

Simple Overview on Cloud Computing

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Abstract: There's a reason why the buzz around cloud computing never seems to die down — concrete results are replacing the initial hype. Take for example the tech leader Cisco Systems, whose size and success wasn't enough to shield its internal IT operations from one of the biggest headaches faced by IT managers everywhere. Citing his company's own experience and corroborating industry studies, Tony West, Cisco vice president and chief technology officer, points out that approximately 70 percent of IT spending goes to just maintaining the existing datacenter environment. Finding the time and allocating the resources for new initiatives that further the organization's overall success get the leftovers, to the frustration of IT and enterprise managers alike. But thanks to an ambitious private cloud project that began a couple years ago, Cisco is bucking this budgetary tradition. Reduced managerial overhead and other private cloud benefits have shrunk costs for routine maintenance to less than 50 percent of Cisco's total IT budget, which represents companywide savings of hundreds of millions of dollars. Along with Cisco, many organizations are benefiting from private clouds. They are discovering that for security and compliance, the private cloud trumps the public cloud every time. What's more, dollars can be saved. As outlined in a 2011 study by the Aberdeen Group, the private cloud saves a total of 12 percent combined annual costs savings over public clouds on a per-application basis.

Keywords: *Saas,Paas,Iaas,cloudComputing,cloud service,privatecloud[1]*

I. SERVICES AT YOUR SERVICE

Budget considerations are an important driver for private clouds, but they are not the only ones. "With this services orientation, I can go to a service catalog and dial up capacity," says Anil Desai, a consultant who specializes in cloud computing and virtualization technology. A cloud's ability to deliver services on demand means IT shops can meet the needs of organization managers private clouds more quickly than when new hardware must be purchased, tested and implemented. The traditional process can take weeks or months, while a well-functioning cloud can deliver additional capacity in minutes. Private clouds also create a solid technical foundation for the so called "Post-PC Era," where desktop computers are no longer the dominant end-user platform but are part of the mix that also includes thin clients, tablets and smartphones. Vital applications and data reside in the cloud, waiting to flow to any of these devices. The enterprise can use the self-healing nature of private clouds to bolster operations continuity, as well. For example, if a virtual machine crashes while running on a blade server in the private cloud, automated management controls can quickly move the VM[2] to a healthy hardware device. "If I'm an IT manager, I'm not spending my days thinking about storage systems or hard drives or CPUs or memory," Desai says. "Instead, I have this big IT pool that can dynamically allocate resources on its own without me having to sit

there and reconfigure things." How to Choose To understand the quick-win potential of private clouds, it is important to see how they fit within the larger cloud landscape. First, consider what defines a cloud. At the top of the list are shared pools of computing resources. So instead of individual departments or workgroups running a dedicated collection of servers, storage systems and applications, each entity taps into a central storehouse that may be used by multiple other "customers." Cloud insiders call this "multitenancy," and the model may serve users within the same organization or include outsiders, depending on the particular cloud strategy being deployed. IT managers can rapidly provision the resources in this storehouse so users receive IT capabilities to address their prevailing needs. Also known as rapid provisioning, this capability should look to cloud consumers as being essentially unlimited and accessible from any device with a network or web connection. Many clouds also use metering of resource usage, which becomes the basis for determining how customers will be charged for cloud services. A number of cloud variations are born from these core capabilities. Most similar to a traditional IT operation is the private cloud[1], which resides in-house or perhaps is hosted by a third-party provider for the exclusive use of one customer. This model is appealing because organizations do not share servers, databases, storage resources and applications with outsiders. This fact, for some cloud skeptics, alleviates the security fears associated with other cloud options. But private clouds are not perfect. Management and maintenance demands on internal IT staff remain high, and enterprises may need upfront capital investments to launch the cloud. Although there is greater scalability available within a private cloud than in a legacy environment, capacities are not theoretically limitless, as with some alternatives. Public clouds also offer an alternative to in-house options. Third-party service providers maintain their cloud infrastructures for multiple users on a self-service, on-demand basis. Using a public cloud has significant appeal because it requires little to no infrastructure investment by the user organization while enabling unprecedented levels of scalability. And because each tenant shares the costs of the pooled resources, the cost to the individual customers may be lower than for in-house services. But many organizations still balk at the compliance, privacy, security and data availability associated with public services. One compromise approach is the community cloud, where organizations with similar needs and security requirements share a common resource. Community clouds do not offer the exclusivity of private clouds or the full cost savings of public options, but they may strike an acceptable balance for some groups of customers. Others may opt for a hybrid cloud, which mixes and matches private and public clouds. In the most common scenario, an organization maintains a private cloud but has a contract in place that enables users to break out into a public cloud to obtain additional resources to meet unusual demands. Deciding which cloud deployment method is best depends on a wide array of factors, including cost, internal control, performance needs, scalability requirements, security regulations and other considerations.

II. HOW TO MOVE TO A PRIVATE CLOUD

If an organization makes the decision to launch a private cloud, what steps must it take to pull off the plan? Cloud veterans and consultants cite five key moves.

Step 1: Analyze and, if necessary, upgrade the internal network.

“The way you go about designing a cloud network for a data center is quite different from when you are putting together a traditional campus wide network,” Cisco’s West says. Begin by considering capacity. West advises that organizations estimate likely traffic volumes to and from the private cloud based on the number of users and cloud servers that will be running. “Then make sure that you’ve got plenty of room for expansion because one thing about the cloud is that any guesses about capacity are almost always wrong on the low end,” he explains. Speed is the next factor to evaluate. “Increasingly, we are seeing compute and storage traffic pushing networks from 1 gigabit per second in the direction of 10 Gigs,” West reports. Step 2: Standardize on the smallest number of hardware platforms. Running highly compatible hardware – all blade servers based on Intel Xeon processors, for example – IT managers can easily achieve the dynamic provision and resource pooling goals of cloud computing. Step 3: Virtualize wherever possible. The widespread server virtualization efforts of the past few years have helped many enterprises reduce physical hardware requirements, increase the utilization rates of the remaining devices and alleviate some power demands. Now organizations are looking beyond consolidation to the next big wave of virtualization, which spans servers, storage systems and networks. “The idea now is to create portable workloads that I can put on any server at any time,” Desai says. “I can move workloads while they are running, I can change the amount of memory they have, and I can change which networks they are connected to. And I’m able to do all of this dynamically rather than shutting down and rebooting a server or physically adding memory to a machine.” Step 4: Implement technologies that automatically orchestrate workloads. Cloud practitioners[3] should look to specialized tools designed to keep workloads evenly balanced among all individual servers in the private cloud, while also assuring that each application has the power it needs to meet prevailing demands. For example, a virtual machine may be designated to run on a high performance server during regular working hours, but then automatically move to a less powerful platform in the evening when demand levels drop. Step 5: Determine which applications are right for running in a private cloud. Clouds can accommodate many common types of enterprise services, such as e-mail systems, which do not require the full power of dedicated servers and related resources. More complex applications, such as large scale enterprise resource planning (ERP) systems, are designed to run by themselves with their own resources.

III. SKILLS IMPACTS IN CLOUD COMPUTING

The move to cloud solutions opens up new opportunities for IT professionals. Key technical skill sets become more critical to career success, including custom application development and deep technical knowledge of the various collaboration products such as Exchange Server. These skill sets can be used to complement and enable customization of the provider cloud offerings. IT should look for opportunities to reduce tactical day-to-day support and spend more time developing and delivering services and applications that demonstrate value to the business. “I think new marketing efforts will change and help IT administrators in their understanding of what the cloud portends,” said Kay Sellenrode, Senior Technical Consultant for Platani. “IT professionals and developers face quite some challenges. But they represent good challenges. IT professionals need to see the new version of cloud as a product they would deal with in-house. They know the basics already. What’s

important is not what they’re doing, but where they’re doing it. “The need for design skills will remain. The principal difference is that the infrastructure may be hosted outside the company. Additionally this will include more care of service agreements and less maintaining the service running Windows Server. “They can give themselves new names; a network administrator can become a cloud administrator,” he explained. “Once they learn more about the cloud and they see there’s a big change that will help them in the future, it will become clear to them that they will have a job that is more challenging than just being an administrator.”

In general, IT professionals should prepare for the multitude of cloud environments in which they might work. New paths are presenting themselves and options abound. Administrators may choose to shift to consulting, which entails enhancing their soft skills and beginning to focus on serving business needs. They may end up serving as a liaison between business divisions and IT within an enterprise. Contrastingly, they may also choose to deepen their technical skill sets and specialize in building and configuring the stack itself.

Considerations for Developers

Developers will have to focus on innovation, integration, and rapid delivery on business requirements. They also will find more design opportunities beyond what they currently manage. Developers will need to work effectively with a much broader group of IT professionals for solutions they are developing. IT will also need to work more closely with business units to find out what they can do to help improve the productivity in departments such as marketing, human resources, and finance. Since enterprises can adopt more varied solutions in the cloud, it becomes vital to ensure that the selected solutions address any required service agreements between the business and IT.

Security Implications

Cloud solutions have new security implications for consideration. Organizations in different industries have divergent requirements regarding privacy and data retention. This means that the solution selected by an organization or an enterprise must be carefully evaluated to ensure that the selected services allow the organization to remain in compliance. International companies may need to comply with regulations that vary by country or economic region. These must also be taken into consideration by the IT professional when selecting a cloud-based service.

Managing security and compliance involves translating enterprise compliance requirements into a technology implementation. This requires practical skills and an understanding of implementing compliance within the deployed solutions. IT professionals will benefit from sharpening their security skills, including knowledge around data protection, privacy standards, and secure message integrity. Secure messaging may include topics such as encryption, digital signing, and malware protection. Additional skill sets of value include identity management, authentication methods, and auditing.

IV. INFRASTRUCTURE AS A SERVICE

IaaS is the capability to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run software. This may include both operating systems and applications. Companies can choose to optimize their infrastructure by adopting an IaaS. IT professionals who manage and maintain IaaS infrastructure have a cultural mind shift to adopt. Once viewed simply as a localized resource, infrastructure in the cloud now carries the characteristics of a commodity and functions as a service. In this new guise, it becomes dynamic, always available,

and has self-service capabilities. That translates into the need for an additional skill set beyond what traditional IT administrators already possess. It is a common misconception that the mind shift is simply to virtualization. Although a first step, virtualized infrastructure fails to reach the level of service necessary. It pools resources into a single structure to serve multiple customers. An elastic, or dynamic, quality becomes important. A measured service, which includes the change monitoring and operational IT reporting, must be created. The first step in moving to an IaaS model usually starts with a private cloud with virtualization. In this environment, as applications and services achieve critical mass the cloud provider will be called upon to provide IT services to support the systems and potentially the applications.

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