Synchronous Audio-/Video-Recording for eTeaching and Evaluation of Students Results

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Synchronous Audio-/Video-Recording for eTeaching and Evaluation of Students Results

1. eTeaching System

2. Synchrounous A/V-Recording of Lectures

3. Evaluation of Reached Students Results

4. Summary

1. eTeaching System

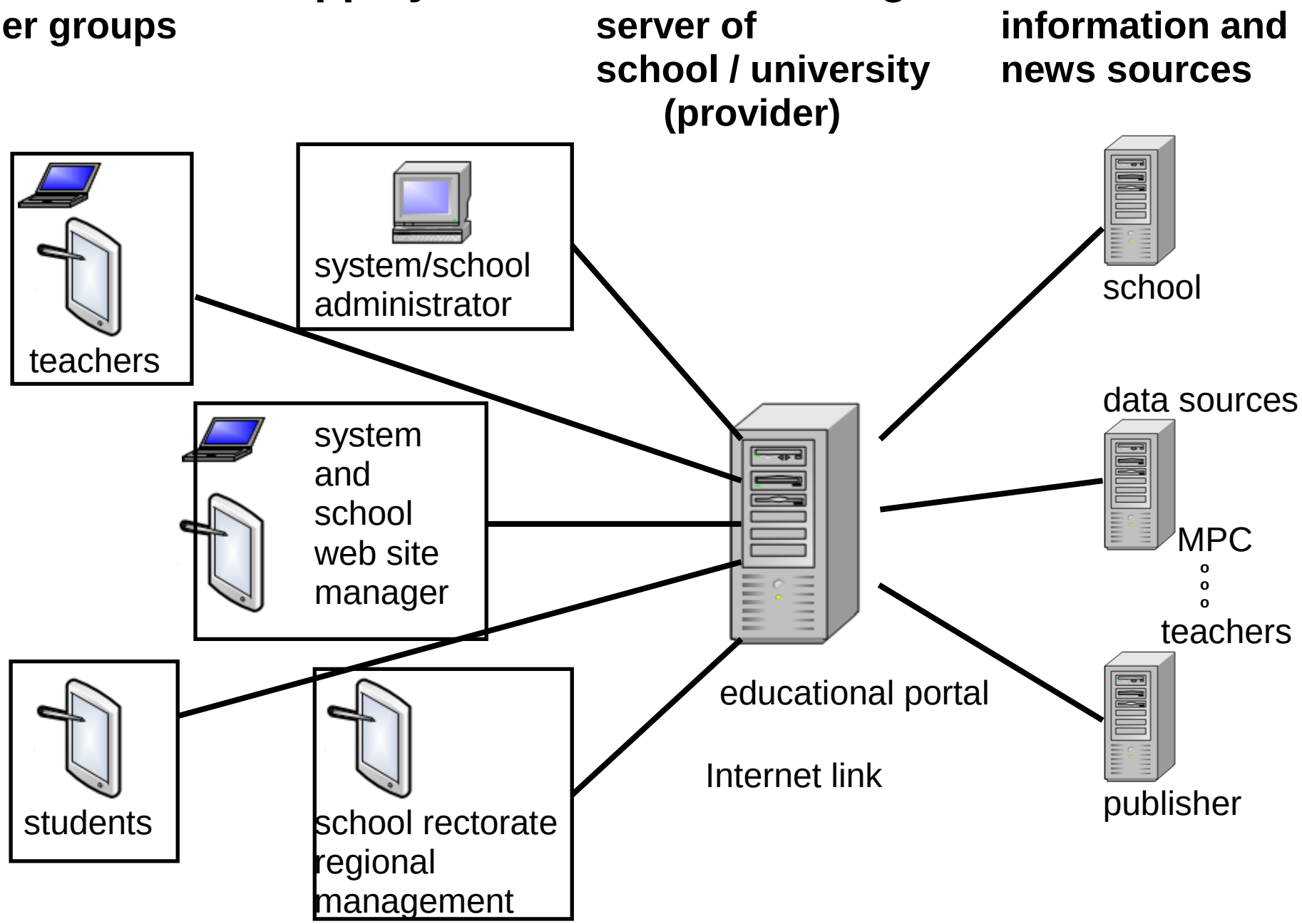
technical solutions for tabletPC

additional problem solutions necessary for:

- video / audio quality
- signal delay and jitter
- QoS management options
- compatibility
- common standards and protocols
- integrated services
- cooperation of several programs on one computer
- used protocols (H.3xx, H.264/265, SIP, …)
- supported network standards
- automated, AI-based management
- portal for work in schools and universities
- working instrument for teachers and pupils/students

……

Modular school app system inclusive management



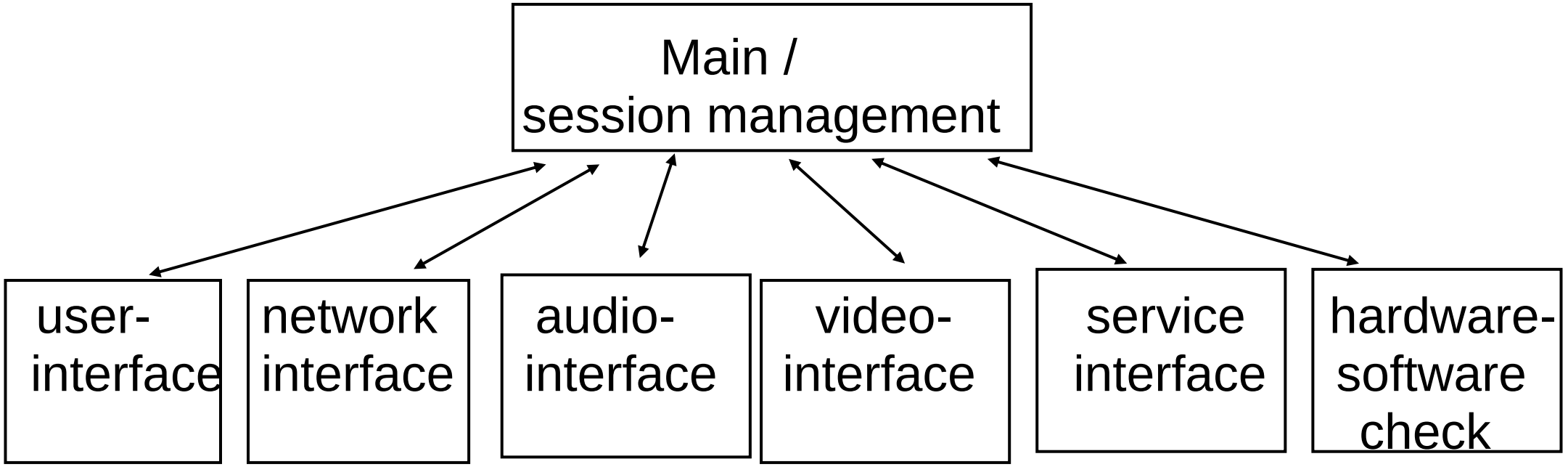
typical tasks currently:

- **students use TabletPC instead of textbooks and books**
  → everywhere: in lessons, at home, during examinations
- **teachers use TabletPC during lessons**
  → teaching, examining, tests
  → lesson preparation / follow-up treatment on separate PC
- **system / school administrator**
  → updating + controlling of the systems via PC
- **system / school site manager**
  → updating + controlling of the school Web / intranet site via PC
- **school rector, local education authority**
  → management of teaching
- **media pedagogical centre (MPZ)**
  → preparation of teaching material and methods
- **publisher**
- **didactic and pedagogic solutions**
  → new methods for teaching, new methods for learning, → efficiency

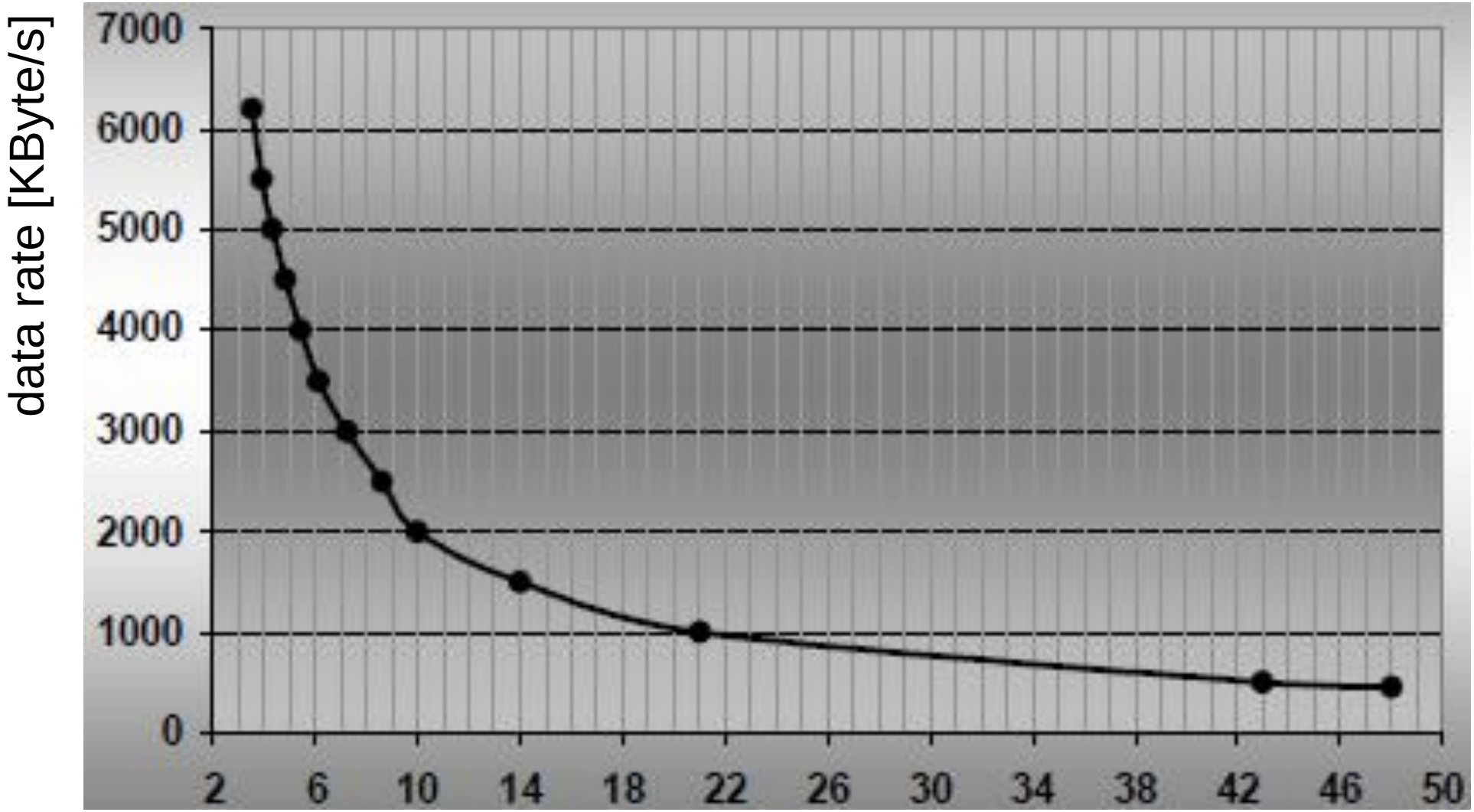
2. Synchrounous A/V-Recording of Lectures

Example: AV communication system VisitPhone

Program structure

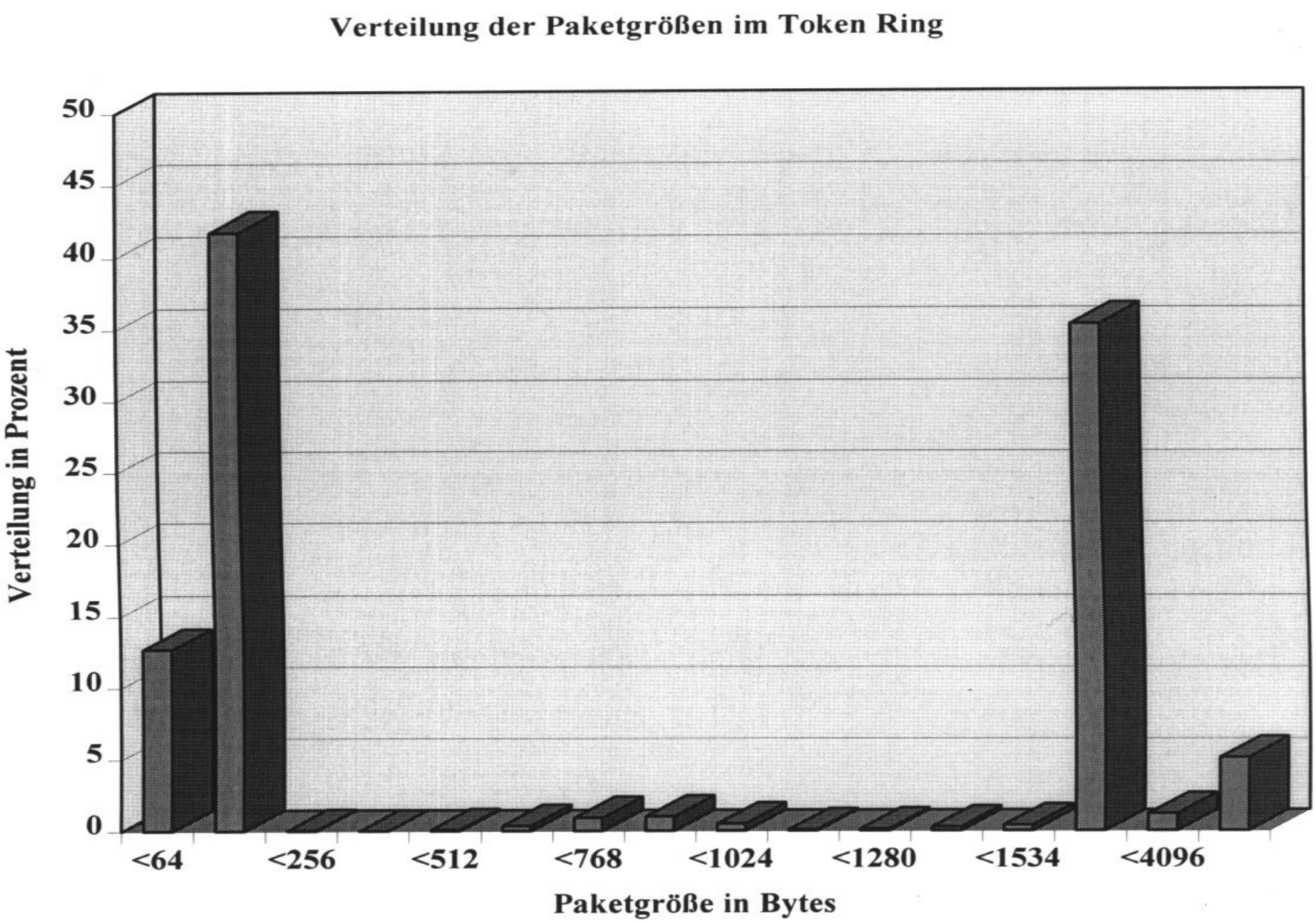


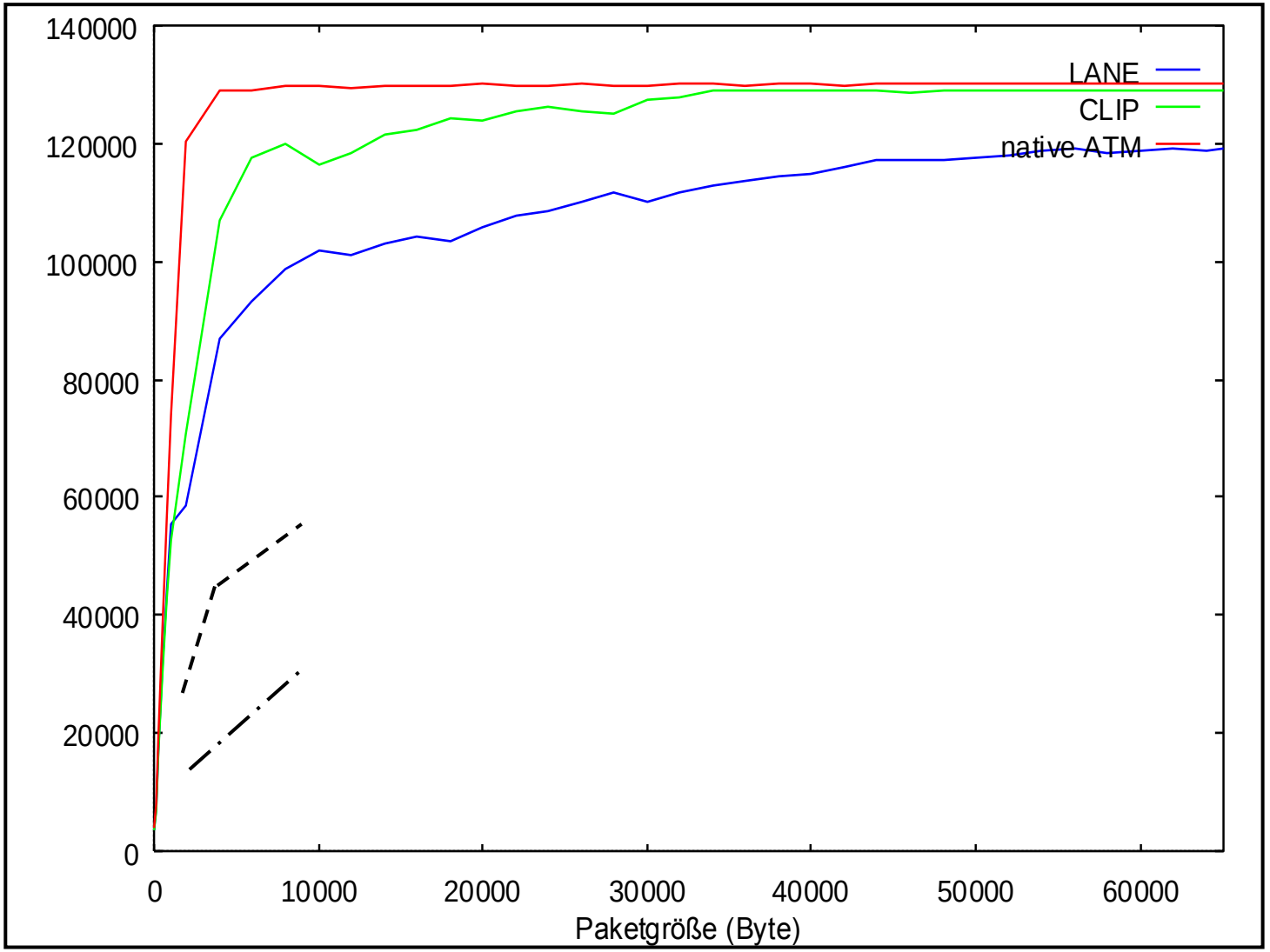
systematic investigations



Ratio between data rate and compression factor for PAL quality in case of M-JPEG compression

Distribution of packet size in dependence on different block length in university LAN for TCP/IP

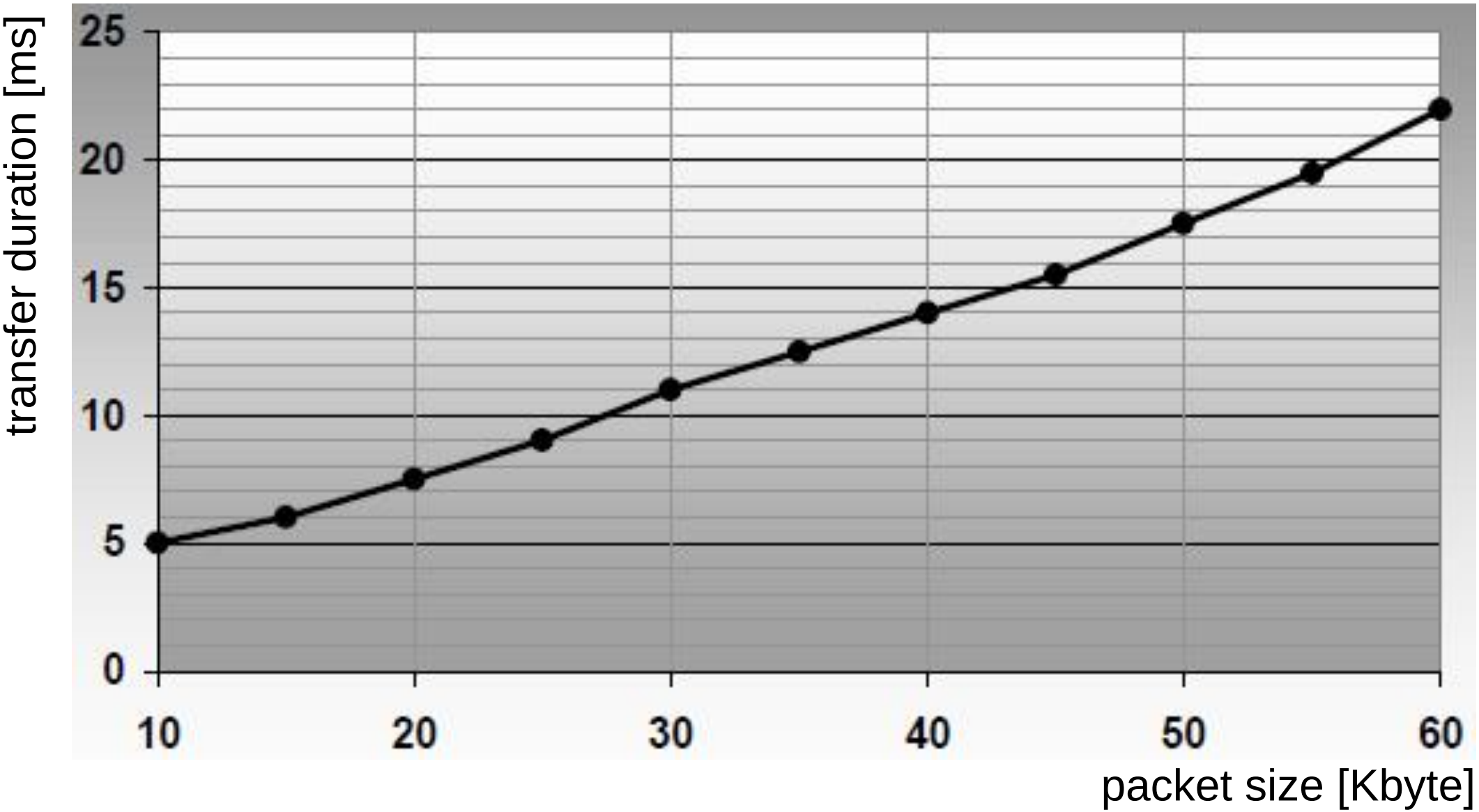




Fast Ethernet, UDP

Fast Ethernet, TCP

data transfer P233 -> PII266

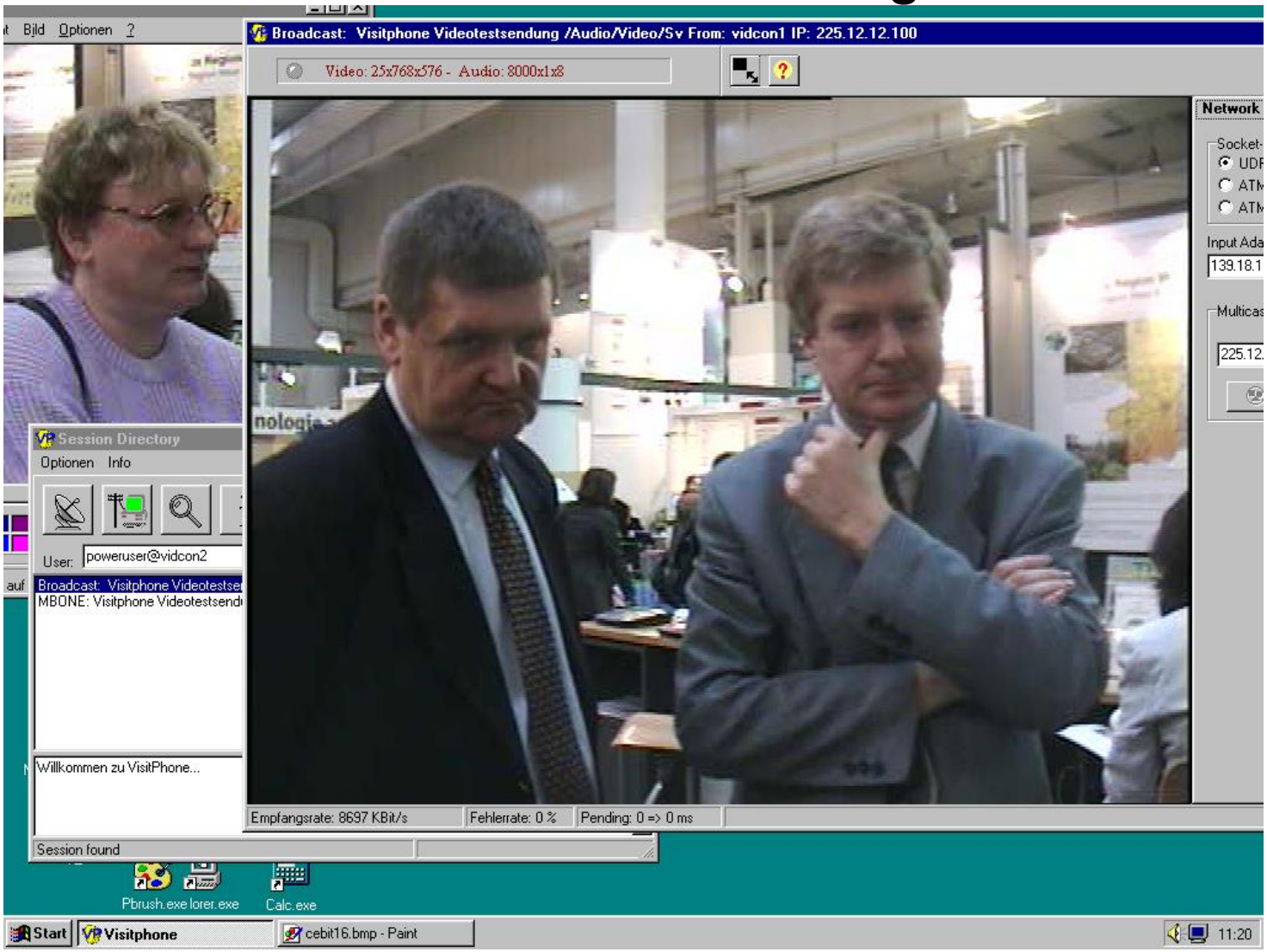


Ratio between packet transfer duration time and packet size for UDP/IP for Fast Ethernet (P233 system, Windows'95)

Some examples from former (HTWK) projects

Condition: Technical performance of devices (right theme/time)

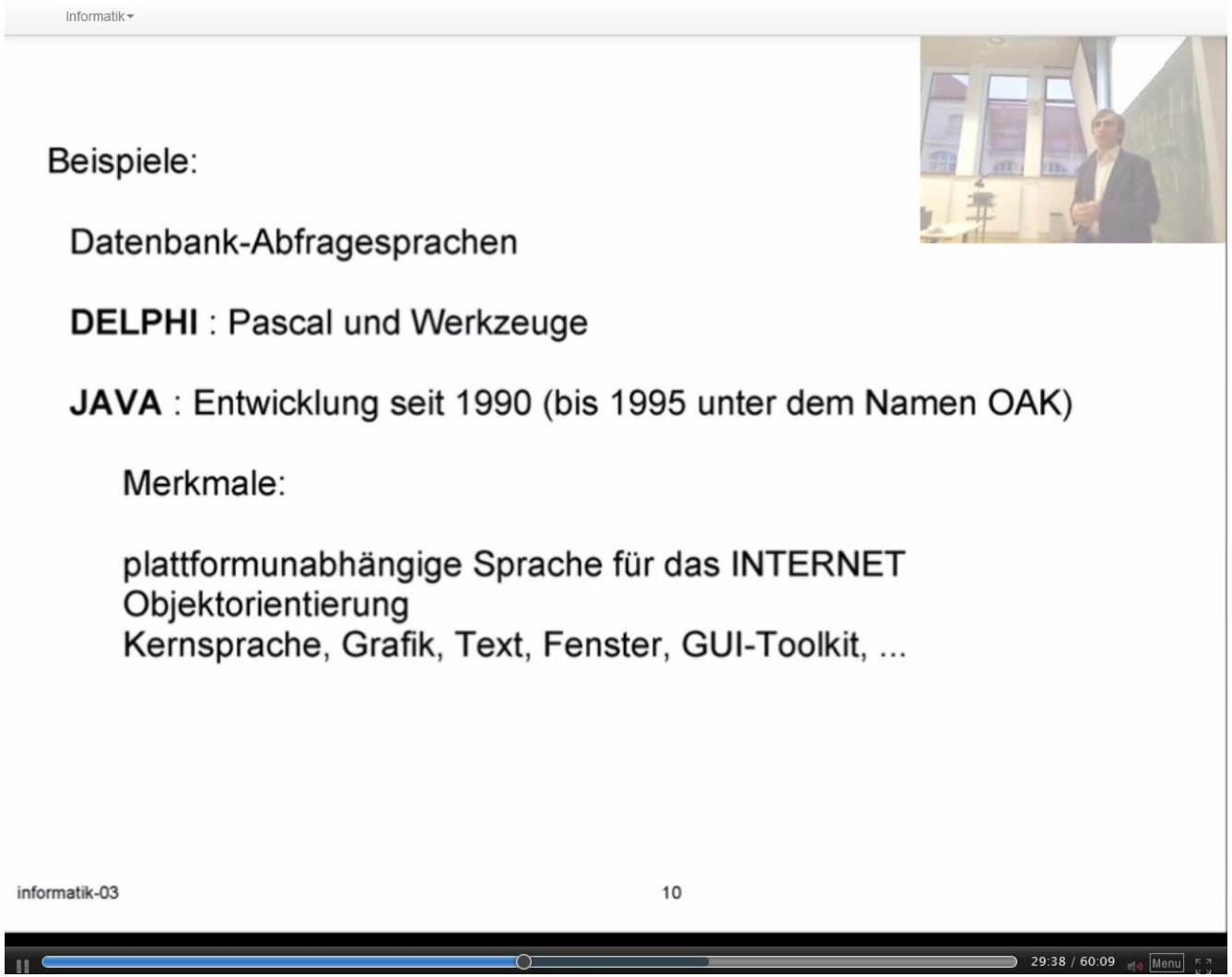
Cebit'97 .. '01: AV-Conferencing in PAL for Distance-Learning



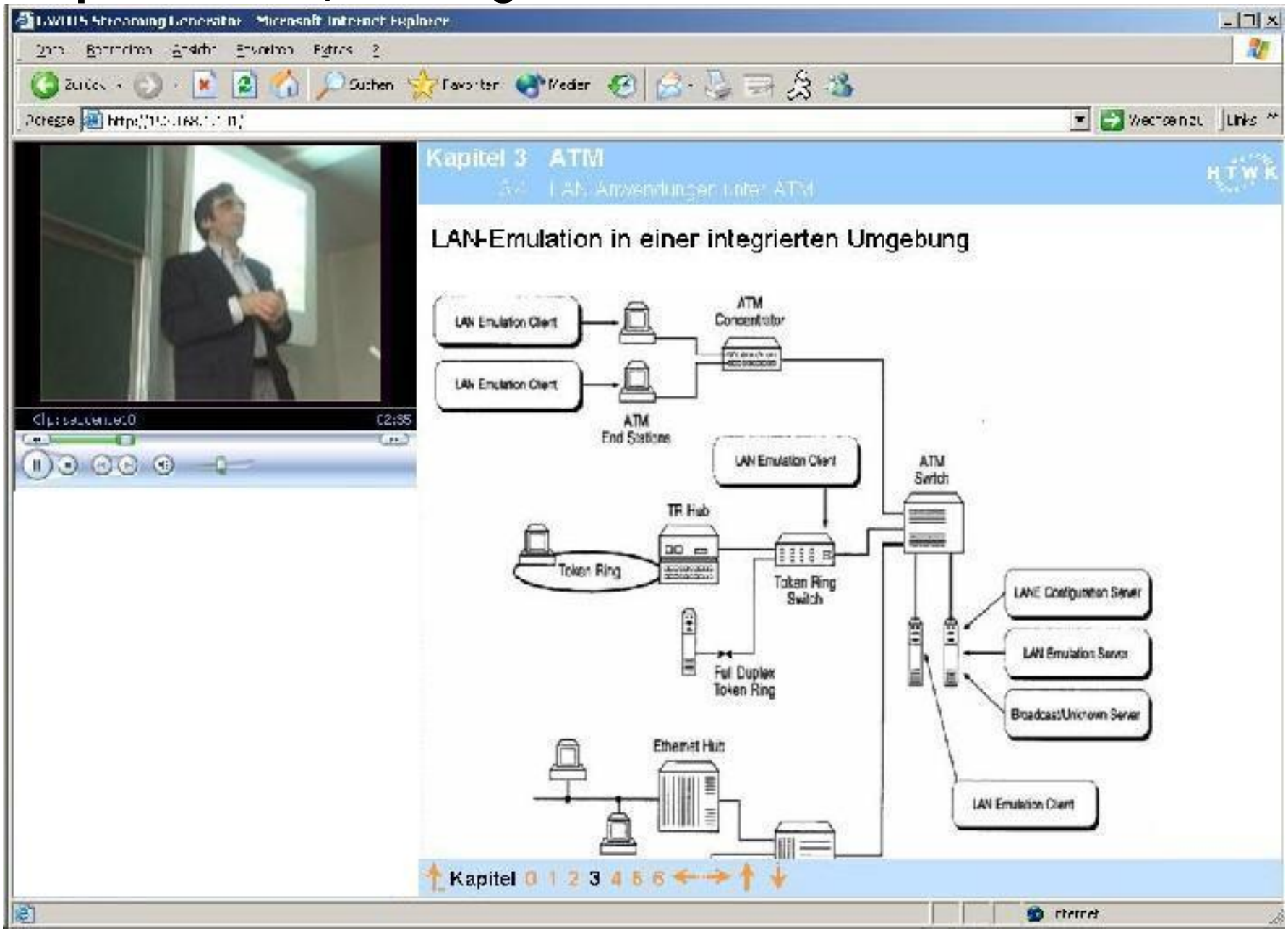
- network 100-150 Mbit/s
- PC/workstation Pentium processor
- multitasking
- free choice of adapters

Improved possibilities at HTWK Leipzig (2000-2010):

- notebook + camera + server
- Word + presentation tool + Web browser



example: lecture, viewing via PC and GWOTS



example: lecture, viewing via PocketPC

limited performance:

presentation via AV or slides or other services

current modern solution:

PowerPoint + Skype + tabletPC/tablet notebook (+ server)

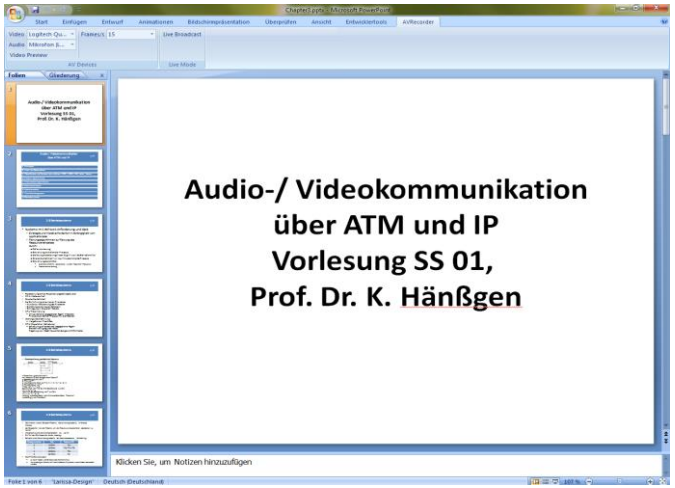
→ Web browser + tabletPC/smartphone:

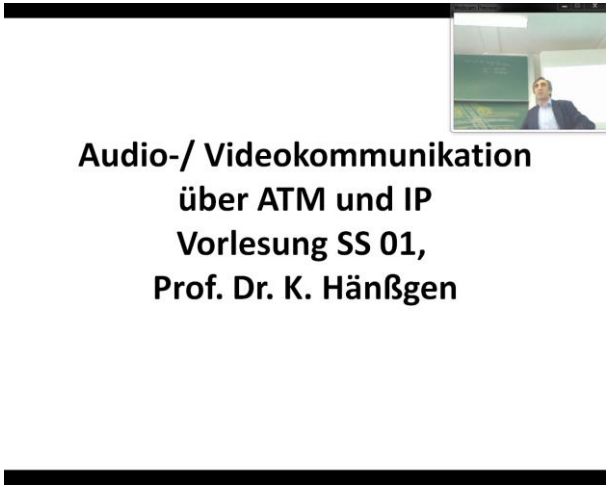
- **high quality**
  high resolution of video material (1000x2000) and
  good eLearning conditions (audio in HiFi, pencil, ...)
- **high compression**
  large storage quantities (>1TB) and high transfer rates (>~.1Gb/s)
- **synchronous video/audio + presentation material**
  small requirements/needs for generating e-teaching material
- **simultaneous communication into all directions**
- **automated management**
- **automated object recognition and separation**
  automated content and knowledge management

recording and replaying of lectures via Powerpoint

3 components:

- recording via Powerpoint Add-In at teacher presentation device using logfiles

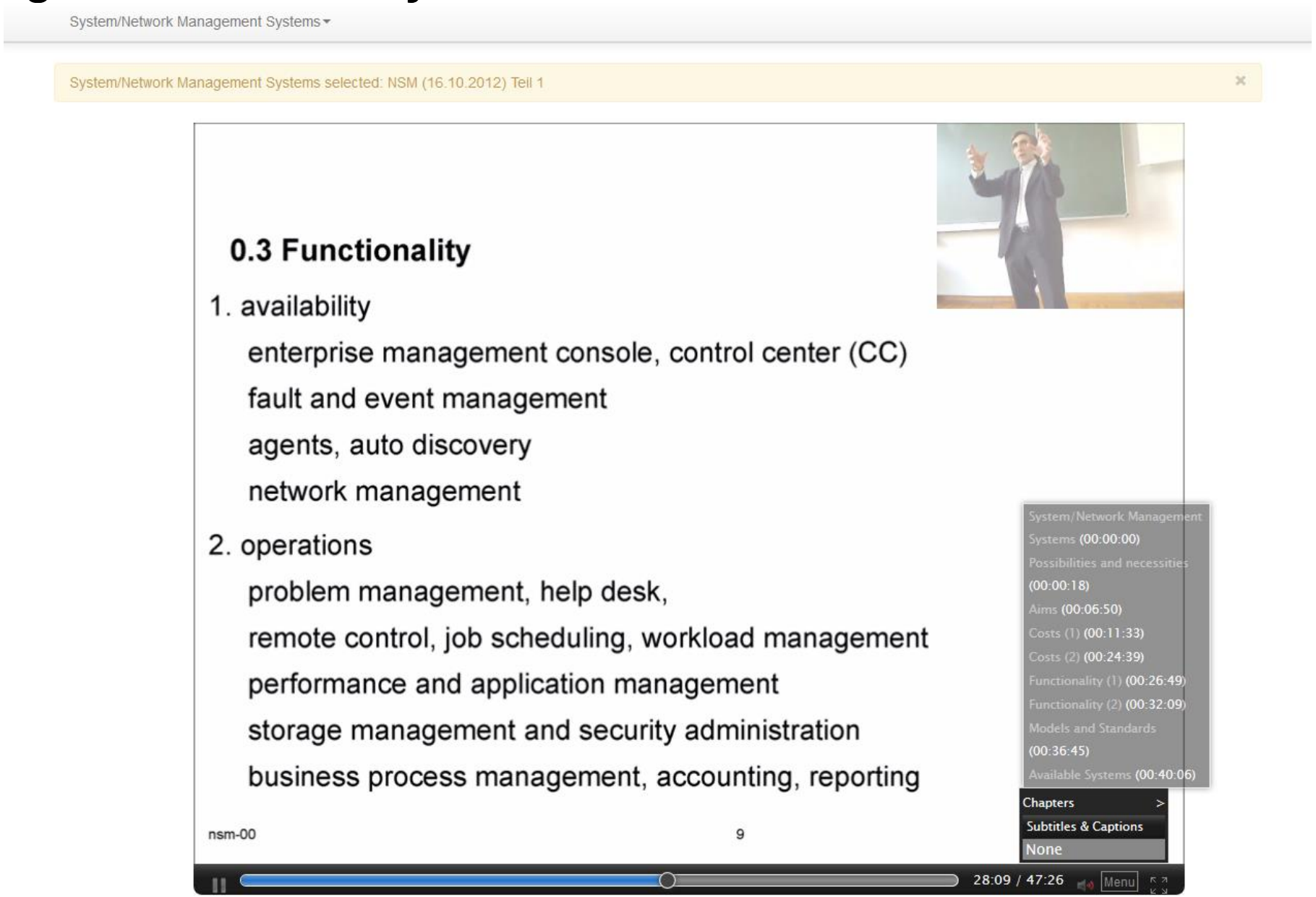




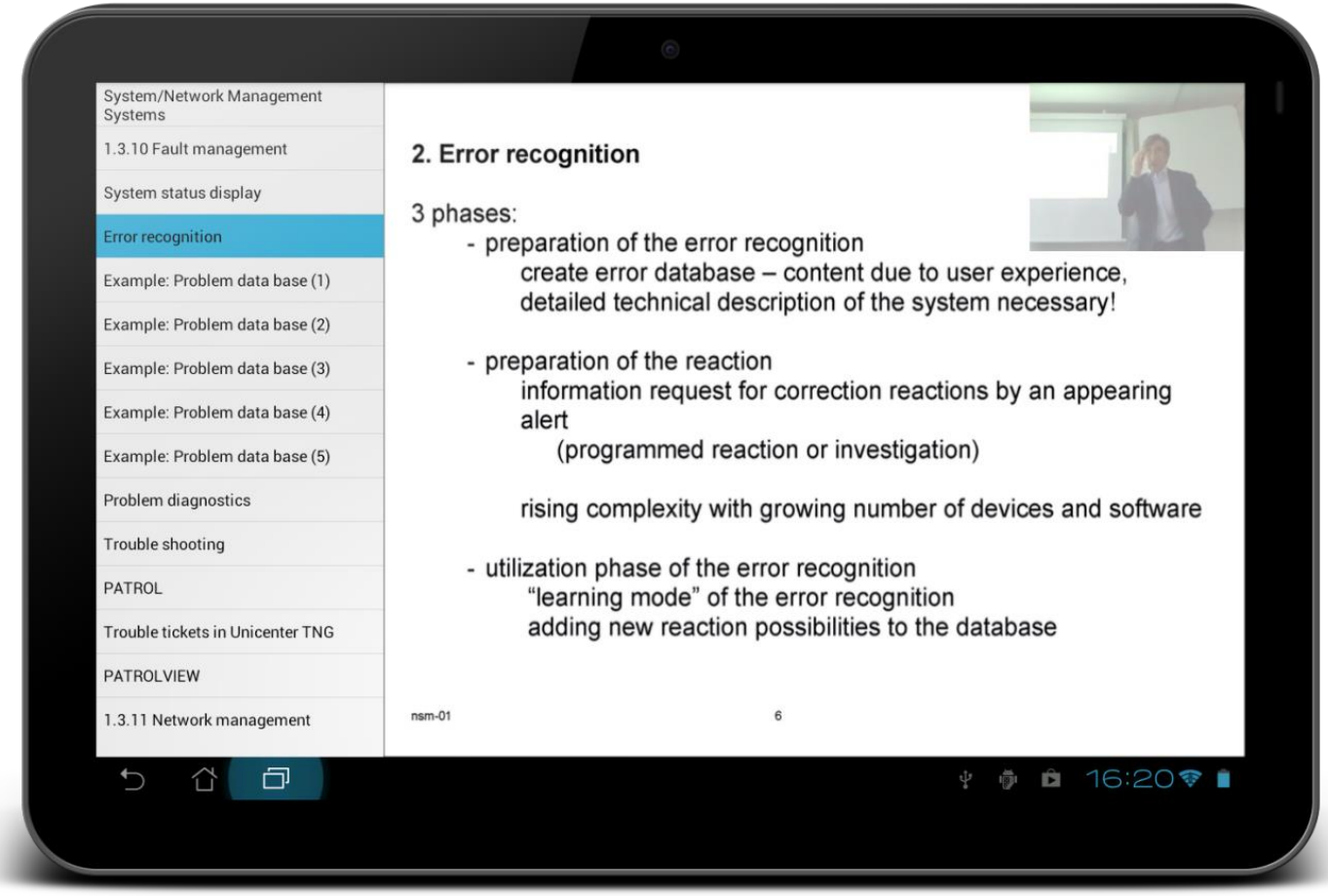
- revising and changing of content at server

- replaying via HTML5 Webplayer/Android on TablettPC/Smartphone
  - choice of a chapter via WebVtt
  - Android App

- usage via HTML5 Player



- usage via Android app



- Data transfer via JSON-API to app
- Tablet layout contains content overview, transparency page, video

3. Evaluation of Reached Students Results

Teaching scenario

HTWK case of educational module

Originally: 1 lecture + 1 seminar with 2 hours each per week

Introduction of e-teaching/e-learning systems

modernization allowed:

- effective teaching, cost efficiency
- stronger introduction of autonomous and self-determined learning for students
- omitting seminars, lecture with 2 hours per semester week
- task for self-study: own responsibility, use recorded lectures + recommended textbooks
- written examination to assess the level of knowledge
- exam preparation: repetition of recorded lectures

Analysis of learning outcomes

Educational module 2014, 85 participants, 3 curricula (2x 3rd semester, 1x 5th semester)

average grades of examinations, scale "1" to "5", with "1" as highest grade

average grades until 2013: 2.5..2,8 +- 0.3,

2014 all curricula together:	3.8 +- 0.2
2014 5th semester students:	2.0 +- 0.4
2014 3rd semester students:	4.5 +- 0.3

analysis of use of e-service:

- ~ 10% of students - a-/v-recordings access each week
- ~ 60% of students - a-/v-recordings access one week before exam
- ~ 10% of students used recommended textbooks,
- ~ 50% of students used Internet sources

Reconsidering of teaching implementation in 2015:

- change of the examination regulations
- a weekly exercise for students, graded solution in credits scale (0; 1; 2),
- students admitted to the final exam only if > 70% of exercises with rating >= 1

results 2015:

~ 50-70% of students accessed recorded lectures

average grades:

- students all curricula together: 2,9 +- 0,2
- students 5th semester: 1.6 +- 0.8
- students 3rd semester: 3.0 +- 0.3

In 2017, average grade for students: 2.6 +- 0.2.

4. Summary

e-services play an increasingly important role in modern teaching.

However: e-systems cannot substitute teachers in training,
but can support teachers and students:

because:
for students in lower semesters (3.), individual responsibility not yet strongly developed

effective controls on knowledge acquisition necessary,
then students knowledge and achieved examination results like in conventional education

measurable in average grades of examinations