

# Multimedia document abstractions for multi-platform delivery publishing

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## Presentation Outline:

- Goal: multimedia dissemination in heterogeneous environments
- Problems: High authoring costs, large number of alternatives
- Approach: automatic generation of adaptive presentations
- Conclusion



# Goal: Ubiquitous on-line multimedia services

## Requirements for document and authoring process model:

- **Dissemination to multiple platforms**
  - High-end multimedia PCs, graphical workstations
  - Laptops, palmtops, PDAs
  - Mobile phones, smartphones
  - TV set-top boxes
  - etc
- **Cost-effective and timely generation of multimedia presentations**
  - automate authoring process
  - take platform/network characteristics into account
  - take user's knowledge, experience and task into account
- **Just-in-time multimedia presentation adaptation**
  - support authoring with incomplete information
  - some information is only available during run-time

# Approach (1)

## Adaptable versus adaptive documents:

- **adaptable documents:**
  - multiple delivery publishing model used in electronic publishing
- **adaptive documents:**
  - explicit user models, task models, platform specifications

## Both approaches can be used together:

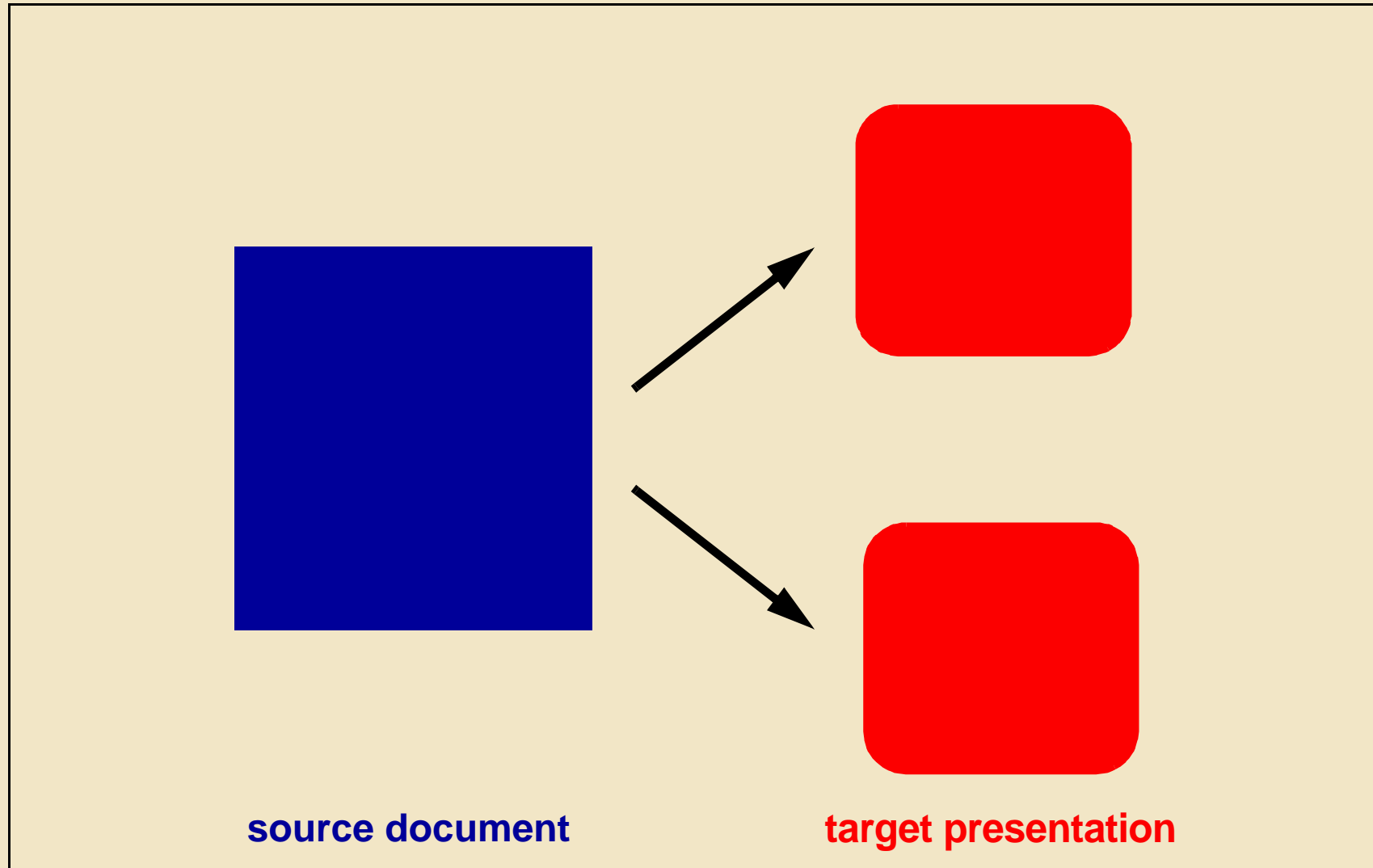
- **adaptable documents:**
  - adaptation during authoring/generation time
  - focus: document abstractions
- **adaptive documents:**
  - run-time adaptation
  - focus: alternate content

## Approach (2)

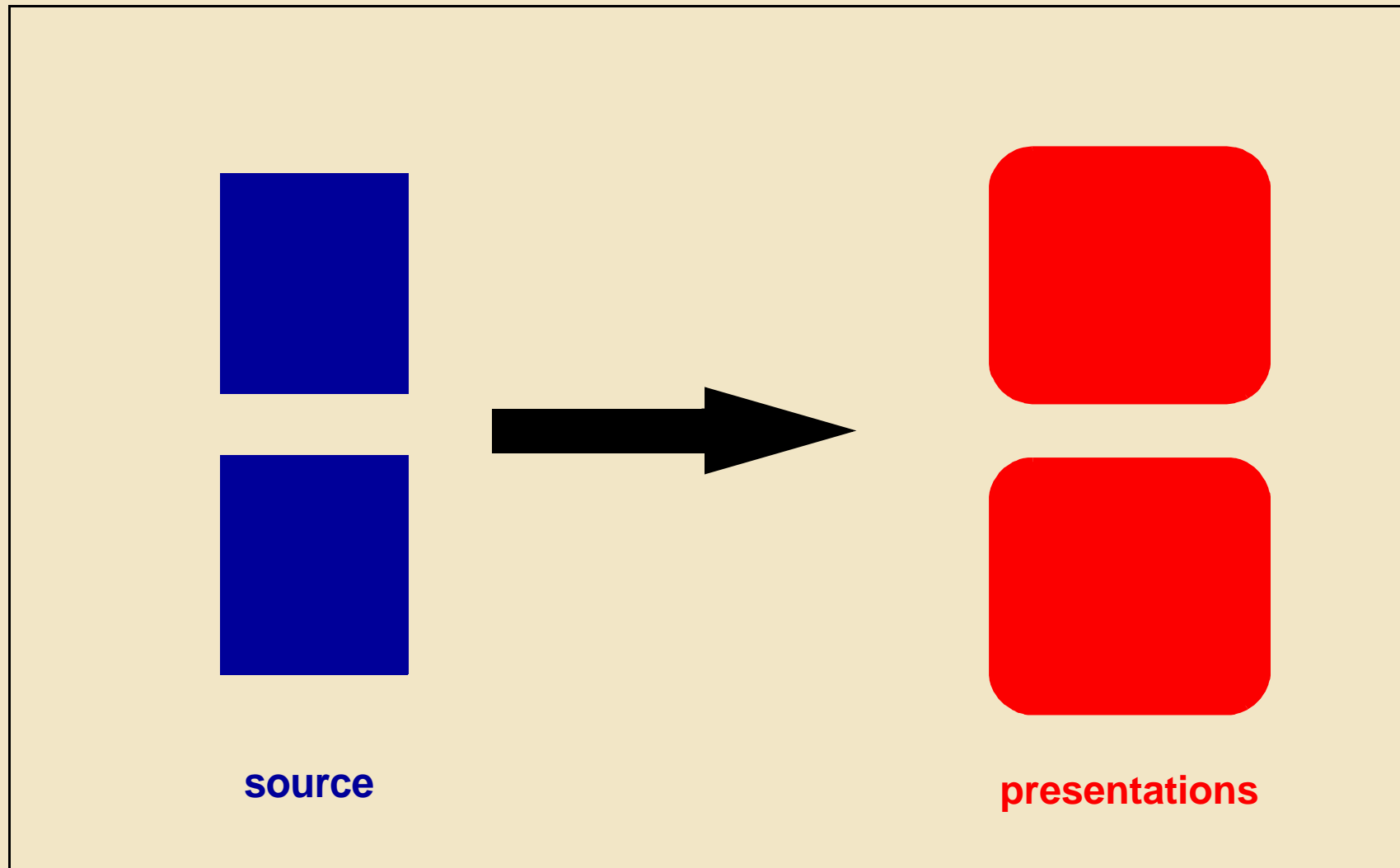
### Many models/tools are useful for both approaches

- document abstractions
  - from output medium/layout (structured document models in electronic publishing)
  - from system/network resources (QoS models in multimedia)
  - from users (tutoring models in adaptive hypermedia)
- tools for generating multiple presentations from a single source
  - markup languages, style sheets etc

## Document abstractions (1)



## Document abstractions (2)



## Document abstractions (3)

### In hypermedia: what is content, what is structure and what is style?

- Coarse-grained temporal alignment (e.g. **par**, **seq**)
- Fine-grained temporal alignment (e.g. **begin**, **end**, **dur**)
- Hyperlinking (**a**, **anchor**)
- Basic spatial layout (e.g. **regions**)
- Alternate content (e.g. **switch**)
- Transitions (not in SMIL)
- Background colors, anchor styles, etc (not in SMIL)

### Which aspects of the document are likely to vary when different presentations are used?

### When do you have sufficient information?

- authoring
- rendering
- presentation

## Alternate content (1)

Currently based on explicit encoding of alternate content

E.g. the **switch** element in SMIL

- At most one of the children of a switch element is played.
- The first acceptable element is chosen, so ordering should be best first.

```
<switch>
```

```
  <audio system-bitrate="44000" src="hi-res.aiff" />
```

```
  <audio system-bitrate="16000" src="low-res.aiff" />
```

```
</switch>
```

- If no element is suitable then no child of the switch is played.  
A catch-all choice at the end of the switch (with no test attribute) could be used.



## Alternate content (2)

### SMIL test attributes:

- **system-bitrate** - specifies available network bandwidth.
- **system-captions** - allows authors to supply subtitles, for those with hearing difficulties or learning a language.
- **system-language** - denotes the intended language group.
- **system-overdub-or-caption** - selects between dubbing or subtitles. Can also be used with the system-captions attribute.
- **system-required** - This will be an XML namespace in future versions.
- **system-screen-size** - height x width in pixels
- **system-screen-depth** - gives the depth of screen color palette the player is able to display. Switch on bitrate and language

## Alternate content (3)

Combinatorial explosion on the leaf-nodes of the document hierarchy:

```
<switch>
  <audio system-bitrate="44000" system-language="nl"
    src="nl-hi-res.aiff" />
  <audio system-bitrate="44000" system-language="en"
    src="uk-hi-res.aiff" />

  <audio system-bitrate="16000" system-language="nl"
    src="nl-low-res.aiff" />
  <audio system-bitrate="16000" system-language="en"
    src="uk-low-res.aiff" />
</switch>
```

# Conclusions

## Two-step adaptation:

- adaptation in presentation generation process (multiple delivery publishing)
- adaptation in presentation output format (alternate content)

## Multiple delivery publishing:

- models and tools still text-oriented
- in hypermedia, the boundary between content, structure, style is fuzzy
- alternate content may lead to a combinatorial explosion on the leaf-node level