



Scalable Vector Graphics (SVG)



- **Jazyk** pro 2D vektorovou grafiku
- Založen na jazyce XML
- W3C recommendation
- Určen zejména pro oblast WWW
- Nachází uplatnění i v digitální kartografii



- Grafické objekty
- Symboly
- Efekty s rastrovým obrazem
- Fonty
- Animace



- Shapes, text
 - fill, stroke
 - solid color, gradients, patterns
- Raster
- Filtrace
- Maskování – clip, opacity



- Element svg
- Element g
- Elementy rect, path, ...
- Element image
- Dědičnost
- ...



- Element switch
- External resources
- Element g
- Elementy rect, path, ...
- Element image
- Dědičnost
- ...



- Část je sdílena s CSS 2
- SVG jako výměnný formát
- SVG jako výstup z XSLT
- SVG opatřené stylem z CSS 2



```
<?xml version="1.0"
  standalone="no"?>
<svg width="10cm" height="5cm"
  xmlns="http://www.w3.org/2000/svg">
  <rect x="2cm" y="1cm" width="6cm"
  height="3cm" />
</svg>
```


SVG - XSLT



```
<?xml version="1.0" standalone="no"?>
<xsl:stylesheet version="1.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
  xmlns:svg="http://www.w3.org/2000/svg">
  <xsl:output
    method="xml"
    encoding="utf-8"
    doctype-public="-//W3C//DTD SVG 1.1//EN"
    doctype-system="http://www.w3.org/Graphics/SVG/1.1/DTD/svg11.dtd"/>
  <!-- Add version to topmost 'svg' element -->
  <xsl:template match="/svg:svg">
    <xsl:copy>
      <xsl:copy-of select="@*" />
      <xsl:attribute name="version">1.1</xsl:attribute>
      <xsl:apply-templates />
    </xsl:copy>
  </xsl:template>
  <!-- Add styling to all 'rect' elements -->
  <xsl:template match="svg:rect">
    <xsl:copy>
      <xsl:copy-of select="@*" />
      <xsl:attribute name="fill">red</xsl:attribute>
      <xsl:attribute name="stroke">blue</xsl:attribute>
      <xsl:attribute name="stroke-width">3</xsl:attribute>
    </xsl:copy>
  </xsl:template>
</xsl:stylesheet>
```



```
<xsl:template match="svg:rect">
  <xsl:copy>
    <xsl:copy-of select="@*" />
    <xsl:attribute
name="fill">red</xsl:attribute>
    <xsl:attribute
name="stroke">blue</xsl:attribute>
    <xsl:attribute name="stroke-
width">3</xsl:attribute>
  </xsl:copy>
</xsl:template>
```

SVG - XSLT



```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD
SVG 1.1//EN"
"http://www.w3.org/Graphics/SVG/1.1
/DTD/svg11.dtd">
<svg width="10cm" height="5cm"
version="1.1"
xmlns="http://www.w3.org/2000/svg">
  <rect x="2cm" y="1cm" width="6cm"
height="3cm" fill="red"
stroke="blue" stroke-width="3"/>
</svg>
```



```
rect {  
  fill: red;  
  stroke: blue;  
  stroke-width: 3  
}
```



```
<?xml version="1.0" standalone="no"?>
<?xml-stylesheet href="mystyle.css"
  type="text/css"?>
<!DOCTYPE svg PUBLIC "-//W3C//DTD SVG
  1.1//EN"
  "http://www.w3.org/Graphics/SVG/1.1/DTD/
  svg11.dtd">
<svg width="10cm" height="5cm" viewBox="0
  0 1000 500"
  xmlns="http://www.w3.org/2000/svg"
  version="1.1">
  <rect x="200" y="100" width="600"
  height="300"/>
</svg>
```



- width, height
- viewBox (<min-x>, <min-y>, <width>, <height>)
- preserveAspectRatio

```
<svg width="453px" height="300px"  
viewBox="-5616 0 11039 11029"
```

SVG – Prostorové referenční systémy



- Interoperabilita
- Element metadata
 - reference na dokument
 - well-known identifier
 - úplně v dokumentu

SVG – Prostorové referenční systémy



```
<metadata>
  <rdf:RDF xmlns:rdf =
    "http://www.w3.org/1999/02/22-rdf-
    syntax-ns#"
    xmlns:crs = "http://www.ogc.org/crs"
    xmlns:svg="http://www.w3.org/2000/svg">
    <rdf:Description>
      <crs:CoordinateReferenceSystem
        svg:transform="rotate(-90)"
        rdf:resource=""http://www.example.org/sr
        s/epsg.xml#4326"/>
      </rdf:Description>
    </rdf:RDF>
</metadata>
```


SVG – Prostorové referenční systémy



```
<metadata>
  <rdf: ...>
    <rdf:Description>
      <crs:CoordinateReferenceSystem
svg:transform="rotate(-90) scale(100,
100)">
      <crs:Identifier>
        <crs:code>4326</crs:code>
        <crs:codeSpace>EPSG</crs:codeSpace>
        <crs:edition>5.2</crs:edition>
      </crs:Identifier>
    </crs:CoordinateReferenceSystem>
  </rdf:Description>
</rdf:RDF>
</metadata>
```



- Cesty – mohou být vyplněny
- Polylinie, Eliptická, Beziérova, ...
- Zápis pomocí předpisu
- Prvky obecného předpisu
 - move to (M), line-to (L), close (z)

```
<path d="M 100 100 L 300 100 L 200 300 z"  
      fill="red" stroke="blue" stroke-  
width="3" />
```

SVG – Základní tvary



- rect, circle, ellipse, line, polyline, polygon



- Xlink

```
<a xlink:href="http://www.w3.org">  
  <ellipse cx="2.5" cy="1.5" rx="2"  
  ry="1" fill="red" />  
</a>
```



```
<script type="text/ecmascript"> <![CDATA[  
    function circle_click(evt) {  
        var circle = evt.target;  
        var currentRadius =  
circle.getAttribute("r");  
        if (currentRadius == 100)  
            circle.setAttribute("r",  
currentRadius*2);  
        else  
            circle.setAttribute("r",  
currentRadius*0.5);  
    }  
]]> </script>
```

SVG – Animace



- Elementy
- DOM
- SMIL

SVG – Animace



- Pohyb
- Barva
- Transform

SVG – Podpora



- Mozilla Firefox
- SMIL interpret
- Inkscape
- Corel Draw
- Adobe Illustrator



VML (Vector Markup Language)



- Stejný jako SVG
- Microsoft
- Nebyl nikdy standardizován
- IE



```
<html xmlns:v="urn:schemas-microsoft-  
com:vml">  
<style>v\:*  
  {behavior:url(#default#VML);}</style>  
<v:rect style="width:100px; height:20px"  
  fillcolor="#b3c4fd"></v:rect>  
<v:rect style="width:100px; height:20px"  
  fillcolor="#b3c4fd">  
  <v:textbox><small><center> Obdélník  
  </center></small></v:textbox> </v:rect>
```



SMIL (Synchronised Multimedia Integration
Language)



- layout
 - region, root-layout
- par
 - seq
 - par
 - text, img, audio, video, ref, animation

SMIL – Ukázka



```
<smil>
  <head>
    <layout>
      <root-layout height="350" width="600"
background-color="#ffffcc" title="SMIL
version 1.0 Introduction"/>

      <region id="text_0" width="600"
height="350" top="0" left="0" z-
index="2" />
    </layout>
  </head>
```

SMIL – Ukázka



```
<body>
  <par>
    <seq>
      <text src="smil2.rt" region="text_0"
begin="2.00s" />
      <par>
        <text src="xml2.rt" region="text_0"
/>
        <seq>
          <audio src="label2.rm" begin="11.00s"
end="16.56s" />
        </seq>
      </par>
    </seq>
  </par>

```

...



```
<rect ...>  
  <animate attributeName="width"  
    from="10px" to="100px"  
          begin="0s" dur="10s" />  
  <animate attributeName="height"  
    from="100px" to="10px"  
          begin="0s" dur="10s" />  
</rect>
```


SMIL – Kontrola obsahu



- switch

SMIL – Odkazy



- a, area

SMIL – Odkazy



```
<smil
  xmlns="http://www.w3.org/2001/SMIL20/Lan
  guage">
  <head> <layout>
    <region id="source" height="%50"/>
    <region id="destination" top ="%50"/>
  </layout></head>
  <body>
    <a href="embeddedSMIL.smil"
  target="destination" accesskey="a">
          </a>
  </body>
</smil>
```

SMIL – Synchronizace



- **Elementy**

- **par**

- **seq**

```
<par begin="-10s" dur="20s">
```

```
  
```

```
  
```

```
  
```

```
</par>
```



- **Přechody mezi prvky nebo scénami**



VRML (Virtual Reality Modeling Language), X3D

VRML – Ukázka



```
#VRML V2.0 utf8
Transform {
  children
  Shape {
    appearance Appearance {
      material Material {
        diffuseColor 0 1 0
      }
    }
    geometry Cylinder {
      height 0.1
      radius 0.5
    }
  }
}
```

X3D – Ukázka



```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D
  3.0//EN"
  "http://www.web3d.org/specifications/x3d
  -3.0.dtd">
<X3D profile="Immersive" version="2.0">
  <Scene>
    <Transform>
      <Shape>
        <Appearance>
          <Material diffuseColor="0 1 0"/>
        </Appearance>
        <Cylinder height="0.1" radius="0.5"/>
      </Shape>
    </Transform>
```


Použitá zdroje



- <http://www.w3.org>
- <http://www.web3d.org>
- <http://www.carto.net>