

Lecture 1

Introduction to Mobile Business II

Application Design, Applications,
Infrastructures, and Security

Mobile Business II (SS 2015)

Prof. Dr. Kai Rannenberg

Deutsche Telekom Chair of Mobile Business & Multilateral Security
Goethe University Frankfurt a. M.



- The Chair of M-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

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

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

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Vita of Kai Rannenberg

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

Dissertation on “**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
1999-09 till 2002-08
Microsoft Research Cambridge UK
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





Kai Rannenberg



Jetzabel
Serna-Olvera



Sebastian
Pape



Markus
Tschersich



Stephan Heim



Shuzhe Yang



Lars Wolos



Marvin Hegen



Ahmad Sabouri



Fatbardh Veseli



Gökhan Bal



Christopher
Schmitz



Welderufael
Tesfay



Ahmed Yesuf



Mike
Radmacher



Andreas
Albers



Stefan
Weiss



Christian
Kahl



André
Deuker



Sascha
Koschinat



Christian
Weber



Andreas
Leicher



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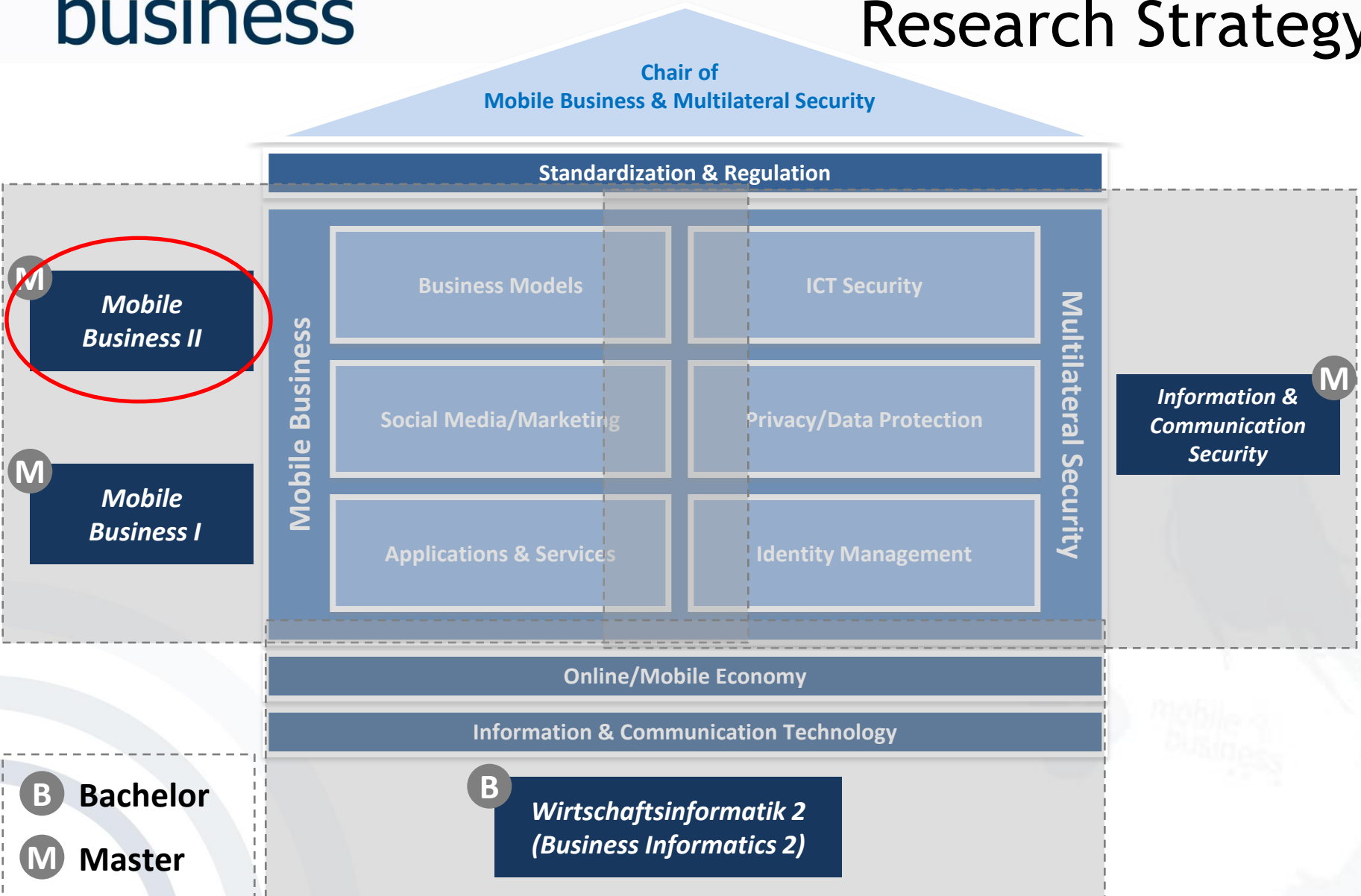
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	SS 2015	WS 2015/16
Bachelor	<p><i>Course</i> Business Informatics 2</p>	<p><i>Course</i> Business Informatics 2</p>
Master	<p><i>Course</i> Mobile Business II - Application Design, Applications, Infrastructures, and Security</p> <p><i>Seminar</i> User-centric Privacy Enhancing Technologies and Mobile Services for Consumer Goods</p> <p><i>Course</i> Information and Communication Security: Infrastructures, Technologies, and Business Models</p> <p><i>Course</i> Privacy vs. Data: Business Models in the digital, mobile Economy</p>	<p><i>Course</i> Mobile Business I: Technology, Markets, Platforms, and Business Models</p> <p><i>Seminar</i> TBA</p> <p><i>Course</i> Information and Communication Security: Infrastructures, Technologies, and Business Models</p>



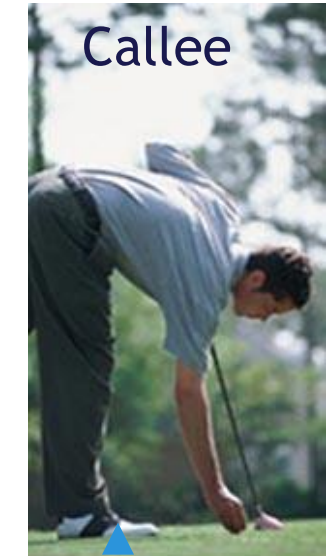
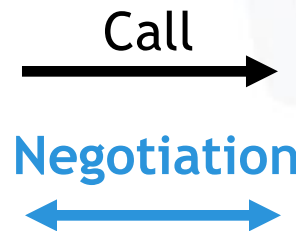
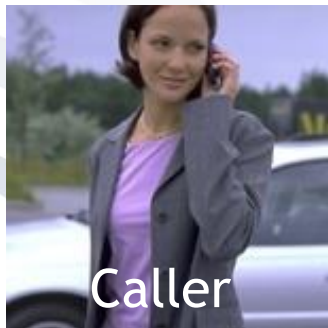
- Usage and trial of “Mobile Services & Devices”
- Experience “M-Business” life
- Experience security issues
- Compare with state of the discussion in research
- Feedback to designer and developers
- Influence future work environments



- **Multilateral Security**
 - Security, Trust and Privacy
 - Mobile Signatures
 - Personal Security Devices
- **Mobile Life, Work, and Business**
 - Location Based Services
 - Mobile Communities
- **M-Infrastructures**
 - Combination, Integration, Innovation
 - Standardisation, Regulation

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

Cancel

Call

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.

RMS 100

♦ Current Situation: **Private**

Accept Call?

Call with normal urgency
 For: Kai Rannenberg
 From: Herbert Damker
 Subject: Paper accepted!

Stop Ringing

Deny

Accept


i


+Show


Send


Call


X



 Names


 Dates


 Extras


 Undo


 Find


 Assist



RMS Denied Call (Caller Display)

- 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.

Define Situation 'Meeting'

<input type="checkbox"/>	Emergency	-> connect
<input type="checkbox"/>	Callback voucher	-> connect
<input type="checkbox"/>	Caller in group Colleagues	-> let caller decide Text: 'Request decision'
Else		-> deny Text: 'Not available'

Define Rule

In the situation 'Meeting'
my RMS should for ...

<input checked="" type="radio"/> all calls	<input type="radio"/> calls of class:
<input type="radio"/> business calls	<input type="radio"/> private calls

... and ...

<input type="radio"/> no caller ID
<input type="radio"/> caller want to be anonymous
<input checked="" type="radio"/> callback voucher
<input type="radio"/> caller in group:
<input type="radio"/> caller is:
<input type="radio"/> every caller
<input type="radio"/> Emergency

... do the following:

<input checked="" type="radio"/> connect
<input type="radio"/> deny
<input type="radio"/> divert to:
<input type="radio"/> require surety of \$10 and connect
<input type="radio"/> require subject and connect
<input type="radio"/> let caller decide
<input type="radio"/> require caller ID

Text to send: -



- **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

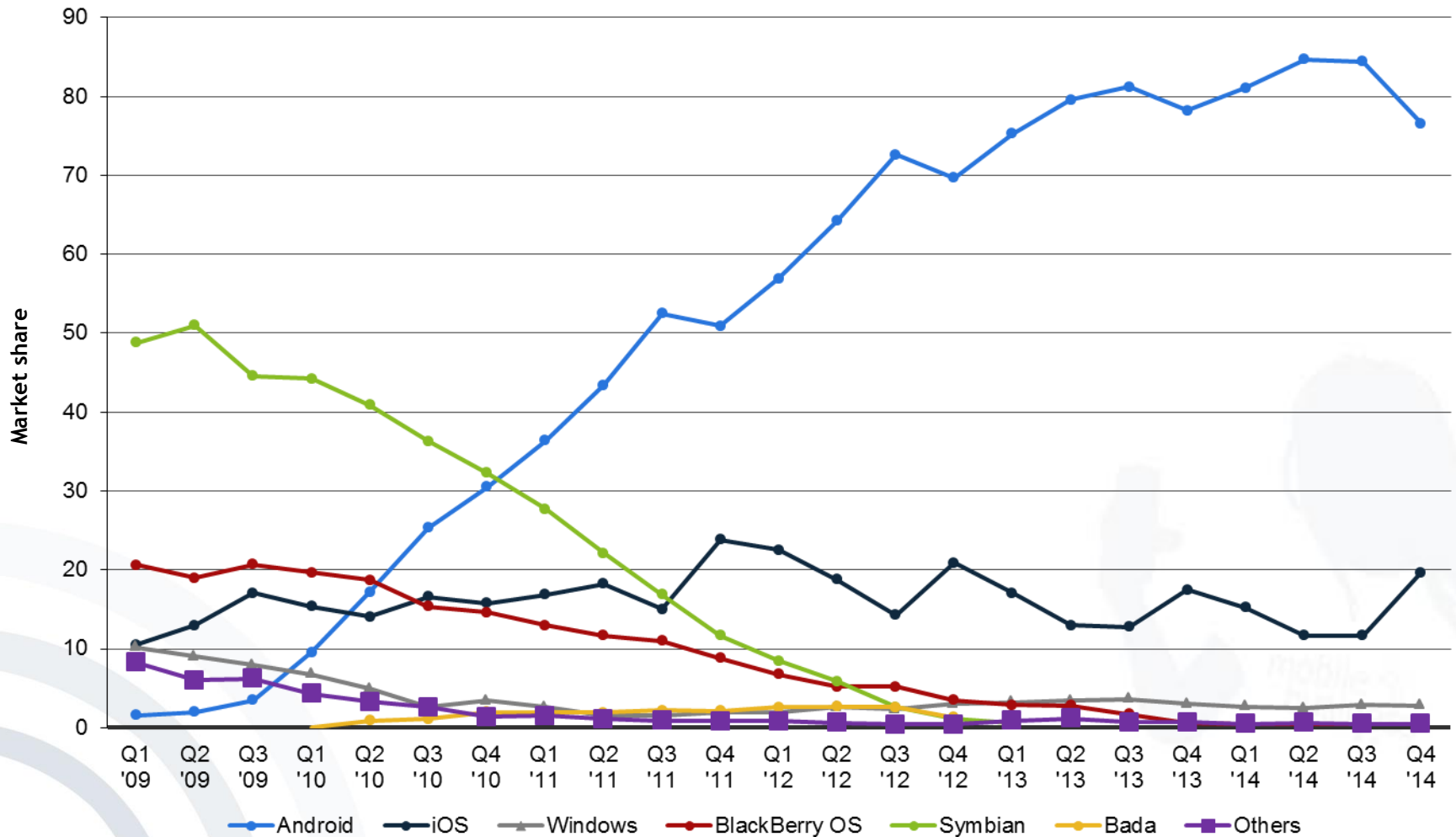
User demands

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

Many more *design* hints



Worldwide Smartphone Sales to End Users by Operating System (2009-2014)



Mobile Applications are getting more and more popular

- Over 1.400.000 Applications in Apple's App-Store in February 2015 (over 725.000 native iPad Apps)
- Centralised marketplace for software
- Several (dis)advantages compared with websites like
 - Access to hardware resources (like GPS)
 - Offline functionalities
 - Has to be developed for each OS individually
 - Mobile Native Apps vs. Mobile Web Apps
- HTML5 may integrate the advantages of Apps and mobile websites



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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, ...

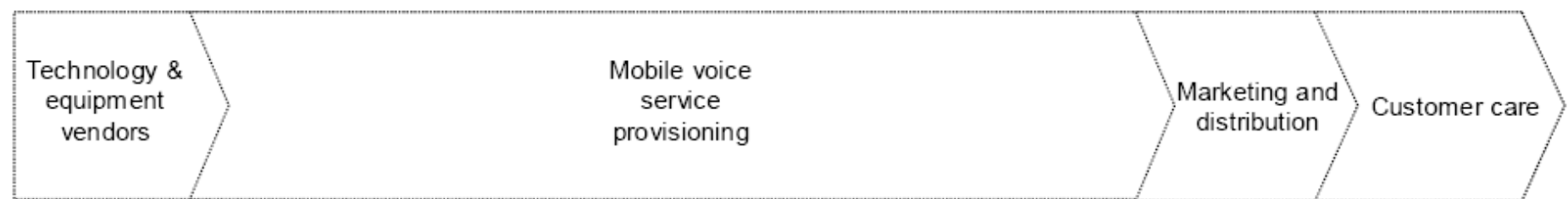
Cisco,...

Telekom
Vodafone
...

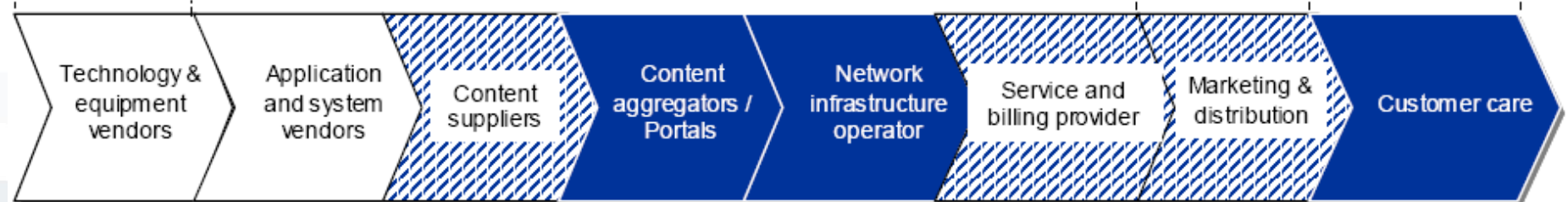
MS,
IBM,
...

MS,
SAP,
Telekom,
Google
...

TRADITIONAL VALUE CHAIN OF MOBILE SERVICE DELIVERY



EMERGING MOBILE OPERATOR VALUE CHAIN



Primary opportunity for operator
 Some opportunity
 Opportunity through alliances

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

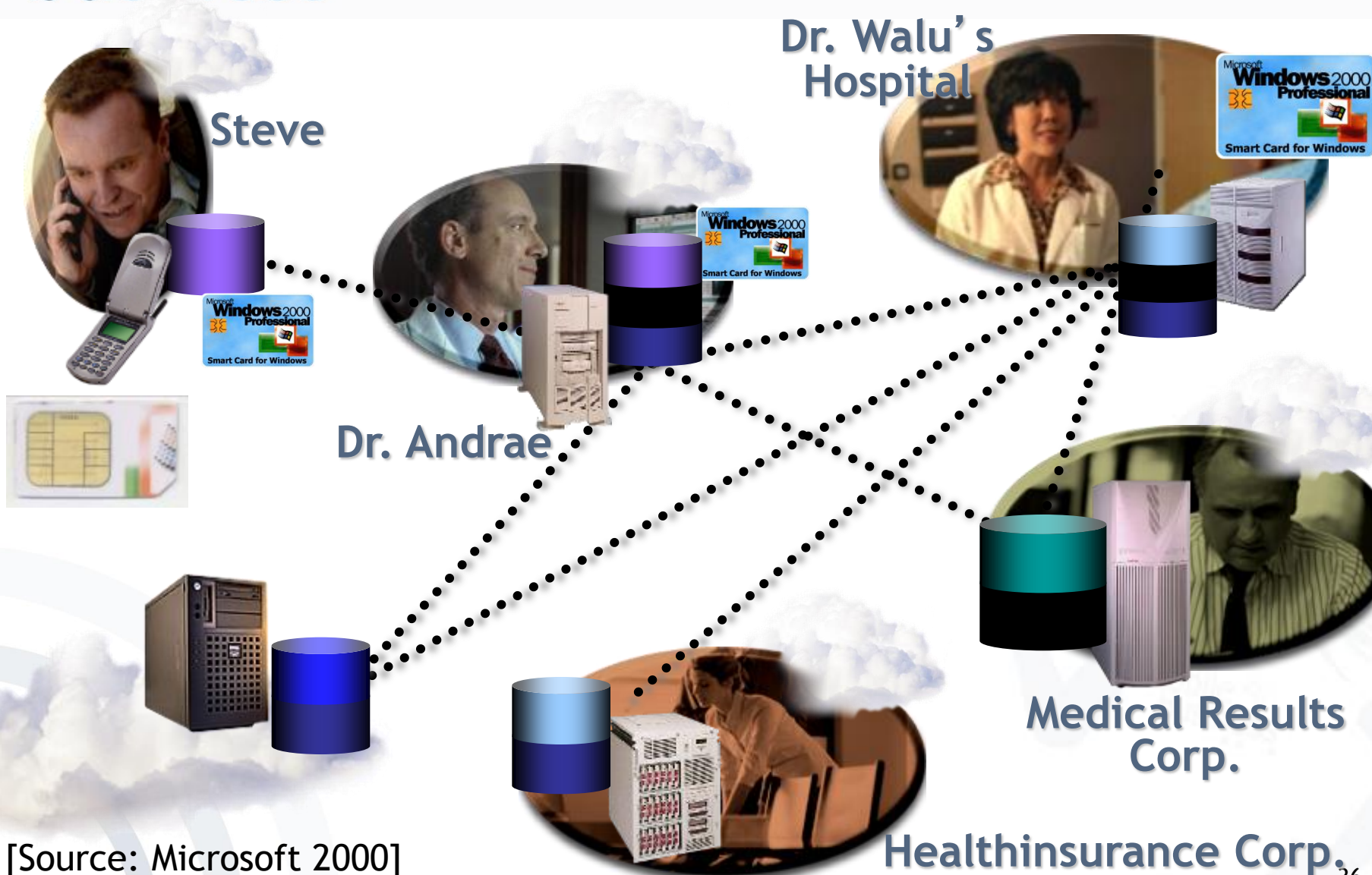


video

[Source: Microsoft]

mobile business

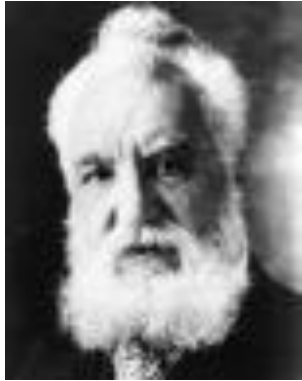
Parties Involved



[Source: Microsoft 2000]

History of Mobile Business

Early Approaches



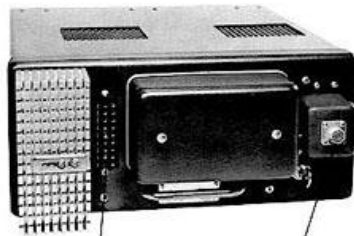
- February 14, 1876. Alexander Graham Bell, a Scotch deaf-mute teacher, patents his telephone (no. 174.465).
- June 17, 1946. AT&T and Southwestern Bell introduce MTS (mobile radio telephone service) in St. Louis, Missouri.



DIAL CONTROL UNIT



MANUAL CONTROL UNIT

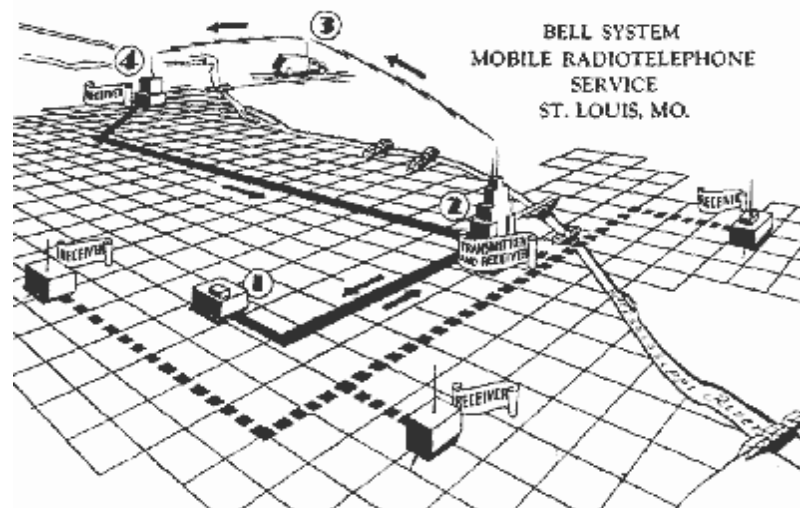


POWER/CONTROL CONNECTOR



ANTENNA CONNECTOR

ANTENNA



History of Mobile Business

Early German Mobile Networks

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

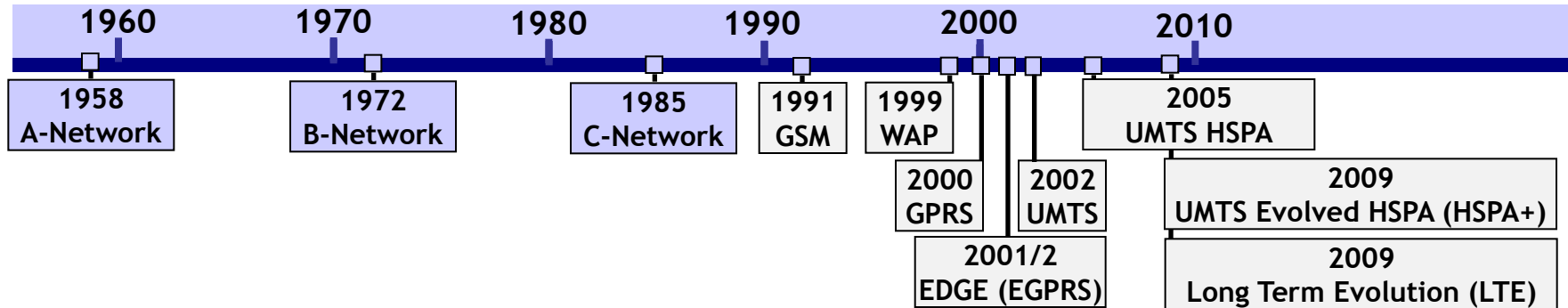


- Since 1981 NMT-450 (Nordic Mobile Telephone) in Norway, Sweden, Saudi Arabia, Denmark, Finland, ...



- 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

First analog mobile radio system in Germany: Switching was done manually. Discontinued 1977



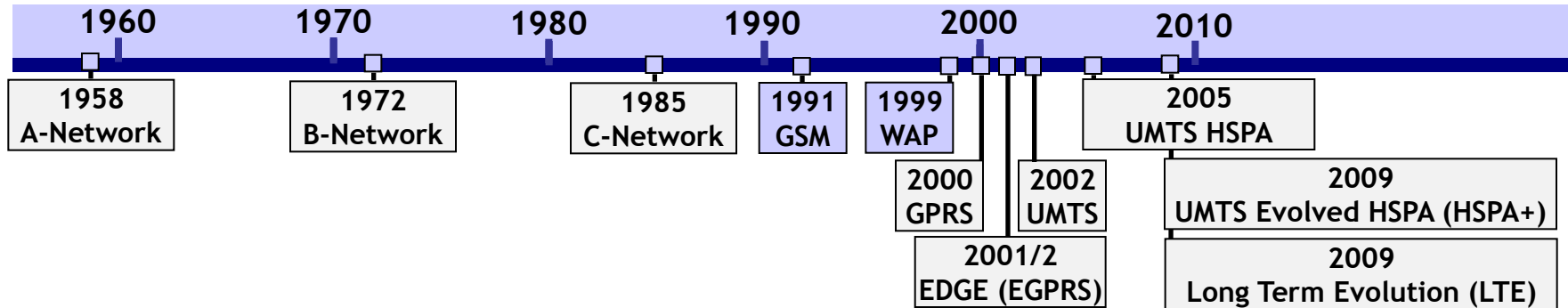
B-Network

Further development of the A-Network: The caller who wanted to reach a mobile station had to know the other's location. Discontinued 1994-12-31



C-Network

Analog, cellular mobile radio network of Deutsche Telekom. Discontinued 2000-12-31



GSM

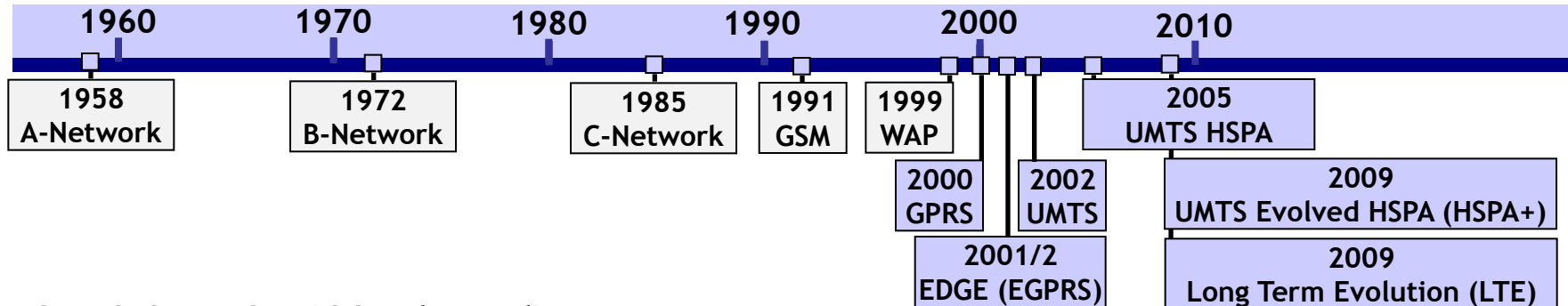
The technical standard for digital mobile radio networks in more than 100 countries; GSM includes data transfer services.

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 and Exercises

14.04.2015	L01	Introduction	Lecture
15.04.2015	L02	Cryptography	Lecture
21.04.2015	L03	Positioning Methods for Location-based Services	Lecture
28.04.2015	L04	LBS Business Models & Use Cases	Lecture
29.04.2015	L05	M-Payment I	Lecture
05.05.2015	E01	Cryptography	Exercise
12.05.2015	G01	tbd - Guest Lecture	Guest Lecture
13.05.2015	E02	LBS and Mobile Communities	Exercise
19.05.2015	L06	M-Payment II	Lecture
26.05.2015	G02	App Markets and App Development - Guest Lecture by Marco Benninghaus	Guest Lecture
27.05.2015	G03	tbd - Guest Lecture by Michael Pachmajer	Guest Lecture
02.06.2015	L07	Mobile Surveillance, Data Protection, and Identity Management	Lecture
09.06.2015	L08	(Mobile) Electronic Signatures	Lecture
10.06.2015	L09	Regulation of (mobile) Telecommunications	Lecture
16.06.2015	L10	Regulation by Licensing	Lecture
23.06.2015	E03	Regulation of (mobile) Telecommunications	Exercise
24.06.2015	E04	tbd	Exercise
30.06.2015	L11	Design of Mobile Applications & Services: HCI Issues	Lecture
07.07.2015	L12	Evaluation of Mobile Application & Service Designs	Lecture
08.07.2015	L13	Current Research Topics	Lecture
14.07.2015	Q&A	TBA	Exercise / Lecture

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search.epnet.com/login.asp
www.jstor.org



Online search engines:

scholar.google.com
academic.live.com

Microsoft (2000) Materials for the Introduction of .Net

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.

Statista2014a

<http://de.statista.com/statistik/daten/studie/73662/umfrage/marktanteil-der-smartphone-betriebssysteme-nach-quartalen/>