

A Forrester Consulting Thought Leadership Paper Commissioned By Oracle

Enterprise Cloud: Lessons Learned From Early Adopters

An Analysis Of The Experiences Of IT Decision-Makers Involved In Cloud Projects

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FORRESTER

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Executive Summary

Cloud computing — a standardized, self-service, pay-per-use deployment model — is touted as a way to provide companies with rapid access to powerful and more flexible IT capabilities that could yield significant business benefits.

By abstracting infrastructures, IT and business

organizations are expecting to rid themselves of all of the delays, costs, and inconveniences that result from provisioning and running hardware and software. But this often proves to be an elusive objective, as cloud computing presents a number of challenges to the business and those responsible for applications and IT operations.

Cloud computing is not an “IT thing,” it is a key technology for innovative and flexible business solutions. Most IT organizations lack the strategy and tools to build and manage such an environment.

In February 2012, Oracle commissioned Forrester Consulting to conduct a survey of 156 senior IT decision-makers with cloud responsibilities, in order to better understand the dynamics of the above challenges. This survey focused on current strategies and practices employed by mainstream IT organizations for deploying enterprise clouds. In addition to reporting the results and analysis of this survey data — which is a valuable asset for IT decision-makers embarking on cloud projects in and of itself — Forrester Consulting has added key considerations and recommendations based on our analysis. The following are the major outcomes of this study:

- The quest for business agility and flexibility is the main driver for enterprise cloud.
- Organizations with an infrastructure-centric cloud focus are struggling to meet these business objectives.
- Enterprises underestimate the deployment, release, and management issues of the complete application stack in the cloud.
- A complete, application-centric, business-aware cloud solution is needed.

Key Findings

In conducting this survey, Forrester found that many IT respondents consider themselves to be trusted partners of the business who are ready to embrace new technologies to innovate and advance the business, but that their efforts are impaired by the inadequacy of current tools and organizations.

The quest for business agility and flexibility is the main driver for enterprise cloud.

- 80% of respondents believe that driving innovative business services through technology is the key to the integration of business and IT.
- 70% respondents agree that cloud technology plays a critical role in driving business agility and innovation.
- These data points confirm that the expected role of technology is shifting. Until recently, technology was viewed as a way to improve the costs and efficiencies of IT organizations. But technology is now viewed as a key business value driver for the enterprises — driving business innovation, differentiation, agility, and cost control.

Organizations with an infrastructure-centric cloud focus are struggling to meet these business objectives.

- 90% of respondents believe that managing the transition of critical business applications to the cloud is a major challenge.

- 98% of respondents cited the following four major cloud issues — deploying and configuring multitier applications in the cloud; managing the availability, performance, configuration, and compliance of applications in the cloud; building and managing the cloud life cycle using a set of loosely coupled point solutions; and building a cloud platform optimized for business applications.
- The above further confirms that IT is struggling primarily because it does not have the right tools to address the issues they face.
- Furthermore, IT groups that only plan to deliver infrastructure cloud solutions will struggle to meet business objectives, as such solutions lack the software platform capabilities necessary to run enterprise or mission-critical applications.

Enterprises underestimate the deployment, release, and management issues of the complete application stack in the cloud.

- 94% of organizations feel that they are not able to manage the cloud application life cycle properly because they lack the right tools. The majority of tools on the market today focus primarily on managing infrastructure services and lack the capabilities to address the platform, application, and business aspects of the cloud.

A complete, application-centric, business-aware cloud solution is needed.

- 90% of respondents think that a complete cloud — including full cloud life-cycle management of all required IT services and components — is required to achieve their business objectives.
- 78% of respondents are interested in complete cloud life-cycle management solutions that include an integrated management of the IT stack that powers the cloud, including application, middleware, database, hardware, and virtualization infrastructure.
- Respondents cited the following as the three primary requirements for a complete cloud: a flexible and integrated cloud platform that allows all required IT services (infrastructure, database, middleware, platform, application, and testing-as-a-service) to be offered as cloud services; an application-aware cloud platform that enables existing business applications to be deployed without changes while maintaining their benefits; and business-driven clouds that better manage the customer experience and business services. The other key requirement cited by customers is that the cloud must simplify their IT environment and operations. As such, organizations that resort to a complex maze of disparate tools and technologies — often provided by different vendors — often struggle to achieve their business objectives, as it results in an even more complex environment, causing further integration pains and operational challenges. For this reason, there is a marked need for comprehensive cloud solutions that not only allow customers to build, manage, and operate a complete catalog of cloud services but also to manage the IT stack powering the cloud in a holistic and simplified manner and give them deep insight into business applications, services, and transactions. Such solutions eliminate integration pains and effort on the customer side and provide an accelerated path to a complete enterprise cloud — better serving the business.

Cloud Paves The Road To IT/Business Integration

Three persistent business-driven models of IT have emerged over the past years, based on how IT is perceived by C-level execs and its internal customers, the constraints of the industry to which the company belongs, and the company's mission for IT (see Figure 1). Forrester's three archetypes for the IT organization are as follows:

- **A Solid Utility is based on available and cost-effective infrastructure.** Solid Utility IT organizations must provide cost-effective, dial-tone reliability: The network is always there, PCs function, the help desk responds, and back-office applications are up and working. Finance pays close attention to IT in these environments; costs are expected to be transparent and to decline over time. This is typically what a mature IT operation does.
- **A Trusted Supplier adds project delivery to the Solid Utility model.** Some firms need centrally managed application projects to support process changes in and between functional departments. In Trusted Supplier IT organizations, where the CIO is likely to report to either the CEO or COO, the enterprise expects to have all of the infrastructure capabilities of Solid Utilities — plus they centrally manage application projects and deliver them on time and within budget. Achieving this requires mastery of the application stack and solid application life-cycle management.
- **With a Partner Player, the business is IT and IT is the business.** IT organizations in these firms pour their energy into creating unique and competitive solutions for customers, suppliers, and internal business users. As a result, there is little time for the delay in translating requirements between business groups and IT that occurs with Trusted Suppliers. Partner Player IT organizations must have the reliable infrastructure of the Solid Utility, the project discipline of the Trusted Supplier, and the added dimension of C-level expectations. No solution brought forth by either IT operations or application development is complete without the business dimension.

Figure 1

The Three Archetypes Of IT Organizations

How does the enterprise view the ... ?	Solid Utility	Trusted Supplier	Partner Player
Role of technology	Infrastructure technology critical; application criticality varies by business unit	Technology is critical for enterprise functions like sales, marketing, finance	Technology is integral to go-to-market offerings
Technology required	That which is standard for infrastructure excellence	That which is standard for functional excellence	That which is unique for competitive advantage
Visibility into IT	Financial	Functional department management	Executive team
Mission of IT	"Keep the lights on"	"Do the project right"	Depends on the industry (e.g., "Get the package there overnight")
Focus of the CIO	Operational, contain costs	Service-oriented, ensure successful delivery	Business partner, integrate with enterprise strategy

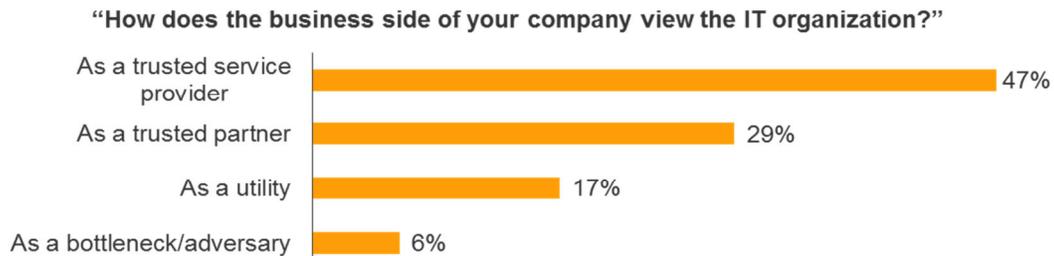
Source: "Transform Your I&O Organization Into An Innovation Machine," Forrester Research, Inc., October 4, 2011

The majority of respondents identify themselves as a trusted service provider, which reflects the evolving nature of IT (see Figure 2). Around 30% of customers surveyed considered themselves as a trusted partner — which indicates how enterprise IT environments are increasingly trying to focus on the business context as opposed to just being content

with being a service provider. This trend is expected to gather momentum. And as expected, a relatively small set of customers identified themselves as a utility or adversary.

Figure 2

How IT Organizations See Their Status Relative To The Business



Base: 156 IT decision-makers
(Percentages do not total 100 because of rounding)

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

Cloud Computing Objectives And Expected Benefits

Data from the custom survey indicate that what is significant in cloud computing is the fact that, regardless of their focus and the way they see themselves, 80% of the organizations surveyed agreed that their role is to use new technologies to support innovative business initiatives (see Figure 3). For 67% of the survey respondents, cloud computing is the solution that potentially improves IT efficiency and drives technological innovation. Cloud computing should then align closely to the three IT organization archetypes and fundamentally satisfy all three models: business, applications, and operations.

Figure 3

Innovation And Cloud Computing Are Key Business Initiatives

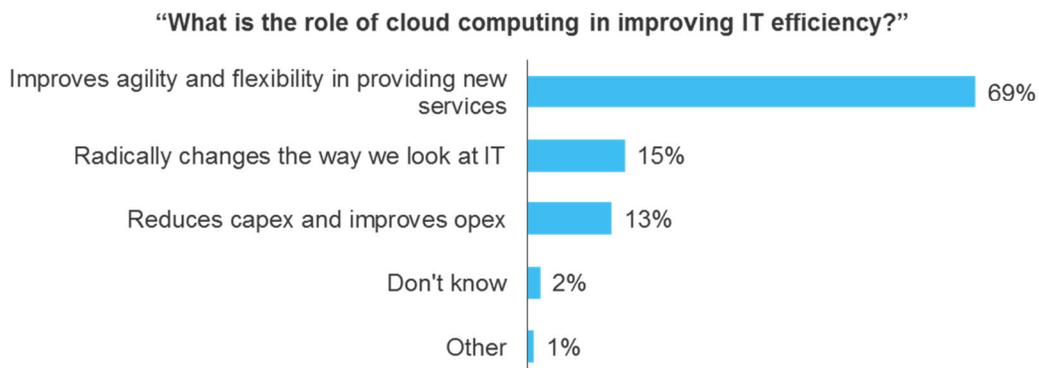


Base: 156 IT decision-makers
(multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

To support the different archetypes, a complete cloud solution must include 1) infrastructure-centric services that focus on the operational aspects of cloud to provide availability and elastic capacity of the computing and storage resources; 2) application-centric services that focus on applications, providing faster provisioning, deployment, and management of these applications within the cloud; and 3) business-centric services that focus on the business aspects of the cloud, providing agility, low cost, and high quality of business services and processes offered through the cloud. Our survey confirmed that these benefits are important; respondents reported that agility and flexibility were the main advantage of cloud computing (see Figure 4).

Figure 4
Cloud Computing's Role In IT Efficiency



Base: 156 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

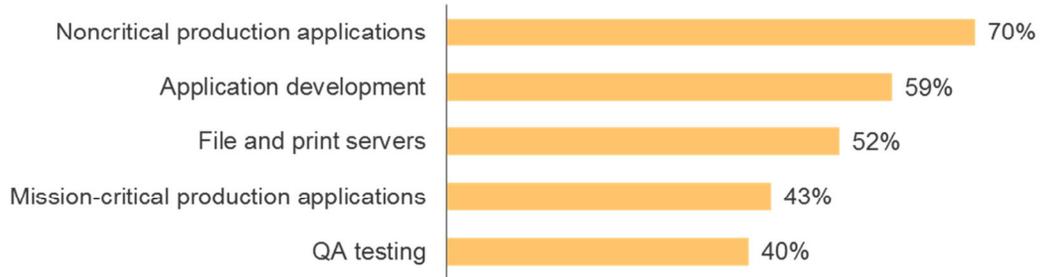
Cloud Computing Challenges

Several data points in the survey highlight an important problem that can potentially cause many enterprise cloud solutions to fail (see Figure 5 and see Figure 6). In Figure 5, only 43% of respondents stated that they used or planned to use mission-critical applications in the cloud. This is in spite of the data shown in Figure 4, which indicates that most respondents considered improving agility and flexibility in providing new services as a key benefit of cloud computing. Figure 5 also shows that 70% of respondents currently use or plan to use noncritical applications in the cloud — which Forrester believes provides little if any differentiation for the IT organization. In Figure 6, the number of respondents considering an infrastructure-as-a-service solution is almost double that considering platform-as-a-service. Along with other data discussed below, this reveals that the majority of cloud solutions used today lack significant capabilities to enable agility and flexibility. Whether by choice or the lack thereof, Forrester believes that IT organizations focusing only on infrastructure for cloud will struggle to deliver business services, including mission-critical applications, in the cloud, as such infrastructures lack the software platform capabilities necessary to run enterprise or mission-critical applications.

Figure 5

A Misalignment Of Intent And Actions: Most Organizations Are Deploying Noncritical Applications In The Cloud

“Is your organization using or planning to use cloud computing for any of the following?”



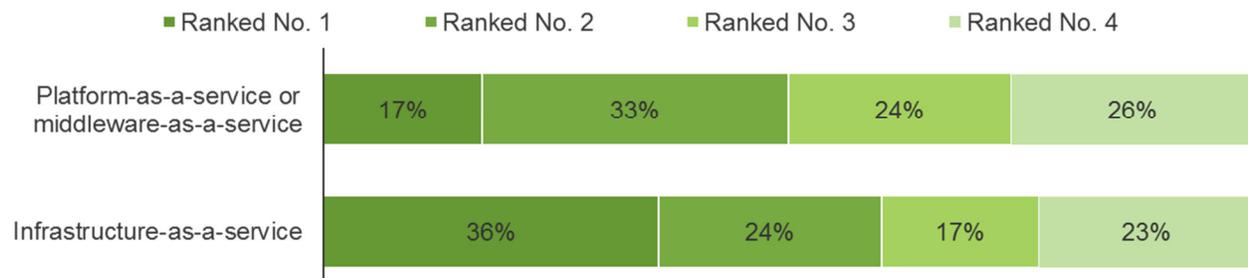
Base: 156 IT decision-makers
(multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

Figure 6

The Low Ranking Of Platform-As-A-Service Solutions Demonstrates A Shortcoming In Current Cloud Solutions

“Rank each of these cloud offerings in their order of importance.”



Base: 156 IT decision-makers

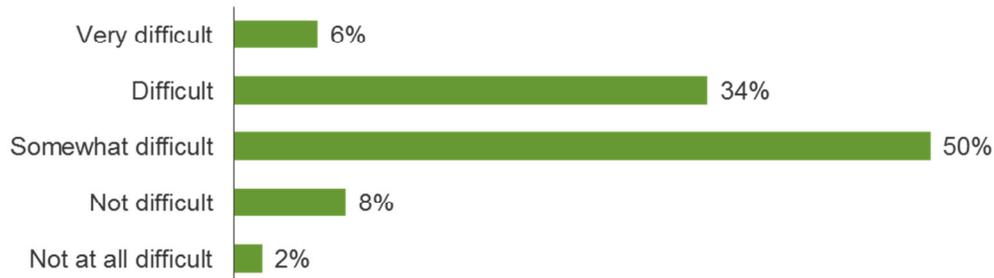
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

Additional data points from the survey confirm that current cloud technologies are not a good match for their intended uses. While 75% of the IT organizations surveyed understand that a major IT operation evolution is needed to take advantage of cloud computing, few are really prepared. In fact, 52% of respondents say that cloud is not ready for their applications, and the majority believes that the transition to the cloud will be a difficult undertaking (see Figure 7).

Figure 7

Managing The Transition Of Critical Applications To The Cloud Is Difficult

“How difficult will it be to manage the transition to the cloud for your critical applications?”



Base: 156 IT decision-makers

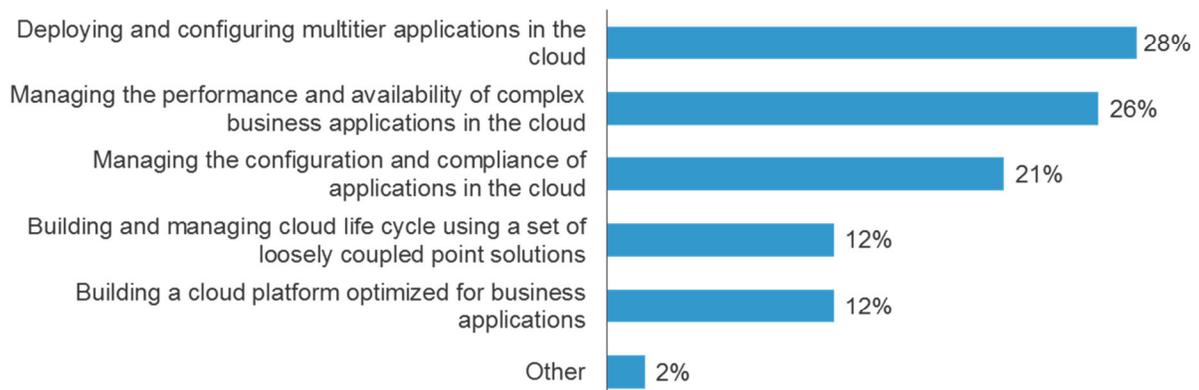
Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

When asked how their IT organization manages applications in the cloud, 90% of respondents said they find it difficult to transition their critical applications to the cloud and run them there. This reflects a very common situation, wherein the cloud focuses primarily on infrastructure services and is not really ready for applications. See Figure 8 for an additional breakdown of the application management issues in the cloud.

Figure 8

Major Cloud Application Management Issues

“Where do you think IT organizations experience the greatest difficulties with cloud computing?”



Base: 156 IT decision-makers
(multiple responses accepted)

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

Security aside, enterprises see major obstacles in managing the performance, deployment, and transformation of critical applications. This is aligned with the fact that most clouds today primarily focus only on the infrastructure layer and are not built to handle critical enterprise applications. The cloud must be designed and managed to enable application services and business services.

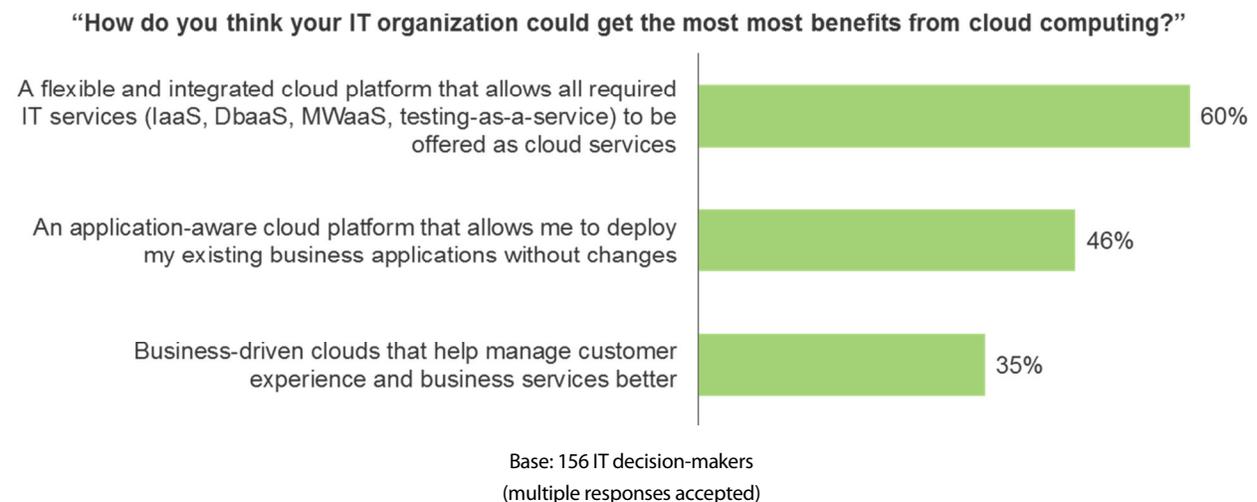
While probing further, it was also found that 55% of the survey respondents believe that they do not have the right tools to manage the complete life cycle of cloud applications; as a consequence, 39% think that they do not manage this life cycle properly.

The Complete Enterprise Cloud

When asked how to address all of the major cloud-related challenges described in the previous section, survey respondents identified the key requirements of a “complete” cloud solution (see Figure 9).

Figure 9

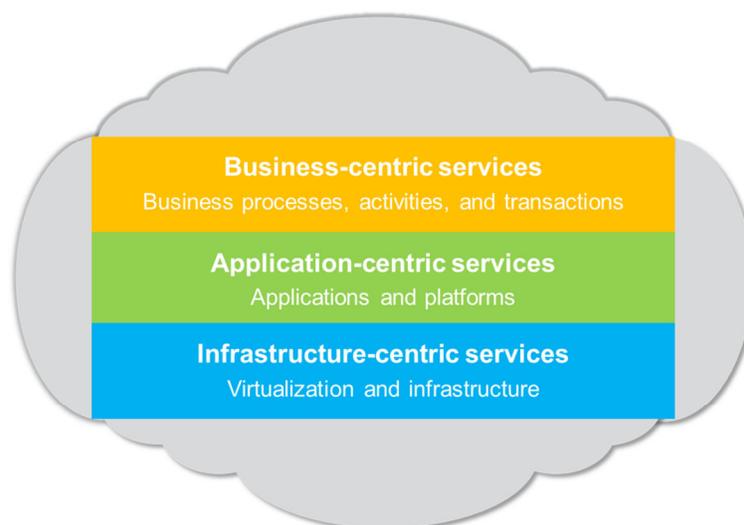
The Complete Enterprise Cloud Must Be Operation-, Application-, And Business-Aware



Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

As is evident from the above, a complete cloud solution must satisfy the requirements of IT operations by offering three major functionality layers: an infrastructure layer, which provides a full abstraction of the infrastructure; an application-oriented layer, which provides not only a platform but also configuration, deployment, and management of the full application stack; and a business layer that leverages cloud’s ability to adapt to customer experiences, business services, and business processes and enables all of the advantages of business flexibility, business agility, and business cost improvements expected by the lines of business while keeping the service quality that is paramount for achieving success (see Figure 10).

Figure 10Requirements For The “Complete Cloud”



Source: Forrester Research, Inc.

Few cloud solutions offered today satisfy the overall complete cloud requirements:

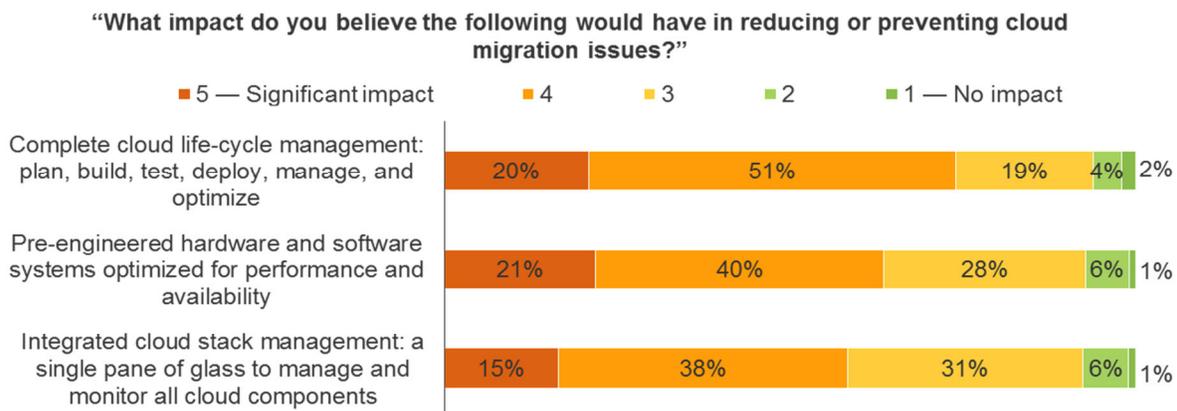
- **Infrastructure-as-a-service (IaaS) is entirely focused on infrastructure.** IaaS essentially provides an abstraction of computing and storage and brings the ease of provisioning and the capacity elasticity that are its main operational advantages. It does not comply with all of the requirements of control and management that are the norm in IT operations.
- **Platform-as-a-service (PaaS) adds the application dimension.** However, PaaS does not provide the facilities of deployment and configuration that are so important to today’s complex multitier business services.
- **Software-as-a-service offers full stack and management.** However, SaaS does not bring the business agility that is the major objective of the business — particularly what is needed to differentiate the enterprise and make it more competitive.

The Characteristics Of A Complete Cloud

In addition to the three functionality layers shown in Figure 10, a complete cloud must also provide three other characteristics (see Figure 11). Respondents to the custom survey confirmed that this is their top requirement — from managing the entire cloud life cycle to providing integrated cloud stack management to a pre-engineered platform for availability and performance. These characteristics strongly represent the foundation for business success.

Such a complete cloud would allow the business to reach its agility, flexibility, cost, and quality of service objectives. A complete cloud solution would bring all of the expected benefits and more to the various organizations involved in cloud computing. A complete cloud solution has the potential to completely transform IT into the trusted partner that all businesses want (see Figure 12).

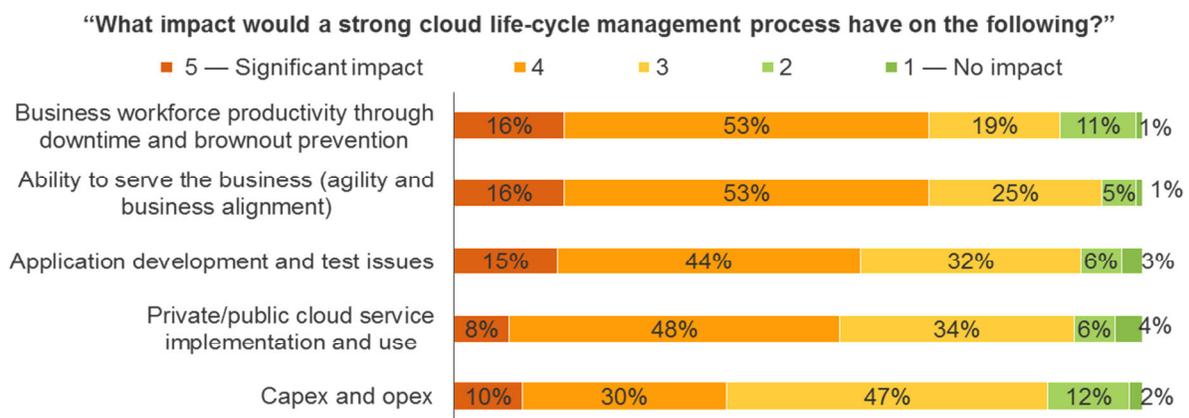
Figure 11
The Importance Of Complete Cloud Components



Base: 156 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

Figure 12
A Complete Cloud Life-Cycle Management As A Part Of A Complete Cloud Solution Transforms IT

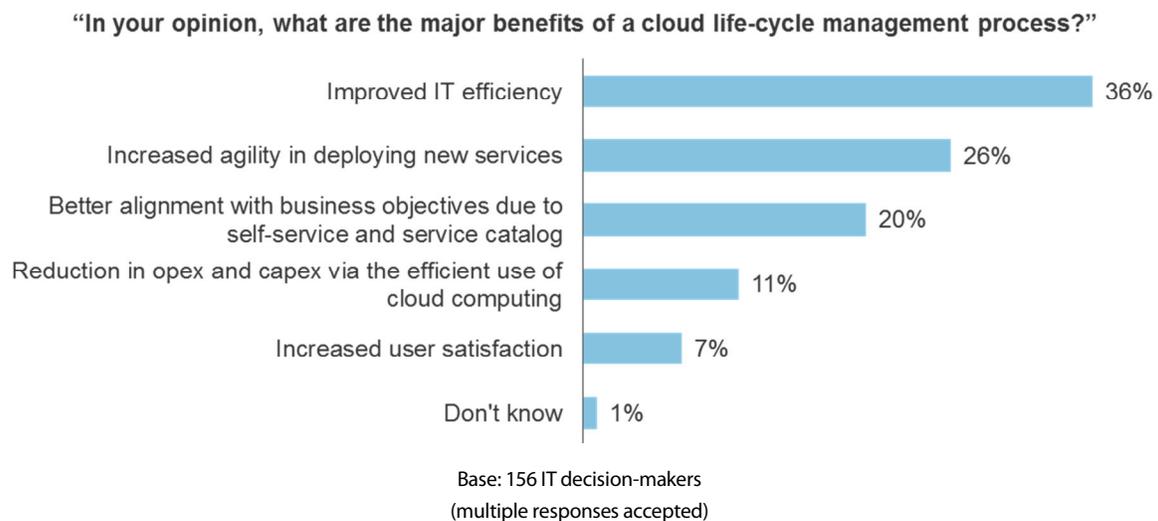


Base: 111 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

As shown in Figure 12, complete cloud life-cycle management enables business to fulfill its expectations in terms of quality of service and business service agility while reducing capex and opex expenditures. It then addresses the application layer and application development group objectives. Finally, survey respondents agree that such a complete cloud solution would change their view about using a public or private cloud based on their level of completeness. Respondents also identified additional benefits of a complete cloud solution (see Figure 13).

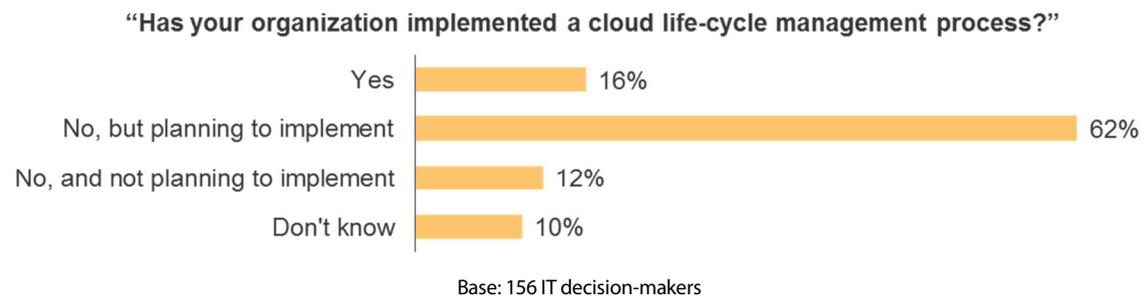
Figure 13
Benefits Of A Complete Cloud Solution



Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

This study further confirmed that 78% of survey respondents have or will implement a full cloud solution that includes an integrated stack and a full life-cycle management of cloud applications within the next 12 months (see Figure 14).

Figure 14
Full Life-Cycle Management Implementation Intentions



Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

CONCLUSIONS

In this study, we discussed the results of a survey of IT and business decision-makers. The study sheds light on the main drivers of enterprise clouds and the priorities of both IT and business organizations. The study further revealed that IT and business organizations agree on a set of challenges and roadblocks standing in their way. Below is a summary of the main lessons from the survey, including some guidelines and tips to help you with your enterprise cloud endeavors.

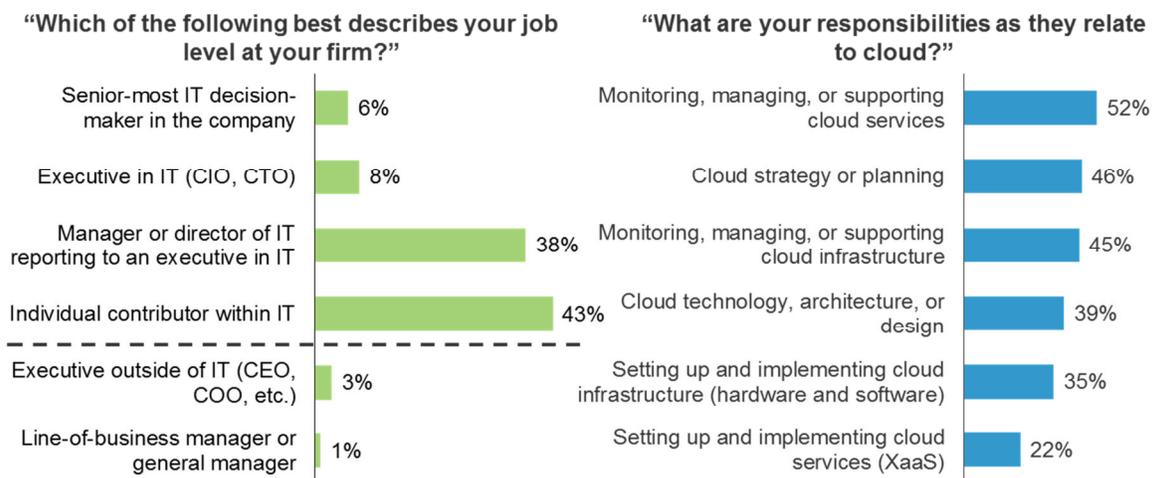
- **Business agility and efficiency is the main driver for enterprise cloud.** Enterprises view cloud computing as an essential technology to address key business objectives. Cloud solutions are seen as a way to drive significant business value for the enterprise — in terms of business agility, business cost control, business efficiency, business innovation, and business differentiation. Cloud is no longer viewed as an IT-only initiative.
- **Organizations with an infrastructure-centric view of cloud struggle to meet these business objectives.** The ability to deliver significant business value requires a lot more than just shared computing and storage infrastructure. Abstracting infrastructure — the basis of infrastructure-as-a-service — does not provide the controls and management that IT must have to raise its standing beyond just a basic utility provider; nor does it allow IT to provide and manage actual business services. IT organizations looking to offer any significant value to the business must provide cloud solutions that focus on platform, application, and business value aspects. Survey respondents agree on the importance of application-centric cloud and the challenges associated with deploying complex, multitier applications.
- **Firms underestimate the deployment, release, and management issues of the complete application stack in the cloud.** Today's applications are complex and depend on a number of factors included in the stack and middleware. Building and testing a release that works with all its dependencies, configuring and deploying it in a consistent manner in a cloud infrastructure, and monitoring and remediating performance and runtime issues that affect the business are fairly complex tasks that require solid tools to be successful. Cloud solutions, even at the PaaS level, do not provide the complete application services that are required. Using an integrated suite of tools for all these tasks keeps the consistency of the release and facilitates its deployment and operation. To be successful, IT organizations must look for deep and integrated application-centric tools that deliver out-of-the-box capabilities to create, manage, and automate all services required to support business applications. This is also confirmed by survey respondents, who highlighted top challenges in managing IT using multiple disparate tools.
- **A complete, application-centric, business-aware cloud solution is needed.** Enterprises need a complete enterprise cloud solution — with full life-cycle management, integrated stack management, business-driven application management, and engineered systems — to meet the goals of business agility and efficiency in addition to reducing IT complexity and operational costs. The complete cloud management solution must allow IT to build, manage, and support all cloud services — including infrastructure-centric services (virtualization and infrastructure services), application-centric services (business applications and platform services), and business-centric services (business processes, activities, and transactions). Further, to meet objectives for business innovation, flexibility, and efficiency, clouds must be operation-, application-, and business-aware. It is clear that incomplete, shallow, and loosely integrated cloud management approaches will fail. The ideal approach is to identify a strategic vendor that offers you advanced tools with deep and highly integrated functionality to create complete, application-centric, business-aware clouds. Survey respondents confirmed the key characteristics and components needed for a complete cloud solution.

At the end of the day, cloud computing for enterprise IT is like being a car rental company: Your business customers only care about the driving experience; it's your responsibility to make sure there are no bad experiences along the way.

Appendix A: Methodology And Demographics

In this study, Forrester conducted an online survey of 156 North American organizations with 5,000 or more employees to evaluate the role of cloud in current IT practices as well as future goals and desired state. Survey participants included decision-makers with responsibility for or influence on cloud and infrastructure decisions at their organization. Questions provided to the participants asked about the current state of IT, plans for cloud adoption, challenges IT faces in deploying cloud, and perceptions around how to get the most out of a cloud deployment, including opinions on cloud management and tools. The study was conducted in February 2012.

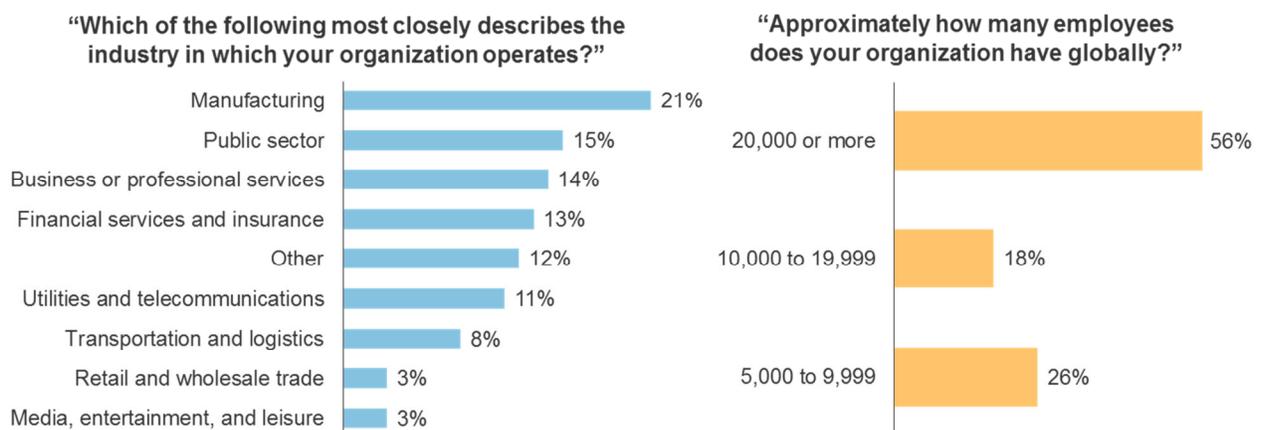
Figure 15
Respondent Roles And Responsibilities



Base: 156 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012

Figure 16
Industries And Company Sizes Represented



Base: 156 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of Oracle, February 2012