Business Informatics 2 (PWIN)
SS 2017

Introduction & Course Organization

Prof. Dr. Kai Rannenberg

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

- **Introduction of the Chair**

- **Course Organization**

- **Scope and Outline of the Course**

- **Introduction to Information & Communication Systems**

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

Deutsche Telekom Chair of Mobile Business & Multilateral Security

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Vita of Prof. Dr. 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

Fatbardh
Veseli

Welderufael
Tesfay

Ahmed Yesuf

Christopher Schmitz

David Harborth

Majid Hatamian

Iulia Bastys

Akos Grosz

Research Fellows & External PhD Students

Markus Tschersich

Mike Radmacher

Andreas Albers

Stefan Weiss

Shuzhe Yang

André Deuker

Gökhan Bal

Sascha Koschinat

Ahmad Sabouri

Tim Schiller

Niels Johannsen

Thomas Leiber

Christian Weber

Stephan Heim
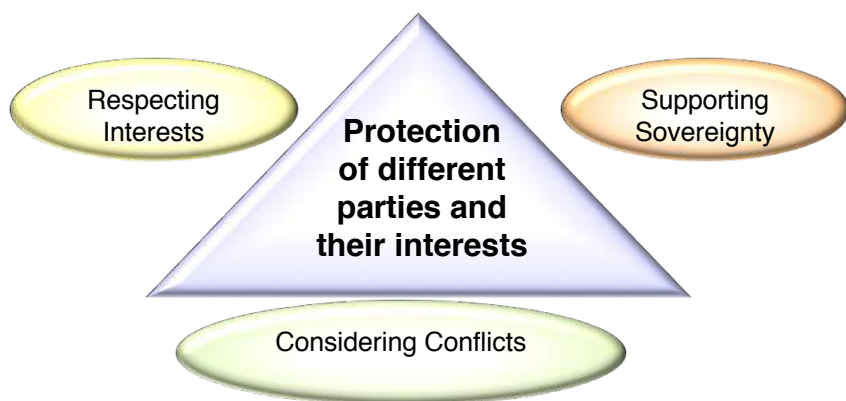
Office:

Elvira Koch

Email: elvira.koch@m-chair.de
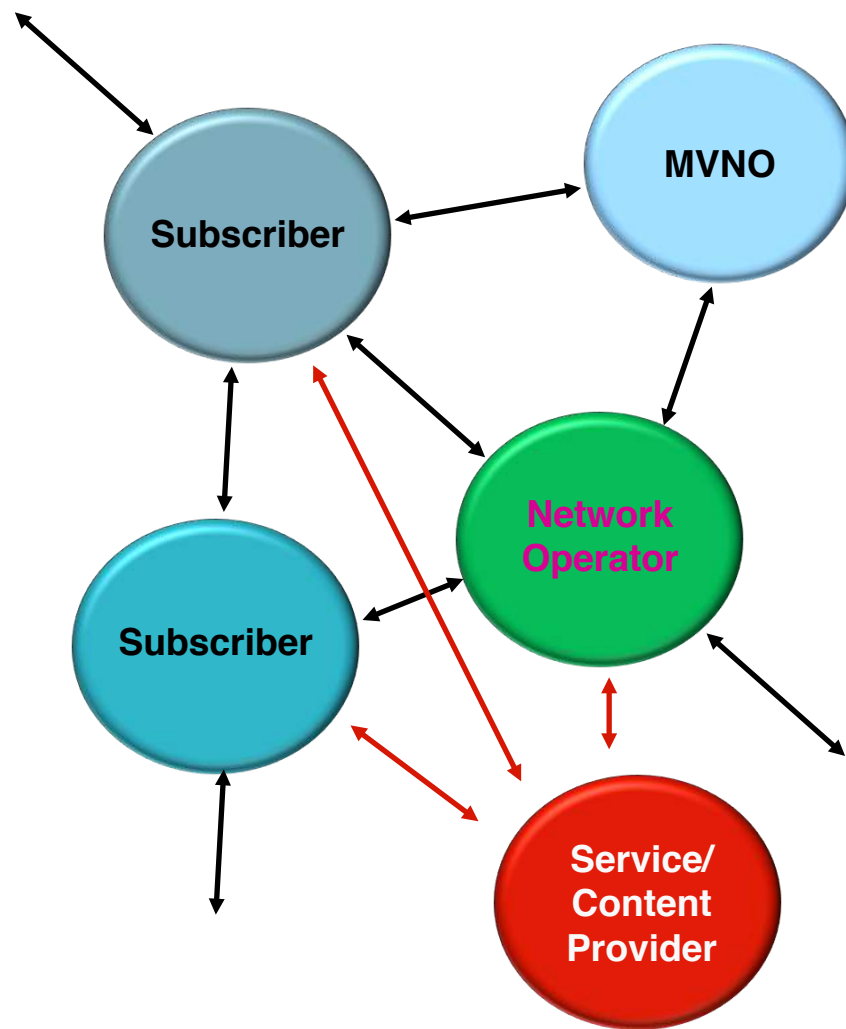
Office Hours: Mo.-Fr. 10:00-12:00 &
                             13:00-14:00

Different Parties with different Interests

- Customers/Merchants
- Communication partners
- Citizens/Administration

Respecting Interests

Protection of different parties and their interests

Supporting Sovereignty

Considering Conflicts

... in a world of consortia
- more partners
- more complex relations

Subscriber

MVNO

Subscriber

Network Operator

Service/ Content Provider

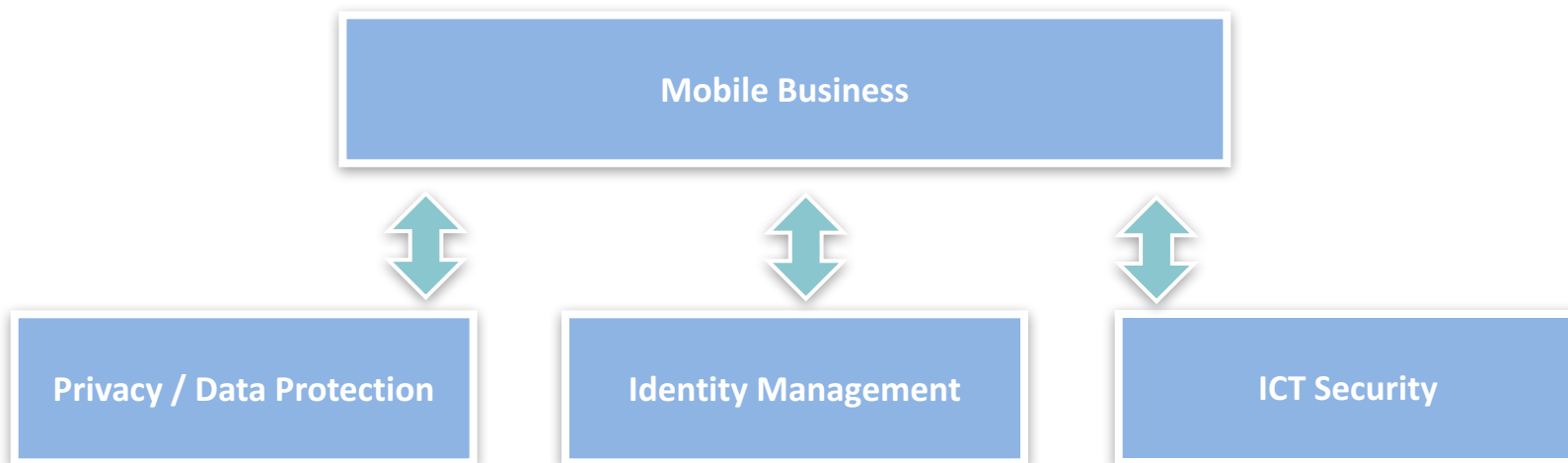|	SS 2017	WS 2017/18
Bachelor	*Course* **Business Informatics 2 (PWIN)**	*Course* **Business Informatics 2 (PWIN)**

Master	*Course*
	 Mobile Business II:
	    Application Design, Applications, Infrastructures and Security
	
	 Privacy vs. Data:
	    Business Models in the digital, mobile Economy
	
	 Seminar
	 Augmented Reality: "The Next Big Thing"
	
	 Project seminar
	 Privacy in Smartphone Ecosystems
		Course
		 Mobile Business I:
		    Technology, Markets, Platforms and Business Models
		
		 Seminar/Project seminar
		 Privacy in the Digital World
		
		 Seminar
		 TBA

- ## Master of Science in Betriebswirtschaftslehre

  http://www.wiwi.uni-frankfurt.de/?id=96

- ## Master in Wirtschaftsinformatik

  http://www.informatik.uni-frankfurt.de/index.php/de/studierende-studiengaenge/studierende-
  studiengaenge-master-wirtschaftsinformatik.html

M-Chair Research Statement

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

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                    ┌─────────────────────────────────────┐
                    │          Mobile Business            │
                    └─────────────────────────────────────┘
                         ↕              ↕              ↕
  ┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
  │ Privacy / Data   │   │ Identity         │   │ ICT Security     │
  │ Protection       │   │ Management       │   │                  │
  └──────────────────┘   └──────────────────┘   └──────────────────┘
```

Overview of M-Chair Research Areas & Projects

- **Potential:** Mobile network operators have a customer relation with most of the German population!

- **Offering:** Mobile network operators are providing service providers with a communication channel to potential customers.

- **Motivation:** Service providers gain higher, mobile initiated revenues in their business.

- **Objective:** Eliminating data costs for customers while making them marketing costs for service providers.
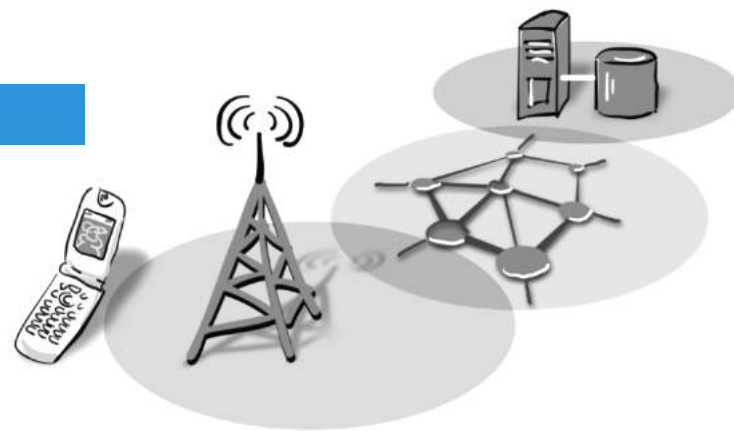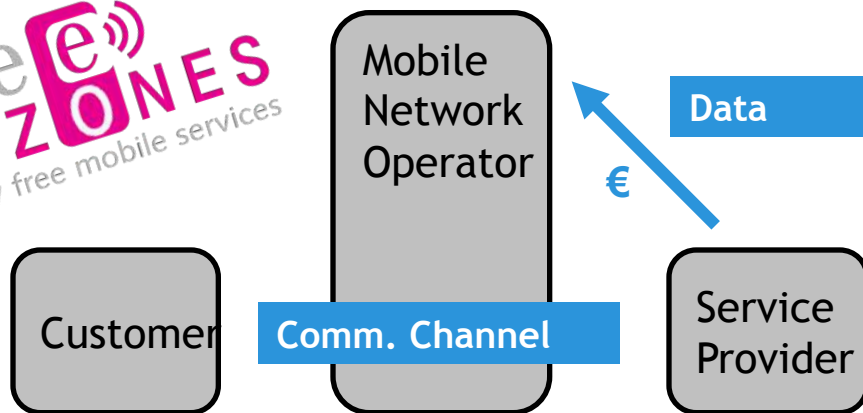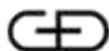
PREMIUM Services Project (Completed in 2011)

Research on Pricing Mechanisms for Context-sensitive Mobile Consumer Contacts offered to Mobile Advertisers

▪Design of dynamic, interactive pricing mechanism to address the unique characteristics of Context-sensitive Mobile Consumer Contacts

▪Development of an Evaluation Tool for Advertisers in order to determine the value of mobile consumers in their current usage situation

▪Implementation of Pricing Service Platform for the webservice-based provision of Pricing Mechanisms to SMEs (e.g. Online Webshops)

PrimeLife
(Completed in 2011)
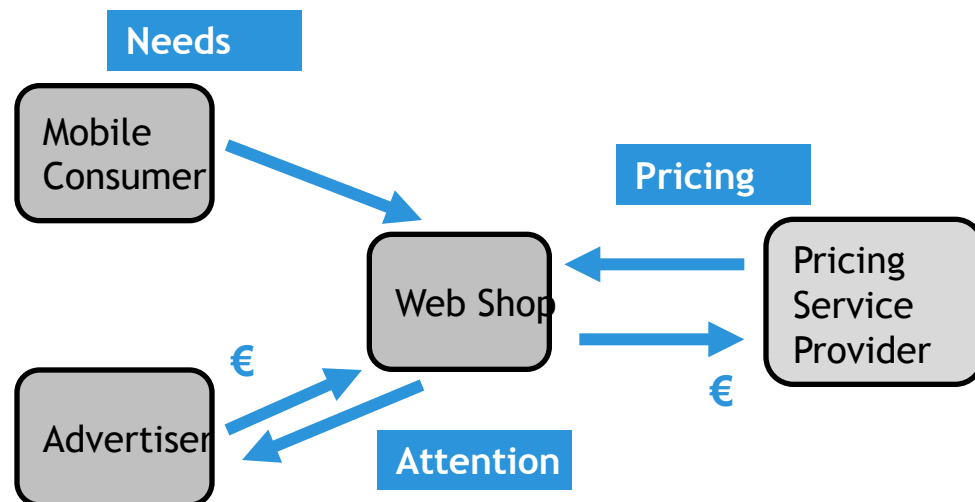
- EU FP7 Challenge "Secure, dependable and trusted Infrastructures"

- Integrated Project
- Planned for 3 years from 2008-03 (extended till 2011-06): Summit event at IFIP Sec 2011 Lucerne
- EC contribution : ~€ 10 Mio
- Partners
  - IBM, Microsoft, SAP, Giesecke & Devrient, W3C, and more...

- Providing Privacy *throughout Life*: Prime*Life*!
  - ... digital footprints left over lifetime
  - ... in emerging Internet applications
  - ... user-centric and configurable

- Making Privacy Real: Prime*Life*!
  - Making results of PRIME (FP6) and PrimeLife widely usable and deployed
  - Cooperating with other projects for transferring PRIME and PrimeLife technologies and concepts

- Advancing State-of-the-Art in Technology supporting Privacy and Identity Management
  - Mechanisms, HCI, Policies, Infrastructure

... Building on results and expertise of PRIME

# ABC4Trust (Completed in 2015) Overview and goals

- Attribute-based Credentials for Trust (ABC4Trust)
- Nov. 2010 – Feb. 2015
- Objectives:
  - Abstraction of concepts of privacy-ABCs & unification of features
  - A common unified architecture
    - Independent from the specific technologies
    - Enabling the federation of privacy-ABC Systems based on different technologies
    - Enabling interoperability between different privacy-ABC technologies
- ➢ Avoid lock-in into one specific system
- ➢ Raise trust in privacy-ABC technologies

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

TECHNISCHE UNIVERSITÄT DARMSTADT

IBM

CTI computer technology institute & press

ABC4TRUST

ULD

Microsoft

MiRACLe

ALEXANDRA INSTITUTE

NOKIA

CryptoExperts WE INNOVATE TO SECURE YOUR BUSINESS

Eurodocs Your Digital Identification Business Partner

SÖDER HAMN!

- 1st Pilot – Privacy in Online Evaluation and Feedback Systems
  - Deployment: Patras University, Greece
  - Scenario: Students evaluate anonymously the courses they attended
- 2nd Pilot - Privacy in social communication fora
  - Deployment: Söderhamn Secondary School, Sweden
  - Scenario: Pupils communicate using pseudonyms on the school communication system

- Benefits of Privacy-ABCs
  - Privacy-ABCs are by default untraceable (no user-tracking)
  - Enable minimal disclosure (user reveals only the necessary information)
  - User can chose to stay anonymous or generate (unlimited number of) pseudonyms
  - Advanced security (no sharing of credentials, device-binding for extra protection)
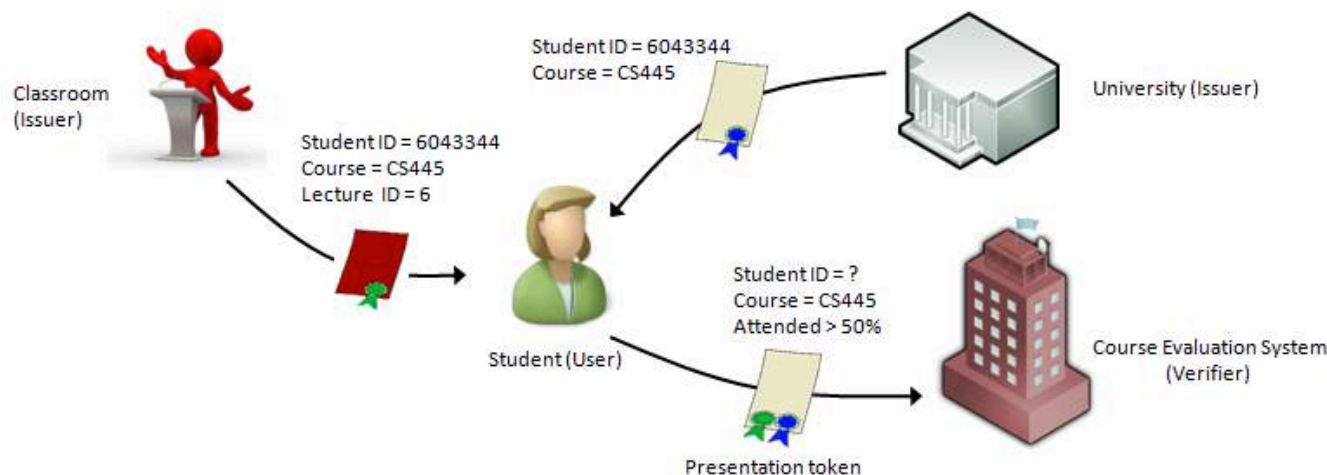
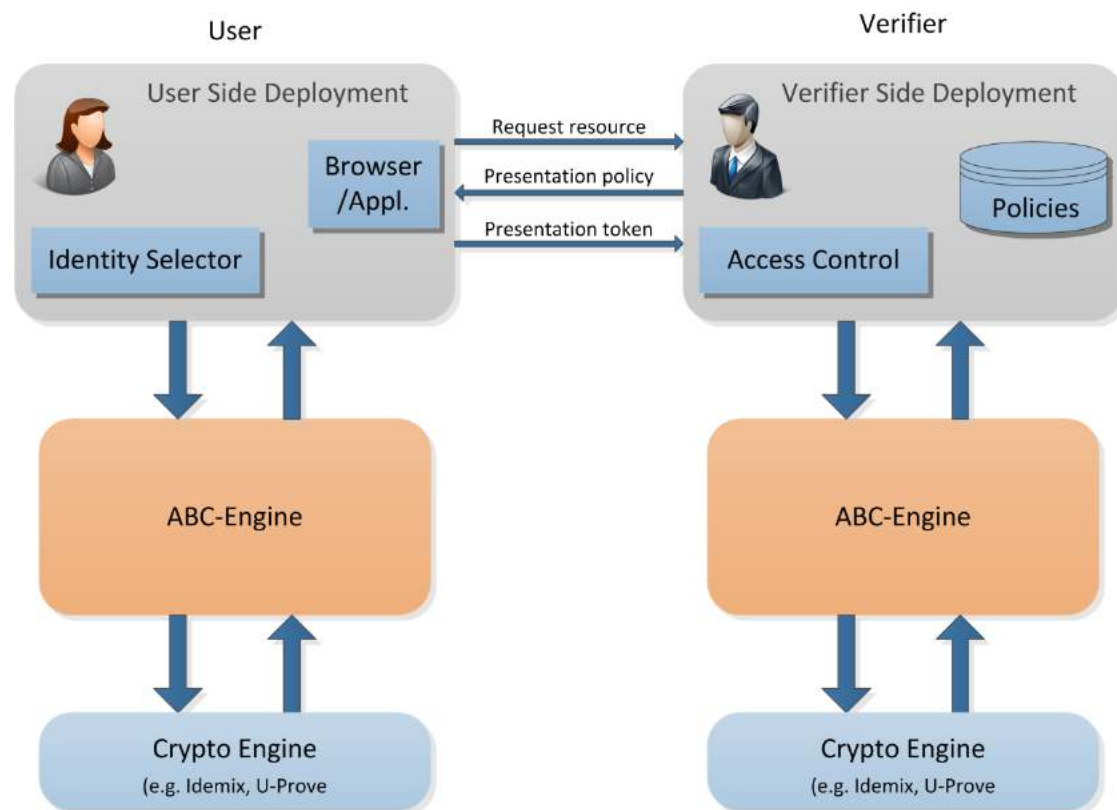## Reference implementation with ABC functionality

- coded in the ABC-Engine,
- exposed to the application layer as web-services,
- as open source

For developers

- Easier application development
- Cryptographic operations are abstracted away from

For users

- Only need to install a browser plug-in

- There is a constant increase of costs due to cyber attacks (hacking, industrial espionage, exploitation of loopholes).

- How to combine technical sciences, social sciences and state-of-the-art industry processes and tools to
    - predict complex attack scenarios spanning digital, physical, and social engineering aspects,
    - enable informed decisions on security investments,
    - reduce security incidents, and
    - increase resilience?

- **Project aims**
  - tool support for investments into cyber security controls
  - models and processes to analyse and visualize possible attacks
  - an attack navigator to systematically predict, prioritise, and prevent complex attacks
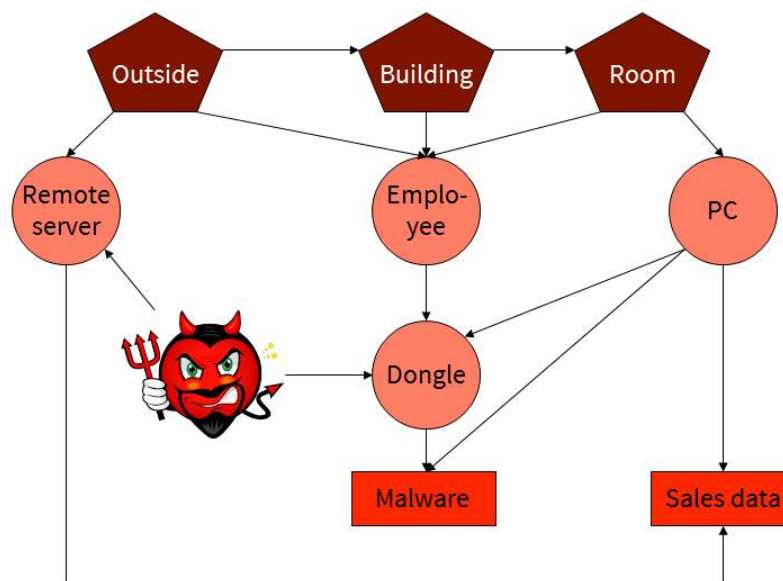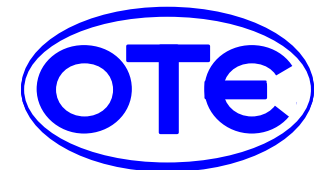
- Privacy and Usability (Privacy & Us)

- Dec. 2015 until Nov. 2019

- Objectives:
    - Develop ways to minimize the negative impact of personal information disclosure
    - Create awareness of the possible negative consequences of uncontrolled personal data disclosure
    - Develop and evaluate methods to assess risks and make informed decisions

- Since October 2015 for 3 years

Proposal acronym:	CREDENTIAL
Call addressed:	H2020-DS-2014-1 Digital Security: Cybersecurity, Privacy and Trust
Work programme topic:	DS-02-2014 Access Control

- *Vision*: develop, test, and **showcase innovative cloud-based services** for storing, managing, and sharing **digital identity information** and other highly critical **personal data** with a demonstrably **higher level of security** than other current solutions.

  - Secure, user-friendly, cloud-based identity management solution
  - Open, portable and broadly interoperable architecture

- Piloting in different domains
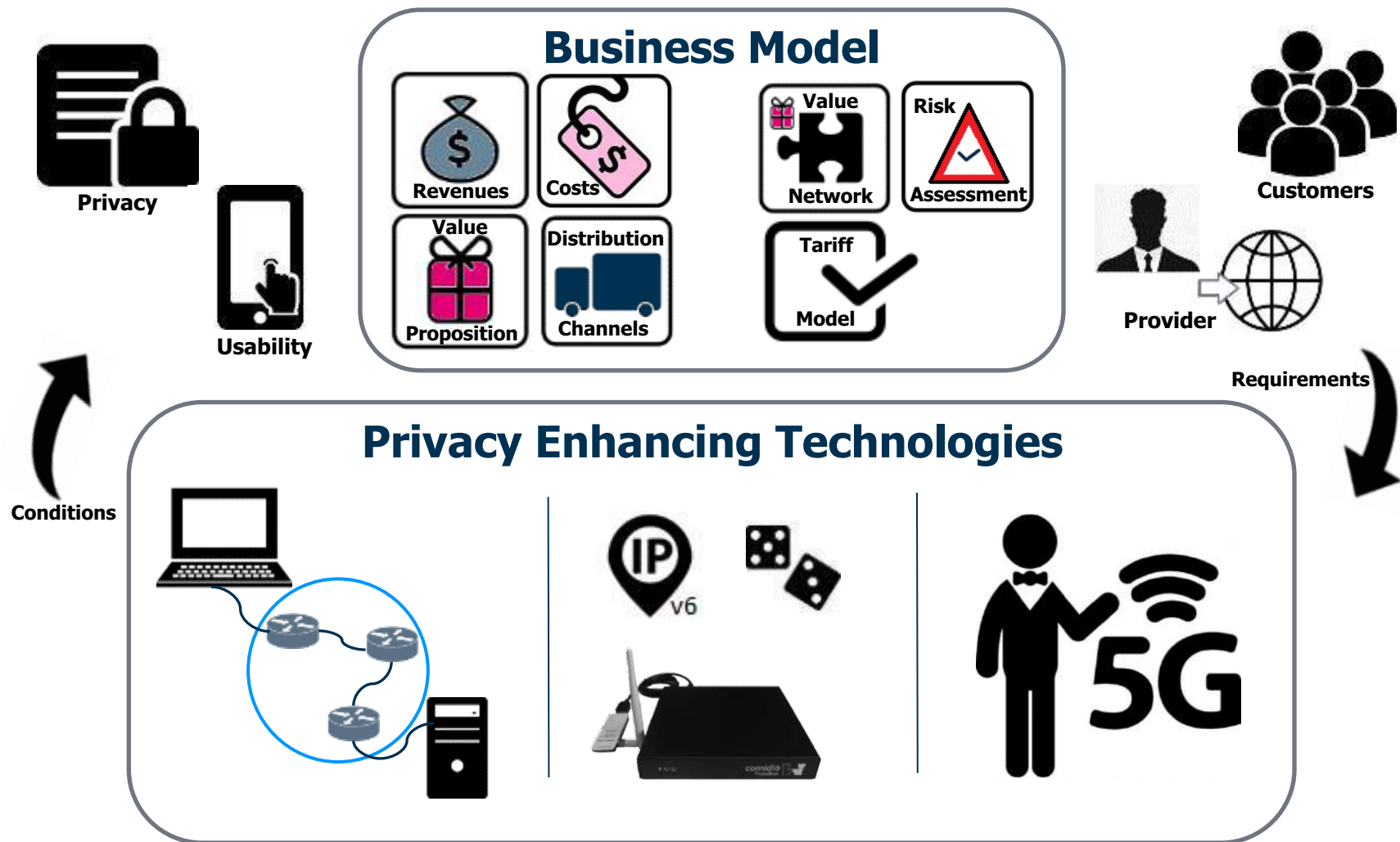 - e-government,
  - e-health, and
  - e-business

Part. No.	Participant organisation name	Abbr.	Country
1	AIT - Austrian Institute of Technology GmbH (Coordinator)	AIT	AT
2	Atos Spain S.A.	ATOS	ES
3	FOKUS Fraunhofer Institute for Open Communication Systems	FOKUS	DE
4	Johann Wolfgang Goethe-Universität Frankfurt	GUF	DE
5	Graz University of Technology	TUG	AT
6	Hellenic Telecommunications Organization S.A.	OTE	GR
7	INFOCERT S.p.A.	ICERT	IT
8	Karlstad University	KAU	SE
9	Klughammer GmbH	KGH	DE
10	Lombardia Informatica S.p.A.	LISPA	IT
11	Stiftung Secure Information and Communication Technologies	SIC	AT
12	Trustonic GmbH	TRU	DE
13	EuroCloud Europe a.s.b.l.	ECE	LU

- **Duration:** 08/2015 – 07/2018

- **Aim:** Protection of communication networks of small and medium sized energy providers.

- **Focus:** Balance between security and usability. Enable non-experts to detect and overview security risks.

- **Research I:** Development of security metrics and corresponding measuring methods.

- **Research II:** Creation of a cross-organisational knowledge-database for small and medium sized energy providers to improve availability and integrity of critical infrastructures against attackers.

AN.ON-next

- **Duration:** 01/2016 – 12/2018

- **Aim:** Create and integrate privacy-enhancing technologies into the internet infrastructure

- **Focus:** Establish PET in the mass market
  - Develop new or adapt existing business models
  - Standardize technologies
  - User study: How do users understand tariff and pricing models?
  - User study: What is the perceived relationship of service feature and accepted prices?
 - How can existing value creation architectures and operational models be adapted?

mobile business

Bundesministerium für Bildung und Forschung

AN.ON NEXT GENERATION

Business Model

Revenues

Costs

Value Network

Risk Assessment

Value Proposition

Distribution Channels

Tariff Model

Privacy

Usability

Customers

Provider

Requirements

Conditions

Privacy Enhancing Technologies

IP v6

5G

- **Selbstdatenschutz im Online Commerce**

- **Duration:** 04/2016 – 03/2019

- **Aim:** Enhance Privacy for Online Shopping

- **Focus:** Develop an online commerce solution with an architecture that enables pseudonymous online shopping, while respecting the interests of all stakeholders.
  - Modelling business processes
  - Considering especially the requirements of the web shop providers since they are crucial for mass-market penetration
  - User studies concerning usability and business model development

Commodity chain

Virtual and real Ids

Standardisation and Regulation
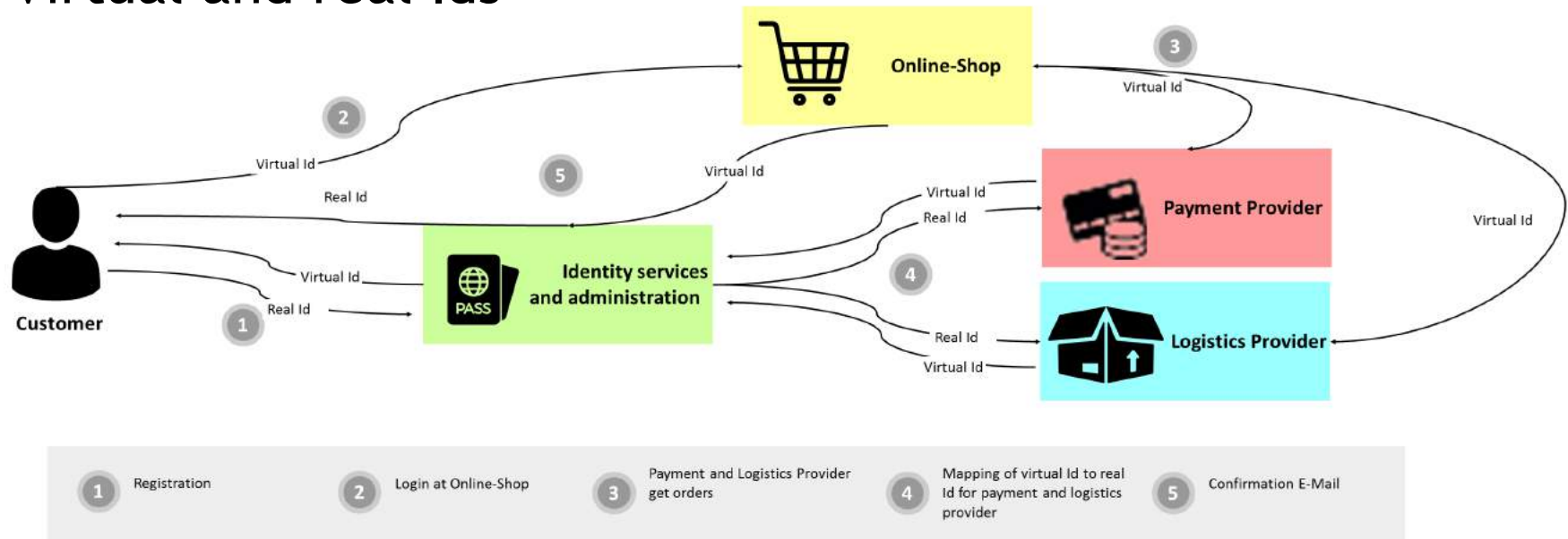
- **Multilateral Security, Privacy, and Identity Management in**
    - IT Security Evaluation
        - Criteria (IS 15408, Common Criteria)
        - Certification
    - Standardisation (in ISO/IEC JTC 1/SC 27)
        - WG 3: IT Security Evaluation Criteria
        - WG 5: Identity Management and Privacy Technologies

- **Standardisation and regulation (EU ENISA Management Board, …)**

Partners of the Chair

and many more ...

- Introduction of the Chair

- Course Organization

- Scope and Outline of the Course

- Introduction to Information & Communication Systems

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(christopher.schmitz@m-chair.de)

Akos Grosz, M.Sc.
(akos.grosz@m-chair.de)

E-Mail contact: win2@m-chair.de

Course Material and Additional Information

- **Course Slides**
  - Slides of the course can be downloaded from the website of the Chair at www.m-chair.de

- **Online News**
  - News about the course (e.g. room changes, announcements, etc.)
  - Available via website of Chair, RSS feed or e-Mail newsletter. For subscription, log onto www.m-chair.de

- Exercises
  - Presentation and discussion of exercise results
  - Addressing of open questions from the lectures
  - Preparation for final written exam

- „Mentorium"
  - Preparation, presentation and discussion of exercises in smaller groups of students

- All materials are going to be made available on the website of the Chair in advance and should be prepared by the students.

Written Final Exam

- Duration: 90 minutes
- 6 Credit Points
- Date of written exam is going to be posted on the examination office's website
- Exam language: German
- All lecture and exercise content is relevant unless it is explicitly excluded
- Previous written exams can be found at www.m-chair.de

- Acceptance of verified achievements of universities or universities of applied sciences and arts (located in Germany or foreign countries) is possible.

- Achievements from schools generally rejected:
  - Apprenticeships of grammar schools, secondary schools, technical colleges, etc.
  - Apprenticeships of vocational schools

Equivalence of prior Academic Achievements to this course

- Acceptance will be granted if it is verified that at least 75% of the contents of this course (incl. exercises) was covered and studied at a former university.

- In addition, the weekly number of hours of the course at the former university must be higher or equal to the hours of this course (2L+1E) in order to be accepted .

- The application documents have to consist of an outline of the passed course from the former university, a corresponding certificate and a table of the contents, which shows the overlap with this course (***structured by the outline of this course!***).
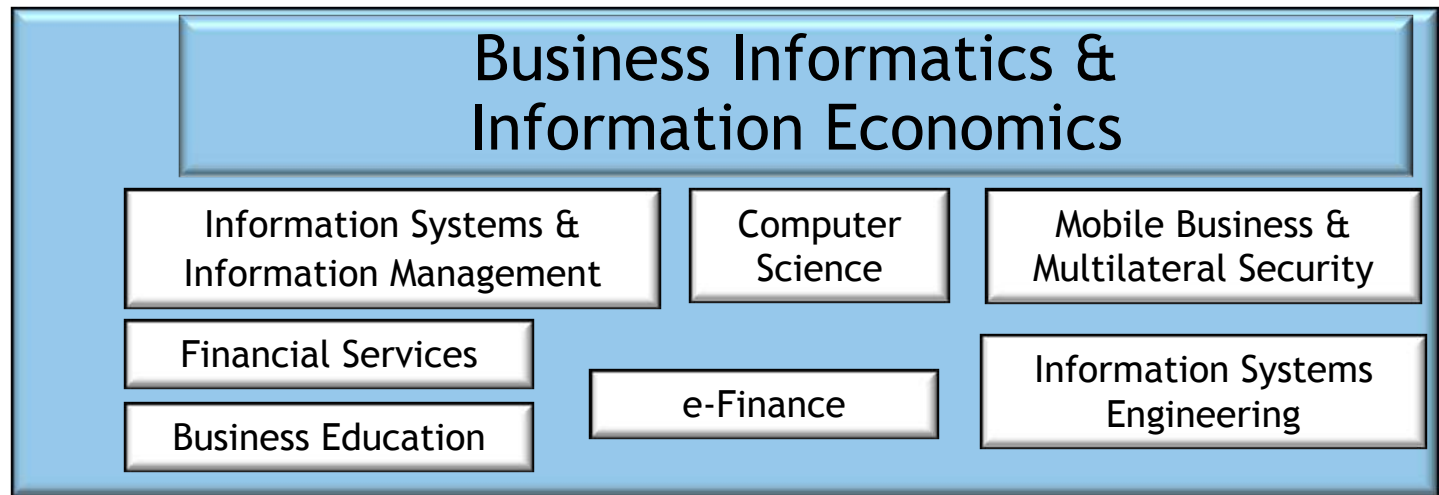
Addition Information Source

www.enzyklopaedie-der-wirtschaftsinformatik.de

- **Introduction of the Chair**

- **Course Organization**

- **Scope and Outline of the Course**

- **Introduction to Information & Communication Systems**

Integration of the Course into the Teaching of Business Informatics

Focus Phase

Business Informatics & Information Economics

| Information Systems & Information Management | Computer Science | Mobile Business & Multilateral Security |

Financial Services

e-Finance

Information Systems Engineering

Business Education

Advanced Phase

PWIN / Business Informatics II

Orientation Phase

OWIN / Business Informatics I

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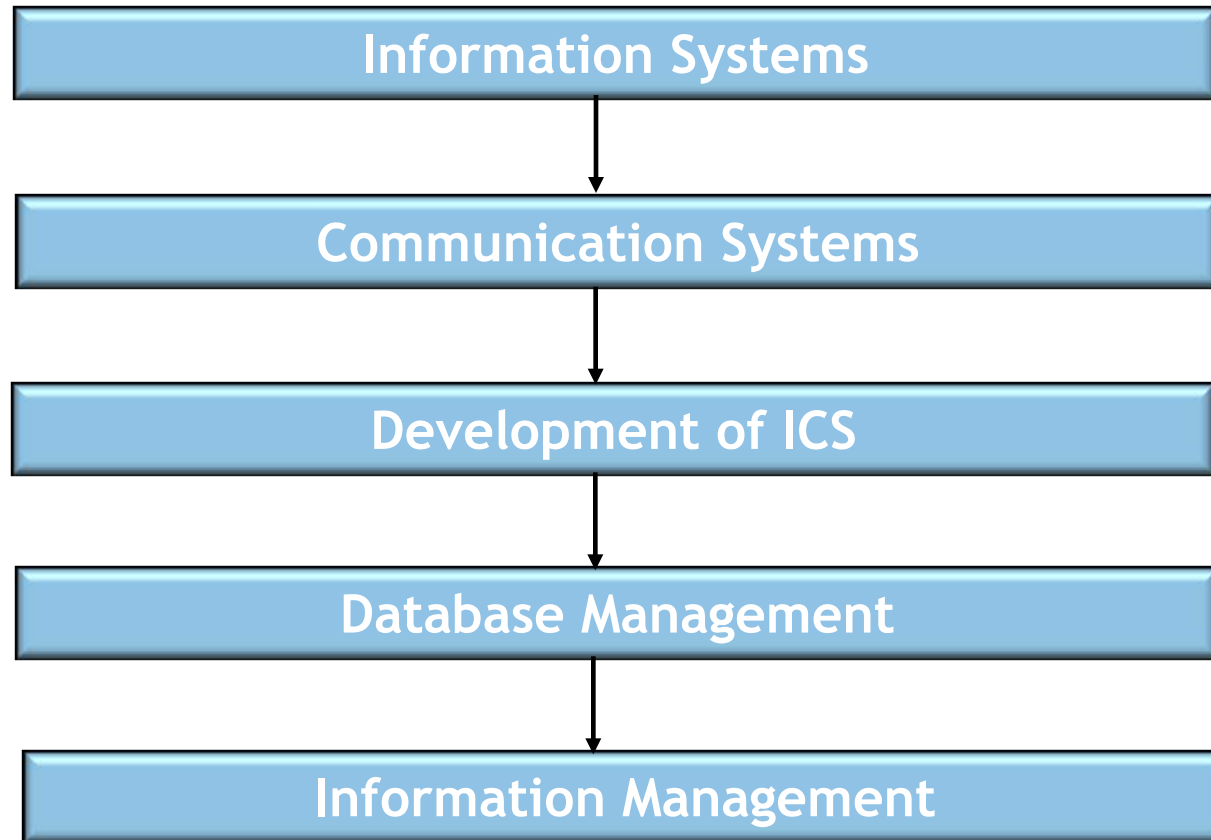
Components of the Course Business Informatics II (PWIN)

Information Systems

Purpose of and Research on Information Systems

Enterprise Modelling

Architectures of Information Systems

Mobile Information Systems

Components of the Course Business Informatics II (PWIN)

Communication Systems

Introduction to layer-based Communications

Fixed Networks

Wireless Networks

After NSA-gate the Internet will not be what it used to be

[Schneier 2013]

Components of the Course Business Informatics II (PWIN)

Development of ICS

- Management of IT-Projects
- Software Engineering
- Object Orientation & UML
- Markup Languages

Components of the Course Business Informatics II (PWIN)

Database Management

Databases

SQL

Information Management

Business Process Reengineering

Business Process Modeling

Outline (1)

Woche	Datum	Zeit	Raum	Veranstaltung
KW 17	Do, 27.04.2017	08:00 bis 10:00	HZ 4	Vorlesung 1
	Do, 27.04.2017	10:00 bis 12:00	HZ 4	Vorlesung 2
KW 18	Do, 04.05.2017	10:00 bis 12:00	HZ 4	Vorlesung 3
	Fr, 05.05.2017	10:00 bis 12:00	HZ 3	Übung 1
KW 19	Di, 09.05.2017	16:00 bis 18:00	SH 5.101	Mentorium 1
	Mi, 10.05.2017	10:00 bis 12:00	SH 5.101	Mentorium 1
	Mi, 10.05.2017	12:00 bis 14:00	SH 5.101	Mentorium 1
	Do, 11.05.2017	08:00 bis 10:00	HZ 4	Vorlesung 4
	Do, 11.05.2017	10:00 bis 12:00	HZ 4	Vorlesung 5
KW 20	Do, 18.05.2017	10:00 bis 12:00	HZ 4	Gastvorlesung 1
KW 21	Mi, 24.05.2017	08:00 bis 10:00	HZ 4	Vorlesung 6
	Mi, 24.05.2017	10:00 bis 12:00	HZ 4	Vorlesung 7
	Mi, 24.05.2017	18:00 bis 20:00	HZ 3	Vorlesung 8
KW 22	Do, 01.06.2017	10:00 bis 12:00	HZ 4	Übung 2
KW 23	Di, 06.06.2017	16:00 bis 18:00	SH 5.101	Mentorium 2
	Mi, 07.06.2017	10:00 bis 12:00	Cas 1.801	Mentorium 2
	Mi, 07.06.2017	12:00 bis 14:00	Cas 1.801	Mentorium 2
	Do, 08.06.2017	08:00 bis 10:00	HZ 4	Übung 3
	Do, 08.06.2017	10:00 bis 12:00	HZ 4	Übung 4

Outline (2)

Woche	Datum	Zeit	Raum	Veranstaltung
KW 24	Di, 13.06.2017	16:00 bis 18:00	SH 5.101	Mentorium 3
	Mi, 14.06.2017	10:00 bis 12:00	SH 5.101	Mentorium 3
	Mi, 14.06.2017	12:00 bis 14:00	SH 3.105	Mentorium 3
KW 25	Di, 20.06.2017	16:00 bis 18:00	SH 2.106	Mentorium 4
	Mi, 21.06.2017	10:00 bis 12:00	SH 0.106	Mentorium 4
	Mi, 21.06.2017	12:00 bis 14:00	SH 5.106	Mentorium 4
	Do, 22.06.2017	08:00 bis 10:00	HZ 4	Vorlesung 9
	Do, 22.06.2017	10:00 bis 12:00	HZ 4	Vorlesung 10
KW 26	Do, 29.06.2017	10:00 bis 12:00	HZ 4	Übung 5
KW 27	Mo, 03.07.2017	18:00 bis 20:00	Cas 823	Vorlesung 11
	Di, 04.07.2017	16:00 bis 18:00	SH 2.106	Mentorium 5
	Di, 04.07.2017	18:00 bis 20:00	HZ 3	Vorlesung 12
	Mi, 05.07.2017	10:00 bis 12:00	SH 5.101	Mentorium 5
	Mi, 05.07.2017	12:00 bis 14:00	SH 5.101	Mentorium 5
	Mi, 05.07.2017	18:00 bis 20:00	HZ 3	Vorlesung 13
	Do, 06.07.2017	08:00 bis 10:00	HZ 4	Übung 6
KW 28	Di, 11.07.2017	16:00 bis 18:00	SH 2.106	Mentorium 6
	Mi, 12.07.2017	10:00 bis 12:00	SH 0.106	Mentorium 6
	Mi, 12.07.2017	12:00 bis 14:00	SH 0.106	Mentorium 6
	Do, 13.07.2017	10:00 bis 12:00	HZ 4	Gastvorlesung 2
KW 29	Do, 20.07.2017	08:00 bis 10:00	HZ 4	Vorlesung Q&A

Agenda

- Introduction of the Chair

- Course Organization

- Scope and Outline of the Course

- Introduction to Information & Communication Systems

"[…] a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making, coordinating and control in an organization."

Source: Laudon, Laudon (2013), p. 35
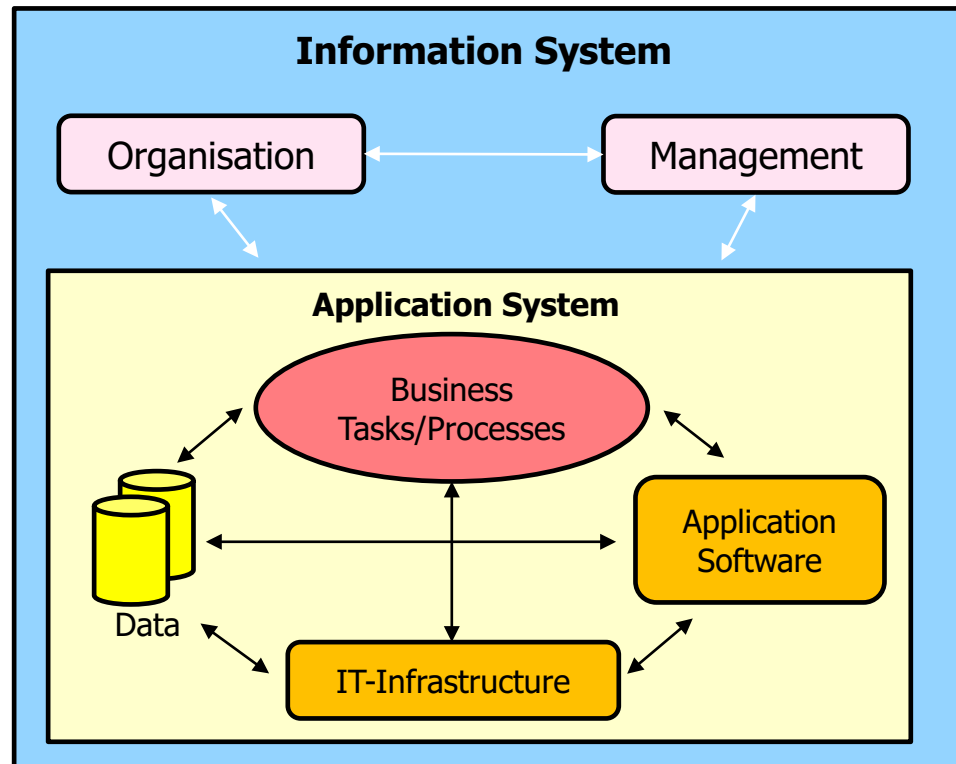
- **Information System (IS):**
  A system which was built to be used as part of an enterprise. It contains all relevant application systems and is embedded into the organisation and management of an enterprise.

- **Application System (AS):**
  A system, which consists of business tasks and processes it supports, the underlying IT-infrastructure, the application software and the data it required in order to accomplish its objectives.

Source: Laudon, K.C., Laudon, J.P., Schoder, D. (2010), p. 18.

Information System

Organisation ←→ Management

Application System

Business Tasks/Processes

Application Software

Data

IT-Infrastructure

Communication Systems

- A communication system is a collection of to each other compatible
    - Hardware (terminals, physical network components),
    - Software (operation systems, network protocols, application systems), and
    - Transmission protocols,

which allow an exchange of information – for example between different sites of an enterprise.
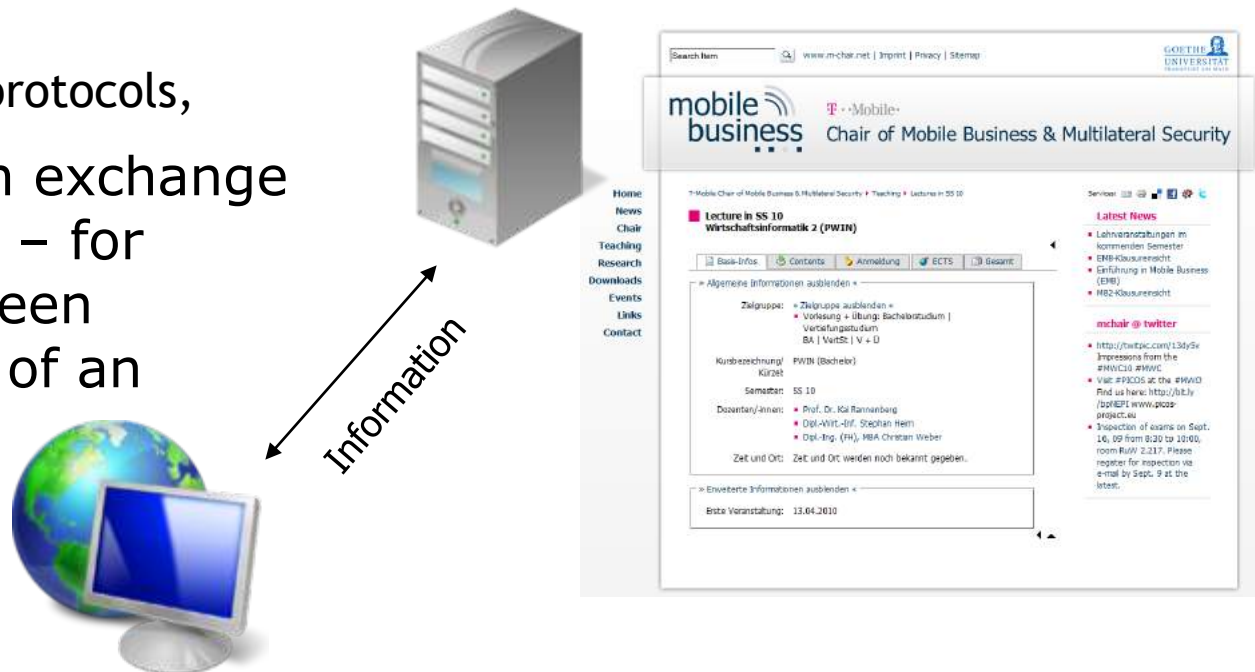
Information

Interplay of Information and Communication Systems

- **Information Systems (organizational orientation)**
    - Designed for a specific operational area of responsibility
    - Considers organisational and basic personal requirements
    - Supports decision making, coordination, controlling and monitoring in enterprises, but even more aids managers and employees to analyse problems, understand complex business cases and develop new products.

- **Communication Systems (technical orientation)**
    - Physical networking
    - Transmission media
    - Hardware and software

Literature

- Laudon, K.C., Laudon, J.P., Schoder, D. (2010) „Wirtschaftsinformatik – Eine Einführung", Peason Studium, München.

- Laudon, K. C.; Laudon, J. P. (2013): *Essentials of Management Information Systems. 10th* Edition, Pearson Education Limited, Kendallville.

- Schneier, Bruce (2013): *The US government has betrayed the internet. We need to take it back.* www.theguardian.com/commentisfree/2013/sep/05/government-betrayed-internet-nsa-spying