Cloud Migration

Cloud migration as the name itself suggests involves moving a business application, its data to a cloud or use the infrastructure provided by a cloud company. It may also involve moving from one cloud provider to another. Many businesses are now migrating to cloud for the reasons of cost efficiency, scalability and to ensure higher performance of the applications.

Carrying out a cloud migration involves many steps and various stakeholders. Migration is a complex process and needs good planning. Planning is the first phase of migration and involves detailed studies from different perspectives on the migration. Some of the perspectives that needs to be taken into consideration while planning for migration are

  i.   Business perspective
  ii.   Platform perspective
  iii.   Maturity perspective
  iv.   Process perspective
  v.   Operations perspective
  vi.   Security perspective

During the planning phase, a business entity has to plan according to their needs and select one of the cloud services which it would like to have. The different cloud services are (figure 1):

  i.   IAAS (**I**nfrastructure **A**s **A S**ervice)
  ii.   PAAS (**P**latform **A**s **A S**ervice)
  iii.   SAAS (**S**oftware **A**s **A S**ervice)

In IAAS cloud services, the service provider only provides the infrastructure necessary to run the application (AWS, Azure, Google Compute Engine). In case of IAAS, the service provider takes care of storage, virtualization, networking, CDN.

In PAAS cloud services, apart from the infrastructure the service provider also provides application platform, database, development environment and integration. Examples of PAAS are AWS Elastic Beanstalk, Heroku, Google App Engine.

In SAAS cloud services, the service provider manages complete application and its infrastructure. In addition to IAAS and PAAS the other services included in SAAS are CRM, Business Management, Security and Tools. Example of SAAS is Google Apps, Salesforce.
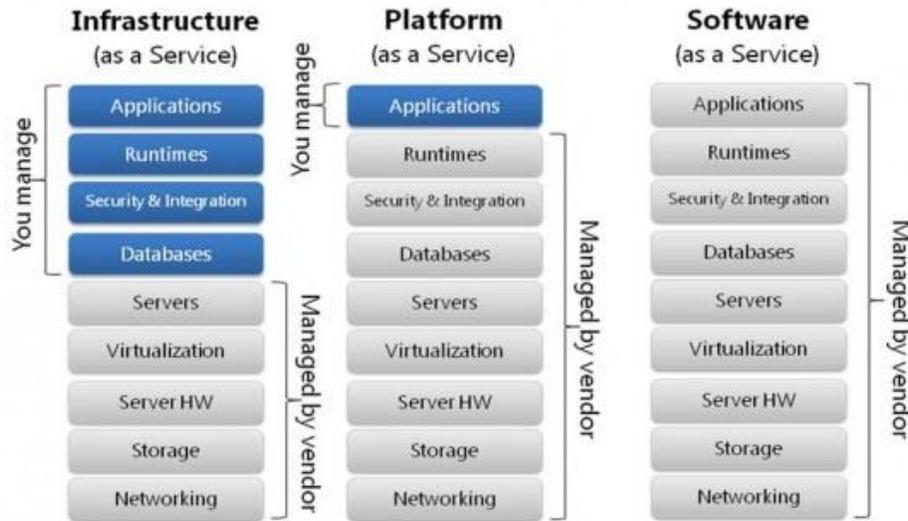

Figure 1

A business should choose between the different options based on their needs. Once, a business entity has decided to go cloud and carried out their planning and selected the model they want to opt, they should choose the type of cloud they want. There are three different types of cloud (figure 2)
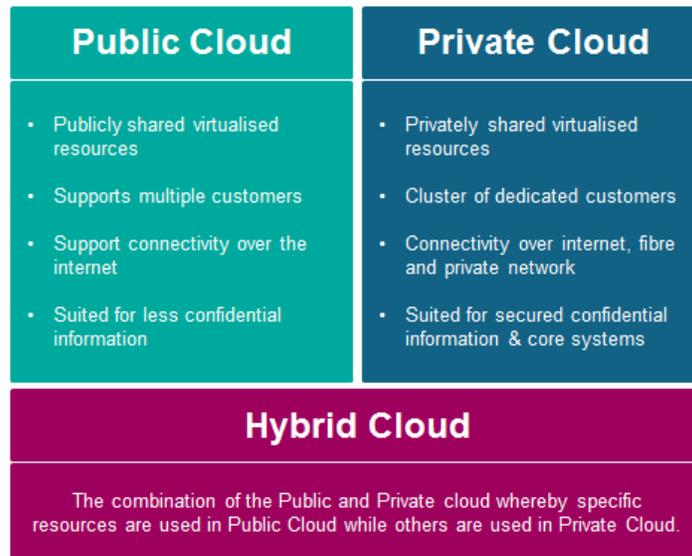
   i.   Public
  ii.   Private
 iii.   Hybrid

Figure 2

In case of Public cloud, the resources are completely provided by the cloud service provider. In case of private cloud, the business entity creates their own private cloud using a platform like OpenStack or VMWare's vCloud. In case of Hybrid, the resources are hosted using both private and public cloud. The following figure shows the different types of cloud.

In case of Public cloud, the resources are completely provided by the cloud service provider. In case of private cloud, the business entity creates their own private cloud using a platform like OpenStack or VMWare's vCloud. In case of Hybrid, the resources are hosted using both private and public cloud. Hybrid cloud (fig 3) is fast gaining demand as it helps us to combine the advantages of the two worlds of private cloud's security and public cloud's scalability.
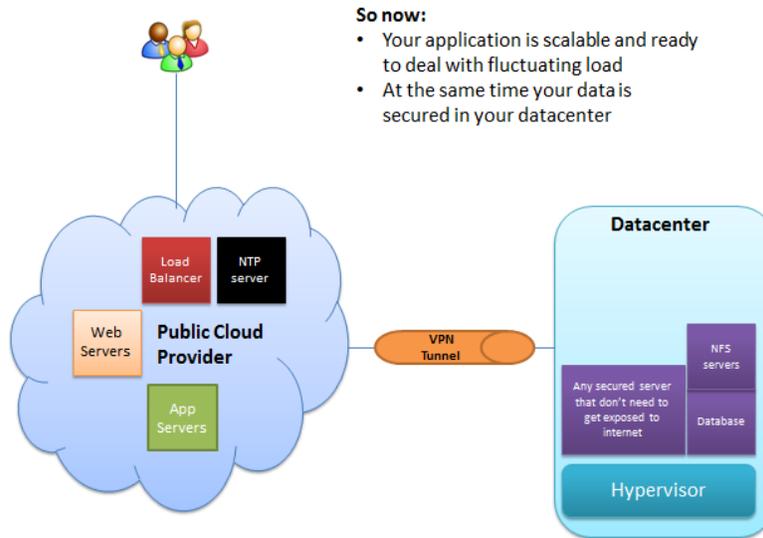
Figure 3

Public cloud can be utilized to meet the fluctuating demand and meet it accordingly. At the same time, by also having a private cloud that stores the customers data, the business entity ensures data security.

After selecting the cloud type, it's time to take steps to ensure migration is done successfully. Carrying out a migration is a complex task and issues like inter-operability, security gaps and unanticipated issues can create obstacles. An evaluation of the application becomes very necessary to check for cloud migration readiness. The issues that needs to be considered at this stage are as follows

i.   Application Design complexity
ii.   Integration complexity
iii.   The Host Operating System
iv.   Application database
v.   Network

The most important requirement for migration is that the application should follow an architectural design and design should have scalability as a feature for the application.

When it comes to integration phase, the dependencies of the application should be listed out. Examples of dependencies can be payment gateways, SMTP servers, external storage or any third party vendors. Integration points present a challenge in terms of connectivity, authentication etc. The best way to deal with this is to clearly list out all dependencies and have an action plan ready.

Applications running on one OS platform, may not be compatible with other OS platform. It is very important to check the OS of the cloud provider and see if our application is compatible with it.

Data is what forms the core of any application, some of the data held by an application may run into peta bytes. Moving such enormous data is very challenging and risky. A careful consideration of services that offer to migrate the data should be done as if any sensitive data gets leaked, it will bring bad publicity to the business entity.

Coming to networks, some service providers do not support multicasting, so it is advisable to check out the network capabilities of the service provider.

Once assessment of the application is done and stock taking of the resources of the cloud provider is also taken care of, it is time to do the migration. Different strategy for migration can be adopted (fig 4) which are as follows.

  i.   Rehosting
 ii.   Replatforming
 iii.   Repurchasing
 iv.   Refactoring/ Rearchitecting
  v.   Retire
 vi.   Retain

In case of Rehosting, the application may not be optimized for cloud, but simply hosted on a cloud. Even though not optimized for cloud, still companies can save huge amounts of money by simply rehosting their application.

In case of replatforming, the core of the application is left unchanged and minor changes are carried out to ensure application can be migrated to a cloud.
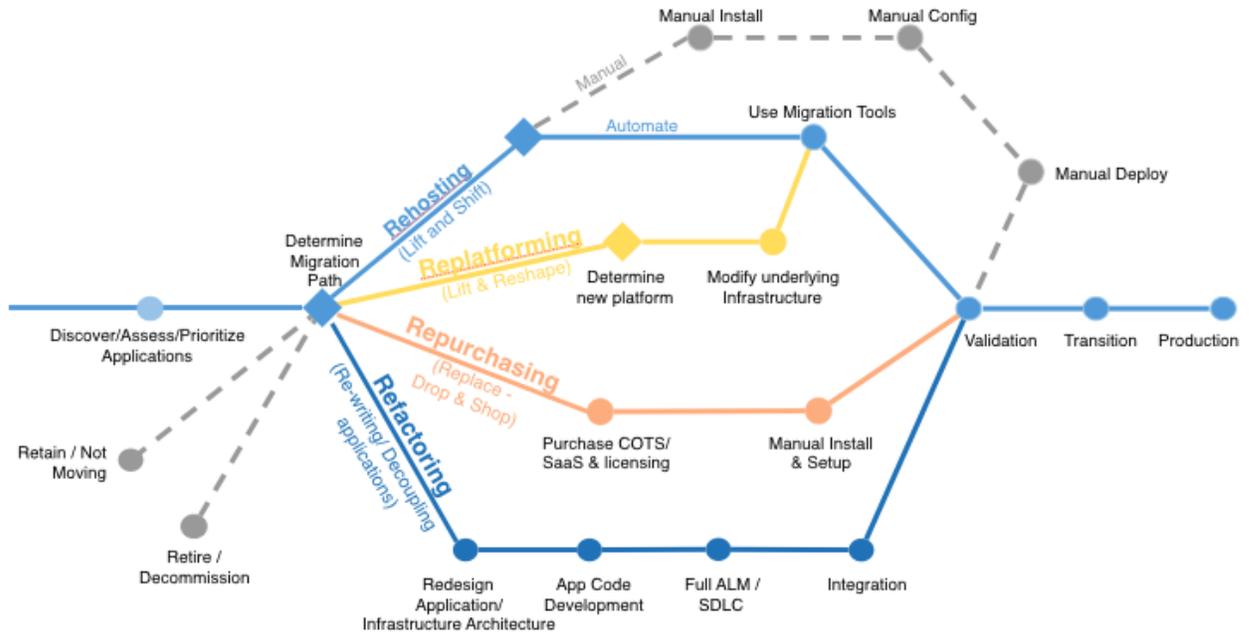
Figure 4

In case of repurchasing, a completely new application might be purchased by the business entity.

When it comes to rearchitecting or refactoring, the architecture of the application may be looked into and changes carried out accordingly. This strategy involves huge costs as at times it might be needed that a complete makeover of the application may have to be carried out. This strategy is good only if it is backed by a strong market demand for the application to be overhauled.

In case of retire, a careful analysis of system resources needs to be carried out to identify any dead code or resource which is not in use. It is always better to discard such things as it helps in saving costs.

In case of retain, only portion of the application that is needed to be on cloud should be migrated and the rest should be retained. As the application's presence of the cloud grows, the resources retained will start falling.