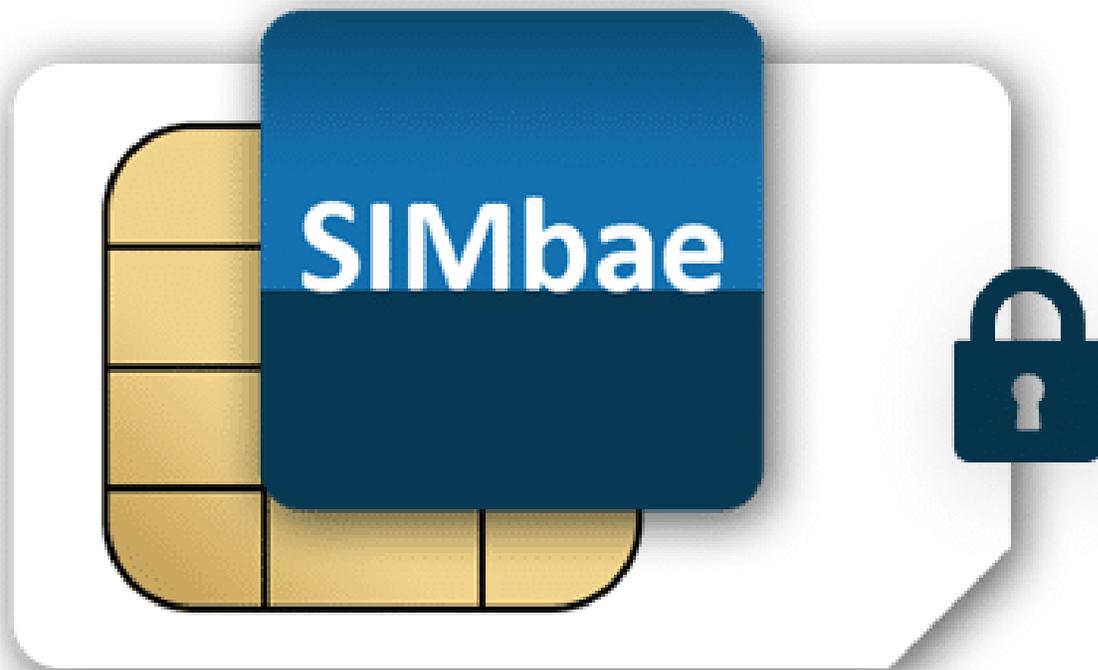


Able Device provides a lightweight SIM based platform for IoT devices



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SIMbae™, a SIM-based application engine, is a device agent that runs on any Global Platform compliant SIM card and runs in parallel of a device's pre-existing functionality, so it doesn't even know SIMbae is there. SIMbae acts as an independent agent on the device for many applications and use cases; it can perform pre-configured tasks completely autonomously without the need for inbound or outbound communication. However, communication with SIMbae and visualization of received data is important for some use cases.

The Challenge

SIMbae functionality can be accessed over-the-air (OTA) using either Class 2 SMS messages, TCP or UDP. By creating a cloud-based application using the TagoIO platform and integrating it with an SMS and IP communication gateway, 2-way OTA communication with the SIM integrates seamlessly to parse and display SIMbae data for the user. This Tago based application enables three use cases:

- Loading new configurations to SIMbae that will allow it to continue to run autonomously
- Debugging and potentially solving issues with IoT devices already in the field
- Obtaining a rough location of a device the does not contain a GPS receiver

The Solution

OTA Settings

The SIMbae core application engine is pre-loaded with a configuration that allows the system to autonomously make decisions on criteria such as the quality of service of the currently connected network or should the device attempt to connect to a different network for better communications. Occasionally, a business may decide to change the criteria used to make that decision. In that case, Tago can be used to push new settings to SIMbae.



Debug Portal

SIMbae's Debug It!, a primary use case for utilizing 2-way OTA communication, involves remotely identifying and resolving bugs that may reside in an end device's cellular module firmware, embedded application, or other network performance issues. Debug-It encompasses a handful of powerful functions, including:

- Remotely sending AT commands to the modem
- Testing network performance from the device's perspective
- Resetting the network stack
- Relaying user input to the portal
- Reading and modifying SIM-accessible files

- Forcing a network change

By linking these features with the TagoIO platform, it gives the user an interactive debugging platform that functions and feels like a locally connected terminal session. At the same time, the IoT device remains deployed in the field. Utilizing these features allows the device to change modem settings and potentially reset buggy hardware without the need to send someone to the device's physical location.

Data	Type	Date and Time
+CSQ: 23,2	response	02/08/2021 01:55:04 am
at+csq	command	02/08/2021 01:54:48 am
+CREG: 0,5	response	02/08/2021 01:41:55 am
at+creg?	command	02/08/2021 01:41:39 am
+CREG: 0,5	response	02/08/2021 01:37:06 am
at+creg?	command	02/08/2021 01:36:50 am

Figure 1: Remote AT Command Terminal Dashboard

Non-GPS Tracking

SIMbae's Find-It! use case allows network information such as the performance of the currently connected cellular tower and other detected nearby towers to be sent back to an application. By utilizing a network location provider such as **LocationSmart**, the tower information that SIMbae™ collects is used to estimate the location and movement of the connected device. While the location's accuracy may decrease in rural areas with few towers, it allows for general tracking of assets known to be following a specific highway or at one of several spaced-out locations. This tracking feature uses the Tago

platform as an intermediary between SIMbae and the LocationSmart service and works with devices that do not have a GPS module installed.

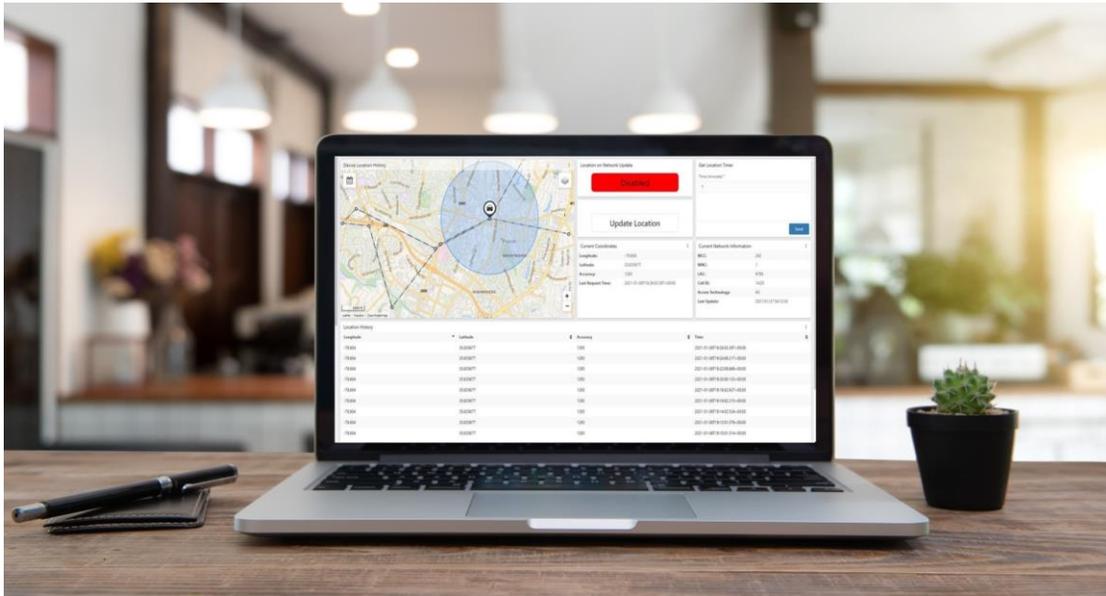


Figure 2: Non-GPS Tracking Dashboard

The Results

Developing dashboards with the TagoIO platform has streamlined the process of communicating with SIMbae and visualizing data received from IoT devices in the field. While a platform is not required to utilize SIMbae, by utilizing TagoIO to parse responses and displaying data within dashboards we provide a comprehensive look into the current state of SIMbae and long-term trends of received data that was previously difficult to visualize in real-time. In addition to the server-side data collection that is

now possible, an integrated set of communication gateways has sped up the process of initial testing and integration of SIMbae.

Learn more about Able Device at <https://abledevice.com>

Learn more about TagoIO complete eco-system for IoT solutions by visiting <https://tago.io> or sending an e-mail to contact@tago.io

Tago

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