Integration: The critical path to cloud computing

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Introduction

The first wave of cloud computing emphasized simplicity and rapid time to value. When coupled with core economic and technical advantages, the adoption of cloud computing was validated and accelerated worldwide. The widespread adoption of Software as a Service (SaaS) applications made it clear that productivity can be enhanced, time-to-market accelerated, and savings can be gained by applying cloud-based techniques to many different business challenges.

In the second wave of adoption, businesses are finding that a growing number of Platform as a Service, Infrastructure as a Service, and virtualization technology offerings provide a rich set of choices for new functionality and cloud-based deployment models.

The rate of adoption in the second wave varies by company and industry, but it is indisputable that more and more cloud-based offerings and services are showing up as an important part of the solutions offered by IT departments to support the enterprise. There is no doubt that a major shift is underway. The analyst and research firm IDC predicts that spending on IT cloud services will hit USD42 billion by 2012. In fact, Gartner has forecasted that SaaS delivery within the enterprise application software markets is trending towards annual growth rate of 27 percent—the fastest growing sector in the software industry today.

Companies are realizing that in order to gain the maximum value from these new cloud-based solutions, they must be connected to the existing on-premise infrastructure of the business. In fighting this battle, new forms of complexity rapidly emerge and must be mastered for the promised benefits of cloud computing to be achieved.

Many questions must be answered to make this hybrid world work, and core IT practices must be reshaped. But the first challenge on the critical path to making the most of the cloud is integration.

This white paper examines the integration challenges that companies face as they create a hybrid infrastructure for applications that reside on premise, at managed hosting environments, at Software as a Service providers, in cloud environments like Amazon Web Services, or created on Platform as a Service offerings upon which organizations can build their own custom cloud applications.

New capabilities, new questions

Cloud computing is most commonly discussed in terms of four categories; each coming with different design, operations and integration challenges:

- **Software as a Service (SaaS)** offers the same simplicity for applications, allowing new functionality to be rolled out as fast as a subscription can be obtained with a credit card. Salesforce.com, Taleo and NetSuite all provide powerful applications to address core business needs. Google® and Microsoft® are competing to provide a cloud-resident suite of desktop applications.

- **Platform as a Service (PaaS)** provides an environment for development that can be configured and ready to use in minutes. Several vendors offer complete environments for building software applications based on a ready-made cloud infrastructure.

- **Infrastructure as a Service (IaaS)** offerings make provisioning computing infrastructure something that is purely virtual, something that can be done in an instant, controlled through a simple console or an application programming interface.

- **Virtualization Technology** from companies like VMware, Citrix, Novell, Sun, and Microsoft provides the ability to transform on-premise data centers into private clouds. All of the other layers use virtualization technology and many data centers find innovative ways to save money with the technique.

These general capabilities comprise what is now known as cloud computing and as they are adopted, CIOs and IT staff must rethink enterprise computing. Issues that must be addressed include deciding which parts of your infrastructure to move to the cloud and which to keep on premise. Other decisions include choosing among cloud offerings for SaaS,

development, and infrastructure and adapting plans for disaster recovery, networking, IT systems management, training, security, load balancing, scaling and backup.

In the first wave of adoption, as applications were moved to the cloud, integration was a concern, but in many cases the newly adopted SaaS offerings were used in a stand-alone fashion. But in the second wave, SaaS applications are becoming central and major parts of the computing, development and application infrastructure. As they move to the cloud, each company is forced to answer the following question: **How can all layers of the hybrid computing infrastructure be integrated in as simple, manageable and cost-effective manner as possible?**

Integration in the hybrid world

In the hybrid world that spans on-premise data centers and the cloud, the integration problem has become more complex in several ways. First of all, the computing infrastructure for the foreseeable future will now be spread across the following locations:

- On-premise data centers
- Managed and co-located data centers
- Infrastructure as a Service hosting
- Platform as a Service hosting
- Software as a Service hosting

This means that the integration challenge will be to create a many-to-many network to connect nodes in all of these locations to nodes in any of the other locations. This varied distribution of applications and computing infrastructure means that IT departments will have to grapple with the following integration issues:

- The application functionality that is deployed in the cloud must be connected to systems that remain on-premise or are in other cloud locations.

- As integration requirements escalate it is going to create a development bottleneck unless integration is simplified and productized.

- The vastly larger number of integrations will present a management and maintenance challenge.

- Integrations may need to be deployed in any number of different locations and forms, which may change over time as functionality migrates from one part of the hybrid world to another.

Unless these issues are addressed, integration will become the key roadblock to full exploitation of the cloud.

First-generation integration technology not architected for cloud computing

The fact that integration technology has existed for many years has masked the fact that cloud computing has changed the game and created a whole new set of challenges. The first generation of integration technology was categorized under such names as Enterprise Application Integration (EAI), Extraction, Transformation and Loading (ETL), and Enterprise Information Integration (EII). Of course, custom coding was also frequently used for integration. Applying these techniques as a catch-all for cloud integration will not work for the following reasons:

- Integration techniques of the previous generation were not architected with cloud computing in mind, meaning IT may need to address product deficits such as the ability to support and manage vast number of disparately located integrations that will be needed, or the availability to provide a flexible write-once, deploy-anywhere model.

- In the past when companies created integration between applications they commonly used one of three methods: EAI toolkits, ETL or custom code.

- EAI technologies which are based on messaging frameworks were developed to handle complex integration needs related to Business Intelligence, Business Activity Monitoring and on-premise application to on-premise application integration.

- EAI technologies can be as complex as they are indeed powerful, but which can equate to a lengthy ramp-up and deployment cycle. Considerations such as hardware, operating system, broker software, connector software, and management software will also need to be addressed.

- ETL is a category of technology that describes the process of extracting data from many different sources, transforming it into a consistent format, and then loading it into a single repository, usually a data warehouse. ETL's focus on batch operation vs, real-time management capabilities and limited deployment options are not aligned to Cloud or SaaS strategies. the lack of workflow and event-recognition.

- Custom code offers the ultimate range of functionality, limited only by the power of a programming language to express logic. The problem is that although commercial libraries of connectors can help with the connectivity part of the puzzle, each custom integration essentially starts from scratch. In addition, custom integrations are brittle; making a simple change can be difficult and error prone. The lack of systematic error tracking and diagnostics also makes it hard to track down problems. The ability of custom code to create unique functionality must be judged against the maintenance burden for the code and the lack of systematic and consistent management capabilities. There is also the issue of the development bottleneck. In a custom integration, only a programmer can change the transformation and workflow rules. While custom code can work as a method to handle

high-volume throughput for a single integration, it is not an approach that can handle numerous integrations.

EAI and ETL technologies have a place in the world when it comes to on-premise integrations that have a high transaction volume and complexity. But to reiterate, both approaches were simply not architected for the simplicity, reusability, and flexible deployment needed in the rapidly emerging wave of cloud integrations.

IBM® resolves the integration challenges of the hybrid world

For an integration technology to handle the hybrid world, it must be simple to develop, reusable and deployable on premise or as a service in the most convenient location—in short, it must be complete.

WebSphere® Cast Iron Cloud integration is the only integration technology that addresses all of the challenges of the hybrid world in a single platform. IBM offers a rapid, flexible and simple form of integration defined by a number of attributes. Companies use WebSphere Cast Iron Cloud integration to solve a variety of application integration problems, as it provides:

Comprehensive Integration: WebSphere Cast Iron Cloud integration has everything needed to support integrations in a hybrid world in a single integration platform—Data Migration,

Process Integration and even UI Mashups. Whether data is being migrated to populate a new cloud application, integrated between applications and business processes or extracted and made visible from within a single application UI, one product does the job. Connectors, transformations, workflow, management functions, event capture and reporting all come in a form that can be run anywhere it is needed and completely deployed from the cloud based on the requirements of the participating applications.


Complete Deployment Flexibility: WebSphere Cast Iron Cloud integration is a single product with three different deployment options. These Cloud integration products can be deployed as an Integration as a Service offering in the cloud, on a virtual machine or a hardware appliance in an on-premise or managed data center. Deployments can move from one location to another as needed, without requiring any redevelopment. The result of this transportability is that you can design once and run anywhere. If an on-premise application is moved to run on a cloud infrastructure, These products can move along with it, from an on-premise virtualized or appliance version into a cloud-based deployment.

Some companies use virtualization to run several different integration projects on shared hardware. Others prefer the plug-and-play convenience of the hardware appliance. WebSphere Cast Iron Cloud integration is truly multi-purpose, unlike other products that offer different versions for on-premise and cloud integration.

Physical Appliance

Virtual Appliance

Trusted Partnerships: IBM Cast Iron is the leader in creating productized integrations for SaaS providers. IBM has strong partnerships with Salesforce.com, Google, Taleo, NetSuite, ADP, Amazon, Oracle, Microsoft, and many other vendors. WebSphere Cast Iron Cloud integration enables partners to use a simple, user-friendly visual interface to integrate their products. The point-and-click method allows "Integration in Days," which has been IBM Cast Iron's hallmark for thousands of customer integrations. In the hybrid world, this simplicity also means that customers trust WebSphere Cast Iron Cloud integration to manage large numbers of integrations through a centralized console using non-specialist resources who do not need to be highly trained programmers.

Reusability: Part of WebSphere Cast Iron Cloud integration's flexibility comes from its large library of template integration processes (TIPs). These templates provide a question-and-answer based wizard that walks users through a common integration scenario. For example, a TIP might ask for all the information needed to transform an opportunity in a CRM system into an order in an ERP system. Hundreds of TIPs are included with a WebSphere Cast Iron Cloud integration purchase and each one can then be customized further to meet individual needs. These Cloud integration products reduce the skill level needed to implement integrations and provides a way to ensure that best practices are followed
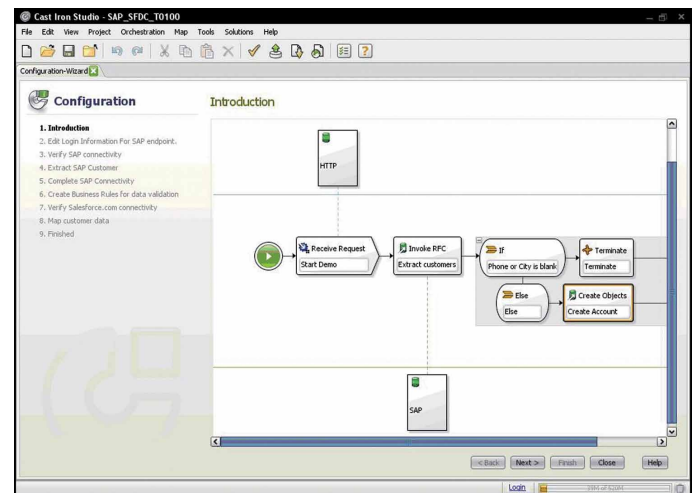
Building on the best practices learned throughout our user community, WebSphere Cast Iron Cloud integration's customer and developer communities are a hub of activity for community support and the sharing of reusable assets such as TIPs and connectors. IBM Cast Iron customers frequently post TIPs that have been developed for common problems that are then improved by community scrutiny. IBM Cast Iron's product management team interacts with the community to ensure that future plans for features and improvements to the core product are aligned with customer needs.

IBM subscription pricing provides a scalable and predictable model based on the number of endpoints connected. A fixed price subscription for unlimited endpoints is also available. This pricing model allows integrations to be affordably deployed for both low-and high-volume integrations.

As the following case studies reveal further, WebSphere Cast Iron Cloud integration is a solution that has been carefully constructed to meet the needs of integration in the cloud. The cloud transforms the rigid limits of past generations of computing technology into a malleable virtual world. Much of the potential of the cloud disappears if the integration methods used are those that were built to exist within past rigid limits. Software as a Service, Platform as a Service, Infrastructure as a Service, and on-premise virtualization technology cannot provide their full value without the Integration as a Service that WebSphere Cast Iron Cloud integration provides.

Case studies

Here are customer examples of how IBM is being used by the Schumacher Group, an emergency room management company, and Awana Clubs International, a global non-profit children's ministry organization.

Conclusion

Technical leaders who take a proactive approach to line-of-business in their organizations have to ensure their key business applications work together. To get the most value out of their current IT investments, they must integrate their

The Schumacher Group

The Schumacher Group is a rapidly growing healthcare company that specializes in the management of emergency room facilities. The Schumacher Group needed to integrate customer master, project and resource emergency room data with systems further downstream, where the care is delivered outside of the emergency room. The data needed to move between PeopleSoft and Salesforce.com applications and repositories kept in MS SQL Server and other data sources accessible through web services. Both batch and real-time integrations were needed to improve data quality and reliability and to allow for a continuing cycle of business process improvement. In addition, the company chose
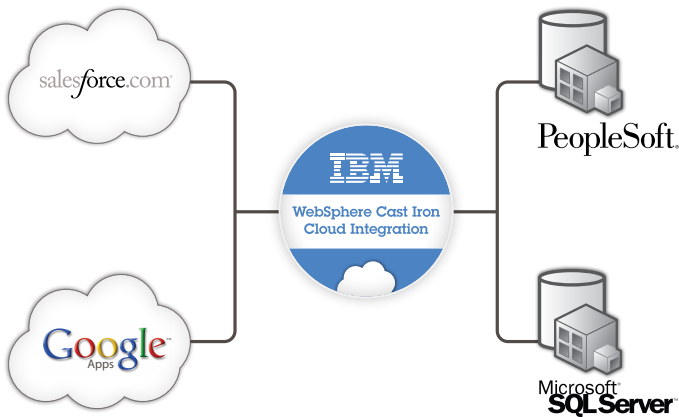
integration provided one solution for both real-time and batch integration.

The initial project was completed in eight days by junior personnel and has since been extended to solve new problems. The IT staff found WebSphere Cast Iron Cloud integration complemented existing policies for disaster recovery. The flexibility of these Cloud Integration products enabled the Schumacher Group to easily integrate their hybrid world of cloud and on-premise applications.

Awana Clubs International

Awana Clubs International is a global leader in children's ministry, which operates as a non-governmental organization (NGO) in over a 100 countries around the world. As a charitable organization relying on donations for its opera-

Google enterprise gadgets as the Portal to provide emergency room information to the thousands of providers that they manage. Now, they securely extract this emergency room data from their on-premise data warehousing applications and expose it through Google gadgets.

After determining that custom code and ETL technology would be too costly and insufficiently scalable, Schumacher Group chose the WebSphere Cast Iron Cloud integration as their integration solution. WebSphere Cast Iron Cloud

tions, they needed to easily track and update the financial viability of their donor accounts. Initially all account information was being stored in JD Edwards, which presented a problem given their sales representatives wanted a robust CRM solution to provide a centralized dashboard view of all their accounts. This meant Awana needed a centralized repository which consolidated all account invoices, billing information, order status, and so on. They also needed a solution that enabled any changes in account data in either application to be viewed in real time from their sales-facing CRM dashboard.

To achieve this sales order visibility, Awana needed to connect Salesforce.com to JD Edwards. Custom code was rejected because of its expense to maintain and instead Awana chose WebSphere Cast Iron Cloud integration. The no-coding approach of the these integration products enabled Awana to easily connect account and opportunity information from Salesforce.com with JD Edwards' order processing and financial reconciliation applications. Awana was able to achieve this integration mapped to their complex workflows within 30 days.

The results for Awana were immediate: man-hours required for managing customer information were reduced by 75 percent, freeing up valuable resources for other projects. Field notifications were reduced from 30 days to 24 hours. The simplicity and user-friendly approach of WebSphere Cast Iron Cloud integration meant that Awana employees had access to the latest financial information for their customers, thus achieving full sales order visibility.

business-critical applications and exchange data seamlessly between them. Common integration approaches such as EAI, ETL or custom code cater to the needs of complex integrations in large companies with extensive time and resource commitments. Moreover, they present hidden costs in services, support, maintenance as well as risks in scaling to fit future projects and IT needs. Today's businesses are demanding a simplified, fast, and low-cost approach for their integration projects, the flexibility of deploying their integrations in the cloud or on premise and the option to change form factors if needed, providing the flexibility to scale to their specific IT policies and strategies. With thousands of customer integrations, a comprehensive feature set and the strongest integration partnerships from leading application vendors, WebSphere Cast Iron Cloud integration is truly rapid, flexible and simple—making it the future-proof choice for today's businesses as they look for a real-time, bidirectional solution for their current and future integration needs.

To learn more about WebSphere Cast Iron Integration Solution, please call us at 650.316.6064 or visit us online at http://www.ibm.com/software/integration/cast-iron-cloud-integration/.

Notes

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