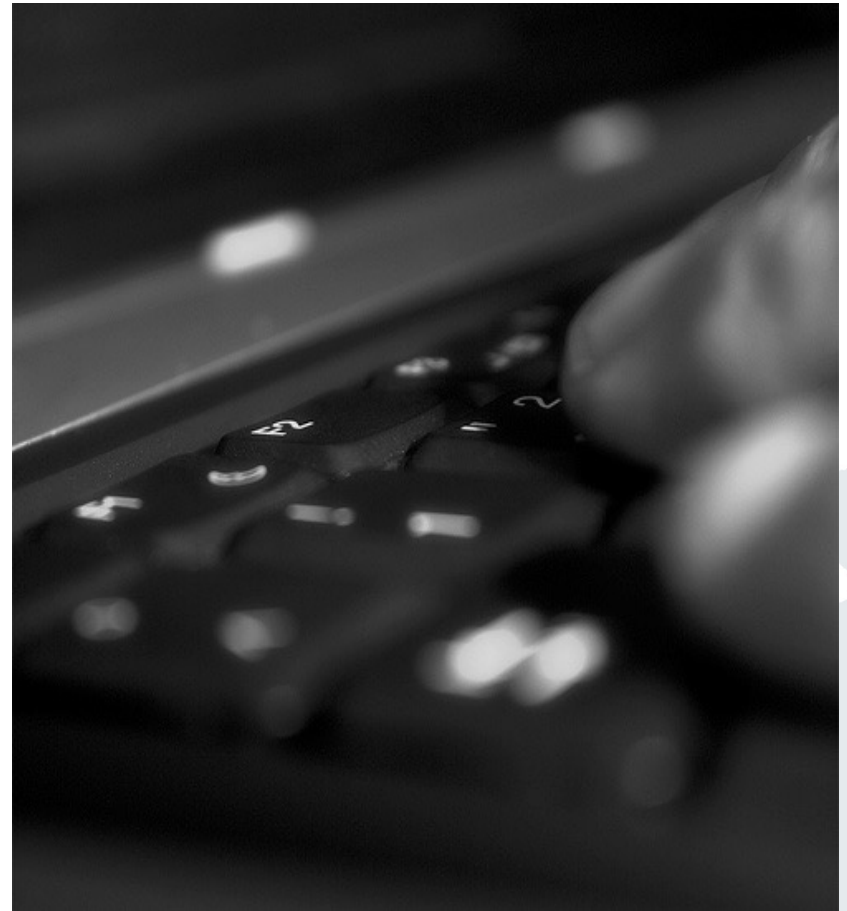


## Exercise 1 Business Informatics 2 (PWIN)

Information Systems  
WS 2023/24

Prof. Dr. Kai Rannenberg  
[www.m-chair.de](http://www.m-chair.de)



Jenser (Flickr.com)

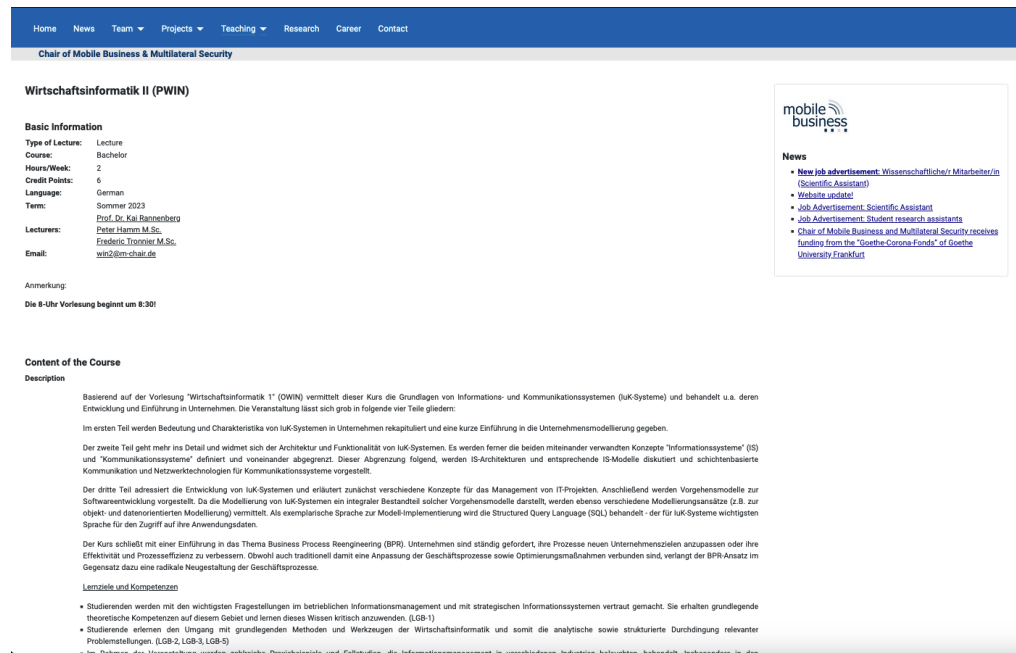
Sascha Löbner, M.Sc.  
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Frédéric Tronnier, M.Sc.  
(frederic.tronnier@m-chair.de)

E-Mail contact: [win2@m-chair.de](mailto:win2@m-chair.de)

- **Course Slides**
  - Slides of the course can be downloaded from the website of the Chair at [www.m-chair.de](http://www.m-chair.de)
  
- **Online News**
  - News about the course (e.g. room changes, announcements, etc.)
  - Available via website of Chair




The screenshot shows the website for the Chair of Mobile Business & Multilateral Security. The navigation bar includes links for Home, News, Team, Projects, Teaching, Research, Career, and Contact. The main content area is titled 'Wirtschaftsinformatik II (PWIN)' and contains the following sections:

- Basic Information:**
  - Type of Lecture: Lecture
  - Course: Bachelor
  - Hours/Week: 2
  - Credit Points: 6
  - Language: German
  - Term: Sommer 2023
  - Lecturers: Prof. Dr. Kai Riemannberg, Peter Hamon M.Sc., Frederic Toonier M.Sc.
  - Email: [wit2@m-chair.de](mailto:wit2@m-chair.de)
- Anmerkung:** Die 8-Uhr Vorlesung beginnt um 8:30!
- Content of the Course:**
  - Description:**

Basierend auf der Vorlesung "Wirtschaftsinformatik 1" (WIN1) vermittelt dieser Kurs die Grundlagen von Informations- und Kommunikationssystemen (IuK-Systeme) und behandelt u.a. deren Entwicklung und Einführung in Unternehmen. Die Veranstaltung lässt sich grob in folgende vier Teile gliedern:

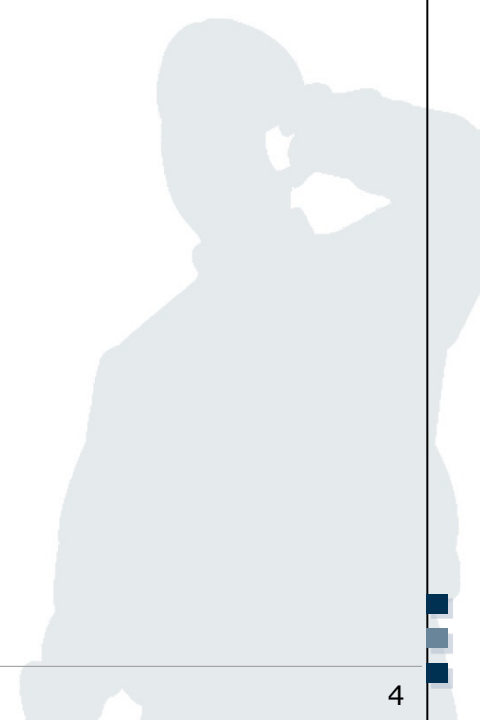
    - Im ersten Teil werden Bedeutung und Charakteristika von IuK-Systemen in Unternehmen rekapituliert und eine kurze Einführung in die Unternehmensmodellierung gegeben.
    - Der zweite Teil geht mehr ins Detail und widmet sich der Architektur und Funktionalität von IuK-Systemen. Es werden ferner die beiden miteinander verwandten Konzepte "Informationssysteme" (IS) und "Kommunikationssysteme" definiert und voneinander abgegrenzt. Dieser Abgrenzung folgend, werden IS-Architekturen und entsprechende IS-Modelle diskutiert und schichtenbasierte Kommunikation und Netzwerktechnologien für Kommunikationssysteme vorgestellt.
    - Der dritte Teil adressiert die Entwicklung von IuK-Systemen und erläutert zunächst verschiedene Konzepte für das Management von IT-Projekten. Anschließend werden Vorgehensmodelle zur Softwareentwicklung vorgestellt. Da die Modellierung von IuK-Systemen ein integraler Bestandteil solcher Vorgehensmodelle darstellt, werden ebenso verschiedene Modellierungsansätze (z.B. zur objekt- und datenorientierten Modellierung) vermittelt. Als exemplarische Sprache zur Modellimplementierung wird die Structured Query Language (SQL) behandelt - der für IuK-Systeme wichtigsten Sprache für den Zugriff auf ihre Anwendungsdaten.
    - Der Kurs schließt mit einer Einführung in das Thema Business Process Reengineering (BPR). Unternehmen sind ständig gefordert, ihre Prozesse neuen Unternehmenszielen anzupassen oder ihre Effektivität und Prozesseffizienz zu verbessern. Obwohl auch traditionell damit eine Anpassung der Geschäftsprozesse sowie Optimierungsmaßnahmen verbunden sind, verlangt der BPR-Ansatz im Gegensatz dazu eine radikale Neugestaltung der Geschäftsprozesse.
  - Lernziele und Kompetenzen:**
    - Studierenden werden mit den wichtigsten Fragestellungen im betrieblichen Informationsmanagement und mit strategischen Informationssystemen vertraut gemacht. Sie erhalten grundlegende theoretische Kompetenzen auf diesem Gebiet und lernen dieses Wissen kritisch anzuwenden. (LGB-1)
    - Studierende erlernen den Umgang mit grundlegenden Methoden und Werkzeugen der Wirtschaftsinformatik und somit die analytische sowie strukturierte Durchdringung relevanter Problemstellungen. (LGB-2, LGB-3, LGB-5)
    - Im Rahmen der Veranstaltung werden relevante Fachzeitschriften und Studien zur Informationswissenschaft in verschiedenen Sprachen beherrscht, behandelt, insbesondere in der...



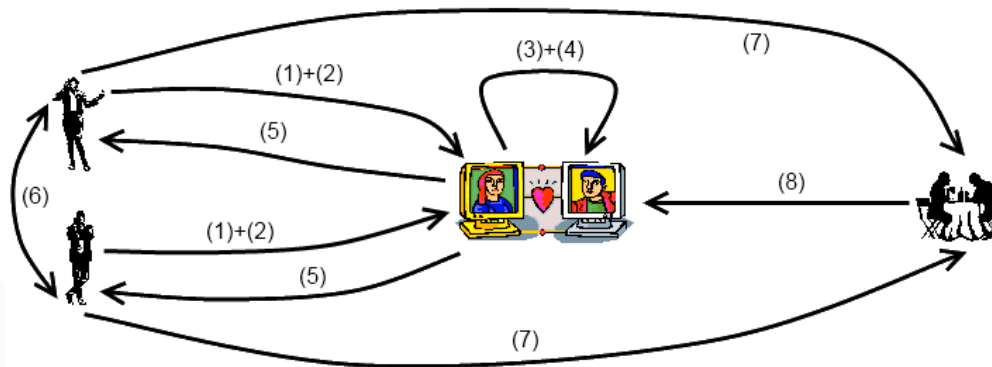
**News**

- [New job advertisement: Wissenschaftlicher Mitarbeiter/in \(Scientific Assistant\)](#)
- [Website update!](#)
- [Job Advertisement: Scientific Assistant](#)
- [Job Advertisement: Student research assistants](#)
- [Chair of Mobile Business and Multilateral Security receives funding from the "Goethe-Corona-Fonds" of Goethe University Frankfurt](#)

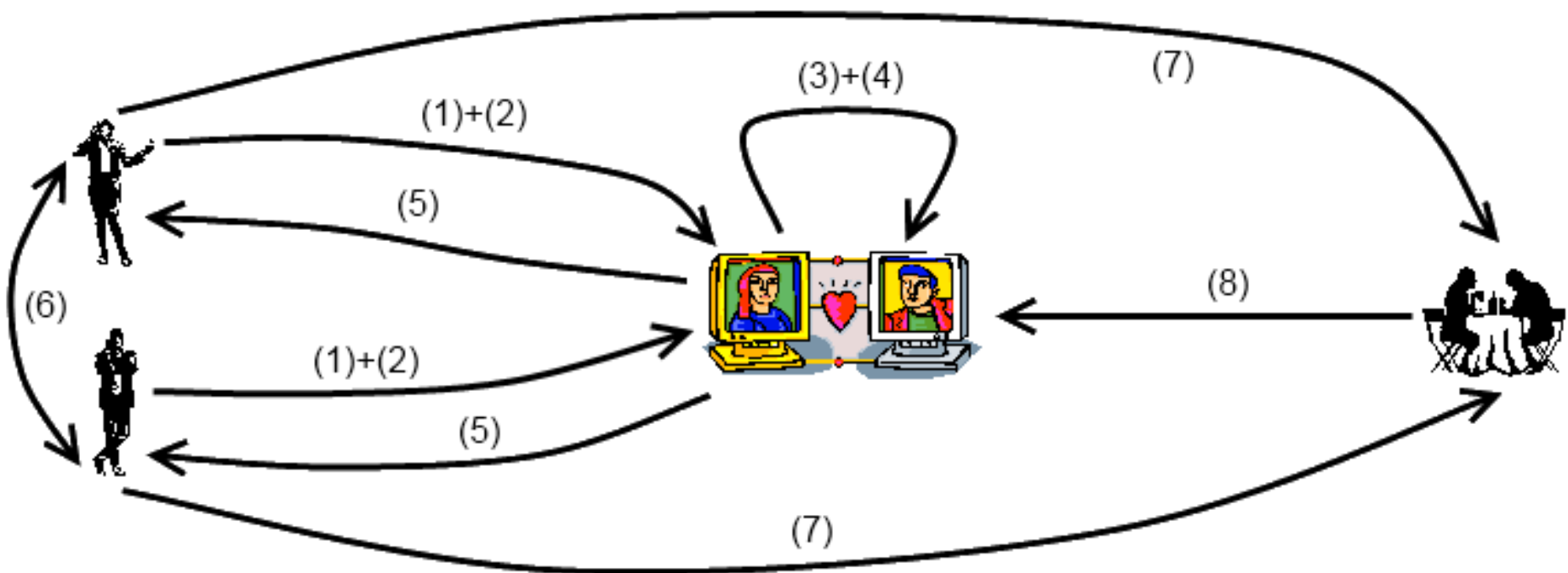
- Application scenario
- Exercise I
  - Exercise 1: Application System vs. Information System
  - Exercise 2: Modeling
  - Exercise 3: Enterprise Modeling
  - Exercise 4: Media disruptions



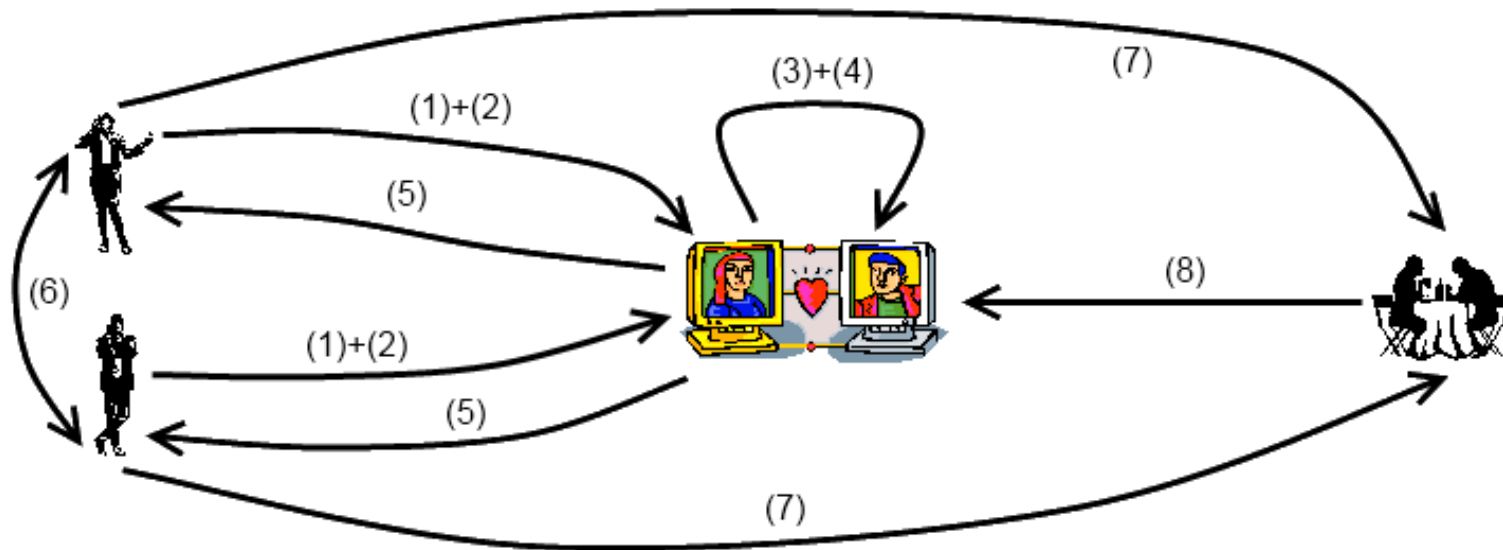
- Foundation for all exercise sessions
- Fictitious mobile dating platform which takes advantage of the unique features of mobile communication



- Users have personal profiles (e.g. comprised of gender, age, personal interests, etc.)
- Pseudonyms available for user-to-user communication
- Users have their own contact list with journal and calendar to maintain their dates
- Certificated attributes for better matchmaking
- Location-based push notifications for ad-hoc-meetings (matching based on profile information)
- Meeting Point recommendations (incl. navigation directions)
- Meeting points pay for being recommended. Users pay for the service usage via their phone bill.



- 1) Users register and submit personal profile information. InstaMatch certifies the information.
- 2) Users access and activate the InstaMatch on their mobile device
- 3) InstaMatch searches for other users in their close proximity
- 4) InstaMatch matches personal profiles of users in close proximity



- 5) If there is a match, InstaMatch informs the corresponding users
- 6) InstaMatch enables a user communication via text messages, chat or voice
- 7) If users want to meet, a list of appropriate meeting points can be recommended to them
- 8) After the date, **users are able to rate their meeting** in order to improve their next matching process.

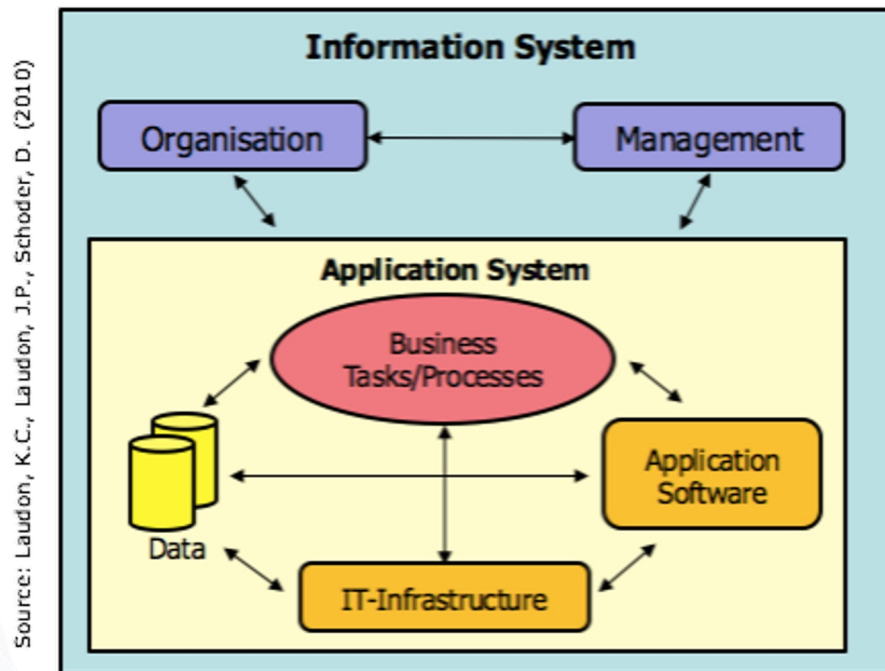


- Application scenario
- Exercise I
  - Exercise 1: Application System vs. Information System
  - Exercise 2: Modeling
  - Exercise 3: Enterprise Modeling
  - Exercise 4: Media disruptions

- a) Differentiate and **define** Application System (AS) and Information System (IS).
- b) Name the components of a Hardware System, Software System, Application System and Information System
- c) Referring to InstaMatch, give an example for an Information System and an Application System

- **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. *Components*



- Information System (IS):

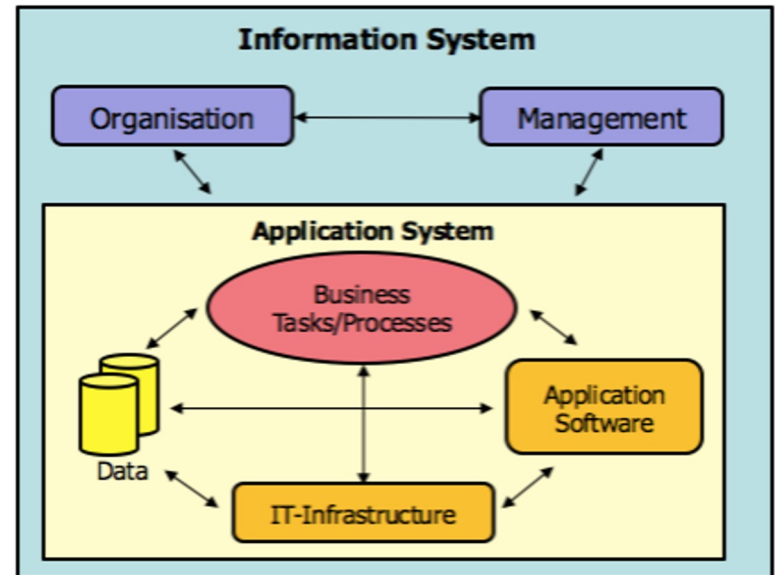
*Information system*

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

*Objectives*

Source: Laudon, Laudon (2013), p. 35

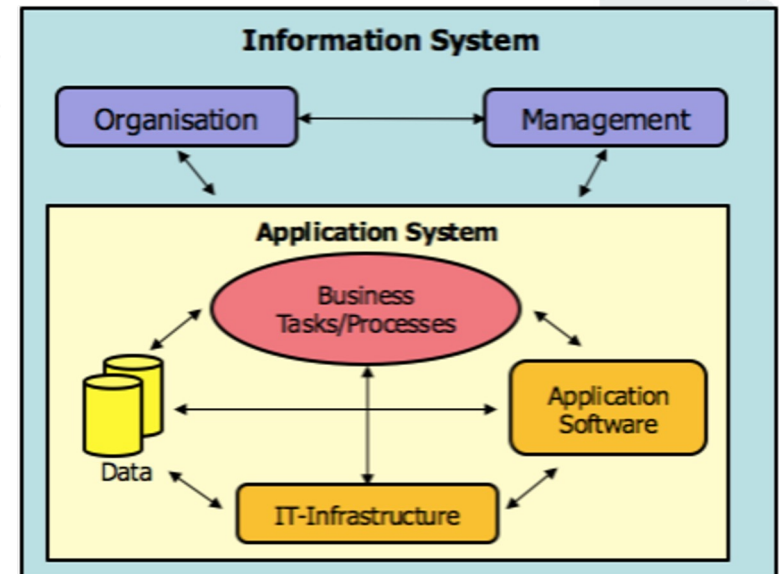
Source: Laudon, K.C., Laudon, J.P., Schoder, D. (2010)



- Information System (IS):

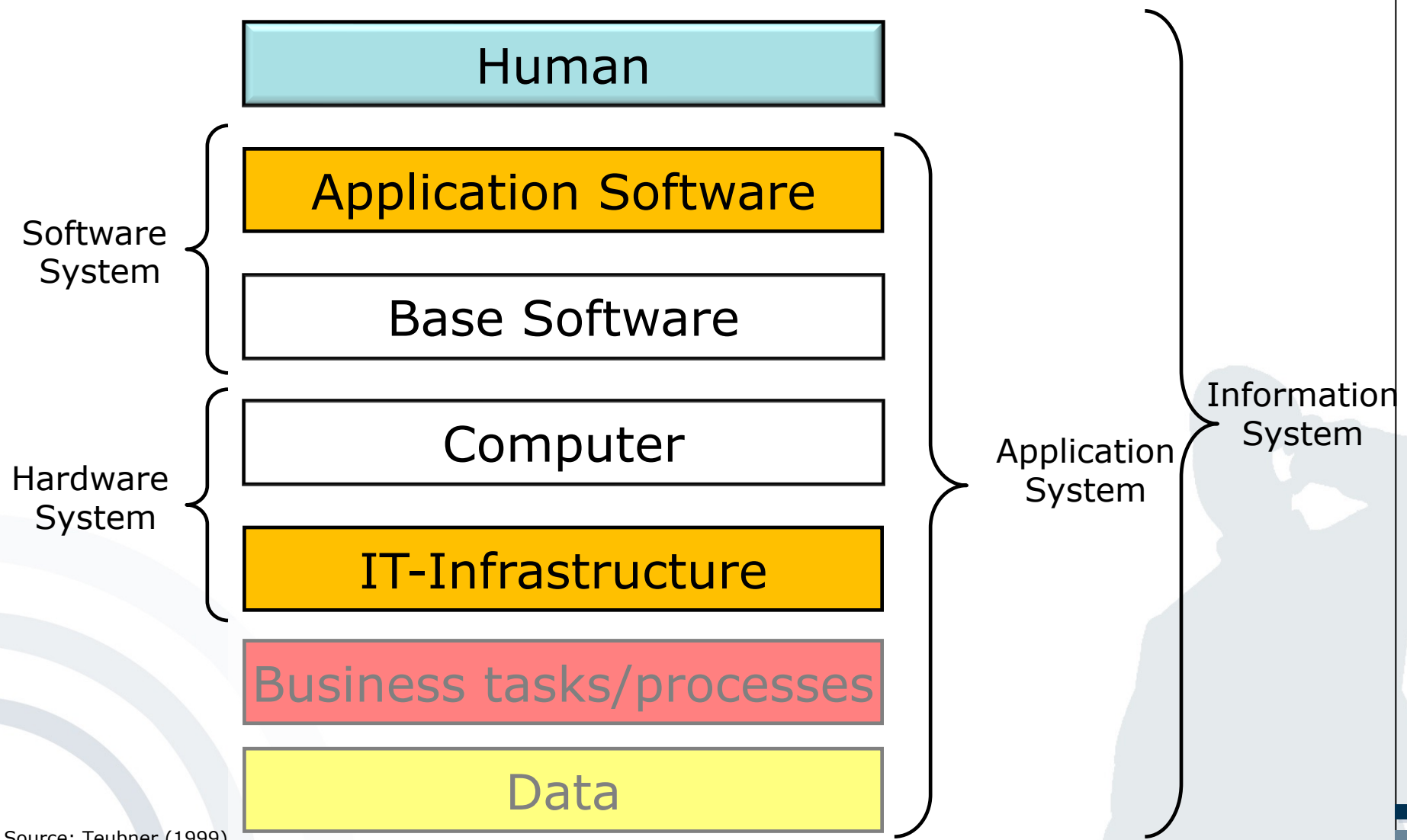
A system which was built to be used in a part of an enterprise. It contains all relevant application systems and is embedded into the organisation and management of an enterprise.

### Context



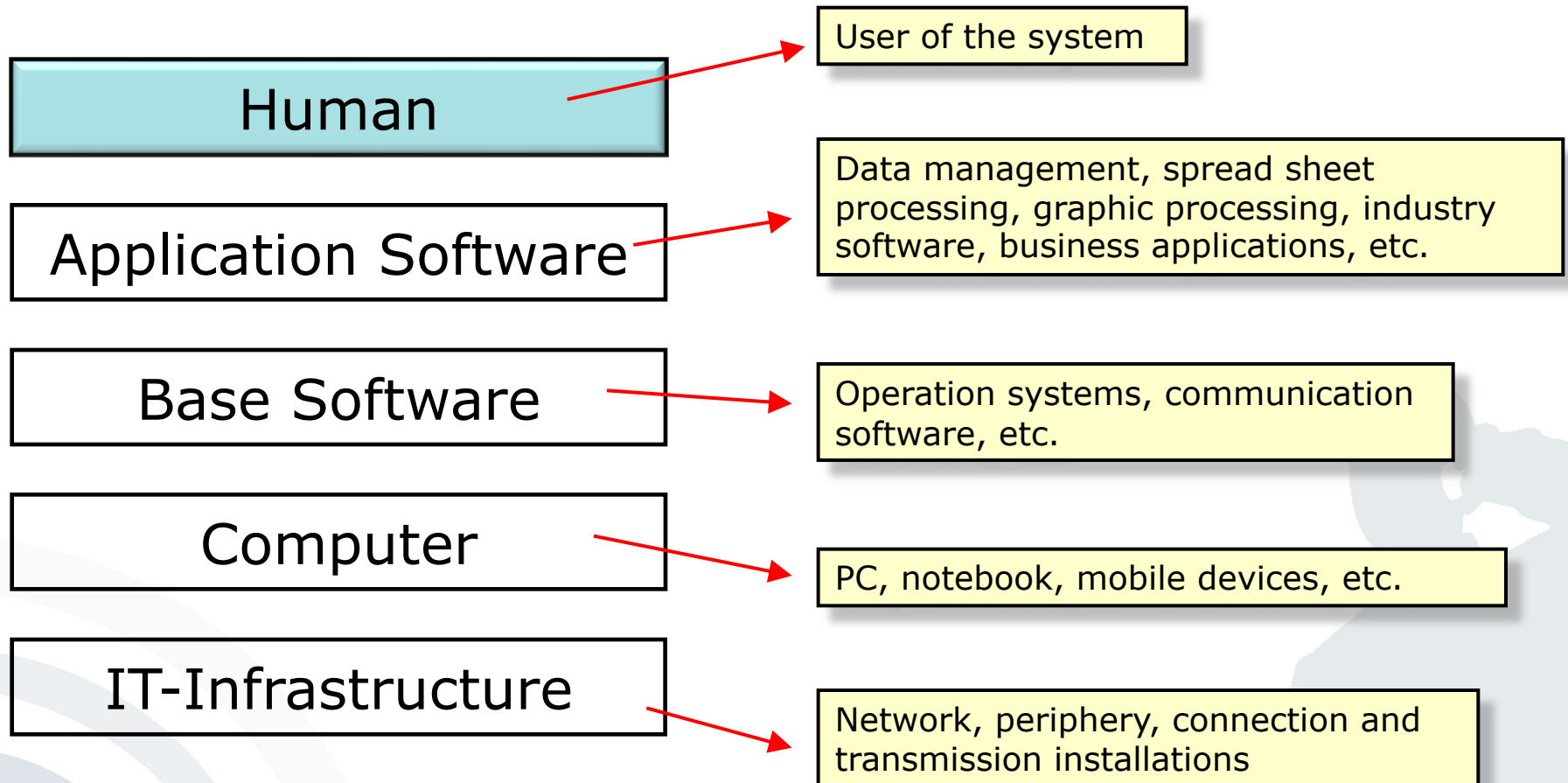
Source: Laudon, K.C., Laudon, J.P., Schoder, D. (2010)

- b) Name the components of a Hardware System, Software System, Application System and Information System.



Source: Teubner (1999)

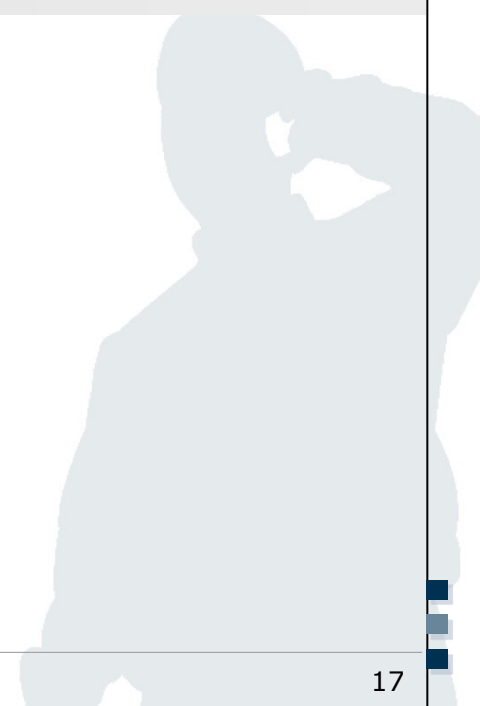
# Exercise 1b: Solution



Source: Teubner (1999)



- Application scenario
- Exercise I
  - Exercise 1: Application System vs. Information System
  - Exercise 2: Modeling
  - Exercise 3: Enterprise Modeling
  - Exercise 4: Media disruptions

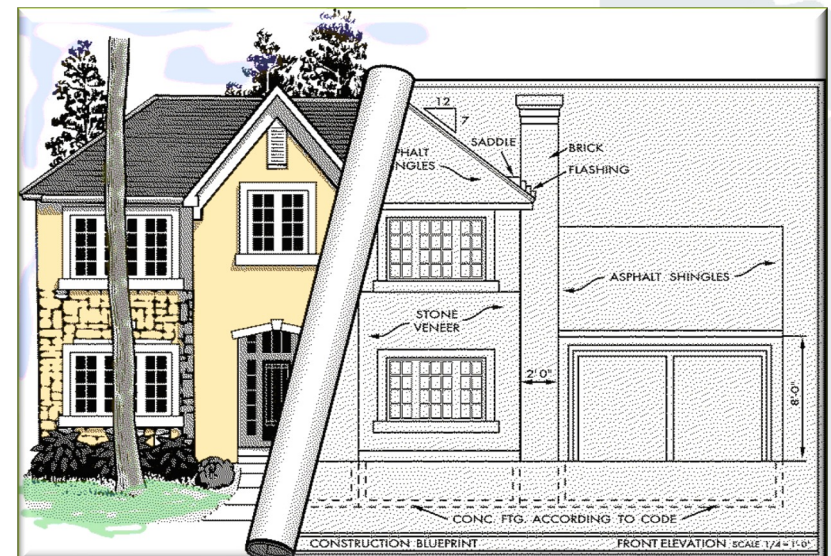


- a) What is a model? Give an example in relation to InstaMatch.
- b) Explain briefly the abstraction mechanisms “aggregation” and “generalisation” in the modelling context. In addition, give an example for each of the two mechanisms with regard to InstaMatch.
- c) What are meta models? Give an example in relation to InstaMatch.

- A model is a representation of a the real world with the following properties
  - **Representation:** A model is always representation of natural or artificial objects, which themselves can be models.
  - **Abstraction:** Models are typically an excerpt of reality.
  - **Pragmatism:** The contents of a model are determined by the following questions: For whom? Why? For what?

- *Example:*

- Building vs. Build Plan
- InstaMatch: Description of Use Case in E0

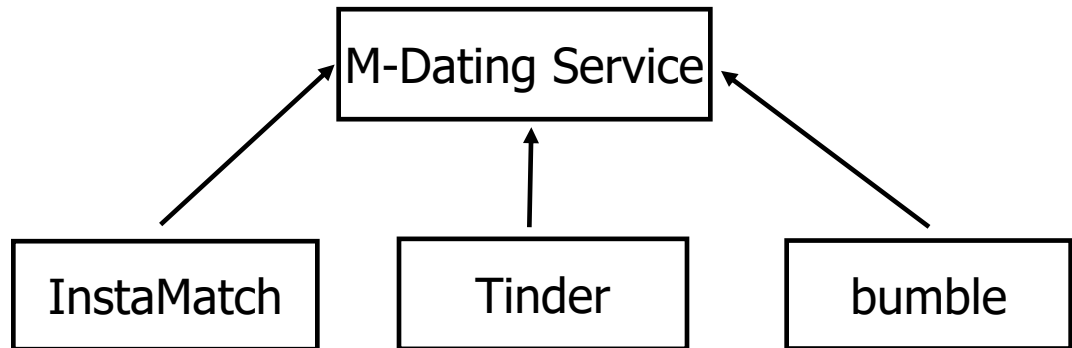


- Models are used for the purpose of **simplification and complexity reduction**
- Abstracting mechanisms in this regard are:
  - *Aggregation* (vs. Disaggregation): Different objects are combined to a new object.
  - *Generalisation* (vs. Specialisation): Similar objects are abstracted to become a new high-level object.

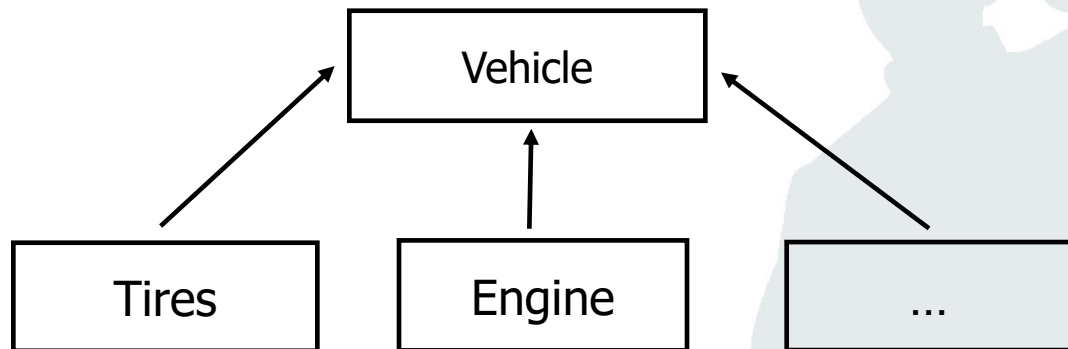
- Models are used for the purpose of **simplification and complexity reduction**
- Abstracting mechanisms in this regard are:
  - *Aggregation* (vs. Disaggregation): Different objects are combined to a new object.
  - *Generalisation* (vs. Specialisation): Similar objects are abstracted to become a new high-level object.
- InstaMatch Examples
  - *Aggregation*: Location, Gender, Age, Interests  
→ Matching algorithm
  - *Generalisation*: Smart Watch, Smart Phone, Tablet-PC  
→ Mobile Device

# Exercise 2b: Further Examples

- Generalisation



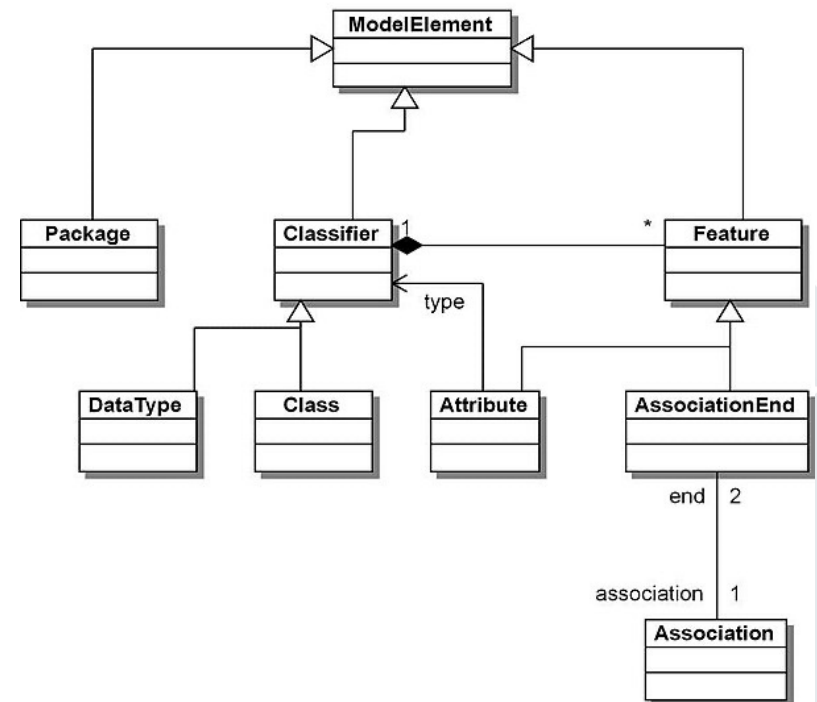
- Aggregation



- Meta-model: “Language” for the definition of the model, describes the grammar of a model and formalizes notations.

*Example:*

Unified Modeling Language (UML) diagrams are used to model processes. The meta model (see picture) describes the models that can be created using UML, in UML notation itself.



Meta Object Facility (MOF)  
architecture of an UML meta model

- Application scenario
- Exercise I
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  - Exercise 4: Media disruptions



## Exercise 3: Enterprise Modelling

- a) Explain why ARIS models differentiate between the three abstraction layers *conceptual model*, *technical model*, and *implementation*. What target group (e.g. project manager, developer, etc.) does each layer specifically address?
- b) Develop a high-level Enterprise Model of the InstaMatch using the ARIS approach.
- c) Give three examples of challenges that could arise in enterprise modelling.

## ARIS objective:

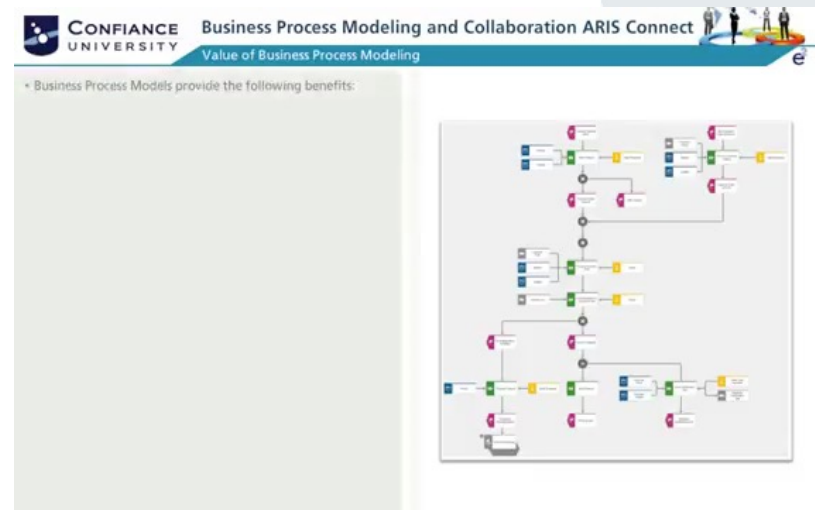
- Architecture of Integrated Information Systems
- framework to model and structure enterprise information systems to ensure that they meet their requirements.

## How:

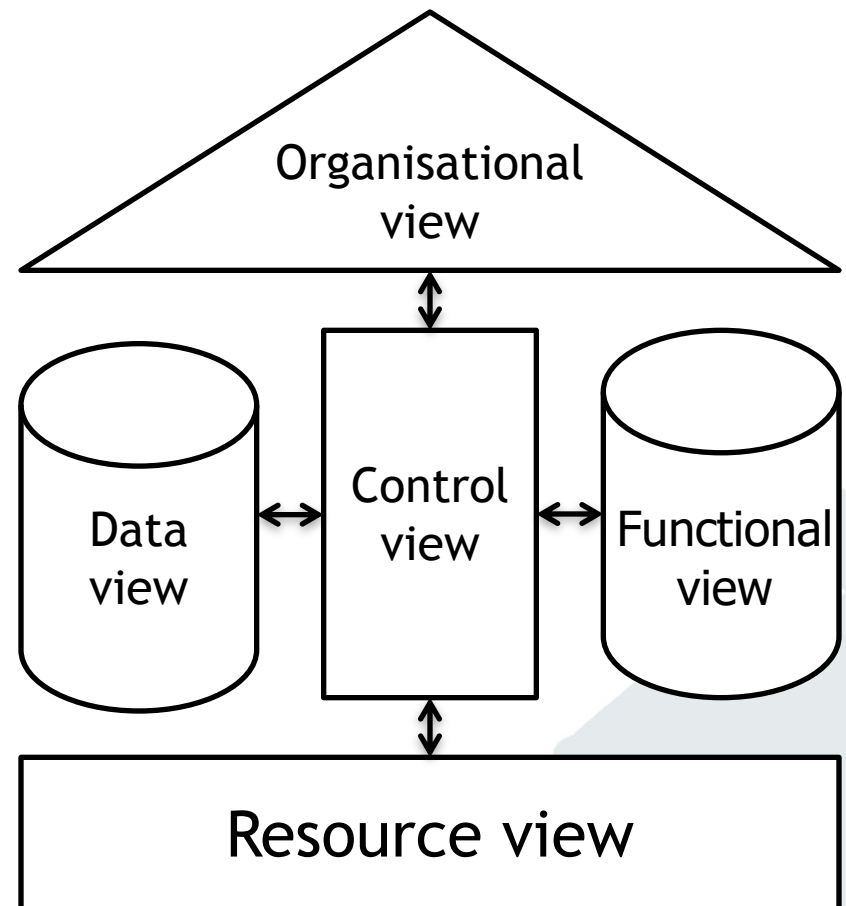
- **Five views** (Organisation, Data, Control, Function, Resource) with **three description levels** (conceptual, technical, physical)

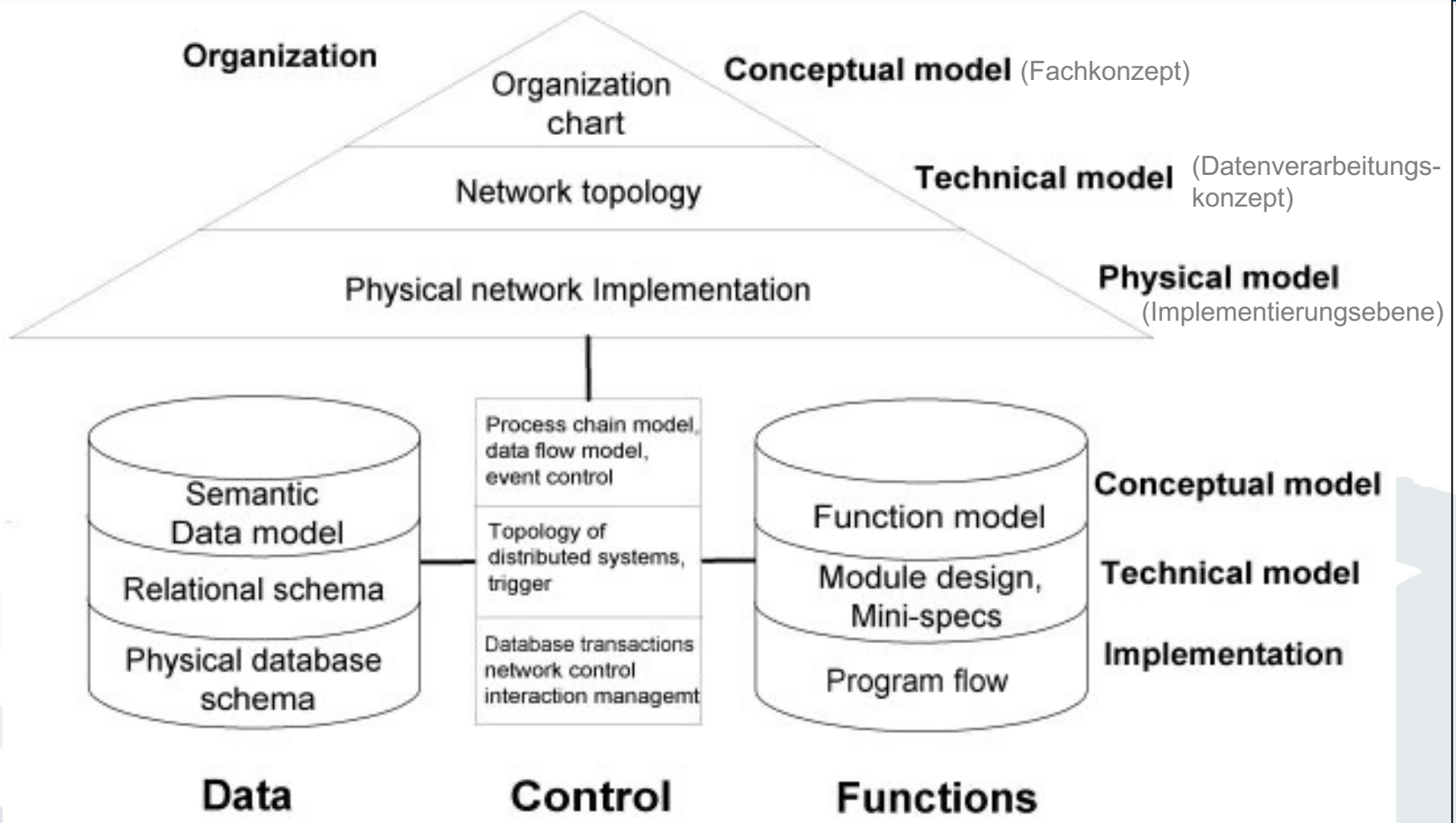
## Watch:

<https://www.youtube.com/watch?v=TRJmLqE9c7E>



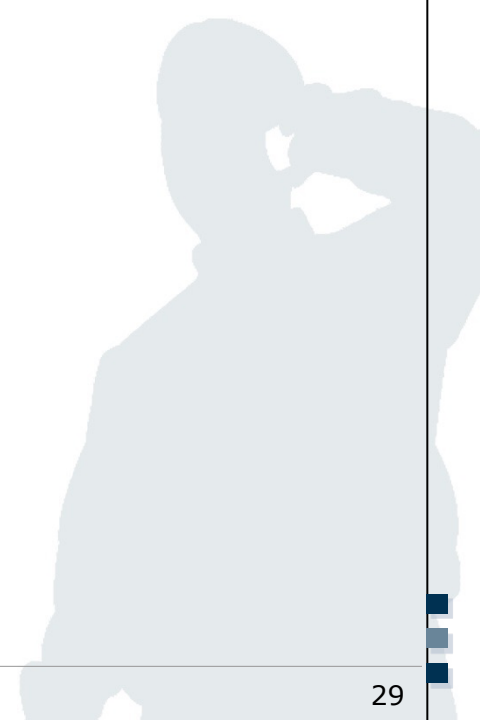
- **Organisational view**
  - Resources (humans, machines, hardware, etc.)
  - Organisational chart
- **Functional view**
  - All processes generating output as well as their relation to each other
  - Function tree
- **Data view**
  - All events generating data (e.g. documents, e-mails, etc.)
  - Entity-relationship model
- **Control view**
  - Integration of all other views into a logic process
  - Event-driven process chains
- **Resource view**
  - Services, products and financial assets
  - Product tree





## ARIS Architecture

- *Conceptual model, technical model and physical model* satisfy the need of different target groups for a different “views” on the same enterprise model.



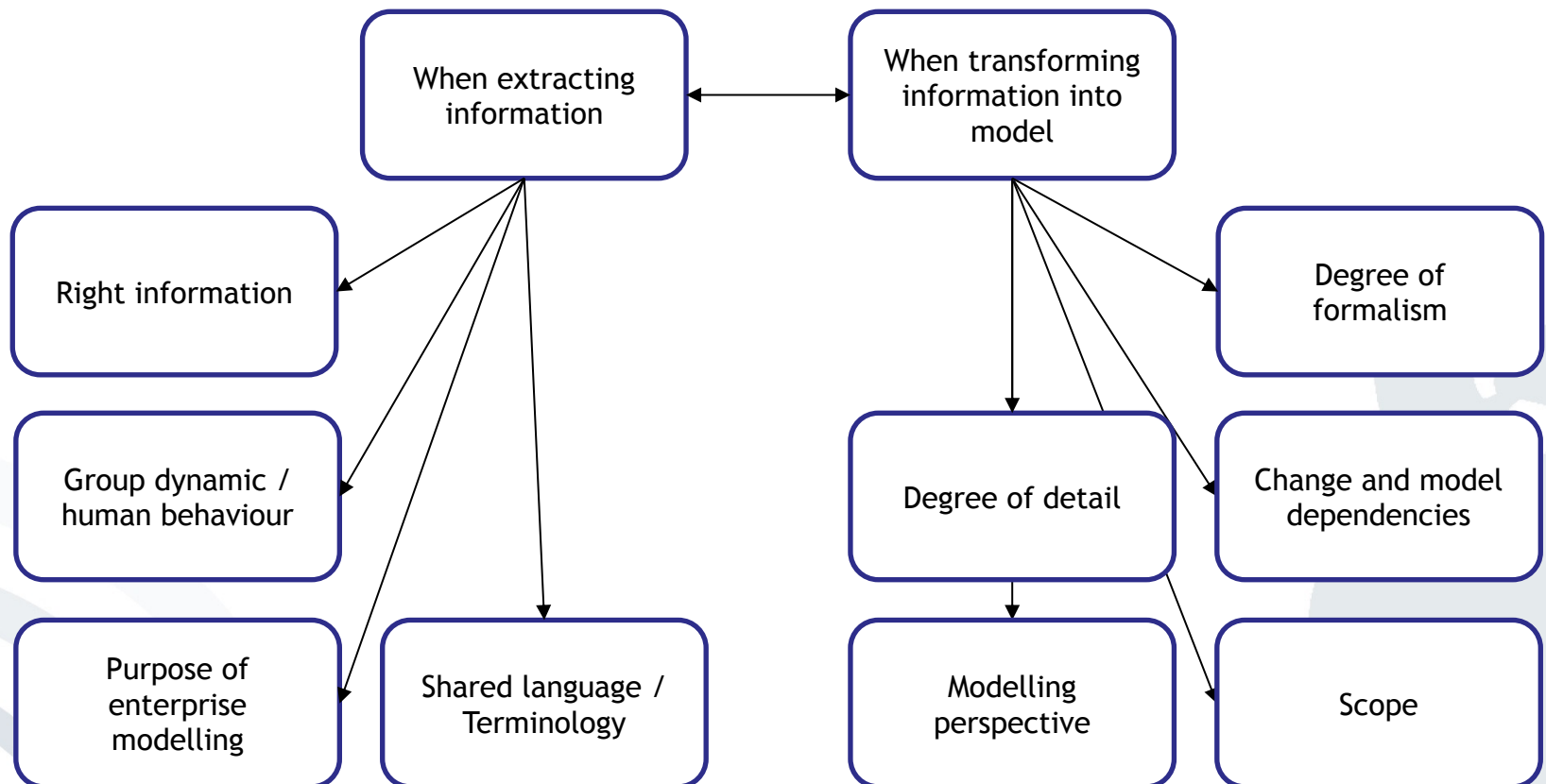
- **Conceptional Model**
  - Describes processes independent from the implementation in an information system (e.g. via ERM or EPK)
  - Target group: Specialty departments
- **Technical Model**
  - Translation of business concepts into IS-related concepts (e.g. structure chart, topologies, relations, etc.)
  - Target group: Business Informatics specialists
- **Physical Model**
  - Specific/detailed description of a technical IS implementation based on the technical model (e.g. programming code, database systems)
  - Target group: Software Engineers

ERM

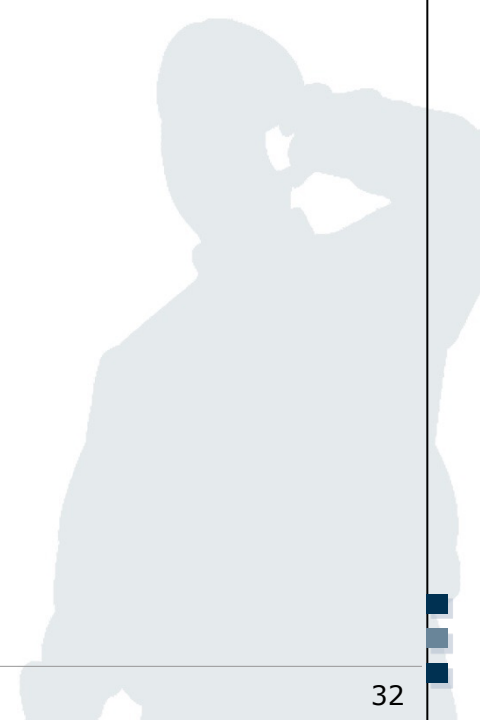
Relations

SQL

- Possible challenges when creating enterprise models

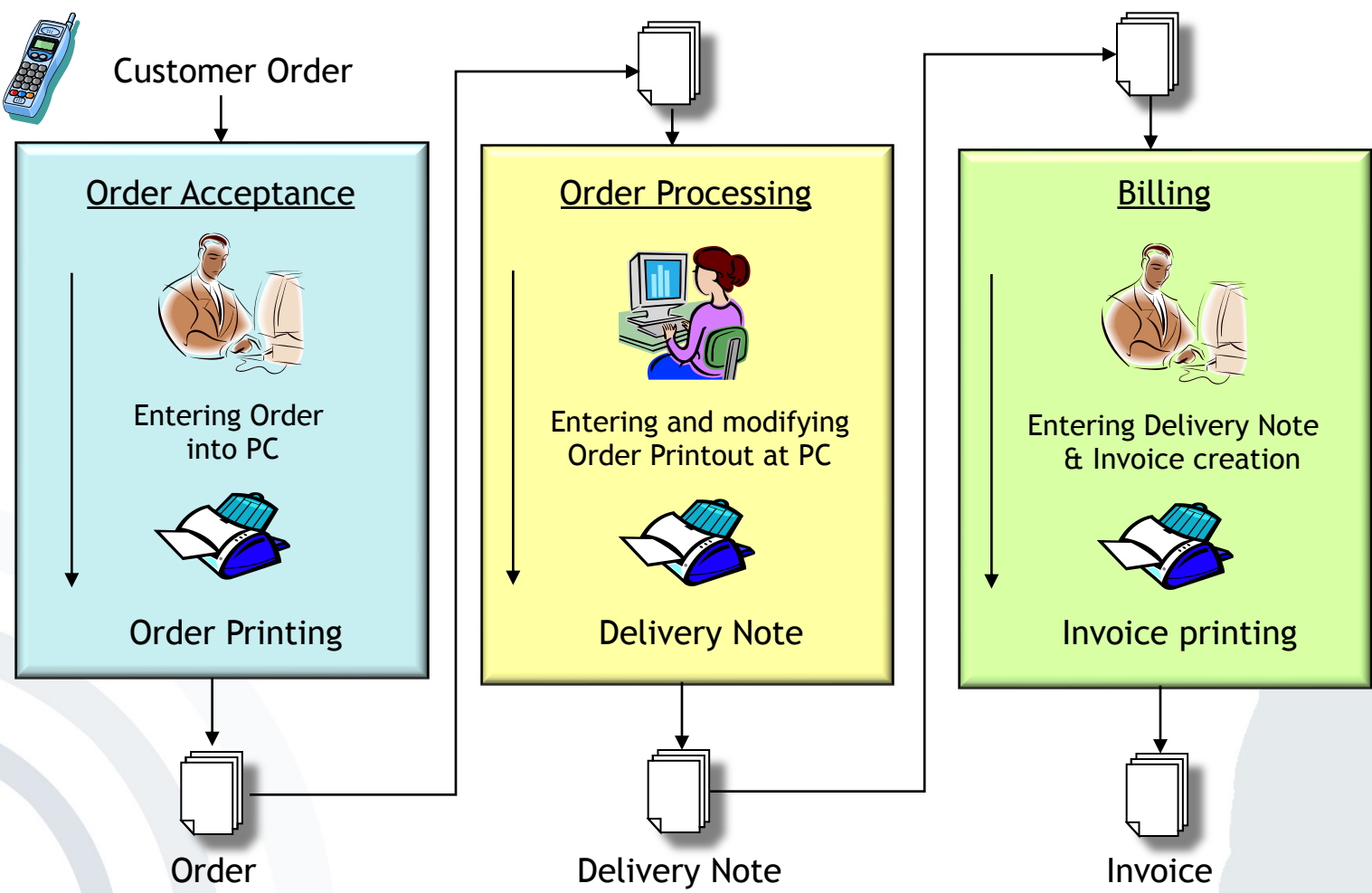


- a) What is the meaning of the term “media disruption” in the context of Information Systems? Name two consequences of media disruptions in Information Systems for an enterprise.





## Business Process in an Enterprise (example): Isolated Information Systems



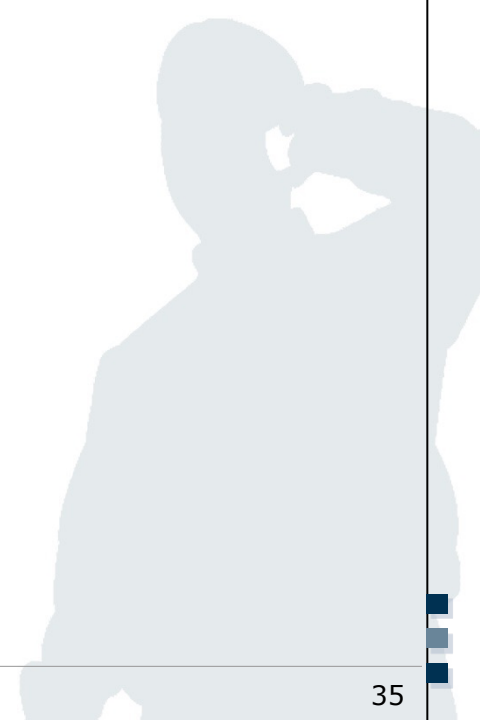
Source: Based on Schwickert, 2003

## Problems of isolated Information Systems

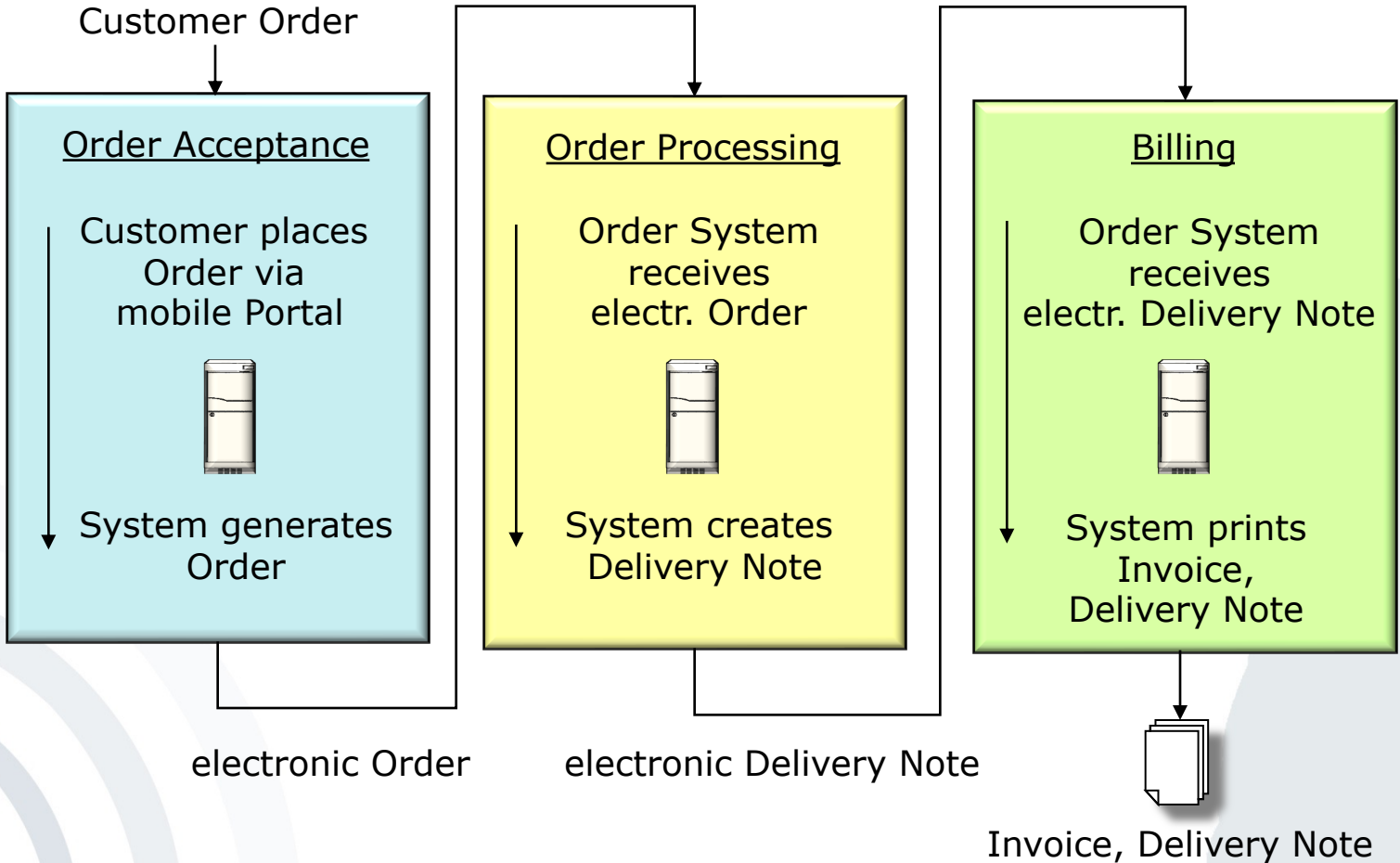
Media disruptions between Information Systems, i. e.

- Long processing times
- Error-prone
- Personnel-intensive
- Cost-intensive
- Inflexible (e.g. regarding order modifications)
- Difficult controlling because of lack of common data basis

b) How can media disruptions be rectified? What challenges can emerge during this approach?



## Business Process in an Enterprise (example): Connected Information Systems



Source: Based on Schwickert, 2003

## **Main challenge to Connected Information Systems:** Integration of different, often incompatible systems and components

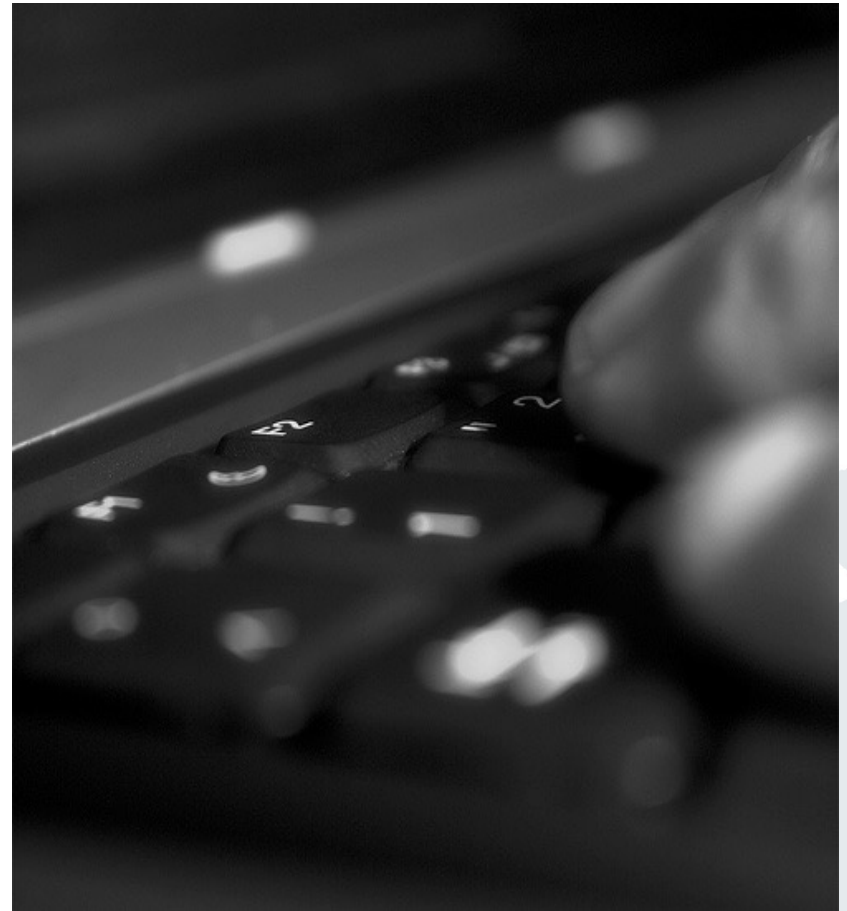
- Redundant data storage in existing IS
- Incompatible data formats in existing IS
- No existing communication interfaces of existing IS

## **Further challenges**

- High switching costs to a new IS
- High complexity of integrated IS
- Potential resistance from extant system users

Exercise 1  
Business Informatics 2 (PWIN)

# Thank you!



Jenser (Flickr.com)

- Kaidalova, J., Seigerroth, U., Kaczmarek, T., & Shilov, N. (2012). Practical challenges of enterprise modeling in the light of business and it alignment. In *The Practice of Enterprise Modeling: 5th IFIP WG 8.1 Working Conference, PoEM 2012, Rostock, Germany, November 7-8, 2012. Proceedings 5* (pp. 31-45). Springer Berlin Heidelberg.