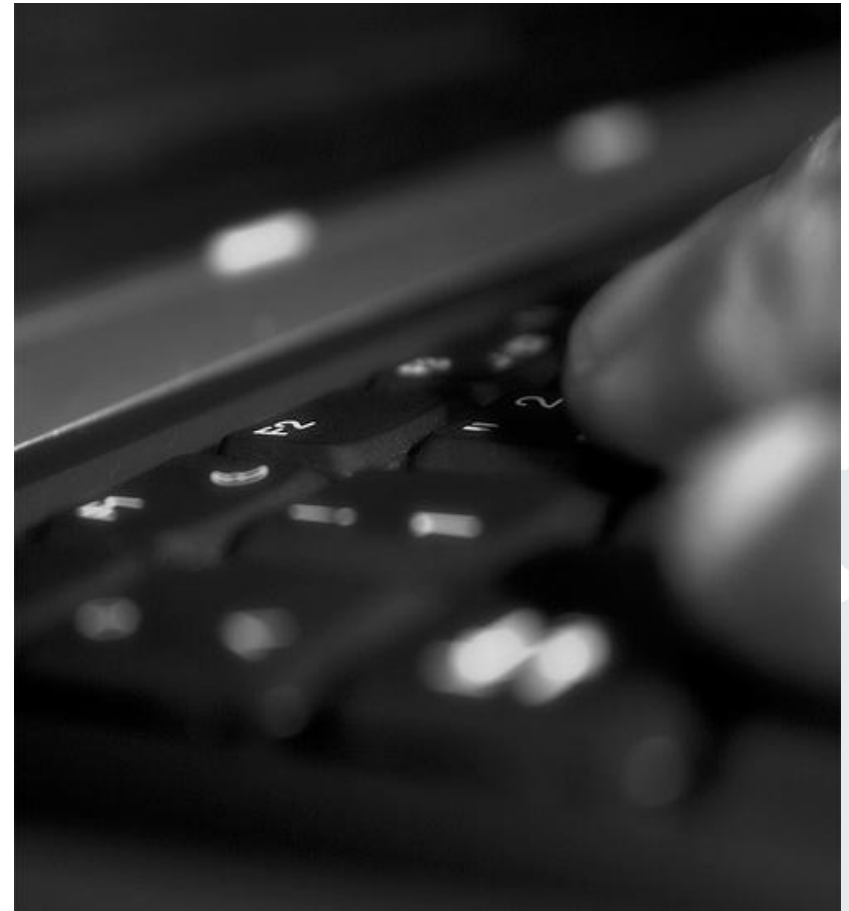


Exercise 1
Business Informatics 2 (PWIN)

Information Systems
SS 2011

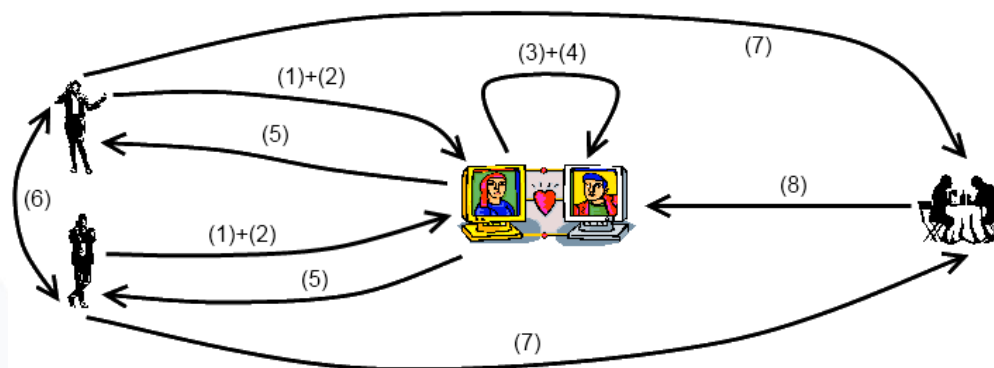
Dr. Andreas Albers
www.m-chair.net



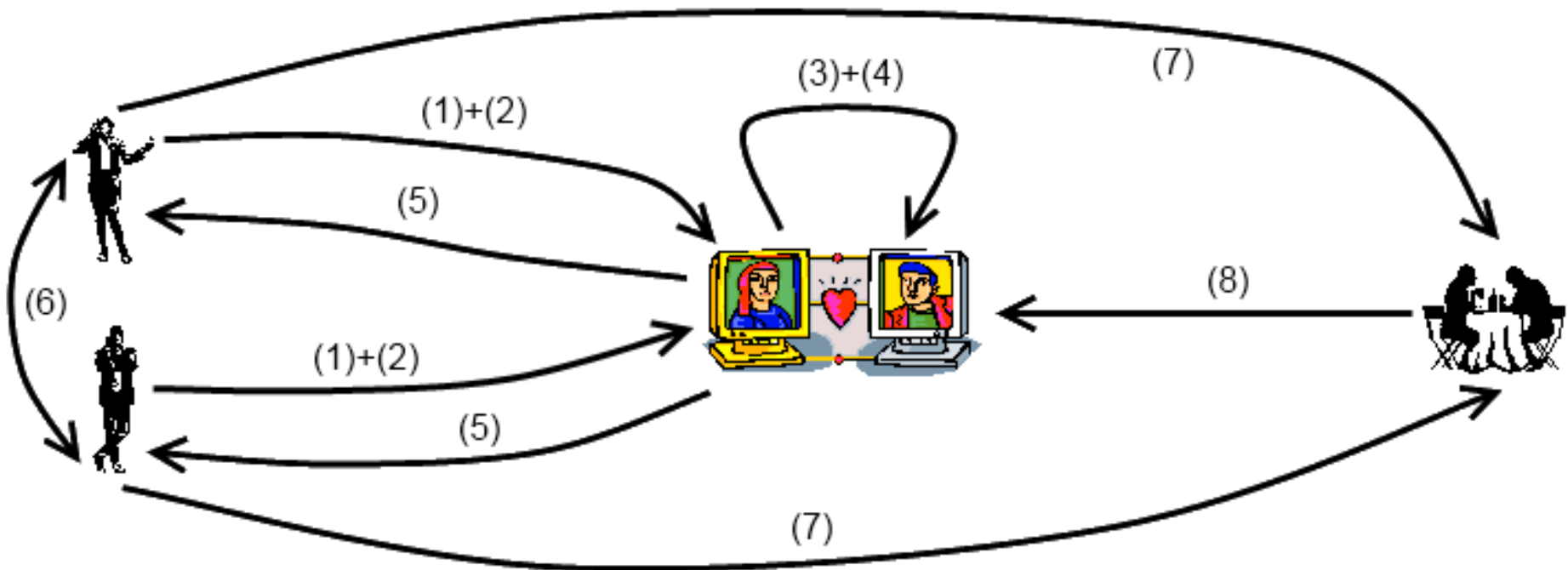
Jenser (Flickr.com)

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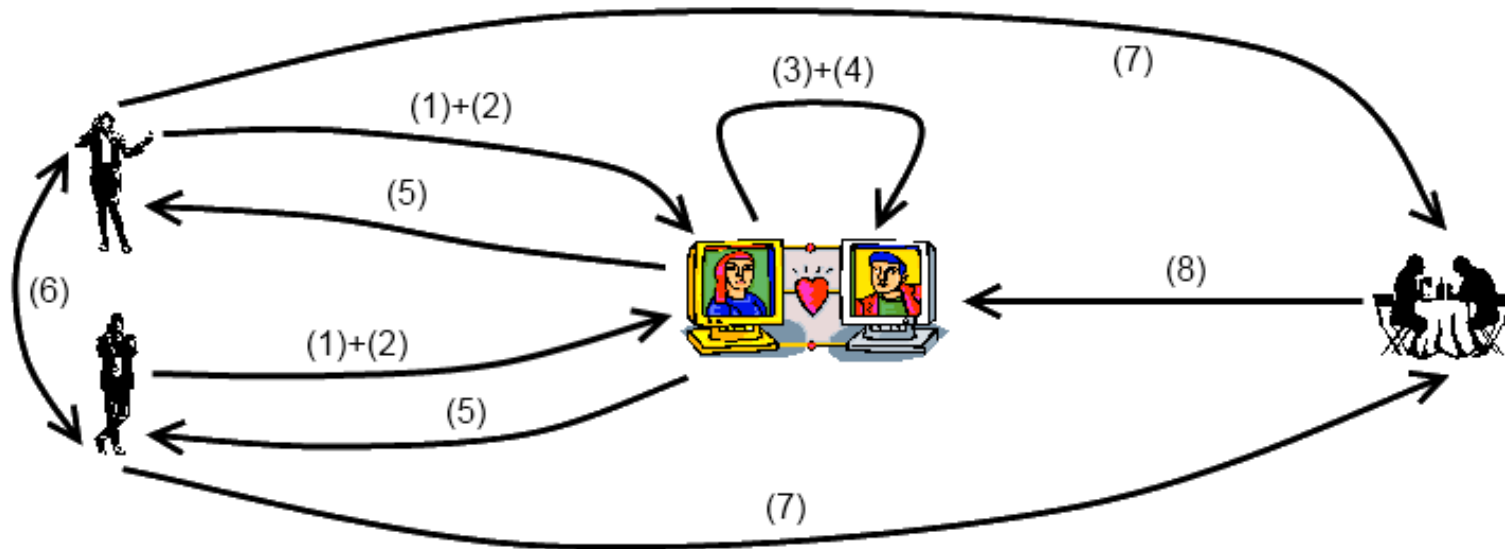
- Foundation for all four Exercise sessions
- Fictitious mobile dating platform which takes advantage of the unique features of mobile communication



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

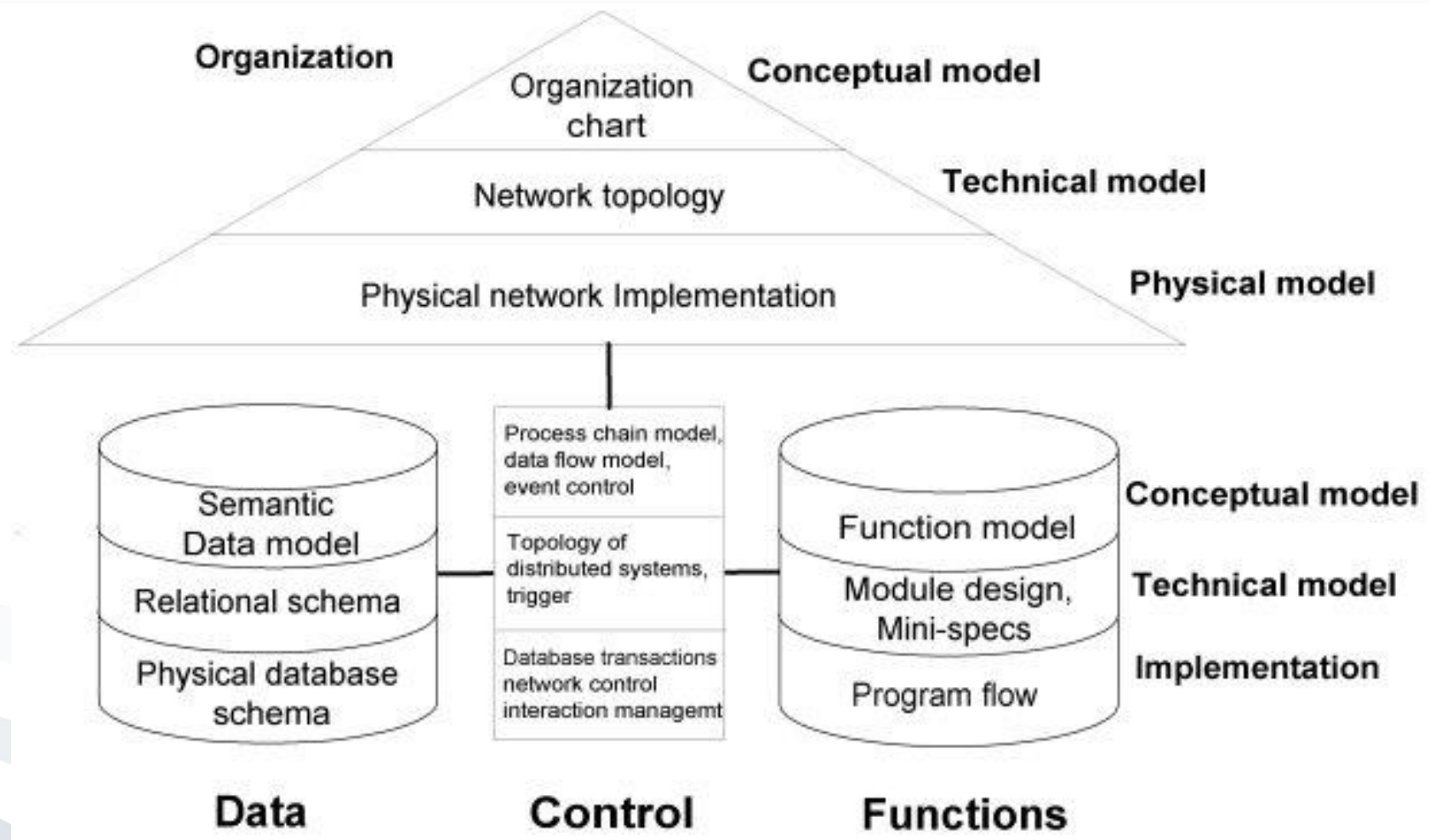


- 5) If there is a match, InstantONS informs the corresponding users
- 6) InstantONS enables a user communication via text messages, chat or voice
- 7) If users want to meet, a list of appropriate meeting points can be recommended to them
- 8) After the date, users are able to rate their meeting in order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

- **Dates Near Me** <http://www.datesnearme.com/> (last visit: 2011-04-20)
- **FriendScout24** http://www.friendscout24.de/z/de_DE/kontaktanzeigen-lexikon/mobile-dating.html (last visit: 2011-04-21)
- **iLove** <http://www.ilove.de/> (last visit: 2011-04-21)
- **MeetMoi.com** <http://www.meetmoi.com/welcome> (last visit: 2011-04-20)
- **M-Flirt** <http://www.m-flirt.de/> (last visit: 2011-04-20)
- **Skout** <http://www.skout.com/> (last visit: 2011-04-21)
- **T-Mobile Dating** http://www.t-mobile.de/dating/0,9566,13889-_,00.html (last visit: 2011-04-21)
- **Zogo** <http://www.zogo.com/> (last visit: 2011-04-21)

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- a) Explain why Enterprise Modeling based on the ARIS concept differentiates between the three abstraction layers *conceptual model*, *technical model*, and *implementation* (Fachkonzept, DV-Konzept und Implementierung)? What target group (e.g. project manager, developer, etc.) does each layer specifically address?



ARIS Architecture

- *Conceptual model, technical model and implementation* satisfy the need of different target groups for a different “views” on the same enterprise model.
- In addition, it increases the flexibility for using different meta-models within the same enterprise model.

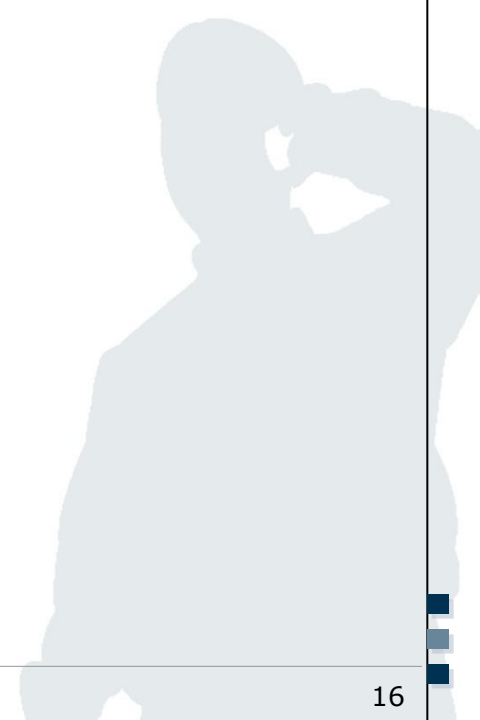
- **Conceptional Model**
 - Describes processes independent from the implementation in an information system (e.g. via ERM or EPK)
 - Target group: Specialty departments
- **Technical Model**
 - Translation of business concepts into IS-related concepts (e.g. structure chart, topologies, relations, etc.)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

- 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 the InstantONS service.

- 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.
- InstantONS Examples
 - **Aggregation**: Server, infrastructure, website, application
→ InstantONS
 - **Generalisation**: Mobile Phone, Smart Phone, Tablet-PC
→ Mobile Device

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- a) Scalability is one general requirement for the architecture of Information Systems. Please name and explain three additional requirements.

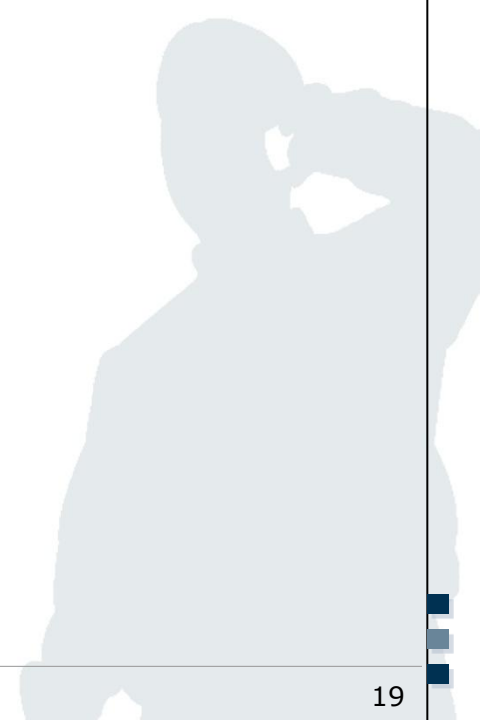


- **Minimisation of Complexity for IS Components**
 - Less complexity leads to less development failures and better maintainability of the IS
- **Portability of IS Components**
 - Allows to efficiently reuse IS components in other IS on the same or a different platform
- **Independence of IS Components**
 - Allows the exchange of an IS components without affecting other IS components or the whole system

- Minimisation of Complexity for IS Components
- Scalability of IS Components
- Portability of IS Components
- Maintainability of IS Components
- Standardisation of IS Components
- Well-defined Interfaces between IS Components
- Independence of IS Components

Modularisation of IS Components

- b) Explain the meaning of the additional three requirements from a) with regard to the InstantONS service.

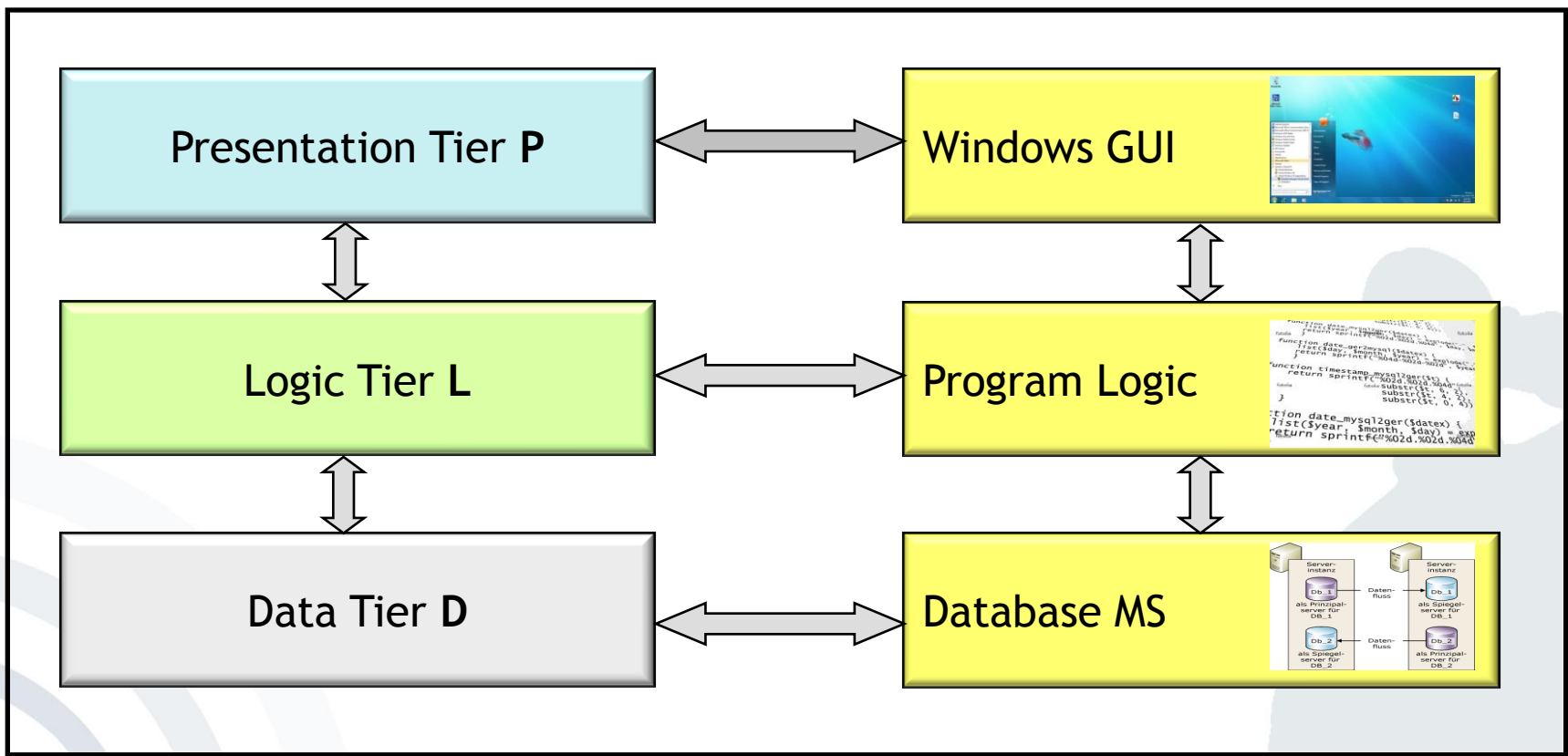


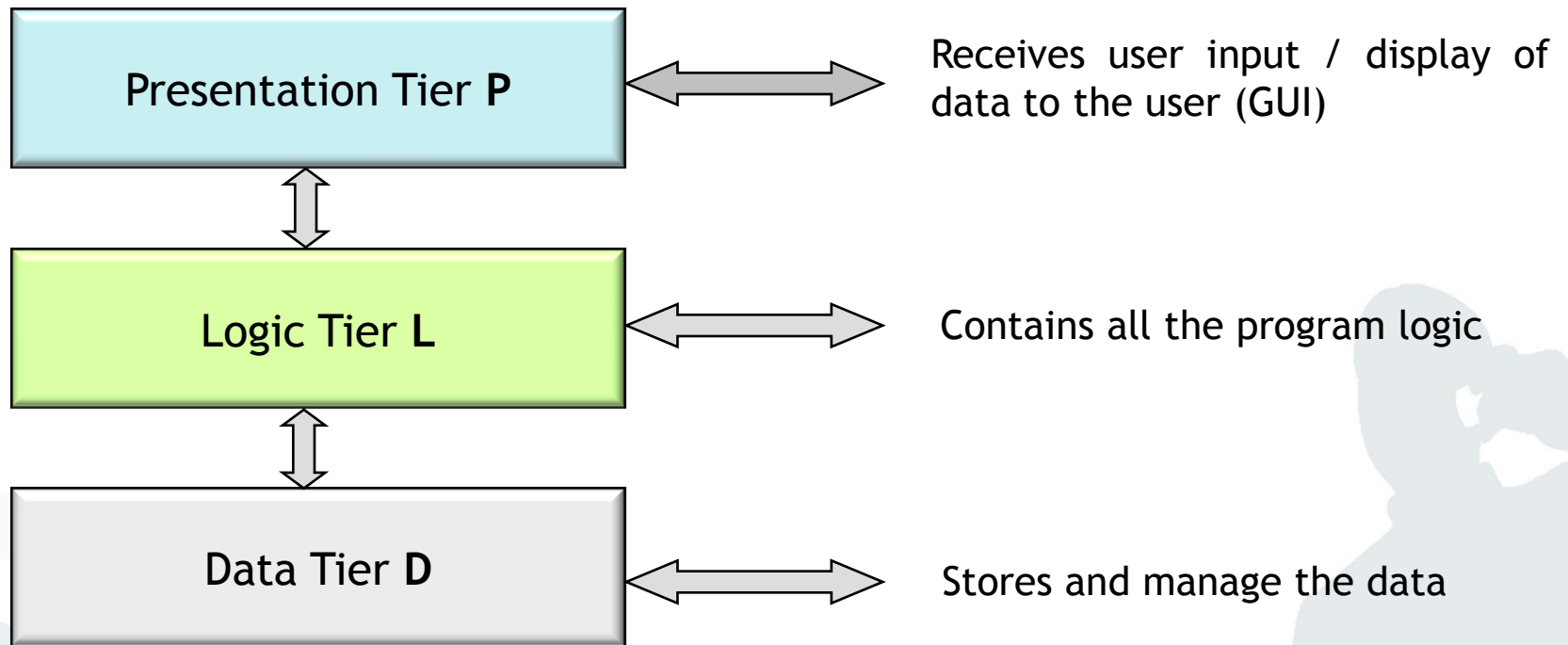
- **Minimisation of Complexity for IS Components**
 - Allows to drill down the InstantONS complexity to manageable software aspects while at the same time keeping their maintainability
- **Portability of IS Components**
 - With InstantONS as mobile app, a portable “profile matching” component can be used on different platforms (e.g. Android, iOS, etc.) without or only minor changes to it.
- **Independence of IS Components**
 - Allows to upgrade the “profile matching” component without affecting any other InstantONS components.

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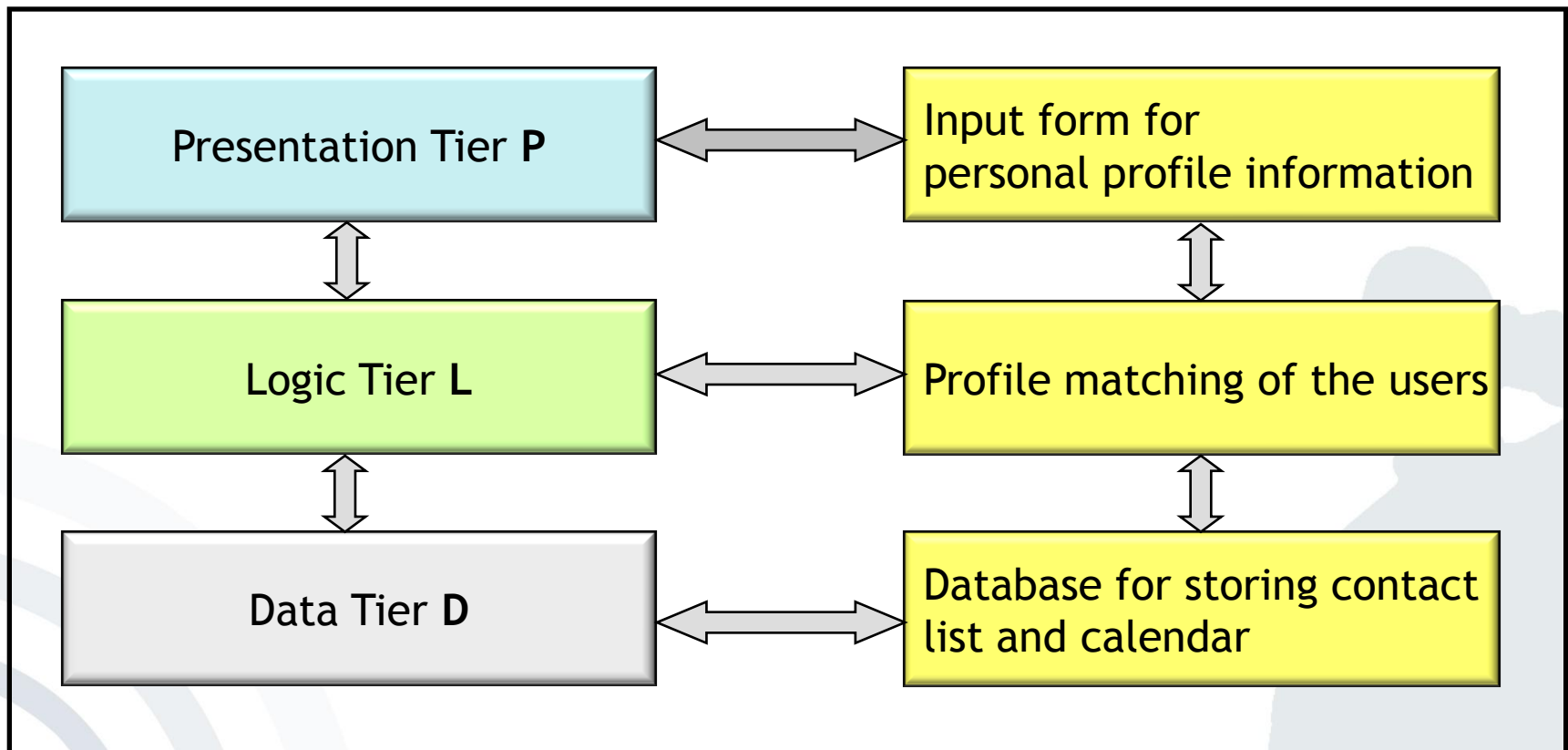
- a) Please map the following InstantONS service components to the Three-Tier Layer concept. The service components to be mapped are:
- The form for the input of personal information (e.g. gender, age, etc.) for users
 - The database for storing the contact list and calendar of a user
 - The software module containing the profile matching logic for the personal profiles of users.

Conventional IS

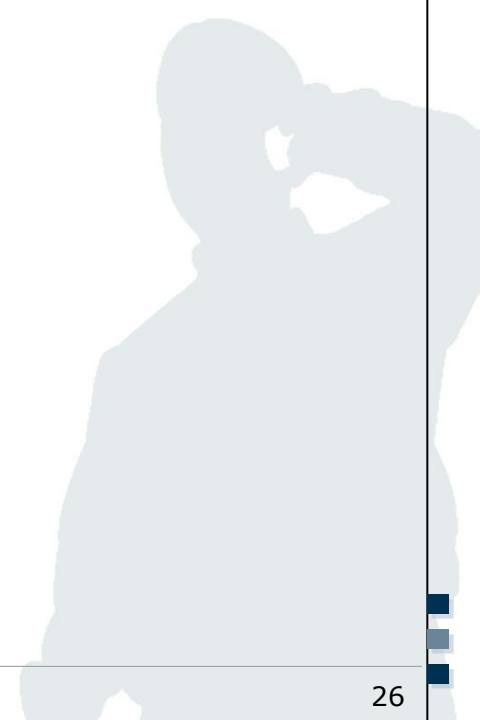




InstantONS



b) What is the benefit of structuring Information Systems based on the Three-Tier Layer concept?



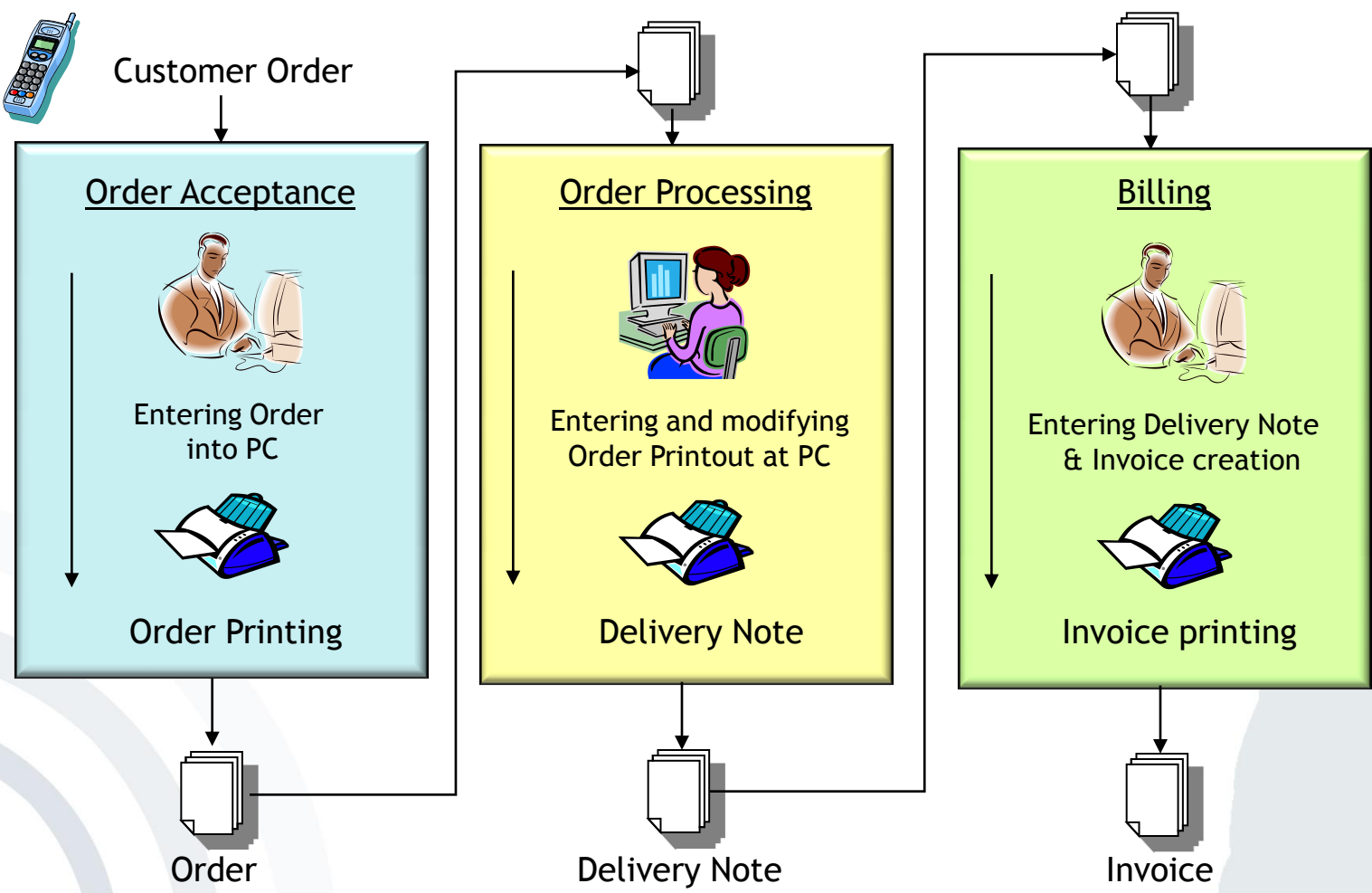
- Modularisation of the IS architecture based on the Three Tier concept:
 - Reduction of Complexity
 - Improved Maintainability

- But also
 - Scalability
 - Portability
 - Independence
 - ...

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- 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



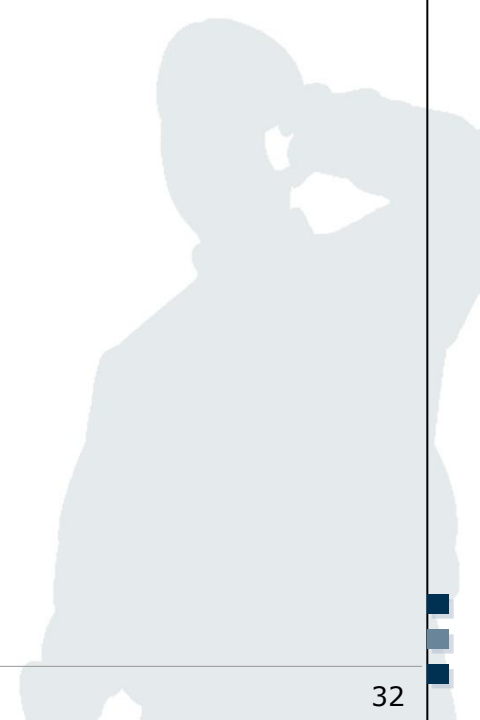
Source: Based on Schwickert, 2003

Problems of isolated Information Systems

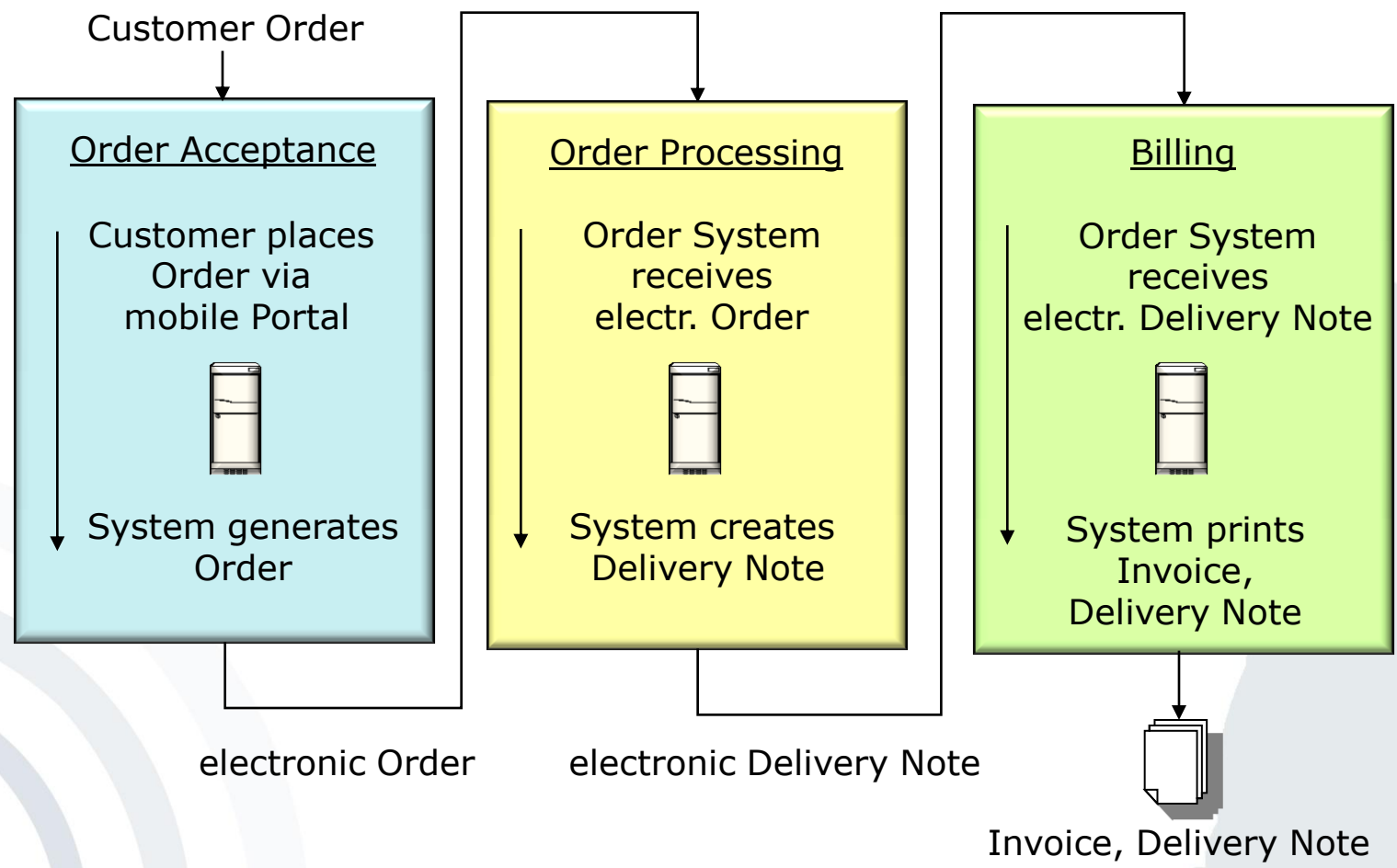
Media disruptions between Information Systems, i. e.

- 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?



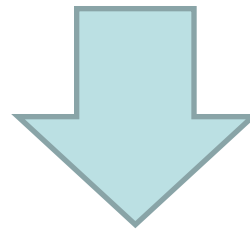
Business Process in an Enterprise (example): **Connected Information Systems**



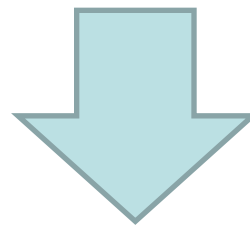
Source: Based on Schwickert, 2003

Connected Information Systems

- Requirements for the development of connected Information Systems

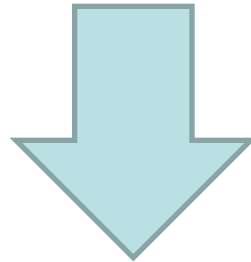


- Holistic view on an enterprise and its organisation, management, business processes, resources, etc.



- Enterprise Modelling as approach

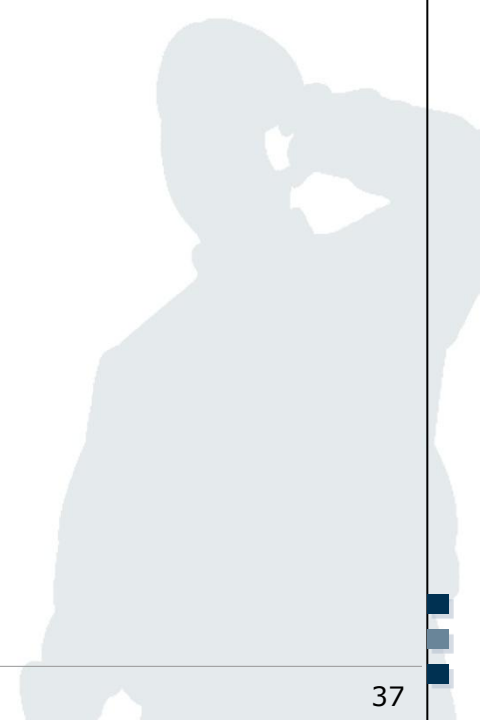
- Integration of different, often incompatible systems and components



- Enterprise Application Integration (EAI) approach

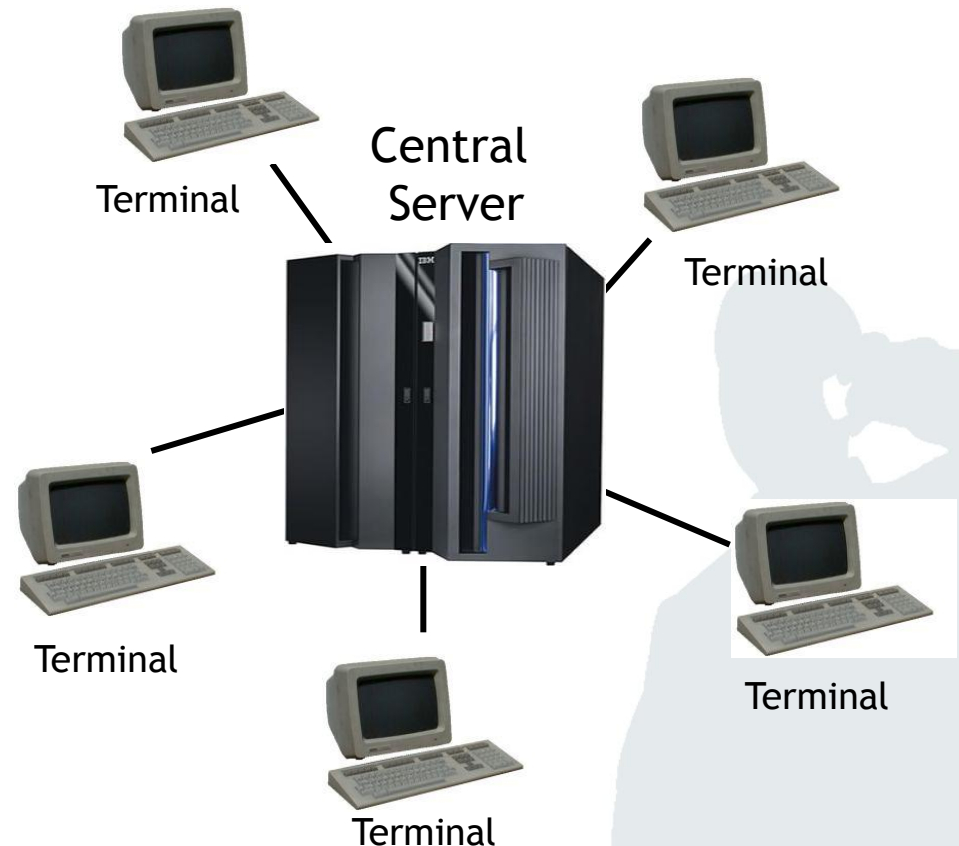
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- a) Name and describe a scenario for an enterprise in which a central server concept is appropriate. Explain the benefits for the enterprise in this scenario.

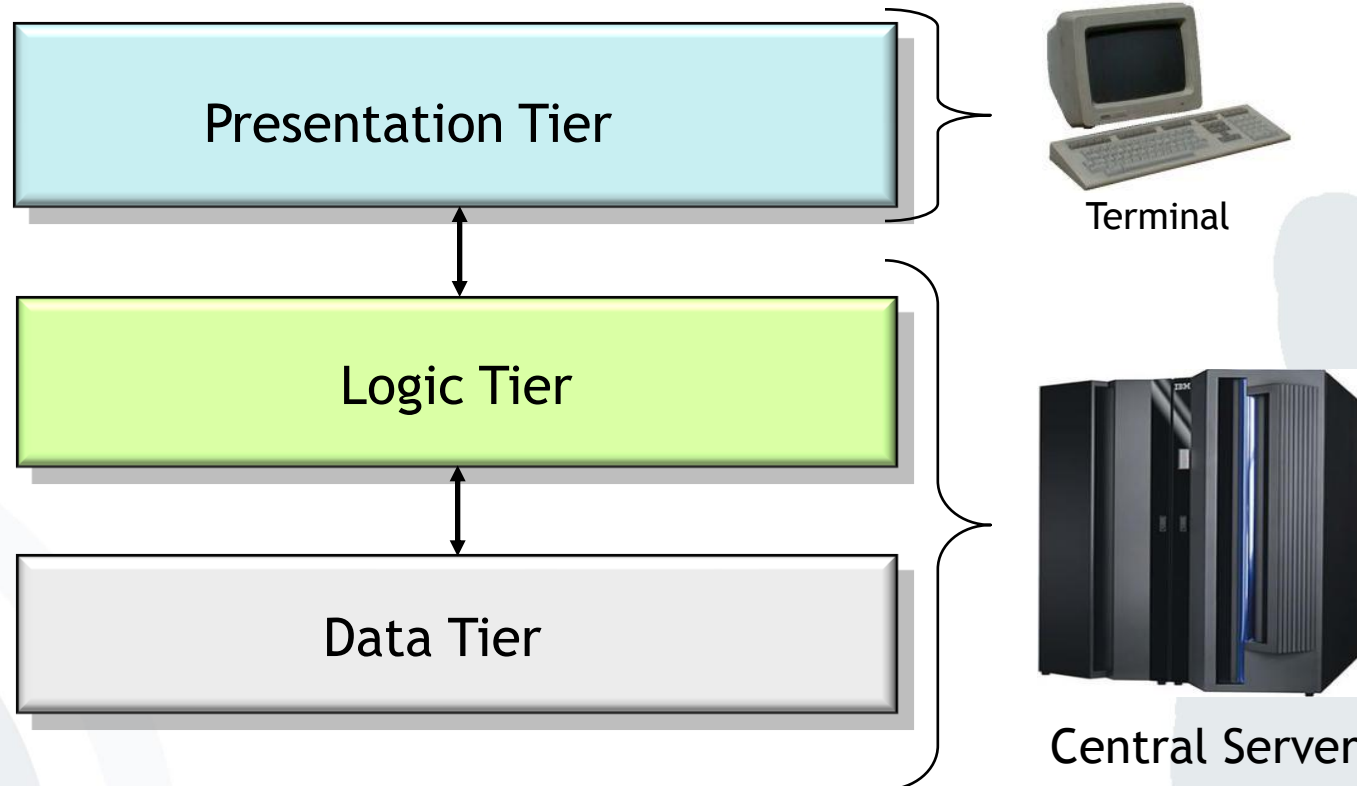


Central Server Architecture

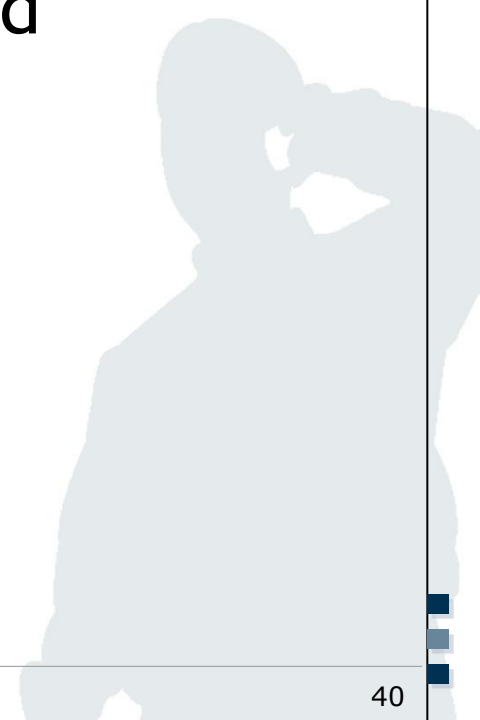
- One powerful Central Computer
- „Dumb“ low-feature terminals (often even without hard drive)
- Terminals provide only the graphical user interface (GUI)
- Central Server in charge of processing applications
- Central Server takes care of database and its management



Central Server Concept along the Structural Three-Tier Architecture



- Benefits
 - Central, common data storage
 - Homogenous application environment
 - No terminal administration required
 - Low-cost terminals

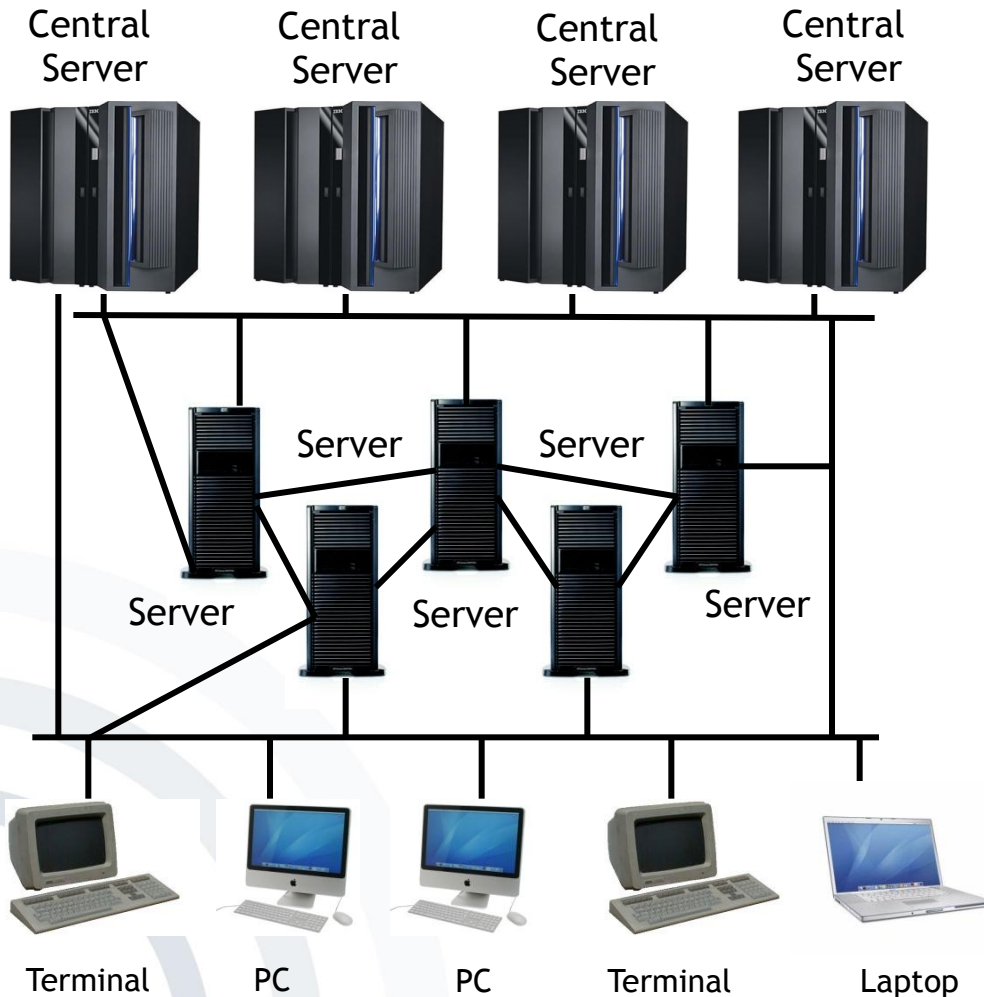


- Issues
 - Single Point of Failure
 - Fixed Network Structure
 - Monolithic
 - Cost-intensive Central Servers
 - Problematic in case of huge traffic and amounts of data

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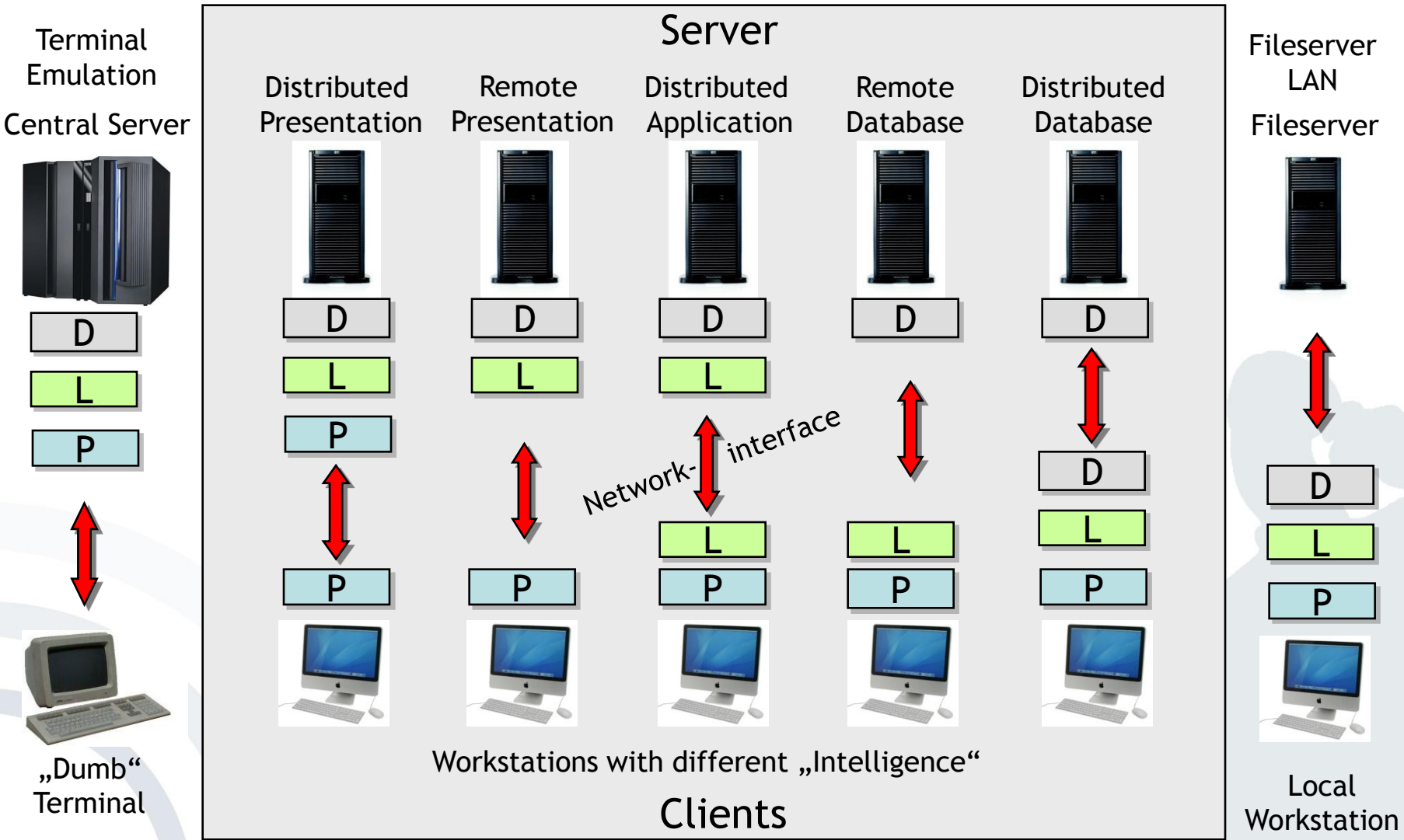
- a) Assume the InstantONS user client application constitutes a mobile website running in the Internet browser of the mobile device. Can this application be regarded as a client/server concept?

Client/Server Architecture



- Clients request services.
- Server offer services.
- Computers can act in both (client and server) roles.

Client/Server Architecture along the Three-Tier Structural Concept



Source: Based on Hennekeuser, 2004

- Yes, the mobile website of InstantONS can be regarded as a client/server architecture concept.
- It constitutes a “remote presentation” within the client/server paradigm.
 - The server hosts the actual website
 - The client requests data and services
 - The server can also be the client if it requests data from other servers (e.g. navigation maps).

- b) If you have answered “Yes” in a), please name the type of client/server concept (e.g. distributed database). If you have answered “No” in a), then name the type of the architecture (e.g. central server concept, etc.). In any case, give a reason for your answer.

Presentation is outsourced to the Client

- Outsourcing of the communication or presentation to the client become specifically beneficial in case of a connection to a Central Server without an own user interface.
- Clients are able to run on different platforms.
- User interfaces can individually customised according to a user's needs. (e.g. GUI)
- Client can not be a „dumb“ terminal.
- Examples: Citrix XenDesktop, TeamViewer

Server

Remote
Presentation



D

L



P



Client

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- a) Name a traditional application for the client/server concept “remote database”.

Remote database

Data management resides on the Server

- Traditional partition for database applications.
- Multiple application systems use the same database.
- Data management can also be distributed across multiple servers.
- Problem: DB-Query-Standard „SQL“ contains proprietary extensions and differences.

Traditional example:
Customer Information System

Server

Remote
Database



D



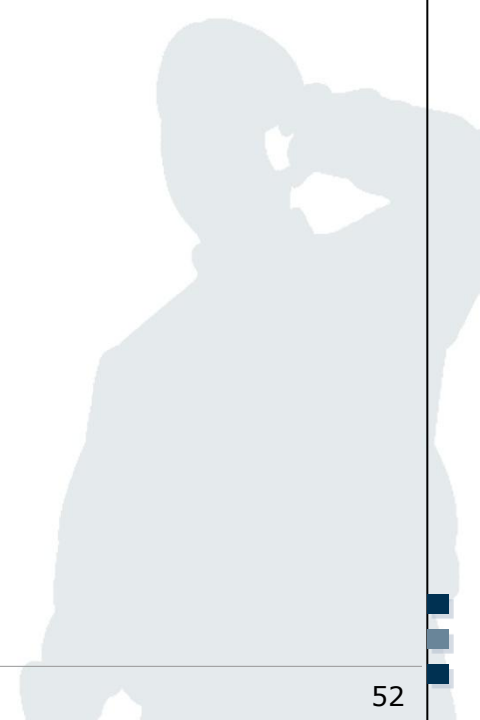
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Client

- b) In contrast to the client/server concept “remote database”, why are web-based Information Systems increasingly being used in enterprises? Name an advantage and disadvantage of this trend. Would you also implement the InstantONS service as a web-based Information System?



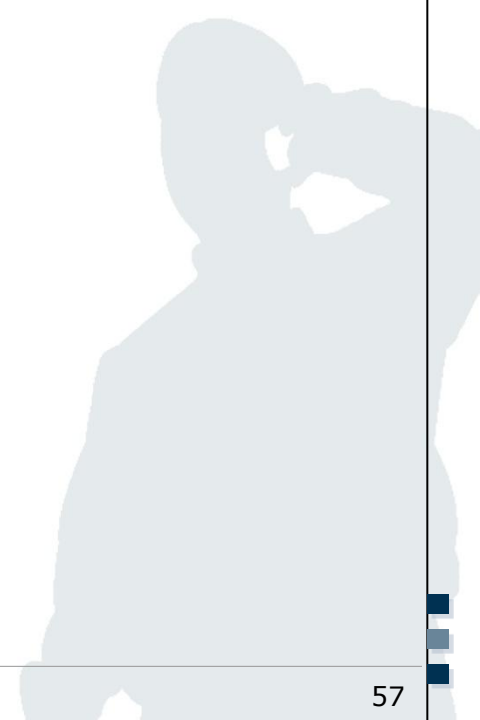
- **Web-based Information Systems**
 - Platform-independent
 - No installation required
 - Client only requires browser for execution
 - Browsers preinstalled on every modern operating system
 - Clients can be “dumb” terminals
 - Central data storage on Web-Server
 - Software Updates only on the Web-Server
 - Easy portability to other devices (e.g. mobile phones)

- Issues
 - Only simple user interfaces available/possible
 - IS cannot take advantage of local OS system resources (e.g. 3D graphic processing)
 - Internet connection always required
 - Although HTML/CSS/JavaScript are standardised, process HTML/CSS/JavaScript often in different ways

- An implementation of a web-based InstantONS service is reasonable
 - No local device resources required
 - Platform-independence beneficial (due to many different available mobile devices)
 - Central database is required anyway (fits with web-based IS concept)

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- a) Which characteristics describe the Cloud Computing architecture? How is this concept different from the central server concept?



Cloud Computing Architecture

Internet-centric Computing Architecture

- Providers are offering complex services based on hard- and software in an abstract form.
- Storage, computing power or complex services can be accessed by client via defined interfaces via the Internet.
- Underlying hard- or software of a cloud is not relevant for a client.
- Types Cloud Computing Services
 - Infrastructure as a Service
 - Platform as Service
 - Software as Service
- Providers, e.g.
 - Amazon, Google, Microsoft, etc.



- Advantages
 - Information system become highly scalable
 - Central data storage and backup
 - Cost efficient (one has only to pay for the actually used computing power and time)
 - Anytime, anywhere access to applications and data
 - Allows to run sophisticated applications on low-powered systems (e.g. mobile devices; e.g. Google's mobile voice recognition)
- Disadvantages
 - Enterprises or end users have to rely on the Cloud Service Provider
 - Potential Threats
 - Data Security, Data Privacy
 - Provider Bankruptcy, Lock-in Effects
 - Internet Connection failures

- Cloud Computing:
 - Abstracts from underlying IT-infrastructures (Computing power, storage, services, etc) for its customers
 - Allows customers the dynamic allocation of required IT-resources on demand
 - Pricing based on consumed IT-resources (e.g. CPU-cycles, used disk space, etc.)
- Central Server:
 - Allocation of IT-resources on based the actual hardware/software. For instance, single server units (3 GHz Processor, 16 GB RAM, 1 TB hard disk)
 - Pricing based actual or “virtualised” hardware/software

- b) Assuming the Cloud Computing concept is suitable for the InstantONS service, what type of cloud service (e.g. infrastructure as a service) should be booked and why?

All three types of Cloud Services are possible. Decision depends on planned InstantONS architecture.

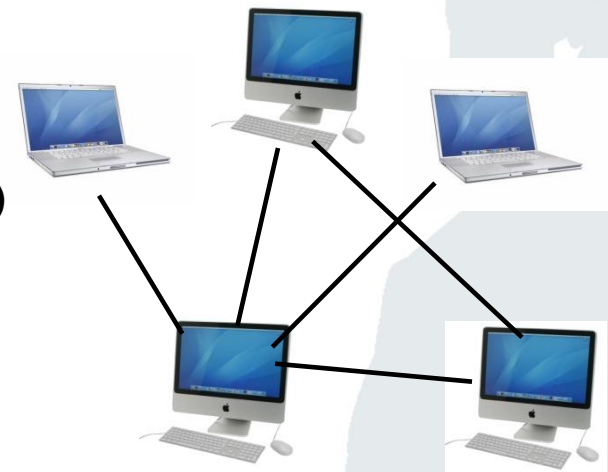
- Infrastructure as a Service
 - Only the IT-infrastructure is provided by the cloud
 - The InstantONS provider needs to install its own *Platform* and subsequently build its service upon it
- Platform as a Service
 - The cloud provides the infrastructure and operating system.
 - The InstantONS Provider can install the application on this platform (e.g. web-based application)
- Software as a Service
 - The cloud provides software functionality as a service which can be accessed through Application Programming Interfaces (APIs) via the Internet
 - First, the InstantONS provider needs a platform to run the basic InstantONS service. Second, this basic service is complemented by additional functionality from the cloud service (e.g. routing and directions)

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Since during the service usage users and providers of the InstantONS service do not act in equal roles, the service cannot be completely based on the Peer-to-Peer concept. But is it possible to implement some service components based on the Peer-to-Peer concept? If yes, what are the benefits? Give reasons for your answer.

Network of computers with equal rights

- Properties
 - No central instance coordinating the required interactions
 - No centralized database
 - Peers act autonomously
 - Every peer is aware only of those other peers he is currently communicating with
 - Peers, connections and information within this concept are not guaranteed for the participants.
- Advantage
 - Required resources are provided by many parties (e.g. for the distribution of large files)
- Disadvantage
 - High complexity of Peer-to-Peer systems
 - Requires critical mass of peers
 - Security issues



- A **hybrid solution** comparable to the architecture of Skype is feasible.
- **Matchmaking, data storage, service** are hosted on a central server or cloud.
- The Peer-to-peer concept is suitable for the **communication between users** in order to unload management of (heavy) communication traffic from the central server.