



COMP 4021

Internet Computing

SVG Definitions

(Plus Pattern, Clipping Window and Gradient)

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This Presentation

- There is a 'definitions' area of SVG in which something can be defined (once) and then used in the SVG (as many times as you want)
- These are some of the things you can define:
 - A definition of your own
 - Clipping paths
 - Gradients
 - Filters
 - Patterns

Define an Object (01_bitmap_clip.svg)

- An object is defined once and used several times

```
<defs>  <g id="Cloud">
    <circle cx="24" cy="36" r="15"/>
    <circle cx="41" cy="26" r="17"/>
    <circle cx="90" cy="40" r="13"/>
    <circle cx="105" cy="31" r="13"/>
    <ellipse cx="75" cy="20" rx="27" ry="20"/>
    <ellipse cx="56" cy="50" rx="25" ry="18"/> </g> </defs>
<circle id="Sun" cx="125" cy="140" r="56" style="fill:orange"/>
<use id="SunCloud1" xlink:href="#Cloud" x="20" y="20" />
<use id="SunCloud2" xlink:href="#Cloud" x="0" y="130" />
<use id="SunCloud3" xlink:href="#Cloud" x="150" y="210" />
```



Object Defined on Another Object

(02_double_definition.svg)

```
<defs> <g id="Cloud">
  <circle cx="24" cy="36" r="15"/>
  <circle cx="41" cy="26" r="17"/>
  <circle cx="90" cy="40" r="13"/>
  <circle cx="105" cy="31" r="13"/>
  <ellipse cx="75" cy="20" rx="27" ry="20"/>
  <ellipse cx="56" cy="50" rx="25" ry="18"/> </g>
<g id="SuperCloud">
  <use xlink:href="#Cloud" x="20" y="20" />
  <use xlink:href="#Cloud" x="70" y="10" />
  <use xlink:href="#Cloud" x="0" y="55" />
  <use xlink:href="#Cloud" x="75" y="50" /> </g>
</defs>
```

Cont.. (02_double_definition.svg)

```
<circle id="Sun" cx="125" cy="140" r="56" style="fill:orange"/>
```

```
<use id="SmallCloud1" xlink:href="#Cloud" x="20" y="20" />
```

```
<use id="SmallCloud2" xlink:href="#Cloud" x="0" y="130" />
```

```
<use id="SmallCloud3" xlink:href="#Cloud" x="150" y="210" />
```

```
<use id="BigCloud1"
```

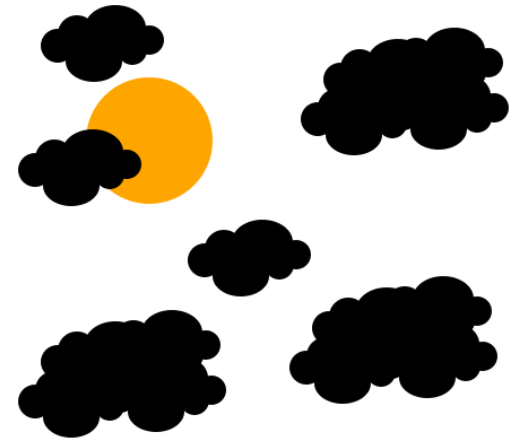
```
  xlink:href="#SuperCloud" x="250" y="30" />
```

```
<use id="BigCloud2"
```

```
  xlink:href="#SuperCloud" x="240" y="250" />
```

```
<use id="BigCloud3"
```

```
  xlink:href="#SuperCloud" x="0" y="280" />
```



Bitmap and Clip Path (03_bitmap_clip.svg)

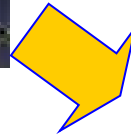
- A clip path is basically a 'window' through which the rest of the SVG can be shown

```
<style type="text/css">
  text { font-family: Arial;
        font-size: 120px;
        font-weight: bold;
        }
  rect { fill: black;
        fill-opacity: 1.0;
        }
</style>
```

```
<defs>
  <clipPath id="some_text">
    <text x="0" y="130">
      Clipping</text>
    <text x="10" y="220">
      Window</text>
    </clipPath>
  </defs>
```

```
<image xlink:href="image.jpg"
       style="clip-path:url(#some_text)"
       width="800" height="400"/>
```

Bitmap and Clip Path (Cont.)



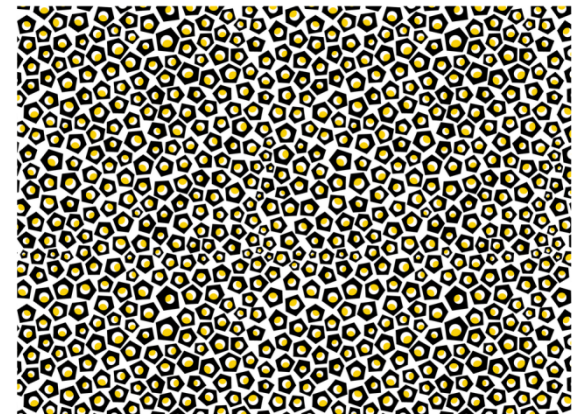
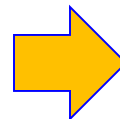
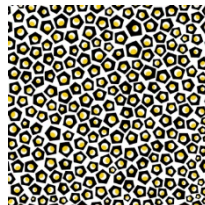
**Clipping
Window**

Patterns (04_pattern.svg)

- A pattern fills an area by repeating an image many times

```
<defs> <pattern id="dotspattern" x="0" y="0"
  patternUnits="userSpaceOnUse" _____ Current user
  width="495px" height="495px"> coordinate system)
  <image xlink:href="dots.png" x="0" y="0"
  width="495px" height="495px"/> </pattern> </defs>
<rect style="fill:url(#dotspattern)"
  width="950" height="700" x="50" y="50" />
```

dots.png

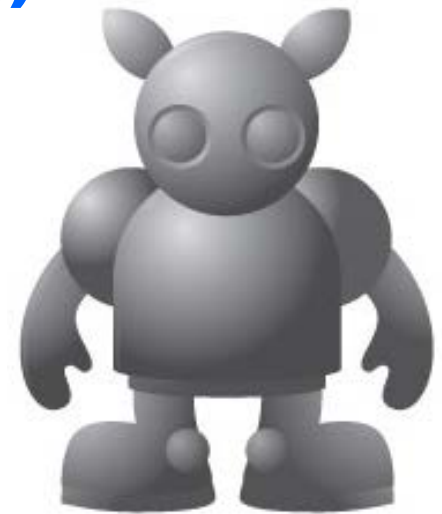


Gradients (05_gradient.svg)

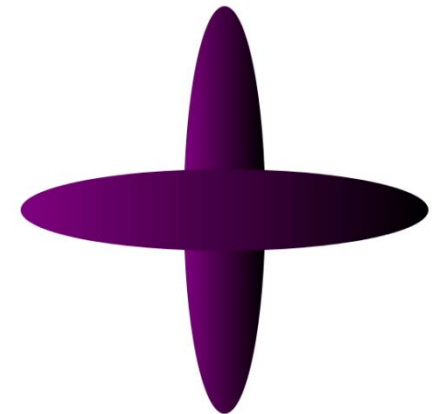
- Gradients can be visually very powerful

```
<defs>  
  <linearGradient id="disc_gradient">  
    <stop offset="0" style="stop-color:purple"/>  
    <stop offset="1" style="stop-color:lilac"/>  
  </linearGradient>  
</defs>
```

```
<ellipse style="fill:url(#disc_gradient)"  
  cx="400" cy="400" rx="50" ry="250" />  
<ellipse style="fill:url(#disc_gradient)"  
  cx="400" cy="400" rx="250" ry="50" />
```



Example creature
made using gradients



Take Home Message

- Graphical editors like Photoshop and Inkscape are used to create SVGs; raw SVGs (except really simple ones) are rarely created by hand now
- SVG is a markup language; we can see that a markup language is not just used for styling pages, but for complex operations as well (like SVG)
- SVG is a W3C standard, so it is often used for storing and transferring graphics