vCloud and vSphere

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vSphere and vCloud are categorized as infrastructure as a service(Iaas) products. They were developed by VMware and are a cloud computing virtualization platform.[1] vSphere is not one piece of software but a suite of tools that contains software such as vCenter, ESXi, vSphere client and a number of other technologies. Similarly, vCloud is also a suite of applications but for establishing an infrastructure for a private cloud.[2] The suite includes a variety of products such as the vSphere suite, site recovery management for disaster recovery, site networking and security, and many more. These specific services as well as Iaas in general are discussed. Advantages and disadvantages of utilizing such as service are presented followed by an analysis of vSphere and vCloud. Additionally, the big data extensions available for these services are examined.

Keywords: vCloud, vSphere, Iaas, I524

https://github.com/michaelsmith1983/sp17-i524/blob/master/paper1/S17-IO-3019/report.pdf

CLOUD COMPUTING

With the rise of high speed internet, connectivity amongst devices loc made cloud computing a practical alternative to the standard local solution. Cloud computing is defined as the utilization of remote servers to provide the computing power and data management instead of utilizing a local computer. During the late 1990's, companies began to see the potential benefits of moving to the cloud, one of the first companies to do so was salesforce.com who delivered applications to end users over the internet. [3] Today there are many companies in the business of cloud computing. The majority of business aqcuired coming from Microsoft, Google, and Amazon. Cloud computing business can be subdivided into three categories such as software as service(Saas), platform as a service(Paas), and infrastructure as a service(Iaas). Saas is software that runs remotely from a service provider and is utilized over the internet, some examples that fall into this category are google docs, gmail, office, and office 365. Paas are web and database services enabling the user to develop and run applications in the cloud, some examples are google app engine, microsoft azure, and amazon web services. Iaas provides the user virtualized computing infrastruture over the internet. Companies such as amazon web services, Microsoft azure, and vCloud provide this service. It is important to note that services offer more than just one type of cloud computing option. [4]

ADVANTAGES OF IAAS

Iaas is a business model in where a provider will host all components of infrastructure including hardware, software, servers, and data storage for their clients. The cost to the client is at a rate of usage which can range from various different rates such as per hour, week or month. Other charges come from levels of computing power and data storage. While it might seem costly to pay for such as service, utilization of Iaas provide several advantages for organizations. Management does not have the upfront costs their own IT infrastructure as well as maintaining hardware or replacing equipment that has failed or become obsolete. The cost of ensuring the network is and up and running through having a qualified team of IT on staff is also mitigated. Due to the cost of Iaas being metered the companies will only pay for what they need. [5] Depending on the application of an Iaas, there may be instances where a company may need to quickly scale up their usage. A great example is when a website produces an unexpected influx of visits in short period of time. If the IT infrastructure is maintained in house, it might not be able to quickly scale up to the demand. This would be detrimental to the business due to a slow online experience of the customer or possibly a website that crashes. [6] Depending on the company, it can be both costly and impractical to staff IT personnel that monitor demands twenty four hours a day seven days a week. The Iaas has the capacity to scale with demands and solutions are in place to help alleviate instances where a sudden increase in IT infrastructure is required. Disaster recovery is a major worry for companies, implementation of a safe backup solution can be both costly and difficult to execute. Iaas offer disaster recovery solutions, as long as an internet connection is available, the same environment can be accessed from leading to little to no downtime. With offsite storage of data via Iaas any form of data loss potential is limited to very little or none. [5]

DISADVANTAGES OF IAAS

Iaas is not a perfect solution, it does come with potential problems. Security is a major concern, becoming fully reliant on a service provider for IT solutions means their outages become a major problem for the client's business. Sensitive data that is being protected in the cloud always has the risk of possibly being stolen. As these Iaas services grow with a list of companies they support, this can lead them to become appealing targets for possible hackers due to the degree of damage that can be done. A common threat to all websites that Iaas are not immune to are called distributed denial of service (DDos) attacks. This is a type of cyber-attack where the goal is to make a network unavailable for normal users by disrupting service of a host on the internet. [7] The typical method to disrupt service is done so by flooding the bandwidth of a host with a plethora of requests through a botnet which is definied as a network of computers programmed to receive commands without the owners knowledge. These attacks have grown to such an extent that the department of homeland security has initiated funding new research leading to the prevention of DDos. [8] From a business perspective, this vulnerability can have disastrous effects to the users of Iaas, risks should be assessed and possible backup plans in place.

VCLOUD AND VSPHERE

vCloud falls into the cloud computing subcategory Iaas. It is a suite of multiple products that include vSphere, vCloud Director, vCloud, connector, vCloud networking and security, vCloud networking and security, vCenter site recovery and manager, vCenter operations management suite, vFabric application director, and vCloud automation center. vSphere is responsible for the physical hardware resource management and allocation of virtualization across a large group of infrastructure such as CPUs, data storage and networking.

vSphere utilizes ESXi which is an enterprise class type 1 hypervisor. A hypervisor is also known as a virtual machine manager defined as "a hardware virtualization technique that allows multiple guest operating systems (OS) to run on a single host system at the same time. The guest OS shares the hardware of the host computer, such that each OS appears to have its own processor, memory and other hardware resources." [**?**] The type 1 refers to a type of hypervisor that can run directly on the hosts pc and control its resources.

vCloud director is a tool for overall cloud management that helps the user build hybrid clouds through pooling resources into data centers. This product helps empower existing IT within an organization with the tools necessary to expand their infrastructure into the cloud. vCloud connector creates a single user interface that as a bridge between private and public clouds, this simplifies management by enabling the user to transfer workloads under a single hybrid cloud umbrella.

vCloud networking and security provides capabilities to protect virtual machines. A firewall is applied either encompassing a virtual datacenter or at the network interface. VPN or virtual private network is utilized to ensure safety for extensions of the virtual data center, as well as secure sockets layer (SSL) VPN which is an industry standard for security compliance. [9] With regards to data security, a feature included will scan file servers for sensitive data such as credit card or social security numbers and ensure proper measures are in place for protection of such critical data.

Cloud Disaster recovery is defined as "a backup and restore strategy that involves storing and maintaining copies of electronic records in a cloud computing environment". [10] This also addressed in the feature vCenter site recovery manager. It is an automated solution that will recover from downtimes in a timely manner. This is done so by using replication technology to migrate virtual machines to a different site. Users are able to test the migration process in order to safely address any potential migration issues.

LICENSING

Depending on the demand, the cost of vCloud can be quite expensive. It is important to note that there are current Iaas offerings that are free but with limit usage. Amazon web services offers a free tier consisting of certain limits such as 1 million requests per month on aws lambda, 25 gb of storage through dynamoDB, 100 million free events per month on amazon mobile analytics and many other limits. [11] Other services generally offer limited time services followed by a pay requirement.

VSPHERE BIG DATA EXTENSIONS

Within the vSphere suite is a feature that can support big data and Apache Hadoop workloads. A set of tools are available for the user to deploy and run Haddop within the virtual infrastructure. The following distributions of Hadoop are supported: apache Hadoop, cloudera, pivotal, hortonworks, and mapR. Customization options such deploying a specific version of Hadoop or even multiple types of Hadoop are supported. In order to automate the management of Hadoop, VMware initiated project Serengeti. It can quickly deploy a Hadoop cluster into vSphere, it will protect the master node by automatically starting a new virtual machine if there is a suspected failure. An important note is that graphical user interface of big data extensions is only supported on the web client 5.1 or later, if big data extension is installed on vSphere 5.0, all abilities of the administrator can only be performed within the command-line. [12]

VCLOUD API

The vcloud application program interface (API) clients and the director communicate via HTTP through an XML exchange. "You use HTTP GET requests to retrieve the current representation of an object, HTTP POST and PUT requests to create or modifty an object, and HTTP DELETE requests to delete an object." [13]

CONCLUSION

VMware is one of the oldest companies that have been involved in the virtualization market. Their service provides a suite of tools that assist companies who want to utilize IT virtual infrastructure. The Iaas can help businesses in a lot of areas that would be difficult in a private IT environment such as scalablity, cost, disaster recovery and backup. There are drawbacks to Iaas such as risk of downtime from the IT service provider and security risks of sensitive data, however the vCloud suite has features that can address these drawbacks with regards to security. Additionally, vcloud supports big data extensions including support for various versions of hadoop and have initiatives such as project serengeti which will automate its management. Vcloud is a potential option for clients interested in extending their IT infrastructure into the cloud.

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