

Evaluating the possibility of a standardized way, using an Industry IoT Framework with network devices

Hyperion wanted to evaluate the possibility of using network devices for a standardized IoT Framework in all their factories to collect, organize, analyze, and store industrial data at scale to get a cost-efficient, customizable solution to support data analysis and improving overall productivity.

By starting at the base, figuring out the process, what equipment to set up and provision, and how to store, structure, and analyze the collected data we built a Proof of Cloud Concept (PoCC) for the project.

Seeing what's needed

The goal was to ingest data from industrial equipment in the factory to network gateways and relay it to AWS IoT Core for data processing and data storage using AWS native services.

New network gateways should be easy to provision based on a basic understanding of internet device setup. All collected data was to be both visible in real-time dashboards and accessible to consumers in real-time through a single identity provider. A goal that could only be achieved through the use of a combination of network devices and AWS native services.

Starting with the basics

By setting up a WiFi SSD, AccessKey + AWS IAM user and credentials, and the AWS Environment, the local sites can manage IAM roles, and users in the AWS console can easily install and provision new gateway sensors. A process that can be achieved in a couple of minutes after watching and reading the provided instructions for about 30 minutes.

Automating Cloud Provisioning

Setting up the entire cloud process to be automated using Lambda, and modifying the provisioning function to include future use-case for production managers to just sign in and view their data in real-time.

This data modeling and data visualization is done fully automatically through AWS IoT SiteWise and requires assets models, asset hierarchies, IoT message routing, monitor portal, monitor projects, and monitor dashboards from the factory network gateway that are modified for AWS IoT SiteWise in order to visualize the data.



Company:

Hyperion Materials & Technologies

Industry:

Industrial, Machinery, Manufacturing

Purpose:

“Making hard materials that make you better”

Main Markets:

Worldwide

Employees:

1001-5000

Website:

www.hyperionmt.com

About Hyperion:

Born out of GE, Diamond Innovations, and Sandvik Hard Materials - Hyperion Materials & Technologies is a global leader in advanced materials with more than seven decades of experience developing and manufacturing tungsten carbide powder, cemented carbide, industrial diamond, and cubic boron nitride products.

Supported by provisioning a new network gateway and sending an MQTT message triggers a Lambda function, thus creating the resource in SiteWise and giving them the attributes of the gateway and its related sensors. The MQTT message contains information about the gateway and its nodes, providing the necessary information for mapping the sensors to the resources by the AWS Lambda function. Once created, assets are associated with their parent assets, creating the desired data structure. The assets need message routing to populate with data, so IoT core rules route data to SiteWise, and rules are created by the Lambda function, linking incoming messages to assets.

After all the data is assured, the data storage solution needed provisioning, extraction, and retention capacities. Guaranteed through the use of a centralized serverless data lake, based on AWS S3. When a new site is discovered, the Lambda Function creates the needed resource for message routing and data collection. The collected data can then be extracted by AWS Athena which integrates services such as Office 365 and other ODBC-supported applications. For retention, lifecycle policies are put in place to transfer data stored for a longer period of time to a more suitable S3 solution, with longer retrieval times, but at a lower cost.

Once the hardware and software were configured and data stored the production managers could sign in and view all collected data in real-time, visualized on easily customized drag-and-drop interface dashboards through the IoT SiteWise Monitor Portals.

Results and future compatibility

By setting up the new connections and systems all collected data is stored in a serverless data lake based on AWS S3 that utilizes a structured folder for easy data extraction. A solution that collects and compiles incoming data, performs necessary preprocessing, delivers data to the correct location of the data lake in the desired format, and supports data analysis whenever needed.

Overall a cost-efficient, customizable, accessible solution for Hyperion's needs.

For the future, the data lake created can easily be integrated with analysis applications using AWS connectors, for simple levels of analysis such as Microsoft BI, or AWS native analysis services such as AWS Quicksight. The solution is fully compatible with tools such as AWS SageMaker or Lookout for Equipment, which can be used to explore the possibilities of predictive maintenance.

Using AWS SageMaker Hyperion can analyze the data through Jupyter Notebooks using python. If a more managed approach is desired, other more managed AWS Machine Learning services can easily connect to the data source and perform real-time prediction and forecast based on demand.



About Elastic Move:

Elastic Move is a Swedish company founded in 2009 with a focus on migrating, modernizing, designing, and implementing cloud solutions for large and medium businesses. We take our role of being a Trusted Advisor very seriously and make sure that what we're doing has long-term benefits for the customer, even if it means we're losing a project in the short term. Establishing an honest and strong foundation, on which we can build a trusting relationship with the customer from the bottom up. We also have extensive experience with AWS and have been a trusted, advanced consulting partner for over a decade, with a team of engineers who are all 100% AWS certified, to make sure you're always in good hands.

Website:

www.elasticmove.com