What is cloud computing ?

Cloud computing is a service that provides information technology as a service. Cloud computing is an internet based solution where the resources that are provided like the electricity distributed on the electrical grid. The computers that are based on cloud computing are configured in such a way that they tend to work together and various applications can use the collective power of these computers to run on a single system.

Cloud computing is flexible and it is because of the allocation of resources on demand. This helps in facilitating the use of the system's cumulative resources, which eliminates the need to assign specific hardware to a task. Before cloud computing was introduced, websites and server based applications were executed on the systems. With the help of cloud computing, the resources can be used on any computer as long as it is connected to the internet. This helps in providing an environment where the applications can execute without any regard for a particular configuration.

Brief description of the problem of ComC

ComC is a medium sized company which deals with electricity and gas. ComC has some offshore assets which are located in the North of the United Kingdom. The company comprises nearly 200 employees with offices all over the United Kingdom. The company has an organisational structure which is based on the functional divisions, which are administration, engineering, support, sales and marketing.

The company currently has a database server that logs and archives the offshore data into a database. The company also has a tape drive that backs up the database stored off site on a daily basis. The ComC has a server that hosts some data reporting and monitoring applications. The company also has an email server which stores the incoming mails for the distribution to employees and sends out the outgoing messages.

The end users access these applications using a remote desktop client over the internet. Due to the large volume of datta and general company growth, they are considering migrating part or all their business and necessary functions of the company in the cloud.

Fundamental concepts of Cloud Computing

1) **On demand self service**

This allows users to quickly get access to the information technology resources the user what without requiring additional human interaction.

2) **Broad network access**

Broad network access is the ability to access a server from anny standard device that is connected to the network including personal computers, laptops, mobile phones or tablets.

3) **Resource pooling**

Compute, networking and storage are pooled and shared across multiple customers.

4) **Rapid elasticity**

Rapid elasticity helps to quickly scale or shrink the capability of the user's cloud to match the demand.

5) **Metering**

Metering tracks and controls the level of resource usage and the cost of that usage.

Many users generally chose three options for their cloud deployment which are public cloud, private cloud or hybrid cloud. A private cloud is provisioned for the exclusive use of the organisation. The infrastructure is usually owned, managed and operated by the organisation within its own firewall. A public cloud infrastructure is used by the general public. This type of cloud is owned, managed and operated by a cloud service provider and runs on the provider's premises. A hybrid cloud infrastructure allows the user to access both private as well as public cloud resources from a single management environment. In addition, three distinct types of information technology services available today through public, private and hybrid clouds.

SaaS

Software as a service or SaaS allows users to access an application without having to manage or control the underlined cloud infrastructure. Examples of Saas are gmail or salesforce.com.

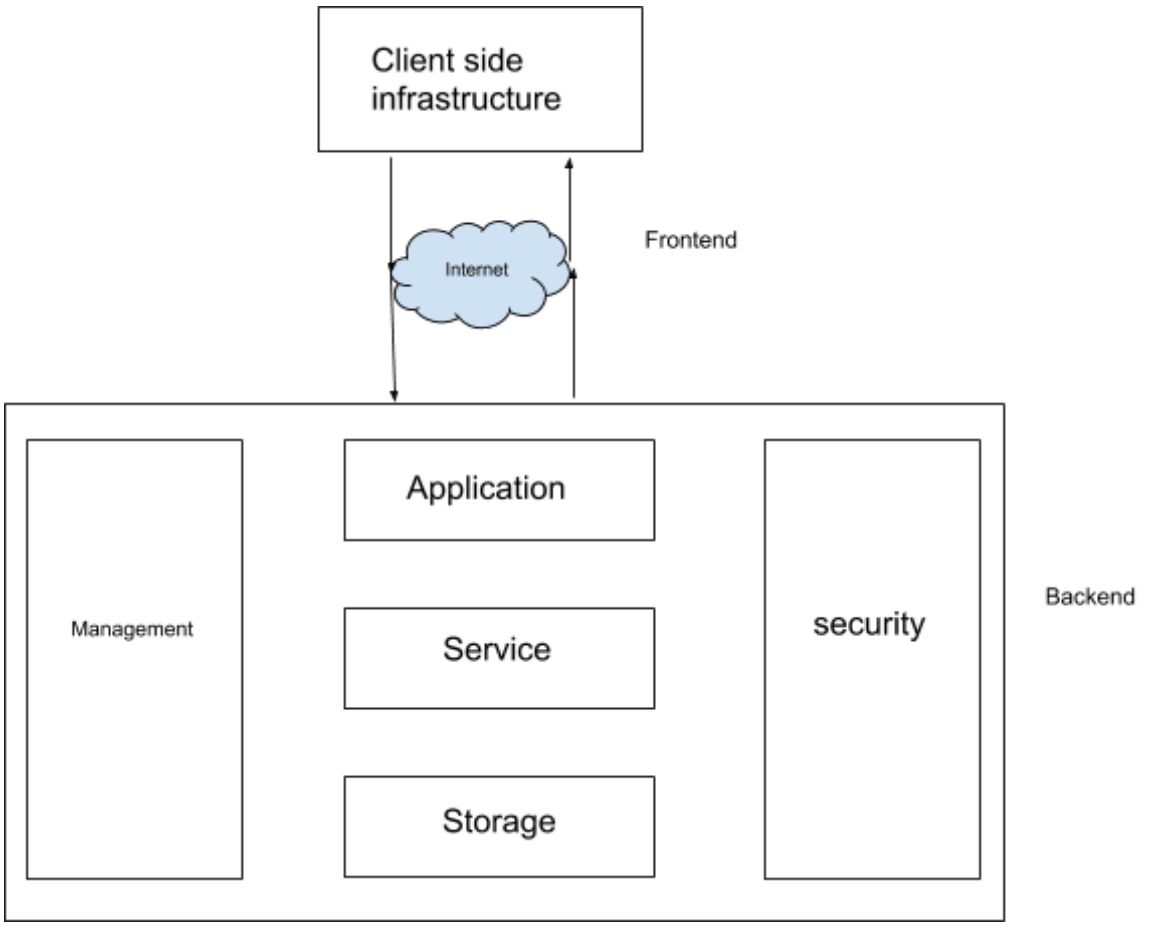
PaaS

Platform as a service or PaaS gives users access to a software development environment to allow them to create their own cloud applications using programming languages, libraries, services and tools. The user has control over these applications without having to manage or control the underlined cloud infrastructure. Examples or PaaS is cloud foundry.

IaaS

Infrastructure as a service or IaaS is widely viewed as a cloud. The infrastructure as a service cloud allows a user to quickly and easily provision full computing resources, including processing, storage and networks without having to manage or control the underlined cloud infrastructure. The example of a private IaaS is SUSE openStack cloud. Most data centers today are highly virtualized, but it can still take one or two days or maybe even a week to provision a virtual machine.

The cloud computing architecture designing



Many business enterprises used cloud computing. Above is the cloud computing design which consists of the frontend as well as backend programs. The frontend includes the client side infrastructure which means what the user will see and use with the help of the internet. The backend involves the management of the program, security, the services that the program will be providing to the user, the information provided by the user will be stored in the backend program.

Cloud architecture is a combination of oriented and event driven architecture. Therefore cloud architecture includes all the elements of the cloud environment. Cloud computing architecture is designing the systems of the softwares which exist in the cloud environment and it also includes many components of the cloud which work together with each other over a loose connection mechanism such as a messaging queue.

The frontend and backend are connected with the help of a network (internet) by the means of a delivery system. The above diagram demonstrates the cloud computing architecture.

According to the scenario given, ComC will be requiring an internet connection to access the applications. This helps the company to perform their daily tasks and to communicate and manage the data to the client. The ComC computer should be using cloud computing as it will help in providing storage, network and the resources that will help the company to function with the different softwares. With the help of cloud computing the company will be able to access the necessary data of the computer from anywhere and at any time. Cloud computing will help the company to function efficiently and will also help the company to meet its targets in an efficient way. Cloud computing is a cost effective and quick tools which will help in supporting ComC to achieve their given targets in an efficient way.

ComC should be using cloud computing because cloud computing can help ComC to access their important datas from anywhere in the world, with the help of any device that is connected to the internet. Cloud computing can help ComC to access their data in real time. Cloud computing is advanced as it is supported in almost all the platforms.

Windows Azure vs AWS

Amazon web services and windows Azure are both huge names in terms of public cloud computing, but which one is better for ComC. We will be comparing these cloud computing services and choosing which one is best for ComC.

Compute power

AWS
Amazon web service users have the ability to configure their own VMs or else they can choose pre-configured machine images. The users have the freedom to choose

the size, power, memory capacity and also the number of VMs, and these are chosen from different regions and availability zones.

Azure
The Azure users VHDs which are equal to a machine instance which is capable of creating a VM. These VHDs can be pre-configured by Microsoft. The user must only specify the amount of cores and memory.

Storage

AWS
Amazon web services have a temporary storage that is allocated when an instance is started and the temporary memory is destroyed when the instance is ended. AWS also provides block storage which is similar to that of a hard disk, that can be separate or attached to an instance.

Azure
Azure offers storage but temporary storage through D drive, block storage through Page Blobs for VMs. These Blobs can also function as an object storage. The Azure storage supports relational databases. Microsoft Azure also offers import export, Azure backup and also site recovery that will help in recovery options.

Hybrid cloud capabilities

AWS
AWS has a 100TB hard drive which can help ComC in moving their data between the cloud and the client's servers. The AWS has only recently been introduced into the hybrid world therefore the capabilities that ComC will be may differ.

Azure
Azure has been a long time information technology provider and it has strong support for hybrid cloud services. The Azure gives users hybrid platforms like azure StorSimple, hybrid SQL server and also Azure stack which will help the user to access public cloud computing in the user's own premises using the same pay as you go pricing model.

Conclusion
AWS and Azure offer many similarities, therefore it mostly does not matter on the fact that which one is better but it depends on what the business needs. Therefore for ComC, I think that they should go for Microsoft Azure because it can provide many good features that the company can use. Also Microsoft Azure has been in the

hybrid cloud computing for more time than the AWS which means it can perform better.

Types of cloud computing models

Public cloud
The public cloud infrastructure is for open use by the general public. The public cloud computing can be owned operated and managed by any business, educational institute or any government organisation or it could also be a combination of the different organisations. This type of cloud computing exists on the premises of the cloud provider.

Private cloud
The private cloud computing infrastructure is provisional for the use of only a single organization which comprises multiple consumers. The private cloud computing can be managed, operated and owned by a single organisation and this type of cloud computing can exist outside the organisation's premises.

Hybrid cloud
The hybrid cloud infrastructure is the combination of public and private cloud computing. These are both bound together by standardised or proprietary technology that can help in data and application portability.

Conclusion
According to ComC, the company should go for a cloud computing infrastructure that can have the features of both public as well as private cloud computing and can use the features of both the cloud computings. Therefore, ComC should go for hybrid cloud computing as this can give the company a choice to go for a public or private cloud computing according to the situations that occur

Advantages of cloud computing

1) **Cost savings**

Cloud computing's main feature is that it is cost efficient. Cloud computing can help any organisation to save substantial capital costs as cloud computing does not require any type of physical hardware investments. Cloud computing also does not require any professional to manage the equipment by the cloud service provider.

2) **Strategic edge**

Cloud computing offers more features compared to others. Cloud computing helps the organisations to access the latest applications at any time and anywhere without spending the organisation's money on the installations.

3) **High speed**

Another feature of cloud computing is that it allows the user to access the services quickly in fewer clicks. Cloud computing can help organisations to access their resources within a few minutes.

4) **Backup and restore data**

Cloud computing helps the organisation to directly store the data once the task of work is complete. The backup and recovery of that data can be easily accessed in a few minutes rather than searching each and every file that the organisation has.

5) **Automatic software integration**

Software integration in the cloud computing occurs automatically, therefore the organisation doesn't have to take any additional efforts to customise and integrate the applications according to the organisation's preferences.

6) **Reliability**

Cloud computing always updates its systems and services automatically. This is one of the features which make cloud computing very reliable.

7) **Mobility**

The people or the employees in the organisation can access the cloud computing from any location whether it is on the premises or outside the premises.

8) **Unlimited storage capacity**

Cloud computing offers the users unlimited storage facilities. If the organisation needs more storage then they can pay a nominal monthly fees and can expand the storage of the cloud computing.

9) **Collaboration**

Cloud computing helps the employees of the organisation who are located in different locations to collaborate in a convenient manner which is also very safe.

10) **Quick deployment**

Cloud computing gives the organisation the advantage of frequent development. Therefore, if the organisation decides to use cloud computing then they can set it up in a few steps and in very little time.

Disadvantages of cloud computing

1) **Performance can vary**

When any organisation is working in a cloud environment then the applications are running on the server which is providing resources to the businesses that the organisation is associated with. Any unwanted behaviour or DDOS attack can affect the performance of the company's resources.

2) **Technical issues**

Cloud computing is prone to many technical issues and outages. Even the best cloud provider can face these technical issues and therefore cloud computing is not that stable.

3) **Security threat in the cloud**

Cloud computing has security but it is not very secure. The company should consider cloud computing only after considering all the threats. The company will be sharing their sensitive data to the other businesses and therefore the other businesses can misuse their data.

4) **Downtime**

The organisation should consider the factors like power loss, low internet connectivity, service maintenance and other factors that should be considered while changing to cloud computing.

Conclusion

Despite all the pros and cons of cloud computing, it is the fastest growing part of a network based computing. Cloud computing offers many incredible services and features which the organisation can use. Therefore you can say that cloud computing is here for the long run.

Cloud models

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Conclusion

ComC should be considering going for IaaS as a cloud model as it has many features. IaaS allows the company to quickly and easily provision full resources, storage and network with some professional to manage it. Therefore the organisation can save a lot of money and resources by using IaaS. Therefore ComC should use Iaas as their cloud model. The IaaS is more powerful and will be able to give better and professional results.

Data Migration

Data migration means to move the data of the company from one location to another, or from server type to a cloud type of computing in this case. Data migration means changing the location of that company's data. Nowadays, data migration is started when the organisation or company moves from one premises to another or application based to a cloud based storage and application which will help transform the company, in this case is ComC.

The risks involved in data migration

1) **The metadata in your content can degrade**

Many of the migration projects imply a high risk of data loss. When the company’s data is unstructured then the risk of loss increases. Many organisations are aware about the metadata loss which has occurred and what part the data or documents have been transferred in the migration process, while other organisations are not aware about the risks that are involved about the migration process.

2) **Hyperlinks in your documents can stop working**

In the upgrading world, losing the hyperlinks that the company uses to connect the different documents can cause a number of different problems. If the data of the company is transferred in a different place then it can cause chaos. The company

ComC should be using a solution that allows them to quantify and direct the company, regardless of how the company chooses to organise the data of the company.

3) **The content you're migrating has no value**

Some of the companies don't know the consequences of data migration. If the company migrates all the data then they will not be able to know what data is important and what data is not. The company will be transferring a lot of unwanted data. The company will be collecting a lot of unwanted data which will cost the organisation a lot of time and resources.

4) **You don't know which documents the company will need**

This type of problem arises when the organisation tries to migrate different versions of the same document. The organisation will not be able to know which documents do they need and which data are important. This process can be difficult when some of the data of the organisation is paper based. If the organisation is migrating one or two documents then it would not be very hard but if the organisation is migrating almost every document in it then the process will take a long time and there may be many errors.

5) **You need to store sensitive content differently**

When the organisation migrates then there may be many risks involved. The main aim of the organisation during the migration should be that the documents and data should be kept safe and in a location where the company has no harm of exposing them. But during migration most of these important and sensitive files are amongst the others, which means that they are exposed to the different threats.

Security concerns for cloud based services

1) **Data breaches**

Cloud computing is a new form and has recently been introduced to many industries. Yet cloud computing has data breaches as it has been going on for years. A recent study reports that over 50% of the information technology and security believed that their company's security measures to protect data on the cloud have been very low. The simple conclusion is that cloud computing has a set of unique features that make it vulnerable.

2) **Hijacking of accounts**

The growth and implementation of cloud computing in various industries have opened many new threats in the case of hijacking. The hijackers are now able to use the details of the organisation's employees for login in the system and exploiting all

the sensitive data of the company. The data hijackers can manipulate the information through the hijacker credentials.

3) **Insider threat**

Insider threat is a threat that very much exists and the company will not be able to see when the attack may occur. The employees will use their authorised access to an organisation's service and may misuse the sensitive information. The employees will be able to access sensitive information like the customer's account, financial forms and other sensitive information.

4) **Malware injection**

The malware injections are scripts that have been embedded into the cloud service and it runs as a SaaS to the cloud servers. This means that the code can be injected into the system and then it will be considered as the part of the cloud and will be viewed as part of the software that has been running in the cloud servers themselves. Once the malware is injected then attackers can eavesdrop and can steal the important data of the company.

5) **Abuse of cloud services**

Cloud computing has allowed small as well as big industries to host vast amounts of data easily. But due to the unprecepetent storage capacity, the company will be vulnerable to attackers and data hijackers. These risks involve sharing of the company's data like the pirates softwares, vidoes, music, sensitive files and this may lead the company to fully collapse.

Steps to ensure smooth migration

Many companies think that data migration is a simple process but they do not know what risks are involved when data migration occurs. The company should do the data migration in a proper way so that it does not collapse the company. Below are the steps that a company should use while performing data migration.

1) **Strategy development**

Data migration is a very complex method. Before the data migration process, the company should be aware what the goal of the data migration is and what are the steps that the company should take while performing the data migration. Depending on the starting point of the migration, there are many ranges of vendors that will be able to assist the company.

However, the company should keep in mind that many vendors only perform one part of the data migration process and not all the processes. The company should

carefully evaluate the capabilities that they need and then make a decision about which vendor can meet that requirements of the company.

Once the company is confident about the vendor that they have chosen then the company should work in such a way that the team members can speed the process up. For a greater chance of success, the company should ensure that the company's technical and business teams know what the aim of the migration is.

The final step is to gather all the key stakeholders within the company and ensure that everyone is on board with the migration process.

2) **Assessment and analysis**

Once the company has developed the strategy of how the migration will take place, then the next step is to start assessing the contents and the data that the organisation currently have.

This method will ensure that the company does not leave any data behind. This process will help the company to know where the important data are and how the migration process will take place.

The company can see how the data has been stored and how it will further be organised with the help of some filters. This step is not only for the soft copy but also the hard copy. By sifting through the paper based content, the company will be able to ensure that they are not missing on any important and sensitive documents.

3) **Preparation**

During this step of the migration, the company can digitalise the rest of the paper based content. By ingesting all the paper based content, the company will be able to kill two birds from one stone, going forward, the company will also not be wasting any time browsing through those files again.

Once the paper based contents are digitised then the company will then remove the ROT content and pre-processing the rest of the data of the company. Other substeps that are included in the step include compressing the data of the company, enhancing metadata for greater searchability and also converting it into PDFs. Some of these solutions will help the organisation to redact the sensitive information that the organisation does not want to be further distributed.

The organisation will not be able to complete all the steps manually, but the company should be prepared by appointing a professional if it goes sideways. The organisation should take into consideration that not all vendors can help will all the

processes so therefore the company should appoint a vendor who can complete not all but most of the tasks.

4) **Classification and extraction**

The company should begin sorting all the data into categories in which they know what the data to be migrated.after this step, the company can start prioritising all of the categories and start routing it into the right buckets. The company will decide on how the data will be categorised, it can be categorised into file type, age or any other criteria that the organisation wants.

This step will also help the organisation to do more advanced data extraction. This information which consists of the names of the supplier can be leveraged to create the data rules which will help the company to determine how the contents of the organisation will be sorted during the migration process.

5) **Validation and staging**

The company should always be recording its process and where the data has been stored. This is the step in which the company has to review their work thoroughly. The company should take additional time to assess their data rules and they should also ensure that they are working to achieve the specific goals. Although most of the process is automated, if the company will keep on checking the process of the data then there will be less chance or risk and so the company does not have to face any further problems.

6) **Exportation**

Now that the organisation has a well organized dataset with which they can work with, then it is time for that organisation to complete the process of migration. The last step for the organisation is to complete the migration process after checking all the risks, faults and data involved. Now the organisation’s content will be fully accessible for other organisations' needs.

Wrap Up

When the organisation looks up the migration process as a whole then they may think that it is difficult, but once it is divided into smaller steps then it becomes less complex. When the organisation approaches the data migration process in a step to step manner, rather than a big process, then the company will be able to simplify the execution of the project and will be able to gain strategic value from the contents and transform the documents of the company into important data that will help to function the whole organisation.

The company should remember that a full-scale migration process is conducted better when it is with an appropriate technological partner. Many of the companies

may think that it is easy to do it alone, but transforming the data on a big scale will always need support as it can be prohibitive, in the manner of cost and resource, to execute a project of such huge scale when the company relies on their manual methods.

For the company to ensure that the process of migration is a success then they should be sure to choose a partner that is right for the job and who will follow all the tips that the organisation put forward. If they have all the needs then the migration process will happen without any interference and the company will be well on their way to transforming their documents into clean, actionable data.