White Paper

Enabling IT-as-a-Service

Cisco Accelerates Private and Hybrid Cloud Adoption through Intelligent Automation Solutions

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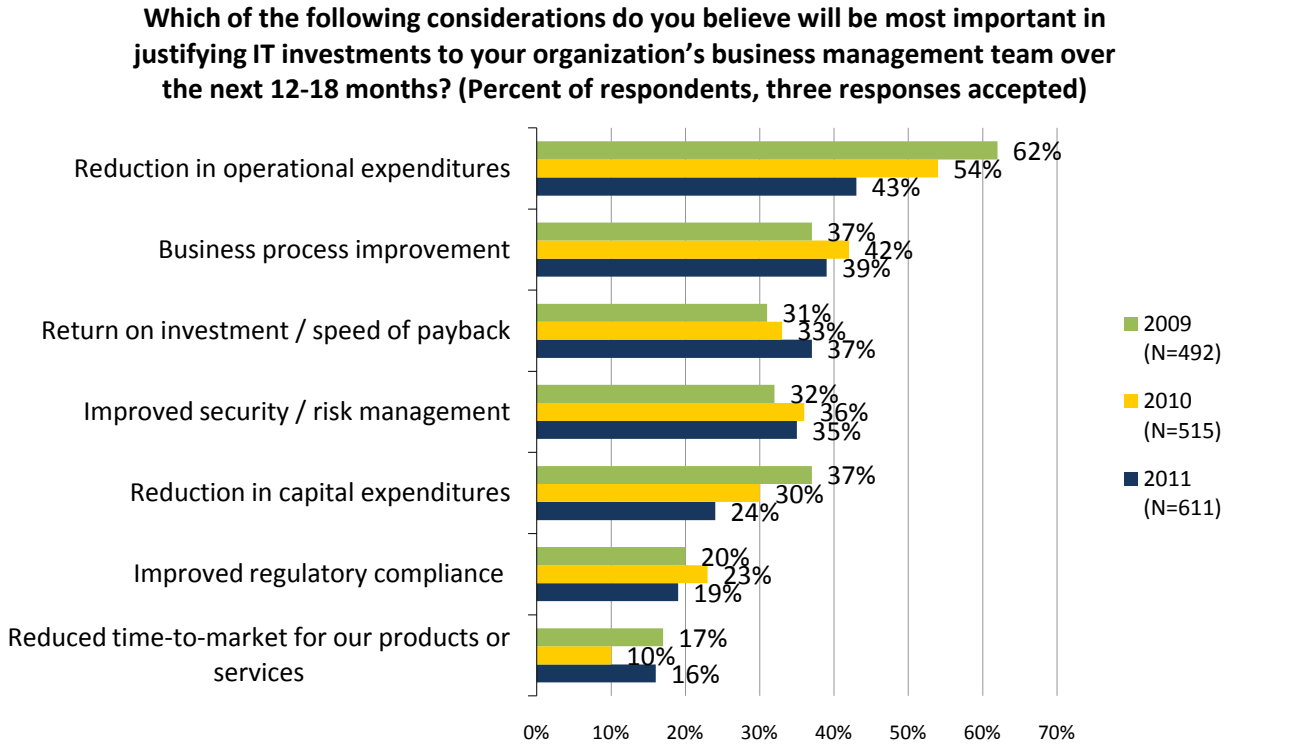
The Rise of Services-focused IT

For years, the promise of running IT departments like an internal service provider in an IT-as-a-Service (ITaaS) model has been elusive. Frameworks such as ITIL have provided an impetus for this service mentality, but with an emphasis on IT operations and less focus on infrastructure and application development. The result was still a siloed IT environment held together by heroic efforts. The majority of IT spending is dedicated to "keep the lights on" activities, hindering IT's ability to keep up with the pace of business innovation. Enter virtualization and cloud computing: essential building blocks for the agility, flexibility, and "services" focus that IT needs to deliver to the business.

These advances couldn't have come at a better time. The current business environment dictates that IT needs to respond to the business faster than ever before. This goes beyond being able to simply provide a new server; it is about the end-to-end IT services—spanning applications, infrastructure, and operations—that help the business improve its competitiveness and capture new revenue.

Organizations strive to be able to instantly respond to change or dramatically improve a specific business process. This is not lost on IT—in fact, many organizations are beginning to change their investment justifications to ensure that any new technology purchase or operational initiative is geared toward business process improvement, a primary justification for new IT expenditures over the past few years.[1]

Figure 1. Primary Justifications for IT Investments



Source: Enterprise Strategy Group, 2011.

Clearly, IT is changing focus, moving away from cost optimization drivers fueled by macroeconomic woes. But focus on improving business processes is only part of the equation. IT departments are also looking to transform their operating models and infrastructure into environments previously seen in cloud computing providers and other external service providers.

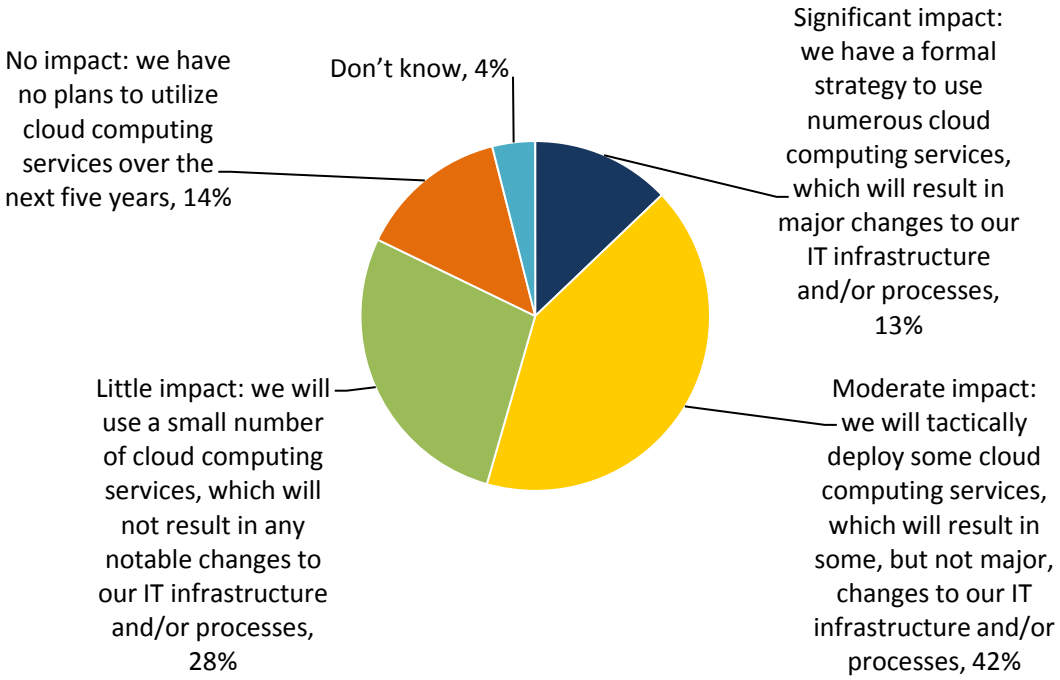
As Figure 2 illustrates, ESG research respondents view public cloud, the most visible iteration today of ITaaS, as playing a major role moving forward. More than half of survey respondents stated that public cloud will have a

[1] Source: ESG Research Report, *2011 IT Spending Intentions Survey*, January 2011.

moderate or significant impact on their IT strategies.[2] As a result, it is not only the data center and IT that are transforming, but also the roles of those who support those efforts. This includes the CIO, who is gradually becoming a broker of IT services with a business-first mentality that guarantees a service will be delivered via the best method possible. In the future, a service could be delivered via IT internally or through an external cloud provider, depending on the needs of the business.

Figure 2. Impact of Cloud Computing on IT Strategy

In your opinion, to what extent will public cloud computing services impact your organization's IT strategy over the next five years? (Percent of respondents, N=611)



Source: Enterprise Strategy Group, 2011.

A key determining criteria is agility and, more specifically, IT's ability to quickly deliver the service the business requires, when it requires it. However, other factors must be considered as well, including the architecture, data, security, and operational policies associated with the workload. When security and governance are of paramount importance, a private cloud may be required. If speed and elasticity are desired, public cloud services may be more appropriate. Either way, most organizations appear to recognize that ITaaS in the future will be a hybrid cloud model: an internal private cloud with a mix of public cloud services and workloads.

The ITaaS approach requires a transformation, and the IT organization requires solutions that will help enable it. This includes deploying highly automated virtualization technologies, coupled with a private cloud framework, to provide on-demand computing resources in a shared, self-service model with a catalog of standardized service options. If the organization chooses to broker external services, then it will require policy-based controls and orchestration to manage this combination of internal (private cloud) and external services (public cloud). Critical to the success of this blend of approaches is maintaining clarity and uniformity in how users interact with IT and, in particular, how both IT and the business can gain access to resources across what would be a mix of providers.

Often underestimated aspects of success in major transitions are skills and behavioral change. Recent ESG research data points both to a problematic shortage of skilled resources to build virtual environments that will serve as the underpinnings of cloud, and also to a lack of internal skills as an inhibitor to fully achieving the benefits of virtualization and cloud. Cloud computing is as much about the operational model as it is about the technology. This requires expertise in areas such as resource pooling, metered usage, and self-service provisioning.

[2] Source: ESG Research Report, *Cloud Computing Adoption Trends*, May 2011.

In addition to skills, organizations often ignore the changes needed in behavior. This includes the siloed nature of IT organizations, which makes it difficult to implement and take advantage of shared pools of resources in a pay-per-use model, as well as how business users, application developers, and IT architects are accustomed to requesting à la carte IT resources as one-off requests. Solutions that provide IT and the business with a "menu" of standard service options and a clear understanding of the trade-offs around unit cost and time to provisioning for "off the menu" choices will help facilitate the behavioral changes that need to take place. Ultimately, these tools must put the choice in the hands of the IT consumer so they can make informed decisions while providing the right governance and control to ensure that those choices comply with operational and security policies.

Organizations cannot make this transformation happen without help. Vendors need to step up and not only deliver the technology and infrastructure, but also assist with the frameworks, software, and process changes that will be required to adjust the fundamental behavior of the IT organization.

IT-as-a-Service

Why are so many organizations interested in delivering ITaaS? If implemented correctly, it can deliver numerous capabilities which will ultimately translate to business benefits. Some of those capabilities include:

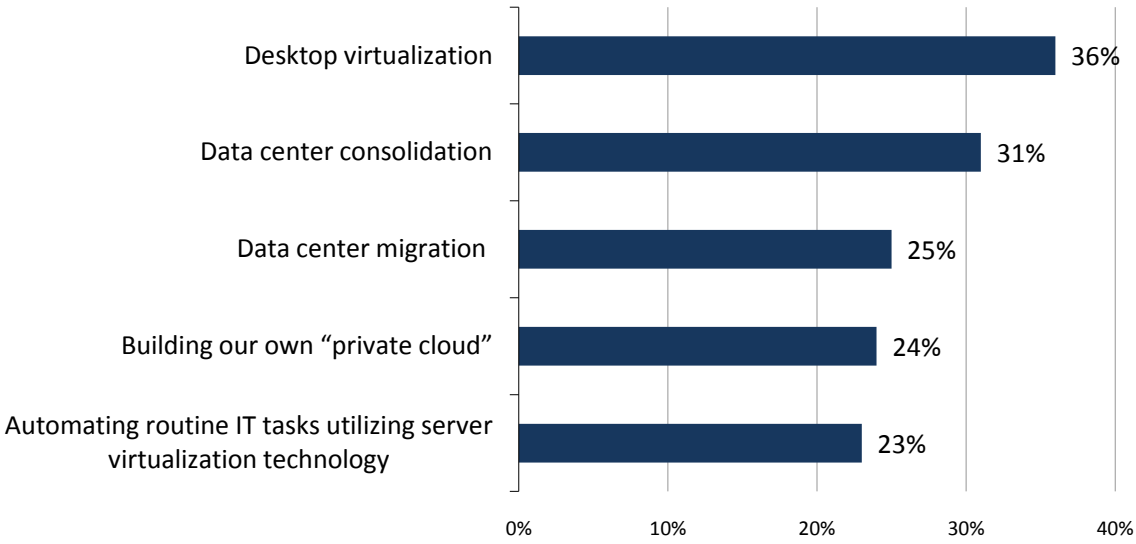
- **Speed and agility**. IT's ability to respond more quickly translates into faster provisioning of services that fuel the business. By driving innovation and differentiation in today's always-on business environment, IT can create a sustainable competitive advantage and go way beyond being "just" a cost center, which is how the static and inflexible legacy environments in so many data centers today are often perceived.
- **Leveraging virtualization to enable cloud computing**. The ITaaS model implies the adoption of cloud computing and requires a number of changes. Typically the first change has related to technology—more specifically, to server virtualization. In fact, ESG's annual IT spending survey indicated that "increased use of server virtualization" was the number one IT priority for the last two years. It should also be noted that this research indicated that cloud computing was the fastest climber from 2010 to 2011, demonstrating that organizations were going beyond just the "interested" stage and actually allocating IT budget to create cloud computing environments.[3]

  To further underscore the relationship between server virtualization and cloud computing, a prior ESG survey of current server virtualization users revealed that building a private cloud registered among the top five IT priorities for these organizations (see Figure 3).[4] Cloud computing is much more than virtualization; however, in most cases, maturity in server virtualization is a precursor to private cloud adoption.
- **Unified, converged infrastructures.** Cloud computing is also a new consumption model, which has an impact on how those environments are built. The new building blocks for the cloud are not just individual VMs, physical servers, networks, or storage equipment, but rather a new unit of tightly integrated and converged infrastructures. These new converged platforms are delivered either as a complete solution or in the form of a reference architecture that can be used to build out private cloud environments. This IaaS layer is the foundation for use cases ranging from application test/dev to virtual desktops. It shouldn't be surprising, then, that many service providers have already adopted this architecture to deliver enterprise class cloud services as well.

[3] Source: ESG Research Report, *2011 IT Spending Intentions Survey*, January 2011.
[4] Source: ESG Research Report, *The Evolution of Server Virtualization*, November 2010.

Figure 3. Top Five IT Priorities for Users of Server Virtualization

Which of the following would you consider to be important IT initiatives for your organization over the next 12-24 months? (Percent of respondents, N=463, multiple responses accepted)



Source: Enterprise Strategy Group, 2011.

- **Scalability**. In a highly dynamic environment, IT needs to rapidly scale. This is especially true for virtualized deployments. Indeed, ESG research indicates that virtual environments will be scaling up rapidly over the next two years, with the majority of organizations reporting significant growth in both the number of virtualized servers and the number of virtualized servers running in production environments. The latter is much more important as the production environment requires much higher levels of availability and protection.

  It should be noted, however, that the ability to scale does not only refer to long term growth. It also refers to the ability to burst applications for short timeframes. This could include extra capacity for end of month/end of the quarter processes or to handle a special promotion from marketing. In a hybrid cloud model, this implies a "build the base, rent the spike" approach. Scale also includes more than one dimension: in addition to scaling up, organizations also need to scale back down and return resources to a general pool for better optimization. This implies that a lifecycle approach is required, whether for shutting down public cloud instances or re-purposing unused virtual machines in a private cloud.

- **Simplification**. This is critical for the initial and long-term success of any ITaaS platform. The key is to have an easy to use and intuitive self-service portal interface for both IT and business users. This is certainly no easy task—the portal is abstracting all the complexity of the highly virtualized and rapidly changing infrastructure of the data center. The user, however, may not care about that. All the user knows is that they need a service to meet their needs—how many VMs and how much storage is required may be irrelevant. This is true across the board, whether it is a revenue-generating mission critical application or test/dev environment for QA. However, in this case, the environments should be vastly different in terms of availability and data protection. This will also translate into different costs to deliver the services, which must be clearly understood through the portal so the business can make informed and intelligent decisions. While simplicity is preferred for less technical users, the portal should also allow advanced IT users to have the option to view infrastructure details based on their role.

- **Automation**. With highly dynamic environments, rapid change can be accommodated by individual acts of heroism from the IT staff for a limited time, but it is not sustainable. The key to enabling long term repeatable success shouldn't be based solely on the quality of the IT staff and their skill sets, but rather on policy-based automation and orchestration of manual repetitive tasks. This will allow the best and brightest on the IT staff to formalize best practices that will mitigate risk and enable more effective governance and control. It will also free staff to work on more strategic initiatives and help drive even more efficiencies for the business.

Required Building Blocks for the Cloud Computing Era

In order to meet the needs of the business, new operating models and architectures are being developed—ones that more closely resemble a service provider environment than in an enterprise. While the infrastructure plays a critical role, this transformation also requires new tools to help re-architect existing processes and automate or orchestrate previously manually-intensive operations. So while the new technology and infrastructure will be important building blocks, there are other required building blocks to enable a cloud service. They include:

- **Service catalogs.** A big part of developing a new operating model for cloud computing is establishing a means of standardization. A catalog of standard offerings is critical as it reduces complexity and eliminates time wasted by provisioning highly varied requests. Standardization of services is essential for on-demand provisioning: a well-defined set of standard service options results in greater benefits through automation and more cost-effective service delivery.
- **Self-service portals.** In order to deliver the agility and speed required in today's fast-paced environment, organizations will also need to make self-service provisioning an essential component. This will require the creation of an easy to use portal with policy-based controls and governance. Keep in mind that the portal will be the main interface for both business and IT users to procure services regardless of their role and where they are located. This will be the face of the IT service broker.
- **Process automation and orchestration.** The service catalog and portal definitely increase flexibility and efficiency in the ordering of services; however, IT needs to be able to deliver those services almost as quickly as they were ordered. On the back end of the service catalog, organizations need ties into orchestration and automation engines to eliminate time-consuming and error-prone manual provisioning processes. This should also include the concept of lifecycle management for the ongoing maintenance and decommissioning of services.
- **Highly virtualized, converged infrastructures**. As previously mentioned, prepackaged (or at least pre-architected) environments purpose-built for the cloud are becoming the new units of compute. This consists of tightly integrated physical servers (typically blades), high performance networks, and enterprise-class storage designed for virtualization and built to handle scalable, dynamic environments. Ideally, these converged infrastructures will be integrated with the other building blocks outlined above and will help to remove the complexity typically associated with large scale IT environments. Because these units are preconfigured and tested—they should deploy faster and without the typical inter-technology domain integration pain points.

Cisco Solutions

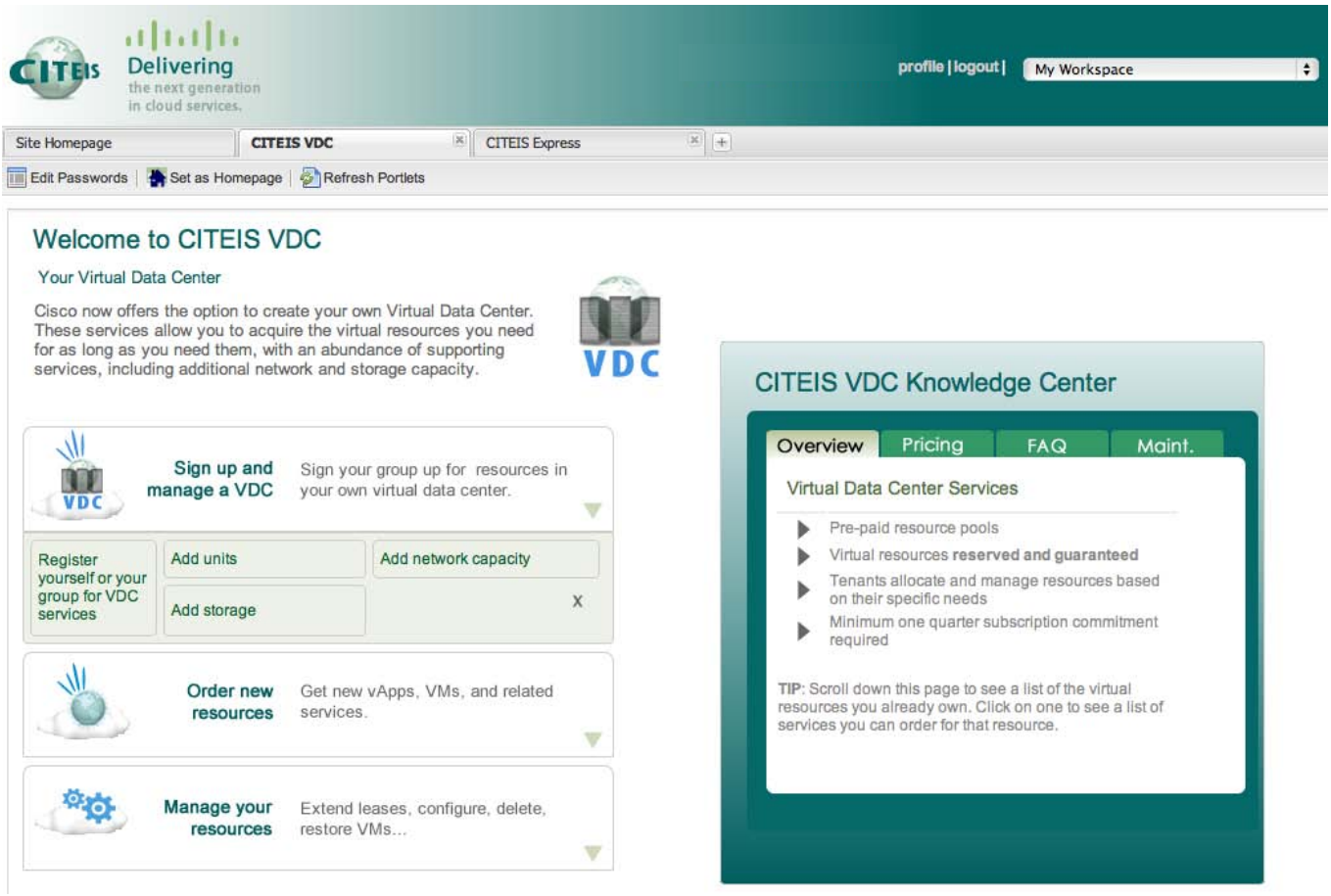
Cisco, well known for its networking capabilities, has been aggressively expanding its portfolio in order to enable enterprise organizations to extend their virtualized environments into private and hybrid clouds. Examples over the past few years include the introduction of a new computing platform (Cisco UCS) and most recently an intelligent automation solution that includes a self-service provisioning portal, service catalog, and orchestration software (through the acquisitions of newScale and Tidal Software). These solutions are all focused on transforming IT to be delivered as a service. However, not all users adopt new technology at the same pace or have an appetite for rapid change. Cisco, therefore, offers its solutions as either standalone or fully integrated solutions. The solutions include:

- **Cisco Intelligent Automation for Cloud**. Recognizing that ITaaS is about more than infrastructure improvements, Cisco assembled software solutions that will enable organizations to standardize their IT offerings, deliver them through a self-service portal, and orchestrate the automated provisioning and configuring of the underlying infrastructure. Components of this solution include:
  - *Cisco Cloud Portal*. From the acquisition of newScale, this software includes a comprehensive service catalog and a web-based interface for self-service provisioning. This enables users to quickly and easily order new IT services or adjust existing ones while ensuring adherence to defined policies or regulations. It also allows organizations to encourage the adoption of standardized services and implement lifecycle management, with governance across both internal (e.g., private cloud) services and external services. The inherent tracking capabilities enable pay-per-use metering, whether implementing simple "showback" or a more complex chargeback approach.
  - *Cisco Tidal Enterprise Orchestrator*. The ability to order standardized services is a great first step, but they need to be provisioned. The Tidal orchestration engine automates the delivery of the service, ensuring the appropriate service level and configuration. It is important to note that this orchestration will work for both physical and virtual environments, so it can be introduced and leveraged while virtualized environments continue to mature. The Tidal orchestration software leverages adapters to connect to tools in the data center including Cisco UCS, VMware, and many other heterogeneous server, network, storage, applications, and systems management resources.
- **Cisco Converged Infrastructure.** Built around the capabilities of the Cisco UCS and Nexus switching, Cisco has partnered with storage vendors (EMC with Vblocks and NetApp with FlexPods) and hypervisor vendors (VMware, Citrix, Microsoft) to create highly flexible converged infrastructure solutions focused on enabling virtualized and cloud environments. Infrastructure purpose-built to handle very dynamic environments and eliminate the traditional infrastructure silos will help to accelerate the time to provision new services and reduce total cost of ownership. This is especially true when combined with the Cisco's Intelligent Automation for Cloud solution.

Cisco has partnered and acquired technology to deliver a complete solution, but why should an enterprise turn to Cisco to enable a private or hybrid cloud? Cisco:

- **Delivers proven solutions**. Cisco networking products have been battle tested in demanding environments for a number of years. Data center products like UCS and recently acquired solutions like the Cisco Cloud Portal (newScale) have been proven to enable cloud service providers to effectively implement ITaaS. Cisco also has a broad portfolio of advanced services for cloud enablement, ranging from strategic consulting to training, that have been deployed by leading service providers. As enterprise IT investigates solutions to deliver ITaaS, it makes sense to leverage established technology with a track record of success. This helps to mitigate risk and ensure a much higher degree of success.
- **Practices what it preaches.** Enterprise IT organizations are transforming, including Cisco's own IT group. Looking to lead by example, Cisco's internal IT group deployed the Cisco Cloud Portal and Cisco Tidal Enterprise Orchestrator integrated with VMware, Cisco's UCS and Nexus switching, and NetApp storage to power the production environment. The effort is referred to as Cisco IT Elastic Infrastructure Services (CITEIS). Leveraging the Cisco Intelligent Automation solution running on Cisco UCS, any Cisco employee can request infrastructure services on-demand, ranging from a single VM to an entire virtual data center. A screenshot from the CITEIS private cloud is seen in Figure 4 and illustrates the simplicity of creating a virtual data center: simply log in and request services.

Figure 4. The CITEIS Homepage Powered by Cisco Cloud Portal



Source: Cisco, 2011.

- **Enables flexible deployment**. Not every enterprise will adopt technologies and services at the same pace and in similar fashion. Cisco provides flexible deployment options depending on how a technology is to be consumed. For example, the Cisco Cloud Portal can be deployed over an existing heterogeneous environment to manage provisioning and lifecycle processes. This would include creating standard offerings to be loaded into the service catalog and introducing the concept of self-service provisioning with the portal. The infrastructure itself may be provisioned using existing third-party orchestration tools. For those looking to deploy a private cloud in a greenfield environment, the ITaaS transformation could occur at a much faster pace. Just as Cisco's internal IT did, combining Cisco Intelligent Automation for Cloud solutions with converged infrastructure systems like FlexPods or Vblocks can accelerate the deployment of a private cloud environment.

The most important benefits from these solutions are measured not by IT, but rather by the business. Cloud for the sake of cloud is not beneficial, but an environment that improves the speed of doing business, reduces costs, and mitigates risk is worth deploying. That is the driving force behind Cisco's enhanced portfolio.

One of the biggest benefits is related to the agility an organization can achieve by incorporating the Cisco Cloud Portal and Tidal Enterprise Orchestrator in the new Cisco Intelligent Automation for Cloud solution. An IT department's ability to provision new services in minutes instead of weeks, rapidly scale infrastructure, and meter usage just like an external cloud service provider can provide the ultimate in IT service delivery while driving down both operational and capital costs.

Standardization and policy-based provisioning will help to mitigate risk and ensure compliance with not only best practices, but government and industry regulations. Lifecycle management and auditing capabilities provide greater IT visibility and control.

This functionality can also be leveraged for a hybrid cloud deployment, managing both private and public cloud services using the same portal interface and orchestration engine. With this flexibility, IT organizations will be able to scale infrastructure without scaling people to manage it. They will be able to optimize capacity and utilization by cutting back on the capital required to buy infrastructure to meet peak demands. In essence, a hybrid cloud infrastructure lets an organization only use the resources it needs, when it needs them.

The Bigger Truth

IT *needs* to be delivered as a service. IT must think in terms of delivering services not servers, and "claims processing" rather than "data processing." But legacy infrastructure and mindsets are still holding organizations back. Changing people and organizational points of view is difficult; doing it without the right tools is impossible. Just demanding that the IT group build a cloud and deliver ITaaS will not make it happen.

The right combination of software, hardware, and enablement services to help standardize, provision, and automate IT environments can help accelerate an organization's journey to realize the benefits of ITaaS and cloud computing. This will enable the CIO to be an effective broker of IT services, leveraging both internal resources and external service providers.

Cisco has expanded its portfolio and now delivers a complete set of solutions to enable enterprises to evolve to ITaaS. Cisco does this by engaging directly with the IT organization and through partnerships with technology vendors, resellers, integrators, and service providers that can provide turnkey solutions to accelerate the transition. The Cisco Cloud Portal and Cisco Intelligent Automation for Cloud, which also includes the Cisco Tidal Enterprise Orchestrator, provide compelling software solutions that help organizations fully realize the potential of the Cisco UCS and converged architectures like FlexPod and Vblock.

Ultimately, this is all about the business and the results it can generate. With Cisco's ITaaS solutions, enterprises can increase the speed of IT, improve business agility, accelerate time to market with new and differentiated capabilities, and deliver shareholder value.

Enterprise Strategy Group | **Getting to the bigger truth.**

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