Spring 2020

CS 6620: Foundations of Cloud Computing

Instructors

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Submitting the assignment

Submit all relevant cloudformation template files in a single zipped directory on Blackboard.

Experiential Project: GE Aviation

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This assignment represents a current ongoing challenge in an actual industrial environment. I have coordinated with Northeastern University's Experiential Network and GE Aviation to develop this assignment. Your completed presentations will be shared with the data scientist at GE who provided the specifications.

Assignment overview

For this assignment you will review the customer requirements below and prepare a recommendation for setting up an AWS architectural solution.

The customer requirements below have been provided by Eric Gero, a Data Scientist at GE Aviation. Your recommendation will be in the form of a 15 minute presentation, contained in a self-explanatory slide deck. You will submit the slides. Expect to give the presentation online remotely, although this may change depending on the number of submissions (i.e., if a large number of students opt to do the project individually).

For this assignmment you will work in small groups (between 1 and 4 students). I strongly encourage you to work collaboratively, even in spite of the challenges of remote work. I think we should take the recent social distancing as a reminder of the importance of finding good remote solutions for collaborative work. We have Piazza, Blackboard, Zoom, and many other resources available to us, so please try to use these to work together.

Customer requirements for ITPP Data API

GE Aviation is in the process of rewriting its Internal Threat Protection Program (ITPP). The current system runs on GE hosted servers, but the new system will move to the cloud. More specifically, the new system will run in a Docker container that will be hosted in Amazon ECS using AWS Fargate. The data will be a stored in a PostgreSQL instance hosted in AWS RDS.

We are also implementing several machine learning models that will provide predictive analytics for ITPP. It is to be decided where the machine learning models will be hosted, whether on a GE owned server or in AWS. However, the ML models will require data from ITPP and will need to provide model results back to ITPP on a regular basis. To meet this need, we would like to develop and API that is capable and responsible for transporting data from ITPP to the ML engine and from the ML engine to our database tables. The ITPP Data API should possess the following traits:

1. Data should be encrypted as it moves between systems.
2. The API must be able to support the needs of multiple machine learning models. Meaning data should be sent in a format like XML or JSON.
3. The ML engine should be able to call the API and send a list of fields that it would like to receive back.
4. The ML engine should be able to send its results to the API and the API should handle saving the data to the database.
5. Any other traits that occur to you to be potentially useful or desirable.

Eric is available to answer questions by email at eric.gero@ge.com (mailto:eric.gero@ge.com). You may also direct questions to me and I can ask him. If you email him directly please cc me (a.mullen@northeastern.edu (mailto:a.mullen@northeastern.edu)).

Designing the architecture

Use the Customer Requirements above to guide your architecture plan. You may also find some guidance by referring to the Solution Design Worksheets contained in the Project 2 slides, "GoGreen Insurance Company" in your Academy Cloud Architecting course materials. This task is quite different from that one, though, so do not feel limited to those worksheets.

Keep the pillars of the Well-Architected Framework in the forefront of your mind and be sure to explain in your presentation how your solutions to the client's needs also anwser the requirements of the Well-Architected Framework. Be explicit about where the client may wish to make tradeoffs and what the pros and cons of different options would be.

You are not required to implement anything directly in AWS. However, you may wish to set up demo resources, which can be done in the lab sandbox.

Presentation

Your recommendations should be as clear and explicit as possible. Use the latest AWS icon set and follow the example of the AWS Academy slides in laying out diagrams so that they are clear and understandable. You may provide additional data (scripts/CLoudFormer templates) in addition to your slides, but it should be clear how those should be used.

For creating slides, use the AWS architecture icons (either the new ones or the legacy ones) to illustrate your slides:

https://aws.amazon.com/architecture/icons/ (https://aws.amazon.com/architecture/icons/)

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