CMIF:

A Structure for Transportable, Dynamic Multimedia Documents

Dick C.A. Bulterman
Guido van Rossum
Jack Jansen
Dik Winter
Sjoerd Mullender
Lynda Hardman

CWI: Centrum voor Wiskunde en Informatica

Amsterdam

Presentation Outline

- Multimedia: what is it (and why is it interesting)?

- CMIF: CWI's Multimedia Interchange Format

- Hyperstructures & CMIF: Open Questions

What is Multimedia?

- Present:

  mul•ti•me•di•a *<buzzword; adj>*: a property of applications software that allows for the mixed use of several (chiefly output) media—such as sound, video, text, image and graphic data—in a manner that makes the unsuspecting user think that something unusual is happening on an otherwise conventional computing system.

  Examples: multimedia mail; multimedia documents; multimedia research

  See also: Clothes, Emperor's New.

- Future:

  mul•ti•me•di•a *<adj>*: a generalized ability of programs and architectures to define, manipulate and present all forms of temporal and spatial information.

  Examples: multimedia programs; multimedia computers

  See also: Data, Universal.

Distributed Multimedia

workstation

data server

data server

workstation
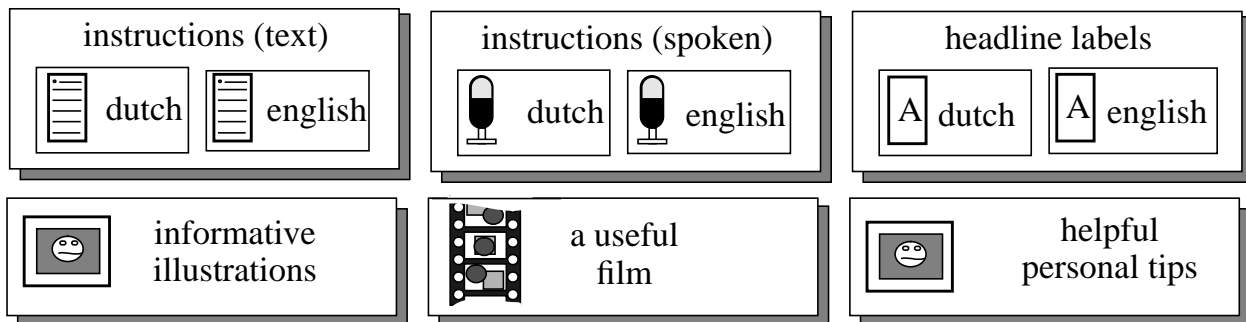
workstation

workstation
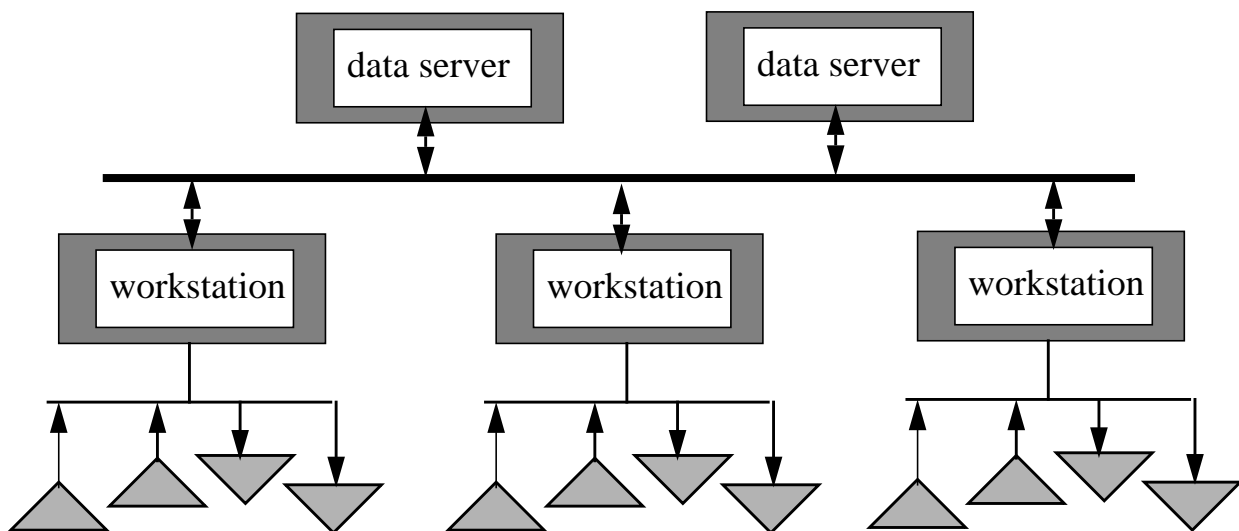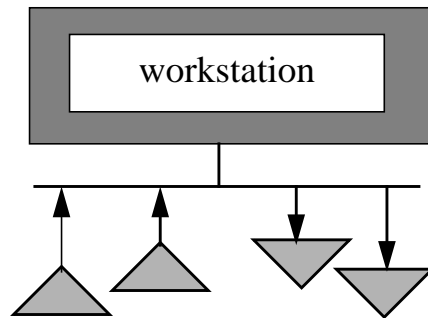
General Areas of Interest

- Document Structures for Transportable Presentations

    —   document object model
    - inter-object synchronization
    - object presentation model

- User Interaction Models

    —   presentation tailoring
    - component placement

    —   presentation control
    - component selection

A Typical Multimedia Problem:
Setting Coffee

• Components:

instructions (text)	instructions (spoken)	headline labels
dutch english	dutch english	A dutch A english

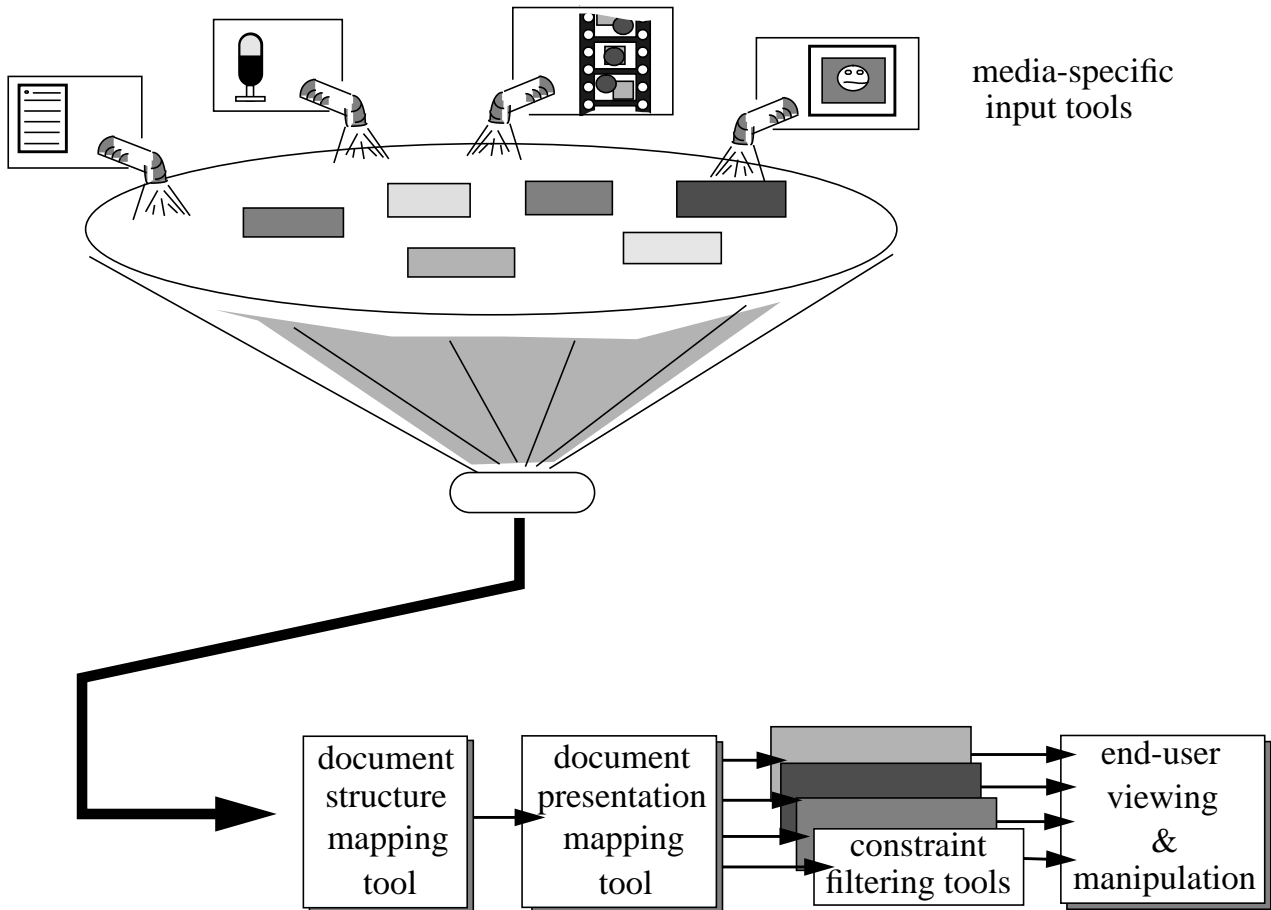| informative illustrations	a useful film	helpful personal tips

• Problems (presentation):

— creating data

— synchronizing components

— laying out a presentation

— starting a presentation
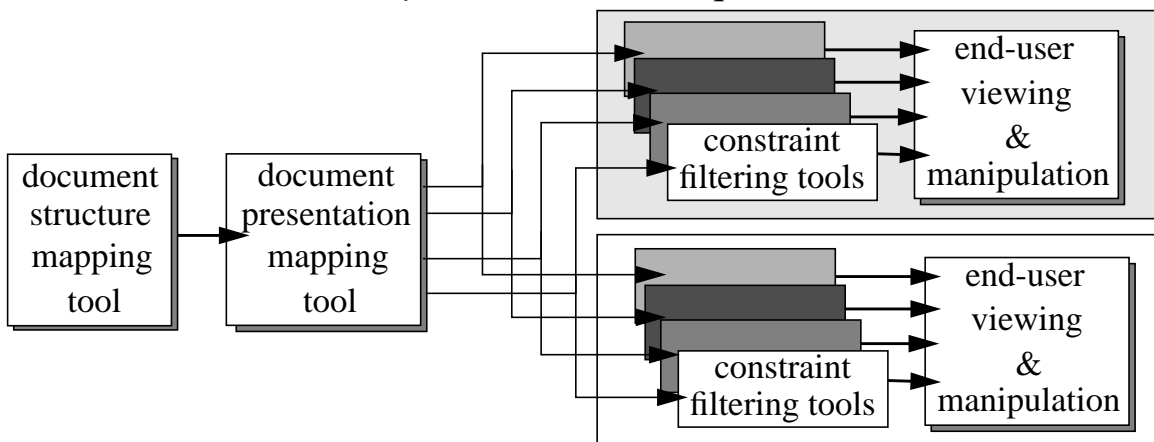
— controlling a presentation

• Problems (support):

— representing data

— fetching components

— resource allocation

— data/control modelling

— interactive feedback

The CWI Multimedia Pipeline

media-specific
input tools

document
structure
mapping
tool

document
presentation
mapping
tool

constraint
filtering tools
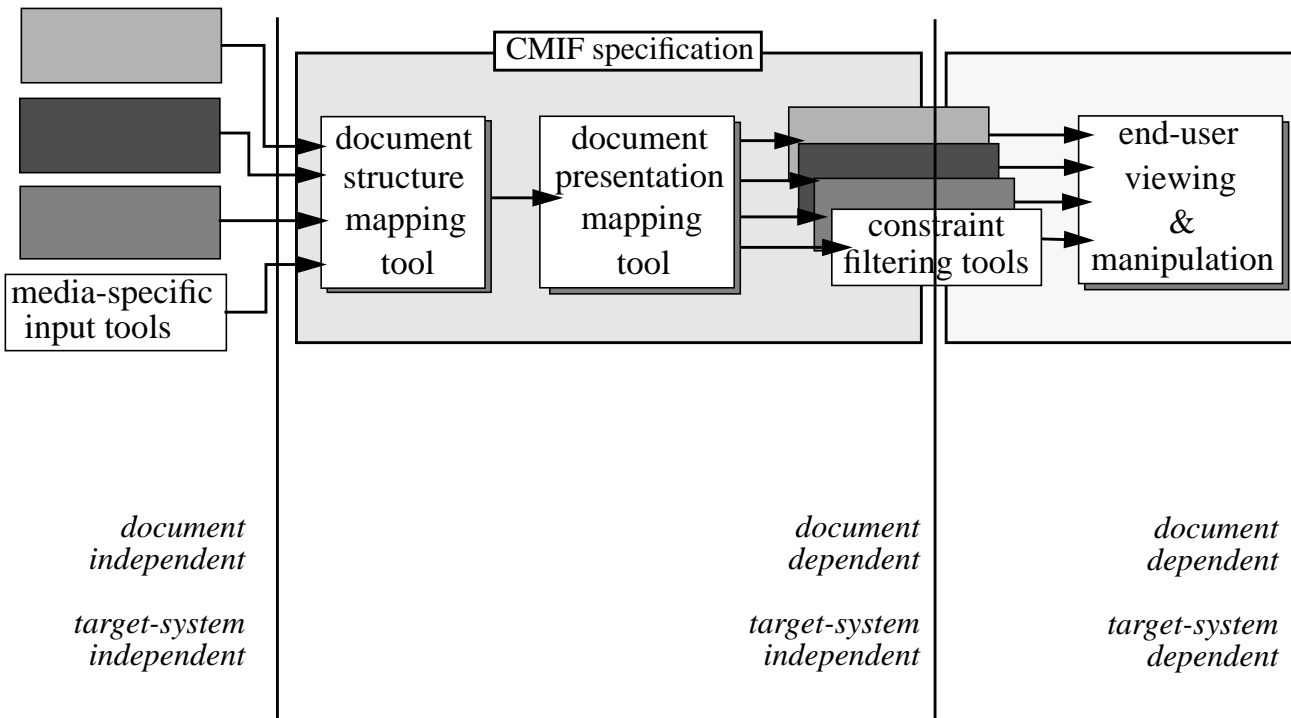
end-user
viewing
&
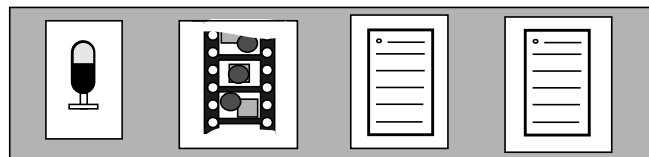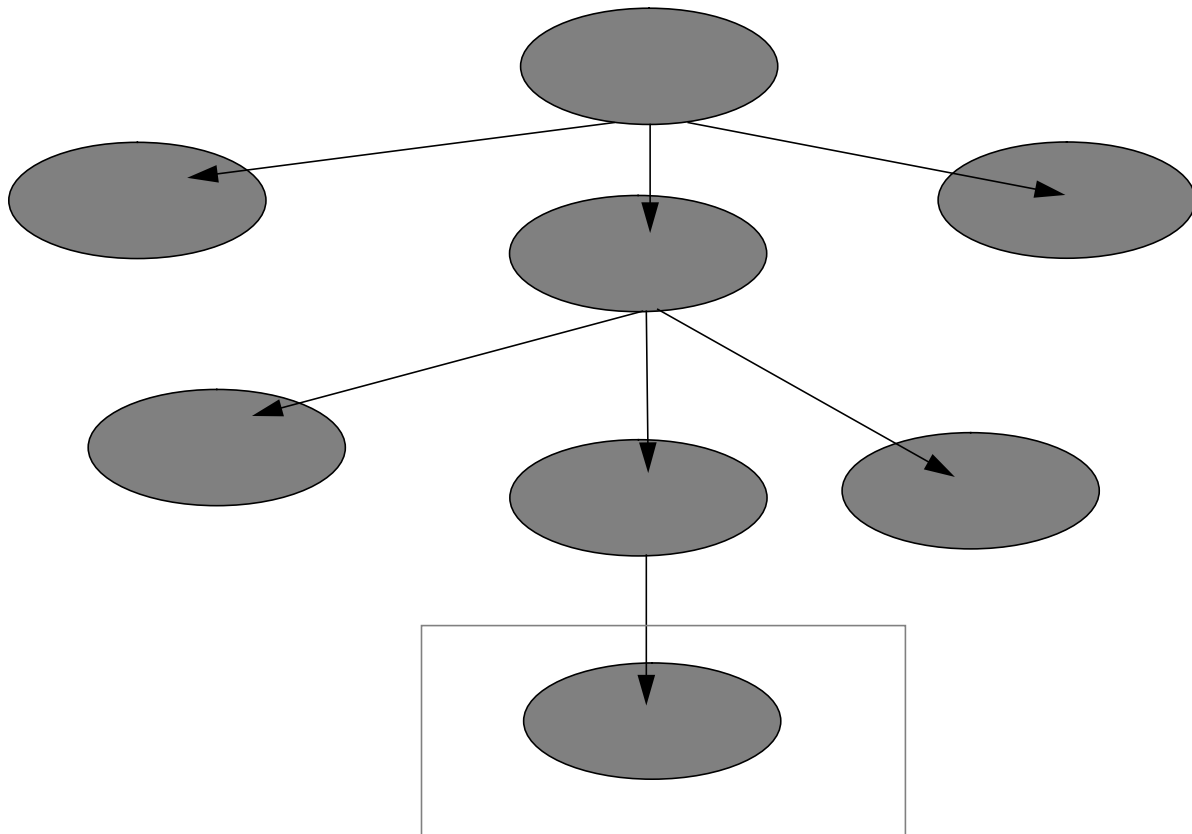manipulation

CMIF: Transportable Multimedia

- Current Structure Shortcomings:

  — FAX syndrome for audio/video/text data

  — centralized source/sink model

  — lowest-common-platform data modelling

- CMIF Goals:

  — decouple *data* and *structure*

  — define *transportable* documents

  — support *heterogeneous environments*

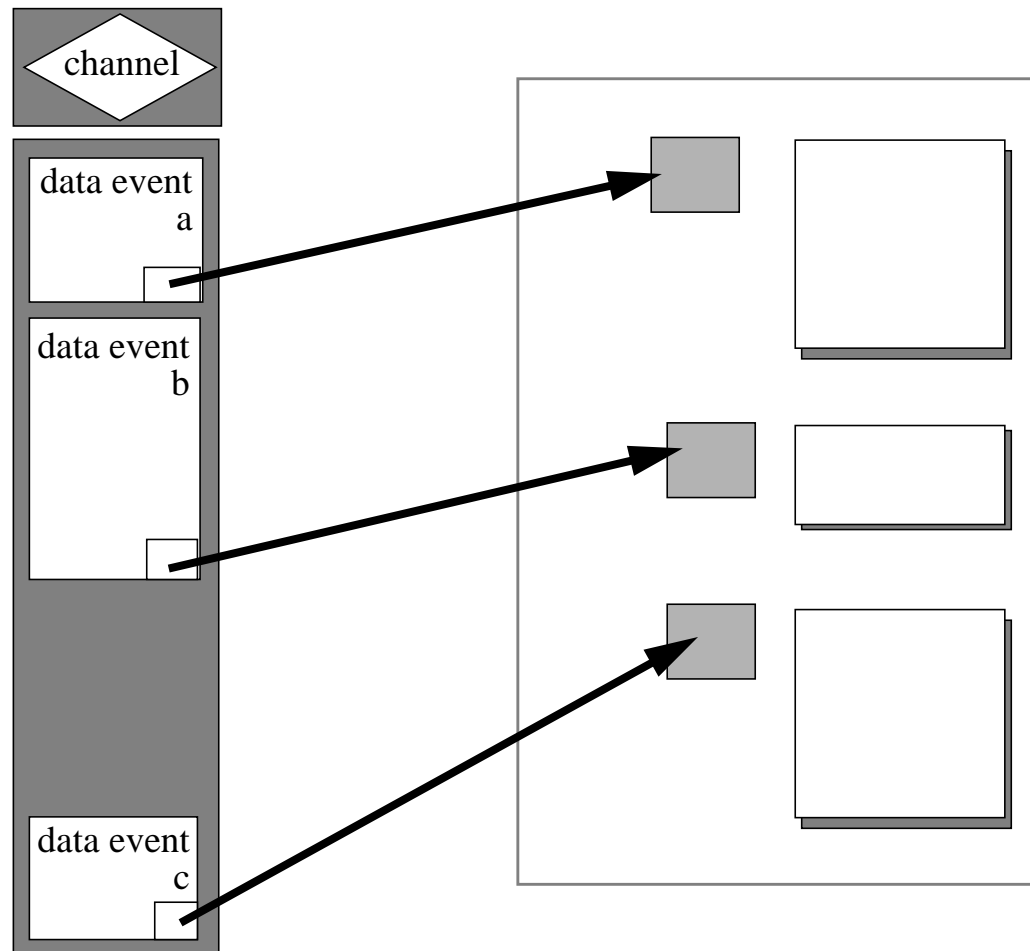 — define flexible *synchronization* requirements
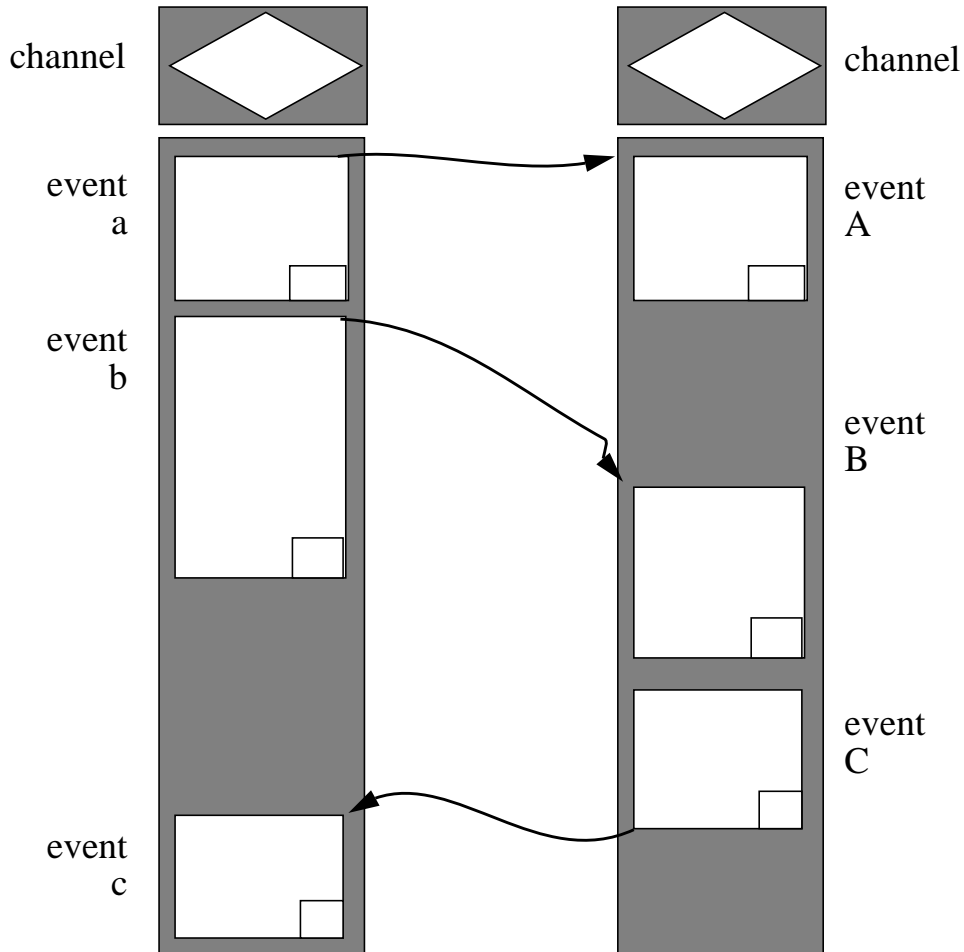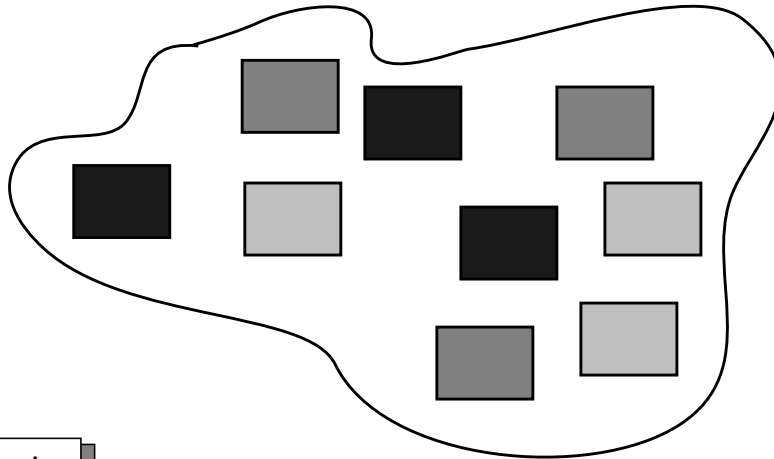
CMIF and the Multimedia Pipeline

CWI

| document structure mapping tool | document presentation mapping tool | constraint filtering tools | end-user viewing & manipulation |

CMIF specification

media-specific input tools

document independent

target-system independent

document dependent

target-system independent

document dependent

target-system dependent

CMIF Information Tree

Information Modelling in CMIF

channel

data event
a

data event
b

data event
c

Synchronization in CMIF

channel

event
a

event
b

event
c

channel

event
A

event
B

event
C

Hyper-Information and CMIF

CWI

element selection
tool

CMIF specification

document
structure
mapping
tool

document
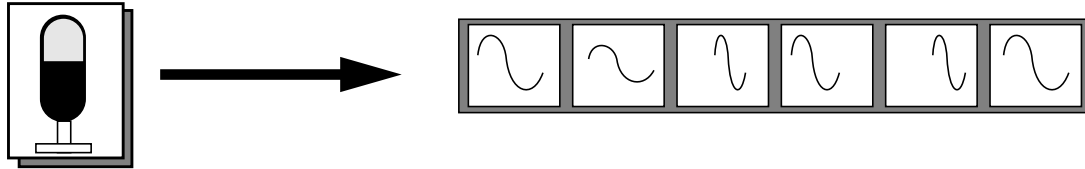presentation
mapping
tool

constraint
filtering tools
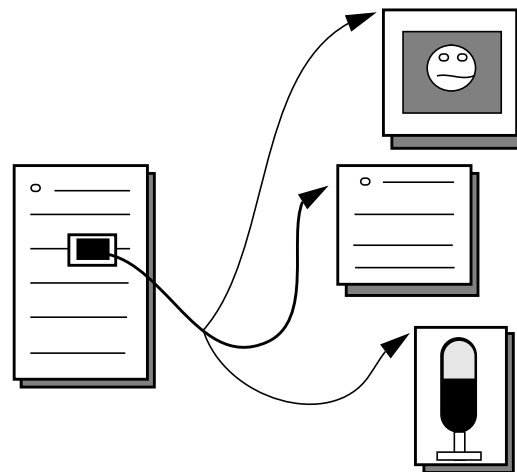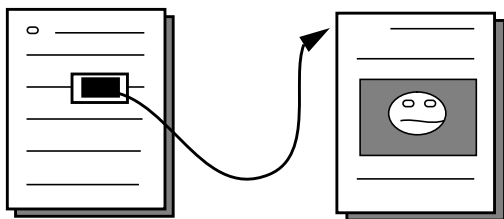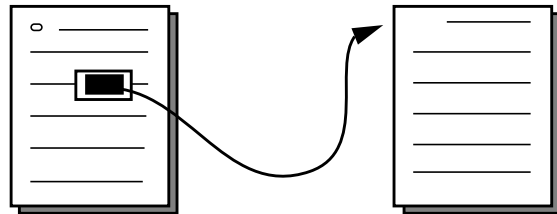
end-user
viewing
&
manipulation
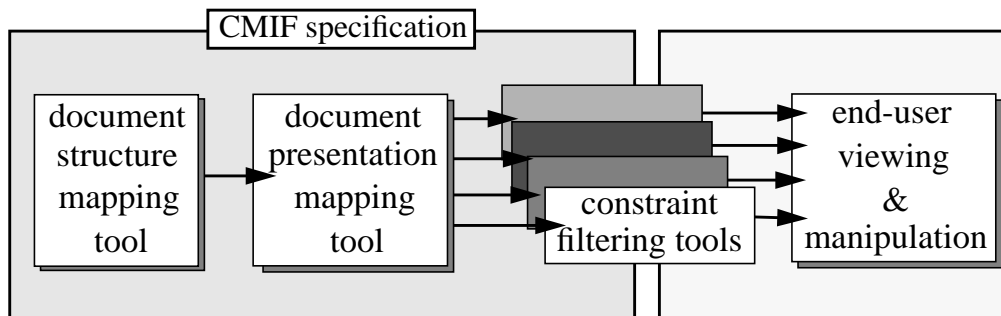
Open Issues

- Modelling time-based data

- Creating/managing 'multimedia hyperlinks'?
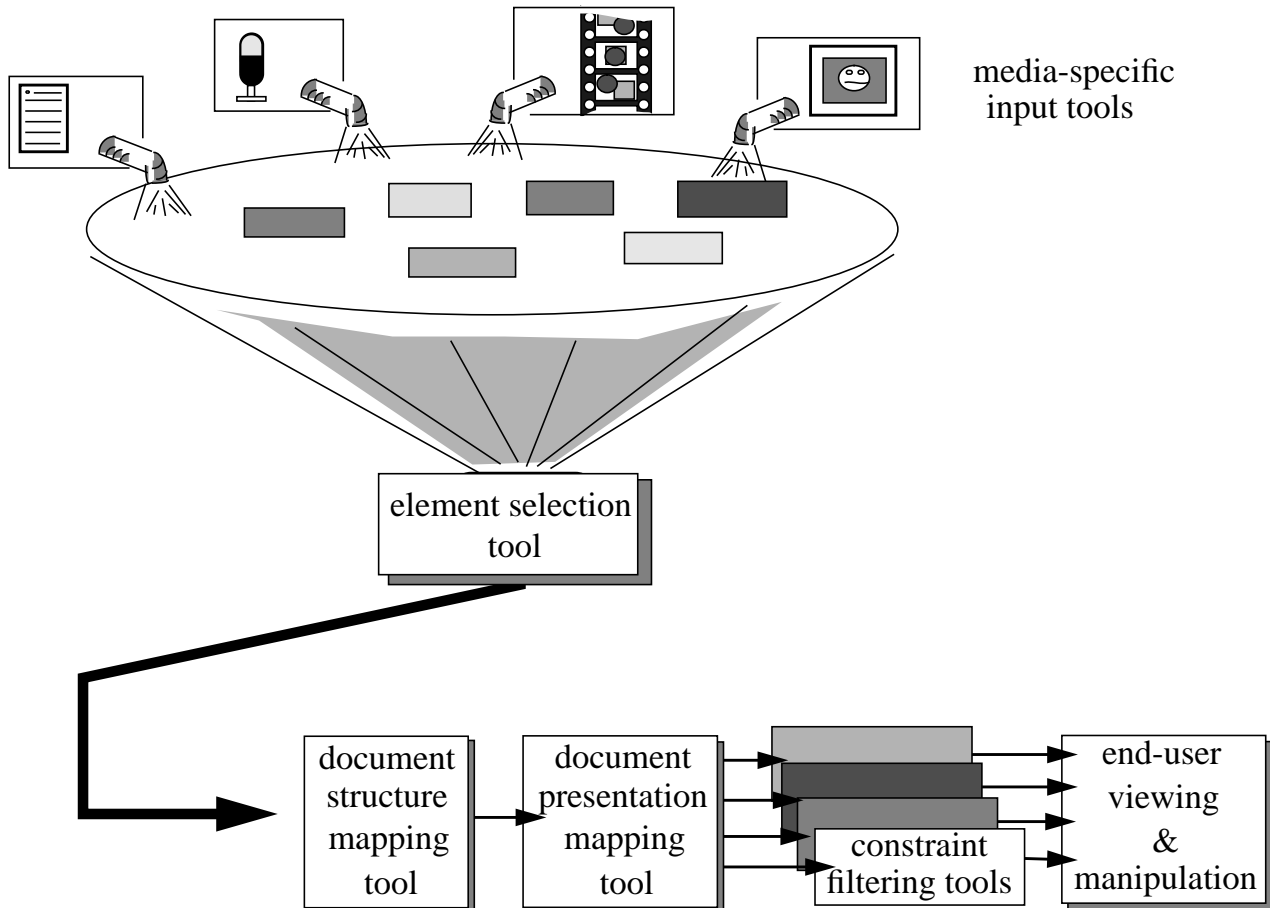
- Dynamic selection

Modelling Time-Based Data

sync
info

dcab   abcd   bcad   acdb   cadb   badc
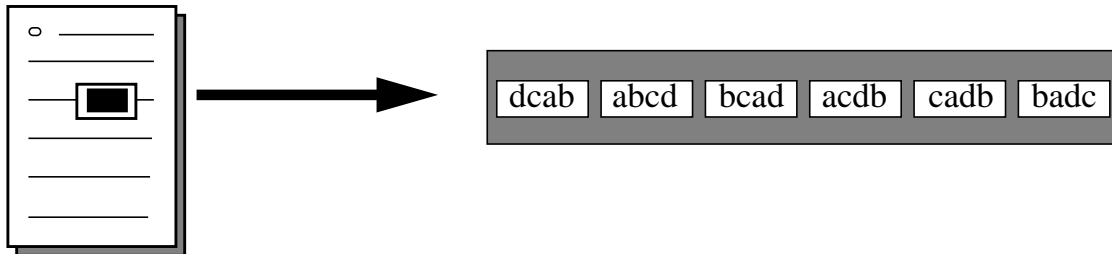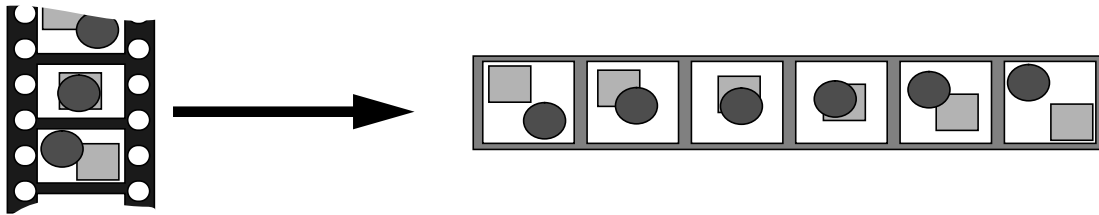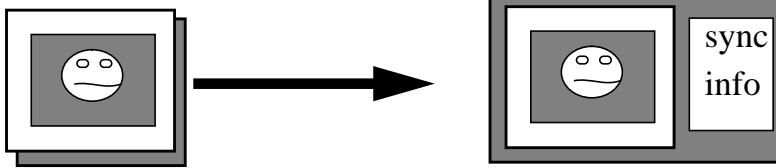
Modelling 'Multimedia Hyperlinks'

Dynamic Data Selection
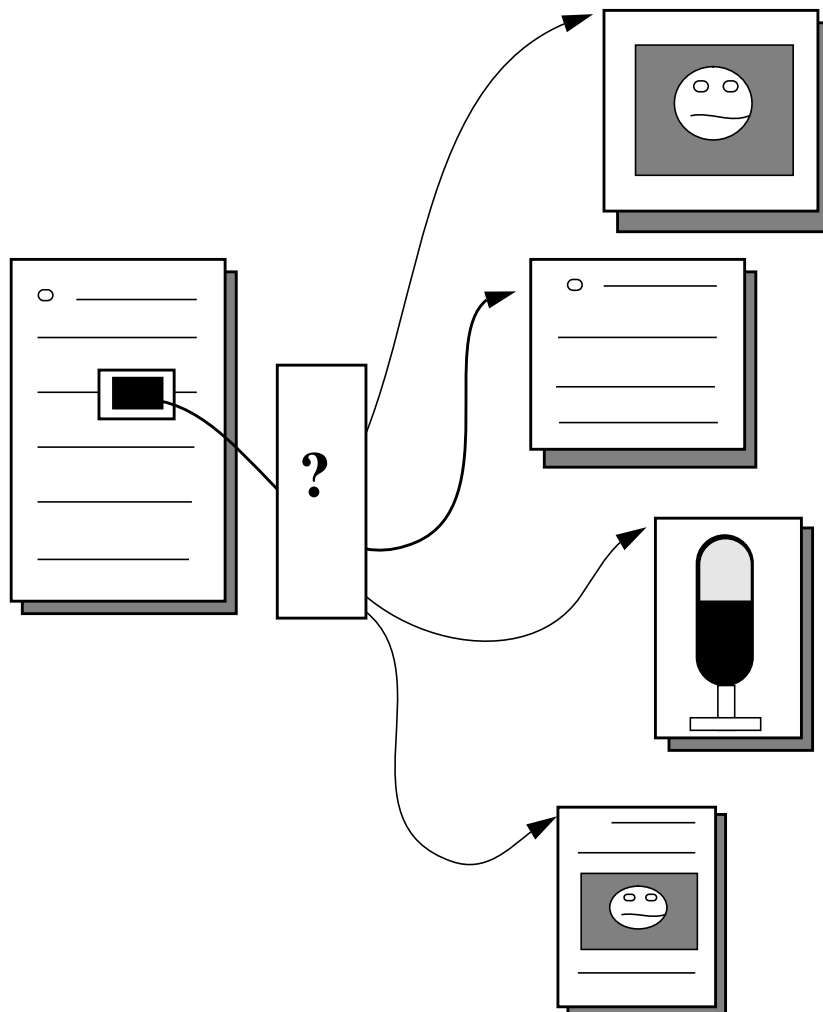
Dynamic Feedback Control

media-specific
input tools

element selection
tool

| document structure mapping tool | document presentation mapping tool | constraint filtering tools | end-user viewing & manipulation |

Summary

- Creating nice multimedia documents for a one platform is hard

- Creating one multimedia document for multiple platforms is harder

- Adding hyper structure information is very hard (but, luckily, very interesting!)