

Mobile P2P Databases

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Outline

- Introduction
- Advantages and Disadvantages
- Historical Background
- Scientific Fundamentals
- Key Applications
- Future Directions

Introduction



report 1
report 8



report 1



Local database

report 1
report 2
report 3



report 1
report 4
report 5

Introduction (cont...)

- Mobile P2P Databases: Database that is stored in the peers of a mobile P2P network.
- Communication is via short range wireless protocols.
- Each peer has a local DB.
- Each local DB has collection of reports or data items.
- Peers communicate reports and queries.

Introduction (cont...)

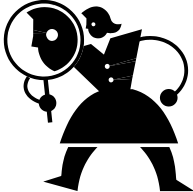
Challenges:

- Locating peers and knowing data they store.
- Bandwidth and power constraints.
- Storing reports and dissemination poses memory constraints.



Careful and efficient utilization of scarce peer resources (specifically bandwidth, power, and memory) are an important challenge for mobile P2P databases

Selling Points

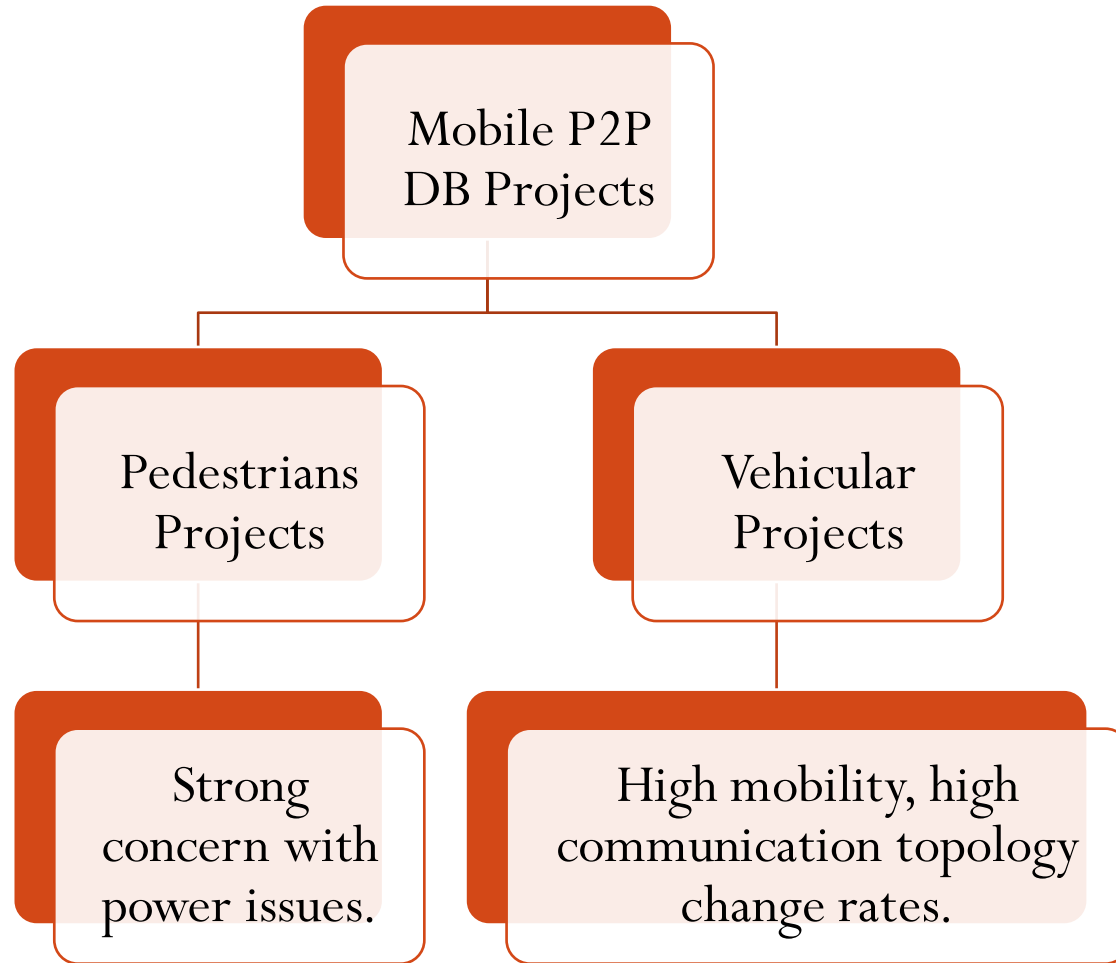
- Short-range wireless networks utilize the unlicensed spectrum. Communication is free. 
- Comes handy in emergency, disaster and other situations where infrastructure is destroyed.
- Are harder to mine for private information. 
- Failure of the central site will not render the system unavailable. Reliable!!
- Can withstand high update rates.

Disadvantage

Mobile P2P DB do not provide answer guarantees.



Historical Background



Historical Background (cont..)

Pedestrians Projects:

- **7DS – Columbia University**
 - Accessing web pages in environments where only some peers have access to the fixed infrastructure.
- **iClouds – Darmstadt University**
 - Provision of incentives to brokers (intermediaries) to participate in the mobile P2P database.
- **MoGATU – University of Maryland, BC**
 - processing of complex data management operations, such as joins, in a collaborative fashion.

Historical Background (cont..)

Pedestrians Projects:

- **PeopleNet – National University of Singapore**
 - Proposes the concept of information Bazaars, each of which specializes in a particular type of information; reports and queries are propagated to the appropriate bazaar by the fixed infrastructure.
- **MoB – University of Wisconsin and Cambridge University**
 - Incentives and the sharing among peers of virtual information resources such as bandwidth.
- **Mobi-Dik – University of Illinois at Chicago**
 - Information representing physical resources, and proposes stateless algorithms for query processing, with particular concerns for power, bandwidth, and memory constraints.

Historical Background (cont..)

Vehicular Projects:

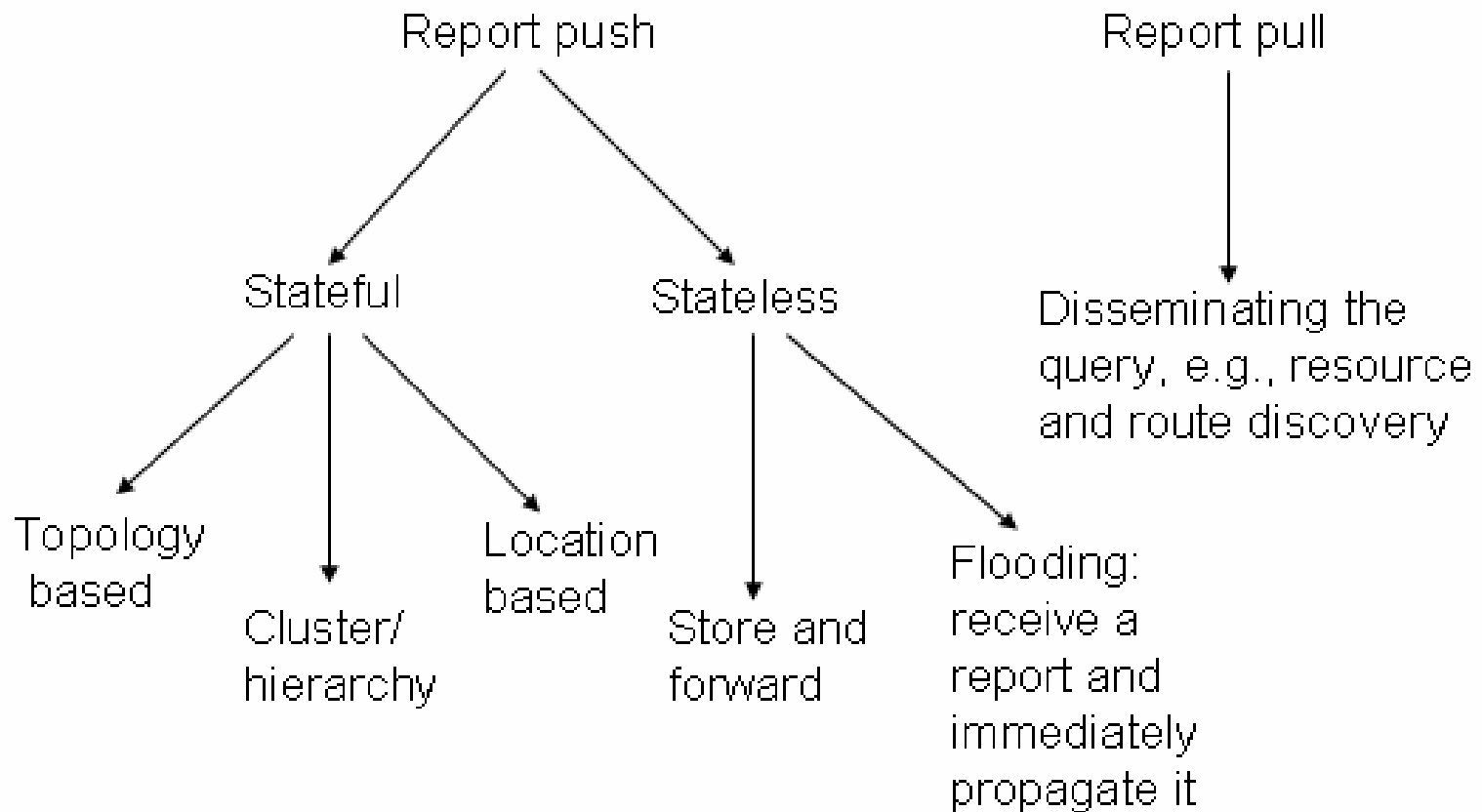
- **CarTALK 2000 – A European project**
 - Develops a co-operative driver assistance system based upon inter-vehicle communication and mobile P2P databases via self-organizing vehicular adhoc networks.
- **FleetNet – Internet on the Road Project**
 - Develops a wireless multi-hop ad hoc network for intervehicle communication to improve the driver's and passenger's safety and comfort.
- **VII – Vehicle Infrastructure Integration, a US DOT project**
 - Deployment of advanced vehicle-to-vehicle (using the mobile P2P paradigm) and vehicle-to-infrastructure communications that could keep vehicles from leaving the road and enhance their safe movement through intersections.

Historical Background (cont..)

Vehicular Projects:

- **Grassroots – Rutgers University**
 - Develops an environment in which each vehicle contributes a small piece of traffic information to the network based on the P2P paradigm, and each vehicle aggregates pieces of the information into a useful picture of the local traffic information.

Scientific Fundamentals



Key Applications

- Social Networks
- Emergency Response, Homeland Security, and the Military
- Airport Applications
- Mobile E-commerce
- Transportation Safety and Efficiency

Future Directions

- Prolong network lifetime
- Sparse networks
- Rapid topology changes
- Emergent global behavior from local knowledge
- (Self-) Localization techniques

Future Directions

- Integration of mobile P2P databases and infrastructure
- Specialized queries
- Mathematical modeling of data dissemination