# Applied Distributed System Programming

## Coursework 1

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# Cloud Service Management

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## Abstract

Cloud Services are increasing day by day, offering the customers the possibility to have all their needs in a distance of a few clicks. Because of his price, the features it offers make a lot of companies to change from traditional Networks to a Service where they have everything, server to store their data, platform where they can manage their application and Software where they can control their business just with some clicks on their devices, could be a laptop or a mobile phone and the only resource they need is the Internet, to be online. Having a Cloud Service, the customer can at least pay a cheaper price, not to worry anymore with Hardware and Software and to pay to maintain them.

## Introduction

Why we need Cloud Services? Many Enterprises Companies in these days are switching to cloud services to minimize the costs and make the access to their data easier than having to deal with physical devices or software installed in their System. It's no longer needed to worry about technical issues inside the network as the service is all managed through the Internet. Having a Cloud System allow the Companies to access to their infrastructure easily and quickly as the access can be done anywhere at any time they want, the only resource they need is to have access to the Internet. The access the data become easier, using a cloud service increase the productivity and the efficiency of the Business as the application is always accessible even from any Location. Research shows that most of the Companies recently changes to cloud services with the intention to reduce the costs, the most of them in hardware and software or IT management, with the aim of increasing the Profit and keep the information safe and secure. Because most of the subscription are about the storage amount, the companies are more confident as the Service offer reliability and Integrity of their data, and they are secure and accessible at any time anywhere. The

## Cloud Services and traditional network

As the word says cloud is being used to describe an Internet technology in Network designs, with the cloud service it is possible to use any service or application that is built in the Internet. With the cloud service the customer will using third party technology and infrastructure to store his data in their servers that is allocate somewhere else, on a Data Centre. Instead of being using own network or devices, the customer decides to minimize the costs by hiring a service that is available at any time at anywhere, a service that can offer a backup of the Customer's data, a service that can be managed from any location, the only

resource is needed is the Internet. We are using Cloud service all the time, for example checking the email, saving your data, all of these features and of course there are more out there, could be implemented in traditional Network, like have an email server and managed your emails from there, having your own hard drive where you can store your data or private information, but instead of having all of these, most of the Companies or even particulars, they decided to invest in a service available all the time and from everywhere, it doesn't matter the location, the only thing needed is the Internet so the services can be managed online. This service doesn't require periodic maintenance as a Traditional Network where the Company has to pay for the IT Computing Team to managed and fix any kind of issues that may happen in the System, so Cloud Service allow the Customer to manage his service at any time, the service will be running faster without interruption as a Traditional Network, and it will all the time online and requires less maintenance.

## Cloud, its concepts and system models

When referring to a Cloud, basically means Internet, where people or Organizations share resources, information and software using the internet service. A Cloud computing provider make use of Servers to store users' data. Cloud has three System Models: SaaS stands for Software as a Service, PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). The IaaS (Infrastructure as Service) Service Model provide the companies the ability of control, so instead of having their own infrastructure installed locally the Cloud allow the Organizations to move them to cloud. The PaaS (Platform as a Service) Service Model provides the customer the ability to develop software or applications that he needs. The SaaS (Software as Service) Service Model provides the customer an online Software Subscription. Many Vendors offer software that depends on which sector they are acting, for example Vendors offer software that are included on the Legal department, HR department and Others, there services are low-cost, and the customer can save budget instead of Having an IT department providing this kind of service. The aim of the Cloud Service is to help/provide the Customer an architecture with a high bandwidth, so they can always have access to the Platform and manage their service. The fail of the Internet or even on the Servers could be a big issue for the organization as their Online System depends on them. Cloud Service has disadvantages as well, besides Internet Connection the Customer doesn't have total control on the System, as the Service is online could be hacked or having their data compromised.

## Core communication facilities in the Cloud and its congestion issues

The main facilities provide by the Cloud Service are: email, video calling, Instant messaging, voice mail and the data storage. These Services are offered by CaaS (Communication as Service) which are responsible for managing the Hardware and Software. When offering a huge quantity of data or service application, since the cloud service grow a lot is the past few years, the servers sometimes can get overloaded by the amount of customers uploading files or using the applications/software, even if they decided to upgrade the Servers for a better and high performance soon the new Server is going to be overloaded as the number of Customers or requests is increasing with the time the technology is growing up. With the increase of requests from the customers, the Cloud service choose to use Load balancers, where the aim is to split every kind of request to a specific server. Services like FTP, SMTP or HTTP can be managed by using load balancing and make sure that the connections are distributed.

## Cloud Computing Systems' Virtualization

Virtualization by far is a method where the user can create a virtual machine over an Operating System. In terms of cloud Computing, Virtualization is very important, it separates the Software from the Hardware, so any demand on software or applications it makes sure that they are reallocated through the servers. As the number of customers increases there is a need to implement more and more servers, so because the number of Servers is high it's highly recommended that all operations through the servers should be automated so the customers can create his virtual machine without the intervention of a human, it will be automatized, meaning it will automatically start or stop on the servers. A serious issue that could happen for the customer is if he has a virtual machine running in the same server as another customer, because by default switches drop packet that supposed to be sent and received from the same port, these problem happen because some Enterprises Companies may be using Ethernet switches which is not supposed to be design for Virtualized infrastructures, so the cloud provider assign multiple VMs from a specific customer into a single Server taking the risk of the failure of the server and cause some damage to the customer.

## Advantages and Disadvantages of Cloud

Since cloud were introduced many companies choose to use this service instead on traditional Network, as any other service Cloud has its Advantages and Disadvantages. The principal advantage that may the companies to switch to the Cloud service is the cost, this service provides a cheap budget and on the other hand the Company doesn't need anymore to pay to the IT Team for the maintenance or cost with hardware and software. Another advantage I high Speed when adhering to the service, as it can be done in some clicks and all of resources wanted in short period of time. Accessibility is another advantage that we get on cloud services, as soon your service is online it can be accessible from everywhere and the only resource needed is the Internet. Backup is useful as well for the customer as his data is safe and secure, meaning that he can at any time recover his data from the backup available online. They can manage the service by choosing their needs through the online service. And like any other service Cloud has negative aspects, some Disadvantages like they are vulnerable to attacks from third parties such a hacker for example where they can steal information from the servers and make use of those information to cause damage to the customers; the hole service depends on the internet, meaning is there is a Internet failure the entire service wouldn't work as it depends on the network to be online for use; the service may be inactive for undetermined period of time, such as a downtime issues; as the service is running on a remote server the control functionality is limited is hard to control a system in this situation; when adhering a new vendor some Companies face some problem when trying to migrate the service to another vendor, sometimes it take time for the old vendor to migrate the all service to another platform.

## The Cloud Architecture Service Management Operations

The Cloud service is expanding over and over on all kind of industry, many kinds of business are changing now to the Cloud as the service is cheap and manageable from everywhere without to worrying with maintenance or expenses if it was in a traditional Network.

## Scenarios of Cloud Informatics and its Risks

IaaS (Infrastructure as a Service) focus on the Storage, network that the Cloud Service offer, so a Company can rent these resources to run his business instead of a traditional network, meaning the Customer is allowed to choose his public Cloud Vendor, some popular scenarios for example AMAZON WEB SERVICES (AWS) Microsoft Azure. PaaS (Platform as a

Service) is responsible for develop applications, for example database management or even an Operating System, as example Google App engine, Windows Azure and others. SaaS (Software as a Service) is a software which the Customer has a login and subscription and can manage his business from the software, could be for example a CRM (Customer relationship Management) application or for example Google's Apps where you can store or view or data.
The Cloud Service even if it's secure it can offer some risks for the Company, for example when store some confidential documents can face some security issues, like having their document opened by third parties and cause serious damage to the Company.

## Security and Identity Administration of Cloud Informatics

The Cloud Service offer a service for a customer could be a Storage or A software, so for the administration of the Cloud Service the customer needs to Authenticate in the System first, as soon the customer get access to the system it will have access to all resource that the System provides. The system will create a session and cookie to keep authorization information. A process called SSO (Single Sign On) is created so it maintains the customer looged in and it the session doesn't expire for the entire communication.

## Cloud services and strategies for Live VM migration issues

For the Service they offer, Cloud Services allow the customer to migrate the service without any interruption, the Live Virtual Machine can be migrated without stopping any services running into the VM. For the Cloud System management is a big step for the Industry as the Company appreciate such feature. To maintain this functionality the infrastructure has to be improved in terms of performance. To Live migrate a VM three tasks has to be followed, Memory Data Migration, Storage Data Migration and Network Connection Continuity.

## Main problems in the Cloud Systems

The main problem in the Cloud System are Security issues, Cost Management, Lak of resources or expertise, Control, Compliance, Migration Performance and Managing Multiple Clouds. When storing data into the Cloud the Customer is unable to see where is the location that that data is, but the service has SaaS that can give a reliability to the customer as the service provide mechanism to authenticate. Even when migrating all the Service to cloud is may look cheaper but with the amount of needs the cost may vary. As the business are growing there is a need to guarantee the service for the customers, so the providers Vendors are investing more and more to keep up with the customer.

## Cloud Security issues in the mobile cloud

Cloud Computing is a service that provide de access for example from mobile phone, a smartphone with the access on the Internet allows to the Customer to manage his service, but in terms of security is a big issue. When the subject is store data on the cloud through the mobile phone it concerns the user, as his going to have his data exposed online and can suffer risk of having his data stolen, violating his rights and privacy. It can suffer attacks from wireless devices for example, or a virus and malware sent to his phone, attacks on authentication, on availability, integrity of his data. So, to stop threads or attacks on the device is crucial advice that the OS on the device needs to up to date, connect just with trustable wireless, install antivirus, use safer browsers, use encryption, use of strong passwords.

## Benefits of using Cloud Technologies

When adhering Cloud Technologies, the customer would face many features that he can benefit. The Customer when having a traditional Network, he spends a huge amount on equipment and maintaining them, so using a cloud infrastructure the Customer will save a lot of money as he doesn't have to pay or invest the money on hardware or a data center for example. The Could infrastructure will offer all these features to the customer or Organization for a considerable amount and the Customer only need to have the Internet connection for all the time he needs to access his service or platform. Another benefit from the Could Services is the Security of their Data, so cloud Infrastructure tries to minimize the Cyber Attacks by implementing various security features on the system. Cloud Infrastructure allow customers access from any mobile devices where they can easily manage their business even if there are not in their office, a service 24/7 as long they are connected to the Internet, keeping the staff the possibility to have any information up to date. Another benefit is data is always secure in case of a Disaster Recovery, all data will be on the servers in case of backup, so the infrastructure will prevent the customer in case of loss of data. The Company can also control their Data and decide which level of access it can allow users to do in the System.

## Cloud today Cloud Technologies in the future

By far the Cloud Technologies is being used from most of the Enterprises Companies that decided to have one Infrastructure where they can manage from anywhere their business. Today almost everything in the Digital world is being connected to the cloud infrastructure instead of investing in equipment or software and having IT department to do the maintenance. Regarding to the future of cloud, according to some giants' CEOs whose using Cloud Services, most of the business will operate from the cloud and the use of hardware won't be a problem anymore as the Cloud Infrastructure will be used for that purpose. In a couple of years Cloud Services will have more features for security and applications available with the intention to maintain the customers and offer better service. So maybe in the future Customers will just need a device on their hand or a Laptop to run their business.

## Conclusion

While Cloud Service offer a good and not expensive product to customer, there are some concerns about security, when the subject is store private data in a Server that you don't have idea where it locates. Knowing that the infrastructure that is offered is well structured there are many points that the customer is not so sure, so giving a small brief to the customer when adhering the service would be ideal and at least the customer would be so confuse. The Cloud Service Providers are often increasing security features in the system giving the customer a better service that they are paying for. To avoid Cyber attacks the Cloud Service is always upgrading the system and including more security features into them.

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