

Debugging UIWebViews and Websites on iOS

Session 600

Timothy Hatcher

Safari and WebKit Engineer

These are confidential sessions—please refrain from streaming, blogging, or taking pictures









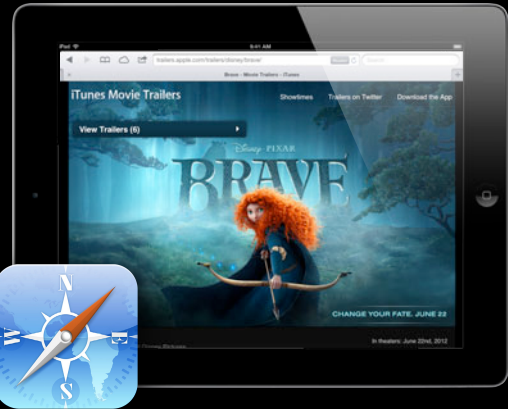


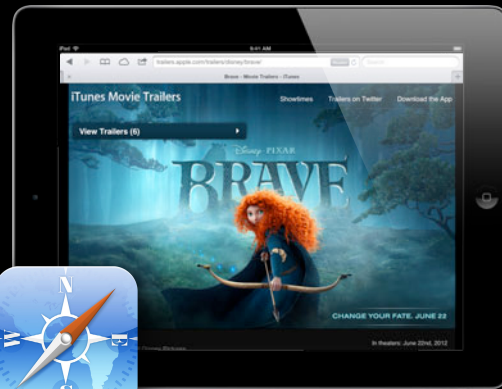
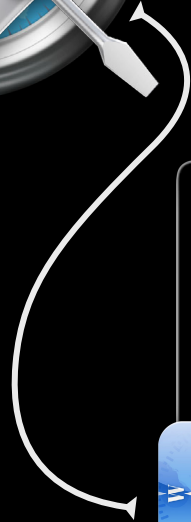
#

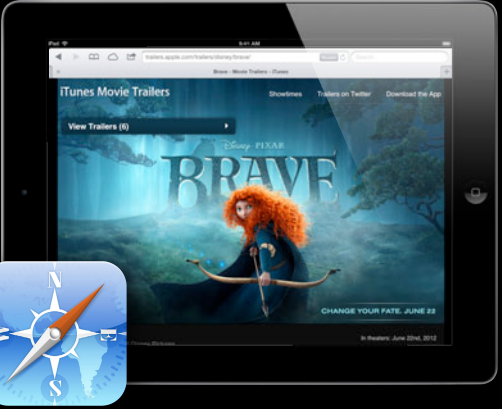
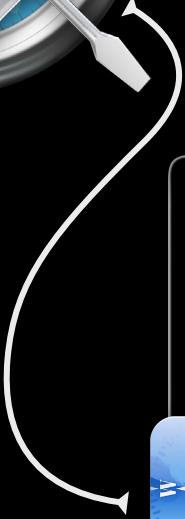


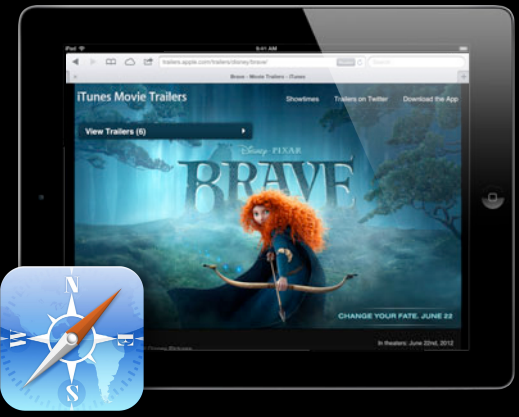




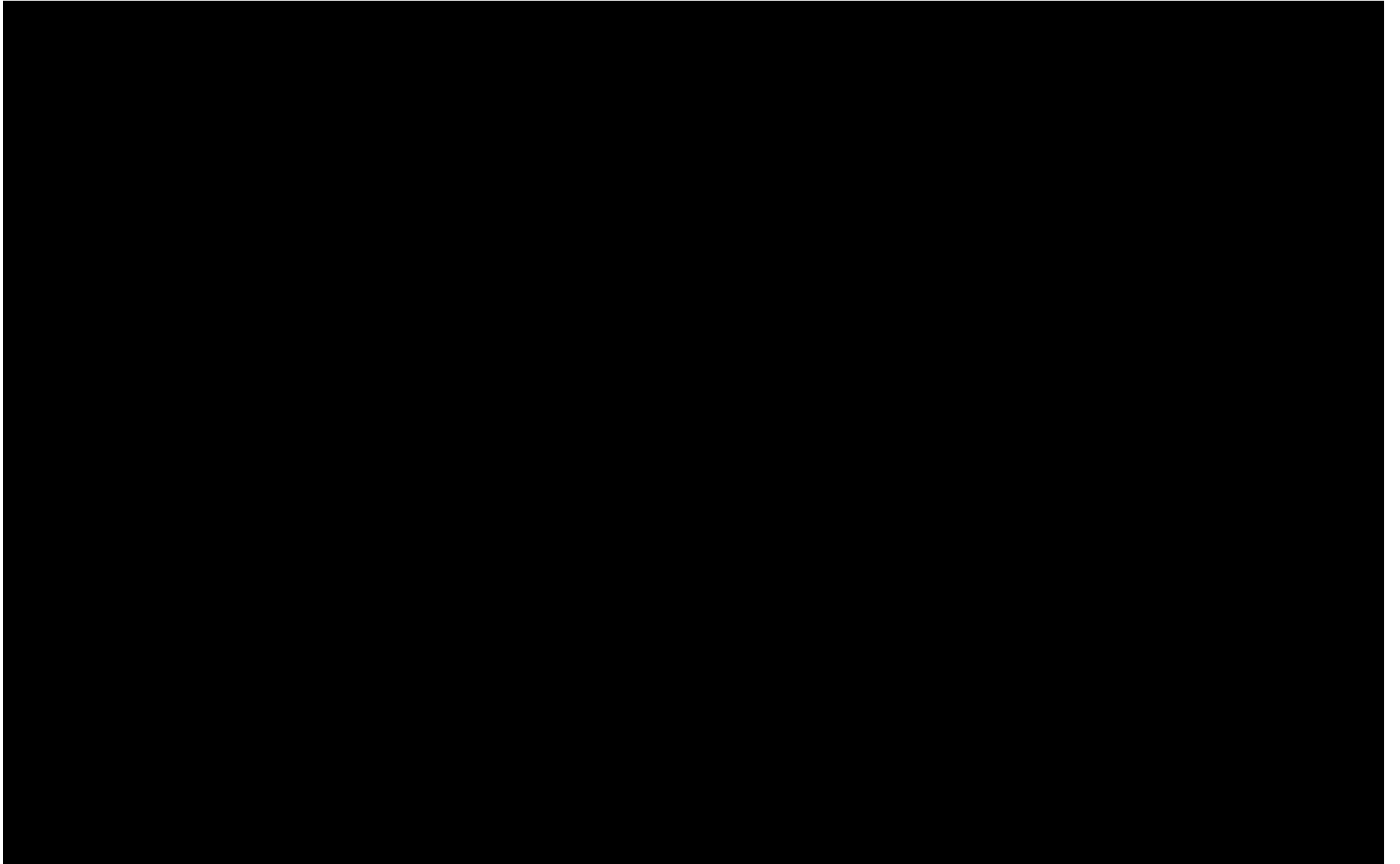












Web Inspector — iPhone Simulator — Safari — www.apple.com

www.apple.com

- ▶ Frames
- ▶ Images
- ▼ Scripts
 - ac_retina.js — images...
 - apple_core.js — image...
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 - globalnav.js — images...
 - promomanager.js
 - prototype.js — images...
 - s_code_h.js — images...
 - scriptaculous.js — ima...
 - search_decorator.js — ...
- ▼ Stylesheets
 - base.css
 - billboard.css
 - billboard.css
 - enhanced.css — image...
 - home.css
 - home.css
 - navigation.css — imag...

```

<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en-US" lang="en-US">
  <head>...</head>
  <body id="home" class="home">
    <script type="text/javascript">var searchSection = 'global'; var searchCountry = 'us';</script>
    <script src="http://images.apple.com/global/nav/scripts/globalnav.js" type="text/javascript" charset="utf-8"></script>
    <nav id="globalheader" class="apple globalheader-javascript globalheader-loaded svg globalheader-loaded">
      <!--googleoff: all-->
      <ul id="globalnav" role="navigation">...</ul>
      <!--googleon: all-->
      <div id="globalsearch">
        <form action="http://www.apple.com/search/" method="get" class="search empty" id="g-search">
          <div class="sp-label">...</div>
          <input id="search-section" type="hidden" name="sec" value="global">
        </form>
        <div id="sp-magnify">
          <div class="magnify-searchmode"></div>
          <div class="magnify"></div>
        </div>
        <div id="sp-results"></div>
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</html>

```

document.body

- ▶ <body id="home" class="home">...</body>
- > \$0.innerHTML.length
- 16
- innerHTML
- innerText
- > \$0.innerText

Computed Style

Style Attribute

HTML Attributes

No Style Properties

Style Rules

```

html, body {
  background: #fff;
}

body {
  font: 12px/18px "Lucida...
  background-color: tran...
  color: #333;
  -webkit-font-smoothing: ...
}

html, body, div, ul, ol, li, dl, dt, dd, h1, h2, h3, h4, h5, h6, pre, form, p, blockquote, fieldset, input, abbr, article, aside, command, details, figcaption, figure, footer, header, hgroup, mark, meter, nav, output, progress, section, summary, time {
  margin: 0;
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}

```

Base Style Rules

What You'll Learn

- Web Inspector overview
- Inspection and tweaking
- Performance analysis
- Debugging issues

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Web Inspector Overview

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    <nav id="globalheader" class="apple globalheader-javascript globalheader-loaded svg globalheader-loaded">
      <!--googleoff: all-->
      <ul id="globalnav" role="navigation">...</ul>
      <!--googleon: all-->
      <div id="globalsearch">
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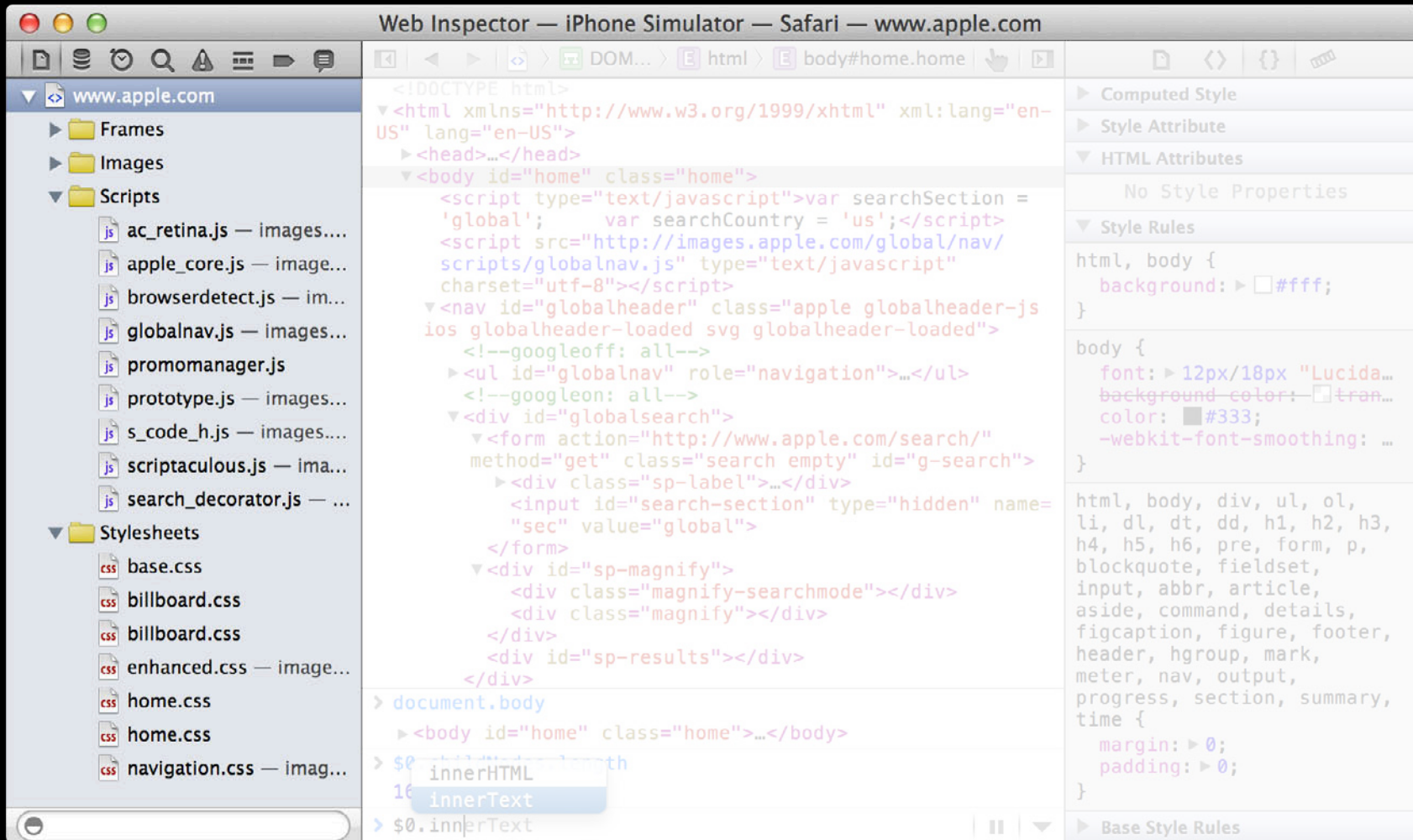
html, body {
  background: #fff;
}

body {
  font: 12px/18px "Lucida...
  background-color: tran...
  color: #333;
  -webkit-font-smoothing: ...
}

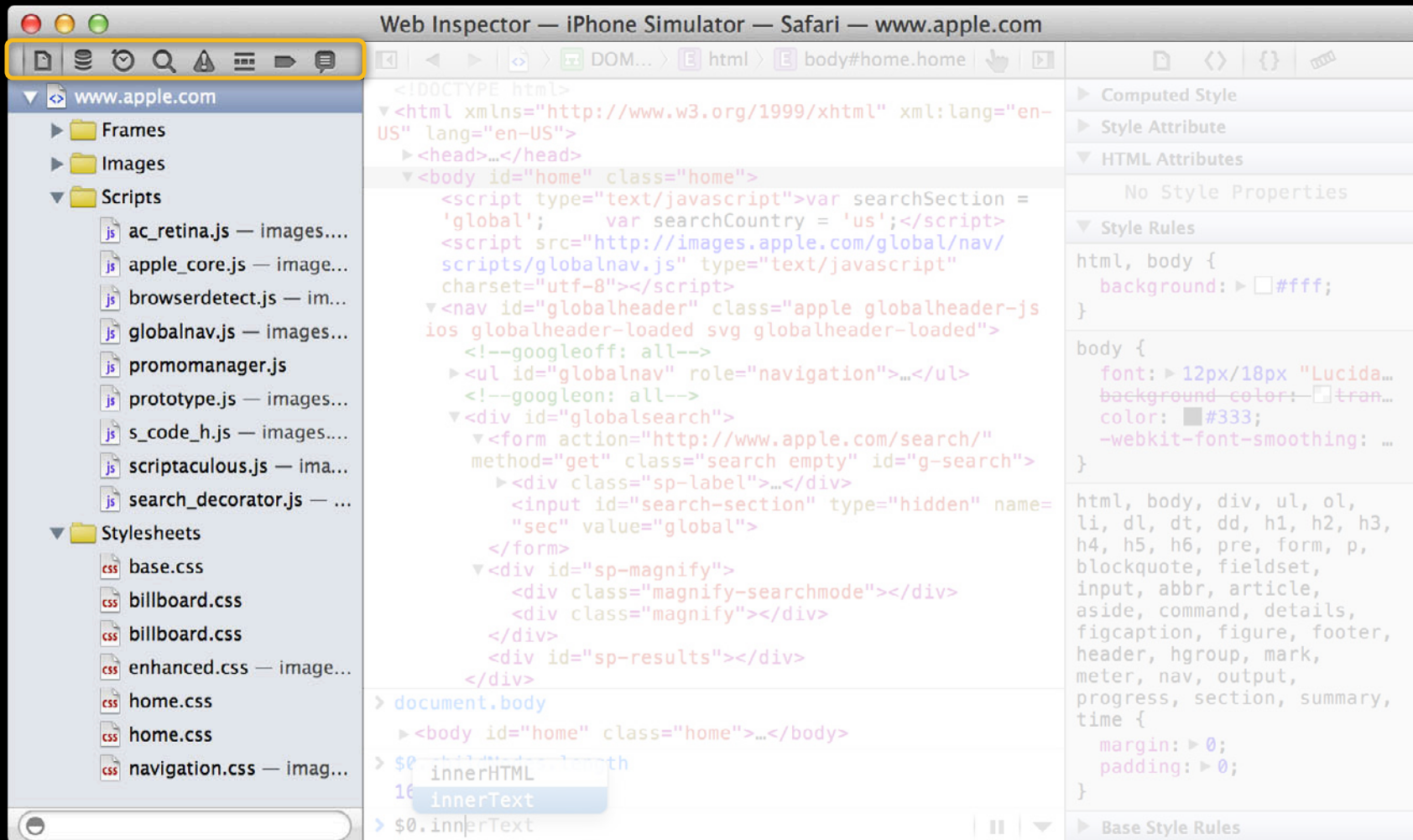
html, body, div, ul, ol, li, dl, dt, dd, h1, h2, h3, h4, h5, h6, pre, form, p, blockquote, fieldset, input, abbr, article, aside, command, details, figcaption, figure, footer, header, hgroup, mark, meter, nav, output, progress, section, summary, time {
  margin: 0;
  padding: 0;
}

```

Base Style Rules



Navigation Sidebar



Navigation Sidebar



Resource Navigator (^ 1)



- Frames and resources
- Extra scripts
- Anonymous scripts



Storage Navigator (^2)



- Cookies
- Local and session storage
- Databases and tables
- Application cache



Instrument Navigator (^3)



- Timelines
 - Network Requests
 - Layout and Rendering
 - JavaScript and Events
- JavaScript profiles
- CSS selector profiles



Search Navigator (^4)



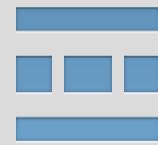
- Full text resource search
- DOM tree search



Issue Navigator (^ 5)



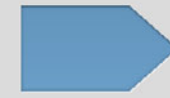
- JavaScript exceptions
- Console API errors and warnings
- HTML and XML parsing issues
- Network errors



Debug Navigator (^6)



- Current call stack when paused



Breakpoint Navigator (^7)



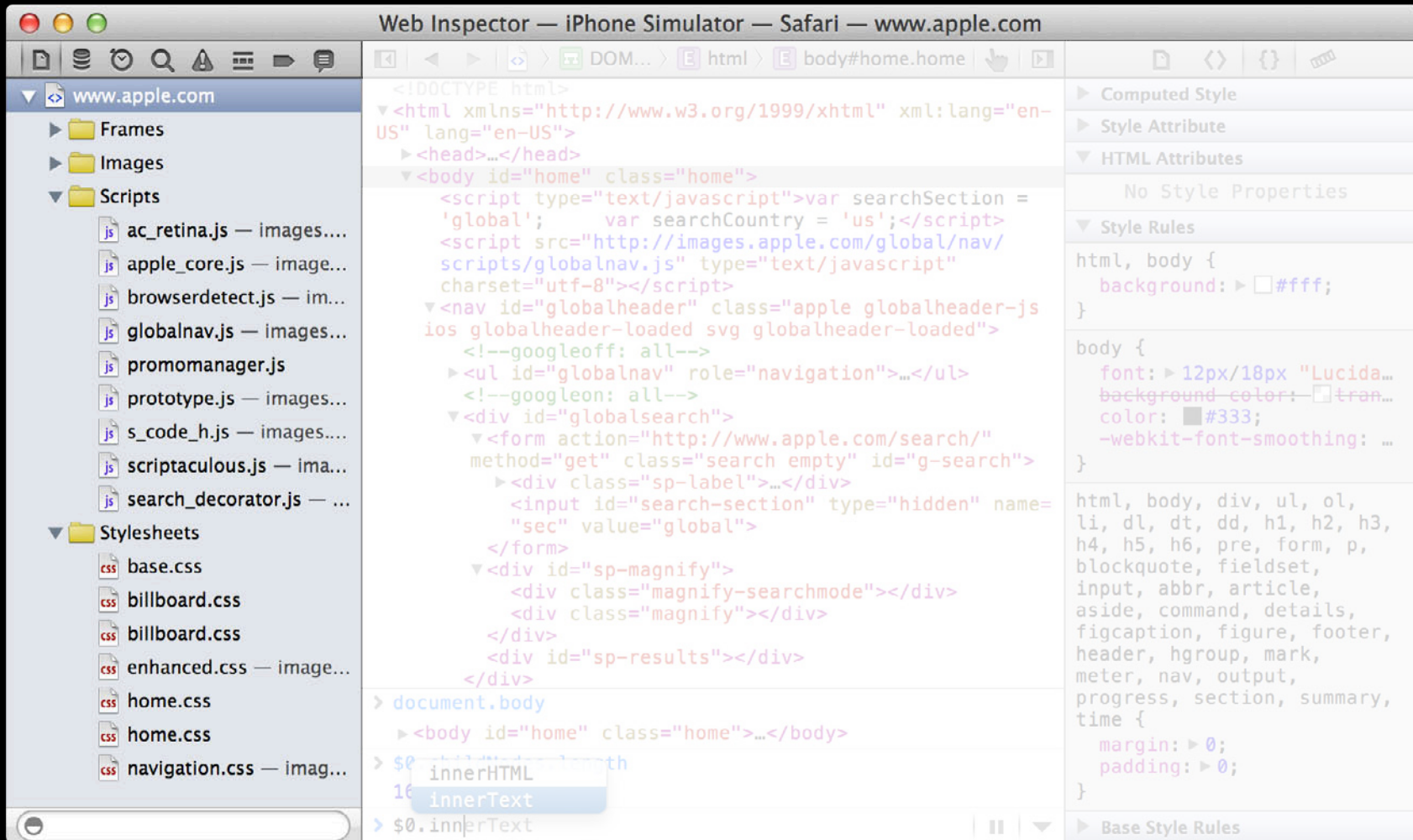
- Special exception breakpoints
- Current resource breakpoints



Log Navigator (^8)



- Current log with JavaScript console
- Previous logs on reload



Navigation Sidebar

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 - billboard.css
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 - home.css
 - home.css
 - navigation.css — imag...

```

<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en-US" lang="en-US">
  <head>...</head>
  <body id="home" class="home">
    <script type="text/javascript">var searchSection = 'global'; var searchCountry = 'us';</script>
    <script src="http://images.apple.com/global/nav/scripts/globalnav.js" type="text/javascript" charset="utf-8"></script>
    <nav id="globalheader" class="apple globalheader-javascript globalheader-loaded svg globalheader-loaded">
      <!--googleoff: all-->
      <ul id="globalnav" role="navigation">...</ul>
      <!--googleon: all-->
      <div id="globalsearch">
        <form action="http://www.apple.com/search/" method="get" class="search empty" id="g-search">
          <div class="sp-label">...</div>
          <input id="search-section" type="hidden" name="sec" value="global">
        </form>
        <div id="sp-magnify">
          <div class="magnify-searchmode"></div>
          <div class="magnify"></div>
        </div>
        <div id="sp-results"></div>
      </div>
    </nav>
  </body>
</html>

```

document.body

- <body id="home" class="home">...</body>

\$0.innerHTML

16 innerText

\$0.innerText

Computed Style

Style Attribute

HTML Attributes

No Style Properties

Style Rules

```

html, body {
  background: #fff;
}

body {
  font: 12px/18px "Lucida...
  background-color: tran...
  color: #333;
  -webkit-font-smoothing: ...
}

html, body, div, ul, ol, li, dl, dt, dd, h1, h2, h3, h4, h5, h6, pre, form, p, blockquote, fieldset, input, abbr, article, aside, command, details, figcaption, figure, footer, header, hgroup, mark, meter, nav, output, progress, section, summary, time {
  margin: 0;
  padding: 0;
}

```

Base Style Rules

Content Browser and Quick Console

Web Inspector — iPhone Simulator — Safari — www.apple.com

www.apple.com > DOM Tree > html > body#home.home

```

<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en-US" lang="en-US">
  <head>...</head>
  <body id="home" class="home">
    <script type="text/javascript">var searchSection = 'global';    var searchCountry = 'us';</script>
    <script src="http://images.apple.com/global/nav/scripts/globalnav.js" type="text/javascript" charset="utf-8"></script>
    <nav id="globalheader" class="apple ios">
      <!--googleoff: all-->
      <ul id="globalnav" role="navigation">...</ul>
      <!--googleon: all-->
      <div id="globalsearch">
        <form action="http://www.apple.com/search/" method="get" class="search empty" id="g-search">
          <div class="sp-label">...</div>
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          <div class="magnify-searchmode"></div>
          <div class="magnify"></div>
        </div>
        <div id="sp-results"></div>
      </div>
    </nav>
    <div id="top">...</div>
    <div id="main">...</div>
  </body>
</html>

```

document.body

- > <body id="home" class="home">...</body>
- > \$0.innerHTML.length
- 16
- > \$0.innerHTML

Computed Style

Style Attribute

HTML Attributes

No Style Properties

Style Rules

```

html, body {
  background: > #fff;
}

body {
  font: > 12px/18px "Lucida...
  background-color: > tran...
  color: > #333;
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html, body, div, ul, ol,
li, dl, dt, dd, h1, h2, h3,
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blockquote, fieldset,
input, abbr, article,
aside, command, details,
figcaption, figure, footer,
header, hgroup, mark,
meter, nav, output,
progress, section, summary,
time {
  margin: > 0;
  padding: > 0;
}

```

Base Style Rules

Content Browser and Quick Console

Web Inspector — iPhone Simulator — Safari — www.apple.com

www.apple.com > DOM Tree > html > body#home.home

```
<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en-US" lang="en-US">
  <head>...</head>
  <body id="home" class="home">
    <script type="text/javascript">var searchSection = 'global';    var searchCountry = 'us';</script>
    <script src="http://images.apple.com/global/nav/scripts/globalnav.js" type="text/javascript" charset="utf-8"></script>
    <nav id="globalheader" class="apple ios">
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        </div>
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      </div>
    </nav>
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  </body>
</html>
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> document.body

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 - home.css
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    <nav id="globalheader" class="apple globalheader-javascript globalheader-loaded svg globalheader-loaded">
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Style Attribute

HTML Attributes

No Style Properties

Style Rules

```

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  background: #fff;
}

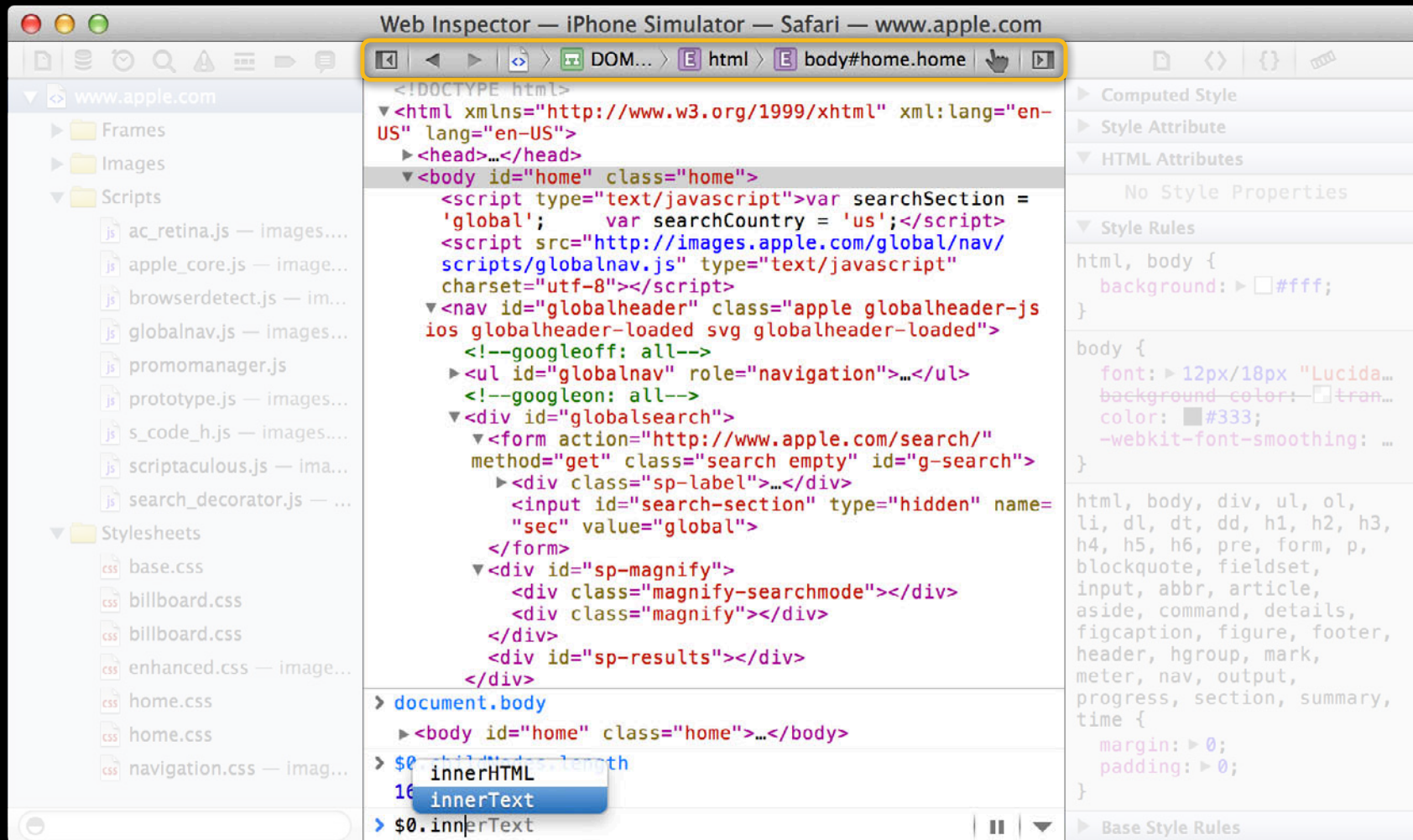
body {
  font: 12px/18px "Lucida...
  background-color: tran...
  color: #333;
  -webkit-font-smoothing: ...
}

html, body, div, ul, ol, li, dl, dt, dd, h1, h2, h3, h4, h5, h6, pre, form, p, blockquote, fieldset, input, abbr, article, aside, command, details, figcaption, figure, footer, header, hgroup, mark, meter, nav, output, progress, section, summary, time {
  margin: 0;
  padding: 0;
}

```

Base Style Rules

Content Browser and Quick Console



Content Browser and Quick Console

Navigation Bar



Navigation Bar



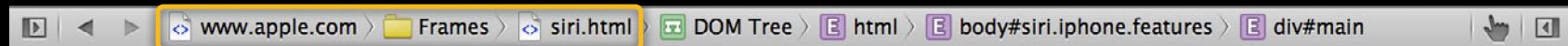
- Sidebar toggle buttons

Navigation Bar



- Sidebar toggle buttons
- Back and forward buttons

Navigation Bar



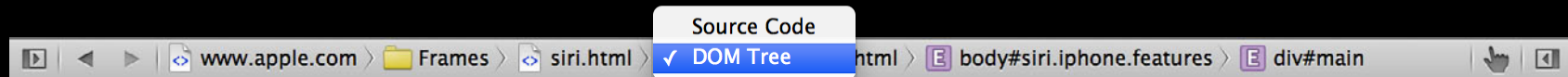
- Sidebar toggle buttons
- Back and forward buttons
- Content path

Navigation Bar



- Sidebar toggle buttons
- Back and forward buttons
- Content path
- Content view selector

Navigation Bar



- Sidebar toggle buttons
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Navigation Bar



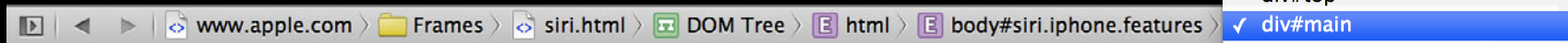
- Sidebar toggle buttons
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Navigation Bar



- Sidebar toggle buttons
- Back and forward buttons
- Content path
- Content view selector
- Selection path

Navigation Bar



```
script
script
nav#globalheader.apple.ios
div#top
```

- Sidebar toggle buttons
- Back and forward buttons
- Content path
- Content view selector
- Selection path

Navigation Bar



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Navigation Bar



- Sidebar toggle buttons
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  margin: 0;
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}

```

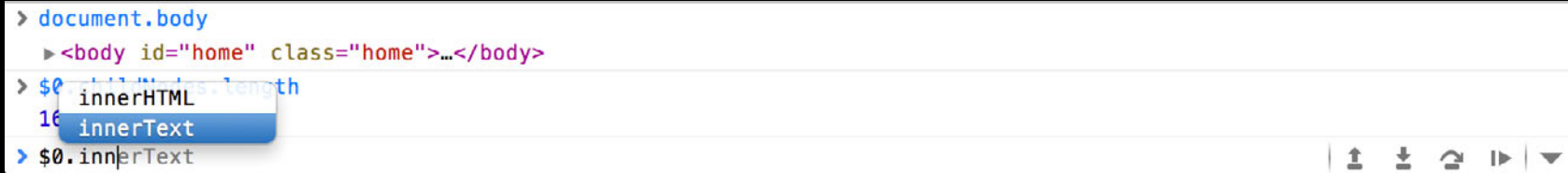
document.body

- <body id="home" class="home">...</body>
- \$0.innerHTML
- 16 innerText
- \$0.innerText

Content Browser and Quick Console

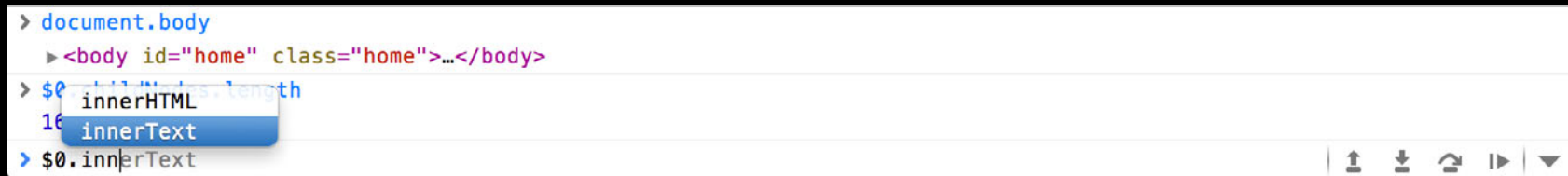
Quick Console

```
> document.body
  ▶ <body id="home" class="home">...</body>
> $0.innerHTML.length
16
  innerHTML
  innerText
> $0.innerText
```

A screenshot of a browser's developer console. The top part shows a tree view of the document.body element, which is a <body id="home" class="home">...</body>. Below this, the selected element's properties are listed: innerHTML and innerText. The innerText property is highlighted with a blue selection box. The console also shows the command \$0.innerHTML.length, which returns 16. At the bottom, the command \$0.innerText is entered. On the right side of the console, there are navigation icons: up, down, refresh, and play.

Quick Console

```
> document.body
  ▶ <body id="home" class="home">...</body>
> $0.innerHTML.length
16
  innerHTML
  innerText
> $0.innerText
```

A screenshot of a JavaScript console interface. The first command is 'document.body', which has been expanded to show '<body id="home" class="home">...</body>'. The second command is '\$0.innerHTML.length', which has been evaluated to '16'. A dropdown menu is open over the '\$0.innerHTML' part of the second command, showing 'innerHTML' and 'innerText' as options. The third command is '\$0.innerText'. On the right side of the console, there are several control icons: an upward arrow, a downward arrow, a refresh/clear icon, a play/pause icon, and a dropdown arrow.

- Auto expanding JavaScript console
- Object property completion
- Debugger controls

Web Inspector — iPhone Simulator — Safari — www.apple.com

www.apple.com

- Frames
- Images
- Scripts
 - ac_retina.js — images...
 - apple_core.js — image...
 - browserdetect.js — im...
 - globalnav.js — images...
 - promomanager.js
 - prototype.js — images...
 - s_code_h.js — images...
 - scriptaculous.js — ima...
 - search_decorator.js — ...
- Stylesheets
 - base.css
 - billboard.css
 - billboard.css
 - enhanced.css — image...
 - home.css
 - home.css
 - navigation.css — imag...

```

<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en-US" lang="en-US">
  <head>...</head>
  <body id="home" class="home">
    <script type="text/javascript">var searchSection = 'global'; var searchCountry = 'us';</script>
    <script src="http://images.apple.com/global/nav/scripts/globalnav.js" type="text/javascript" charset="utf-8"></script>
    <nav id="globalheader" class="apple globalheader-javascript globalheader-loaded svg globalheader-loaded">
      <!--googleoff: all-->
      <ul id="globalnav" role="navigation">...</ul>
      <!--googleon: all-->
      <div id="globalsearch">
        <form action="http://www.apple.com/search/" method="get" class="search empty" id="g-search">
          <div class="sp-label">...</div>
          <input id="search-section" type="hidden" name="sec" value="global">
        </form>
        <div id="sp-magnify">
          <div class="magnify-searchmode"></div>
          <div class="magnify"></div>
        </div>
        <div id="sp-results"></div>
      </div>
    </nav>
  </body>
</html>

```

document.body

- <body id="home" class="home">...</body>

\$0.innerHTML

16 innerText

\$0.innerText

Computed Style

Style Attribute

HTML Attributes

No Style Properties

Style Rules

```

html, body {
  background: #fff;
}

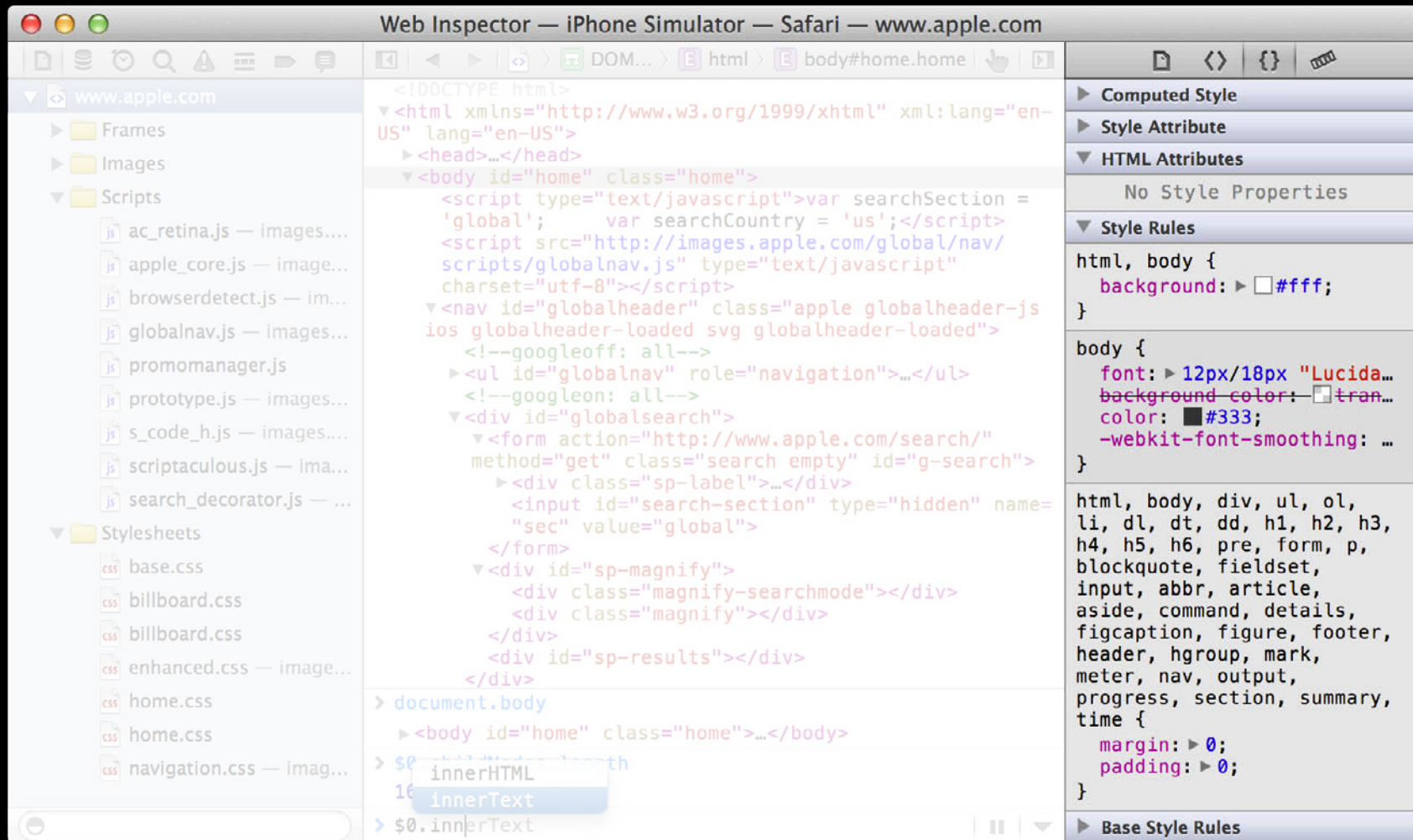
body {
  font: 12px/18px "Lucida...
  background-color: tran...
  color: #333;
  -webkit-font-smoothing: ...
}

html, body, div, ul, ol, li, dl, dt, dd, h1, h2, h3, h4, h5, h6, pre, form, p, blockquote, fieldset, input, abbr, article, aside, command, details, figcaption, figure, footer, header, hgroup, mark, meter, nav, output, progress, section, summary, time {
  margin: 0;
  padding: 0;
}

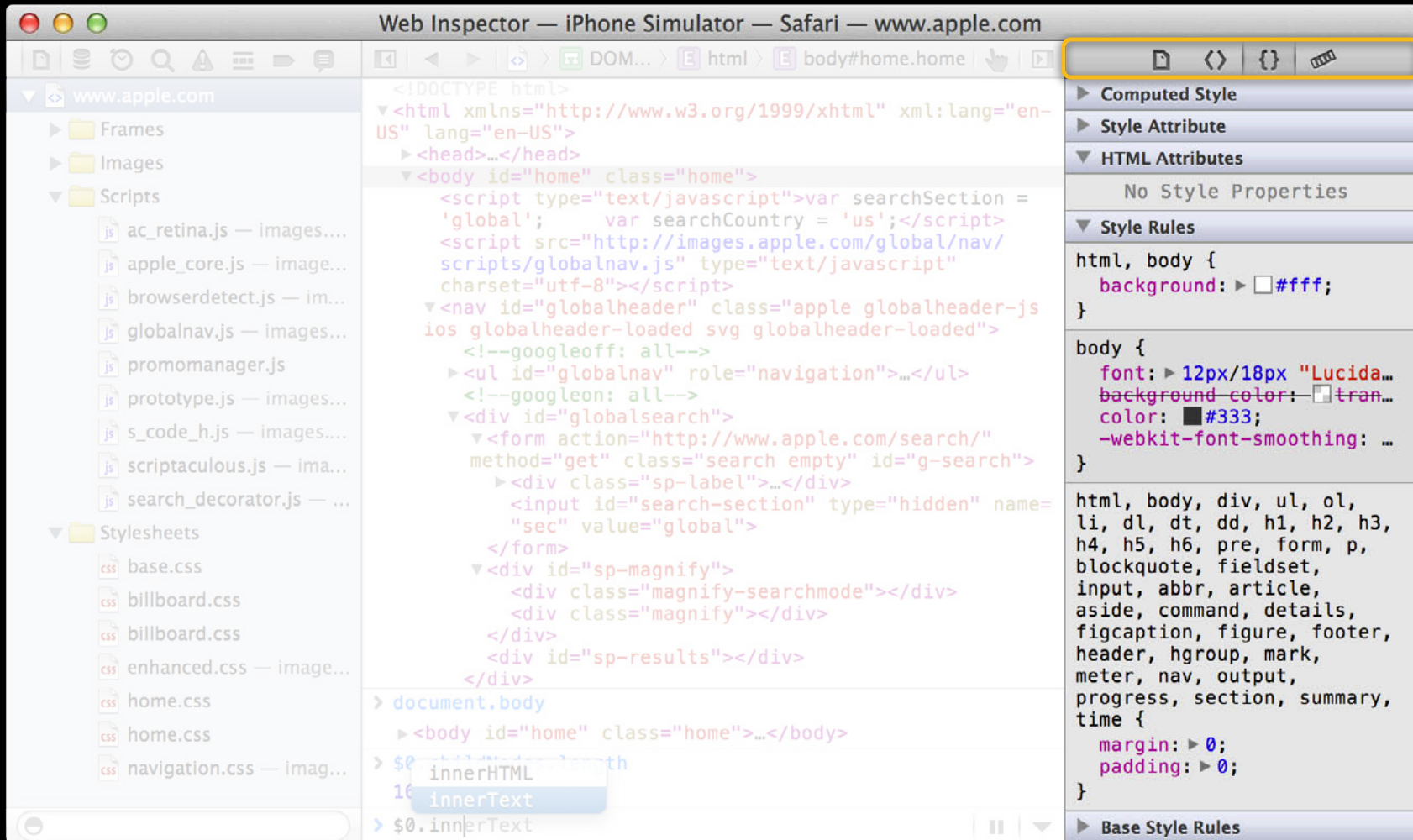
```

Base Style Rules

Content Browser and Quick Console



Details Sidebar



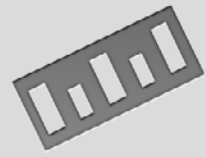
Details Sidebar



Resource Details (^ ↗ 1)



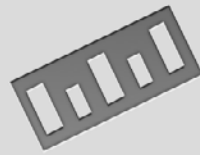
- MIME-type and resource type
- Full URL and components
- Query parameters
- Request and response headers



Node Details (^ ↗ 2)



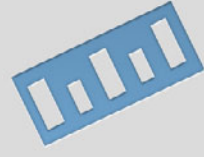
- Type, name and value
- Attributes
- DOM properties
- Event listeners



Style Details (^ ↗ 3)



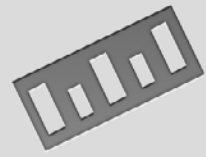
- Computed style
- Style attribute
- HTML attributes
- Style rules
- Base style rules



Appearance Details (^ 4)



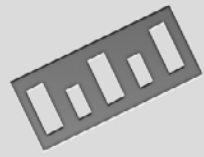
- Box model
 - Position
 - Margin
 - Border
 - Padding
 - Content



Application Cache Details



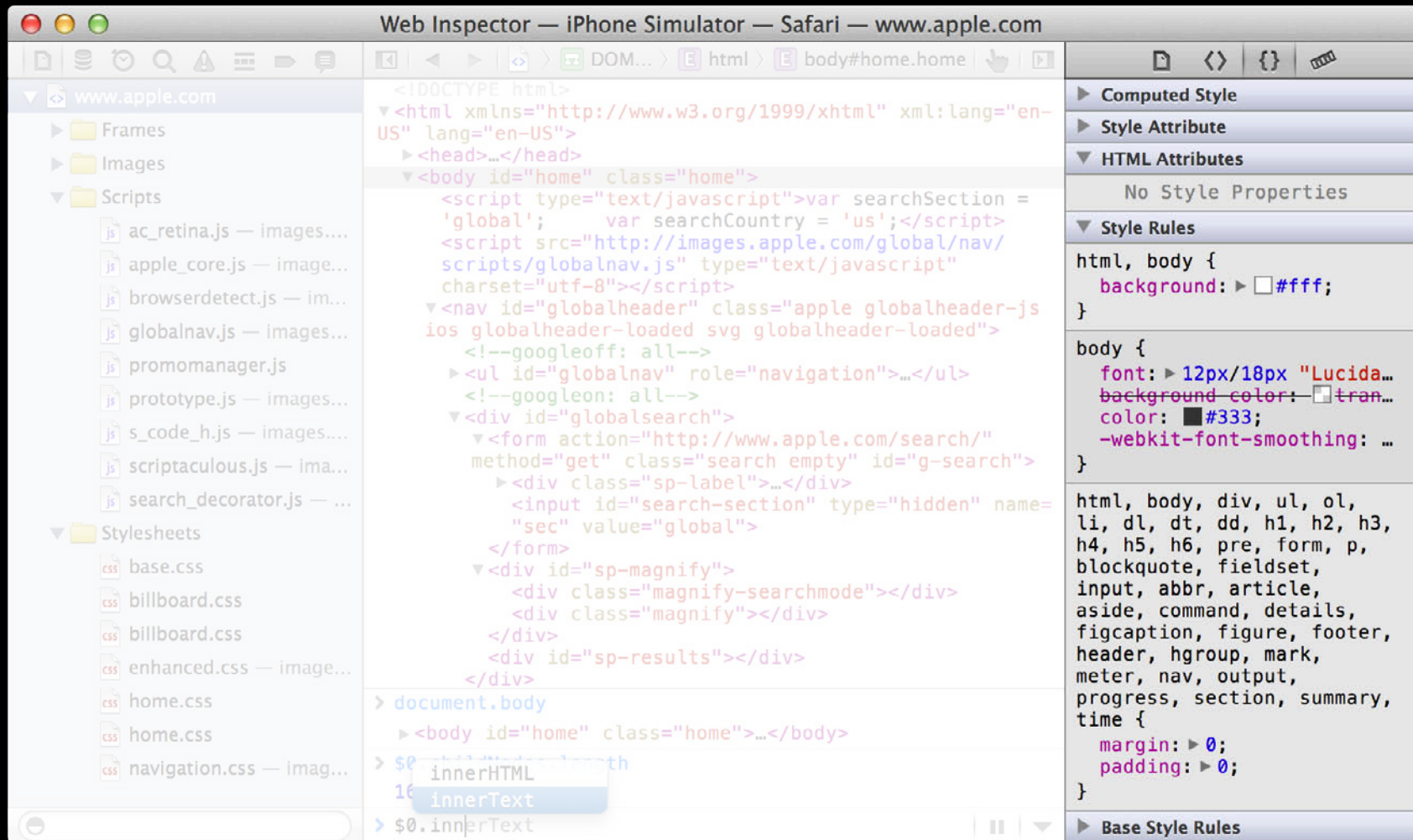
- Manifest and frame URLs
- Online status



Scope Chain Details (^ ↗ 5)



- Local variables
- Closure variables
- Catch variables
- With properties
- Global variables



Details Sidebar

Web Inspector — iPhone Simulator — Safari — www.apple.com

www.apple.com

- ▶ Frames
- ▶ Images
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<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en-US" lang="en-US">
  <head>...</head>
  <body id="home" class="home">
    <script type="text/javascript">var searchSection = 'global'; var searchCountry = 'us';</script>
    <script src="http://images.apple.com/global/nav/scripts/globalnav.js" type="text/javascript" charset="utf-8"></script>
    <nav id="globalheader" class="apple globalheader-javascript globalheader-loaded svg globalheader-loaded">
      <!--googleoff: all-->
      <ul id="globalnav" role="navigation">...</ul>
      <!--googleon: all-->
      <div id="globalsearch">
        <form action="http://www.apple.com/search/" method="get" class="search empty" id="g-search">
          <div class="sp-label">...</div>
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          <div class="magnify"></div>
        </div>
        <div id="sp-results"></div>
      </div>
    </nav>
  </body>
</html>

```

document.body

- ▶ <body id="home" class="home">...</body>
- > \$0.innerHTML
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Computed Style

Style Attribute

HTML Attributes

No Style Properties

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html, body {
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  color: #333;
  -webkit-font-smoothing: ...
}

html, body, div, ul, ol, li, dl, dt, dd, h1, h2, h3, h4, h5, h6, pre, form, p, blockquote, fieldset, input, abbr, article, aside, command, details, figcaption, figure, footer, header, hgroup, mark, meter, nav, output, progress, section, summary, time {
  margin: 0;
  padding: 0;
}

```

Base Style Rules

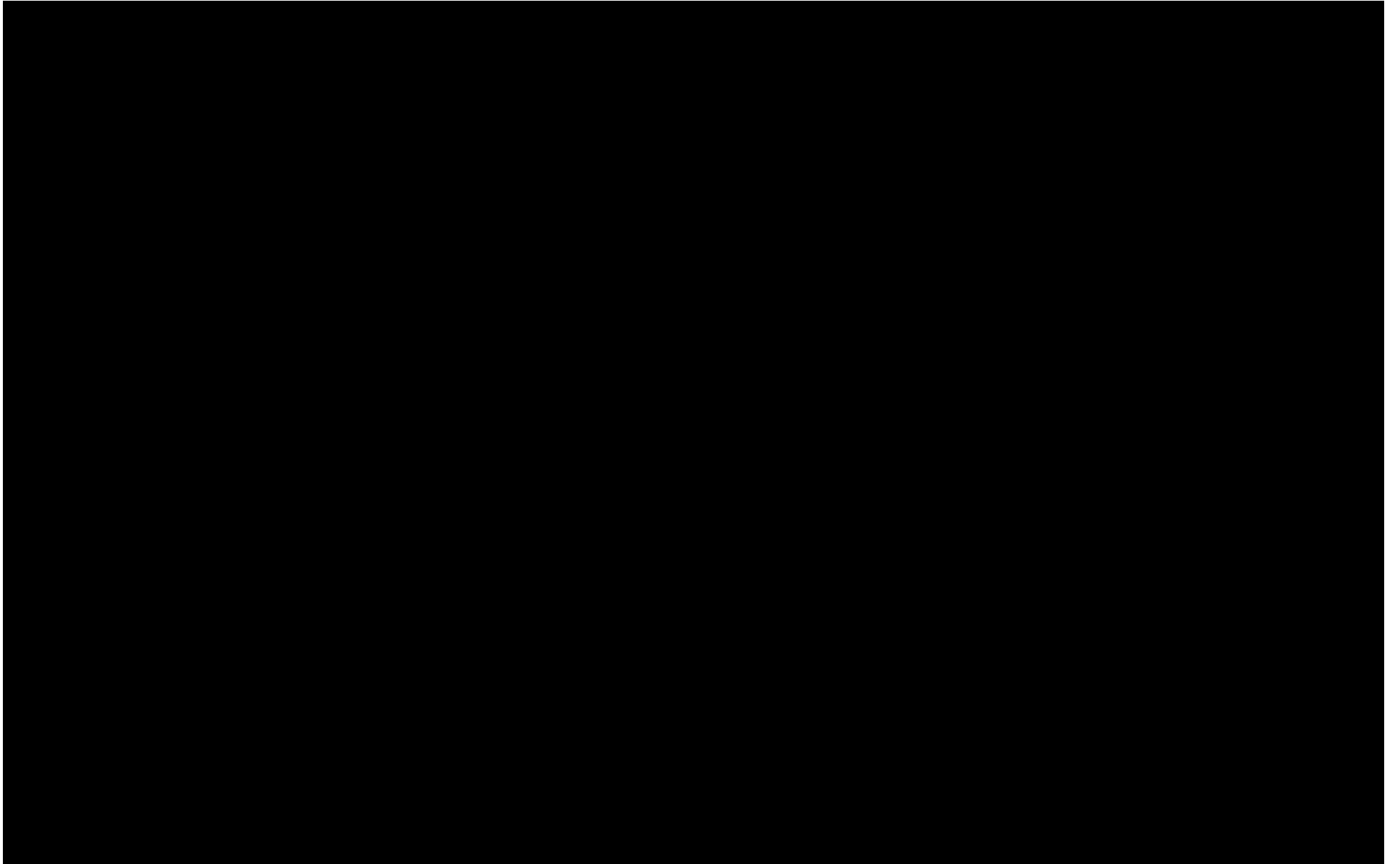
What You'll Learn

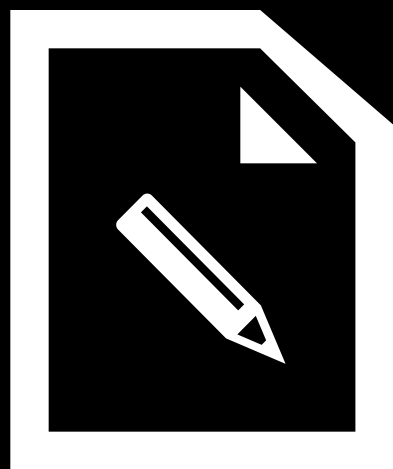
- Web Inspector overview
- Inspection and tweaking
- Performance analysis
- Debugging issues

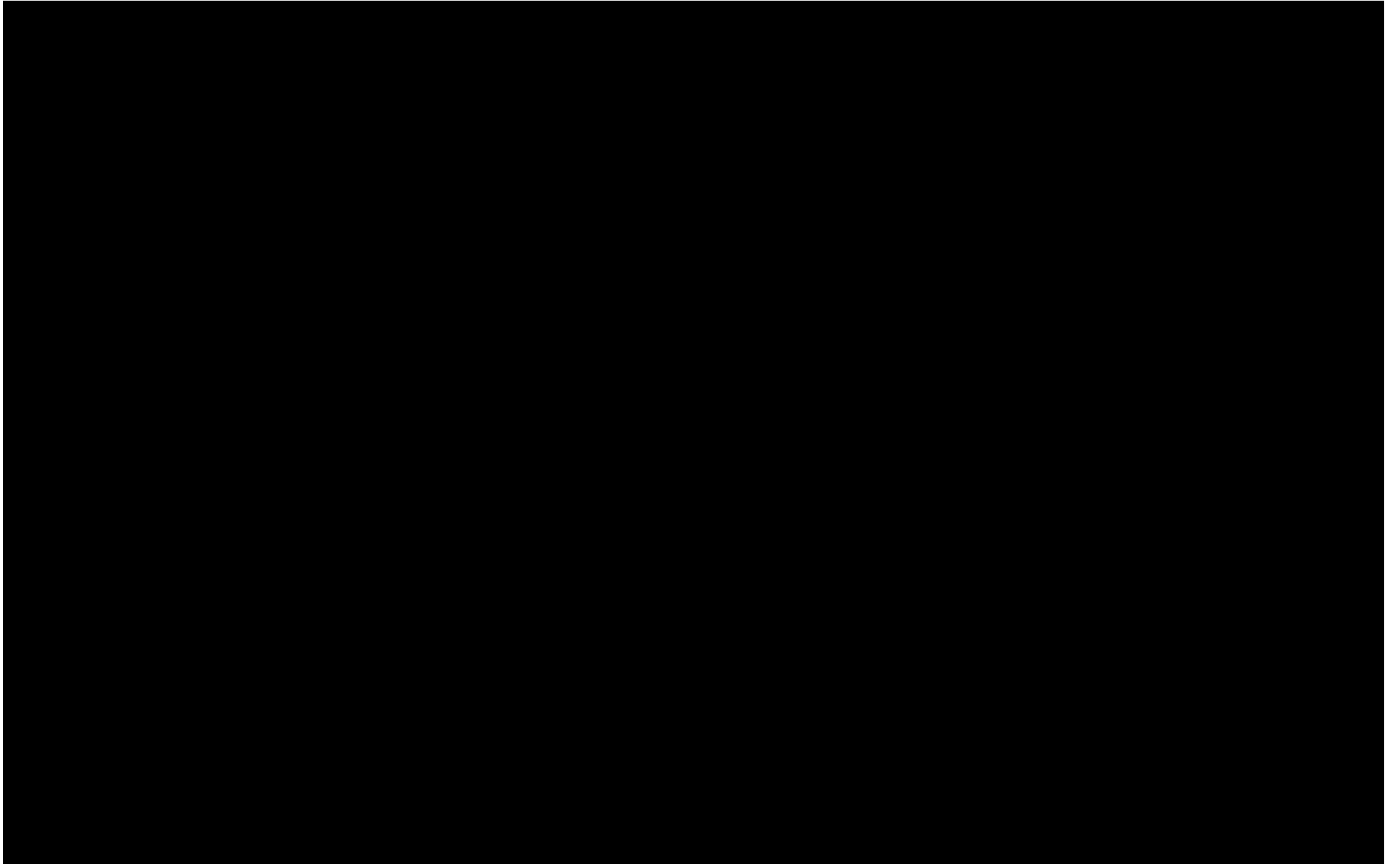
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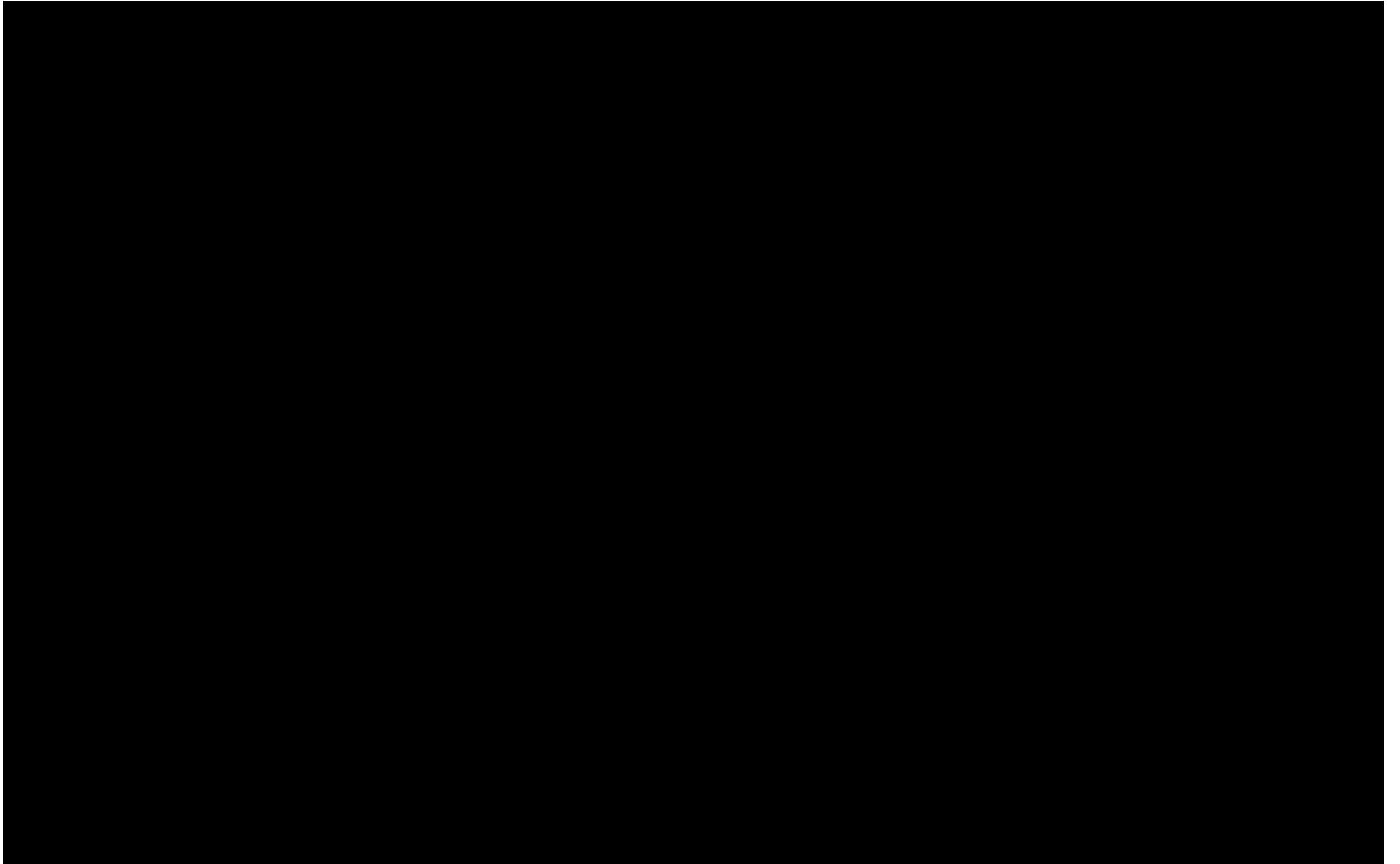
Inspection and Tweaking

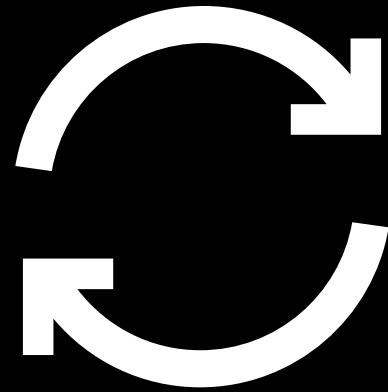


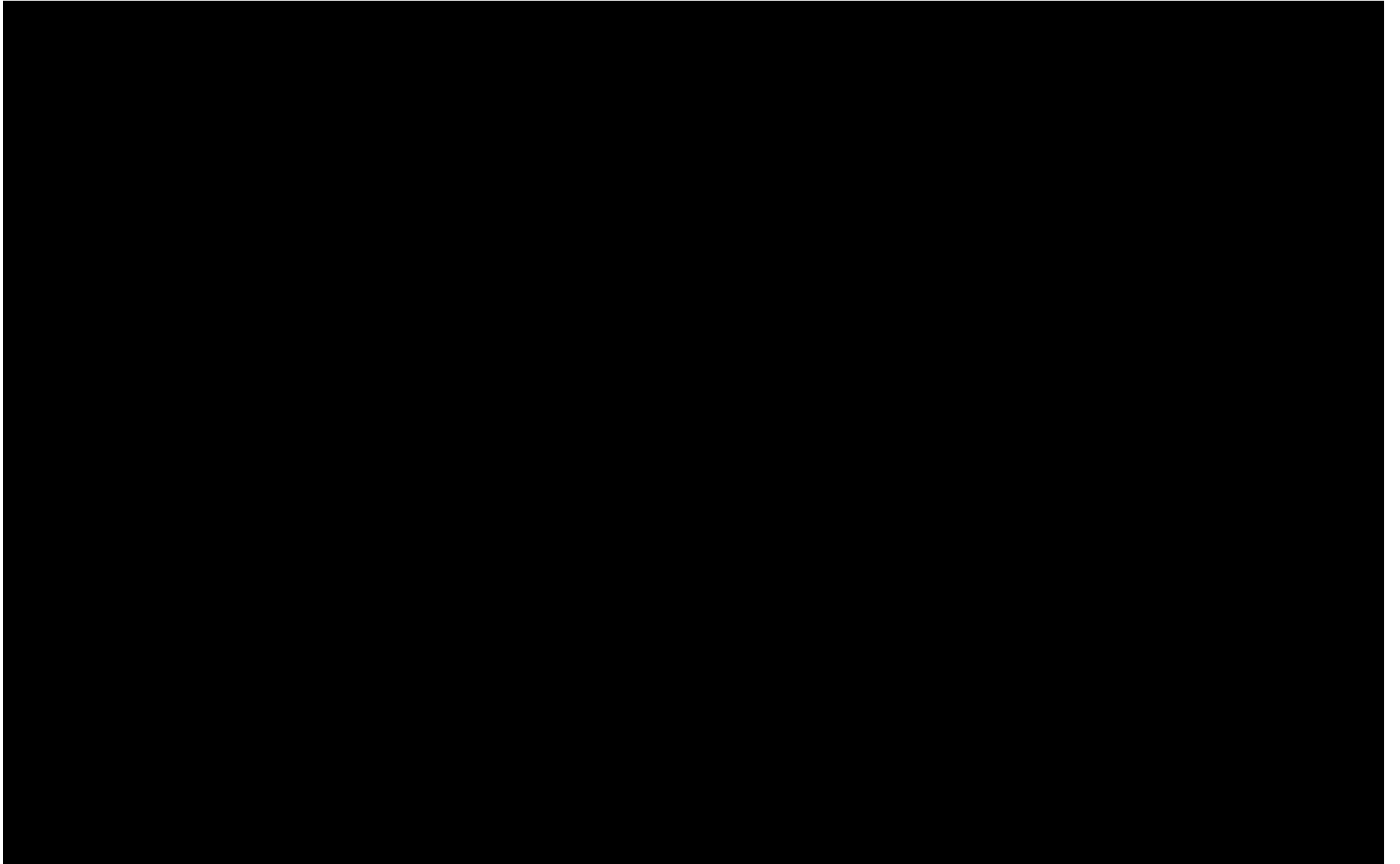


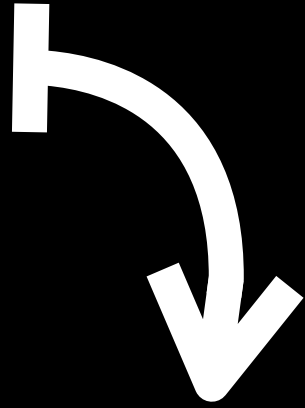


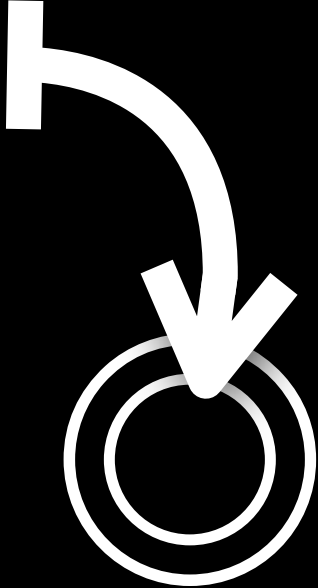
⌘ R



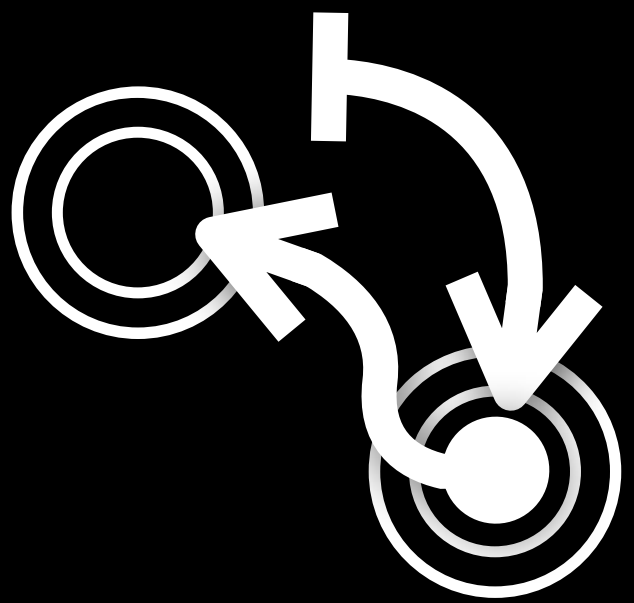


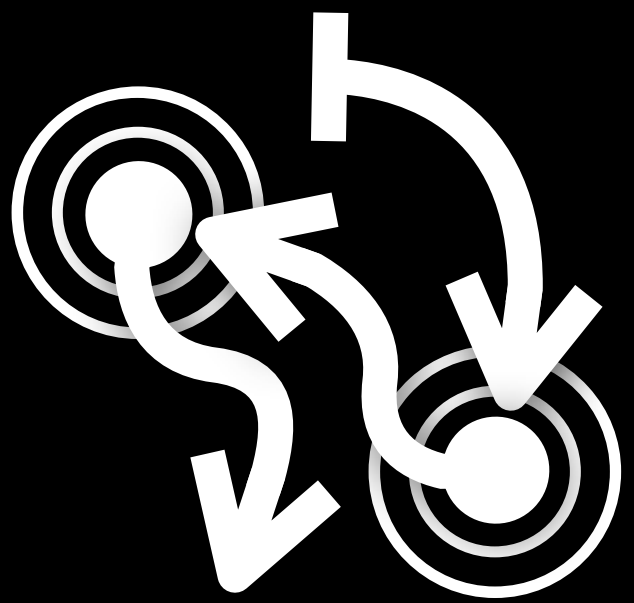


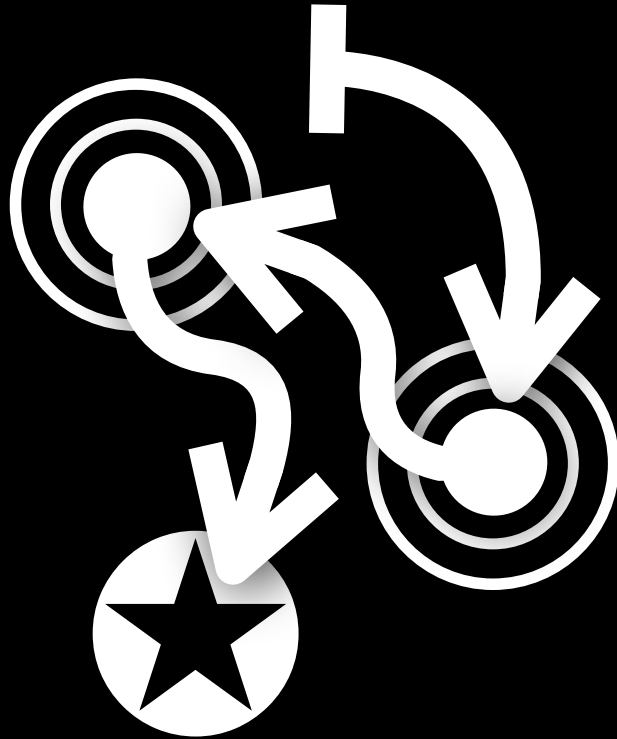


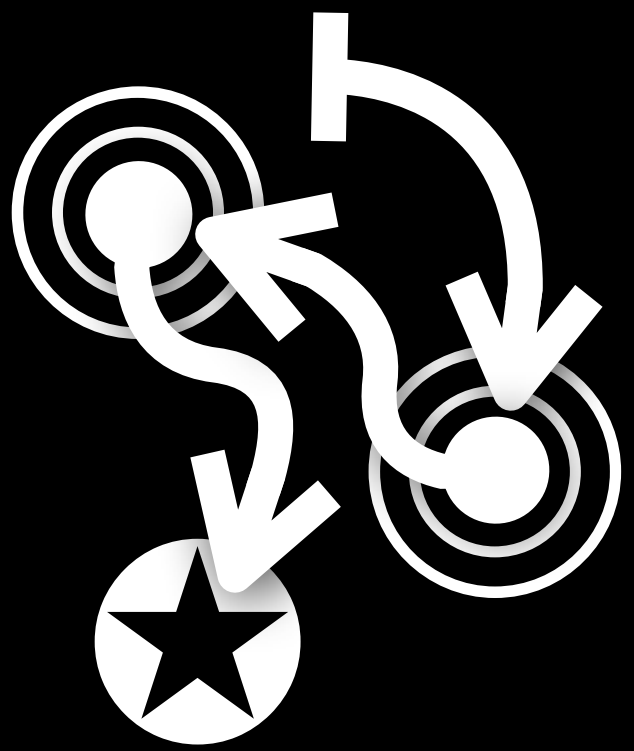




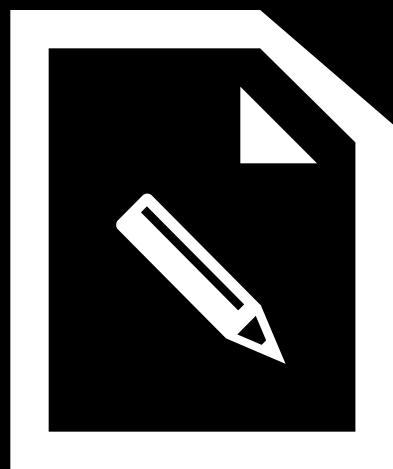


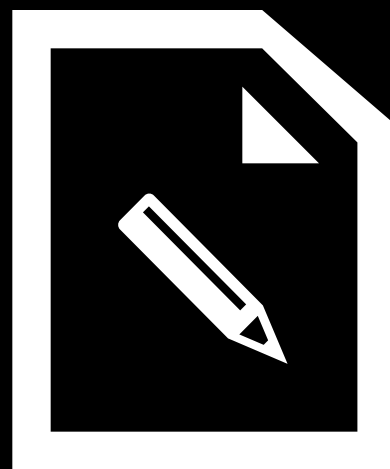












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Demo

Inspection and Tweaking

Summary

Inspection and Tweaking

Summary

- Finally “View Source” for Safari on iOS—and more!

Inspection and Tweaking

Summary

- Finally “View Source” for Safari on iOS—and more!
- Tweak without the endless rebuild cycle

Inspection and Tweaking

Summary

- Finally “View Source” for Safari on iOS—and more!
- Tweak without the endless rebuild cycle
- Hover DOM nodes to highlight the CSS boxes

Inspection and Tweaking

Summary

- Finally “View Source” for Safari on iOS—and more!
- Tweak without the endless rebuild cycle
- Hover DOM nodes to highlight the CSS boxes
- Double-click to edit CSS and DOM nodes

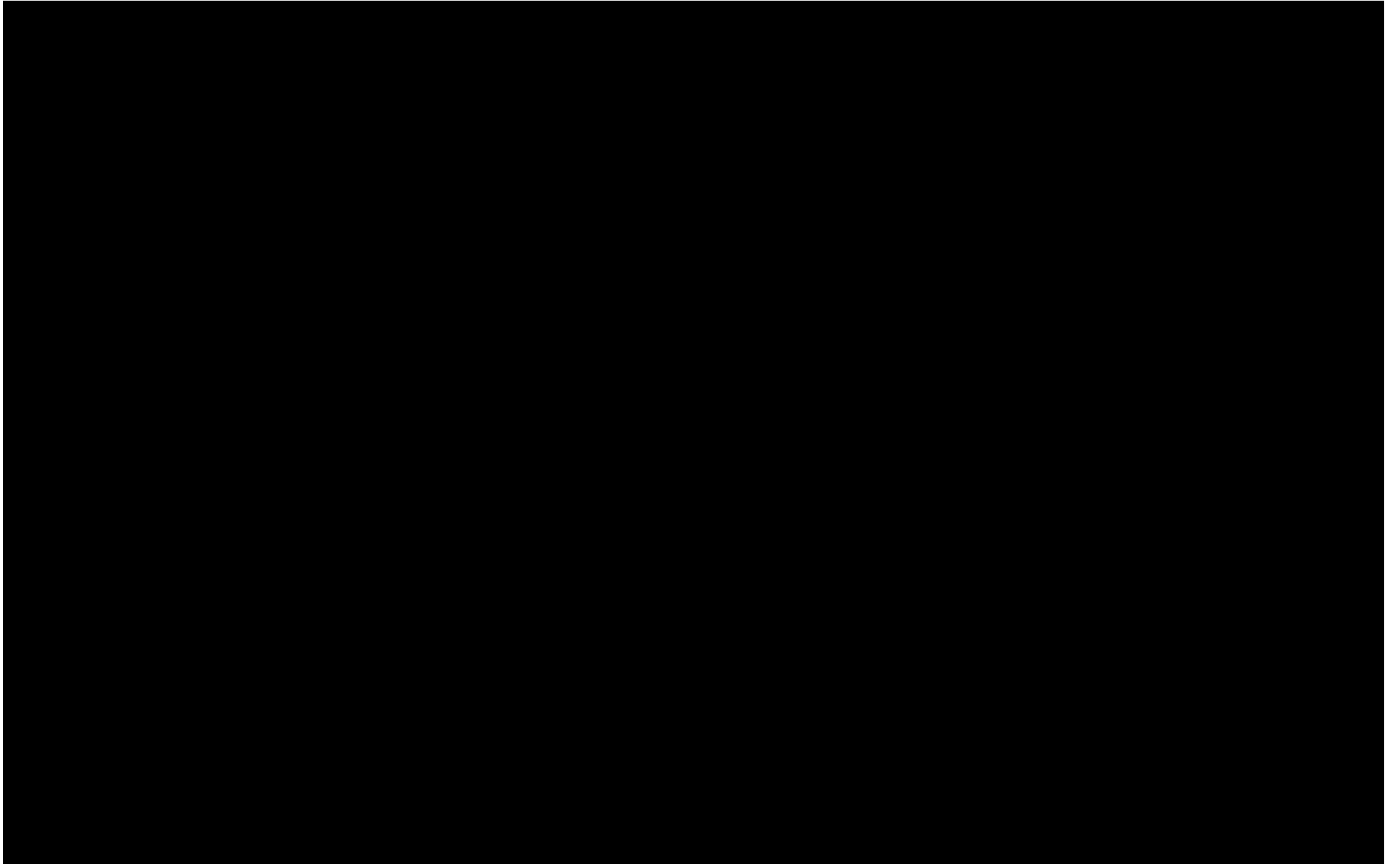
What You'll Learn

- Web Inspector overview
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Performance Analysis



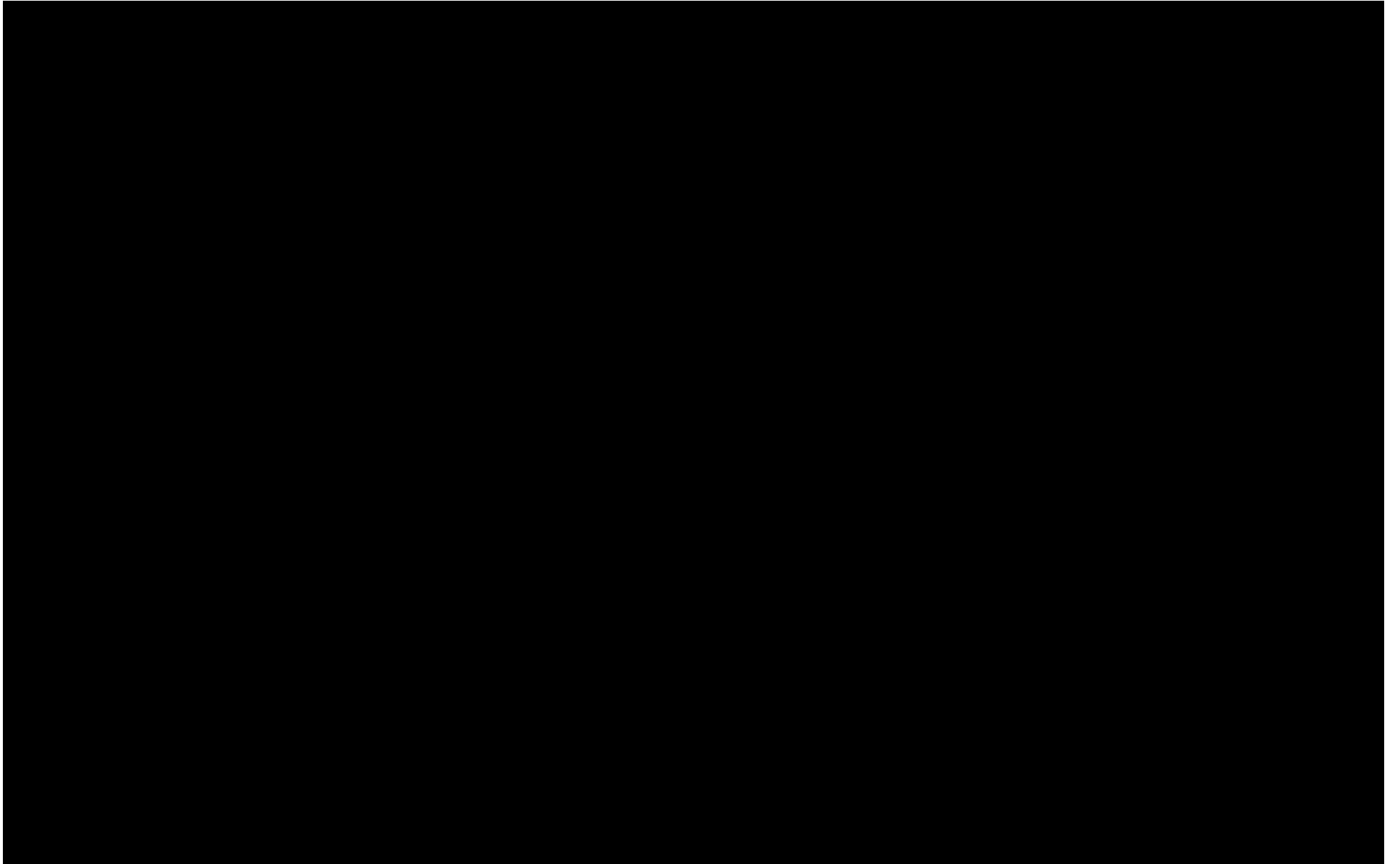




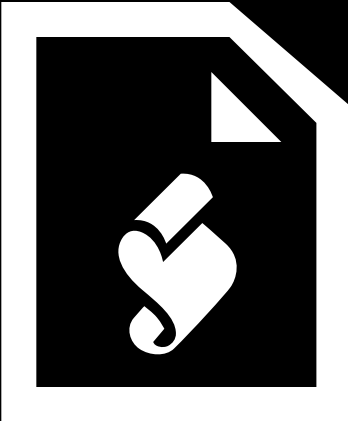


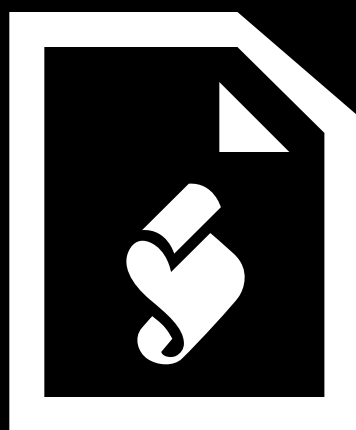
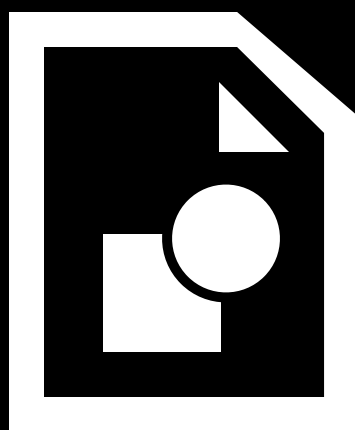












Demo

Performance Analysis

Summary

Performance Analysis

Summary

- Always test cell network performance

Performance Analysis

Summary

- Always test cell network performance
- Minimize the number of resources and large resources

Performance Analysis

Summary

- Always test cell network performance
- Minimize the number of resources and large resources
- Minify JavaScript and avoid large libraries

Performance Analysis

Summary

- Always test cell network performance
- Minimize the number of resources and large resources
- Minify JavaScript and avoid large libraries
- Use asynchronous or deferred script loading

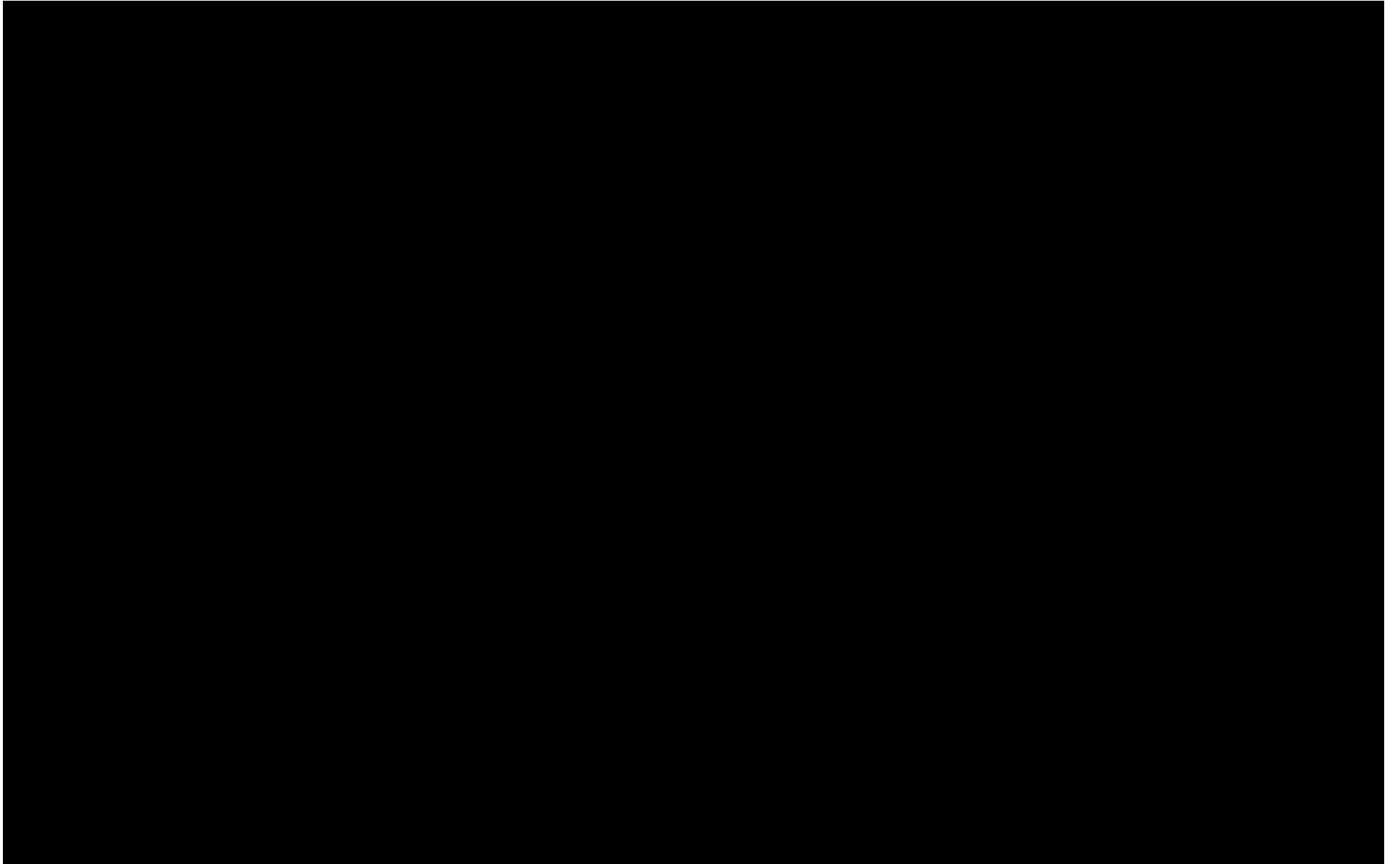
What You'll Learn

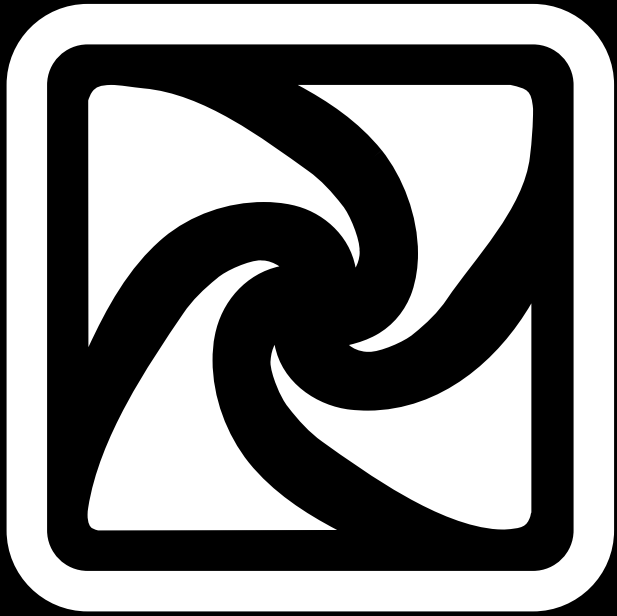
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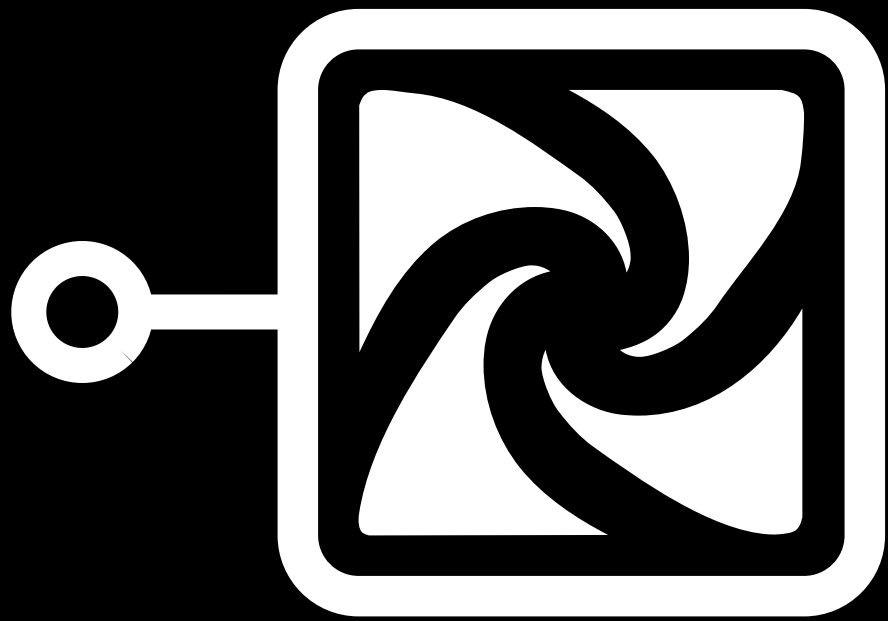
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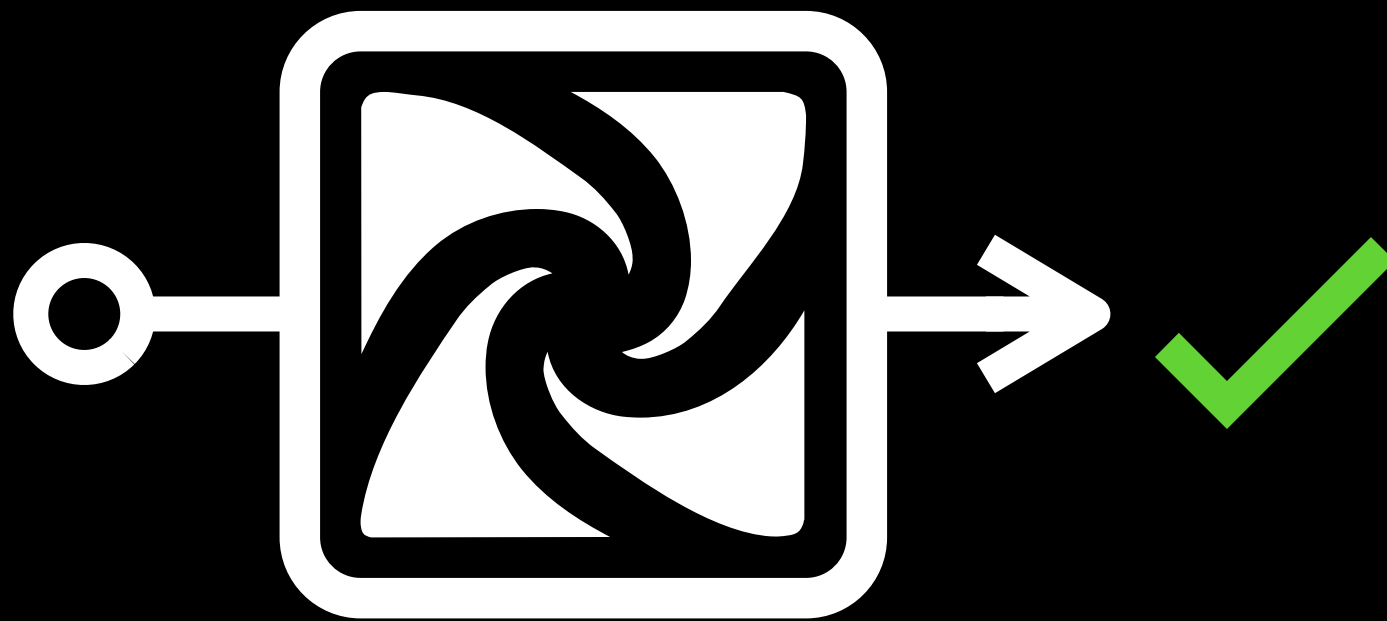
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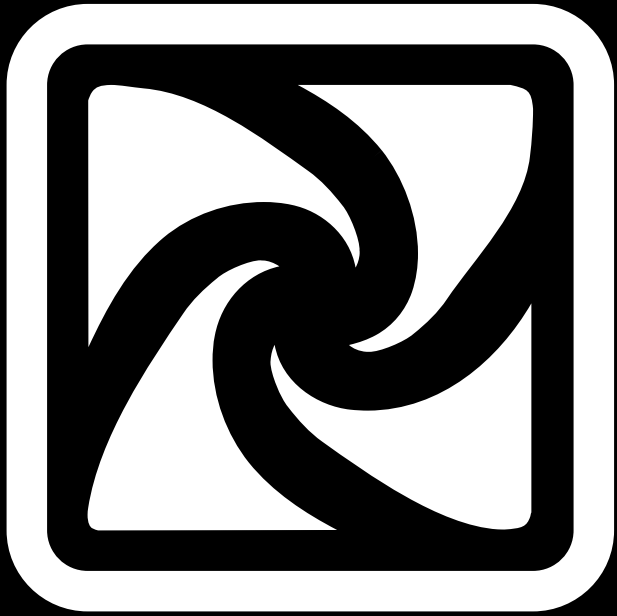
Debugging Issues

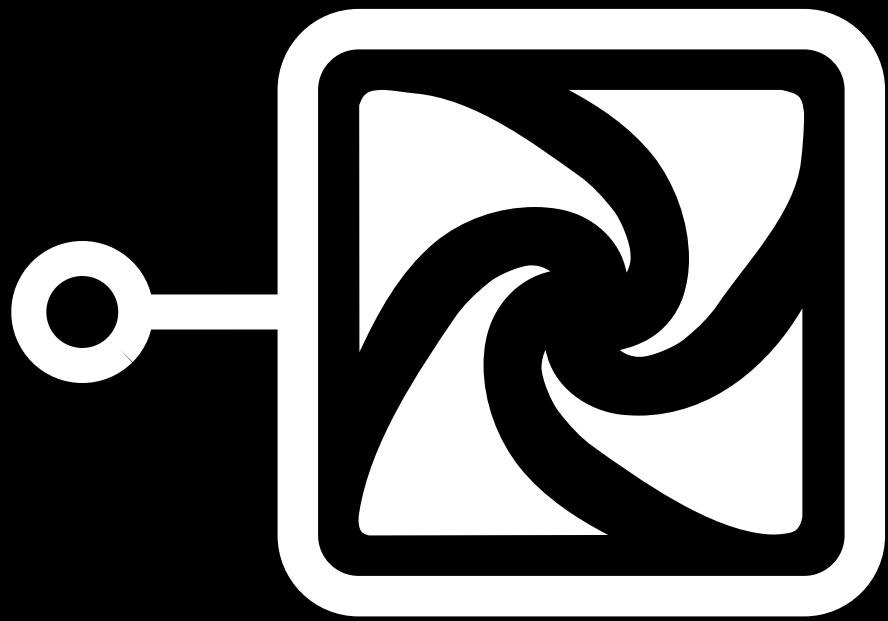


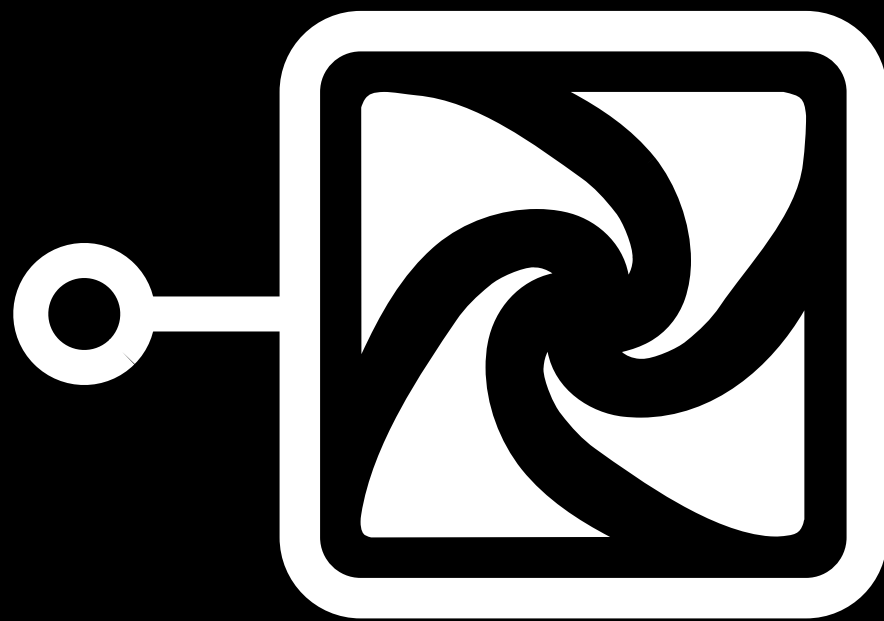












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Demo

Debugging Issues

Summary

Debugging Issues

Summary

- No longer is "stringByEvaluatingJavaScriptFromString:" a black box

Debugging Issues

Summary

- No longer is "stringByEvaluatingJavaScriptFromString:" a black box
- Call functions instead of passing large scripts

Debugging Issues

Summary

- No longer is "stringByEvaluatingJavaScriptFromString:" a black box
- Call functions instead of passing large scripts
- Evaluate in the Quick Console using the current scope

What You'll Learn

- Web Inspector overview
- Inspection and tweaking
- Performance analysis
- Debugging issues

More Information

Vicki Murley

Safari Technologies Evangelist

vicki@apple.com

Safari Dev Center

<http://developer.apple.com/safari>

Apple Developer Forums

<http://devforums.apple.com>

Related Sessions

Optimizing Web Content in UIWebViews and Websites on iOS

Marina
Tuesday 4:30PM

Delivering Web Content on High Resolution Displays

Nob Hill
Wednesday 11:30AM

Advanced Effects with HTML5 Media Technologies

Marina
Thursday 2:00PM

Labs

Safari and Web Tools Lab

Safari & Web Lab
Wednesday 2:00PM

Web Content Optimization Lab

Safari & Web Lab
Wednesday 3:15PM

Safari and WebKit Open Lab

Safari & Web Lab
Thursday 3:15PM

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Summary

- Web Inspector is now available on Safari for iOS and your iOS app
- Enable Safari's developer tools on Mac and iOS
- Web Inspector has a new streamlined user interface
- Be informed when debugging your site and app's web content

Q&A

 WWDC2012