# A Comparison of Hybrid Wireless Mesh Protocol and Greedy Perimeter Stateless Routing

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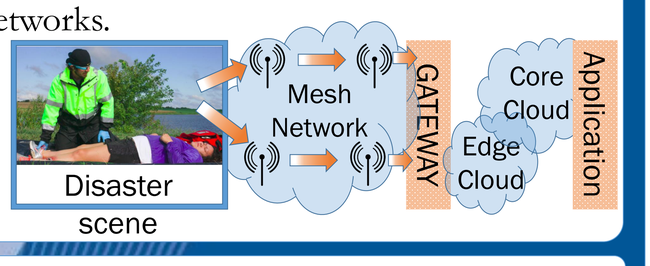
## Mesh Networks

- The Internet of Things demands **fast**, **reliable** networks over **large areas**. In the face of network uncertainty, a mesh network can be easily created as a temporary local network outside of commercial networks.
- Mesh Networks consist of a **Sender**, **Receiver** and multiple **Mesh Points**




## Related Works

### Hybrid Wireless Mesh Protocol

- **Industry Standard** (802.11s)
- **Stateful Routing**: Tree-based topology and path finding
- **Path Finding:** With topology tree, multiple shortest paths can be found

### Greedy Perimeter Stateless Routing

- **Geographic Routing**
  - Fault Tolerant
  - Scalable
- **Stateless Routing**: Greedy Forwarding technique routes in GPS direction of destination
- **Path Guessing**: Shortest path is not guaranteed

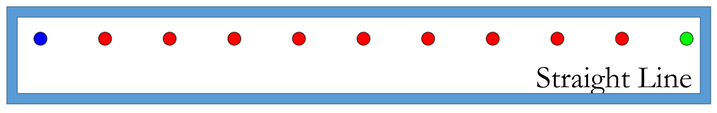
## Problem

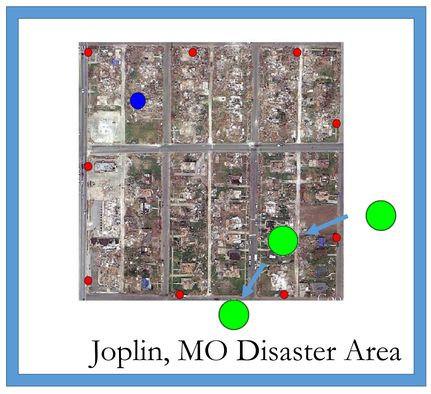
- Mesh Points are **unstable**
  - Frequent installs/uninstalls and failures
- **Goal**: **High sustainable** throughput
- **Solution**: Efficient Geographic Data Routing using the Internet of Things

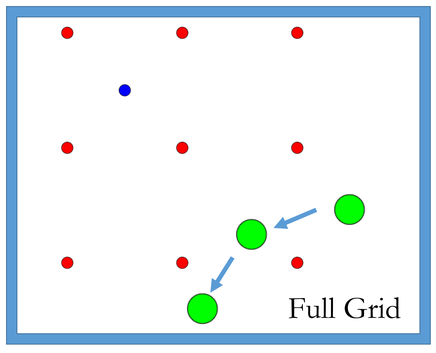
## Simulation Implementation

- Network Simulator 3 (NS-3)
- Mobility Scenes (Pictured Right)
- Variations of Scale, Area and Failure Rate
- Sender streams data to the mobile receiver through the mesh points

| Parameter | Value |
|---|---|
| Data Rate | 5 Mbps |
| Packet Size | 1448 Bytes |
| Frequency | 2.4 GHz |
| Radio Type | 802.11g |



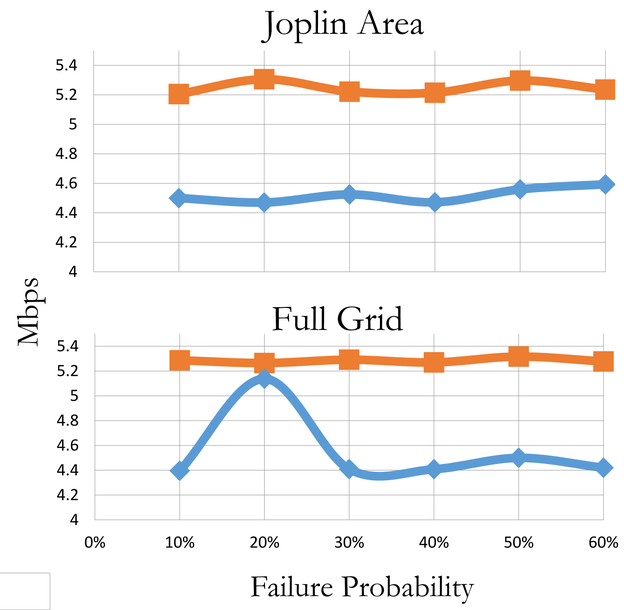



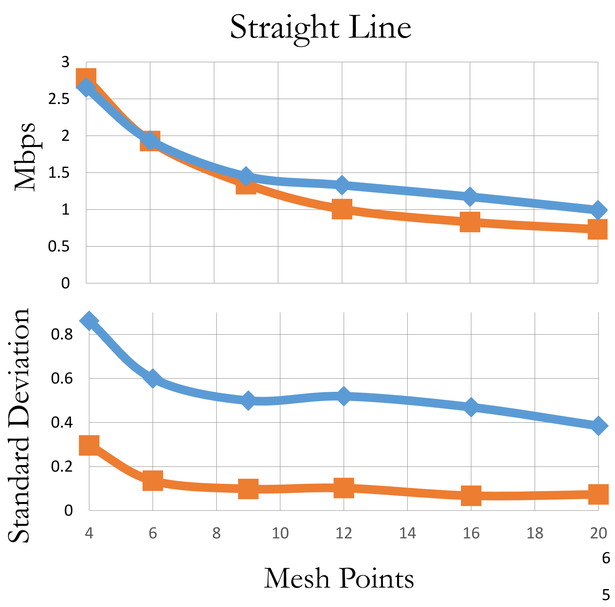

## Simulation Results

GPSR HWMP

### GPSR is Fault Tolerant!

- GPSR has **higher throughput** in two different mobility scenes
- GPSR responds more quickly to failed Mesh Points



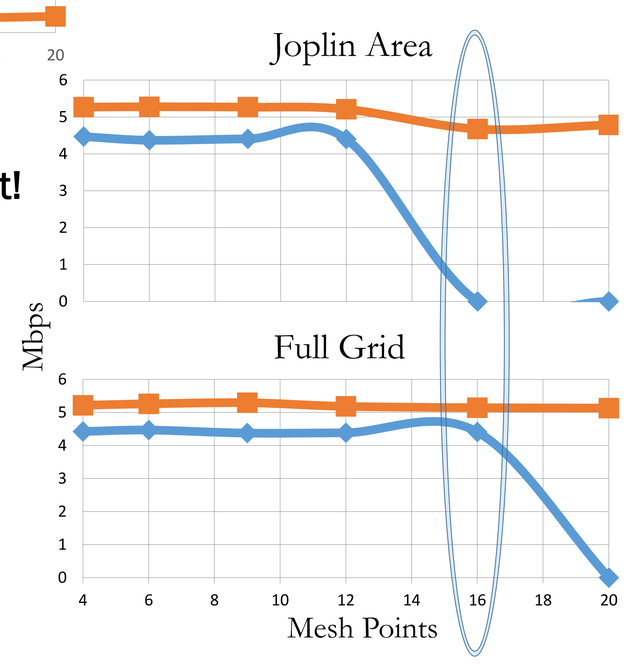




### GPSR has Higher Throughput!

- GPSR handles higher traffic in two common mobility scenes
- GPSR continues to perform at large scale
- HWMP breaks down after 16 Mesh Points

### GPSR has Stable Throughput!

- GPSR has more **Stable Throughput** than HWMP
- GPSR is more stable even when there is only one valid path




## Summary and Future Work

- In simulation, GPSR shows higher and more sustainable throughput compared to industry standard HWMP
- In the future, we would like to implement GPSR on physical hardware and verify our results in the field

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