

## ***Lecture 1***

Introduction to Mobile Business I:  
Technology, Markets, Platforms,  
and Business Models

**Mobile Business I (WS 2016/17)**

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Johann Wolfgang Goethe University Frankfurt a. M.



- Chair of Mobile Business and Multilateral Security
- Teaching and Research Agenda
- Introduction into Mobile Business - History of Mobile Business & Mobile Telecommunication Systems
- Outline of this Course

## Business Informatics @ Goethe University Frankfurt

<p><b>E-Finance</b></p> <p>Prof. Dr. Peter Gomber</p>	<p><b>Business Informatics (Informatics)</b></p> <p>Prof. Dr. Mirjam Minor</p>	<p><b>Information Systems Engineering</b></p> <p>Prof. Dr. Roland Holten</p>
<p><b>Business Education (associated)</b></p> <p>Prof. Dr. Gerhard Minnameier</p>	<p><b>Business Informatics</b></p>	<p><b>Business Education (associated)</b></p> <p>Prof. Dr. Eveline Wuttke</p>
<p><b>Information Systems &amp; Information Management</b></p> <p>Prof. Dr. Wolfgang König</p>	<p><b>Business Informatics &amp; Microeconomics</b></p> <p>Prof. Dr. Lukas Wiewiorra</p>	<p><b>Mobile Business &amp; Multilateral Security</b></p> <p>Prof. Dr. Kai Rannenber</p>

# Chair of Business Administration, especially Business Informatics, Mobile Business and Multilateral Security

Deutsche Telekom Chair of Mobile Business & Multilateral Security

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Kai Rannenberg



Jetzabel  
Serna-Olvera



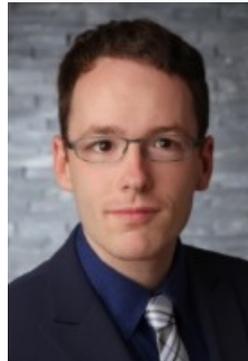
Sebastian  
Pape



David Harborth



Fatbardh  
Veseli



Christopher  
Schmitz



Welderufael  
Tesfay



Ahmed Yesuf



Majid Hatamian



Shuzhe Yang



Gökhan Bal



Mike  
Radmacher



Andreas  
Albers



Stefan  
Weiss



André  
Deuker



Markus  
Tschersich



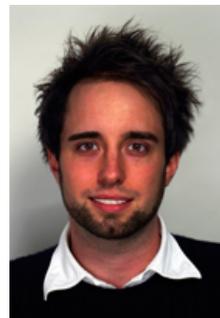
Sascha  
Koschinat



Stephan Heim



Lars Wolos



Tim  
Schiller



Niels  
Johannsen



Ahmad Sabouri



Marvin Hegen

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## Vita of Kai Rannenberg

Einbeck, Göttingen, Eystrup, Wolfsburg, ...  
TU Berlin (Dipl.-Inform.)  
Uni Freiburg (Dr. rer. pol.)



Dissertation  
**“Kriterien und Zertifizierung mehrseitiger IT-Sicherheit“**  
Standardization at ISO/IEC JTC 1/SC 27 and DIN NI-27

Kolleg **“Sicherheit in der Kommunikationstechnik“**  
Gottlieb Daimler- and Karl Benz-Foundation

**Multilateral Security:**  
**“Empowering Users, Enabling Applications“, 1993 - 1999**

## Recent history of Kai Rannenberg

1999-09 till 2002-08

Microsoft Research Cambridge UK

[www.research.microsoft.com](http://www.research.microsoft.com)

Responsible for “Personal Security Devices and Privacy Technologies“

2001-10 Call for this chair

2001-12 till 2002-07 Stand-in for the chair

Since 2002-07 Professor



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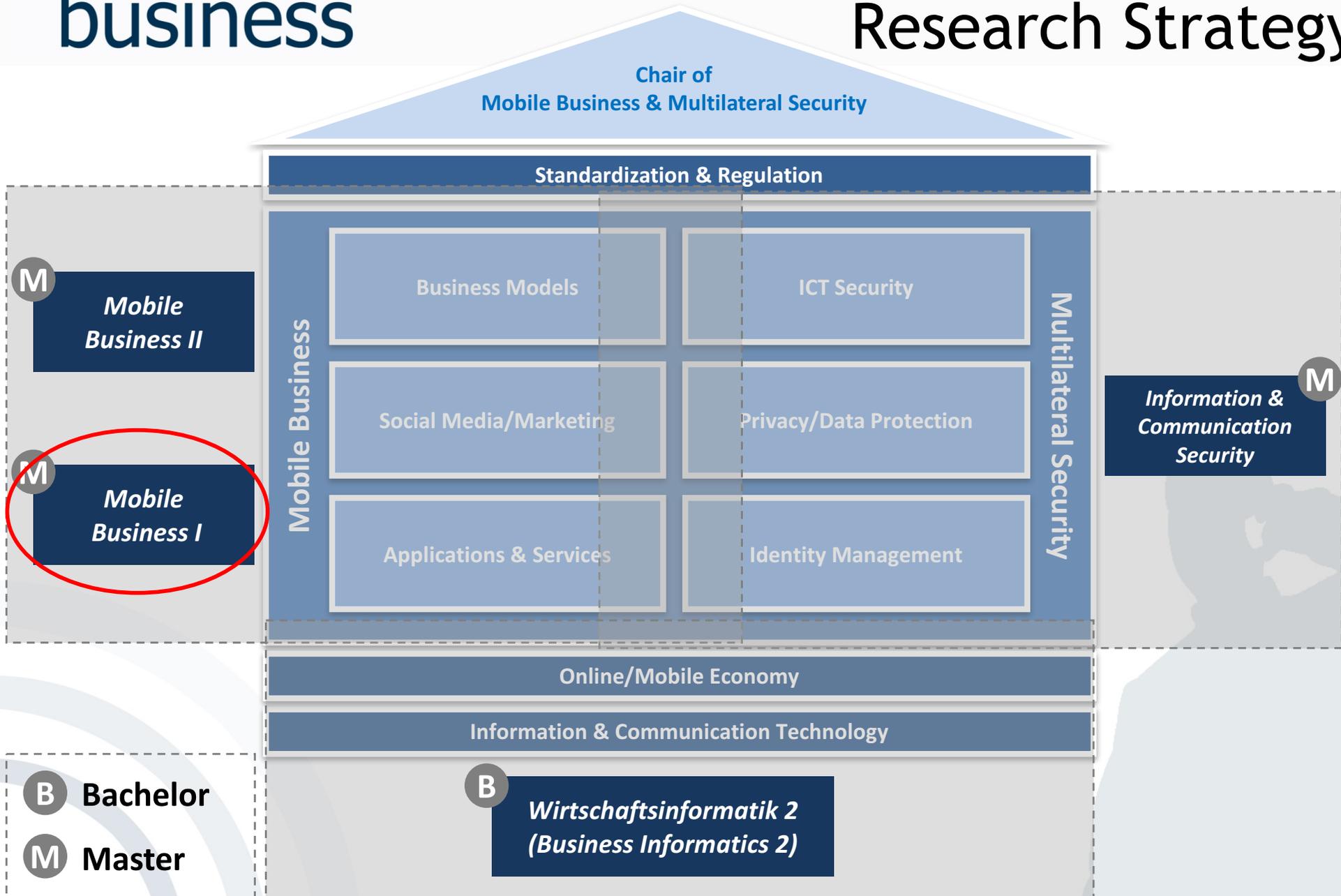
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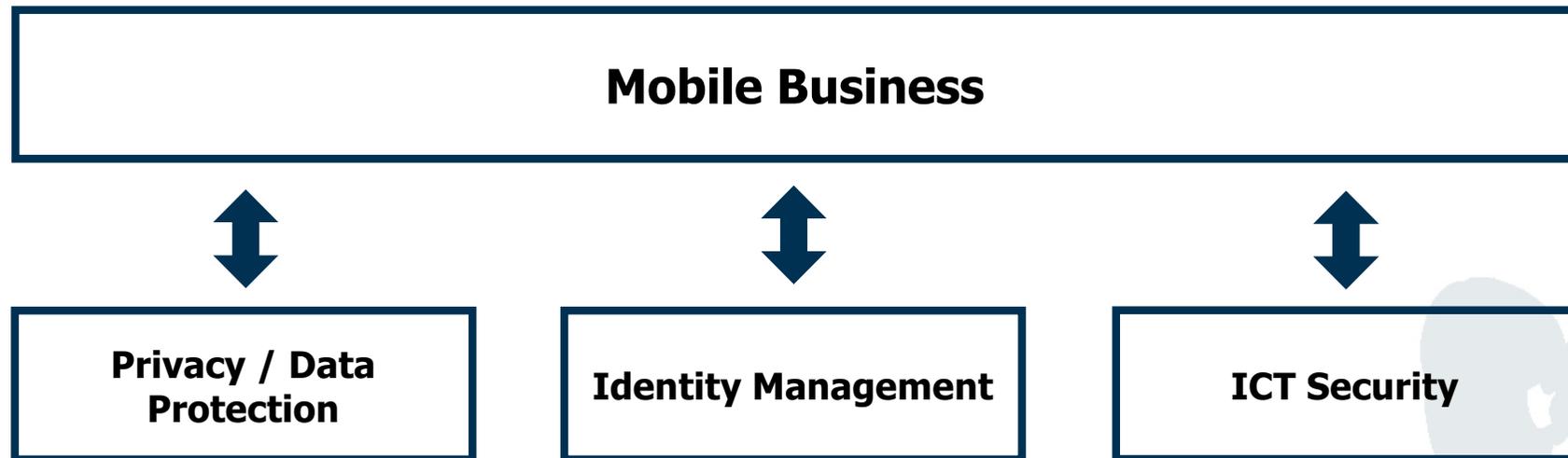
Please use the email address [mb1@m-chair.de](mailto:mb1@m-chair.de)



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	WS 2016/17	SS 2017
Bachelor		<p><i>Course</i> „Business Informatics 2 (PWIN)“</p>
Master	<p><i>Course</i> Mobile Business I: Technology, Markets, Platforms, and Business Models</p> <p><i>Course</i> Information and Communication Security: Infrastructures, Technologies, and Business Models</p> <p><i>Project Seminar</i> Privacy in Smartphone Ecosystems</p> <p><i>Seminar</i> IT-Sicherheitsmanagement</p>	<p><i>Course</i> Mobile Business II - Application Design, Applications, Infrastructures, and Security</p> <p><i>Project Seminar</i> Privacy in the Digital World</p> <p><i>Seminar</i> tba</p> <p><i>Course</i> Privacy vs. Data: Business Models in the digital, mobile Economy</p>





Advancing *Mobile Business* while enabling individuals to be in control of their personal data by providing *Identity Management, Privacy Protection, and ICT Security* within the Digital Economy

# M-Chair Research Projects & industry cooperations



Privacy and usability in  
smartphone ecosystems



Pricing mechanisms for  
context-sensitive mobile  
consumer contacts  
offered to mobile  
advertisers



Information security for  
small & medium-sized  
energy providers



Architecture  
for privacy-  
friendly  
attribute-  
based  
credentials



Embedding PET in the  
internet's infrastructure



Context-sensitive mobile  
advertising



Tool support for  
threat and risk  
detection



Means for providing  
privacy throughout  
life

Privacy-friendly cloud  
identity services



Privacy concept for  
mobile social  
communities



Anonymous  
online shopping



(Mobile) social media  
concepts for enterprises



Fraud risks in telco  
services



Enabling privacy-  
friendly location-  
based services



Enabling appropriate  
identification and  
identity management



Telco identity  
enabler services

Marketing

Security & Risk  
Management

Privacy

Identity Management

Infrastructure

## The features

- User specified automatic call filtering
- Higher protection for caller and callee
- Range of possibilities to signalise urgency
- Range of reaction possibilities



# Topics of Negotiation

- Extent of identification
- Urgency of the call
- Security requirements
  - authentication
  - confidentiality
  - non-repudiation



**RMS Call**

Who Rannenberg, Katrin

◆ My ID: none

◆ Subject: Meeting? 

 .....

Urgency:

Normal     High     Emergency

Security Settings: [View Details](#)

◆ Confidentiality: Important

◆ Authentication Don't care

Statement of urgency

“It is really urgent!”

Specification of a function

“I am your boss!”

Specification of a subject

“Let’s have a party tonight.”

Presentation of a voucher

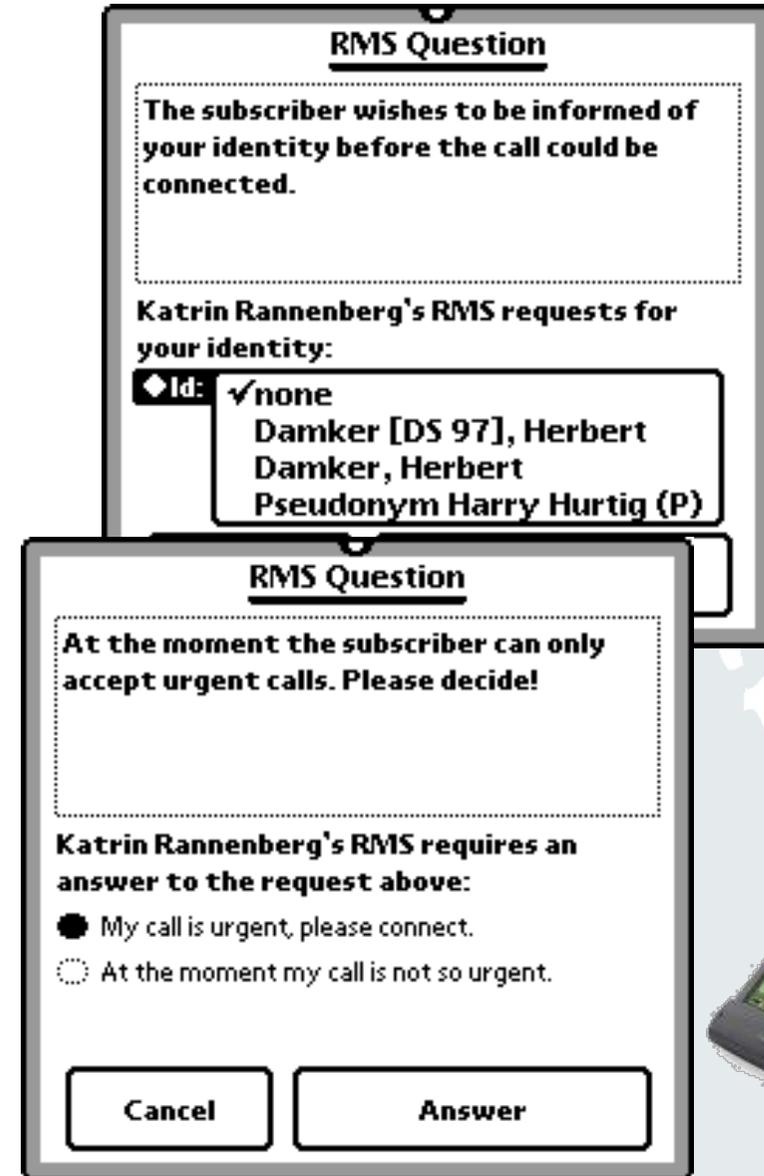
“I welcome you calling back.”

Provision of a reference

“My friends are your friends!”

Offering a surety

“Satisfaction guaranteed  
or this money is yours!”



**RMS Question**

The subscriber wishes to be informed of your identity before the call could be connected.

Katrin Rannenberg's RMS requests for your identity:

Id:  none  
Damker [DS 97], Herbert  
Damker, Herbert  
Pseudonym Harry Hurtig (P)

**RMS Question**

At the moment the subscriber can only accept urgent calls. Please decide!

Katrin Rannenberg's RMS requires an answer to the request above:

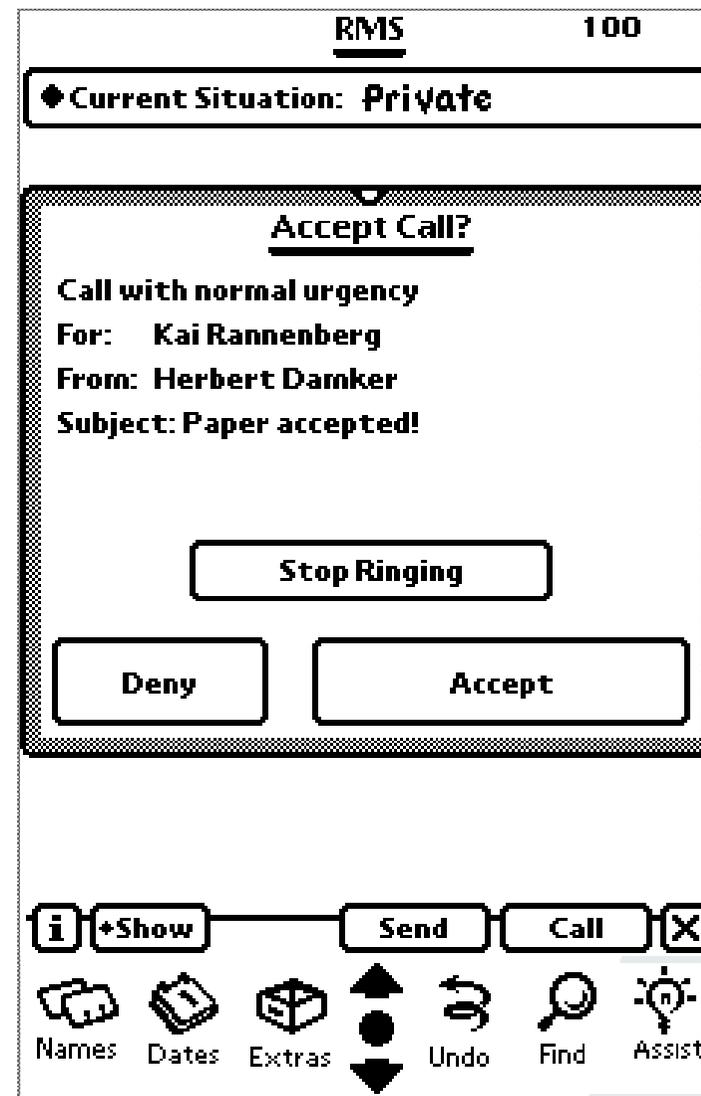
My call is urgent, please connect.  
 At the moment my call is not so urgent.

Cancel Answer



# RMS Accepted Call (Callee Display)

- Bell is ringing!
- Callee notified
- Callee can still decide to accept or deny the call



- Call not connected
- Caller gets information (configured by callee)
- Caller can leave a message or request a call back

**RMS: Call denied**

Unfortunately the subscriber can not accept the call at the moment.

**Leave with Katrin Rannenberg:**

Text message  
 Request for callback (with voucher)  
 No message

**Cancel** **OK**



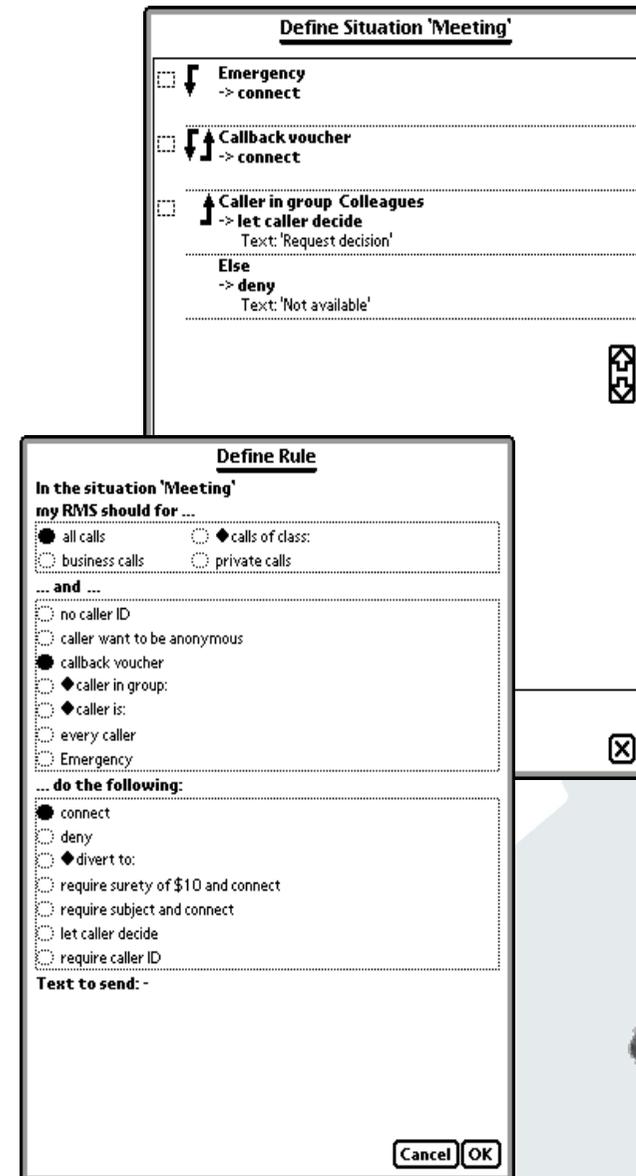
## Situations

Set of rules how to deal with an incoming call

## Rules

Combination of features

Users can reconfigure initial rules and situations as they like.



The image shows two overlapping screenshots from a mobile device interface for configuring an RMS. The top screenshot is titled "Define Situation 'Meeting'" and contains three rule entries:

- Emergency -> connect
- Callback voucher -> connect
- Caller in group Colleagues -> let caller decide  
Text: 'Request decision'

Below these entries is an "Else" section:

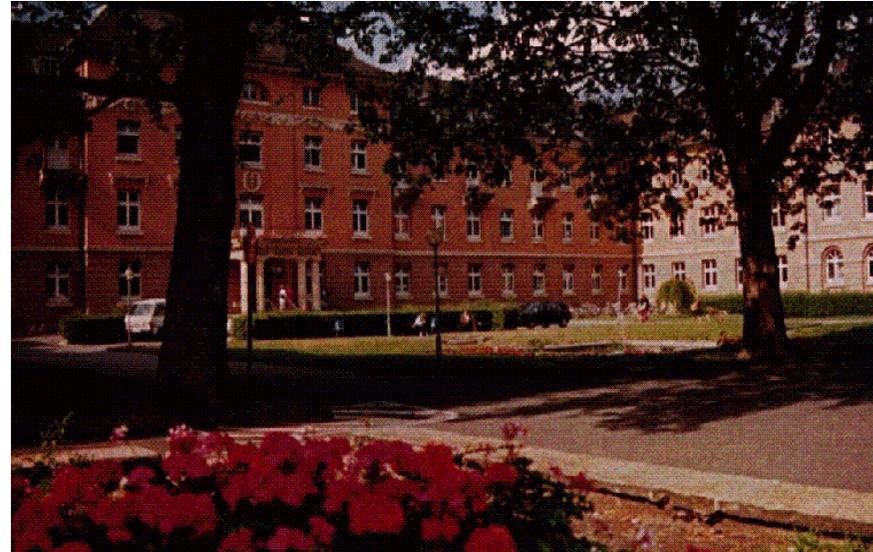
- Else -> deny  
Text: 'Not available'

The bottom screenshot is titled "Define Rule" and is for "my RMS should for ...". It has several sections:

- my RMS should for ...**
  - all calls
  - business calls
  - private calls
  - calls of class:
- ... and ...**
  - no caller ID
  - caller want to be anonymous
  - callback voucher
  - caller in group:
  - caller is:
  - every caller
  - Emergency
- ... do the following:**
  - connect
  - deny
  - divert to:
  - require surety of \$10 and connect
  - require subject and connect
  - let caller decide
  - require caller ID
- Text to send: -**

At the bottom right of the "Define Rule" screen are "Cancel" and "OK" buttons. A small image of a mobile phone is visible in the bottom right corner of the overall slide.

- **Fictitious, but realistic** cases
- **Real users:**  
ca 40 doctors, nurses,  
admin people, etc.
- 1 week **“Playtime”**
- 18 months  
**preparation and analysis:**  
workflow analysis  
usability tests, script  
writing, attack  
planning



- Reachability manager
- Negotiating security
- Identities and pseudonyms
- Signing device
- Medical information (patient records and knowledge base)
- Hospital communication

## Overall results

- High benefit for everyday tasks
- Increasing awareness of security
- Integration of asynchronous messages very useful
- Manual filtering of calls often used

## User demands

- Smaller device - RMS functionality in mobile phone
- Integration of full-flavour email
- Authentication also during a call

Many more *design hints*



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## What is Mobile Business ?

- There are as many definitions as interested parties.
- “Ask again in 5 years at best, then we will have further information ...“
- A multitude of related notions:  
E/C/V-Business, Mobile Commerce, Mobile...
- Hypes and myths
  - “Mobile Business is THE future!“
  - “Mobile Business is just a hype!“



## What is Mobile Business ?

We chose a definition that (hopefully) lets us do interesting things:

*“The usage of  
mobile devices, infrastructure,  
communication and interaction  
for  
mobile applications and  
transactions.”*



- Workplaces and private life will change thoroughly through mobile technologies and services.
- This implies extraordinary challenges and chances.
- The development will be strongly affected by international factors.



## GSM World

**Equipment Manufacturers**  
(Apple, Samsung, Microsoft/Nokia, Google/Motorola, Huawei, ...)

**Telcos**  
(Telekom, Vodafone, Telefónica...)



IBM,  
Infineon, ...

MS, ...

Dell, ...

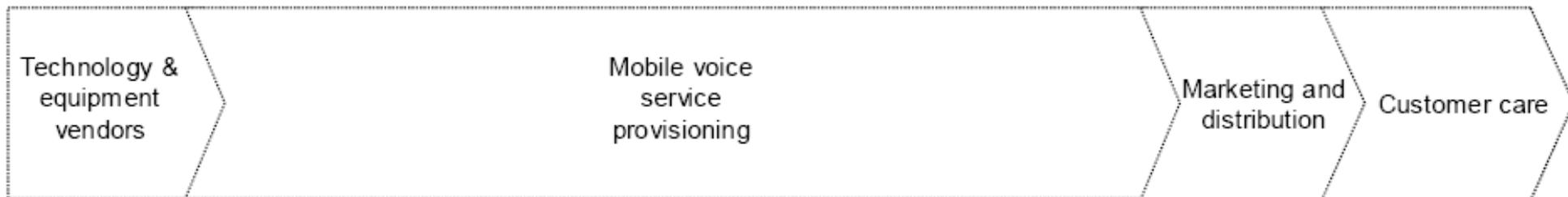
Cisco, ...

Telekom  
Vodafone  
...

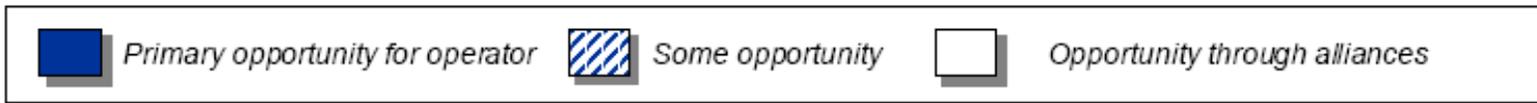
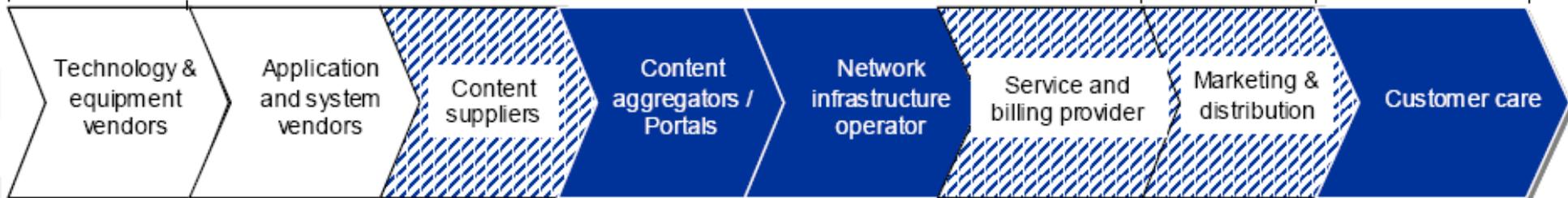
MS,  
IBM,  
...

MS,  
SAP,  
Telekom,  
Google  
...

## TRADITIONAL VALUE CHAIN OF MOBILE SERVICE DELIVERY



## EMERGING MOBILE OPERATOR VALUE CHAIN



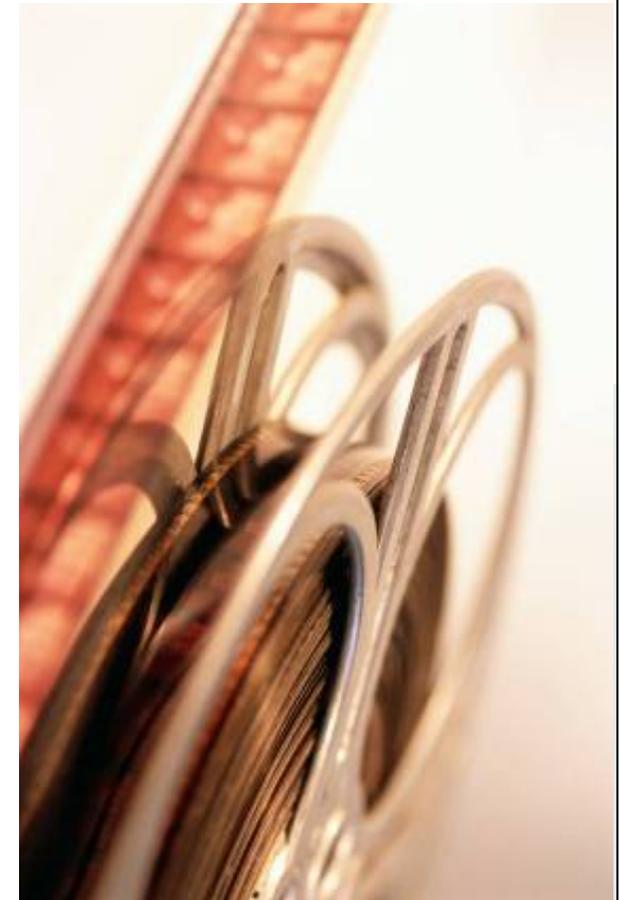
## What makes Mobile Business mobile?

- Customers?
  - Terminals?
  - Service provisioning?
  - Means of payment?
  - Possibilities of interaction?
  - Business cases for Mobile Operators (and others)?
- ➔ One instrument for analysing are scenarios & visions.

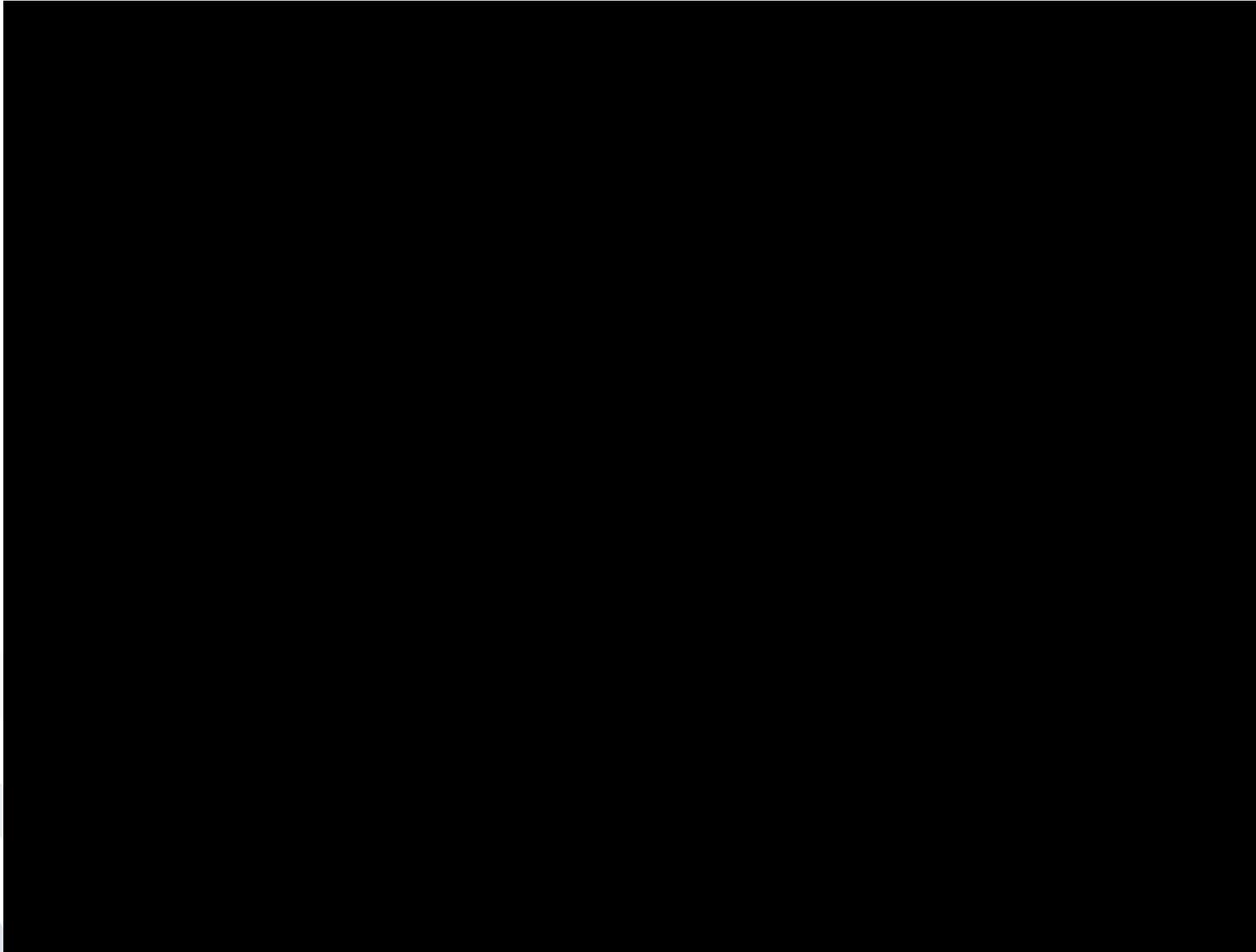
- Not every country's scenario (e.g. health care) can simply be transferred to another country.
- Mobile Business does not only relate to mobile phones. Other platforms are important, too.



- Classification of videos
  - Videos are useful because they convey visions.
  - Visions have to be benchmarked by reality.
  - Which aspects of visions are reasonable / useful?
  - What is necessary for their realization?
  - Can a business model emerge from this?
  - For whom?



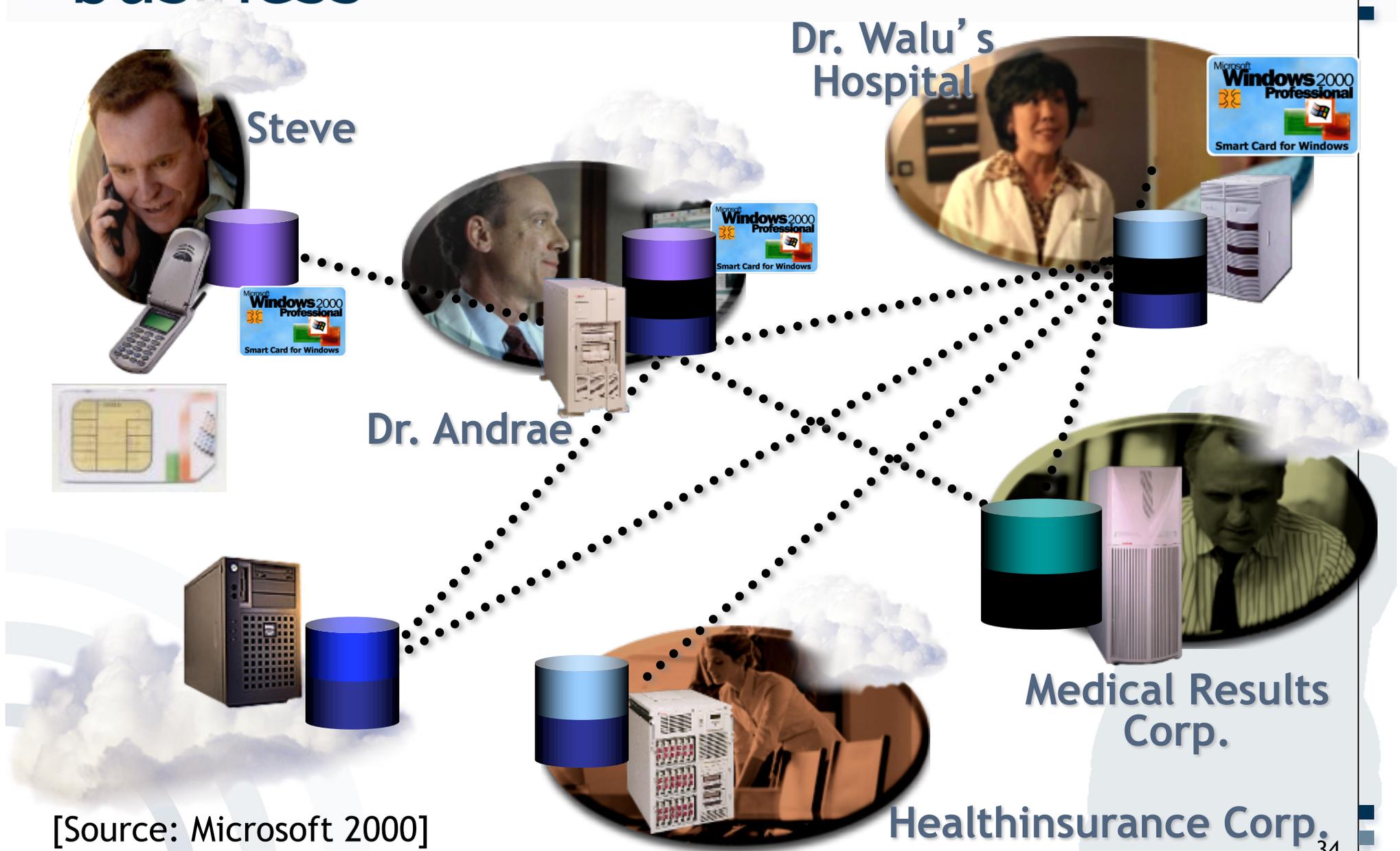
# Illustrative Microsoft Video



[Source: Microsoft 2000]

# mobile business

## Parties Involved



[Source: Microsoft 2000]



# History of Mobile Business

## Early German Mobile Networks

- 1958 A-Net (till 1977)
- 1972 B-Net (till 1994)
- 1986 C-Net (till 2000)

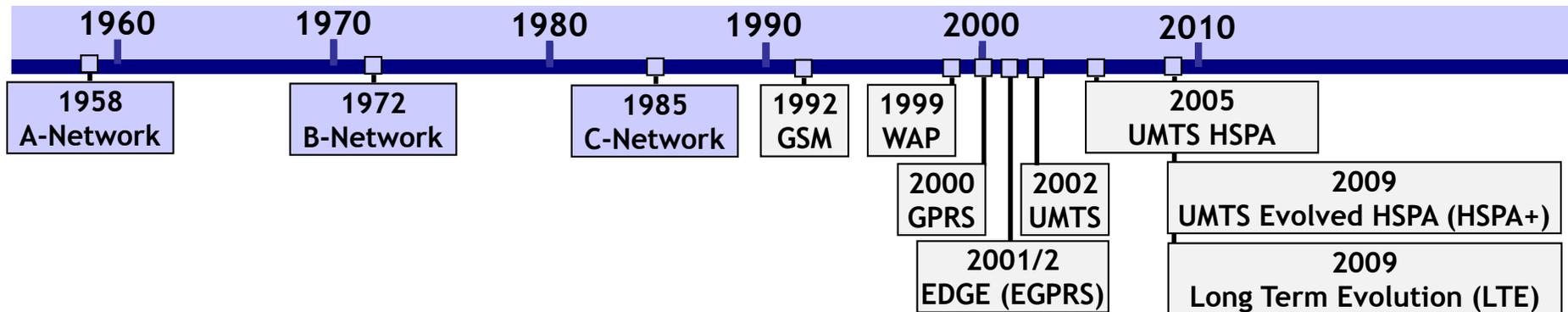


- Since 1981 NMT-450 (Nordic Mobile Telephone) in Norway, Sweden, Saudi Arabia, Denmark, Finland, ...



- First GSM trials 1991
- Commercial usage since 1992
- First digital mobile radio network with high voice quality and reliability (roaming).
- Global diffusion in more than 212 countries with more than 1 billion users.
- In February 2004 the first commercial mobile radio network (based on GSM) was launched in Iraq.
- GSM is the basis of data services like GPRS and EGDE.





### A-Network (1958 - 1977)

Switching was done manually by operators (switchboard clerks). To call one needed to know the location area of the mobile station.



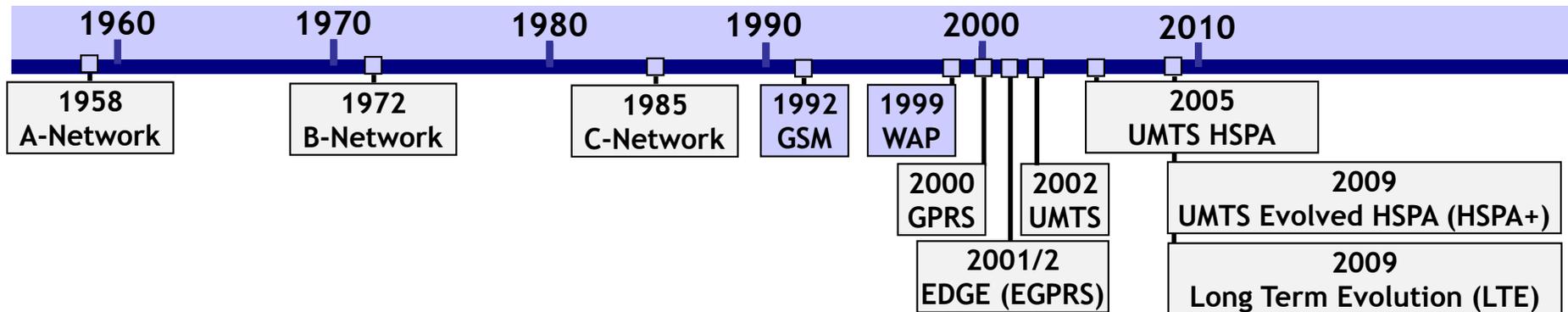
### B-Network (1972 - 1994-12-31)

Callers could call mobile stations directly, but needed to know the current mobile station's area and use the respective area code.



### C-Network (1985 - 2000-12-31)

First German cellular mobile radio network with centralized management of the mobile station's location.



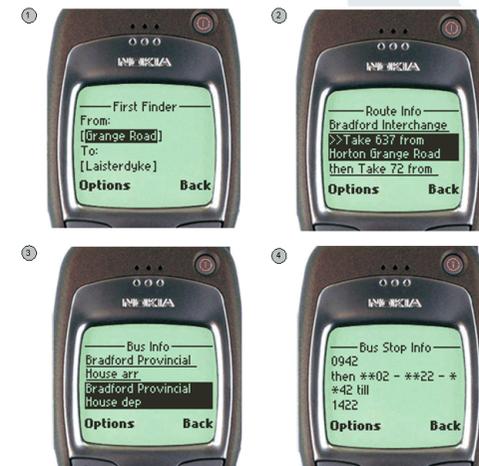
## GSM

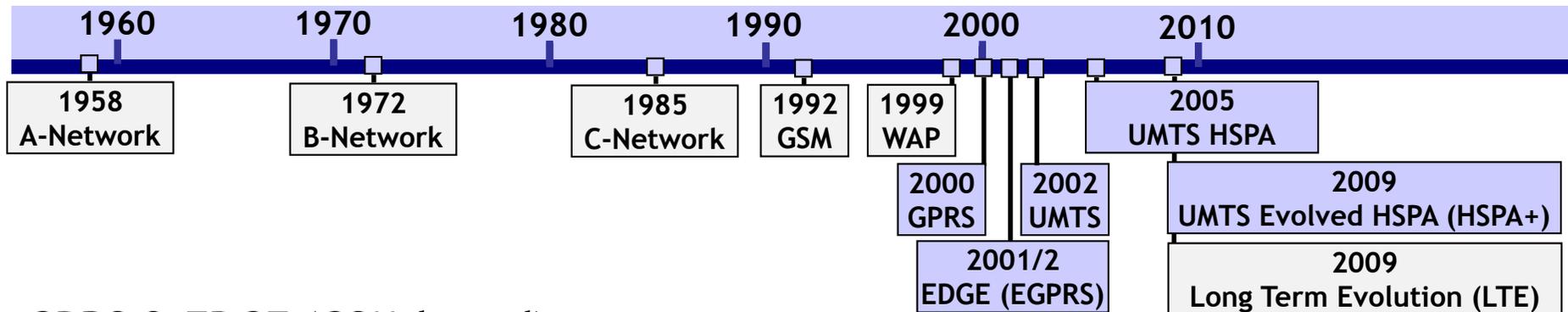
The technical standard for digital mobile radio networks in more than 100 countries; GSM includes data transfer services.

## WAP

The WAP standard describes a protocol suite. With special mobile phones certain mobile contents (pages) are accessible using WAP-enabled mobile phones.

[Source: WAP 2010]





## GPRS & EDGE (GSM-based)

Further development of the GSM standard: Data is transferred in packets. EDGE is an enhancement to GPRS and provides increased data transmission rates (3 to 4 times faster than GPRS).

## UMTS (3G) network

Third mobile radio standard and the successor of GSM for mobile multimedia incl. video and audio transmissions.

## UMTS High Speed Packet Access (HSPA), UMTS Evolved HSPA (HSPA+)

HSPA and Evolved HSPA (HSPA+) provide enhanced performance in speed and latency.

## Long Term Evolution (LTE)

LTE is the first all-IP mobile network technology. It provides significantly higher data rates, capacity and lower latency than HSPA and HSPA+.

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- Interest ...
  - ... in new topics
  - ... in the interaction of technology, business, economy and society
  - ... in experiments
- Other Business Informatics lectures help but are not mandatory.



## *Lectures*

1. Introduction to Mobile Business I
2. Basic Communication Paradigms and Mobile Telecommunications Infrastructures
3. Wireless Internet-oriented Infrastructures and Protocols
4. Electronic Business vs. Mobile Business
5. Mobile Communication Services
6. Market Structure and Value Creation
7. Business Models
8. Smartcards and Related Application Infrastructures
9. Mobile Devices
10. Concepts of Mobile Operating Systems
11. Market Overview of Mobile Operating Systems and Security Aspects
12. Mobile Trusted Devices
13. Acceptance and Success Factors in Mobile Business



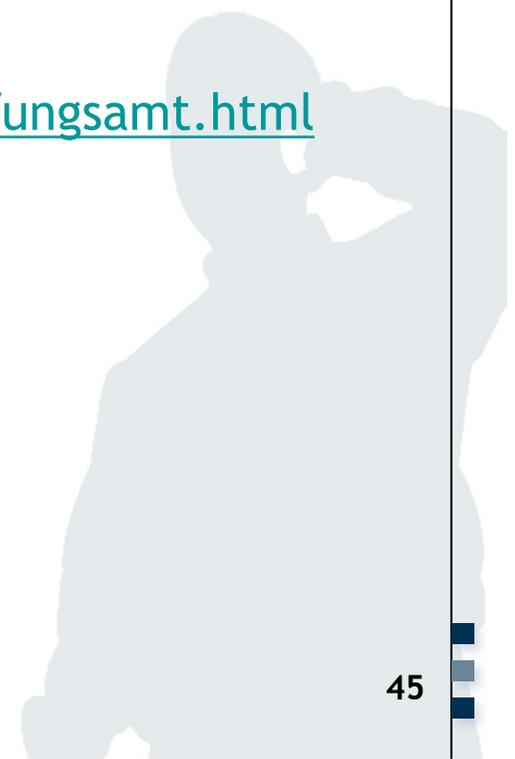
*Please keep yourself updated*

1. Schedule:

[http://m-chair.de/index.php?option=com\\_teaching&view=lecture&id=16](http://m-chair.de/index.php?option=com_teaching&view=lecture&id=16)

2. Exam:

<http://www.wiwi.uni-frankfurt.de/mein-wiwi-studium/pruefungsamt.html>



### Please Note:

Electronic library of magazines, access to more than 2000 magazines

[www.ub.uni-frankfurt.de/banken.html](http://www.ub.uni-frankfurt.de/banken.html)

available only for University members via HRZ account (141.2.XXX.XXX IP-addresses; PC Pool) or via University Library login:

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[search.epnet.com/login.asp](http://search.epnet.com/login.asp)  
[www.jstor.org](http://www.jstor.org)



### Online search engines:

[scholar.google.com](http://scholar.google.com)  
[academic.live.com](http://academic.live.com)

[Microsoft 2000]

Microsoft (2000) Materials for the Introduction of .net

[Passerini et al. 2004]

Passerini, K.; Gagnon, S. Cakici, K. (2004) Opportunities in the Digital Economy: A New Value Chain and Services for Mobile Telecom Operators, in: C. Bullen and E. Stohr (Eds.) *Proceedings of the 10th American Conference on Information Systems*, New York, NY, USA, pp.2530-2535.

[Sauter 2008]

Sauter, M. (2008): Grundkurs Mobile Kommunikationssysteme (3. erweiterte Auflage), Vieweg, Wiesbaden.

[WAP 2010]

WAP Forum Releases: What Is WAP?

[www.wapforum.org/what/technical.htm](http://www.wapforum.org/what/technical.htm), accessed 01-10-2010.

