

# Batik & SVG

## Open Vector Graphics

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# Agenda

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

# Batik

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



# Batik

... and an Apache open source SVG toolkit



The screenshot shows the homepage of the Batik SVG Toolkit. The page has a blue header with the text "THE APACHE XML PROJECT" on the left and "Batik SVG Toolkit" on the right. Below the header, there are three links: "XML.APACHE.ORG", "WWW.APACHE.ORG", and "WWW.W3.ORG w3c". A left sidebar contains a navigation menu with items like "Home", "Overview", "FAQ", "License", "Download", "Install", "Demo", "In the news", "Tools and Apps", "Browser", "Rasterizer", "Font Converter", "Pretty-printer", "Architecture", and "API (Javadoc)". The main content area features a blue button labeled "Batik Overview" and a large graphic with the text "batik1.5" and the URL "http://xml.apache.org/batik". The graphic also includes three stylized leaves in blue, red, and green.

# Scalable Vector Graphics (SVG)

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

SVG is a graphics format from the W3C.



[SVG Home Page](#) • *Specifications:* [SVG 1.2 \(draft\)](#) • [SVG 1.1](#) • [SVG Mobile](#) • [SVG Print](#) • [Requirements](#) • *Reference:* [Test Suite](#) • [SVG Implementations](#) • *Admin:* [Roadmap](#) • [Charter](#)

## Scalable Vector Graphics (SVG)

*XML Graphics for the Web*

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

# 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

# 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)

# 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.

# 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>
```

# Web Demos

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

# Apache Batik

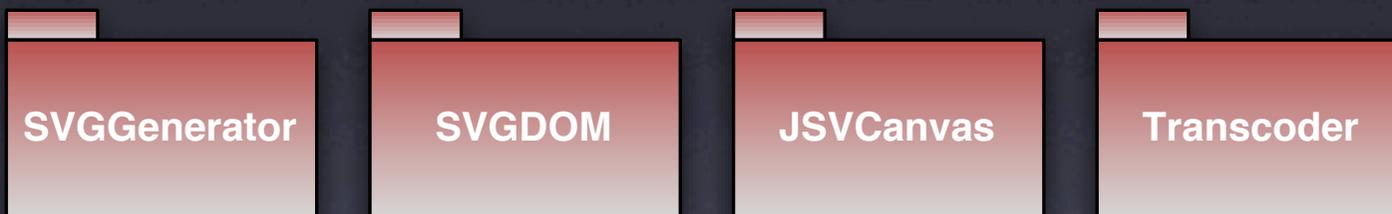
- Java SVG Toolkit
- 3 Levels of APIs
  - Low Level - internal stuff
  - Core - primary API
  - Applications - ok not really an API at all

# Apache Batik

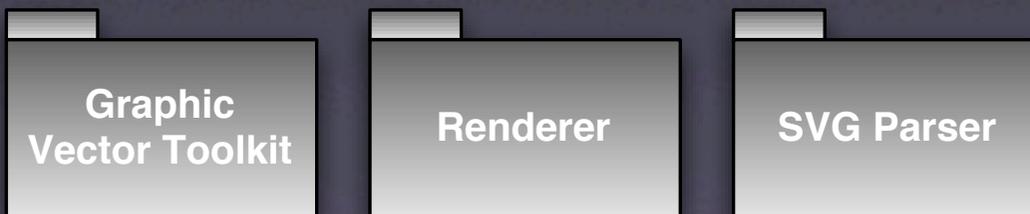
## Application Level Modules



## Core Level API



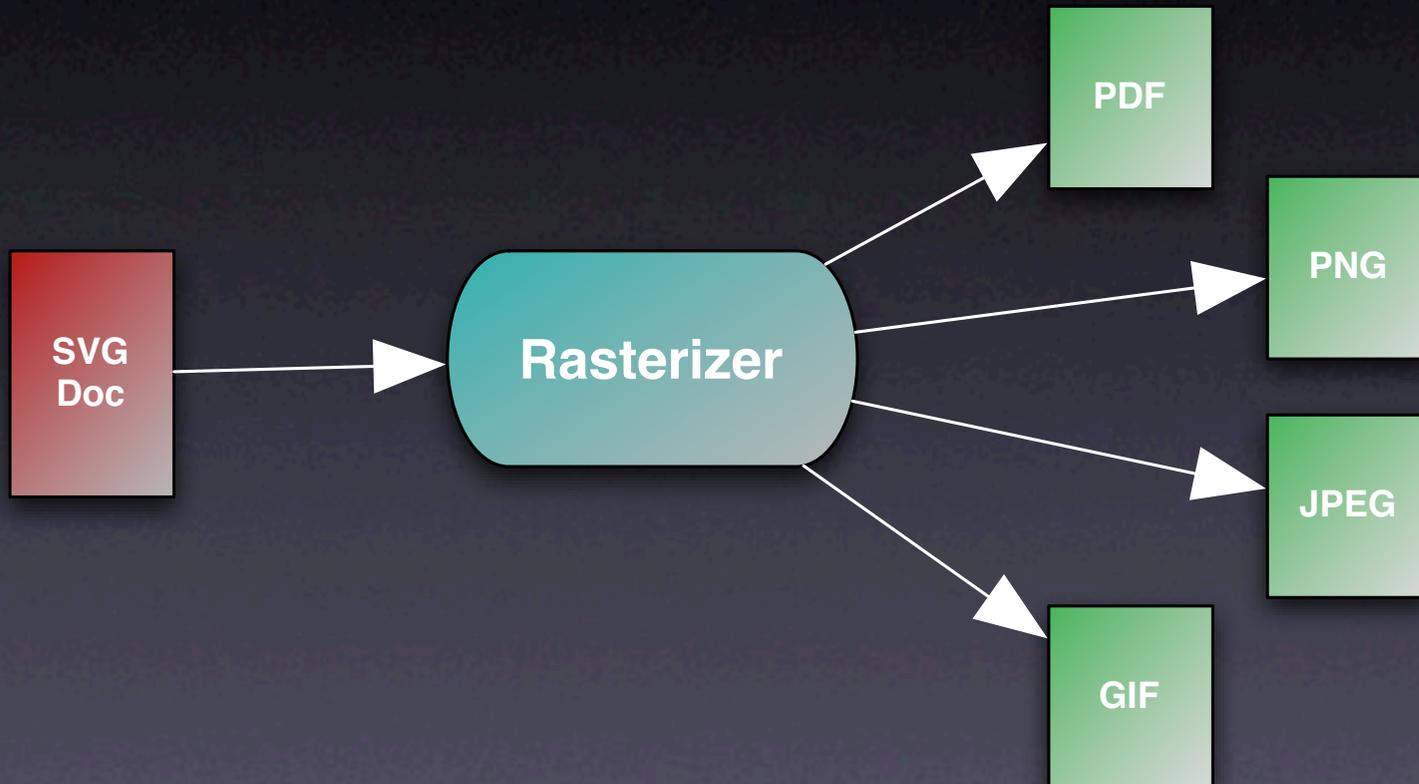
## Low Level (internal API)



# Squiggle SVG Browser

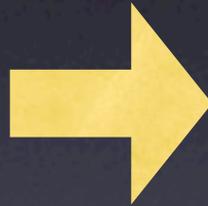


# Rasterizer



# Pretty Printer

```
Emacs@rowan3
[?]xml version="1.0" encoding="UTF-8"?>
<svg viewBox="0 0 4360 3270" height="327pt" width="436pt"><rect style="
fill:silver;" height="3240" width="4320" y="30" x="40"/><rect style="
fill:white; stroke-width:6; stroke:black" height="3234" width="4314" y
="3" x="3"/><g style="fill:#FFFFFF; stroke-width:15; stroke:black"><re
ct height="3160" width="4240" y="40" x="40"/></g><g style="fill:#000080
; font-family:Times New Roman;font-style:italic; font-size:180; text-a
nchor:end;"><text y="256" x="4100" id="Heading">Distribution Functions
</text><text y="456" x="4100">per Package</text></g><g style="fill:#00
8080; font-family:Times New Roman;font-size:100; text-anchor:end; "
transform="translate(190 640) rotate(-90)"><text>Functions</text></g>
<g style="fill:#008000; font-family:Arial;font-size:100;"><text y="1080"
x="2535" id="Notes">Average Functions =
50.81</text><text y="1200" x="2535">Total Packages =
516</text><text y="1320" x="2535">Total Functions =
26218</text></g><text style="fill:#008080; font-family:Times New
Roman;font-size:100; text-anchor:end; " y="3110" x="4100">Packages</te
xt><g style="font-family:Times New Roman;font-size:80; text-anchor:mid
dle;"><text y="2970" x="464"> 0%</text><text y="2970" x="814">10%</text>
<text y="2970" x="1164">20%</text><text y="2970" x="1514">30%</text>
<text y="2970" x="1864">40%</text><text y="2970" x="2214">50%</text><
text y="2970" x="2564">60%</text><text y="2970" x="2914">70%</text><
text y="2970" x="3264">80%</text><text y="2970" x="3614">90%</text><text
y="2970" x="3964">100%</text></g><path d="M 464,2842 L 464,2881 z M 81
4,2842 L 814,2881 z M 1164,2842 L 1164,2881 z M 1514,2842 L 1514,2881
z M 1864,2842 L 1864,2881 z M 2214,2842 L 2214,2881 z M 2564,2842 L 25
64,2881 z M 2914,2842 L 2914,2881 z M 3264,2842 L 3264,2881 z M 3614,2
842 L 3614,2881 z M 3964,2842 L 3964,2881 z M 3964,2842 L 464,2842 z"
style="stroke:#000000; stroke-width:6"/><path d="M 464,2842 L 464,300
6 z" style="stroke:#000000; stroke-width:6"/><path d="M 434,2842 L 463,
2842 z" style="stroke:#000000; stroke-width:6"/><g style="font-family:
Times New Roman;font-size:80; text-anchor:end;"><text y="2842" x="424"
>0</text></g><g style="fill:#DBDBED;stroke-width:4; stroke:black"><rec
t height="176" width="1662" y="2642" x="464"/></g><path d="M 434,2622
L 463,2622 z" style="stroke:#000000; stroke-width:6"/><g style="font-fa
mily:Times New Roman;font-size:80; text-anchor:end;"><text y="2622" x
="424">21</text></g><g style="fill:#DBDBED;stroke-width:4; stroke:blac
k"><rect height="176" width="739" y="2422" x="464"/></g><path d="M 434
,2402 L 463,2402 z" style="stroke:#000000; stroke-width:6"/><g style="
font-family:Times New Roman;font-size:80; text-anchor:end;"><text y="2
402" x="424">42</text></g><g style="fill:#DBDBED;stroke-width:4; strok
e:black"><rect height="176" width="393" y="2202" x="464"/></g><path d="
M 434,2182 L 463,2182 z" style="stroke:#000000; stroke-width:6"/><g
style="font-family:Times New Roman;font-size:80; text-anchor:end;"><text
y="2182" x="424">63</text></g><g style="fill:#DBDBED;stroke-width:4;
-u: *-Emacs cfp.svg Top L1 (XML)-----
```



```
Emacs@rowan3
[?]xml version="1.0" encoding="UTF-8"?>
<svg viewBox="0 0 4360 3270" height="327pt" width="436pt">
<rect style="fill:silver;" height="3240" width="4320" y="30" x="40"
/>
<rect style="fill:white; stroke-width:6; stroke:black" height="323
4"
width="4314" y="3" x="3"/>
<g style="fill:#FFFFFF; stroke-width:15; stroke:black">
<rect height="3160" width="4240" y="40" x="40"/>
</g>
<g style="fill:#000080; font-family:Times New Roman;font-style:ita
lic; font-size:180; text-anchor:end;">
<text y="256" x="4100" id="Heading">
Distribution Functions
</text>
<text y="456" x="4100">
per Package
</text>
</g>
<g style="fill:#008080; font-family:Times New Roman;font-size:100;
text-anchor:end; "
transform="translate(190 640) rotate(-90)">
<text>
Functions
</text>
</g>
<g style="fill:#008000; font-family:Arial;font-size:100;">
<text y="1080" x="2535" id="Notes">
Average Functions = 50.81
</text>
<text y="1200" x="2535">
Total Packages = 516
</text>
<text y="1320" x="2535">
Total Functions = 26218
</text>
</g>
<text style="fill:#008080; font-family:Times New Roman;font-size:1
00; text-anchor:end;"
y="3110" x="4100">
Packages
</text>
<g style="font-family:Times New Roman;font-size:80; text-anchor:mi
ddle;">
</g>
</svg>
-u: ---Emacs cfp_pp.svg Top L1 (XML)-----
Mark set
```

# Core APIs

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

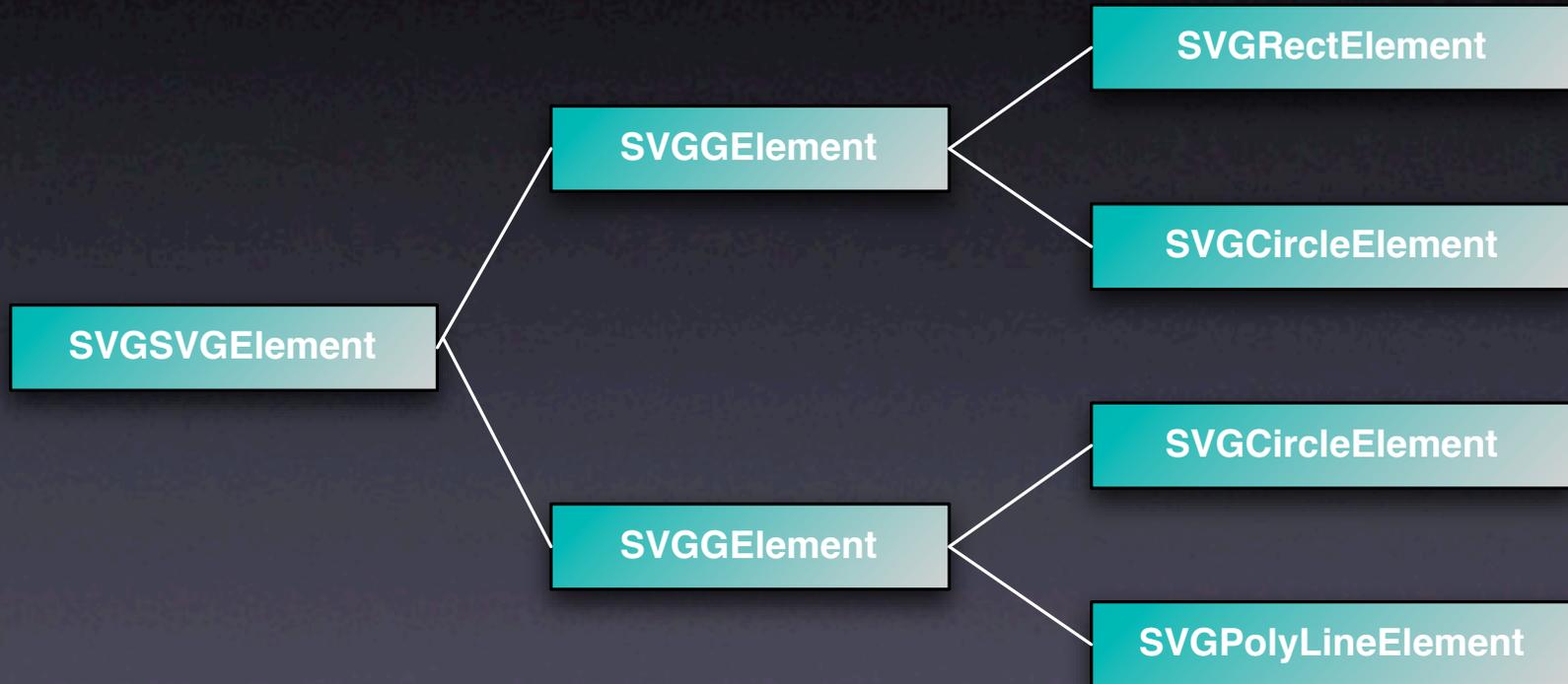
# SVG DOM

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>
```

# SVG DOM

org.w3c.dom.svg



# 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";

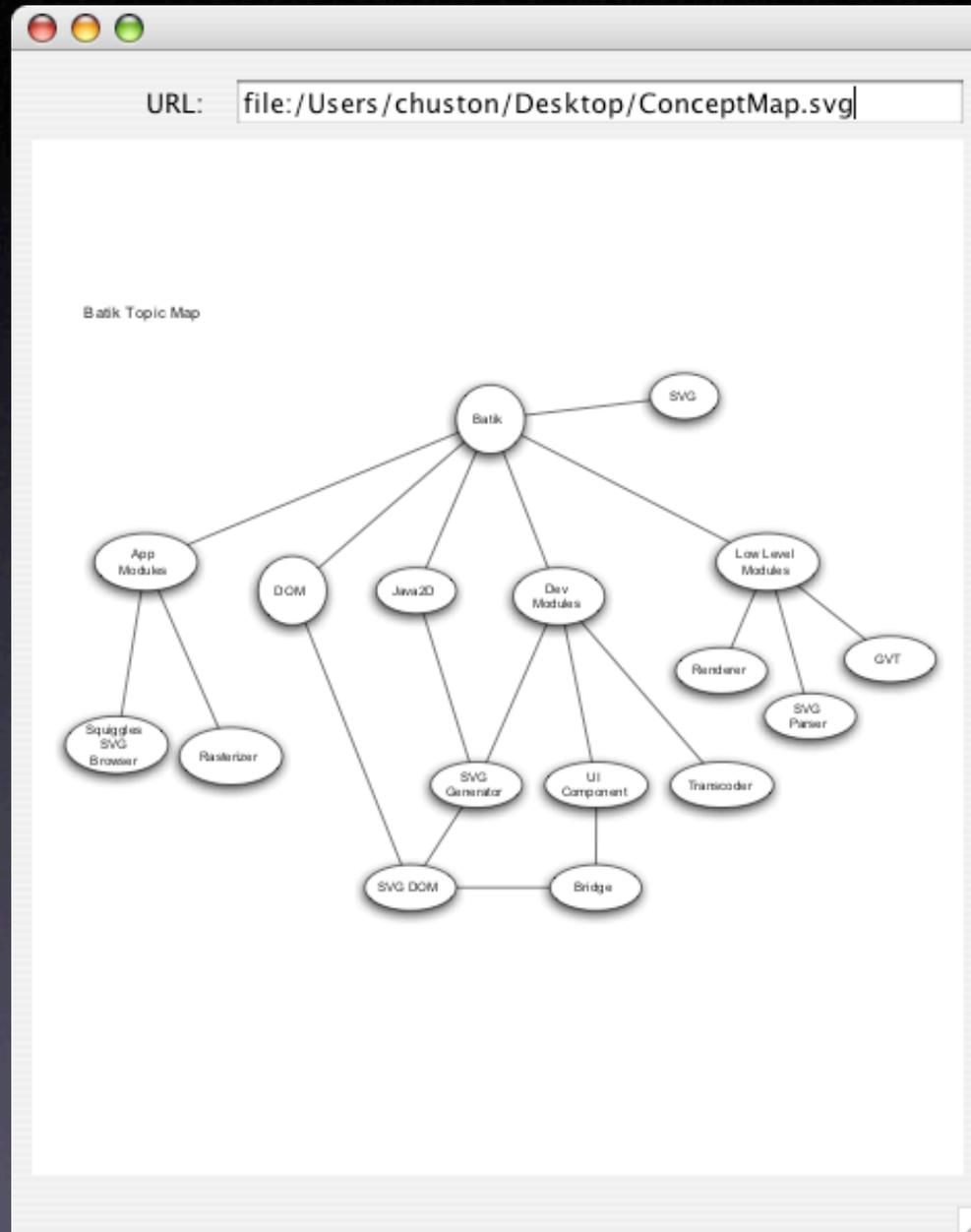
        org.apache.batik.dom.svg.SAXSVGDocumentFactory docFactory =
            new org.apache.batik.dom.svg.SAXSVGDocumentFactory(parserClassName);
        String uri = "file:/Users/chuston/Documents/DJUG/BasicConcepts" +
            "/Batik_Presentation/svg_trymes/dom_rects.svg";
        org.w3c.dom.svg.SVGDocument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

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

# JSVCanvas

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

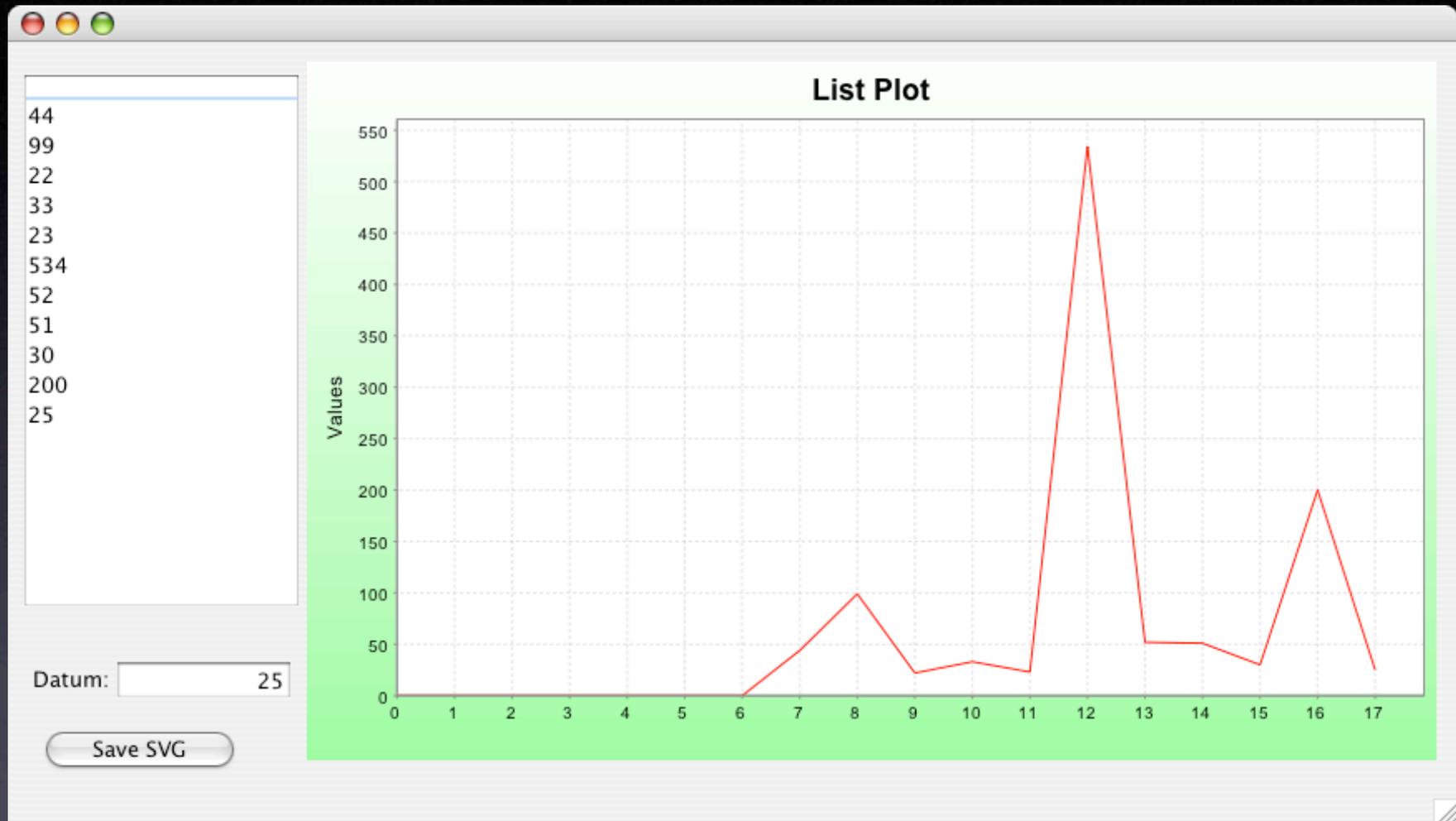
# Bean Builder Demo



# 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?

# SVG Resources



**SVG Essentials**  
*David Eisenberg*  
O'Reilly

**W3C SVG Site**  
[www.w3.org/Graphics/SVG](http://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/>

# Batik Resources

Apache

<http://xml.apache.org/Batik>

... and, uh, Apache

Questions?