Automatic Video-Transcoding for Mobile Devices A Field Report

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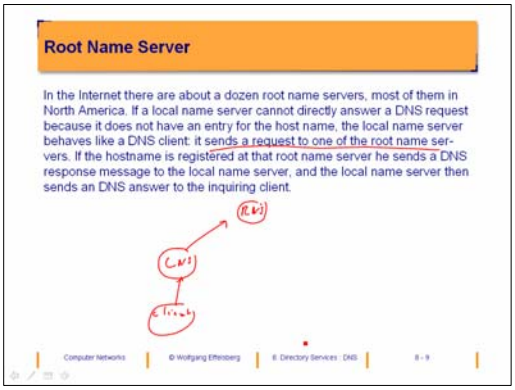
Outline

- The Plot
- Requirements
- Analysis
- Previous Procedure
- New Procedure
- Demonstration
- Outlook

The Plot

Coming from the university context we focus on lecture recordings. Nevertheless, this process can be used for (nearly) every frontal presentation.



Requirements

- Recorded content should be accessible after a short time period.
- Offline media (DVD), downloading and streaming should be supported.
- Different bandwidths should be offered.
- Cross plattform formats should be used.
- Students should be able to use the recordings everywhere.

Requirements

- Easy integration into learn management systems.
- A scalable procedure is necessary to cope with extended throughput.
- Support of slide annotations as well as starting-from-scratch approaches, e.g., for the development of algorithms or mathematical proofs.

Analysis

1. Which end devices should be used?
2. Which formats are necessary?
3. Which input devices should be supported?
4. Which steps may be done automatically?
5. Which steps have still to be done manually?

Mobile Devices

- Typical end devices:
  - Mobile Phone
  - Personal Digital Assistent (PDA)
  - iPod Video
  - Playstation Portable (PSP)
- In addition:
  - Digital video recorder (e.g., Archos)
  - Integrated devices
  - Future developments





Mobile Devices

	iPod	PSP	Mobile Phone	PocketPC
Aspect Ratio	4:3	4:3 (16:9)	3,66:3	4:3
Resolution	320x240	320x240	176x144	320x240
Framerate	30 fps	29.97 fps	15 fps	20 fps
Sample-rate	48 kHz	48 kHz	8 kHz	22 kHz
Codecs	H264/AAC	H264/AAC	MPEG4/ AMR	WM-A/V
Channels	Stereo	Stereo	Mono	Stereo

Formats

- Camtasia Recorder
- Coding into video formats:
  - WMV (cross plattform enabled!!)
  - DIVX
  - MPEG4
  - H264
- Coding into audio formats:
  - AAC
  - AMR
  - MP3

Just Audio?

- Problems may occur if lectures are not specially prepared.
- If the lectures are prepared for the visually impaired, it is certainly possible to use exclusively the audio recording.
- MP3 format then may be preferable.

Input Devices

- Tablet PCs
- Touchscreens
- (Whiteboards)

- Office-Software
- Acrobat
- Whiteboard-Software

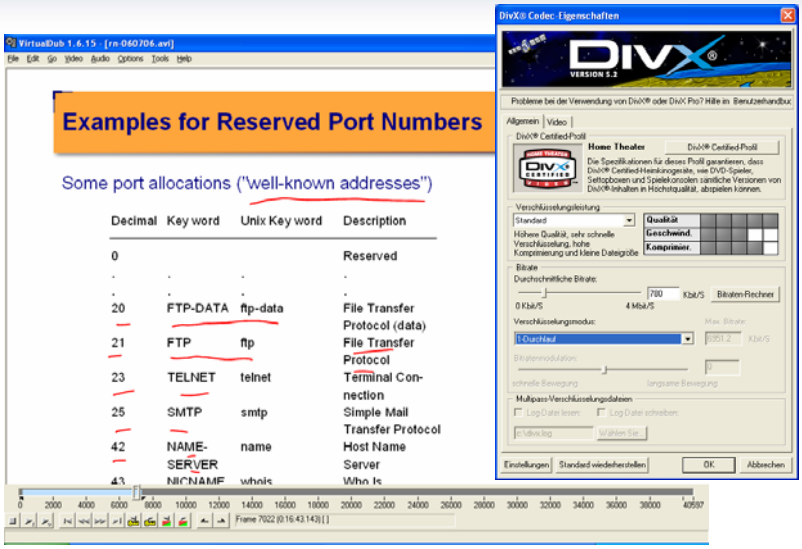
Previous Procedure

- Start of recording by pressing <F9>.
- Lecture recording and annotation.
- End of recording by pressing <F10>.
- Edit of the raw footage and encoding into a certain format. (DIVX)
- Published on a server and supplied as a DVD-ROM.

Manual Effort

Editing, encoding and publishing of the lecture recordings take a lot of time and effort.

Manual Effort



Manual Effort

- Only one format is achieved by using the mentioned encoding procedure.
- For each further format a new encoding procedure is necessary. So the effort is nearly linear.
- Only the start- and end points do not need to be set again.
- The user has to stay logged in during the encoding procedure.

New Procedure

- Starting and stopping of the recording is identical.
- The encoding server watches a directory. (Watchdog)
- The encoding is steered by a shell skript.
- An HTML page as well as an RSS feed are created out of metadata.
- Encoding and publishing is done in parallel.

Transcoder

- Virtual Dub (Open Source)
- Windows Media Encoder (free to use)
- Nokia 3GP Multimedia Converter (free to use after registration)
- FFMPEG (Open Source)
- x264 (Open Source)

Transcoder

- All used transcoders may be controlled via a command line.
- Therefore, they are easy to use and
- Easy to integrate into complex software.

- It is possible to reduce the used transcoders to Windows Media Encoder and FFMPEG. Therefore, the latter has to be compiled accordingly. (x264, AMR, etc.)

Advantages

- Automatic creation of an HTML page which is easy to integrate into a LMS.
- Efficient use of ressources by parallel encoding of the video into the given formats.
- Encoding done as a service, i.e., the user may be logged out. It also may be configured as a remote service.
- Results are automatically published.

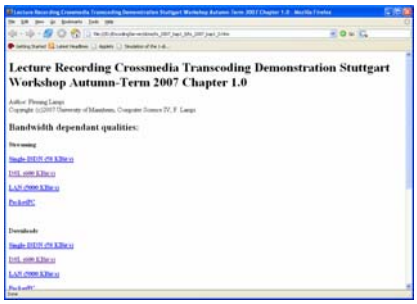
⇒The user spends less time in front of the machine.

Last Manual Steps

- Copying of the raw footage to the editing workstation.
- Editing the video into chapters, dividing of lecture, quizzes and solution of quizzes.
- Creation of a meta data file consisting of four lines.
- Starting of the encoding.
- Integration of the HTML page into the LMS.

Demonstration

The result of such a recording looks like this:



The recording was done some slides before.

Outlook

- Change of the software, leaving the shell script towards a modular framework.
- Keeping track of the development of end devices.
- Amendment of further formats.
- Automatic Integration into the LMS.
- Automatic file transfer to the editing workstation.
- Automatic scene detection for the edit.

Questions?

Thank you for your attention!

Feel free to ask …

or contact us:

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