

Critical Reflection Report

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Web solution URL:

http://ec2-18-212-142-71.compute-1.amazonaws.com/KF6013_Assignment/index.php

Alternate web solution URL:

http://lewisjackson.000webhostapp.com/KF6013_Assignment2/index.php

Abstract

A critical reflection of the cloud services used in developing the cloud-based solution in part two of the assignment. The chosen cloud providers are Amazon Web Services and Microsoft Azure and the cloud services employed are Amazon EC2 and Microsoft Azure Linux Virtual Machine. This report focuses on the technical architecture, the region and the built-in security of the cloud services and compares both critically evaluating at the end.

Contents

Abstract.....	1
1. Introduction.....	3
2. Technical Architecture of Cloud Setup.....	3
3. Cloud Services used.....	4
4. Region.....	4
5. Security.....	5
6. Conclusion.....	5
References for report.....	6
References for the cloud solution	7

1. Introduction

The cloud is a term used for accessing services that are hosted somewhere on a network outside of a user's premises and are managed by another organisation. Hosting data and applications in the cloud mitigates many of the issues associated with traditional in-house servers. As a result, users don't have to deal with adding more servers when running out of space or paying administration costs such as backing up and maintaining the servers.

Cloud services allow the user to set up a virtual machine which is a virtual server hosted by the cloud service but configured to the user's requirements, these servers scale up or down depending on the demands and the user only pays for what they need instead of incurring the cost of purchasing the physical machine and associated hardware and software (Tutorialspoint, n.d.).

This report focuses on the technical architecture, the region and the built-in security of the cloud services used for the web-based solution developed in part two. Furthermore, this report presents a critical evaluation of another available option and its relevance to the developed solution.

2. Technical Architecture of Cloud Setup

The cloud solution architecture consists of many cloud components that can be divided into two parts being the front end and back end. Each end is connected through a network, the front end refers to the client part of the cloud computing system which consists of interfaces and applications that demand entry to the cloud computing platforms. The back end is the cloud itself which is comprised of all the resources needed to provide cloud computing services (Tutorialspoint, n.d.). Cloud infrastructure consists of servers, storage devices, network, cloud management software, deployment software, and platform virtualization. It is the responsibility of the back end to arrange a built-in security mechanism, traffic control and protocols (Athuraliya, 2018).

Moreover, the cloud solution produced in part two utilizes many client-side and server-side technologies. A variety of content delivery networks (CDN) are used to deliver pages and other web content to the user, an example being Google Fonts and Font Awesome which prepares external fonts, colours and layouts to the CSS script used in the cloud application, CSS is added to improve the user experience by presenting the homepage to higher professional standard.

JavaScript adds functionality to a website by providing objects such as button clicks, jQuery CDN is implemented to simplify HTML DOM tree traversal and manipulation, event handling and Ajax.

Additionally, Google Maps is added to present the user of their current location, the geolocation of a "#Pokémon" tweet in the UK and a route planner is used to see the distance and time the user is away from the tweeter.

A database is not required for the cloud solution because no user data is being saved, and all the data pulling from Google Maps, Twitter, Pokeapi and openWeather is accessed through application programming interfaces (API's). API's are a set of procedures that grant applications access to data from the services.

Furthermore, business logic is applied heavily in the cloud solution as all of the twitter functionality requires API calling to retrieve and display twitter data. Also, twitterOauth is implemented to provide that added security with two-factor authentication, doing this allows the user to login to twitter if they have not already and gives them the option to allow access

to their twitter account which they can send a tweet from the text area on the website with “#KF6013_Pokemon” added.

OpenWeather data is gathered using their API call and the response is displayed in a JSON format, the data updates every time the user clicks on a tweeted user (shown as a random Pokémon sprite) and displays that users current weather data.

3. Cloud Services used

The cloud services used in part two of the assignment are the Amazon Elastic Compute Cloud (Amazon EC2) and the Microsoft Azure Linux Virtual Machine (Azure VM). Both Amazon EC2 and Azure VM supply a wide selection of VM types recommended for enterprise web hosting that provides secure, resizable compute capacity in the cloud.

Enterprise web hosting is used for popular marketing and media sites that need to dynamically scale resources and be highly available to support largely trafficked websites, sites like Netflix span multiple availability zones to protect their data from datacentre failures (Tutorialspoint, n.d.). Instances or VM's are combinations of virtual CPU, virtual memory, temporary storage, and networking capacity.

The selected Amazon Machine Image (AMI) for AWS is the Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-00eb20669e0990cb4 which is a free tier AMI that offers the command tools and repositories required for the cloud solution. The instance type is a t2.micro which is ideal for small web pages that don't handle a lot of data or require much processing power.

On the other hand, the selected machine image for Azure is the Red Hat Enterprise Linux 7 and the VM size is Standard A1 v2 (1 vcpus, 2 GiB memory). Linux is chosen for both services as it is the most reliable operating system that has the least amount of restrictions placed against it making it more open to user customizability.

A LAMP stack is set up on each cloud service. Both setups are very similar however Amazon EC2 provides an added security layer using key encryption to connect to the instance using the SSH client PuTTY. Azure VM supplies the same setup however it isn't a requirement meaning a user can connect to the server with a standard username and password (Microsoft Azure, 2017).

4. Region

Cloud providers have servers situated in different regions and customer solutions are backed up on different servers. If one server blows up, then the customer service is rerouted to another server where the backup lives.

The selected region for the EC2 instance is US East (N. Virginia) us-east-1 because of every other server region not allowing authorisation. The AWS educate account only allows the us-east-1 region to work which isn't ideal for performance as the network quality suffers. Low latency and low packet loss are crucial for users because if the website takes too long to load, users will just leave. If access is granted the chosen region to set up the instance would have been Europe (London) eu-west-2 as it is the closest located server meaning faster speeds (Amazon Web Services, n.d.).

Azure also offers a student account which has proved more effective as the Azure Linux VM selected region is set up in UK South making it the better-suited instance due to the cloud provider supplying a closer region. Transferring files across using the FileZilla client is faster using Azure which can be useful when dealing with big data.

Both cloud services offer load balancing which refers to the hardware or software load over web servers which improves the efficiency of the server and application. This is more beneficial for larger enterprise web hosting sites like Netflix which need to distribute traffic across more available sources and dynamically grow and shrink usage to meet traffic demands (Tutorialspoint, n.d.).

5. Security

Amazon EC2 and Azure VM offer similar security protocols that act as a virtual firewall to prevent unauthorised access to or from a private network which examine packets and passes them to the intended recipient but only if certain rules are followed for each instance or VM. When creating infrastructure as a service application using Amazon EC2 or Azure VM, cloud providers are responsible for ensuring the virtualization, servers, storage and networking are operating, the rest relies upon the user's control (Tutorialspoint, n.d.).

Amazon Virtual Private Cloud (VPC) and Azure Security Center (ASC) helps the user prevent, detect and respond to threats by allowing the user to set up different security protocols such as security groups, firewalls and denial of service attack mitigation (Microsoft Azure, 2018). Security groups are a set of rules that can be added or modified to every instance or VM (Amazon Web Services, n.d.).

Security group are similar to an inbound network firewall, in which users have to specify the protocols, ports, and source IP ranges that are allowed to reach that instance. The inbound port rules added to the cloud solution server are 22(SSH) which grants users access to FTP files to the site, 80(HTTP) which allows users to view the site in a web browser and 443(HTTPS) which secures communication over the network. Although, the developed cloud solution doesn't require much security as no user data is being saved meaning cyber attackers have nothing to gain.

6. Conclusion

Both cloud services offer similar tools, customizability and pricing. The services are inexpensive as the user only pays for the resources they use, and dissimilarity from traditional hosting models the cloud architecture dynamically scales web applications on-demand to handle changes in traffic. Flexible tools are supplied for developers to build failure applications and isolate themselves from common failure situations (Alexander N, 2016).

The benefit of Azure over AWS is the region selection for the VM which tested more effective for Azure as it is the closest region providing better performance and speeds, however, it isn't a major factor for the cloud solution developed as only a small amount of data is being transferred and processed.

On the other hand, AWS proved more effective when setting up the instance by using Key encryption as the default way to access the server, doing so provided that extra layer of security when transferring files.

Nevertheless, both services were identical when adding security protocols as Amazons Virtual Private Cloud and Azures Security Center supply similarly secure and robust network to the resources. Overall, the preferred cloud provider of choice is Amazon Web Services because the benefits outweigh Azures.

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