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Chapter Extract

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Cloud orchestration

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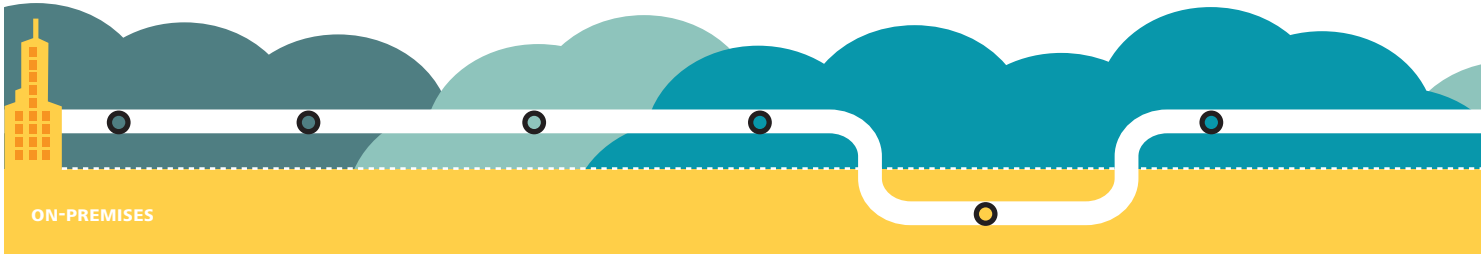
Cloud orchestration

From cloud to clouds (to core)

Cloud adoption across the enterprise is a growing reality, but much of the usage is in addition to on-premises systems – not in replacement. As cloud services continue to expand, companies are increasingly connecting cloud-to-cloud and cloud-to-core systems – in strings, clusters, storms, and more – cobbling together discrete services for an end-to-end business process. Tactical adoption of cloud is giving way to the need for a coordinated, orchestrated strategy – and for a new class of cloud offerings built around business outcomes.

CLOUD adoption across the enterprise is a growing reality. Forrester predicted that "by the end of 2013, enterprises will use an average of 9.6 software-as-a-service (SaaS) applications."[1] Yet much of the cloud usage is not in lieu of on-premises enterprise systems. Forrester also found that "only 18 percent of the enterprises that were first-wave adopters and less than 9 percent of the second-wave adopters have used SaaS as a full replacement."[2] As a result, these cloud services increasingly require integration back to core internal systems – linking edge offerings to legacy financials, order management, inventory, HR, manufacturing, and other enterprise systems. Companies are connecting clouds – in strings, clusters, storms, and more – and cobbling together discrete services to

Tracking a business transaction in the cloud and core



INTEREST
A tweet in a new marketing campaign elicits a customer response.

LEAD
The customer requests a demo and receives an email from the company.

OPPORTUNITY
A marketing rep assigns the lead to a sales rep for review.

QUOTE
The sales rep creates a quote and converts the lead to a new account.

CREDIT
A collections agent performs a credit check and assigns a credit limit.

CONTRACT
With approval from the sales manager, the sales rep creates a contract.

create end-to-end business processes. Tactical adoption of cloud is giving way to the need for a coordinated, orchestrated strategy.

As cloud services continue to expand in number and sophistication, gaps in managing cloud-to-cloud and cloud-to-core portfolios are beginning to appear, leading to new and smarter ways to operate in this hyper-hybrid[3] IT environment. It is also opening the door for a new category of offerings: pre-integrated and orchestrated cloud offerings delivering higher-order business outcomes-as-a-service.

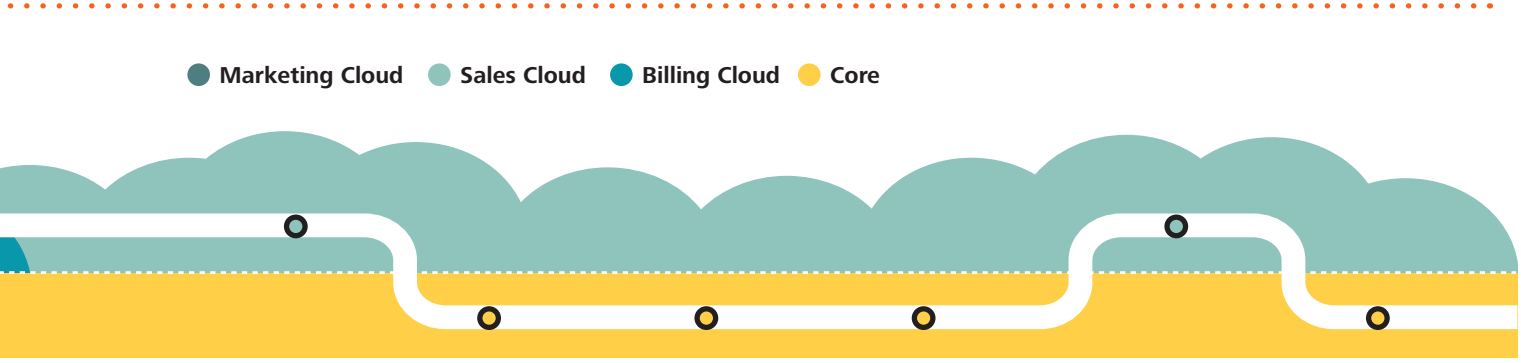
All together now

Integration, data management, and enterprise architecture have long been aspirations for IT. With cloud, these practices have become more complex. And they've shifted from leading practices to critical core disciplines. Integration stability and reliability was the number two challenge in a recent survey on cloud adoption, trailing only security concerns.[4] Virtually every enterprise should be developing a strategy on how to integrate, aggregate, and orchestrate its collection of cloud and on-premises assets. Understanding the extensibility, portability, and reliability of a cloud service should begin at the sourcing stage.

- Extensibility refers to the ability to get information into and out of the service – the availability of data and transactions to be invoked by other parties and the ability to trigger external events from within the cloud service. Many cloud providers offer lightweight web services and RESTful[5] interfaces, but it's important to review the assets around APIs and data structures – documentation, toolkits, testing harnesses, backward compatibility, and deprecation policies.

- Portability represents the ease of migrating your business from the cloud service. Can data be exported? What about customised business logic? Are there contractual terms associated with intellectual property ownership?

- Reliability addresses performance of the service – not just the core cloud offering, but the surrounding stack. For an orchestrated process, the integration layer and dependencies on legacy systems should be able to scale dynamically to take advantage of the elasticity of cloud services. The end-to-end business process is only as strong as its weakest link.



Cloud orchestration can build from a mature enterprise integration and architecture footprint. The underlying tenets are familiar: service orientation, data correlation, security services (especially authentication, entitlement management, and encryption), and a separation of business logic. Several integration platforms have emerged from the cloud, offering cloud-based deployment options as well as preconfigured connectors and integration patterns for popular cloud services. Providers include Boomi, CastIron, MuleSoft, and TIBCO's Cloud Bus.

New beginnings

The cloud provider market is starting to address the desire for higher-level, pre-integrated cloud orchestration services. For example, consider the example of a health plan's recruiting and HR service. Today, health plans contract with separate cloud providers for CV sourcing, background checks, on-boarding, benefits, payroll, and performance management – which means they need to develop and maintain point-to-point interfaces between the various players to enable the full prospect-to-employee lifecycle. They are waiting for an end-to-end "hire to retire" service to emerge, which could provide contracting, configuration, and handoffs across various systems. The enterprise could subscribe to a single service, priced based on usage or, in an ideal world, on outcomes.

Traditional ERP players are acquiring and integrating cloud applications to supplement core offerings. Established cloud providers are creating storefronts of complementary cloud solutions, which make choosing and buying an expanding inventory of services easier. But we are still in the early days of this expansion, and integration often remains the buyer's problem. Over time, technical compatibility within a vendor's stack should become less challenging. ERP and cloud providers are also planning improved interoperability between their products[6] – an encouraging development, to be sure, but of little help in the immediate term.

Others may yet enter the cloud orchestration market. Systems integrators and professional services firms that specialise in integrating diverse systems could expand and formalise their roles by pre-integrating the components of an end-to-end bundle. For such organisations, this may offer a way to monetise intellectual property around industry and process experience while diversifying from consulting to a product revenue stream. Several high-tech players looking to expand their offerings could emerge, such as Amazon, Google, HP, and Microsoft.

A brave new world

The initial market for effective cloud orchestration is likely to be startups and small- to medium-sized businesses. They could receive the benefits of one-stop access without the hassle of navigating vendor contracts, integrating systems, and managing data. Larger businesses in emerging markets are also natural targets. Like startups, their circumstances may not justify a full enterprise solution. Finally, serial acquirers could gain agility and advantage from being able to integrate diverse platforms more efficiently. In each case, IT's mission should be to create integration, data management, and security services to guide cloud adoption.

But the majority of larger businesses will be living with the reality of a mix of cloud and core offerings, even as sophisticated cloud orchestration emerges. IT's charter to own cloud integration, data, and security is even more important in this case – especially as businesses are increasingly dependent on hybrid operating environments. Build the components to orchestrate the cloud today, and you'll be ready to adopt more compelling services as the market develops.

Hybrid high tech

A global hardware and software company was undergoing rapid change stemming from acquisitions, organic growth, and divestitures. The company's goal? To maintain its core hardware and product businesses while expanding its software and services offerings. The company's expansion introduced complexity in many areas, such as marketing, sales and incentive management, product configuration, pricing, and project and workflow management. Speed to market was a driving force, since the organisation wanted to engage with customers from dozens of countries in a consistent and coordinated manner. The company also recognised that its strategy was built around continual transformation of its offerings – and that required flexibility and agility in the enabling systems.

The organisation was vexed by decades of what it called "lumpy" expenditures – costly IT infrastructure refresh cycles, with a history of overspending for capacity because of unpredictable demand. But the concern was about more than cost and scale. The company also sought shorter time to market and the ability to more efficiently assimilate new ventures. This was important, given its recent wave of acquisitions.

The company's vision is to move to a 100 percent cloud-based infrastructure for the enterprise. As a first step in fulfilling this vision, and to continue to provide seamless, end-to-end business processes, the organisation orchestrated a complex integration between multiple cloud services and its on-premises systems. A new sale requires smooth interaction between separate cloud systems for many processes: calendaring and messaging; materials development; lead and campaign management; opportunity, sales, and support management; configuration, pricing, and quoting services; sales and support management; and compensation and incentives. The integration enabled these systems to communicate with each other, and it also included hooks into on-premises systems for human resources and order and billing management. Recognising that the glue to bring together the various services was as important as the individual functionality being delivered, the company created disciplines around cloud-to-cloud and cloud-to-core integration: tools, architectural standards, and a dedicated team to drive growth and adoption.

Through the company's efforts, maintenance costs have gone down: Instead of heavily funding incremental software improvements, the company is taking advantage of enhancements being rolled out by the cloud services. System performance has improved; outages have become shorter and less frequent. The company's global teams have enjoyed greater browser and device compatibility, as the cloud offerings have a wider footprint than was historically allowed. And the business feels better served by IT: IT's responsiveness has improved, as has the business's understanding of associated costs. Finally, the company has started to take the next step toward the overall vision by shifting to cloud hosting of traditional ERP to "rightsize" the underlying infrastructure – a solution that can scale up (or down) based on the company's circumstances.

Where do you start?

EVEN with the more sophisticated cloud offerings that span end-to-end processes, the challenge of integrating cloud-to-core remains. How does the CIO manage the definition of standards for cloud adoption? Establish architecture to support integration? Handle data correlation, retention, and migration? These are important questions to answer now – and they'll be even more important as cloud services spread across the enterprise. CIOs should be making deliberate investments in developing advanced integration and data management capabilities to support a cloud-to-cloud-to-core model.

- **Petition for a new cloud business model.** Many companies could save money if cloud pricing was based on usage and outcomes rather than licensing fees. If this is true for your organisation, let the cloud providers know. And if your company is ready for an orchestrated cloud option now, connect with others who share your need. Let your voices be heard by the software vendor community.

- **Build an integration foundation.** Even if your organisation doesn't operate in a cloud-to-core environment, it's likely you eventually will. Laying the groundwork now will make integration easier later. If you've already invested in middleware to link legacy systems, build from there. However, you may find that a cloud-based model requires new approaches.

- **Connect the dots.** Definitions of customer, product, employee, and other data elements vary from one cloud solution to another – and need to be mapped to your business's semantics and taxonomy. Understand how each application defines its dataset, and develop a strategy for funneling data from various cloud systems to support your organisation's reporting and analytic objectives.

- **Read the fine print.** Develop a healthy skepticism of cloud provider contracts. Understand your rights to data ownership, portability, and migration. If you change providers, can you be confident that your data is protected? Negotiate terms where possible to maintain your flexibility.

- **Build a strong chain.** Overall business performance is limited by the weakest cloud solution in the process chain. Understand the performance variability your business will tolerate, and weigh whether each individual cloud service can meet those demands. And remember: The scalability and performance of the interconnected whole is only as strong as its weakest link. Cloud's elasticity could stress (and break) legacy solutions built around more modest, predictable requirements. Cloud-based integration platforms ramp up (or down) to meet your needs – similar to the cloud offerings you are looking to orchestrate.

- **Explore edge architecture.** Borrowing from the days of SOA, consider describing business capabilities and processes as services. The goal is to connect enterprise core, private, and public cloud offerings – which can be broken into a common set of services used to deliver on business needs. This will lead to deliberate identification and management of business rules, APIs, identities and personas, entitlements, workflow items, and interfaces. The goal is to promote reuse, standards adoption, and architectural integrity – from a business-driven mindset. A revamped IT delivery model will likely be needed, as will support from both IT and business executives for a new governance mindset.

Bottom line

As enterprises use disparate cloud offerings to handle critical business processes, the desire to link these offerings to core legacy systems and data grows. IT organisations will be asked to provide that orchestration. A recent Gartner survey shows that "over 70 percent of organisations that are using or planning to use cloud services expect internal IT organisations to assume the role of cloud services broker."[7] That need has generated challenges that extend beyond integration to include security, data integrity and reliability, and business rules for managing a hybrid state. It is also creating demand for cloud orchestration to link multiple cloud services to each other – and to the core. CIOs who have the disciplines of data management and integration architecture in place will be positioned to create harmony out of the existing landscape and to leverage orchestration services when they arrive.

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3. Deloitte Consulting LLP, *Tech Trends 2012: Elevate IT for digital business,* 2012, chapter 5.
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   See Roy Fielding, *Architectural styles and the design of network-based software architectures,* 2000, http://www.ics.uci.edu/~fielding/pubs/dissertation/top.htm, chapter 5, accessed January 8, 2014.
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