DALHOUSIE UNIVERSITY

# SCI 5410
# Serverless Data Processing

# Assignment 3
# Part A
# AWS Kinesis

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## Overview of Amazon Kinesis

Amazon Kinesis is a service which is provided by Amazon Web Services which allows programmer to gather, process and analyze amount of data at any scale. In addition, Kinesis also monitors real-time security and gives alertness when threats arise. Additionally, it allows developers to develop real time applications such as fraud detection, live leaderboard and gives the result of analyzed data to any application. Kinesis is used to convert data into required is used to convert data into required format it means it provides real-time analytics instead of building processing pipelines. [1]

Amazon kinesis provides services which are given below:

- Kinesis Video Stream: Securely stream video from connected devices to AWS for analysis purpose. [1]
- Kinesis data Stream: Captures, processes, and stores data at any scale. [1]
- Kinesis data Firehose: Captures, transforms, and delivers stream data for analytics. [1]
- Kinesis data Analytics: Transform and analysis streaming data at any time. [1]

## Usecase for Amazon Kinesis

A Halifax city, it needs to improve public safety and reduces the operations by increasing the power of real-data analysis. It is about collecting data from different aspects of the city such as air quality, traffic pattern, waste control, noise level, weather changes. To address these challenges, Halifax city government decides to start the smart city platform by leveraging the scalability amazon Kinesis service. As these services is able to handle huge amount od data coming form various areas of the city. So, government deploys the IoT devices such as Surveillance Cameras, traffic sensors, sound level sensors, weather level sensors and other environment sensors. In this platform, the data from all the IoT devices is streamed to Amazon Kinesis data streams service. As it is very difficult to monitor the noise level, weather changes, traffic pattern and other safety incidents manually.

In this smart platform, developers set up Amazon Kinesis data streams service and use Amazon Kinesis data analytics service to analysis data any time. In these applications, they will execute the queries in DynamoDB since DynamoDB provides a high scalable and NoSQL database solution in order to get the results which they can use to monitor traffic patterns, weather changes, noise level, waste control and other environmental incidents. In addition, the platform will use the Amazon S3 service to store all the data for long period of time as AWS S3 service is used to store and get any amount of data in any time from any location. Additionally, for better visualization and monitoring key performance, developers use Amazon Quicksight tool as it also tracks the environmental metrics. Furthermore, platform utilize amazon SNS service get notifications or alerts when risks arise. Apart from that, in terms of prediction, Amazon sagemaker machine learning tool analysis all the data and make predictions about traffic and weather forecasting, air quality and environmental changes. By prediction, government can take the necessary steps in

right direction to address any challenge. And it can only be done by AWS Kinesis service. By this service, government addresses the real-life issues by monitoring and analysing data, make informed decisions to address the issue and improve the quality of life for residents.

Figure 1 shows the architecture of Amazon Kinesis Data Stream service use in Halifax smart city platform.

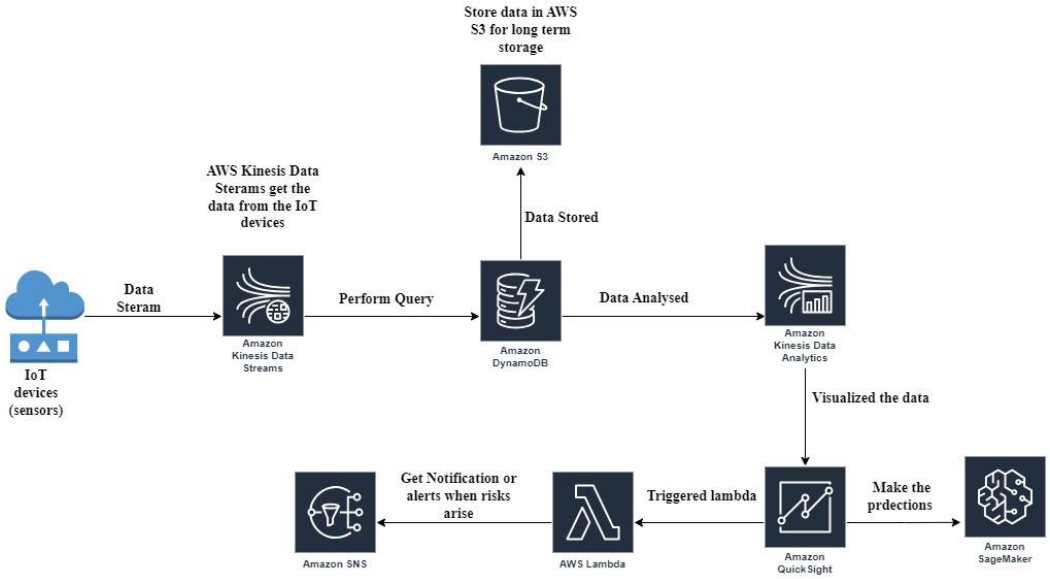


Figure 1 Architecture of Amazon Kinesis Data Stream service for smart city platform [1]

# References

[1] Draw.io, “Flowchart Maker & Online Diagram Software,” app.diagrams.net, 2023. [Online]. Available: https://app.diagrams.net/. [Accessed: 13th July 2023].

[2] “Amazon Kinesis,” Amazon Web Services, Inc., 2019. [Online]. Available: https://aws.amazon.com/kinesis/. [Accessed: 13th July 2023].