Grundzüge der Wirtschaftsinformatik
Introduction to Business Information Systems

Unit 6
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Logistics

- Lecture
  - Tuesdays, 13:15 - 14:45, Auditorium Maximum (Building 33)

- Tutorial and Exercises
  - Wednesdays, 11:30 – 13:00, Building 33 Room 2401 (in German)
  - Thursdays, 09:45 - 11:15, Building 43 Room 4/126 (in German)
  - Thursdays, 15:00 - 16:30, Building 33 Room 2216 (in German)
  - Thursdays, 16:45 - 18:15, Building 33 Room 2116 (in German)

- Exam
  - In conjunction with the exam in „Accounting“
  - Date: January 18, 2008
  - Time: 13:00 – 15:00 (120 minutes – 60/60)
  - Classroom: Building 35 R, rooms 1210 A und 1210 B

Structure of the Lecture

Unit 1: Introduction
Unit 2: Central Processing Units
Unit 3: Storage and Data Structures
Unit 4: Input and Output Devices
Unit 5: Software
Unit 6: Networks, Data Interchange, and the Internet
Unit 7: Design, Development, Deployment, and Operations of Information Systems
Unit 8: Office Applications
Unit 9: Enterprise Applications
Unit 10: Supply Chain Applications and E-Business
Unit 11: Management Support Systems
Unit 12: Exam Review

Assignment from last week

- WI2, pp. 517-749; IBIS, pp. 34-51
- Review the slides

WI1 = Hansen/Neumann: Wirtschaftsinformatik 1; WI2 = Hansen/Neumann: Wirtschaftsinformatik 2; IBIS = Wigand et al: Introduction to Business Information Systems.

Link to the Previous Unit

- Last Unit:
  - How can we tell a computer what to do?
  - What is a program? What is an operating system? How do they interact?
  - What languages and tools exist for developing software?

- Today:
  - How can one computer send data and instructions to another computer?
  - How can data be transmitted over wires, radio communication, or fiber optic cables?
  - How do the Internet and its services work?
  - What security problems exist in networks, and what can we do to mitigate them?
From Isolated Computers to Computer Networks

- Exchange of data via a portable storage media
  - CD / DVD

From Isolated Computers to Computer Networks (2)

- Exchange of data via a direct technical link
  - Computer 1
  - Computer 2

From Isolated Computers to Computer Networks (3)

- Exchange of data via a direct technical link
  - Data Terminal Equipment (DTE)
  - Data Transmission System
  - Data Communication Equipment (DCE)
    - Converts data to signal
    - Connects to receiver
    - Converts signal back to data

From Isolated Computers to Computer Networks (4)

- Computer 1
- Computer 2
- Computer 3
- Computer 4
- Computer 5

Serial vs. Parallel Data Transfer

- Parallel: Multiple bits at a time
- Serial: One bit at a time
- Parallel data transfer is unsuitable for long distances
- Serial data transfer must be synchronized – Start / Stop bits

Basic Communications Channel Characteristics

- Simplex channel
- Half-duplex
- Full-duplex channel
Direct Link via a Dedicated Digital Line

Exchanging Data over Telephone Lines: Modems and Acoustic Coupler

Modems and Acoustic Couplers

Modulation

ISDN, DSL, Powerline Communication

Multiplexing
Computer Networks

Network Concepts and Considerations

- Network topology
  - Ring network
  - Bus network
  - Hierarchical
  - Star network
  - Hybrid network

- Network types
  - Local Area Networks
  - Wide Area Networks
  - International networks
  - Home and small business networks

A Simple Network

Advantages of a Network

- Share Peripherals
- Exchange Files and Messages

Sharing Access to Peripherals

Exchange Files and Messages
Network Components

PC1  Communication Media  Network Interface Card (NIC)  PC2

Network Interface Card (NIC)

Network Cabling

Twisted Pair
Coaxial (Shielded)

Topology: Ring

PC1  PC2  PC3

Topology: Bus

PC1  PC2  PC3

Topology: Star

PC1  Server  PC2

PC3

File Locking Mechanism

Dear Mr. Miller:
The price for the desired maintenance is $150.

PC1  PC2

PC3
A server is a computer that offers services. Those services can be accessed remotely by other computers, which are called clients.

Terminal-to-Host / “Thin Clients”

The Internet

Packet-based Transmission

Routing
**Internet: The Basic Idea**

![Diagram showing network connections between devices](http://www.heppnetz.de/teaching/gwi/)

**IP Address**

- Unique, numerical address for a computer (a connection) in a network.
- Example: 170.124.233.14
- IP represents position in the network. Changes when a service moves or the structure of the grid is being modified.

**The Web is an application built on top of the Internet**

![Diagram of web applications and protocols](http://www.heppnetz.de/teaching/gwi/)

**A Cornerstone of the Web: Unique Resource Identifiers (URIs)**

![Diagram of URI representation](http://www.heppnetz.de/teaching/gwi/)

**Key Features of the Web**

- "Document"-based (resources)
- Hyperlinks between resources
- Support of multiple content types:
  - Text, pictures, sound, …

**Domain**

- Name for a host or service
  - e.g. www.unibw.de
- Is being translated by a Domain Name Server into an IP address
  - www.unibw.de -> 207.203.214.28
Domain Names

http://www.unibw.de

- Top Level Domain
  - de, com, gov, mil, de, it, ca etc.
- Subdomains
  - Name of the organization (e.g. "unibw")
  - *Host name*
  - others

Protocols

http://www.unibw.de

- Defines the type and content of the transmission
  - HTTP: Hypertext Transfer Protocol
  - FTP: File Transfer Protocol
  - SMTP: Send Mail
  - POP3: Retrieve Mail
  - TELNET: Terminal protocol

Web Server

A web server stores web pages. Those pages can be requested by any remote computer.

Web Browser

The web browser is the program that requests and displays a web page.

Sending eMail: SMTP

user id = psmith
password = sample
1 message following

Receiving eMail: POP3

user id = psmith
password = sample
do I have new mail?
Hypertext Markup Language

A Simple HTML Document

Browser View

Important HTML Tags

How does Google work?

Search Engines / Spiders
Network Security
Threats and Protection

Your Data is at Risk
• Loss
• Manipulation and Corruption
• Unauthorized Access and Usage
• Abuse of your computer for attacking others

Malware (Malicious Software)
• Computer Viruses
• Trojan Horses
  – Password sniffer, Keyboard logger
  – FTP clients
• Worms
• (Advertising) Spyware

Computer Virus
Virus Routines
Original Application Program
Replication & Propagation
Malicious Activity

Trojan Horses
Program that appears to be a useful tool but secretly performs malicious activities

How Malware Propagates
• Media exchange (floppy disk, ZIP, CDR, memory stick,…)
• E-mail attachments
• Infected documents
• Network drives
• Security leaks in the Operating System or Application software
**Propagation**

Floppy Disks
Local Files
Shared Network Drives

E-Mails with Infected Attachments

**Computer Worm**

A self-replicating computer program. Computer viruses attach themselves to, and becomes part of, another executable program; a worm is self-contained and does not need to be part of another program to propagate itself.

(http://en.wikipedia.org/wiki/Computer_worm)

**Malicious Internet Traffic**

Searching for Vulnerabilities

**Security Leaks in Commercial Software**

**Spyware**

- Collect information from your computer and transmit it without telling you to a remote computer
- Usage patterns, credit card details, passwords, …

**Protect Yourself!**

- Backups
- Firewall
- Anti-Virus Software
- Software Updates
- Behavior
Firewall

Virus Scanner

Searching for Vulnerabilities

Checks files for known viruses before opening them

Hard disk

Updates for Windows and MS Office

Updates for Windows and MS Office

Malicious Code (Virus and Trojan) Warnings

Urban Myths

Sympathy Letters and Requests to Help Someone

Traditional Chain Letters

Threat Chains

Information about hoaxes:

Hoaxes

http://hoaxbusters.ciac.org

Updates for Windows and MS Office

http://windowsupdate.microsoft.com
http://office.microsoft.com/productupdates

Assignment for Next Week

• WI1, pp. 151-322; IBIS, pp. 169-194
• Review the slides

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Thank you!

The slides and additional materials will be available at

http://www.heppnetz.de/teaching/gwi/