization and cloud advances, many organizations failed to perform due diligence on how they'd integrate and synchronize data between on-premises and cloud apps. Ironically, Lheureux added, virtualization and cloud are driving the requirements for integration.

The fact that SaaS vendors don't provide a complete integration system came as a nasty surprise to many early adopters of cloud apps. "There was a misperception that because every cloud provider had an API, app integration was 'automagical,'" Lheureux said. Cloud vendors' APIs aren't the answer in most cases because they're frequently proprietary, long and complicated, he said, referring to Force.com APIs with more than 500 pages of specs.

IT organizations also assumed cloud application integration could be done with traditional integration technologies, like [extract, transform, load \(ETL\)](#), external EDI and FTP services for integration between applications and types of businesses. The problem is that these tools are expensive, require a lot of skills and aren't necessarily designed to work the way a cloud system works,

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said Carl Lehmann, who covers enterprise architecture, integration and business process management for 451 Research LLC, based in New York.

For the last five years, Lheureux has seen companies dealing with integration on a one-off, ad hoc basis every time they got a new [SaaS app](#). “Until you get a few cloud projects under your belt, you don’t appreciate just how complex integration is,” he said. “Now they have a mess and must start applying a rational discipline across all types of applications.”

### HURDLES IN CLOUD, ENTERPRISE APP INTEGRATION

IT organizations that want to integrate multiple [SaaS technologies](#) from multiple vendors with multiple on-premises applications face complex problems, Lehmann said, including the following:

- Ensuring transformation as data goes from one system to the other or from on-premises to the cloud;
- Maintaining the connections and the data exchange with the same level of security that organizations had in the enterprise;
- Having the right types of connections to accommodate the volumes of data and interaction between the two systems; and
- Orchestrating data flow to get the right data to the right system at the right time, and, in doing so, creating a comprehensive, cohesive information scheme and not silos of information.

[Orchestration](#) is the most-needed integration functionality, in Lehmann’s opinion. Users need a graphic visual interface that allows them to look at the quality, security, liability and accuracy of all the data so they can manage and orchestrate them accordingly.

### SAAS PROVIDERS’ APP INTEGRATION CAPABILITIES

Today, many [SaaS providers](#) specialize in their applications’ unique capabilities and don’t address integration, Lheureux and Lehmann said. They advise users to carefully assess the integration functionality SaaS vendors can

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provide, plus their own capabilities and which third-party cloud-enterprise application integration technologies could fill the gap between the two.

Focus [SaaS vendor](#) technology evaluations on the quality and capabilities of transformation, security, the volume and the orchestration software, Lehmann said. Make certain that the SaaS vendor is capable of exposing data in a standardized way so it can be used by an integration service provider or an on-premises enterprise integration technology, like an enterprise service bus.

The emergence of third-party integration service providers has kept SaaS application integration projects going. Third-party tools—from Dell (Boomi), MuleSoft, PathLogic, Jitterbit, Kapow, Talend, Vitria, Tibco, Red Hat and IBM (Cast Iron)—assist with SaaS-to-on-premises application integration. “Their prices are reasonable for small to midsize companies and [they] also translate departmental solutions in larger enterprises,” Lehmann said. “I would rely on those types of vendors to assist in integration.”

Gotchas when working with integration services providers include pricing models that change with scale, volume or number of users. Be aware of how their pricing models scale so you can budget for that, Lehmann said.

Most SaaS vendors will provide greater integration capabilities in the future, he said. Lheureux thinks that time can’t come too soon and believes that cloud providers have been remiss in offering integration as an add-on and not included-in software.

“Redirecting your customers to a third party for integration solutions when integration is a requirement in every IT project of substance is falling short of meeting your customer requirements,” Lheureux said. “SaaS providers should have bitten the bullet and given their customers integration capabilities rather than forcing customers to buy them from a third party.”

Lheureux pointed to Workday as an example of a company that has ponied up with integration systems, providing the application, middleware and integration middleware in a bundle (or SaaS and [integration Platform as a Service](#)). He predicts that Microsoft will offer integration as a feature of its Windows Azure cloud service.

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## CLOUD INTEGRATION DISCIPLINE AND STRATEGY

To break down barriers to [cloud application integration](#), DevOps should also change from ad hoc to companywide standard practices. “You can’t be successful in managing an evolving, constantly changing application portfolio if you are not really disciplined at doing integration,” Lheureux said.

For most organizations, there’s still time to craft a cloud-to-enterprise application integration strategy. “Right now, everyone’s going slowly,” Lehmann said. “They’re not shifting their entire enterprise to a SaaS model. They’re doing it departmentally or by function.”

Start strategy planning with standardizing ways to master the four main challenges mentioned earlier: transformation, security, volume and orchestration, Lehmann said. From there, Lheureux said, create a coherent, disciplined application integration strategy that works across all sources of application data—in-house or cloud, behind or outside the enterprise firewall. Before buying, make an informed decision about how a piece of the cloud will be integrated.

A coherent strategy doesn’t necessarily mean using only one technology approach or one implementation approach, Lheureux said. Certainly, organizations benefit from using one infrastructure for integration, no matter where application data and process logic resides. Within that framework, however, have a portfolio of technologies and models you can use on a case-by-case basis based on predefined criteria.

A final word of advice: Treat integration artifacts as valuable assets. Maintain them for reuse. Whether you’re connecting to a dozen cloud apps or a thousand external trading partners, all of the interface definitions, maps for translations and so on are valuable when cloud or enterprise applications are updated or replaced and trading partners come and go. —*Jan Stafford*

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## Cloud Connectors Are Fine, but Watch for Vendor Lock-In

A PLETHORA OF on-premises applications that need to connect to cloud-based software, or Software as a Service, leaves architects scrutinizing their options. The newest—and, according to experts, best—way to connect these applications is through a cloud-based connector, an Integration as a Service layer that provides translation and syncing capabilities. Heavy hitters like IBM and Dell offer their own, but don't discount lesser-known cloud connectors. Experts recommend that architects evaluate how the connector will be used before settling on one.

The hard truth of integration is that there is a wide variety of standards that need to be supported, said Martijn Linssen, founder of We Wire People, a technology consulting firm in Utrecht, Netherlands. "There's no easy answer to that," he said. "It's not something you can decide in a few weeks."

### A WEALTH OF OPTIONS

Linssen recommended examining business requirements that correlate with the integration. For example, architects may need to link enterprise resource planning systems to cloud-based customer relationship management as well as other software that may be on-premises or [in the cloud](#).

Dell's Boomi, Informatica Cloud and IBM's WebSphere Cast Iron Live are all about cloud-based integration (CBI). While CBIs are sophisticated, they can also present a simplified environment, said Stefan Ried, principal analyst at Forrester Research Inc. in Cambridge, Mass. "They connect your customer records on an account to your customers' [records] in your SAP system," he said. "They do nothing more."

IaaS and CBIs may not be robust enough for some companies, however.

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Situations that require more than just data matching, such as dynamic routing or sophisticated processing scenarios, require more of a Platform as a Service (PaaS) approach, according to Ried. For example, a company may need to route debt records for Brazil to one software program, while those for Canada or the United States go to another. “If you do things like ... inspecting or changing data, those integration-centric PaaS [technologies] are the best choice,” he said. MuleSoft, Tibco, Cordys and others all provide PaaS business logic functionality, Ried added.

### NEW CONNECTIONS, NEW APPS

More of the connectivity does require sophistication, Ried said. Applications like master data management (MDM) as cloud-based services can manage conflicts and duplicates in data. “It’s not a technical problem; it’s a logical problem that MDM addresses, getting rid of outdated data ... you’re not just looking at a connector but solving problems in a sophisticated way with MDM,” he said.

Companies are also reconsidering how the software appears to the user and how much of the interaction with programs is between other programs as opposed to being between a user and the program, Ried said. “For example, if you look at Salesforce.com, it has something like 800 million transactions per day, but about half are not human beings sitting in front of a [Web] browser. Half are machines talking to Salesforce.com,” he added.

From these types of interactions, new applications, like call center applications, are natural outgrowths. These require sophisticated connections to software like [Salesforce.com](https://www.salesforce.com). Architects can try this manually [using Java or .NET](#), or they can use a cloud connector like Cordys, Ried said. “You can take the capabilities and connect to the APIs of those platforms, creating connectivity to the applications very easily,” he said.

Another consideration is whether the connector can be put in the hands of business users and scale over time, said Rebecca Wettemann, a research vice president at Nucleus Research, a research and advisory firm in Boston. “In the case of Salesforce.com,” she added, “where I’m configuring instead

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of customizing, [one should ask], Can I give the business analyst a GUI interface so that if people need to make changes, it's not a costly effort every time?" Any integrators used should be able to adapt as [business needs change](#) without requiring extensive coding efforts, she said.

### GETTING WHAT'S RIGHT FOR YOU

Wettemann advised shopping around for connectors and examining what vendors can offer in terms of prebuilt adapters to connect what is already running on-site and in the cloud. "At this point, you should be able to find a cloud integration vendor that can do 80% [of the integration] with out-of-the-box adapters," she said.

Review vendor references, particularly in the areas of latency and scalability, Wettemann said. Because there is a variety of options, architects can home in on those that specialize in their types of projects, she said.

Finally, expect a relatively quick implementation and return on investment (ROI). "You should be able to get payback from your integration investment in under six months," Wettemann said. "Particularly in the cloud, you want to get your ROI so that you have that money to take advantage of what might be the next opportunity to get value from your integration." —*Christine Parizo*

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