Cloud Integration for Hybrid IT

Balancing Business Self-Service and IT Control

Table of Contents

The Cloud Data Management Imperative

It's no longer a question of *if* your company will be adopting cloud-based solutions, but *when* and *how* many. Gartner predicts worldwide software as a service (SaaS) application revenue will reach $22.1 billion by 2015[1].The industry analyst firm also predicts that by the end of 2016, more than 50 percent of Global 1000 companies will have stored customer-sensitive data in the public cloud[2].

With the proliferation of cloud-based applications, platforms and infrastructure, the potential for data fragmentation and disconnected data silos has grown exponentially. While the benefits of cloud computing have been well documented – scalability, business agility, and cost are usually at the top of the list[3],from the outset, the push to adopt software as a service (SaaS) applications in the enterprise has come from the business. Individual business units, departments and divisions refuse to accept the timeframes and limited resources of corporate IT, at times even making cloud application purchases on credit cards. But in order to execute cross-functional business processes within these newly deployed SaaS applications (for example, integrating Opportunities in Salesforce CRM with Orders in Oracle eBusiness Suite), departmental implementations inevitably reach their limits and corporate IT support is required. However, accessing production back-office systems that contain mission-critical financial data is not something IT organizations take lightly. And if the SaaS application that requires this data access was not implemented, managed and/or even authorized by corporate IT in the first place, any integration requests are unlikely to be assigned a high priority.

Business analysts and SaaS application administrators have a need for speed, but they also have a need for proper cloud data management. Too often, departmental cloud application implementations fail to achieve the targeted ROI due to low rates of end-user adoption and an inability to achieve a single customer view across systems. Meanwhile, IT organizations must now find ways to not only deliver timely and relevant data, they must also find ways to empower the business with self-service data integration and data quality capabilities, while ensuring that compliance and governance standards are met.

[1] Gartner Says Worldwide Software-as-a-Service Revenue to Reach $14.5 Billion in 2012: http://www.gartner.com/it/page.jsp?id=1963815

[2] Gartner Reveals Top Predictions for IT Organizations and Users for 2012 and Beyond: http://www.businesswire.com/news/home/20111201005541/en/Gartner-Reveals-Top-Predictions-Organizations-Users-2012

[3] Future of Cloud Computing 2012: http://www.slideshare.net/mjskok/2012-future-of-cloud-computing-2nd-annual-survey-results

The importance of the right approach to cloud data management has emerged as both a business and IT imperative. Historically recognized as one of the top barriers to cloud adoption, if properly managed and maintained, data integration and data quality can actually become critical enablers of cloud computing success.

This paper will introduce a cloud data management reference architecture based on the Lean Management principles and outline the key capabilities that are available with Informatica Cloud.

Cloud Integration End-User Expectations

Given the LOB-led adoption of cloud applications, a more business-friendly approach to tackling cloud integration challenges is required. The expectations of SaaS application users are the same for a cloud integration solution – it must be easy to implement and easy to use. Cloud integration approaches must be feature rich, but without the heavy IT implementation and complexity that comes with traditional integration architectures such as message brokering and the enterprise service bus (ESB). A true cloud-based integration solution is expected to be multitenant and on demand, so that each customer is able to take advantage of the latest features, upgrades are automatic and end-users have the ability to try before they buy. Of course, the usual performance and scalability requirements of a powerful and proven integration platform are also required.

Figure 1: Business Analysts and Cloud Application Administrators expect ease-of-use integration

In addition, the cloud integration engine that powers the solution must natively access the API of each cloud application to access the various data objects contained within it. Whenever the API of a SaaS application is upgraded to a newer version, which is typically 2-3 times per year, any additional referential integrity rules must be automatically incorporated into the newer API so that existing integration processes don't break.

Cloud applications are not only designed to be easy to use, they're also generally much more agile and dynamic than their on-premise counterparts. As John Hoefnagels, Business Systems and Process Manager at Toshiba Americas Business Solutions (TABS) noted in his Dreamforce 2010 presentation[4]:

"Integration is no longer just for IT. One of the best things that Salesforce offers is the ability to make changes very quickly to the system. You can add a field in a minute. On the other hand, if you can't get anything to put into that field for six months while you're waiting to go through your IT process, how does this really help you? If you can't respond to the data with the same amount of agility it's essentially useless."

Cloud Integration for Hybrid IT

Gartner defines Hybrid IT as:

"The result of combining internal and external services, usually from a combination of internal and public clouds, in support of a business outcome." [5]

According to Chris Howard, managing vice president at Gartner:

"Hybrid IT is the new IT and it is here to stay. While the cloud market matures, IT organizations must adopt a hybrid IT strategy that not only builds internal clouds to house critical IT services and compete with public CSPs, but also utilizes the external cloud to house noncritical IT services and data, augment internal capacity, and increase IT agility." [6]

[4] Sales Cloud Integration — presentation at Dreamforce 2010 features 3 customer case studies: http://www.youtube.com/watch?v=lulPayTdZ0Q

[5] Gartner: Hybrid IT: How Internal and External Cloud Services are Transforming IT http://www.gartner.com/technology/research/technical-professionals/hybrid-cloud.jsp

[6] Gartner Says Hybrid IT is Transforming the Role of IT http://www.gartner.com/it/page.jsp?id=1940715

When it comes to the right approach to cloud application integration, it's critical that the solution is able to seamlessly bridge the cloud and on-premise world. This may or may not mean moving data transformation and integration execution to the cloud, but it does mean that end-users must be able take advantage of interoperability between cloud and on-premise environments – create once and deploy anywhere. This hybrid requirement means that the cloud integration platform shares a common code base, run-time engine and overall architectural integrity with the native on-premise data integration platform.

> *"IT organizations are looking for ways to improve cloud governance and control while ensuring business continuity and continued innovation. An important part of this is finding vendors and solutions they can trust, such as Informatica."*
>
> *– Robert Mahowald, Research Vice President of SaaS and Cloud Services, IDC[7]*

A unified, hybrid data integration platform enables IT organizations to realize even greater efficiency and productivity benefits when it comes to cloud application integration initiatives. If implemented and managed properly, business analysts and cloud application administrators have real-time, secure access to data contained in on-premise systems, databases and social as well as other cloud application data sources without getting slowed down by the IT backlog. Meanwhile, IT stakeholders are able to maintain governance and control over mission-critical business applications, while still ensuring that individual LOB users can access relevant information and integration workflows. These repeatable and reusable integration workflows can be designed by IT using their in-house data integration software and then deployed to the cloud integration application where they can be accessed and executed. Similarly, LOB-created workflows can be shared with IT integration developers for rapid prototype developing, business requirements gathering and general best-practice sharing.

Cloud Integration Reference Architecture: Lean Principles in Action

In order to build the next generation integration Center of Excellence (CoE), it is imperative to have the right integration platform components to achieve the eventual goal of "Lean Integration [8]." Lean Integration is a concept that mirrors the "just-in-time" (JIT) manufacturing principles of the automotive industry. With JIT manufacturing, the necessary components to assemble a car are sourced throughout the supply chain and brought onto the factory floor just before they are needed thus minimizing

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[7] Informatica Powers Hybrid IT With Cloud Data Integration: http://www.informatica.com/us/company/news-and-events-calendar/press-releases/05032011-cloud-summer.aspx

[8] http://www.integrationfactory.com/

the amount of time a worker has to wait for the necessary part. Lean Integration transforms organizational processes and relies on leading-edge technology for automation and reuse to systematically reduce costs and accelerate delivery. The objectives of cloud integration are one and the same as Lean Integration:

- Eliminate waste
- Increase value for end-user customers
- Drive continuous improvement

Here is a cloud integration reference architecture that follows the Lean Integration model:
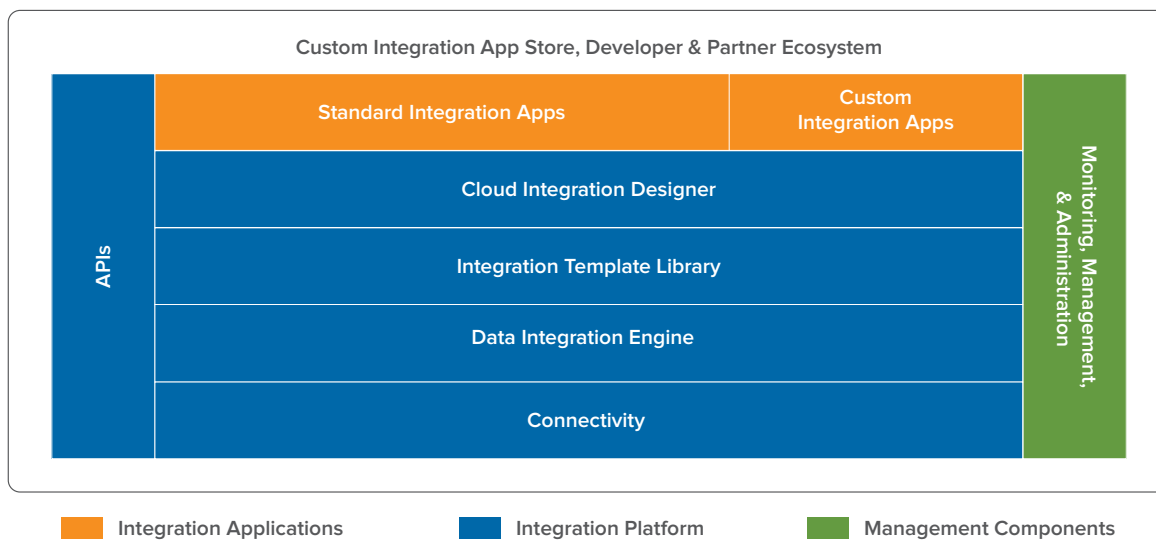

Figure 2: Cloud Integration Reference Architecture: Building on Lean Integration Principles

Integration Applications

Recognizing common use cases, such as data migration, data cleansing, synchronization, and replication purpose-built integration applications allow business analysts as well as IT professionals to get up and running quickly and take advantage of a user interface designed for self-service and maximum productivity.
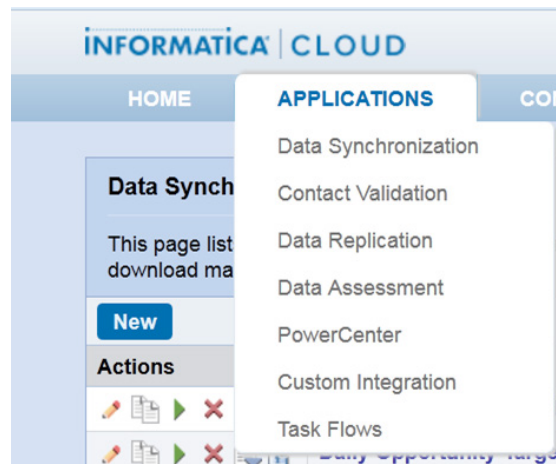

Figure 3: Standard out-of-the-box integration applications

Cloud Integration Designer

It's taken a long time for web-based technologies to meet and exceed the functionality of their client-server predecessors. Cloud computing, social and mobile computing has accelerated the pace of end-user adoption and innovation as well as the expectations for application access and ease of use. Cloud integration development and administration must meet the needs of next-generation developers and take advantage of new approaches and platforms. At the same time, it must be possible for developers to seamlessly move between cloud and on-premise environments.

Integration Template Library

With Lean Integration, numerous Integration Templates (analogous to the automotive "components") can be configured by Data Architects and placed in a Template Library for Cloud Application Administrators to use as and when they are needed. In this way, IT is able to ensure that only approved integration workflows take place (just as a Supply Chain manager can control that only authorized components make their way to the factory floor). A Cloud Integration Designer is a way for Data Architects to define the interaction methods for an integration process, and finally publish it as a full-scale custom integration application.
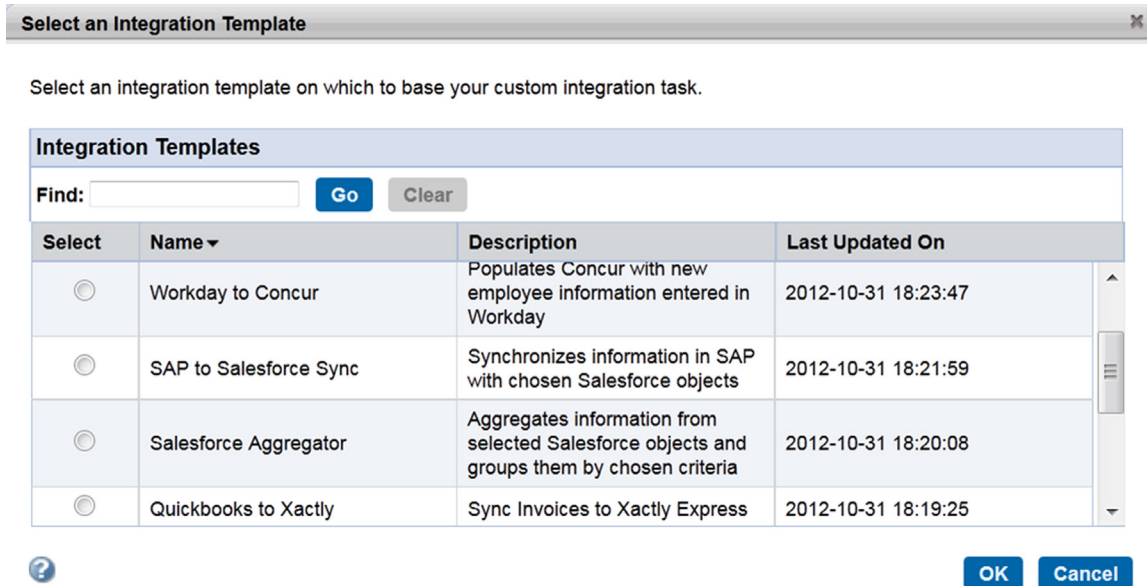
Figure 4: Integration Templates approved by IT can be placed in a 'library' for business users to select when needed

Data Integration Engine

The Data Integration Engine refers to the "speed" of the integration process and is analogous to the various robots working with each other on an automotive factory floor to assemble the components onto the main chassis as quickly as possible. As industry author and expert David Linthicum notes:

> *"You need to consider integration for what it is: the mother of all single points of failure."* [9]

Cloud computing requires powerful real-time and batch process and data integration capabilities and it's critical that the underlying engine can deliver the power, performance and scalability to meet short, medium and long term requirements.

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[9] What to Look for in a Cloud Integration Solution, David Linthicum: http://pdf.edocr.com/0e790729b63a0fa90634ead5733cc 4aa9468e6bc.pdf

APIs

The cloud integration platform must be able to interface with the "long-tail" of cloud applications that rely on web-services APIs and are being adopted in the enterprise in a regulated manner. Additionally, REST APIs enable developers to manage and control integration processes and to ensure they run in the most efficient and controlled manner. A robust cloud application connectivity layer ensures that native integration can be quickly achieved for new cloud applications that will come online in the future.

Monitoring and Management

Monitoring and management are critical components of a cloud integration system as they provide ongoing visibility into integration processes so that errors can be dealt with immediately. Cloud integration administration capabilities should take advantage of mobile technologies and take advantage of the ability to share usage patterns and metrics as well as benchmark information with end-users.
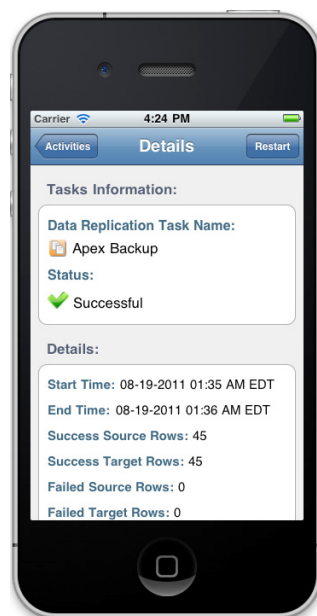

Figure 5: The Informatica Cloud REST API powers a mobile administration app available on iOS and Android devices.

Informatica Cloud Overview

As this paper has outlined, cloud data management must be as flexible and agile as cloud applications and platforms. Built from the ground up to be a multitenant cloud service, with Informatica Cloud organizations can quickly and cost-effectively get up and running and benefit from a rapid pace of cloud integration innovation and automatic upgrades. Informatica Cloud delivers a set of focused applications that address the primary cloud integration challenges: data migration, application synchronization, data cleansing and data replication. These purpose-built integration applications allow business users and developers alike to integrate data across cloud-based applications and on-premise systems, social sources and databases. Informatica Cloud delivers powerful bi-directional data loading and extraction capabilities, advanced scheduling to automate complex multistep integrations, and powerful enterprise functionality such as fine-grained access controls, delegated administration, and interoperability with PowerCenter, the market-leading native on-premise integration software. Informatica Cloud also delivers a wide range of cloud application connectivity, typically exposing specific cloud application functionality by taking advantage of the latest vendor-supported APIs.

Cloud Connector Toolkit

This cloud integration functionality is taken further by a comprehensive integration platform as a service comprising the Informatica Cloud Connector Toolkit and Cloud Integration Templates. The Cloud Connector Toolkit consists of an enterprise-class Java API that allows developers to rapidly build native integrations to virtually any cloud or on-premise applications. This Cloud Connector Toolkit can become a key component of an Integration Competency Center, helping organizations to ensure that these new apps are connected with mainstream apps from the outset. The Cloud Connector Toolkit delivers native connectivity to an application's data objects so that downstream, end users of the cloud integration solution simply have to select additional objects when connecting sources and targets, instead of interacting with a WSDL to describe every transformation. The Cloud Connector Toolkit's API allows developers to easily read, write, and browse application metadata, and as a result, business users merely have to select any additional objects they desire when performing integration task. This approach reduces IT deployment times and support costs and ensures end-users productive.

Cloud Integration Templates

Cloud Integration Templates allow data architects and Informatica PowerCenter developers to design custom integration between applications that are re-useable and dynamic in nature. Cloud integration end users, whether they are in business or IT roles, can simply select the use case that they desire, whether it is from the Informatica Marketplace or directly from within their private Template Library, and incorporate it into their integration workflow to achieve the desired business process outcome.

Cloud Integration Templates save users even more time by using pre-defined mappings for specific processes which reduces the number of steps required to execute sophisticated integration workflows. Cloud application administrators, business analysts and other enterprise users can easily execute custom cloud integration tasks without going through the complexity of having to know what each type of data transformation accomplishes. The Cloud Integration Template architecture allows reusability such that business users simply need to change the respective data types or application connector within an integration workflow. The results is a vast improvement in end-user productivity by eliminating the need to manually build and change mappings and better IT governance control and data stewardship. By using Cloud Integration Templates to encapsulate business rules, access to data in other systems can be made more dynamic, and integration complexity is completely abstracted away.

Actions	Name▲	Description
🖉 ✖ 🗏 ⚙ 🔐	**Eloqua Archival**	Archives stale Eloqua leads to a database so that ...
🖉 ✖ 🗏 ⚙ 🔐	**Marketo CLV Analytics**	Extracts relevant information from Marketo to data...
🖉 ✖ 🗏 ⚙ 🔐	**Quickbooks to Xactly**	Sync Invoices to Xactly Express
🖉 ✖ 🗏 ⚙ 🔐	**Salesforce Aggregator**	Aggregates information from selected Salesforce ob...
🖉 ✖ 🗏 ⚙ 🔐	**SAP to Salesforce Sync**	Synchronizes information in SAP with chosen Salesf...
🖉 ✖ 🗏 ⚙ 🔐	**Workday to Concur**	Populates Concur with new employee information ent...
🖉 ✖ 🗏 ⚙ 🔐	**Workday to SFDC Sales Reps**	Automatically creates SFDC users for all new Sales...

Figure 6: Accelerate time to value with pre-packaged Cloud Integration Templates

Cloud Connectors and Integration Templates on the Informatica Marketplace

The Informatica Marketplace helps accelerate implementation times, promote community collaboration, and enables customers and partners to build and share custom cloud integrations solutions. There are now two Cloud Malls on the Marketplace:

- **Informatica Cloud Connector Mall:** Features native connector for cloud applications such as Workday, Eloqua, and Chatter, amongst others.
- **Informatica Cloud Integration Template Mall:** Features ready to install templates such as Records Validation, Aggregation, and Merging, amongst others.

Microsoft Great Plains Connector

Integrate with Microsoft Dynamics Great Plains using Informatica Cloud.

Cloud XML Connector (BETA)

Read XML files as to integrate with any other Informatica Cloud Endpoint.

Workday Connector

Allows you to quickly load, extract or sync employee and related data to and from Workday.

Twitter Connector (BETA)

Read Twitter mentions based on keywords and tweet what matters.

Eloqua Connector

Integrate with Eloqua using Informatica Cloud.

Zuora Connector (BETA)

Access your Zuora objects using Informatica Cloud.

Figure 7: The Informatica Marketplace contains many connectors and templates to help you address ever-expanding integration use cases

For more information on the Informatica Cloud Platform, visit www.informaticacloud.com/platform

Conclusion

The new era of cloud application adoption is going to result in an explosion of data – data which needs to be accessed and leveraged by your existing on-premise applications and other databases. The traditional enterprise application integration (EAI) architectures of the last decade which worked well for on-premise applications will not be relevant for your cloud application integration challenges, and will negatively affect business agility and ultimately performance. The typical cloud application user is not an integration expert and expects the same user experience that a cloud-based application provides. Informatica Cloud gives IT departments within enterprise organizations the governance and control they need while still empowering business users with the agility and flexibility they require to execute integration processes.

For more information, please visit: www.InformaticaCloud.com

Hybrid IT Case Studies: Informatica Cloud in Action

More and more enterprise organizations are using the Informatica Cloud integration service together with their on-premise data integration software for a hybrid approach towards integrating their cloud apps. Let us look at a few of them.

Level 3 Communications

Business Problem

As an international provider of fiber-based communications services, Level 3's senior management wanted more accurate revenue forecasting and order quote reports to make better business decisions[10].Three different BI groups within the company were tasked to incorporate their Salesforce.com CRM data into a data warehouse comprising of data from several on-premise applications and middleware.

Solution

Level 3 is using Informatica Cloud's data loading and data replication integration apps as well as Informatica PowerExchange for Salesforce for data synchronization to implement a hybrid data integration solution. The integration architecture synchronizes account, opportunity, product, and price information in Salesforce with account and opportunity information in an Oracle database connected to TIBCO as well as marketing information contained in SQL Server. Informatica Cloud enables Level 3's CRM administrators to utilize user-friendly cloud data integration that works seamlessly with their existing Informatica PowerCenter implementation.

Results

The entire Informatica Cloud architecture was provisioned, configured, and deployed in less than a week. Level 3 used Informatica Cloud to achieve a comprehensive view of both its on-premise and cloud-based data, which improved the company's business intelligence capabilities by reducing the time to extract data from salesforce.com and increasing productivity by over 60%. By integrating data from Level 3's on-premise data warehouse with its salesforce.com CRM data, Informatica Cloud enhances the company's ability to generate more complete, accurate and timely sales force management-related reports.

> *"The simplicity and ease of setup [with Informatica Cloud] enables our IT team and business users to focus more on higher value data analysis."*
>
> *— Paul Farnsworth, Level 3 Sr. VP IT Technology Solutions Delivery*

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[10] Level 3 Communications Uses Informatica Cloud for Enhanced Business Intelligence: http://www.informaticacloud.com/company/news/press-releases/349-level-3-communications-uses-informatica-cloud-for-enhanced-business-intelligence.html

Major Pharmaceutical Corporation

Business Problem

This large pharmaceutical company was already an existing customer of Informatica's PowerCenter and MDM software with a well-run Integration Competency Center. Despite being highly efficient in integrating several on-premise applications, even this integration Center of Excellence could not serve the needs of its Salesforce.com users in a timely manner. A sales operations division of this pharmaceutical company needed access to mission critical data in a few weeks, but was told that it would be a 3-6 month wait with an approximately $100,000 chargeback to the division.

Solution

Frustrated with the lengthy wait, and costly price tag for the integration, the main business analyst within the division broke ranks with the traditional IT procurement process and decided to purchase Informatica Cloud for his division. Within 24 hours, the analyst was comfortable using Informatica Cloud, and ended up creating over 200 custom integration tasks. He was also in production within 6 weeks instead of 6 months despite having no knowledge of integration or PowerCenter.

Results

The sales division is able to own their integration projects much more completely and accomplish them faster. For complex integration scenarios, they are always able to export their workflows to the central PowerCenter deployment at IT, who then execute the necessary processes and push it back into the Informatica Cloud instance. As word of this sales division's success spread around the company, 6 other divisions within the company also adopted Informatica Cloud, and the Integration Competency Center's newest focus is on enabling self-service integration for cloud applications.

For more customer stories, please visit www.InformaticaCloud.com/customers

Appendix: Glossary of Terms

MDM: Master Data Management

EAI: Enterprise Application Integration

WSDL: Web Services Description Language

LOB: Line of Business such as Marketing, Sales, Finance, or Operations

ESB: Enterprise Service Bus

API: Application Programming Interface

SaaS: The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings[11].

PaaS: The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.3 The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.
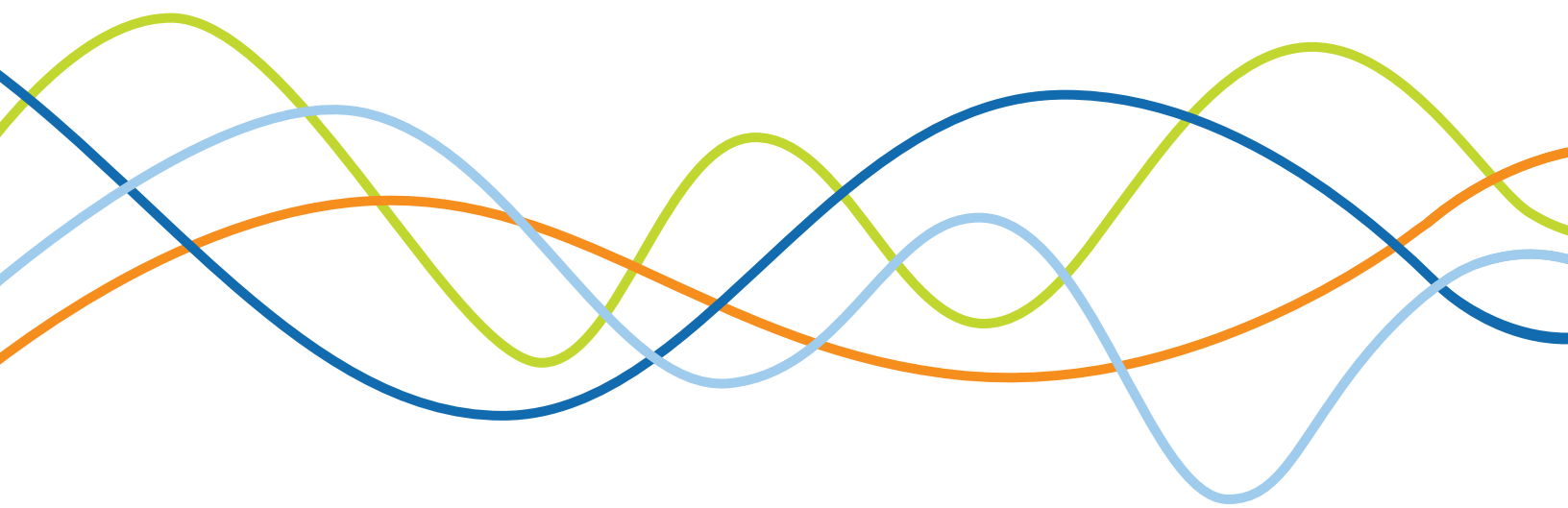
IaaS: The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

SOA: Service Oriented Architecture

JIT: Just In Time, a manufacturing concept used in the automotive sector, and repurposed in the field of integration.

ICC: Integration Competency Centers, also known as Centers of Excellence for integration best practices.

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[11] The NIST Definition of Cloud Computing: http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

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