Industry Analysis: Cloud Computing

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Table of Contents

Introduction

Cloud computing is a term used to convey the complex, distributed exchange of data and resources over a network. The most famous of networks is the internet, but companies, governments, and individuals can even create their own network for distributed resource access. To better understand the power of cloud computing, as enabled by virtual machines and distributed computing resources, it's prudent to understand the components of an integrated network. There are clients—which are typically end user computers like laptops and workstations—that connect to servers. The physical connection, either through radio waves (i.e. wireless) or through Ethernet is the distribution path of the network. The network is a logical construct physically implemented by connecting wires, switches and routers that direct the flow of data traffic, and firewalls that control access to different hierarchical access levels logically segmented for security purposes.

Now, utilization of this physical construct, logically separated by security protocols, can be accomplished by minimizing the data flow from the client to the server and back again from the server to the client. Having the client ask for data in a message and then sending that message to the server where the processing is done is faster than the client trying to ask for the entire data set to be transferred over the network. The centralization of data processing is where the virtual machines come into play. Virtual machines are nothing more than another logical construct used to segment physical processing power and data storage into logically distinct computer environments. The ability to allocate processing power and data storage dynamically to logically distinct computers is reason that cloud computing is so powerful. With the advent of server farms— essentially a giant warehouse where thousands of servers are housed and linked together—cloud computing was not far behind.

The computing power required to manage the copious amount of data necessitated the advent of server farms. The management of these server farms required the dynamic allocation computing resource and data storage. Today Facebook, Amazon, and Google are some of the organizations that utilize the power afforded by aggregated virtual machines known as the cloud.

Background

Cloud computing has taken on science fiction connotations and is thought to be a relatively new concept. However, the idea behind aggregating distributed computing power has been in the minds of technological innovators for decades. "The idea of an 'intergalactic computer network' was introduces in the 60's by J.C.R. Licklider, who was responsible for enabling the development of Advanced Rese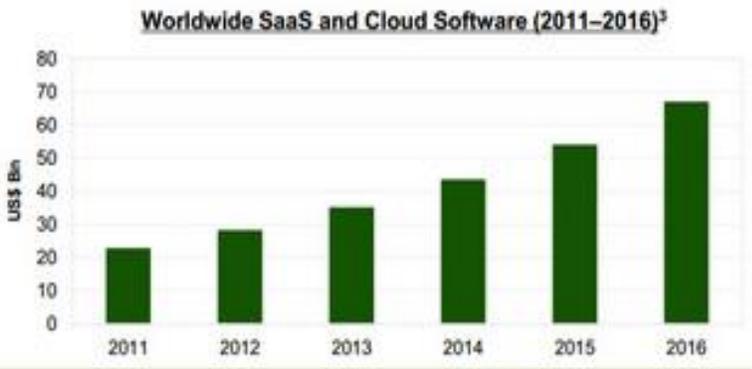arch Projects Agency Network (ARPNET) in 1969."[1]. Although a radical idea at that time, a vision of an interconnected global network able to access data from wherever whenever is something we now could not function without. In the 1970's IBM was the first company to release an operating system called VM heralding the birth of the term virtual machine. The VM operating system allowed for multiple virtual systems on a physical host. Fast-forward to 1997, a University of Texas professor Ramnath Chellappa coined the term cloud computing. In 1999 and we find a small startup company—Salesforce.com—pioneering the concept of utilizing distributed computing power to deliver "enterprise applications via a simple website." [1]. Harnessing the power of aggregated computing power (i.e. cloud computing) was just the first step in developing the power of the cloud.

The next iteration was introduced by Amazon in 2002 with Amazon Web Services. These services included storage, computation, and other offerings. In 2006 "Amazon launched its Elastic Compute cloud (EC2) as a commercial web services that allows small companies and individuals to rent computers on which to run their own computer applications."[1]. In 2009 Google added to the continuing exponential growth of cloud computing adoption by offering browser-based enterprise applications. As the public attention turns toward the "newest" technology trend adoption rates of cloud computing platforms will continue to increase. However, like most technologies cloud computing has been around for decades.
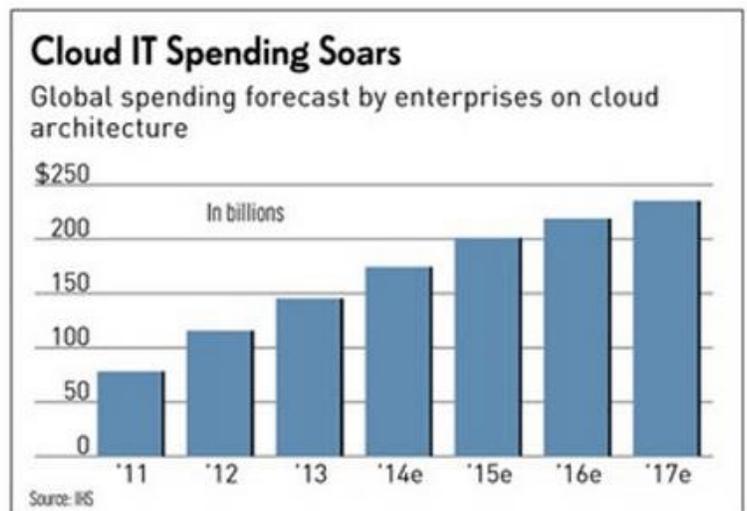
Dominant Economic Characteristics

Market Size

The market size of the cloud computing industry continues to show robust growth. If adoption tends persist, then expenditures a forecasted to reach nearly $70 billion USD annual expenditures

Worldwide SaaS and Cloud Software (2011–2016)[3]

in 2016 for worldwide consumption of just the applications that utilize cloud computing. That's roughly a 250% gain from 2011. With the introduction of more powerful computer hardware and software that enables the logical separation of the computing power into virtual machines the cloud computing market will continue to grow. The only hindrance to the continued growth of this market will be the availability of skilled professional available for organizations to hire.

The limited talent pool that has the capabilities to implement and administer the complexities of cloud based computing does not seem to impact the surveyed expectations of organizations' spending on cloud computing systems. As the graph shows the forecasted global spending on enterprise cloud architecture, which is the actual physical component of cloud computing, is expected to reach nearly $250 billion USD by 2017 **[1].**

Cloud IT Spending Soars
Global spending forecast by enterprises on cloud architecture
Source: IHS

Scope of Competitive Rivalry

The cloud computing industry is varied and nuanced with each competitor offering niche services. Depending on what the consumer trend will be over the long run many of these offering will be phased out. Google, Microsoft, Red Hat, and SalesForce are the predominant organizations that offer cloud based enterprise solutions.

Google

Google will continue to be the most utilized search engine and search analytics provider in the world. With the adoptionof niche services and platforms Google can capture a slice of the gorwing clod computing market. From the Gartner Magic Quadrant analysis **[2]:**

> Google's large installed base (it claims 30,000 paying customers) consists of many small Web innovators and some very large Web business sites (such as Snapchat and Khan Academy). The vendor also claims that over 90% of its internal IT is run on App Engine. The practice of the internal use of App Engine, as well as the App Engine experience of supporting the high number of isolated tenants, sets the stage for Google's enterprise campaign.
>
> Google's outstanding reputation as a cloud services provider and an early big data innovator lends credibility to Google App Engine… **[2].**

Microsoft

Microsoft has dominated the private and public sectors' productivity software (i.e. Microsoft Office). The introduction of Azure demonstrates Microsoft's focus on the future of cloud computing. From the Gartner Magic Quadrant analysis **[2]:**

> Microsoft's offering, Windows Azure, has evolved into an environment that supports IaaS and PaaS models. The vendor's approach is to focus on a "cloud first" push toward frequent updates and an aggressive approach to features and enhancements. Its long-term goal is to deliver the full range of .NET application infrastructure capabilities as Azure services. Its capabilities include its SQL Database as well as messaging middleware

services (Windows Azure Service Bus), in-memory data grid services (Windows Azure Cache) and Windows Azure BizTalk Services. It has also recently added Windows Azure Mobile Services, a cloud mobile back-end service offering that supports multiple clients beyond its own mobile client strategy. Its presence in other cloud environments (for example, SaaS through Dynamics CRM Online and Office 365, including SharePoint Online) also contributes to the vendor's broad cloud strategy **[2].**

Red Hat

Red Hats collaboration with the open source community gives the organization an advantage to the newest innovation. Finding practical applications and monetizing these innovations is a difficult task. From the Gartner Magic Quadrant analysis **[2]:**

Red Hat is a leading provider of the open-source Linux OS technology (Red Hat Enterprise Linux [RHEL]) and the open-source JBoss family of middleware products. The vendor has utilized these to enter the market with its high-control, cloud-based, shared-OS OpenShift Online offering, and also offers an on-premises CEAP called OpenShift Enterprise, which can be used by IT organizations to create a private Platform as a service (PaaS) environment **[2].**
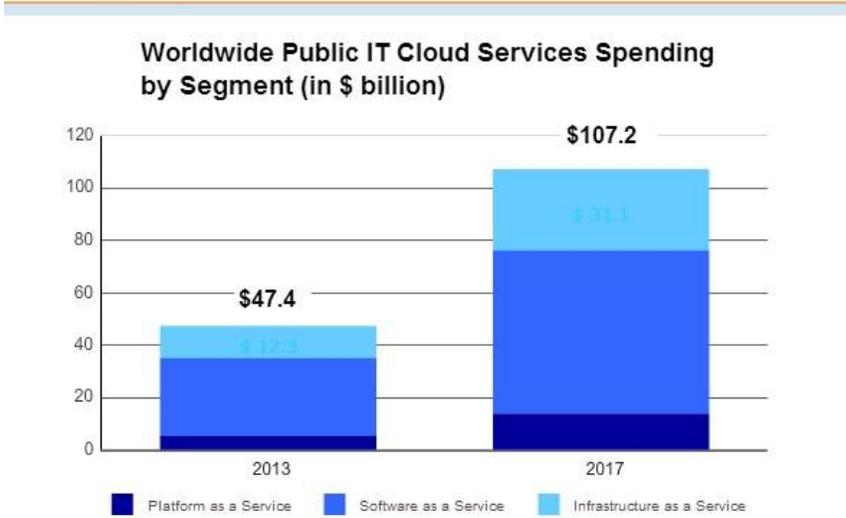
salesforce.com

Sales force continues to make strong gains in the software as a service (SaaS) and the platform as a service (PaaS) markets. From the Gartner Magic Quadrant analysis **[2]:**

Salesforce.com has been a pioneer in the cloud computing industry offering a market-leading SaaS since 1999 and a market-leading PaaS since 2007. Force.com, a cloud-native, high-productivity, shared-everything cloud platform service remains their star cloud computing platform **[2].**

The scope of competition in the cloud computing market is vast and each organization has their own proprietary offering to sway consumers. What consumers will inevitable settled on is a cloud computing service that affords the purchaser data security while delivering performance. What company will be able to offer this combination is a matter of public opinion.
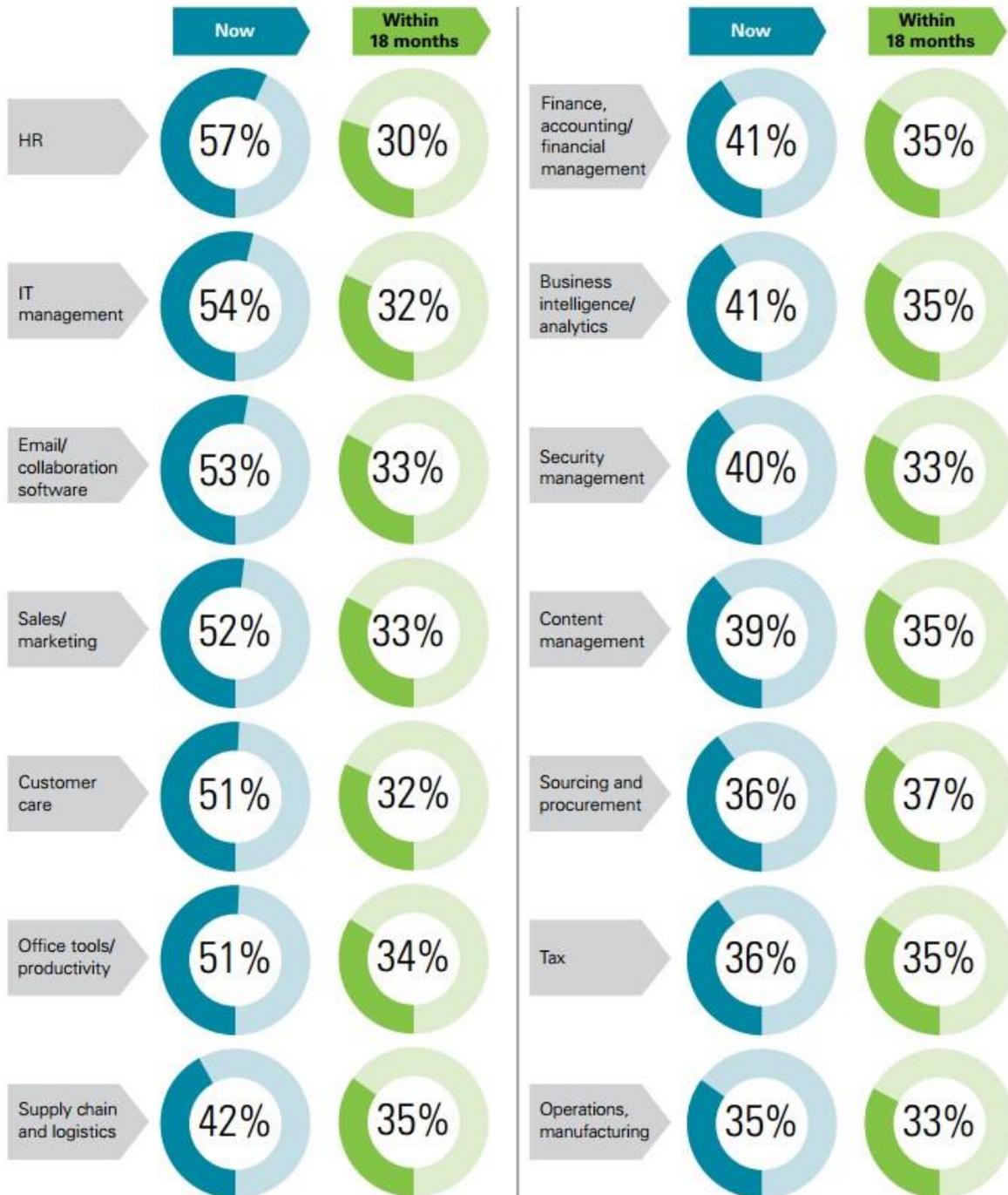
Market Growth Rate

Cloud computing is maturing in the IT industry as many enterprise companies adopts it into its infrastructure as well as its business processes. A research performed by the International Data Corporation (IDC), a market research, analysis, and advisory firm that specializes in Information Technology, saw that the cloud computing industry would grow from multimillion to multibillion dollars industry. IDC reported that in 2013, the market growth rate in cloud computing had hit a growth of $47.4 billion and is predicting an increase of $107.2 billion **[3]**.

This following graph shows how much is being spent on cloud computing as well as how much growth cloud computing is gaining. This shows that the cloud computing market in the IT industry is going to grow much more in the near future as securities and assurances improve. In addition, enterprise companies, small businesses, and so on, are already using the cloud technology and utilizing cloud computing to decrease IT spending, but increase cloud computing market as depicted in this image below **[3]**.

In which functional areas of your business are you using cloud-enabled services today, and which are you *likely to adopt* within the next 18 months?

	Now	Within 18 months			Now	Within 18 months
HR	57%	30%	Finance, accounting/ financial management	41%	35%
IT management	54%	32%	Business intelligence/ analytics	41%	35%
Email/ collaboration software	53%	33%	Security management	40%	33%
Sales/ marketing	52%	33%	Content management	39%	35%
Customer care	51%	32%	Sourcing and procurement	36%	37%
Office tools/ productivity	51%	34%	Tax	36%	35%
Supply chain and logistics	42%	35%	Operations, manufacturing	35%	33%

Total respondents (n = 674)

Source: KPMG International's Global cloud survey: the implementation challenge

Number of Companies in the Industry

Cloud computing is not a new concept. The concept of cloud computing has been around since the mid 1900's. The Industry however is not as old, ranging back from the 90's and growing through the past decade. Although the Cloud Computing industry is not small, many of its competitors are small to midsize companies. There are nearly 200 recognized cloud computing providers given that large companies like Amazon, Red Hat, IBM and Oracle and Microsoft are have a fraction of their company broken down into multiple divisions offering different cloud computing platforms. Microsoft has three major divisions in cloud computing including Microsoft Azure, Azure Web Services and Microsoft 365. Other companies like Cloud.bg, Cloud Sigma and GoGrid focus largely on cloud computing but make up a smaller percentage of the market by revenue.

Amazon which is mainly known for its online shopping has its own cloud computing division Amazon Web Services. Amazon Web Services was ranked as a 2014 top leader in Infrastructure-as-a-Service by the Computer Business Review **[4]**. The division started in 2006 and made a profit of $99 million by the end of its first year. In 2013 the company made revenue of over $1.69 billion and is projected to make revenue of over $2.5 billion by the end of 2014. Red Hat is another major provider in open sources cloud computing solutions and a top Platform-as-a-Service provider. During its 2014 fiscal year Red Hat generated revenue of over $1.53. The major software provider Microsoft has generated $156 million over 2014 through its public cloud IaaS or Infrastructure as a Service. Microsoft is also consider as one of the top IaaS provider for 2014 and is a major competitor against Amazon Web Services. Also in 2014 Google, a company that earns a majority of its $40+ billion dollar revenue through advertising, generated $66 million from its cloud services. Google was recognized a top cloud storage provider in 2014. Oracle reports that their cloud revenue has increased by thirty percent in their first fiscal 2015 quarter. They have generated $475 million in revenue from their Software-as-a-service and Infrastructure-as-a-service offerings. The growth of software development, infrastructure, security and storage solutions contribute to the demand for cloud based storage, security and data processing solutions. According to Forbes, Gartner Inc, a global technology research and advisory company predicts that by 2016 nearly half of the world's largest enterprises will invest in cloud computing solutions making it the bulk of worldwide IT spending

[5. Columbus]. It predict that companies worldwide will spend over three billion dollars on cloud based security service solutions alone. That one billion is more than what companies spent in 2013 for similar cloud based solutions. As the cloud computing industry continues to thrive off companies investments and expand, opportunities for growth and new entries will continue. In the past five years companies like, Boundary, Couchbase, Cloudkick, Dotcloud, Fluid Info, Open Stack and Tidemark have joined the market and continue to expand.

Customers

Thanks to the large amount of cloud service providers companies of any size can deploy a scalable cloud solution. According to Forbes, Oracle alone has over ten thousand customers with twenty five million users. To scale the customer base, Oracle has over ten thousand customers yet it does not fall on Right Scale's Top Ten List of Public Clouds Used. Amazon Web Service is the top public cloud provider for both enterprises and small business. Amazon Web Services has nearly 200,000 customers in 190 countries world-wide. Technology. Some of Amazon's largest customers include HTC, Expedia, Pinterest, Comcast, the Food and Drug Administration and even the National Aeronautics and Space Administration. VMware has over 500,000 customers including the Fortune 100 companies making VMware's vSprere/vCenter the top private cloud used for both enterprises and small business. Other top private cloud providers including: Red Hat, Microsoft and Citrix have thousands or customers worldwide

Top Public Clouds Used:

Place	Enterprise (1000+ employees)	SMB (Under 1000 employees)
#1	AWS	AWS
#2	VMware vCHS	Rackspace Public Cloud
#3	Azure PaaS	Google App Engine
#4	Azure IaaS	VMware vCHS
#5	Rackspace Public Cloud	Azure PaaS
#6	Google App Engine	Google IaaS
#7	SoftLayer/IBM	Azure IaaS
#8	Google IaaS	SoftLayer/IBM
#9	HP Cloud	HP Cloud

Top Private Clouds Used:

Place	Enterprise (1000+ employees)	SMB (Under 1000 employees)
#1	VMware vSphere/vCenter	VMware vSphere/vCenter
#2	VMware vCloud Director	OpenStack
#3	Microsoft System Center	Microsoft System Center
#4	OpenStack	VMware vCloud Director
#5	Citrix CloudStack	Citrix CloudStack
#6	Eucalyptus	Eucalyptus

[6]. According to Right Scale there are four types of customers adopting the cloud: cloud watchers, cloud beginners, cloud explorers, cloud focused. Cloud watchers are future customers who are actively incorporating the cloud into their strategic planning. These watchers are scanning the market for vendors and providers to initiate a subscription or service contract. Cloud beginners are users in the initial stages of cloud implementation. Cloud explorers are already utilizing the benefits of cloud services including platform, software or Infrastructure-as-a-Service. Cloud focused customers usually consist of smaller companies and organizations with under a thousand employees. These companies are heavily invested in utilizing cloud utilities. Even though most enterprise customers fall into Cloud beginners and Cloud Explorers, they customers employ more than one cloud solution. According to Right Scale, nearly seventy-five percent of enterprises use a multi cloud systems and half of enterprise are planning to use hybrid cloud systems. Nearly ninety-six percent of enterprises are already cloud customers while only four percent of enterprises have not incorporated the cloud into their strategic plans.

Degree of Vertical Integration

Vertical integration is defined as a merger of companies at different stages of production and/or distribution in the same industry. In the industry of technology, vertical integration holds a significant part and plays a major role in today's IT company. This could mean taking hold of the equipment of another IT company, patents, or knowledge assets (applications, software and etc.). Red Hat, for example, is an IT base company that operates with a business model called the "open-source way," as well as having it in its own mission statement. This makes Red Hat an

aggressive competitor (compared to Google, Microsoft, and Microsoft) in the IT industry, due to having bridging the gap between two different communities (the open-source community and the enterprise community) and creating innovative technologies. The main idea of vertical integration in the IT industry is to obtain knowledge assets from another company, along with hardware, software, patents and such **[8].** A merge that Red Hat did recently is with eNovance, an OpenStack (a free and open-source cloud computing software platform) integration service company. As cloud computing becoming a thing in the near future, Red Hat is one step ahead with this vertical integration due to merging with a company that is on the same path as Red Hat is. The downfall of vertical integration in the IT industry is the fact that, debating if the knowledge assets, products, services, hardware, software, patents and so on, is worth buying at the cost of millions to billions of dollars. Most IT companies are preferably merged, acquired or starting off as a small business since the majority of IT companies do not have the capabilities or resources to keep up with the growing and current trend in the IT industry, especially in cloud computing.

Ease of Entry/Exit

The ease of entry and exit in the cloud computing industry is base off the entry into the IT industry. Cloud computing is still being improved by many IT companies to condense processes as appose to pre-cloud computing. In addition, it is difficult for one to enter. The difficulty of entry into the industry is due to major companies, such as Red Hat, Google, Amazon, and especially Microsoft, being around for quite some time as well as being the major technology innovators in the IT industry; along with that, it possess many barriers for one to enter into the IT/cloud computing industry. One must have a strategic business analysis, investment requirements, patents, knowledge assets, etc., and the competitive edge to compete with other IT companies.

It is hard for one to enter the industry, some start up by building a small IT base company to build software/web applications through the technologies being introduced such as the cloud. Others are created as integration services providing support for integrating other companies' platform onto another platform such as the cloud for better processes and work flow. This is a bit of a work around that most do to ease into the IT/cloud computing industry. It makes it much

easier to gain private investment and build up the company's portfolio by doing so. However, this takes away the expansion of the cloud computing industry as many small companies are offering or providing better support for integration, software products and, rarely, resources.

Technology/Innovation

Technology is mostly, if not all, and usually about innovation. In the IT industry, as well as the cloud computing industry, technology is almost always growing and new innovation of technology comes at a fast pace. The early adoption of the cloud computing came from three distinct layers of services provided from the IT industry. Those three distinct layers are: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Blythe Aronowitz stated in the article, "Cloud Computing – Storms on the Horizon," …the IT perspective, several trends focused on increasing the efficiency of software distribution, and hardware utilization have converged to enable a cloud computing model…" which are grouped into the four distinct layers mentioned previously. In addition, it provided the major changes in the IT industry and introduced the cloud. The cloud made storing and accessing data much easier than to saving it to a USB flash drive or having to access a physical computer remotely.

Moreover, the biggest innovation that came to the IT industry that made cloud computing possible is the fact that the consumer can use specific applications/software on most computers as well as having the capability to save the data for later usage. In addition, it is further improved to run on less hardware requirements for performances. This gives the consumers efficiency for better workflow with the ease of usage. What's more, cloud computing, alone, is driving rapid innovation, development and distribution in the industry. The Bay Area Rapid Transit (BART), for instance, serves about 400,000 commuters each day in the northern part of California. It owns and operates a wireless network that provides cell phone services to commuters underground. In addition, BART reduced the expected delivery time of its pilot for its mobile application from months to weeks by using cloud computing services, which enable its developers to develop and deliver projects faster and more efficient prior to before (Forbes, 2014). Another example is that most games are being played on the cloud, which most (if not all) utilizes cloud computing to make buying, renting, and playing games much less complicated compared to before. What's

more, it is also helping more companies to expand its businesses to more and more consumers across the world.

Product Characteristics

Cloud computing products and services are relatively similar, making it difficult to differentiate products and services from one company from another. The main services are categorized into three different "as-a-service" models—these models are: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS).

I. Infrastructure-as-a-Service (IaaS): Organizations outsource equipment used to support operations such as servers, hardware, and storage. The outsourced service provider owns the equipment, but the client essentially pays on a per-use basis. It is one of thee main cloud computing service models mentioned before. Possible IaaS components include: Automation, Virtualization, and Storage. Some IaaS cloud computing companies are: DropBox, VMWare, BMCSoftware, EMC^2, Amazon Web Services, and Juniper Networks.

II. Platform-as-a-Service (PaaS): Similar to IaaS, PaaS is a service delivery model where clients can rent hardware, storage, and operating systems, but over the Internet. PaaS allows operating system features to be interchangeable and upgraded. Utilizing Paas allows expenses to be minimal, but with low expenses, clients have a possibility of being "lock-in" with the company's services. Some PaaS cloud computing companies are: Red Hat, Verizon, AT&T, Oracle, Google App Engine, and Windows Azure AppFabric.

III. Software-as-a-Service (SaaS): SaaS is the most basic model of cloud computing. With this model, there are no third-party developments, which is a plus to clients. Saas is a software licensing and delivery model in which different software are licensed under subscription basis. These software subscriptions are centrally hosted meaning users can access the software using a web browser through thin-client infrastructures. As more companies utilize the cloud, SaaS has become a very common delivery model for many business applications. Some Saas cloud computing companies are: SalesForce, Halogen Software, Cloud 9, CloudShare, Tricipher, DocuSign, and Citrix.

Economies of Scale

Cloud computing naturally brings economies of scale because of high utilization. When a company utilizes IaaS, workloads will share the same server infrastructure as other organizations, which result in lower expense costs. Like many large companies, cloud computing also benefits from economies of scale. With services and features like automation and virtualization, it helps standardize and pools IT resources to being automated instead of performing manual maintenances. To keep expenses minimal, large data centers (DCs) are recommended because it can lower costs per servers.

Cloud Economies of Scale are characterized by:

1. Supply-Side Savings—DCs can lower server expense costs
2. Demand-Side Aggregation—Demands overall availability

Multi-Tenancy Efficiency—The more clients or users, it would lower application management and server expense costs.

Experience Curve Effects

The Experience Curve, originally called the learning curve, is a conceptual framework that states that unit production costs decline by some fixed percentage each time the total accumulated volume of production in units double. Companies use this framework to help reduce costs faster than the competition. When companies find ways to do what they do better, they also see a cost reduction.

For the cloud computing service industry, this is not necessarily an important factor than it would be to a product-based industry. Seeing how companies that deal with the cloud mainly offer services, the experience curve wouldn't be a leading strategy to be used. Even so, the experience curve figures will vary from company to company within a specific industry.
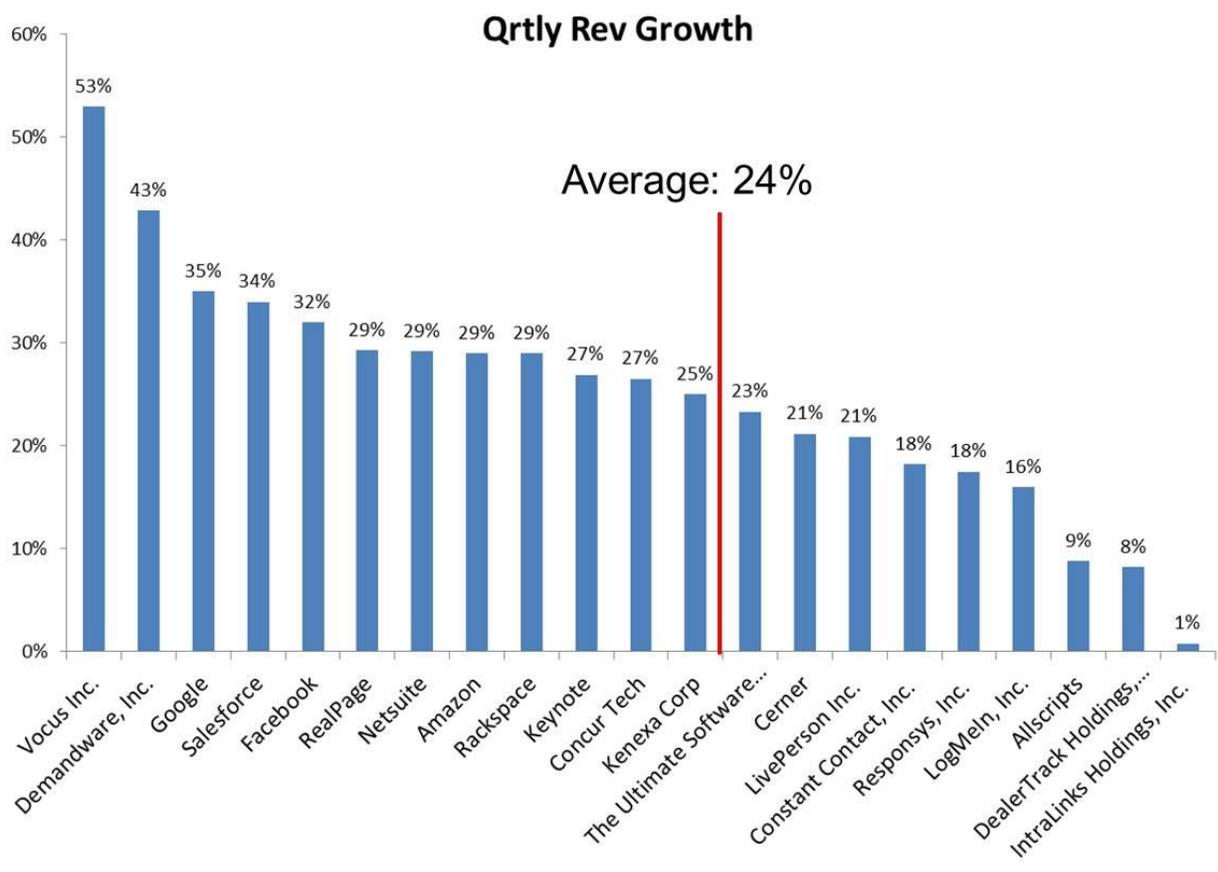
Capacity Utilization

The capacity utilization of a process deals with the extent a company is able to operate at. A higher utilization means that more resources are being put to use, which leads to increased productivity and efficiency. In an ideal world, a company could run and sustain itself indefinitely, under 100% capacity utilization. However, this shouldn't exist in the real world

because something used at complete capacity gives no room for error and it would be tough to sustain for an extended amount of time.

In the service industry, capacity utilization is just as important as it is in the products industry. For cloud computing, capacity is measured in the forms of storage, CPU cycles, network bandwidth, or workload memory capacity. Utilization would be measured by uptime availability and usage volume. Keeping operating and service capacities balanced is the key to operational efficiency.

Industry Profitability

The cloud computing industry is fairly new and is growing very rapidly as its popularity rises. The Cloud is the baby of the technology industry but it's been gaining popularity in usage for both personal and enterprise markets. With all the advancements in capabilities and security, many companies are seeing the benefit and are switching over. The following chart depicts twenty of the big players in the cloud computing industry and their quarterly revenue growth percentages for the 2012 traditional year. Keep in mind, these are the figures as of 2012 and the current state of the industry has been positively growing, with other companies climbing their way to the top as well.
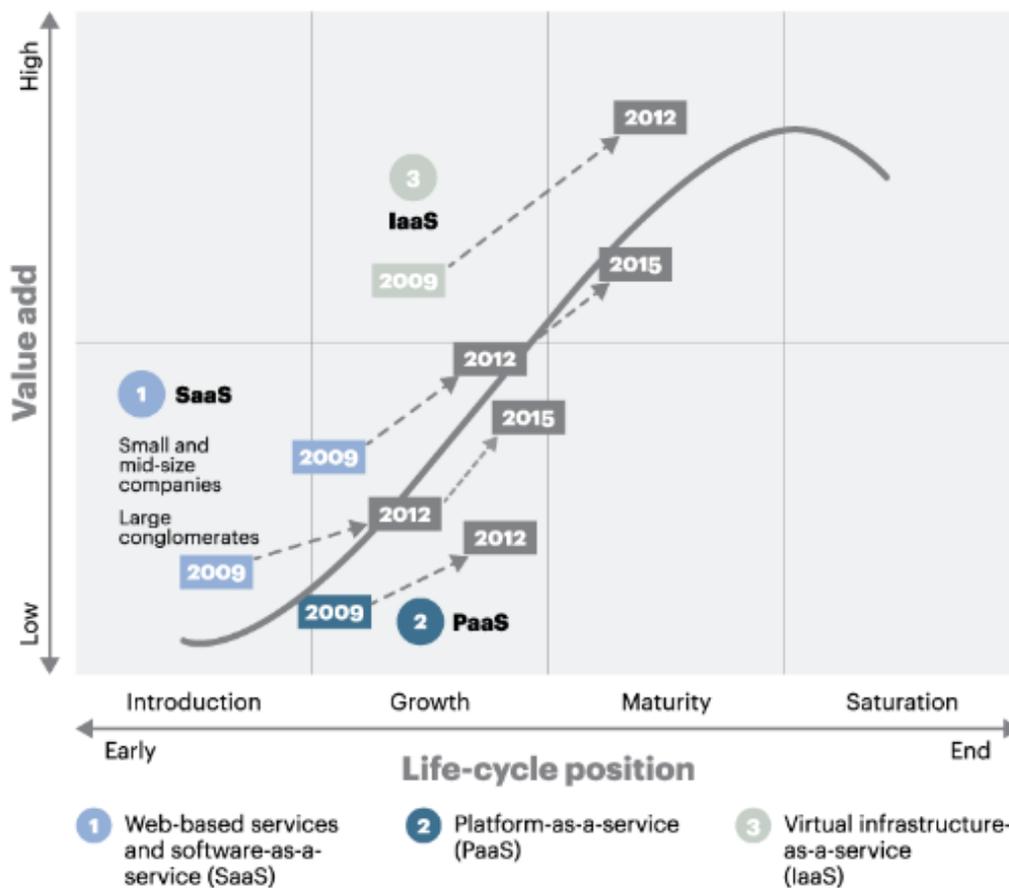
Six Forces of Competition

Michael Porter's Six Forces of Competition analyzes different levels of competition within an industry and provides an all-inclusive evaluation of the industry's driving forces of competition and profitability. According to Porter, high forces can be considered as a high threat because it can reduce profits [13]. A competitive force can be defined by its rating of high, medium, or low in strength. This type of rating method can also help determine if the force is considered a threat to the industry. There are different aspects that competitors within an industry can compete on, such as price discounting or improvement of service quality. Porter's Six Forces of Competition includes: Threat of New Entrants, Rivalry among Existing Firms, Threat of Substitute Products or Services, The Bargaining Power of Buyers, The Bargaining Power of Suppliers, and Relative Power of Other Stakeholders.

I. Threat of New Entrants

Although Cloud Computing is still in its beginning stages, the industry is growing promptly and this introduces new entrants to the market. With the growing market, it causes the level of competition to increase, but it also depends on what type of company it is within the cloud computing market that determines how much new entrants are introduced. Different type of companies within the cloud computing market includes: Infrastructure-as-a-Service (Iaas), Software-as-a-Service (SaaS), and Platform-as-a-Service (PaaS). Analyzing these three companies, the level of new entrants is different for each one. IaaS has fewer entrants when compared to SaaS and PaaS because of the fixed costs that are necessary to compete with traditional IT [14]. Cloud Computing does not have much entry barriers; instead it reduces the barriers of entry to new start-up companies because of its low expense and expertise which are needed in traditional IT.

Cloud Computing may have low entry barriers, but it also means higher competition, potentially decreased profitability and prices, and decreased creativity for a unique business. Low entry barriers do not mean there are none. Possible entry barriers may include: Government Policy, Brand Identity, and Switching Costs. Cloud computing can employ a hybrid, community or public cloud model. When companies employ this type of cloud model, it becomes harder to comply with industry and government regulations. Cloud Security Alliance (CSA), an organization that was developed to assist communication between users and cloud vendors provides guidance to companies who adopted the hybrid cloud model to comply with government regulations **[15]**. As technology continues to rapidly grow, it becomes easier for smaller, starting companies to be introduced into the market. These companies may have started their companies with lesser expense and expertise, but to maintain their company's competitive advantage would be difficult with the lack of creativity and uniqueness. It is difficult for customers to switch to another cloud computing company when new training is needed to use the product. The threat of new entrants can be rated as low to moderate competitive force.

II. Rivalry among Existing Firms

In addition to new entrants being introduced to the cloud computing market, which increases competition, there is also competition between existing companies. There are news articles published online about cloud computing is heading to cost nothing, but the question is: Why compete when the cost of cloud computing is going to be $0? The reason why companies compete with each other even knowing that cloud computing will soon cost nothing is because they are competing to see who can efficiently utilize cloud computing with minimal cutthroat margins. For example, the battle between Amazon and Google's cloud services, both companies have set solid work into the cloud business, but Amazon is far ahead of Google in cloud services. Google's cloud service arrived eight year later after Amazon began renting out portions of their cloud and Amazon's foresight is so far ahead against its competitors, that it was placed by itself in terms of vision and execution **[16]**.

Mentioned before, it depends on what type of company it is within the cloud computing market that determines how much new entrants are introduced. The company that would have that most fierce competition would be Infrastructure-as-a-Service (IaaS) because companies must compete for the same customers and products that similar to other companies. With the technology industry growing rapidly, companies begin their price wars with their competitors. With such a high competitive market, it comes with a higher degree of rivalry. There is a low exit barrier percentage for cloud computing because customers are locked-in to the cloud computing company when they decided to subscribe to their products. According to Yasin, freelance technology writer for GCN, surveyed federal IT managers about exit barriers and the result is almost ninety-percent of these agencies don't have any cloud computing exit strategy [17]. Due to low expenses and expertise needed for startup companies, they tend to lack creativity and

uniqueness which allows them to stand out from the crowd from the rapidly growing technology industry. Because of the absence of uniqueness, many companies blend together, making it difficult to identify one company from another. In addition, not only is it difficult to differentiate companies from one another, it is also difficult to distinguish the different, yet very similar products. As a result, the rating for rivalry among existing firms is a high competitive force.

III. Threat of Substitute Products or Services

The main competitor against cloud computing is traditional IT and Open-Source Computing. With new entrants introduced into the market, new "as-a-Service" products and services are being researched and developed. This helps widen the scope of different products and as a result, this creates many diverse products that can be used as substitutes to current standard cloud models. Furthermore, these "as-a-Service" offerings could be lower prices, but with better overall performance. Customers who are subscribed to Google's cloud services are basically "locked" into exclusive products or services, which in turn will progressively become a cutthroat margin [18]. Other than traditional IT, companies are discovering other cloud computing companies such as Red Hat, an open source cloud computing company. Many companies who are subscribed to other cloud computing companies still require paying a substantial expense. Meanwhile, open-source cloud computing companies are far less expensive than other cloud companies such as Google or Amazon. The rating for threats of substitute products or services is rated a high competitive force because there are many potential new products.

IV. The Bargaining Power of Buyers

With rapidly increasing new companies joining the cloud market, we can clearly grasp the idea of power being shifted from suppliers to buyers. With customers moving switching from traditional IT to cloud computing, they are able to bargain and decrease prices. By now, most of us understand the true "boss" of a company is its customers. A buyer's bargaining power includes its customers' size and their concentration in certain geographical areas [19]. Majority of bargaining power of buyers are in Software-as-a-Service (SaaS) because the market has a low switching cost and there is a variety of many products and choices to choose from. On the other hand, Platform-as-a-Service (Paas) has the least bargaining power of buyers because of the

absence of development languages. Buyers have become the drive of competition in the technology industry especially though demanding requirements, which customers defined.

Priorities of Cloud Buyers

Priority	All Buyers of Managed Hosting	Buyers of Cloud
Financial Health	12%	5%
Operational Health	18%	15%
Technology Fit	12%	15%
Industry Fit	6%	1%
Price Competitiveness	16%	33%
SLA / Business Term Assent	13%	5%
Scalability within offering	14%	21%
Extensibility outside offering	9%	5%

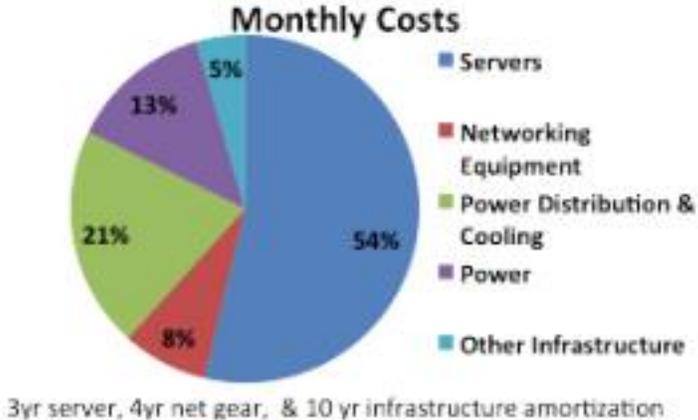■ All Buyers of Managed Hosting   ■ Buyers of Cloud

The above graph displays what buyers are seeking for when they are considering switching to cloud computing. Majority of buyers are seeking for a cloud computing company that can offer price competitiveness. When a buyer or a group of buyers is existent in the market, they can greatly influence a company's selling decisions and determine its price competitiveness. Buyers can bargain and demand for a decrease in prices, or a demand in higher quality of products or services. The price competitiveness is one of many aspects that are utilized to determine the attractiveness of the industry by lowering its profitability [20]. We can rate bargaining power of

buyers as a high competitive force because buyers can bargain and costs to switch are relatively low.

V. The Bargaining Power of Suppliers

Bargaining power of suppliers can raise prices or reduce the quality in products or services. It is the opposite of bargaining power of buyers, where buyers can bargain for a lower price or demand higher quality in products or services. There are three types of "as-a-Service", as mentioned in before, models – Infrastructure-as-a-Service (Iaas), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). Suppliers are limited in bargaining with buyers because suppliers fear if they increased prices, some of their customers will switch to another company due to low switching costs. In the three service models, suppliers have different levels of bargaining power. In IaaS, suppliers have some bargaining power because of brand loyalty with customers such as Amazon, while in PaaS has the most bargaining power because of vendor lock-in their customers and Saas has the least bargaining power due to low switching costs [21]. Overall, the bargaining power of suppliers should be limited because the goal is to keep customers. The most bargaining power suppliers have is with data centers and power services. Data centers are packed with servers and other processors; as a result, it requires a lot of cooling equipment to prevent overheating. Like many data centers, cloud data centers consume a lot of power. In 2007, U.S. Environmental Protection Agency (EPA) warned the congress about the power consumption from cloud data centers and it will double every five years [22]. With the power consumption doubling, it puts a lot of stress on power grids. Below is a graph of monthly costs associated with cloud data centers. The bargaining of suppliers can be rated as a moderate competitive force because there is a limited electrical power resource.

Monthly Costs

- Servers — 54%
- Networking Equipment — 8%
- Power Distribution & Cooling — 21%
- Power — 13%
- Other Infrastructure — 5%

3yr server, 4yr net gear, & 10 yr infrastructure amortization

VI. The Relative Power of Other Stakeholders

Main stakeholders of cloud computing is the Cloud Security Alliance (CSA) Governance Group. The CSA governs verifies cloud computing companies are complied with the government and all data are protected. The CSA is the leading non-profit organization, which educates and promotes vendor-neutral practices [23]. The CSA's committee group consists of Advisors, Co-Chair/Editors-in-Chief, and a Managing Editor/Researcher. Other stakeholders of the industry include customers or buyers because they have the power to decrease prices or demand for higher quality in products or services. If we analyze a company, the higher stakeholders such as the Chief Information Officer (CIO) and Chief Financial Officer (CFO), they would consider moving to the cloud because of lower costs, but broadband connection would be a concern. Depending on the stakeholders of each company, the outcome of moving to the cloud will differ. As a result, ranking the relative power of other stakeholders would be a moderate competitive force.

Forces Driving Industry Competition

Forces of Competition	Competitive Force Strength
Threat of New Entrants	Low to Moderate
Rivalry among Existing Firms	High
Threat of Substitute Products or Services	High
The Bargaining Power of Buyers	High
The Bargaining Power of Suppliers	Moderate
The Relative Power of Other Stakeholders	Moderate

Competitive Position of Major Companies and Competitor Analysis

The technology industry is vast and covers many different subgroups of technology. Cloud computing is a growing subset of technology and is the focus of this analysis. Four companies are to be compared through a series of analyses. Those four companies are Google, Amazon, Microsoft, and Red Hat. The first three are giant leaders in the cloud computing industry, while Red Hat is a smaller and newer company in the industry. By looking at examples of both the large and smaller companies, we can get a broader feel of how the industry is like as a whole.

The following is a general snapshot of the key measures of the four companies to be compared:

Comparative Overview of Major Competitors				
Company	2013 FY Revenue	% Growth from FY 2012	2013 FY Profits	Employees
Google (GOOG)	$59,825,000,000	19.23% Increase	$33,967,000,000	51,564
Amazon (AMZN)	$74,452,000,000	21.87% Increase	$20,271,000,000	117,300
Microsoft (MSFT)	$77,849,000,000	5.6% Increase	$57,600,000,000	128,000
Red Hat (RHT)	$1,328,817,000	17.27% Increase	$1,128,217,000	6,300

A more comprehensive financial overview between the four companies is shown here:

Competition Key Statistics Comparison				
Financial Highlights	**Google**	**Amazon**	**Microsoft**	**Red Hat**
Fiscal Year Ending	Dec 31	Dec 31	Jun 30	Feb 28
Profit Margin	19.24%	-0.25%	23.35%	10.90%
Operating Margin	22.96%	0.12%	31.19%	14.29%
Revenue	67.91B	85.25B	91.50B	1.67B
Quarterly Revenue Growth	20.10%	20.40%	25.20%	19.10%
Gross Profit	33.97B	20.27B	59.90B	1.30B
EBITDA	19.96B	3.89B	33.26B	314.68M
Quarterly Earnings Growth	-5.30%	N/A	-13.40%	14.70%
Total Cash	60.06B	6.88B	88.54B	803.04M
Total Debt	8.64B	3.10B	23.92B	0.00
Current Ratio	4.47	0.89	2.52	1.17
Operating Cash Flow	21.25B	5.70B	32.38B	552.26M

**Values are of the most recent quarter

Google

Google is a globally operated corporation, originally founded by Larry Page and Sergey Brin in Menlo Park, California on September 4, 1998. Since then, it's been growing into the technology giant it is today. Currently, Google is number three in Forbes' World's Most Valuable Brands list. This is an amazing achievement, taking into effect all of the things it takes to get on this list, much less be top three of it. Google offers many different products and services. Most notably, Google is known for its search engine, which was the original intent for the development of Google. Since then, many other innovations have come about. One of these innovations that relates directly to the topic of this report is Google Drive.

Google Drive is Google's cloud storage service. This allows anyone with a Google account to save, view, and manipulate files or documents. With Drive, files could be stored effectively and safely, while being able to access it from anywhere with an Internet connection. Google Drive is far more than just a means of storage, as it is bundled together with different applications that

allow anyone to edit commonly-used file types, either alone or collaboratively with others. Released only two years ago on April 24, 2012, Google Drive has currently over 240 million users worldwide. In such a short time, Google Drive is picking up popularity amongst personal cloud storage options. Google Drive has contributed to Google's success, as a company and it shows no signs of slowing.

As far as market position is concerned, most cloud storage companies essentially are the same in terms of what they offer. Differentiation factors can include transfer speed, storage capacity, or pricing, but in essence, the service itself is comparable from company to company. One big factor that shows a bit more of the underlying corporate structure would be to look at the way the companies handle their employees. This gives insight into how they operate and what the corporate values are. Luckily, Forbes has constructed a handy list of the 47 best cloud computing companies and CEOs to work for in 2014. According to this list, Google is number five on this list with 90% of its employees who would recommend this company to a friend.

Google's Company Financial Profile

Valuation

P/E Current	29.39
P/E Ratio (with extraordinary items)	27.82
P/E Ratio (without extraordinary items)	31.22
Price to Sales Ratio	6.25
Price to Book Ratio	4.31
Price to Cash Flow Ratio	20.35
Enterprise Value to EBITDA	16.99
Enterprise Value to Sales	4.71
Total Debt to Enterprise Value	0.02

Profitability

Gross Margin	56.77
Operating Margin	23.43
Pretax Margin	24.27
Net Margin	20.45
Return on Assets	11.93
Return on Equity	15.36
Return on Total Capital	14.39
Return on Invested Capital	14.87

Efficiency

Revenue/Employee	1,250,733.00
Income Per Employee	255,758.00
Receivables Turnover	6.65
Total Asset Turnover	0.58

Capital Structure

Total Debt to Total Equity	6.01
Total Debt to Total Capital	5.67
Total Debt to Total Assets	4.73
Long-Term Debt to Equity	2.56
Long-Term Debt to Total Capital	2.42

Liquidity

Current Ratio	4.58
Quick Ratio	4.55
Cash Ratio	3.69

Google SWOT Analysis:

Strengths	Weaknesses
• Reliable and accurate services • Good financial situation • Effective product integration	• Relies on a single income source • Unprofitable products • Patent litigations
Opportunities	Threats
• Transitioning to the mobile market • Obtaining patents through acquisitions • Spread of Google Fiber	• Mobile internet is growing • Products are unprofitable • Strong competition from other companies

Amazon

Amazon is a large technologically rooted products and services company founded in 1994, by Jeff Bezos. It was originally started as an online bookstore. Now, it is a giant online superstore that carries millions of products, both physically and digitally available for download. The company is also ranked among Forbes' World's Most Valuable Brands list. However, it doesn't rank as high as Google did, but still managed to place at a solid number 24. Again, simply making the cut to be on this top 100 list is a privilege and accomplishment on its own. Amazon's global headquarters consists of 14 buildings, all located in Seattle, Washington. Amazon, much like Google, offers a wide array of different products and services. The corporate logo suggests that the company carries every product from A to Z. This shows the large variation in the physical products the company offers. Aside from the physical products that Amazon deals with, the focus will be on the services, more specifically the cloud services, the company offers. Amazon has its own version of a cloud service that it offers to its customers. This service is called Amazon Cloud Drive. It works just as any other cloud storage company works, in that it allows the customer to effectively store files onto Amazon's servers. This allows you to access your data and stored information from anywhere in the world, granted there is an Internet connection. Unlike Google's cloud storage system, Amazon's Cloud Drive acts more like a storage center. This means that this service is strictly for the storage of files, rather than the manipulation of it, like Google's Drive service. Nonetheless, Amazon's Cloud Drive is a popular and booming alternative to cloud storage services and contributes to the overall success of Amazon, as a company.

As far as market position is concerned, most cloud storage companies essentially are the same in terms of what they offer. Differentiation factors can include transfer speed, storage capacity, or pricing, but in essence, the service itself is comparable from company to company. One big factor that shows a bit more of the underlying corporate structure would be to look at the way the companies handle their employees. This gives insight into how they operate and what the corporate values are. According to the Forbes' Best Cloud Computing Companies and CEOs to Work For list, Amazon is number twenty on this list with 66% of its employees who would recommend this company to a friend.

Amazon's Company Financial Profile

Valuation

P/E Current	518.37
P/E Ratio (with extraordinary items)	-658.62
P/E Ratio (without extraordinary items)	675.92
Price to Sales Ratio	2.45
Price to Book Ratio	18.78
Price to Cash Flow Ratio	33.87
Enterprise Value to EBITDA	33.86
Enterprise Value to Sales	1.63
Total Debt to Enterprise Value	0.04

Profitability

Gross Margin	26.62
Operating Margin	1.15
Pretax Margin	0.68
Net Margin	0.37
Return on Assets	0.74
Return on Equity	3.05
Return on Total Capital	1.87
Return on Invested Capital	2.08

Efficiency

Revenue/Employee	634,714.00
Income Per Employee	2,336.00
Receivables Turnover	18.31
Total Asset Turnover	2.01

Capital Structure

Total Debt to Total Equity	70.97
Total Debt to Total Capital	41.51
Total Debt to Total Assets	16.71
Long-Term Debt to Equity	53.16
Long-Term Debt to Total Capital	31.09

Liquidity

Current Ratio	1.07
Quick Ratio	0.75
Cash Ratio	0.54

Amazon SWOT Analysis:

Strengths	Weaknesses
• Cost leadership strategy • Superior quality products and services • Efficient distribution chain and logistics	• Products and services only available online • Sales are at zero margins • Negative publicity
Opportunities	Threats
• Online payment systems • More of Amazon's own brand production • Physical store location presence	• Online security • Strategic alliances • Low-cost online retailers

Microsoft

Microsoft is a large multinational corporation that started in Albuquerque, New Mexico, US on April 4, 1975. It was founded by Bill Gates and Paul Allen and is currently headquartered in Redmond, Washington. Much like the other companies in this report, Microsoft offers a wide variety of products and services. Microsoft has a strong focus in its physical products and has a strong market presence in the computer industry. The products and services that Microsoft offers range from software applications, such as the Microsoft Office Suite, to videogame consoles, like the Xbox One, or even to entire operating systems that computers run on. In the computer and technology industry, Microsoft is sort of your Jack of all trades.

What will be looked at more specifically is Microsoft's version of its cloud storage services– OneDrive. Microsoft OneDrive started its life as SkyDrive. Its main goal was much like that of another online cloud storage service. It has actually been around for quite some time, being launched on August 1, 2007. OneDrive enables the access and storage of personal files onto the Microsoft servers. It has a presence in every recent product, offering a consolidated location for your files that are available from many different devices with an Internet connection. Aside from the personal OneDrive that's offered to any consumer looking at cloud storage, Microsoft offers its own unique OneDrive for Business service. This service is basically a more secure and functional cloud storage system tailored to the enterprise market.

As far as market position is concerned, most cloud storage companies essentially are the same in terms of what they offer. Differentiation factors can include transfer speed, storage capacity, or pricing, but in essence, the service itself is comparable from company to company. One big factor that shows a bit more of the underlying corporate structure would be to look at the way the companies handle their employees. This gives insight into how they operate and what the corporate values are. According to the Forbes' Best Cloud Computing Companies and CEOs to Work For list, Microsoft is number eleven on this list with 77% of its employees who would recommend this company to a friend.

Microsoft's Company Financial Profile

Valuation

P/E Current	17.83
P/E Ratio (with extraordinary items)	18.33
P/E Ratio (without extraordinary items)	15.86
Price to Sales Ratio	3.99
Price to Book Ratio	3.83
Price to Cash Flow Ratio	10.87
Enterprise Value to EBITDA	10.19
Enterprise Value to Sales	3.68
Total Debt to Enterprise Value	0.08

Profitability

Gross Margin	68.94
Operating Margin	32.03
Pretax Margin	32.08
Net Margin	25.45
Return on Assets	13.98
Return on Equity	26.17
Return on Total Capital	21.33
Return on Invested Capital	21.86

Efficiency

Revenue/Employee	677,570.00
Income Per Employee	172,453.00
Receivables Turnover	4.68
Total Asset Turnover	0.55

Capital Structure

Total Debt to Total Equity	25.22
Total Debt to Total Capital	20.14
Total Debt to Total Assets	13.14
Long-Term Debt to Equity	22.99
Long-Term Debt to Total Capital	18.36

Liquidity

Current Ratio	2.50
Quick Ratio	2.45
Cash Ratio	1.88

Microsoft SWOT Analysis:

Strengths	Weaknesses
- Brand loyalty & reputation - Universally easy to use products - Strong distribution channels	- Dependence on hardware manufacturers - Security flaw criticisms - Slow innovation
Opportunities	Threats
- More cloud-based services - Mobile device transition - Growth through acquisitions	- Intense competition in the software market - Changing consumer needs - Open-source projects

Red Hat

Red Hat is a technology company that deals with aspects of cloud computing, but doesn't directly offer its own sort of cloud storage system. In fact, they partner with Amazon to offer cloud storage capabilities. The company was founded in 1993 by Bob Young and Marc Ewing in Raleigh, North Carolina. Unlike the other companies in this report, Red Hat deals with a slightly more specific market. Red Hat is in the technology industry, but focuses on the Linux operating system. The company offers pure services, rather than selling physical products, so that may already differentiate itself from the other companies listed previously. Unlike the traditional cloud storage services, Red Hat offers a multitude of cloud-based and virtualization services to help companies do what they need to do easier and more effectively.

Seeing how Red Hat deals more with cloud platforms and development, it wouldn't be an entirely fair comparison to put it against Google, Amazon, and Microsoft for their cloud services. However, the markets of all of these companies are intertwined together so valid comparisons can be made in the general sense. Red Hat is a relatively new and small company compared to Google, Amazon, and Microsoft, but has successfully obtained the majority of the market share for its line of work. As of the first quarter of 2014, Red Hat's market share was 64% in the Linux virtualization market.

Red Hat is in a slightly different subset of the cloud computing industry, but share many things in common with the rest of the industry. An important factor that shows a bit more of the underlying corporate structure would be to look at the way the companies handle their employees. This gives insight into how they operate and what the corporate values are. According to the Forbes' Best Cloud Computing Companies and CEOs to Work For list, Red Hat is ranked at number seven on this list with 84% of its employees who would recommend this company to a friend. Also, this company gets special recognition for its CEO, James M. Whitehurst, who was the fifth highest rated CEOs with 96% of Red Hat's employees approving of him and the way he runs the company, according to Glassdoor.

Cloud Computing

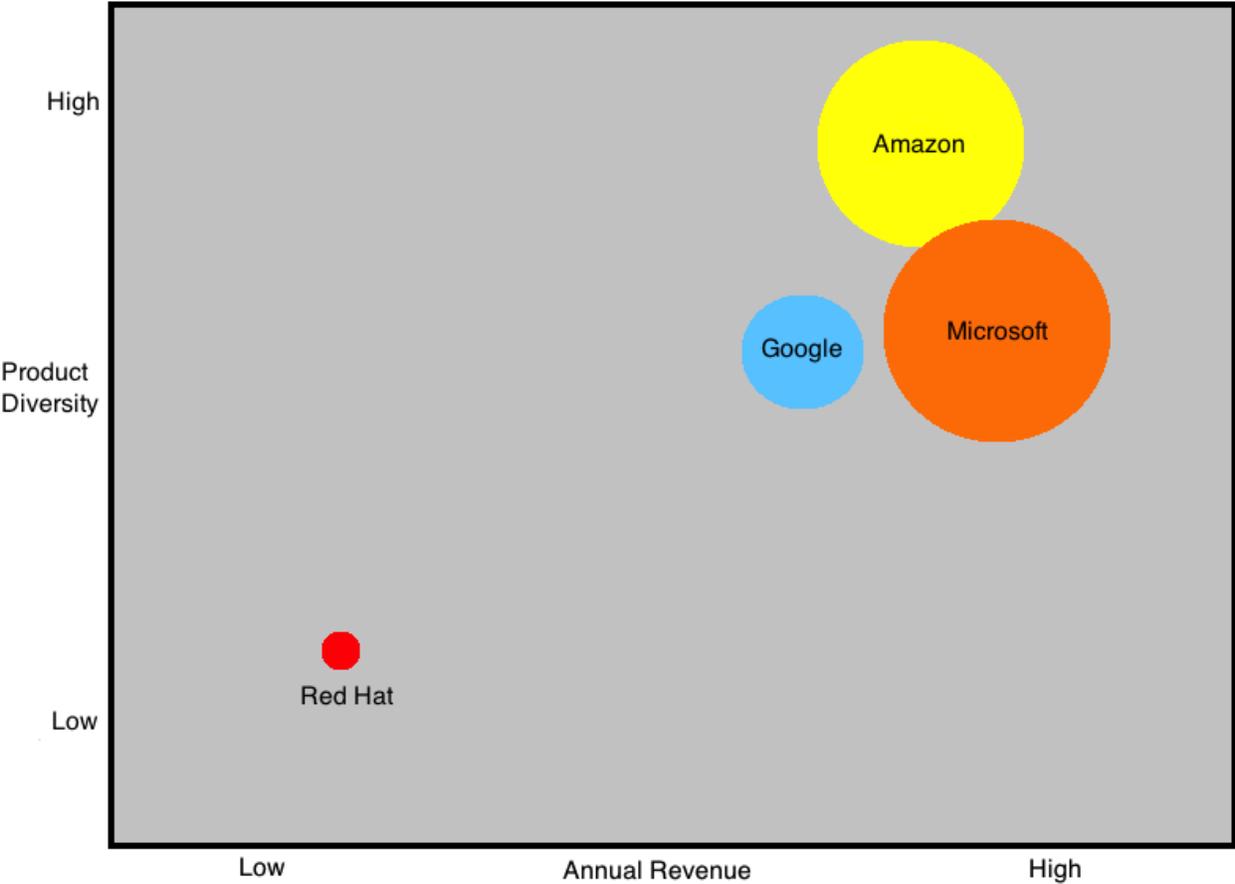**Red Hat's Company Financial Profile**

Valuation

P/E Current	63.12
P/E Ratio (with extraordinary items)	61.64
P/E Ratio (without extraordinary items)	63.43
Price to Sales Ratio	7.30
Price to Book Ratio	7.21
Price to Cash Flow Ratio	20.96
Enterprise Value to EBITDA	34.33
Enterprise Value to Sales	6.36
Total Debt to Enterprise Value	0.00

Profitability

Gross Margin	83.67
Operating Margin	15.28
Pretax Margin	15.61
Net Margin	11.62
Return on Assets	6.02
Return on Equity	11.61
Return on Total Capital	11.61
Return on Invested Capital	11.61

Efficiency

Revenue/Employee	243,590.00
Income Per Employee	28,300.00
Receivables Turnover	4.63
Total Asset Turnover	0.52

Capital Structure

Total Debt to Total Equity	0.00
Total Debt to Total Capital	0.00
Total Debt to Total Assets	0.00
Long-Term Debt to Equity	0.00
Long-Term Debt to Total Capital	0.00

Liquidity

Current Ratio	1.30
Quick Ratio	1.30
Cash Ratio	0.86

Red Hat SWOT Analysis:

Strengths	Weaknesses
• Software innovation • Growing need for the Cloud • Acquisition strategy	• Low marketing presence • Diversity of products • Alternative OS integration
Opportunities	Threats
• Growing need for the Cloud • Increased connection speeds • Decreased data storage costs	• Network security attacks • Geological disasters • Technological discontinuity

GM 105 – Industry Analysis | 36

Competitor Analysis

The four companies mentioned in this analysis (Google, Amazon, Microsoft, Red Hat) are all in competition with one another. Each company has its own strengths and weaknesses and they all share similarities in the services they offer, but it's the differences in them that make them what they are. The graph below depicts each company as circles of corresponding employee size. The companies are compared on the variables of net revenue and diversity of products and services. This allows us to see the size of each company in comparison to one another as well as the amount of revenue each bring in through all the products and services that each offer.

Key Success Factors

Security

Security is the top concern among users and it's a greater concern for organizations that are utilizing cloud solutions. Every cloud solution revolves around data, and for many customers that data contains sensitive information that could potentially harm the organization if security is compromised. Companies that specialize in cloud security solutions such as Symantec and TrendMicro offer Software-as-a-Service solutions for desktops and infrastructure hardware. Red Hats use Open Source technology which is widely used by many customers. In order to protect its customers Red Hat develops its solutions to meet their customer's security protocols. Amazon, Microsoft and Google offer centralized security over their data centers. Each of these companies claims to offer world class virtual and physical security. Amazon offers multiple security methods including: virtual LANs, Virtual Private Network connections to private clouds, encrypted data storage and secure transfer protocols.

Value

Small businesses turn towards cloud computing as a strategic plan to achieve corporate goals. Large companies utilize cloud computing to improve efficiency of business processes. Organizations of all sizes seek value in their investment. Major information technology implementation expenses have to be justifiable from the CIOs decision down to the managers that implement strategic plans. Companies want to see a return on investment therefore cloud technology providers like Microsoft Azure offer solutions that work with existing Microsoft products for improved utility. Unlike other goods, technology service providers cannot compete on price alone. Instead, these providers must stand out by creating unique solutions. Red Hat uses Open Source technology and subscription based services to create solutions that offer value to their customers.

Expertise

Many consumers of IT infrastructure, software, and platform services are looking for advisory and consulting services. Red Hat doubles as both a provider of information technology solutions and consulting services. Red Hat offers training courses for its own products and its partner's products. Other companies like Oracle rely on vendors to provide training and expertise on Oracle products.

Opportunity

Amazon Web Services was built upon the idea of leasing their surplus server space. Since its founding in 2006, Amazon has leased its cloud services charging its customers based on their usage offering scalability. For many organizations scalability is constricted by budget and resources. Amazon offers service that meets capacity on demand. Customers only pay for what they use and have access to more when they need it.

Red Hat matches their competing proprietary software providers by developing solutions on an Open Source platform. Red Hat's Enterprise Virtual Suite serves as a competitor in the Infrustructure-as-a-Service market to traditional competitors like Virtual Machines, VMware, and Microsoft's Enterprise Desktop Virtualization or MEDV. Red Hat's OpenShift Platform-as-a-service is a direct competitor to Microsoft's proprietary Azure system. Red Hat is developing cloud computing solutions based on its Open Stack open source platform.

Growth

Growth comes from within as well as in external relationships. Red Hat has grown from an American company founded and based in North Carolina in 1993 into a worldwide corporation. During this time the company has grown its product offerings from its core Linux operating system it has developed Infrustructure, Software and Platform-as-a-Service as well as cloud based data storage solutions. Red Hat has grown over the years by acquiring smaller companies like JBoss and eNovance, as well as making business partners. Amazon has also grown internally by expanding its product offerings. Amazon offers cloud computing services including: Amazon Elastic Compute Cloud and Elastic MapReduce for

large data processing. Amazon Networking services including: Amazon Route 53 domain name service, Virtual Private Cloud for private computing through a virtual private network, and Direct Connect which provideds dedicated network connections for faster data transfer. Amazon also offers cloud storage and content delivery including: Amazon Simple Storage for web storage, Amazon Glacier for records and long term data storage, Elastic Block Store for block storage, and Import/Export for transferring large amounts of data. Amazon also offers scalable database services including: Amazon Data Pipeline, DynamoDB, ElastiCache, Amazon Relational Database Service, Redshift, SimpleDB, Amazon Kinesis. Amazon even offers data management services such as CloudFront, CloudWatch and Amazon Identity and Access Management authentication services.

Availability

In some cases this goes hand in hand with growth however availability means reaching the customers in the surrounding community is just as important as reaching customers abroad. Microsoft is a master of availability. Microsoft is available worldwide in 119 countries. Because of this high availability, Microsoft products are widely used and a standard among global corporate culture. Microsoft is also available in over 100 languages making it available for retail across the world. Amazon has become the top used public cloud through availability. As Amazon's online sales market grew globally so did its Web Services division. Amazon is available globally in 11 regions. The top companies in the industry are available worldwide and come in different languages.

Maintaining Partnerships

It is not uncommon for technology companies to provide services or consulting for other technology companies. Red Hat has consulted for Intel. Amazon provides data solution services to HTC and Adobe Cloud. Red Hat offers consulting services for its partner's software packages. Partnerships benefit

KEY SUCCESS FACTORS	WEIGHT	RED HAT RATING	RED HAT WEIGHTED SCORES	AMAZON RATING	AMAZON WEIGHTED SCORES
SECURITY	0.20	3	0.6	3.2	0.64
VALUE	0.15	3.8	0.57	4	0.6
EXPERTISE	0.15	4	0.6	3	0.45
OPPORTUNITY	0.15	3.8	0.57	5	0.75
GROWTH	0.15	3.5	0.525	5	0.75
AVAILABILITY	0.10	2	0.2	3.8	0.38
MAINTAINING PARTNERSHIPS	0.10	3	0.3	3	0.3
TOTAL	1.0		3.365		3.87

Industry Prospects and Overall Attractiveness

Trends

In the IT industry, technologies are constantly changing, and at the fast pace. One company cannot survive if it does not keep up to date with current trends of technology. As of now, cloud computing is the trend that is being integrated onto the infrastructures of many companies across the world. At the same time, some may think that the cloud is not ready yet, and that it still needs further development and research. However, well known IT companies are just doing that by vertically integrating with another company or like to acquire the knowledge base assets of cloud computing technology. In addition, there has been an increase in the three-distinct layers that started cloud computing: IaaS, PaaS, and SaaS.

There has been a huge increase requesting for SaaS (Software-as-a-Service). This form of business plays a major role in the cloud computing technology. Most companies and most, if not all, start-ups have been merging recently due to the increase of SaaS. In addition, many start-ups are in the process of appearing in this particular marketplace that helped developed cloud computing.

The overall increased demand for managing services based on IaaS, PaaS, and SaaS is both a powerful and effective reason for the trend of cloud computing as well as cloud technology.

The increasing of public cloud services and its ecosystems has improved rapidly for provisioning of both the technology and services by the service providers. In which, a huge prospect is anticipating in this market of business based on cloud computing as well as cloud technology.

The growth increasing demand of development of the cloud storage ecosystem and data center hubs have given a new potential of directions to plenty of businesses based on cloud computing and cloud technology. In addition, the demands for big data management is the one major important reasoning for causing the trend of cloud computing.

By a short and long shot, cloud computing is consistently increasing over time, in which it draws in more audiences into its market. The usage of the cloud computing is steadily increasing as it is

not a trend in technology, but more of an improved innovation technology to make computing easier.

Potential Threats

Integrating cloud computing into one's infrastructure holds plenty of risks and threats. Cloud computing is in a market that is growing rapidly in the IT industry. On the other hand, cloud computing possess many threats as it does with benefits. The threats that cloud computing industry are facing, puts cloud computing back to the drawing board. One of the threats cloud computing is facing in the market is, security. A group called the CSA, Cloud Security Alliance, was formed to identified the potential threats in cloud computing. Therefore, making security the top major potential threat in cloud computing. If the data is breach through cloud computing in any company, that means the data can be stolen, erase, or changed that can cost millions and millions of dollars to fix for that particular company.

Information, or data, is greatly valued and if it is not handled properly, that can also cost any company millions of dollars, if not billions, to try and retrieve it back. This second threat, identified by CSA, is the environment in which the cloud computing is on. An environment of the cloud is the cloud service providers that provide IaaS, PaaS, and SaaS for cloud computing. If the environment is not well taking care of, or not set up carefully, the data can be stolen or erased by a hacker that can cost a company millions of dollars financially.

Security and the environment is the umbrella of potential threats that can be broken down into specifics. Nevertheless, the environment and security are the most potential threats to cloud computing market in the IT industry that can surely bankrupt a company, if the company is not careful.

Conclusion

For our analysis of the cloud computing industry, the trend is moving rather rapidly as many companies are moving towards it. On a bigger scale, the whole IT industry is constantly changing as cloud computing market grows. Major IT companies are merging with others to gain knowledge base, hardware, and etc. assets so that they can provide better cloud computing experience to the consumers and the enterprise communities. IaaS, PaaS and SaaS are constantly evolving with technologies to improve products as a service to the consumers and the enterprise communities. Successful companies are those that have a greater presence in the cloud computing market by merging and acquiring other companies, small or big, in the same realm to provide a better cloud computing product for the consumers. Competition is most needed to drive innovation and improvement of cloud computing as it is in demand on a large scale. Many cloud computing providers need to focus on the potential threat to capture the market growth of cloud computing. In addition, with the creation and help from CSA, the best practices and standards set by it, provides useful information to help establish the potential threats of cloud computing; which, in return, it promotes the trend of cloud computing to keep moving forward as well as being a strong market segment in the IT industry today.

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