Università degli Studi di Firenze

Dipartimento di **E**lettronica e **T**elecomunicazioni

University of Oulu

Media**T**eam **O**ulu, **E**lectrical **E**ngineer **D**epartment

Agent Based Adaptive Management of Non-Homogeneous Connectivity Resources

Authors:

Flavio Esposito, Simo Hosio, Junzhao Sun,

Francesco Chiti, Romano Fantacci

Summary

- ➤ Pervasive Environment
- ➤ The Mobility Management issue in Heterogeneous Network
- ➤ Overall Architecture
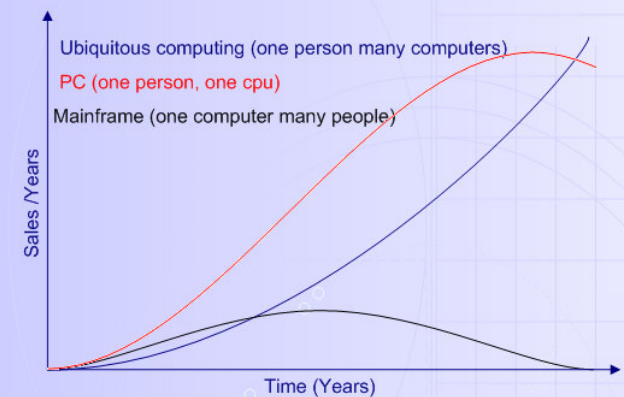- ➤ Design e Implementation
- ➤ Sperimental Results
- ➤ Conclusion

Pervasive Environment

Ubiquitous Computing

- ◆ Computer everywhere
- ◆ Invisibility
- ◆ Context-aware

Main Threads in Ubiquitous Computing

Ubiquitous computing (one person many computers)
PC (one person, one cpu)
Mainframe (one computer many people)

Sales /Years

Time (Years)

Your phone is beeping.

Look, it remembers!

VIRTUAL SENSORS

Place:
Home
Status:
Free time
Tasks:
Bowling in 30 min

INSTANT MESSAGING
AVAILABLE TO SARAH:
"AT HOME"

PHYSICAL SENSORS

Pervasive Environment
(Heterogeneous Networks)

✓ **Need**

Network side

QoS (User side)

Mobility Management

Location

Positioning

Routing

Handoff

Horizontal

Vertical

Problems and Expected Advantages

Vertical HO Management between GPRS-Bluetooth

Problems

- ✓ Handoff Latency
- ✓ Application Invisibility

Advantages

- ✓ Increase of bandwidth /m^3
- ✓ Differential Traffic Classes (voice and data)
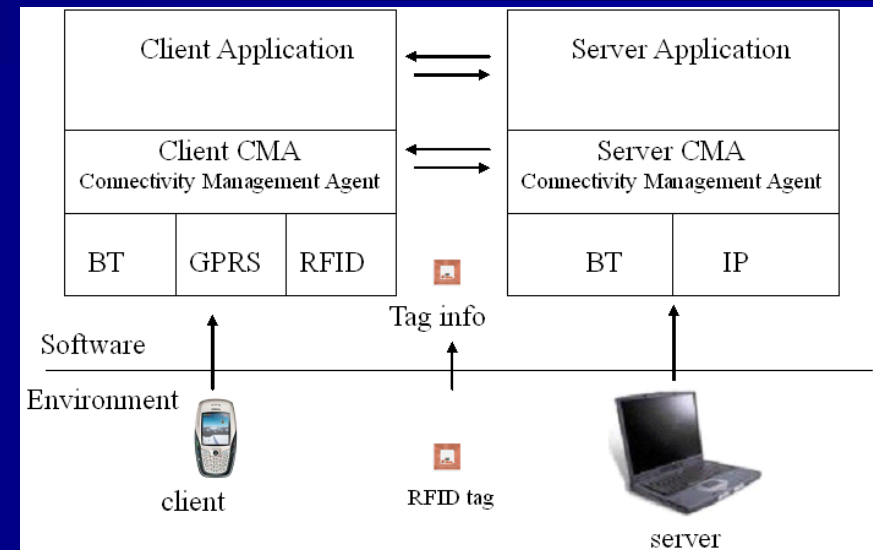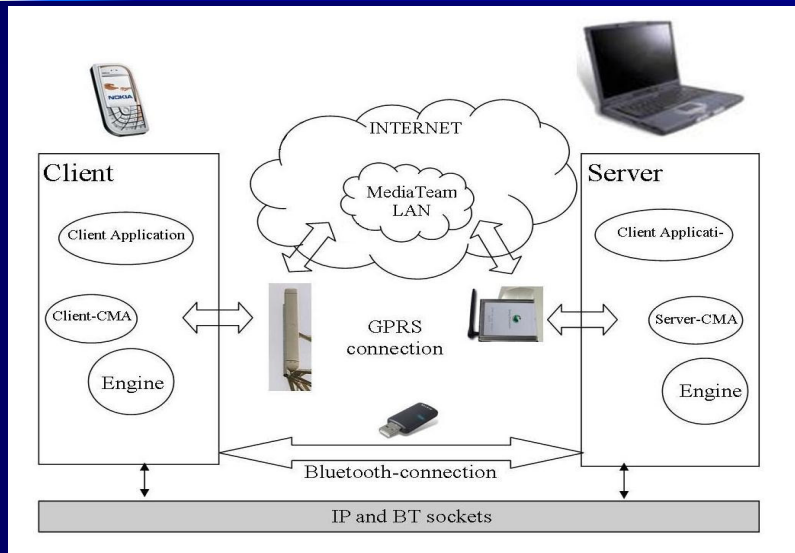
NEW
MIDDLEWARE
CAPNET Based

CAPNET Project

CAPNET: Context Aware Pervasive NETworks

Context Aware Management in Pervasive Network : Hardware and software development for AmI services (Ubicomp)

University of Maryland

University of Oulu

University of Linköping

Overall Architecture

Overall Architecture
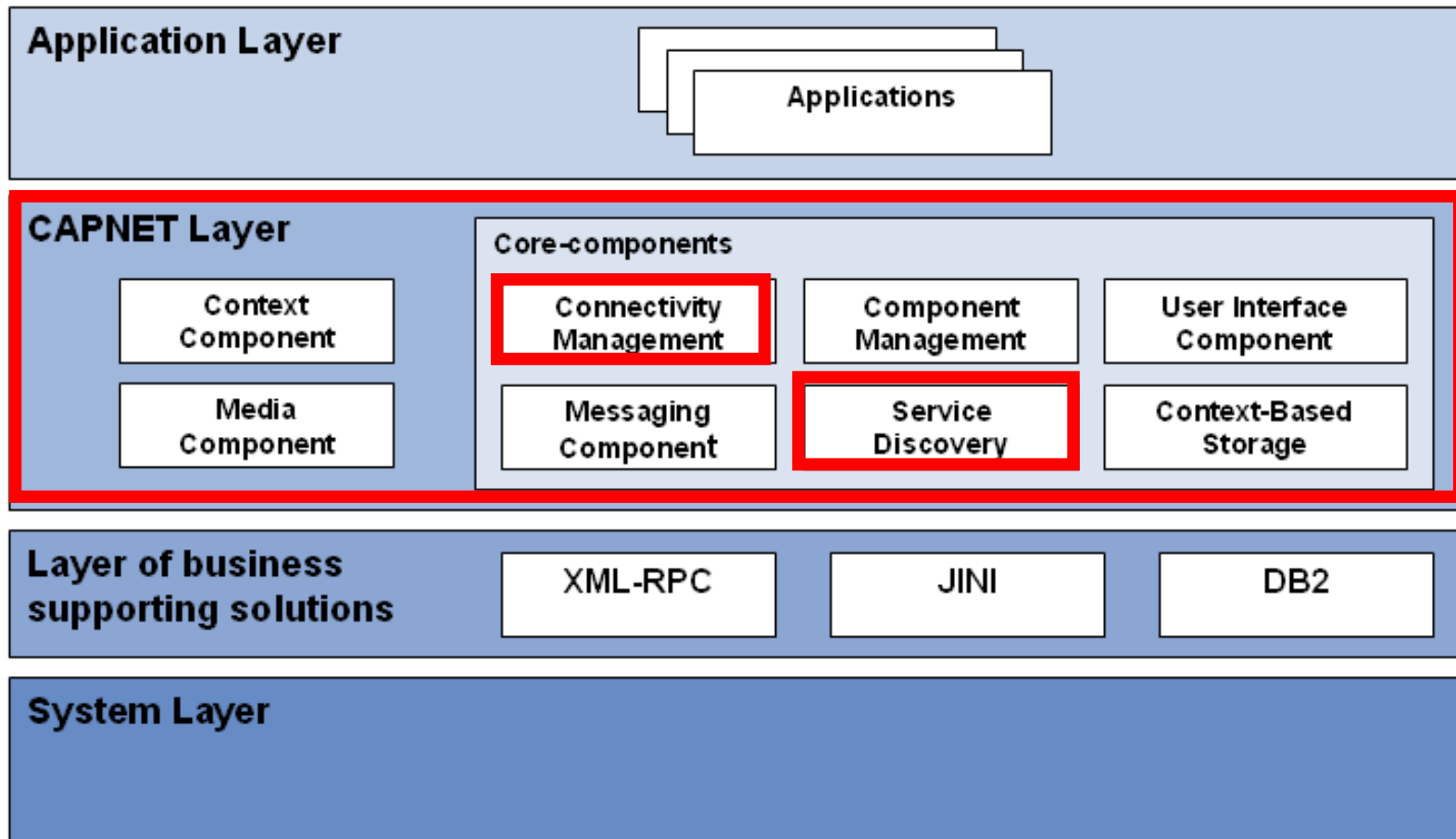
Overall Architecture

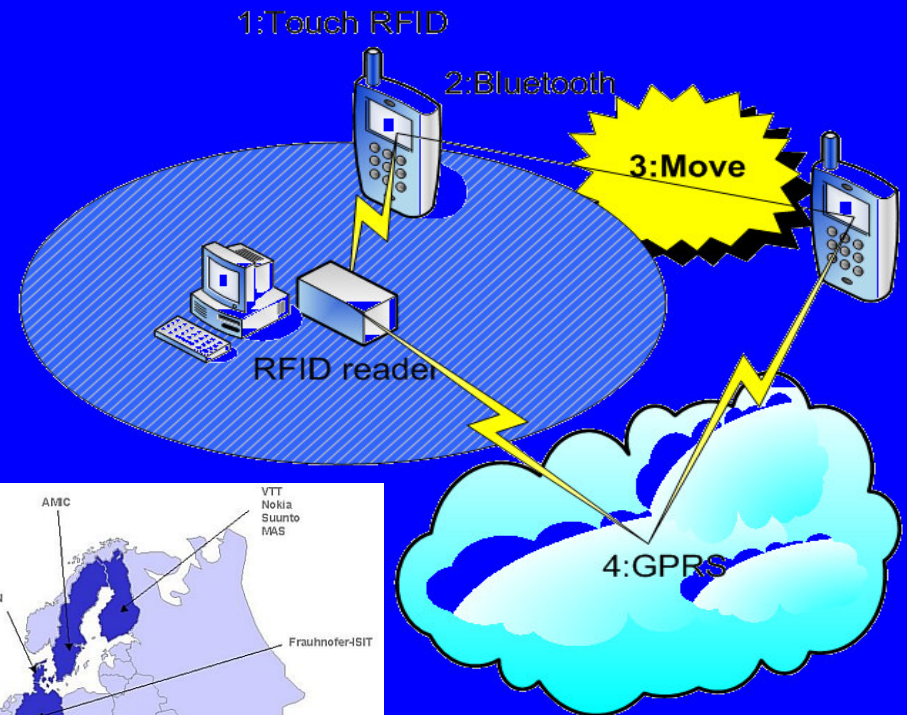Client SIDE: Symbian Series 60   Server SIDE Java
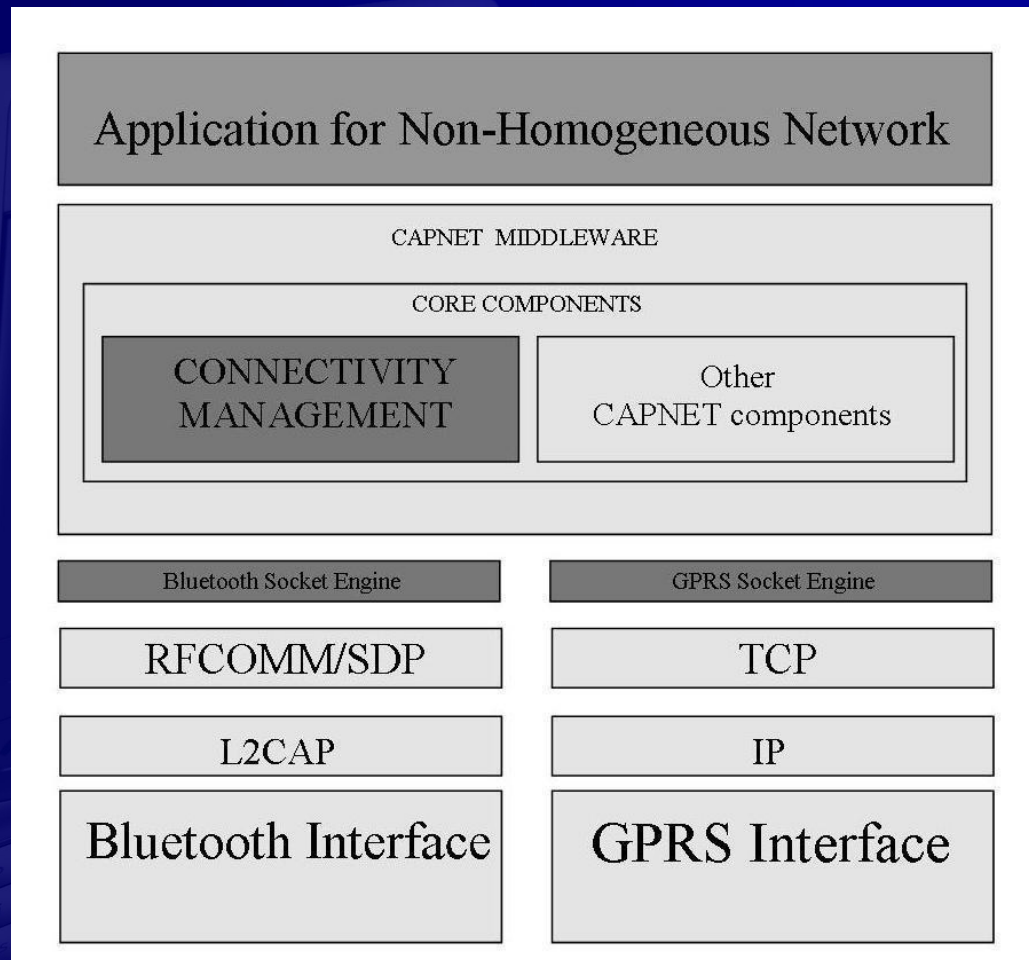
Design and Implementation

Scenario

1: RFID

2: *Channel Creation* (2 connections)

3: User Mobility (no BT anymore)

4: *Switch* on GPRS connection

Project MIMOSA

(prototype mobile phone)

Microsystems platform for MObile Services and Applications
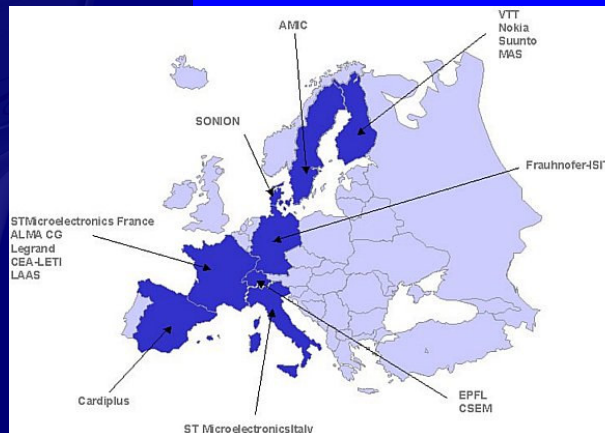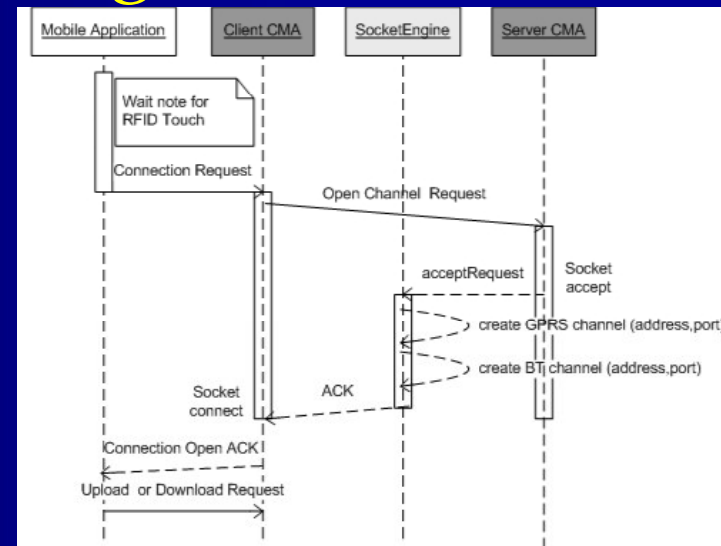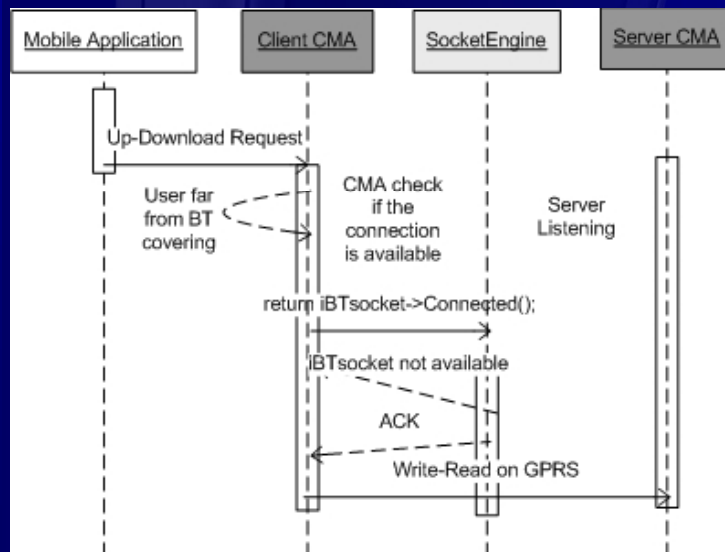
Design and Implementation

Class Diagram
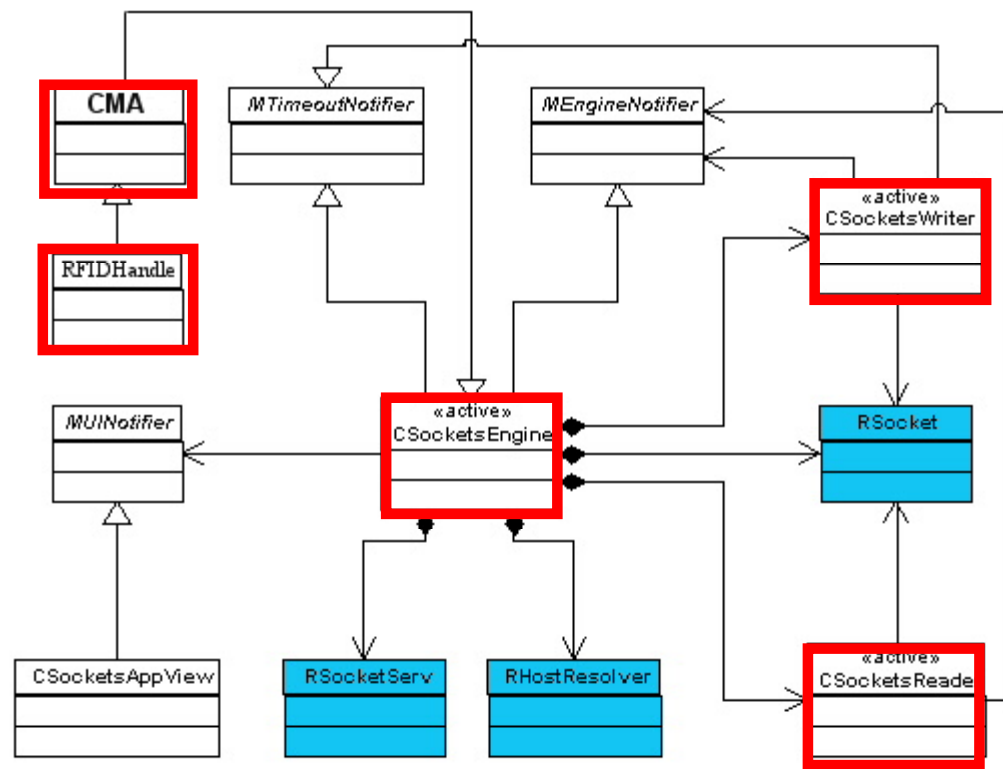
Design and Implementation

Dynamic Diagram

❖ Channel Creation

❖ Switch

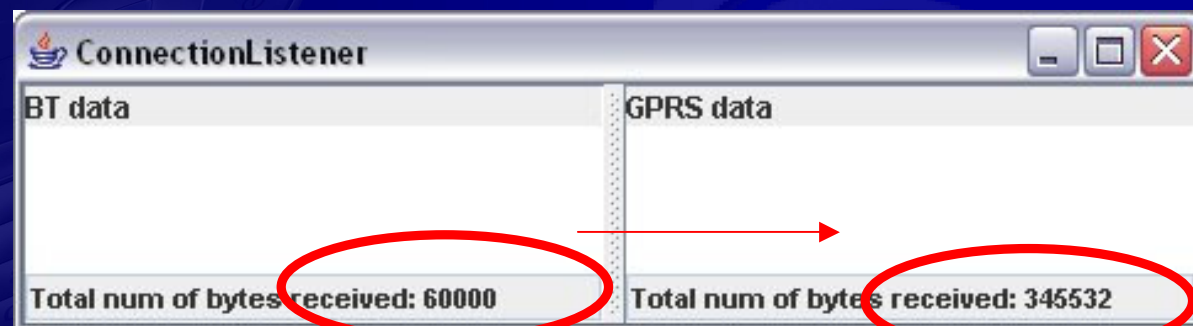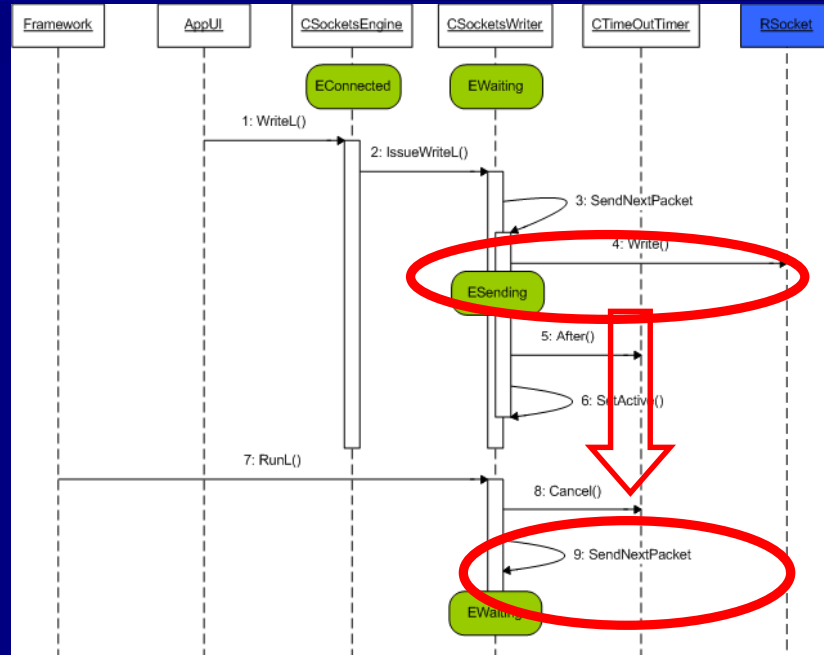# Design and Implementation
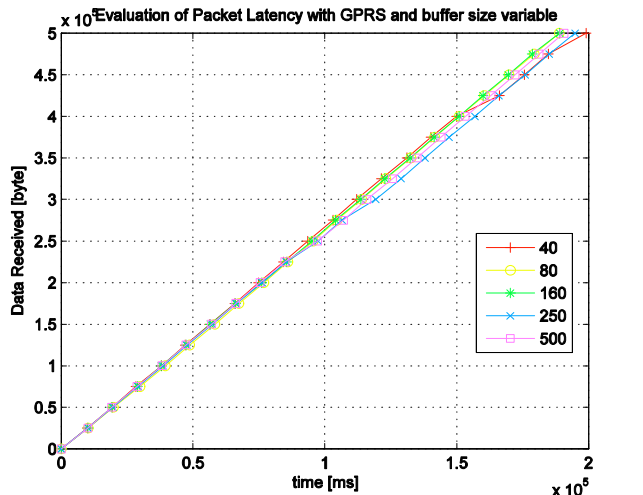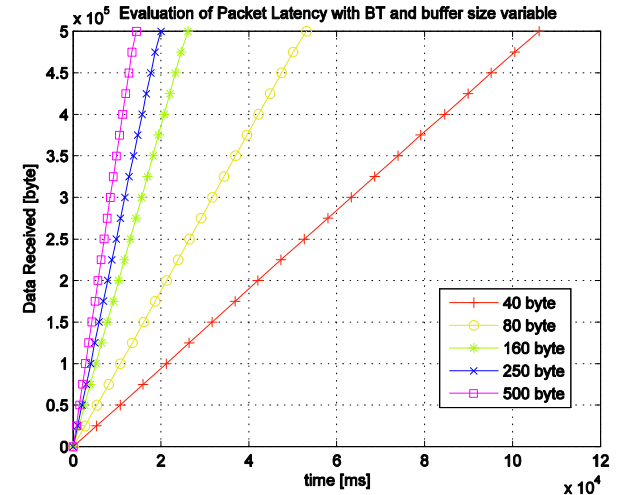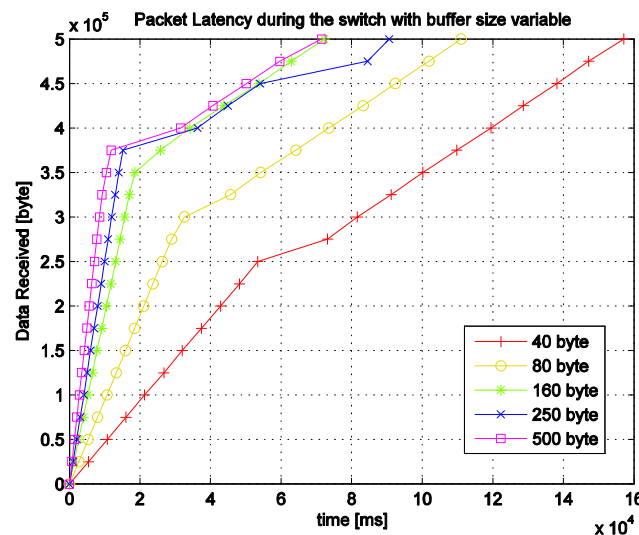
❖ Block System

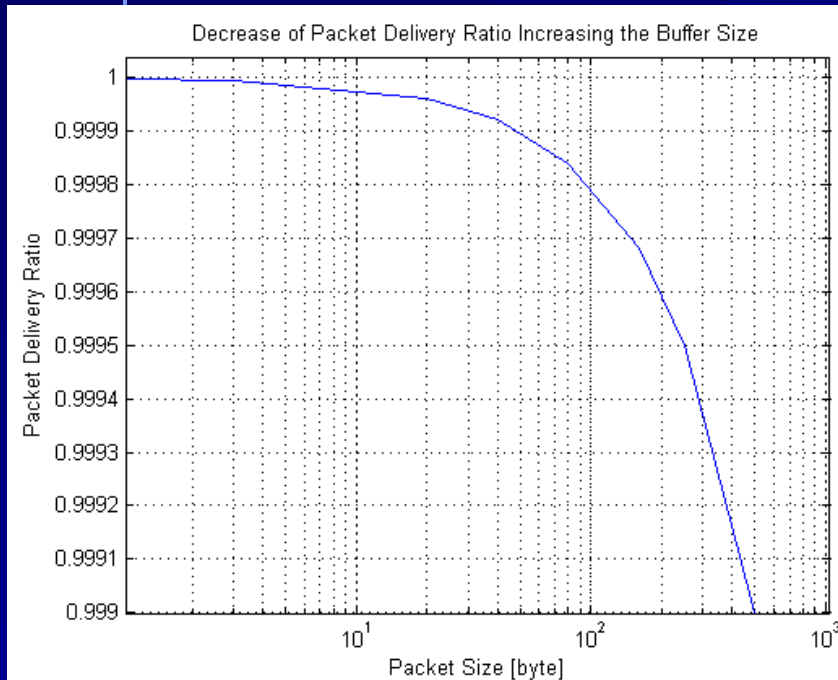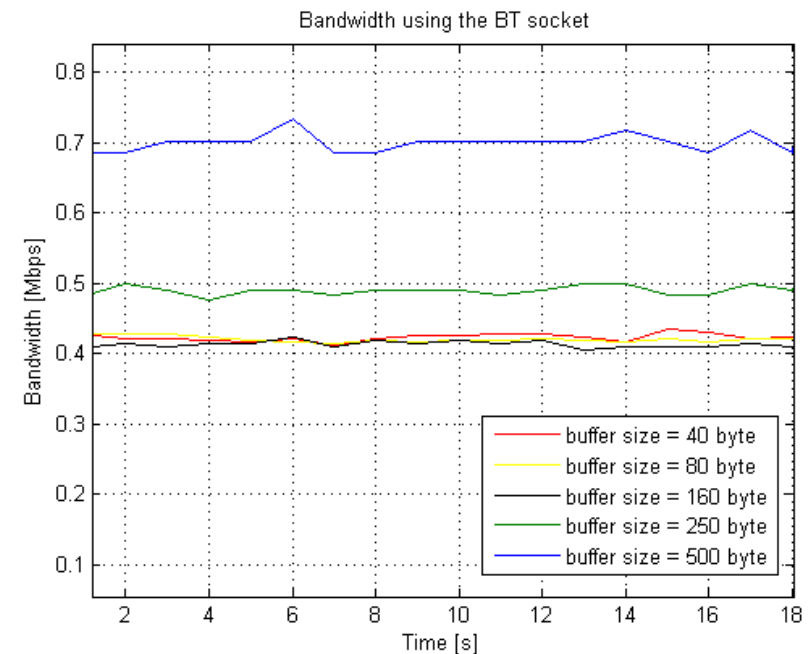# Sperimental Results Transmission Latency

Without Handoff

With Handoff

Sperimental Results PDR and Bandwidth
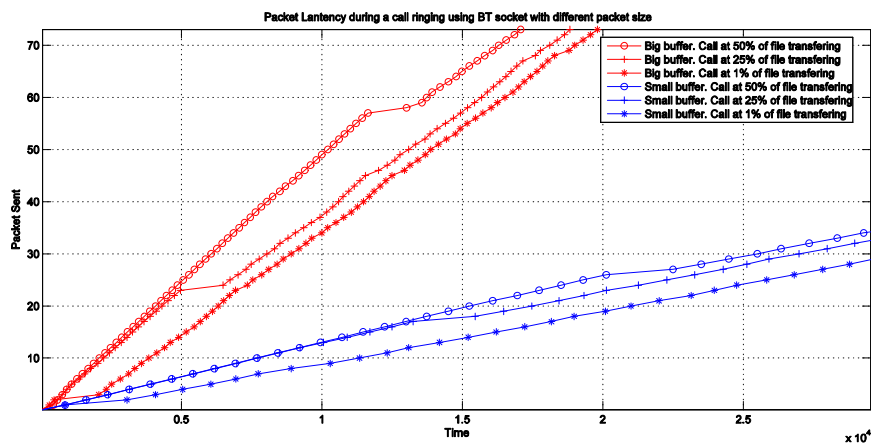

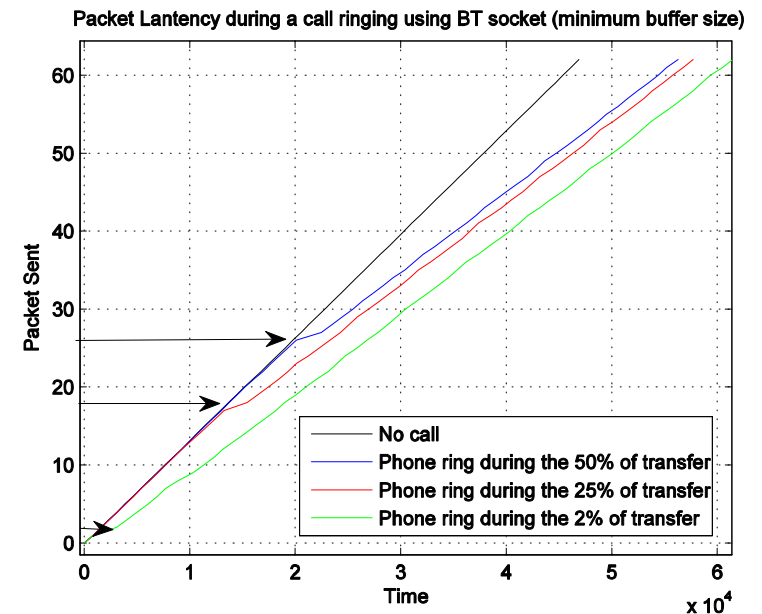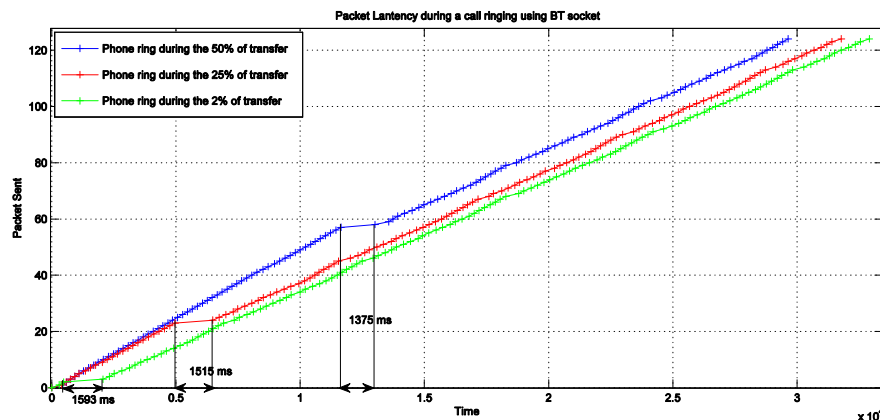Packet delivery ratio variando la dimensione del buffer

Banda variando la dimensione del buffer

Sperimental Results Traffic Classes

Data and Voice Traffic Classes

CONCLUSIONS

❖ **Heterogeneous Network**

♦ New Middleware: Mobility Management between GPRS and Bluetooth for Mobile Phone with RFID

♦ Different Traffic Classes Management: Voice and Data

❖ **Future Developments**

♦ Connectivity Management Engine who enables others technologies CO or Connection-less

♦ Hard Handoff Application Development

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