**D602 Task 1 Scenario**

**Kronkers Project Overview**

Scenario

Kronkers is a regional supermarket chain across several Mountain West states. It began as a small family business 30 years ago and has grown to three states and an annual budget of $1.1 billion. The company has grown to 300 employees, of whom 15 are employed as data analysts or data scientists. The leadership remains within the original family that founded the company, and Kronkers is privately held. Last year the company grew at an annualized rate of 7% with profit margins of 1.9%.

Key Company Strengths

Kronkers prides itself on being a family-owned and family-run business that has experienced growth due to strong customer service, high-quality produce, and a restricted focus on introducing only products that have already sold well with competitors or for which strong data is available from other sources. Kronkers seeks to place new stores in locations that have traditionally performed well but that larger supermarket chains have abandoned to pursue other priorities.

In addition, Kronkers places high priority on understanding the needs of its customers, their preferences, and how the company can best meet those needs. This has led to an increasing focus on data analysis and the development of machine learning models to automate and enhance various aspects of its operations, including personalized product recommendations, demand forecasting, and customer segmentation.

Machine Learning Technology Details

Currently data analysts at Kronkers are working on each application of machine learning separately and are spread across teams at the company. Product recommendations and customer segmentation, for instance, are analyzed on the Marketing team, while demand forecasting is analyzed within the Procurement department. The company’s analysts principally work in Python, but there is no programming language that is standard within the organization and so some analyses have been written in R and some in Julia depending on the particular needs of the project. Analyses are stored in a shared OneDrive space accessible to all analysts.

Use of completed machine learning models is not widespread and deployment varies by model. One model is run using an internal API hosted on a company server, while others are run on a user’s individual company laptop on an as-needed basis, often quarterly to prepare business reports. Shifts in customer demand or other parameters that are used to run models are entered manually in the code or imported as text files. Data sets that serve as inputs and outputs from each model are stored with the model within the same OneDrive folders.

Emerging Needs

1. While there are a few experienced programmers and data scientists at Kronker’s, to date there has been no role dedicated to maintenance of code, machine learning models, or deployment. However, there is a small budget allocated in the current fiscal year for machine learning model maintenance, tracking, and quality control.
2. While some within the company recognize the importance of MLOps there are several senior leaders that question the utility of MLOps.
3. The continuing growth of Kronkers into new geographic regions and the high competition within the supermarket sector generally has resulted in an increasing need not only to discover new insights from data that competitors may not have, but also to protect those insights as intellectual property and trade secrets.

Specific Requests

*Kronkers seeks an improved machine learning development and deployment solution to address its growing market needs. The new solution should provide:*

1. Accommodation for machine learning models written in several programming languages.
2. Methods for deployment that allows various departments within the company to access machine learning models, to train these models, and to run predictions using these models.
3. A method to store code and machine learning model artifacts as well as the data sets upon which these models are based. This solution must