

# Mobile Commerce Applications

## [Varshney-2003]

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# Mobile Commerce Applications

## Abstract

The paper ‘Location Management for Mobile Commerce Applications in Wireless Internet Environment’, discusses the challenges presented by mobile applications in a wireless environment.

Futuristic mobile applications demand the underlying wireless infrastructure to provide them with certain requirements such as **location accuracy, response time, multicast support, transaction frequency and duration, and dependability.**

The current architecture does not support these diverse requirements. This paper proposes a location management architecture and also discusses its implementation with respect to the future mobile commerce applications in a wireless environment.

# Mobile Commerce Applications

## Outline

- Introduction
- M-Commerce Applications and Requirements
- Location Management Architecture
- Implementation of the Architecture
- Research Issues in Location Management
- Conclusions
- References

# Mobile Commerce Applications

## Introduction

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# Mobile Commerce Applications

## Introduction

- M commerce applications need wireless internet
- Applications include
  - Mobile financial services
  - Mobile advertising
  - Location aware services
- Applications have requirements such as
  - Location precision, response time, scalability requirements
- Architecture designed to support them

# Mobile Commerce Applications

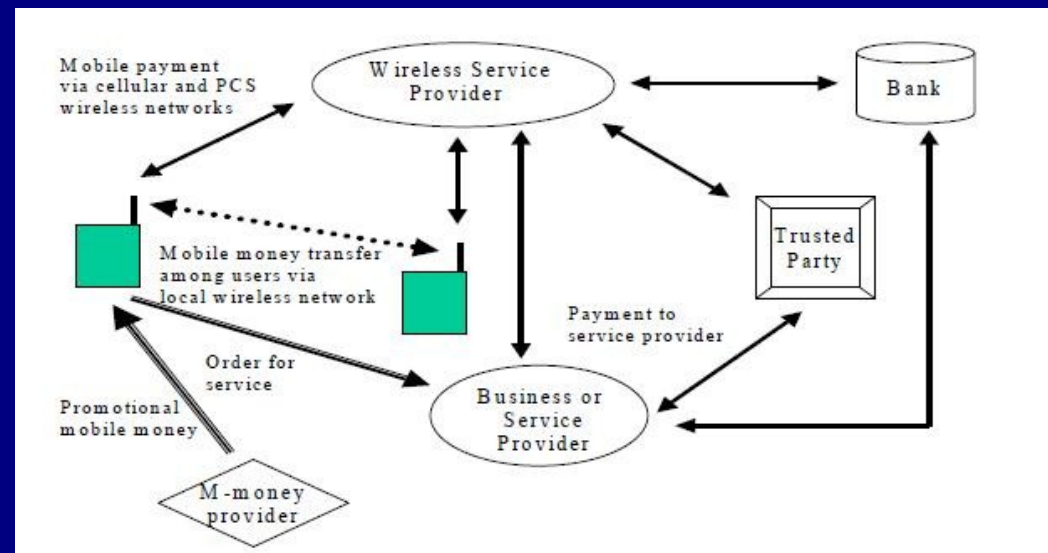
## M-Commerce Applications and Requirements

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# Mobile Commerce Applications and Requirements

## Mobile Financial Applications

- A basic scenario of mobile financial services is shown in the figure
- They require
  - Support for mobile payments
  - Secure transactions

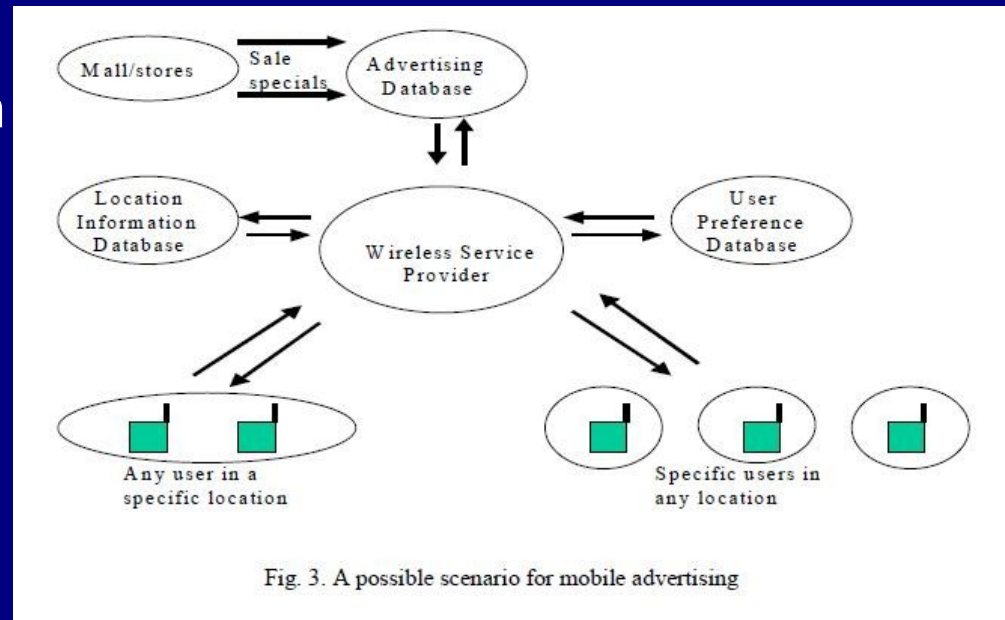


[V2003] Figure 2

# Mobile Commerce Applications and Requirements

## Mobile Advertising

- Targeted campaign
  - User in specific location
  - Specific user anywhere
- Major issue
  - Privacy of user info
- One solution
  - Opt-in approach



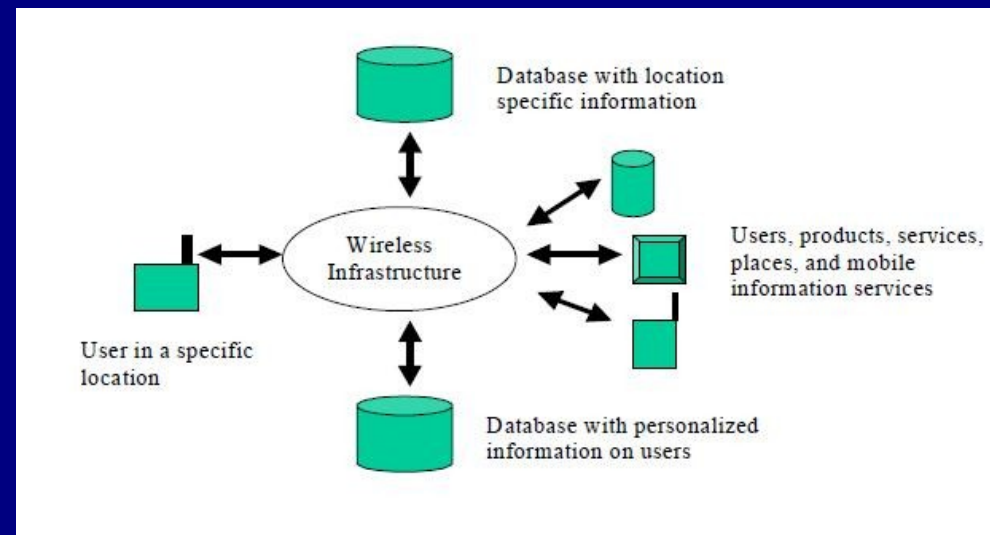
[V2003] Figure 3



# Mobile Commerce Applications and Requirements

## Location Based Services

- Two kinds of services
  - Push
  - Pull
- Requirements
  - Location tracking for mobile devices
  - Database for fixed devices



[V2003] Figure 4

# M-Commerce Applications and Requirements

## Location Management Requirements

Table I. M-commerce Applications and Location Requirements

	Mobile Financial Applications	Mobile and Locational Advertising	Personalized location-based services
Location Precision (upper limit)	Meters (sub-cell)	Hundreds of meters (cell)	Meters (sub-cell)
Response time and frequency per transaction	Seconds/few times in a transaction	Minutes/once in a transaction	Seconds/several times in a transaction
Required Wireless Network Coverage	Citywide	Small area to citywide	Citywide to nationwide
Number of devices and entities involved	Few	Several	Several
Information transfer mode	Secured unicast	Asymmetric non-real-time multicast	Asymmetric real-time unicast or multicast
Wireless dependability requirement	Very high	Can tolerate lower dependability	high
Transaction frequency and duration	Once a day for few seconds	Few times a day for few seconds	Several times a day for few minutes

[V2003] Table 1

# Mobile Commerce Applications

## Location Management Architecture

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# Mobile Commerce Applications

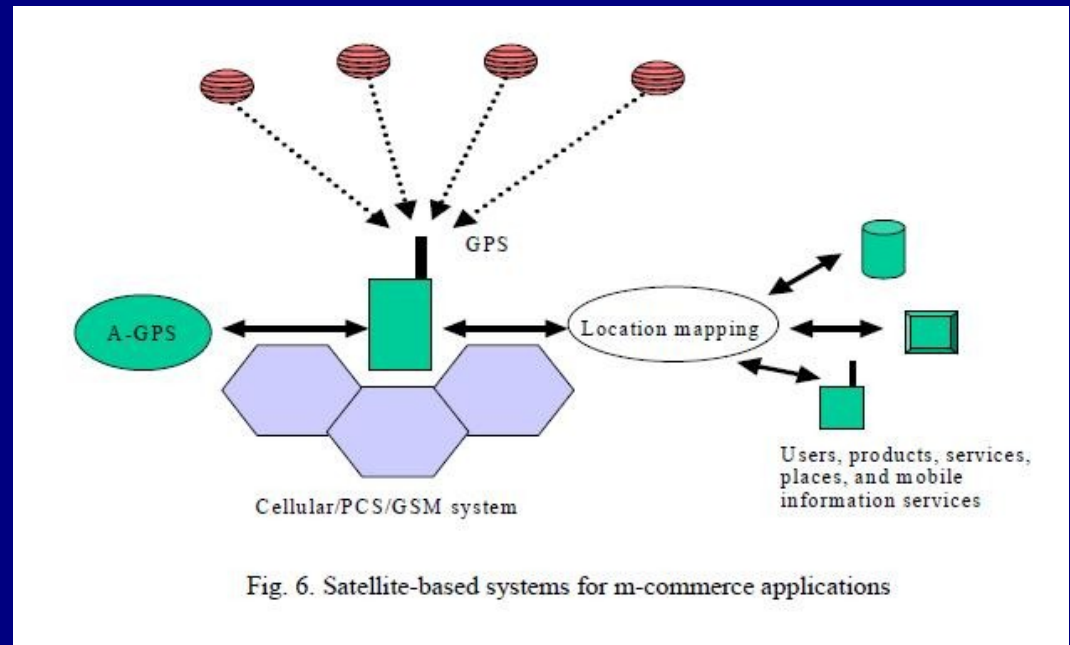
## Location Management Architecture

- Location management requirements satisfied by
  - Satellite networks
  - PCS and 3G networks
  - Wireless LANs and PANs
- These requirements include
  - Location Precision
  - Wireless coverage
  - Multicast
  - Wireless dependability

# Location Management Architecture

## Satellite Based Networks

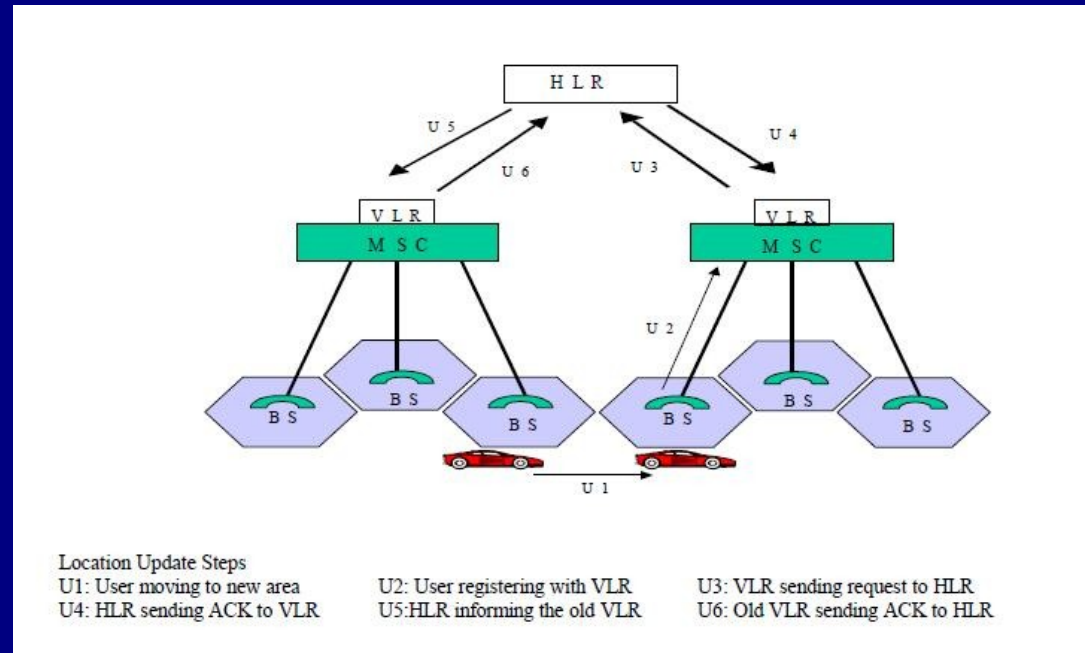
- Wide area location tracking
- Precision range is few to some hundred meters



# Location Management Architecture

## Cellular Wireless Networks

- Location accuracy is size of location area
- Less cells, reduced cell area give more accuracy
- Better precision by E911
  - A-GPS, D-GPS
  - TDOA, AOA, LPM



# Location Management Architecture

## WLANs, PANs and RFID

- WLANs and PANs
  - Higher precision in indoor applications needed
  - Closer base stations enable better tracking
  - Minimum accuracy determines cell radius
- Radio Frequency Identification (RFID)
  - Multi dimensional RFID grid to cover large area
  - Tracks person with a tag entering that area

# Mobile Commerce Applications

## Implementation of Architecture

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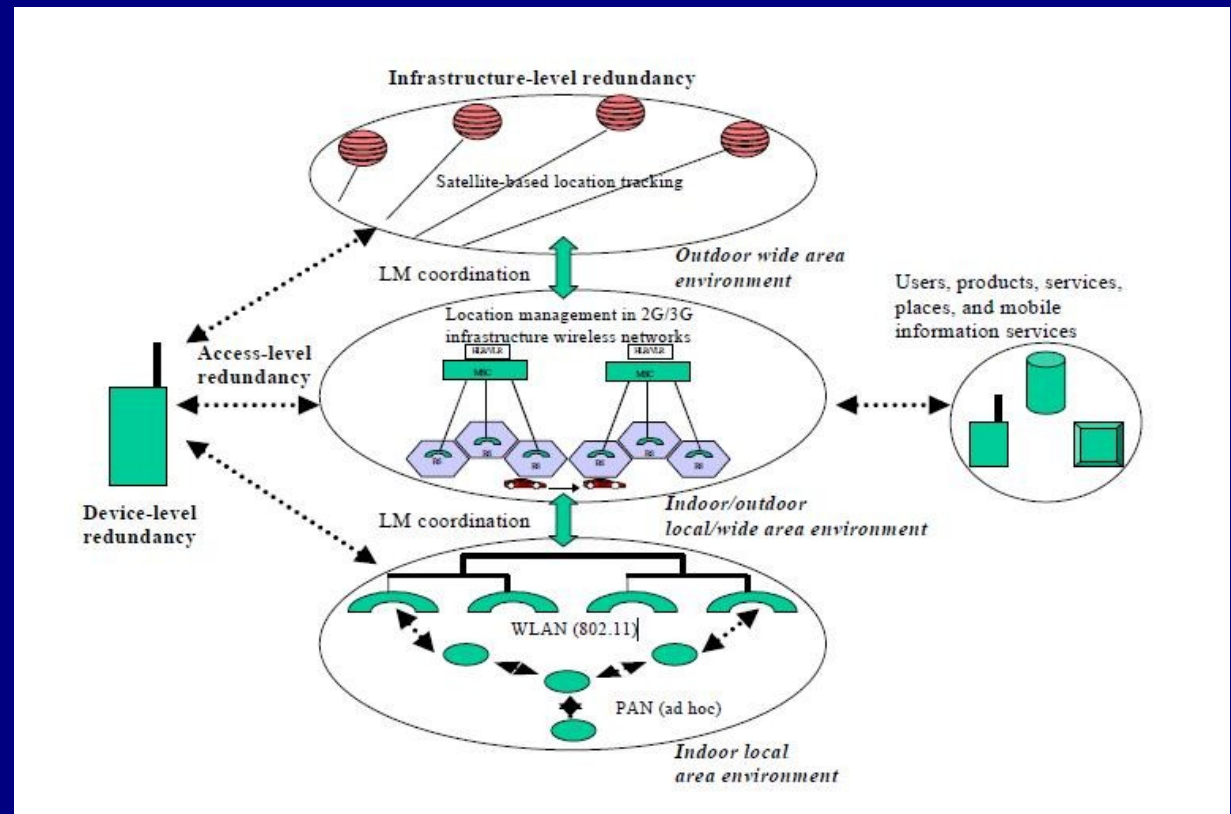
# Implementation of Architecture

## Future M-Commerce Applications

- Wireless Re-engineering, Data Center, Mobile Office
  - Location accuracy, high wireless dependability
  - Wide coverage, unicast operation
- Mobile Auction and Wireless Trading
  - Location accuracy, wireless dependability
  - Real time wireless multicast over a large area
  - Longer transactions
- Mobile Entertainment Services and Games, Distance Education
  - Location accuracy, wireless dependability low
  - Real time wireless multicast
  - Asymmetric flow of information

# Implementation of Architecture Supporting the Requirements

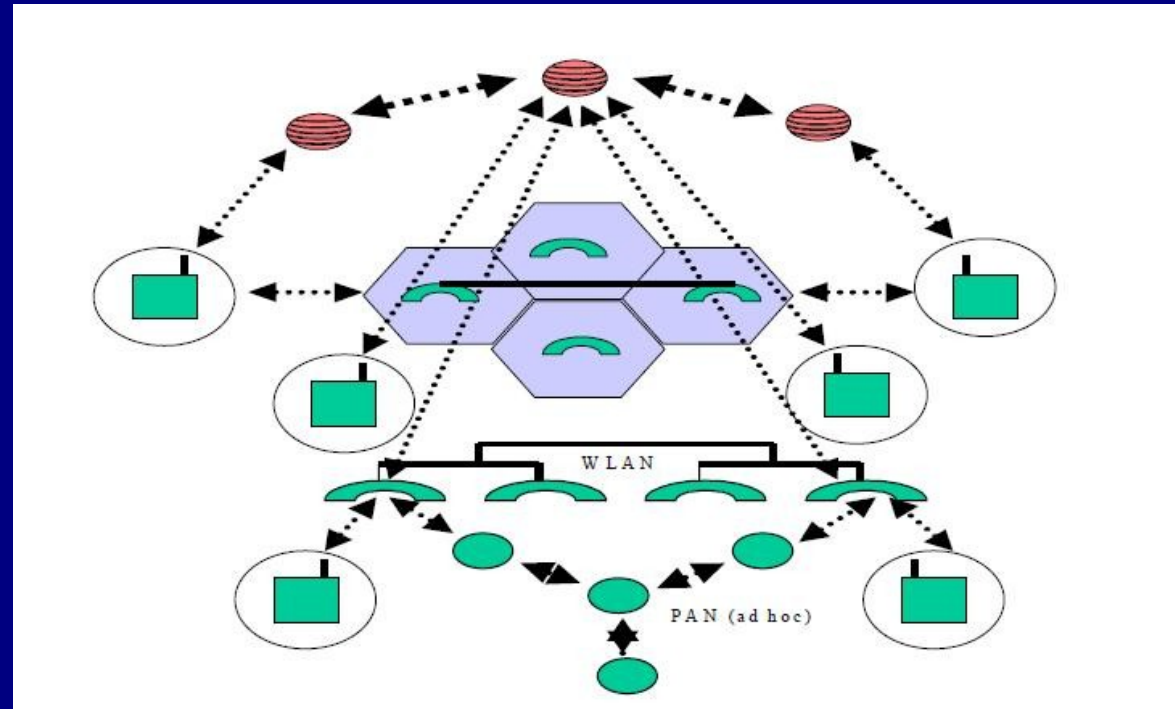
- Location Accuracy can be supported using several networks as shown



[V2003] Figure 5

# Implementation of Architecture Supporting the Requirements

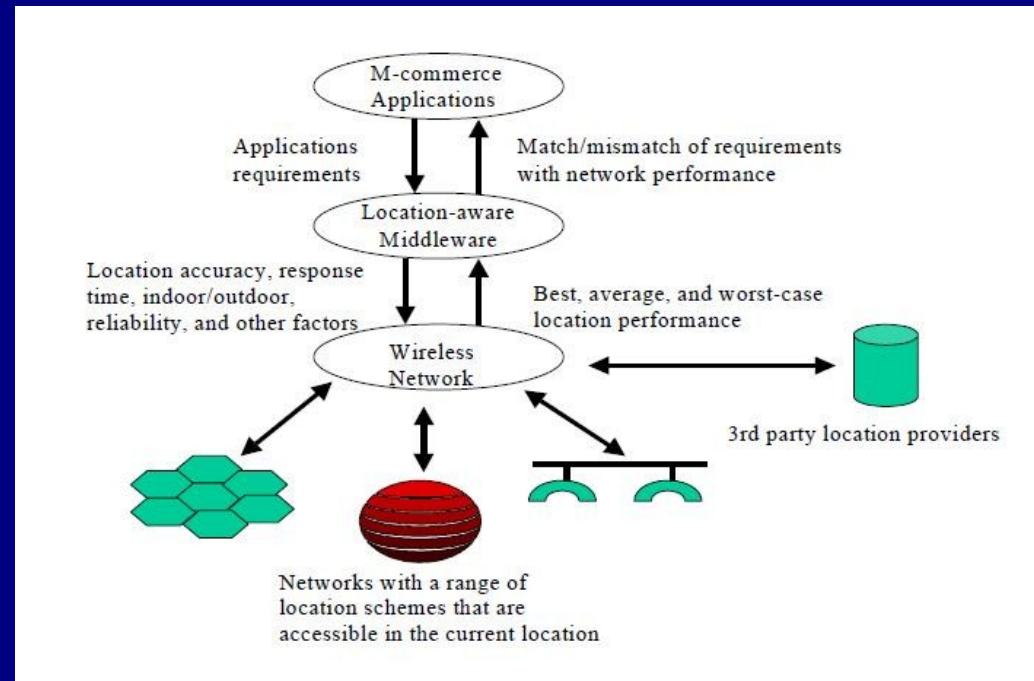
- This architecture also supports multicast



[V2003] Figure 11

# Implementation of Architecture Supporting the Requirements

- Multiple networks involved
- Middleware negotiates requirements from multiple networks



[V2003] Figure 12

# Mobile Commerce Applications

## Research Issues in Location Management

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- **Research Issues in Location Management**
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# Research Issues in Location Management

## Future Directions

- Schemes can be based on
  - Requirements of applications
  - Underlying wireless networks
- Application overhead calculated using simulations
  - Parameters can be location precision, response time
  - Transaction frequency and duration, update rate
  - Coverage area and number of entities involved
- Scalability determined using data present
  - Max no. of requests, desired response time etc.
- Interoperability-Minimum Common Functionalities

# Mobile Commerce Applications

## Conclusions

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# Mobile Commerce Applications

## Conclusions

- M Commerce a main driver for wireless Internet
- Unique requirements need a different architecture
- New location management schemes needed
- New architecture supports most requirements
- Future m commerce applications discussed
- Implementation of architecture suggested



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## References

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