



WHITE PAPER

Laying the Groundwork for Private and Public Clouds

Over the past two years, the concept of cloud computing has grabbed hold of the IT consciousness and stirred up the industry. But with so many vendors jumping into the cloud-computing fray, promising the world and then some, deciphering what's real and what's not can be difficult for even the most seasoned IT professionals. The truth is that cloud computing does indeed hold great promise for the enterprise, but it's not the answer to all IT needs.

THE PROMISE OF CLOUD COMPUTING

For companies to be competitive in today's fast-paced, online-oriented and highly interconnected global economy, they must be agile, flexible and able to respond rapidly to changing market conditions. That means, for example, being able to scale seamlessly when transaction-processing demands balloon unexpectedly or grab storage space on the fly to meet a project's short-term capacity requirements.

Traditional IT, in which applications are bound to specific physical servers

and storage, is proving too rigid for the evolving needs of the business. Instead, companies need a next-generation style of computing in which highly scalable, dynamic and virtualized resources are available on-demand and only as needed. That's cloud computing.

The National Institute of Standards and Technology describes cloud computing as a model for enabling convenient,



on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction. By “configurable computing resources,” NIST means networks, servers, storage, applications and services.

In other words, users should be able to click their way through simple Web front-ends to get instant access to the applications, infrastructure or platforms they need to do their jobs. They’d specify the duration and only pay for the resources they use, whether they are tapping into cloud services from the internal IT organization or from an external service provider.

CLOUD COMPUTING AS EVOLUTIONARY MODEL

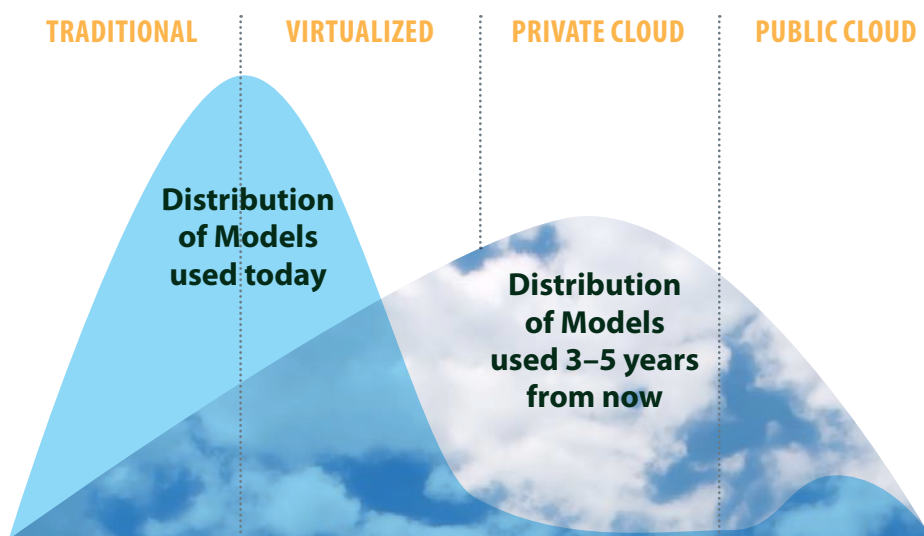
Cloud computing is essentially a familiar concept: The idea of a readily available pool of resources has been raised time and time again. For example, over the past decade we’ve heard about autonomic, grid and utility computing. We’ve also seen the emergence of a services-oriented approach to application architecture, as well as the rise of a do-it-yourself style of computing with the advent of application services and Web 2.0 technologies.

But what’s different is that the foundational technologies have matured to a point that the Holy Grail of IT—that infinitely scalable and readily available

pool of resources—is coming within reach. Foundational technologies include broadband network access, browser-based self-service applications, services-oriented architecture, horizontal scaling or fail-in-computing and, perhaps most significant, x86-based server virtualization.

Amazon Web services, with its “order IT with a credit card” compute and storage services, has made the viability of the cloud model clear. Individuals, work teams and enterprise IT now understand how easy it can be to grab extra compute or storage from a publicly available pool of resources, and how cost-effective the pay-as-you-go model can be.

Large Enterprise Portfolio of COMPUTE MODELS



In the enterprise, cloud computing can also ease the inefficiencies inherent in the traditional model of computing, in which the bulk of the IT spend goes toward maintaining legacy infrastructure, rather than business enhancements and innovations. It’s a process that often begins with virtualization, and that knocks down the barriers associated with the physical environment.

THE INGREDIENTS OF CLOUD COMPUTING

Deciding that cloud computing is a logical extension of a virtual environment and makes good business sense is only half the battle for IT executives. Figuring out what type of cloud to use and what to put in it is equally challenging.

Planning an enterprise cloud strategy must begin with the understanding that cloud computing, despite the furor



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surrounding it, is neither revolutionary nor the be-all and end-all, says Barton George, Dell’s cloud computing evangelist. Rather, it’s an evolutionary computing model that is prompting enterprises to take a hard look at how they might improve IT. That IT reexamination is a worthwhile undertaking regardless if cloud services are the end result.

George likens cloud computing to the stone in the fairy tale Stone Soup, in which a stranger tricks townspeople into adding ingredients into his “wonderfully flavorful but still somewhat lacking” stone soup.

“Cloud computing is the stone, or the catalyst, that’s going to drive an update of IT, but all the stuff that goes into it, like usage-based billing, self-service portals, pooling of resources, and all the other component parts, is really where the goodness comes in,” George says. “So you’ve got this ethereal concept of cloud, which is the end state you’re trying to get to, but it’s all the ingredients you’re going to put in there that will help you update your data center.”

Andi Mann, vice president of research, systems and storage management for

Enterprise Management Associates in Boulder, Colo., agrees. Cloud computing is but the next stage of virtualization’s evolution, he says.

Virtualization now is about flexibility, with the driver being the ability to get fast access to new services without IT standing in the way, Mann says. While IT no longer needs to be wary of the roadblocks typical of the physical environment (such as purchasing, procurement, racking, stacking and cabling), it must watch out for business, cultural and political barriers.

Indeed, cloud computing is as much about the way enterprises think about IT as anything else, agrees Kevin Van Mondfrans, cloud solutions planner at Dell. “Operations must now think about IT as a service to the internal organization and its response time, its ability to be more agile, and the need to be more accountable in the way it delivers and services IT,” he says.

TYPES OF CLOUD SERVICES

There are three types of cloud service models:

- **Infrastructure as a service**, or IaaS, which enables systems

administrators and developers to self-provision the processing, storage, network and other resources required to deploy and run applications and operating systems.

- **Platform as a service**, or PaaS—essentially a software development and hosting environment, made up of development tools, databases, middleware, and infrastructure software.
- **Software as a service**, or SaaS, which is the most widely known and most mature type of cloud service. With SaaS, users have Web access to applications hosted on a service provider’s infrastructure. Typical SaaS applications include those for customer relationship management, collaboration, e-mail, enterprise resource management and supply chain management, as well as software for engineering, manufacturing and operations.

STRUCTURES OF THE CLOUD

Just as three types of services have evolved out of the cloud, a trio of primary deployment models has emerged too: private, public and hybrid.

PRIVATE CLOUD

Whether operated and hosted by the enterprise IT department or by an external provider, a private cloud is for the exclusive use of a single organization. That’s appealing to enterprises that want to control security and data availability and to integrate legacy environments. On the downside, if a company is building its own cloud, its



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IT organization needs to account for that capital expenditure and may be hamstrung by infrastructure limitations. A private cloud is far more flexible than a traditional IT environment, but it is not truly limitless in scalability.

PUBLIC CLOUD

Public clouds, which are open to any number of organizations and individual users, have the reverse appeal. Using a public cloud requires no capital investment or associated risk, and enables agility and efficiency with vast scale. On the other hand, the shared nature of the resources raises security and regulatory concerns, as well as issues surrounding vendor lock-in.

HYBRID CLOUD

A hybrid cloud allows for data and application portability between the private and public worlds. For example, an application requiring additional processing capacity that is unable to find it in the private cloud could access the public cloud for resources.

Determining which model to use—or whether cloud computing makes sense at all for your organization—requires careful consideration of each application. Some legacy applications, for example, might not be able to take advantage of the cloud's scalability

because of the way they're architected. Others, especially those that aren't mission-critical, might not warrant the use of dedicated infrastructure.

When it comes to thinking about the cloud, IT has to take a hard look at how it can improve application delivery. Private and public clouds will join, not necessarily replace, traditional and virtual infrastructures as the compute models IT will use going forward, George says.

Right now, most enterprises rely heavily on traditional and virtual infrastructures. Over time, however, more and more of the IT infrastructure will move into private and public clouds as the benefits become clearer for each organization and the offerings mature.

NO BETTER TIME THAN NOW

Now is the time to start evaluating your IT infrastructure and the role private or public cloud services might play for your company going forward.

"It's a matter of lead or follow and be circumvented," George says. "If you don't jump on this thing, you might find a lot of people in your organization pulling out their credit cards and going to Amazon or Google Apps for the services they need. And that's going to create a big mess for you

because they won't be thinking about enterprise requirements such as service-level agreements and application integration."

CIOs would be wise to take this opportunity to establish IT's service delivery role, Van Mondfrans adds. They can do so by creating a standardized services catalog, complete with specifications for how each service would treat data, handle security and deliver compute capacity.

As IT morphs into the service-provider role, it is shifting from a cost center to a business unit with greater accountability to its internal customers, Van Mondfrans says. Goals include enabling self-service for business users, instituting a bill-back program, further automating systems administration and outsourcing as appropriate to the public cloud, while maintaining responsibility for policy, security and best practices.

Cloud computing doesn't require a headlong rush, but dawdling won't serve your purposes, either. "We're pretty far along on virtualization adoption but just in the early stages of turning to the cloud," Van Mondfrans says. "That means customers aren't behind, but IT will transform very quickly, and they'll easily find themselves behind in the marketplace if they don't get going today."