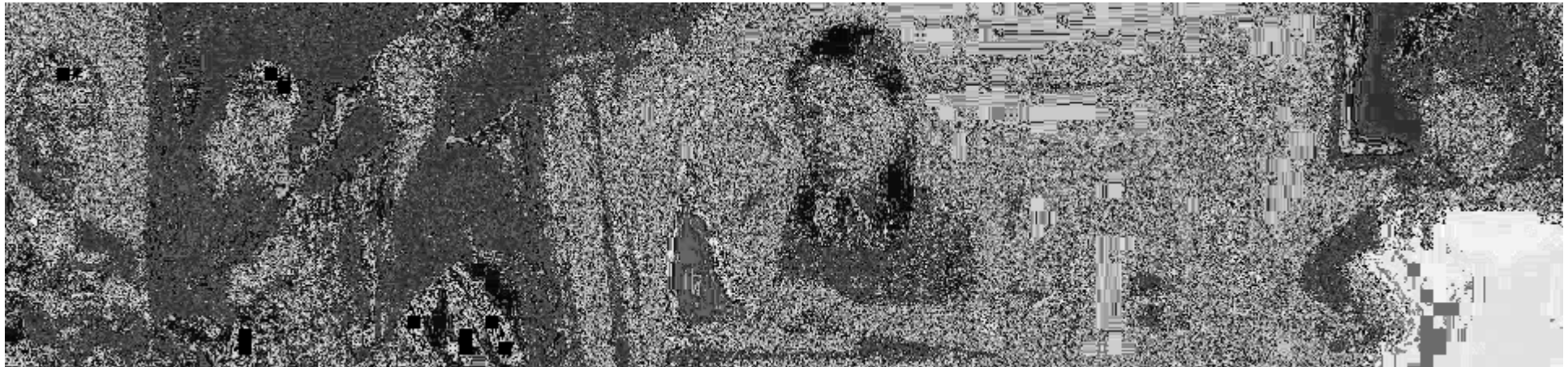


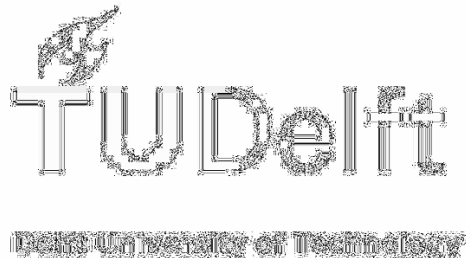
Multiple Wireless Protocol Advertising System



Technological Improvement for Devices with Multiple Access Interfaces

Skief Houben

1-9-2006



Lucent Technologies
Bell Labs Innovations



Contents



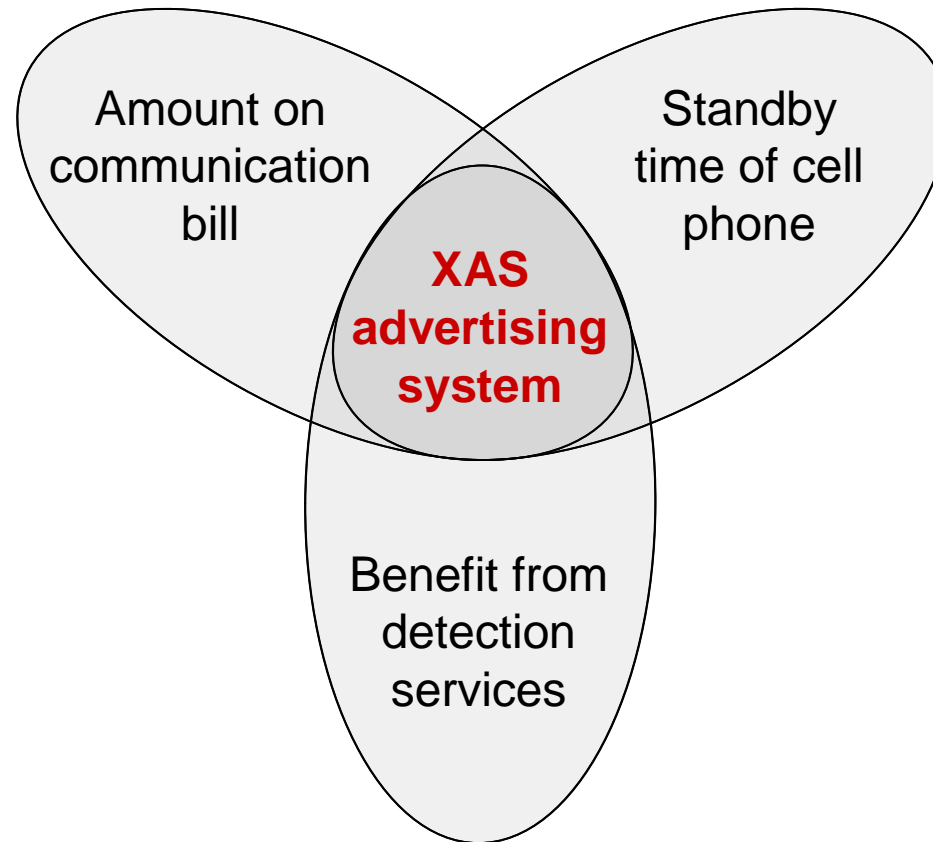
Three challenges

XAS advertising system

Results

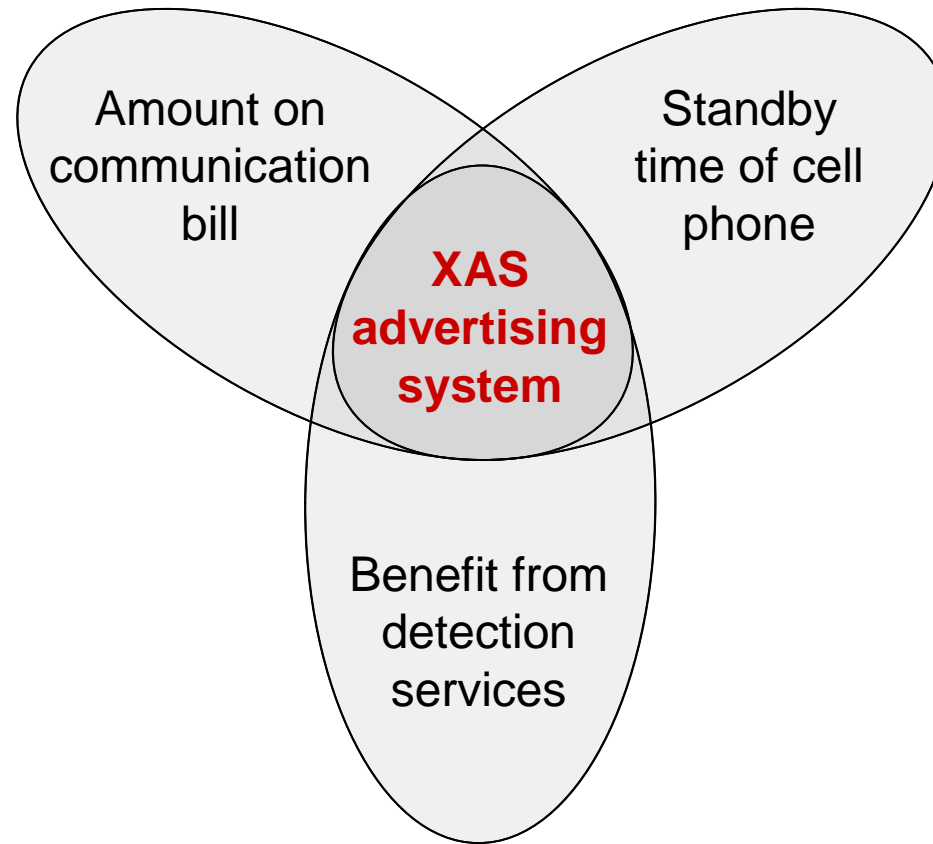
Conclusions

Introduction



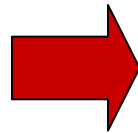


Introduction



Contents

Introduction



Three challenges

XAS advertising system

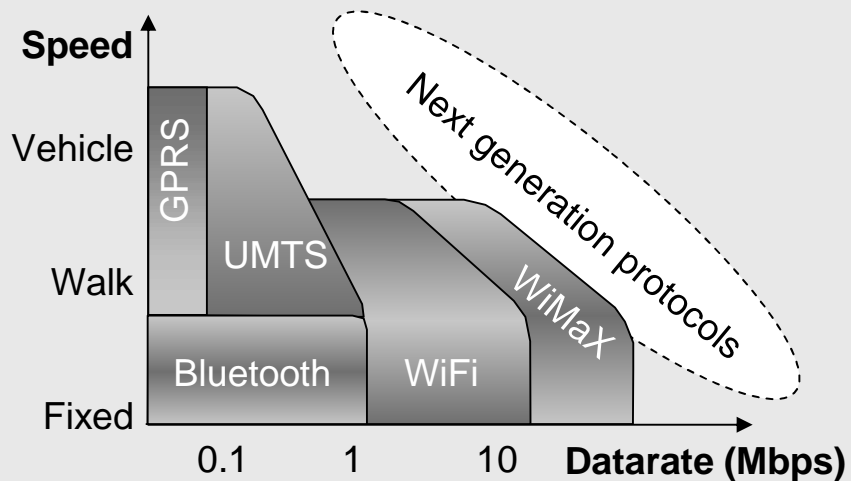
Results

Conclusions

The availability of multiple wireless protocols has given rise to three challenges

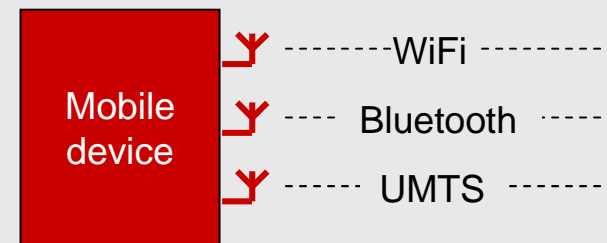
Multiple wireless protocols

An increasing number of wireless technologies is being developed to answer the constantly growing demand for mobile access at higher data rates

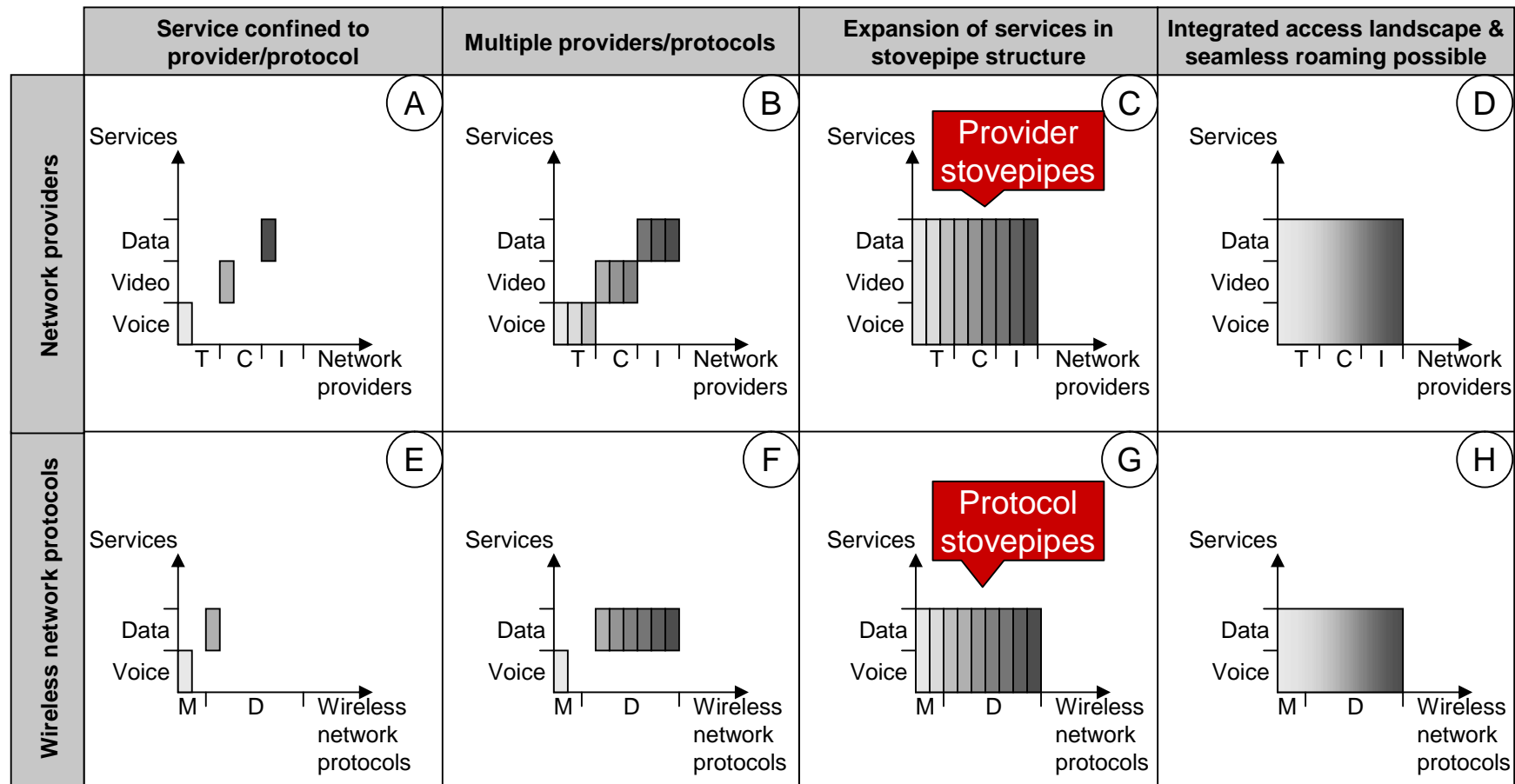


Three challenges

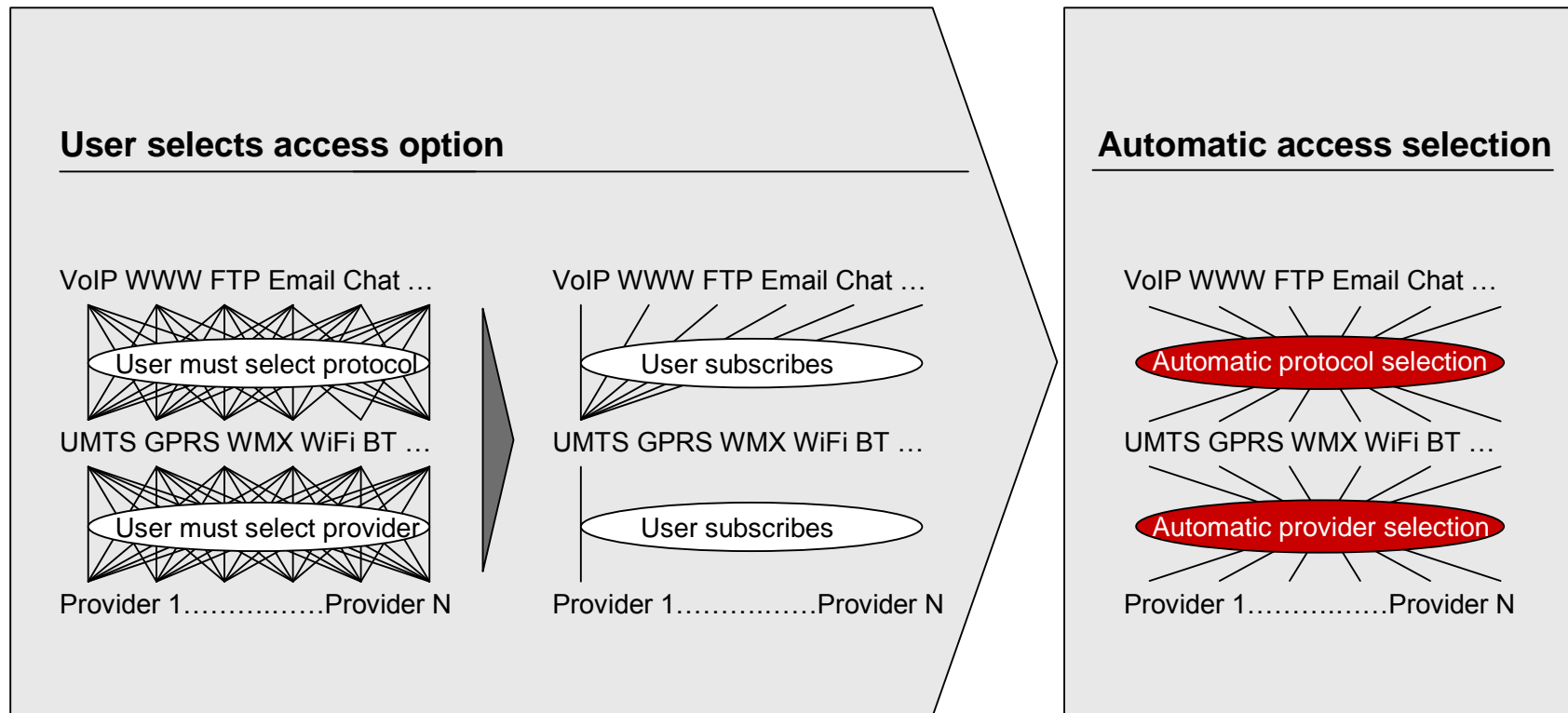
- 1) Select best access option
- 2) Reduce power consumption
- 3) Enable detection services



1) Dynamic switching between access options will become possible in the future



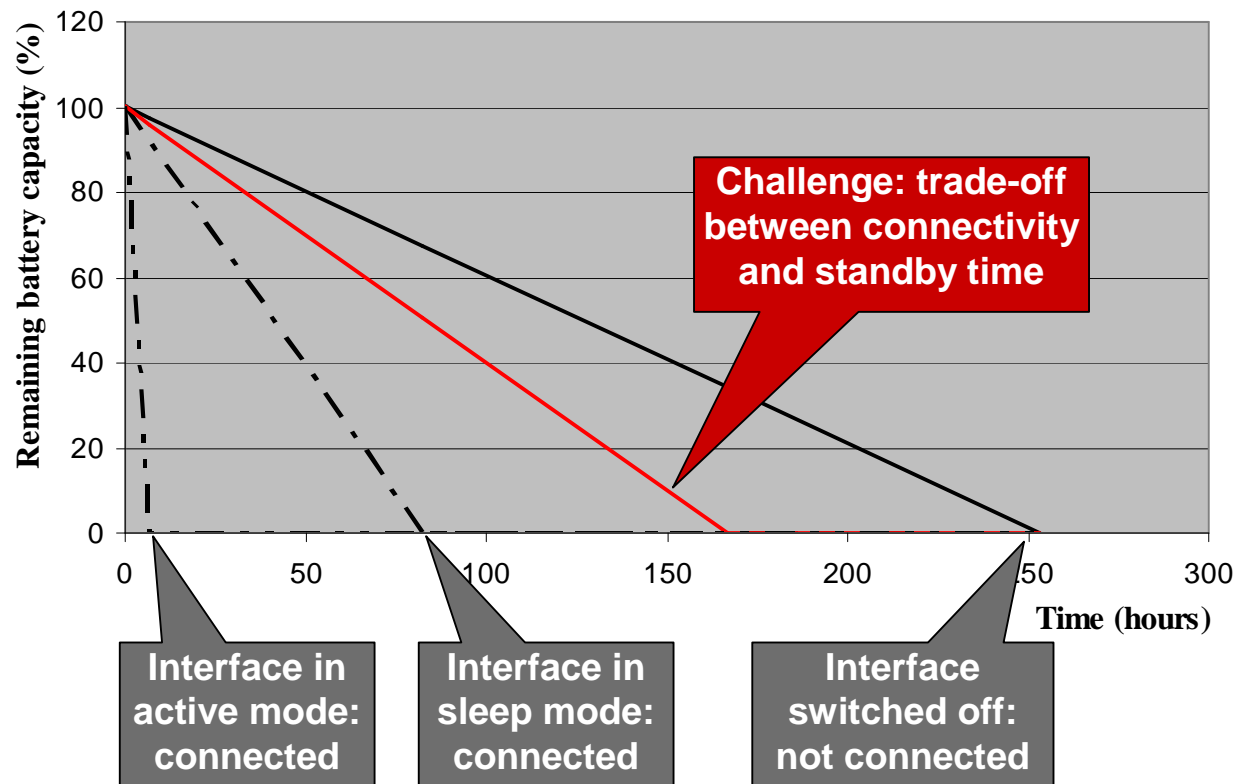
1) Automatic access selection requires knowledge on access resources and conditions





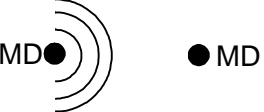

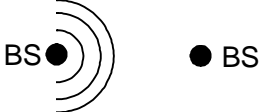
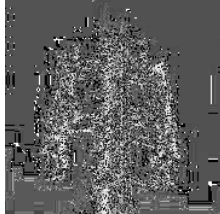
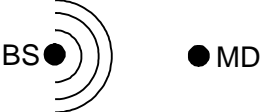
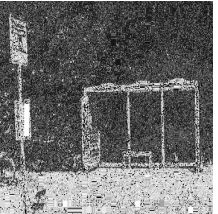
Automatic access selection is possible only if access options can be compared. This requires information on all access resources and conditions

2) Idle interface cards waste valuable battery power

Remaining battery capacity of typical PDA with WiFi interface



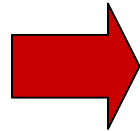
3) The demand for detection services is not met

	... detected by Base Station	... detected by Mobile Device
Mobile Device...	  <p>User-profile based services:</p> <ul style="list-style-type: none"> • Commercial party uses demographic distribution for advertisement purposes • Service operator offers certain protocols based on user profile 	  <p>User-user services:</p> <ul style="list-style-type: none"> • Detect friends in the same area • Detect gamers to battle with • Advanced dating service • ...
Base station...	  <p>Network services:</p> <ul style="list-style-type: none"> • Auto-configuration of network • Maximize competitive position by “eavesdropping” conditions of nearby operators 	  <p>Broadcasting services:</p> <ul style="list-style-type: none"> • Bus departure times available • Local traffic information available • Tourist information available • ...

Contents

Introduction

Three challenges

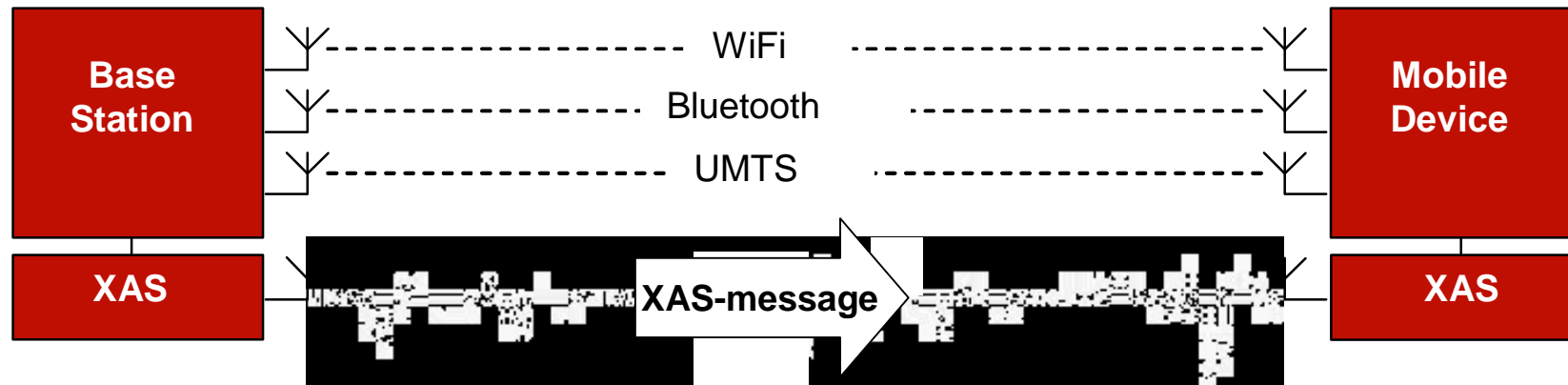


XAS advertising system

Results

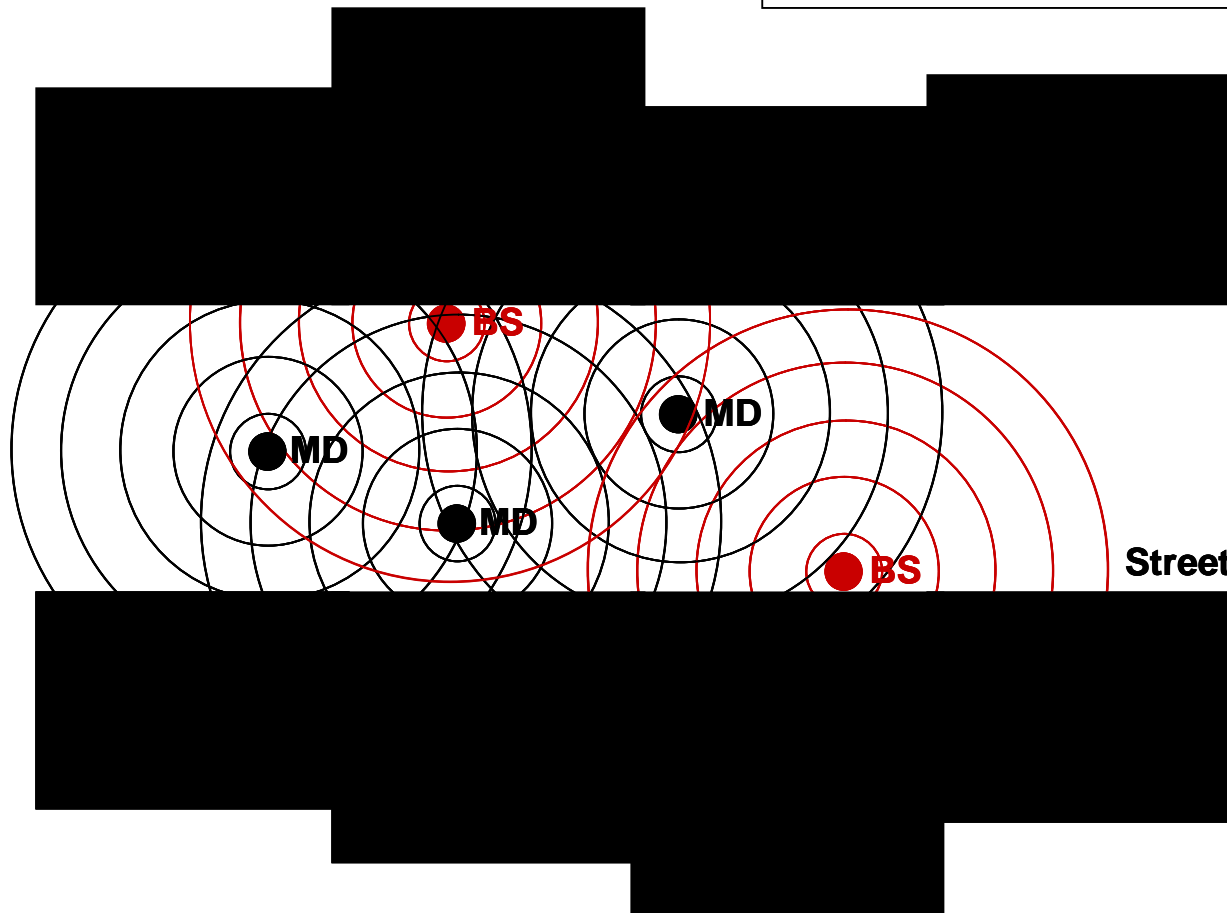
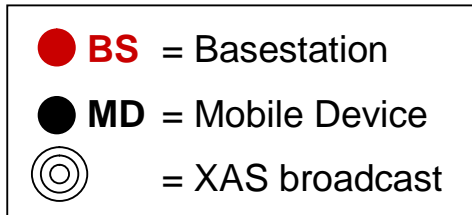
Conclusions

Advertising system is a solution to challenges indicated



Challenge:	Achieved by XAS, because:
Enable automatic access selection	XAS messages contain necessary information to compare different options
Limit negative influence of idle interfaces	Idle interfaces can be switched off, XAS takes over detection task
Make value added services possible	XAS messages contain characteristic information about the sender

Both Base Stations and Mobile Devices broadcast XAS messages periodically

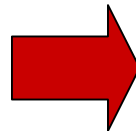


Contents

Introduction

Three challenges

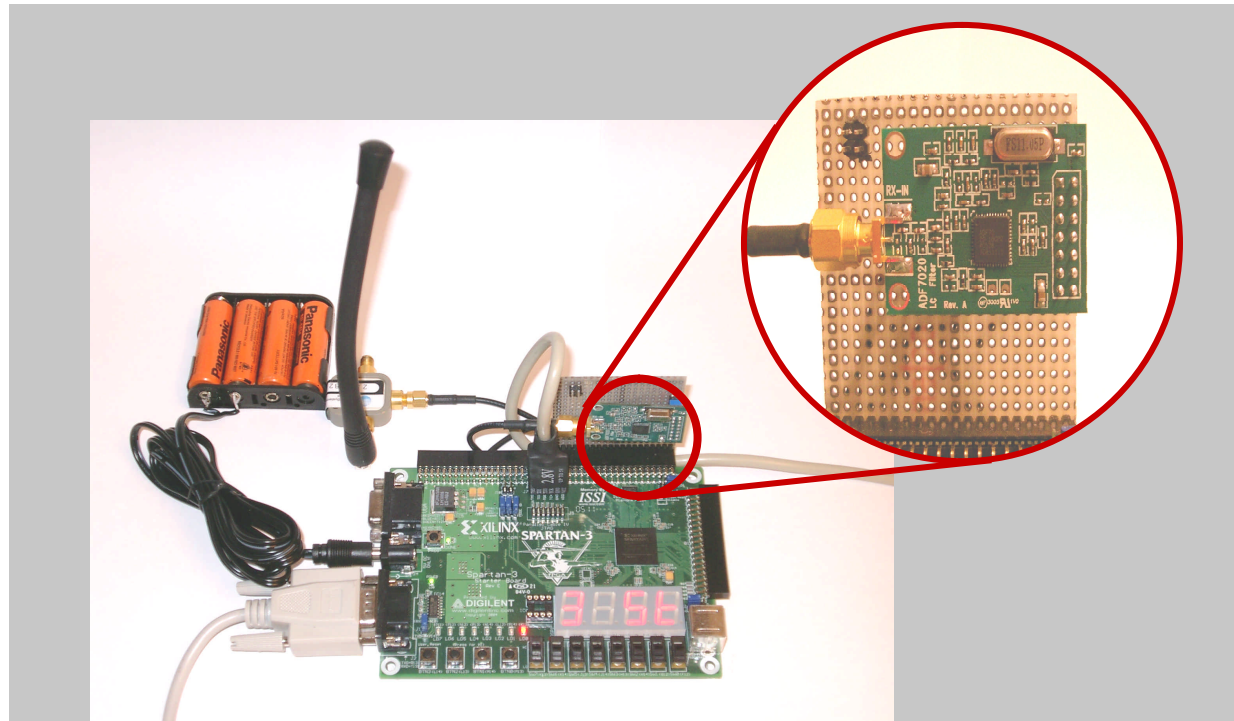
XAS advertising system



Results

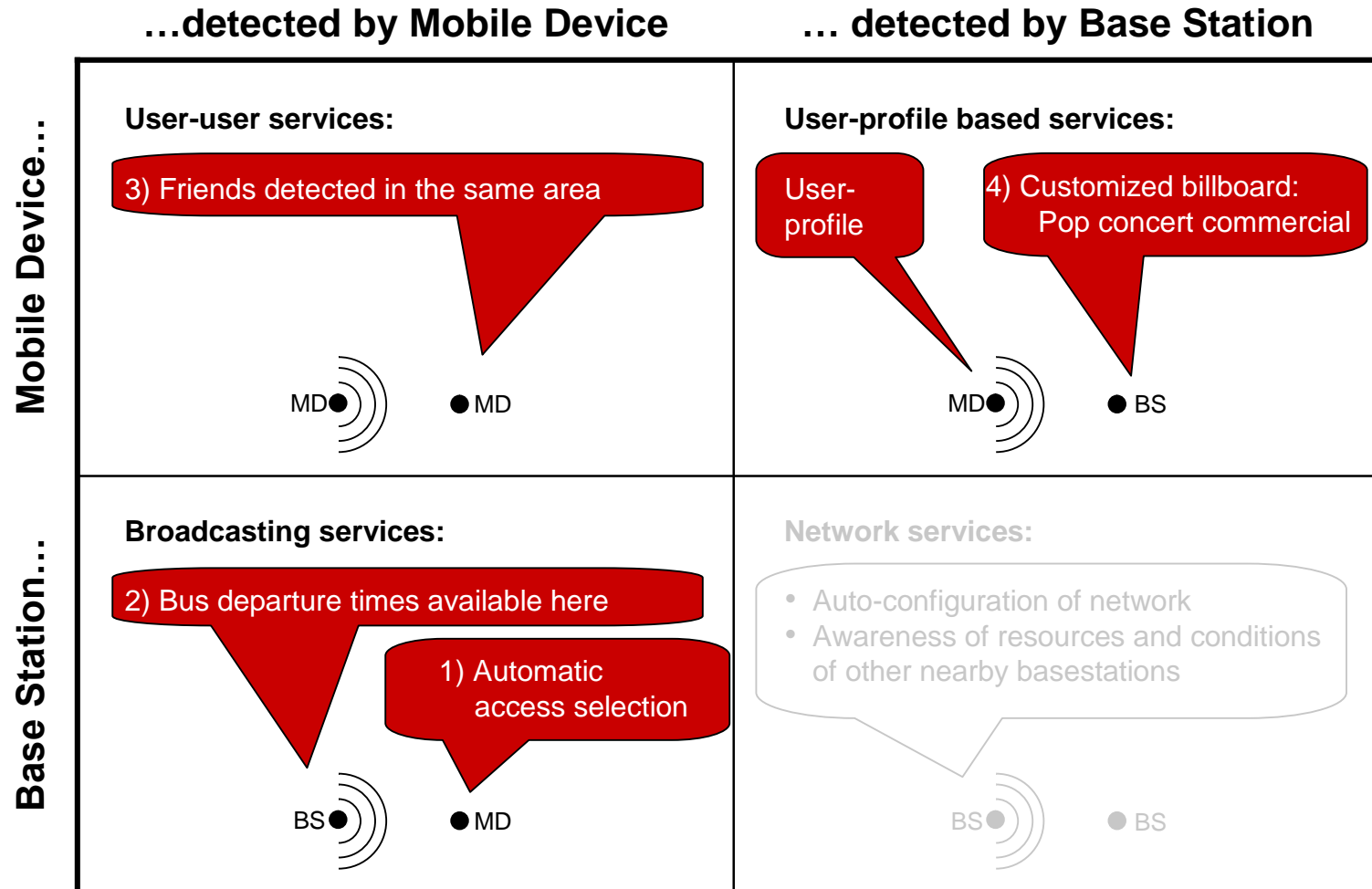
Conclusions

A demonstrator has been implemented to show feasibility and functionality of XAS concept



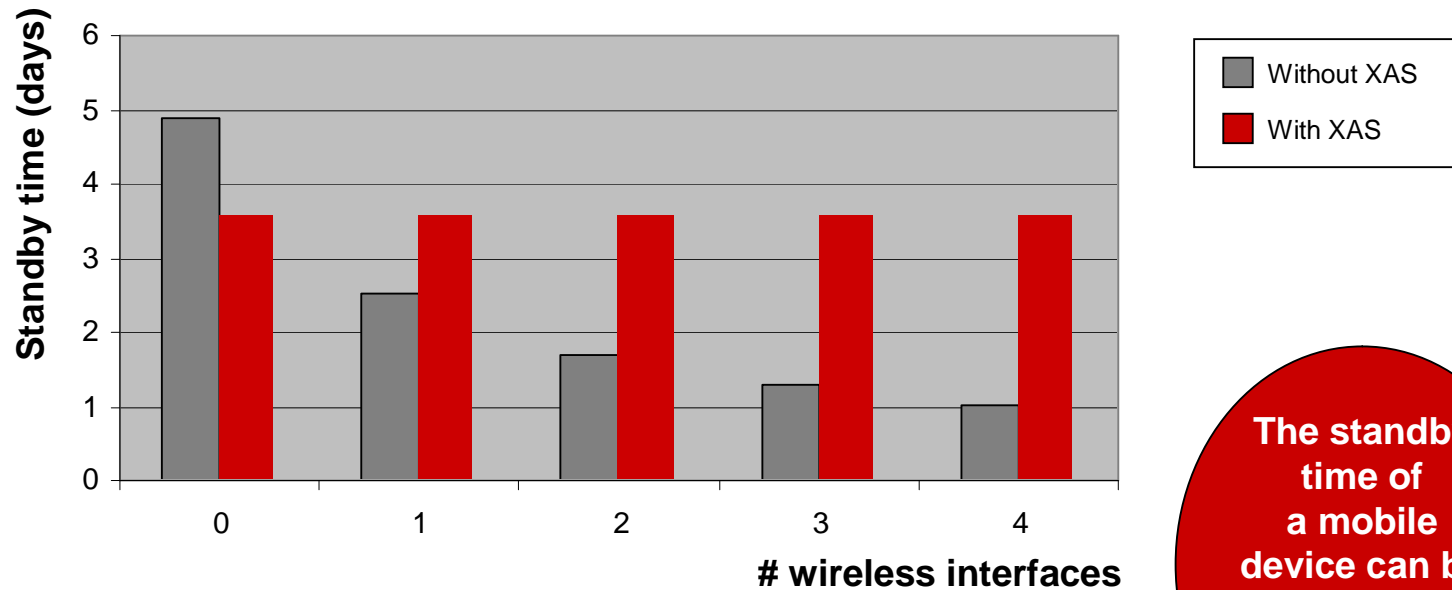
Design parameter	Design choice
Frequency band	Unlicensed band at 433 MHz, 1.74 MHz bandwidth
Message size	Optimized to minimum, 960 bits
Messaging strategy	Summarized messages
Time interval	Optimized to maximum, 1.4 seconds
Modulation format	8-PSK
MAC protocol	CSMA+MACA+ISMA

The demonstrator showed the benefits of automatic access selection and value added services



XAS limits negative influences of idle interfaces on standby time of mobile device

Standby time of an average PDA* without and with XAS



The standby time of a mobile device can be extended substantially with XAS

Device/component	Type	Active power consumption	Idle power consumption
Compaq I-paq H3800 w-pack	PDA	250 mA	5,6 mA
Palm Liferdrive	PDA	277 mA	4,2 mA
Qtek s100 (or MDA compact)	PDA	400 mA	6,7 mA
ORINOCO PC Gold	WiFi-card	161 mA	12 mA
Cisco AIR-PCM350	WiFi-card	216 mA	9 mA
RX5000	Transceiver	3,8 mA	-

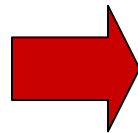
Contents

Introduction

Three challenges

XAS advertising system

Results



Conclusions

Conclusions

- The variety in protocols and corresponding connectivity options has given rise to three challenges:
 - Enabling automatic access selection
 - Reducing negative influences of idle adapters on standby time
 - Making value adding detection services possible
- The XAS concept has proven to provide a solution for these challenges
- An implemented demonstrator has shown the technical feasibility, the capabilities and opportunities of XAS.



Thank you!