

# Rich Web Applications – Client Standards

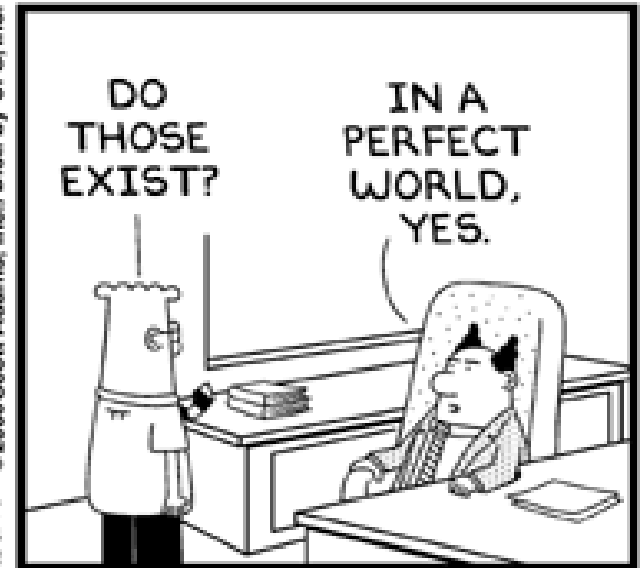
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Kevin E. Kelly  
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Part of the “Web 2.0” picture



# Client Standards in the Real World



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# Agenda

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- Introduction
- W3C Rich Web Activity
- Compound Documents
- WICD
- Issues
- Demo
- The Backplane
- Q&A



# Introduction

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- Work
  - Co-op'ed at IBM
  - US Air Force
  - Automotive Embedded Startup
  - Rational Software
  - Acquired by IBM
- Standards
  - Chair Compound Document Format Working Group, was also in the XForms Working Group
  - Hypertext Coordination Working Group member
  - HL7 Advisory Council Rep to the W3C

A graphic consisting of a vertical black line intersecting a horizontal black line. To the left of the intersection are three overlapping squares: a blue one at the top, a red one on the left, and a yellow one at the bottom.

# W3C Domains

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- Architecture Domain
  - DOM, XML, Internationalization, Web Services, URI
- Technology and Society Domain
  - Patent Policy, Privacy, Semantic Web
- Ubiquitous Web Domain
  - Device Independence, Mobile Web, Multimodal, Voice Browser
- Web Accessibility Initiative
  - Web Accessibility, International Web Accessibility
- **Interaction Domain**
  - Next Slide



# W3C Interaction Domain

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- Graphics Activity
  - SVG
  - WebCGM
- HTML Activity
  - HTML/XHTML
  - Hypertext Coordination Group
- Math Activity
  - Math (MathML)
- Style Activity
  - CSS
- Synchronized Multimedia Activity
  - SyMM (SMIL)
  - Timed Text
- XForms Activity
  - XForms
- **Rich Web Client Activity**
  - Next Slide



# W3C Rich Web Client Activity

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- The mission of the W3C Rich Web Clients Activity is to develop specifications that enable improved client-side experience on the Web, including formats for document-based browsing as well as formats and APIs for application development.
- Web API WG
- Web Application Formats (WAF) WG
- Compound Document Format (CDF) WG



# Web API

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- The W3C Web API Working Group is chartered to develop standard APIs for client-side Web Application development.
- This work will include both documenting existing APIs such as XMLHttpRequest and developing new APIs in order to enable richer Web Applications.
- <http://www.w3.org/2006/webapi/>
- REX, Window API, Clipboard operations, ...



The logo for the WAF WG (Web Application Formats Working Group) features a stylized mountain range in shades of blue and red, with a vertical black line intersecting it. The text "WAF WG" is written in a large, bold, blue sans-serif font to the right of the graphic.

# WAF WG

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- The W3C Web Application Formats Working Group is chartered to develop languages for client-side Web Application development.
- <http://www.w3.org/2006/appformats/>
- Standardize a declarative format for web applications leveraging/reusing some or all of: XUL, XAML, MXML, Laszlo
  - To be combined (compounded) with other formats

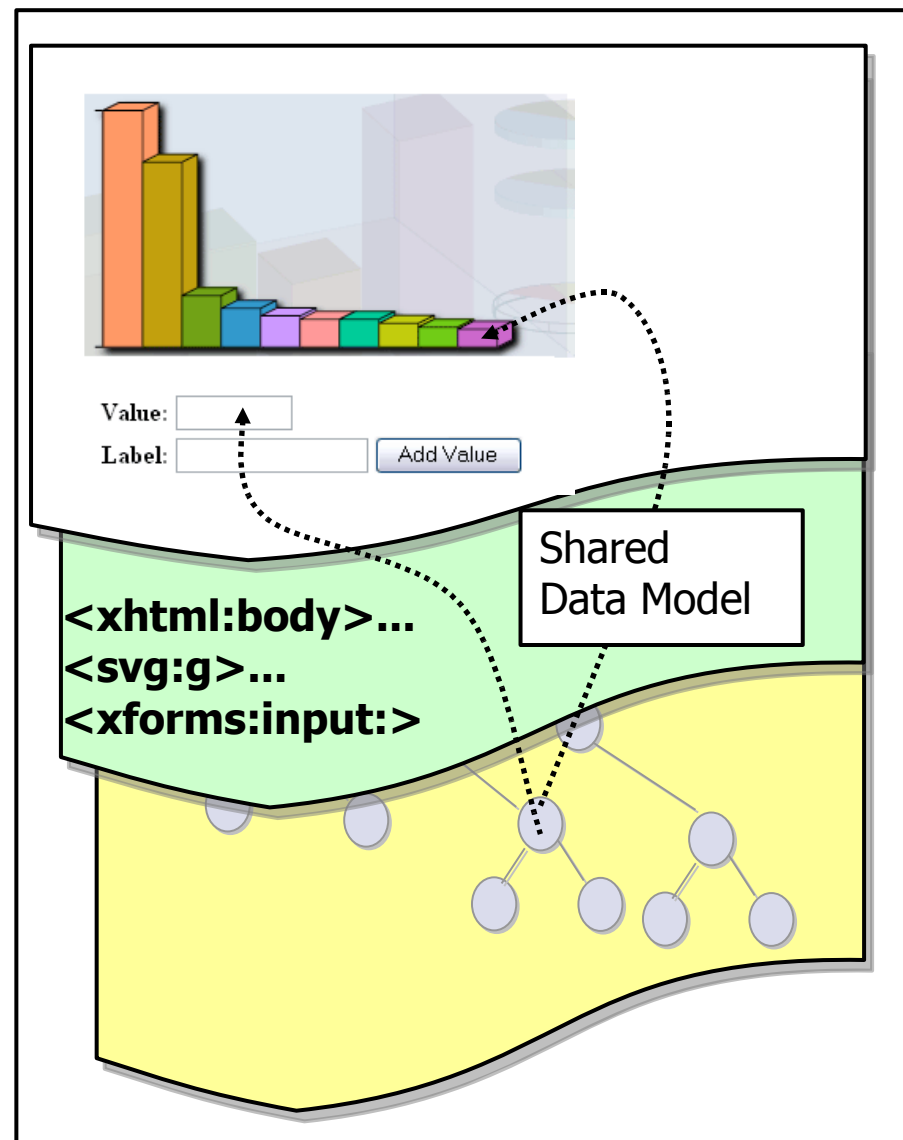
The logo for the Compound Document Formats Working Group (CDF WG) features a stylized graphic of overlapping colored squares (blue, red, yellow) and a black crosshair. To the right of the graphic, the text "CDF WG" is written in a large, bold, blue sans-serif font.

# CDF WG

- The scope of the Compound Document Formats Working Group covers the technologies related to combining existing documents formats, either by reference or by inclusion or both.
  - It is **not** within scope to create a new document format for an specific purpose, where the new format does not consist of a combination of existing W3C formats.
  - It is within scope to create a new document format that combines existing W3C formats to address industry needs.
  - It is also within scope to create new technologies that apply to the possible new complications that arise from combining formats. Furthermore, it is within scope to define solutions for accessing and manipulating the formats developed by this group, using a DOM API through both scripting and compiled programming languages.

# Compound Documents

- Mix multiple XML markup languages within the page
- Declarative programming, rather than procedural programming
- Less script, more markup
- Uses client side tags, not server-based rendering via translation/transform
- Deterministic client output
- DOM ties everything together and supports programmability
- Server-side language/platform neutral





# Compound Documents

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- A Compound Document is a document that combines multiple document formats (namespaces) either by reference, by inclusion, or both.
  - Examples:
    - XHTML + SVG + MathML
    - XHTML + XForms + SVG
    - XHTML + VoiceML



# Who Cares About CDF?

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- Content authors who need to “write once, render many”
  - Ex. mobile content is often reformatted many times for different targets
- Browser/renderer implementors
  - Provide a consistent “markup mashup”
  - Make content profiles the standard
    - Not bugs in a large marketshare implementation
    - Enhance content negotiation



# Who Cares About CDF?

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- Bitflash SVG Tiny Player
  - “The BitFlash Player API provides all the functionality you need to ensure that your application conforms to the WICD specification’s wireless profile.”
- JSR-290 Java™ Language & XML User Interface Markup Integration
  - “This JSR enables creation of Java ME applications which combine Web UI markup technologies with Java code. The intent is to leverage the W3C Compound Document Format (CDF) specification.”



# Compound Document by Reference

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- Compound Document by Reference (CDR) may be composed over several documents in which one document of a particular namespace references another separate document of a different namespace.



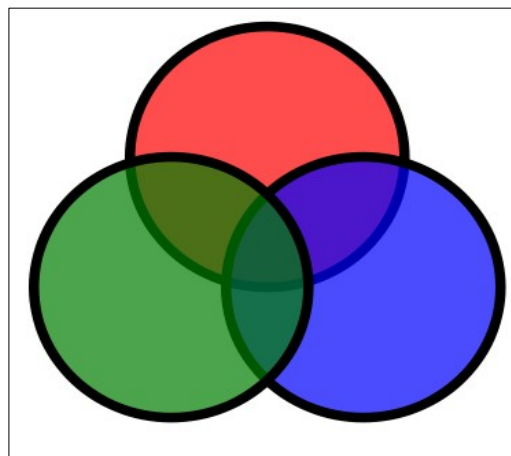
# CDR

circles  
.xhtml

```
<?xml version="1.0"?>
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>circles</title>
  </head>
  <body>
    <object height="350" width="600" type="image/svg+xml" data="circles.svg"/>
  </body>
</html>
```

circles.svg

```
<?xml version="1.0" encoding="UTF-8"?>
<svg xmlns="http://www.w3.org/2000/svg">
  <g fill-opacity="0.7" stroke="black" stroke-width="0.2cm">
    <circle fill="red" cx="6cm" cy="2cm" transform="translate(0,50)" r="100"/>
    <circle fill="blue" cx="6cm" cy="2cm" transform="translate(70,150)" r="100"/>
    <circle fill="green" cx="6cm" cy="2cm" transform="translate(-70,150)" r="100"/>
  </g>
</svg>
```







# Compound Document by Inclusion

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- Compound Documents may be composed of a single document that contains multiple namespaces.



example.xhtml

```
<?xml version="1.0" encoding="iso-8859-1"?>
<xhtml:html xmlns:xhtml="http://www.w3.org/1999/xhtml">
  <xhtml:body>
    <xhtml:h1>A Compound Document</xhtml:h1>
    <xhtml:p>A simple formula using MathML in XHTML.</xhtml:p>
    <mathml:math xmlns:mathml="http://www.w3.org/1998/Math/MathML">
      <mathml:mrow>
        <mathml:msqrt>
          <mathml:mn>49</mathml:mn>
        </mathml:msqrt>
        <mathml:mo>=</mathml:mo>
        <mathml:mn>7</mathml:mn>
      </mathml:mrow>
    </mathml:math>
  </xhtml:body>
</xhtml:html>
```

## A Compound Document

A simple formula using MathML in XHTML.

$$\sqrt{49} = 7$$





- What is WICD?

A Broadway musical



Champaign Illinois ABC affiliate



Web Integration Compound Document  
a device independent Compound Document profile  
based on XHTML, CSS and SVG



The logo consists of a vertical black line intersecting a horizontal black line. To the left of the intersection, there are three overlapping squares: a blue one at the top, a red one in the middle, and a yellow one at the bottom. The text "CD Framework" is written in a large, blue, sans-serif font to the right of the graphic.

# CD Framework

- **Compound Document Framework**
  - CD Framework describes generic rules and behavior for combining sets of standalone XML formats.
  - The Compound Document Framework is language-independent.
    - While it is clearly meant to serve as the basis for integrating W3C's family of XML formats within its Interaction Domain (e.g., CSS, MathML, SMIL, SVG, VoiceXML, XForms, XHTML, XSL) with each other, it can also be used to integrate non-W3C formats with W3C formats or integrate non-W3C formats with other non-W3C formats.

The logo for WICD Core features a stylized graphic of overlapping colored squares (blue, red, yellow) and a black crosshair. To the right of this graphic, the text "WICD Core" is written in a large, bold, blue sans-serif font.

# WICD Core

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- WICD Core 1.0 defines a Web Integration Compound Document (WICD) Core which serves as a foundation for the creation of rich multimedia content profiles and describes rules for combining Extensible Hypertext Markup Language (XHTML), Cascading Style Sheets (CSS), and Scalable Child Element formats, such as Scalable Vector Graphics (SVG) in a non device specific manner.
- WICD Core 1.0 is based on CDR Framework



# WICD Mobile Profile

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- The WICD Mobile 1.0 profile is designed to enable rich multimedia content on mobile handset devices. It may also be appropriate for other handheld devices. However, WICD Mobile addresses the special requirements of mass market, one-hand operation devices and enables publishers to target these type of devices without having to evaluate user agent identification string.
- In this profile, child documents are embedded by reference.
- WICD Mobile 1.0 builds upon WICD Core 1.0.

# WICD Mobile in Action

WICD is getting traction in the mobile space!





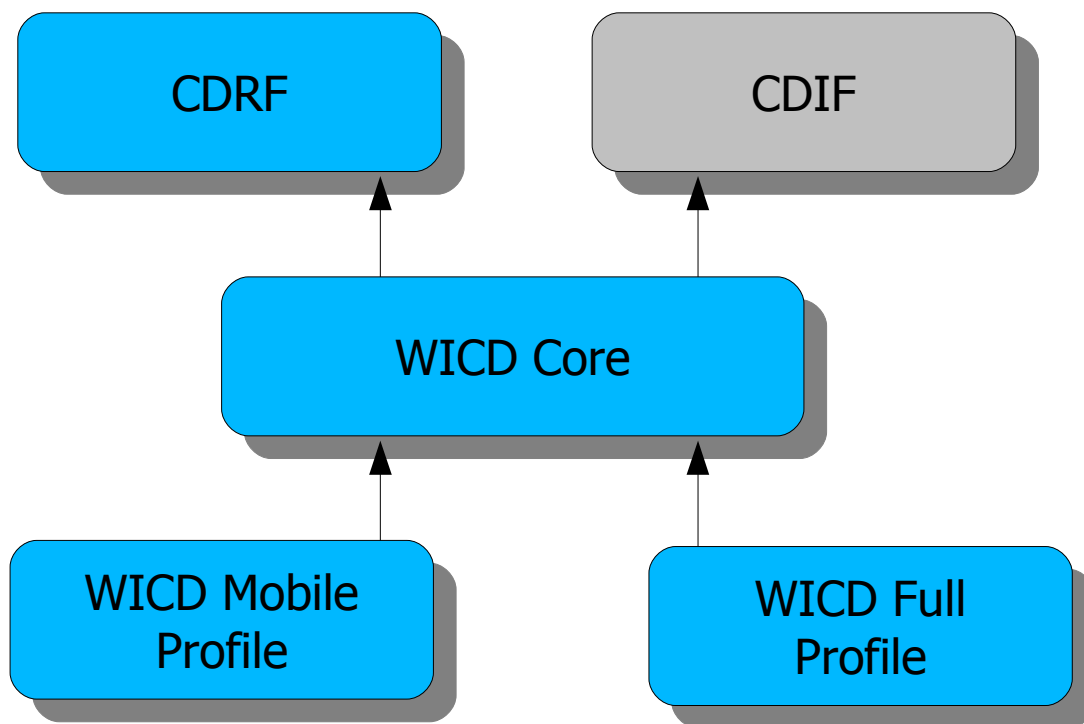
# WICD Full Profile

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- The WICD Full 1.0 profile is designed to enable rich multimedia content on desktop-type agents. It may also be appropriate for high capability handheld devices with a pointing device.
- In this profile, child documents are embedded by reference.
- WICD Full 1.0 builds upon WICD Core 1.0.



# WICD Profile Spec Structure



CdxF: General rules and runtime processing model behavior for combining sets of standalone XML formats.

WICD Core: Specifies device independent, presentation-focused, rules and runtime processing behavior for XHTML, SVG, and CSS.

WICD Mobile: a profile for rich multimedia content for mobile handheld devices using:  
XHTML Basic 1.0, SVG Tiny 1.2,  
CSS MP 1.0, DOM3,  
and ECMAScript 3ED CP.

WICD Full: Profile for rich multimedia content for desktop browsers using:  
XHTML 1.1, SVG Tiny 1.2, CSS 2.1,  
DOM3, and ECMAScript 3Ed

CDRF - Compound Document by Reference Framework  
CDIF - Compound Document by Inclusion Framework  
WICD - Web Integration Compound Document





# WICD Issues

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- What's the big deal?
  - Haven't we all been building these docs forever?
- Document Identification
- Cross document eventing
- Focus navigation across documents



# Document Identification

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- When declaring support for WICD 1.0, a conforming user agent should use an "Accept" header with the value:

```
application/xhtml+xml; profile="http://www.w3.org/2005/12/wicd"
```

```
application/xhtml+xml; profile="http://www.w3.org/2005/12/wicd-mobile"
```



# Cross Document Eventing

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- For CDR, event listeners and script is recommended
  - Does not define any new mechanism
- For CDI, a single DOM model for eventing is used
  - Questions over defining behavior across namespace barriers within a document have not been fully addressed



# Focus Navigation Across Documents

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- In a WICD document, the focusable items, i.e. items which can form part of a focus traversal, are defined by the respective document types being combined.
  - For example, focusable items in an SVG document are defined by the SVG 1.2 focusable attribute
  - WICD addresses two navigation models
    - One Dimensional Focus Navigation (Flat, Hierarchical)
    - Two Dimensional Focus Navigation (Flat, Hierarchical)



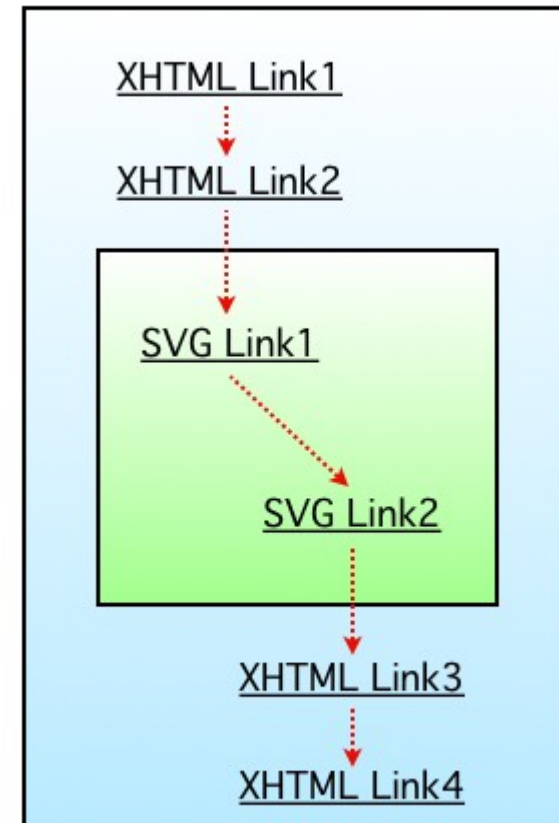
# One and Two Dimension Defined

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- One Dimensional
  - Focus Navigation can be one dimensional (linear focus ring, like a Blackberry scroll wheel).
- Two Dimensional
  - On devices with a multi-directional input device (like a joystick), focus navigation can also be two dimensional (spatial).

# Flat Defined

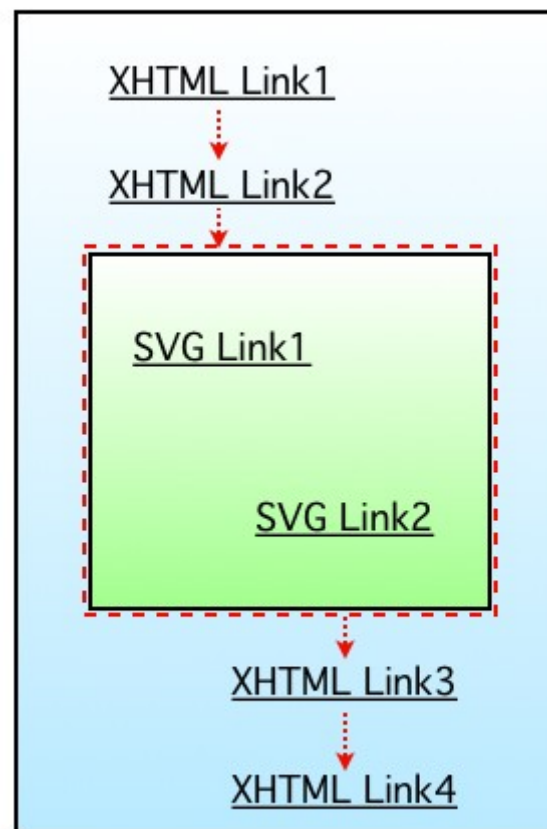
```
<object data="flat.svg" type="image/svg+xml" width="50%">  
  <param name="focusable" value="flat" />  
</object>
```



Flat Focus Handling

# Hierarchical Defined

```
<object data="activateme.svg" type="image/svg+xml" width="50%">  
  <param name="focusable" value="hierarchical" />  
</object>
```



Activatable Focus Handling





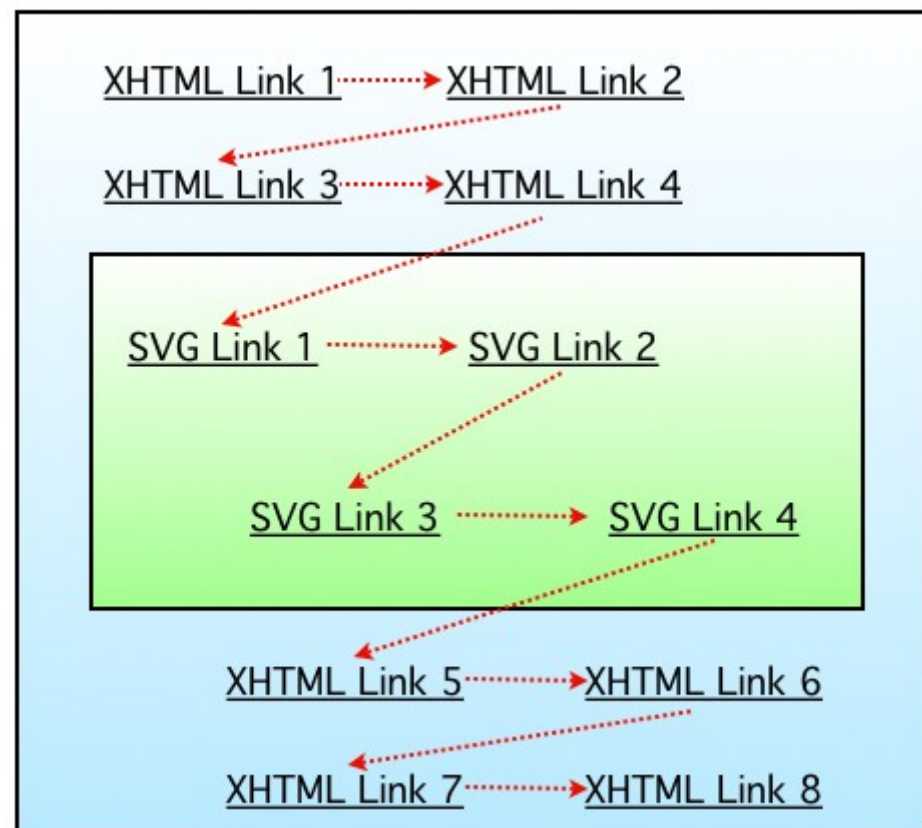
# Flat Focus Ring Navigation

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- XHTML and SVG have methods for **flat**, one dimensional focus traversal.
  - XHTML provides a default traversal order, and allows it to be changed with the use of tabindex attribute within one XHTML document.
  - SVG provides the focusNext and focusPrev elements which may be used to provide similar functionality within an SVG document.
- However, neither of these methods can be used when XHTML and SVG are combined. Therefore in the case of a WICD document by reference, combining XHTML with SVG, some alternate form of navigation is required.

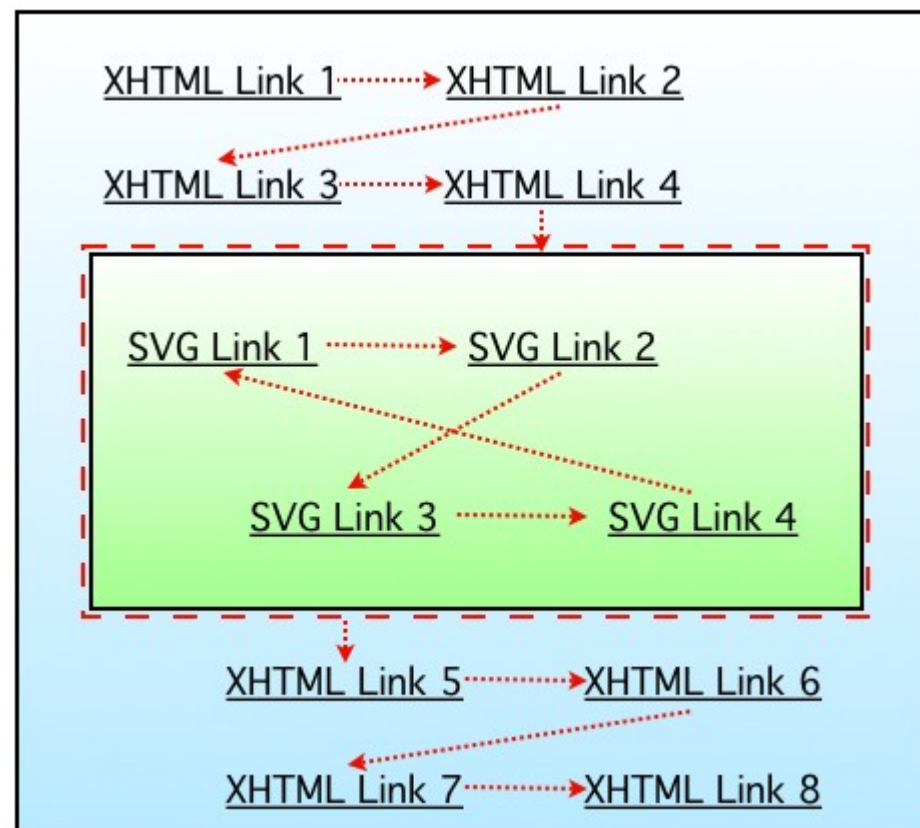
# One Dimensional - Flat

- Desktop agents can use the tab key to navigate over focusable elements.
- Here, all focusable elements of a single Web document are chained in one linear path, based on the order of occurrence in the source document. This creates the so-called focus navigation ring, where advancing over the last focusable element brings the focus back to the first focusable element.



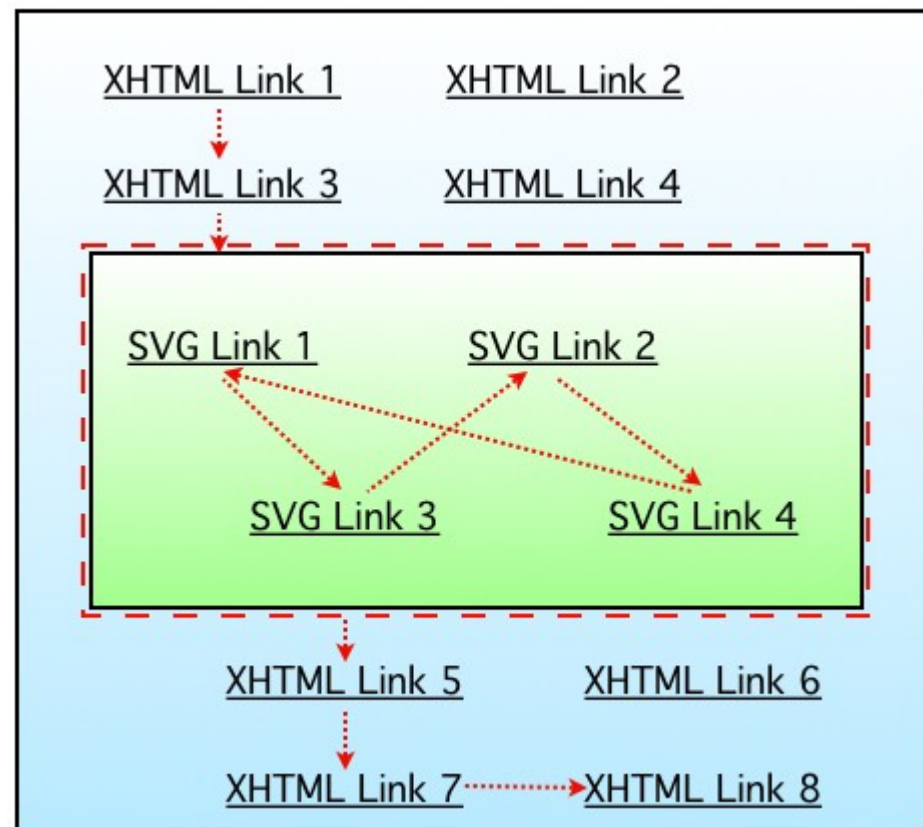
# One Dimensional - Hierarchical

- In this example , the XHTML parent document contains it's own focusable elements, as well as one SVG child element with focusable sub elements. Focus navigation starts from "XHTML Link 1". All focusable elements of the parent XHTML document are included in one, linear focus traversal path.
- The child is made accessible as one single focusable element, initially. It's focusable sub elements are not flattened into the parent document. The child needs to be manually activated by the user, for it's focusable sub elements to become accessible.



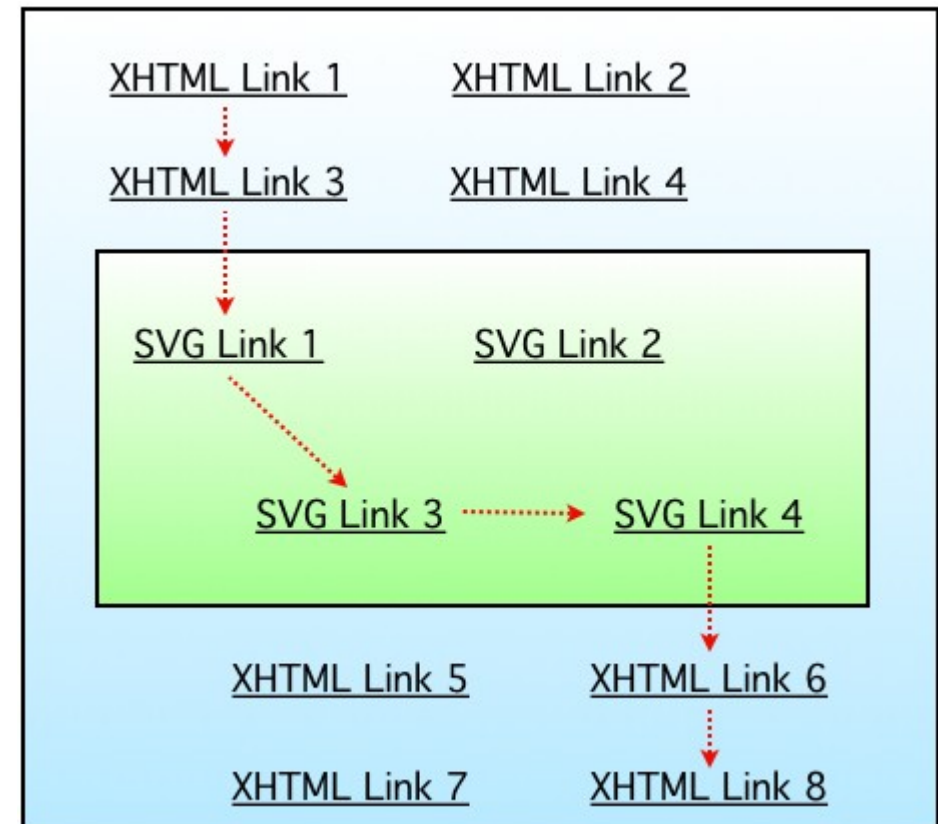
# Two Dimensional - Hierarchical

- In this example, there are multiple ways of navigating through the Compound Document.
- Focus may travel from "XHTML Link 1" to "XHTML Link 3". But it may also travel from "XHTML Link 1" to "XHTML Link 2".
- Focus traversal does not relate to the order of focusable elements in the source documents. Instead, focus traversal relates to the rendered location of neighboring focusable elements.



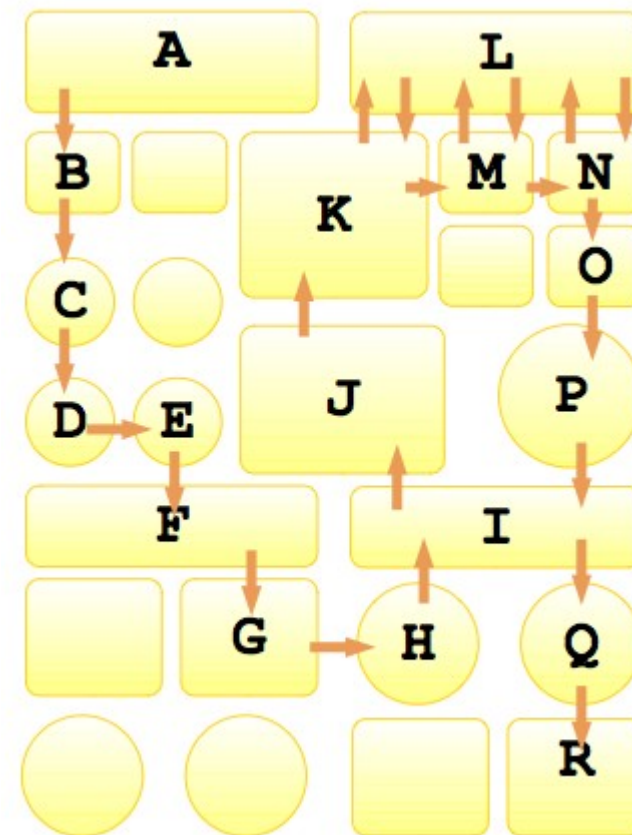
# Two Dimensional - Flat

- Focus can travel freely in any direction and focusable child elements may be flattened into the focus traversal path of the parent.
- A child with flattened elements does not get focused as a whole. It does therefore not need to be activated by the user.



# Current Focus Pointer

- The Current Focus Point Algorithm can be used to implement two dimensional focus traversal. It is given, as an example implementation guideline. It allows for natural traversal over randomly arranged focusable elements in a WICD document, using a multi-direction input device (i.e., joystick).
- Current focus pointers are never made visible.





# CDI Profile Content Authoring

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- How are combined namespace profiles defined?
  - What is needed for content validation and content creation tooling?
    - A definitive schema representation of the profile
- WICD CDI 1.0 (in progress)
  - XHTML, XForms, SVG, and CSS



- Compound Document Toolkit



- Profile association, content assist, validation
  - WICD CDR 1.0 Examples
- Tax Form WICD CDI 1.0 Example





# The “Backplane”

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- Common Data Model other than DOM
- Common submission
- Common process control markup
- Common event-based processing
  
- W3C Backplane Whitepaper
  - <http://www.w3.org/MarkUp/Forms/2006/backplane/>

Now accessible to all!



# CD and the Backplane

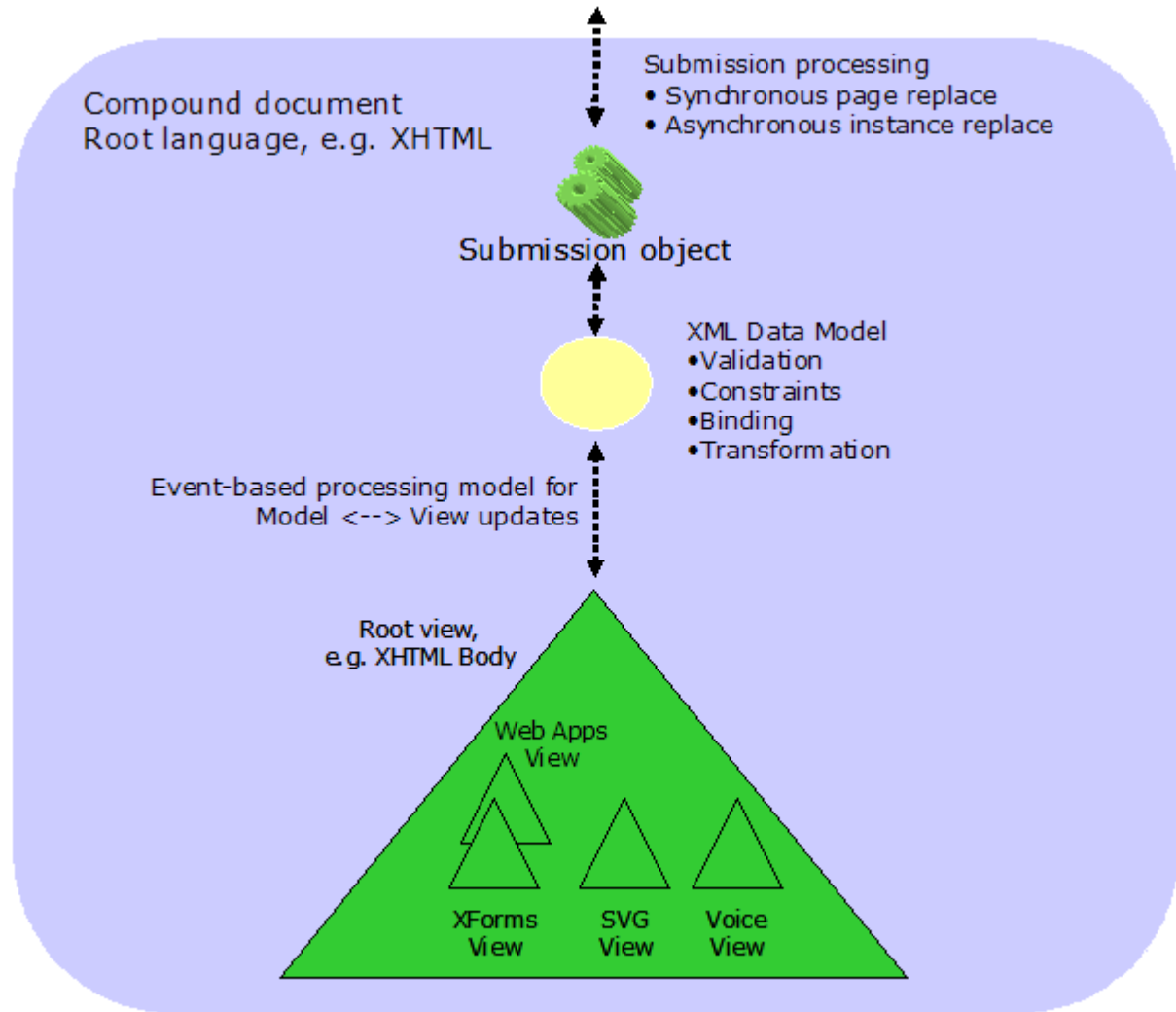


Figure 1: Rich Web Application Backplane





# Summary

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- Compound Document profiles present a viable vehicle for delivering rich web content and is part of the “Web 2.0” picture
  - Combining markups intended to be standalone is problematic and non trivial
- WICD is the first CD profile instantiation
- The Backplane, a common set of building block technologies, may aid in the integration and composition of web applications leveraging W3C formats and APIs



# Resources

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- W3C CDF WG
  - <http://www.w3.org/2004/CDF/>
- Compound Document Toolkit
  - <http://www.alphaworks.ibm.com/tech/cxde>
- Mobile Web Browsing gets WICD
  - <http://www.informit.com/articles/article.asp?p=413465&rl=1>
- Reinventing the Office Suite
  - [http://www.infoworld.com/article/05/09/14/38OPstrategic\\_1.html](http://www.infoworld.com/article/05/09/14/38OPstrategic_1.html)
- Model-driven compound document development :Build compound XML documents in Eclipse
  - <http://www-128.ibm.com/developerworks/library/x-mdcdd/>
- Compound XML document profiles for rich content, Part 1: Exploring extensibility alternatives using XML Schema
  - <http://www-128.ibm.com/developerworks/xml/library/x-cxdp1/>
- Compound XML document profiles for rich content, Part 2: A pattern for developing compound XML document schemas



➤ <http://www-128.ibm.com/developerworks/xml/library/x-cxdp2/>



# Acknowledgements

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- Compound Document Toolkit
  - Steve Speicher, Keith Wells, Jan Kratky



# QUESTIONS



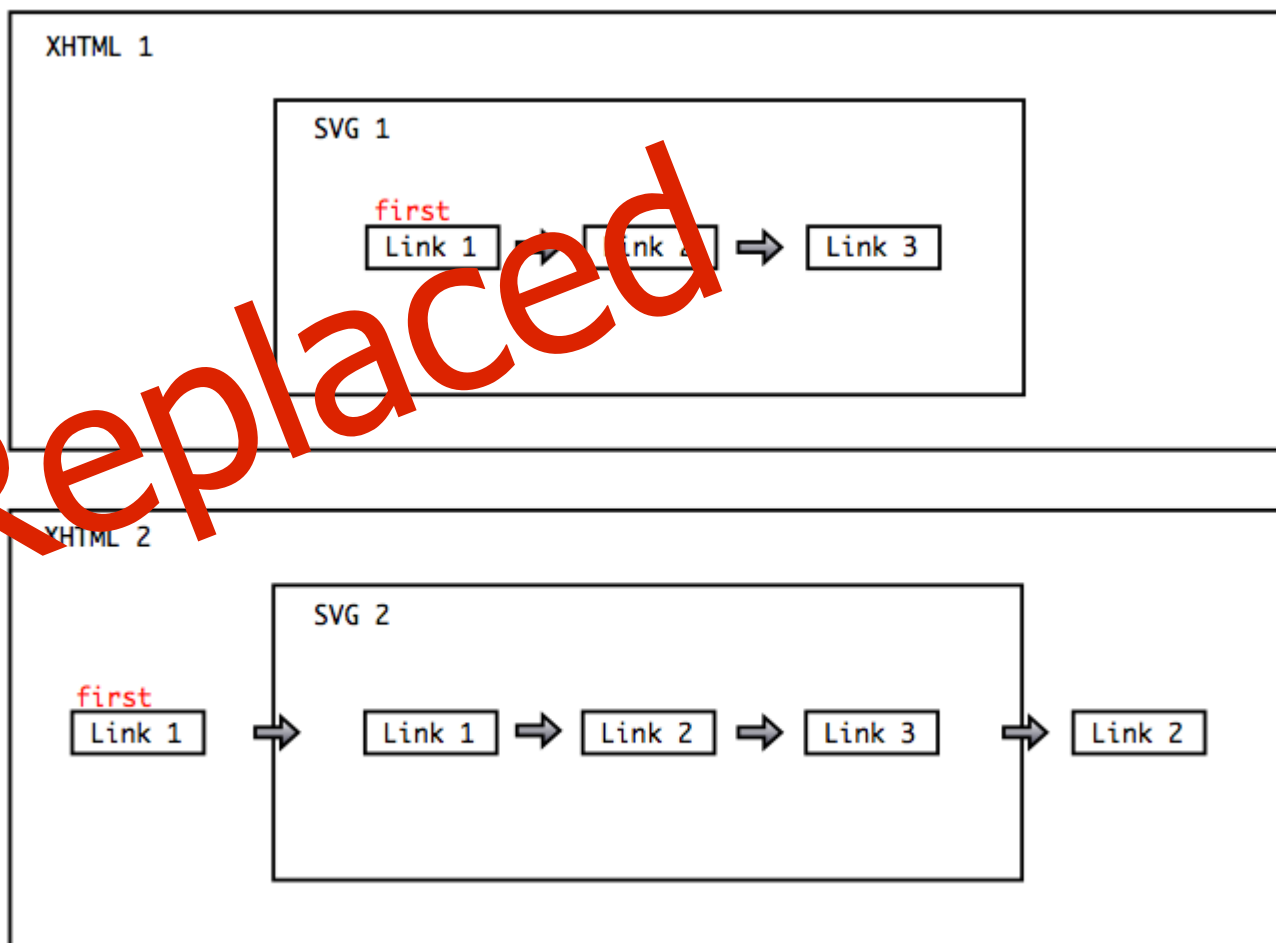


# Thank YOU



# Flat Navigation Model

- Where does focus for navigation begin?

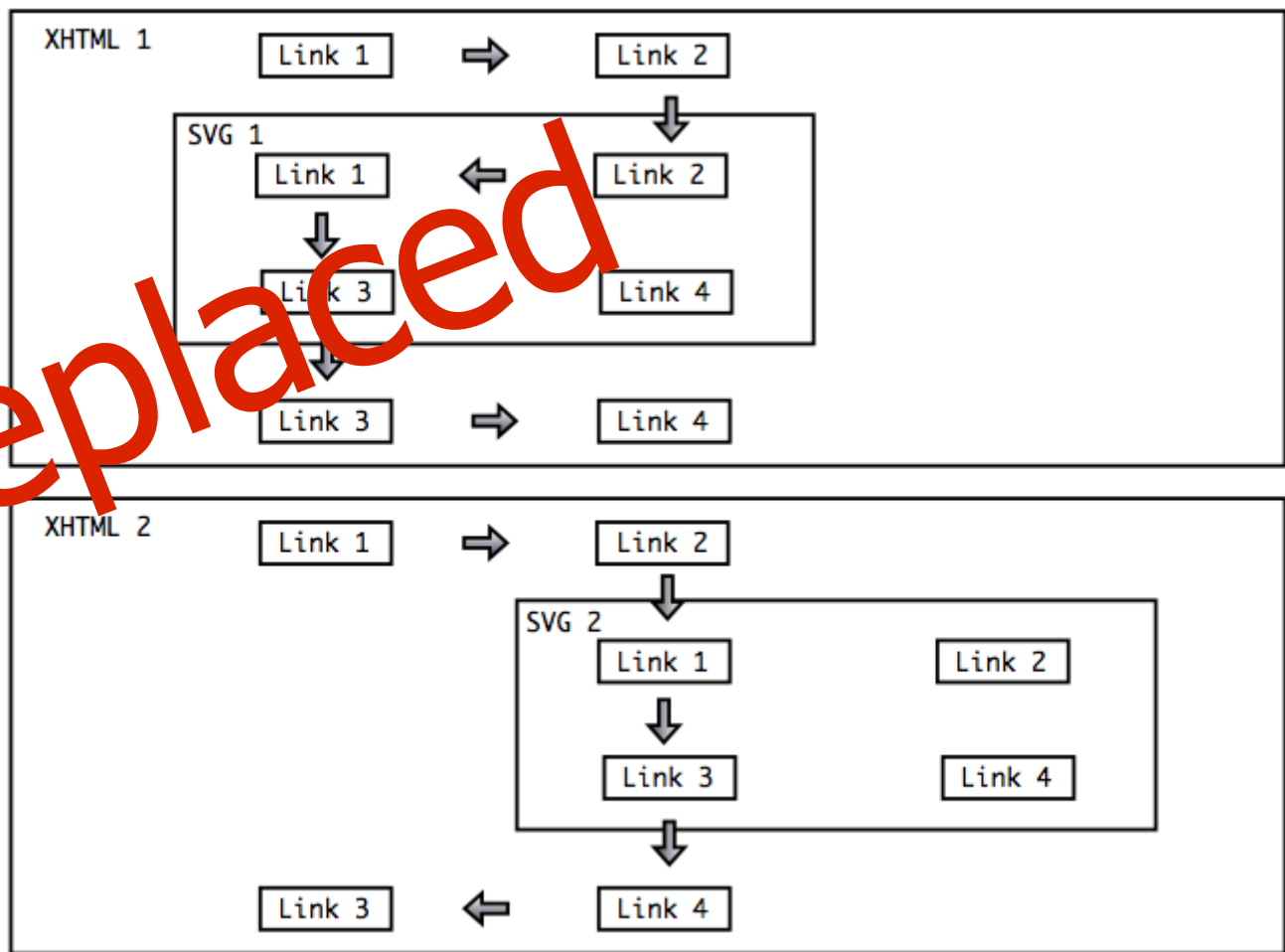






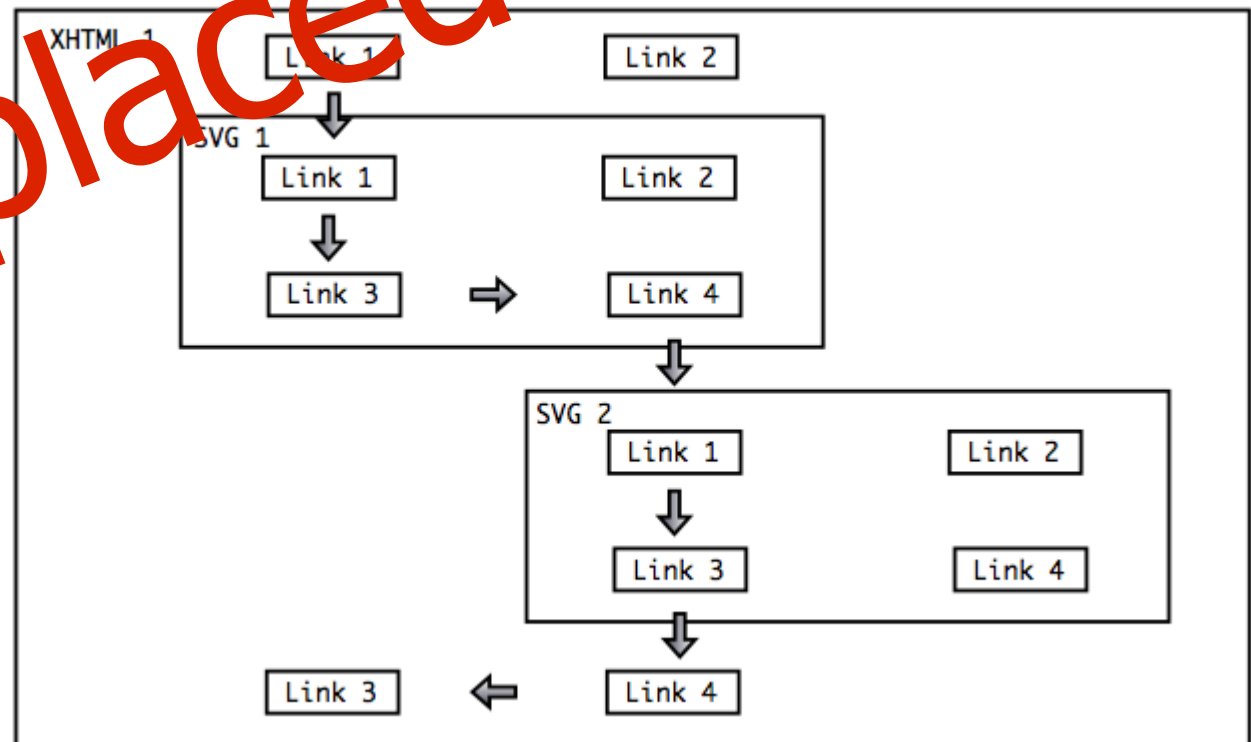
# Flat Navigation Model

- Placement matters.



# Flat Navigation Model

- The issue here is, that Link-4 of SVG-1 is positioned just above Link-1 of SVG-2. Ideally, the agent will allow the user to navigate directly from one child element to the next.



# Flat Navigation Model

- The main idea of the flat graphical focus navigation is the concept of an invisible 'current focus point' inside the page and inside the currently focused element.
  - The concept of the invisible current focus point enables a very natural navigation behavior between focusable elements of different size.

