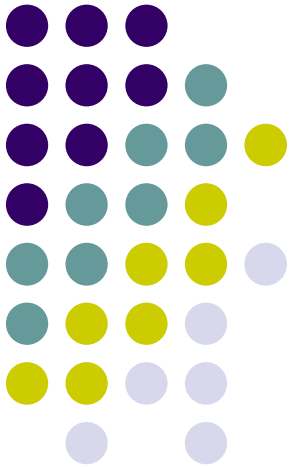
Stylesheet Translations of SVG to VML

Student: Julie Nabong

Advisor: Dr. Chris Pollett

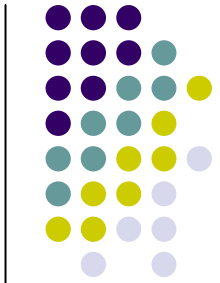
Committee Members: Dr. Agustin Araya

Dr. Robert Chun



May 2004

Topics



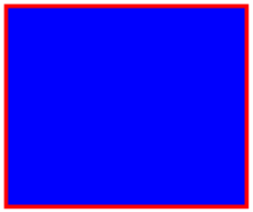
- Introduction
  - Motivation
  - Objectives
  - Requirements
  - Approach
- Implementation Features
- Results
- Limitations
- Conclusion
- Demo

Introduction - Motivation

jpeg: 3001 b

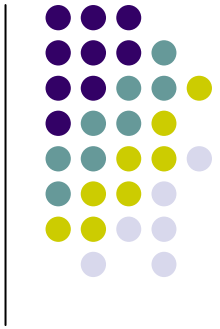
gif: 3601 b

bmp: 150,742 b

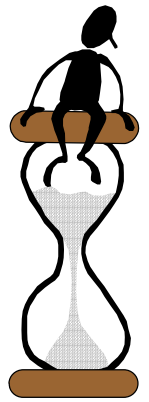


svg: 274 b

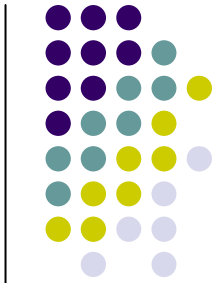
Motivation (cont.)



- JPEG, GIF
  - longer download
  - zoom – lose quality
  - Paint, Macromedia,…
- SVG
  - smaller file size
  - zoom – same quality
  - text editor



Motivation (cont.)

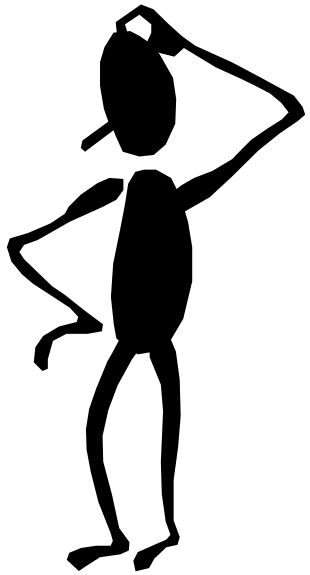


SVG

- **S**calable **V**ector **G**raphics
- W3C Recommendation
- Jan 2003
- two-dimensional graphics
- XML-based

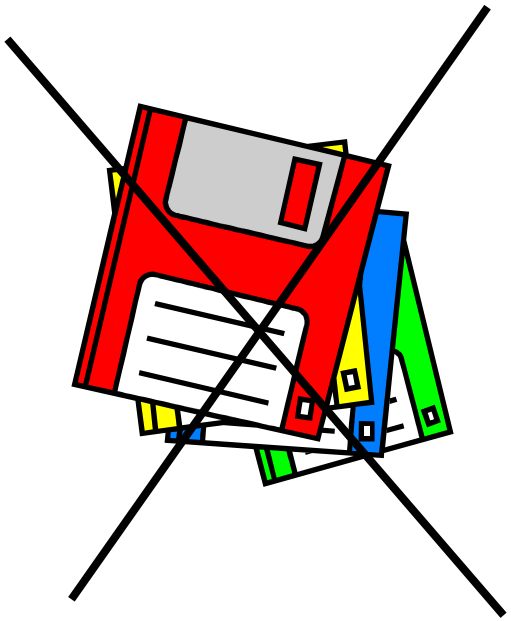
Motivation (cont.)

- SVG
  - does not work in Netscape 6.01
  - can be viewed in I.E., but
  - inconvenience
    - search viewer
    - download ~ 2MB viewer
    - install



Motivation (cont.)

- Solution – transform SVG to VML
  - works in I.E.
  - no extra software needed
  - text editor
  - XML
  - zoom – same quality



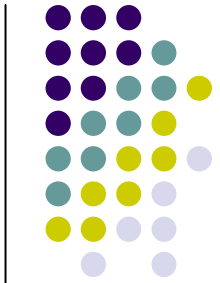
Motivation (cont.)

- **V**ector **M**arkup **L**anguage
- W3C Recommendation Candidate
- two-dimensional graphics
- XML-based

Project Objectives

- develop software
  - accepts SVG document input
  - outputs document with VML
- goal:
  - eliminate need for plug-in
  - display SVG transparently

Requirements

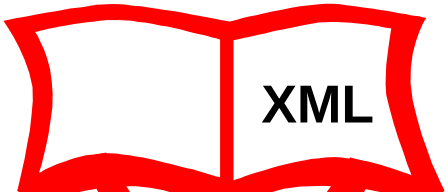


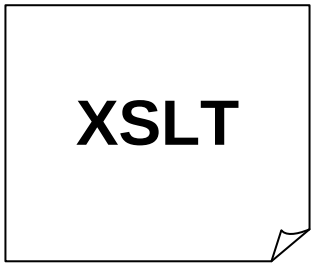
1. an SVG document – with supported tags
2. an XSLT stylesheet – *translator.xsl*
3. an HTML document – *display.html*
   a. loads SVG and stylesheet
   b. has transform method
   c. displays result
4. browser - I.E. 6.0

Approach

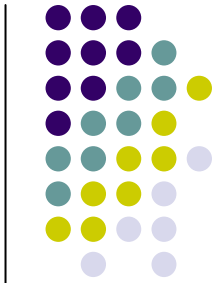
- World Wide Web Consortium (W3C)

- W3C Recommendations



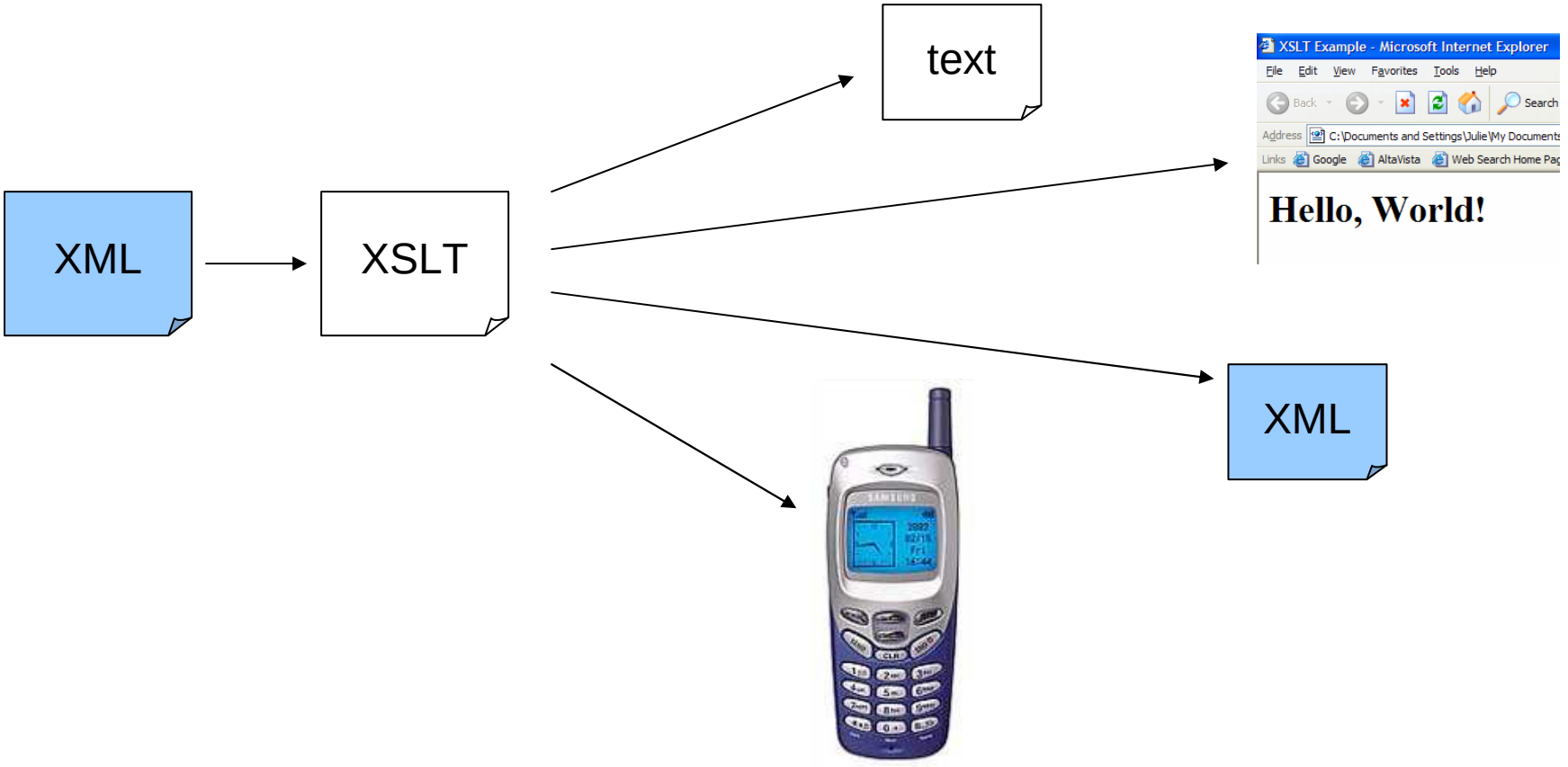


XSLT

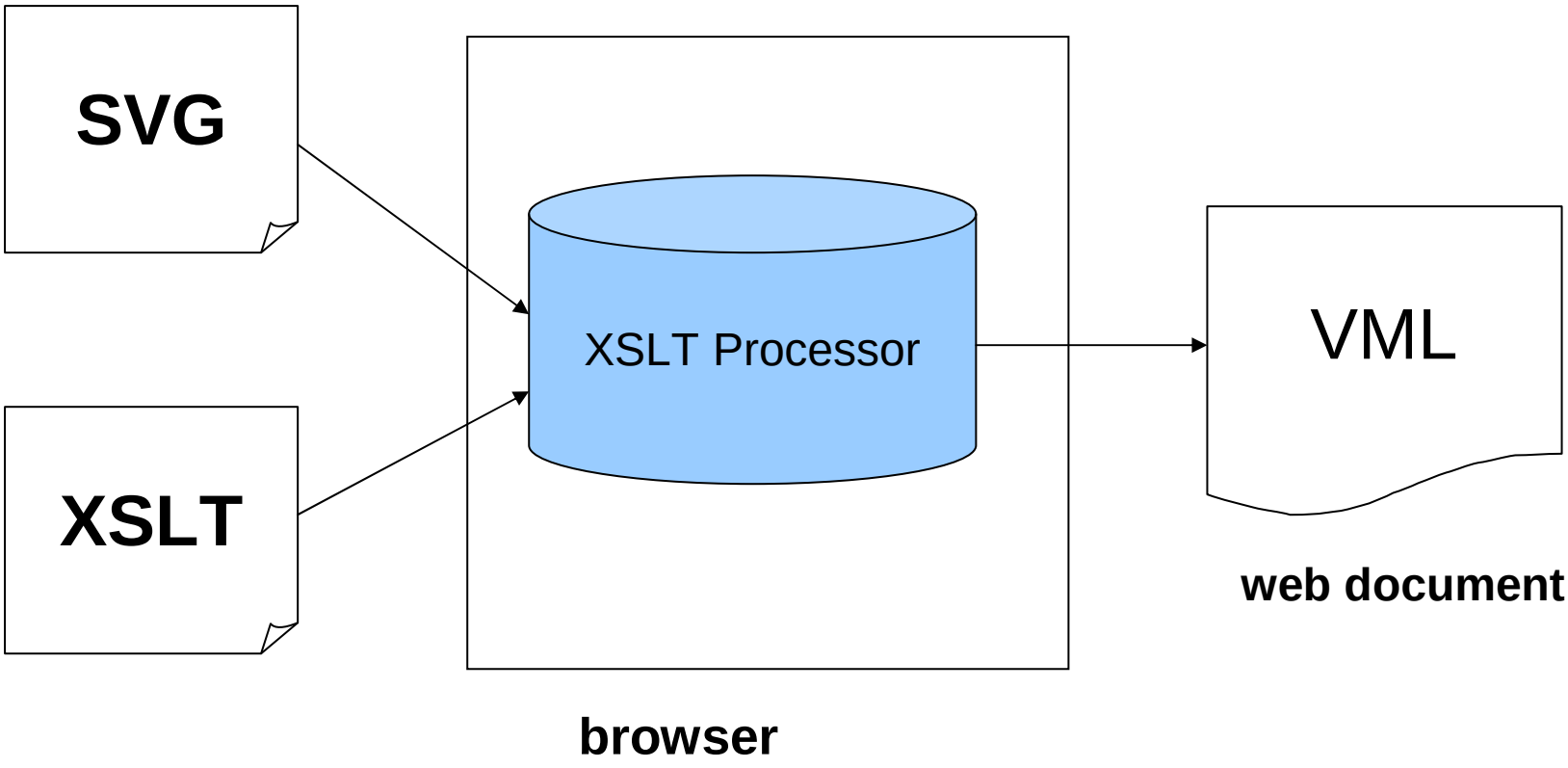


- e**X**tensible **S**tylesheet **L**anguage **T**ransformation
- W3C Recommendation, Nov 1999
- XML-based
- Goal: transform XML documents

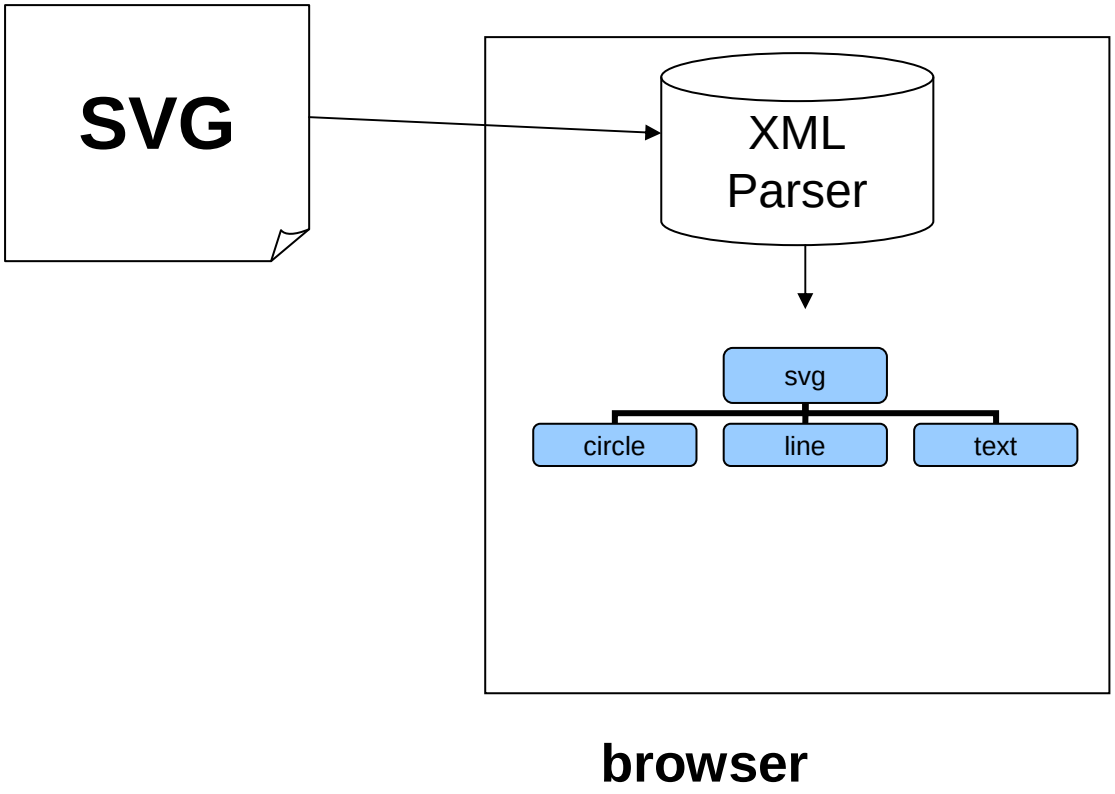
Approach (cont.)



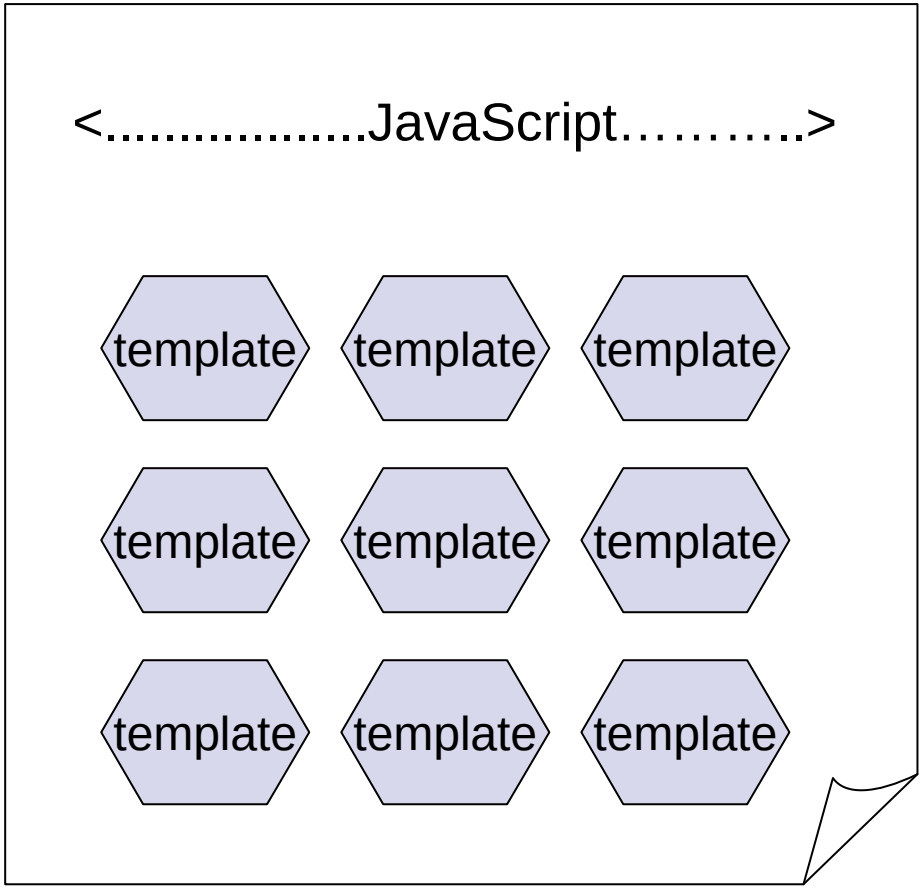
Approach (cont.)



Approach (cont.)

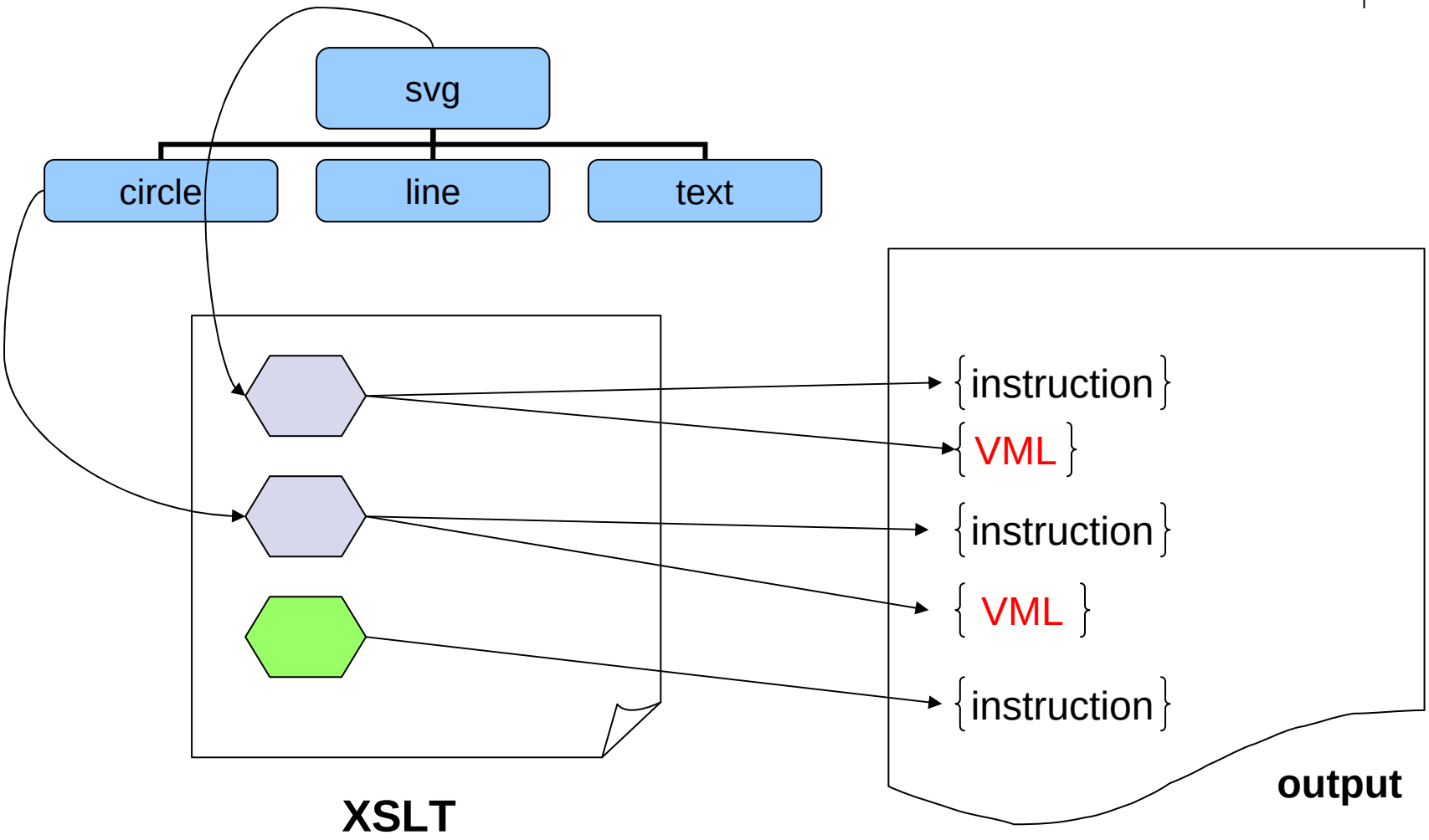


Approach (cont.)

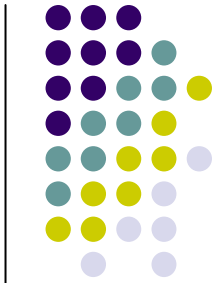


XSLT File: Stylesheet

Approach (cont.)

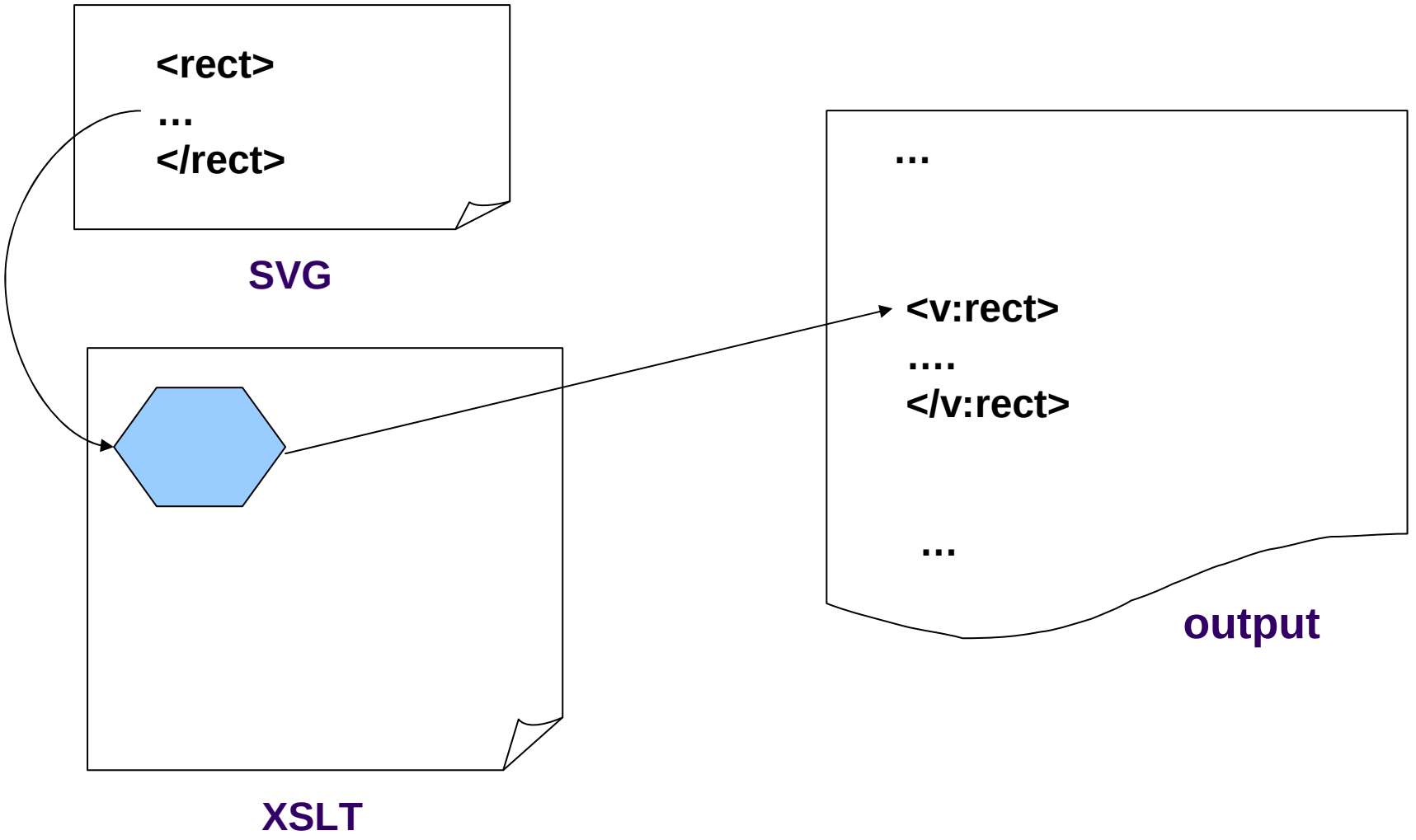


Implementation Features

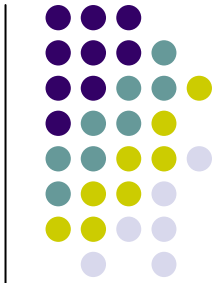


1. Direct mapping **<rect>** → **<v:rect>**
2. No mapping **<g>** → **<xsl:if**
3. Scripting function getPoints(svgpoints) {... return points; }
4. Gradients 
5. Events **<OBJECT ...>**

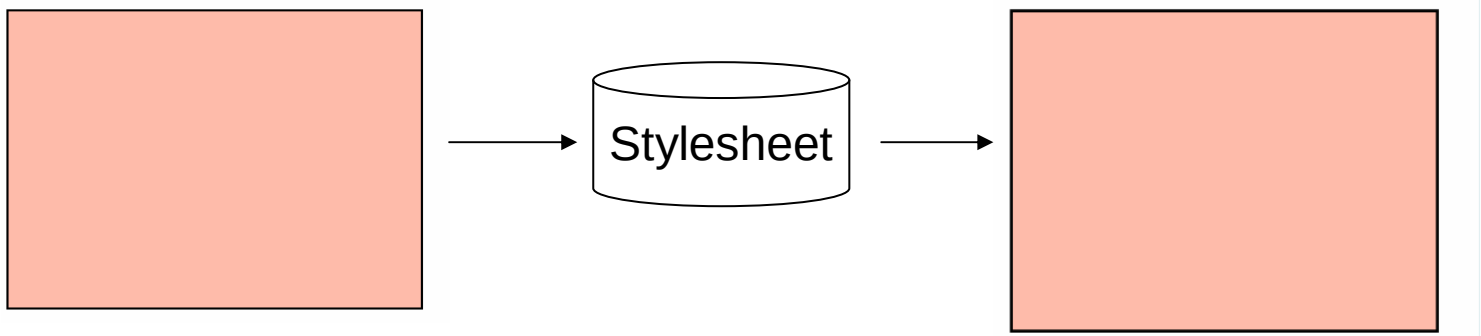
Implementation Features – 1. Direct mapping



Implementation Features – 1. Direct mapping (cont.)



- Transformation of <rect> Element

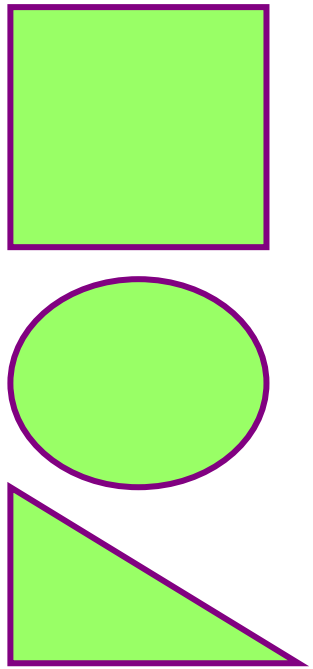


Implementation Features – 2. No mapping

<g..>

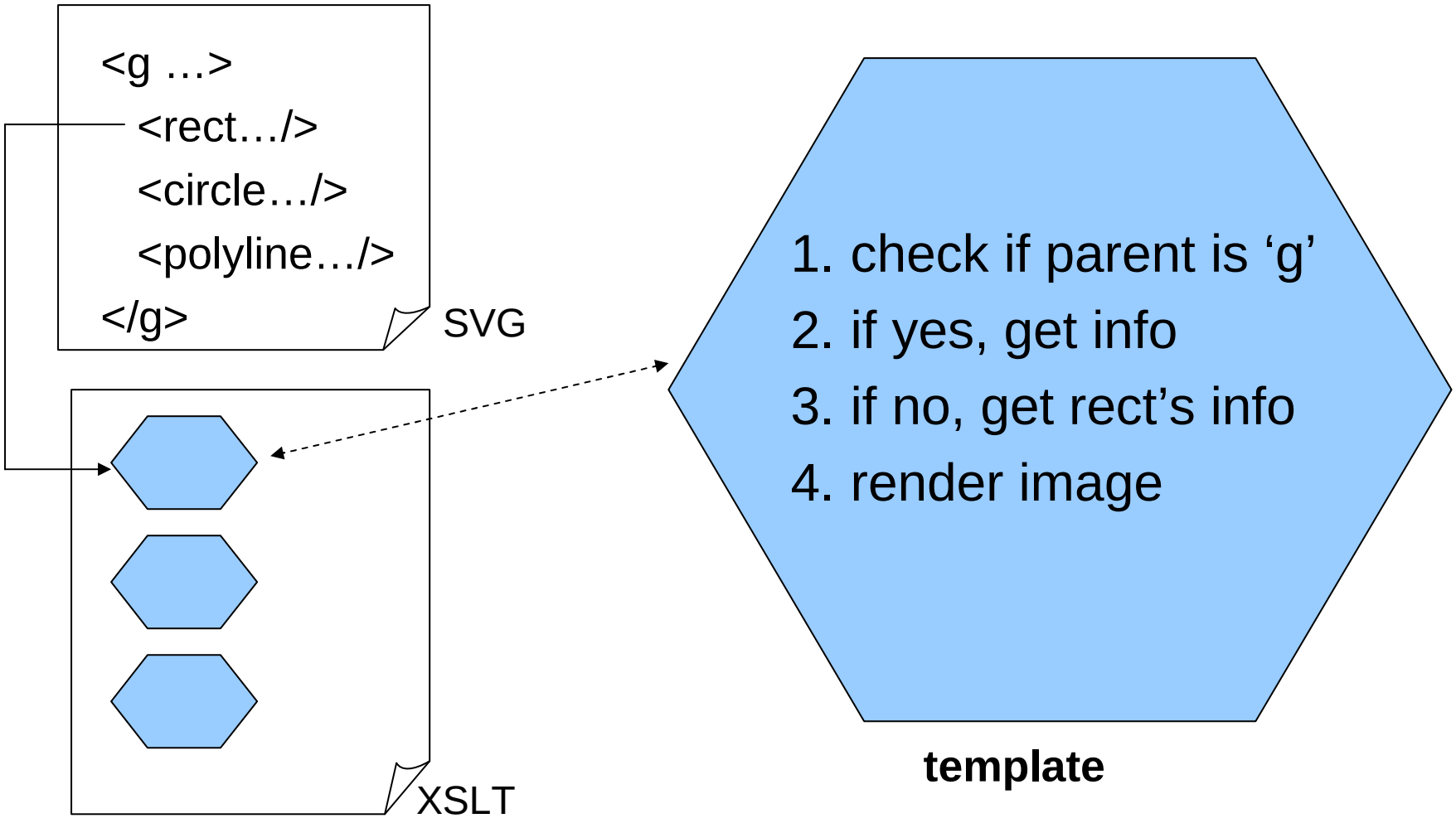
```
<g…>
   <rect../>
   <circle../>
  <polyline…/>
</g>
```

SVG

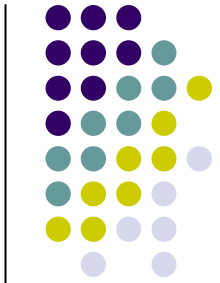


</g..>

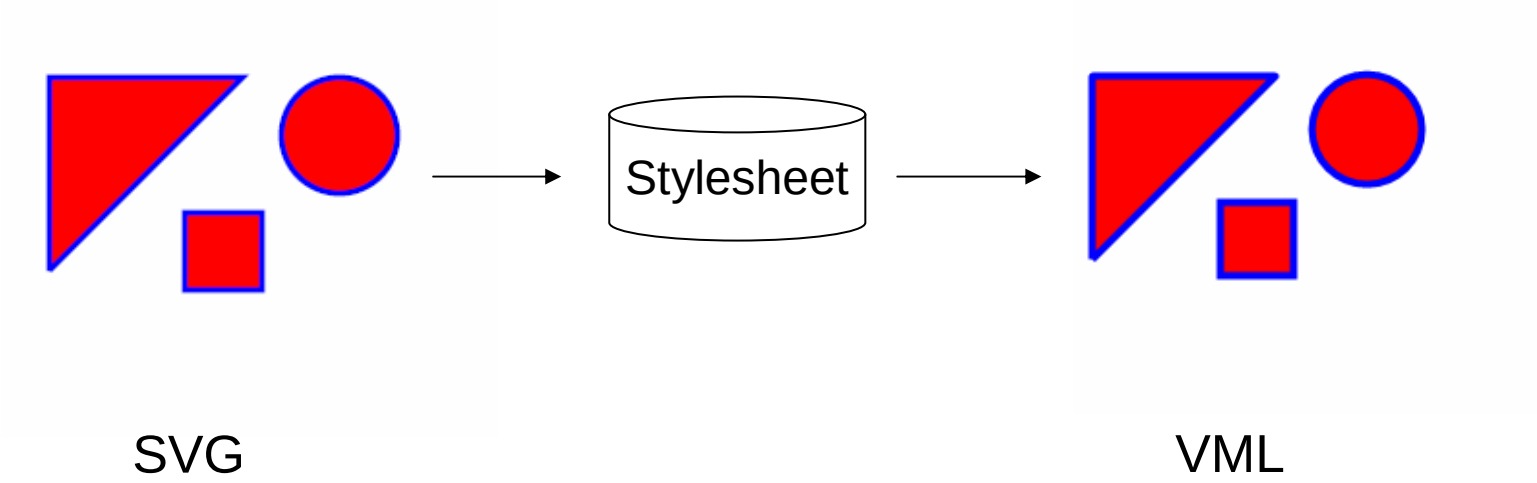
Implementation Features – 2. No mapping (cont.)



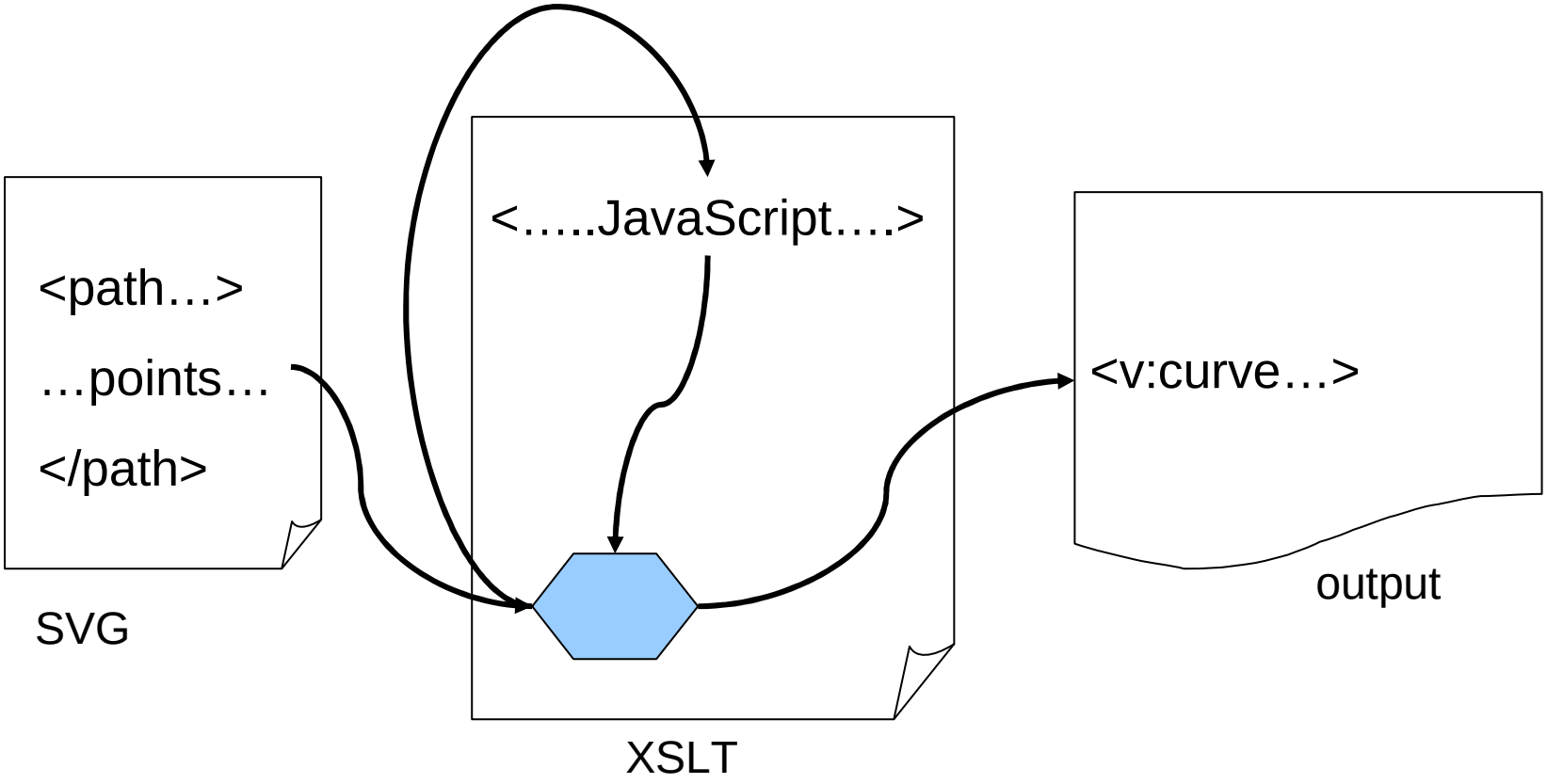
Implementation Features – 2. No mapping (cont.)



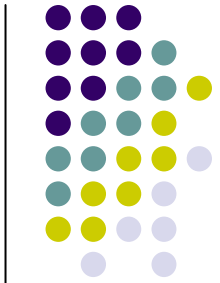
- Transformation of <g> Element



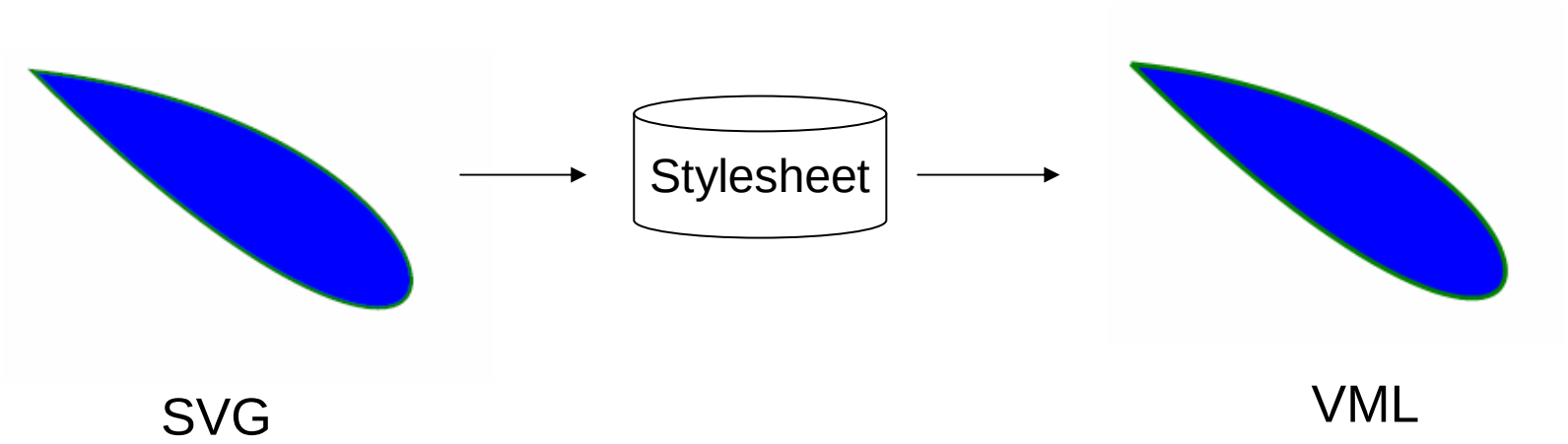
Implementation Features – 3. Scripting



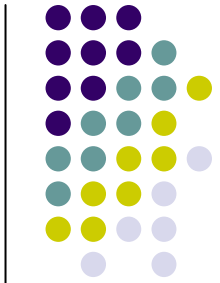
Implementation Features – 3. Scripting (cont.)



- Transformation of <path> Element

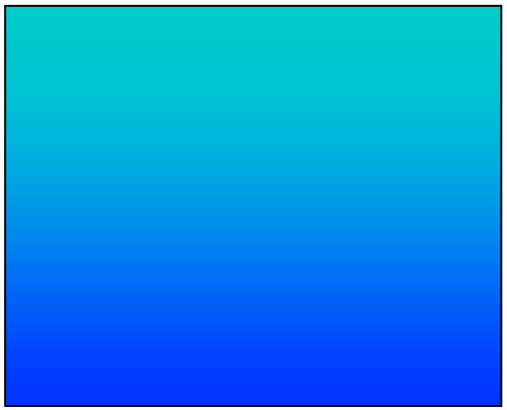


Implementation Features – 4. Gradients

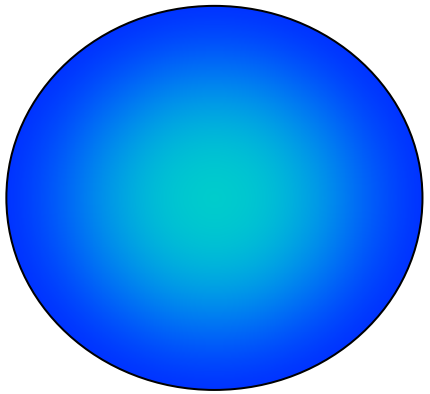


- Gradient – smooth transition of one color to another

examples:

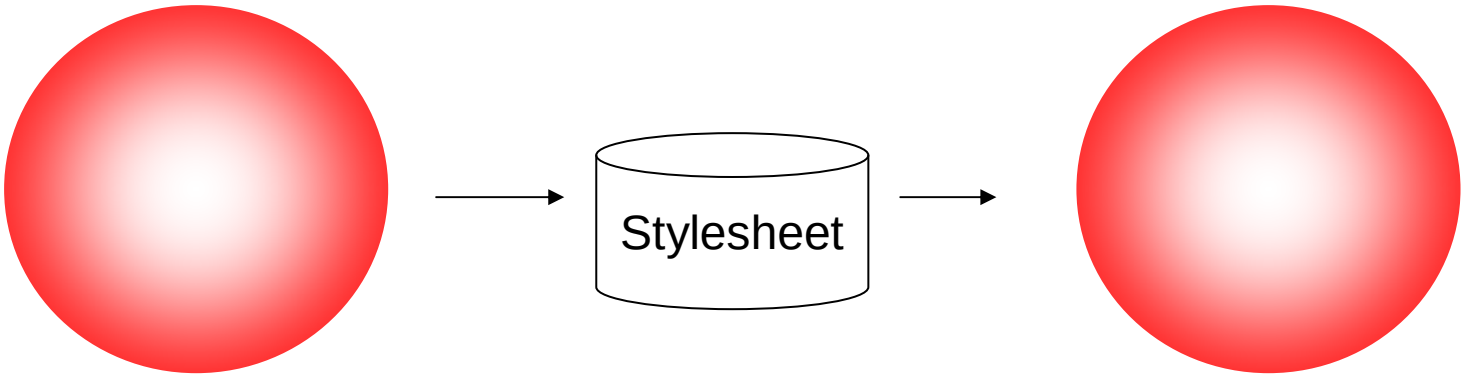


linear



radial

Implementation Features – 4. Gradients (cont.)

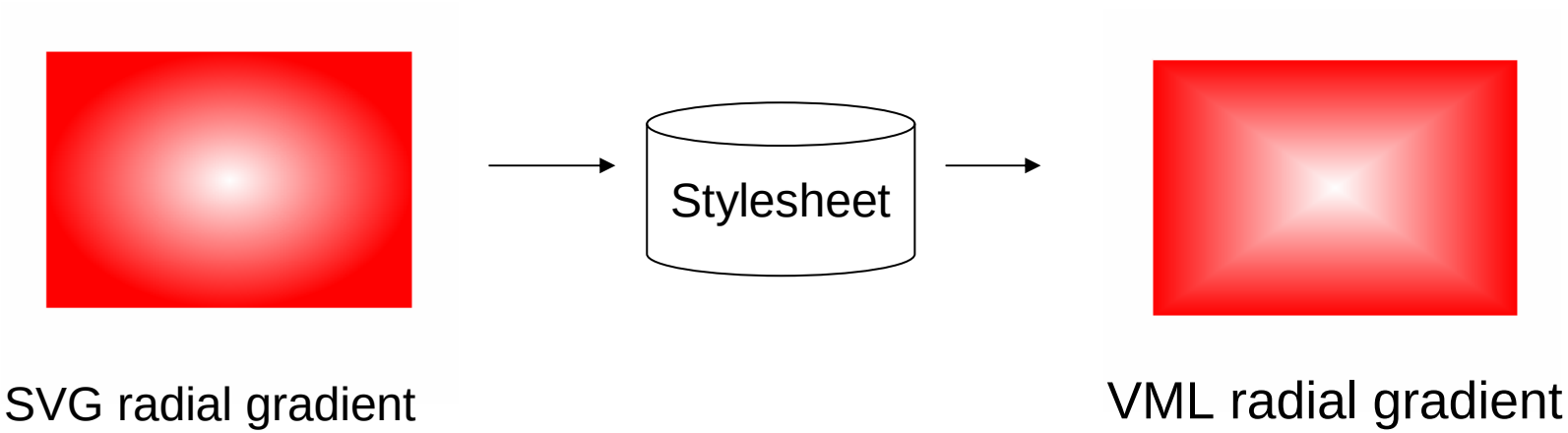


SVG radial gradient

VML radial gradient

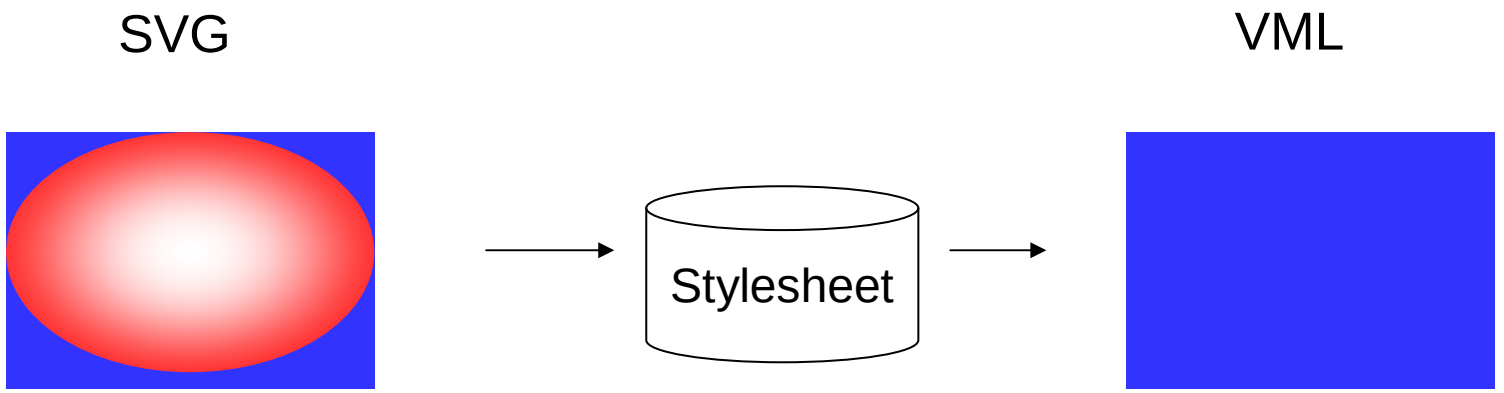
SVG circle to VML oval = **OK**, but…

Implementation Features – 4. Gradients (cont.)

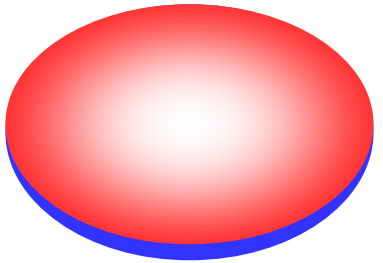


SVG rectangle to VML rectangle = **not OK**

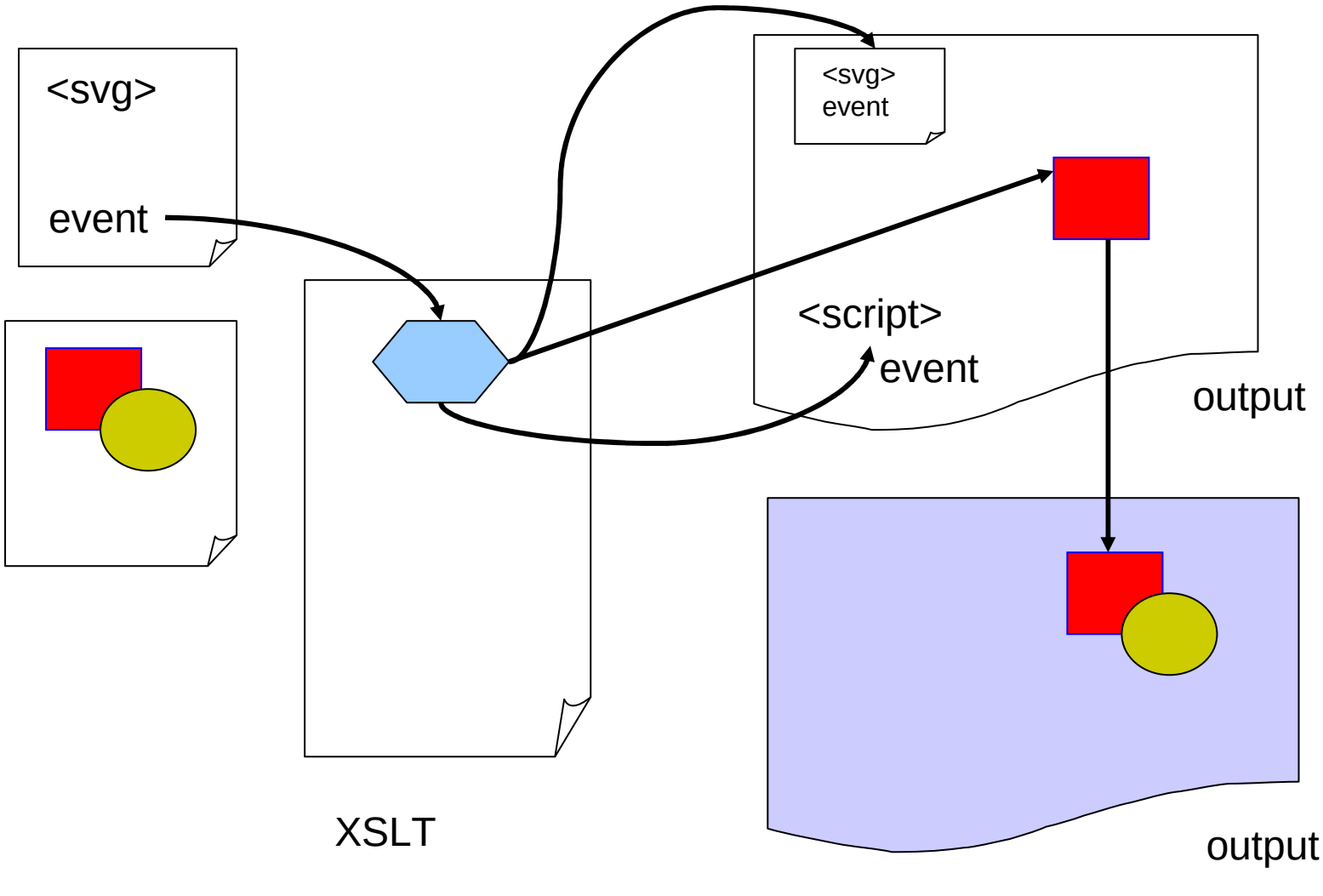
Implementation Features – 4. Gradients (cont.)



Solution



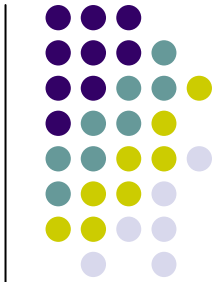
Implementation Features – 5. Events



Results

- Stylesheet
  - 23 templates
  - JavaScript
  - 1,430 lines

Results (cont.)

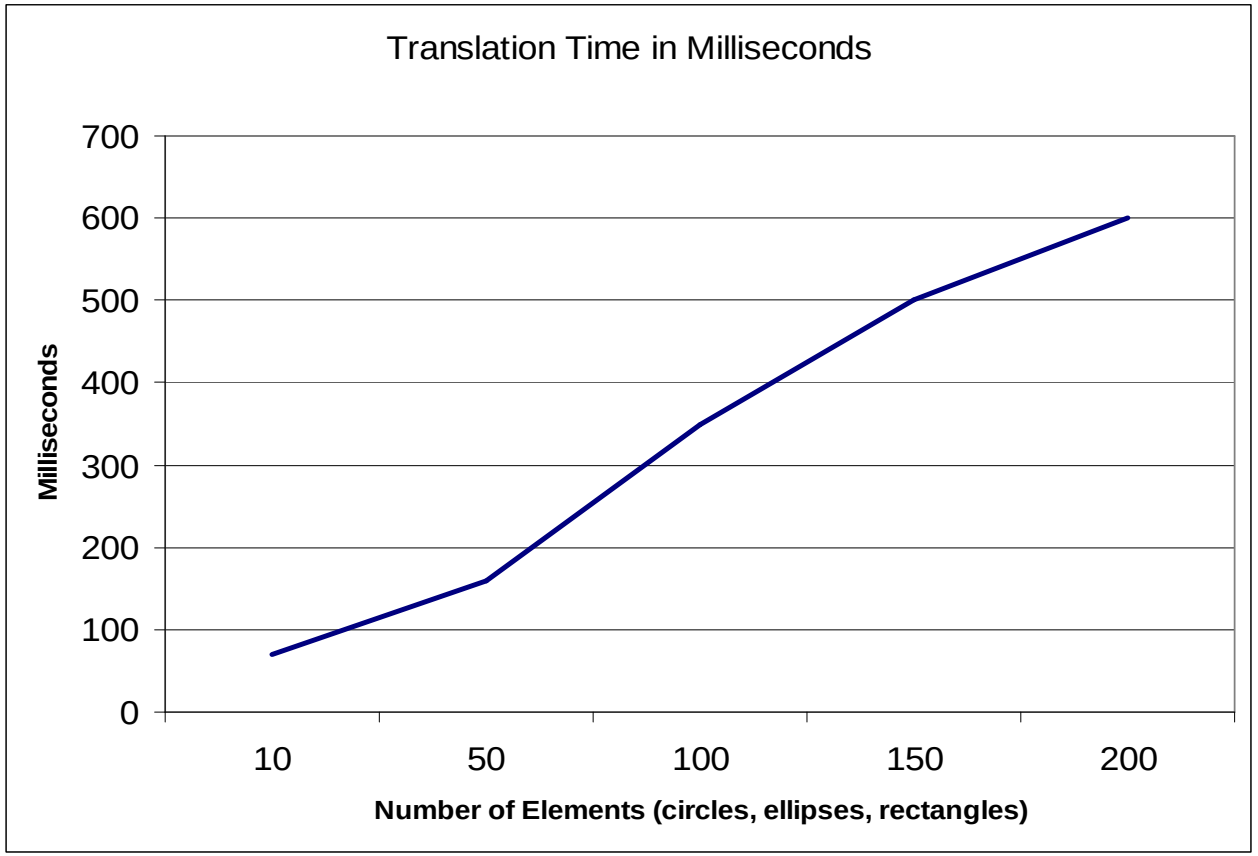


- Experiment Data

Num of Elements	Translation Time in Milliseconds
10	70
50	160
100	350
150	501
200	601

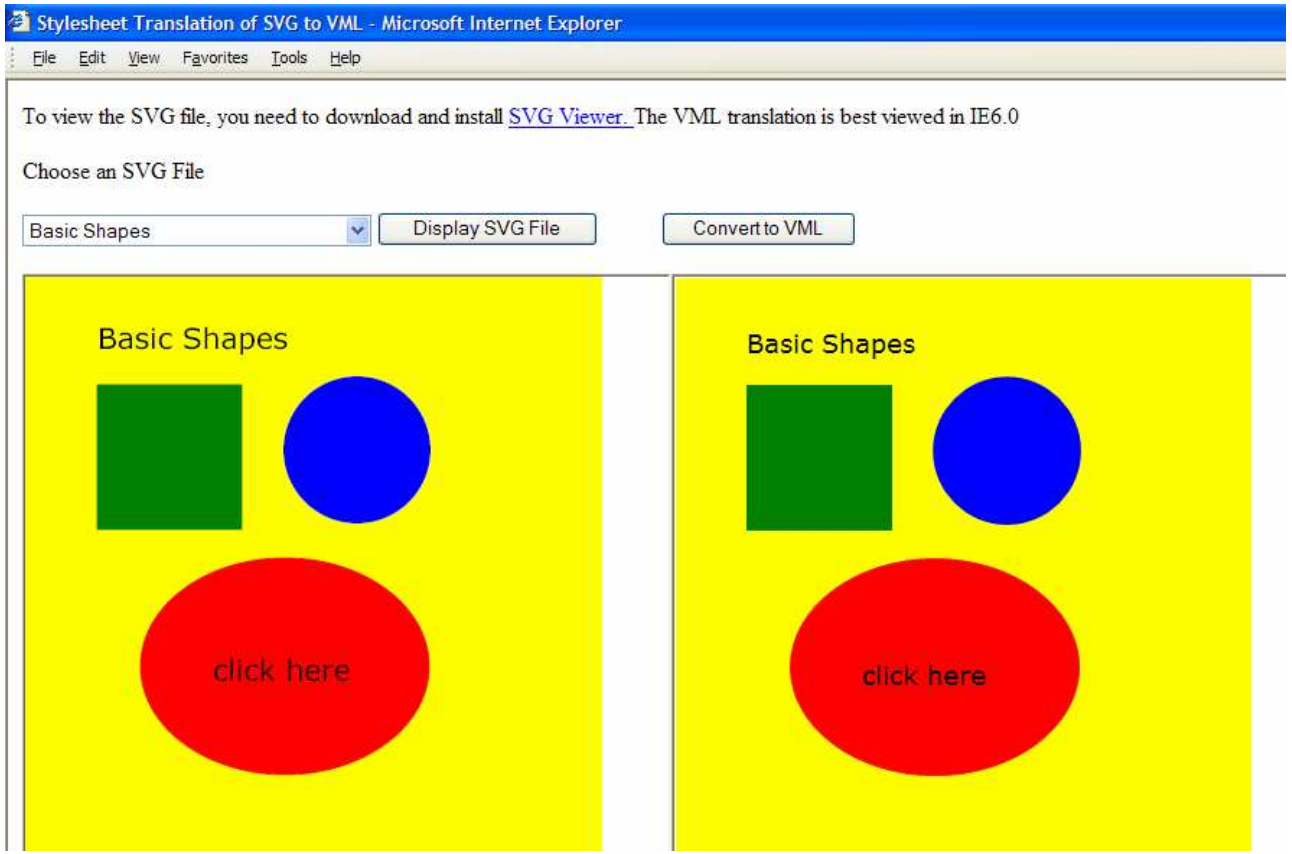
Results (cont.)

- Experiment Chart

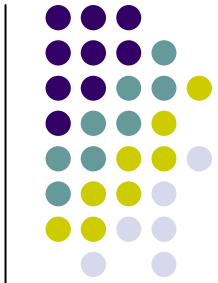


Result (cont.)

- Transformation Snapshot

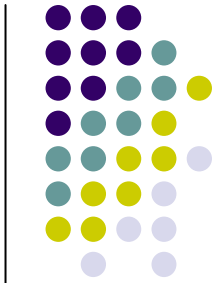


Results (cont.)



- project transforms SVG documents with the following elements:
  - geometric shapes
  - gradient fills
  - lines
  - scripts
  - events
  - etc.

Limitations

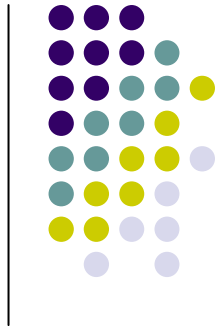


- no zooming on mouse click
- no dashed lines and arrows
- no shadows on images
- some SVG elements not supported

Conclusion

Points Learned:

1. need XML Path Language to use XSLT
2. XSLT
   a. unique language
   b. hard to debug
3. second transformation
4. need XML DOM
5. DOM2 Events not supported in I.E. 6.0



XML

SVG

VML

XML DOM

XPath

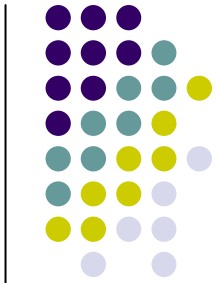
XSLT

JavaScript

References

[AGS]	Adobe Graphics Server. http://www.adobe.com/products/server/graphics/main.html
[B03]	Bondre, P. XSLT – Efficient Programming Techniques. http://www.xml.org/xml/xslt_efficient_programming_techniques.pdf
[DOM04]	W3C Document Object Model. http://www.w3.org/DOM/
[G04]	GraPL. http://www.grapl.com/desktop/index.html
[H02]	Holman, G. Definitive XSLT and XPath. Prentice Hall. Upper Saddle River, NJ. 2002
[L04]	Lee. W. M. "Transforming XML into WML." http://www.wirelessdevnet.com/channels/wap/training/xslt_wml.html
[M04]	Map2SVG. http://www.gis-news.de/svg/map2svg.htm
[MSDN98]	Introduction to Vector Markup Language. http://msdn.microsoft.com/library/default.asp?url=/workshop/author/vml/. MSDN 1998.
[R04]	Ryan, J. "Transforming Flat Files to XML Using SAX and XSLT." http://www.developer.com/xml/article.php/2108031

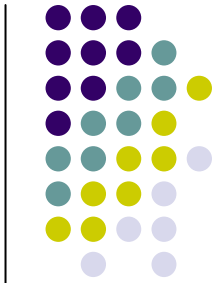
References (cont.)



[S04]	Schemasoft. http://www.schemasoft.com/mathml/index.htm
[SVG03]	Scalable Vector Graphics (SVG) 1.1 Specification. http://www.w3.org/TR/SVG/
[VML98]	Vector Markup Language (VML). http://www.w3.org/TR/NOTE-VML
[W03]	Watt A, Lilley C., Ayers, D., George, R., Wenz, C., Hauser T., Lindsey K., Gustavsson, N. SVG Unleashed. Sams Publishing. Indianapolis, Indiana. 2003
[W04]	W3Schools. http://www.w3schools.com
[X03]	XML DOM. http://www.devguru.com/Technologies/xmldom/quickref/node_transformNode.html
[XDSO]	XML Data Source Object. http://msdn.microsoft.com/library/default.asp?url=/library/en-us/xmlsdk30/htm/ontransformnode_event.asp
[XML99]	XML Path Language. http://www.w3.org/TR/xpath
[XSLT99]	XSL Transformations (XSLT). http://www.w3.org/TR/xslt

Demo

Thank You For Coming!



- Questions