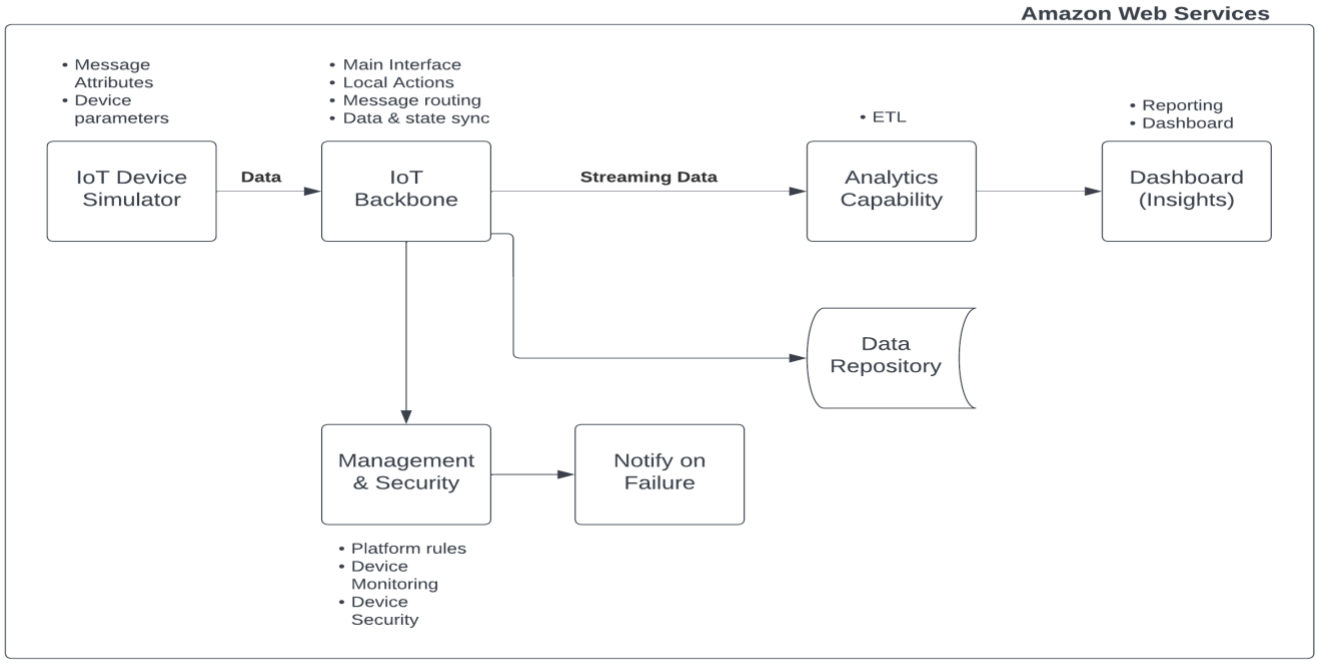
Prototype to deployment: A cloud based centralized IoT platform for healthcare monitoring

IoT based healthcare monitoring helps an engineer create more personalized approaches for health status analysis as well as develop more logical strategies of disease management. In general, a major challenge associated with prototyping an IoT device is the steep learning curve for traditional simulation tools such as OMNET++. Storage and computing capacities can also be a significant limiting factor while simulating several devices at once using such tools. Prototyping operational monitoring and/or streaming analytics capabilities on a single machine is tedious, time-consuming, and computationally expensive. Our idea proposes a centralized solution for an engineer to simulate IoT devices and provides enhanced capabilities such as analytics and reporting services to overcome these challenges. Additionally, it would constitute a service to monitor and audit devices for failures and notify concerned personnel of such failures.

It provides a one-stop, centralized solution which is scalable, reliable, easily accessible to and extensible by cloud engineers, ML engineers and business analysts alike. It would be easily deployable on Amazon Web Services (AWS). It would allow for an end user (for e.g., an IoT engineer) to modify the data collection attributes of the healthcare IoT devices simulated. It would also serve as a cumulated repository to store query-able messages. For the future scope of work, the platform can be extended to deploy ML/AI models on cloud. It would also remove developers/engineers from concerns related to PII (Personally identifiable information) and PHI (Personally Health Information) since the MQTT messages sent by the simulated devices send the attributes of the data, along with a device ID but not information associated with a specific individual.

The following process diagram explains the implementation plan:



All the deployment will be done will be done directly on the AWS environment. Different AWS services such as AWS IoT Core (serves as the main backbone), AWS IoT Device Simulator, Amazon Kinesis (to provide streaming analytics capabilities), AWS Quicksight (serves as a reporting dashboard) will be utilized on an existing personal AWS account. Each block mentioned above (for example, “IoT Device Simulator”) references a separate cloud services architecture, which will be explained in detail in the final report.