Thought Leadership:
Building and Managing the Cloud Ecosystem

CIOs must have a coordinated cloud ecosystem strategy to help the enterprise achieve greater agility, simplicity, scalability, efficiency, and innovation, and to drive more cost-effective operations.
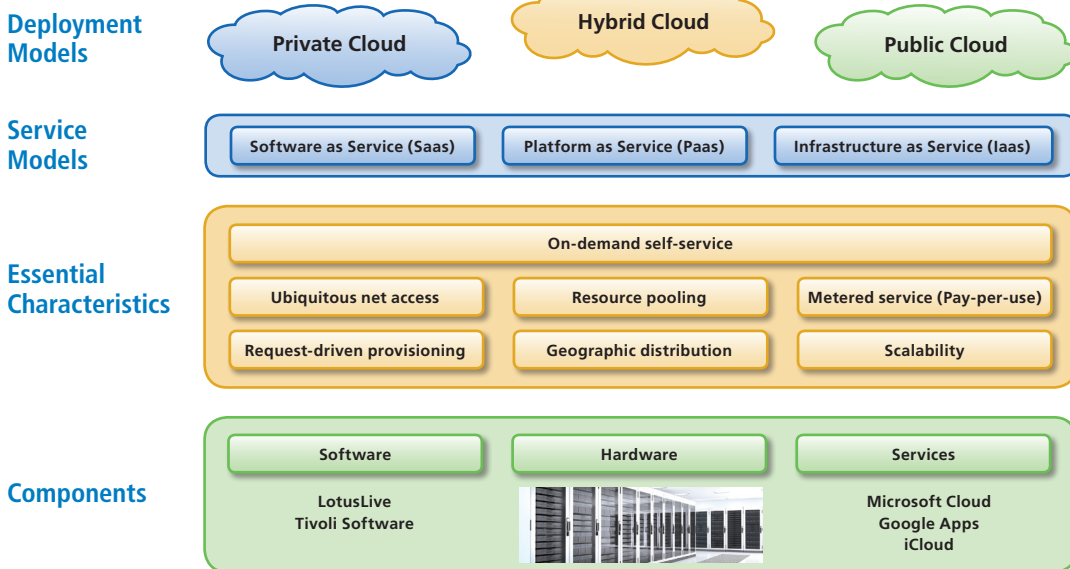
Executive Summary:

A CIO surveying the state of the IT environment is sure to see that it is taking on a very different shape than it had just a few years ago. The cloud, of course, is responsible for much of this development.

The traditional data center operations scenario or dedicated hosted environment still applies to legacy systems that are hard-wired to appliances, or those that would be too difficult to re-engineer for virtualized computing. The same is true for a few core applications that must adhere to guaranteed performance requirements, and for steady-state workloads for which cloud computing would provide no cost advantage.

But many other enterprise applications have at the least been virtualized, while a few others already have advanced to living on internal private cloud infrastructures. Some other systems – customer relationship management applications, for example — early on may have moved to the public software-as-a-service cloud, and the next SaaS wave, which includes options such as financial and workforce management solutions, likely is under serious consideration by many businesses. A number of enterprises also may have purpose-built applications for deployment on infrastructure-as-a-service or platform-as-a-service offerings from an ever-expanding contingent of providers that now includes names like Amazon, Google, IBM, Microsoft, Salesforce, and Rackspace.

Today, even business processes are being delivered as a service in the emerging BPaaS BPO model. Indeed, in a few cases the CIO may not even be fully aware of the cloud's influence on the business, as some departments heads have gone ahead and contracted for services on their own.

Cloud Concepts

Deployment Models

Private Cloud   Hybrid Cloud   Public Cloud

Service Models

| Software as Service (Saas) | Platform as Service (Paas) | Infrastructure as Service (Iaas) |

Essential Characteristics

On-demand self-service

| Ubiquitous net access | Resource pooling | Metered service (Pay-per-use) |
| Request-driven provisioning | Geographic distribution | Scalability |

Components

| Software | Hardware | Services |

LotusLive
Tivoli Software

Microsoft Cloud
Google Apps
iCloud

Source: Infosys

So, if there's one thing any survey of the IT environment should make obvious, it's this: The cloud economy has undergone a tremendous evolution in the last few years. There's no sign of that stopping anytime soon, whether it is in the nature of new twists in the technology or in its commercial models.

IT leaders must embrace this evolution for the benefits the cloud brings to the business, and in recognition that the migration to the cloud is already underway: In five to seven years, Infosys believes that 60 to 70 percent of enterprise workloads will be in the cloud. Or, more pointedly, that those workloads will be part of an ever-widening and ever-more-dispersed array of cloud services.
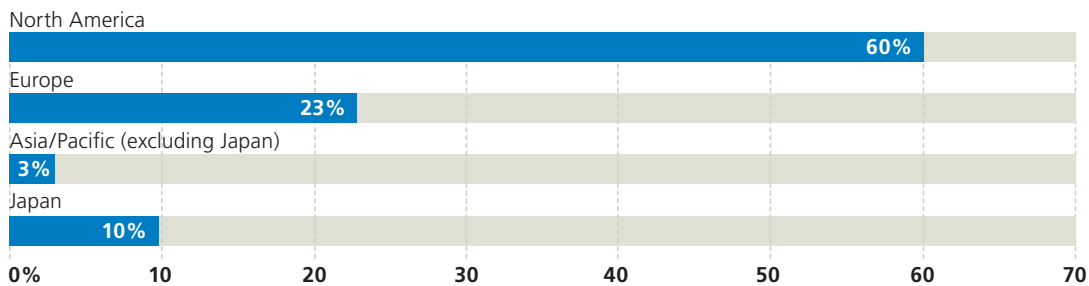
Inevitably, organizations will experience resistance, to varying degrees, against embracing the cloud unless CIOs and IT leaders are able to drive a coordinated cloud ecosystem strategy to bring increasing value to their organizations from these disparate environments. Such a strategy will enable their enterprises to master the challenges of unifying fragmented cloud environments, and grasp the opportunities that come with leveraging the construct of the cloud in its entirety. Those CIOs who can adopt and adapt to the changing and multi-faceted cloud landscape will bring to the business greater agility, simplicity, scalability, efficiency, innovation and cost-effectiveness.

The Cloud Journey

There remains time to put in place strategies and frameworks — or hubs — to drive a unified cloud ecosystem strategy, but depending on enterprise circumstances, some IT leaders may need to move faster than others. With virtualization penetration hitting 50 percent, according to distinguished analyst and Gartner Inc. VP Tom Bittman, the foundation for private cloud deployments is in place for many, if not all, companies. Meanwhile, the same research firm says that public cloud acceptance varies: In the Asia/Pacific region, outside of Japan, client adoption is just 3 percent, but client adoption reaches its zenith in the U.S. at 60 percent.

Data Center Services Market
■ Public cloud adoption (percent)

North America — 60%
Europe — 23%
Asia/Pacific (excluding Japan) — 3%
Japan — 10%

| 0% | 10 | 20 | 30 | 40 | 50 | 60 | 70 |

Source: Data Center Services: Regional Differences in the Move Toward the Cloud, 2012, Gartner Inc.

Regardless of how any one enterprise is currently engaged with the cloud, it is expected that in just a few years the majority of workloads in most businesses will migrate to some form of the cloud. Analyst Bittman has noted that Gartner surveys show that 75 percent of midsize and large enterprises see private cloud in their futures. In addition to the growth of private clouds, the global cloud computing services market for SaaS, PaaS and IaaS is projected to reach about $127 billion by 2017, according to a report by Global Industry Analysts. Growing mobile workforces as well as business continuity efforts are expected to play a role in the uptake.

CIOs who don't prepare for the fragmentation this portends, as workloads extend across legacy, private cloud, hosted private cloud, and multi-public cloud solutions, will not be able to effectively source and manage their evolving IT infrastructure. Trying to manually calculate from this tangle of resources the appropriate option whenever the business needs more processing capacity or when new applications are in demand will impede the company's ability to move quickly, compete aggressively, and drive innovation. Without a hub to manage the cloud environment in its totality, without a means of supporting extreme automation, the organization's cloud initiatives will tend toward chaos.

Trying to avoid the fragmentation problem by just saying "no" to cloud expansiveness will jeopardize business speed and is unlikely to work since such policies reinforce some business users' perception of IT as a roadblock to be circumvented rather than facilitator. And, it's a sure way to create more problems within the IT organization, cutting off avenues to help the department itself save money on capital expenses and maintenance costs when budgets are tight.

The Cloud Leadership Opportunity

Indeed, the days are long gone when CIOs could assess their worth to the organization by the size of their IT budgets, especially considering that some 80 percent of those budgets relentlessly apply to lights-on mainte-nance. CFOs and financial directors surveyed recently by ICT services company Getronics revealed that 64 percent of them consider a top IT spending concern to be maintenance of IT infrastructure. And, while the business-technology group is occupied with the work that creates these expenses, shadow IT groups form elsewhere to push forward — often with the help of the cloud — on their innovations and R&D initiatives that IT says are too time-consuming or for which it lacks the resources.

CIOs who embrace the potential of the cloud in its many forms have an opportunity to address the cost concerns, as well as to help cement their business leadership roles. One example of how the cloud can contribute to cost controls can be seen in an initiative undertaken by Ricoh, the imaging and network systems solutions and industrial/consumer products vendor. It worked with Infosys to create The Ricoh Private Cloud to centralize its IT infrastructure for all its operations across Europe. The project included massive server consolidation and is helping the company bring down the cost of infrastructure by almost 30 percent.

And, with a framework to guide their IT sourcing decisions, CIOs can prepare the organization to effectively align the appropriate and most cost-effective cloud model to the particular business need and seamlessly orches-trate requirements for every initiative. In fact, this represents a huge opportunity for the CIO to have a great impact on the business, considering the explosion of high performance apps and the need to gain insight from terabytes or even petabytes of unstructured and semi-structured Big Data that largely demands that the business be able to quickly and effectively tap into the resources of public and private clouds. Today the Big Data vision is being fast-forwarded by big data analytics apps that work with data sources such as Apache Hadoop and NoSQL.
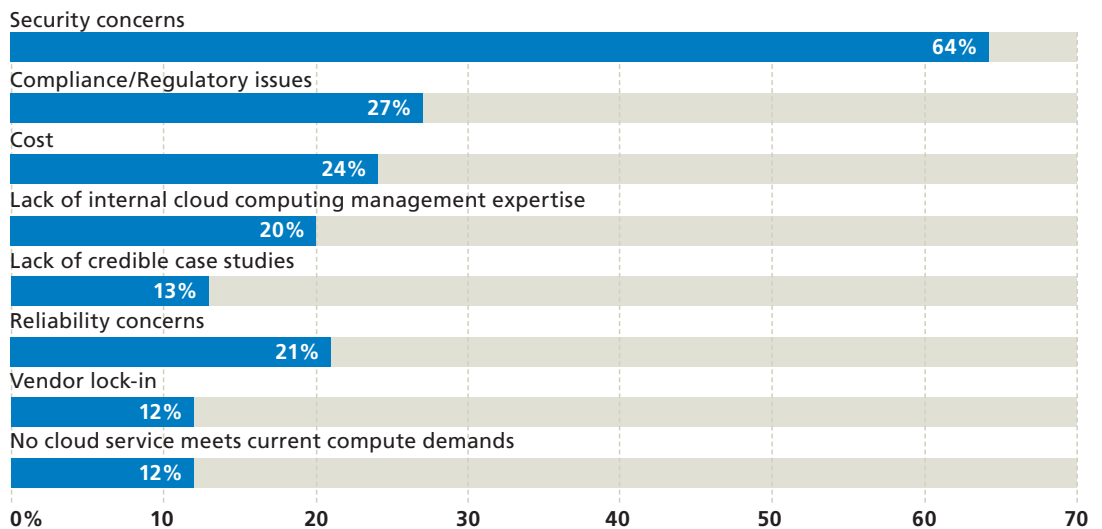
But without a 'hub' and tools that craft a holistic and unified view of different cloud environments, the complexity of trying to determine the appropriate cloud path to take for any initiative creates a burden for IT. You must, after all, account for both technical capabilities and commercial implications (cost, for example, or existing resources available for use). That's a bitter pill to swallow when the aim is to use the cloud to drive speed and reduce pain. So, in an effort to stay on that track, decisions may be suboptimal because there's no time to take every pertinent component into due consideration.

It is not uncommon, for example, for organizations that are starting a new project to be bereft of a mechanism to assess what they have already provisioned and what capacity is available, especially with external providers. The lack of such visibility often leads to accessing more resources, whether or not they are actually required. It's only during post-event reviews that it comes to light that the organization now has subscribed to more capacity than was needed.

Additionally, without a hub to ensure the cloud ecosystem is working harmoniously, governance and management also become a drag on IT. The complexities of provisioning the chosen cloud environment; of tying options to a self-service portal for users to request resources or access authorized cloud services via a service catalog; of automating IT processes and principles (security or industry or geographical compliance, for instance) across hybrid cloud environments; and of managing configurations in these dynamic and fluctuating environments, can be overwhelming. So, too, is trying to track and meter cloud usage, and making sure SLAs are adhered to.

Clearly, it is critical for the CIO to have access to such visibility and capabilities for deploying enterprise standards around cloud workloads and for managing these ecosystems. Acknowledgement of impediments to cloud adoption are voiced in The Uptime Institute's 2012 Data Center Survey that primarily focuses on 1,100 owners and operators from around the world: Security by far leads the way among concerns, but also ranking among the top four is a lack of internal cloud computing management expertise.

What are the primary impediments to cloud computing adoption in your organization?

Security concerns
64%

Compliance/Regulatory issues
27%

Cost
24%

Lack of internal cloud computing management expertise
20%

Lack of credible case studies
13%

Reliability concerns
21%

Vendor lock-in
12%

No cloud service meets current compute demands
12%

0% 10 20 30 40 50 60 70

Source: Uptime Institute 2012 Data Center Industry Survey

Enterprise-centric View of the Cloud Needed to Realize Leadership Opportunity

Solutions are emerging to aid CIOs in meeting this challenge, and to enable IT leaders to achieve the goals of helping the enterprise fully and speedily leverage the cloud for innovation, time to market, and more. Such frameworks and tools have a positive downstream effect, as well. Their deployment puts IT ahead of the curve, discouraging individual business units from going rogue and moving shadow-IT projects to the cloud.

It's important, however, for IT professionals investigating these options to understand which among them truly un-fragments the cloud ecosystem using an enterprise-centric approach. While cloud computing changes the way IT is deployed, maintained and used by enterprises, its adoption must adhere to the same benchmarks that guide internal IT deployments, taking into consideration how best to run workloads and the standards, security, and regulations that will apply to them; enforcing accountability; and driving extreme automation so as to efficiently put requirements into effect. This is complicated, however, by the fact that cloud offerings vary in their levels of functionality, transparency, support and security.

A first step for coordinating an enterprise-centric cloud strategy is ensuring that workloads are assessed for their suitability to the environment. A good place to begin implementing assessment capabilities is with the private clouds that are a primary focus for most enterprise endeavors, even within organizations that have begun to run some non-core components in public clouds. That approach lets IT explore the cloud adoption journey in a concentrated way, with the goal of evolving to include the full range of cloud options over time.

For the first time, there is a solution that lets enterprises realize the goal of building and managing a unified hybrid cloud environment: The Infosys Cloud Ecosystem Hub. The Hub provides a framework where toolsets assess workloads under consideration for migration to the cloud — for example, computing memory and storage requirements, quality of service needs, governance and compliance parameters, and costs of running the solution on the public cloud in comparison to the private cloud or with dedicated infrastructure on an internal network. This enterprise-centric and unified focus on all facets of the ecosystem, from data and business process integrity to environmental robustness, is a decided departure from viewing the cloud through separate and discrete lenses of infrastructure, platforms, software or business processes.

As IT broadens its cloud services options, the Hub, in essence, brokers cloud resources. It recommends where to deploy applications, based on an understanding of the workload details and the real compute costs of available public and private cloud options, as well as their architectures in terms of suitability for task. The Hub asks IT professionals questions meant to discover whether an application has its roots in WebSphere, Java or .NET platforms, which could impact whether the better public cloud service fit might be an Amazon, Microsoft, or Verizon offering, for example. It also seeks to discover if the workload can run on a hosted private cloud for which the business has already paid fixed infrastructure costs, for example, or in a venue where consumption determines pricing.

The cloud in many ways is about self-service, which is so important to reducing cycle times and accelerating speed of delivery, and therefore to accelerating enterprise innovation. The Cloud Ecosystem Hub provides a single-pane-of-glass view of all the disparate cloud options and makes tasks around procurement and provisioning a drag-and-drop operation that is as seamless to conduct as if one were only navigating internal, behind-the-firewall resources. Self-service capabilities include all parties to the provision, beginning with the unit requesting the development, to project managers, to IT staff allocating resources. Collaborative decision-making becomes part of the cloud sourcing process. With role-based access to status data, all stakeholders to such requests are able to participate without having to make manual adjustments for required configurations.

Equally aligned for speed is the Hub's ability for processes, policies, and security to be provisioned along with the resources for workloads, so that compliance and enterprise standards are enforced. "Extreme automation" capabilities make it possible, for example, to deploy a Web server with a user-defined, pre-set configuration, software and security settings to the optimal cloud service with very minimal possibilities of error. Manual intervention is possible so that IT can assure requirements are accounted for, but as the organization grows more comfortable with the Hub, it can leverage "extreme, extreme automation." In this mode, the tools provided by the framework can automatically decide and self-provision resources, configurations and process and policy settings without human intervention.

Similarly, the framework ensures that de-provisioning workloads and associated resources is automatic, too. The cloud's elasticity is compromised when resources continue to be allocated for workloads that no longer are running. But public cloud providers take different approaches to de-provisioning deployments, complicating IT's ability to free up assets. With built-in scheduling for de-provisioning services based on timeframe requirements indicated in initial requests, the Cloud Ecosystem Hub effectively unifies even this bedeviling aspect of fragmented cloud environments.

Finally, the Cloud Ecosystem Hub also enables enterprise IT to monitor the cloud array from a single window, so that departmental usage can be tracked for charge-backs, and quality of service metrics and service level assurance standards can be maintained in a cohesive way. Without an overall framework providing this capability, IT's hopes of getting a unified view of cloud resource usage and optimization will be subject to each providers' metrics, which aren't always as transparent as they should be.

Three Key Points of the Cloud Ecosystem Hub

Build

Manage

Govern
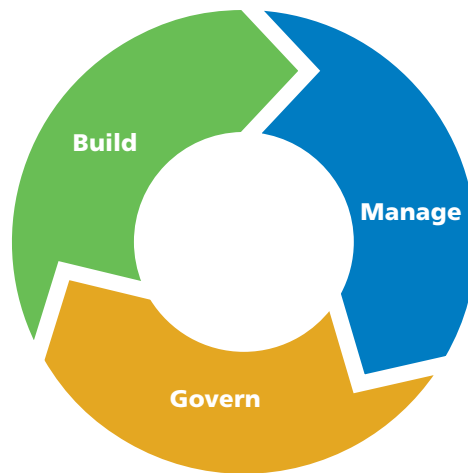
Source: UBM TechWeb

Thanks to partnerships with dozens of best-in-class cloud providers, Infosys is able to bring to IT leaders this highly integrated and orchestrated approach to best matching enterprise workloads to cloud deployments, and assuring those deployments happen in an optimal and accelerated way. Recently, for example, Infosys joined with Gen-i and Microsoft to service the Australasian market so that enterprise IT leaders can gain access to hybrid cloud services and content from a single extensible source, while retaining a single point of management responsibility. The result is that users will have greater flexibility to achieve the right mix of technology solutions, and the right level of performance, security and compliance, at the right price.

The value of the Cloud Ecosystem Hub, then, is precisely that it allows the cloud to be used as the cloud was meant to be used — that is, as a centrally governed set of resources and capabilities that can be quickly and optimally deployed to support enterprise needs, and managed via a unified view for fine-grained control of all the ecosystem's components.

Driving the Future

Such an approach provides the only way that businesses that plan to or that already are running successful but isolated cloud applications can see that success replicated across widening cloud infrastructures.

Consider, for example, one Infosys client, a wealth management company in Japan that relies on the cloud to run reports analyzing financial transaction information from sources such as Reuters and other feeds at the end of each day. That's a ten- to twelve- hour project on traditional IT infrastructure, but implemented in the cloud using Big Data constructs, it takes less than ten minutes. Another client in the retail sector is able to dynamically price products using competitive analysis of other retailers' pricing gleaned from crawling the Internet. That's truly Big Data in action, but it wouldn't be feasible for the company to put up the infrastructure to do that on its own. With the cloud, this information can be analyzed in near-real-time, delivering a huge competitive advantage.

It's those very successes, though, that will put more pressure on IT organizations to push the cloud envelope further to drive more agility at the right price points. Imagine wins like these replicated across the organization in dozens of other instances! But that can't be done unless the challenges of using the cloud ecosystem to its fullest potential are resolved.

By providing a unified way to manage the cloud ecosystem, Infosys Cloud Ecosystem Hub removes barriers to its use and accelerates its more open and effective deployment. Indeed, the Hub will continue to evolve to further support the cloud-agnostic environment of the future, where true interoperability across services will enable IT to deploy workloads in an automated fashion to the appropriate cloud environment based on factors such as which provider offers the best pricing for the week.

The cloud future isn't here yet, but the opportunity for CIOs to lead the way in delivering agility, simplicity, scalability, efficiency, innovation and cost-effectiveness is. The Infosys Cloud Ecosystem Hub solution provides a framework for enterprise IT to build, manage and govern their entire cloud ecosystem, without losing control in the process.

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Jennifer is a New York-based freelance writer and editor specializing in business and technology. She has been an executive editor at leading technology publications, including *InformationWeek*, where she spearheaded an award-winning news section. At *Network Computing*, she helped develop online content strategies including reviews and analyst reports. Other publications and web sites she's contributed to include: *RFID Journal*, *Federal Computer Week*, IT Expert Voice, bMighty.com, *Smart Enterprise*, and SemanticWeb.com.