**Report on “Mainflux IoT Platform”**

* What is Mainflux IoT Platform?

Mainflux is a technology company offering end-to-end, open-source

Patent-free IoT platform. Mainflux is modern, scalable, and secure open-source IoT platform with the complete full-scale capabilities for development of Internet of Things solutions, IoT applications and smart connected products.

* What are the Mainflux features?
  + Device Management
    - Go programming language for highly concurrent server backend programming
    - Remote configuration, device control and management of firmware/ software updates, and troubleshooting   
      Grouping devices by connection to channels (Channel corresponds to MQTT topic)
    - Stop/reboot selected devices
  + Data aggregation and data management
    - Aggregation and collecting data from devices and processing and storage to database - a scalable data store that supports the volume and variety of IoT data.
    - Internal database PostgreSQL
  + Connectivity and message routing
    - Bidirectional communication (interaction) with very large number of devices and gateways, using different open protocols and data formats.
    - PUB/SUB multiprotocol messaging bridge HTTP Server, WebSocket Server MQTT Broker, CoAP Server
    - NATS -message broker, an open-source scalable messaging system used for message exchange within the Mainflux platform itself.
  + Event management
  + Core analytics
  + User Interface
    - Graphical depiction of real-time sensor data- reports, graphs, and dashboards different types of data, telemetry, statistics, geo location, metadata-Interactive user interface for device management sending commands, changing configuration and metadata, etc.
    - Angular 7+ & Typescript and Bootstrap 4+ & SCSS
  + Application enablement
    - A set of software SDKs and pre-built client libraries for various HW platforms in several programming languages (C/C++,JavaScript, Python)
    - NGINX load balancing
    - Docker Container and docker-compose, Kubernetes
  + Open Source and Patent free
  + Protocol and device agnostic
  + Easy to deploy on premise, hybrid or in cloud

**Notes -**

* This platform is written in Go programming language.
* It accepts connections over multiple network protocols (i.e. HTTP, MQTT, and CoAP). IoT Protocols: HTTP Server, WebSocket Server MQTT Broker, CoAP Server.
* It is meant to be used as IoT middleware on top of which sophisticated IoT solutions can be built.
* Along with core messaging, the Mainflux platform contains three main concepts: User, Thing and Channel.
* **User -** represents a human user of the system which is identified by email and password and used to authenticate the user. In order to manage other resources (Things and Channels), a user has to be logged in. Managing resources includes creating, editing and deleting channels and things, as well as connecting things to channels in order to establish a communication conduit.
* **Thing** - represents various devices and applications which are described by their ID, owner (the user who created them), type (application or device), name and key.
* Built as a set of microservices containerized by Docker and orchestrated with Kubernetes.
* I have used Docker image for local setup.
* They also provide “MFX-1 IoT EdgeX Gateway”. Details of the gateway can be found here ( <https://www.mainflux.com/edge.html> )

**Pricing –**

* On Premises – Free (Mainflux is an Open Source IoT Platform (Apache v2.0) that you can host on any compatible platform running Linux or Docker.)
* Managed Cloud Edition - From $500 /mo (They deploy, host & manage Mainflux on a dedicated Private Cloud, following DevOps guidelines with multi-AZ, auto scaling, cloud watch, snapshots & on-demand sandboxes.)

Pricing details can be found here (<https://www.mainflux.com/pricing.html>)