Deployment of an Artificial Intelligence (AI) IoT Gateway

Daniele Cleri

AAEON® Europe on behalf of Texim Europe

Company Name: AAEON® Technology Inc.
Founded: 1992 (Acquired by ASUS in 2011)
Employees: 850+
Location: Taipei, Taiwan

Corporate Headquarters

AAEON® an ASUS assoc. co.

Headquartered in Taipei, Taiwan, AAEON® is now serving its global partners in 16 locations worldwide.

This presentation with live demo will show the remote deployment of an Artificial Intelligence Enabled IoT Gateway (powered by UP Squared and AI Core) and describes the risks and challenges involved, including how we can approach this using open source tools.

AAEON® Indoor 4G LoRaWAN Gateway
High End Multi Radio Edge gateway for indoor applications

This industrial edge AAEON® 4G LoRAWAN gateway powered by Intel® ATOM® Apollo Lake CPU offering LPWAN and Long range connectivities:

- LoRaWAN 8-channel radio,
- Bluetooth 4.2 (for short range data acquisition),
- WiFi (mid range),
- 4G modem (for long back haul).

It provides a complete coverage for any kind of application.

Risks and Challenges – Compatibility and Longevity

Deployment of extra hardware and software when connecting devices might be necessary over time.

AAEON® Gateways based on Long Term Support hardware: Intel® Apollo Lake SoC available until 2024.

Risks and Challenges - Connectivity

Decentralizing IoT networks, moving functionality to the edge, such as using fog computing models where smart devices such as IoT hubs take charge of time-critical operations and cloud servers take on data gathering, device management and analytical responsibilities.

AAEON® High Performance Gateways with Quad Core CPU and multiple wired and wireless connectivity options like LoRaWAN, WiFi, Bluetooth, 4G, 2 x Gigabit Ethernet.

Risks and Challenges - Intelligent Analysis & Actions

Extracting insights from data for analysis, where analysis is driven by AI technologies:

- Machines actions in unpredictable situations.
- Information security and privacy.
- Machine interoperability.
- Understanding of human behaviours.

AAEON® AI Core Neural Network Accelerator based on Intel® Movidius™ Myriad™ VPU.

Risks and Challenges - Security

A rising number of Internet security breaches are showing the needs of increase the security of IoT devices.

In order to do that we should:

- Authorize and authenticate devices,
- Manage device updates,
- Secure communication,
- Detect and Manage vulnerabilities and incidents,
- Predict and preempt security issues.

Using Open Source tools like the ones provided by **Balena.io**.

How to setup a **Indoor 4G LoRaWAN Gateway and Balena.io**

Deploying an application to a **Indoor 4G LoRaWAN Gateway** consists of two major steps:

- Setting up the **Indoor 4G LoRaWAN Gateway** with Balena OS, the host OS that manages communication with Balena.io and runs the core device operations.

- Pushing the application to the Balena.io image builder, which pulls in all necessary dependencies and creates the container image for the application.

Once these steps are finished, the **Indoor 4G LoRaWAN Gateway** will download and kick off the application, and begin sending logs to our Balena.io dashboard.

Account setup

Balena.io uses **git** to push code from a development computer to a dedicated repository.
As part of the account creation process, we will be asked to add a public SSH key.

The SSH key secures the connection to the server, making sure there is the authority to make changes to the repository.

Create an application

An application is a group of devices that share the same architecture and run the same code. When we provision a device, it is added to a specific application, but can be migrated to another application at any time.

To create an application, select the device type, select an application type, enter a name, and click Create new application.

Add our first Gateway (device)

To connect with Balena.io, our Gateway will need a BalenaOS image that is configured for our device type, application, and network.

After selecting a device type, you will see a list of available BalenaOS versions. In general, the most recent version is recommended. We can also select whether to use the Development or Production edition.

A toggle is also used to select whether the network connection will be through Ethernet Only or with the option for WiFi + Ethernet.

Once we have finished the image configuration, we can click the Download Balena OS button.

Provision the Gateway

In order to get Balena OS up and running on our Gateway, we need to first set it up to boot from your USB drive rather than its internal eMMC memory.

Our Gateway will now boot from the USB drive and flash Balena OS onto the internal eMMC memory.

Deploy a Project

Now that we have a device connected to a Balena.io application, we are going to deploy a Project.

- Clone a Project
- Set up a reference in our local git repository to the Balena.io application remote repository
- Push new changes to the remote repository
  - it will get compiled and built on the servers and deployed to every device in the application fleet.

Thank You!

Q & A

You are invited to visit Texim Europe's booth and talk with you in more details.

AAEON® an ASUS assoc. co.

TEXIM EUROPE