National College of Ireland

Configuration Manual

MSc Industry Internship
MSc Cybersecurity

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School of Computing
National College of Ireland

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MSc Project Submission Sheet

School of Computing

Student Name:	Keerti Ramesha
Student ID:	21144362
Programme:	MSc Cybersecurity **Year:** 2022-23
Module:	Industry Internship
Lecturer:	06/01/2023
Submission Due Date:	06/01/2023
Project Title:	Adaptive Cloud Access Security Broker (CASB)
Word Count:	**1280 Page Count: 7**

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Keerti Ramesha

Date: 06/01/2023

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Assignments that are submitted to the Programme Coordinator Office must be placed into the assignment box located outside the office.

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Configuration Manual

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1 Introduction

The configuration manual extends the research project report by giving more information about the implementation of the project – Adaptive Cloud Access Security Broker (CASB). This research focuses on the importance of Cloud access security brokers in cloud deployments and how machine learning can power the standard CASB solutions to respond to threats dynamically at real time.

2 Hardware requirements

The solution involves two parts – the CASB service and the machine learning module. The CASB service is deployed on Oracle cloud infrastructure. The machine learning model has been built on the local machine with the following configuration:

- System type: 64-bit Windows system, x64 based processor
- Processor: 11th Gen Intel(R) Core(TM) i7-1185G7 @ 3.00GHz
- RAM: 16.0 GB (15.6 GB usable)
- Storage: 256 GB SSD

The recommended hardware configuration to run the code smoothly and work with CASB without performance overhead is a minimum 4GB RAM, Dual-core intel i5 processor or similar.

3 Software requirements

The programming languages used in this project are Java and Python. Java is used to write the Apache flink job that runs detections on incoming events using the trained model. It is also used for processing incoming events from the auth layer, data aggregation and updation to the database.

3.1 Development Environment

Python is used for the machine learning code which is a scheduled job responsible for training the model. The IDE used to run the python code for the PCA model is Jupyter Notebook. Install Anaconda Navigator to build the python platform. Anaconda consists of the necessary IDE to run the python code such as Jupyter Notebook, JupyterLab, Python 3.

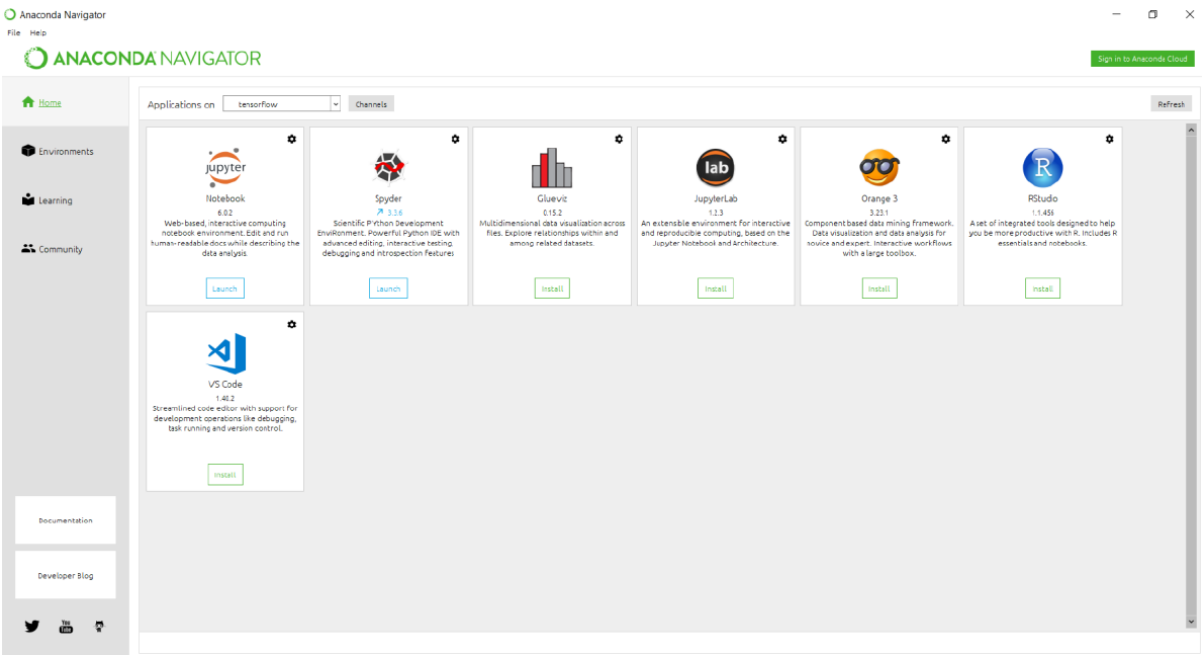

Figure 1 Anaconda Interface

3.2 Libraries

There are several python libraries used such as pyhocon, numpy, pandas and scikit-learn which are installed and imported as shown below.

```
import logging
import pandas as pd
import numpy as np
from sklearn import preprocessing
import pickle
from sklearn.decomposition import PCA
```

Figure 2 Libraries

Pandas – used for data analysis and manipulation
Numpy – used to enable arrays
Sklearn – provides various machine learning models and statistical analysis tools
Pickle – which enables reading and writing data to and from database by converting the python object into byte stream
Logging – used to enable writing the event statuses to log files

3.3 Cloud Environment

For the purpose of this research, Oracle cloud infrastructure (OCI) has been used. A cloud tenancy in the OCI is created and all the resources in the tenancy are monitored using the CASB solution.
However, this solution works with any cloud service provider and can be used in conjunction with any existing CASB solution.

References

Anaconda packages repository available at: https://anaconda.org/anaconda/repo

Principal Component Analysis: https://www.datacamp.com/tutorial/principal-component-analysis-in-python

Installation guide for Anaconda: https://docs.anaconda.com/anaconda/install/index.html

Monthly Internship Activity Report

The Internship Activity Report is a 1-page monthly summary of the activities performed by you and what you have learned during that month. The Internship Activity Report must be signed off by your Company and included in the configuration manual as part of the portfolio submission.

Student Name: Keerti Ramesha Student number: 21144362

Company: Oracle Month Commencing: 15/09/22-31/10/22

Learnings:

- Oracle cloud infrastructure
- Working with a demo environment on OCI and deploy different services on OCI
- Manage and own all tasks related to security design and customer proposal, including mitigation of malware attacks, identity and access management, effective data encryption and security, etc

Research:

- Oracle CASB solution
- Machine learning model implementation
- Findings and threat monitoring model understanding
- Analysis using PCA model (Principal Component Analysis)

Employer comments

Keerti getting up to speed with the Oracle tech product portfolio. Successfully working with our clients to identify customer needs and pain points and then suggesting potential solutions to meet these needs. Great work by Keerti to build her network both inside and outside our organization.

Student Signature: Keerti Ramesha Date: 31/10/2022

Industry Supervisor Signature: Jeremy Nagle Date: 31/10/2022

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Student Name: Keerti Ramesha Student number: 21144362

Company: Oracle Month Commencing: 01/11/22 –30/11/22

Learnings:

- Oracle Cloud Infrastructure
- Working with a demo environment on OCI and deploy different services on OCI
- Manage and own all tasks related to security design and customer proposal, including mitigation of malware attacks, identity and access management, effective data encryption and security, etc
- Oracle Cloud Security

Research:

- Oracle CASB solution
- Machine learning model implementation
- Findings and threat monitoring model understanding
- Analysis using PCA model (Principal Component Analysis)

Employer comments

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Student Signature: Keerti Ramesha Date: 30/11/2022

Industry Supervisor Signature: Jeremy Nagle Date: 30/11/2022

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Student Name: Keerti Ramesha Student number: 21144362

Company: Oracle Month Commencing: 01/12/22 – 31/12/22

Learnings:

- Oracle cloud infrastructure
- Working with a demo environment on OCI and deploy different services on OCI
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Student Signature: Keerti Ramesha Date: 31/12/2022

Industry Supervisor Signature: Jeremy Nagle Date: 31/12/2022