Tufts UNIVERSITY | School of Engineering

The Hub

Internet of Things in Education

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THE PROBLEM

- As IoT devices are becoming more and more common, the importance of **IoT education** has greatly increased
- Many public schools lack the funding to provide reliable **IoT-capable devices** for students to use
- Most classrooms are still predominantly using **Bluetooth devices**, which prevents communication between multiple devices at once

OUR VISION

★ Create an **application programming interface (API)** on a **Raspberry Pi** single-board computer that allows educational **Bluetooth Low Energy (BLE) devices** such as LEGO® Education WeDo 2.0 devices to mimic the behavior of **Internet of Things (IoT) devices**

★ The API will enable the BLE devices to **communicate with each other** via a central cloud as opposed to the traditional one-to-one Bluetooth communication

THE RESULTS

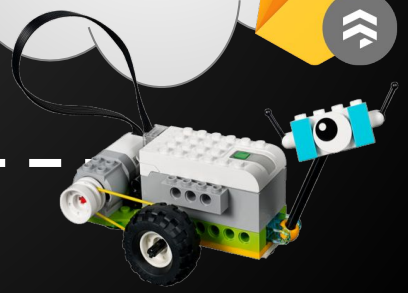
- Implementation of a system that allows **≥ 10 BLE devices** to communicate with each other through a **Node.js server** Raspberry Pi
- Devices are able to **send and retrieve data** from the local cloud independently

THE DESIGN

- The **Raspberry Pi** acts as a central module to communicate with the **BLE devices**
- The Pi communicates with the **local cloud** using the **wireless local area network (WLAN)**
- The Pi runs a **Node.js server** that facilitates communication between BLE devices and the cloud

THE DATA

- **Real-time** data updates using **Google Cloud Firestore**
- **API endpoints** allow BLE devices to send and receive data



WHAT'S NEXT?

- Create an **offline mode** that allows the Pi's local storage to act as a **temporary cloud** for classrooms where Internet is not available
- Integrate **more BLE devices**
- Create a **user-friendly interface** for teachers to manage devices in a classroom