Batik & SVG
Open Vector Graphics

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Agenda

- Introduction to Batik & SVG
- SVG Quick Tour & Demonstration
- Batik Quick Tour & Demonstration
- Questions

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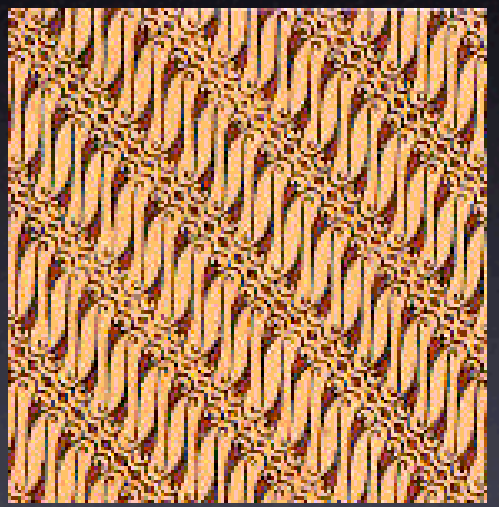
Batik

Batik is the name of
a style of patterned fabric native
to the island of Java...



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Batik

... and an Apache open source SVG toolkit

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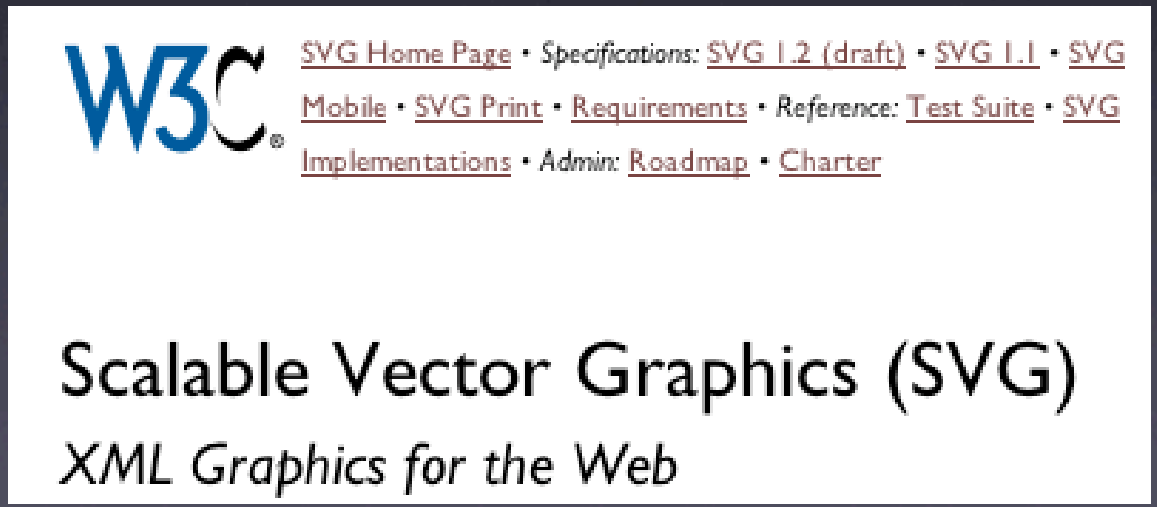
Scalable Vector Graphics (SVG)

SVG is not a fabric and is not from any islands.

SVG is a graphics format from the W3C.



http://www.w3.org/Graphics/SVG

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Scalable Vector Graphics (SVG)

- Scriptable XML based vector graphics format
- Web graphics like Macromedia Flash
- e-documents like Acrobat PDF
- W3C Open Standard
- Has wide support - everything from Adobe Illustrator to Nokia cell phones

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Bitmaps vs. Vectors

- SVG is a Vector Format
  - A set of instructions describing what to draw.
  - A renderer interprets the description and creates an output device specific image.
  - Other examples: Encapsulated Postscript (EPS), Windows Meta File (WMF)

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Bitmaps vs. Vectors

- Bitmaps are a rectangular array of picture elements (pixels).
  - JPEG, GIF, PNG, TIFF are all bitmap formats.
- No way for computer to understand the image contents.
- Image size scales badly.

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Bitmaps

A rectangular array of Picture Elements (pixels)

Let's See It

Simple

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.0//EN"
          "http://www.w3.org/TR/2001/REC-SVG-20010904/DTD/svg10.dtd">
<svg>
  <circle cx="200" cy="200" r="50" style="fill:red" />
</svg>
```

Animated

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.0//EN"
          "http://www.w3.org/TR/2001/REC-SVG-20010904/DTD/svg10.dtd">
<svg>
  <style type="text/css"> <![CDATA[
     circle.special {fill: blue}
  ]]>
  </style>
  <circle  id="lake" class="notspecial" cx="50" cy="100" r="40">
    <animateMotion dur="2s" path="M 0,0 L 150,0"
                   begin="lake.click" fill="freeze"/>
  </circle>
  <circle class="special" cx="100" cy="100" r="50" />
</svg>
```

With a Filter

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.0//EN"
          "http://www.w3.org/TR/2001/REC-SVG-20010904/DTD/svg10.dtd">
<svg>
  <defs>
    <filter id="dropShadow">
      <desc>Produces a 3D effect as if the item was close to the surface</desc>
      <feGaussianBlur in="SourceAlpha" stdDeviation="2" result="blur"/>
      <feOffset in="blur" dx="3" dy="3" result="offsetBlur"/>
      <feMerge>
        <feMergeNode in="offsetBlur"/>
        <feMergeNode in="SourceGraphic"/>
      </feMerge>
    </filter>
  </defs>

  <style type="text/css">
    <![CDATA[
      circle.special {fill: blue; stroke: red; stroke-width: 2pt; filter: url(#dropShadow)}
      .emphasis {filter: url(#dropShadow)}
    ]]>
  </style>

  <circle id="myCircle" class="special" cx="100" cy="50" r="30">
    <animateMotion dur="3s" path="M 0,0 L 200,0" begin="myCircle.click" fill="freeze"/>
  </circle>
  <circle class="emphasis" cx="200" cy="50" r="30" />

</svg>
```

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Web Demos

Perlyroids	http://www.roasp.com/cgi-bin/new_svg/examples/perlyroids.pl
Vision Monster	http://visionmonster.com/svg/
Phonetics	http://braintag.net/phonetics.svg
SVG Notebook	http://www.svgnotebook.com/

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Apache Batik

- Java SVG Toolkit
- 3 Levels of APIs
  - Low Level - internal stuff
  - Core - primary API
  - Applications - ok not really an API at all

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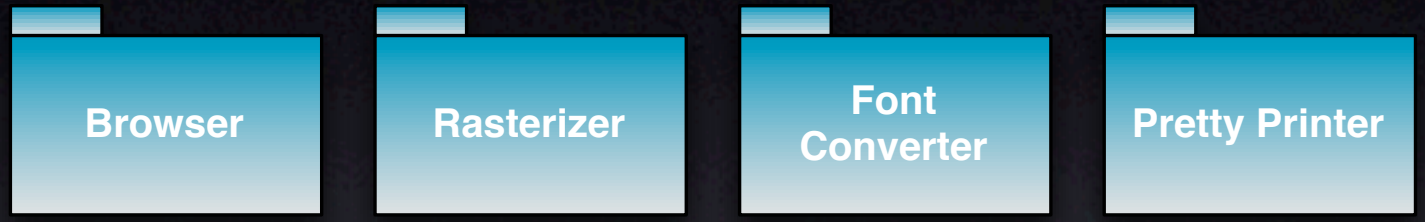
Apache Batik

Application Level Modules



Core Level API

Low Level (internal API)

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Squiggle

SVG Browser

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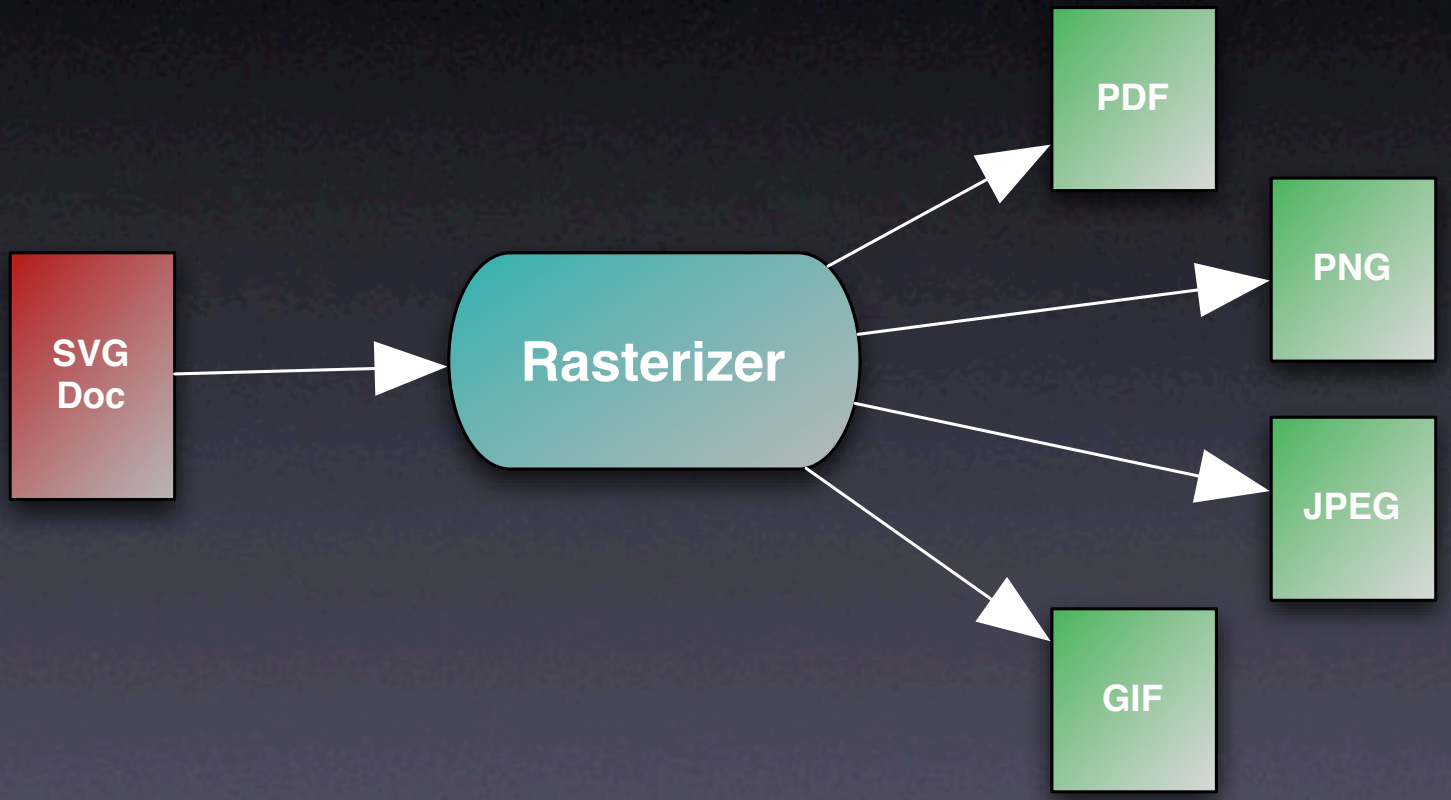
Rasterizer



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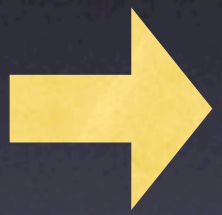
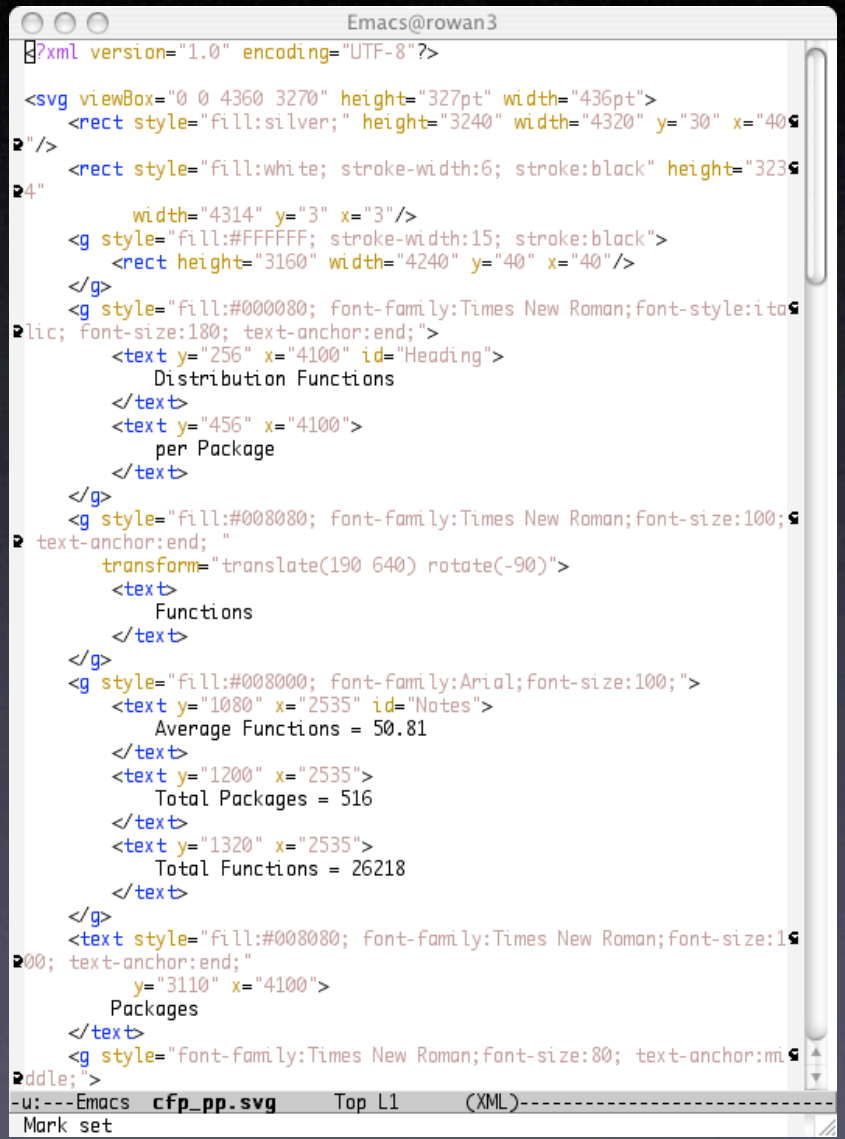
Pretty Printer





Core APIs

- org.apache.batik.dom.svg
- org.apache.batik.transcoder
- org.apache.batik.swing
- org.apache.batik.svggen

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SVG DOM

org.w3c.dom.svg

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.0//EN"
          "http://www.w3.org/TR/2001/REC-SVG-20010904/DTD/svg10.dtd">
<svg>
  <g>
    <rect x="10" y="10" width="100" height="50"
          style="fill:blue" />
    <circle cx="135" cy="45" r="25"
            style="fill:red" />
  </g>
  <g>
    <circle cx="50" cy="120" r="40"
            style="fill: green" />
    <polyline points="50,120 60,60" style="stroke: green" />
  </g>
</svg>
```

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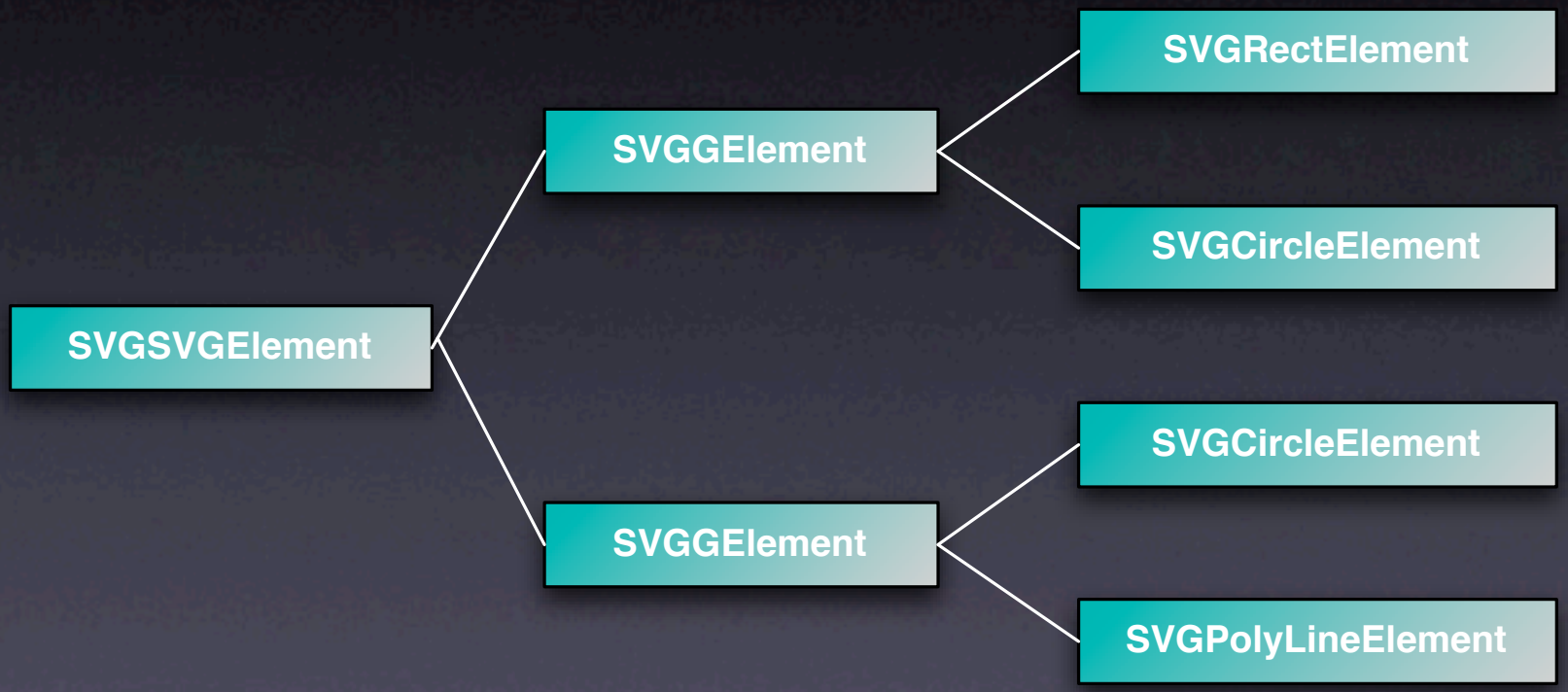
SVG DOM

org.w3c.dom.svg



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DOM Reading

```
public class DOMReading
{

    static public void main(String args[])
        throws java.io.IOException, javax.xml.parsers.ParserConfigurationException,
               org.xml.sax.SAXException
    {
        String parserClassName = "org.apache.xerces.parsers.SAXParser";

        org.apache.batik.dom.svg.SAXSVGDocumentFactory docFactory =
            new org.apache.batik.dom.svg.SAXSVGDocumentFactory(parserClassName);
        String uri = "file:/Users/chuston/Documents/DJUG/BasicConcepts" +
                     "/Batik_Presentation/svg_trymes/dom_rects.svg";
        org.w3c.dom.svg.SVGDocument document = docFactory.createSVGDocument(uri);

        System.out.println("Document: " + document);
    }
}
```

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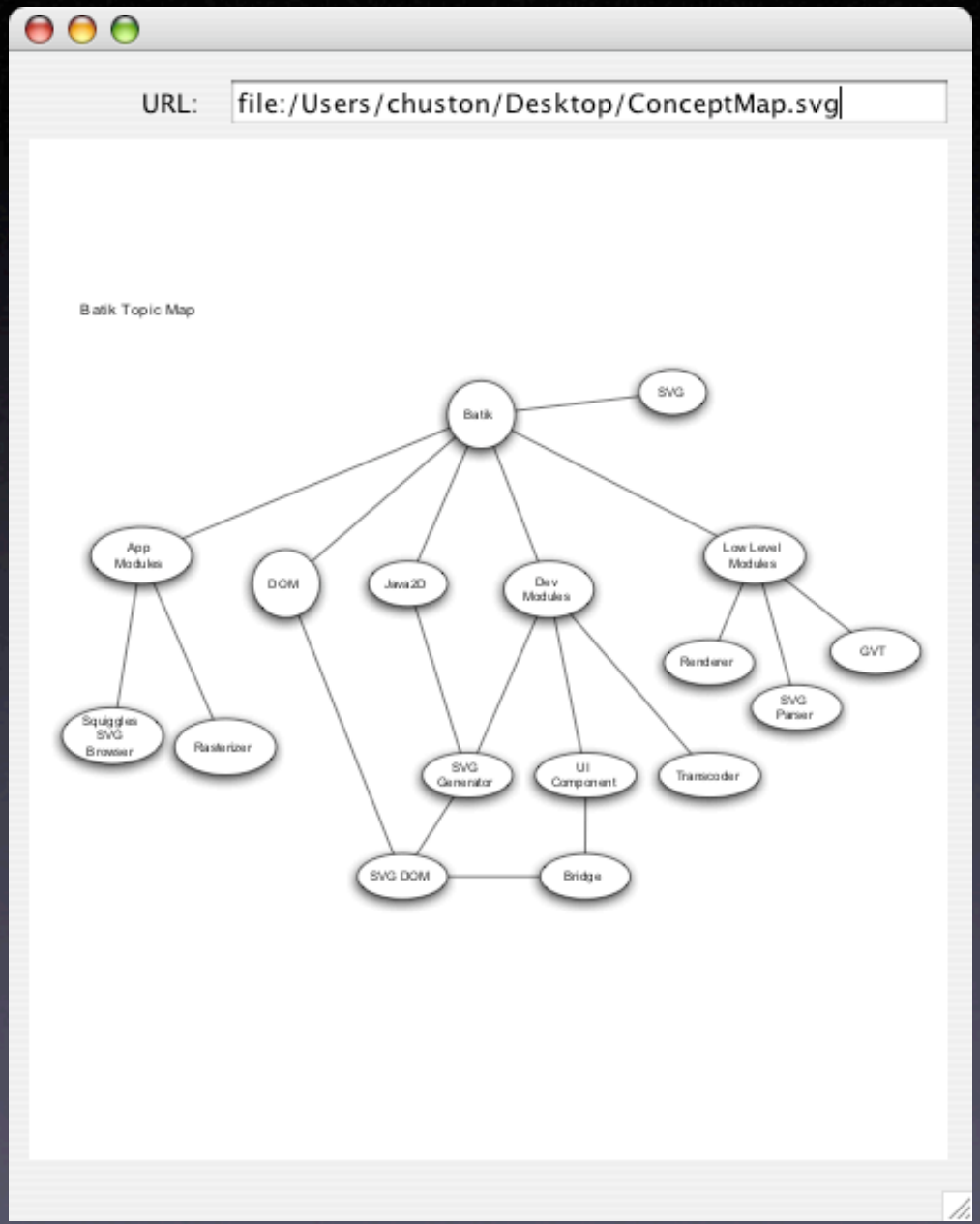
JSVCanvas

- A Swing Bean that displays and interacts with SVG files.
- Like so...

Bean Builder Demo



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SVG Generator

- A Graphics2D implementation backed by SVG!
  - Any swing/awt component can now output SVG.
  - Unified imaging code - use Java2D
- Easy as pie!

Bean Builder Demo

Exports JFreeChart ChartPanel to SVG
Illustrator, PDF, Squiggle, IE all play well with output

```
// Get a DOMImplementation
DOMImplementation domImpl =
    GenericDOMImplementation.getDOMImplementation();

// Create an instance of org.w3c.dom.Document
Document document = domImpl.createDocument(null, "svg", null);

// Create an instance of the SVG Generator
SVGGraphics2D svgGenerator = new SVGGraphics2D(document);
// Ask the chart to render into the SVG Graphics2D implementation
_chart.draw(
            svgGenerator,
            new Rectangle2D.Double(0.0, 0.0, 400.0, 400.0),
            null);

// Finally, stream out SVG to a file using UTF-8 character to byte
// encoding
try {
    Writer out =
        new OutputStreamWriter(new FileOutputStream(targetOutFile), "UTF-8");
    svgGenerator.stream(out, true);
    out.close();
}
catch (IOException iex) {
    String message = iex.getMessage();
    JOptionPane.showMessageDialog(this, message, "IO Exception", JOptionPane.ERROR_MESSAGE);
}
```

Step 1

Step 2

Step 3

Ain’t it cool?

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SVG Resources

SVG Essentials

David Eisenberg

O'Reilly

W3C SVG Site

www.w3.org/Graphics/SVG

http://www.svgx.org/

IBM Developer Works

http://www.ibm.com/developerworks/web/library/x-svgint/

SVG Developers Yahoo Group

http://groups.yahoo.com/group/svg-developers/

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Batik Resources

Apache
http://xml.apache.org/Batik

... and, uh, Apache

Questions?