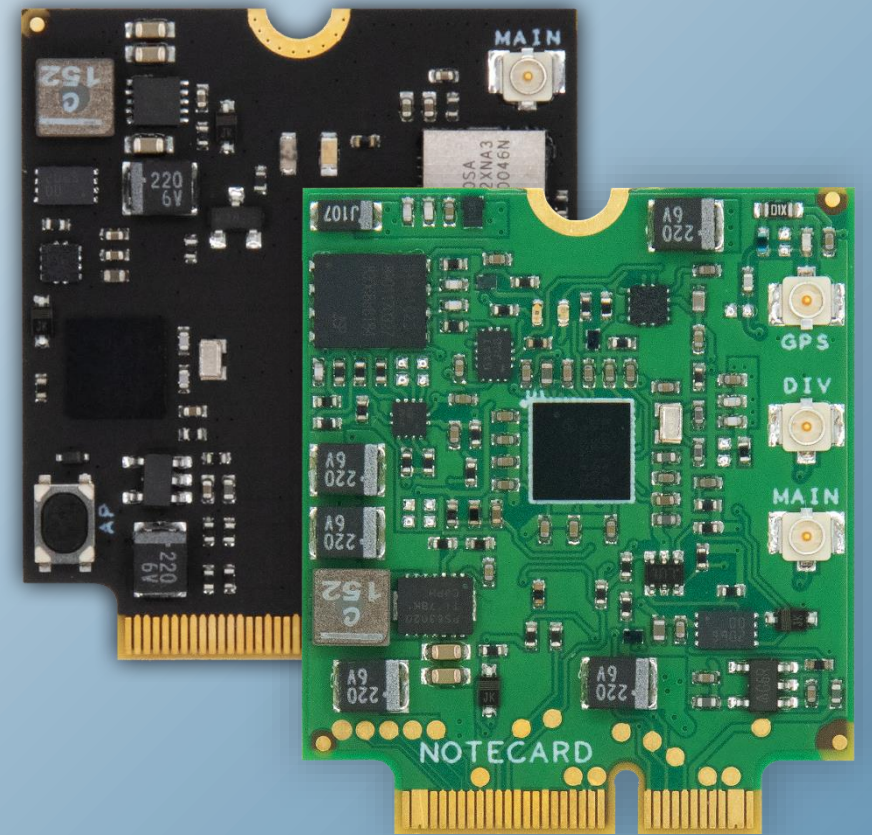


Introducing Simplified Cellular IoT with Blues Wireless and the Notecard

**Adding IoT to your
tinyML Project**
SciTinyML 2023

 blues wireless





Peter Ing

Blues Amplifier | Edge Impulse Expert | Arm Ambassador
tinyML Foundation



**"Making wireless IoT easier for developers
and more affordable for all"**



Easy for developers and **affordable** for all.



Securing your data from device to cloud



Building zero-config low-power hardware



Providing an unmatched developer
experience

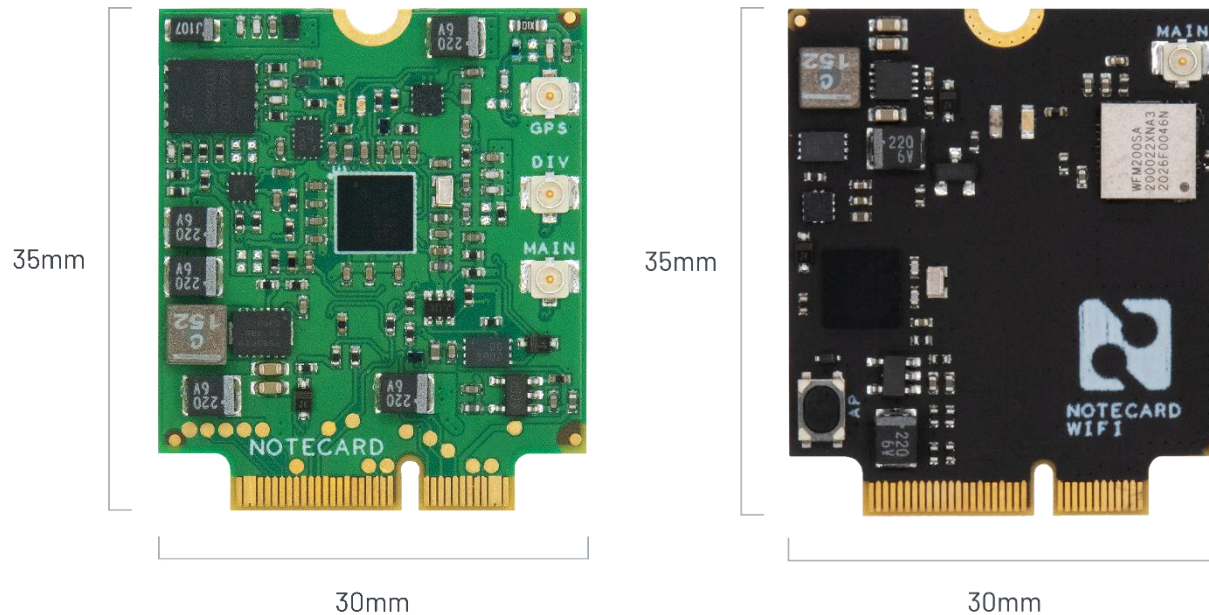
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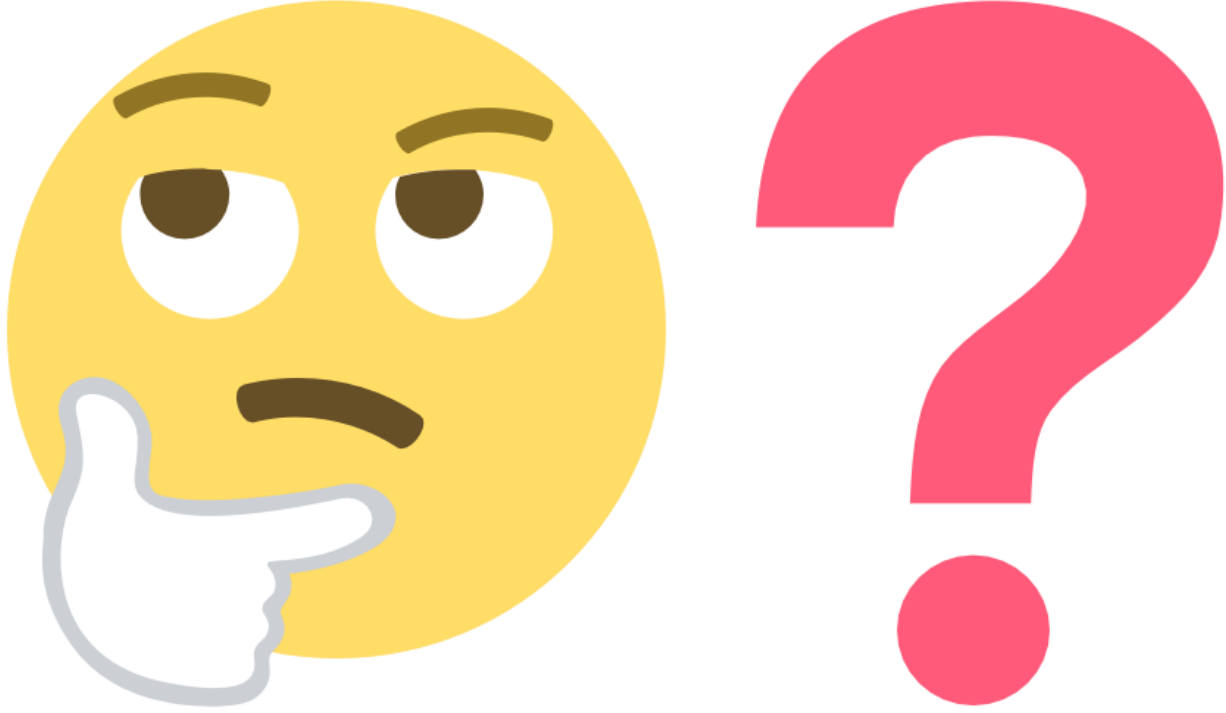
Complexity kills. It sucks the life out of developers, it makes products difficult to plan, build, and test.

Ray Ozzie – CEO of Blues Wireless

Today's Agenda

- Intro to the Notecard and Blues Wireless
- Hands-on Demonstration of Wireless IoT

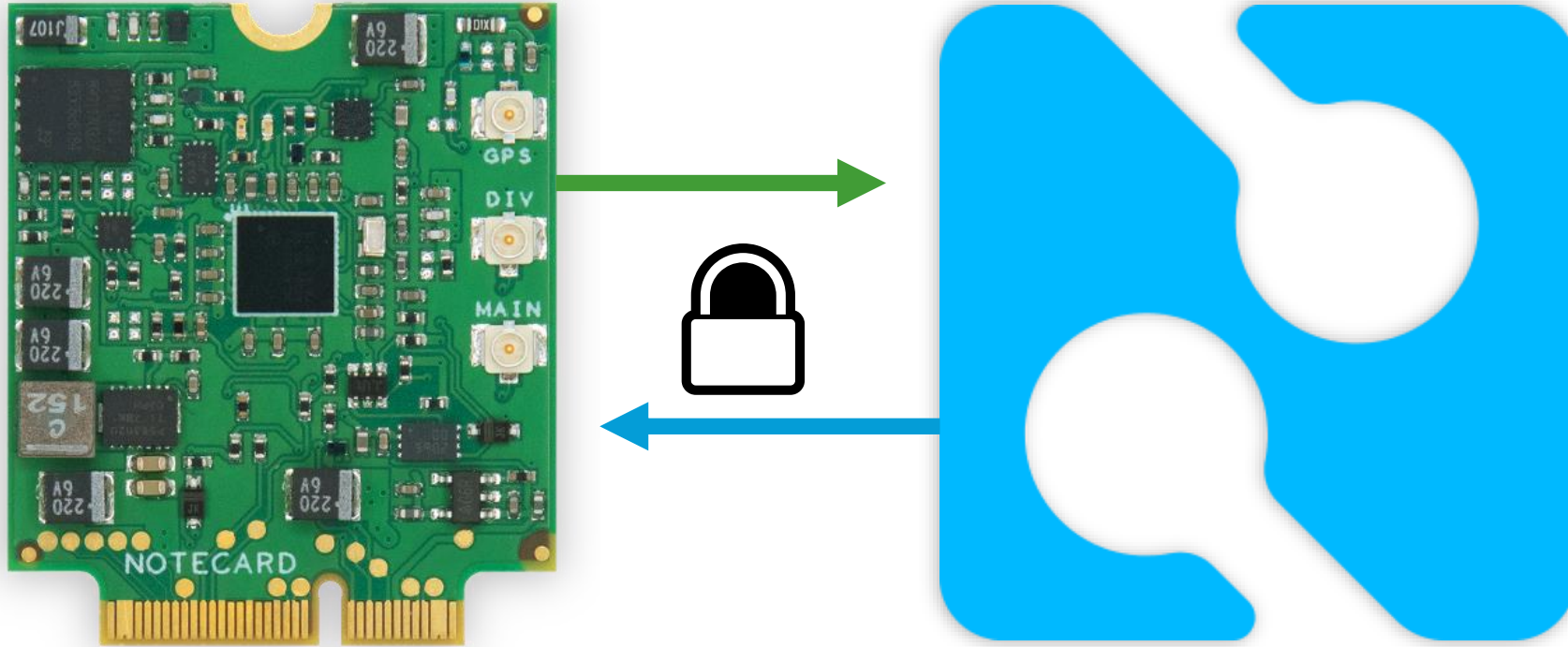




Why Blues Wireless

- Easy to use – no need to understand Modem SDK's , hardware interfacing or RF
- Free data plan– works globally just power up and go
- Simple hardware interfacing – I2C or Serial
- Simple Software interfacing – communicate JSON commands, no AT Commands
- Standalone mode or interfaced to a host device
- Wide variety of features and hardware to support many IoT applications – GPS, Temp/Humidity, Accelerometer included

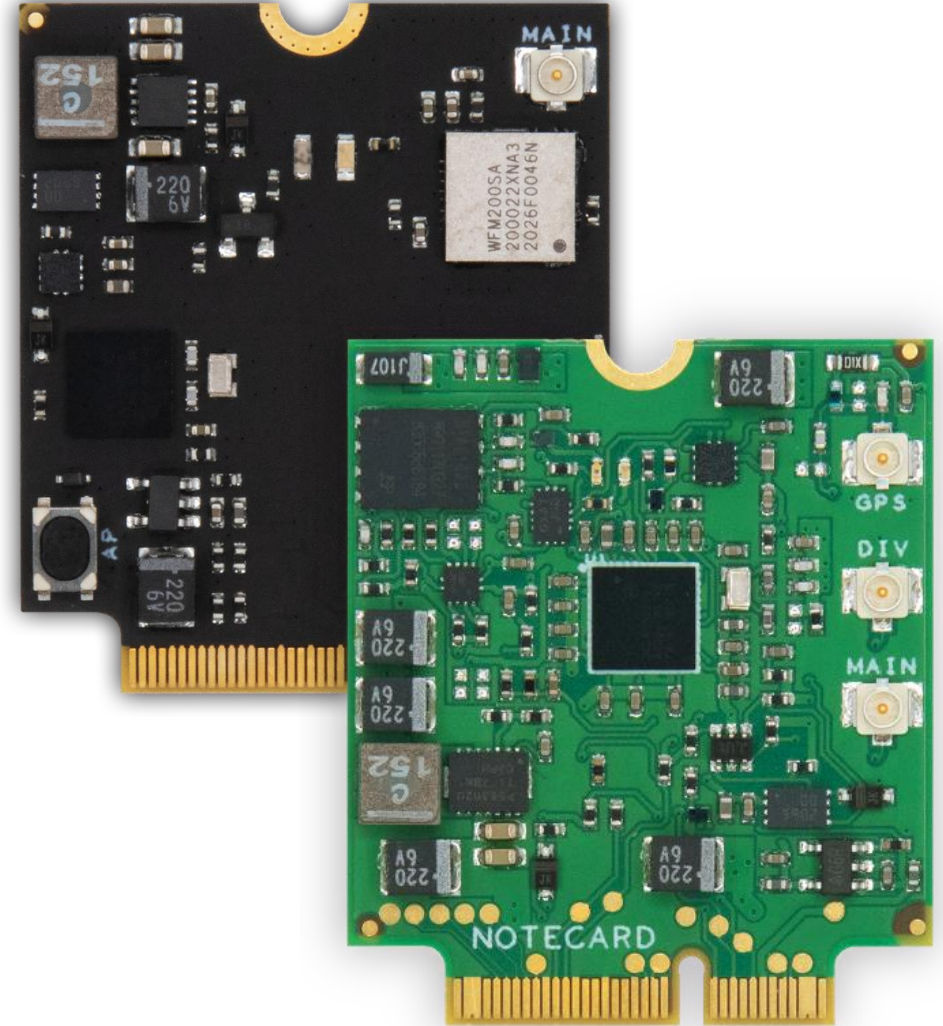
“Device-to-Cloud Data Pump”





Notecard

- Low-power system-on-module
- Global cellular/GPS or Wi-Fi
- 500MB cell data + 10 years service
- Simple JSON-based API
- Python, Go, Arduino, C/C++
- Cellular: NB-IoT, LTE-M, Cat-1



When Does the Notecard Make Sense?



- Low-bandwidth cellular
- Edge computing scenarios
- Secure communications
- Turnkey cloud integrations

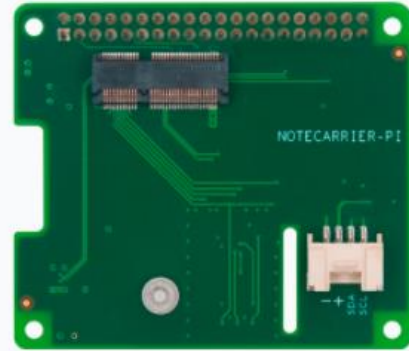


- Wi-Fi replacement
- Sub-millisecond latency
- Video streaming

Notecarriers



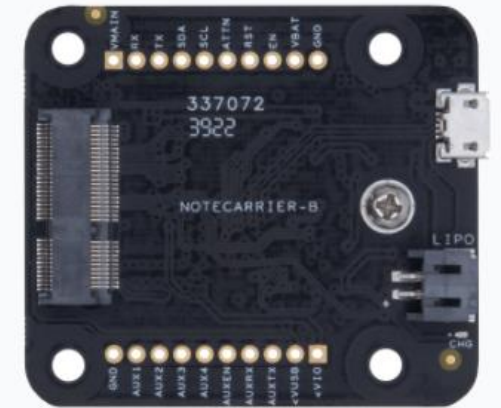
Notecarrier F



Notecarrier Pi



Notecarrier A



Notecarrier B

Example: *card.location* API

Request

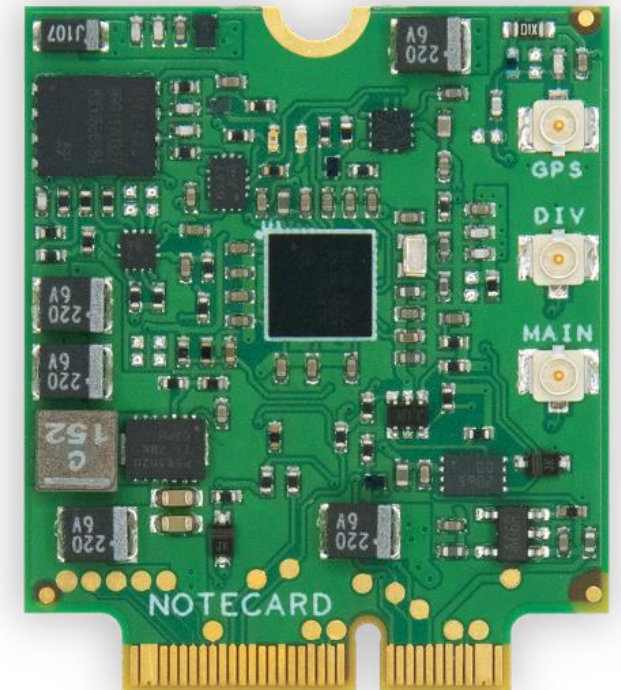
```
{ "req": "card.location" }
```

Response

```
{  
  "status": "GPS updated (58 sec, 41dB SNR, 9 sats),  
  "mode": "periodic",  
  "lat": 42.577600,  
  "lon": -70.871340,  
  "time": 1598554399  
}
```

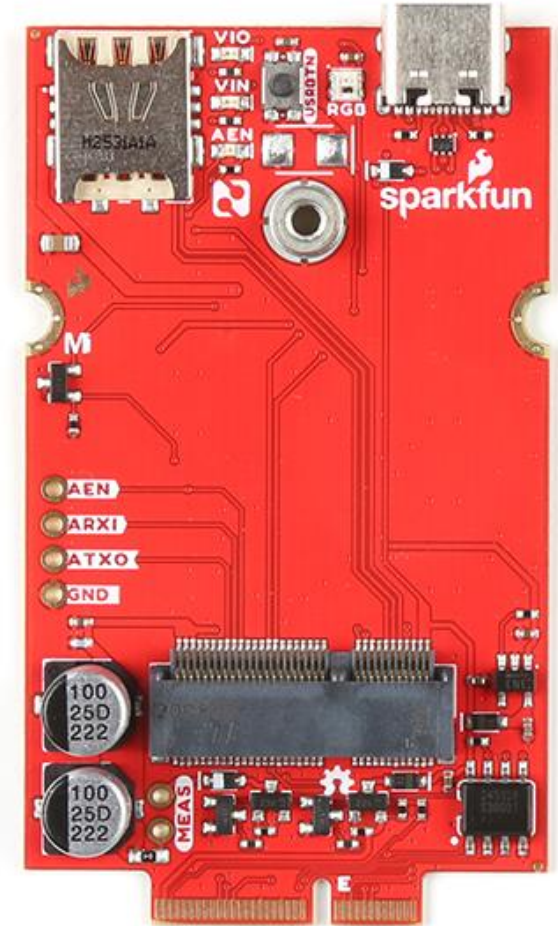
What don't you need with the Notecard?

- SIM or Separate Mobile Plan
- AT Commands or Cellular Connection Management
- Custom Security Implementation
- OTA DFU
- Power Management
- Cloud Integration



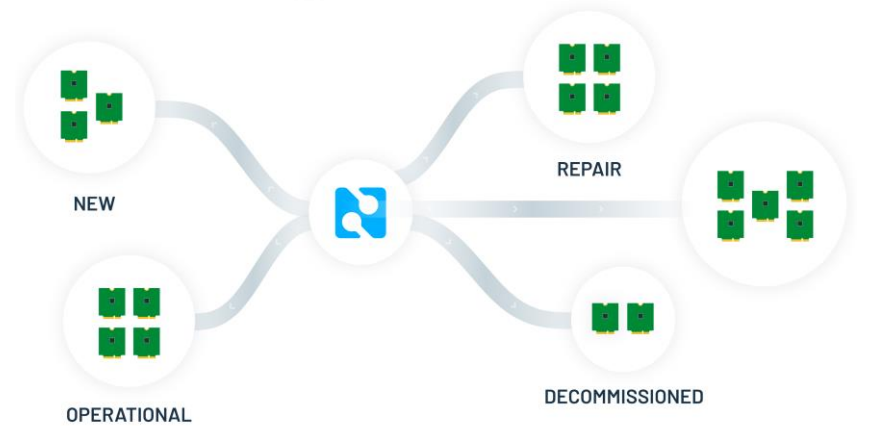
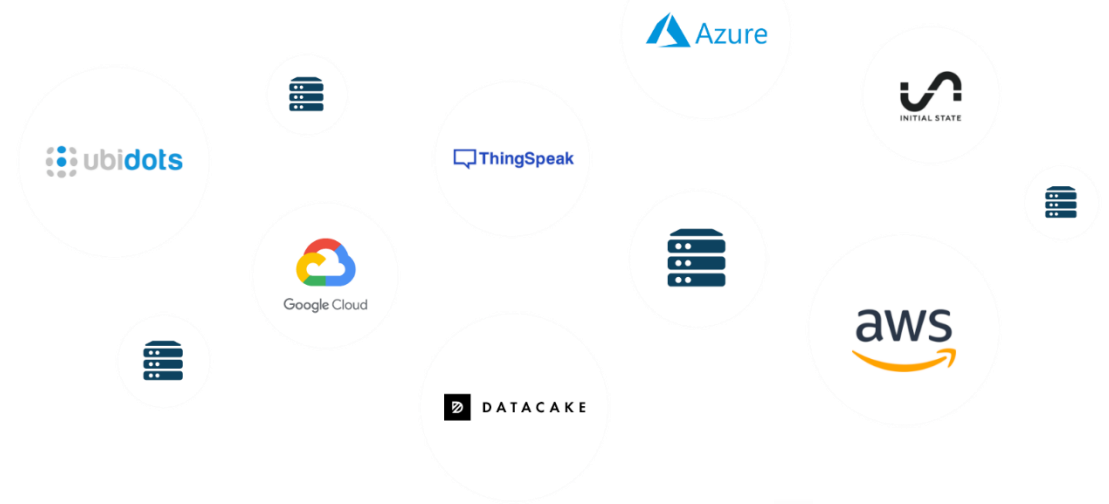
Notecarrier

- Carrier boards for easy prototyping
- Notecarrier for every scenario:
 - **F** – Feather-compatible socket
 - **A** – Any MCU, onboard antennas
 - **B** – Small form factor
 - **Pi** – Raspberry Pi SBC
 - SparkFun MicroMod Cellular Function



Notehub

- Route data to **any cloud** app
- Manage **fleets** of devices
- OTA MCU/Notecard **firmware updates**
- **Secure** communications



Notehub “Consumption Credits”



- Only Pay for What You Use!
- Billing Account “Topped Up” to 5,000 CCs Monthly
- Notecard Purchase → 5,000 CCs

Notehub “Consumption Credits”



- **Send an Event to Notehub? FREE**
- **Route an Event from Notehub to Cloud? 1 CC**
- **Pull an Event via API? 1 CC**
- **All other API requests? 0.001 CC**

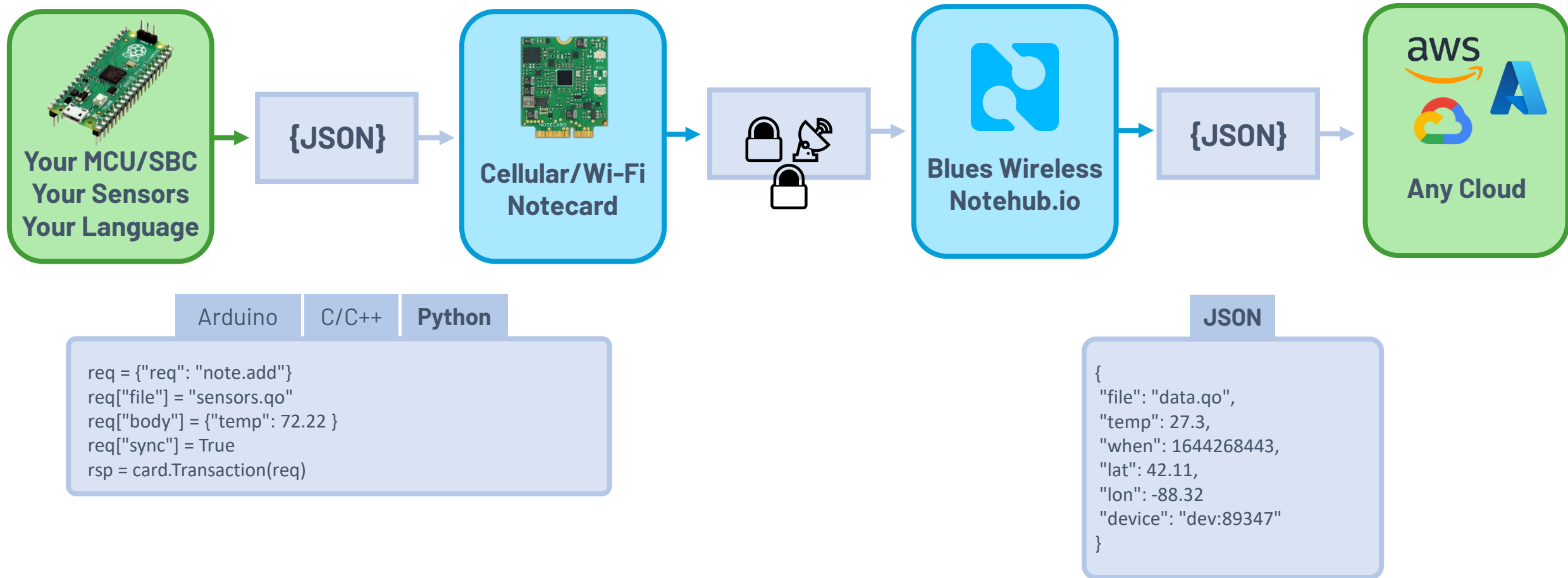


Scenarios

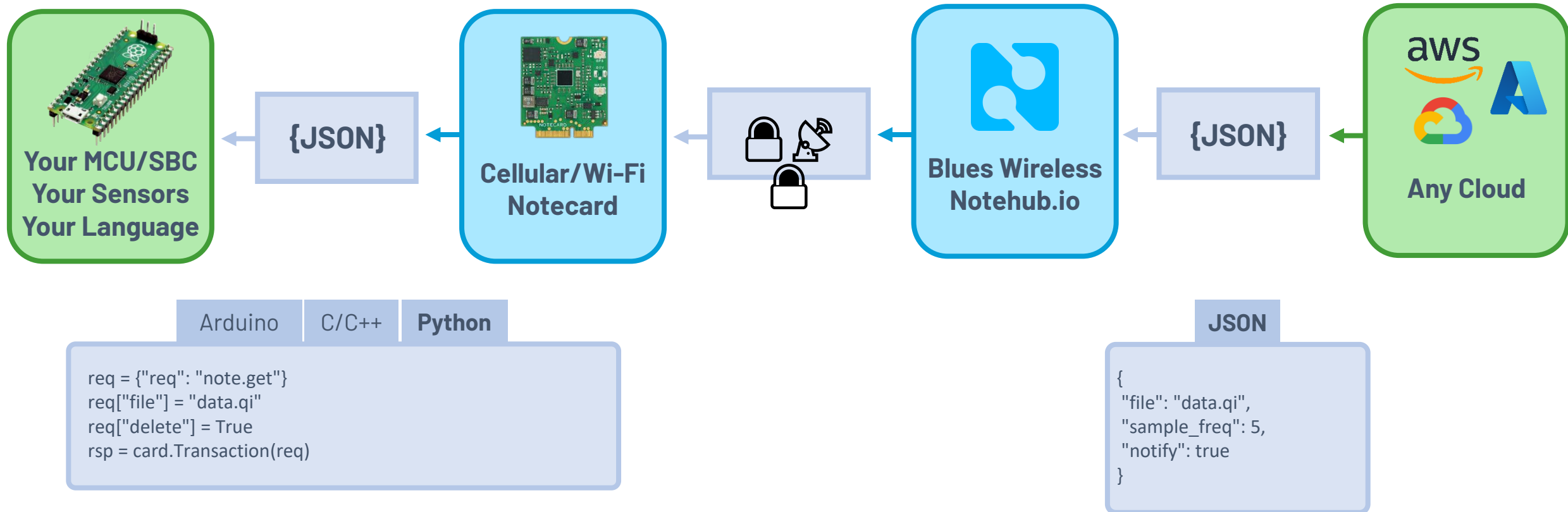
Outbound – Device to Cloud

Inbound – Cloud to Device

Outbound Communication (from MCU to Cloud)



Inbound Communication (from Cloud to MCU)



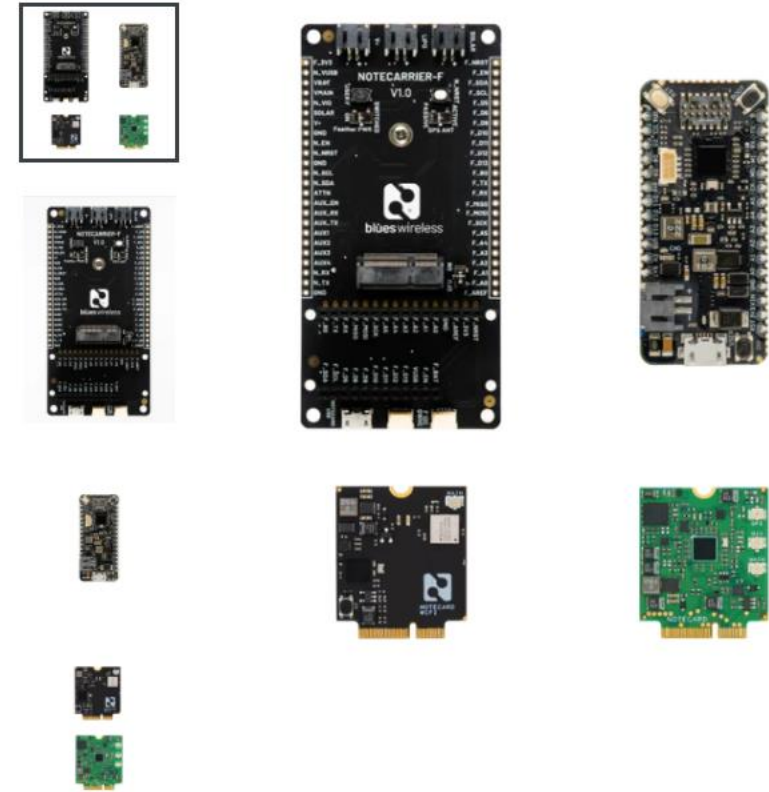
Demo

Bonus Features

- Blues Swann
- App Accelerators
- Outbound DFU

Blues Starter Kit

- Notecarrier F
- Swan
- WiFi Notecard
- Notecarrier Pi

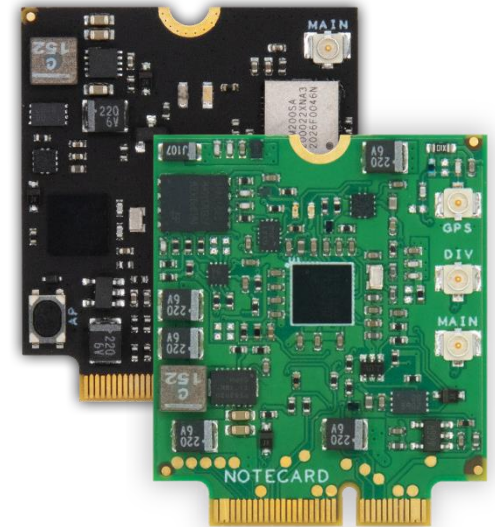


Thanks!

- **dev.blues.io** for Blues Wireless resources
- 15% off Starter Kits @ **bit.ly/blues-get-started**
- **Win a Free kit to the 2 best ideas - blues.tinyML@gmail.com**



Peter Ing
Blues Amplifier







arm

Arm Virtual Hardware Overview



CORELLIUM®

Revolutionizing IoT Software Development



Reduces Barriers to Entry

Enabling more global developers to access silicon and development boards



Faster Time to Market

Accelerates application development for the IoT market

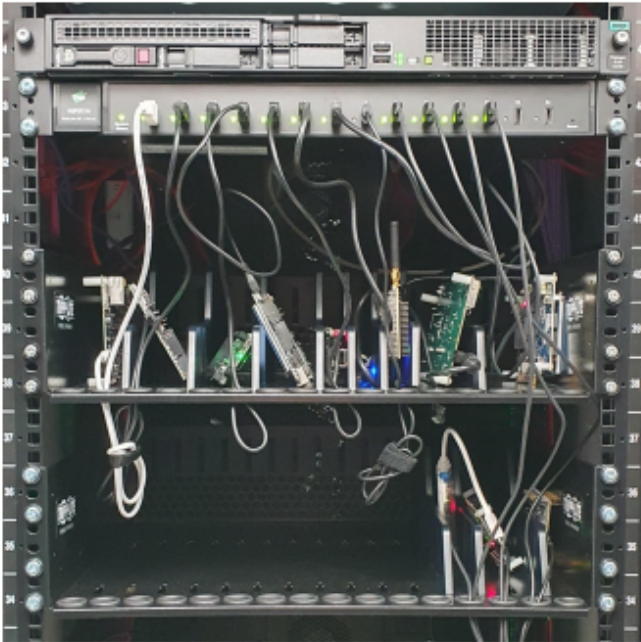


Scalable Performance

Supports enterprise-class DevOps and MLOps integration testing

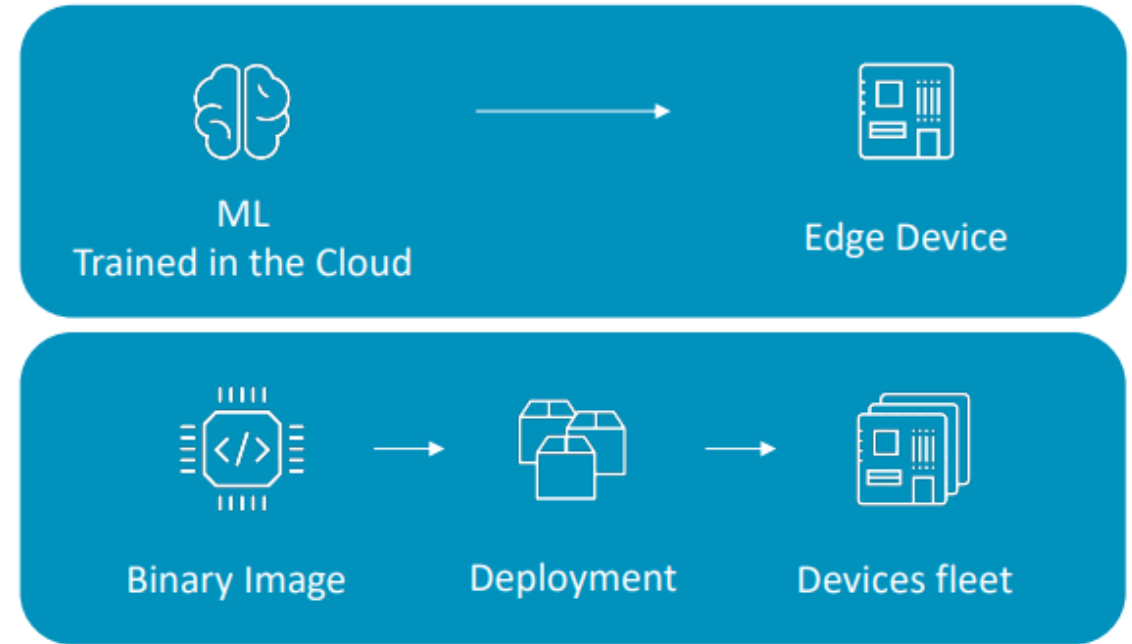
Embedded microcontroller developers

No scalability with physical hardware



Cloud-native developers

Hard to run on end devices



Use Case: Machine Learning Operations

