

Final

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Computing Portfolio

ACCA5025

Cloud Computing Architecture

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Assignment 1

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Essay Contents

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Introduction

During the course of this written essay, I will be covering a wide variety of topics as listed in the table above. I work for a small enterprise that runs an eCommerce website and its associated web service. The enterprise has asked me to consider two different types of virtual machines, one being a high-budget no cost limit and a medium-budget with some loss of service.

Along the way I will also be describing and detailing a few other terms that associate with virtual machines.

Virtualization & Virtual Machines

Virtualization

What is Virtualization?

In terms of virtualization in cloud computing it is a creation of something virtual such as an operating system or a server in the cloud rather than creating an actual version of them.

Virtualization acts as a barrier between the hardware of a computer and the user which then also allows the creation of virtual machines, which I will mention below. This also allows for the creation of different types of virtual hardware such as a processor, mouse or even a graphics card to then be used on a virtual machine.

Whilst on the topic of virtualization still, it also comes with some benefits such as:

- Manageability,
- Sustainability,
- Availability,
- Security.

These different benefits account for increased efficiency and allows for more multitasking

Virtual Machines

What are Virtual Machines?

A virtual machine is a virtual environment that is based upon a computer that comes along with its own hardware such as a keyboard, CPU or even the RAM of the computer that it is trying to emulate which then provides all the functions of a physical computer that you are not able to see.

Some good examples of virtual machines are the Java Virtual Machine, .NET Framework and the Parrot Virtual Machine (Shaw, n.d.).

How many different types of virtual machines are there?

According to (Shaw, n.d.) there are two different types of virtual machines:

- **Type 1 - Process Virtual Machines which separate a single process.**
- **Type 2 - System Virtual Machines which offer a full separation of the operating system and applications from the physical computer.**

What about the Advantages and Disadvantages of Virtual Machines?

Provided by (Ward 2015) some of the pros and cons of using a Virtual Machine are listed below.

Advantages:

- **Less physical hardware,**
- **More eco friendly,**
- **Potential for expansion,**
- **Supports a variety of operating systems.**

Disadvantages:

- **Cost**

- Complexity.
-

Task 1

High Budget Virtual Machine with no cost limit.

The first Virtual Machine that I have chosen to speak about is based upon VMWare.

VMWare, founded in 1998, now part of Dell Technologies, is a cloud computing software provider. When it comes to VMWares server virtualization a hypervisor has to be installed on a physical server to allow the function of multiple different virtual machines to run on a signal server simultaneously.

The benefits to using VMWare are:

- Better return on investment - This allows you to use more physical computer resources than you should.
- More efficiency and space - VMWare also allows for the use or running more applications on fewer physical servers thus requiring less power to be drawn for the energy and the cooling of the servers.

VMWare also has its own software to do with having more High Availability than what it does, this is vSphere High Availability. This is where the solution allows you to switch the virtual machines between physical hosts if a certain piece of hardware is to fail. This is between the Master server and then the Slave servers in a cluster (IBM 2019). To be able to access HA you would need to purchase the VMWares Enterprise package. Per two processors it would cost \$5,750 so depending on how large

the company is you could look to spend over \$100,000 just to have high availability incase of the hardware failure.

Task 2

Mid to Low budget with loss of Service.

Then for my Medium to Low budget form of virtual machine I have decided to go for one that is only a general purpose virtual machine coming from Microsoft Azure.

Out of the general purpose virtual machines I could have chosen from Azure, such as the Av2 series or even the DCv2 series, I have chosen the B series as my medium to low budget virtual machine option, more specifically standard B1s.

First of all the B series virtual machines are more than ideal for workloads that do not require maximum performance from the processor constantly. When it comes to the B series there are also 10 different versions to pick from; they vary from Standard B1ls (which is only supported by Linux) and then up to standard B20ms.

The version of the B Series that I have chosen to go for is either going to be the standard B1s or the standard B2s. The major differences are that the B2s are double in size than what the B1s are which could help depending on the size of the company and how many virtual machines you would like to have and how much it would benefit.

About the B2s, they have around 2 vCPUs, 4 GiB, 8 GiB Temporary Storage (SSD), A 40% Base CPU performance and A 200% Maximum Performance (Microsoft 2022).

What about the pricing of the Standard B2s in the UK South region. According to (Cloud Mercato, n.d.) the monthly pricing of B2s is around 20.4 gbp a month which would roughly add up to 244.8 a year, which depending on the size of a company being small to medium wouldn't be an overall bad price.

Where would I use both Virtual Machines?

In this scenario I would use the first VM I described in task one for a much larger company that could use the amount of virtual machines with all the higher availability as they would want it accessible constantly to be able to access things and to notice when things go down and malfunction.

And then for the one that I have described in the second task I would use for a much smaller company as it wouldn't be very large and active so it wouldn't require much around the clock attention depending on the size of the company.

Authorization & Authentication

Authorisation

What is Authorization?

Authorization is the process where you authorize or give permission to someone to do something. For example, authorizing someone to have access to something that they would not normally have access to.

But in a computer system there is something called an IAM system (Identity and Access Management) that helps system admins control who can and who can't access different resources that the system may have to offer (Okta Inc 2022).

Authentication

What is authentication?

On the other hand authentication is confirming whether or not the user or person is in fact the person that they are claiming to be instead of an unknown person trying to get into someone else's account. An example of a form of authentication would be a simple username or password when trying to log into an account.

As well as this there are also multiple factors that need to be taken into consideration, these would be:

- **Something you know such as a password or a 4-6 digit pin,**
- **Something you have such as a one time passcode,**
- **something you are such as biometric features.**

(Okta Inc 2022)

What about the differences?

Well as you can see from describing both authentication and authorization above you can see a clear difference between the pair of them. The major difference between them is what job that

they both individually do. The major difference is that one gives access to a person and one checks to see if that person is the person that they are meant to be instead of trying to be someone that they are not.

Other importances

Multi-Factor Authentication - Multi-factor Authentication with 2 Factor Authentication being a form of it, is another step up in authentication security. This is where a second set of credentials come into play, if i take Google for example, they have a form of 2FA where you try to log in and they will ask you to confirm your login details that come from a notification off of youtube confirming that it is you that is trying to sign into google.

Principles of Least-Privilege Permissions - This involves giving the user the utmost least permissions possible when it comes to them doing tasks. By also using the least permissions possible when it comes to this it can also improve the user productivity or even reduce the number of attacks that could come through.

Network Security Groups - According to microsoft “A network security group contains security rules that allow or deny inbound network traffic to, or outbound network traffic from, several types of Azure resources. For each rule, you can specify source and destination, port, and protocol” (Microsoft 2022).

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FINAL GRADE

41 / 100

GENERAL COMMENTS

Instructor

Virtualization/VM: 16

Cloud Services: 11

Availability: 0

Security: 14

Feedback:

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Would liked a little more detail VM components.

The cloud services discussion missed the point a little since it was really asking for a discussion of PaaS, SaaS, IaaS rather than low level virtualisation. However, you have taken an interesting approach and I will mark it because it has merit within the context of the scenario.

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