How WebKit Works

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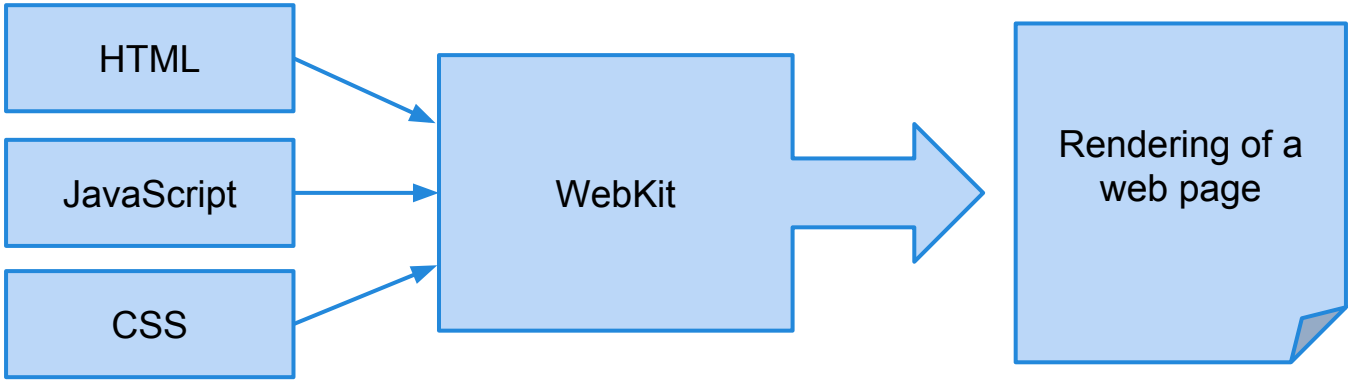
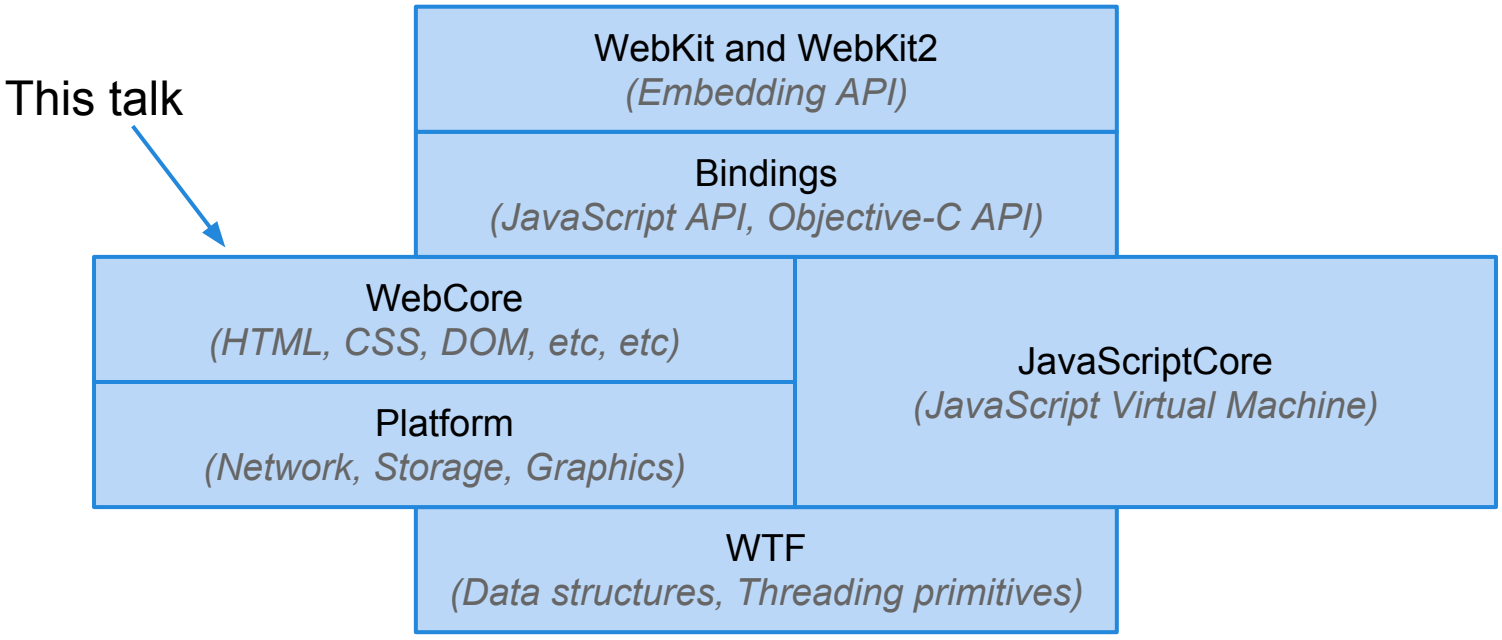
What is WebKit?

WebKit is a rendering engine for web content

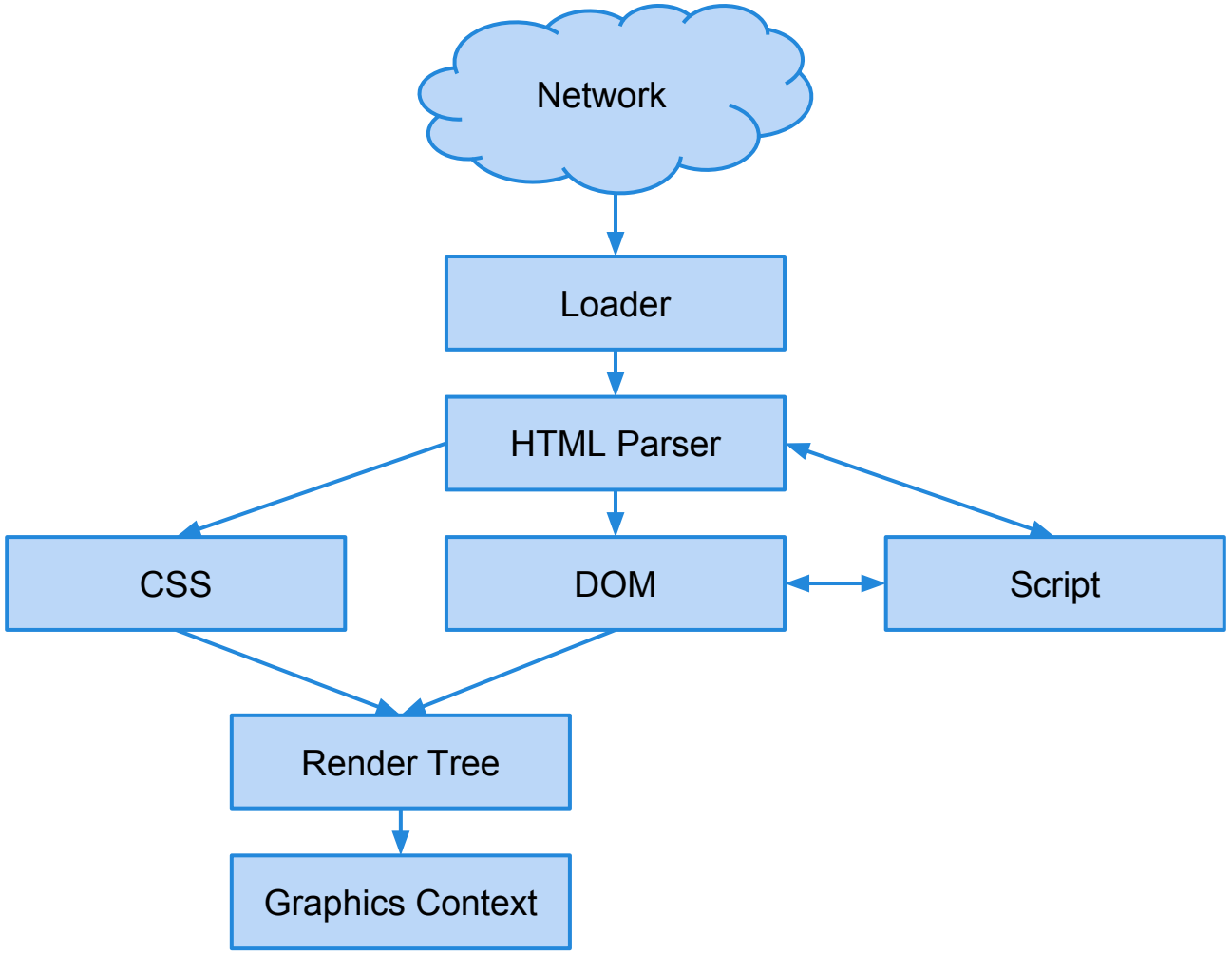


WebKit is not a browser, a science project, or the solution to every problem

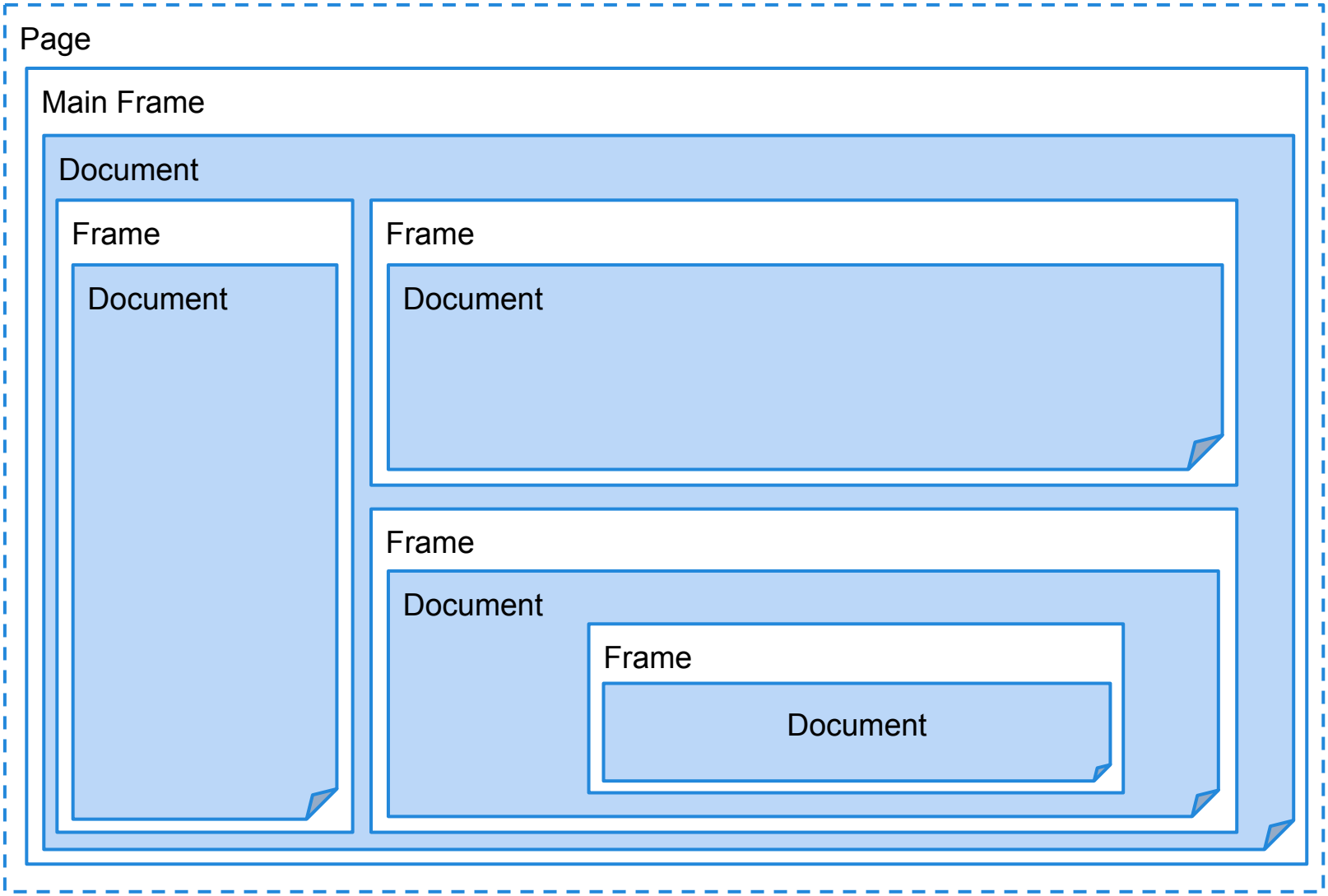
Major Components



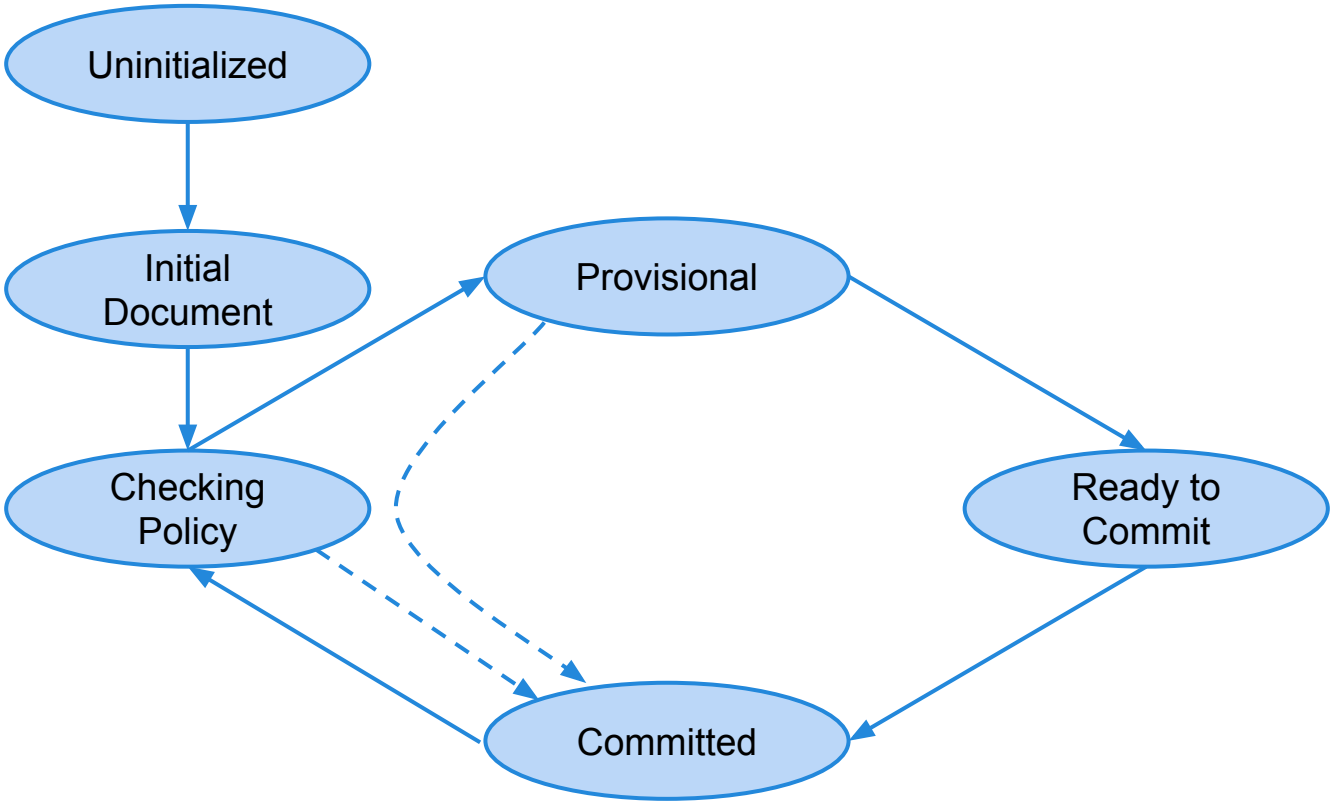
Life of Web Page



Pages, Frames, and Documents

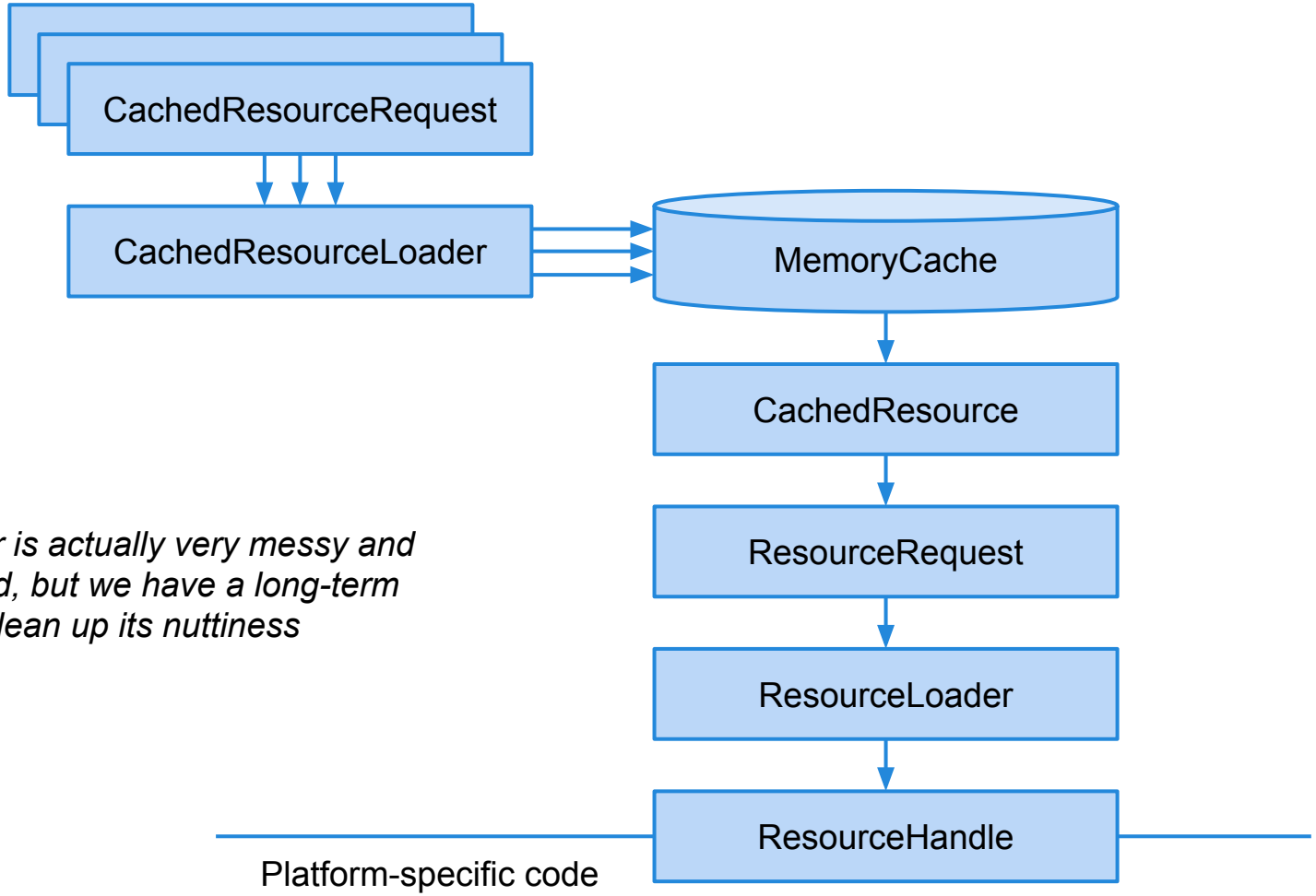


Lifecycle of a Frame



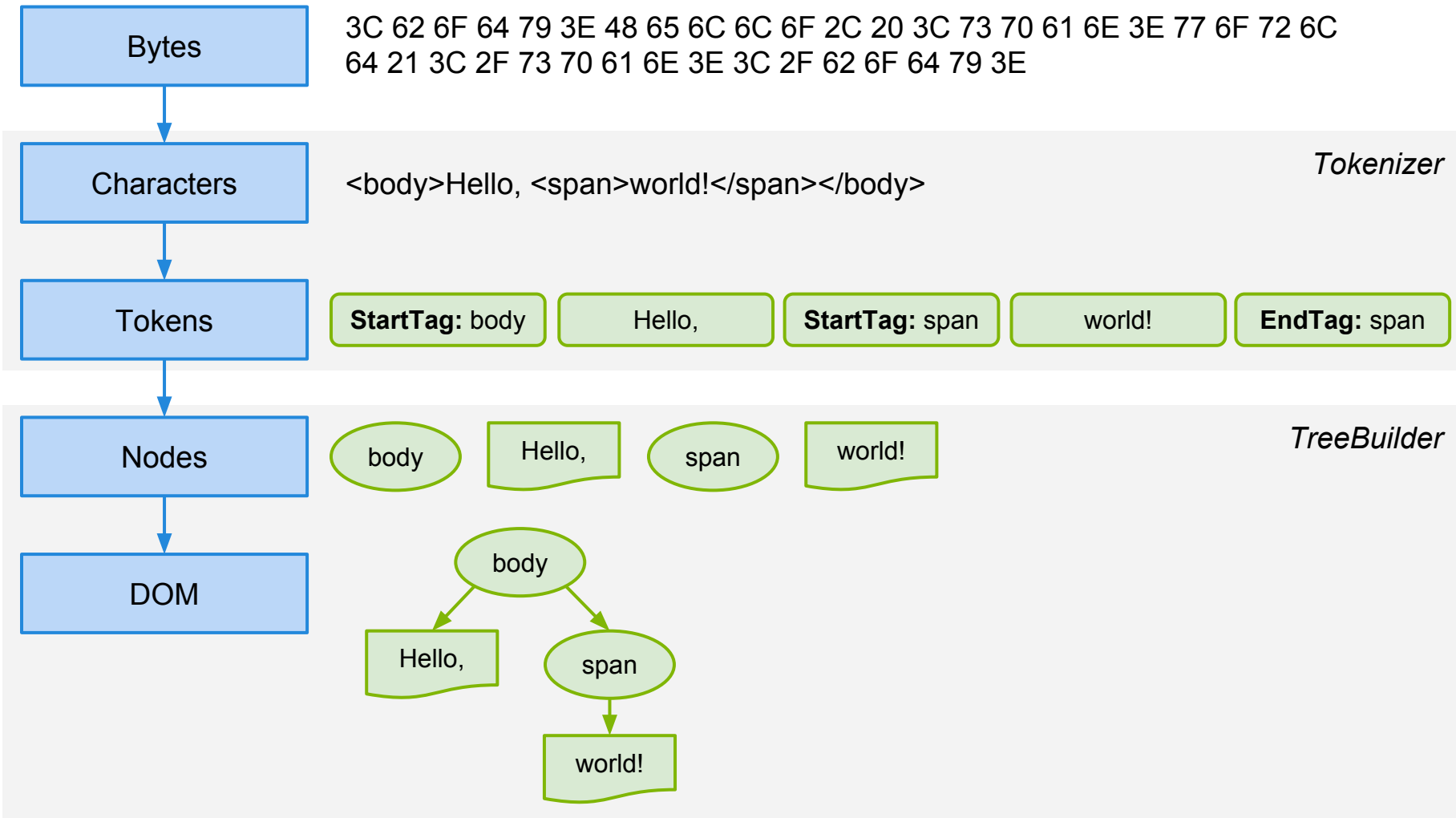
- Committed is the quiescent state

How the Loader Works (Idealized)

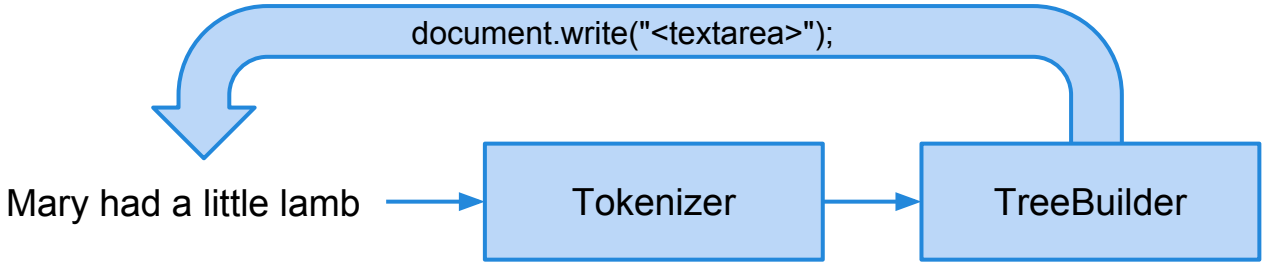


The Loader is actually very messy and complicated, but we have a long-term project to clean up its nuttiness

How the HTML Parser Works



Preload Scanning for Fun and Profit

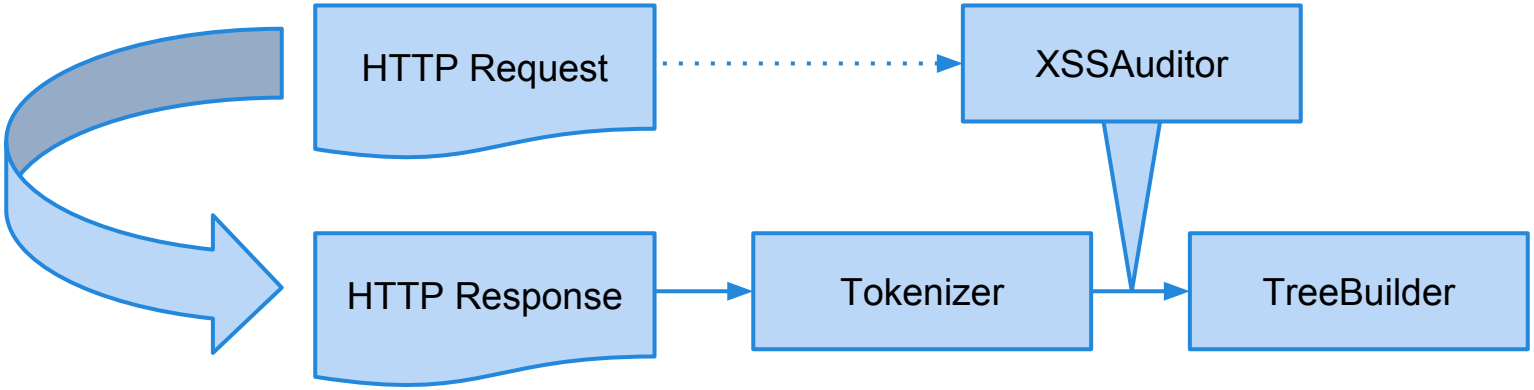


Script execution can change the input stream

Preload scanner tokenizes ahead

- When parser is blocked on external scripts
- Starts resource loads earlier

XSSAuditor



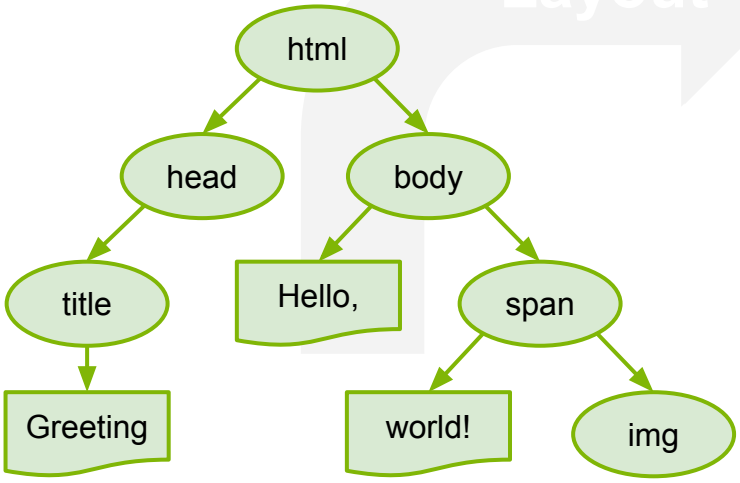
XSSAuditor examines token stream

Looks for scripts that were also in the request

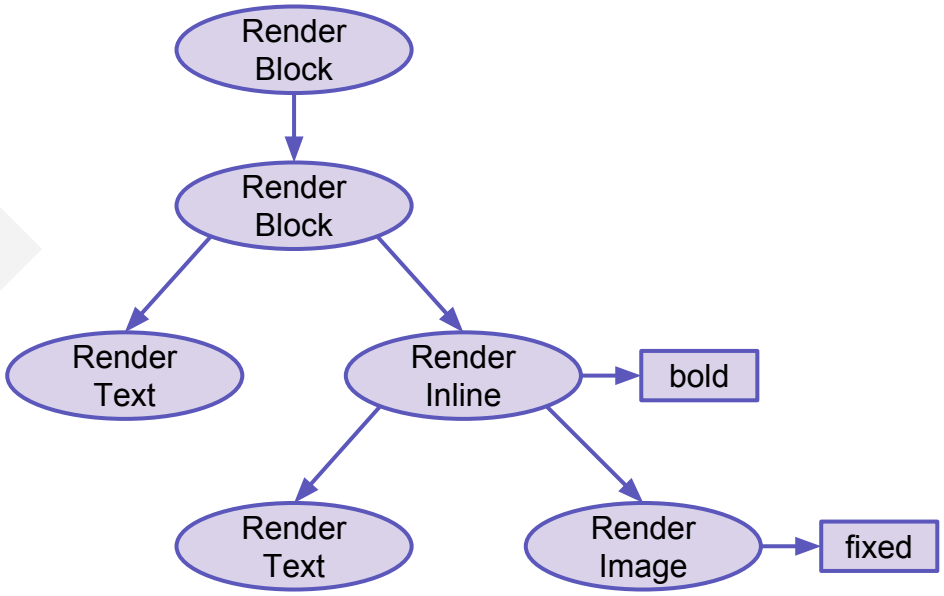
- Assumes those scripts were reflected XSS
- Blocks them

DOM + CSS → Render Tree

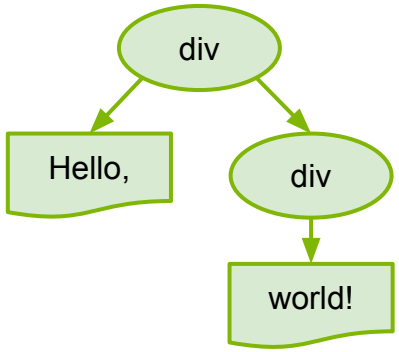
```
#footer { position: fixed; bottom: 0; left: 0 }
body > span { font-weight: bold; }
```

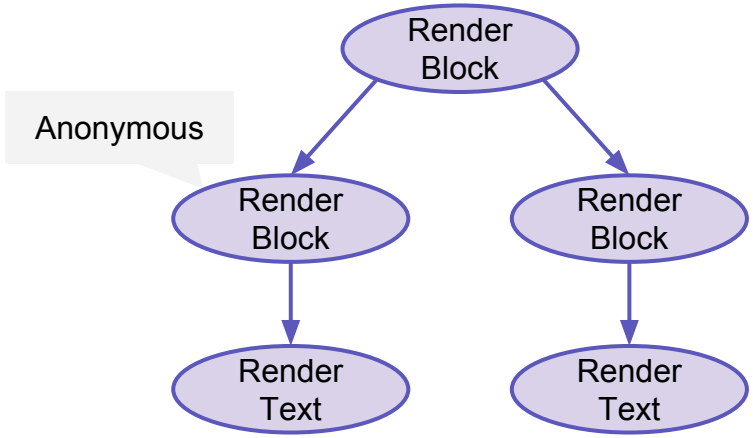


Layout



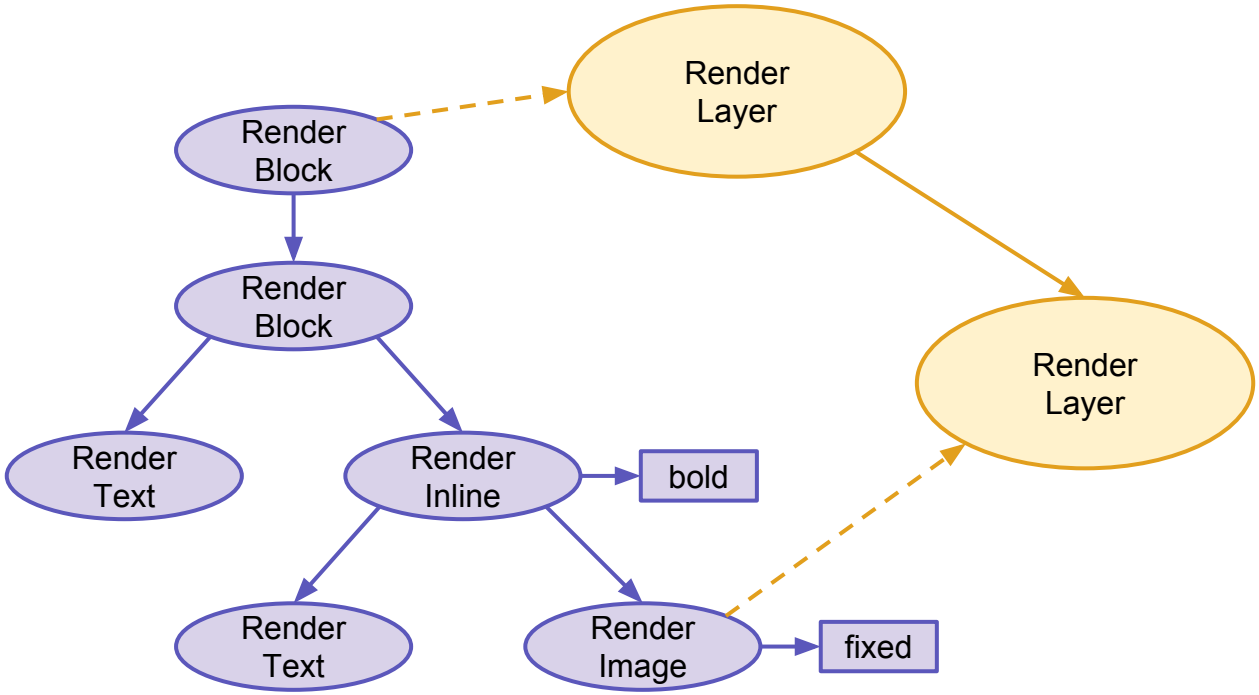
Anonymous RenderObjects





- Not every RenderObject has a DOM Node
- Every RenderBlock either:
  - Has *all* inline children
  - Has *no* inline children

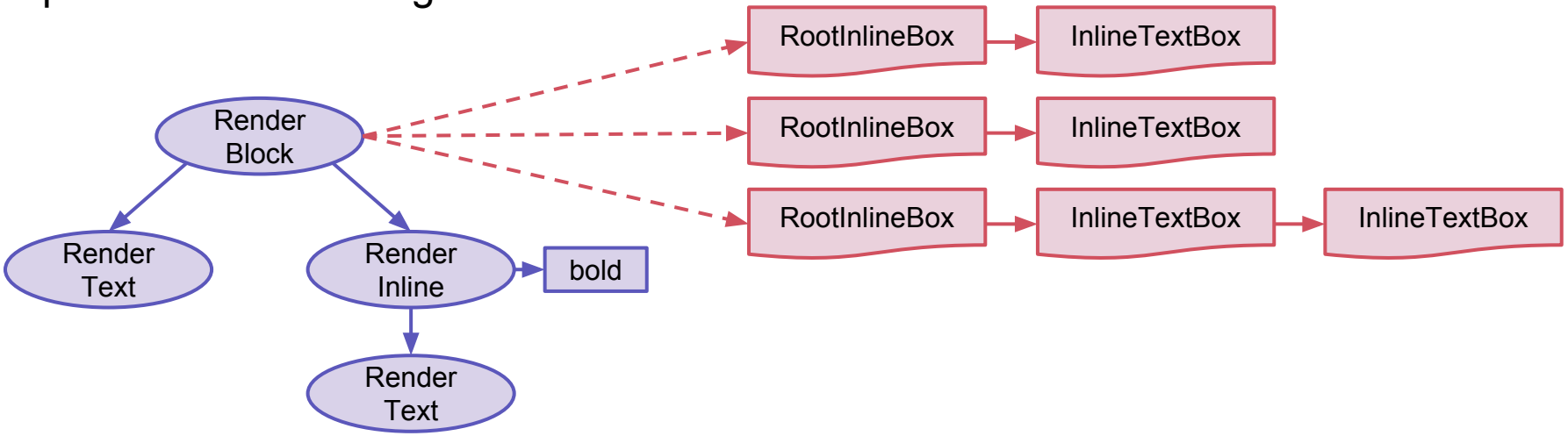
LayerTree



- Sparse representation of RenderTree
- Enables accelerated compositing, scrolling

Yet Another Tree: LineBoxTree

An old silent pond...
A frog jumps into the pond,
splash! Silence again.



- One RootInlineBox per line of text
- List of inline flow and inline text boxes

Conclusion

- WebCore's main processing pipeline:
  - Loader and Parser
  - CSS, DOM, and Script
  - RenderTree, LayerTree, and InlineBoxes
- Other major subsystems
  - Accessibility, Editing, Events, CSS, Web Inspector
  - Plugins, SVG, MathML, XSLT...
- Other components
  - WebKit, Bindings, Platform, JavaScriptCore, WTF
  - ... 1.5 MLOC of C++
- Learn more:
  - http://www.webkit.org/coding/technical-articles.html

Thanks!

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