Åbo Akademi University

Cloud Computing

Assignment 2

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Chapter 1

Introduction

Developing our knowledge in which is the best option of choice of image of virtual machine, the teacher, in this assignment, suggested an exercise of testing and analysis of test results of different VM's. For this, and also as a suggestion of the teacher, it was used different tools, such as:

- **The Phoronix Test Suite** - Not only provides the process of carrying out automated tests but also records this test, having the choice of uploading them in a web-based result viewer or downloading them.

- **OpenBenchmarking** - The public and private storage of test result data supported by the **The Phoronix Test Suite** that also is an effective collaboration tool for sharing results and efficiently comparing multiple test result sets.

Chapter 2

Process

Starting this assignment, the first step was to create an account on the OpenBenchmarking website (my profile: https://openbenchmarking.org/user/laraujo).

Then, the second step was to choose which instance type of virtual machine to use. As stated in the 3rd task, we had to choose different instance types, with at least one from each of the following families: T, M, and C. Also, to have a better understanding of the difference between price and efficiency, it was chosen two instance types that had more or less the same pricing, and for the third one, it was chosen an instance type that had half of the pricing of the others, this to have contrast on the pricing.

Following this idea, the **m5.large**, **c5.large**, and **t2.medium** instance types were chosen.

	vCPU	ECU	Memory (GiB)	Instance storage (GB)	Using Linux / UNIX
General use - current generation					
m5.large	two	10	8 GiB	EBS only	0.096 USD per hour
t2.medium	two	Variable	4 GiB	EBS only	0.0464 USD per hour
c5.large	two	10	4 GiB	EBS only	0.085 USD per hour

Figure 2.1: Instance types chosen

After this study of different instance types, it was time to run the images. For this, it was used the same process of the first assignment to launch the first virtual machine, and since the download and install different packages for **Phoronix Test Suite** was necessary, it was created a copy of the first image with everything installed, so the setup for the other two VM's easier.

	Name	Instance ID	Instance state		Instance type	Status check	Alarm status	Availability Zone
☐	–	i-0b9cc5aebba099dcd	⊘ Running	⊕⊖	t2.medium	⊘ 2/2 checks passed	⊘ 1 alarms ✚	us-east-1f
☐	–	i-0f179e89a002f2a8b	⊘ Running	⊕⊖	c5.large	⊘ 2/2 checks passed	⊘ 1 alarms ✚	us-east-1f
☐	–	i-057940530bc7a673b	⊘ Running	⊕⊖	m5.large	⊘ 2/2 checks passed	⊘ 1 alarms ✚	us-east-1f

Figure 2.2: Virtual Machines Images running

Having now all three virtual machine's running, the next step was to install, log in to me openbenchmarking.org account from the phoronix-test-suite command line, and run all the following Test Suites and Tests and the required dependencies:

- pts/openssl

- pts/stream

- pts/encode-mp3

- pts/apache

- pts/network-loopback

- pts/john-the-ripper

Concluding the tests in all three virtual machines, the final step was to analyze the data obtained, for that, we can open the Open Benchmarking website and examine them.

Firstly, let's take a look at the specifications of the different VM's. Here we can see that there isn't a big difference between them, having only a distinction on the type of the motherboard and a big difference between the amount of memory from the **c5.large** and **t2.medium** to the **m5.large**.

CC21Assignment2			
ptsl.	c5.large	t2.medium	m5.large
Processor	Intel Xeon Platinum 8124M (1 Core / 2 Threads)	Intel Xeon E5-2686 v4 (2 Cores)	Intel Xeon Platinum 8259CL (1 Core / 2 Threads)
Motherboard	Amazon EC2 c5.large (1.0 BIOS)	Xen HVM domU (4.2.amazon BIOS)	Amazon EC2 m5.large (1.0 BIOS)
Chipset		Intel 440FX 82441FX PMC	
Memory	4096MB		8GB
Disk	9GB Amazon Elastic Block Store	8GB	9GB Amazon Elastic Block Store
Network	Amazon Elastic		Amazon Elastic
Graphics		Cirrus Logic GD 5446	
OS		Ubuntu 20.04	
Kernel		5.4.0-1038-aws (x86_64)	
Compiler		GCC 9.3.0	
File-System		ext4	
System Layer	KVM	Xen HVM domU 4.2.amazon	KVM

Figure 2.3: Specifications

Taking a step forward and inspecting the test results we can notice that, in an overall view, the **c5.large** is the one who has the best results, following by the **t2.medium** and lastly the **m5.large**. This result was not expected, once the **m5.large** is the most expensive one. And, what is also interesting to notice is that despite the **t2.medium** costing half of the others VM's the results do not show that it displays a much better outcome of what it was expected.

CC21Assignment2			
ptsl.	c5.large	t2.medium	m5.large
openssl: RSA 4096-bit Performance	258.1	246.7	235.6
stream: Add	13920.0	18833.3	13579.9
encode-mp3: WAV To MP3	10.982	13.591	13.428
apache: Static Web Page Serving	12925.62	8272.66	10697.38
network-loopback: Time To Transfer 10GB Via Loopback	16.173	17.656	16.193
john-the-ripper: Blowfish	1590	2105	1451
			OpenBenchmarking.org

Figure 2.4: Test Results

Let's now take a closer look at some specific tests. The first one that should be inspected is the system memory (RAM) performance, which, as we can see from figure 2.5, the most efficient virtual machine is the **t2.medium**. This result, as was already explained, is one of the most unexpected outcomes.

Figure 2.5: System memory performance test

Next, the time required to encode a WAV file to MP3 format test, and as is evident in figure 2.6, the **c5.large** is the faster one.
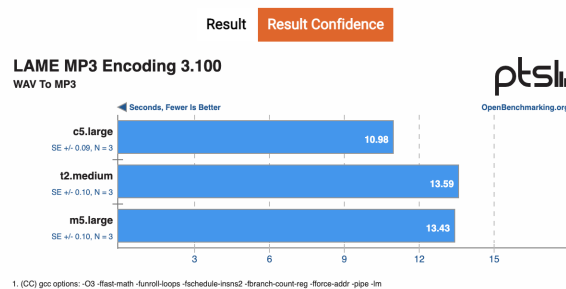

Figure 2.6: Time required to encode a WAV file to MP3 format test

The last one is the John The Ripper test, which is another unexpected one, having the **t2.medium** as the best performer.

Figure 2.7: John The Ripper test

Chapter 3

Conclusion

Having an overview of the assignment, we could notice that choosing the most expensive VM's doesn't mean that they will have the best performance in every test. So, because of that, there is a need of understanding which virtual machine is the most cost-efficient one, for example, the **t2.medium** presented in this assignment is a good illustration of a good cost-efficient virtual machine when compared to the other two. Concluding the assignment, I'd like to point out that having these types of tests is good to understand how efficient a virtual machine is, and it was really interesting seeing how cost-efficient a VM can be.