

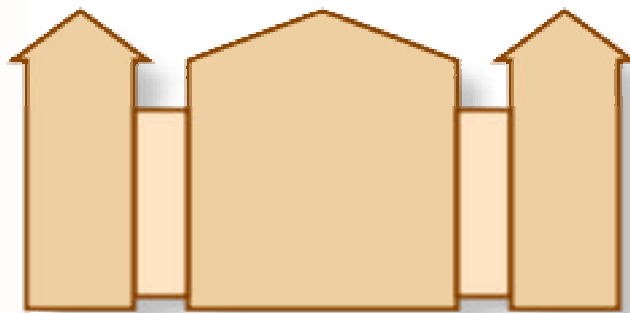
Towards a Formatting Vocabulary for Time-based Hypermedia

Jacco van Ossenbruggen

Joost Geurts

Lloyd Rutledge

Lynda Hardman



CWI Amsterdam

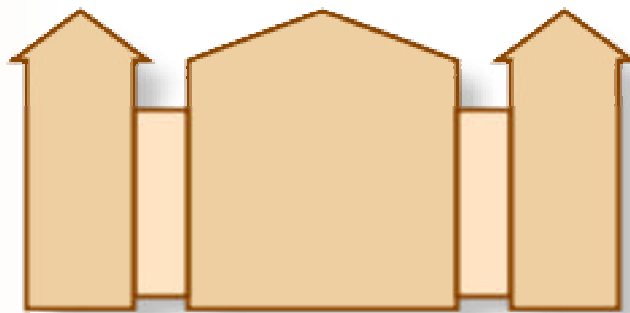
I want multimedia stylesheets

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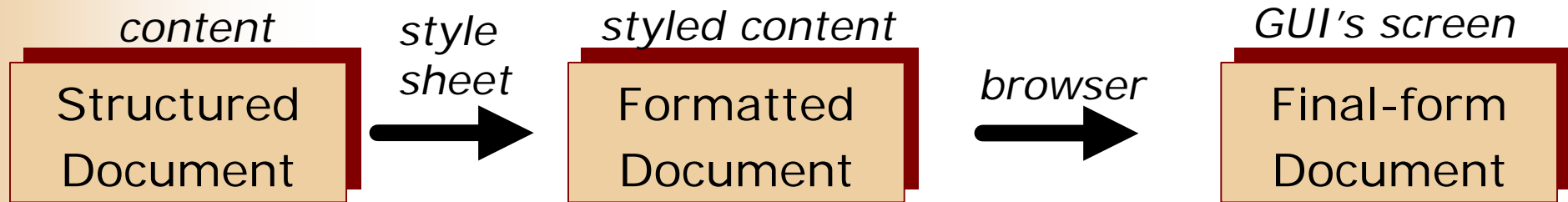


CWI Amsterdam

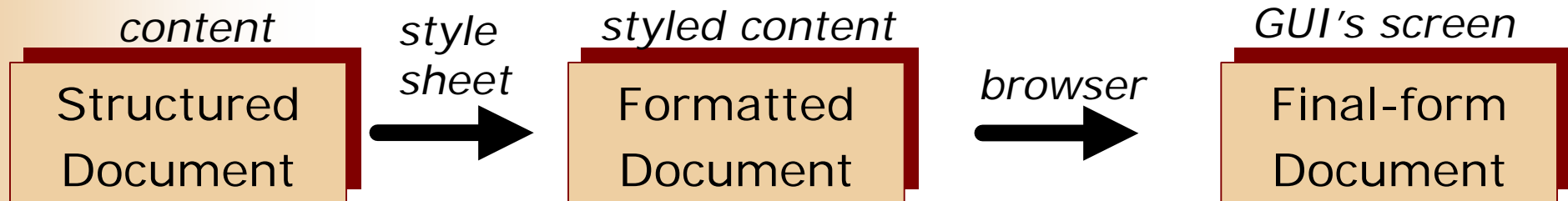
Talk overview

- Crash course document formatting
 - Separation of content & presentation
 - Formatting vocabularies
- Multimedia formatting examples
 - Demo: when text-based formatting doesn't work
 - Timing, composition, transitions & layout reqs
- Effects on multimedia formatting process
 - Based on implementation in our Cuypers prototype

Document formatting basics



Document formatting basics



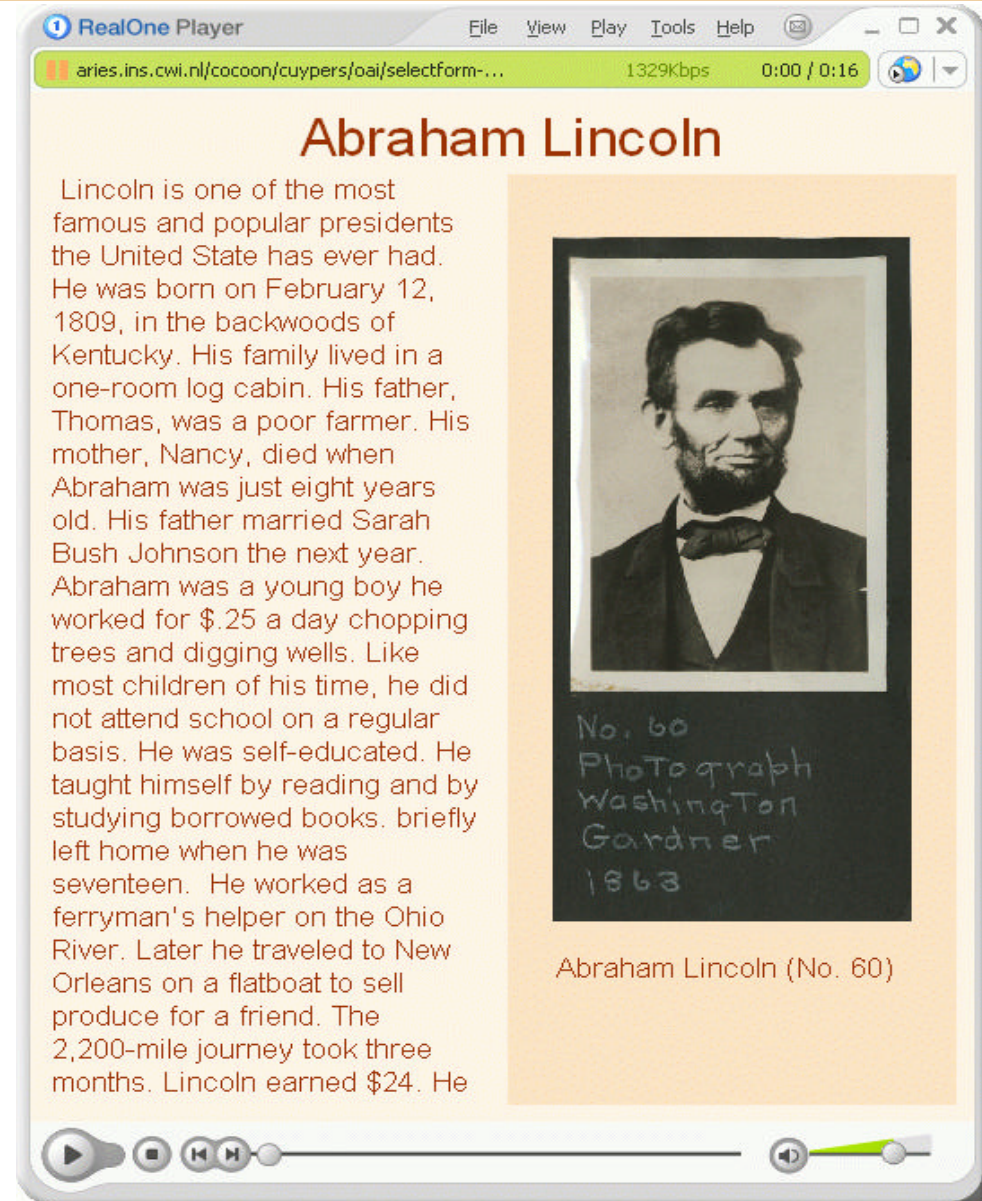
- Separation of content ...
 - captured in structured document, “presentation free”
 - can be reused: multiple styles can be applied
- ... from presentation
 - captured in style sheet
 - can be reused: applicable to multiple documents
 - Need to express formatting in style sheet
 - when using XSLT: XHTML, SVG, MathML, SMIL, ...
 - formatting vocabularies: CSS, XSL FO, DSSSL, ...

Also useful for multimedia

- For all the same reasons
 - Reuse content in different contexts
 - Reuse style on different content
 - Flexibility, longevity and tailorability
 - But: often hard to separate content from presentation
- Stylable multimedia not widely supported
 - c.f. CSS support for HTML (SVG)
 - although SMIL 2.0 Rec. caters for CSS support
- Multimedia requires additional formatting support
 - See examples in following slides

Working Example (OAI)

- Metadata from Open Archives Initiative (OAI)
- Semantic relations inferred from metadata [Little et al., ECDL 2002]
- Layout determined by Cuypers transformation engine [Ossenbruggen et al., WWW10]




RealOne Player

aries.ins.cwi.nl/cocoon/cuypers/oai/selectform-... 1329Kbps 0:00 / 0:16

Abraham Lincoln

Lincoln is one of the most famous and popular presidents the United State has ever had. He was born on February 12, 1809, in the backwoods of Kentucky. His family lived in a one-room log cabin. His father, Thomas, was a poor farmer. His mother, Nancy, died when Abraham was just eight years old. His father married Sarah Bush Johnson the next year. Abraham was a young boy he worked for \$.25 a day chopping trees and digging wells. Like most children of his time, he did not attend school on a regular basis. He was self-educated. He taught himself by reading and by studying borrowed books. briefly left home when he was seventeen. He worked as a ferryman's helper on the Ohio River. Later he traveled to New Orleans on a flatboat to sell produce for a friend. The 2,200-mile journey took three months. Lincoln earned \$24. He



No. 60
Photograph
Washington
Gardner
1863

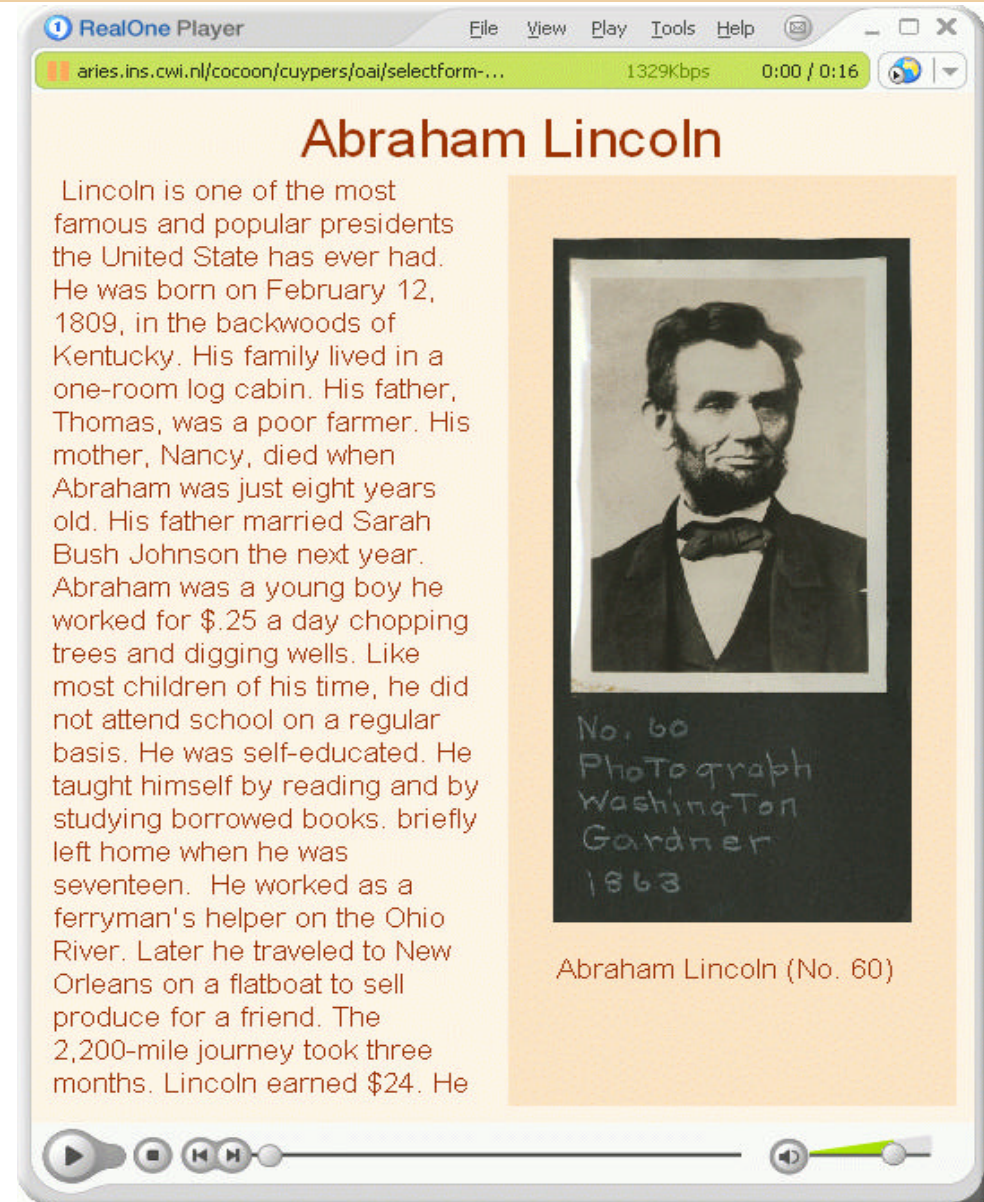
Abraham Lincoln (No. 60)

CSS Styling for multimedia

Example use cases

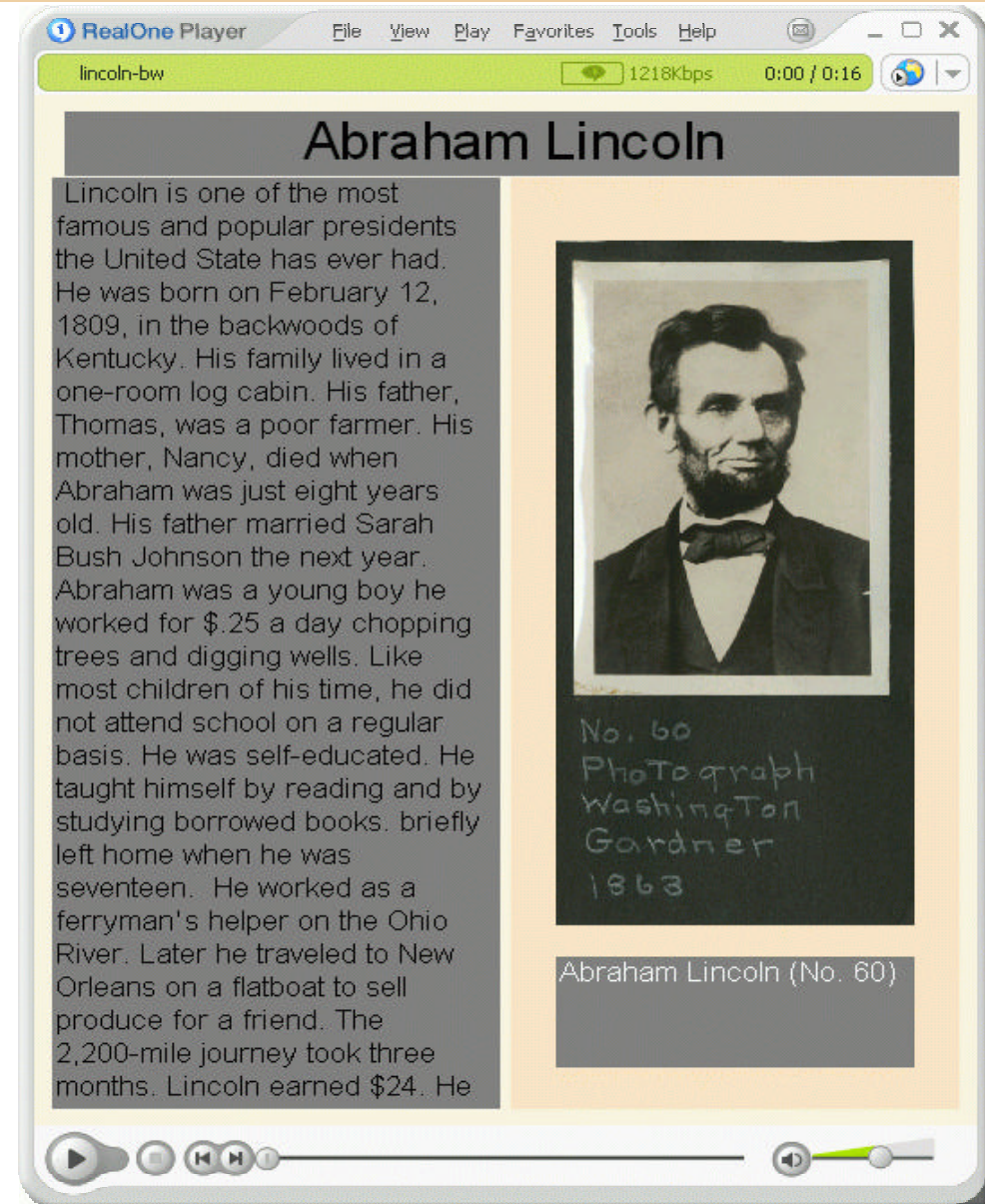
Stylable color schemes

- Could be done in SMIL (if players would support CSS)
- But don't forget to style your components too!
- And what if your components include non-stylable media



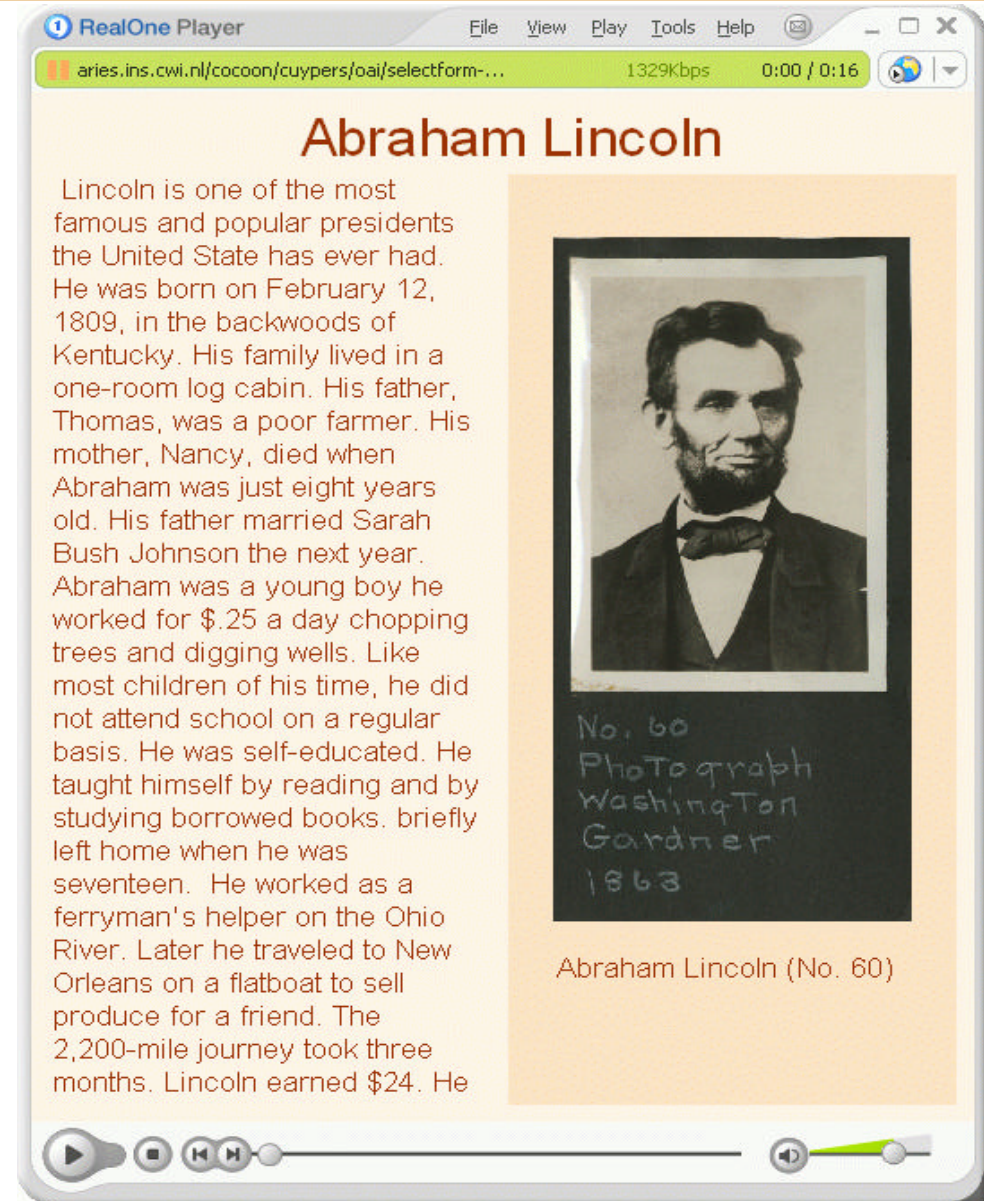
Stylable color schemes

- Could be done in SMIL (if players would support CSS)
- But don't forget to style your components too!
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Stylable transitions

- Not currently in CSS
- CCS could be extended with SMIL 2.0 transition effects vocabulary:




The screenshot shows a RealOne Player window with a video player interface. The video content is a page titled "Abraham Lincoln" with a text block and a photograph. The text describes Lincoln's early life, including his birth in 1809, his family, and his work as a young boy. The photograph is a black and white portrait of Lincoln, with handwritten text below it: "No. 60 Photograph Washington Gardner 1863". The video player controls are visible at the bottom.

RealOne Player

aries.ins.cwi.nl/cocoon/cuypers/oi/selectform-... 1329Kbps 0:00 / 0:16

Abraham Lincoln

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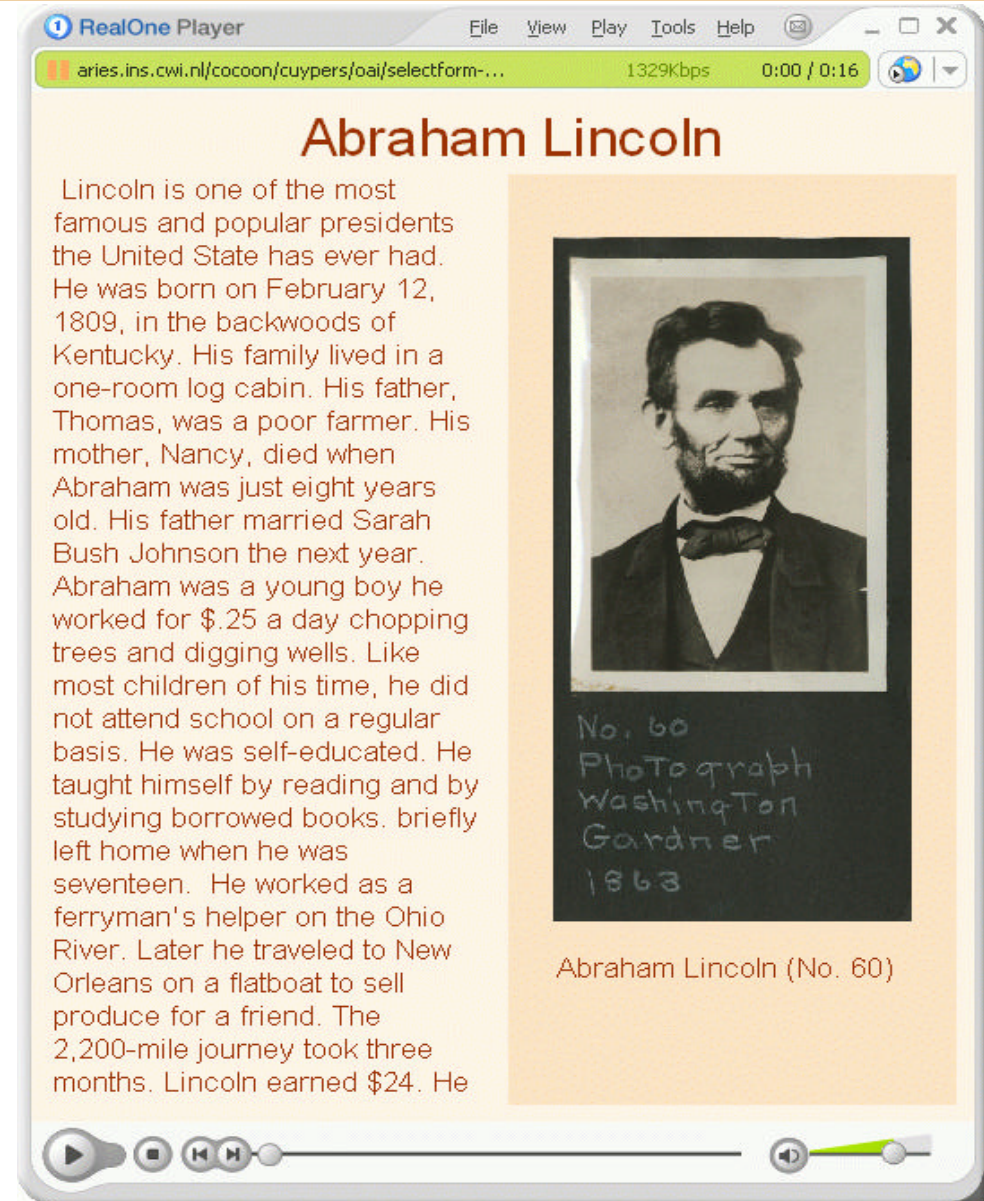
No. 60
Photograph
Washington
Gardner
1863

Abraham Lincoln (No. 60)

Stylable transitions

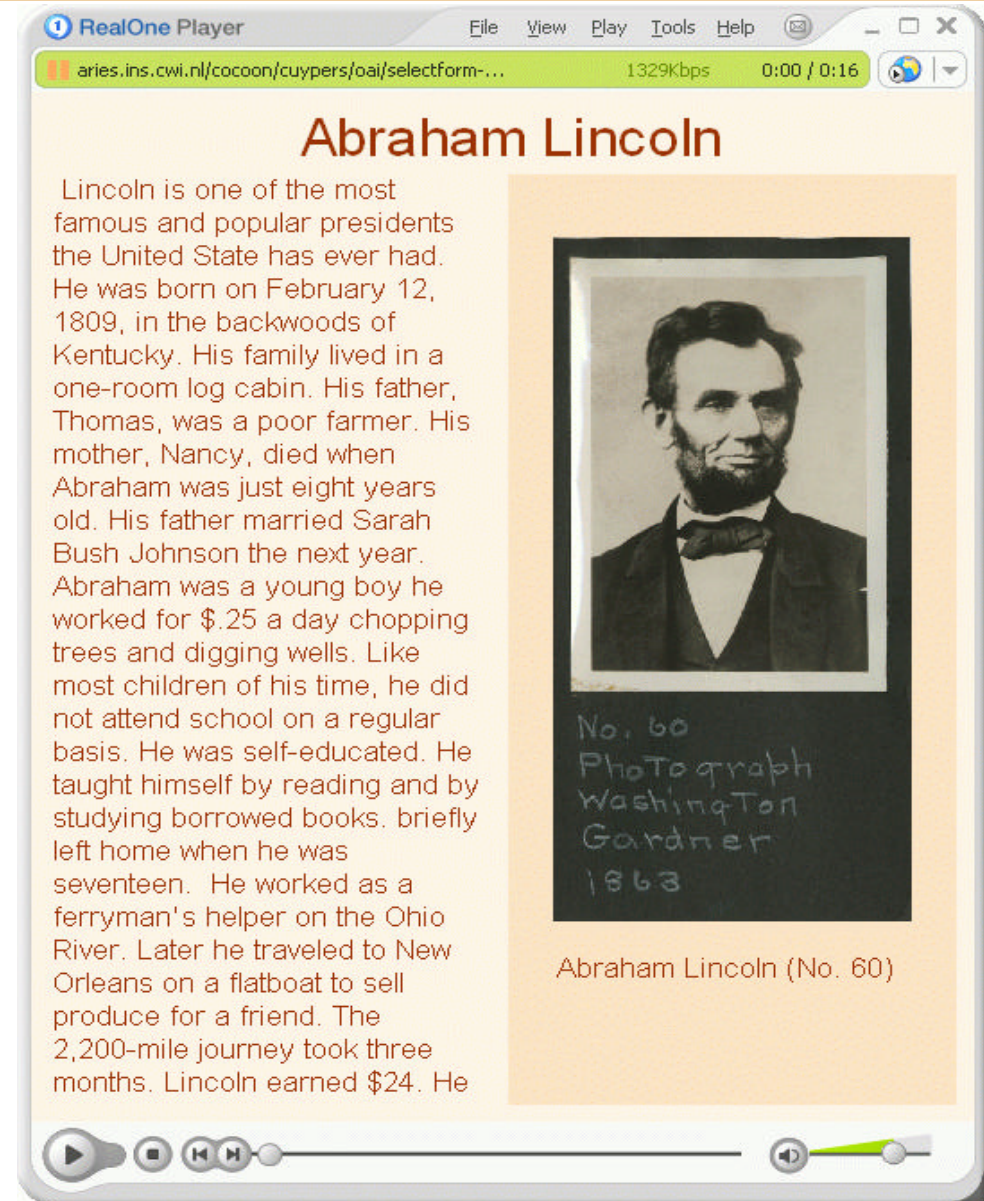
- Not currently in CSS
- CCS could be extended with SMIL 2.0 transition effects vocabulary:

```
img {  
  transInType:    fade;  
  transInDur:     1s;  
  transOutType:   clockWipe;  
  transOutDur:    1s;  
  transOutSubtype: clockwiseTwelve;  
}
```



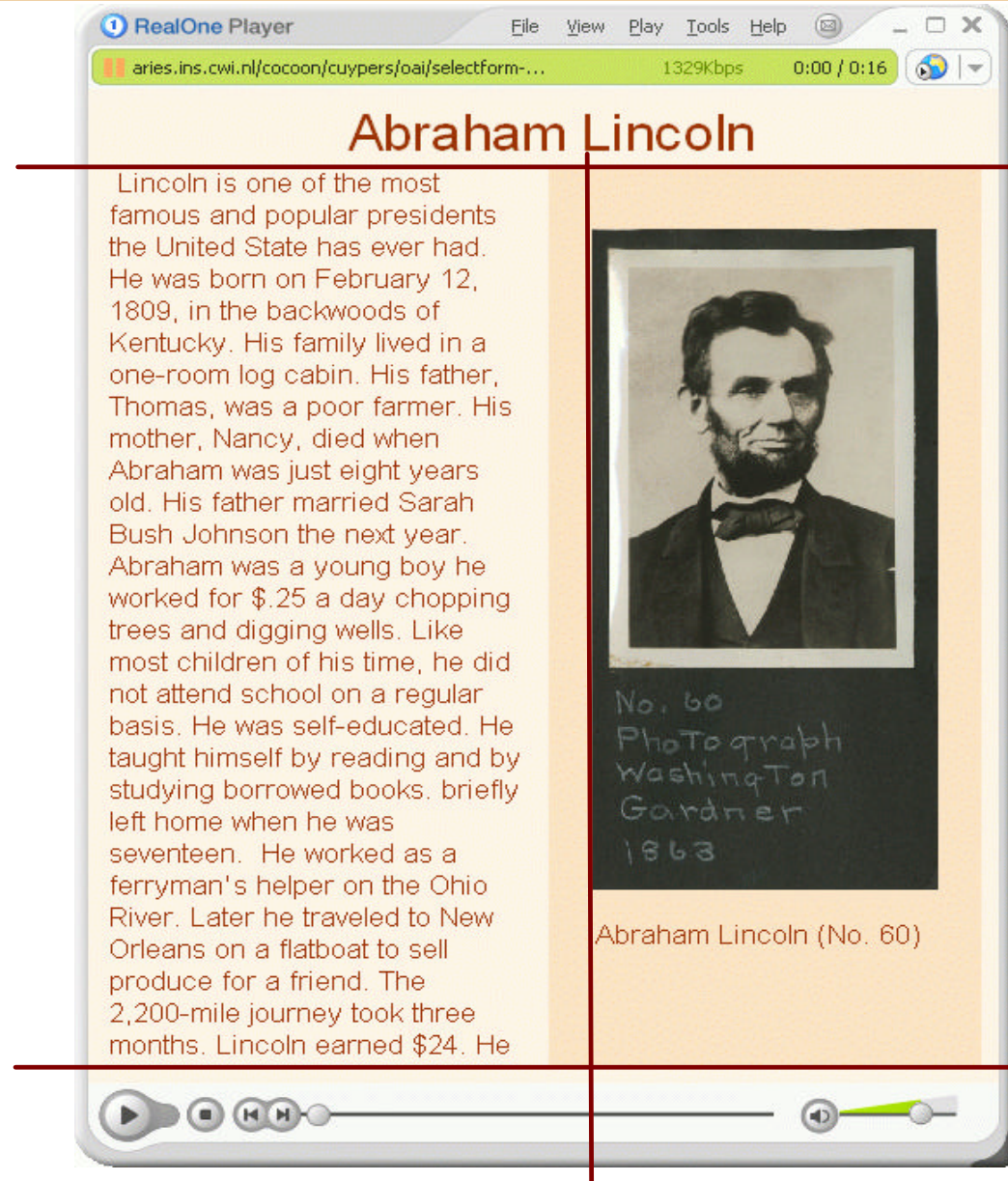
Stylable visual layout

- Could be in CSS using absolute positioning
- Even better: specify spatial relations directly:



Stylable visual layout

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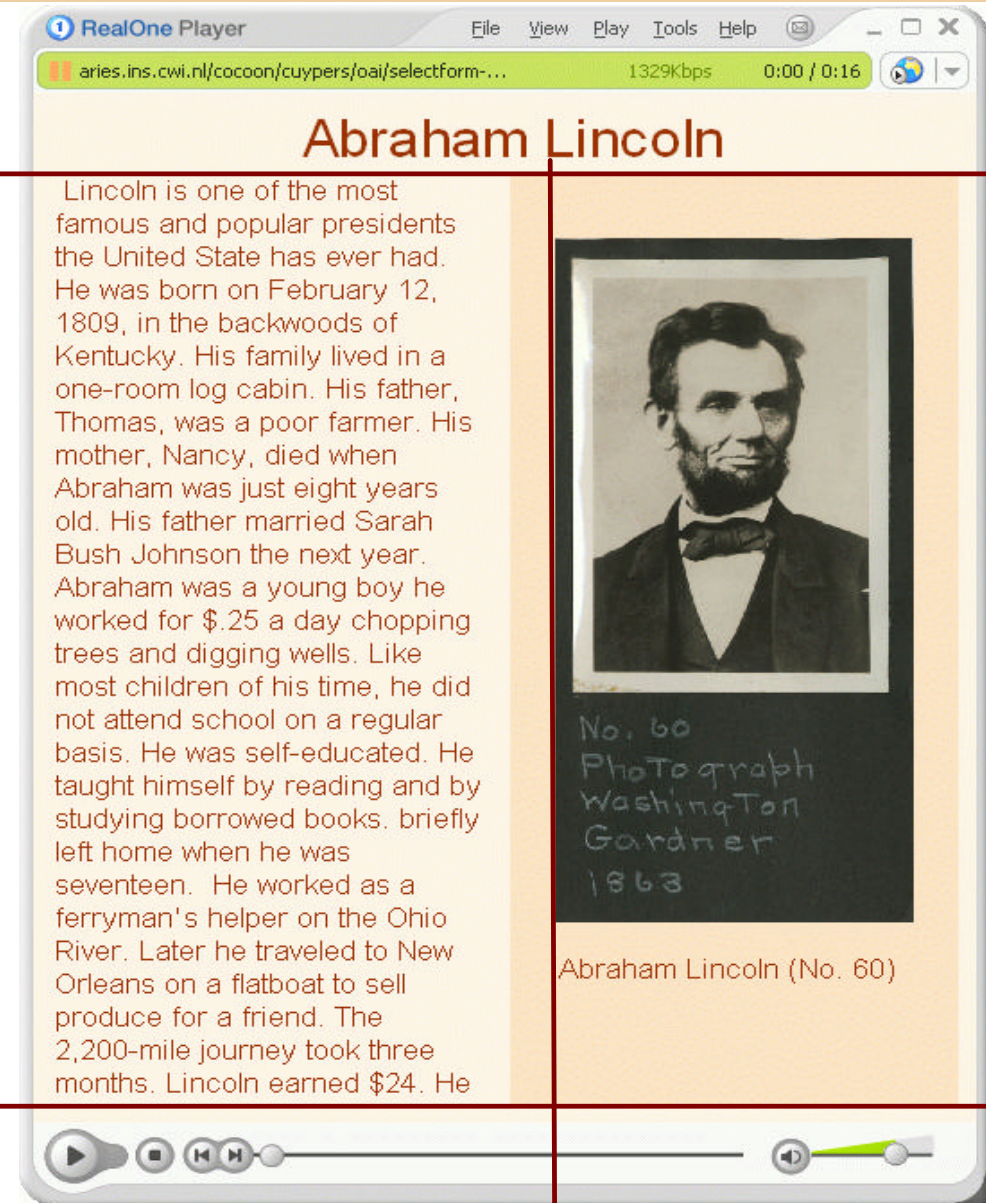


Stylable visual layout

- Could be in CSS using absolute positioning
- Even better: specify spatial relations directly:

Biography positioned left of,
and vertically aligned with,
slideshow


Caption positioned below,
and horizontally aligned with
image



Stylable temporal behavior

- Not currently in CSS
- For “timesheets” see [Schmitz & Ten Kate, WWW9; Ossenbruggen2000; and others]
- CSS could be extended with SMIL vocabulary:

The screenshot shows a RealOne Player window with the following content:

- RealOne Player** (Title Bar)
- File View Play Tools Help (Menu Bar)
- aries.ins.cwi.nl/cocoon/cuyppers/oi/selectform-... (Address Bar)
- 1329Kbps 0:00 / 0:16 (Status Bar)
- Abraham Lincoln** (Section Header)
- Lincoln is one of the most famous and popular presidents the United State has ever had. He was born on February 12, 1809, in the backwoods of Kentucky. His family lived in a one-room log cabin. His father, Thomas, was a poor farmer. His mother, Nancy, died when Abraham was just eight years old. His father married Sarah Bush Johnson the next year. Abraham was a young boy he worked for \$.25 a day chopping trees and digging wells. Like most children of his time, he did not attend school on a regular basis. He was self-educated. He taught himself by reading and by studying borrowed books. briefly left home when he was seventeen. He worked as a ferryman's helper on the Ohio River. Later he traveled to New Orleans on a flatboat to sell produce for a friend. The 2,200-mile journey took three months. Lincoln earned \$24. He
- 
- No. 60
Photograph
Washington
Gardner
1863 (Caption)
- Abraham Lincoln (No. 60) (Caption)
- RealOne Player playback controls (Play, Stop, Previous, Next, Progress, Volume)

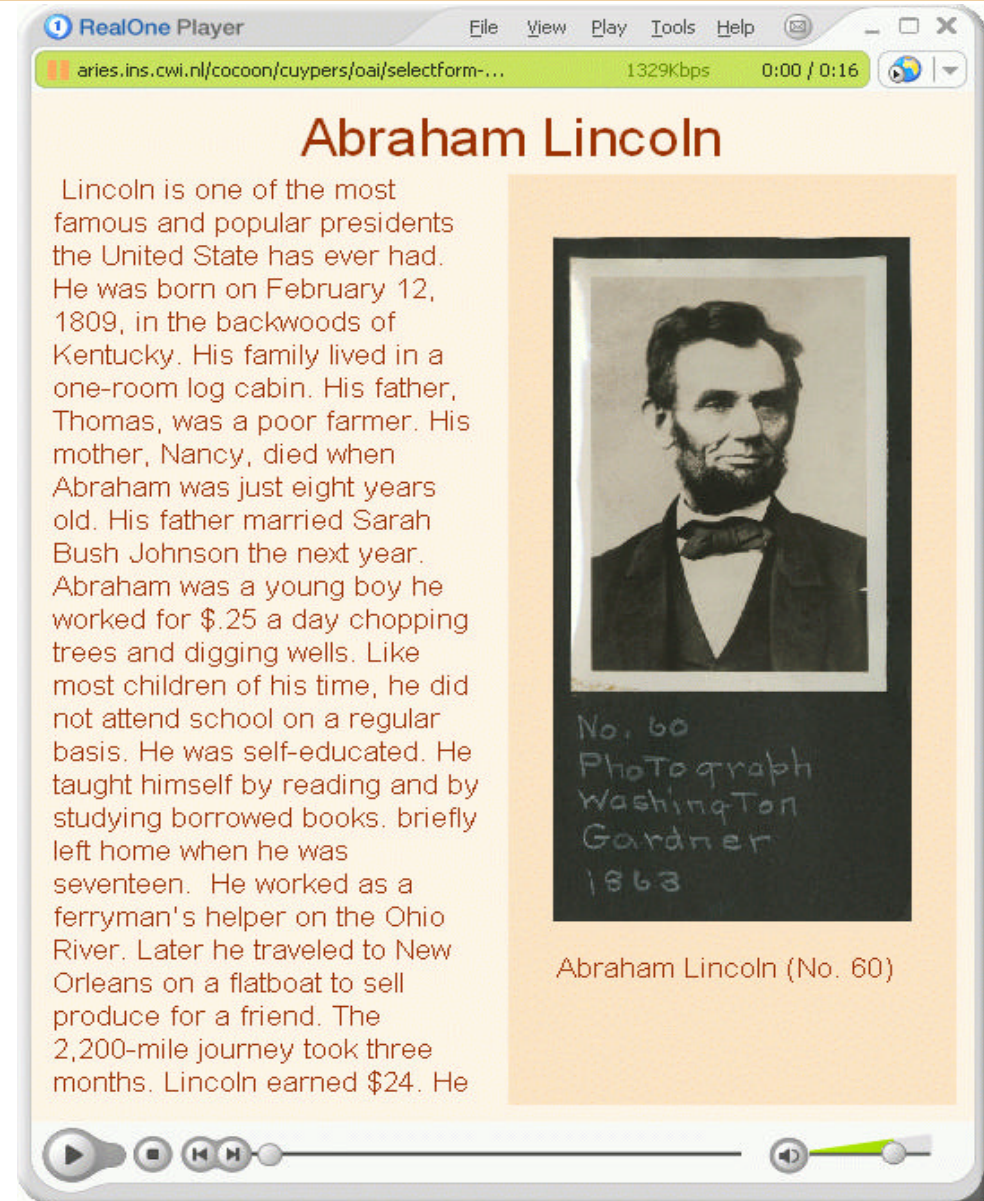
Stylable temporal behavior

- Not currently in CSS
- For “timesheets” see [Schmitz & Ten Kate, WWW9; Ossenbruggen2000; and others]

- CSS could be extended with SMIL vocabulary:

```
.slide {  
  dur: 5s;  
}
```

```
.slideshow {  
  repeat: indefinite;  
}
```




RealOne Player

aries.ins.cwi.nl/cocoon/cuyppers/oi/selectform-... 1329Kbps 0:00 / 0:16

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Abraham Lincoln (No. 60)

Multimedia transformations

Example use cases

Content selection & ordering

XSLT might be used to select, filter, re-order, re-group, etc. from XML content

```
<list>
  <president>
    <name>
      Abraham Lincoln
    </name>
    <biography>Lincoln is
      one of the most ...
    <img ...>
  </president>
  <president>
    <name>
      Andrew Johnson
    </name>
```


...

RealOne Player

aries.ins.cwi.nl/cocoon/cuypers/oi/selectform-... 1329Kbps 0:00 / 0:16

Abraham Lincoln

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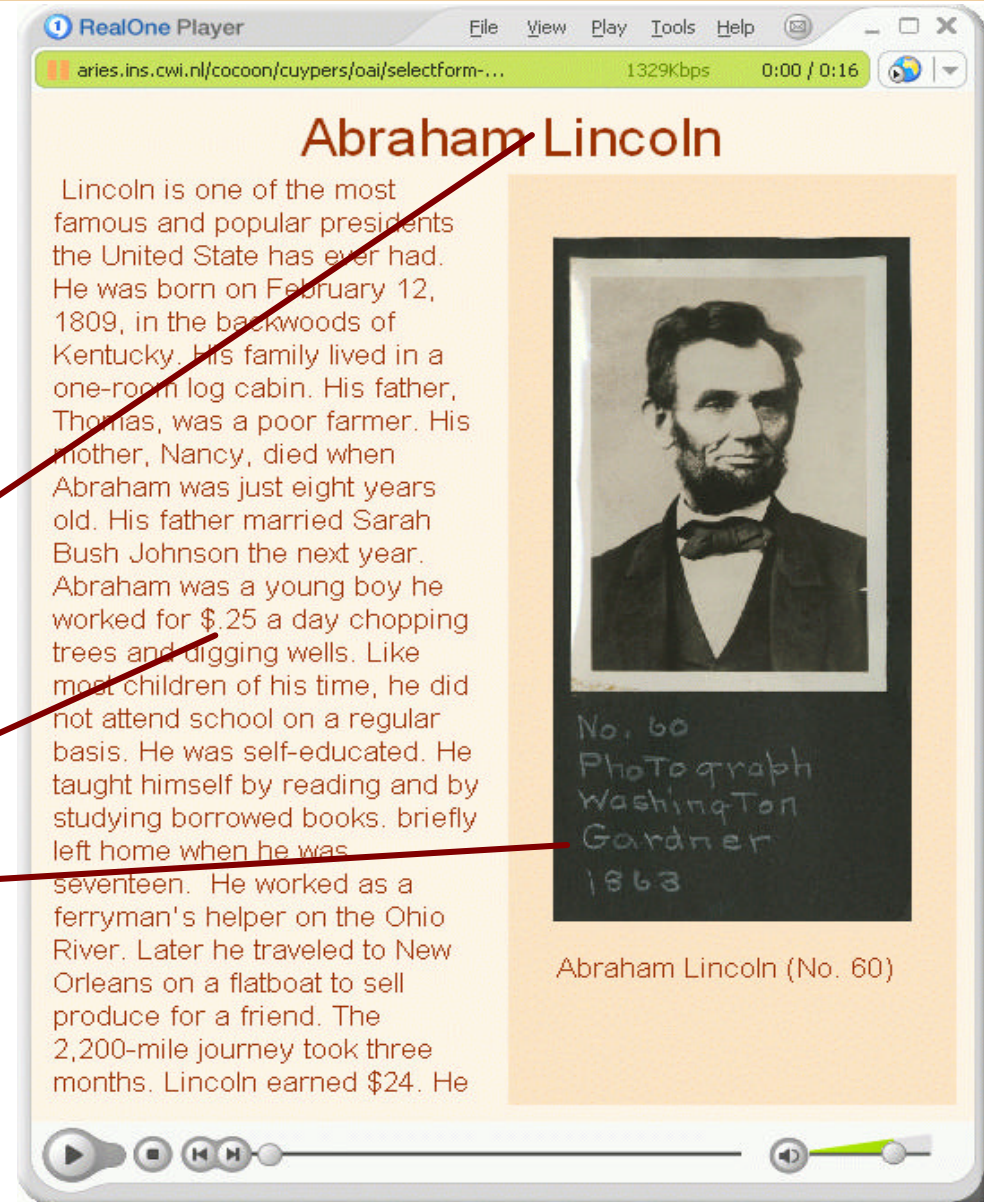
No. 60
Photograph
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Abraham Lincoln (No. 60)

Content selection & ordering

XSLT might be used to select, filter, re-order, re-group, etc. from XML content

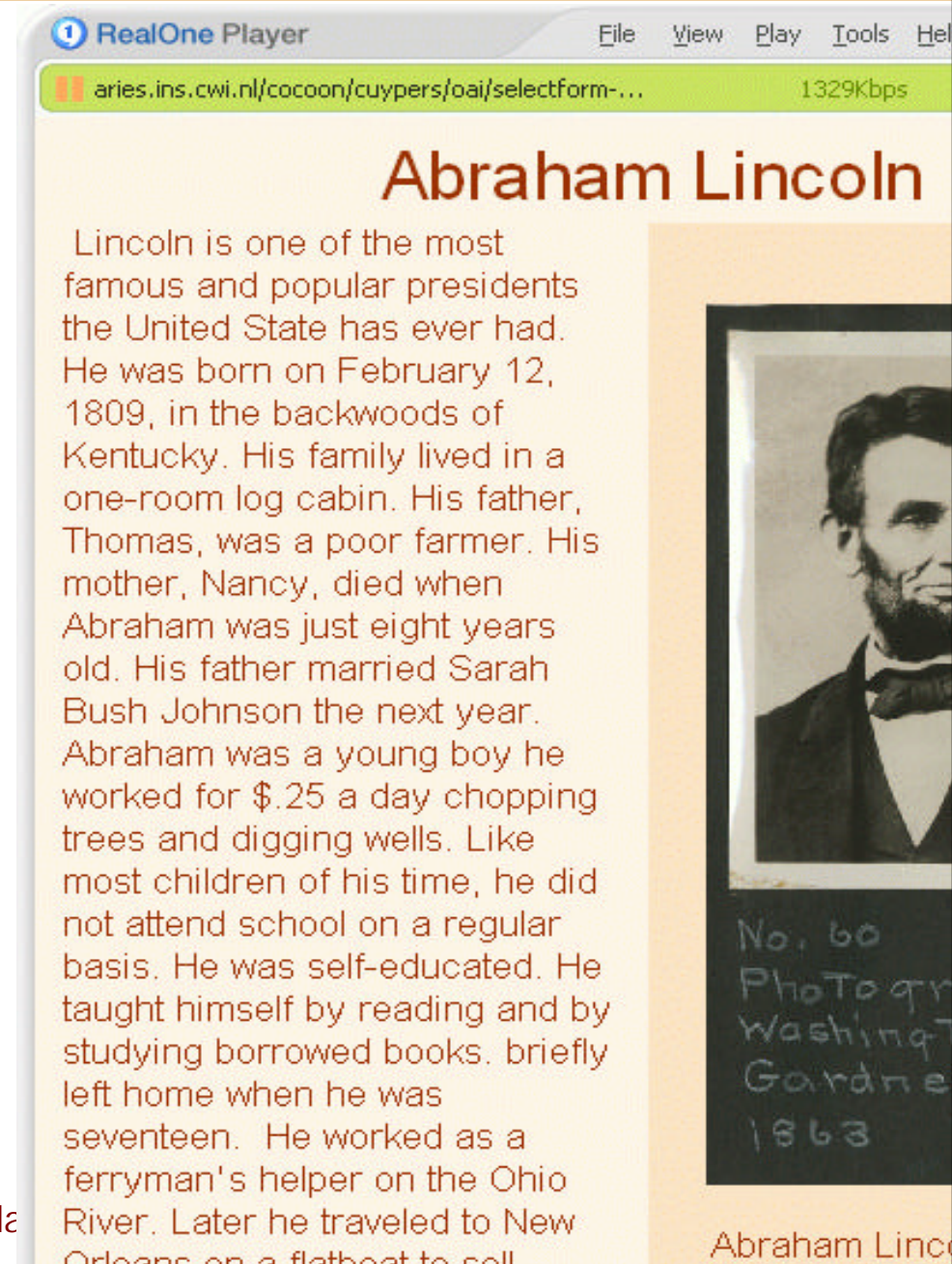
```
<list>
  <president>
    <name>
      Abraham Lincoln
    </name>
    <biography>Lincoln is one of the most ...
    <img ...>
  </president>
  <president>
    <name>
      Andrew Johnson
    </name>
  </president>
</list>
```



Media with size constraints

Text-based overflow strategies (e.g. CSS) are often inappropriate for multimedia

```
img { overflow:  
  visible?  
  hidden?  
  scroll?  
  "resize"?  
  "try-something-else"  
}
```




RealOne Player

aries.ins.cwi.nl/cocoon/cuypers/oai/selectform-... 1329Kbps

Abraham Lincoln

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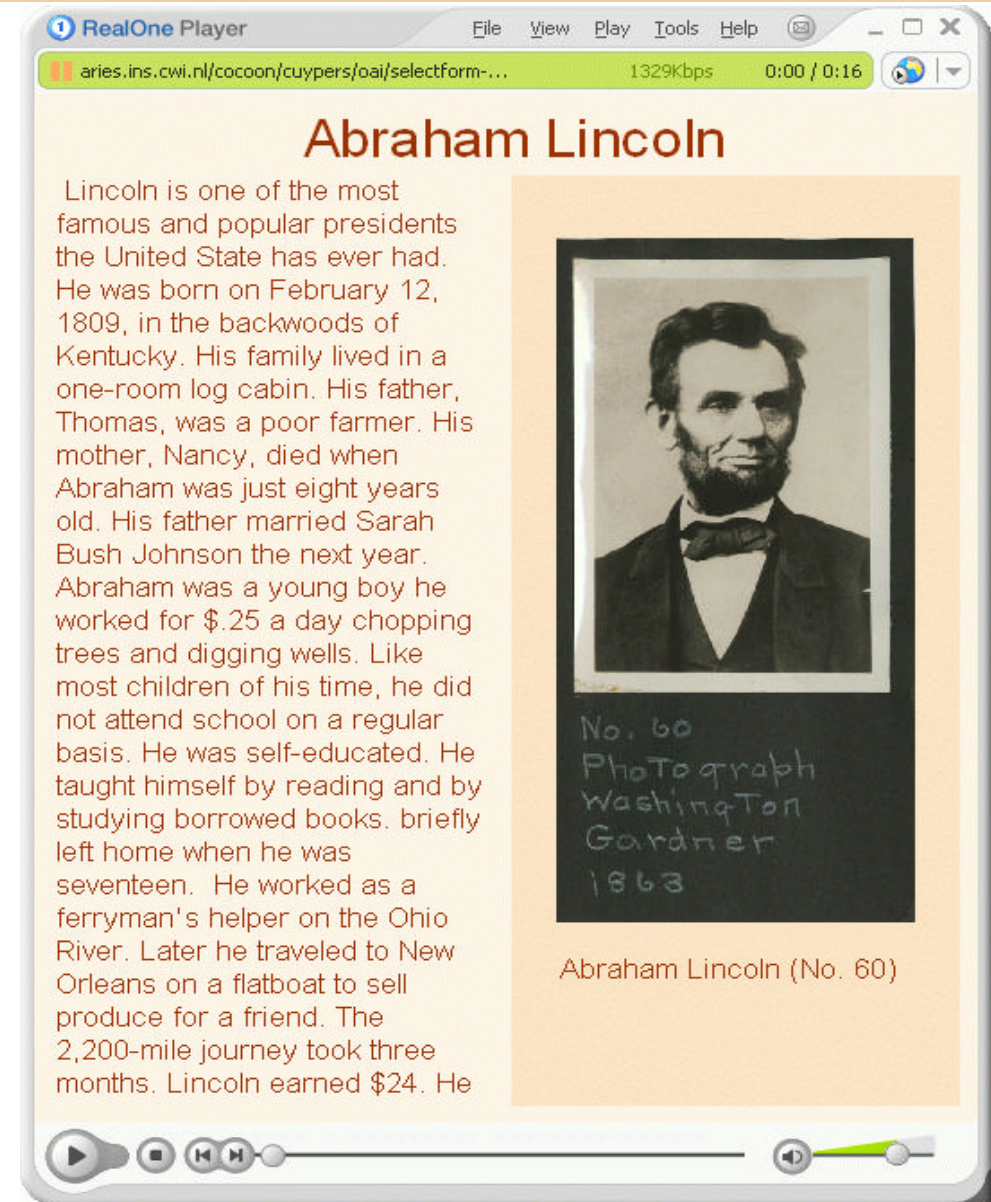
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Abraham Lincoln

Media with size constraints

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img { overflow:  
  visible?  
  hidden?  
  scroll?  
  "resize"?  
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}
```

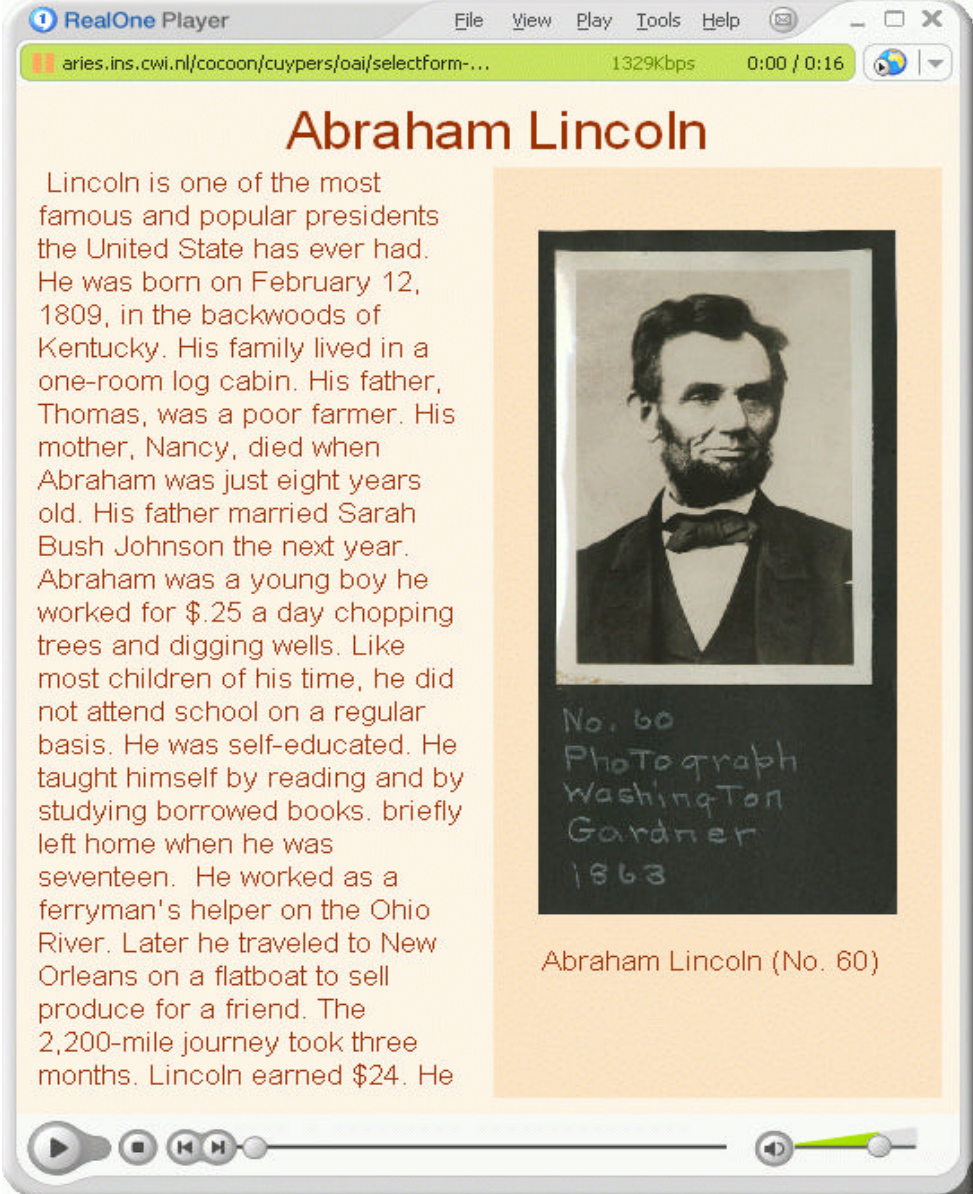


Global resource constraints

- Max. screen-size, duration, bandwidth for multimedia
- But also: 10 page limit of WWW proceedings

```
try:           // portrait  
text next to slideshow
```

```
catch:        // landscape  
text below slideshow
```



The screenshot shows a RealOne Player window with a browser address bar containing the URL `aries.ins.cwi.nl/cocoon/cuyper{0ai}/selectform-...`. The page title is "Abraham Lincoln". The main content consists of a text block on the left and a portrait of Abraham Lincoln on the right. Below the portrait is a handwritten note on a black background that reads: "No. 60 Photograph Washington Gardner 1863". The caption below the portrait is "Abraham Lincoln (No. 60)". The player interface includes a play button, a progress bar, and a volume control.

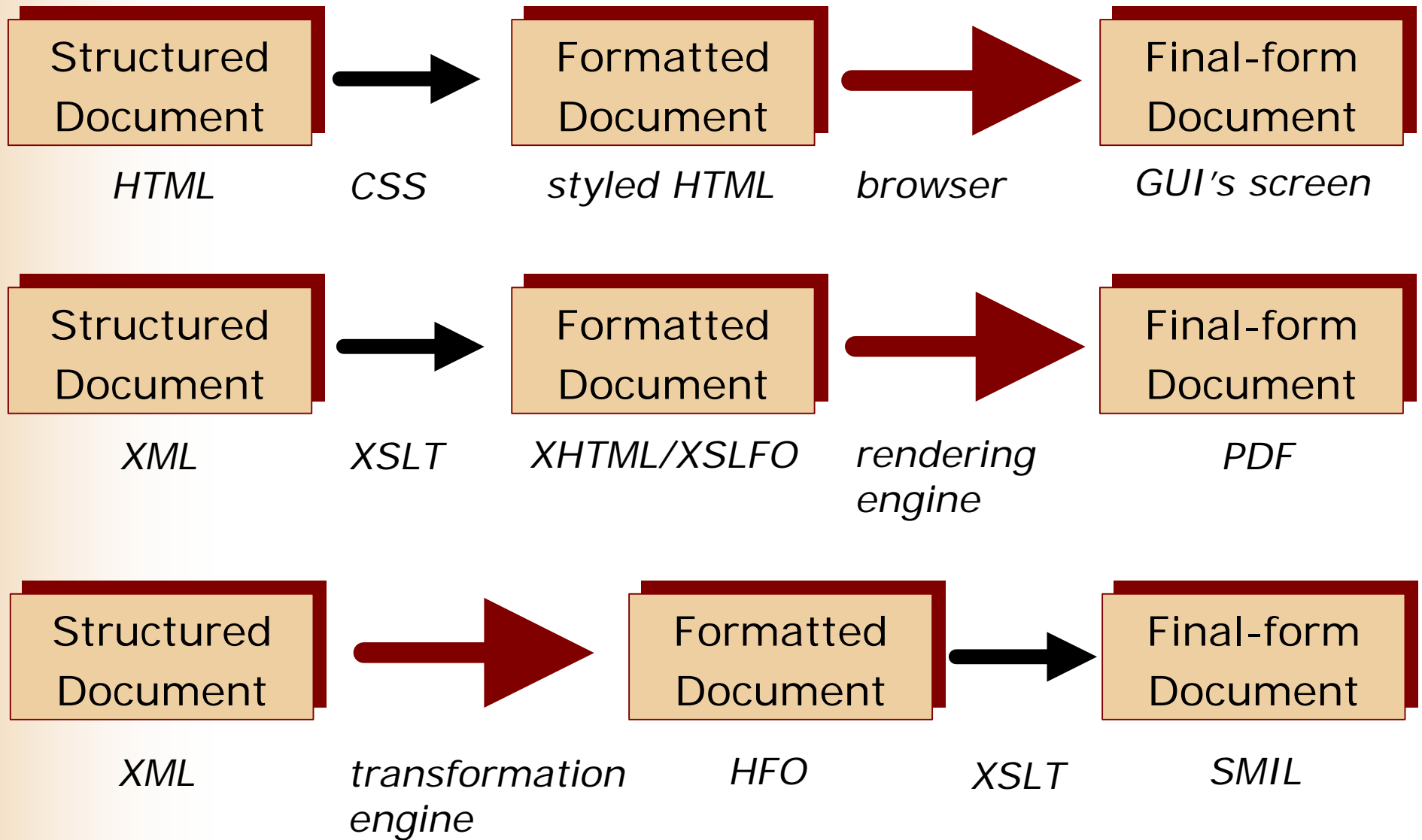
Requirements overview

- Visual layout & style
 - Sizes & positions, color schemes, fonts, ...
- Temporal structure & style
 - Timing, durations, repeats, transitions, ...
- Template & data driven transformations
 - Dimensions, types and number of media items often unknown
- Abstract from target output format
 - Generate SMIL X.0, timed HTML, ...
- Support resource constrained applications
 - Can the player actually play what the style sheet generates?

Cuypers multimedia transformation engine

- Prototyped small time-based hypermedia formatting object vocabulary (HFO)
- Implemented using constraint solver and Prolog backtracking (ECLiPSe)
- Used to explore use cases of working example (server-side)
- Online demo available (URL also in paper):
<http://www.cwi.nl/~media/cuypers/>

Formatting process comparison



Conclusions

- XSLT and CSS already cover a large part
- Could be extended for multimedia support
- Resource-constrained formatting requires more significant changes

Conclusions

- XSLT and CSS already cover a large part
- Could be extended for multimedia support
- Resource-constrained formatting requires more significant changes

Take home message

- Multimedia needs stylesheets too!

Acknowledgements

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- NWO ToKeN2000/I²RP, NASH
(Dutch national projects)



Cuypers demo in cooperation with

- Distributed Systems Technology Centre,
Queensland



Initial HFO prototype

- Oscar Rosell Martinez

Media adapted from

- Abraham Lincoln Presidential Library Museum
- Rare Book and Special Collections Library at
the University of Illinois.