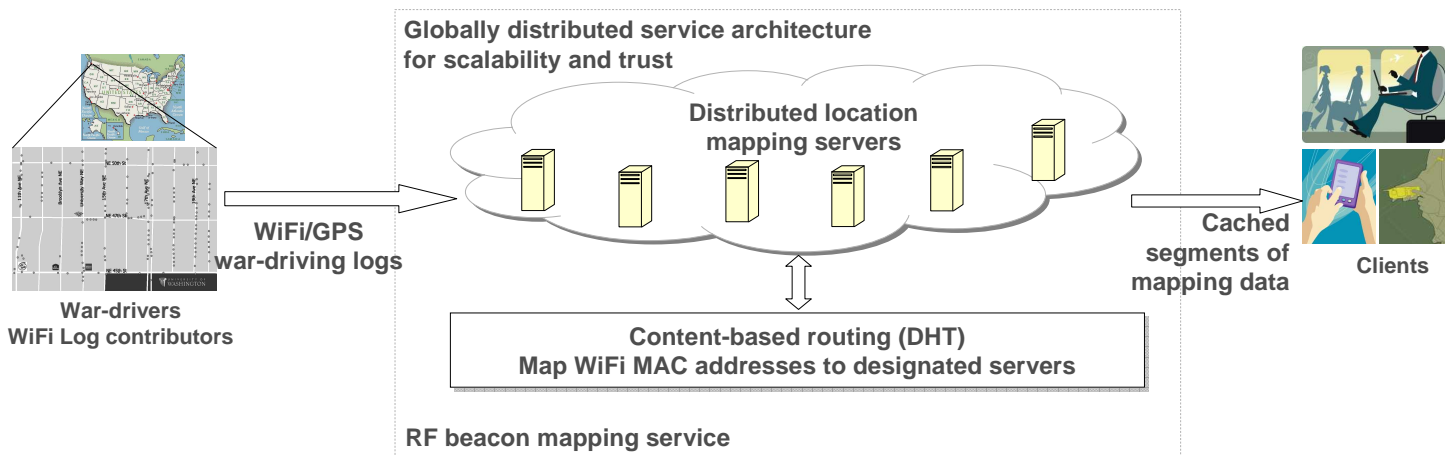


Motivation

- Nearly ubiquitous deployment of WiFi in metro areas
- WiFi access points periodically transmit beacons containing a unique identifier: their MAC address
- Mobile devices can listen for these RF beacons to position themselves
- **Our research focus:** Provide a toolkit for RF-beacon-based device positioning and a service for mapping RF beacons to geographical coordinates



The Architecture



Design

- “War drivers” contribute logs of readings of WiFi MAC addresses and (*latitude, longitude*) coordinates
- Mapping servers in the infrastructure maintain location estimates for individual access points using Bayesian/particle filter techniques
- Client devices position themselves entirely privately by:
 - passively listening for nearby access points
 - keeping cached copies of access point locations
 - applying Bayesian filters to their readings of nearby APs

Research Challenges

- Verifying accuracy of user-contributed logs
 - Use a reputation-based scheme to give preference to contributors of “good” data
- Managing the distributed infrastructure
 - Distribute computation load for different access points to different servers
 - Use content-based routing (DHT indexed by MAC address) to locate appropriate server for each access point
 - Use two-dimensional index data structures (prefix hash trees) to gather segments of location estimates for, say, all access points in Seattle