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# The Evolution Of Cloud Computing Markets

by Stefan Ried, Ph.D., Holger Kisker, Ph.D., and Pascal Matzke  
for Vendor Strategy Professionals

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### EXECUTIVE SUMMARY

Looking past the current industry hype surrounding all things cloud, Forrester believes that cloud computing is a sustainable, long-term IT paradigm, and the successor to previous mainframe, client/server, and network computing eras. Underpinned by both technology and economic disruptions, the cloud will fundamentally change the way technology providers engage with business customers and individual users. But, at the moment, most customers are suffering from cloud confusion as vendor marketing stretches the term “cloud” across a wide variety of capabilities and, worse, fails to explain the potentials and the limitations of cloud computing in a well-structured way. Forrester’s taxonomy of cloud computing markets provides vendors and customers with clear definitions and labels for cloud capabilities. With this taxonomy in hand, vendor strategists can position their offerings in the overall cloud market and better articulate their business value propositions to customers.

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### NOTES & RESOURCES

Forrester analyzed cloud computing adoption in 2010 based on its Enterprise And SMB Software Survey, North America And Europe, Q4 2009; inquiries; and conversations with many vendors, including Cisco Systems, Cordys, HP, Hubspan, IBM, Microsoft, NetSuite, Oracle, salesforce.com, and SAP.

#### Related Research Documents

[“Smart Computing Drives The New Era Of IT Growth”](#)

December 4, 2009

[“TechRadar™ For Infrastructure & Operations Professionals: Cloud Computing, Q3 2009”](#)

October 2, 2009

[“Yet Another Cloud”](#)

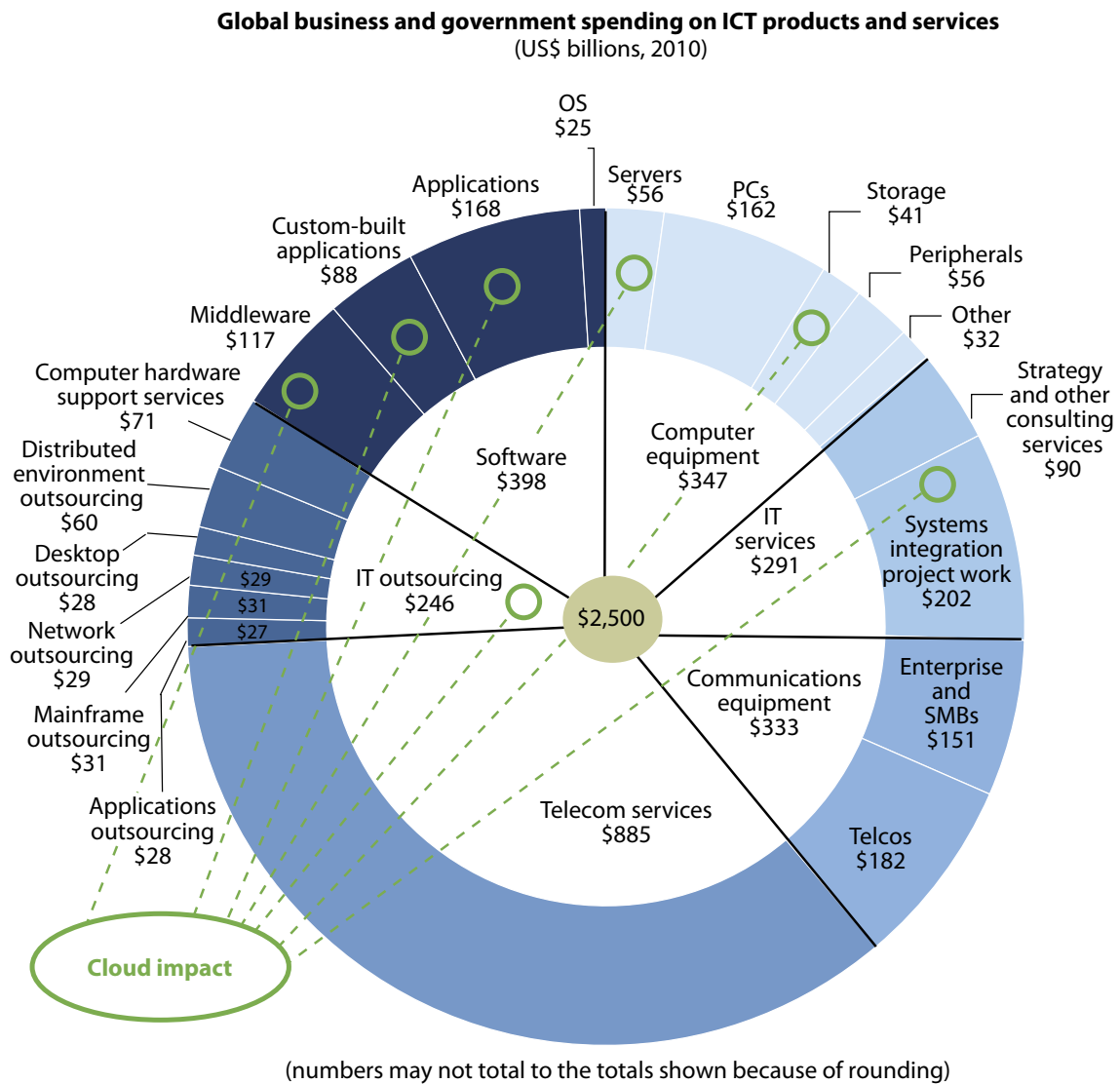
July 30, 2009

**CLOUD COMPUTING CAUSES A MACRO-SHIFT OF TECH INDUSTRY MARKETS**

Cloud computing has an impact on many of the core segments of the \$2.4 trillion worldwide spend by businesses and governments on information and communications technology (ICT) products and services (see Figure 1). At the highest level, cloud computing changes how customers deploy software applications and middleware, it draws spending from portions of the outsourcing market, and it cannibalizes customer investment in hardware and data centers.

Over time, the net effect of cloud adoption will be a transformation of traditional software and hardware market segments into IT services.

**Figure 1** Forrester’s Tech Industry Market Overview



## Cloud Computing Underpins The Next Era Of Tech Industry Innovation

The tech industry has seen several large paradigm changes over the past four decades: 1) The mainframe computing era enabled business growth to be untethered from the number of employees needed to process transactions manually; 2) the personal computing era empowered business users to run their businesses based on individual data and applications on their PCs; and 3) a decade of network computing established an unprecedented level of transparency of information across multiple groups inside a company and an amazing rate of data exchange between enterprises.

Each of these revolutions brought with it new economies of scale. The cost-per-transaction, the cost of automating office and desktop processes, and finally the cost of network bandwidth fell quickly and enabled business users to apply ICT solutions more broadly to create business value. Forrester believes that cloud computing will help unleash the next wave of tech-enabled business innovation, which we call Smart Computing.<sup>1</sup> The advent and eventual widespread adoption of cloud computing infrastructure and applications will be a major stimulus for the Smart Computing paradigm.

Forrester's definition of cloud computing therefore focuses not on the technology but on the delivery model that enables the change of business models:

*A standardized IT capability (services, software, or infrastructure) delivered via Internet technologies in a pay-per-use, self-service way.<sup>2</sup>*

Given the looming shift of user adoption and spending to a new technology and business model for much of the ICT industry, we have structured this report to answer vendor strategists' crucial questions: 1) Why cloud computing, and why now? 2) What is the structure of the new market opportunity? 3) How will cloud computing change vendors' business models? And how should vendors transition current market share and IP to new cloud-based businesses? 4) What are the longer-term implications of cloud computing?

Vendor strategists face the challenge of simultaneously creating value for customers and prospects, communicating their firm's cloud positioning, keeping up with competitors, and preparing for a potentially disruptive change of their business model.

## BUSINESS AND TECHNOLOGY INTERPLAY GIVES RISE TO CLOUD COMPUTING

Three major market forces both enable cloud computing and drive its adoption by computing user organizations (i.e., subscribers to cloud services) and by service providers:

1. **IT becomes embedded in the business.** As enterprises have awakened to the increasing interdependence of business and IT issues, they are building IT capabilities within a broader business context. The Internet has driven a gradual migration of functionality from applications designed for single departments or processes toward resources that are shared

and interconnected between people, departments, and companies. And buyers are more likely to measure technology investments in business terms, measuring technology value in terms of improved business outcomes, not traditional measures like the scope or speed or size of technology infrastructure. Forrester refers to this evolution as the shift from *information technology (IT)* to *business technology (BT)*.<sup>3</sup>

- 2. Shared service architectures mature.** The simultaneous shift toward shared IT resources reinforces the preference for one-to-many service architectures that leverage homogeneous platforms for more economical delivery of a broad portfolio of business services and solutions. Internal consolidation and virtualization of data centers is just the beginning for many companies.<sup>4</sup> The quest for higher utilization of IT resources then leads users to try out shared platforms operated by external service providers, which have significantly higher levels of resource sharing and therefore lower per-unit costs.
- 3. Technology Populism spreads.** As the overall population becomes more Internet-literate, consumers, and digital natives in particular, are using technology to manage and integrate their private and business lives.<sup>5</sup> Increasingly, digital devices and services will combine to create the personal cloud, an integrated resource for organizing, preserving, sharing, and orchestrating personal information and media.<sup>6</sup> The rapid evolution of the personal cloud on the consumer side raises business users' expectations for immediate, universal access and unlimited scale of technology resources.

### Cloud Computing Promises Real Economic Benefits As Well

The combination of these three trends with the potential economic and functional superiority of external cloud infrastructures vis-à-vis internal enterprise IT will continue to drive company decisions to out-task the planning, building, and managing of technology assets and processes. Senior executives, and in particular CFOs, are beginning to value the potential economic benefits associated with cloud computing, particularly:

- **Faster time-to-value.** Beyond tactical cost reduction, companies are beginning to value the nearly immediate availability of cloud computing services without capital commitments. As cloud computing converts fixed costs into variable costs, it releases capital for investment in other areas of the business and allows companies to adjust their spending to changing business needs. In some instances, cloud computing can also enhance the balance sheet strength and credit rating of a company because the business will be able to direct more capital into revenue-generating activities.
- **Improved business flexibility.** From a strategic perspective, companies are trying to achieve IT flexibility. Companies need to move swiftly to adapt to change, seize new opportunities, and meet the demands for increased productivity and reduced costs. Similarly, as business workloads and requirements expand and contract, IT organizations must quickly match their

computing resources to current business needs. As cloud computing provides flexible access to information system operations, it helps companies continue to change while maintaining a competitive advantage.

### But Prevalent Cloud Washing Erodes Customer Credibility

These driving trends and prospective benefits create widespread awareness of cloud computing. However, not all vendors are leveraging this momentum appropriately. Some are hesitating, and others are overusing the word “cloud.” Some vendors and services providers recognized the cloud momentum early and started to add the “cloud” tag to many of their existing services. For example, relabeling as cloud computing a traditional application service provider (ASP) service mischaracterizes its (nonexistent) pay-per-use and self-service characteristics. Forrester calls such a misuse “cloud washing.”<sup>7</sup> Most enterprise customers recognize old wine in new skins pretty quickly. Nevertheless, cloud washing has been a significant roadblock to cloud computing adoption because:

- **Cloud washing causes customers to tune out.** If vendors relabel everything as a cloud service, the term cloud computing ceases to mean anything. Vendors waste the unique opportunity to leverage the benefits that cloud computing offers to customers. And for those customers who have not read enough about the structure of the cloud computing market, they may have the wrong perception about the technology; cloud washing can create unrealistic expectations that are impossible for vendors to meet and that impede sales.
- **Cloud washing diminishes the credibility of existing enterprise solutions.** A second and equally harmful side effect is the cloud washing of highly reliable large-enterprise solutions. Most of these solutions are usually characterized by high performance, mass volumes of data, and high availability. They are running on-premise or in long-term outsourcing relationships today. Vendors talking up the promise of cloud computing in general terms risk undermining existing systems investments and creating unrealistic expectations for new, much-lower-cost cloud solutions displacing traditional enterprise systems.

### STRUCTURING THE CLOUD MARKET

To guide vendor strategists toward the most promising opportunities, and improve industry understanding as a prerequisite for realizing those opportunities, Forrester’s cloud computing taxonomy introduces a comprehensive way to categorize cloud market offerings and understand their relationship with more traditional deployment models such as ASP and business process outsourcing (BPO).

### Two Dimensions Define Cloud Computing Market Segments

Our cloud computing taxonomy uses two dimensions to define distinct market segments:

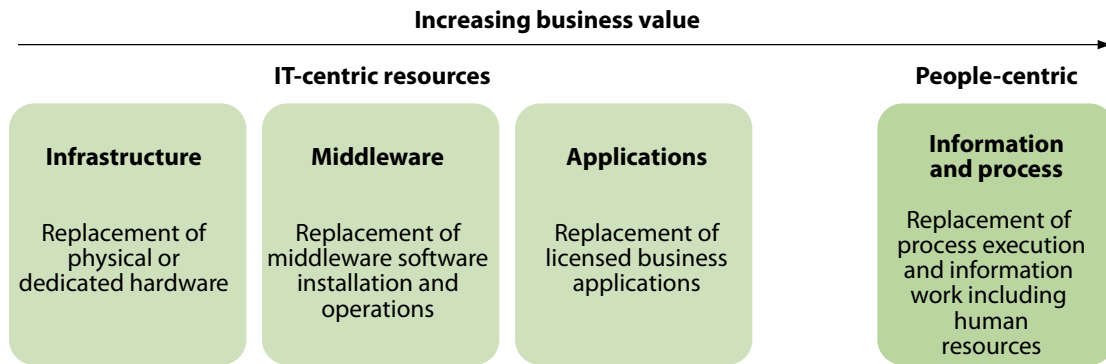
1. **What resources are shared (horizontal dimension).** Different layers of the traditional IT resource stack can be shared by pillars of cloud services: infrastructure, middleware, applications, and information and processes (see Figure 2-1). Infrastructure services in the cloud replace the purchase of hardware like servers or storage. Middleware in the cloud provides a pre-integrated, standardized middleware stack to replace the licensing, installation, integration, and operation of such software. The same applies to business applications in the cloud, which replace the traditional purchase and installation of software packages with a subscription access to a managed environment. Finally, information, business processes, rules, and the people who perform them can be replaced by cloud-based services.
2. **With whom resources are shared (vertical dimension).** Increased levels of sharing start with a single company via a private cloud service, then proceed to a defined and trusted number of companies, and finally move up to the unlimited and anonymous public crowd (see Figure 2-2).

Increasing levels of sharing in the vertical dimension are associated with three distinct flavors of cloud computing:

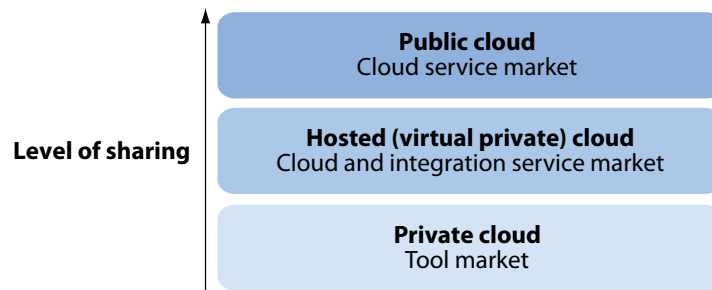
- **Private clouds.** These services share computing capabilities within a single company. If IT organizations go beyond the virtualization of infrastructure and use flexible self-service provisioning tools, the relationship between IT and business can be described as a private cloud. An important difference between large-scale corporate data centers and private clouds is the governance model, i.e., how the CIO engages with the business side of the enterprise. If this engagement is characterized by high standardization of infrastructure and the risk of fluctuating utilization on the IT side rather than on the business side, then the business side perceives the corporate data center as a private cloud services provider.
- **Hosted (virtual private) clouds.** In this layer, IT capabilities are provided by service providers, similar to traditional hosting or outsourcing models but with far more flexibility regarding consumption-based pricing, standardization, and usage flexibility.
- **Public clouds.** Services in this layer are offered via the Internet in a standardized, self-service, and pay-per-use way. There are only a few already-consolidated large-scale public cloud service providers, such as Amazon.com, that handle huge volumes of identical services without individual customer interactions.

**Figure 2** What Resources Are Shared, And With Whom Are They Shared, In Cloud Computing

**2-1 The type of resources shared in cloud computing**



**2-2 The level of sharing describes the economy of scale in the cloud**



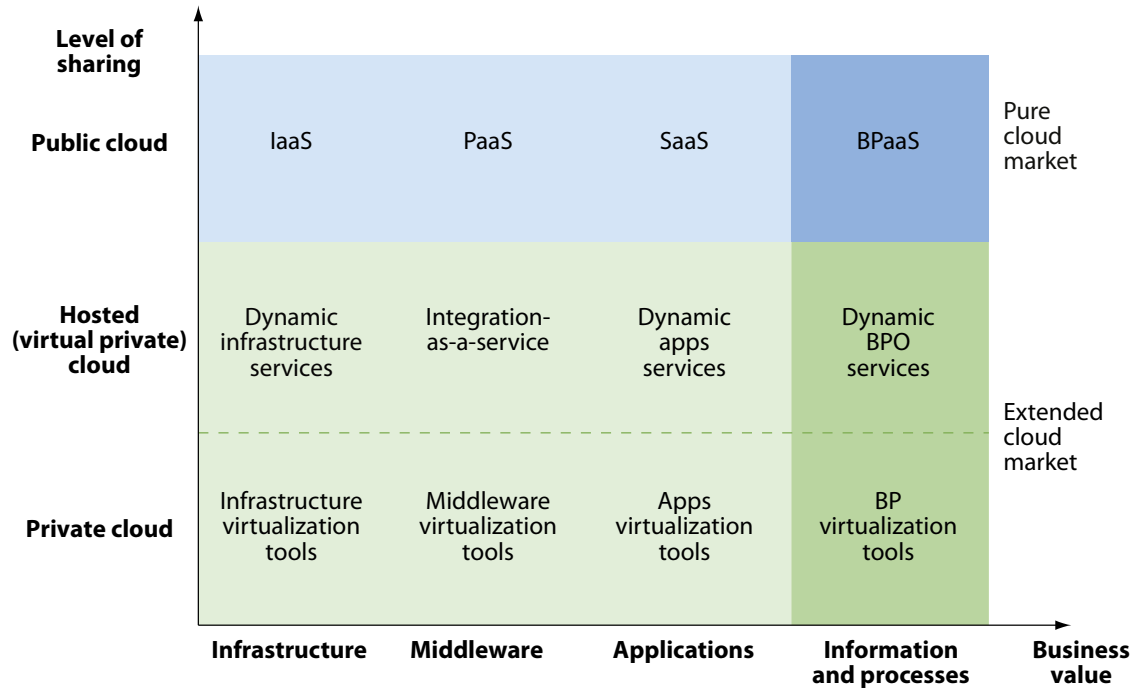
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Source: Forrester Research, Inc.

**Forrester’s Cloud Computing Taxonomy**

By bringing the two dimensions — what is shared and with whom — together, we create a complete picture of cloud computing market segments (see Figure 3). Although all of the segments in the taxonomy are related to each other along the two dimensions, each box represents a more-or-less discrete market segment, with its own market size, market trends, maturity curve, and competitive landscape.<sup>8</sup> For vendors’ strategic scenario planning, this taxonomy serves as a foundation of common understanding upon which to identify drivers, inhibitors, and industry impact.<sup>9</sup>

**Figure 3** Forrester's Full Cloud Computing Taxonomy



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Source: Forrester Research, Inc.

### THREE IMPLICATIONS OF A CLOUD COMPUTING MARKET SEGMENTATION

The wide variety of services categorized as cloud computing will change the tech industry significantly. New supplier business models will become evident in each “pillar” of the cloud taxonomy, with different market dynamics and evolution, ranging from incubation to mass adoption. Vendors will also develop new engagement models with enterprise customers, for example, focusing on application standardization versus customization. And strategists will come to grips with an increasing shift in user spending from products (computers) to services (computing).

#### 1. New Cloud Business Models Come Into Focus

Software-as-a-service (SaaS) applications are already in widespread use, while the new people-centric business process services are just about to spin off from their old noncloud origins. Statements about the overall cloud market are likely to be meaningless given the variety of market segments, each of which is driven by different business models, revenue streams, and buying behaviors. Although the business models might be significantly different in the different business value pillars of the taxonomy, we can identify some common characteristics:

- **The public cloud is a mass-volume IT services market.** Public clouds are highly standardized and massively shared, and accordingly the ability to customize features and business logic is restricted. Many infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and SaaS providers handle their business nearly anonymously like a telco, without really knowing their customers and their specific requirements. The margin per subscription is relatively small and under permanent competitive pressure, and the profit potential is driven by a huge volume of subscribers and a fast market consolidation. This public cloud business is only a sustainable business model if a provider remains focused on volume and does not follow the demand of its largest customers to offer more customized solutions or even a licensed software version with exactly the same functionality to run on-premise. As an example, salesforce.com does not offer a licensed software release of its customer relationship management (CRM) product to run on-premise because the speed of deployment would be slower than a subscription in the public cloud.
- **The private cloud is a licensed tools and consulting market.** When a company puts a private cloud in place, the engagement model between the IT and business side within the company changes. The IT department is not a cost center anymore; it is a service provider that is financed by operational expenditure contributions from the various business units. Forrester sees a new generation of tools evolving, helping the CIO deliver internally owned infrastructure in the style of a cloud. So the private cloud market includes virtualization tools, IT management software, and middleware platforms with multitenancy capabilities. Thus, these segments are aggregations of parts of traditional licensed enterprise software markets, plus consulting services that help corporate data centers undertake a cloud transformation.
- **The hosted (virtual private) cloud is an IT services market with customer intimacy.** In the middle between public clouds and private clouds, hosted (virtual private) cloud services combine the economy of scale of an external provider with some knowledge of and customization for an individual enterprise customer. An IT outsourcing or hosting provider can become a virtual private cloud provider if it retains customer intimacy by understanding the customer's core business. Hosted (virtual private) infrastructure should appear like an internal data center resource while being provided by an external source.<sup>10</sup> Ideally, these offerings are a total service model, and the end customer does not buy any software license or real hardware besides network connectivity.

The business model of a hosted (virtual private) cloud provider is attractive for IT outsourcing and hosting companies if they focus on a limited number of very large customers rather than a mass of anonymous customers that make up the public cloud market. As examples, Fujitsu Services, IBM, Siemens IT Solutions and Services, and T-Systems are transforming parts of their traditional outsourcing business into this style. The portfolio of such providers also includes cloud/legacy integration services, such as creating access to the corporate identity management system.

## 2. Cloud Providers Will Create New Engagement Models With Enterprise Customers

Both vendors and users will create fundamentally new ways of engaging with each other when buying and selling cloud services:

- **Cloud provider diversity replaces single-vendor sourcing for users.** In precloud times, user companies tried to consolidate suppliers to a minimum number of hardware and software vendors; the cloud, however, will bring greater supplier diversity. For example, many enterprises follow a single vendor sourcing strategy and ask for all business application requirements from their preferred enterprise resource planning (ERP) vendors first. However, when a company is considering a CRM application as a subscription out of the cloud, Forrester has seen that the existing vendor is not even invited for the request for proposal (RFP) process, as the traditional vendor does not represent a visionary disruption to the existing software deployment model. Instead of the former vendor consolidation approach, IT users are starting to embrace cloud orchestration, combining logic from internal systems with a CRM or business intelligence (BI) application in the public cloud, for instance.
- **Vendors focus on standardization of applications and platforms, not customization.** Cloud computing significantly disrupts vendors' practices as well. In the past, business applications vendors successfully tailored their offerings to all kinds of customer requirements. They added more customization options to standard products at the request of a few of their largest customers. The results were complex implementation projects and unpredictable behavior from badly configured application packages. In contrast to this, the most successful cloud vendors are those that convince even the most influential customers to live with standardized application logic. To reach a high SaaS market share, a vendor actually must *not* listen to customers for some time. For example, salesforce.com basically rejects extensions to its packaged application; instead, it has established a standardized platform where customers or independent software vendors (ISVs) can develop extensions. This keeps the core CRM application on a high-growth, mainstream path.
- **Some vendors will separate their cloud and legacy businesses.** Most traditional ERP vendors that tried to deliver a SaaS alternative realized painfully that SaaS is a totally different business model. The cloud style of software vendor strategy is so different from the existing corporate culture that it will be easier to spin off the SaaS business in a totally separate business entity. While this will slow the transformation of traditional software vendors into the cloud, we predict a fast transformation of traditional outsourcing and hosting providers. They will manage to standardize portions of their offering into a hosted (virtual private) cloud delivery model. But again, most traditional hosting companies will stay out of or struggle with a public cloud infrastructure offering.

## 3. Cloud Market Segments Draw User Spending From Existing ICT Markets

The revenues for the various cloud computing market segments will not appear as new money in the tech industry! Most cloud categories will gain their market size purely by displacing user

spending on existing markets. Some are mixing contributions from cannibalization and net new buying potential, but we have not identified any cloud market that raises only new market volumes. Infrastructure-as-a-service offerings, for example, will replace, in many cases, a user's real hardware spending on non-mission-critical servers. Hardware for development and testing purposes is already shifting to the IaaS alternative. Obviously, the utilization of the hardware beneath the IaaS offerings at the cloud provider is far higher than individual development machines. So, as this portion of hardware spending shifts to cloud services, it will shrink by perhaps 30% at the same time.

## THE ICT INDUSTRY IN THE CLOUD ERA

Cloud computing represents both a significant threat and opportunity for ICT vendors. Strategists must contemplate the threat of current revenues shrinking and shifting away to new cloud providers and the opportunity to develop disruptive business models that can capture some of those shifting revenues. Cloud computing will have a profound effect on how IT functionality will be delivered, priced, and consumed. The paradigm shift will be a fundamental change in the direction of IT investments as computer buyers become computing subscribers, shifting away from capital expenditures on technology products (hardware and software) toward IT investments being made through operating expense budgets for services.

### The Short Term: Cloud Accelerates The Shift To Services

Over the next two to three years, cloud computing will:

- **Frame a services-centric industry ecosystem.** Although companies will continue to invest in IT products and technologies, they will increasingly do so in the context of services. Enterprises will increasingly rely on external services providers to facilitate the respective solutions based on their superior shared service delivery architectures as well as their partnerships with other leading technology vendors. As a result, we will see the emergence of a new services-centric tech industry ecosystem where large service providers act as aggregators and deliverers of multiple computing and application technologies as well as business process functions.
- **Alter the financial and sales business models of product vendors.** Services-centric ecosystems will shift the underlying financial business models of most tech vendors. Given customers' focus on liquidity, tech providers will be forced to move away from producing fixed capital goods to making circulating capital available in the context of their ongoing services. While this will have a massive impact on the vendors' balance sheets, it will also require a significant change in their sales and go-to-market approach. The focus will have to move from a culture and sales incentives built around one-time product sales to a culture and corporate governance that embrace long-term customer relationships and trust.
- **Expose the tech industry to more cyclical spending patterns.** While cloud computing in the short term will open new revenue growth opportunities for different vendors within the ecosystem, in the long term, the revenue flow will be subject to strong cyclical changes in

customers' buying patterns. With the shift from products to services, corporate and consumer tech spending will much more explicitly mirror the ebbs and flows of the underlying business cycles. In order for vendors to maintain growth through these cycles, strategists will adjust their portfolios, emphasizing up-cycle themes like speed and flexibility in good times and down-cycle buying themes such as cost reduction and efficiency in not-so-good times.

- **Serve growing IT demands with shrinking IT spend.** Businesses and consumers will increasingly depend on data volume, quality, and ubiquity in the coming decades. However, we expect the on-premise deployment of software in corporate data centers and on personal devices to decrease in the face of mounting cost and complexity. How to resolve this seeming paradox? With cloud computing, where provider-hosted offerings will gradually replace data volume and compute power in corporate data centers and on personal devices.

### The Medium Term: BPO Services Move To The Cloud

The outsourcing of people-centric services has taken place for many years under the label of business process outsourcing (BPO), a multibillion-dollar business annually. Traditional BPO is not cloud computing, however, as contracts typically run for five or even 10 years, which is the opposite of the elastic pay-per-use consumption model that characterizes cloud services. So we do not include traditional BPO service in the “information and business process” pillar of our cloud computing taxonomy. However, we expect new categories of cloud services to emerge over time, based on a combination of human-resource-based services with cloud-style delivery models. We predict these new services will create enormous elasticity in volume at a compelling price point for each of the three levels of resource sharing:

- **Business-process-as-a-service (BPaaS) in the public cloud.** One example of a business process in a highly shared mode is event marketing and management services provided by a company called Meeting Expectations. It provides everything from the IT system for online registration to the payment process to the staff who manages the on-site facility at an event. What's remarkable is that a customer has no contract beyond a single event, and the provider offers its business service to everybody publicly. This provides higher business value with human involvement than just a business process management (BPM) software system running in a public cloud environment.
- **Traditional BPO services will gradually shift to dynamic BPO services.** Similar to traditional application outsourcing, which will shift gradually to dynamic application services, Forrester predicts an evolution from traditional BPO services into dynamic BPO services. While still keeping some customer intimacy, the dynamic BPO service will differentiate itself with cloud-style characteristics. One example is a BPO-style outsourced HR department, which might move a customer's entire HR department, including staff and IT systems, to an external provider. A dynamic BPO service would give customers the option to move some but not all processes into the cloud and to keep some staff inside the company. Customers could request additional business process volumes (including staff) in a self-service style from the provider with flexibility similar to what we see between private and public IT infrastructure.

- **Future shared services centers will embrace internal private cloud engagement models.** The in-house alternative to BPO is also not new. It is a shared service center that consolidates, for example, all HR departments of all business units of a larger corporation into one corporate facility. This type of shared services center used to be one physical location in many cases, but it can also be a virtual shared services center. The important differentiator is the way the shared business services are charged to the business units. If, in addition to the people-centric efforts, the total cost of IT systems are charged in a transparent pay-per-use model (with the shared services center basically making the same evolutionary step into a business process virtualization), then the pure data center has transformed from a virtualized hardware landscape into an internal private cloud approach.

### The Long Term: Cloud-Derived Business Models Emerge

And in the longer term, we see the potential for new, cloud-derived business models, including:

- **The intercompany or collaborative cloud.** Precloud software applications and business models typically focused on one business step, such as trading (buying and selling) goods. Hence, most financial software packages are strictly structured in accounts receivable and accounts payable. As such transactional accounting is not a real differentiator for a trading company, it might source this from a cloud-based service. Once a number of the trading company's suppliers and customers use the same cloud-based system, we envision a totally new generation of financial software that is based on a trading chain volume, focusing on value add and margins based on a commonly shared network of transactional information. A single transaction record would simply appear on the accounts receivable report in one subscriber company and on the accounts payable record on another subscriber to the same SaaS application. Such an approach would dramatically decrease manual efforts and stimulate different business models for trading companies. Similar to this sharing of transactional data, the sharing of master data and metadata, such as spare part specifications on purchasing marketplaces, or quality assurance data and risk management data would be possible in a collaborative cloud.<sup>11</sup>
- **The cloud broker.** In the same way that a travel agent represents multiple airlines, we expect that once many comparable providers of standardized cloud services are on the market, potential subscribers would ask a broker to recommend the service that best fits the company's requirements.
- **The cloud-legacy application integrator.** The distributed location of data and business logic embodied in a hybrid federation of cloud computing and traditional computing will be a huge challenge to middleware software stacks and their providers. Forrester calls this challenge "cloud orchestration" and the corresponding consulting services "cloud/legacy integration."<sup>12</sup>

## RECOMMENDATIONS

### CLOUD COMPUTING WILL STIMULATE A MAJOR SHIFT OF THE IT ECOSYSTEM

Forrester recently identified four major centers of gravity in the current tech industry: packaged business applications, middleware and database software, hardware, and IT services.<sup>13</sup> While vendors were satisfied to play in one or two of these some years ago, the recent acquisitions of Sun by Oracle, EDS by HP, and a number of others are pushing this picture to a new level of consolidation and a new balance of power. Even further down the road, cloud computing will have a significant impact on the balance again. Hardware and the two software classes decrease in importance, and a shift to services-centric models will go along with the cloud computing trend.

Given this disruptive industry context, vendor strategists should:

- **Target the appropriate segment of the cloud market.** Forrester's cloud computing taxonomy is a comprehensive classification of cloud services and tools. Vendor strategists should use this to understand and compare the upcoming offerings of partners and competitors by mapping their current portfolio to the taxonomy. Marketing managers can identify which areas of their current portfolio are suitable for cloud messaging at all and which portfolio elements do not show any of the cloud characteristics and should not be "cloud-tagged."
- **Select the middleware battlefield carefully.** Middleware vendors can try to host their PaaS technology stack on their own, as Microsoft is doing by hosting Windows Azure. However, this damages partnerships with outsourcing providers that like to contribute the value of hosting on their own. The cloud infrastructure software market can still be a software tools market. In contrast, Oracle, for example, relies on partnerships to host its just-launched PaaS offering. Partners may be pleased not to face another competitor but will challenge the provider of the PaaS technology with multitenant and management efficiency requirements. If smaller middleware vendors neither host their PaaS offering nor provide a PaaS stack to a hosting partner, they should at least implement sophisticated cloud/legacy integration capabilities to stay competitive.
- **Anticipate a shrinking ERP implementation market.** Traditionally deployed ERP systems required a hardware investment in addition to the software license. The implementation and customization of business logic was usually a consulting project of two to four times the size of the initial license cost. With SaaS, the higher level of standardization and faster adoption cycle will press the implementation down to a ratio of about 0.5 times the implementation cost compared with a three-year subscription volume. Clever systems integrators (SIs) must start to transform their industry knowledge from a consulting, daily-rate-focused offering into a more packaged approach. Some are starting to offer industry-specific add-ons surrounding packages SaaS applications like Salesforce CRM.

- **Shift hardware sales from enterprises to cloud service providers.** The server hardware sold to end users is under the biggest price pressure of all. And the competition from the cloud is actually intriguingly dangerous: Customers will not negotiate for some standard x86 server; they will simply stop issuing RFPs and source some portions of their workload requirements from the cloud. Therefore, hardware vendors will not see their competitors winning these deals. The corporate data center hardware market will simply never fully recover from the economic downturn of 2008 to 2009. Hardware vendors need to identify a new channel approach for the increasing volumes required by cloud providers. New partnerships with virtualization tool and PaaS technology stack vendors will help enable this new class of hardware sales.
- **Invest in hosting portfolio management, messaging, and positioning.** The provisioning of hosting capabilities is under visible price pressure in the emerging cloud era. Although many customers trust their current hosting provider and value the long-term relationship, they will look at price-leading IaaS offerings and challenge their traditional provider on this basis. Hosting providers have to invest in a revised go-to-market approach, stating clearly where they focus and where they do not. They have to educate their customers along Forrester's cloud computing taxonomy and prevent them from comparing apples and oranges. Enterprise-class services can retain the customer advantage if they add value on top of IaaS offerings from a public cloud competitor, as Capgemini is doing with a value-add approach on top of Amazon's Elastic Compute Cloud (EC2).<sup>14</sup>

## ENDNOTES

- <sup>1</sup> Forrester introduced the concept of Smart Computing in December of 2009. See the December 4, 2009, "[Smart Computing Drives The New Era Of IT Growth](#)" report.
- <sup>2</sup> Forrester's definition of cloud computing is very close to the widely used definition of the National Institute of Standards and Technology (NIST). However, the focus is clearly on the level of standardization and the consumption models. See the September 9, 2009, "[Best Practices: Infrastructure-As-A-Service \(IaaS\)](#)" report.
- <sup>3</sup> Forrester is currently exploring in multiple reports the IT-to-BT shift for CIOs. However, we predicted this challenge earlier for vendors that have to prepare their positioning in time to address the shifted expectations of buyers. For the initial introduction of the impact to vendor positioning, see the January 16, 2008, "[Introducing Forrester's Vendor Positioning Review](#)" report.
- <sup>4</sup> In Forrester's Enterprise And SMB Software Survey, North America And Europe, Q4 2009, we asked respondents from 1,007 enterprises with 1,000 or more employees the following question: "How important are the following software initiatives in supporting your firm's current business goals?" Thirty-one percent of the respondents said that increasing the use of software-as-a-service (SaaS) or other cloud services was a very high or high priority. Sixty-eight percent of the same group said that they will consolidate or rationalize enterprise applications. Virtualization technologies are significantly helpful to achieving this goal. See the February 12, 2010, "[The State Of Enterprise Software And Emerging Trends: 2010](#)" report.

- <sup>5</sup> Forrester defines *digital natives* as individuals who “were born in the late 1990s, having been raised in a world in which Internet and mobile were commonplace.” See the April 26, 2007, “[European Mobile Youth Consumer Survey, 2007](#)” report.
- <sup>6</sup> Forrester predicts that consumer expectations will change. Work- and private-life related applications and data should be accessible together from a single mobile device or desktop or any other device. See the July 6, 2009, “[The Personal Cloud](#)” report.
- <sup>7</sup> For Forrester’s introduction to the danger of cloud washing, see the July 24, 2009, “[How To Message ‘Cloud’ Offerings And Not Get Lost In The Fog](#)” report. For a description of the challenge to an initial version of Forrester’s cloud taxonomy, see the July 30, 2009, “[Yet Another Cloud](#)” report.
- <sup>8</sup> For a detailed analysis of the platform-as-a-service (PaaS) market size and a maturity model of the software-as-a-service (SaaS) market, see the July 13, 2009, “[Platform-As-A-Service Market Sizing](#)” report, and see the August 14, 2008, “[Forrester’s SaaS Maturity Model](#)” report.
- <sup>9</sup> Scenario planning is a relatively old strategy tool. However, it’s not easy to apply it to current vendor strategy challenges successfully. For best practices, see the January 26, 2010, “[Scenario Planning Successfully Applied](#)” report.
- <sup>10</sup> Technically, a server of a virtual private cloud appears, for example, within a corporate data center with an IP number of the data center, and with knowledge of user identities from the corporate LDAP or AD repository. This might require some virtual private network (VPN) and manual configuration efforts for the first subscription of this kind of virtual infrastructure. However, it should not impede the elasticity and self-service mentality of the final business model.
- <sup>11</sup> For an initial discussion of collaborative cloud business models, visit Holger Kisker’s blog post on the topic. Source: Holger Kisker, “The Rise Of The Collaborative Cloud,” *Holger Kisker’s Blog*, September 10, 2009 ([http://blogs.forrester.com/holger\\_kisker/09-09-10-rise\\_collaborative\\_cloud](http://blogs.forrester.com/holger_kisker/09-09-10-rise_collaborative_cloud)).
- <sup>12</sup> For Forrester’s introduction of the concept of cloud/legacy integration and cloud orchestration, see the December 30, 2009, “[Market Overview: The Middleware Software Market, 2009](#)” report.
- <sup>13</sup> Forrester identified the business applications, middleware software, IT services, and the hardware business as the four major centers of today’s IT industry. See the April 22, 2009, “[Oracle’s Sun Acquisition Is A Game Changer](#)” report.
- <sup>14</sup> Source: “Capgemini Makes Cloud Computing for the Enterprise a Reality with Amazon Web Services,” Capgemini press release, November 18, 2008 ([http://www.us.capgemini.com/services/serv\\_pressrelease.asp?ServID=6&ID=718](http://www.us.capgemini.com/services/serv_pressrelease.asp?ServID=6&ID=718)).

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