CSYE 6225: Network Structure & Cloud Computing Course

Assignment # 4

Objective: Usage of AWS Cloud formation to manage a simple stack.

AWS CloudFormation is a service that enables you to model, provision, and manage AWS resources using infrastructure-as-code. With CloudFormation, you define your cloud infrastructure in a text file (either JSON or YAML) called a **template**. This template describes the resources (such as EC2 instances, S3 buckets, VPCs, etc.) and their configurations.

Key Features:

- **Infrastructure as Code (IaC):** CloudFormation allows you to treat your infrastructure the same way you handle application code. You can version control and manage it in a repeatable and scalable way.
- **Templates:** Templates contain resource definitions in a declarative format. They include sections for resources, parameters (to customize the deployment), outputs, and conditions.
- **Stacks:** A **stack** is a collection of AWS resources created and managed as a single unit. When you create a stack from a template, CloudFormation provisions all the resources together.
- **Automation & Consistency:** CloudFormation automates resource creation, configuration, and dependencies. It also ensures that deployments are consistent and repeatable.
- **Change Sets:** Before updating a stack, CloudFormation can generate a **change set** that previews the impact of changes, ensuring safe and informed updates.

Benefits:

- **Simplified Management:** CloudFormation automates the management of resource dependencies and lifecycle.
- **Scalability:** You can easily replicate the same infrastructure across environments using the same template.
- **Rollback Support:** In case of errors during deployment, CloudFormation supports automatic rollback to a known stable state.

Assignment Tasks:

- Accept the Github classroom assignment in order to get access to your copy of the repository. You will only need to clone this repository (no submission on github).
- Create an EC2 Ubuntu micro instance.
- Assign an IAM role to your instance. Attach suitable policies to the role (EC2, S3, and Cloudformation) **[Screen shot [#1] showing Role assigned to the EC2 instance].**
- Install AWS Cli on this EC2 instance **[Screenshot [#2] showing installation successful by showing $ aws version]**.
- Clone your lab-2 repository to the EC2 under /opt/stack/
    - $ mkdir /opt/lab-2-stack (Or on the home directory)
    - $ cd /opt/lab-2-stack
    - $ git clone (YOUR REPOSITORY LINK UNDER SSH)
    - **[Screenshot [#3]: showing all these commands and a successful clone of your repository]**
    - **Note:** to clone using ssh, you will need to create ssh key and add it to your Github profile under settings -> SSH key:
    - Details: https://docs.github.com/en/authentication/connecting-to-github-with-ssh/generating-a-new-ssh-key-and-adding-it-to-the-ssh-agent
- Edit the ./deploy.sh script to add your key pair name that you created in your AWS account (OR assign the default AWS Academy Role to the EC2 instance). The role has enough privileges.
- Run the deployment script ./deploy.sh (ensure it is executable $chmod +x ./deploy.sh)
- **Take the following screenshots upon successful stack creation:**
    - **Screenshot** of the stack from AWS CloudFormation service **[#4].**
    - **Screenshot** of the two created S3 buckets from S3 service **[#5].**
- Destroy the stack by running $ ./destroy.sh (ensure it is executable $chmod +x ./destroy.sh).
    - Screenshot the destroy command after execution **[#6].**
- Take screenshots as follows after destroy script is complete (stack must be deleted):
    - **Screenshot** of the stack from AWS CloudFormation service showing status “DELETE COMPLETE” **[#7].**
    - **Screenshot** of the S3 service dashboard **[#8].**
- **Note:** If the stack creation fails, you have to change the stack name for the next attempt. Ensure you use the same name when using the destroy script.

Submission: Please submit the PDF, including all screenshots with title and description for each, via Canvas. Name the file using your last name.

Grading:

- No late assignments are accepted.
- 5 points for each required screen shot (8 screenshots - max 40 points).
- 10 points for documented screen shots (a couple statements about each screenshot).

End Assignment # 4