
Hybrid Hosting: Evolving the Cloud in 2011

How Superior Price/Performance Can Create a Business Advantage

A whitepaper by AMD and Rackspace

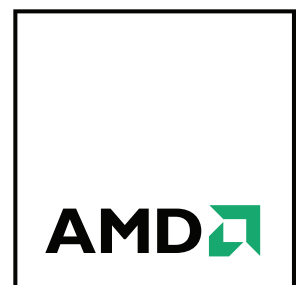
INTRODUCTION

As businesses of every size rely more and more on their technology infrastructure to provide them with a competitive advantage, cloud computing and related technologies have emerged as potential game-changers. The most intense focus has been on finding ways to leverage cloud computing with minimum disruption to business processes and maximum return on investment. The result has been the rise of hybrid hosting. Because hybrid hosting offers significant advantages to its users, the technology has become the solution of choice for a growing number of businesses. Gartner, which rates the benefit of hybrid cloud computing as “Transformational,” observes that “It also sets the stage for new ways for enterprises to work with suppliers, partners (B2B) and customers (business-to-consumer) as these constituencies also move toward a hybrid cloud-computing model.”¹ We will begin, then, with a big-picture look at hybrid hosting.

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OVERVIEW OF HYBRID HOSTING

Hybrid hosting, an approach that combines components of dedicated hosting and cloud hosting in a single solution, allows businesses to switch seamlessly between dedicated hosted services and cloud services, or use both simultaneously, as needed. In particular, hybrid hosting solutions recognize that a business will have different sets of requirements for different types of computing needs as well as requirements associated with specific types of applications.

For mission-critical applications, including line-of-business and proprietary applications, stability and security requirements may point to the need for dedicated hosting. Usage associated with promotional events and campaigns, or any application that experiences highly variable traffic and usage patterns, may be better suited to scalable cloud solutions.

Rather than forcing businesses to choose just one platform, hybrid hosting gives businesses access to both, integrating the strengths of each seamlessly without incurring unnecessary costs and without introducing undesirable complexity. As a result, “[t]he bulk of business computing will shift out of private data centers to the cloud,” according to noted technology author Nicholas Carr.² To look at what that shift entails, we will examine next the basic elements of hybrid hosting.

ELEMENTS OF HYBRID HOSTING

Most enterprise computing today takes place in-house, on hardware owned and managed by the companies that use it. Because a conservative approach to capacity planning calls for companies to size their infrastructure based on anticipated peak needs, the typical non-virtualized in-house server is in use only ten percent of the time.³ By contrast, servers used in cloud hosting are more highly utilized, more efficiently utilized, and can provide computing that is cost efficient, faster, and more capable. Similarly, a 2008 reader survey conducted by CIO Magazine found that “58% say cloud computing will cause a radical shift in IT and 47% say they are already using it or actively researching it.”⁴ In short, the trend is toward enterprises retiring legacy systems, moving to web-based environments, and showing an increasing preference for buying IT as a service.

Limitations of Cloud

While cloud computing provides numerous benefits in its scalability, flexibility and utility billing model, it is not necessarily the ideal platform for all applications. In cases where businesses require a high degree of security, extensive customization, or when maximum performance is essential, a dedicated server may provide a more desirable alternative. We will consider security concerns in depth below.

Increasing Expectations

The increasing availability of cloud computing technologies, driven by a growing number of cloud hosting vendors, has helped businesses become more familiar with — and more comfortable using — cloud computing solutions. As businesses begin to unlock the value of cloud computing for their particular IT environments, they may, in turn, become aware of the vast potential cloud computing and hybrid hosting solutions offer. Consequently, businesses are becoming both better educated and more demanding. According to a report from IDC, this increased familiarity with the potential that hybrid computing represents is “spelling an end to what has been a honeymoon period in the public and hybrid cloud-computing markets.”⁵ Vendors that provide hybrid hosting solutions must adapt to these expectations in order to remain competitive. Moreover, they must understand the issues that could slow cloud adoption and find ways to help businesses overcome those issues.

Easing the Migration

Moving legacy applications to the cloud can have significant benefits. Allowing connectivity between on- and off-premise dedicated physical server resources and cloud-based computing resources provides many options to match the right workload or application to the right platform. With that added flexibility, developers start to think in terms of which platform works best for which piece of their application, allowing for creative architectures that were not possible even a year ago.

However, legacy applications may require recoding before they can take advantage of the flexibility and scalability of cloud computing. Moreover, recoding can be both expensive and time-consuming.

A hybrid model permits a novel solution to the recoding problem. A hybrid platform allows companies to begin to move their applications to a cloud platform a piece at a time, avoiding an expensive, top-to-bottom rewrite entirely or, at a minimum, splitting the task into manageable phases.

Some of the easier application components to move to the cloud include batch job processing, web and storage tiers, and test and development environments. By connecting back to the physical server infrastructure, companies can avoid the more intensive database re-architecture projects and keep their relational database on fast I/O dedicated servers.

As vendors find ways to make the cloud more accessible to businesses, they must have an answer for a key concern businesses have around cloud hosting: security.

HYBRID HOSTING AND SECURITY

All the concerns that apply to data security in traditional IT infrastructure environments apply to both cloud and hybrid hosting environments, along with additional concerns unique to the cloud. To bring structure to security considerations around cloud and hybrid computing, organizations such as the non-profit Cloud Security Alliance(CSA) provide education on, and promote best practices for, security in cloud computing.⁶

The CSA divides security issues into two broad categories. The first category relates to issues of governance, such as:

- legal and electronic discovery;
- compliance and audit; and
- information lifecycle management.

The second category focuses on issues that are more operational nature, and includes:

- application security;
- encryption and key management; and
- identity and access management.

Businesses can evaluate the security measures provided by their cloud and hybrid hosting vendors in the context of the guidelines set forth by the CSA and similar organizations.

Hybrid hosting models can offer a different security approach than a cloud-only hosting solution, because dedicated security appliances are paired with cloud resources. Hybrid Hosting at Rackspace, for example, allows a company to leverage a dedicated hardware firewall in front of their cloud servers to provide granular security to their cloud based application. The Company can further enhance security by adding DDoS (distributed denial of service) prevention appliances.

In addition, for applications with specific compliance requirements(such as ecommerce applications that must pass PCI DSS audits for accepting and processing credit card transactions and data) secure data can reside on dedicated physical servers and databases isolated from other portions of the website, such as the public product catalog. The catalog, by contrast, could move to cloud servers to allow responsive scaling to fluctuating traffic patterns. By combining dedicated and cloud hosting in this manner, it is possible to address many of the security and compliance concerns of a fully cloud-based solution today.

RACKSPACE® CAPABILITIES IN HYBRID HOSTING

Rackspace® Hosting is a leading provider of hybrid hosting capabilities. With extensive experience in both dedicated hosting and cloud computing, Rackspace recognizes that customers require the ability to combine physical and cloud based resources. In 2010, Rackspace launched an offering to fill this need. Called RackConnect™, the offering allows customers to seamlessly link cloud computing and traditional hosting together with enhanced user control and security.

RackConnect™ Hosting Solution

When a customer selects the RackConnect™ service, Rackspace performs an initial setup process to connect the customer's dedicated servers to its cloud account. Customers can choose to use a dedicated firewall or application delivery controller to act as a router between the environments as well as to automatically provision access controls, to ensure their dedicated environment remains secure. This connection occurs entirely within the Rackspace datacenter over a private network, ensuring traffic flows at wirespeed and remains isolated from the internet.

Rackspace can further perform wild card pattern matching based on server name or metadata assigned to the cloud servers, and then add the cloud resource appropriately to application or web server resource pools. As customers spin cloud servers up and down at-will, RackConnect™ automatically adds and removes these servers to and from the appropriate resource pools. With RackConnect™ providing context, we turn next to use cases that demonstrate the potential business advantages of hybrid hosting technology.

HYBRID HOSTING FOR FLEXIBILITY AND SCALABILITY

Among the most significant uses for hybrid hosting is the case of scalable web applications. Dedicated servers, including high-performance custom servers for intensive I/O operations such as databases and file access, support predictable loads. Cloud servers allow for bursting during times of peak demand. Combining the two allows businesses to size the physical environment to average loads and minimize hosting costs by shifting peak loads to utility-priced cloud, incurring costs only when cloud resources are in use. The combined platforms also improve the time to bring additional capacity online, ensuring that applications stay available even when traffic spikes quickly.

A second use case for hybrid hosting is connecting production environments to test and development environments. By moving test and dev platforms to the cloud, developers can have direct access to test servers, alleviating the burden on IT managers, speeding development cycles, and reducing the costs of unused test server capacity. Additionally, connecting cloud-based test and development servers directly to production can speed and simplify code deployments, enabling short development and release cycles while also simplifying release operations. Similarly, regression testing and quality assurance activities can operate at scale using the cloud, since businesses can provision many cloud servers simultaneously to emulate a fully loaded environment. With dedicated hardware, this scale of testing can be cost-prohibitive, but the cloud's pay-as-you-go pricing model can make such load testing cost-effective today.

A third use case, and one rapidly gaining prominence, is one in which businesses use hybrid hosting to enable Software as a Service (SaaS) offerings for customers. In cases of software packages developed for client server deployment, businesses can move them to the cloud rather than rewriting the entire software package as a multi-tenant web-based solution. This allows each customer to maintain a dedicated instance of the application on his or her own cloud server. The SaaS vendor can then connect dedicated physical servers to the cloud server environment to manage the provisioning, store customer data securely, and provide administration, configuration, and management capabilities for the overall solution.

The common thread in all of these scenarios is the cost-effectiveness and flexibility of hybrid platform solutions. Rackspace enables these cost efficiencies in numerous ways, and key among them is Rackspace's choice of AMD technology.

AMD OPTERON™ SERVER PLATFORMS FOR HYBRID HOSTING

To derive the full benefit of cloud hosting's potential as a comparatively low-cost approach, Rackspace needed servers to use highly efficient processors that were competitively-priced. Conversely, to meet the volatile, potentially high demands of hybrid hosting environments, those same processors had to meet stringent requirements for performance, I/O capabilities and low energy consumption. Rackspace chose to base their critical cloud infrastructure on servers based on AMD Opteron™ 4000 Series and AMD Opteron™ 6000 Series platforms because they offer these qualities.

The AMD Opteron™ 6000 Series platform is based on the AMD Direct Connect Architecture 2.0 with up to 48 total cores in a 4P configuration. This platform more than doubles the memory bandwidth⁷, and provides nearly twice the I/O bandwidth of previous generation 2P and 4P servers.⁸ For optimal cost-effectiveness, the AMD Opteron™ 4100 Series processor, part of the AMD Opteron™ 4000 Series platform, is the world's lowest power per core server processor,⁹ serving as the foundation for hybrid cloud workloads and affordability with sub-\$100 pricing per CPU.¹⁰

With these two platforms, AMD enables cloud hosting vendors to offer users optimal levels of performance, power management, and cost efficiency for hosting environments. Since both of these processors are based on the same core technology, they also offer a level of compatibility that allows the mixing of servers with either processor type without causing major management headaches. Workloads can easily scale between the two because of the high degree of platform commonality.

CASE STUDY: HYBRID HOSTING FOR FLEXIBILITY AND SCALABILITY

Major League Gaming, one of the largest online professional video gaming leagues in the world, represents the world's best professional gamers, and offers millions of aspiring gamers the chance to compete, practice and socialize via MLG's massive network of sites.

To enable that interactivity, the MLG website supports resource-heavy applications with millions of user posts, game demos, recordings of past competitions, and other game-related media, with highly variable traffic. MLG turned to Rackspace to deliver that infrastructure.

Rackspace provides a full portfolio of hosting platforms, including hybrid hosting, delivering instant scale and storage combined with dedicated gear for MLG's security-sensitive applications. Tapping Rackspace for hybrid hosting allowed MLG to focus resources on their core strategic goals. As a result, MLG has been able to launch new user experiences faster, handle variable traffic without buying more hardware, and allow developers to perform system administration tasks.

Increased Speed

Previously using only dedicated hardware, MLG lacked the flexibility to deliver an optimal user experience. The optimal experience for their users requires both platform availability and a fast time to market for new applications. With a hybrid hosting environment, MLG gained the ability to treat the machine as a component of the application that they could modify as needed, eliminating the need to uninstall, clean, and rebuild for each new use.

Reduced Cost

Where hybrid hosting delivered the biggest cost benefit for MLG was in the ability to temporarily provision extra capacity to cover big events and launches. The hybrid environment delivered resources during game launches and live events, both of which dramatically increase traffic for a short period of time. Just as important, MLG minimized the costs of unused capacity between peaks.

CONCLUSION

Hybrid hosting technologies hold tremendous potential. Though not a silver bullet, the technologies enable flexibility that is critical for business today. In order to support the full spectrum of customer requirements, a hybrid approach of cloud and dedicated hosting solutions makes the most sense.

Contact Rackspace for more information.

http://www.rackspace.com/hosting_solutions.php

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¹ "Hype Cycle for Cloud Computing, 2010." Gartner RAS Core Research Note G00201557, David Mitchell Smith, 27 July 2010, RA3 01102011, page 14.

² Nicholas Carr. "The Big Switch: Rewiring the World, from Edison to Google."

³ <http://www.vmware.com/pdf/TCO.pdf>, page 6

⁴ CIO Magazine. October 2008.

⁵ ITWorld. October 2010.

⁶ Cloud Security Alliance. <http://www.cloudsecurityalliance.org/>

⁷ Based on quad channel DDR3-1333 for AMD Opteron™ 6100 Series processor vs. dual channel DDR2-800 for Six-Core AMD Opteron™ processor.

⁸ I/O comparison based on 3x HyperTransport™ technology links @ up to 4.8 GT/s (up to 14.4 GT/s total bandwidth) for Six-Core AMD Opteron™ processor vs. 4x HyperTransport technology links @ up to 6.4 GT/s (up to 25.6 GT/s total bandwidth) for AMD Opteron™ 6100 Series processor.

⁹ As of March 15, 2010, AMD Opteron™ processor Models 4162 EE /4164 EE have the lowest known power per core of any server processor, at 5.83W (35W/6 = 5.83W/core). Intel's L5609 is 10W/core (40W/4 cores) see http://www.intel.com/p/en_US/products/server/processor/xeon5000/specifications

¹⁰ AMD Opteron™ processor Model 4122 1ku pricing.

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