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Authoring Transformations by Direct Manipulation

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Outline

- Motivation
- Transformations authoring
- Incremental transformations
- Conclusion and perspectives

Motivation

- Authoring multimedia presentations for classes of document
- Authoring adaptable presentations

Multimedia presentation architecture

User Context

Negotiation

Result of negotiation (Transformation Sheets)

Document Medias Metadata

Transformation

Presentation Document

Formatting

Execution

Author involvement

Author

Adaptation parameters

Negotiation

User Profile

Transformation sheets

XSLT

Execution

Formatting

XML Document

docbook

Transformation

Multimedia Document

SMIL

Author skills

- Classes of document
  - Generally for professional
  - Need heavy infrastructure (database, schema)
- Adaptable presentation
  - For any authors (novice, professional, etc.)
  - Optional schema

No transformation coding => direct manipulation

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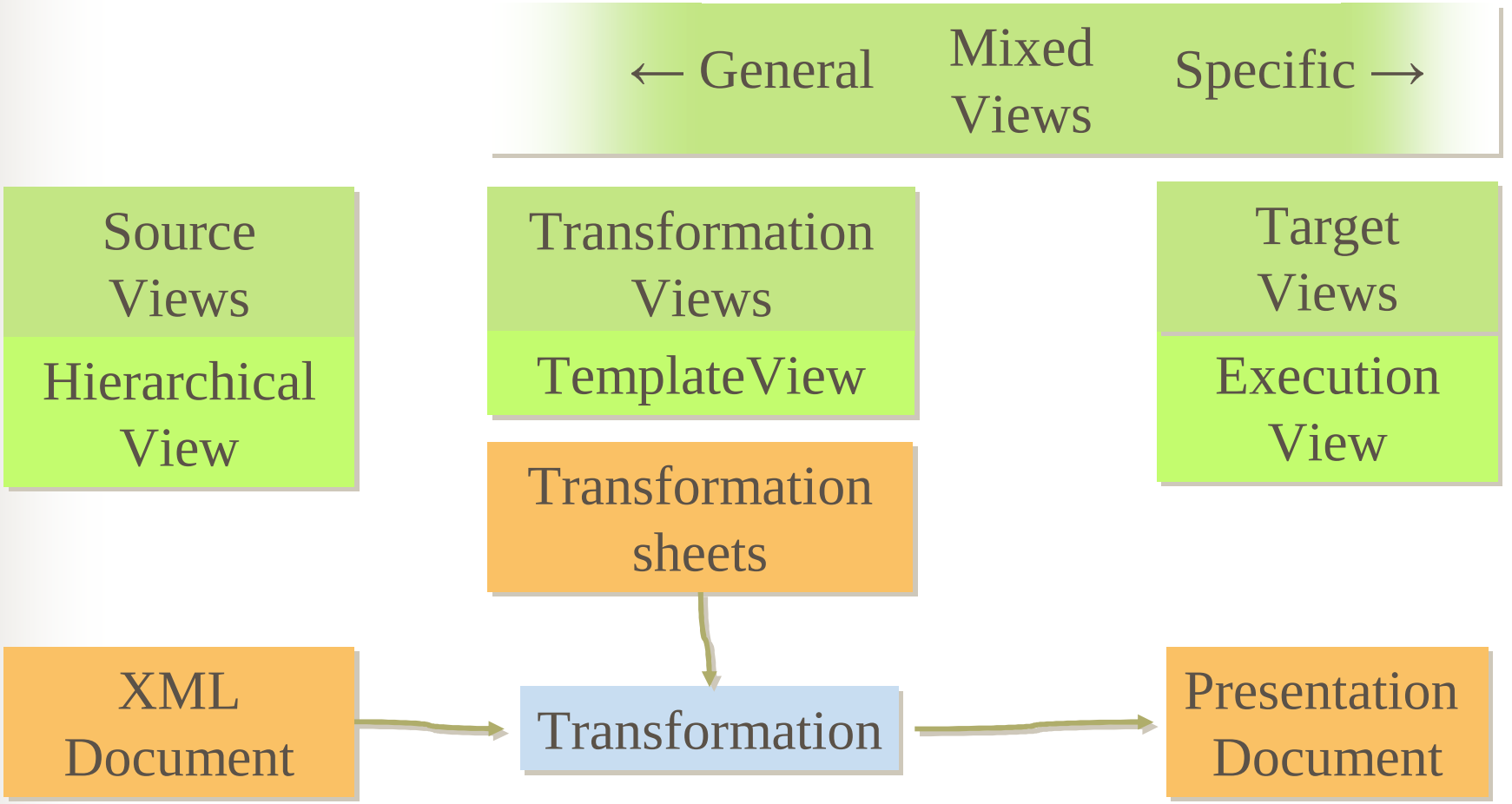
Transformation sheets authoring

- Difficulties
  - Programming language (XSLT)
  - Multimedia: multiple dimensions
- Current tools: text editing + debugger

- Our solutions
  - For general purpose transformations: Visual language (cf. Emmanuel Pietriga)
  - For multimedia: direct manipulation through several views

Main principles



Authoring by direct manipulation

- Build expressions (XPath) in a source view
- Drag and Drop expressions/templates in a target view
- Select and modify the presentation in a target view: "classic" multimedia authoring by direct manipulation
  - Move media object, add new media, set style, set temporal relation, etc.

⇒ Which transformation rules to modify or generate ?

Input parameters for XSLT generation

- Target context: author selection
  - Target node, position in parent
  - Template/for-each node
  - Source node
- Resulting nodes of expression
  - Arity (0, 1 or many)
  - Type (element, attribute, etc.)
- Editing mode for the presentation part: local or global

Examples

- Arity of the resulting node set
  - 1 : generates an if instruction
  - Many : generates a for-each instruction
- Target node type
  - Image : generates a src attribute
  - Text : generates text content

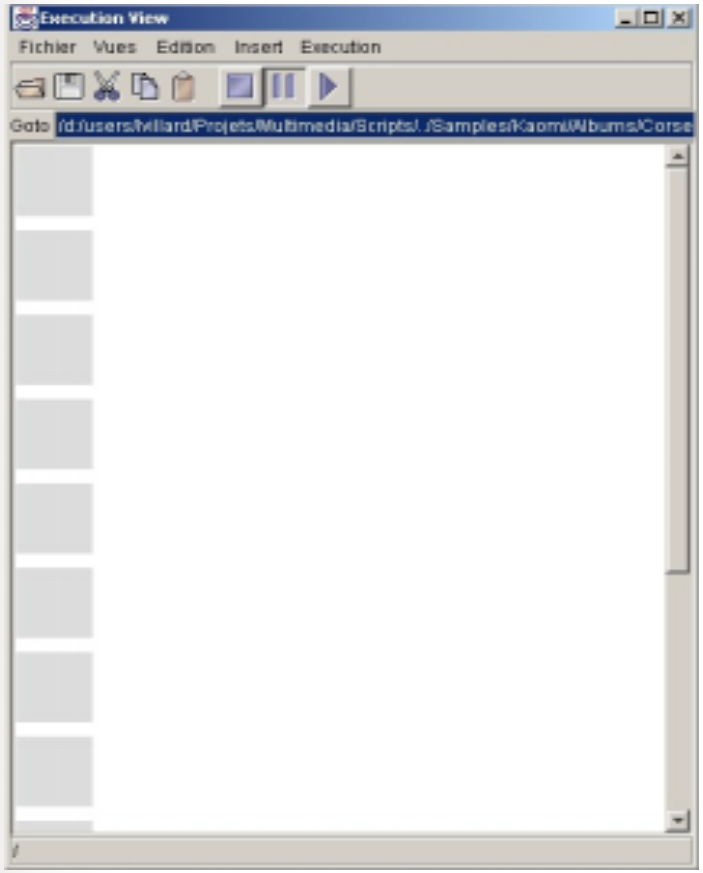
Editing mode: local

- The author expects to have a local modification

  => Produce code to identify the selected node

- Example: insertion of an image in the transformation sheet

Example: image insertion



XSLT modification

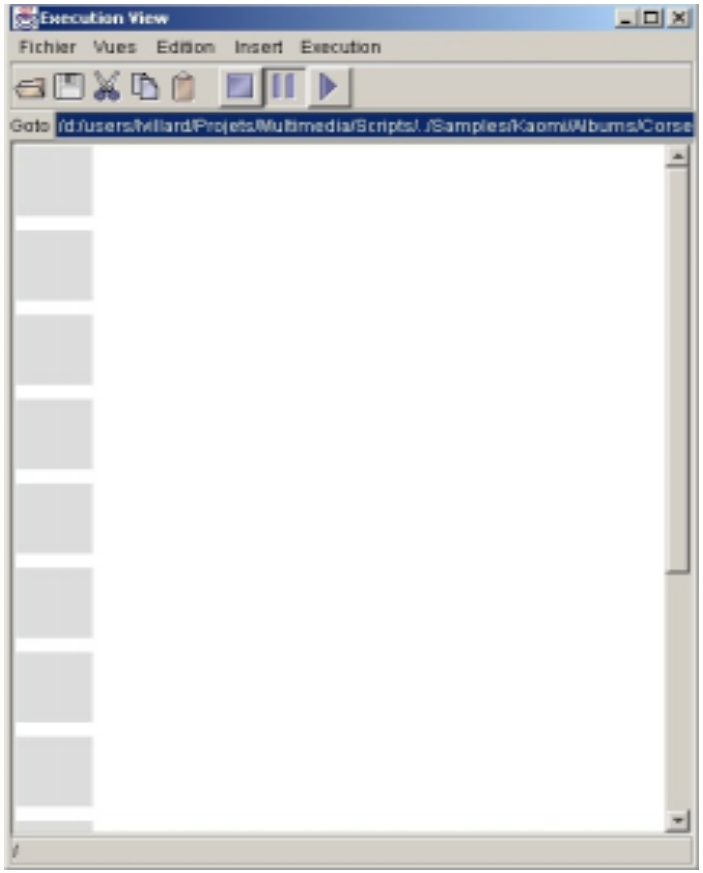
```
<xsl:template match="album" mode="sp">
   <s:region id="title"/>
   <apply-templates select="photo" mode="sp"/>
</xsl:template>

<xsl:template  select="photo"
                  mode="sp">
  <s:region>
    <xsl:if test="position()=3">
       <s:region id="rPhoto-3"/>
    </xsl:if>
</s:region>
</xsl:template>
```

Editing mode: global

- XSLT production for the nodes selected by an expression
- Must deal with all multimedia dimensions

Example


Execution View
Fichier Vues Edition Insert Execution
Goto


Execution View
Fichier Vues Edition Insert Execution
Goto
PhotosLionel/Corse/p1.gif
PhotosLionel/Corse/p2.gif
PhotosLionel/Corse/p3.gif
PhotosLionel/Corse/p4.gif
PhotosLionel/Corse/p5.gif

XSLT modification

```
<xsl:template select="photo" mode="te">
   <s:image region="rPhoto{generate-id()}"/>
</xsl:template>

<xsl:template select="photo" mode="sp">
   <s:region>
      <s:region id="rPhoto{generate-id()}"/>
   </region>
</xsl:template>
```

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Incremental transformation

Two step process

- Preprocessing: transformation sheets analysis
  - Build templates and variables dependency graphs
  - Build re-evaluation rules

    (Editing operation, Instructions to be re-evaluated)
- Incremental processing
  - Execute the instructions computed during the first step

Conclusion

- First experiments
  - for-each/apply-templates instructions
  - Target view: execution view
- Implementation
  - In an existing multimedia authoring tool : Kaomi
  - Incremental processor implemented inside Xalan (Apache Software Foundation)

Perspectives

- At the implementation level
  - Consider more editing operations (remove, modification, etc.)
  - Consider other views (Timeline, etc.)
- At the theoretical level
  - Generation of relative expressions
  - Generation with Schema awareness
  - Take into account transformation rules that modify processor context (param, variable)