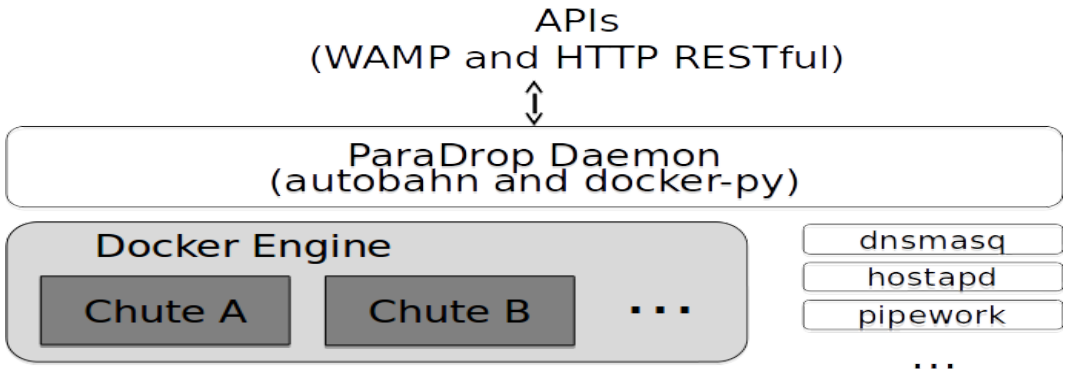
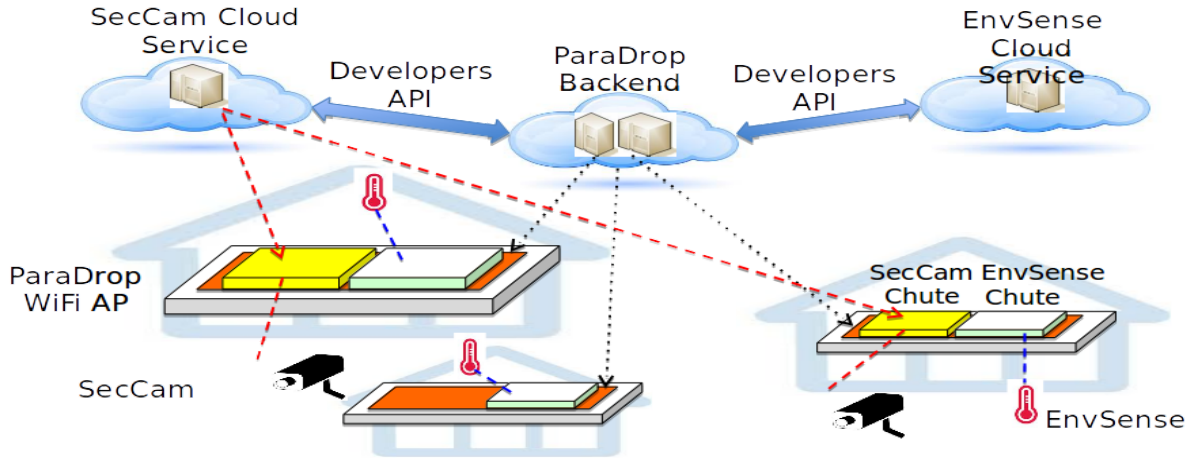
ParaDrop: A Platform for Edge Computing

Support both Wireless LAN and Bluetooth interfaces



ParaDrop is an orchestration framework to manage applications running in the edge - Wi-Fi access points. Our goal is to bring networking intelligence into the home through the commodity Wi-Fi AP hardware. The flexible, secure, lightweight container virtualization and multi-tenancy platform allows a network-based approach to implement applications that are agnostic to the end points of a service. ParaDrop provides HTTP RESTful APIs for developers to interact with the system, and WAMP APIs to get real-time notifications . To abstract the wireless LAN interface, dnsmaq and hostapd modules have been integrated. The backend implementation uses the MEAN(MongoDB, Express, AngularJS, and Node.js) stack to manage the chutes in various routers. There is a deployment of ParaDrop routers in downtown Madison, Wisconsin.

Demo: Security Camera Architecture



The BLE (Bluetooth Low Energy) interface will detect the presence of a device and start video streaming via the wireless camera to the router frontend. The application will detect motion via image processing and save snapshots on the router for future reference. The threshold of the motion can be set in order to change the sensitivity for motion detection. More specific computing resource like the GPU can be used to detect any missing objects from the images saved.

Infrastructure requirements: Monitor, Ethernet port, power outlet for monitor, laptop, router and wireless camera.

Reference: Peng Liu, Dale Willis, Suman Banerjee, ParaDrop: Enabling Lightweight Multi-tenancy at the Network's Extreme Edge, 2016 IEEE/ACM Symposium on Edge Computing.

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