Configuring CloudML-based AI Analysis Environment

Overview

Machine Learning (hereinafter ML) is increasingly being used across industries. While data analysts used to handle everything manually from model development/learning to model deployment, they soon realized how costly and burdensome it is to manage and operate the model as the number of models increased. This increased the need for a service that can automate the management and operation throughout the entire lifecycle.

CloudML is the service name of Samsung Cloud Platform and it provides modular services based on Kubernetes for automated management of model lifecycle.

CloudML Notebook provides a service that allows users to easily configure and use open source Jupiter Notebook in a Samsung Cloud Platform environment.

CloudML Studio is a no-code-based ML model development platform that allows anyone to develop models with drag. Users can check the development process visualized in UI.

CloudML Experiments provides model learning experiment management services based on open source MLFlow. In addition to experiment management, it also provides Model Registry and Model Verification features.

CloudML Pipeline can automate and manage the entire process from model development to learning. Each performance stage enables flexible resource and image allocation and provides sequential performance and scheduling.

CloudML services can be used independently or used alongside other services of choice.

This document describes how to configure and utilize **CloudML** on Samsung Cloud Platform.
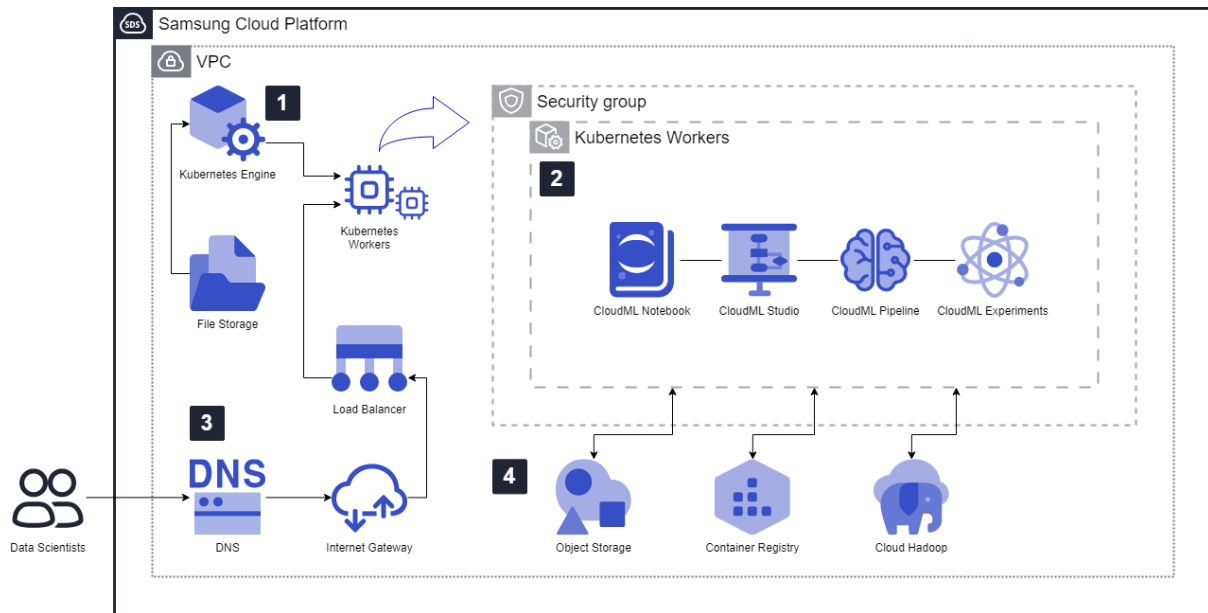
Architecture Diagram

Figure 1. Kubernetes-based CloudML Environment Configuration

1. **CloudML** consists of Notebook, Studio, Pipeline, and Experiments products, and Kubernetes Cluster is required to install and integrate each product. A user first creates the **Kubernetes Engine**, and while it is being created **File Storage** creates the Persistent Volume (PV) of the Kubernetes Cluster.

2. Configure the Kubernetes Cluster user **VPC** and deploy **CloudML** products to the same cluster. When **CloudML** services are installed, users can use the feature by accessing the user view provided by each product.

3. If users wants to connect to a user view-related endpoint URL provided by **CloudML** using a domain, create a domain in the **DNS** service and connect it to the domain and Kubernetes Worker in the **Load Balancer**.

4. In **CloudML** services, **Object Storage** can be linked for analysis data sets, model files, and storage purposes. Users can pull/push the user container image using the **Container Registry**, which is a container image store in the Kubernetes Cluster.

Use Cases

A. No-Code AI-based Visualized Collaboration Analysis System.

CloudML Studio provides a No-Code based visualized analysis environment.

By placing the visualized functions as Drag & Drop, non-experts can easily develop models.

Models developed by **CloudML Studio** can be combined with Python code via **CloudML Pipeline**. This allows both professional analysts and non-professionals to collaborate and develop services.

B. Automating model optimization analysis platform

CloudML Pipeline provides automated analysis. In the past, analysis and simulation work were manually done based on Excel. With **CloudML**, however, users can combine services and come up with a model with optimal performance through automatic data I/F and analysis model simulation. Automation transitions can cut the time spent doing work from days to few hours.

Prerequisites

To install each **CloudML** service, Kubernetes Cluster and File Storage above the minimum specifications provided by each service are required.

Limitations

In order to link each CloudML product, it must be distributed to the same Kubernetes Worker Node.

Considerations

Object Storage service configurations can be used for dataset, model utilization, and storage. **Container Registry** service configuration can be used for custom image utilization.

DNS service configuration can be used for managing service connection domain.

Related Products

- CloudML Notebook
- CloudML Studio

- CloudML Experiment
- CloudML Pipeline
- Kubernetes Engine
- File Storage
- VPC
- Security Group
- Object Storage
- File Storage
- Load Balancer
- Container Registry
- DNS