**IT TECHNOLOGIES**

# **Cloud Computing**

Cloud Computing is nothing but a house on rent.For instance when you move to new city to search a new job,then you first look for an accommodation so that you can stay in your rented house peacefully and search for a job which is why you are here.Your main busineess is JOB SEARCH! In this case you will not have enough money to afford your own house hence you will go for a rented one.So very 1st advantage of renting a house is "FLEXIBILITY" and you go in a flexible contract with your landlord under this rental agreement you stay in his house and pay a monthly rent.Similarly any business goes to a cloud vendor and rent its cloud services or infrastructure. Advantage of renting a house is you do not worry about maintenance or security so everything is taken care by your landlord so that you can live in his house comfortably and focus on your main business which is JOB SEARCH!.Similarly every company wants to focus on its main business and wants its capex to be spenton growing business but every company will need to spend on IT to support its business.Small companies does not have so much money to spend on IT so they look for a house on rent! Companies goes to a cloud vendor and take their services on rent. Hence,they use flexible cloud services and infrastructure which help them grow their business.Also if tomorrow your needs or salary change you can move from 1 BHK to 3 BHK.You can change your house,you can change your cloud vendor this is the beauty of cloud computing! Managing in-house IT incurs a lot of cost and maintenance this cost keep increasing year on year.Considering all these benefits,cloud computing has become a very lucrative area for business to explore.After this let's understand cloud computing from a story.In a village there was a candy maker called SHAM HALWAI his candies were very famous in his village.One day a person from his village takes hs candies to an outside city for his friends and people loves Sham's candies! and ask his friend to bring more next time.Sham feels really happy with this feedback and ask his friends to take more candies with him so suddenly he starts getting a lot of demand from nearby towns and cities but Sham didn't had any mechanism to handle such huge demand.He was struggling to bring all his customers to a common platform for order management as a result sham Halwai ask his son who was in IT to make a small website for him called Sham-halwai.com . He plans to manage sweets order and delivery from this website. But this website only worked for a short duration and lord on the website kept increasing as his products became more and more popular.Demand started coming from across state and from outside country and one day his webiste CRASHED! Sham-halwai.com crashed as it did not had the capacity to handle such huge load now in this case Sham Halwai will ask a cloud vendor to host his website on its cloud.Cloud vendor will go into a contract with Sham Halwai to offer cloud services on rent as per contract(monthly/quarterly/yearly). Now Sham-halwai.com has got the power of cloud infrastructure thus can grow on a massive scale,it no more has in-house IT bottlenecks.This bring us to another key advantage of cloud "LEVEL PLAYING FIELD".It means Sham Halwai can now compete with a bigger player in market competitor in his area as they both can leverage same cloud IT services.Level playing field is a key benefit is a key benefit of cloud computing as this brings a smalland big player at the same level to compete equally.Furthermore, Sham is sitting in July and August and cloud foresee huge demand and profit making during Christmas festive season so he will ask his vendor to increase the overall resources of his website to double.If his website caters to 1 lakh customers today then it should cater 5 lakh customers during Christmas and this is ONLY required for 20 days starting 15 days ahead of christmas to 5 days after Christmas and this enables him to get good resources for those 20 days and he has to pay additional cost for 20 days only.On 20th day he would automatically come back to his original contract and would pay as per his yearly contract however under in-house IT you would have manage such capacity forever only to serve you for those 20 days during Christmas which is a loss.Hence you get a lot of such flexibilities given by various cloud providers.Well, all these cloud vendors are big IT Gaints they have worked on heir infrastructure and technology for years hence can offer services so cheaply.If take example of Google,Google is sitting on his huge infrastructure whatever you search you get it in seconds! Everyone use Amazon for shopping, all this powered by its huge infrastructure so they now offer this power to others on rent.These It Giants have its idea centres across the globe and now they started submerging data centres under the sea!so now if a business man based in Mumbai want cloud services Cloud vendor will provie this from ASIA PACIFIC data centre which is closest to him.This helps in improved network bandwidth,performance along with lower cost as service are offered form a nearby location.AWS(Amazon Web Services)is clearly a leader at this time because they started ahead but Google and Microsoft are picking up fast. This competition is good for the market as everyone in market gets competitive prices for cloud services regardless of whether they are a big company or a startup.Cloud computing is the FUTURE although it has been in the market from last 10 years and was emerging around 2009 but still it's a long journey.There are big companies which still have huge in-house IT and not fully moved to cloud yet.There are few challenges like data security espacially in sectors like banking but with latest security mechanisms and other advancements it's just a matter of time when every company will have zero IT footprint.

There are 3 types of services which together make a cloud computing environment and those 3 services are Infrastructure as a service(IAAS),Platform as a service(PAAS) and Software as a service(SAAS).We will try to realte this with an easy real life example like we picked Sham Halmai's example(candy maker) so at your home you would have had some kind of event or party sometime.In this case the 1st thing you look for is a "CATERING" provider which can provide a nice venue and delicious food so when you approach a catering provider you can make 3 types of deals with him.In 1st type of contract,you will need to do nothing except for paying a fixed sum of money to the caterer. In this type of contract you would ask catering provider to arrange everything venue,food etc so you can simply go and enjoy.This is called Software as a Service(SAAS).In Software as a Service(SAAS) we simply use a software or application over the internet(via web) without worrying about how the application has been built or how it works simply go over the intermet,hit the browser and use the application.Best exapmle is GMAIL account,today almost everyone has a google mail id.GMAIL is a software as a service(SAAS) provided by Google cloud similarly Dropbox is another good example for SAAS.Hence software as a service makes your life very easy it can work on a SUBSCRIPTION based model hence its very easy to use cloud service.The 2nd type contract which you can have with the catering provider is that in which you will tell caterer that we will use all the services providede by the caterer however we will cook our own food because we need to serve self cooked food to our guests.In this case all resources will be provided by the caterer but the receipe shall be yours.This is a very good example for Platform as a service(PAAS). AS the name suggst PAAS provides you a platform where you can build your own applications on the cloud.Suppose you want to build a website using PAAS so while developing this website developers will get all the resources readily available like IDE,APIs.Security development of application everything is handled by PAAS.You cab then focus on CREATIVE aspect of development how creatively you can develope this website and you do not need to worry about which surrounds an application development.Hence PAAS is a very usefu; products and growing very rapidly.A very good example of PAAS is Google App Engine (GAE) along with Amazon's Beanstalk. Similarly almost every cloud provider has a PAASproduct which can be used as per our needs.The 3rdand largest cloud cmputing type which is comparatively easier to understand is infrastructure as a service (IAAS).If we correlate this type to our catering example then you do a deal with catering provider where you tell him that you setup your own infrastructure to cook food .For example- cooking gas,utensils and spices everything will be managed by you and then you will prepare whatsever you want to serve your guests.IAAS is a very easy to understand so if we now see its definition in IT so you ask your IT cloud vendor to provide all infrastructure services kike server,routers,networks you will deploy your infrastructure on the cloud this takes us closer towards "Zero IT Footprint".A new startup company might well decide to keep all its setup on the cloud which is very cost effective.So there are 3 types of cloud computing.Platform as a service growing fastest in 2019 with 32% growth rate it has left behind other 2 and in 2020 it will see a rapud growth .2nd in line is software as a service with 24% growth rate and last in the rank is Infrastructure as a service as its difficult and slow to move infra to cloud but now bbig IT companies hae started moving its infrastructure on the cloud and IAAS has grown at 12% growth rate as correlation among these services is growing day by day. If we imagine an EGYPTIAN Pyramid then on its top shelf sits SAAS in the middle sits PAAS and base is formed by IAAS.

## **Machine Learning**

As we all know ,that we are living in a world of humans and machines human have been evolving and learning from past experience since millions of years on the other hand the era of machines and robots have just begun in today's world.THese machines are the rewards are like they need to be program before they actually follow your instructions.But if the machine started to learn on their own and this is where machine learning comes into picture machine larning is the core of many futuristic technology advancement in our world. And today you can see various examples or implementation of machine learning around us such as Tesla's self-driving car Apple Siri,Sophia.I do bot and many more are there.Well Machine learning is a subfield of artificial intelligence that focuses on the design of system that can learn from and make decisions and predictions based on some experience which is data in case of machines machine learning enables computer to act and make data-driven decisions rather than being explicity programmed to carry out a certain task these programs are designed to learn and improve over time when ixposed to new data.Let's move on and discuss one of the biggest confusion of the people in the world. They think that all the three of them the AI the machine learning and the deep learning all are same,you know ,what they are wrong.Let me clarify things for you artificial intelligence is a broder concept of machines being able to carry out tasks in a smartar way.It covers anything which enables the computer to be.Have like humans think of a famous Turning test to determine Whether a computer is capable of thinking like a human being or not. If you are talking to Siri on your phone and you get an answer you're already very close to it.So this was about the artificial intelligence now coming to the machine learning part.So as I already said machine learning is a subset or a current aplication of AL it is based on the idea that we should be able to give machine the access to data and let them learn from done cells.It's a subser of artificial intelligence.Is that deals with the extraction of pattern from data set?This means that the machine can not only find the rules for optimal Behavior,but also can adat to the changes in the world many of he algorithms involved have been known foe decades centuries even thanks to the advances in the computer science and parallel computing.THey can now scale up to massive data volumes.So this was about the machine learning part now coming over to deep learning is a subset of machine learning whwre similar machine learning.Tamar used to train deep neural network. Well artificial intelligence is a broader umbrella under which machine learning and deep learning.All three the AI and machine learning and deep learning are just athe subset of each other.So let's move on and understand how exactly the differ from each other.So let's start with artificial intelligence.The term artificial intelligence was first coined in the year 1956.The concept is pretty old, but it has gained its popularity recently.But why well, the reason is earlier we had very small amount of data.The data we had was not enough to predict the accurate result.But now there's a tremendous increase in the amount of data statistics suggested that by 2020 the accumulated volume of data will increase form 4,4 zettabyte stew roughly around 44 zettabytes of data along with such enormous amount of data.Now, we have more advanced algorithm and high-end computing power and storage that can deal with such large amount of data as a result.Its is expected that 70% of the price will implemet AI over the next 12 months which is up from 40%in 2016 and 51% in 2017."Artificial Intelligence is a techinque which enables machines to mimic human behavoiur".Stats and probability are essential because these disciples form the basic foundation of all mchine learning algorithms deep learning,Social intelligence and data science.In fact mathematics and probability is behind everything around us from shapes pattrens and colors to the count of petald in a flower mathematics is embedded in each and every aspect of our lives.

Lets's understand who exactly a machine learning engineering is so machine learning engineers are sophisticated programmers who develops machines and systems that can learn and apply knowledge without specific direction artificial intelligence is the goal of a machine-learning engineer.They are computers programmers but thir focus goes beyond specifically programming machines to perform specific tasks. They create programs that will enable machines to take actions without being specifically directed to perform those tasks.What skills it takes to become a machine learning engine.So first of all we have programming languages now programming lannguages are big deal when it comes to machine learning because you don't just need to have proficiency in one language because you might to be working be working in a Hadoop environment.

### **Internet of things(Io T)**

Firstly let's look at an example of a mobile phones Forest.Our mobile phones has GPS tracking.It also has moble gyroscope you have adaptive brightness,which gets adjusted based on the light falling on it you have voice recognition and also have face detection which identifies who is the user now again iPhone x is coming face detection So again,these are a lot of features that are coming pre-built on the mobile assetand most of these have a common interacton between them because let's say one application can use all of these features.I can also have these features in itself being interacting with each other.Let's say based on a GPS location.My brightness could be adjusted on the direction.My phone is being held the brightness in itself can also be adjusted as well.So there are alot of features but when they interact with each other these features come together to bring in a better system that anything that they can provide individually as such that's what internet of things is it basically is a platform where we can connect every day things which are embedded with either Electronics software or sensors to the internet and this in turn enables us to collect as well as exchange between these things.Now when I say things it can be anything and everything.Let's say I have an internet platform where I can connect these things if I take example of my house,I can connect my lock, my light,my AC and all this can be managed on the same platform since I have a platform so I can also connect my car to this.I can keep a track of my fuel meter.,I can keep a track of my speed limit,also track of the location of the car as well.Now if there is a collective platform whre all of hese are connected wouldn't it be great because I would love to of he AC on and set a cool temperature at my phone by the time I reach back from Outside if have a platform that knows my prefences and that keeps track of where I am and where I'm going to then it can also identify that I'm going from back to hope and my prefences suggest that it would be best if there was an easy temperature of about 22 or 23 degree centigrade and this is something that is definitely possible through internet of things.So,this is one of the examples.

We have internet of things in our daily lives.his is probably a hallmark in the IoT industry as it's also one of the first industry is to deploy it at its service.Let's take an example,consider a home appliance such as your AC currently,what you do is that you go home you turn on your AC and wait for it to reach a temperature that you like say about 25 degrees celsius.So you see a problem here? No one that's probab;y becaouse there isn't a problem here.This is a perfectly functional setting.But what if it could be better what if when your car was five minutes away your Ac received a message.What if it was connected to a cloud which had a dashboard containing all the relevent information like the location of your car the outside temperature and the temperature at which you liked your room your AC could then turn onbefore you arrived and create an Ambience that you like?Wouldn't that be something?Well, you can remove all the watersfrom the previous scenario as this no longer.Must just be a figment of your imagination.Thanks to the internet of things (IOT) can connect fitbit's to our vehicles from smart phones to in flight services from home appliances like ACs to whole entire city. With the proliferation of connected devices iot has ventured successfully across all working areas in india and abroad India is quickly becoming one of the largest hubs for oit across the globe companies are viewing iot as key enabler in various fielsd and are come to integrating it into existing infrastructure as the adoption of iot has increased iot market is also expected to increase quite exponentially. Apart from that let's look at a little bit about the salary trends and projections.Now the median salary of iot professionals is 15 point 2 lakh per annum which is according to th 2017 study this figure compared to the 8.65blakh per annum in the eye IT sector gives about 76 % more to iot professionals iot being a relatively new entrant professionals in this area are ommanding higher salaries.