FR. CONCEICAO RODRIGUES COLLEGE OF ENGINEERING

Department of Computer Engineering

1. Course, Subject & Experiment Details

Practical No:	1
Title:	Introduction and overview of cloud computing. Objective: To understand the origin of cloud computing, cloud cube model, NIST model, characteristics of cloud, different deployment models, service models, advantages and disadvantages.
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Evaluation:

Sr. No.	Rubric	Grade
1	On time submission/completion (2)	
2	Preparedness (2)	
3	Skill (4)	
4	Output (2)	

Signature of the Teacher

Experiment 1: Introduction to Cloud Computing Post Lab Questions:

1. How is cloud computing different from utility, on-demand and grid computing?
   Cloud computing can accurately be described as utility or on-demand computing; at the very least, these concepts are a core requirement for a computing environment to be considered a "cloud"—a billing model where you only pay for the computing resources you actually use (the "utility" aspect) and only for when you use it (the "on-demand" aspect). Another synonym would be Computing-as-a-Service.

   Grid Computing is a more specific way of leveraging computing resources that takes a large compute-intensive task and splits it up so that it can be worked on in parallel by many different systems, delivering the desired result far more economically (and typically much faster) than requiring one massive supercomputer to deliver on its own. It is a much older concept, and pre-dates the modern concept of Cloud Computing.

   Cloud and Grid are separate concepts, and you could actually leverage the Cloud to deliver a Grid Computing solution.

2. How do vendors charge for these services?
   Cloud service providers charge you as per the resources you use and the duration for which you use. To illustrate the example of Amazon Web services.

   If you want to host your website on cloud server then you will use EC2 service. For that, charges will vary as per the type of system you use (more rate for more powerful systems). Charges will be calculated as per the CPU time used. (First 700hrs free on some systems). For some resources like key Management (helps you to access the servers securely) charges will be monthly according to the number of keys. Similarly for IP addresses number of addresses will decide monthly charges. Storage service will have different charges for slow and fast storage services which will vary with the amount of storage which you ask for. Similarly for platform as a service and software as a service your billing will be based on the number of features and services you have used as well as the duration and number of users.

3. Can applications move from one cloud to another?
   Yes, applications could be moved from one cloud to another cloud.
   Cloud migration is the procedure of transferring applications, data, and other types of business components to any cloud computing platform. There are several parts of cloud migration an organization can perform. The most used model is the applications and data transfer through an on-premises and local data center to any public cloud.
   But a cloud migration can also entail transferring applications and data from a single cloud environment or facilitate them to another- a model called cloud-to-cloud migration. The other type of cloud migration is reverse cloud migration, cloud exit, and

cloud repatriation where applications or data are transferred and back to the local data center.

4. How does traditional software licensing apply in the cloud world?
   Cloud software licensing refers to the process of managing and storing software licenses in the cloud.
   The benefits of cloud software licensing models are vast. The main and most attractive benefit has to do with the ease of use for software vendors and the ability to provide customizable cloud software license management based on customer needs and desires. Cloud-based licensing gives software developers and vendors the opportunity to deliver software easily and quickly and gives customers full control over their licenses, their analytics, and more. This leads to greater revenue and customer satisfaction.
   Cloud-based licensing allows software vendors to give customers access to real-time data to increase profits and lower costs. The cloud allows access to migration data, information on license use (including those that aren't being used and therefore being wasted), centralized records, etc.

5. What types of service-level agreements are cloud vendors providing?
   A Service Level Agreement (SLA) is the bond for performance negotiated between the cloud services provider and the client. Earlier, in cloud computing all Service Level Agreements were negotiated between a client and the service consumer. Nowadays, with the initiation of large utility-like cloud computing providers, most Service Level Agreements are standardized until a client becomes a large consumer of cloud services.
   Service level agreements are also defined at different levels which are mentioned below:
   - Customer-based SLA
   - Service-based SLA
   - Multilevel SLA

   Service Level Agreements usually specify some parameters which are mentioned below:
   - Availability of the Service (uptime)
   - Latency or the response time
   - Service component's reliability
   - Each party accountability
   - Warranties

   Two major Service Level Agreements (SLA) described:
   Windows Azure SLA –
   Window Azure has different SLA's for compute and storage. For compute, there is a guarantee that when a client deploys two or more role instances in separate fault and upgrade domains, client's internet facing roles will have external connectivity minimum 99.95% of the time. Moreover, all of the role instances of the client are monitored and there is guarantee of detection 99.9% of the time when a role instance's process is not runs and initiates properly.

SQL Azure SLA –

SQL Azure clients will have connectivity between the database and internet gateway of SQL Azure. SQL Azure will handle a "Monthly Availability" of 99.9% within a month. Monthly Availability Proportion for a particular tenant database is the ratio of the time the database was available to customers to the total time in a month.

Time is measured in some intervals of minutes in a 30-day monthly cycle. Availability is always remunerated for a complete month. A portion of time is marked as unavailable if the customer's attempts to connect to a database are denied by the SQL Azure gateway.

6. How can a channel organization best use cloud computing opportunities, resources or services to its advantage?

Cloud computing offers your business many benefits. It allows you to set up what is essentially a virtual office to give you the flexibility of connecting to your business anywhere, any time.

Reduced IT costs - Moving to cloud computing may reduce the cost of managing and maintaining your IT systems. Rather than purchasing expensive systems and equipment for your business, you can reduce your costs by using the resources of your cloud computing service provider. You may be able to reduce your operating costs because: the cost of system upgrades, new hardware and software may be included in your contract, you no longer need to pay wages for expert staff, your energy consumption costs may be reduced there are fewer time delays. Scalability - Your business can scale up or scale down your operation and storage needs quickly to suit your situation, allowing flexibility as your needs change. Rather than purchasing and installing expensive upgrades yourself, your cloud computer service provider can handle this for you. Using the cloud frees up your time so you can get on with running your business.

Business continuity - Protecting your data and systems is an important part of business continuity planning. Whether you experience a natural disaster, power failure or other crisis, having your data stored in the cloud ensures it is backed up and protected in a secure and safe location. Being able to access your data again quickly allows you to conduct business as usual, minimising any downtime and loss of productivity.

Collaboration efficiency - Collaboration in a cloud environment gives your business the ability to communicate and share more easily outside of the traditional methods. If you are working on a project across different locations, you could use cloud computing to give employees, contractors and third parties access to the same files. You could also choose a cloud computing model that makes it easy for you to share your records with your advisers (e.g. a quick and secure way to share accounting records with your accountant or financial adviser).

Flexibility of work practices - Cloud computing allows employees to be more flexible in their work practices. For example, you have the ability to access data from home, on holiday, or via the commute to and from work (providing you have an internet connection). If you need access to your data while you are off-site, you can connect to your virtual office, quickly and easily.

Access to automatic updates - Access to automatic updates for your IT requirements may be included in your service fee. Depending on your cloud computing service

provider, your system will regularly be updated with the latest technology. This could include up-to-date versions of software, as well as upgrades to servers and computer processing power.