

Advanced Effects with HTML5 Media Technologies

Session 604

Vicki Murley

Safari Technologies Evangelist

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



<audio>



<video>

HTML5



`<audio>`



`<video>`

HTML5



<audio>



<video>



Apache on Vimeo

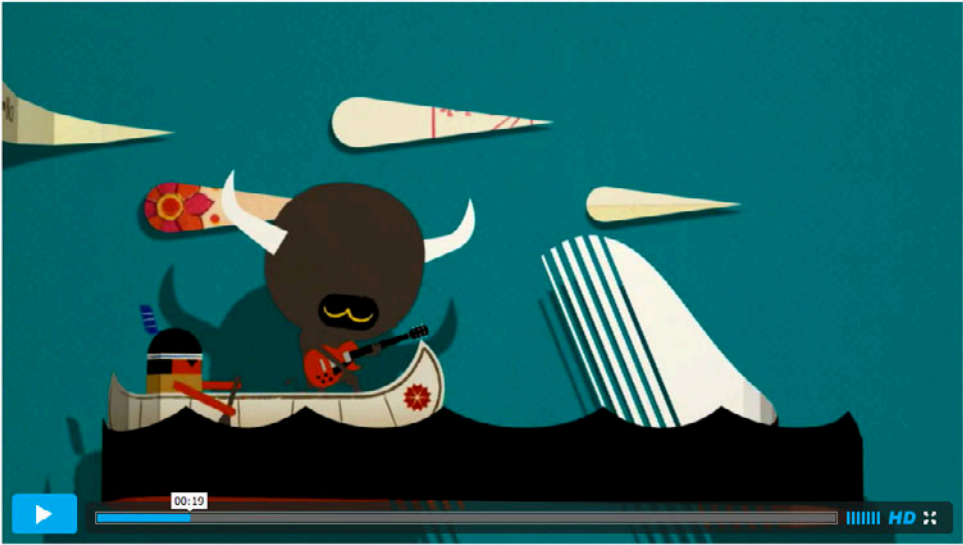
https://vimeo.com/22679618

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00:19 HD


 **Apache**
by **oneedo** 1 year ago

Apple - The new iPad - It's brilliant from the outside in.

www.apple.com/ipad/

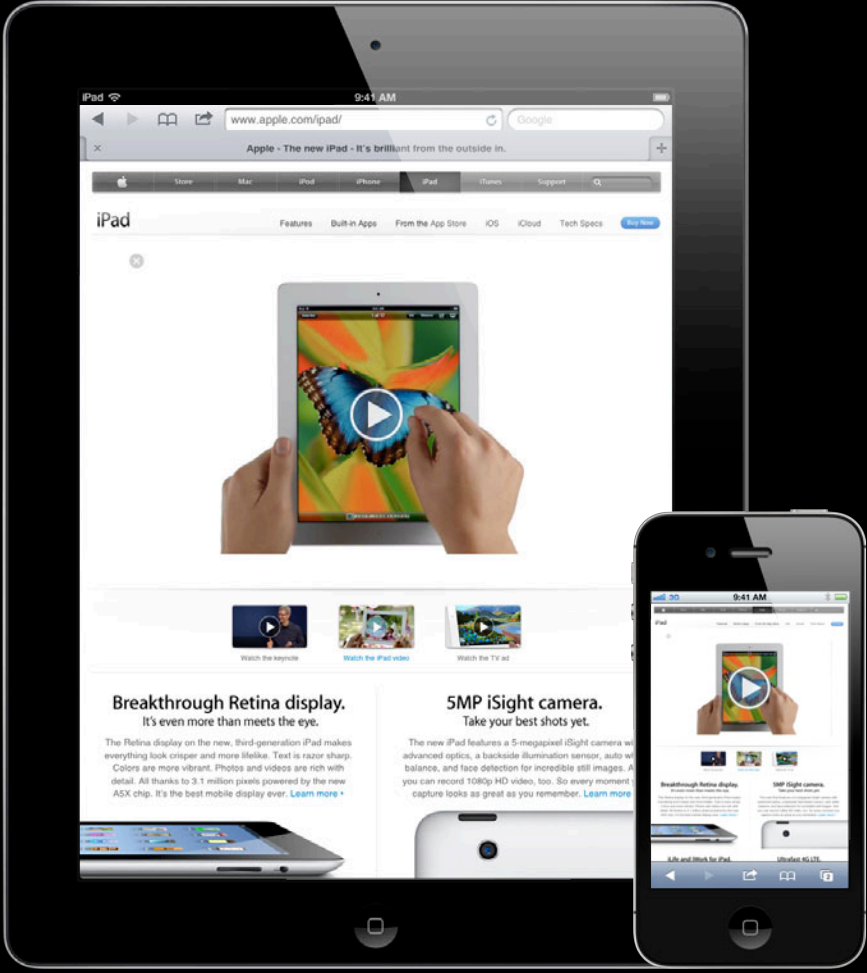
Store Mac iPod iPhone iPad iTunes Support

iPad Features Built-in Apps From the App Store iOS iCloud Tech Specs Buy Now



02:40 -02:52

The image shows a screenshot of the Apple website's iPad product page. At the top, the navigation bar includes links for Store, Mac, iPod, iPhone, iPad (which is highlighted), iTunes, and Support. Below this, the main header features the 'iPad' logo, followed by links for Features, Built-in Apps, From the App Store, iOS, iCloud, and Tech Specs, and a blue 'Buy Now' button. The central focus is a video player. The video frame shows a person's hands holding an iPad, which displays a vibrant photograph of two women standing in front of a colorful building with a sign that says 'The Market'. The video player interface at the bottom includes a progress bar, play/pause, and volume controls, with a current time of 02:40 and a total duration of 02:52.



9:41 AM
www.apple.com/ipad/ Google

Apple - The new iPad - It's brilliant from the outside in.

Store Mac iPad iPhone iPad iTunes Support

iPad Features Built-in Apps From the App Store iOS iCloud Tech Specs Buy Now

Watch the keynote Watch the iPad video Watch the TV ad

Breakthrough Retina display.
It's even more than meets the eye.
The Retina display on the new, third-generation iPad makes everything look crisper and more lifelike. Text is razor sharp. Colors are more vibrant. Photos and videos are rich with detail. All thanks to 3.1 million pixels powered by the new A5X chip. It's the best mobile display ever. [Learn more](#)

5MP iSight camera.
Take your best shots yet.
The new iPad features a 5-megapixel iSight camera with advanced optics, a backside illumination sensor, auto white balance, and face detection for incredible still images. And you can record 1080p HD video, too. So every moment you capture looks as great as you remember. [Learn more](#)

It fits and sticks for iPad. Universal iSight.

HTML5





@!#%?!





New Ways to Integrate Media with HTML5

New Ways to Integrate Media with HTML5

Synchronize multiple media elements

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Implement fullscreen interfaces

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Augment your interface with audio

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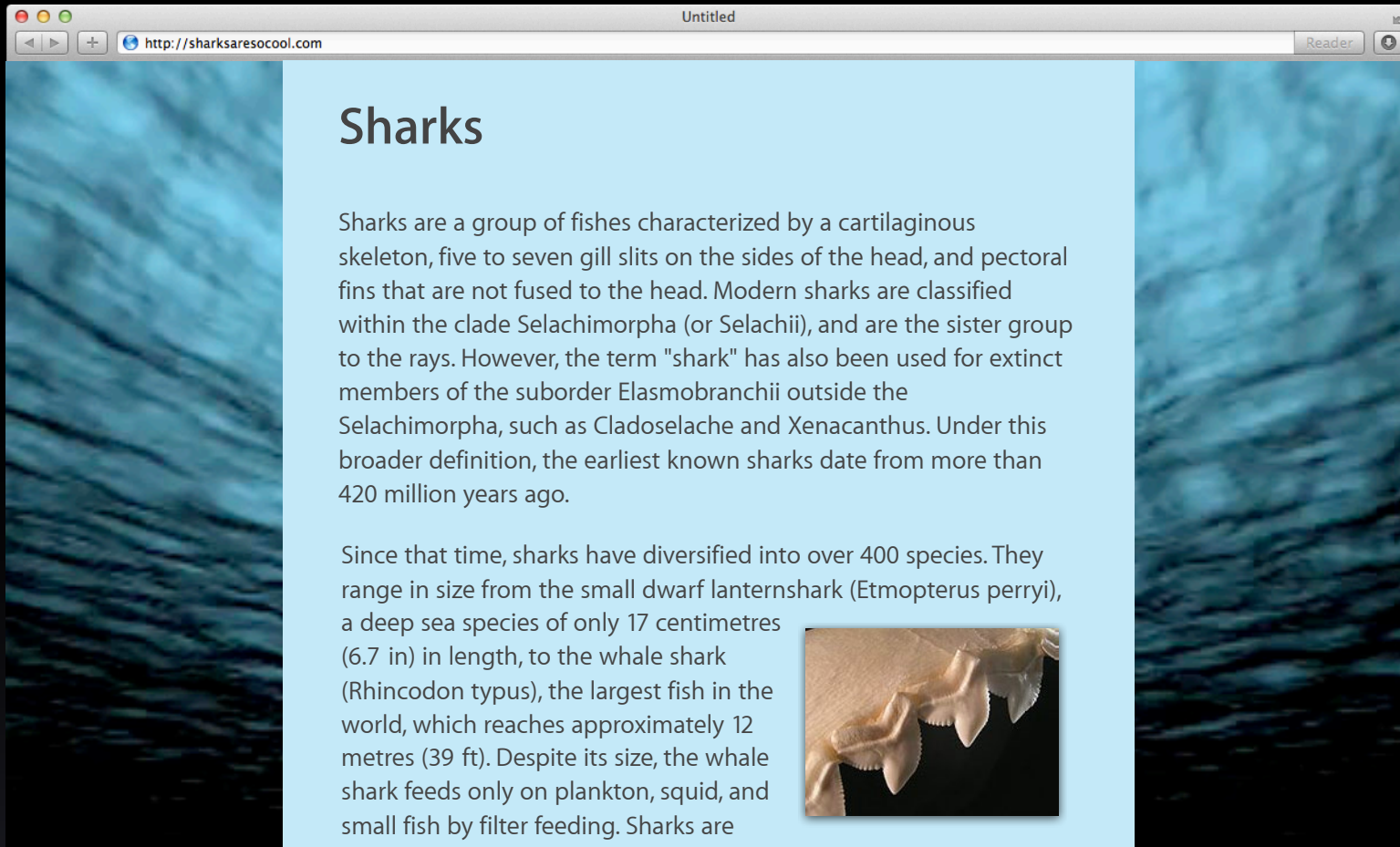
Synchronize multiple media elements

Implement fullscreen interfaces

Augment your interface with audio

When Perfect Sync Is Required

Sophisticated decoration




The image shows a screenshot of a web browser window. The browser's address bar displays the URL <http://sharksaesocool.com>. The page title is "Untitled". The browser interface includes standard navigation buttons (back, forward, home) and a "Reader" mode button. The main content area has a light blue background with a dark blue, wavy, water-like texture on the left and right sides. The article title "Sharks" is prominently displayed at the top of the content area. Below the title, there are two paragraphs of text describing sharks, followed by a small inset image of shark gills.

Sharks

Sharks are a group of fishes characterized by a cartilaginous skeleton, five to seven gill slits on the sides of the head, and pectoral fins that are not fused to the head. Modern sharks are classified within the clade Selachimorpha (or Selachii), and are the sister group to the rays. However, the term "shark" has also been used for extinct members of the suborder Elasmobranchii outside the Selachimorpha, such as Cladoselache and Xenacanthus. Under this broader definition, the earliest known sharks date from more than 420 million years ago.

Since that time, sharks have diversified into over 400 species. They range in size from the small dwarf lanternshark (*Etmopterus perryi*), a deep sea species of only 17 centimetres (6.7 in) in length, to the whale shark (*Rhincodon typus*), the largest fish in the world, which reaches approximately 12 metres (39 ft). Despite its size, the whale shark feeds only on plankton, squid, and small fish by filter feeding. Sharks are



When Perfect Sync Is Required

Adding a sign language track



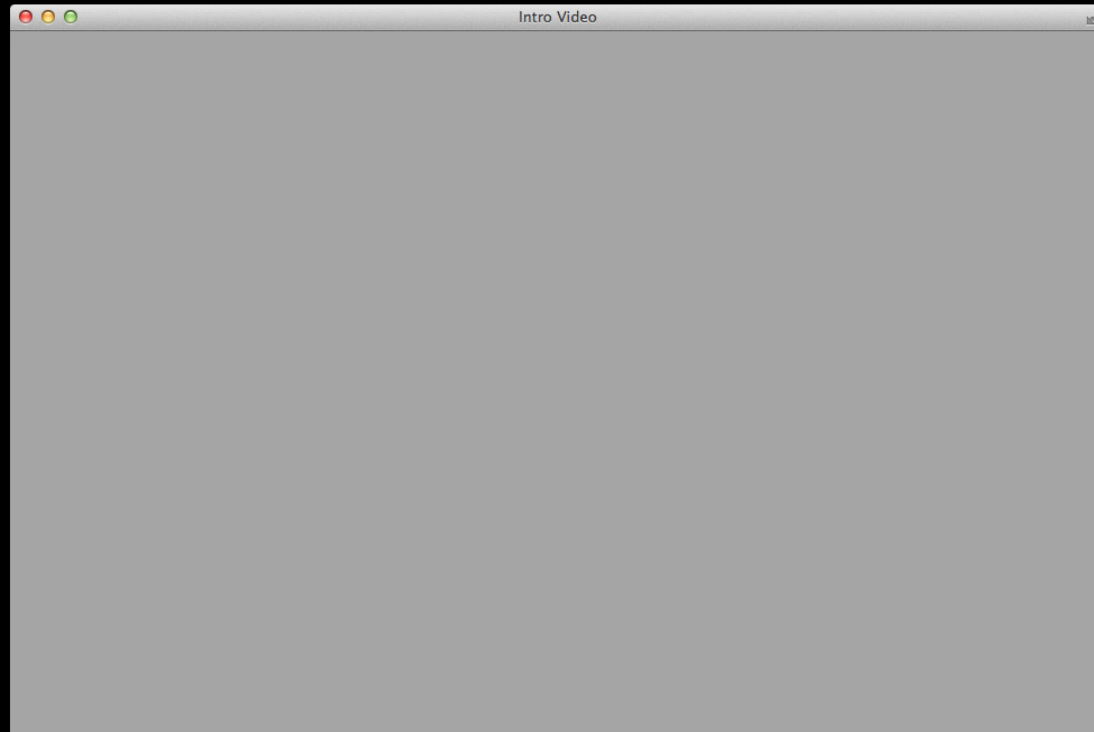
When Perfect Sync Is Required

Comparing two similar events



When Perfect Sync Is Required

Substituting an alternate audio track



When Perfect Sync Is Required

Substituting an alternate audio track



Keeping Playback in Perfect Sync

Maybe I'll try...

- Starting the video

```
// user has tapped PLAY
var myVideos = document.getElementsByTagName("video");
for (int i = 0; i < myVideos.length; i++) {
    myVideos[i].play();
}
```

Keeping Playback in Perfect Sync

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```

- Script execution takes a finite, unpredictable amount of time
- Media playback is not blocked by script execution

Keeping Playback in Perfect Sync

Other challenges

Keeping Playback in Perfect Sync

Other challenges

- Determining when all videos have enough data buffered to play

Keeping Playback in Perfect Sync

Other challenges

- Determining when all videos have enough data buffered to play
- Changing `playbackRate`, for slow motion or fast-forwarding

Keeping Playback in Perfect Sync

Other challenges

- Determining when all videos have enough data buffered to play
- Changing `playbackRate`, for slow motion or fast-forwarding
- Dealing with unexpected stalls on a single video

Media Controllers

New in HTML5 and Safari 6.0



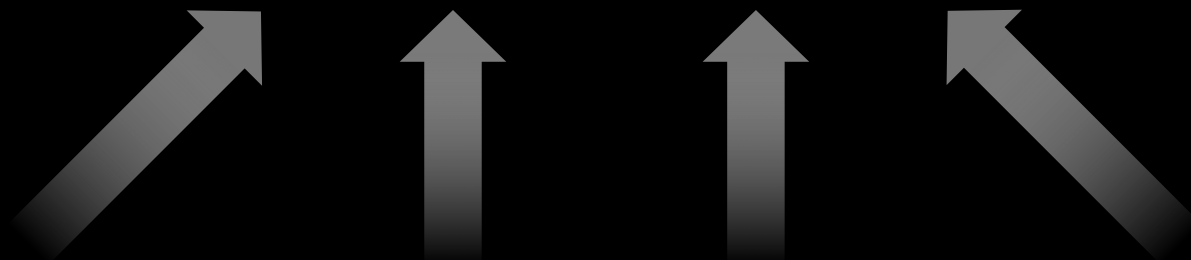
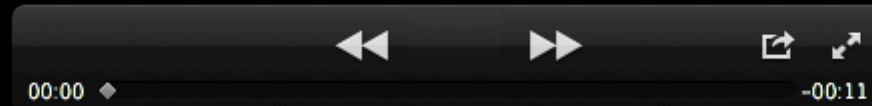
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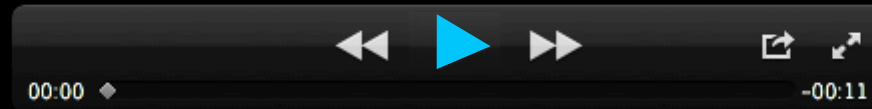
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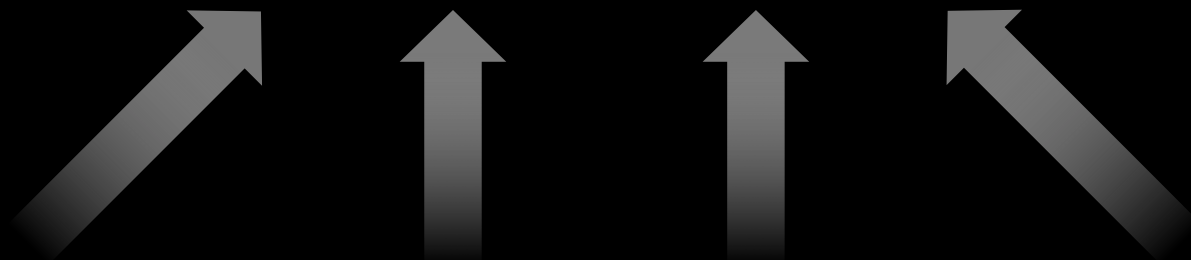
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Use familiar `<audio>` and `<video>` API

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Functions

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play()  
pause()  
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Attributes

```
currentTime  
duration  
ended  
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playbackRate  
played  
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```

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Events

```
abort  
canplay  
canplaythrough  
durationchange  
emptied  
ended  
error  
loadeddata  
loadedmetadata  
loadstart  
...
```

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autoplay
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Setting up a Media Controller

In HTML

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Setting up a Media Controller

In HTML

- Set the `mediagroup` attribute on all slaved elements



Setting up a Media Controller

In HTML

- Set the **mediagroup** attribute on all slaved elements

```
<video src="bohemian-rhapsody.mp4" width="1280" height="720">  
  Sorry, your browser can't display the HTML5 video element.  
</video>
```

```
<video src="sign-language.mp4" width="300" height="200">  
</video>
```

Setting up a Media Controller

In HTML

- Set the `mediagroup` attribute on all slaved elements

```
<video src="bohemian-rhapsody.mp4" width="1280" height="720"  
  mediagroup="videoController" >  
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```

```
<video src="sign-language.mp4" width="300" height="200"  
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<video src="sign-language.mp4" width="300" height="200"
  mediagroup="videoController" >
</video>
```

- Access the controller on any slaved element to control them all

```
var myVideo = document.getElementsByTagName("video")[0];
var myController = myVideo.controller;

myController.play();
myController.pause();
```

Setting up a Media Controller

In JavaScript

- Create a media controller object

```
var myController = new MediaController();
```

Setting up a Media Controller

In JavaScript

- Create a media controller object

```
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```

- Set the controller on any media element

```
document.querySelector("video").controller = myController;  
document.getElementsByTagName("video")[1].controller = myController;
```

Setting up a Media Controller

In JavaScript

- Create a media controller object

```
var myController = new MediaController();
```

- Set the controller on any media element

```
document.querySelector("video").controller = myController;  
document.getElementsByTagName("video")[1].controller = myController;
```

- Control all media with a single controller

```
myController.play();  
myController.pause();
```

Demo

Synchronizing video playback with a media controller

Beth Dakin

Safari and WebKit Engineer

New Ways to Integrate Media with HTML5

Synchronize multiple media elements

Implement fullscreen interfaces

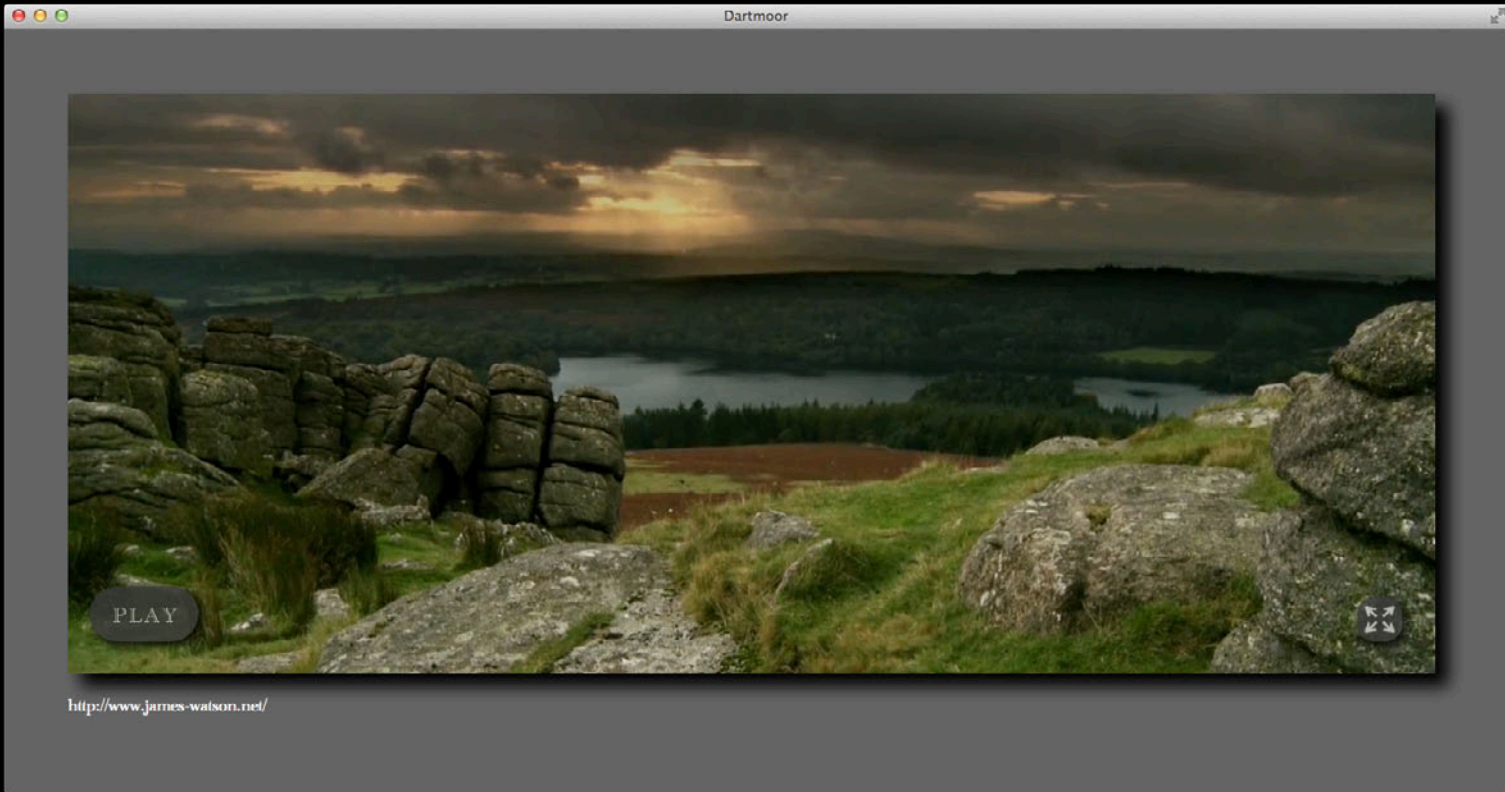
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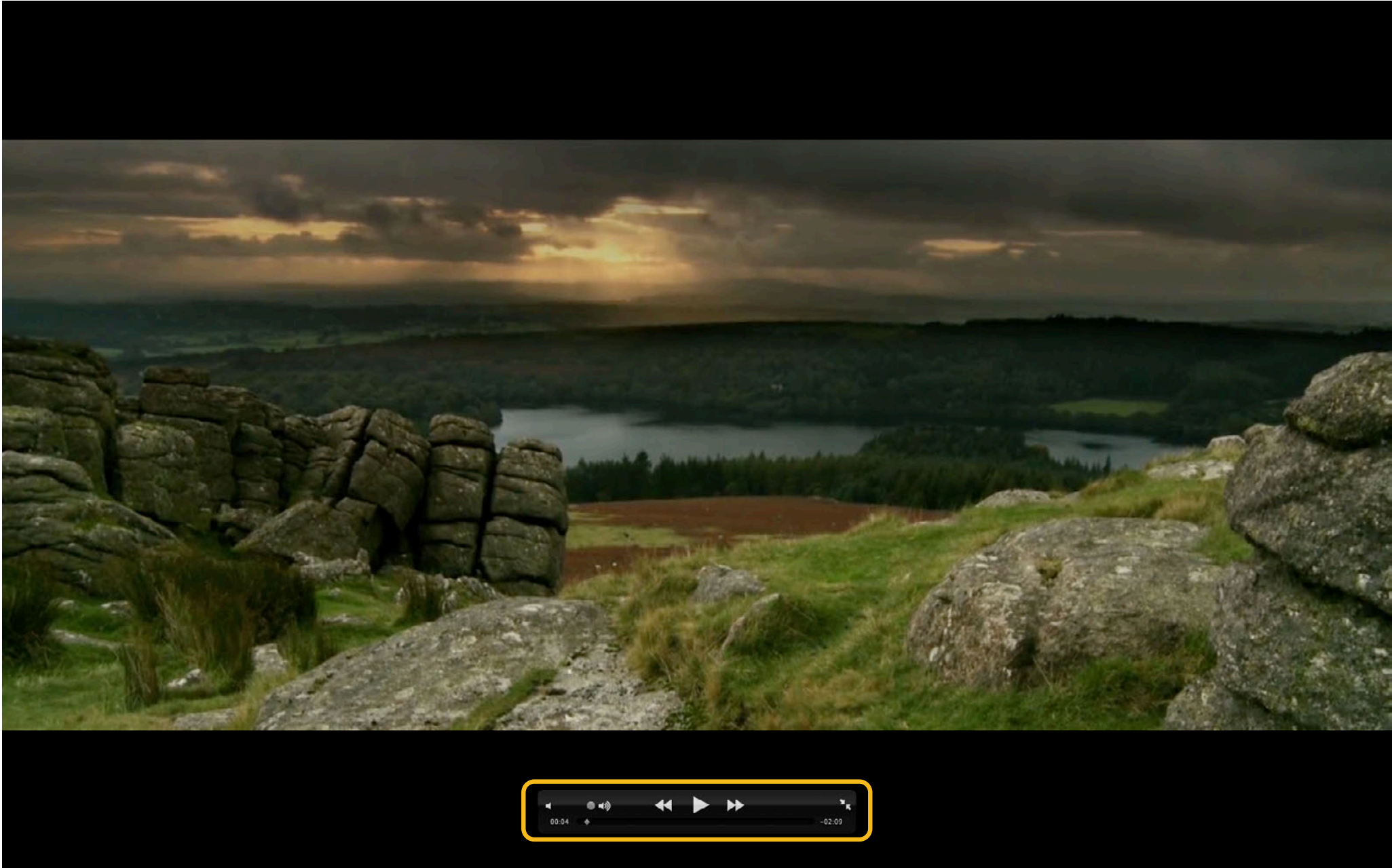
Augment your interface with audio



<http://www.james-watson.net/>







Implementing Fullscreen Interfaces

Learn how to...

Implementing Fullscreen Interfaces

Learn how to...

- Enter and exit fullscreen mode

Implementing Fullscreen Interfaces

Learn how to...

- Enter and exit fullscreen mode
- Define a custom appearance or behavior for the fullscreen element

Entering and Exiting Fullscreen Mode

Taking any webpage element fullscreen

- Fetch the element and request fullscreen for it

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Taking any webpage element fullscreen

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```
document.getElementById("main").webkitRequestFullscreen();
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<https://dvcs.w3.org/hg/fullscreen/raw-file/tip/Overview.html>

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- Takes over the screen from which the request initiated

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- Must be triggered by an explicit user action
 - A `mousemove` event does not qualify

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- Case matters!

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Entering and Exiting Fullscreen Mode

Going back to the page view

Entering and Exiting Fullscreen Mode

Going back to the page view

```
document.webkitExitFullscreen();
```

Entering and Exiting Fullscreen Mode

Going back to the page view

- Also requires an explicit user action

```
document.webkitExitFullscreen();
```

Entering and Exiting Fullscreen Mode

Going back to the page view

- Also requires an explicit user action
 - The initial click to enter fullscreen mode qualifies

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Entering and Exiting Fullscreen Mode

Detecting fullscreen changes

- A single event listener for exiting or entering fullscreen mode

Entering and Exiting Fullscreen Mode

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- A single event listener for exiting or entering fullscreen mode

`webkitfullscreenchange`

Entering and Exiting Fullscreen Mode

Detecting fullscreen changes

- A single event listener for exiting or entering fullscreen mode

```
var main = document.getElementById("main");  
main.addEventListener('webkitfullscreenchange', addKeyListeners, false);
```

Entering and Exiting Fullscreen Mode

Detecting fullscreen changes

- A single event listener for exiting or entering fullscreen mode

```
var main = document.getElementById("main");  
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- Check for a fullscreen element to determine enter vs. exit

Entering and Exiting Fullscreen Mode

Detecting fullscreen changes

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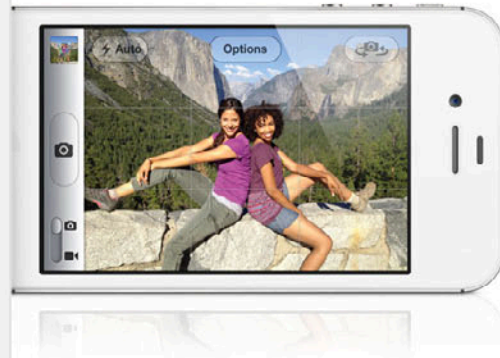
- Check for a fullscreen element to determine enter vs. exit

```
function addKeyListeners() {
  if (document.webkitFullscreenElement) {
    // entering fullscreen mode
    document.addEventListener('keydown', handleKeyPress, false);
  }
  else {
    // exiting fullscreen mode
    document.removeEventListener('keydown', handleKeyPress, false);
  }
}
```

[Browse All Built-in Apps](#)

It does everything. Better.

Shoot 8-megapixel photos and 1080p HD video. See your favorite people with FaceTime. Browse the web. Send messages, messages, and more messages. Check your email and calendar. Listen to music. Watch movies. Oh, and make phone calls. It's the best of everything. Built right in.



It just might be the best camera ever on a phone.

You can expect a few things from the 8MP iSight camera with all-new optics. Like better shots in low light and better shots in lots of light. More color accuracy, reduced motion blur, better exposure, and a lot more focus on faces with face detection. Expect to take it everywhere, pull it out anywhere, and shoot just about everything you see. And expect beautiful, braggable, frammable photos.

[Learn more about Camera](#)



Video recording. Film your life in 1080p HD.

Now you can shoot and edit 1080p HD video. From your iPhone. Film your favorite people, your big adventures, and the small stuff you see every day. And it will all be even clearer, bigger, brighter, and more entertaining than you remember.

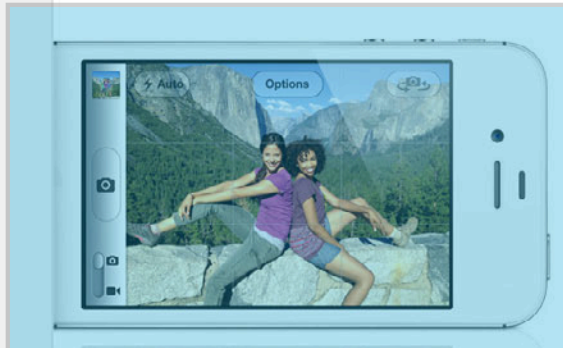
[Learn more about HD video recording](#)



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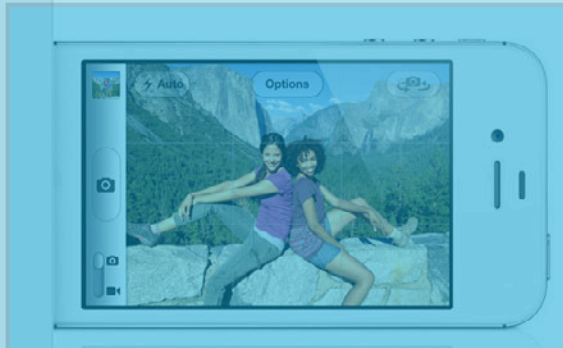
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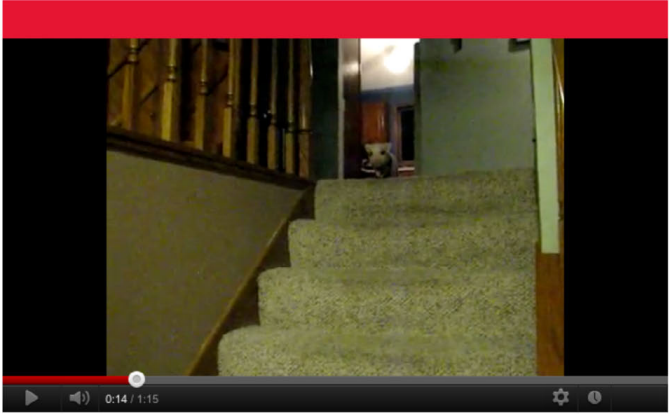
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Squee News, Video and Gossip

Reader



0:14 / 1:15

SQUEE

Teeny Tiny Pig Overcomes His Fear of Stairs to Get to a Bowl of Delicious Oatmeal

Hamlet is a little shy about going to down the steps, but, oh man, does he ever want that bowl of oatmeal. Thankfully, his effort is rewarded in a most delightful way. Snort, snort, snort.

[Via [VVV](#)]

BY CASSIE MURDOCH JUN 5, 2012 11:15 PM

Share +1 Like 36k 124,617 134

Presented by **bing**

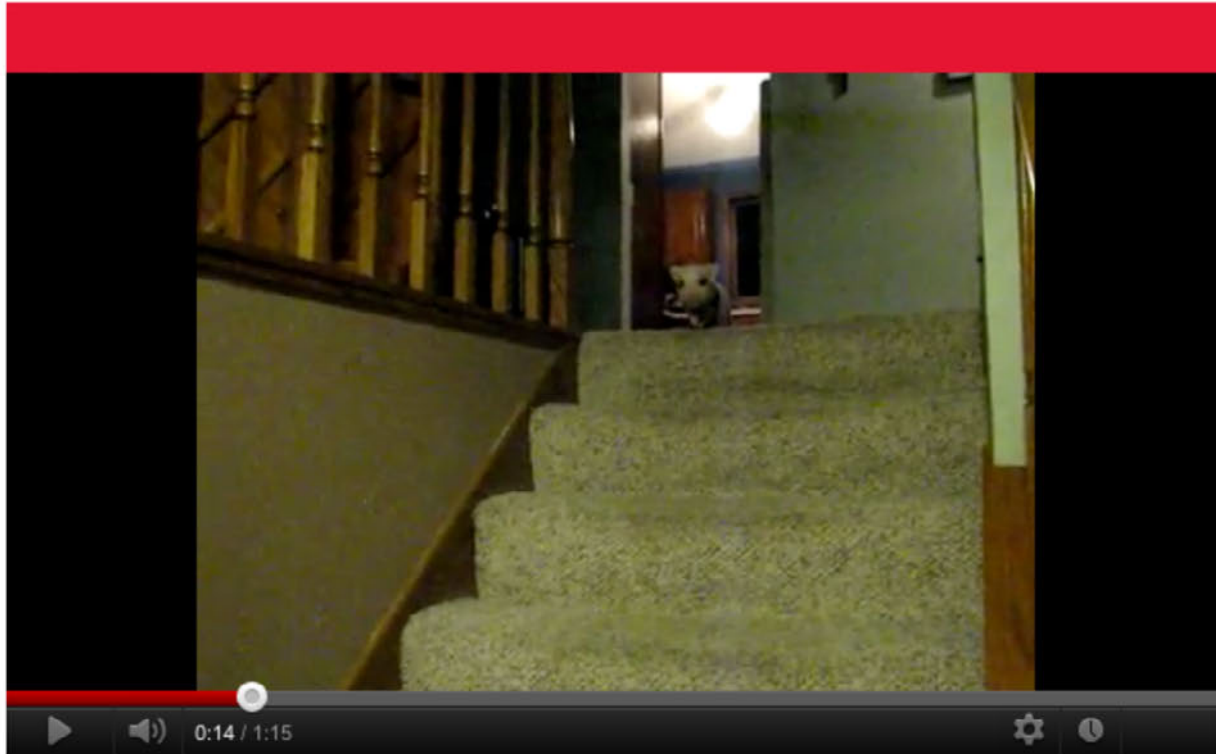
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Like 147,177 people like this.

LATEST STORIES WEDNESDAY, JUN 6, 2012

SIGN IN

- Teeny Tiny Pig Overcomes His Fear of Stairs to Get to a Bowl of Delicious Oatmeal JUN 5, 2012
- Happy Monday: Here Are Some Dogs On Skateboards JUN 4, 2012
- Let These Dog and Pig Friends Enjoy a Playful Romp All Over Your Heart JUN 3, 2012
- Dog Seems a Little Unnerved by Former Street Cat JUN 1, 2012
- Hamster Can Play Dead Among the Best of Them MAY 30, 2012
- Scarf-Wearing Pig Spotted On Pittsburgh Highway MAY 30, 2012



SQUEE

Teeny Tiny Pig Overcomes His Fear of Stairs to Get to a Bowl of

BY CASSIE MURDOCH

JUN 5, 2012 11:15 PM

Share

+1

Like

36k

124,617 134

Presented by bing



LATEST STORIES

WEDN



Teeny Tiny Pig Overcomes His Fear of Stairs to Get to a Bowl of Delic



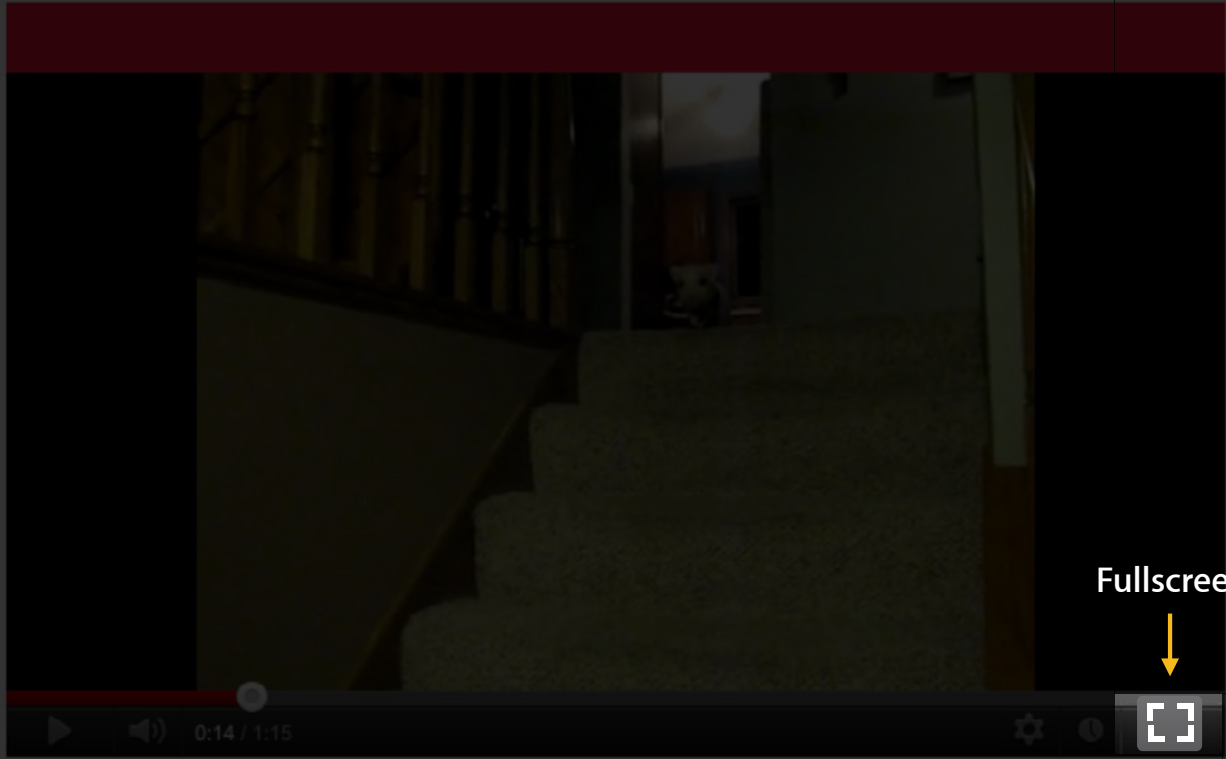
Happy Monday: Friends Enjoy a Picnic in the Park



Let These Dog Friends Enjoy a Picnic in the Park



Dog Seems a Little Scared



Fullscreen



SQUEE

Teeny Tiny Pig Overcomes His Fear of Stairs to Get to a Bowl of

BY CASSIE MURDOCH

JUN 5, 2012 11:15 PM

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Like

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124,617

134

Presented by **bing**

LATEST STORIES

WEDN

- Teeny Tiny Pig Overcomes His Fear of Stairs to Get to a Bowl of Delicious Food
- Happy Monday: Here Are Some Dogs Ours
- Let These Dog Friends Enjoy a Party Over Your Heart
- Dog Seems a Little

Entering and Exiting Fullscreen Mode

You are in control

- iframes cannot take themselves fullscreen by default
- Add the `webkitAllowFullscreen` attribute to allow fullscreen for iframes

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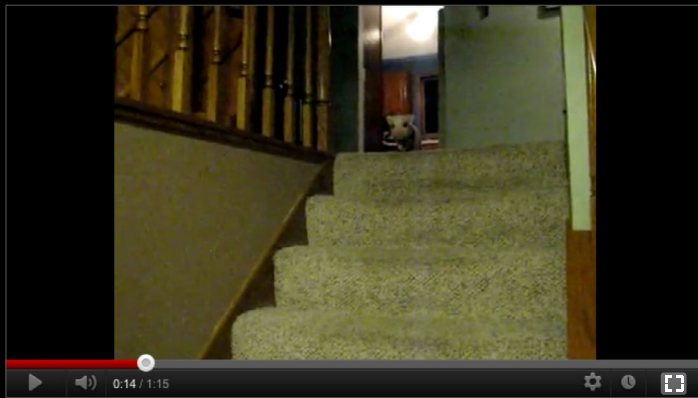
```
<iframe src="http://lose-20-pounds-in-a-day.com">
```

Entering and Exiting Fullscreen Mode

Inline content is aware of your decision

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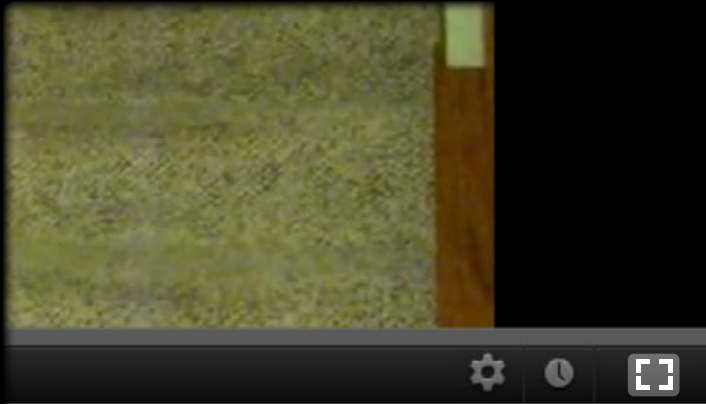
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document.webkitFullscreenEnabled
```

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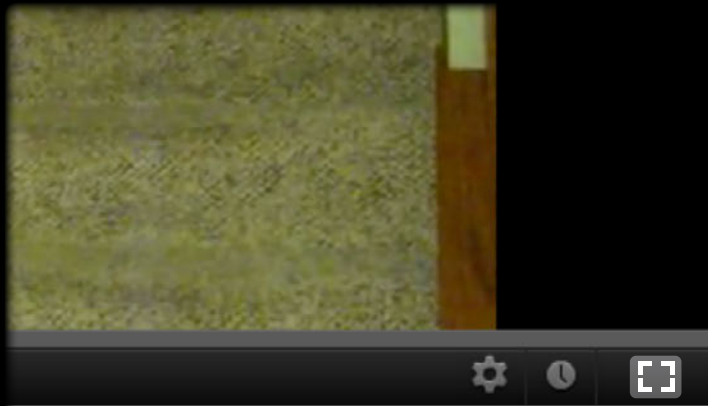
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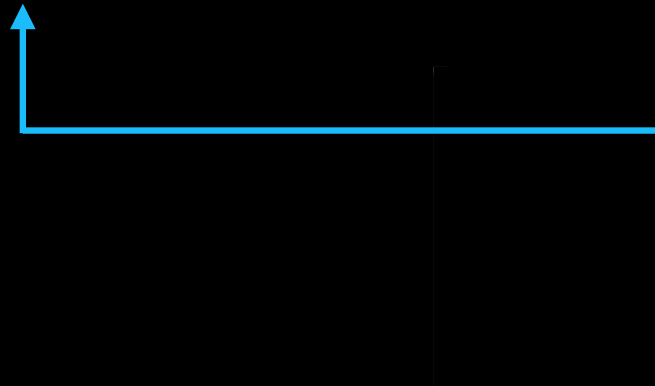
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```

`document.webkitFullscreenEnabled`

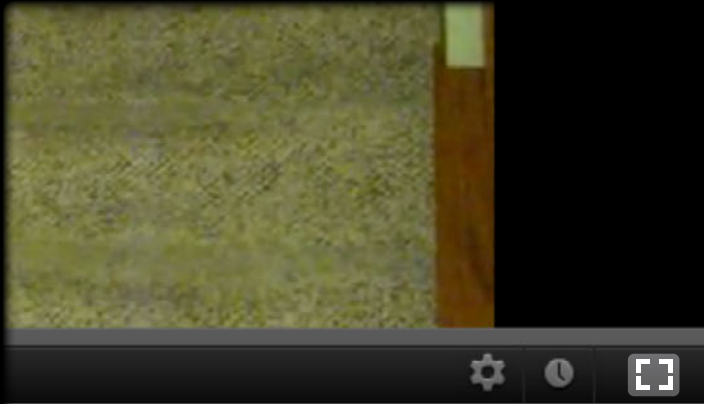


Entering and Exiting Fullscreen Mode

Inline content is aware of your decision

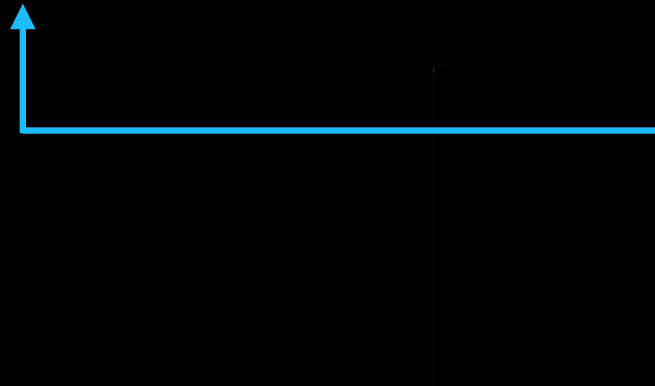
- iframes cannot take themselves fullscreen by default
- Add the `webkitAllowFullscreen` attribute to allow fullscreen for iframes

```
<iframe webkitAllowFullscreen src="http://a-trusted-video-site.com">
```



```
</iframe>
```

```
if (!document.webkitFullscreenEnabled)  
// hide this button
```

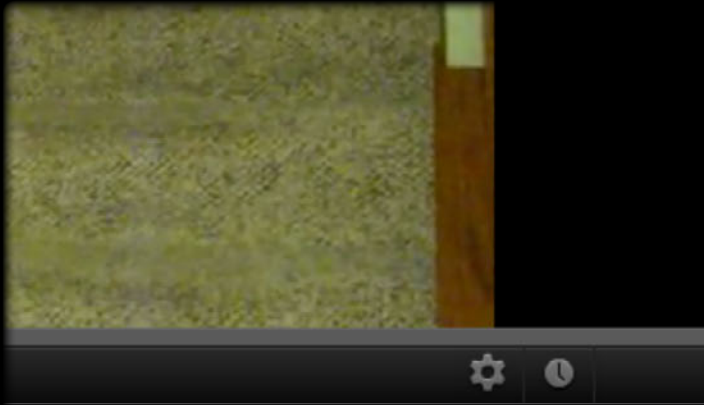


Entering and Exiting Fullscreen Mode

Inline content is aware of your decision

- iframes cannot take themselves fullscreen by default
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<iframe webkitAllowFullscreen src="http://a-trusted-video-site.com">
```



```
</iframe>
```

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if (!document.webkitFullscreenEnabled)  
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```

Implementing Fullscreen Interfaces

Learn how to...

- Enter and exit fullscreen mode
- Define a custom appearance or behavior for the fullscreen element

Implementing Fullscreen Interfaces

Learn how to...

- Enter and exit fullscreen mode
- Define a custom appearance or behavior for the fullscreen element

⊗



CSS Filters

Applying filter effects to any element

`-webkit-filter:`



CSS Filters

Applying filter effects to any element

```
-webkit-filter: saturate(0-n);
```



CSS Filters

Applying filter effects to any element



```
-webkit-filter: saturate(0-n);  
                sepia(0-1);  
                invert(0-1);  
                contrast(0-n);  
                grayscale(0-1);  
                opacity(0-1);  
                hue-rotate(0-360deg);  
                blur(0-npx);  
                brightness(0-n);  
                drop-shadow(xoffsetpx yoffsetpx blurpx color);
```


CSS Filters

Applying filter effects to any element



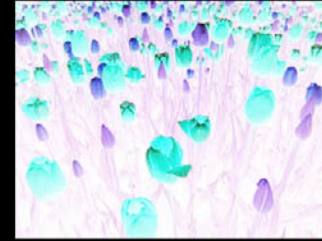
original image



grayscale(1)



sepia(1)



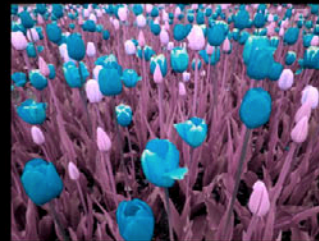
invert(1)



hue-rotate(45deg)



hue-rotate(90deg)



hue-rotate(210deg)



hue-rotate(320deg)



blur(3px)



brightness(0.2)



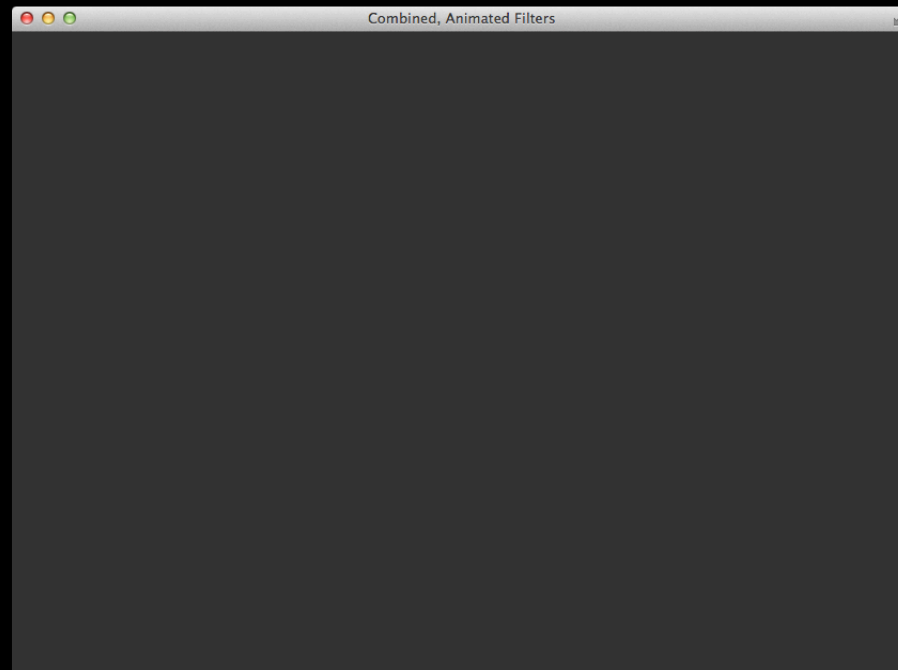
contrast(2)



saturate(3)

CSS Filters

Combining and animating filter functions

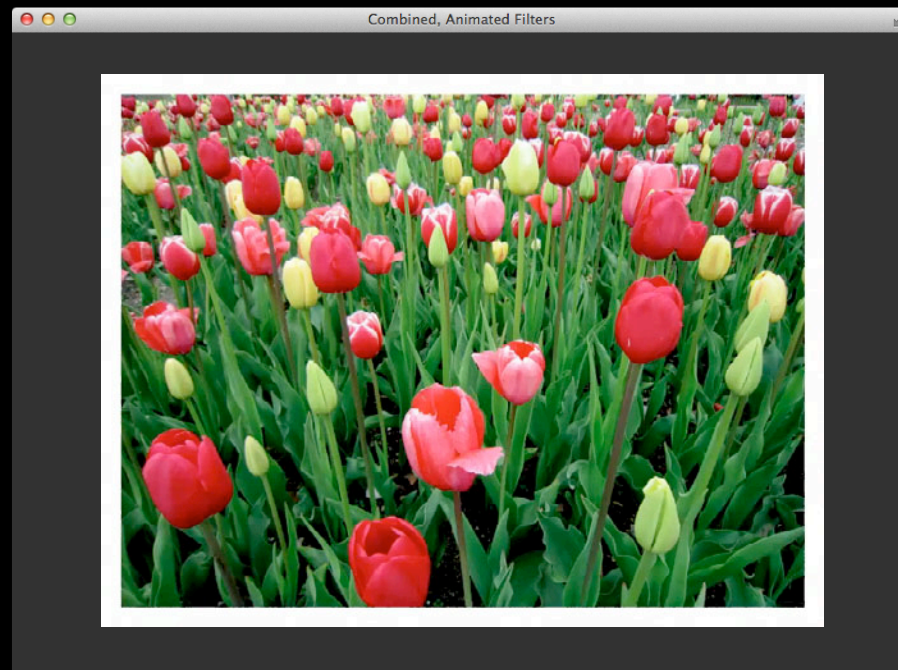


CSS Filters

Combining and animating filter functions



```
-webkit-filter: hue-rotate(320deg) contrast(2);
```

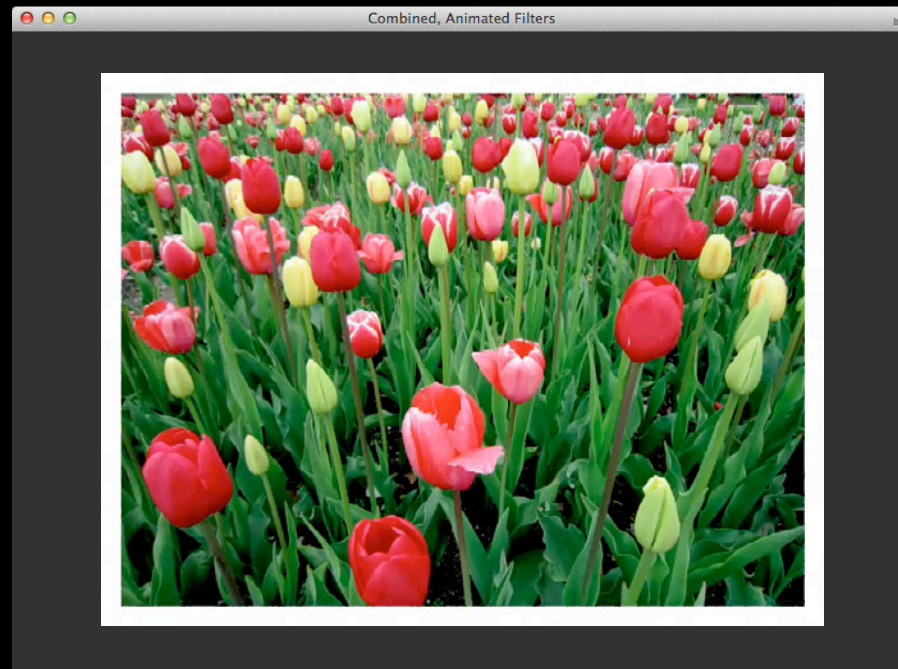


CSS Filters

Combining and animating filter functions

```
-webkit-filter: hue-rotate(320deg) contrast(2);
```

```
-webkit-transition: -webkit-filter 5s linear;
```

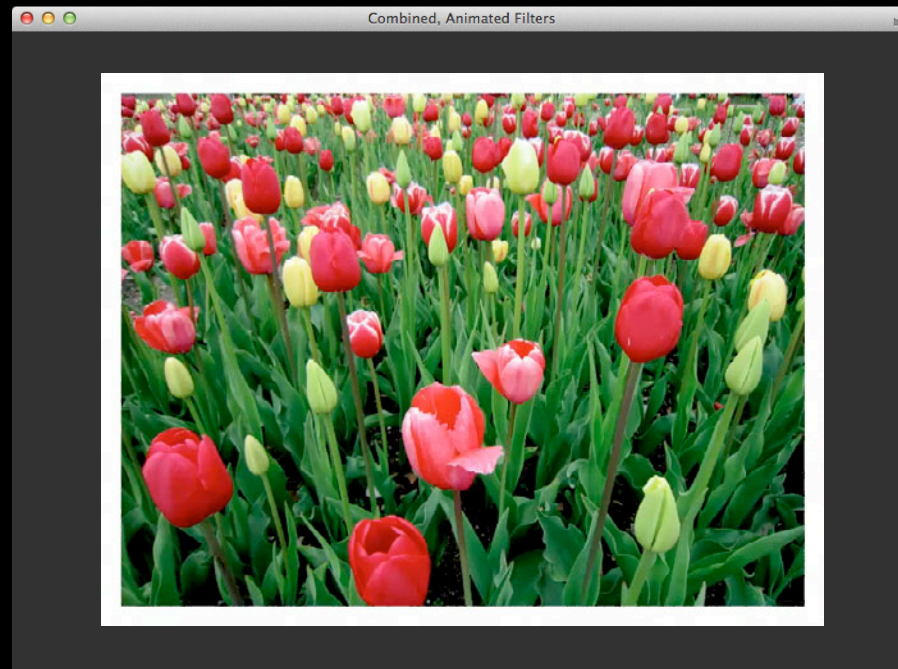


CSS Filters

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Combining and animating filter functions

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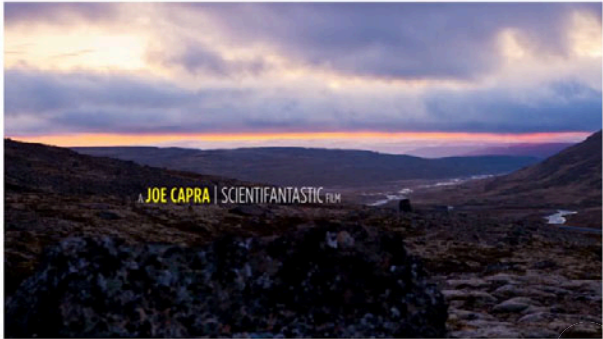
```
-webkit-transition: -webkit-filter 5s linear;
```




Session 604 Demo

SCIENTIFANTASTIC

Midnight Sun | Iceland



PLAY 

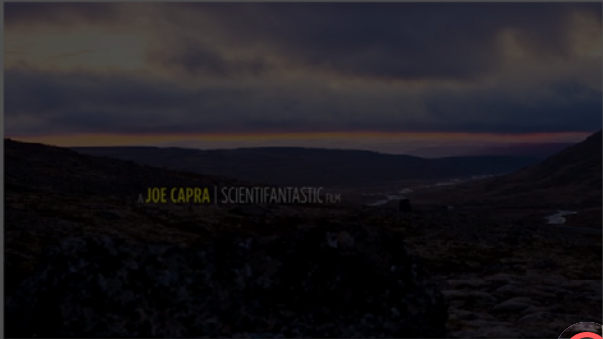
Midnight Sun: A natural phenomenon occurring in
the summer months north of the Arctic Circle and south of the Antarctic Circle where the sun never fully sets and remains visible 24 hours a day.


This short time lapse film was shot during the Icelandic Midnight Sun in June of 2011.

Session 604 Demo

SCIENTIFANTASTIC

Midnight Sun | Iceland



PLAY 

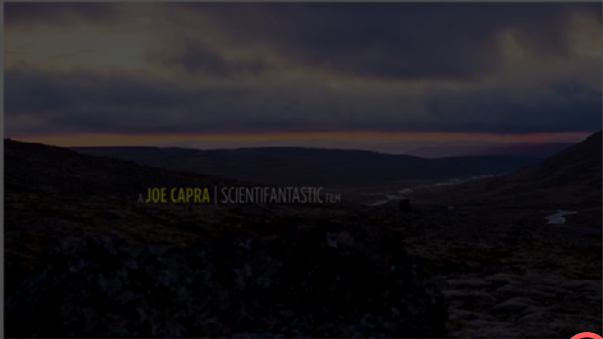
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Session 604 Demo

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Session 604 Demo

SCIENTIFANTASTIC

Midnight Sun | Iceland



A JOE CAPRA | SCIENTIFANTASTIC FILM

PLAY

Midnight Sun: A natural phenomenon occurring in
the summer months north of the Arctic Circle and south of the Antarctic Circle where the sun never fully sets and remains visible 24 hours a day.

This short time lapse film was shot during the Icelandic Midnight Sun in June of 2011.

The image shows a video player interface for a video titled "SCIENTIFANTASTIC". The player has a dark grey background. At the top left, there is a close button (an 'X' in a circle) highlighted with a yellow circle. Below the title, there is a subtitle "Midnight Sun | Iceland" with a yellow dot and a yellow arrow pointing left. The video frame shows a landscape with a low sun on the horizon, with the text "A JOE CAPRA | SCIENTIFANTASTIC FILM" overlaid. Four purple arrows point from the corners of the video frame towards the center. Below the video frame, there is a "PLAY" button and a red 'X' icon. At the bottom, there is a white text box with the following text: "Midnight Sun: A natural phenomenon occurring in the summer months north of the Arctic Circle and south of the Antarctic Circle where the sun never fully sets and remains visible 24 hours a day. This short time lapse film was shot during the Icelandic Midnight Sun in June of 2011." A yellow dot and a yellow arrow point down from the text box. The entire player is titled "Session 604 Demo" in the top right corner.

Session 604 Demo

SCIENTIFANTASTIC

Midnight Sun | Iceland

A JOE CAPRA | SCIENTIFANTASTIC FILM


PLAY

Midnight Sun: A natural phenomenon occurring in
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This short time lapse film was shot during the Icelandic Midnight Sun in June of 2011.

Session 604 Demo

SCIENTIFANTASTIC

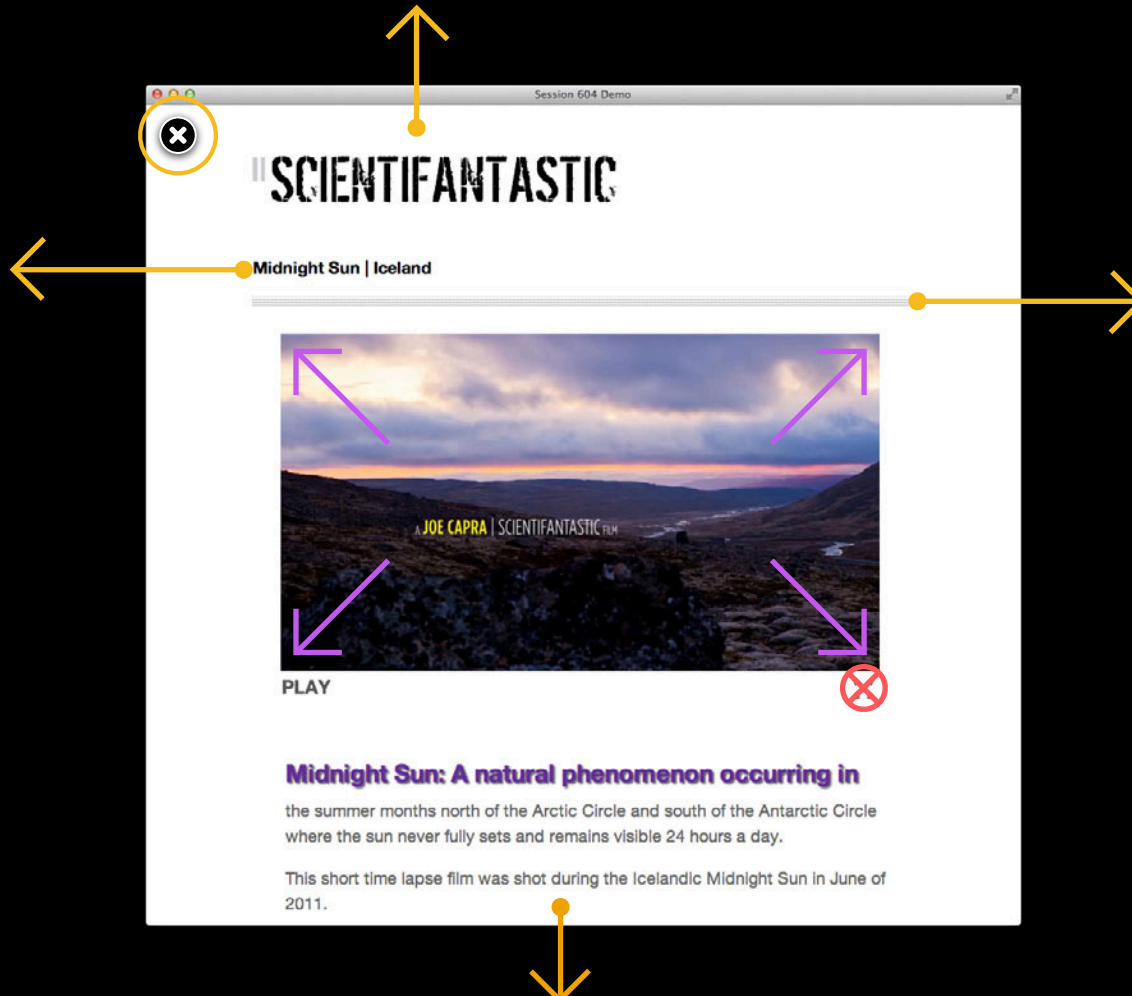
Midnight Sun | Iceland



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Modifying Element Appearance in Fullscreen

- A CSS pseudo-class for fullscreen mode
- CSS pseudo-classes are applied by the browser
- You define the appearance

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```
a {  
  color: gray;  
}
```

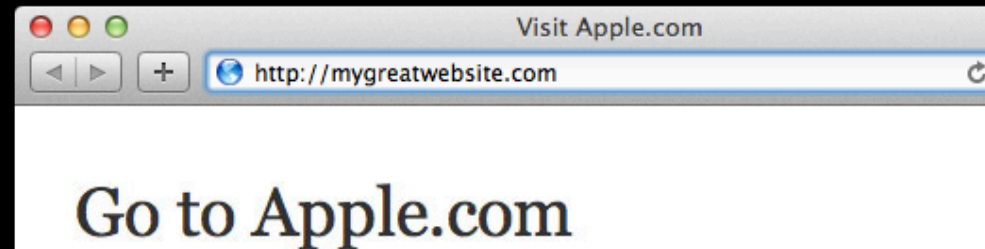


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```
a:hover {  
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  background-color: darkcyan;  
}
```



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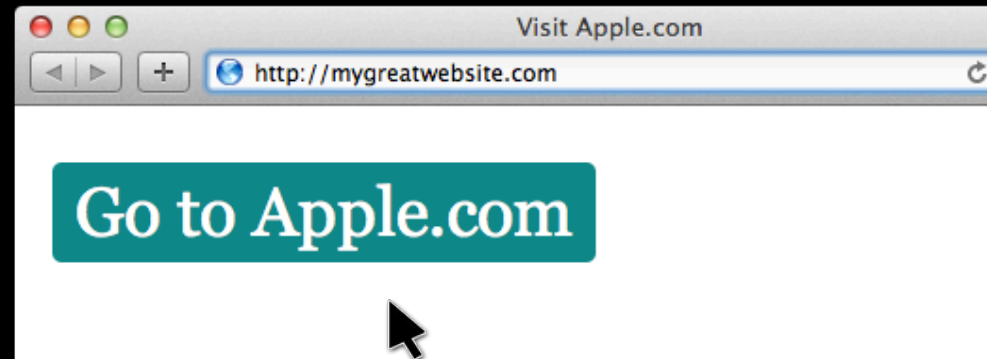


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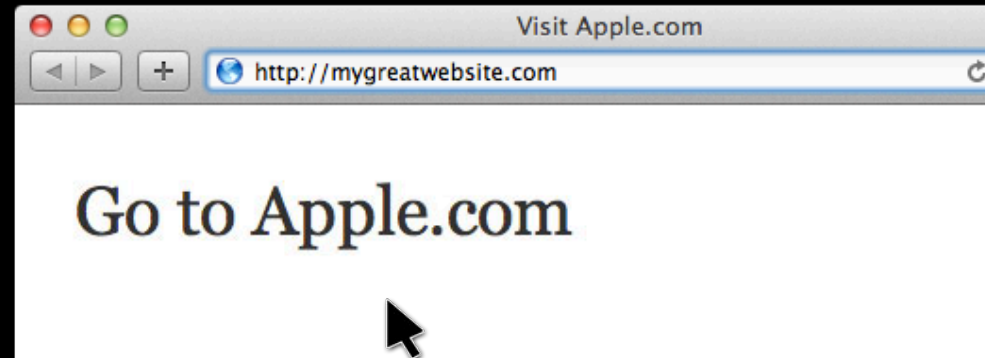


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- A CSS pseudo-class for fullscreen mode
`:-webkit-fullscreen`
- CSS pseudo-classes are applied by the browser
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a {  
  color: gray;  
  -webkit-transition: background-color 2s, color 2s;  
}
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```
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  background-color: darkcyan;  
}
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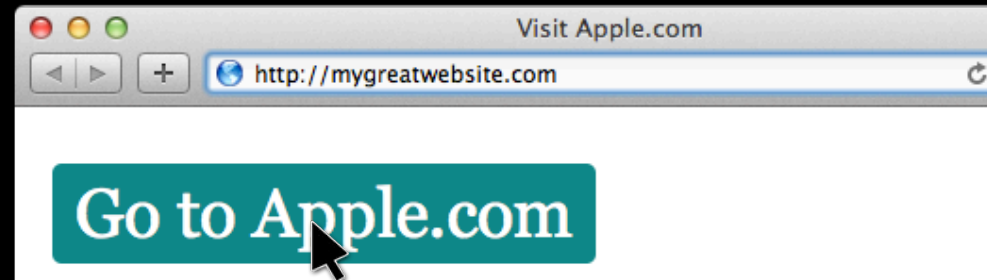


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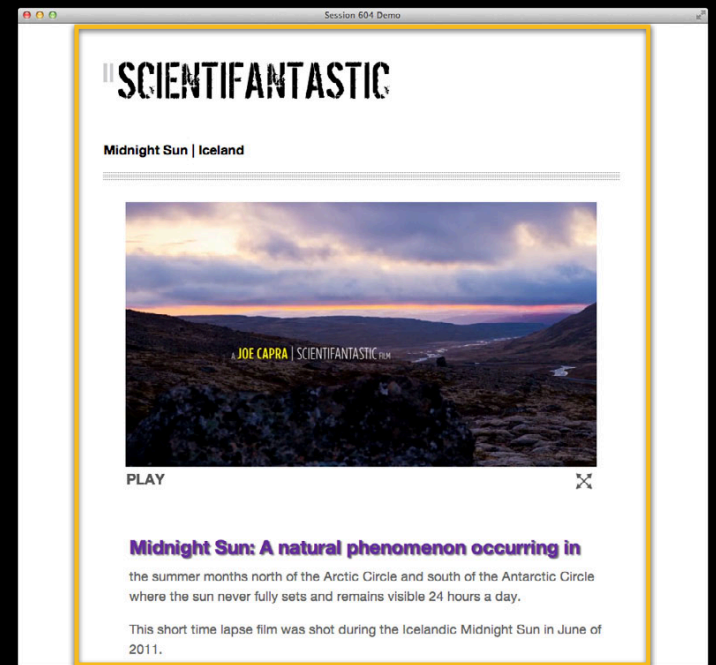
```
a:hover {  
  color: white;  
  background-color: darkcyan;  
}
```



Modifying Element Appearance in Fullscreen

Using the fullscreen pseudo-class

- Changing the background color



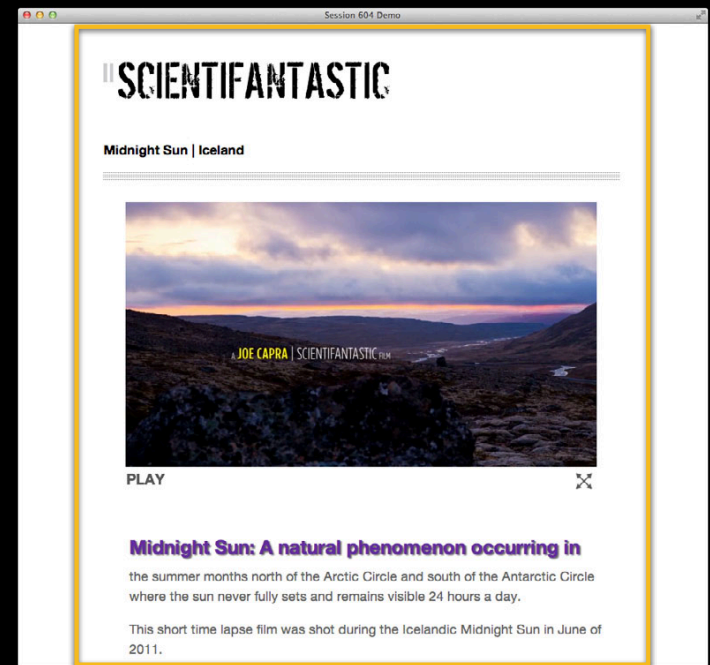
Modifying Element Appearance in Fullscreen

Using the fullscreen pseudo-class

- Changing the background color

```
#main {  
  background-color: white;  
}
```

```
// main is the element going fullscreen  
#main:-webkit-fullscreen {  
  background-color: black;  
}
```



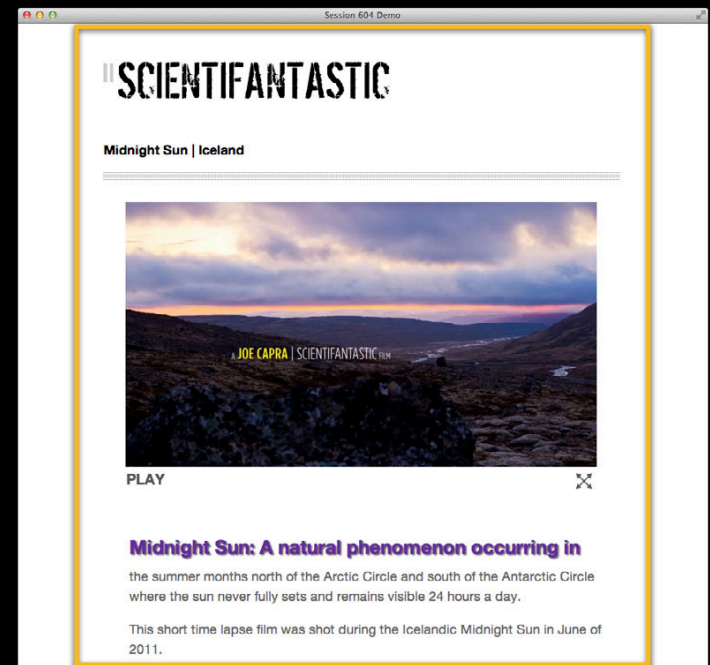
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Using the fullscreen pseudo-class

- Changing the background color

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#main {  
  background-color: white;  
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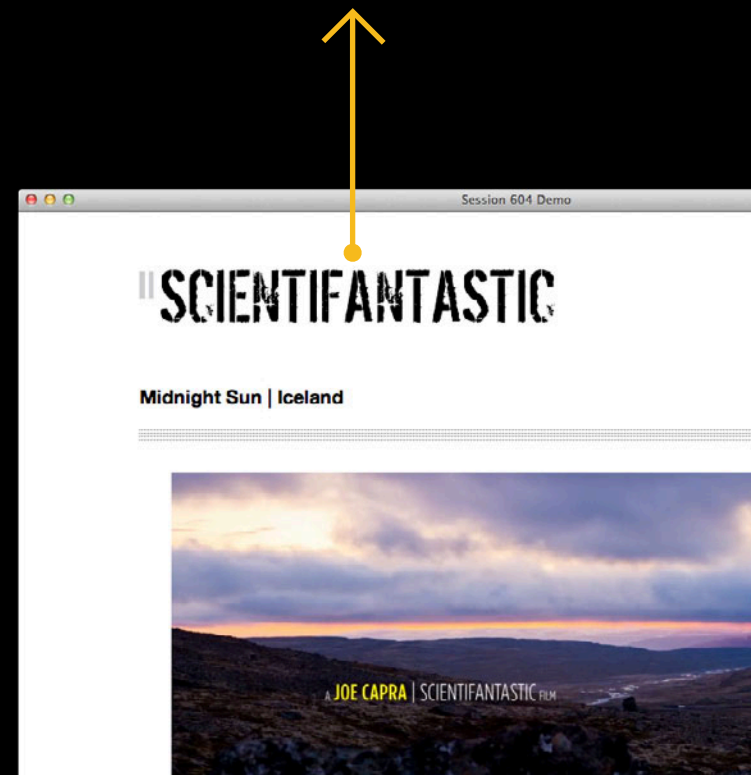


Modifying Element Appearance in Fullscreen

Using the fullscreen pseudo-class

- "Sliding" elements off the page

```
<div id="logo"></div>
```



Modifying Element Appearance in Fullscreen

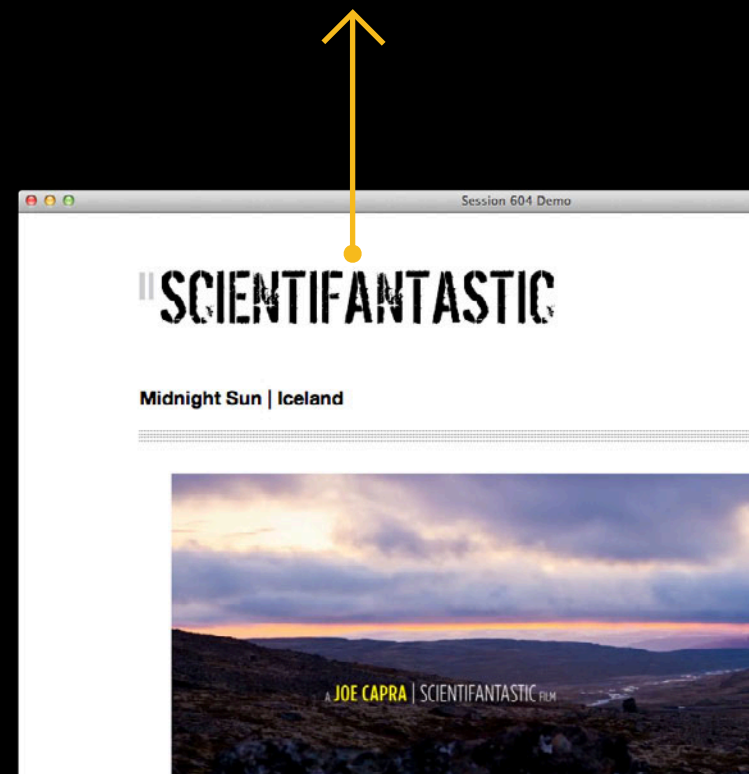
Using the fullscreen pseudo-class

- "Sliding" elements off the page

```
<div id="logo"></div>
```

```
#logo {  
  background-image:url("logo.png");  
}
```

```
// #logo inside of #main,  
// the element going fullscreen  
:-webkit-fullscreen #logo {  
  -webkit-transform: translateY(-300px);  
}
```



Modifying Element Appearance in Fullscreen

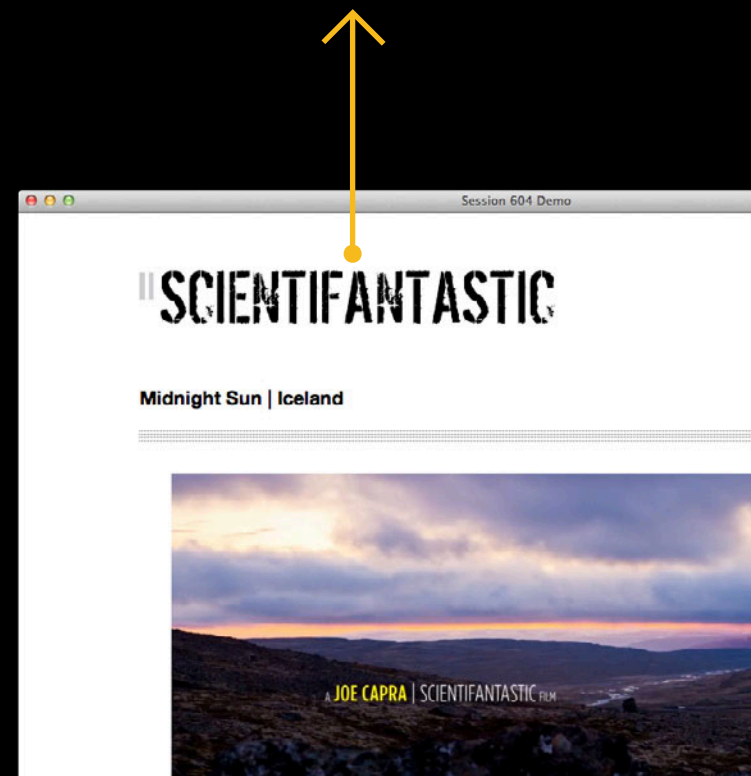
Using the fullscreen pseudo-class

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```

```
#logo {  
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```
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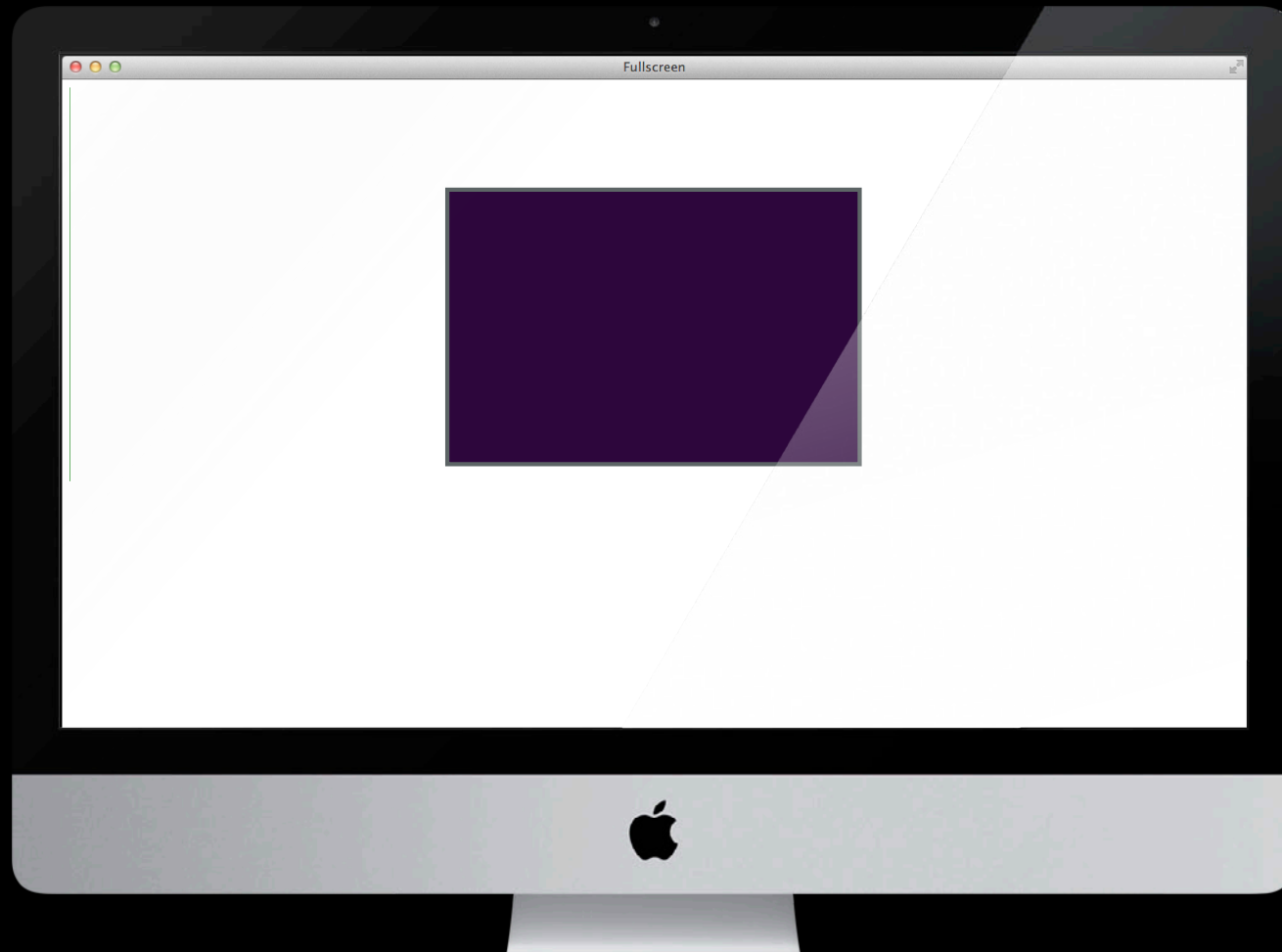
Modifying Element Appearance in Fullscreen

Resizing your element to fill the screen



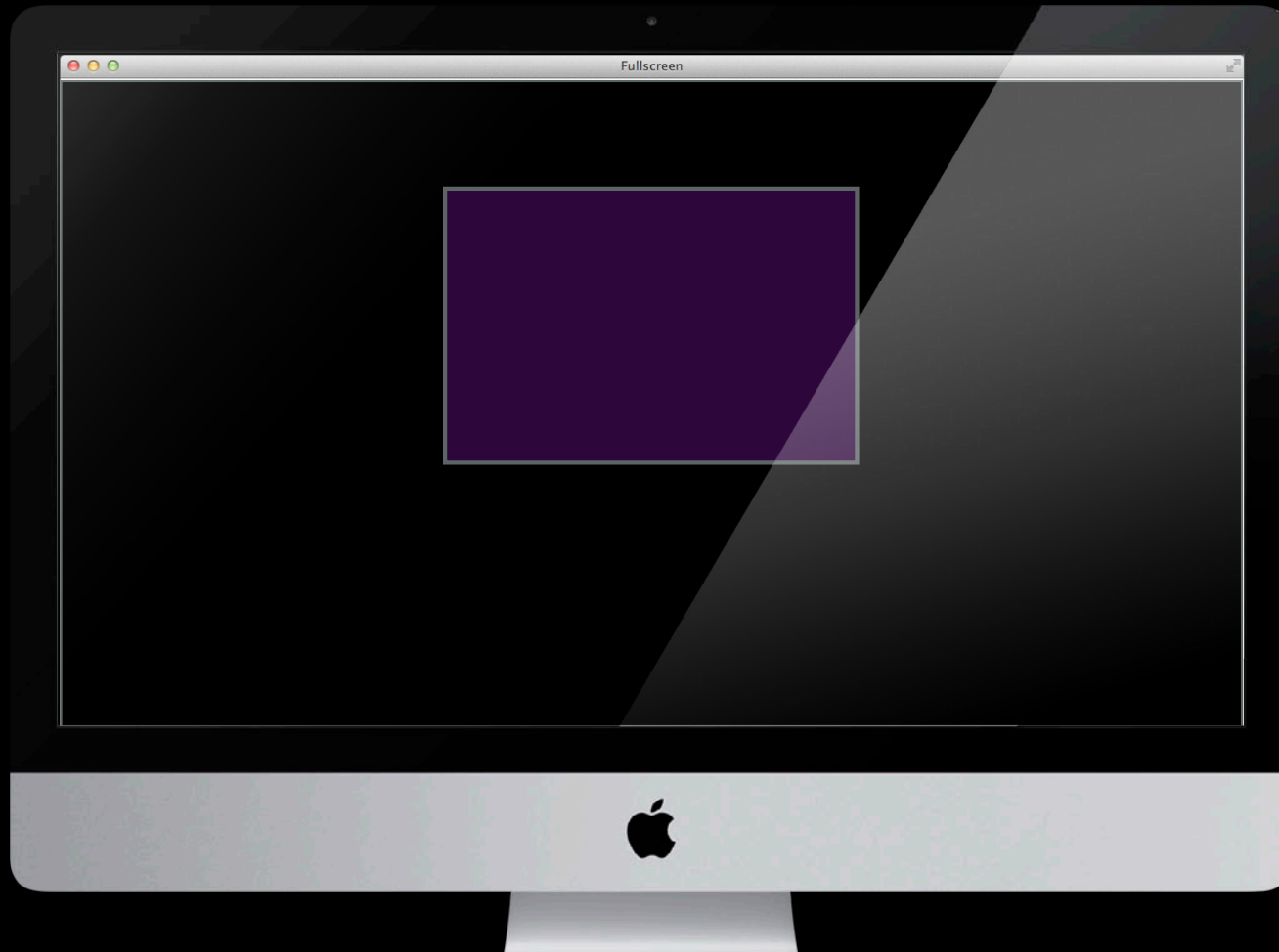
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Resizing your element to fill the screen



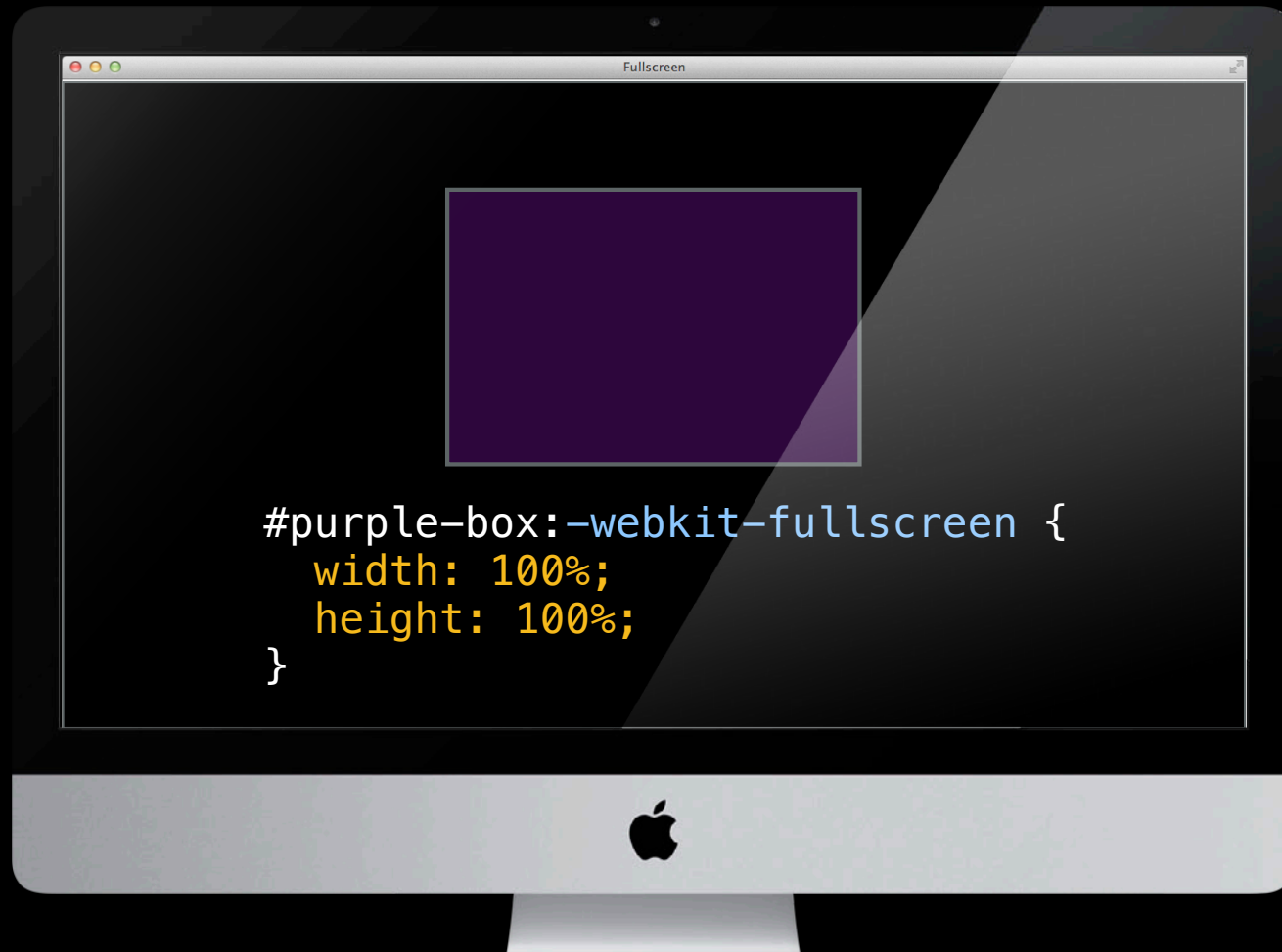
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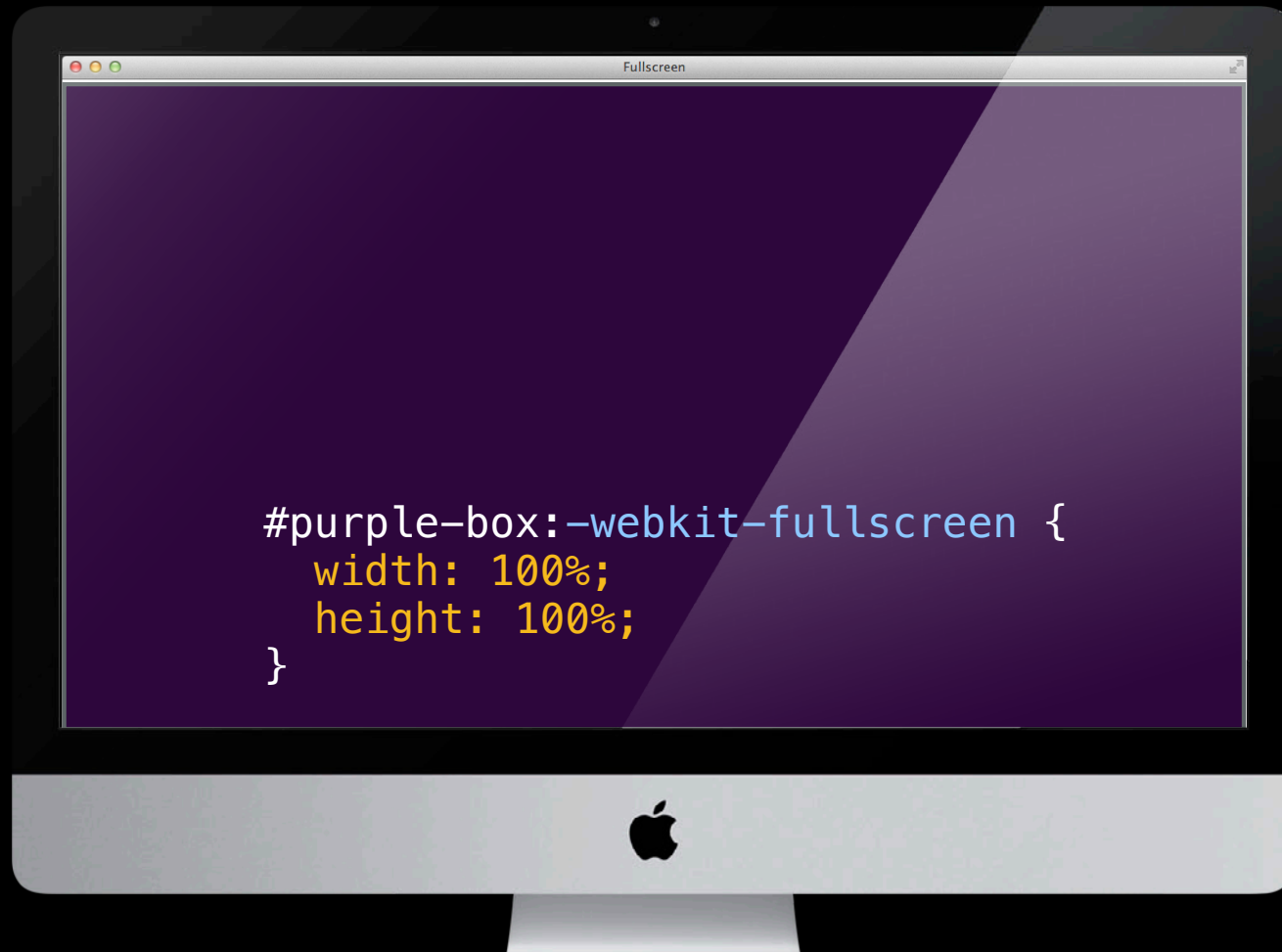
Modifying Element Appearance in Fullscreen

Resizing your element to fill the screen



Modifying Element Appearance in Fullscreen

Resizing your element to fill the screen



Implementing Fullscreen Interfaces

You have complete control

Implementing Fullscreen Interfaces

You have complete control

- Easy to trigger and detect fullscreen mode

Implementing Fullscreen Interfaces

You have complete control

- Easy to trigger and detect fullscreen mode
- You decide how iframes behave

Implementing Fullscreen Interfaces

You have complete control

- Easy to trigger and detect fullscreen mode
- You decide how iframes behave
- Custom appearance and behavior
 - `:-webkit-fullscreen` pseudo-class
 - `webkitfullscreenchange`
 - `document.webkitFullscreenElement`

New Ways to Integrate Media with HTML5

Synchronize multiple media elements

Implement fullscreen interfaces

Augment your interface with audio

New Ways to Integrate Media with HTML5

Synchronize multiple media elements

Implement fullscreen interfaces

Augment your interface with audio

Using the `<audio>` tag

It's easy to...



Using the `<audio>` tag

It's easy to...

- Stream audio



Using the `<audio>` tag

It's easy to...

- Stream audio
- Add a background audio track



Using the `<audio>` tag

It's easy to...

- Stream audio
- Add a background audio track
- Play audio without plug-ins



Using the `<audio>` Tag

It's much harder to...



Using the `<audio>` Tag

It's much harder to...

- Play a sound at an exact time



Using the <audio> Tag

It's much harder to...

- Play a sound at an exact time
- Dynamically apply effects, like reverb and echo



Using the `<audio>` Tag

It's much harder to...

- Play a sound at an exact time
- Dynamically apply effects, like reverb and echo
- Generate sounds



Using the `<audio>` Tag

It's much harder to...

- Play a sound at an exact time
- Dynamically apply effects, like reverb and echo
- Generate sounds
- Access raw audio data





Web Audio API

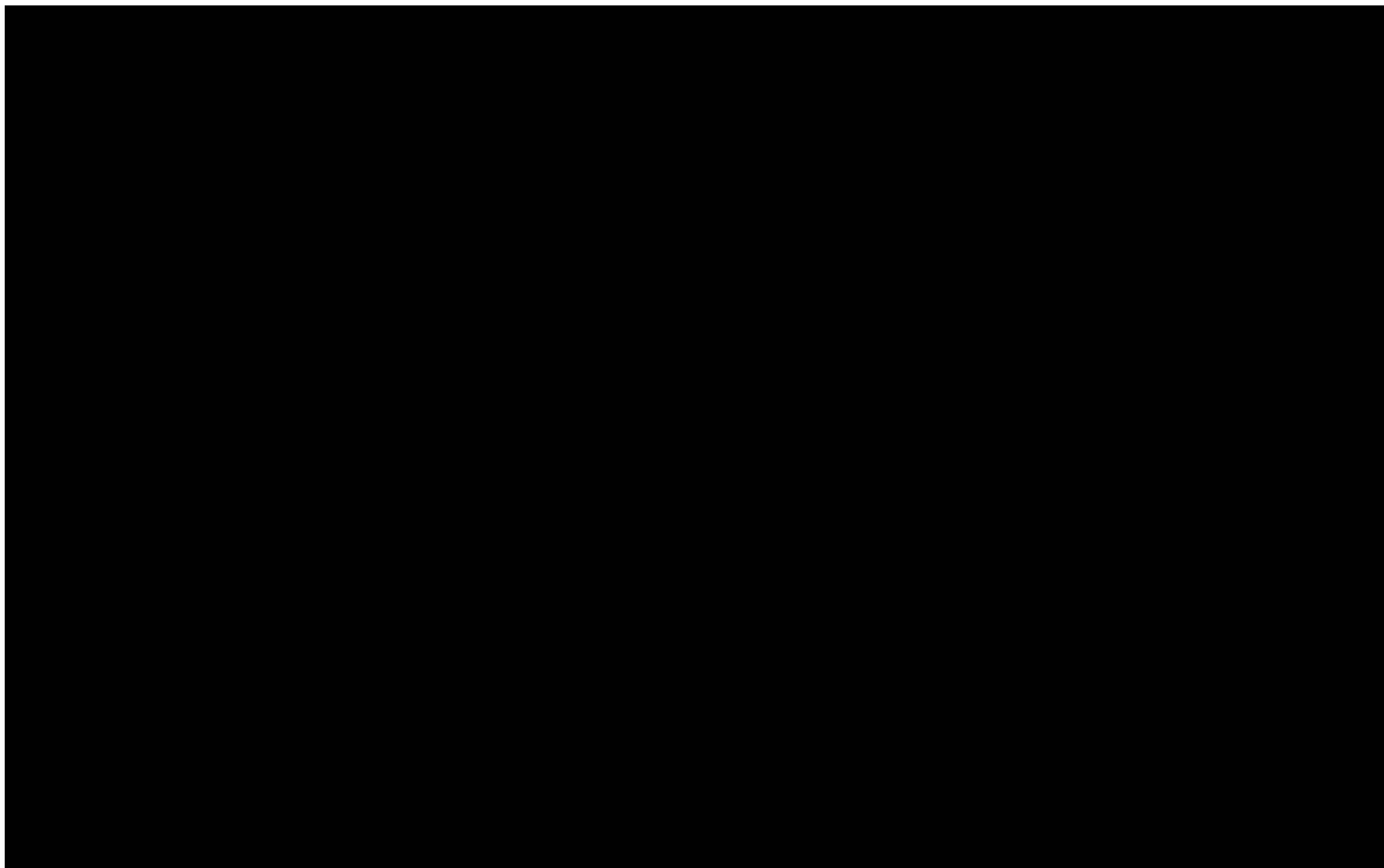


Demo

The power of Web Audio

Web Audio Concepts

- Playing sounds
- Fetching and creating sounds

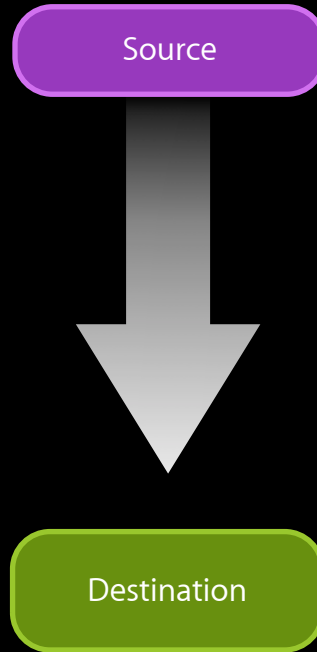


Audio Context

Audio Context

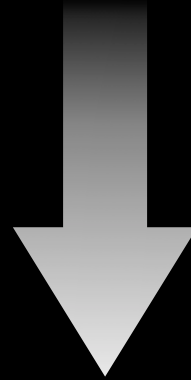
Source

Audio Context



Audio Context

Source



Destination

Audio Sources

Creating an audio source from a remote resource

Audio Sources

Creating an audio source from a remote resource

- Use XMLHttpRequest to get the raw file data

Audio Sources

Creating an audio source from a remote resource

- Use XMLHttpRequest to get the raw file data

```
var request = new XMLHttpRequest();  
request.open("GET", "http://sounds.example.org/explosion.aiff", true);  
request.responseType = "arraybuffer";  
request.addEventListener("load", processBuffer, false);  
request.send();
```

Audio Sources

Creating an audio source from a remote resource

- Use XMLHttpRequest to get the raw file data

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var request = new XMLHttpRequest();  
request.open("GET", "http://sounds.example.org/explosion.aiff", true);  
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- Create a buffer from the remote resource

Audio Sources

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request.addEventListener("load", processBuffer, false);
request.send();
```

- Create a buffer from the remote resource

```
function processBuffer(event) {
  var request = event.target;
  myBuffer = myAudioContext.createBuffer(request.response, false);
}
```

Audio Sources

Creating an audio source from a remote resource

```
var request = new XMLHttpRequest();
request.open("GET", "http://sounds.example.org/explosion.aiff", true);
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- Create an `AudioBufferSourceNode` to route buffer contents to output

Audio Sources

Creating an audio source from a remote resource

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var request = new XMLHttpRequest();
request.open("GET", "http://sounds.example.org/explosion.aiff", true);
request.responseType = "arraybuffer";
request.addEventListener("load", processBuffer, false);
request.send();

function processBuffer(event) {
  var request = event.target;
  myBuffer = myAudioContext.createBuffer(request.response, false);
}
```

- Create an `AudioBufferSourceNode` to route buffer contents to output

```
var mySource = myContext.createBufferSource(); // AudioBufferSourceNode
mySource.buffer = myBuffer;
```

Audio Sources

Playing a sound at exactly the right time



Audio Sources

Playing a sound at exactly the right time



Audio Sources

Playing a sound at exactly the right time

- Use `noteOn(when)` with an `AudioBufferSourceNode`

Audio Sources

Playing a sound at exactly the right time

- Use `noteOn(when)` with an `AudioBufferSourceNode`

```
// where we left off, created an AudioBufferSourceNode
// and "filled" it with our buffer contents
var mySource = myContext.createBufferSource(); // AudioBufferSourceNode
mySource.buffer = myBuffer;
```

Audio Sources

Playing a sound at exactly the right time

- Use `noteOn(when)` with an `AudioBufferSourceNode`

```
// where we left off, created an AudioBufferSourceNode
// and "filled" it with our buffer contents
var mySource = myContext.createBufferSource(); // AudioBufferSourceNode
mySource.buffer = myBuffer;

// connect to the default output
mySource.connect(myContext.destination);

// play the sound right now
mySource.noteOn(0);
```

Audio Sources

Other ways to create audio sources

- From an `<audio>` element
 - use `MediaElementAudioSourceNode`



`<audio>`

Audio Sources

Other ways to create audio sources

- From an `<audio>` element
 - use `MediaElementAudioSourceNode`
- Synthesize a sound
 - use a built-in `AudioSource` called `Oscillator`
 - good for simple tones

Audio Sources

Other ways to create audio sources

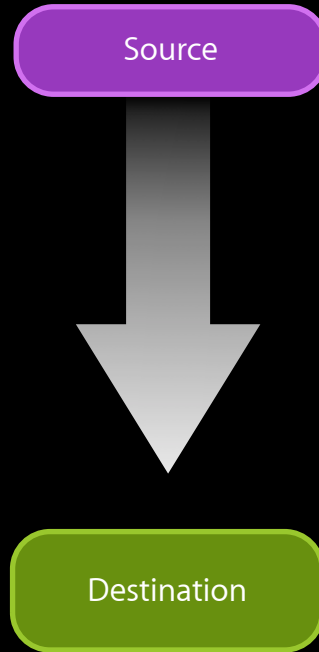
- From an `<audio>` element
 - use `MediaElementAudioSourceNode`
- Synthesize a sound
 - use a built-in `AudioSource` called `Oscillator`
 - good for simple tones
- Generate a completely custom sound from JavaScript
 - use `JavaScriptAudioNode`

Audio Context

Source

Destination

Audio Context

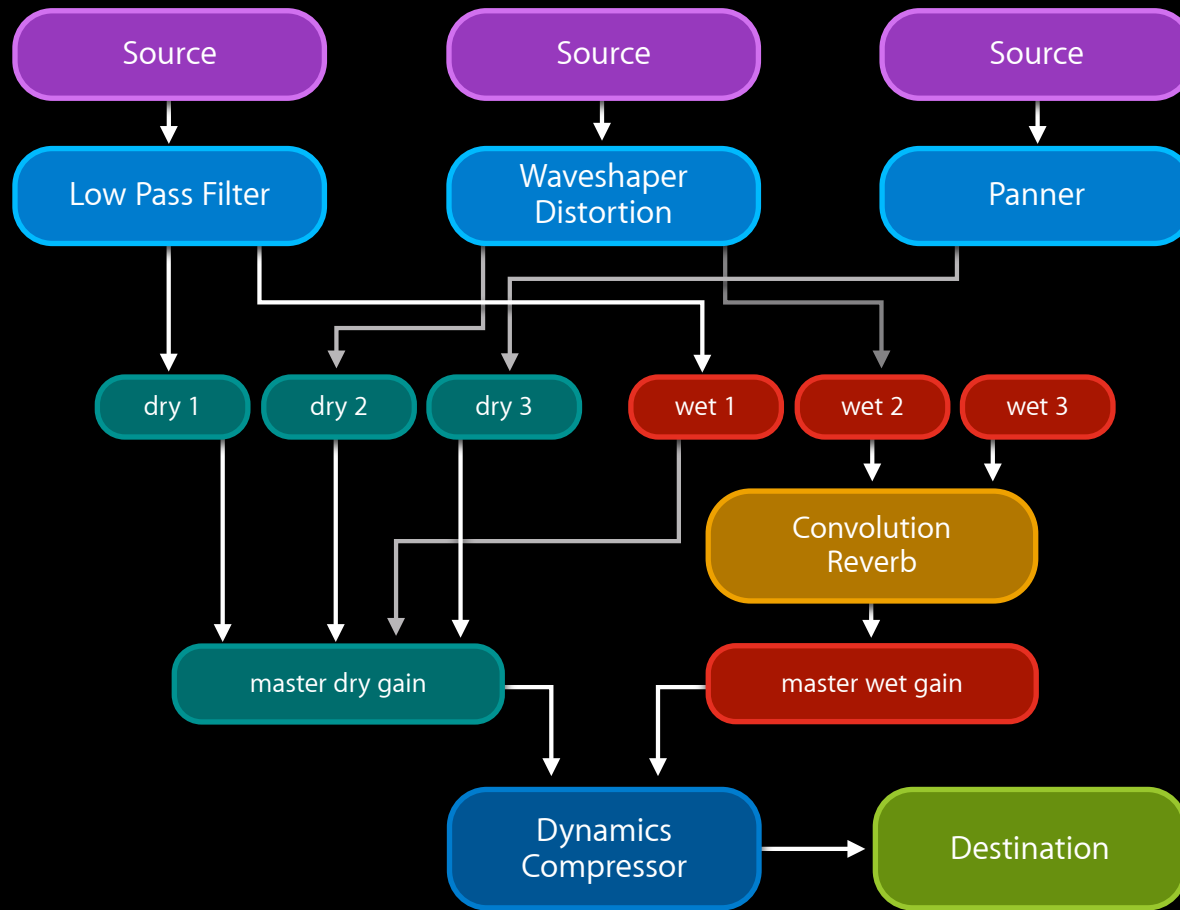


Audio Context

Source

Destination

Audio Context



New Ways to Integrate Media with HTML5

Synchronize multiple media elements

Implement fullscreen interfaces

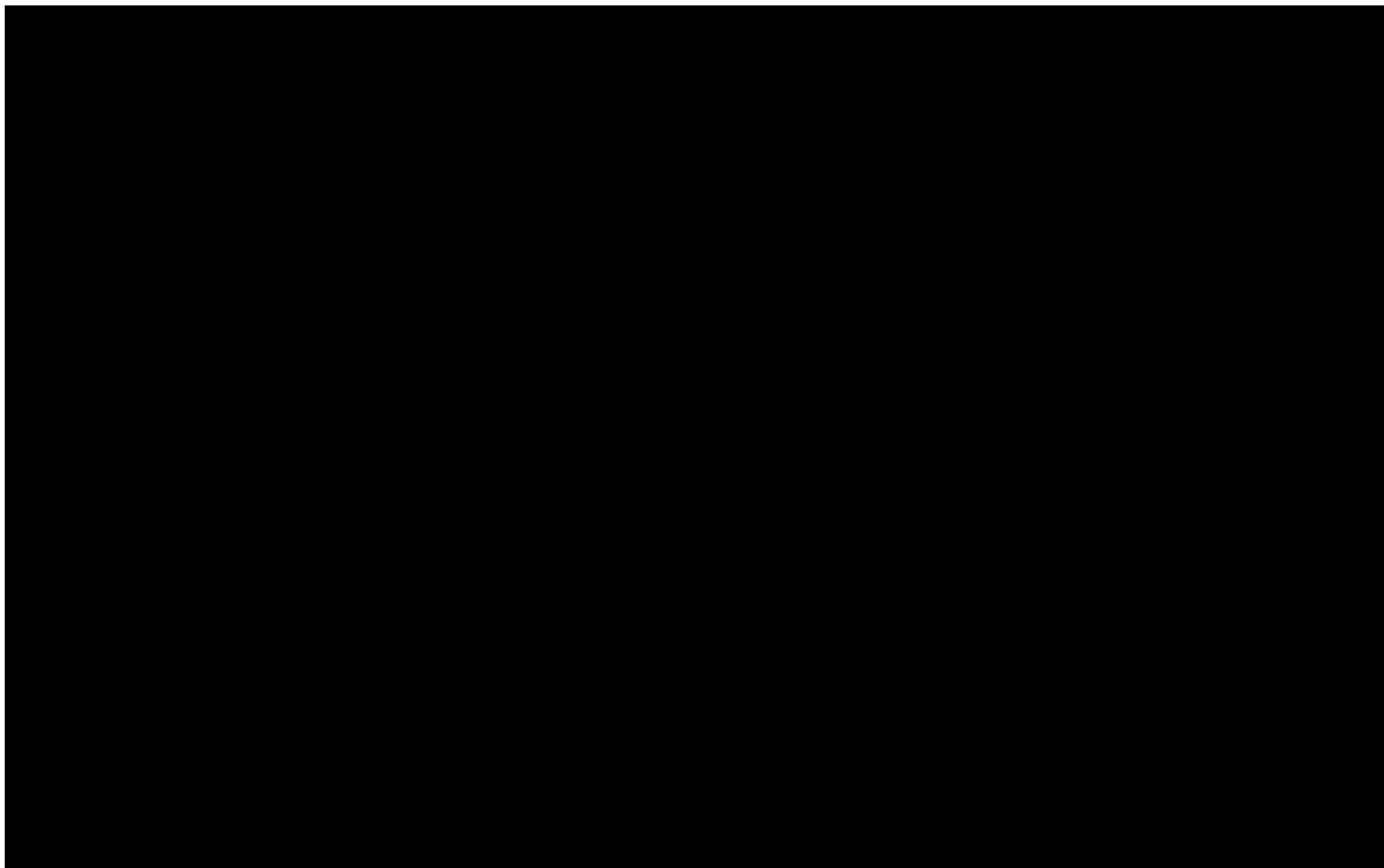
Augment your interface with audio

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Summary

New HTML5 media APIs in Safari 6 and iOS 6

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- Solve common problems and integrate media in new ways

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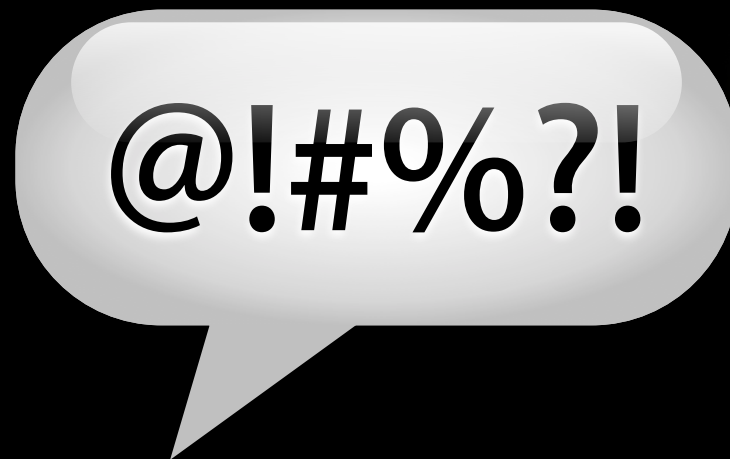


@!#%?!

Summary

New HTML5 media APIs in Safari 6 and iOS 6

- Solve common problems and integrate media in new ways



Summary

New HTML5 media APIs in Safari 6 and iOS 6

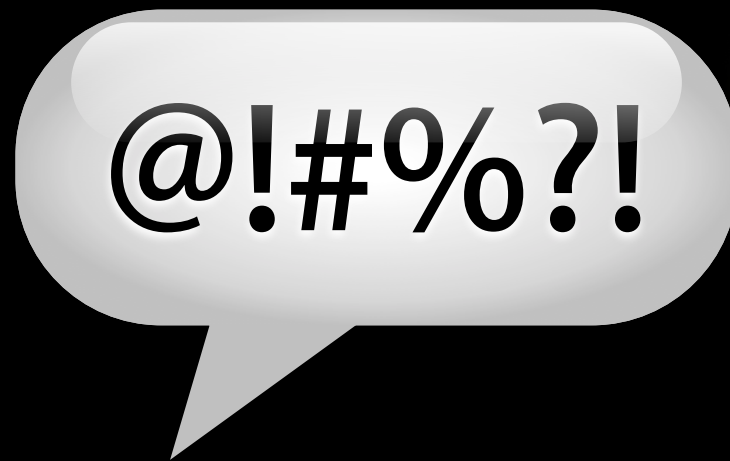
- Solve common problems and integrate media in new ways
- Media synchronization and fullscreen APIs are simple and powerful



Summary

New HTML5 media APIs in Safari 6 and iOS 6

- Solve common problems and integrate media in new ways
- Media synchronization and fullscreen APIs are simple and powerful
- Web Audio enables a new class of web applications



More Information

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Documentation

Safari Dev Center

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

World Wide Web Consortium

<http://www.w3.org>

Apple Developer Forums

<http://devforums.apple.com/community/safari>

Labs

Safari & WebKit Open Lab

Safari & Web Lab
Thursday 3:15PM

Q&A

 **WWDC2012**