

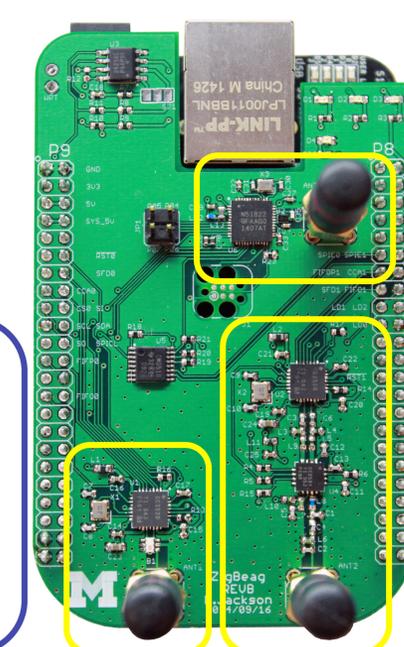
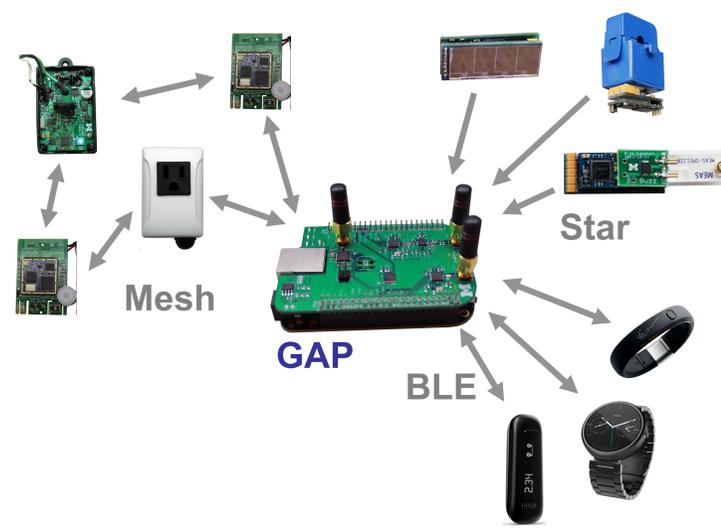
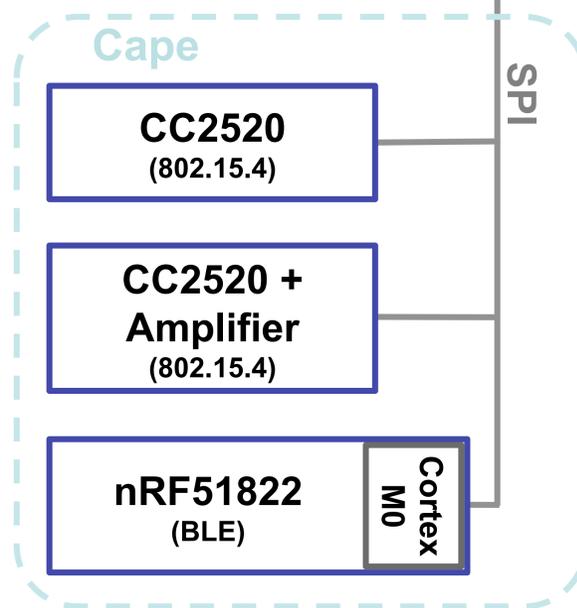
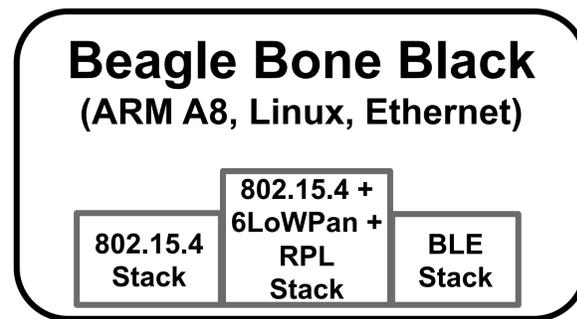
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## The Internet of Things has a Gateway Problem

Embedded, wearable, and other low-power wireless devices do not currently have standardized, shared, and ubiquitous access to the Internet. A mixture of varying physical and MAC layers, application-specific smartphone apps, and device-specific physical gateways hinders the connectivity of the swarm. The swarm is missing the same level of network access WiFi routers provide laptops and smartphones.

## Introducing the Generic Access Point

GAP is a universal gateway for low-power devices. Rather than expect all embedded and wearable devices to speak a single protocol, GAP includes multiple radios to interface with different networks and devices. It's built as a cape for the Beagle Bone Black which provides Linux networking and Ethernet connectivity.



**BLE Radio**  
Intended to replace device-specific apps on smartphones with an open Bluetooth Low Energy gateway for mobile and wearable devices.

**802.15.4 Radio**  
Always-on 802.15.4 receiver for forwarding 6LoWPAN (IPv6) packets. Designed for nodes that do not need or cannot support more complex network layers.

**802.15.4 Radio with Amplifier**  
Runs 6LoWPAN (IPv6) and the RPL routing protocol. Designed to be the root of 802.15.4 mesh networks.

## Profile Based Solution for Networking Devices

GAP aids interoperability by allowing swarm devices to ignore options (storing mode? channel? objective function? etc.) and instead choose the networking profile that matches their application.

**15.4 Star**  
Always-on receiver within one hop. Good for energy-harvesting and intermittent nodes.

**15.4 Mesh**  
Robust multi-hop network based on IPv6. Best for static nodes covering a large area.

**BLE Gateway**  
Generic gateway based on Bluetooth Low Energy. Best for mobile and user-facing nodes.

