IT Operations Managers Must Rethink Their Approach To Private Cloud

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Executive Summary

Forrester recently surveyed 205 infrastructure and operations (I&O) executives and found that while firms prioritize improved virtualization and have ambitions for internal infrastructure-as-a-service (IaaS), or private cloud, they lack sufficient virtualization maturity practices. The survey asked about current virtualization practices to create a clearer picture of virtualization maturity as well as gauge future plans for cloud. Forrester's position is that the cloud is more than virtualization — but virtualization maturity is foundational to a firm's ability build cloud services. Cloud incorporates virtualization, better management processes, and requires a more comprehensive strategy and architecture. However, if you haven't virtualized, then you're on a tricky path to further cloud deployments.

Key Findings

Forrester's study yielded three key findings:

- **Firms are expanding their plans for virtualization, but best practices are not broadly implemented.** Nearly half of the executives surveyed expected 50% of their x86 environment to be virtual within the next two years, while plans for Unix lagged a bit. Our evaluation revealed inconsistent implementation of the virtualization best practices necessary to have a private cloud.

- **Most firms are looking to implement private or hybrid cloud but are confused and skeptical.** Interest in public IaaS has elevated firms' ambition to capture the same benefits but mitigate risk through private cloud, yet nearly three-quarters of respondents admitted they have a lot to learn, and nearly 50% thought that cloud was overhyped.

- **Lack of systems management unification impedes virtualization maturity and private cloud.** Our survey revealed that typical infrastructure teams are operating in a world with mixed physical and virtual infrastructure, multiple virtualization pools, many technologies, and most importantly, different practices and attitudes. Achieving private cloud requires standardization of service delivery and a move toward infrastructure convergence that cannot be easily achieved in this environment.

Firms Are Virtualizing Servers Today, But Best Practices Are Not Consistently Implemented

The adoption of server virtualization is no longer a question at the majority of firms, nor is the use of virtualization in mission-critical environments. Virtualization is a starting point to cloud; it acts as the foundational infrastructure to run cloud deployments. Broad implementation of server virtualization as a standard server deployment model is a critical or high priority at most of the firms we talk to, and our survey confirmed this by revealing:

- **Total cost of ownership, efficiency, disaster recovery, and flexibility benefits driving more virtualization.** Infrastructure virtualization technologies are permeating every IT silo from the data center to the desktop. While Forrester expects these technologies eventually to become a standard part of every infrastructure, Figure 1 shows that interest in virtualization technologies remains high in order to: 1) reduce costs; 2) do more with less; 3) recover more quickly from disasters; and 4) be more agile.

- **Plans on increasing their virtualization efforts.** The firms we surveyed are planning a big increase in their virtualization workload, as shown by Figure 2. In fact, nearly half of our respondents thought that 50% or more of their x86 environment will be virtual in the next two years. Server virtualization is only part of the big picture, however, and most firms will pursue a converged infrastructure with multiple forms of virtualization — server, storage, network, application, and OS, to name a few. Unfortunately, while the best practices for each of these are clear, multiple separate server pools and an overabundance of management tools will contribute to continued chaos, as Figures 3 and 4 illustrate.

- **Virtualization management best practices that are implemented sparsely.** Forrester has identified nine virtualization management best practices, and our survey revealed that few firms have implemented a majority of them. For example, our survey indicates that only 28% of firms surveyed are implementing a virtual machine self-service, and only 27% have implemented chargeback — two critical virtualization management capabilities necessary to achieve internal IaaS (private cloud) (see Figure 5).

Figure 1

Firms Use TCO, Efficiency, Disaster Recovery, And Flexibility To Justify Virtualization

"Please rate the value of x86 server virtualization to your organization in the following categories:"

■ Very important 5   ■ 4   Sum

Category	Very important 5	4	Sum
Lower total cost of ownership for servers	49%	38%	87%
Create a more efficient, shared IT infrastructure	48%	39%	87%
Improve disaster recovery and business continuity	49%	37%	86%
Improve IT infrastructure manageability and flexibility	47%	38%	85%
Speed of provisioning infrastructure	43%	39%	82%
Improve power and cooling efficiency	36%	40%	76%
Faster time-to-market with new business capabilities	32%	43%	75%
Provide developers with fast, easy resources for test and development	39%	35%	74%
Implement an internal cloud (shared, automated, and self-service infrastructure)	30%	43%	73%

Base: 188 IT decision-makers

(Because only ranks 5 and 4 are shown, percentages do not total 100%.)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 2

Firms Plan A Big Increase In Virtual Machines' Share Of Workloads

"Today, approximately what percentage of your x86 server OS instances are operated as virtual servers rather than run directly on server hardware?"

- None, 4%
- 76-100, 8%
- 51-75, 18%
- 1-25, 31%
- 26-50, 38%

"In two years, approximately what percentage of your x86 server OS instances do you believe will be operated as virtual servers, rather than run directly on server hardware?"*

- None, 1%
- 76-100, 25%
- 1-25, 18%
- 51-75, 24%
- 26-50, 33%

Base: 186 IT decision-makers

*Base: 185 IT decision-makers

(percentages may not total 100 because of rounding)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 3

Firms Have Three Or More Separately Managed Server Pools

"Thinking about your firm's pools of servers across the organization, how many separately managed or owned pools are there for each of the following categories?"
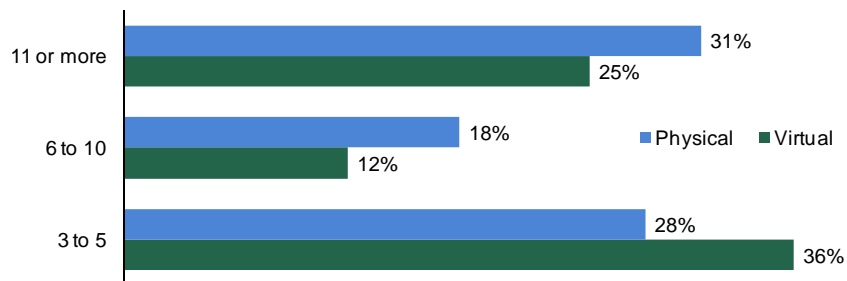
Category	Physical	Virtual
11 or more	31%	25%
6 to 10	18%	12%
3 to 5	28%	36%

Base: 188 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 4

Firms Have Many Virtualization Management Tools

"How many different virtualization management tools do you use to manage the sets of virtualized servers?"

Category	Percentage
11 or more	7%
6 to 10	11%
4 to 5	18%
3	19%
2	30%
1	14%

Base: 188 IT decision-makers

("Don't know" responses not shown)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 5

Few Firms Implement Virtualization Management Best Practices, But Many Plan To

"What are your firm's plans to implement the following server virtualization management capabilities?"

■ Expanding/ upgrading implementation   ■ Implemented, not expanding   ■ Planning to implement in the next 12 months

Capability	Expanding/ upgrading implementation	Implemented, not expanding	Planning to implement in the next 12 months
Use live migration of virtual machines as a standard practice	19%	18%	33%
Booting all virtual machines from networked storage	19%	18%	28%
Consolidated management for virtual and physical infrastructure	18%	23%	32%
Implement a policy for new server deployments	18%	13%	33%
Policy-based automation of virtual machine usage by account, to track which users drive usage	16%	15%	31%
Consolidated management for multiple hypervisor types	14%	22%	27%
Automated software management of virtual machine allocation for routine adjustments, without human review	14%	11%	35%
Chargeback to business user based on actual virtual machine usage in a period	14%	13%	25%
Self-service portal for end users such as developers to deploy, manage, and remove virtual machines	12%	16%	24%

Base: 188 IT decision-makers

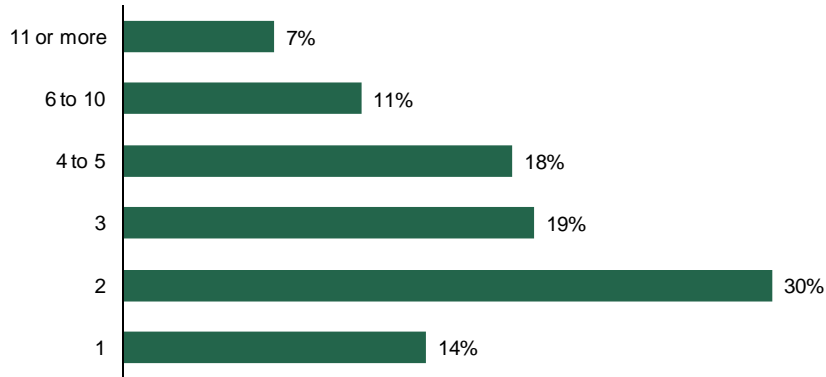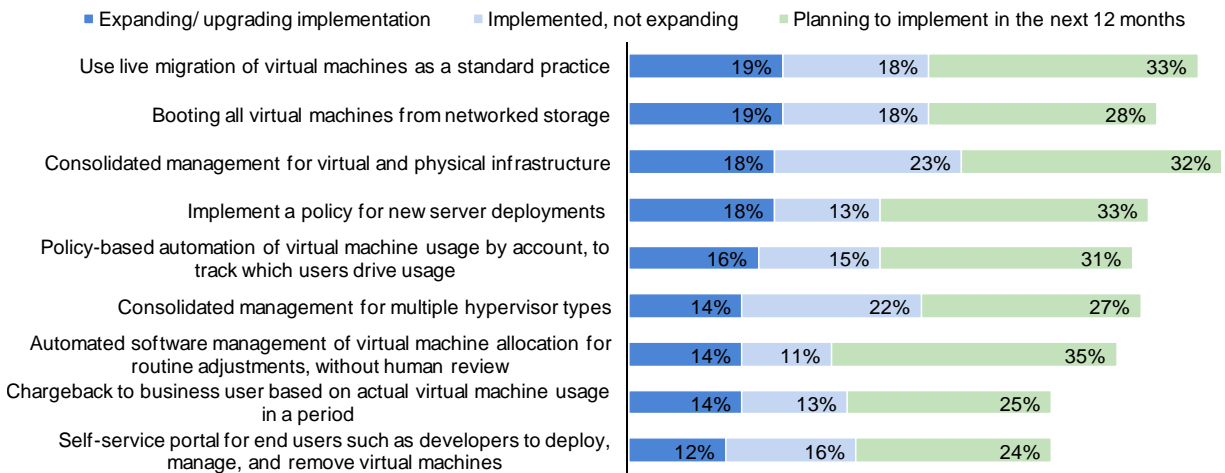(Because "Interested but no plan," "Not interested," and "Don't know" are not shown, percentages do not total 100%.)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011
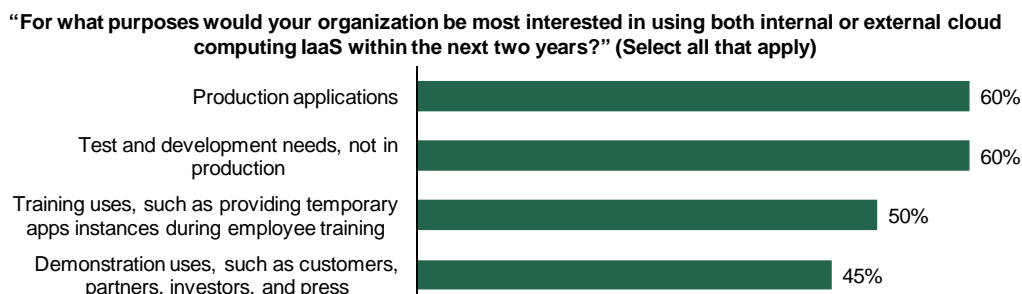
Firms Aspire To Private And Hybrid Cloud

Some of the most compelling cloud computing use cases focus on public IaaS — for example, optimizing apps to scale up and down on demand, resulting in tremendous savings. Recent public cloud outages at large providers have proven even the giants can fall, and this is causing executives to shy away from relying too much on public options. In our survey we found:

- **Firms are open to IaaS.** Our survey revealed that 60% of firms are open to both production and test/development virtualization use cases. Interest in training and demonstration uses was also high at about 50% (see Figure 6).

- **Most firms want private or hybrid cloud.** Not surprisingly given concerns over pure public IaaS, we found 38% of those we surveyed want private cloud and 42% want hybrid (see Figure 7). We agree with the greater priority on hybrid, as this option gives firms the ability to build the private IaaS capacity needed under most circumstances, with the option to get more resources during peaks. Although it's more feasible to implement a pure public or private cloud today, hybrid cloud is the design point to aspire to and plan for; therefore Forrester believes it should be part of a long-term IT deployment plan.

- **Firms are looking for services beyond basic servers.** One-third of our survey respondents indicated that they are looking for business services in their internal cloud, not just virtual machines (see Figure 9). As users understand the potential of internal cloud, they want more than just a bare VM. In order to deliver full services, organizations need to understand and manage the full service life cycle, from provisioning to retirement across both the infrastructure and applications elements of the service.

- **Firms are planning for cloud IaaS strategically but remain confused and skeptical.** Recent inquiries at Forrester reflect significant confusion as to the difference between virtualization and cloud, and our survey reinforced this sentiment. According to Figure 8, nearly three-quarters of our respondents agreed or strongly agreed that they have a lot to learn about cloud, and almost as many lamented that every vendor they hear from has a different definition of cloud IaaS. Figure 9 indicates that skepticism is higher for public IaaS.

Figure 6

Firms Are Open To All Use Cases For Cloud IaaS

"For what purposes would your organization be most interested in using both internal or external cloud computing IaaS within the next two years?" (Select all that apply)
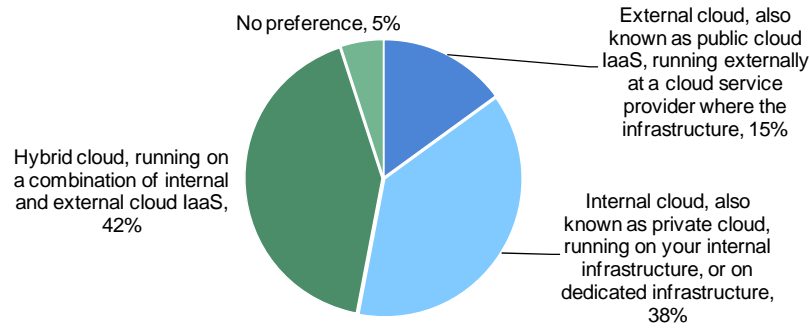

Base: 205 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 7

Most Firms Want Private Or Hybrid Cloud

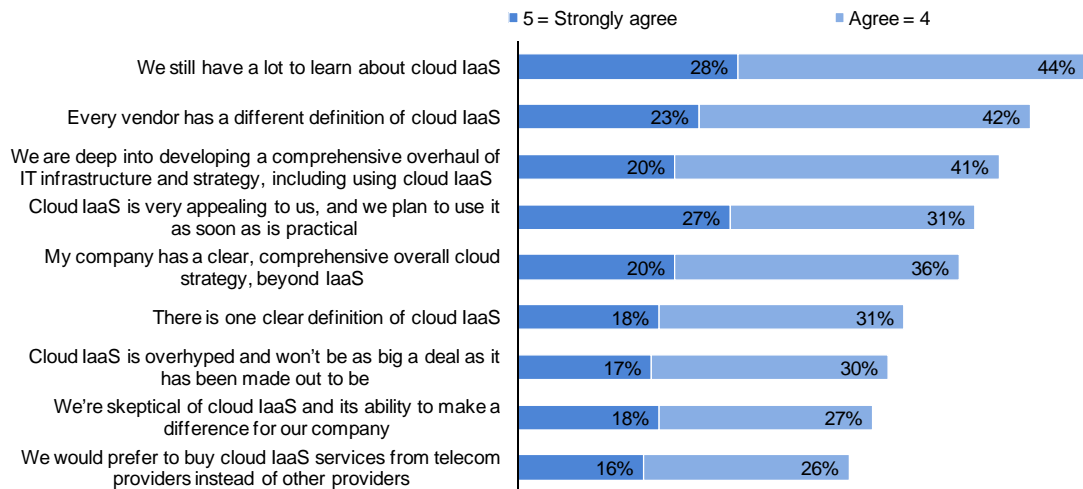**"Which type of cloud computing IaaS deployment approach do you think your organization is most interested in?"**

No preference, 5%

External cloud, also known as public cloud IaaS, running externally at a cloud service provider where the infrastructure, 15%

Hybrid cloud, running on a combination of internal and external cloud IaaS, 42%

Internal cloud, also known as private cloud, running on your internal infrastructure, or on dedicated infrastructure, 38%

Base: 205 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 8

Many Firms Are Skeptical Or Confused About Cloud But Are Making Plans Anyway

"How much do you agree with the following statements about both internal and external cloud IaaS?"

■ 5 = Strongly agree   ■ Agree = 4

We still have a lot to learn about cloud IaaS — 28% / 44%

Every vendor has a different definition of cloud IaaS — 23% / 42%

We are deep into developing a comprehensive overhaul of IT infrastructure and strategy, including using cloud IaaS — 20% / 41%

Cloud IaaS is very appealing to us, and we plan to use it as soon as is practical — 27% / 31%

My company has a clear, comprehensive overall cloud strategy, beyond IaaS — 20% / 36%

There is one clear definition of cloud IaaS — 18% / 31%

Cloud IaaS is overhyped and won't be as big a deal as it has been made out to be — 17% / 30%

We're skeptical of cloud IaaS and its ability to make a difference for our company — 18% / 27%

We would prefer to buy cloud IaaS services from telecom providers instead of other providers — 16% / 26%
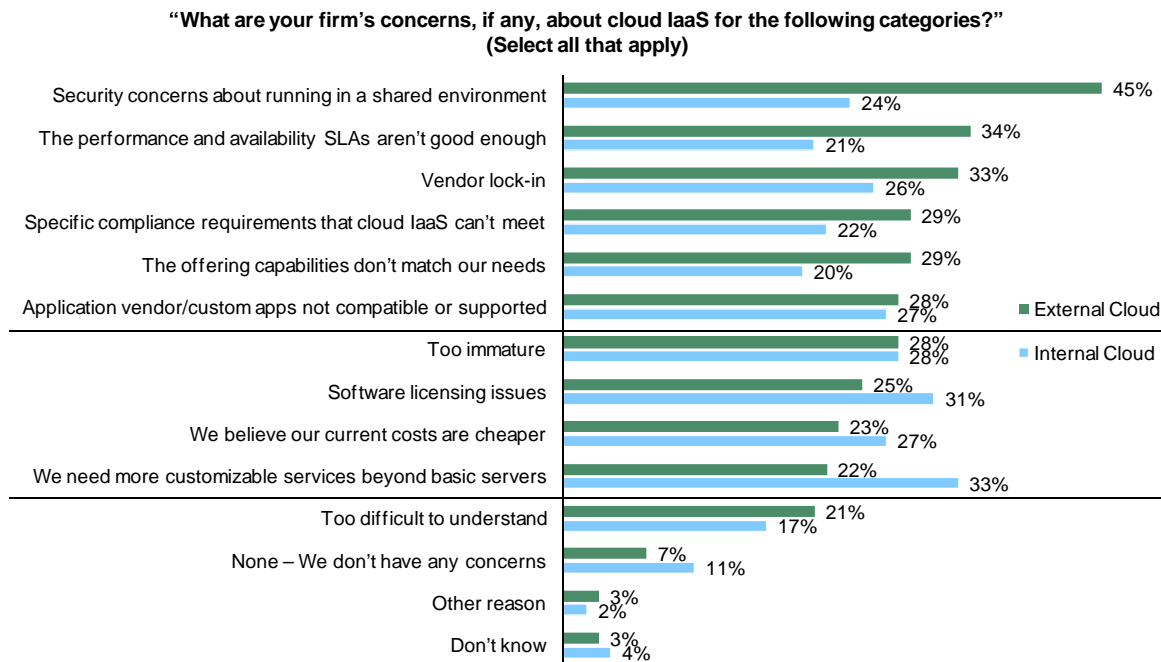
Base: 205 IT decision-makers

(Because options "3," "2," "1," and "Don't know" are not shown, numbers do not total 100%.)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure 9

Skepticism Is Higher For Public IaaS

"What are your firm's concerns, if any, about cloud IaaS for the following categories?"
(Select all that apply)

Security concerns about running in a shared environment	External: 45%	Internal: 24%
The performance and availability SLAs aren't good enough	External: 34%	Internal: 21%
Vendor lock-in	External: 33%	Internal: 26%
Specific compliance requirements that cloud IaaS can't meet	External: 29%	Internal: 22%
The offering capabilities don't match our needs	External: 29%	Internal: 20%
Application vendor/custom apps not compatible or supported	External: 28%	Internal: 27%
Too immature	External: 28%	Internal: 28%
Software licensing issues	External: 25%	Internal: 31%
We believe our current costs are cheaper	External: 23%	Internal: 27%
We need more customizable services beyond basic servers	External: 22%	Internal: 33%
Too difficult to understand	External: 21%	Internal: 17%
None – We don't have any concerns	External: 7%	Internal: 11%
Other reason	External: 3%	Internal: 2%
Don't know	External: 3%	Internal: 4%

■ External Cloud
■ Internal Cloud

Base: 205 IT decision-makers

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

To Reach Higher Levels Of Virtualization Maturity And Ultimately Cloud, Firms Must Unify Systems Management

Cloud goes beyond virtualization by providing a unified environment that is highly standardized, fully automated, self-service, and multitenant. Achieving unification requires that: 1) virtual and physical machines be managed together; 2) on-premises and off-premises machines be managed together; 3) both Unix and x86 machines be managed together; and 4) both IT machines and "informal" machines be visible to I&O professionals. This is difficult because:
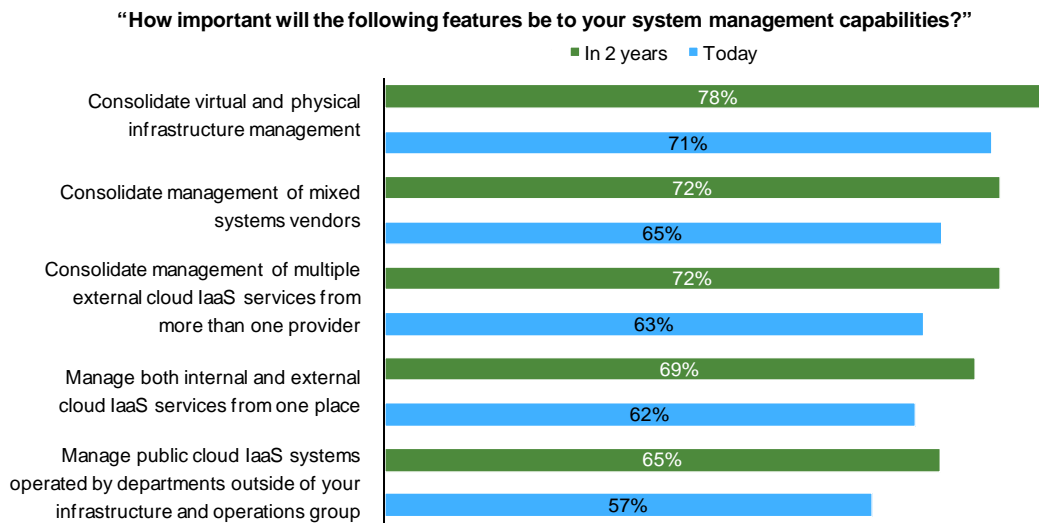
- **Firms have both virtual and physical infrastructure to deal with.** Rarely do firms have a greenfield opportunity to create private cloud; rather, a legacy of mixed virtual and physical infrastructure must be managed. Furthermore, not all software workloads run efficiently in a pure virtual environment, meaning that physical infrastructure is not going the way of the dinosaur anytime soon. Accordingly, our survey respondents put top priority on consolidating both virtual and physical infrastructure management when asked to prioritize systems management capabilities (see Figure 10).

- **Different environments use different systems management tools.** Similar to a mix of physical and virtual infrastructure, a heritage of infrastructure domain silos means that most firms are dealing with a mix of systems management tools from different vendors. Figure 10 shows our survey respondents putting number-two priority

on managing systems across various vendor technologies — particularly combined virtual and physical infrastructure management.

- **Unix and x86 attitudes and maturity differ.** To stand up a cloud-based web environment, you need to be able to stand up a Linux or Windows app server as well as a Unix-based database server. Virtualization is still heavily concentrated in the x86 space, with 58% of our respondents not currently virtualizing their Unix server environment. Even for those planning to virtualize, only 50% are either currently using or planning to use virtual Unix servers to support production workloads in the next 12 months. Because infrastructure teams are often fragmented between Unix and x86, the barriers to unification can be cultural as well as technical.

Figure 10

Firms Prioritize Integrated Virtual And Physical Management The Most, But They Value All Forms Highly

"How important will the following features be to your system management capabilities?"

■ In 2 years   ■ Today

Consolidate virtual and physical infrastructure management	78%	71%
Consolidate management of mixed systems vendors	72%	65%
Consolidate management of multiple external cloud IaaS services from more than one provider	72%	63%
Manage both internal and external cloud IaaS services from one place	69%	62%
Manage public cloud IaaS systems operated by departments outside of your infrastructure and operations group	65%	57%

Base: 205 IT decision-makers

(Combination of "5" and "4" are shown. Options "3," "2," "1," and "Don't know" are not shown.)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

KEY RECOMMENDATIONS

Driven by high interest in public IaaS benefits, firms are seeking to replicate services internally to achieve a private cloud. However, firms must rethink their approach. Different management practices, server pools, and virtualization technologies, as well as mixed environments and inconsistent best practices, will hinder any "big bang" migration attempt. To successfully implement cloud computing, firms should:

- **Determine where their I&O team is in its virtual environment maturity.** Private cloud solutions only work when standards can be defined that allow routine operations without human intervention. If your organization has a ways to go, that doesn't mean you can't create a private cloud; it just means that you should target a greenfield deployment, such as starting with test and development resources or a new business project where you can learn from the solution.

- **Merge management practices, not infrastructures.** Over time you'll want to merge management practices as they align, but don't try to force this too soon. And don't expect your traditional virtualized environment and your cloud to merge into one. They shouldn't. They serve different purposes and carry different economics. Approach management practices with a unified services view and strive toward management of all services under a single umbrella.

- **Use infrastructure convergence as the foundation for cloud.** IT sprawl and server and storage silos make it nearly impossible to identify opportunities ripe for private or hybrid cloud deployments. Standardize, consolidate, virtualize, and automate your IT environment to build a converged infrastructure to get the most out of cloud.

- **Approach cloud with a holistic strategy.** It's tempting to address immediate cloud needs by addressing specific cloud issues; however, without an overall cloud strategy, an organization can end up with the same complexity, security issues, and management costs it seeks to escape.

- **Leverage packaged private cloud solutions as the fastest path.** The fastest way to meet demands and build out a parallel cloud infrastructure is to buy purpose-built private cloud solutions. There are five types of vendors that offer such solutions: 1) enterprise systems management vendors; 2) OS/hypervisor vendors; 3) converged infrastructure solutions vendors; 4) pure-play cloud solutions vendors; and 5) grid-derived solutions vendors. Each brings the core IaaS features along with unique differentiating value.

- **Embrace public clouds in a hybrid fashion.** Public clouds should be part of your strategy and will enhance the value and economics of your internal cloud investments. The core reason for their value is that your internal cloud will never be large enough to meet all your company's needs. Scalability testing, high-performance computing applications, and highly volatile Web applications need on-demand capacity at times, and building out your internal cloud for these peaks is a quick way to destroy the ROI of the cloud. So plan to link your internal cloud to a public cloud resource for these purposes.
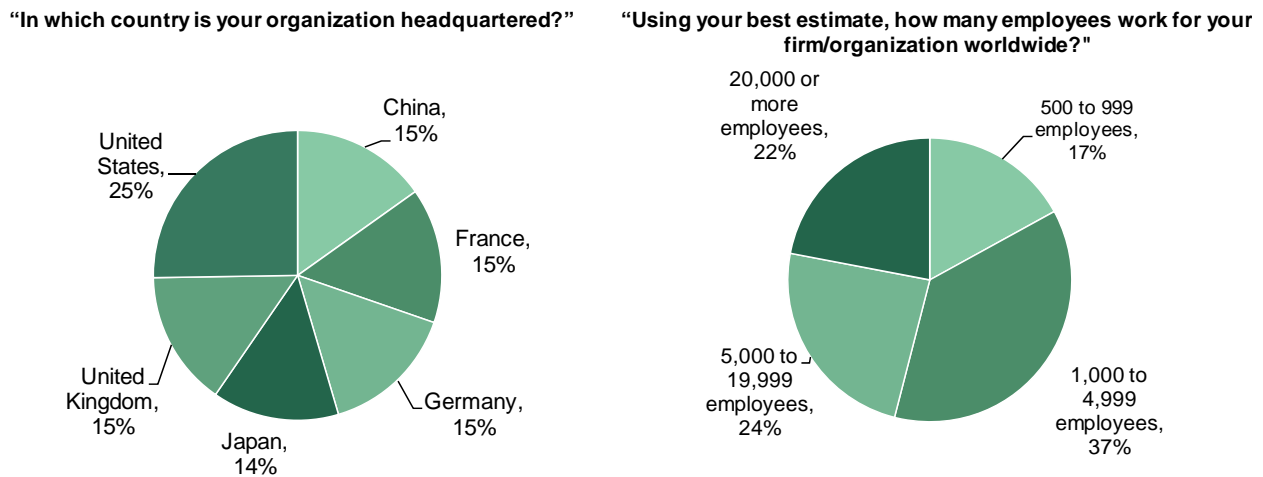
Appendix A: Methodology

In this study, Forrester conducted an online survey of 205 organizations in the US, UK, Japan, China, France, and Germany to evaluate their plans for virtualization and cloud adoption trends. Survey participants included decision-makers involved in infrastructure or IaaS product selection and deployments. Questions provided to the participants asked for current adoption patterns and future plans. Respondents were offered an honorarium as a thank you for time spent on the survey. The study began in July 2011 and was completed in August 2011.

Appendix B: Demographics

Figure A

Country And Company Sizes

"In which country is your organization headquartered?"

"Using your best estimate, how many employees work for your firm/organization worldwide?"

China, 15%

United States, 25%

France, 15%

United Kingdom, 15%

Japan, 14%

Germany, 15%

20,000 or more employees, 22%

500 to 999 employees, 17%

5,000 to 19,999 employees, 24%

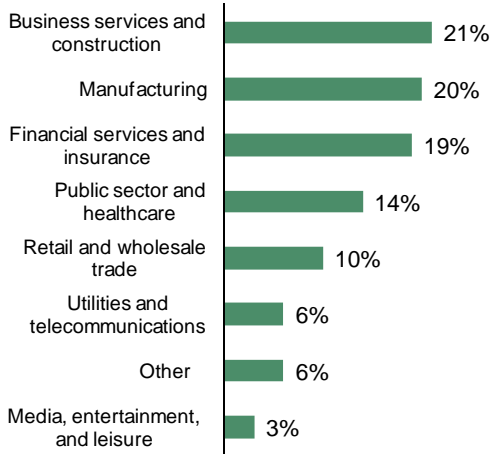1,000 to 4,999 employees, 37%

Base: 205 IT decision-makers

(percentages may not total 100 because of rounding)

Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011

Figure B

Broad Distribution Of Industry And Management Level

"Which of the following best describes the industry to which your company belongs?"

Industry	%
Business services and construction	21%
Manufacturing	20%
Financial services and insurance	19%
Public sector and healthcare	14%
Retail and wholesale trade	10%
Utilities and telecommunications	6%
Other	6%
Media, entertainment, and leisure	3%

"Which title best describes your position at your organization?"

- Manager (manage a team of functional practitioners), 32%
- C-level executive (e.g., CEO, CMO), 18%
- Vice president (in charge of one/several large departments), 13%
- Director (manage a team of managers and high-level contributors), 38%

Base: 205 IT decision-makers

(percentages may not total 100 because of rounding)

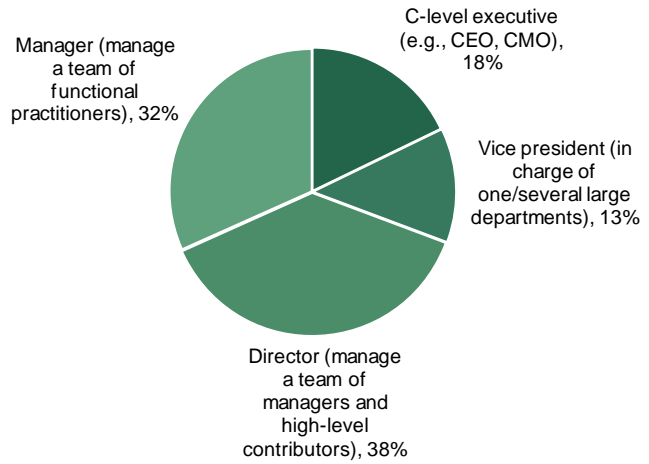Source: A commissioned study conducted by Forrester Consulting on behalf of HP, August 2011