CarTel’s Personal Commute Portal
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Motivation
- Road traffic is a “grand challenge”
  - Congestion costs US $78B per year
  - Delays large and growing (4.2B hours per year in US)
  - Delay variability intensifies waste
- User-specific trip plans can reduce time and fuel significantly
  - Best routes
  - Time-shifting (best time to commute)
- Detailed trip logs provide info visibility

Trip Logs for Commute Analysis
- Personalized interface allows users to browse their own historical driving patterns including:
  - Driving time, distance, and estimated fuel consumption by time of day, day of week, and hour of day
  - Time-shift analysis: How commute time varies by time of day
  - “Competitive commuting” allowing users to compare their commute times, fuel use, carbon footprint, etc.
  - Automatic notifications when a driver enters/leaves region

Challenges
- Collecting traffic delay data
- Predictive delay modeling
- Computing good traffic-aware routes

Data Collection
- Embedded software on cars logs time, GPS, and WiFi scan information
  - Individualized data enables user-specific routes
  - Aggregation to infer traffic conditions
  - Taxis/limos act as additional probes
- Data transmitted via wireless, including QuickWifi (vehicular WiFi)

Predictive Delay Modeling
- Detailed time-of-day probability distributions of delays on segments
  - Historic model with real-time updates

Good Traffic-Aware Routes
- Delays are inherently variable: users want routes that are fast *and* reliable
  - Min expected time != most reliable
- Algorithms optimize multiple objectives
  - Min expected time
  - Max probability of making a specified deadline
  - Other cost functions

[ Delay statistics map built using trip logs ]

[ Best routes at 4pm on a weekday from MIT (O) to Alewife Station (D) ]