# Encapsulating and Manipulating Component Object Graphics (COGs) using SVG

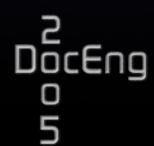
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## Why we use PDF

- Word / Latex don't guarantee portability
- Different versions have different features
- Fonts not embedded
- PDF provides a high quality final form document format

# Why we wish we didn't use PDF

- People want editability
- Editability is hard without document structure
- Finest level of granularity in PDF is the page

#### The COG solution

- Graphical objects are encapsulated as COGs
- Each COG is self contained and can't affect other COGs
- A COG-PDF document contains a sequence of COG definitions and spacers to position them

#### The benefits of COGs

- Increase the granularity of PDF documents
- COGs can be moved, added or removed from documents
- COGs can be programatically manipulated

# Scalable Vector Graphics (SVG)

W3C's XML based vector graphics language

```
<svg width="151" height="21">
    <rect fill="lightblue" width="150" height="20" stroke-width="2"
    stroke="red"/>
    <text y="18" font-family="Arial" font-size="20">Hello World!</text>
    </svg>
```

# Hello World!

### Scalable Vector Graphics (SVG)

- Rendering model similar to Postscript / PDF
- Lots of web-centric features
- Version 1.2 will add support for pagesets

#### SVG vs PDF

- A page in PDF is a single stream of commands
- Being XML based, SVG has a tree structure
- Groups allow for more structure

# Hello World!

- Inherited attributes must be flattened onto group
- Unspecified attributes must be specified on group

- All rendering occurs on the canvas
- Bounds of the viewport define the viewable subset of the canvas
- SVG allows nesting of documents

- "ref" is the inverse of current transformation matrix
- <g> doesn't create a new viewport so can't be used for encapsulation
  - <svg> does create a new viewport

#### SVG COGs

- <defs> is used to store the COG definition
- <use> element can reference another part of the document

#### SVG COGs

```
<svg width="200" height="100">
 <defs>
  <svg width="151" height="21" id="cog1">
 <rect fill="lightblue" width="150" height="20" stroke-width="2"</pre>
 stroke="red"/>
 <text y="18" font-family="Arial" fill="black" font-size="20">Hello World!</
 text>
</svg>
 </defs>
 <use xlink:href="\#cog1" x="10" y="10"/>
 <use xlink:href="#cog1" x="20" y="30" transform="rotate(15)"/>
</svg>
                Hello World!
               Hello World!
```

#### Conclusion

- SVG makes it easier to retain structure, but does not enforce it
- COGs provide a standardised way of encapsulating graphical objects