



A Consumer
Products
Perspective

Tech Trends 2014

Inspiring Disruption

Deloitte
University
Press

Contents

Introduction | 2

Disruptors

CIO as venture capitalist | 7

Cognitive analytics | 19

Industrialized crowdsourcing | 31

Digital engagement | 45

Wearables | 59

Enablers

Technical debt reversal | 73

Social activation | 85

Cloud orchestration | 95

In-memory revolution | 107

Real-time DevOps | 121

Exponentials | 133

Appendix | 145

Introduction

WELCOME to Deloitte's fifth annual *Technology Trends* report. Each year, we study the ever evolving technology landscape, focusing on disruptive trends that are transforming business, government, and society. Once again, we've selected 10 topics that have the opportunity to impact organizations across industries, geographies, and sizes over the next 18 to 24 months. The theme of this year's report is *Inspiring Disruption*.

In it, we discuss 10 trends that exemplify the unprecedented potential for emerging technologies to reshape how work gets done, how businesses grow, and how markets and industries evolve. These disruptive technologies challenge CIOs to anticipate their potential organizational impacts. And while today's demands are by no means trivial, the trends we describe offer CIOs the opportunity to shape tomorrow—to inspire others, to create value, and to transform “business as usual.”

The list of trends is developed using an ongoing process of primary and secondary research that involves:

- Feedback from client executives on current and future priorities
- Perspectives from industry and academic luminaries
- Research by alliance partners, industry analysts, and competitor positioning
- Crowdsourced ideas and examples from our global network of practitioners

As in prior years, we've organized the trends into two categories. Disruptors are areas that can create sustainable positive disruption in IT capabilities, business operations, and sometimes even business models. Enablers are technologies in which many CIOs have already invested time and effort, but that warrant another look because of new developments, new capabilities, or new potential use cases. Each trend is presented with multiple examples of adoption to show the trend at work. This year, we've added a longer-form *Lesson from the front lines* to each chapter to offer a more detailed look at an early use case. Also, each chapter includes a personal point of view in the *My take* section.

Information technology continues to be dominated by five forces: analytics, mobile, social, cloud, and cyber. Their continuing impact is highlighted in chapters dedicated to wearables, cloud orchestration, social activation, and cognitive analytics. Cyber is a recurring thread throughout the report: more important than ever, but embedded into thinking about how to be secure, vigilant, and resilient in approaching disruptive technologies.

For the first time, we've added a section dedicated to exponential technologies, working with Singularity University to highlight five innovative technologies that may take longer than our standard 24-month time horizon for businesses to harness them—but whose eventual impact may be profound. Examples include artificial intelligence, robotics, and additive manufacturing (3-D printing). The research, experimentation, and invention behind these “exponentials” are the building blocks for many of our technology trends. Our goal is to provide a high-level introduction to each exponential—a snapshot of what it is, where it comes from, and where it's going.

From a Consumer Products lens, we provided industry sector specific perspective on majority of the topics including CIO as a venture capitalist (how to leverage brand categories perspective for portfolio planning), crowdsourcing (specific strategies including crowdfunding, flexible workforce and data analysis contests), wearables (discussing the Empowered Employee and the Persistently Connected Consumer) and digital engagement (Omnichannel Brand Engagement, Ubiquitous Sensors and other topics).

Each of the 2014 trends is relevant today. Each has significant momentum and potential to make a business impact. And each warrants timely consideration—even if the strategy is to wait and see. But whatever you do, don't be caught unaware—or unprepared. Use these forces to inspire, to transform. And to disrupt.

We welcome your comments, questions, and feedback. And a sincere “thank you” to the many executives and organizations that have helped provide input for Tech Trends 2014; your time and insights were invaluable. We look forward to your continued innovation, impact, and inspiration.



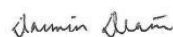
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Enablers



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 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-hybrid³ 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 RESTful⁵ 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 customized 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

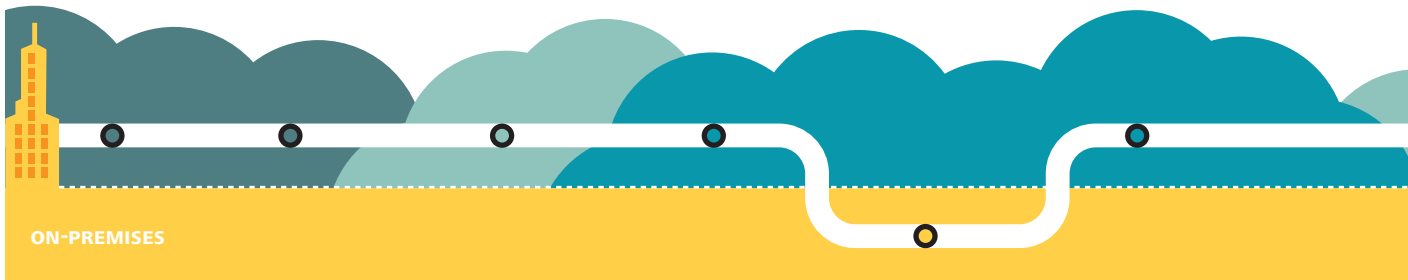
and integration patterns for popular cloud services. Providers include Boomi, CastIron, MuleSoft, and TIBCO's Cloud Bus.

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 résumé 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

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.

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 products⁶—an encouraging development, to be sure, but of little help in the immediate term.

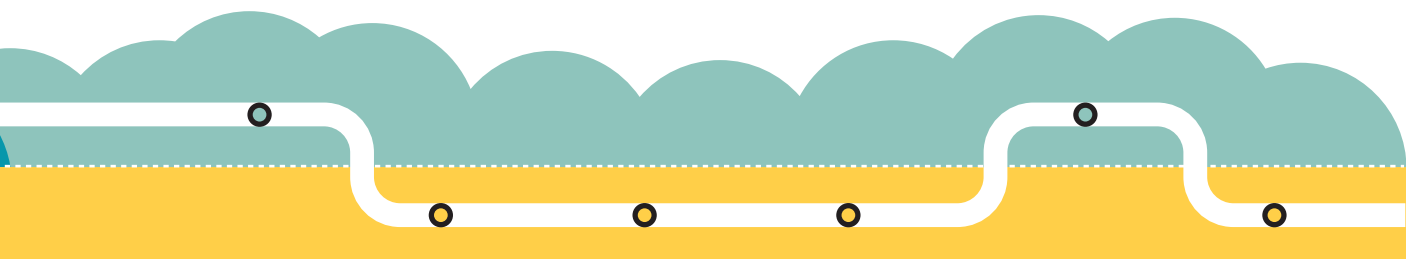
Others may yet enter the cloud orchestration market. Systems integrators and professional services firms that specialize in integrating diverse systems could expand and formalize their roles by pre-integrating the components of an end-to-end bundle. For such organizations, this may offer a way to monetize 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 the Fortune 1000 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.

● Marketing Cloud ● Sales Cloud ● Billing Cloud ● Core



ORDER

The sales rep closes the opportunity and initiates order fulfillment.

PROVISIONS

The provision manager creates license keys for the customer.

BILLING

The customer receives an invoice and serial keys from the collections agent.

PAYMENT

The collections agent follows up with the customer about payment.

REQUEST

The customer has a customer service request.

SERVICE

A service rep responds to the request and then resolves the case.

Lessons from the front lines

Linking the network⁷

LinkedIn, a social networking website, has three main enterprise lines of business: talent solutions, marketing solutions, and sales solutions. As Andres Bang, LinkedIn's head of global sales and operations systems, described recently: The company adopted cloud services to support sales and CRM functions, but found that its business was outgrowing standard out-of-the-box capabilities and that its processes increasingly required integration to ERP and proprietary systems for generating sales leads.

To address its immediate lead-to-cash process requirements, and to build a scalable solution for future orchestration, LinkedIn adopted a cloud-based integration platform. Bang explains that by using the integration platform, LinkedIn was able to connect multiple systems, including its lead generation tool, CRM system, financial system, data warehouse, and proprietary applications. Integrating both its cloud-based and on-premises systems created a "single pane of glass" for the company's salespeople to access the information they need to perform their jobs.

Orchestrated banking⁸

SunTrust Banks, a leading US financial services holding company, found that its relationship managers were encountering issues with accessing customer information in a timely manner, threatening their ability to provide quality customer service. The root of the issue was the company's reliance on an assortment of back-end systems for loan origination, underwriting, servicing, and CRM. SunTrust's architecture was a mix of cloud services, on-premises packaged software, and on-premises custom solutions. The company sought an integrated, scalable solution to expedite the delivery of services to customers—and pave the way for future cloud adoption.

The bank decided to adopt a cloud-based integration platform to address these challenges. By connecting SunTrust's back-end enterprise application and shared services to the cloud, SunTrust was able to eliminate its complex back-end business processes. Furthermore, the cloud enabled seamless integration with the bank's enterprise service bus and provided preconfigured connectors to cloud services.

Today, SunTrust maintains a scalable solution supporting its broader business process transformation. Furthermore, relationship managers are empowered with the tools and resources to access important customer information in a timely manner, reducing the time it takes to provide service to customers.

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 organization wanted to engage with customers from dozens of countries in a consistent and coordinated manner. The company also recognized that its strategy was built around continual transformation of its offerings—and that required flexibility and agility in the enabling systems.

The organization 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 organization 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. Recognizing 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.

Espresso with a shot of cloud⁹

Online distribution channels have transformed Nestlé Nespresso S. A. from a traditional, coffee-shop-and-boutique-store business model to a household brand in the single-serving coffee machine category. But in order to meet growing global customer demand, Nespresso needed to replace its home-grown, complex ERP system with a more scalable architecture and integrated cloud solution.

The business began enhancing its enterprise architecture by launching the Nespresso Open Architecture (NesOA) platform, a tool designed from service-oriented architecture (SOA) principles. With NesOA, Nespresso's IT department could support new distribution channels, manage increased consumer traffic,

and introduce new applications and services to the business. Furthermore, by using a cloud-based integration platform, Nespresso could easily integrate a variety of systems, including the Nessoft ERP system, an interactive voice response system, an automated warehouse management system, and an emergency ordering tool.

As a result, Nespresso's NesOA transformed its home-grown enterprise into a scalable, automated, and more efficient solution to meet business needs. Furthermore, it mitigated the risk of disruption from a single point of failure with a solution based on clustering and redundancies. Nespresso is now poised to leverage cloud and traditional solution offerings to support future growth of its IT system landscape.



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 organization, 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 organization 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 organization'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 organizations will be asked to provide that orchestration. A recent Gartner survey shows that “over 70 percent of organizations that are using or planning to use cloud services expect internal IT organizations to assume the role of cloud services broker.”¹⁰ 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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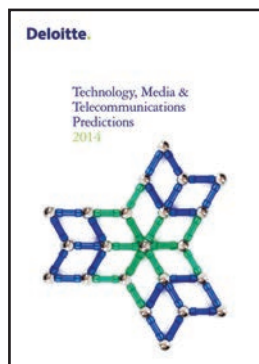
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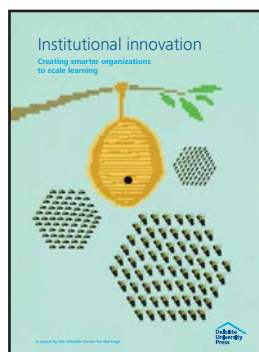
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