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CONSIDERATION FOR THE CLOUD

The Process Every Enterprise Should Think Through

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ABSTRACT

Cloud computing is one of the hottest topics in enterprise IT today. However, amidst all the hype and misinformation, it is critical that enterprise decision makers consider the Cloud as a viable strategic resource for their IT environment. This whitepaper discusses the IT challenges enterprises face and how the Cloud can help overcome those challenges. It then defines different Cloud configurations and the most appropriate uses of each. Finally, it provides guidance on enterprise decision-making regarding Cloud applications and platforms.

INTRODUCTION

Enterprise computing is at a major inflection point. The combination of rapid technological advancement and the economic realities of our time have given rise to the Cloud Computing Era. Much like the historical mainframe and client-server eras, the advent of the Cloud is fundamentally changing the way we consume computing resources. Cloud computing allows enterprises to share resources, software and information across a rapidly growing multitude of connected devices, creating new opportunities for business speed and efficiency.

Today's economy requires the fundamental cost structure of IT to change. Recent studies show that 70% of IT budget is spent on systems maintenance while only 30% is available for productivity-enhancing innovation.* Business leaders desire exactly the opposite: a model where the majority of budgets support innovation, and less is spent just "keeping the lights on." The goal is to find better service delivery models that allocate more IT budget toward innovation and business value. So CEOs, CFOs, CIOs and IT executives are demanding computing solutions that provide cutting-edge performance, enhanced availability, bulletproof reliability, and massive and rapid scalability, all within a cost-efficient envelope that keeps their enterprises fast and lean.

*Source: Gartner IT Key Metrics Data 2010.

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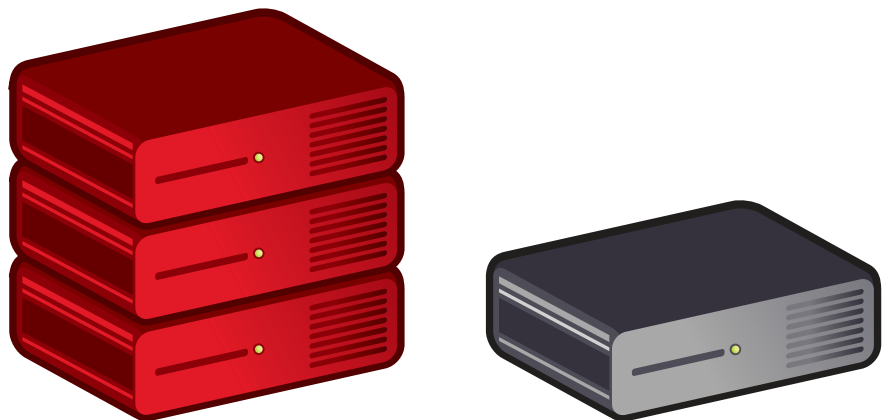
MAINTENANCE VS. PRODUCTIVITY

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BUSINESS PROBLEMS WITH TRADITIONAL IT

Enterprises today face a myriad of obstacles in their IT environments. Complex systems, overburdened human resources, and large capital expenditure requirements create bottlenecks in deployment of new computing resources and capabilities. Because of this, most IT organizations cannot deploy assets or applications quickly or maintain them cost-effectively. A closer look at each of these challenges reveals a set of causes and effects that even further complicate enterprises' ability to keep IT agile and flexible.

SLOW TECHNOLOGICAL LAG

First, there is a lag between modern technology and its thoughtful implementation across an enterprise's employees, systems and processes. In other words, internal IT departments struggle to keep their enterprise up to date on the best available software and hardware. It's not for lack of trying, but technology changes at breakneck speed. This phenomenon is encapsulated in Moore's Law, which states that computing capability increases 1 percent every week – an astronomical rate of change. On the flip side of this axiom is what's known as Moore's *Flaw*: keeping up with the flood of innovation quickly becomes too difficult and too costly for an IT organization to manage. Just as Moore's Law compounds the speed of technology, Moore's Flaw is multiplied by the fact that many enterprises have technology systems that have been piecemealed together over time and/or inherited through acquisitions or mergers. Considering all of this, technological advancement at the enterprise IT level often involves moving the 900-pound gorilla of working through such complicated systems. And even if enterprises can achieve that, then comes the assessment, alteration and maintenance of the processes and people affected by such sweeping changes. Thus, the complexity of technology, along with the adjustments and training needed to adopt it, make its enterprise-level implementation slow to a crawl. Optimizing environments through the calculated use of IT hosting provides a much easier, quicker and less expensive option.

OVERBURDENED RESOURCES

Second, enterprises' human resources in IT are overburdened in today's economy. With the growth of business needs, innovation is demanded within ever-tightening budgets. Many businesses have reallocated human resources in order to focus on core competencies, and most IT departments have been forced to do more with current (or fewer) resources and/or that which incurs little cost. Most enterprises simply cannot justify additional IT headcount if it will primarily be used on systems maintenance and will not provide new productivity. The consequence of this unfortunate, but necessary, reaction to the market is increased difficulty for IT organizations to address current business needs, much less provide productivity and innovation. Performing more tasks with

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fewer resources spreads IT resources thin. This also further compounds the aforementioned sluggishness of technological adoption at the enterprise level. Therefore, companies further strain their resources by asking them to bear the weight of both current, ever-evolving business demands and the necessity of increased productivity.

HIGH CAPITAL EXPENDITURES

Finally, enterprises face the challenge of costly IT capital expenditures required to accommodate their size and scope. Organizations have had to support the full cost of hardware, infrastructure and technical resources themselves, which means they often fail to achieve the optimal mix of resources, overpay for scarce resources, and go without needed specialists that could help provide real business value. A prime instance of these compounding costs is when traditional enterprise capacity planning causes wasteful over-provisioning. In IT departments, demand for a service is usually cyclical. For example, e-commerce traffic for many retailers spikes near the end of the year due to holiday shopping and then retreats to lower levels at other times of the year. Alternatively, a website could realize traffic spikes because of a Super Bowl ad while having slower run rate traffic. So, provisioning a data center for peak load leads to underutilization of resources at other times. And even though all of the additional computing resources provisioned to serve peak demand may go unused during cyclical troughs, the enterprise is still left footing the bill for the full set of resources. Another example of IT cost inefficiency is exposed when organizations perform batch processing, high-performance computing or Monte Carlo simulations. These efforts involve building data centers and computer systems consisting of hundreds or thousands of computers in order to perform a large number of required calculations. Such data centers and computer systems require vast capital expenditures that, like the computing resources for traffic spikes mentioned above, will likely go underutilized at some point in the future. Going back to Moore's Law, those physical assets will become obsolete in a matter of a few years, requiring costly new hardware and application migration projects, making investment even less economical. All these costs – infrastructure, human resources and specialists – and their compounding tendencies add up to a dubious debit on the balance sheet that represents yet another IT handicap for enterprises to overcome.

In summary, traditional enterprise IT can be too slow, too busy and too costly for organizations that need increasing agility and productivity. As the overall consequence, enterprises today get less productivity from internal resources, resulting in a loss of business and/or a loss of business growth. And it is easy to see the frustration that everyone from executives to the frontline employees feels whenever technological change or innovation is needed, but unavailable. Cloud computing and dedicated hosting have emerged to solve many of these problems.

Provisioning a data center for peak load leads to underutilization of resources at other times.

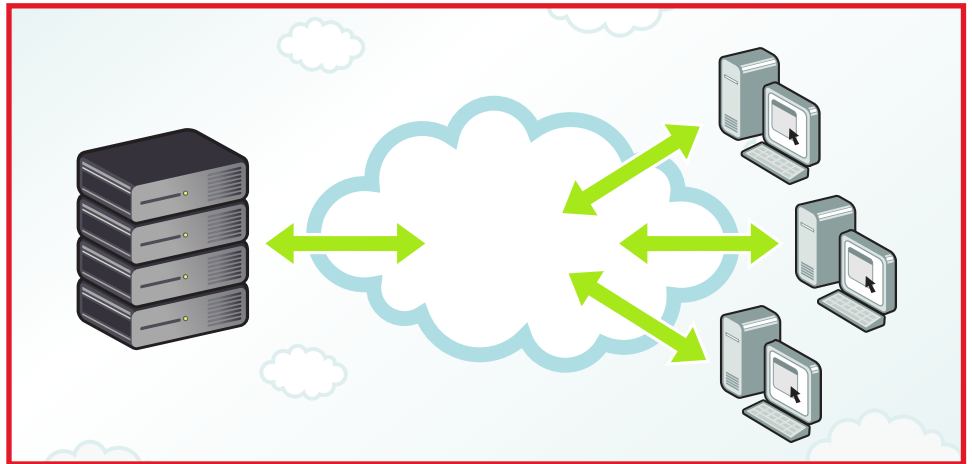# THE EMERGENCE OF THE CLOUD

Cloud computing and dedicated hosting, when implemented thoughtfully, can be secure, cost-effective, flexible, scalable and fast. These traits allow it to provide what IT has and will always need: a way to increase capacity on the fly without investing in new infrastructure, training new and existing personnel, and licensing new software. But before diving into how the Cloud can deliver on its promise to solve many of the business problems of IT, it is worth defining "the Cloud" and dedicated hosting and how they can be used together.

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SHIFTING FOCUS FROM HARDWARE TO SOFTWARE

Enterprise hosting services are not a revolutionary concept. For decades, utility companies have hosted power generation for users, and telephone companies have hosted voice and data services for their subscribers. In similar fashion, today's IT hosting companies are providing businesses with services such as data center hosting, computing and data storage. As a result, the buying decision shifts from purchasing products that enable the delivery of services (a Capital Expenditure, or CapEx, model) toward contracting third parties to simply deliver those services (an Operating Expenditure, or OpEx, model). Why buy the server and store it onsite when you can rent it offsite at a lower total cost of ownership? This represents a significantly different model than the resource-intensive, on-premise models that have dominated the IT industry for years.

> The reasons for the switch are many. Cloud computing boasts a cheaper, faster more efficient and more reliable approach to running web-based applications than traditional IT computing.

Hosting companies and colocation facilities have provided different flavors of dedicated hosting services for some time now, but it is only recently that we have seen the emergence of a true utility computing model, now known as the Cloud, begin to gain traction. The reasons for the switch are many. Cloud computing boasts a cheaper, faster and more efficient approach to running web-based applications than traditional IT computing. However, those who use cloud computing must understand cloud architecture and enhancing technologies like application acceleration and content delivery networks in order to mitigate certain network limitations. Still, many are finding that the investment required to navigate this learning curve is minimal when compared to the lengthy list of cloud benefits.

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THE CLOUD

PRIVATE CLOUD

DEDICATED HOSTING

HYBRID HOSTING

TYPES OF CLOUD COMPUTING

The industry has appropriated the term "Cloud" to span many different hosting and even internal virtualization solutions. For our purposes, we will use the following terminology:

- **The Cloud** – often known as the "Public Cloud," an off-premise (hosted), multi-tenant solution that enables a true utility computing model

- **Private Cloud** – single-tenant virtualization solutions hosted either on- or off-premise

- **Dedicated Hosting** – both virtualized and un-virtualized single-tenant computing solutions hosted off-premise

- **Hybrid Hosting** – a mix of the Cloud and dedicated hosting/private cloud in a solution

Each of these solutions and their hybrid mixture has its own advantages and limitations, making different solutions more appropriate for different use cases.

The Cloud is essentially software-powered hardware. It is a pool of virtualized hardware controlled by software that provides users the ability to provision and decommission resources within a matter of seconds or minutes. Obviously, this approach offers the most leverage and greatest flexibility to enterprises. In this model, the Cloud service provider owns all of the physical infrastructure and assets, and allows enterprises to purchase access to these resources, billing only for time, bandwidth and storage.

The private cloud is a solution in which a single entity hosts resources in a virtualized environment for exclusive use of its own organization. This makes it easier to address security, privacy, compliance and other risks associated with using multi-tenant, shared resources but requires significant up-front and ongoing investment by the private cloud consumer. Private clouds are often built in dedicated hosting environments where a hosting provider provides a dedicated pool of infrastructure with a virtualization application that allows the user to quickly provision new virtual machines on the existing pool of resources.

Hybrid hosting uses a secure private network to connect an enterprise's dedicated servers to its more flexible resources in the Cloud. This can provide the elasticity of cloud computing along with security of dedicated servers, providing the ability to further optimize the use of computing resources, even within a single application.

CONSIDERING THE CLOUD

The first question an enterprise should ask when considering cloud computing is "Why should we use the Cloud?" There are three answers that consistently arise as the most compelling reasons: speed, agility and cost. The Cloud provides resources in a matter of seconds or minutes, as compared to days, weeks or longer for physical infrastructure expansions. Also, the Cloud removes the limitations of physical platforms, in that it can theoretically scale infinitely. And the Cloud's utility model allows the enterprise to pay for only the resources it uses instead of absorbing the sunk cost of physical hardware in the traditional computing model. These significant benefits tempt many to move quickly into the Cloud, but while the Cloud is for everyone, it is not for every*thing*.

This brings us to our next question: "Where should an enterprise use the Cloud?" The Cloud makes the most sense for web-based sites and applications. Websites, especially those prone to spikes in traffic and demand, are prime candidates for the Cloud. As for applications, the Cloud is ideal for most of them. But some regulatory bodies have yet to allow for the Cloud, so applications that require special security accommodations such as payment card industry (PCI) compliance cannot currently run on the Cloud. Legacy applications or form factors are also not ideal for Cloud implementation. Aside from these, all enterprise applications represent ripe opportunities for Cloud adoption, and many of these applications can still benefit from some hybrid implementation of the Cloud and dedicated hosting.

APPLYING THE CLOUD TO APPLICATIONS

Because the Cloud is for everyone but not for everything, it is important to understand its most appropriate uses. Some businesses use dedicated hosting to run databases on dedicated hardware for PCI compliance or because they do not want sensitive data residing on a shared platform. Other applications – for example, web servers and certain SaaS tools – run well in the Cloud because of its elasticity and ability to rapidly scale. The brief, but critical, assessment outlined below can help decision makers quickly determine whether the Cloud is right for a given application. That way, time, resources, money and liability are not invested in an enterprise endeavor that does not provide optimal value.

To begin, assess the application itself:

- Is the workload I/O intensive?

- Is it latency-sensitive?

- Does it require special treatment for security compliance?

- Is it a legacy, proprietary application or form factor?

If the answer to all of these questions is "no," the Cloud will likely be a value-added option for an enterprise's IT strategy.

However, if the answer to any of the questions above is "yes," an implementation structured solely on today's Cloud is probably not practical. But this should not rule out the use of the Cloud completely, since Hybrid hosting allows the use of the Cloud where it offers value while leveraging a dedicated hosting environment where the Cloud is not a candidate. A common example of such a situation is an application that needs a secure database on the backend but does not need security at the edge. In this case, the database is hosted in a dedicated, managed environment and the less-sensitive portions of the application may be automatically dispersed among servers in the Cloud. This hybrid approach allows the enterprise the ability to scale to meet demand from spikes in traffic. Alternatively, a similar application to the above could run entirely within a dedicated hosting environment with the ability to "burst" into the Cloud. This burst functionality allows users to more fully utilize dedicated resources without concern for performance degradation during a spike in demand. Otherwise, the enterprise would have to invest infrastructure to support peak edge capacity, only to have that capacity stranded and unutilized most of the time.

Every enterprise application has specific traits that make the Cloud decision a thoughtful one. Some will be able to utilize the Cloud immediately, while others will take some time to reach a hybrid cloud solution. In either case, the Cloud should rarely be dismissed as unfeasible without qualified assessment and consideration for possible solutions. This initial investment of time and energy can provide lasting returns by easing the challenges that many enterprise IT environments must overcome.

PICKING A CLOUD PLATFORM

Once applications have been identified as Cloud-viable, the next step for an enterprise is to consider which cloud platform to engage. Even though the Cloud seems like the ultimate platform for flexibility, making the wrong decision for an enterprise's Cloud platform can restrict the intended agility. Clearly it is not the Cloud itself that hampers flexibility, but rather the proprietary, closed platforms that some providers offer.

Here are some important qualities to consider in a platform provider:

- What kind of customer service and response time do they guarantee?

- How flexible are their service level agreements (SLA)?

- Is their platform an open-source one or a proprietary, closed one?

- Do they bill a fixed or variable cost for capacity?

- What are the technical specifications that they support?

- Do they offer both dedicated hosting and cloud computing solutions under one roof?

Though enticed by the appearance and assurance of flexibility up-front, enterprises may find themselves locked into systems that reduce their computing options instead of expand them. So it is vital for every enterprise to recognize that not all cloud computing offerings are equal and to pursue a platform that will allow flexibility in the short and long term.

SUMMARY

The Cloud concept can potentially solve the challenges of slowness, overburdened resources and expensive costs that many enterprises are dealing with in their IT environments. Among cloud solutions, the Cloud, dedicated hosting/private cloud and hybrid hosting each provide viable options that can meet varying needs appropriately. To decide among these three, each enterprise should consider latency, security and legacy hurdles. Finally, if an enterprise deems cloud computing to provide true speed, resource and cost advantages, it should select a cloud platform that will not hinder the largest benefit of the cloud concept: flexibility.

ABOUT RACKSPACE

Rackspace® Hosting is a leading specialist in the hosting and cloud computing industry, offering one of the largest breadths of solution flexibility in the industry. Rackspace provides Fanatical Support® service to its customers, across a portfolio of hosted IT services, including Managed Hosting, Cloud Computing, Hybrid Hosting and Email and Apps.
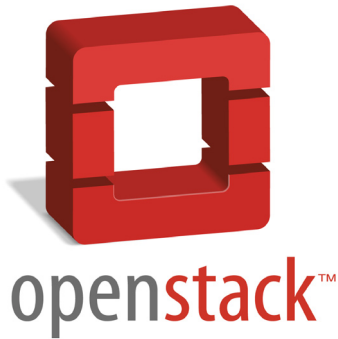
OPENSTACK™ TECHNOLOGY: AN OPEN-SOURCE PLATFORM

To address the issue of platform lock-in across the industry, Rackspace opened the code on cloud infrastructure to provide an open-source platform. OpenStack™ Cloud is aimed at providing enterprise IT organizations with the ability to run a common Cloud platform in their own data center or with any hosting provider. This enables a given enterprise to implement either a Cloud or Private Cloud for significantly less investment than that which is required for similar solutions in the marketplace. Under this scenario, Rackspace would host OpenStack™ Cloud in its data centers for enterprises with the support of the same industry specialists who helped develop the open-source platform. Additionally, Rackspace envisions offering support services for an enterprise's internally-hosted OpenStack™ Cloud.

RACKSPACE HYBRID HOSTING

Whether you require Dedicated Servers and Cloud Servers™ operating independently for different workloads, or a seamlessly integrated architecture for bursting extra compute cycles, Rackspace® Hybrid Hosting allows you to mix and match compute platforms to best suit your needs. Rackspace solutions enable the right fit between application needs and compute platform, and allows enterprises to host entire environments under one roof, reducing the management complexity and cost of their total solution. Using breakthrough technology from F5® and Cisco®, Rackspace RackConnect™ enables seamless integration of Cloud resources serving the solution.

CLOUD READINESS ASSESSMENT

Rackspace provides customized solutions that best fit each individual enterprise's needs. Rackspace has experience in helping its customers leverage Cloud and Hybrid solutions, and helps enterprises in choosing the best solution to service their applications and migrate their platform. To assist in these efforts, Rackspace has developed a **Cloud Readiness Assessment service** that takes advantage of the knowledge it has collected from migrating hundreds of customers to Cloud and Hybrid solutions. The process looks at multiple factors with technical and operational knowledge to transition enterprises efficiently and effectively.

FANATICAL SUPPORT®

Exceptional customer service is one thing about Rackspace that differentiates it from other providers. Our culture hires only the most passionate people in order to build one of the world's greatest service companies. This differentiation gives enterprises an ease of doing business with Rackspace. It allows enterprises the collaboration to build the best solution specific to their business, from planning through implementation. And an enterprise's account team at Rackspace acts as an extension of the customer's internal IT team – proactive and responsive.

ALWAYS-ON ENTERPRISE

Rackspace has the performance, scalability, experience and affordability that enterprises demand. Its robust data center and network infrastructure, plus critical site monitoring, provides for enterprise's sites and applications availability. With the broadest array of hosting solutions, Rackspace® dedicated hosting can be integrated with Cloud solutions for maximum flexibility and on-demand scaling. The company's always available, dedicated LAMPstack and Windows specialists position it at the forefront of cloud computing development in regard to experience and expertise. As for affordability, Rackspace allows enterprises to leverage economies of scale with access to expensive tools and scarce technicians as needed. Additionally, its pay-per-use model in cloud hosting gives enterprises even more cost efficiency.

SOLUTIONS PORTFOLIO

Rackspace provides enterprise-class services and specialists for a fraction of the cost of servicing applications internally. This portfolio includes Managed Hosting for dedicated environments, Cloud Hosting for low-cost utility computing, and Hybrid Hosting for the optimal mix of both to provide the most performance at the best value.

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