Dynamic SVG for Wikimedia projects:
Exploring applications, techniques and best practice for interactive and animated vector graphics
## Techniques

<table>
<thead>
<tr>
<th>Technology</th>
<th>Power</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>JavaScript/ECMAScript</td>
<td>▪ Almost limitless</td>
<td>Barred for Wikimedia</td>
</tr>
<tr>
<td>Cascading Style Sheets (CSS)</td>
<td>▪ Hover effects</td>
<td>Most modern browsers</td>
</tr>
<tr>
<td></td>
<td>▪ Animation</td>
<td>Not in Internet Explorer</td>
</tr>
<tr>
<td>Synchronized Multimedia Integration Language (SMIL)</td>
<td>▪ Hover &amp; click effects</td>
<td>Not in Internet Explorer</td>
</tr>
<tr>
<td></td>
<td>▪ Animation</td>
<td></td>
</tr>
</tbody>
</table>

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#Animation

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Animation

1. Has much smaller file size
2. Can be enlarged without getting blocky
3. Allows interaction besides pause and seek
## Tooltips

Using custom cursors to show number of units on hover

<table>
<thead>
<tr>
<th>Technique</th>
<th>Power</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title tag</td>
<td><em>Text (multiline not in IE)</em></td>
<td>Most modern browsers</td>
</tr>
<tr>
<td></td>
<td><em>Follows cursor</em></td>
<td></td>
</tr>
<tr>
<td>Anchor link</td>
<td><em>Text</em></td>
<td>Most modern browsers</td>
</tr>
<tr>
<td></td>
<td><em>Ugly</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Fixed position</em></td>
<td></td>
</tr>
<tr>
<td>Embedded custom cursor</td>
<td><em>Image</em></td>
<td>Not in IE</td>
</tr>
<tr>
<td></td>
<td><em>Follows cursor</em></td>
<td></td>
</tr>
<tr>
<td>CSS hover selector</td>
<td><em>Any SVG</em></td>
<td>Most modern browsers</td>
</tr>
<tr>
<td></td>
<td><em>Fixed position</em></td>
<td></td>
</tr>
</tbody>
</table>

Using titles and anchor links to show digits' decimal place (position) on hover
Hyperlinks

- Supported on most browsers
- Specify target to load in a new tab/window
Progressive disclosure

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<thead>
<tr>
<th>Technique</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CSS hover selector</td>
<td>■ React to hover</td>
<td>Most modern browsers</td>
</tr>
<tr>
<td>SMIL click event</td>
<td>■ React to click</td>
<td>Not in IE</td>
</tr>
<tr>
<td></td>
<td>■ Grouping has limitations</td>
<td></td>
</tr>
</tbody>
</table>

Interactive plot with groups of selectable objects

Selectable objects using SMIL

#Applications

Applications

Interactive timelines

- Show change to a system over time
- Add triggers (including invisible ones) to change element appearance
- CSS for hover effects
- SMIL for click effects

Hover over the legend (CSS)

Hover over or click buttons on the timeline (SMIL + CSS)

#Simple 3D viewer
Simple 3D viewer

- A large composite of multiple frames tracks the mouse pointer (SMIL)
- Pointer position controls pseudo-3D rotation angle (SMIL)
- As above, but change viewpoint instead of time
- JavaScript, Flash or plug-ins not needed, but angles are limited and resolution is low for file size
- Good for real photographs as number of angles is naturally limited

#GIF animation to SVG converter
**GIF animation to SVG converter**

- Converts a GIF animation into an interactive timeline/simple 3D view
- Command-line Python 2 script using ImageMagick, tested on Ubuntu and Win 7
- Usage

```python
import re, json
import subprocess, sys

def system(command, is_verbosw=False):
    if (is_verbosw): sys.stdout.write(command)  # write omits newline
```

- Uses CSS (no SMIL) so works in most modern browsers

Source code:

```python
#!/usr/bin/env python
import re, json
    # http://stackoverflow.com/questions/3503879
import subprocess, sys

def system(command, is_verbosw=False):
    if (is_verbosw): sys.stdout.write(command)  # write omits newline
```

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Best practice

- Degrade gracefully on less well-endowed browsers e.g.
  - Fall back on CSS hover effects if SMIL click effects unsupported
  - Check tooltips read fine if newlines are replaced with spaces
- Touchscreens have no hover; click includes hover
  - To maintain click effect, hyperlink an icon
- Check thumbnail is OK
- Add link to SVG file in caption

Comparison of the side elevations of some notable bridges at the same scale — in the SVG image, hover over or click a silhouette to highlight it

#Cheers
Cheers

Demonstration of motion along a path and simulation of 3D using SMIL

The 21 game with AI using SMIL

Thank you!

Any questions?

Wanna collaborate?

[[en:user:cmglee]]

A simple action game using SMIL

Novel application of CSS timeline