CLOUD COMPUTING: WHAT YOU SHOULD KNOW

There is hardly a topic creating more of a buzz in today's software industry, than the Cloud. Cloud computing is a dramatic shift in the way we think about providing computing resources. This year IT decision makers have begun to take the topic more seriously. 70% plan on deploying cloud services within two years. While there is still widespread confusion about what cloud services are, what benefits they offer, what the disadvantages may be and especially how secure they are, the trend toward the cloud is accelerating. Let's take a closer look at the state of cloud computing and what you should know about it today.

What is Cloud Computing?

Simply put, cloud computing is the outsourcing of your IT infrastructure via the Internet. Rather than maintaining your own hardware and software environment, cloud computing provides computing resources (such as processor compute time and data storage) on demand via a service provider. Cloud services are often compared in their nature to utility services such as gas or electricity. It is there when you need it, as much as you need, and you pay as you go and only for what you consume.

Cloud computing is the next major computing trend that will match our enterprise and business needs as well as personal lifestyle to computing capacity. For corporations, cloud computing is as significant a shift as the one from mainframe to client server computers more than 25 years ago.

Computing resources will dynamically scale depending on your requirements and are, in theory, without limits. This scenario has many implications: Businesses will have to change their resource planning strategy; small businesses and startups have access to the same computing

resources and capabilities as large corporations. Cloud computing architectures follow the idea of flexible resource sharing; this means that a company's usage of hardware resources is dynamically adjusted to their actual needs at any time. Companies start operating in an environment in which cloud services expand or contract without the need for significant configuration changes.

The idea of cloud computing is not new. The concept can be traced back to two sources in the 1960s - J.C.R Licklider, one of the pioneers of the ARPANET, who described his visions of an "intergalactic computer network" in 1969 and computer scientist Jon McCarthy who said back then that "computation may someday be organized as a public utility". There have been several approaches over the past decades to introduce cloud computing without much success. For example, Oracle presented its idea of a thin client Network Computer, known as NC, in 1996, revived the idea in 1999 when it announced that it would actually build the device and sell it for $200.

Current cloud computing started with the introduction of Amazon Web Services (AWS) in 2006. Google has also been a driving force in giving cloud computing a much more visible face, especially though its popular cloud web backed applications.

Cloud Models

Cloud computing can be divided into four main categories: Public cloud, private cloud, community cloud and hybrid cloud.

Public cloud is the most common and popular form of cloud computing and the type most of us tend to think about when we talk about cloud computing. In a public cloud, computing resources are dynamically provisioned over the Internet. A third party service provider services as "utility" and invoices its subscribers based on the use of computing resources.

Private cloud is delivered to a restricted set of customers (one or multiple customers). In this case, a cloud infrastructure is often maintained for a specific organization. Private clouds can be maintained on or off the premises of the organization that accesses it.

Community cloud is a cloud environment in which multiple organizations access the infrastructure based on similar needs. Community clouds are a compromise between private and public clouds, with typically more available resources than a public cloud, but less cost than a private cloud with just one subscriber. Community clouds are often used by a number of departments within large organizations, including governments.

Hybrid clouds are models of multiple internal and external cloud providers within one cloud infrastructure. Hybrid cloud models are likely to emerge as the most common form of cloud computing in the future as they provide subscribers greater choice and opportunities to access specific services within the same cloud without the need to switch to an entirely different provider, if business needs change. Hybrid clouds typically also involve a flexibility which services are hosted in the cloud and which not, which enables organizations to keep direct control over certain hardware and/or services.

Glossary: SaaS and Cloud Computing

Over the past ten years, there have been countless buzz words that imply concepts similar to cloud computing. It is only natural to ask whether terms such as software as a service (SaaS) are the same as cloud computing. Analysts predict that SaaS may soon be used by most as a phrase that is synonymous to cloud services; as far as consumers are concerned, that may be correct. However, SaaS just refers to software. Popular SaaS models include Internet email, Google Docs or salesforce.com.

What makes today's trend of cloud computing special is that it unifies individual computing ideas of the past, including utility computing, which was a big deal in the 2006-2008 timeframe; distributed computing (or grid computing), well known since the SETI@Home project at UC Berkeley; and centralized data centers which have been with us since the 1960s. Cloud computing usually combines all those services in a unique way.

Advantages and Disadvantages of Cloud Computing

Cloud computing can have unique advantages for your organization, but it requires a deep understanding of the topic to pinpoint the exact benefits. Your specific needs may enable you to draw advantages other providers cannot. The more you know about your organization's IT needs and the more you know about certain service providers, the more you will be able to fine tune your cloud subscription. Some even go as far as saying that the cloud system, as it emerges, today can be "gamed". The beauty of the cloud is that your subscription is flexible and organizations can adjust the cost of their service in a very short time.

The general advantages of cloud computing are:

- Lower Cost: Pay as you go, no hardware investments or software licenses

- More performance: Processing time on demand, even HPC, if needed

- Less maintenance: Someone else manages the servers and core software

- More security: Easier maintenance enforcement of policies, centralized data

- Unlimited storage capacity: Use it when you need it

The most cited possible disadvantages of cloud computing are:

- Dependency on Internet connectivity: Requires a constant connection

- Loss of control: The problem of someone else hosting hardware, software and data, which results in security concerns

- Unpredictable cost: Pay as you go means that the cost of computing will be different every month

All advantages and disadvantages should be carefully considered when choosing a cloud computing path.

Cost Reduction: As Flexible As the Service Itself

Of course, cost reduction is the most interesting consideration for organizations today when they are evaluating cloud computing. Depending on your business structure, your savings may be greater or less than someone else's. It is impossible to provide exact guidelines, so examine average cost reduction models carefully as they may not always apply to your individual case.

An Example: Reverse Capacity Planning

The most innovative approach to taking advantage of cloud computing today is generally described as reverse capacity planning. Typically, datacenters are designed for maximum load and that emergency when there is extra load coming in. So if your peak time is 10,000 users, your infrastructure needs to support a case of 10,000 users all the time, even if there may be just certain times when 10,000 users are accessing the data center.

The unknown variable in this plan is the need for extra capacity. How much extra capacity do you acquire to make sure the infrastructure remains available in emergency scenarios? One extra user or 10,000 extra users? In any case, there will be quite a bit of wasted server capacity – and that extra capacity will be sitting idle most of the time.

Cloud computing will bring a different way to plan computing capacity. In fact, you will look at the very minimum you need to keep your services running and start from there. If 10,000 users access your data center in peak times, but only 100 most of the time, you would only subscribe to a services package that provisions the resources for 100 users, instead of 10,000 + X. The cloud service should scale up dynamically from 100 users to the number you need at any given time, which means you actually pay for exactly the capacity you need.

In some cases, organizations may be paying next to nothing for their computing infrastructure, but will be able to access massive computing horsepower when they need it.

Security: How to Address Security Concerns

The biggest concern of organizations that are considering a move to the cloud is Security. A valid concern: sensitive data is processed outside the business environment within the physical infrastructure of a third party. However, cloud service providers today say that their infrastructure is at least as safe as onsite security. If you are moving toward cloud services, it is worth your while to research the following topics and evaluate them against your requirements:

- Privileged user access

- Regulatory compliance

- Data location and geo-redundancy

- Data safety, encryption and segregation

- Storage, backup and recovery of data, including response times

- Support, including investigative support, when needed

- Reporting

- Track record as well as long term viability of the service provider

When choosing a cloud service provider, it is critical that you make the right choice and choose a provider that is up to the task to keep your data safe. If that is the case, then cloud computing will be at least as safe as if you were to store data on-site. The greatest pro of cloud data safety is the fact that data is stored off-site and not accessible when devices such as notebooks, cell phones and USB sticks are lost. In that view, cloud services provide an invaluable security advantage.

Among the most common cloud service providers are IBM, Rackspace, 3Tera, IBM, Amazon or Google.

The Outlook: Cloud Computing Drives the Industry

Market research firm Gartner recently said that the global cloud services market will surpass $68 billion in 2010, up from $58.6 billion in 2009. By 2014, the market will have ballooned to $148.8 billion.

"We are seeing an acceleration of adoption of cloud computing and cloud services among enterprises and an explosion of supply-side activity as technology providers maneuver to exploit the growing commercial opportunity," said Ben Pring, research vice president at Gartner. "The scale of application deployments is growing; multi-thousand-seat deals are increasingly common. IT managers are thinking strategically about cloud service deployments; more-progressive enterprises are thinking through what their IT operations will look like in a world of increasing cloud service leverage. This was highly unusual a year ago."

Gartner estimates that, over the course of the next five years, enterprises will spend $112 billion cumulatively on software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS), combined.

According to Gartner, The U.S. share of the worldwide cloud services market was 60% in 2009 and will be 58% in 2010. By 2014, the share will have declined to 50%, showing the international momentum.

Audit firm KPMG recently released the results of a survey among IT executives, which points to cloud computing as the main driver of revenue growth in the next three years. KPMG said that "nearly 90%" of respondents plan on increasing IT spending this year, a trend that is led by China and India as companies that are expected to post the most significant revenue and employment growth as a result over the next 12 months.

86% of U.S. technology executives are convinced that corporations will increase their global IT expenditures this year. 33% said the increase will be moderate and in the 4-6% range, while a quarter of respondents anticipates at least 7% higher spending. The executives clearly believe that investing now will reduce IT spending in the long term.

54% of executives named cloud computing as the biggest driver of IT revenue growth, followed by 51% for mobile applications. 43% named client computing and virtualization and 42% mentioned advanced analytics. Spending on cloud computing as well as mobile applications could grow by more than 10% every year, KPMG said.

The survey showed that executives remain cautious on the recovery of the U.S. economy, as they agreed that a full recovery will not happen until mid 2012. However, they take action to prepare for the economy to be back in full force. 73% of executives said they invest for growth, which is

a shift from a strategy to cut cost or long-term growth that was found last year. "Our spring 2010 survey results find tech execs growing increasingly more optimistic on the industry, indicating that their strategic shift from cost cutting to investing is well on its way," said KPMG's Gary Matuszak.

Another key survey result was delivered by Pew Internet & American Life Project, which found that 71% of business leaders believe that, by 2020, we will not be using a general purpose PC as the most popular computing tool anymore. Instead, we will be using new types of cloud applications and Internet apps that run on our smartphones. The most innovative software will be seen on smartphones and most developers will be working on web apps. That, by the way, ties into a recent speech of Motorola's CEO Sanjay Jha at the Executive's Club of Chicago in April of this year, where he predicted that companies will be giving out more smartphones than notebooks to their employees by 2012.

Today's PC will still be there by 2020, according to those 71% of respondents. But the PC will find new roles that may tie into connecting various types of networked devices, ultimately changing into a tool that could be described as a digital hub.

27% of the surveyed group said that the cloud will develop and make its way into our lives, but the PC will still be the main device we will use for our computational tasks. Even if such a general scenario may have been difficult to answer to by many of the businesses surveyed, the trend is not difficult to grasp. The study noted the phrase "the Internet of things", which relates to devices that will have their own IPs and will be networked together in the not too distant future. Whether you are talking about tablets or control devices in verticals, or if it's just the remote control for your TV, "smart" features will be enabled largely through the cloud: For example, if you misplace your remote control for the TV, you could use your smartphone to locate it through an app.

Cloud computing and the technology behind it are maturing quickly. There is a sense of suggested urgency in the industry to research the opportunities presented by cloud computing. It is time for companies to take a serious look at the ways cloud computing can benefit their organizations. If 2010 is the year in which cloud computing saw a huge increase in interest due to its potential, it is not difficult to predict that 2011 will bring significant changes for the way enterprises will plan and build their IT infrastructure.