

Assignment 1 - Dawid Trochim

by Dawid Trochim

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ASSIGNMENT 1 – NETWORK PROGRAMMABILITY, DAWID TROCHIM 1900457



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Introduction

This report will be discussing the meaning of cloud computing, how it affects industries and also how cloud computing is already affecting network professionals and also why. This report is also going to be discussing some standards such as JSON and REST. Generally saying, this report is about how the field of computer networks has moved towards a greater emphasis on software.

1. What is cloud computing and how it moved towards a greater emphasis on software?

There are many ways to describe “cloud computing”, however there is also cloud computing in industry. Cloud computing has been used in industry for a while and the reason for that is efficiency, cloud computing is known to us as networking, analytics, servers, databases and also storage and much more. The way it works is extremely simple, the company is looking for cloud service provider, if they found one that suits their needs then they will usually contact them and pay monthly bill for their services but the price is going to be based on the usage by stuff or customers. Cloud computing can be used for anything e.g. creating some backups, storing files, databases etc [1].

However, it is not as simple as it seems because cloud services have to be properly configured and secured in order to avoid any data leaks which could result in some serious damage and that is why the company that uses cloud services needs to hire or train their network professionals so they can fully configure and monitor cloud services. It also makes the job for developers a bit more difficult because the world is moving towards cloud computing all the time and most of the files are or will be stored on the cloud so developers will have to change the way that they deliver files. Cloud service providers also offer us security, it has been proven that data is safer when stored in the vendor’s data centre than data that we can store at home [2].

There are three types of computing – “IaaS”. IaaS stands for “Infrastructure as a Service”. This is simply another way of cloud computing which allows any person in the world to buy this service and have storage resources and network. Infrastructure as a Service consists of many physical data centres, however customers are not required to physically visit the data centre because they can access it online. Storage in IaaS has three main types – file storage, object storage and also block storage. Object storage is one of the most popular types in IaaS because it easily allows customers to access their service online. File storage and block storage are common when it comes to traditional data centres. Networking in IaaS can be described as accessing networking hardware through APIs as they are programmed to do so [3].

There is also PaaS which stands for “Platform as a Service”. This type of cloud computing is most known for being used to store and run applications, it acts like a foundation that can be used by software developers to create any program or application they want. PaaS is also being accessed by customers through the internet and the main advantage of this is that customers or developers do not have to worry about any storage, OS or even software updates. PaaS is highly available to anyone, it is very easy in use and also cost-effective, amazing for developers. An example of PaaS could be Windows Azure [4].

SaaS is a third type of cloud computing and it stands for “Software as a Service” is another extremely easy service because it allows customers to access the service through the internet and they do not

even have to install any software, the only requirement is having a stable internet connection and that is it. Customers do not have to worry about hardware and software. A very good example of SaaS could be university student portal, the only thing that students need is internet connection to access their service. Another good example of SaaS solution could be banking. For example, customer join a certain bank and gets his login credentials to access his account online and all that is required is simply internet connection and customers do not have to worry about any hardware updates or software updates and even operation system updates [5].

2. Network professionals and cloud computing

Cloud Computing industry needs people that will protect and prevent any attacks and threats. This is why cloud computing requires to either hire some ready and fully qualified network professionals or train the ones that are already working for the company. Cloud computing also requires security professionals. Network professionals need to be able to configure the network to the point where it is extremely safe for customers and company to use Cloud Computing, it is impossible to fully secure the network [6]. Network professionals are required to adapt and learn new skills which could be difficult for some people because everyone adapts differently to some things. They have to be trained for cloud computing configuration and overall monitoring if everything is running as it should be. Network professionals are required to learn the software and all available options to them, they need to know how to quickly troubleshoot the problem. Training or hiring network professionals can be quite expensive and this is one of the drawbacks when it comes to using cloud computing in the industry. They should be able to quickly respond to any attack and provide instant protection and knowledge of the same issue in the future. So summarising this, network professionals need to learn new software and ways of troubleshooting the problem [7].

3. RESTful Web Services

REST stands for “Representational Web Transfer”. It became very popular and the reason behind that is its simplicity when it comes to using it, additionally it is using HTTP which stands for “Hyper Text Transfer Protocol”. HTTP is needed for REST in order to work and be useful. It is using error codes in order to tell the developer if the action executed has been successful, failed or if there is a warning. The famous and known one is 404 which means that request sent cannot be executed due to lack of the resource. Code 200 means that everything is running well. These two are very common code, there are much more. REST has a great compatibility because it can be used in Java, Node, JQuery, Angular, EmberJS. It also has some disadvantages and one of them is not being able to store state-based information and this means that any task that is being performed by the person or the client has to be carried out in stateless mode. RESTful web services have their own API and this API is used for connecting cloud service customers or companies with the cloud service providers and this is the reason why RESTful web services are used in cloud computing and are still being used to facilitate these changes. For example developers can use certain API e.g accuweather in order to send requests and get back requests which would be the current weather and they can put it on the website by using HTTP. [8] [9] [10] [11]

4. Networking and industry

SDN stands for “Software Defined Networking” and it has been heavily adapted by industry and the reason behind that is allowing to create Virtual Network with a help of program and also hardware infrastructure. The main goal for it is to create a very good, compatible and also flexible network with a very low budget and not much time. Software Defined Networking can be used to solve an issue and one of them is a big latency because of the switches, each switch has its own software which results in incompatibility and this is where Software Defines Networking comes in useful because it allows network professionals to remove any control functions from the problematic network. After this is done, the switches are going to be moved to the servers which are called “accessible control servers”. In order to achieve that, OpenFlow protocol must be used. Software Defined Networking is also used for network virtualisation. Network virtualisation is a way of controlling and managing traffic inside the network. Small portions of a network are being managed when these small portions are being sent across different network which are located outside. Network virtualisation is a very efficient way for network professionals to keep availability, security, performance efficient. The main problem with Cloud Computing is its lack of security and vulnerability to be DDoSed or attacked in any other way [12] [13] [14].

This is the reason why “Software Defined Networking” is highly used in situations like that because it decreases the chance of the network being taken down and the reason behind it is the software which allows network engineers to monitor traffic, packets etc because “Software Defined Networking” is responsible for separating data plane and also control plane from each other [15]. These are the reasons why “Software Defined Networking” has been heavily adapted to the industry despite meaning an adaptation to the job role of network engineers as it solves many issues.

5. Standards – JSON and REST

JSON stands for “JavaScript Object Notation” and this is a way of structuring a data, it is usually used for transferring the data through the server and then to web application and also storing it. It acts like an exchange language that made especially for humans and is also compatible with computers. JavaScript Object Notation syntax is taken from JavaScript, however the only difference between JSON and JavaScript is that JSON is text only and is highly compatible because it can be used in every single programming language [16].

REST stands for “Representational Web Transfer”. It became very popular and the reason behind that is its simplicity when it comes to using it, additionally it is using HTTP which stands for “Hyper Text Transfer Protocol”. HTTP is needed for REST in order to work and be useful. It is using error codes in order to tell the developer if the action executed was successful, failed or if there is a warning. [17]

JSON became a standard in cloud computing since it is a good and efficient way when it comes to using APIs [18]. Term “interoperability” is usually used for describing the way of moving data and also workloads from private and public clouds and also between two different cloud service providers. [19]. JSON is used in cloud computing to interact with APIs and also a very efficient way of exchanging data, it is using some web programming because it needs to be able to use HTTP requests and this is why JSON is a standard in cloud computing [20].

JSON and REST are connecting together because JSON is a very good way of exchanging data through HTTP requests, whereas REST is able to provide these requests for JSON and this is how developers

are using these two languages to make applications and programs. Additionally, there are no issues when using JSON with REST because JSON can be used in every single programming language. REST is also an amazing way of troubleshooting as it shows different error codes to the programmer and these are the reason why JSON and REST are two standards when it comes to cloud computing. Interoperability enables developers to create complicated and complexed applications and programs and this is why interoperability has a massive impact on the cloud computing and is also one of the standards when it comes to cloud computing – JSON, REST and Interoperability are necessary when it comes to using Cloud Computing [21].

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GRADEMARK REPORT

FINAL GRADE

83/100

GENERAL COMMENTS

Instructor

Engagement with Literature Skills (40): 34

Knowledge and Understanding Skills (30): 24

Cognitive and Intellectual Skills (20): 17

Transferable Skills for Life and Professional Practice (10): 8

A well structured if slightly brief assignment in places. A good coverage of the core topics nonetheless. Very good use of sources - a large number of high quality sources used and correctly cited. Good work overall, well done Dawid.

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