Reliable Environment for Secure Police Operations and Networks

The Problem

In many first-response scenarios, it is common for multiple departments and jurisdictions to need to cooperate with one another, introducing complex communication challenges:

- **Reliable**: Communications must be robust against network fragmentation and disruption
- **Distributed**: The decentralized nature of operations requires devices to directly communicate with one another in the temporary absence of a central controller
- **Secure**: Communications must be protected from eavesdropping and active interference

Example: “Active shooter” scenario requires reliable, distributed, and secure communication between police, fire & medical first responders.

Responders must be able to temporarily share information such as maps, photos and messages without significant pre-planning.

Objectives

The goals of Respons are to build a robust and reliable software framework that simplifies the construction of advanced public safety applications in disconnected or intermittently connected environments.

Our approach builds on emerging Information Centric Network and Fog Computing concepts while using proven technologies adopted in data center applications to minimize risk.

Approach

We plan to use existing commodity software where possible, and leverage technology that already tackles similar reliability and decentralized challenges in a different context.

We propose to use technology widely deployed in modern datacenters, and apply them to disconnected mobile communication.

Technologies such as etcd offer distributed consensus, while remaining robust in the face of intermittent disconnection.

Proven machine learning techniques for network occupancy will infer LTE, WiFi performance, allowing informed selection of multiple wireless links.

We will use standard network tools like multipath TCP for robust communication over multiple links.

We plan to use opportunistic encryption between devices to protect against passive eavesdroppers, and an optional certificate authority.

Milestones

The Respons software environment should simplify agency-specific software development for information gathering & dissemination in field operations.

Impacts