GadgEon

Engineering Smartness

A Mobile App Enabled School Emergency Response Solution

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Our Customer wanted a reliable, efficient, and easy to communication system so that events leading to emergencies can be monitored and responded at schools, or buildings.

Results / Outcomes

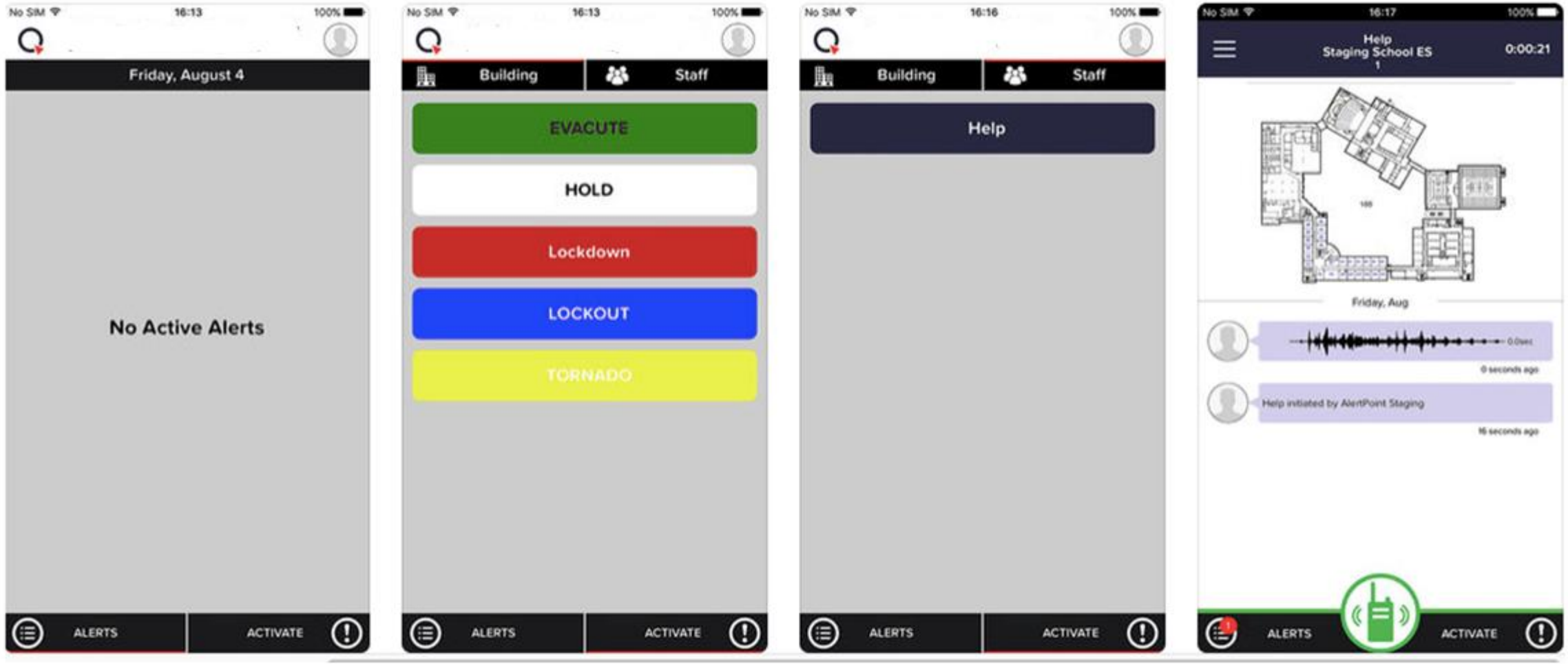
- Instant communication of events throughout the school buildings of several hundred classrooms is achieved by using multiple communication technologies. A ZigBee based large mesh network propagates events to hubs located throughout the facility to give audio and visual alerts.
- The mobile apps helped staff members to receive instant updates on the situation and provided a walkie-talkie type voice communication facility.
- High accurate location identification in the floor plan of the school, enabled the emergency responders to reach the event location quickly.
- The entire system can be customized to generate different audio and visual alerts based on the requirement of the school and can be easily integrated with intercom and or other existing communication facilities in schools or building.
- The desktop apps provided a view of the alerts in real time with aggregation capability for external emergency teams like police headquarters.

The System Description

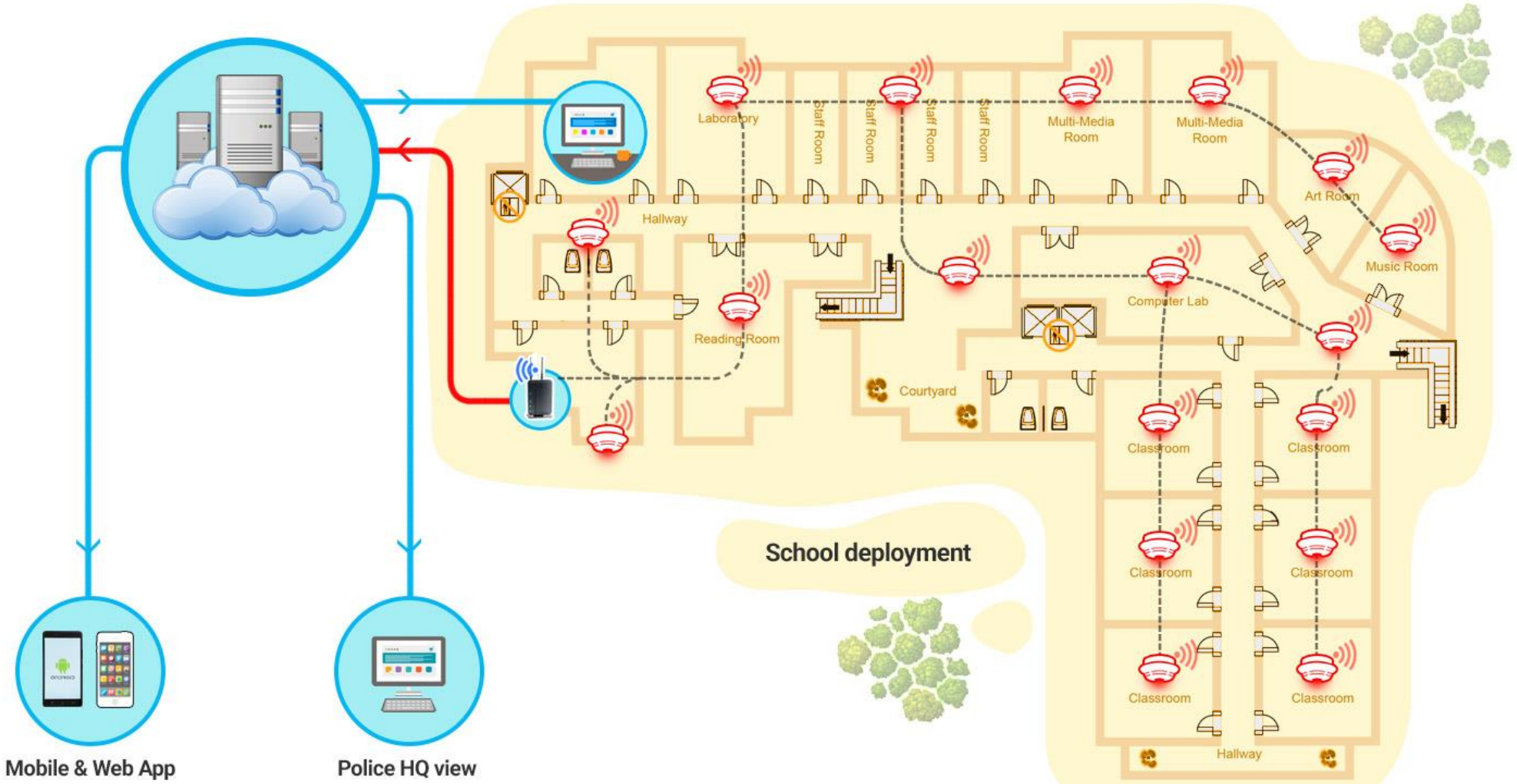
IMPLEMENTATION

- The alert management system consisted of multiple components like Mobile Apps, Cloud application, Communication gateway, Hub, and a desktop application
- Mobile App was designed, tested and deployed that will alerts staff members on new events as they happen. Staff members can generate, escalate, and close alerts. The features like walkie talkie and integration with schools existing alert management system will help to take quick action during alert events.
- Cloud Application - Customized the cloud application to manage provisioning of multiple Gateways and associated Hubs and badges. The application coordinates the communication between Gateways, mobile apps, desktop apps and web applications.
  - MQTT protocol is used as communication protocol between cloud and gateways. REST API and Web sockets are used to interact with cloud and client applications.
  - Web application supported functions like administer schools, alert classifications, user management, firmware upgrade, viewing the current status and statistics of the systems.
  - When an event is generated from the users badge/app, the floor view provides the exact location of the event in a school floor plan, so that emergency responders can locate the person quickly.
- Gateway - Customized Gadgeon's DelEdge to manage hub Zigbee mesh network on one side and communicates with cloud application over MQTT on the other side. Cc2538 based dongle is used for ZigBee functionality.
- Hub - Microcontroller based ZigBee hubs form a large mesh network throughout the school to propagate the alerts. The Hub also provides audio and visual alerts to students and staff. Hub has BLE interface for receiving alert initiated from badges used by staff members.
- Desktop application based on both Windows using C# with WPF framework and Mac OS using electron.js and angular frameworks.

Sample Mobile Interfaces



Overall System Flow Diagram



ZigBee mesh Hubs deployed throughout school for coverage and location identification

THANK YOU

For More Details, Let's Connect

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