

CLOUD DEPLOYMENT MODELS

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ABSTRACT

The National Institute of Standards and Technology (NIST) Define Cloud Computing as “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction”. This paper discusses cloud computing deployment models.

Keywords: *deployment model, private cloud, public cloud, high performance cloud,*

DEPLOYMENT MODELS

There is not one deployment model that works best for every customer. Therefore, the different deployment models allow customers to tailor services to their needs. Cloud computing is quite flexible; referred to as elastic. The deployment models allow customers to respond to some of the downsides and risks of Cloud computing. [5]

PRIVATE CLOUD DEPLOYMENT MODEL

- ◆ Full Control Over Data
- ◆ Own The Data Center
- ◆ Own Network
- ◆ No Need Of Public Internet
- ◆ Full Data Security
- ◆ Loss The Benefit Of Outsourcing
- ◆ Higher Maintenance Cost

A Private Cloud is a Cloud computing deployment model where the provider controls and owns the data center providing the Cloud services. [1]

In pure private model, Private Cloud does not use the public internet. It uses the firm's own network, and the cloud services are delivered over the firm's network. Private Cloud enables the firm to have control over their data. Obviously, this can provide advantages when it comes to data security.

However, the firm is giving up the advantages of outsourcing the costs in the maintenance of the Cloud. [3]

VIRTUAL PRIVATE CLOUD DEPLOYMENT MODEL

- ◆ Use Virtual Private Network
- ◆ Control Over Data
- ◆ Get The Benefits Of Outsourcing (In Maintenance Of Infrastructure)
- ◆ Use Internet As Medium

A Virtual Private Cloud or VPC is where a public Cloud provider has a dedicated set of computing resources for a specific customer. Therefore, the Cloud services are provided to the customers over a virtual private network. And the firm gets the advantages to the Cloud provider maintaining the infrastructure, but is still able to control the data and other parts of what may be sensitive computing resources.

A Virtual Private Cloud uses a virtual private network approach to deliver Cloud services to the customers. The virtual private network still uses the Internet, but it uses the Internet as a medium, and to connect to a VPN server where the data is delivered encrypted over the Internet. So the VPN allows the customers to extend their work to outside data center using the Internet. The customer does not own or have custody of the computers in the Cloud provider's data center. With VPCs, the Cloud provider can have control of the data, either physical control or as part of the dedicated servers at the Cloud provider. It's also possible for a customer to actually purchase hardware and then have it maintained by the Cloud provider over a Virtual Private Cloud. So this way the customer can outsource the maintenance of the hardware to the Cloud provider.

Amazon, IBM, Azure, Google all offer Virtual Private Clouds.

PUBLIC DEPLOYMENT MODEL

- ◆ **Take Full Benefits Of Outsourcing**
- ◆ **Need Public Internet**
- ◆ **Service Available To All**
- ◆ **Pay As Per Usages**
- ◆ **Bit Risk Of Data Privacy And Security**

A public Cloud is the deployment model where a customer uses the services of a third-party provider. The Cloud computing services are delivered over the public Internet. The public Cloud offerings are generally available to all. It is a fully public offering and it is completely off-the-shelf services from a public Cloud provider [2]. Public Cloud services are invoiced on only the services that are used. Public Clouds are typically data centers, in a seismically stable location.

For obvious reasons, Cloud providers do pick seismically stable locations in order to keep the data centers secure. That does not mean that there are not natural disasters and typically Cloud providers do have backup strategies in the event of floods, fires, or other natural disasters. Public Cloud is available to all and available over the public Internet. So firms need to decide what computing model works best for them. Again, there are trade-offs with this deployment model. However in many cases, a public Cloud deployment model can deliver the services that a firm needs at a lower cost than they can provide themselves.

HYBRID CLOUD DEPLOYMENT MODEL

- ◆ **Public Cloud + Private Cloud**

A Hybrid Cloud as the name suggests is a mix of private, maybe on-premises Cloud services or a Virtual Private Cloud and then a third party public Cloud services.

The hybrid has the elements of private and public associated with it. This is not something typically offered by a Cloud provider. It is architecture or a solution that the customer puts together. The private components of the Hybrid Cloud are typically commercial hardware, most likely data center class that have hypervisors installed to manage the private Cloud services. [4]

Therefore, to the users, the users are able to make efficient use of the hardware and get the managed services that are part of the firm's overall computing model. Again, the private component could be a virtual private Cloud that is either hosted at the Cloud provider or again, hosted by some other third party or at the firm' itself.

The public component is typically a public Cloud type of computing services from a public Cloud provider such as Amazon or Azure.

So this would be the infrastructure as a service that becomes the typical public component for hosting, infrastructure, disk backup, and other items that are part of infrastructure as a service.

A popular approach for this type of model is for firms to use the private Cloud to secure very sensitive data. So they are not essentially outsourcing the sensitive data to the public Cloud provider. Also, this does preserve mobility for a firm. So they can move with their public Cloud provider and they still have control over what is in their private Cloud.

The public Cloud again is used a lot of times quite often as the infrastructure as a service. So the firm is able to get the advantages of the expertise, the various levels of Cloud computing, networking, and other services, and they get all the advantages of outsourcing all of that and again managing the IT infrastructure exactly the same way software would be managed.

HIGH-PERFORMANCE CLOUD COMPUTING MODEL

- ◆ **Parallel Computing**
- ◆ **Fast Calculation**
- ◆ **High Performance**
- ◆ **Clustering**
- ◆ **Components**
 - **Computing**
 - **Data Storage**
 - **Network**
- ◆ **In Both Public And Private Cloud Model**

High-Performance Computing or HPC has become a popular offering of Cloud Computing providers.

HPC is actually architecture of arrayed computers or processors. So it is the parallel computing model where if you have one computer processing and you add a second now you have two computers creep running the calculations for you and that can obviously process more data and give you results quicker.

It is that type of idea that is behind high-performance computing. The architecture runs several computers in what is called a cluster. A cluster is a group of computers acting as one and there is software and infrastructure that support this type of computing model. [6]

High-performance computing again uses that parallel processing as a strategy. High-performance architectures can run quadrillions (10^{15}) of calculations per second. There are typically three components of High-Performance Computing. There is the processing of the computing, the Data Storage, and of course the network.

A Cloud provides that flexibility or elasticity for building the cluster and can dynamically add to the cluster if needed. So Cloud actually provides an ideal model for high-performance computing as virtual hardware can be added to the cluster as needed and it can be done very efficiently. Cloud can also provide the networking and storage for high-performance computing. Therefore again, the Cloud solution for High-Performance Computing is quite cost effective and very efficient. [7]

CONCLUSION

Private model is best where data security is the essential and the key aspect. Virtual private model give features as private model but provided by public cloud providers. Public cloud as name available to public, provide wide

range of features and services in affordable price. Hybrid cloud is the mix architecture of public and private cloud. High performance cloud use parallel processing technic.

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