Day 1: Thursday 26th March 2020

Question 1: In cloud computing briefly describe the different service models (IaaS, PaaS & SaaS)

IaaS - Infrastructure as a service (IaaS) is an instant computing infrastructure, provisioned and managed over the internet. It's one of the four types of cloud services, along with software as a service (SaaS), platform as a service (PaaS), and serverless. IaaS quickly scales up and down with demand, letting you pay only for what you use. It helps you avoid the expense and complexity of buying and managing your own physical servers and other data center infrastructure. Each resource is offered as a separate service component, and you only need to rent a particular one for as long as you need it.

Typical things businesses do with IaaS include:

Test and development - Teams can quickly set up and dismantle test and development environments, bringing new applications to market faster. IaaS makes it quick and economical to scale up dev-test environments up and down.

Website hosting - Running websites using IaaS can be less expensive than traditional web hosting.

Storage - backup - recovery - Organizations avoid the capital outlay for storage and complexity of storage management, which typically requires a skilled staff to manage data and meet legal and compliance requirements. IaaS is useful for handling unpredictable demand and steadily growing storage needs. It can also simplify planning and management of backup and recovery systems.

Web apps - IaaS provides all the infrastructure to support web apps, including storage, web and application servers, and networking resources. Organizations can quickly deploy web apps on IaaS and easily scale infrastructure up and down when demand for the apps is unpredictable.

High-performance computing - High-performance computing (HPC) on supercomputers, computer grids, or computer clusters helps solve complex problems involving millions of variables or calculations. Examples include earthquake and protein folding simulations, climate and weather predictions, financial modeling, and evaluating product designs.

Big data analysis - Big data is a popular term for massive data sets that contain potentially valuable patterns, trends, and associations. Mining data sets to locate or

tease out these hidden patterns requires a huge amount of processing power, which IaaS economically provides.

PaaS - Platform as a service (PaaS) is a cloud computing model in which a third-party provider delivers hardware and software tools -- usually those needed for application development -- to users over the internet. A PaaS provider hosts the hardware and software on its own infrastructure. As a result, PaaS frees developers from having to install in-house hardware and software to develop or run a new application. PaaS does not typically replace a business's entire IT infrastructure. Instead, it tends to incorporate various underlying cloud infrastructure components, such as operating systems, servers, databases, middleware, networking equipment and storage services. Each of these functions is owned, operated, configured and maintained by the service provider. PaaS also provides additional resources, including database management systems, programming languages, libraries and various development tools. he principal benefit of PaaS is simplicity and convenience for users -- the PaaS provider supplies much of the infrastructure and other IT services, which users can access anywhere via a web browser. The ability to pay on a per-use basis allows enterprises to eliminate the capital expenses they traditionally have for on-premises hardware and software. Service availability or resilience, however, can be a concern with PaaS. If a provider experiences a service outage or other infrastructure disruption, this can adversely affect customers and result in costly lapses of productivity.

SaaS - Software as a service (SaaS) allows users to connect to and use cloud-based apps over the Internet. Common examples are email, calendaring, and office tools (such as Microsoft Office 365).

SaaS provides a complete software solution that you purchase on a pay-as-you-go basis from a cloud service provider. You rent the use of an app for your organization, and your users connect to it over the Internet, usually with a web browser. All of the underlying infrastructure, middleware, app software, and app data are located in the service provider's data center. The service provider manages the hardware and software, and with the appropriate service agreement, will ensure the availability and the security of the app and your data as well. SaaS allows your organization to get quickly up and running with an app at minimal upfront cost. If you've used a web-based email service such as Outlook, Hotmail, or Yahoo! Mail, then you've already used a form of SaaS. With these services, you log into your account over the Internet, often from a web browser. The email software is located on the service provider's network, and your messages are stored there as well. You can access your email and stored messages from a web browser on any computer or Internet-connected device.

The previous examples are free services for personal use. For organizational use, you can rent productivity apps, such as email, collaboration, and calendaring; and sophisticated business applications such as customer relationship management (CRM), enterprise resource planning (ERP), and document management. You pay for the use of these apps by subscription or according to the level of use.

Advantages of SaaS

Gain access to sophisticated applications - To provide SaaS apps to users, you don't need to purchase, install, update, or maintain any hardware, middleware, or software. SaaS makes even sophisticated enterprise applications, such as ERP and CRM, affordable for organizations that lack the resources to buy, deploy, and manage the required infrastructure and software themselves.

Pay only for what you use - You also save money because the SaaS service automatically scales up and down according to the level of usage.

Use free client software - Users can run most SaaS apps directly from their web browser without needing to download and install any software, although some apps require plugins. This means that you don't need to purchase and install special software for your users.

Mobilize your workforce easily - SaaS makes it easy to "mobilize" your workforce because users can access SaaS apps and data from any Internet-connected computer or mobile device. You don't need to worry about developing apps to run on different types of computers and devices because the service provider has already done so. In addition, you don't need to bring special expertise onboard to manage the security issues inherent in mobile computing. A carefully chosen service provider will ensure the security of your data, regardless of the type of device consuming it.

Access app data from anywhere - With data stored in the cloud, users can access their information from any Internet-connected computer or mobile device. And when app data is stored in the cloud, no data is lost if a user's computer or device fails.

Question 2: Let's imagine you work as a data scientist for one of the big cloud computing service providers and you have been tasked to introduce a new service model for Data Science as a Service (DSaaS). How would you define the service model, what core services will be provided under the new service model and how would you relate it with the traditional technology stack

DSaaS or Data Science as a Service is a kind of outsourcing that revolves around the delivery of the data that is gathered with the help of progressive analytics applications. The application is used by the data scientists on an outside company so that they can trade client in order to increase their production rate. The main process of DSaaS is to collect data from the patron and prepares an appropriate analysis then running a logical algorithm in contradiction to the polished data. This will help to revert the results that will be produced by the algorithm to the clients.

I will introduce Fraud Analytics as a service for a payment/transaction company using cloud service. Their transaction data is being stored in the cloud in real time. Fraud Analytics as a service would help in detecting and stopping fraud in real time.

Relating it with the traditional technology stack, it would perform better than the traditional rule based system whereby all transactions have to monitored at the end

of the day rather than in real time which can help the company/client reduce the amount of money lost to fraud. The key here would be providing DSaaS in real time which would help the company/client reduce fraud in transactions and also help the company dedicate more time and people to other parts of the business that require more hands.