M7024E Laboratory 1: Getting Started with a Public Cloud

Welcome to the first laboratory of the M7024E: Cloud Services course. In this course, we will use Amazon Web services[1] as the public Cloud platform for understanding, using, building and monitoring Cloud services.

1 Objectives

The objective of this lab is to:

- Setup an environment for understanding and building services for a major Cloud provider, for example, Amazon Web Services
- Understand the services provided by the Amazon Web Services

Getting access to the Amazon Web Services account

Lecturer/teaching assistant [2] will provide you with access to Amazon Web Services Access.

2 Cloud-based Content Delivery Networks

A cloud-based content delivery network (CCDNs) are a distributed system of servers located across multiple geographical locations throughout the world. The presence of these servers at several "edge" locations enables the users to access contents such as static Web pages, audio and video files. text files and scripts, etc. with high availability and performance (high throughout and low latency). The request for the static and streaming media content is served by a CDN are directed the nearest edge location. At this location, the CDN caches the popular content on the edge servers to provide high performance access to this content for the users. For example, Netflix has its own CDN for distributing movies to the worldwide audience [3] Amazon provides its own cloud-based CDN called Amazon CloudFront[4].

[1] https://aws.amazon.com/. Retrieved: 06 Nov. 2022.

[2] Assoc. Prof. Karan Mitra, email: karan.mitra@ltu.se

[3] https://media.netflix.com/en/company-blog/how-netflix-works-with-isps-around-the-globe-to-deliver-a-great-viewing-experience. Retrieved: Nov. 6, 2022.

[4] https://aws.amazon.com/cloudfront/Retrieved: 06 Nov. 2022.

In this lab, you will learn about CDNs and setup a CDN distribution on Amazon CloudFront. But first, answer the following questions:

Question 1: *How does CDNs work? What is a difference between a traditional CDN and a Cloud-based CDN? Provide an in-depth discussion with examples and figures.*

Hint: *Scan the paper by Wang* et al. *[1] and look at resources provided by AWS for Amazon CloudFront.*

Question 2: *List major CDN providers in the CDN marketplace. Compare two CDN providers based on at least five characteristics. For example, number of edge locations.*

Exercise 1: In this exercise, you will learn how to host a static website from a Cloud storage and create a CDN distribution to serve static files such as images. Follow the steps below:

1. Create a simple website with some static files embedded such as CSS and images.
2. From an Amazon S3 console, create a new bucket.
3. Enable your bucket for static hosting.
4. Upload the website to the bucket.
5. From a Web browser, access the Web page via the Amazon S3 Website endpoint for your bucket.
6. Now create another bucket and copy **the static files** in the webpage (CSS, image, etc.) to the bucket.
7. From the Amazon CloudFront console, create a new download distribution and specify the name of the second bucket in which you copied the static files.
8. When the distribution becomes available, note the distribution URL.
9. Now edit the URLs of the static files in the Web page in the first bucket and append the CloudFront distribution URL (e.g., files/img.jpg to <mycloudfrontdistURL>/files/img.jpg).
10. Open the Web page again in the Web browser and note if the response time improves over several runs.

Exercise 2: Test your CDN distribution using a number of methods and explain the results.

Suggestions: Use network utilities such as curl, automate tests, and run tests atleast thirty times.

References

[1] M. Wang, P. P. Jayaraman, R. Ranjan, K. Mitra, M. Zhang, E. Li, S. Khan, M. Pathan, and D. Georgeakopoulos, *An Overview of Cloud Based Content Delivery Networks: Research Dimensions and State-of-the-Art*. Berlin, Heidelberg: Springer Berlin Heidelberg, 2015, pp. 131–158. [Online]. Available: http://dx.doi.org/10.1007/978-3-662-46703-9_6