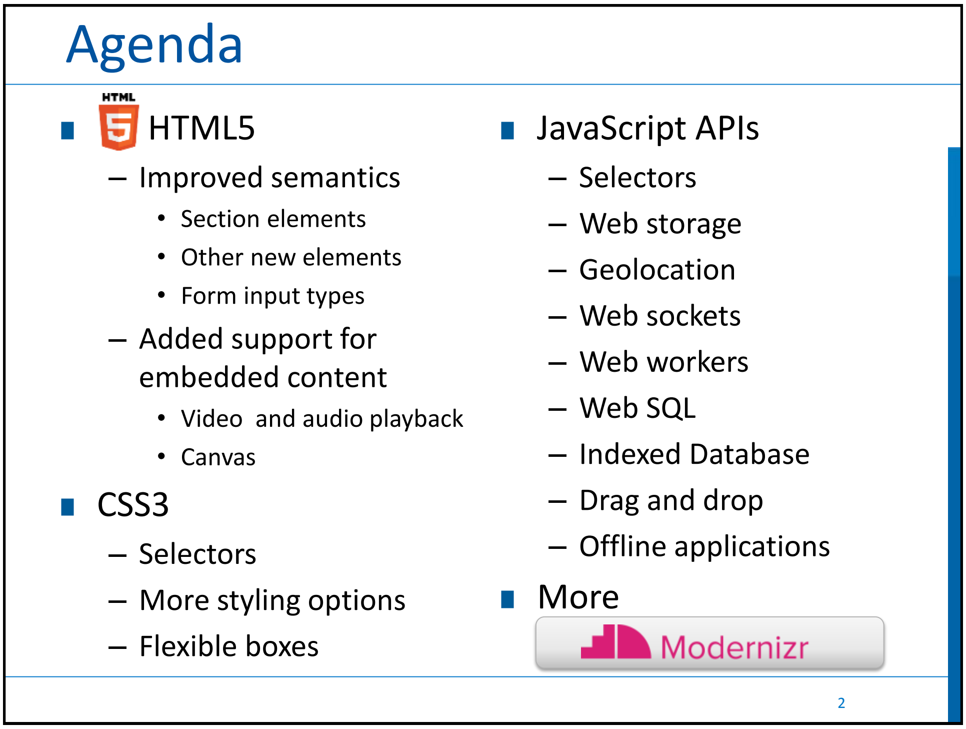
InfoSupport Solid Innovator

HTML5



Agenda

- HTML5
  - Improved semantics
    - Section elements
    - Other new elements
    - Form input types
  - Added support for embedded content
    - Video and audio playback
    - Canvas
- CSS3
  - Selectors
  - More styling options
  - Flexible boxes
- JavaScript APIs
  - Selectors
  - Web storage
  - Geolocation
  - Web sockets
  - Web workers
  - Web SQL
  - Indexed Database
  - Drag and drop
  - Offline applications
- More

HTML
Modernizr

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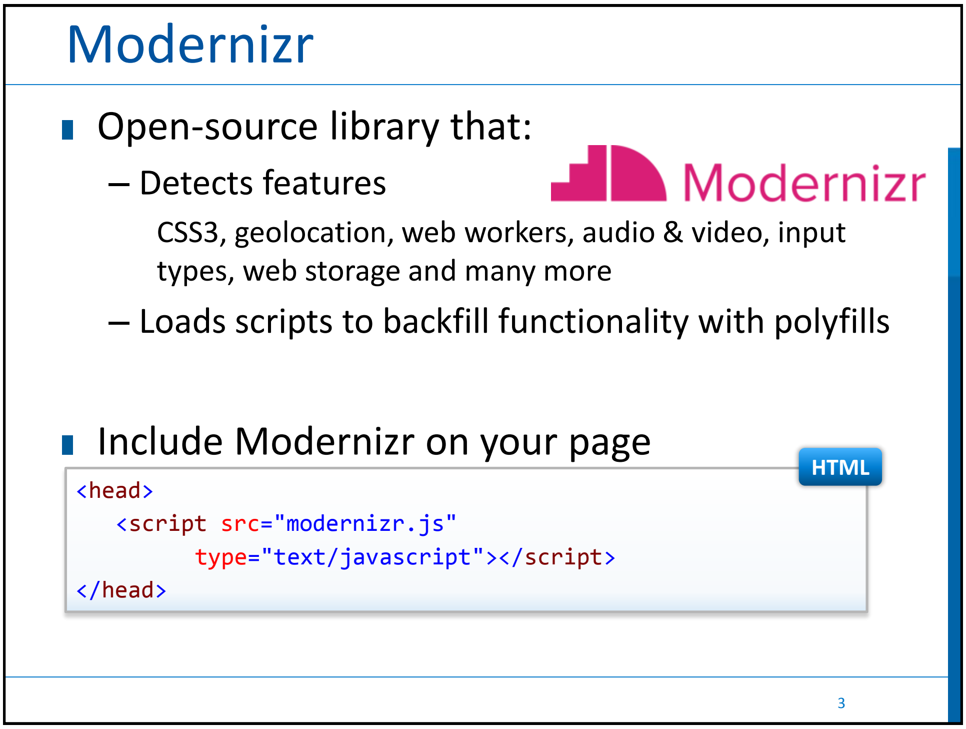


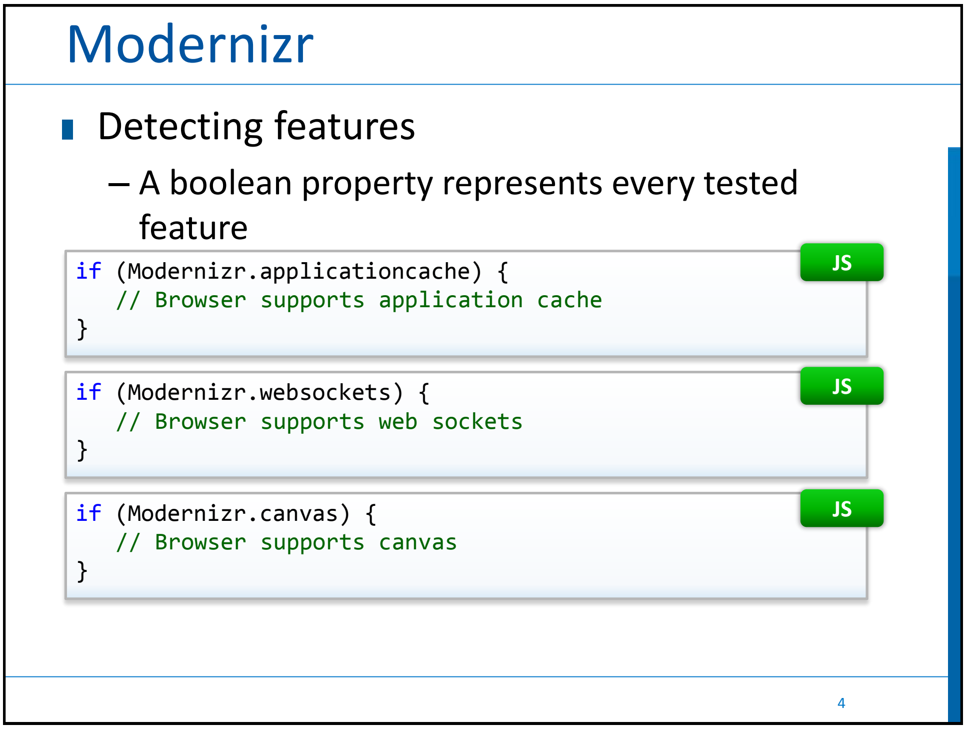
Modernizr

- Open-source library that:
  - Detects features

    CSS3, geolocation, web workers, audio & video, input types, web storage and many more
  - Loads scripts to backfill functionality with polyfills
- Include Modernizr on your page

HTML

```html
<head>
   <script src="modernizr.js"
         type="text/javascript"></script>
</head>
```



Modernizr

- Detecting features
  - A boolean property represents every tested feature

JS

```javascript
if (Modernizr.applicationcache) {
   // Browser supports application cache
}
```

JS

```javascript
if (Modernizr.websockets) {
   // Browser supports web sockets
}
```

JS

```javascript
if (Modernizr.canvas) {
   // Browser supports canvas
}
```

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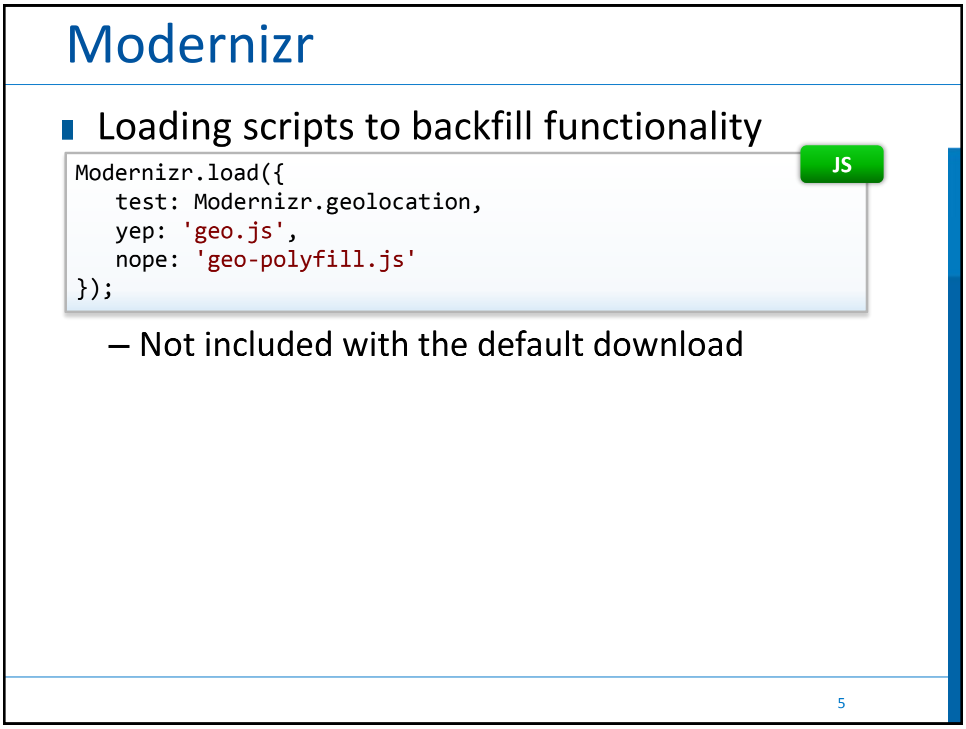


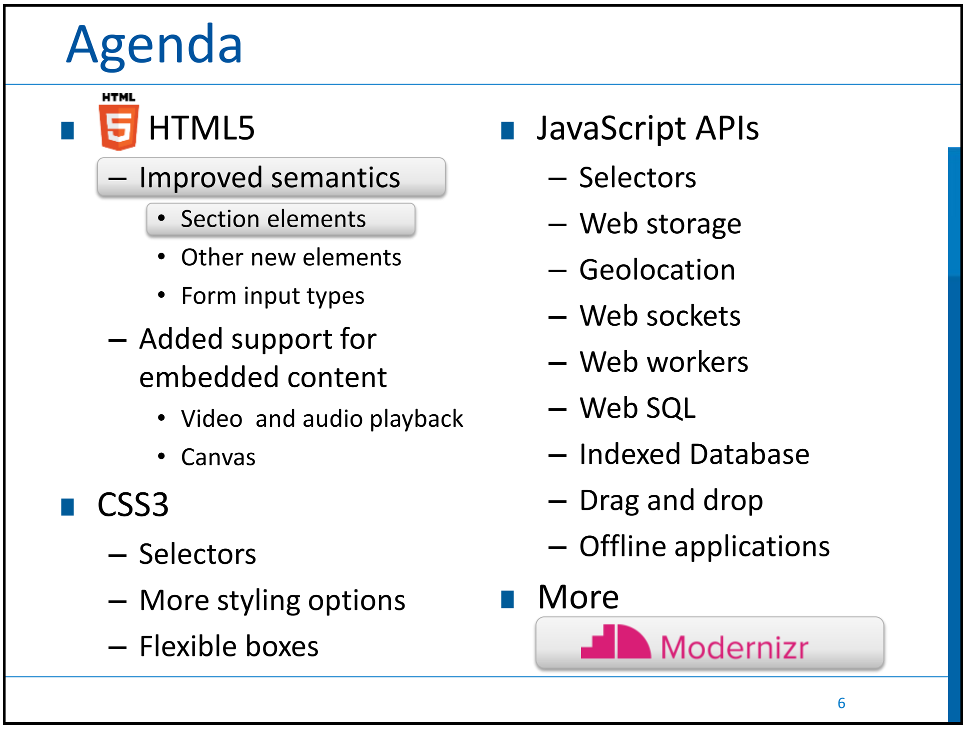
Modernizr

- Loading scripts to backfill functionality

JS

```
Modernizr.load({
   test: Modernizr.geolocation,
   yep: 'geo.js',
   nope: 'geo-polyfill.js'
});
```

  – Not included with the default download



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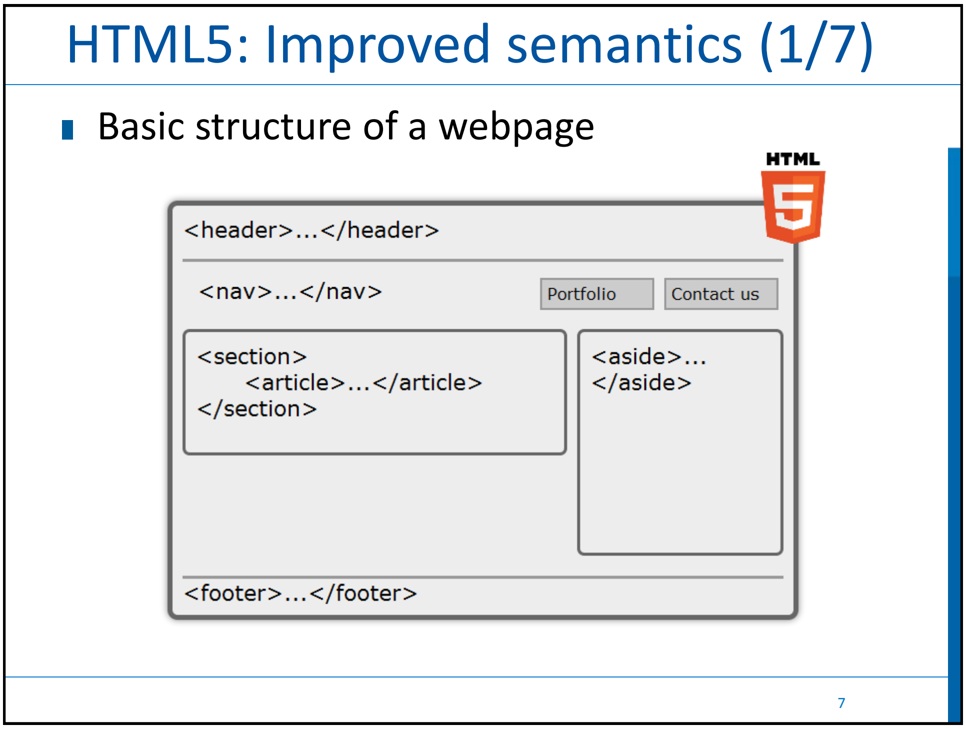

HTML5: Improved semantics (1/7)

- Basic structure of a webpage

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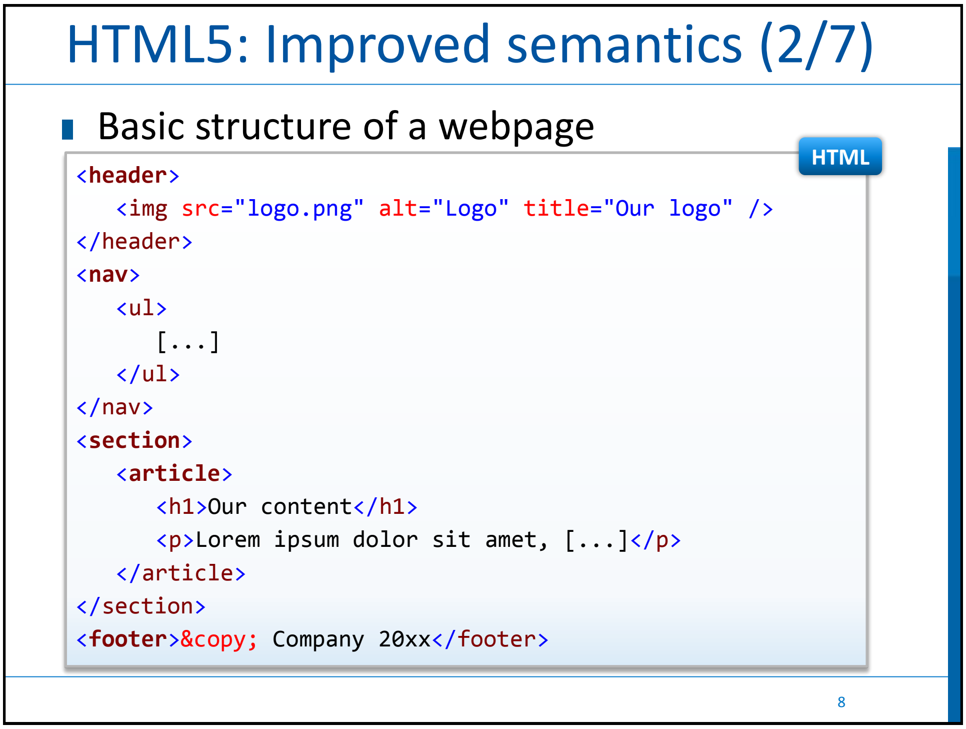

HTML5: Improved semantics (2/7)

- Basic structure of a webpage

HTML

```
<header>
   <img src="logo.png" alt="Logo" title="Our logo" />
</header>
<nav>
   <ul>
      [...]
   </ul>
</nav>
<section>
   <article>
      <h1>Our content</h1>
      <p>Lorem ipsum dolor sit amet, [...]</p>
   </article>
</section>
<footer>&copy; Company 20xx</footer>
```

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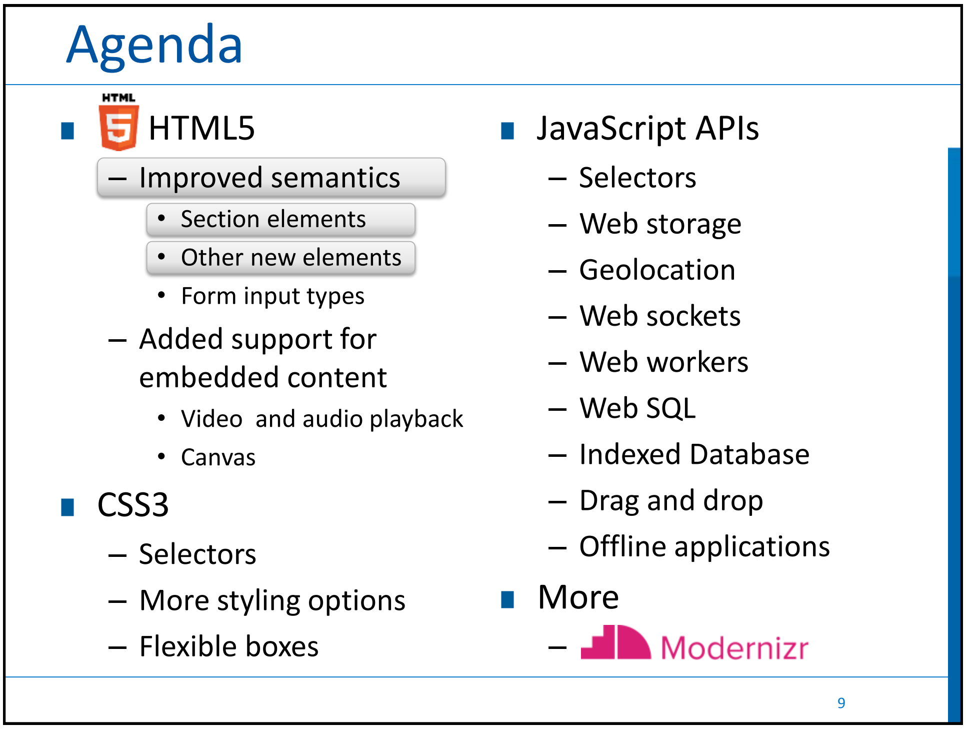

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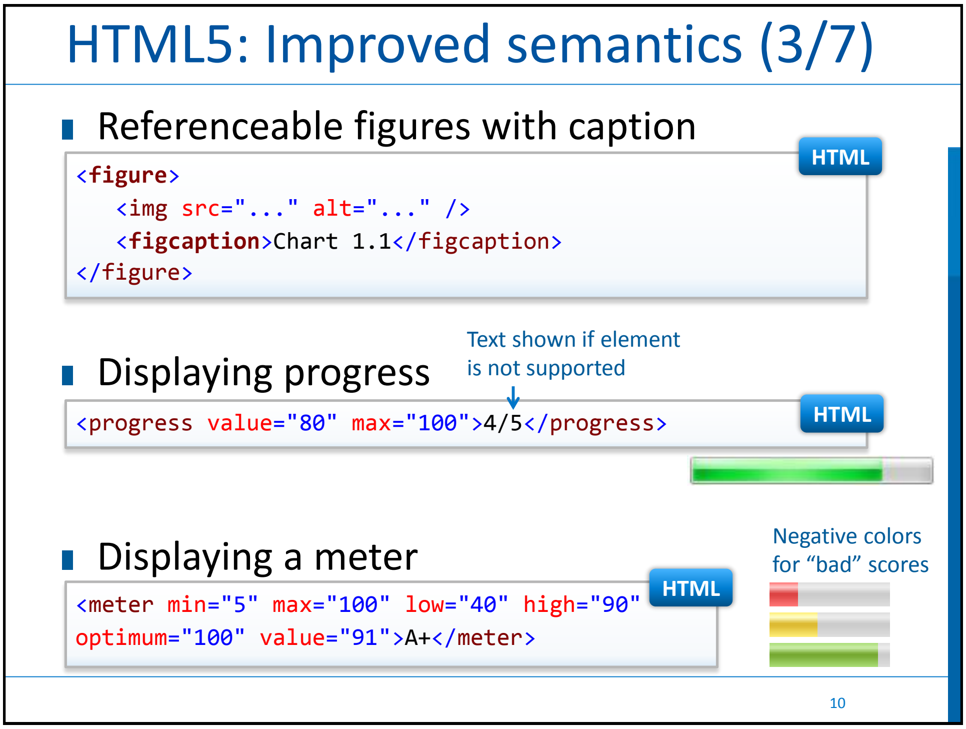

HTML5: Improved semantics (3/7)

- Referenceable figures with caption

HTML

```html
<figure>
   <img src="..." alt="..." />
   <figcaption>Chart 1.1</figcaption>
</figure>
```

- Displaying progress

Text shown if element is not supported

HTML

```html
<progress value="80" max="100">4/5</progress>
```

- Displaying a meter

HTML

```html
<meter min="5" max="100" low="40" high="90"
optimum="100" value="91">A+</meter>
```

Negative colors for “bad” scores

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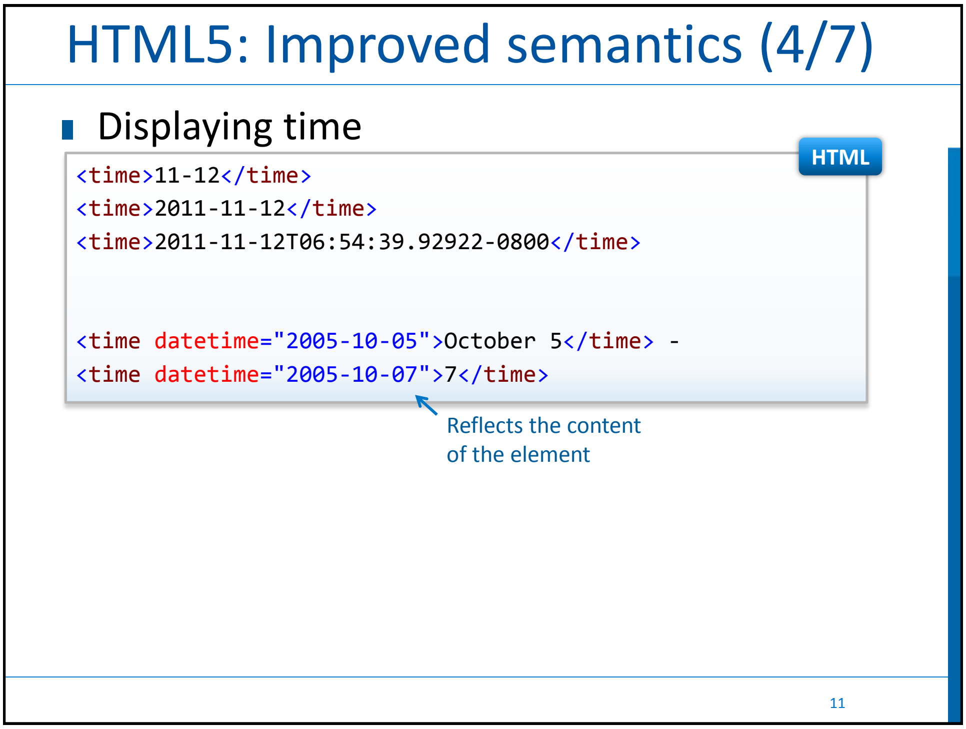

HTML5: Improved semantics (4/7)

- Displaying time

HTML

```html
<time>11-12</time>
<time>2011-11-12</time>
<time>2011-11-12T06:54:39.92922-0800</time>


<time datetime="2005-10-05">October 5</time> -
<time datetime="2005-10-07">7</time>
```

Reflects the content of the element

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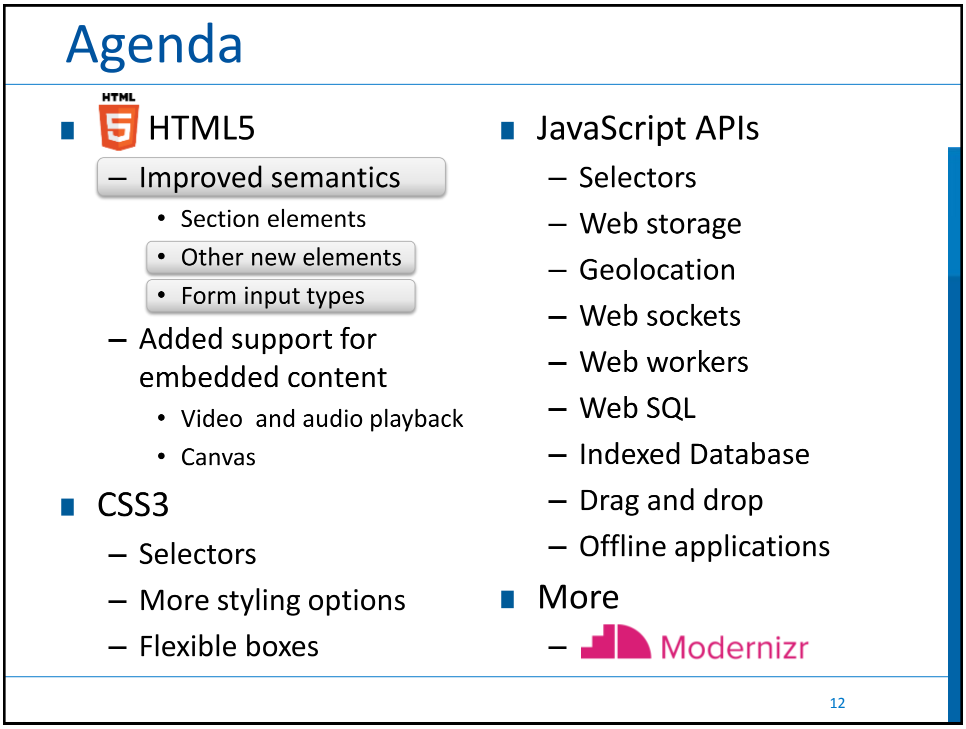

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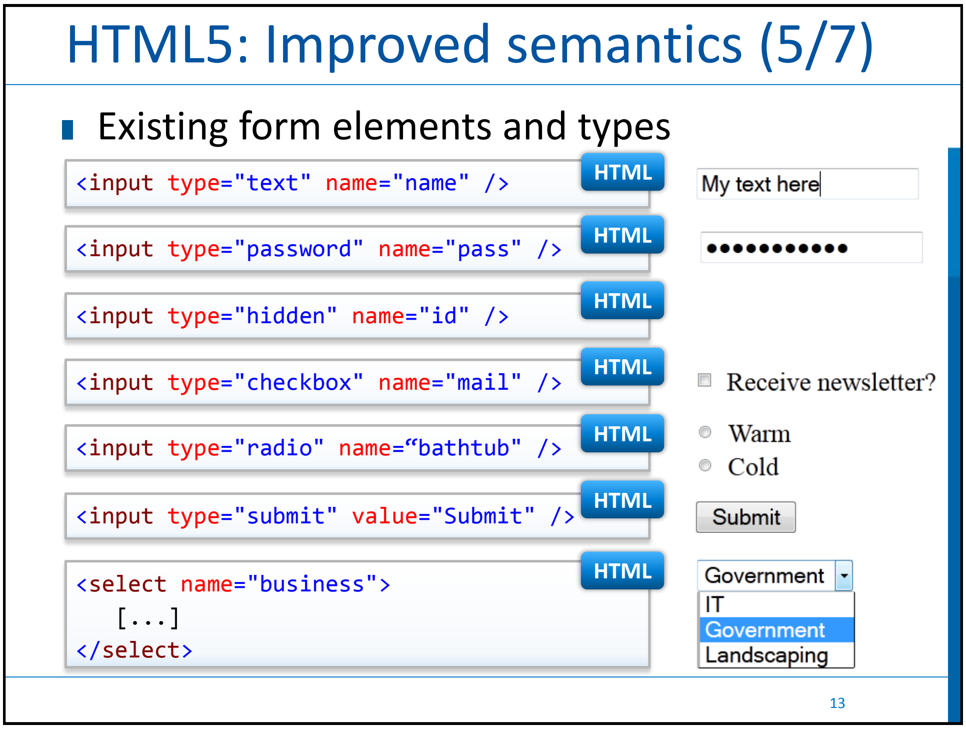

HTML5: Improved semantics (5/7)

- Existing form elements and types

```
<input type="text" name="name" />
```

My text here

```
<input type="password" name="pass" />
```

●●●●●●●●●●●

```
<input type="hidden" name="id" />
```

```
<input type="checkbox" name="mail" />
```

□ Receive newsletter?

```
<input type="radio" name=“bathtub" />
```

○ Warm
○ Cold

```
<input type="submit" value="Submit" />
```

Submit

```
<select name="business">
   [...]
</select>
```

Government
IT
Government
Landscaping

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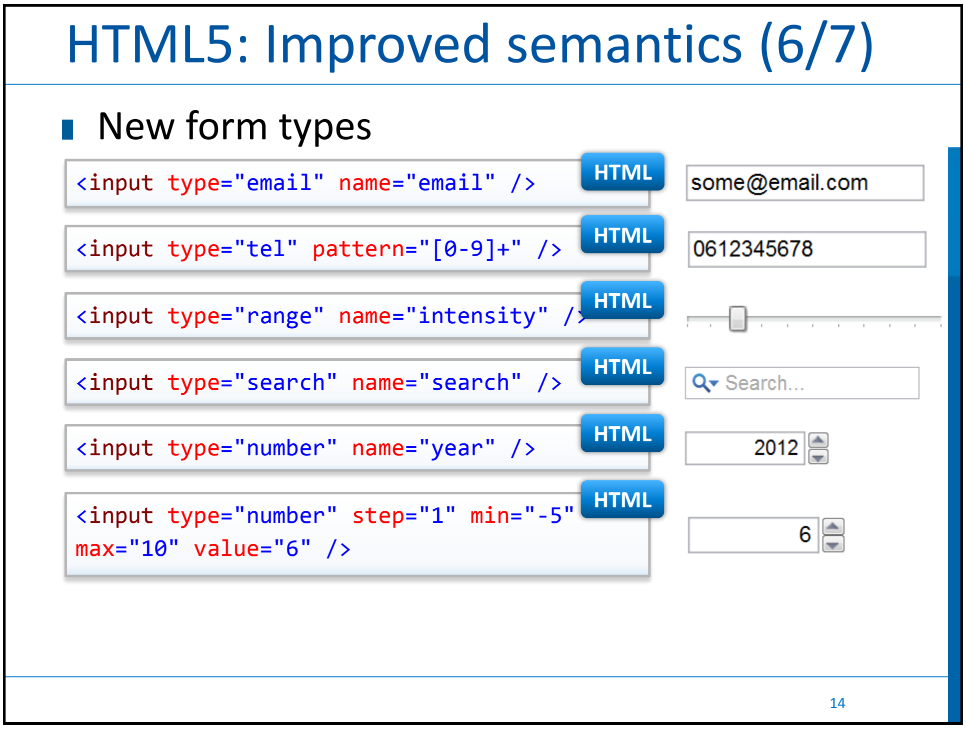

HTML5: Improved semantics (6/7)

- New form types

```
<input type="email" name="email" />
```

some@email.com

```
<input type="tel" pattern="[0-9]+" />
```

0612345678

```
<input type="range" name="intensity" />
```

```
<input type="search" name="search" />
```

Search...

```
<input type="number" name="year" />
```

2012

```
<input type="number" step="1" min="-5"
max="10" value="6" />
```

6

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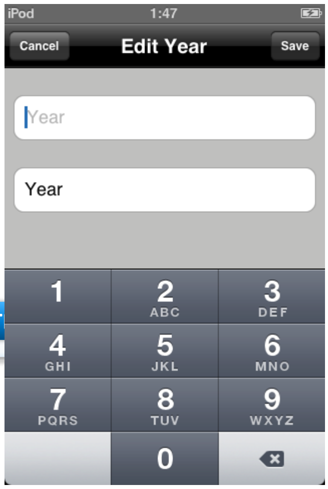
HTML5: Improved semantics (6/7)

- New form types

HT

```
<input type="number" name="year" />
```



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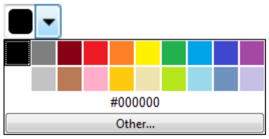
HTML5: Improved semantics (7/7)

- New form types

HTML

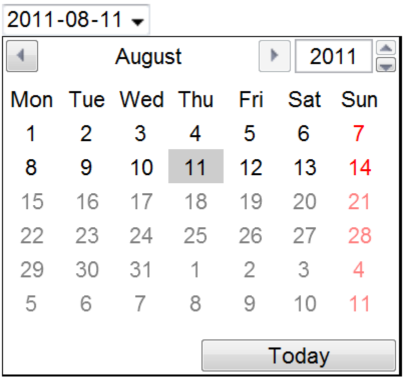
```
<input type="color"
       name="preference" />
```



HTML

```
<input type="date"
     min="2010-08-14"
     max="2011-08-14"
     value="2010-08-14" />
```

– Also support for week, month, time and datetime



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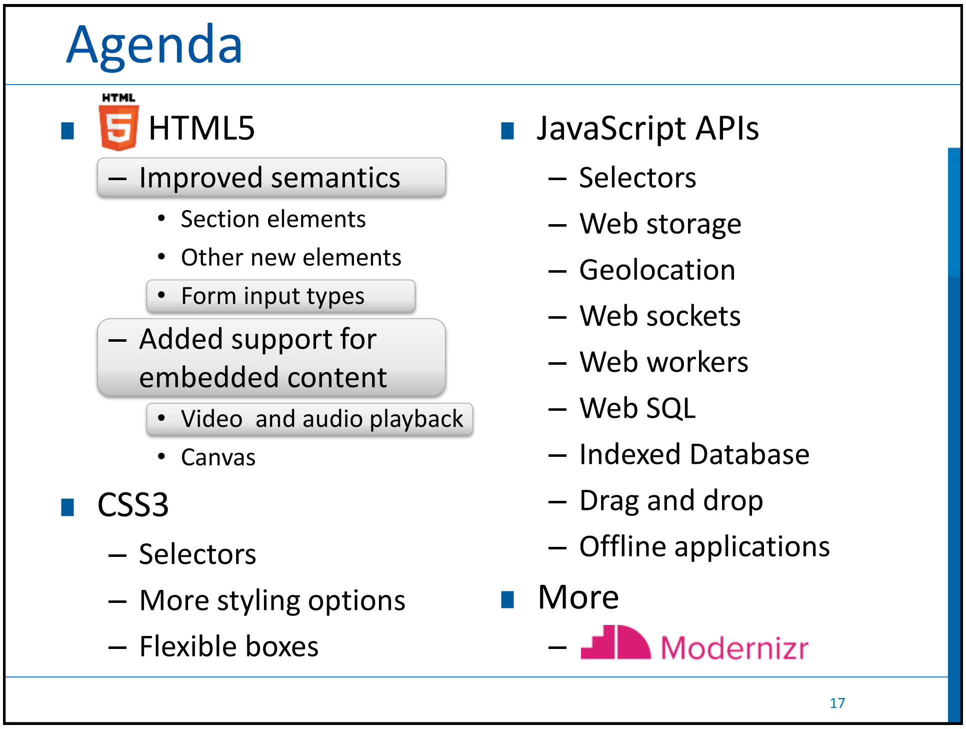

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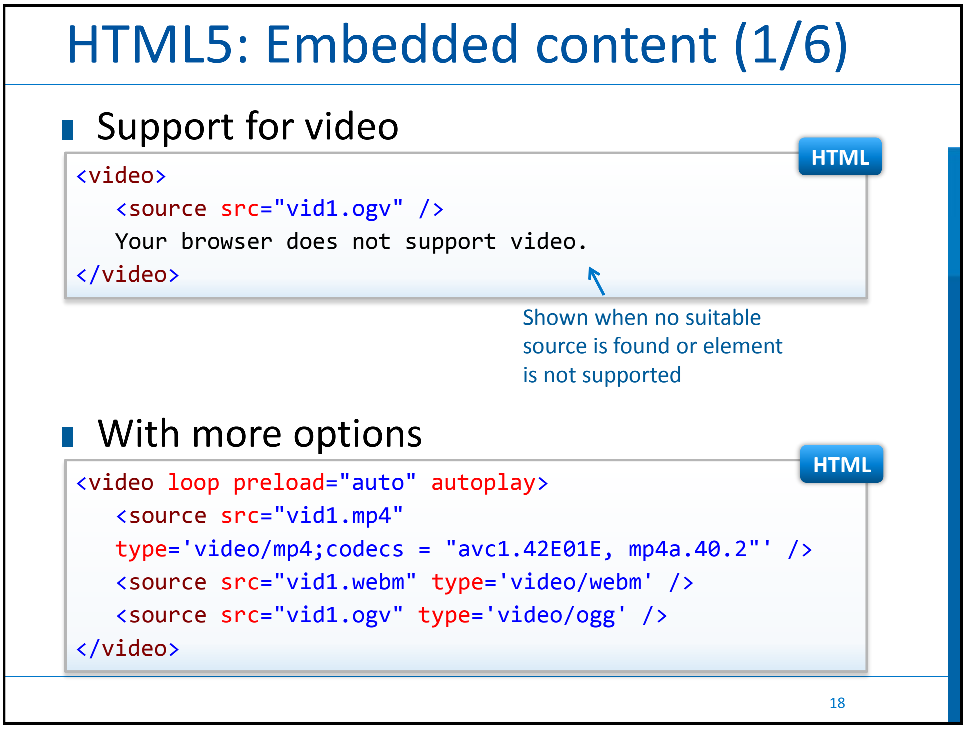

HTML5: Embedded content (1/6)

- Support for video

HTML

```
<video>
   <source src="vid1.ogv" />
   Your browser does not support video.
</video>
```

Shown when no suitable source is found or element is not supported

- With more options

HTML

```
<video loop preload="auto" autoplay>
   <source src="vid1.mp4"
   type='video/mp4;codecs = "avc1.42E01E, mp4a.40.2"' />
   <source src="vid1.webm" type='video/webm' />
   <source src="vid1.ogv" type='video/ogg' />
</video>
```

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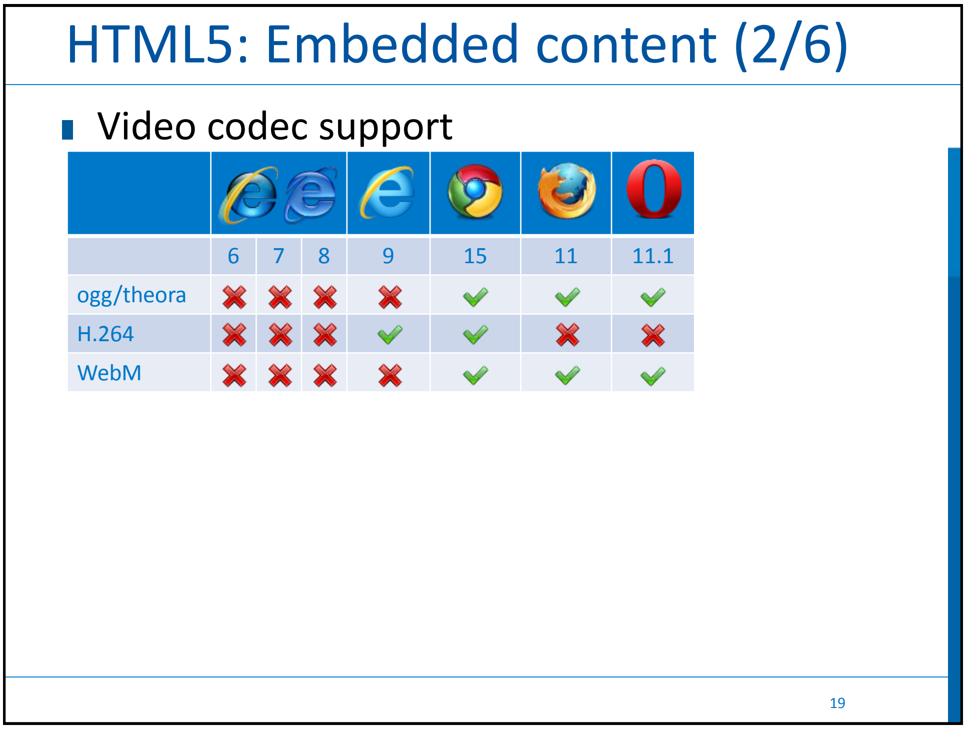
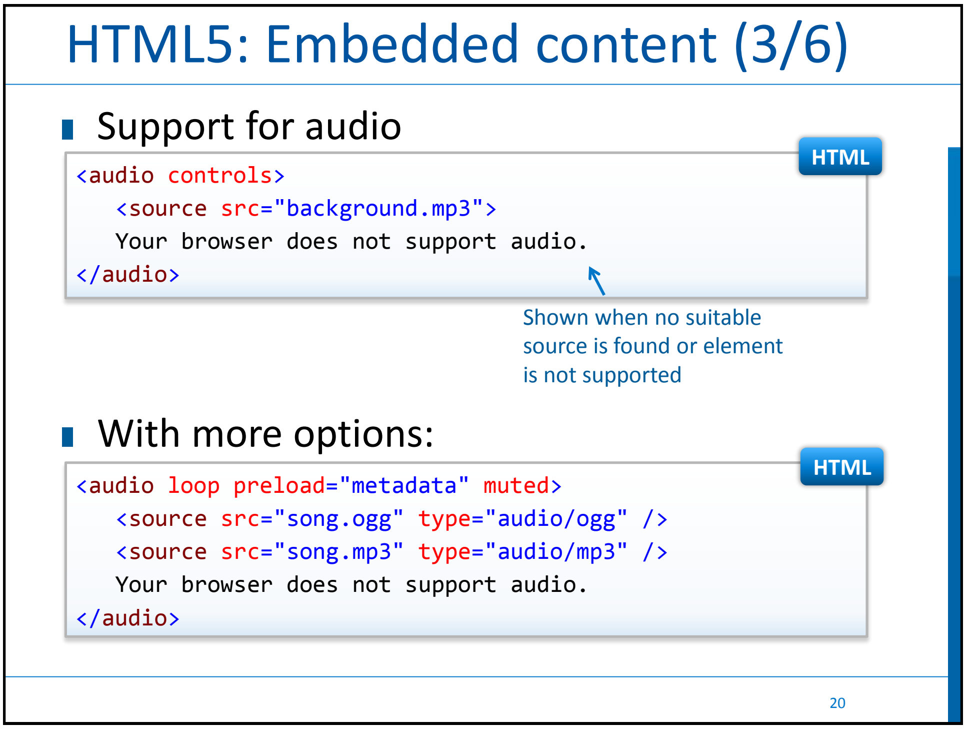


HTML5: Embedded content (2/6)

- Video codec support

	6	7	8	9	15	11	11.1
ogg/theora	✗	✗	✗	✗	✓	✓	✓
H.264	✗	✗	✗	✓	✓	✗	✗
WebM	✗	✗	✗	✗	✓	✓	✓



HTML5: Embedded content (3/6)

- Support for audio

HTML

```
<audio controls>
   <source src="background.mp3">
   Your browser does not support audio.
</audio>
```

Shown when no suitable source is found or element is not supported

- With more options:

HTML

```
<audio loop preload="metadata" muted>
   <source src="song.ogg" type="audio/ogg" />
   <source src="song.mp3" type="audio/mp3" />
   Your browser does not support audio.
</audio>
```

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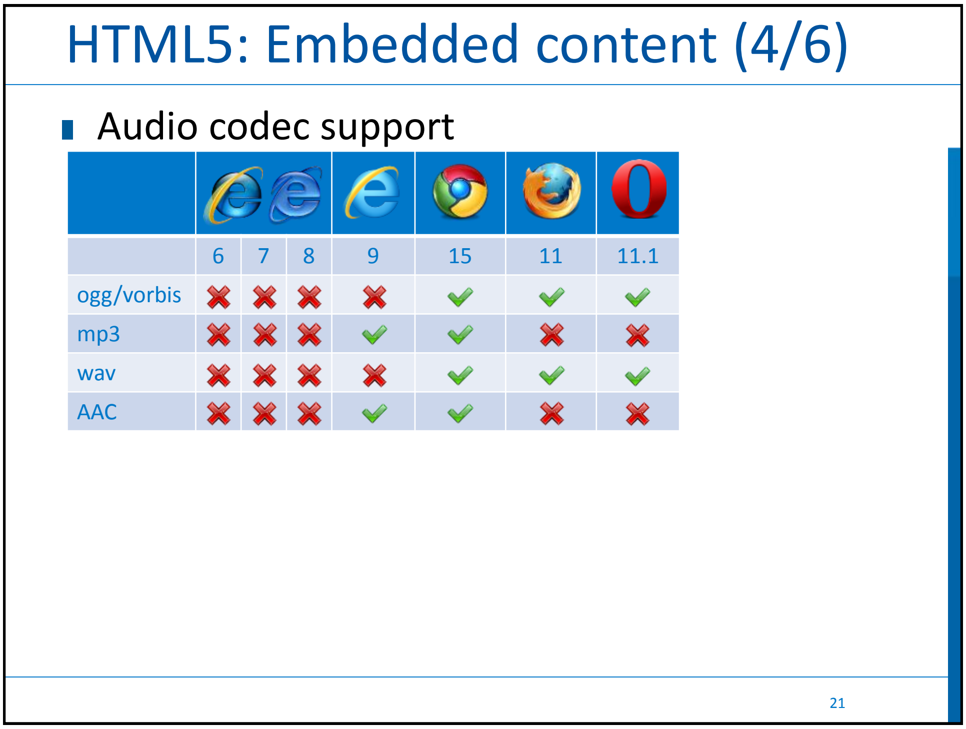

HTML5: Embedded content (4/6)

- Audio codec support

	6	7	8	9	15	11	11.1
ogg/vorbis	✗	✗	✗	✗	✓	✓	✓
mp3	✗	✗	✗	✓	✓	✗	✗
wav	✗	✗	✗	✗	✓	✓	✓
AAC	✗	✗	✗	✓	✓	✗	✗

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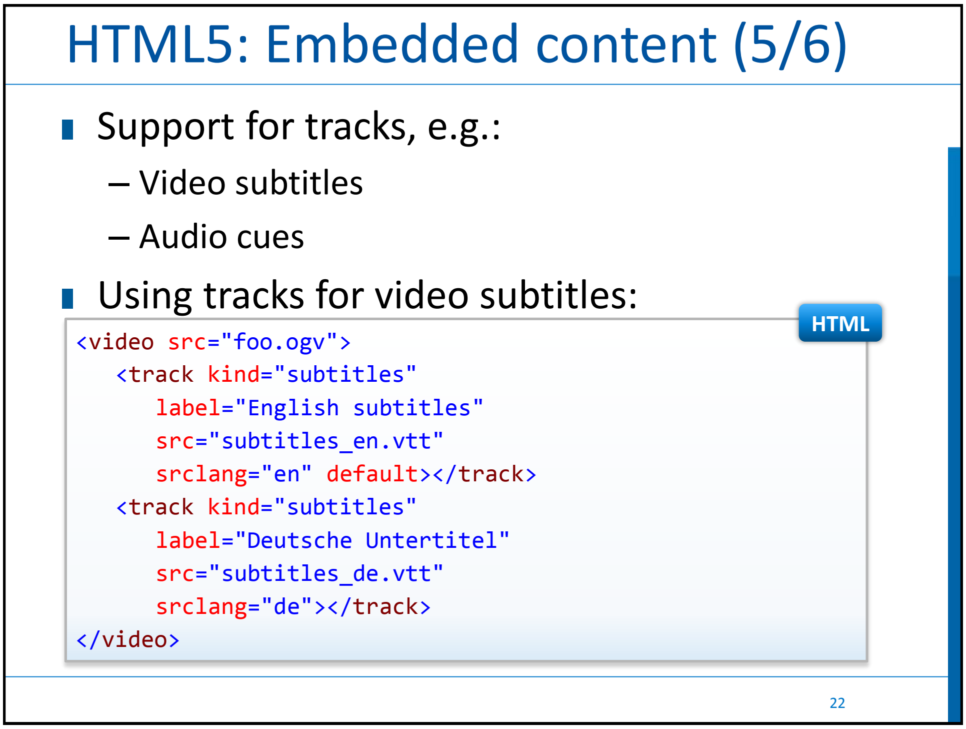

HTML5: Embedded content (5/6)

- Support for tracks, e.g.:
  - Video subtitles
  - Audio cues
- Using tracks for video subtitles:

HTML

```html
<video src="foo.ogv">
   <track kind="subtitles"
      label="English subtitles"
      src="subtitles_en.vtt"
      srclang="en" default></track>
   <track kind="subtitles"
      label="Deutsche Untertitel"
      src="subtitles_de.vtt"
      srclang="de"></track>
</video>
```

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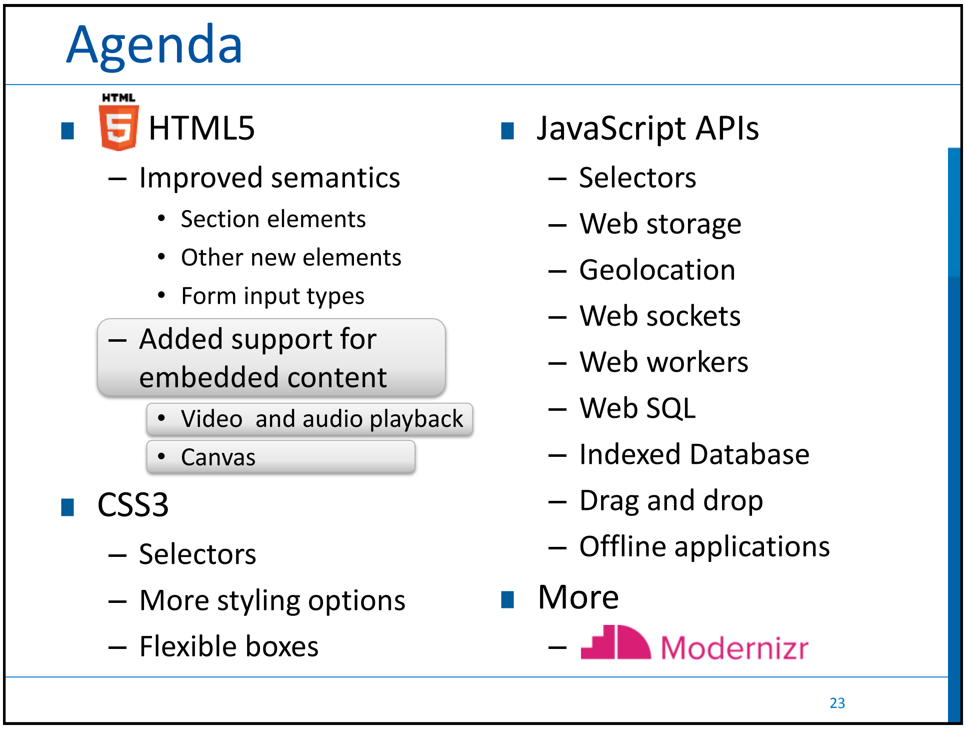

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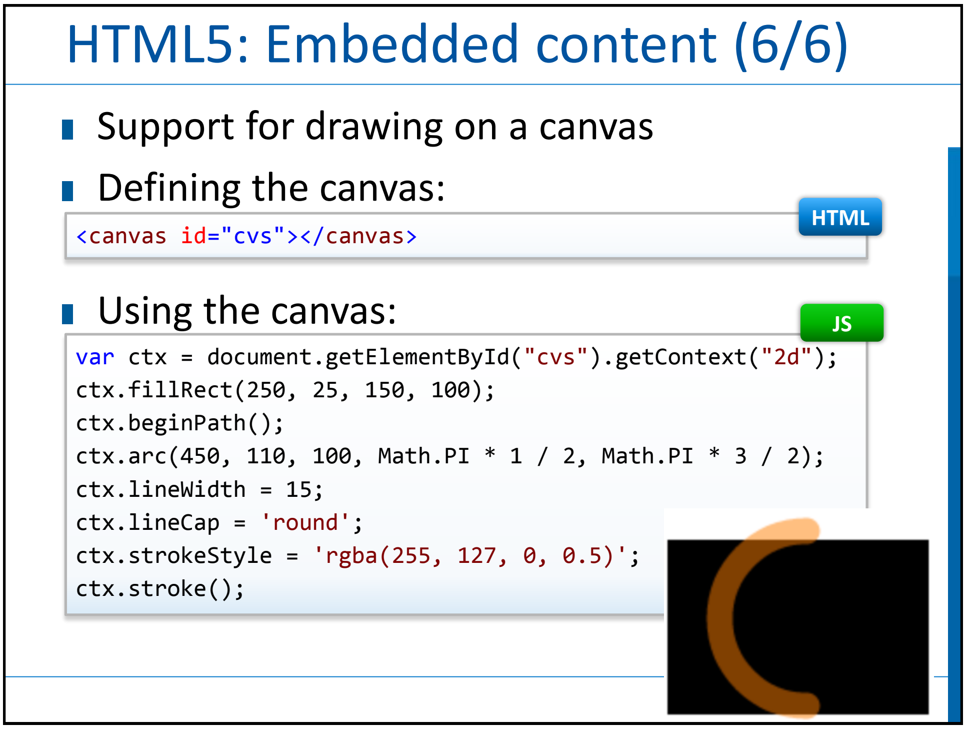

HTML5: Embedded content (6/6)

- Support for drawing on a canvas
- Defining the canvas:

HTML

```
<canvas id="cvs"></canvas>
```

- Using the canvas:

JS

```
var ctx = document.getElementById("cvs").getContext("2d");
ctx.fillRect(250, 25, 150, 100);
ctx.beginPath();
ctx.arc(450, 110, 100, Math.PI * 1 / 2, Math.PI * 3 / 2);
ctx.lineWidth = 15;
ctx.lineCap = 'round';
ctx.strokeStyle = 'rgba(255, 127, 0, 0.5)';
ctx.stroke();
```

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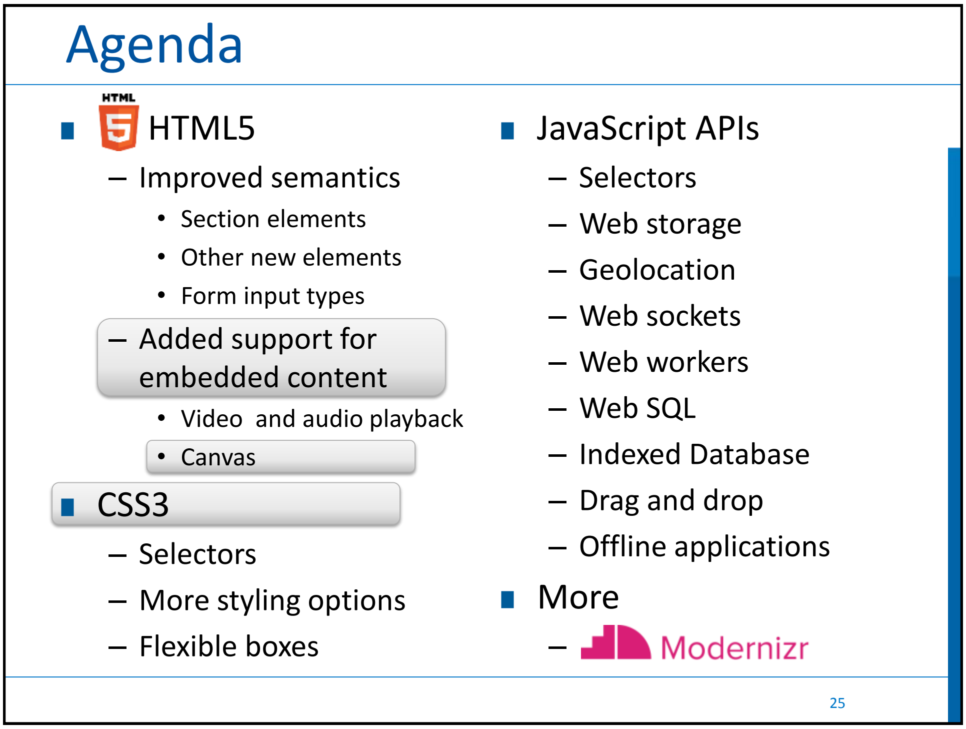

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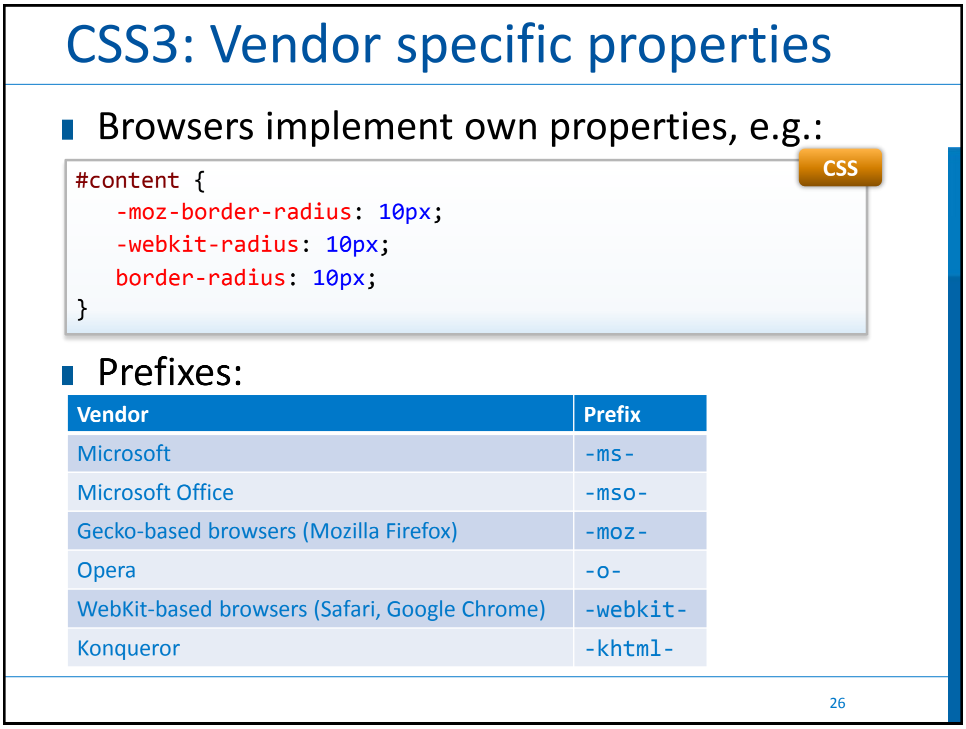

CSS3: Vendor specific properties

- Browsers implement own properties, e.g.:

CSS

```css
#content {
    -moz-border-radius: 10px;
    -webkit-radius: 10px;
    border-radius: 10px;
}
```

- Prefixes:

Vendor	Prefix
Microsoft	-ms-
Microsoft Office	-mso-
Gecko-based browsers (Mozilla Firefox)	-moz-
Opera	-o-
WebKit-based browsers (Safari, Google Chrome)	-webkit-
Konqueror	-khtml-

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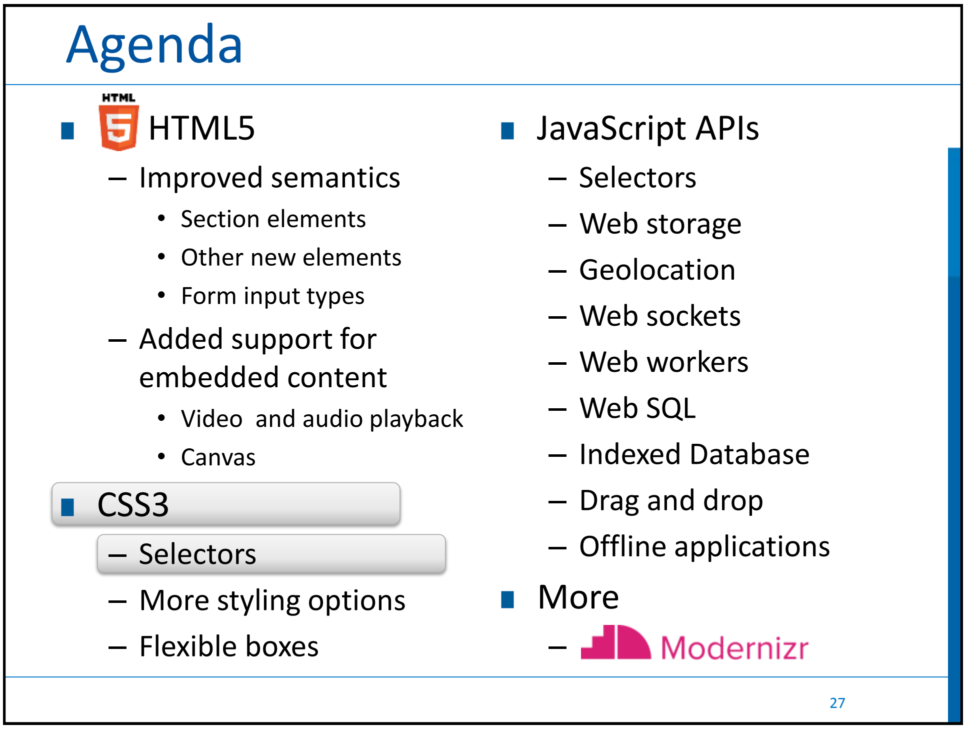

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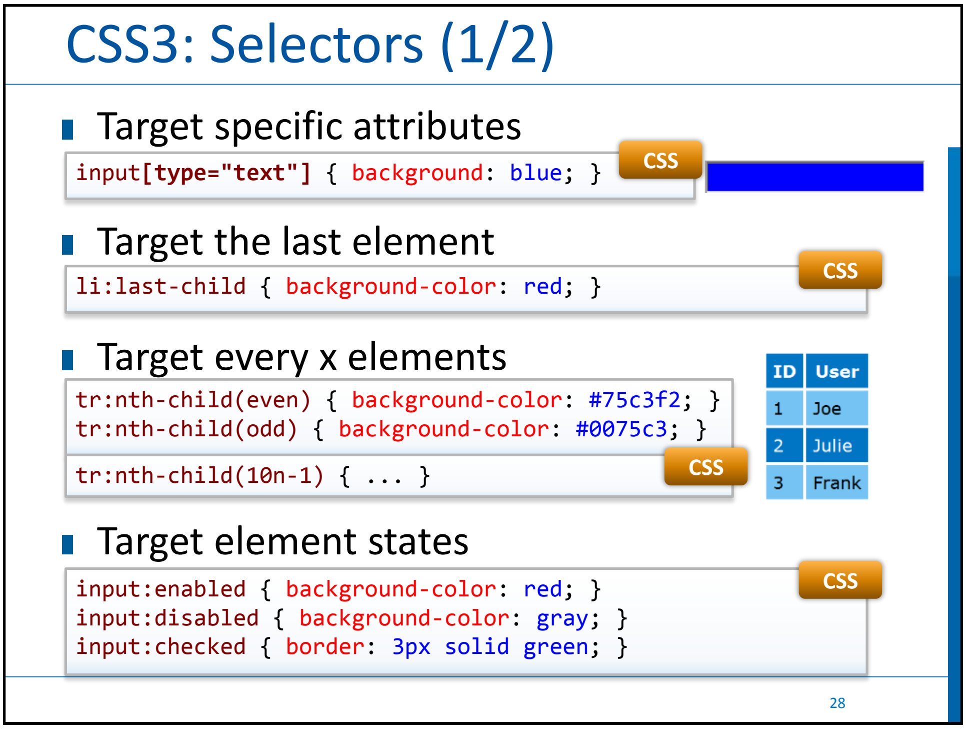

CSS3: Selectors (1/2)

- Target specific attributes

CSS
```
input[type="text"] { background: blue; }
```

- Target the last element

CSS
```
li:last-child { background-color: red; }
```

- Target every x elements

```
tr:nth-child(even) { background-color: #75c3f2; }
tr:nth-child(odd) { background-color: #0075c3; }
```

CSS
```
tr:nth-child(10n-1) { ... }
```

ID	User
1	Joe
2	Julie
3	Frank

- Target element states

CSS
```
input:enabled { background-color: red; }
input:disabled { background-color: gray; }
input:checked { border: 3px solid green; }
```

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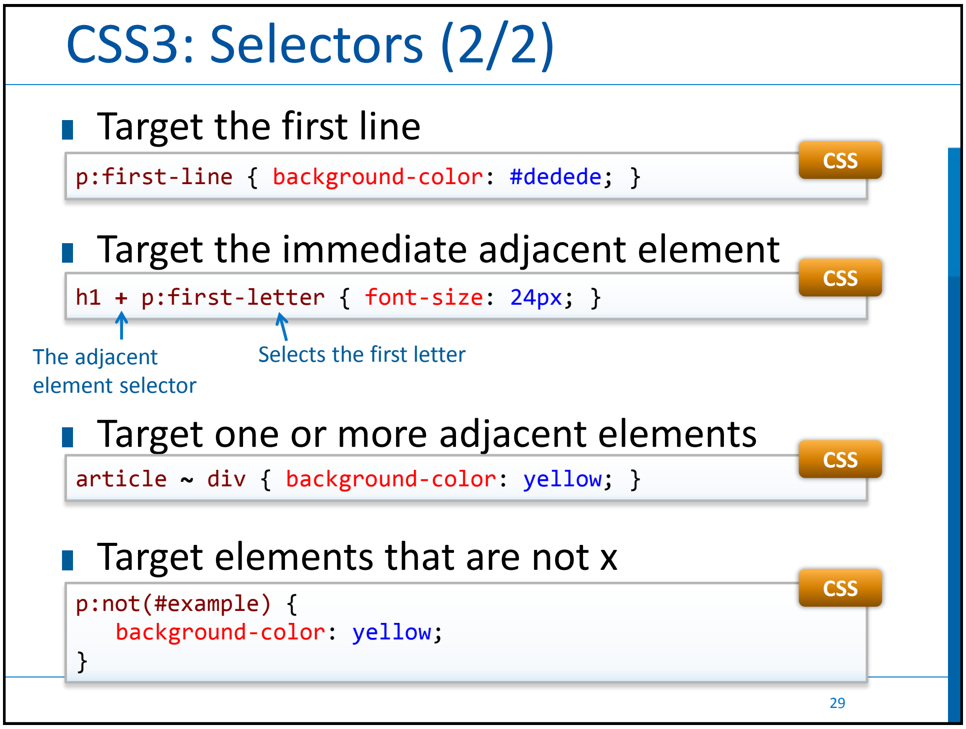

CSS3: Selectors (2/2)

- Target the first line

CSS

```css
p:first-line { background-color: #dedede; }
```

- Target the immediate adjacent element

CSS

```css
h1 + p:first-letter { font-size: 24px; }
```

The adjacent element selector

Selects the first letter

- Target one or more adjacent elements

CSS

```css
article ~ div { background-color: yellow; }
```

- Target elements that are not x

CSS

```css
p:not(#example) {
   background-color: yellow;
}
```

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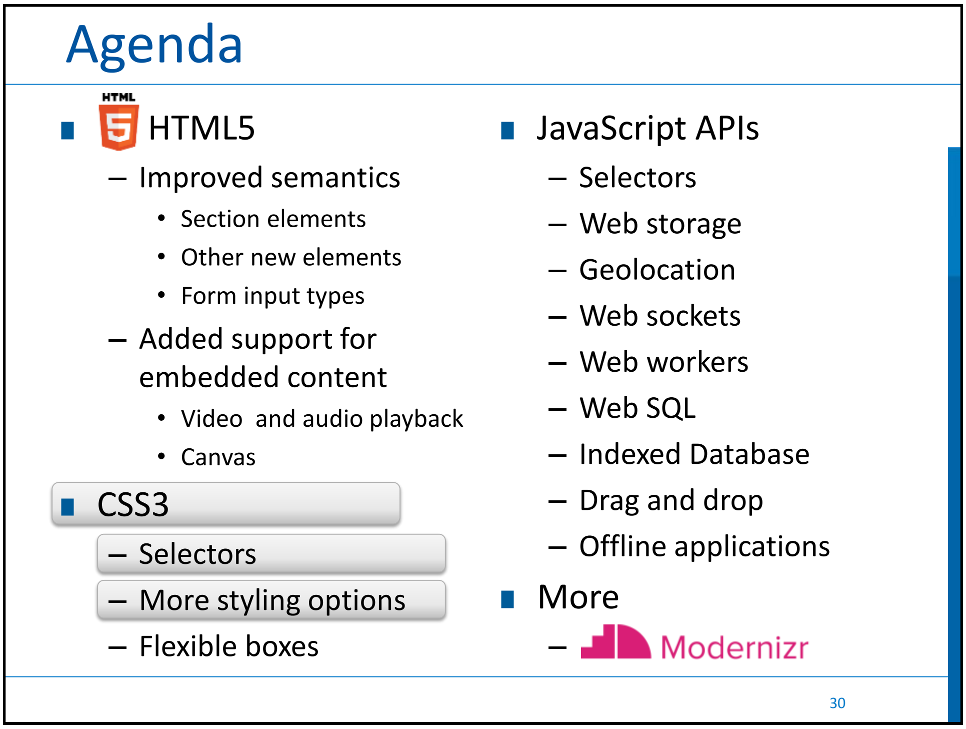

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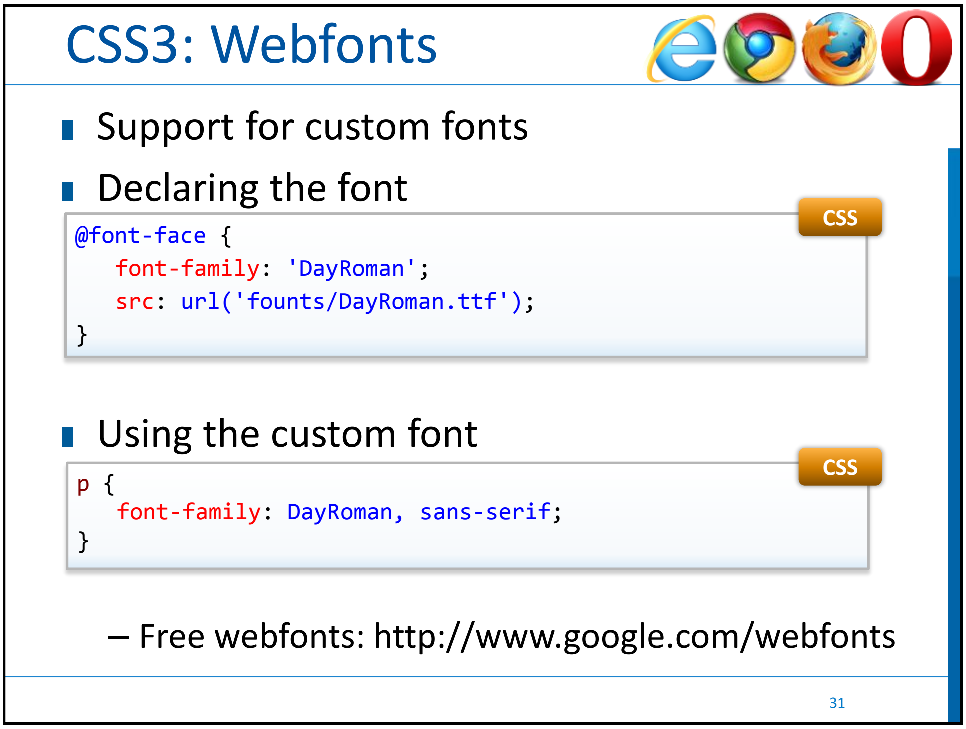

CSS3: Webfonts

- Support for custom fonts
- Declaring the font

CSS
```css
@font-face {
   font-family: 'DayRoman';
   src: url('founts/DayRoman.ttf');
}
```

- Using the custom font

CSS
```css
p {
   font-family: DayRoman, sans-serif;
}
```

– Free webfonts: http://www.google.com/webfonts

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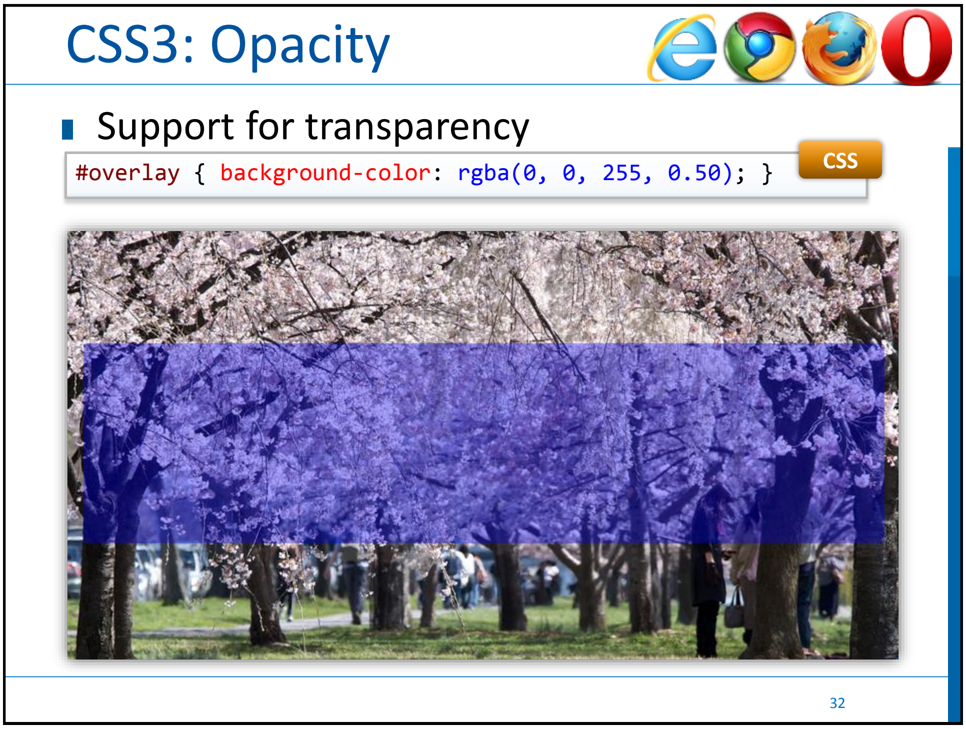

CSS3: Opacity

- Support for transparency

CSS
```css
#overlay { background-color: rgba(0, 0, 255, 0.50); }
```

32

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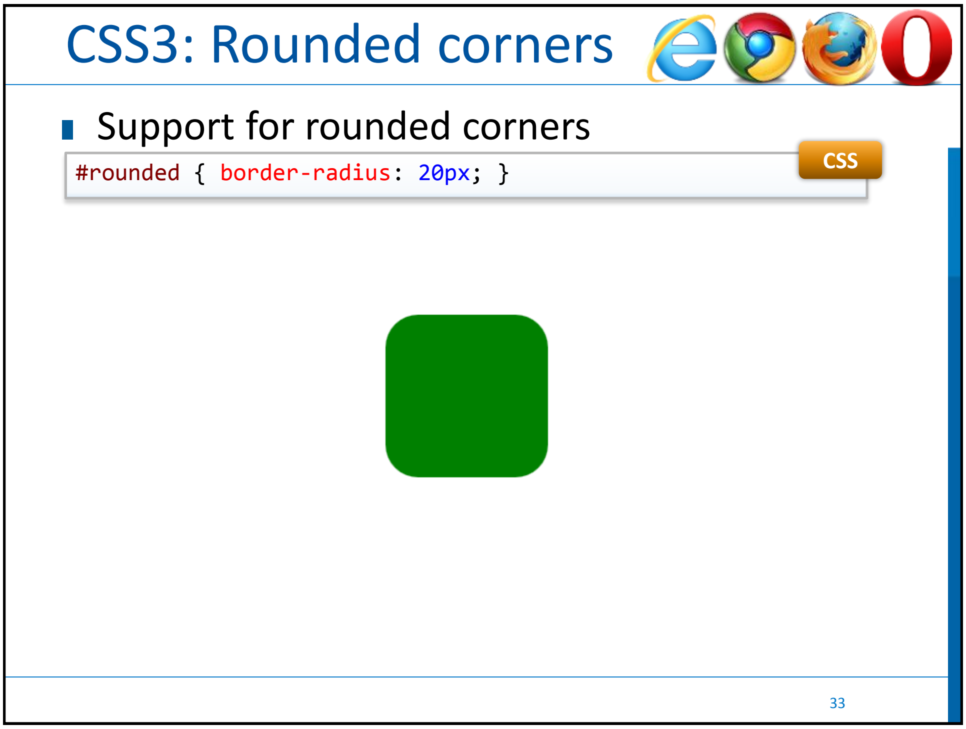


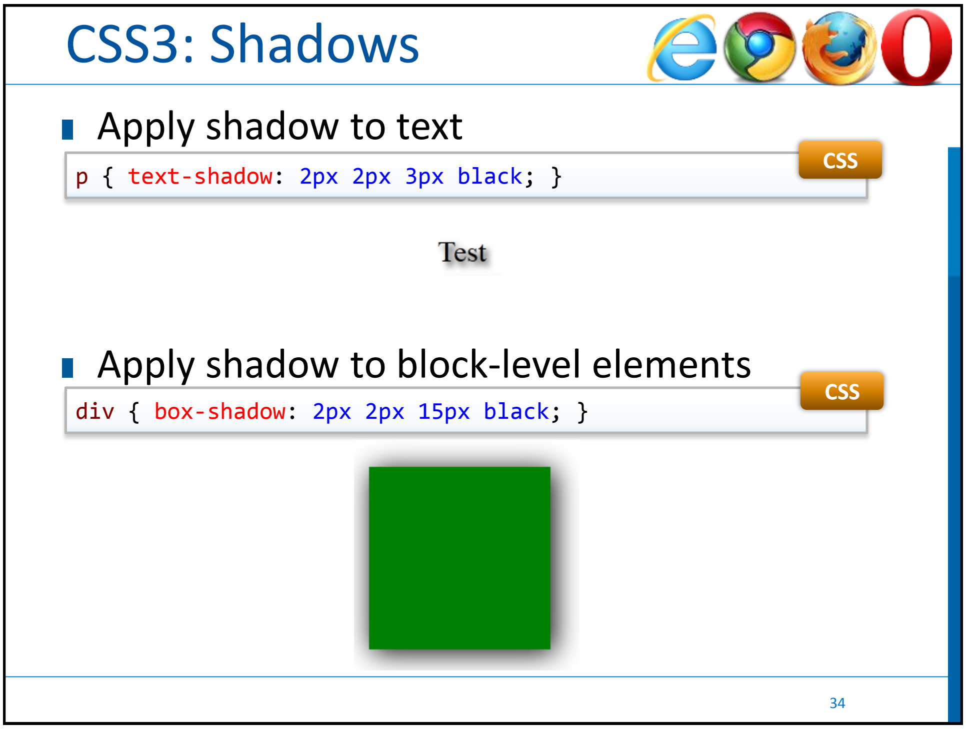
CSS3: Rounded corners

- Support for rounded corners

CSS

```
#rounded { border-radius: 20px; }
```

33



CSS3: Shadows

- Apply shadow to text

CSS

```
p { text-shadow: 2px 2px 3px black; }
```

Test

- Apply shadow to block-level elements

CSS

```
div { box-shadow: 2px 2px 15px black; }
```

34

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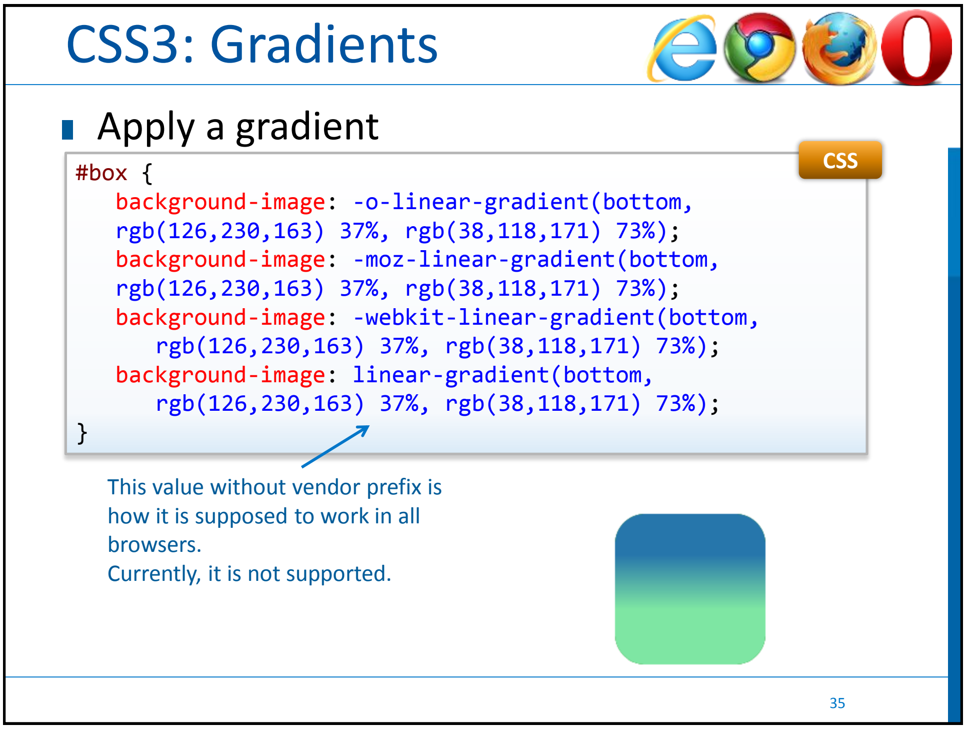


CSS3: Gradients

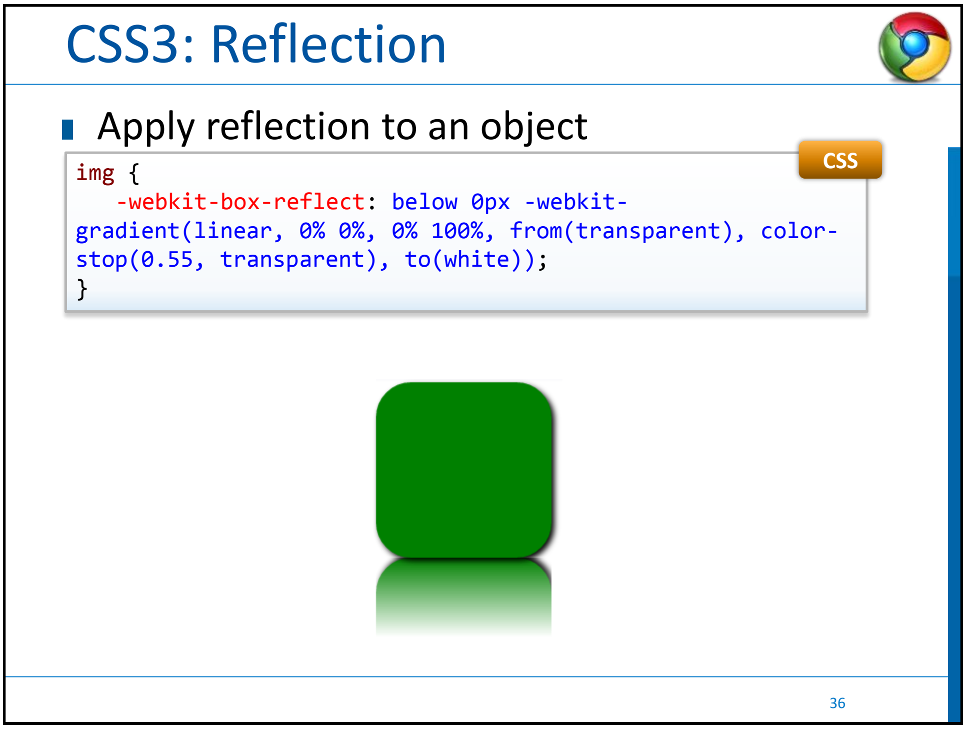
- Apply a gradient

CSS

```
#box {
   background-image: -o-linear-gradient(bottom,
   rgb(126,230,163) 37%, rgb(38,118,171) 73%);
   background-image: -moz-linear-gradient(bottom,
   rgb(126,230,163) 37%, rgb(38,118,171) 73%);
   background-image: -webkit-linear-gradient(bottom,
      rgb(126,230,163) 37%, rgb(38,118,171) 73%);
   background-image: linear-gradient(bottom,
      rgb(126,230,163) 37%, rgb(38,118,171) 73%);
}
```

This value without vendor prefix is how it is supposed to work in all browsers.
Currently, it is not supported.

35



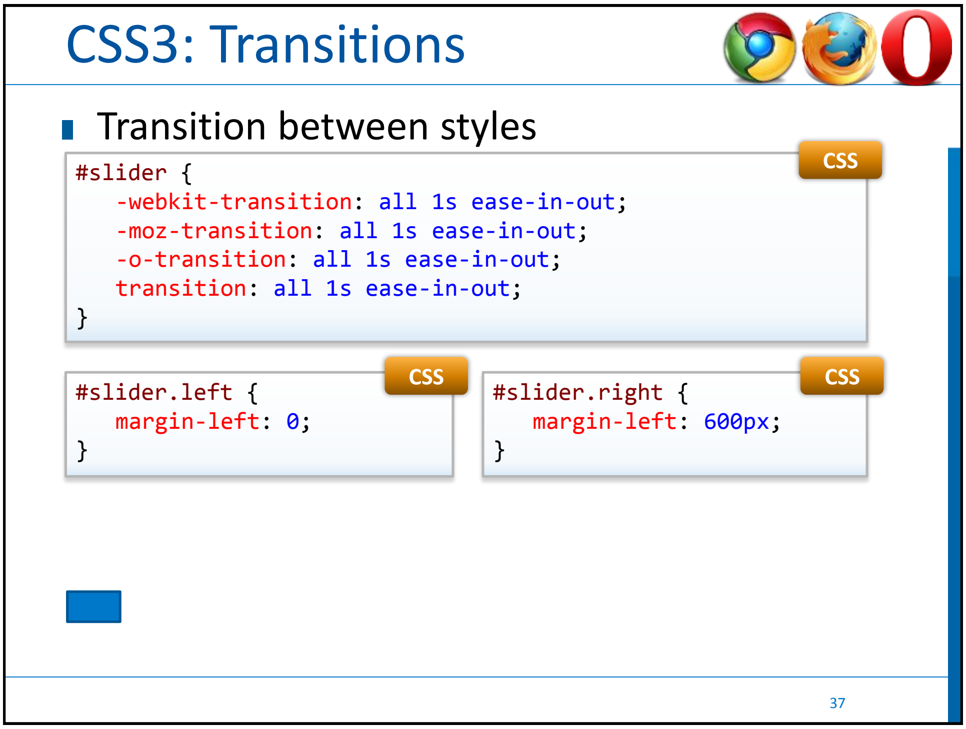
CSS3: Reflection

- Apply reflection to an object

CSS

```
img {
   -webkit-box-reflect: below 0px -webkit-
gradient(linear, 0% 0%, 0% 100%, from(transparent), color-
stop(0.55, transparent), to(white));
}
```

36



CSS3: Transitions

- Transition between styles

CSS

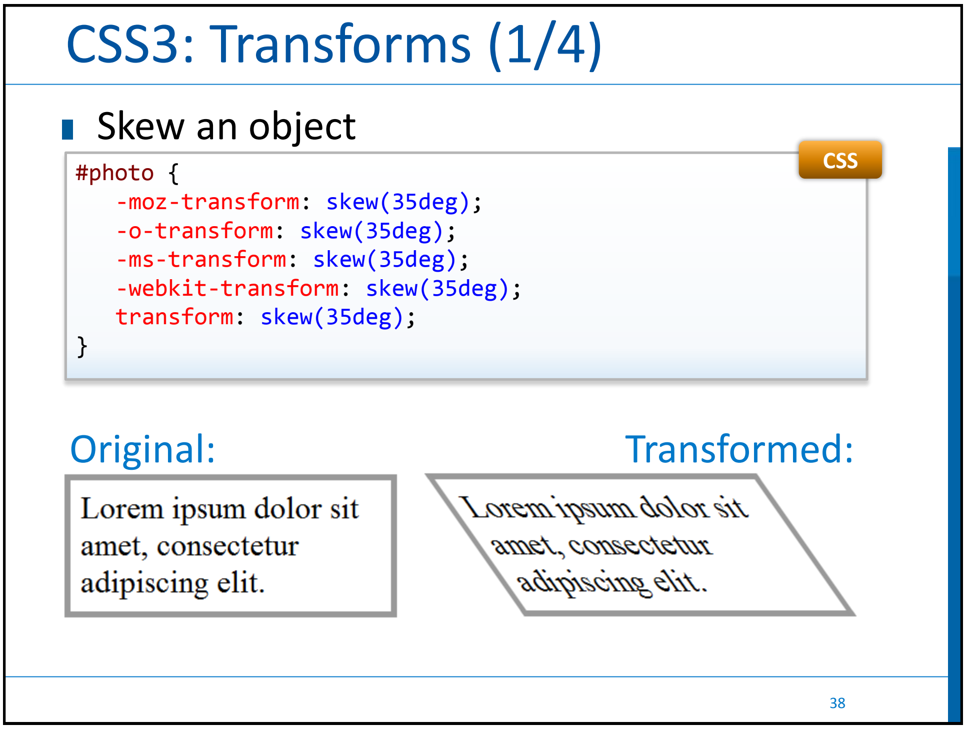
```css
#slider {
   -webkit-transition: all 1s ease-in-out;
   -moz-transition: all 1s ease-in-out;
   -o-transition: all 1s ease-in-out;
   transition: all 1s ease-in-out;
}
```

CSS

```css
#slider.left {
   margin-left: 0;
}
```

CSS

```css
#slider.right {
   margin-left: 600px;
}
```



CSS3: Transforms (1/4)

- Skew an object

CSS

```css
#photo {
   -moz-transform: skew(35deg);
   -o-transform: skew(35deg);
   -ms-transform: skew(35deg);
   -webkit-transform: skew(35deg);
   transform: skew(35deg);
}
```

Original:

Lorem ipsum dolor sit
amet, consectetur
adipiscing elit.

Transformed:

Lorem ipsum dolor sit
amet, consectetur
adipiscing elit.

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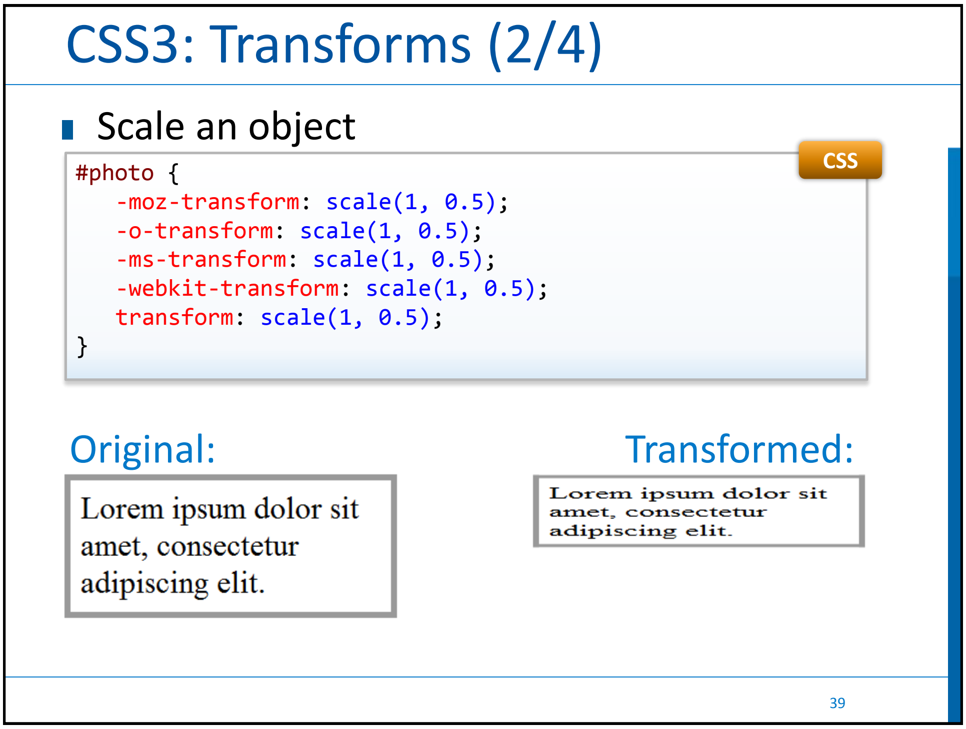


CSS3: Transforms (2/4)

- Scale an object

CSS

```css
#photo {
   -moz-transform: scale(1, 0.5);
   -o-transform: scale(1, 0.5);
   -ms-transform: scale(1, 0.5);
   -webkit-transform: scale(1, 0.5);
   transform: scale(1, 0.5);
}
```

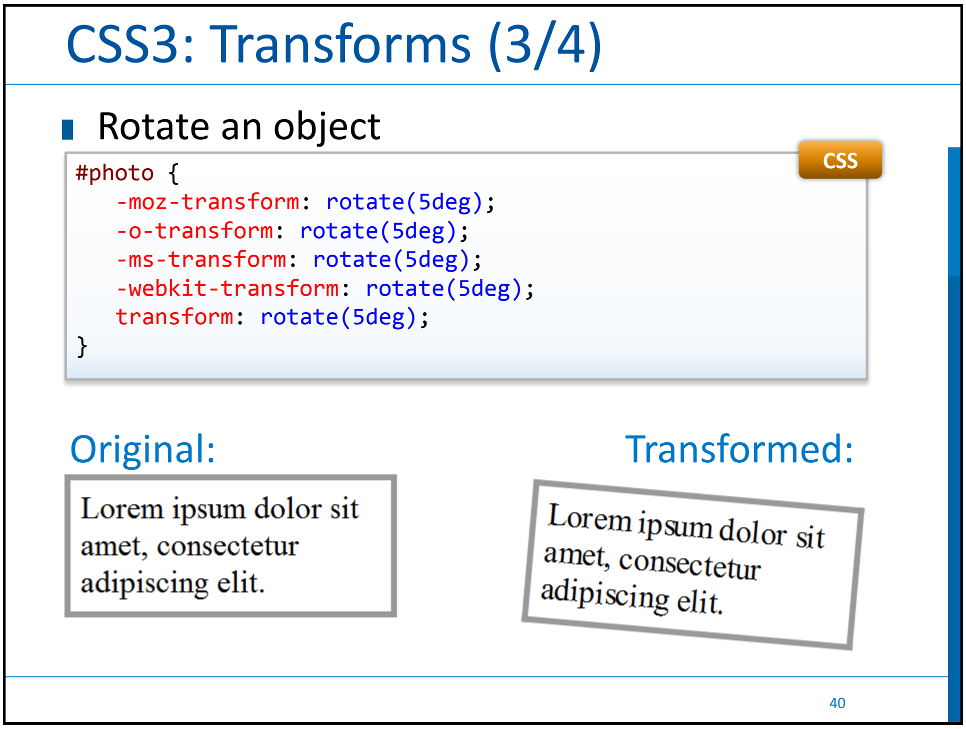
Original:

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Transformed:

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

39



CSS3: Transforms (3/4)

- Rotate an object

CSS

```css
#photo {
   -moz-transform: rotate(5deg);
   -o-transform: rotate(5deg);
   -ms-transform: rotate(5deg);
   -webkit-transform: rotate(5deg);
   transform: rotate(5deg);
}
```

Original:

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Transformed:

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

40

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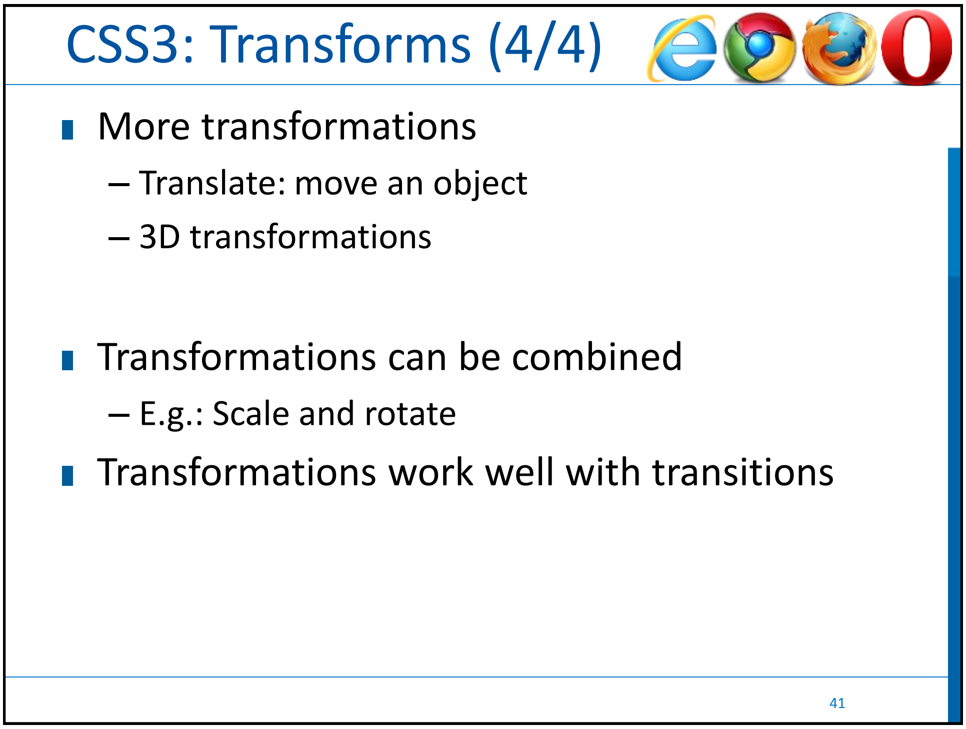

CSS3: Transforms (4/4)

- More transformations
  - Translate: move an object
  - 3D transformations
- Transformations can be combined
  - E.g.: Scale and rotate
- Transformations work well with transitions

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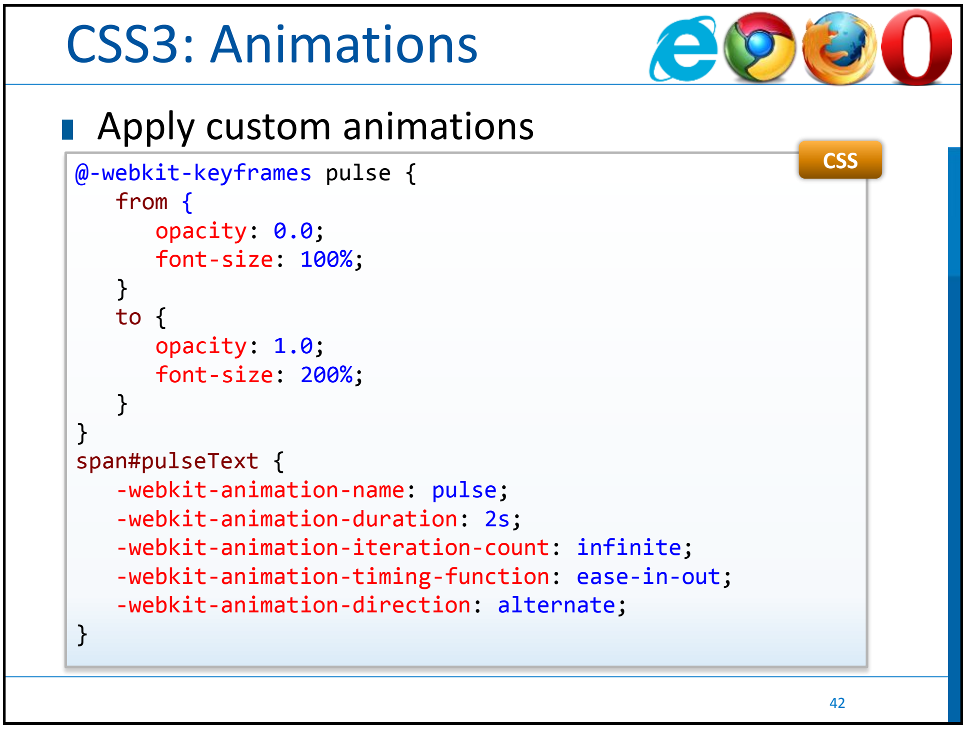

CSS3: Animations

- Apply custom animations

CSS

```
@-webkit-keyframes pulse {
   from {
      opacity: 0.0;
      font-size: 100%;
   }
   to {
      opacity: 1.0;
      font-size: 200%;
   }
}
span#pulseText {
   -webkit-animation-name: pulse;
   -webkit-animation-duration: 2s;
   -webkit-animation-iteration-count: infinite;
   -webkit-animation-timing-function: ease-in-out;
   -webkit-animation-direction: alternate;
}
```

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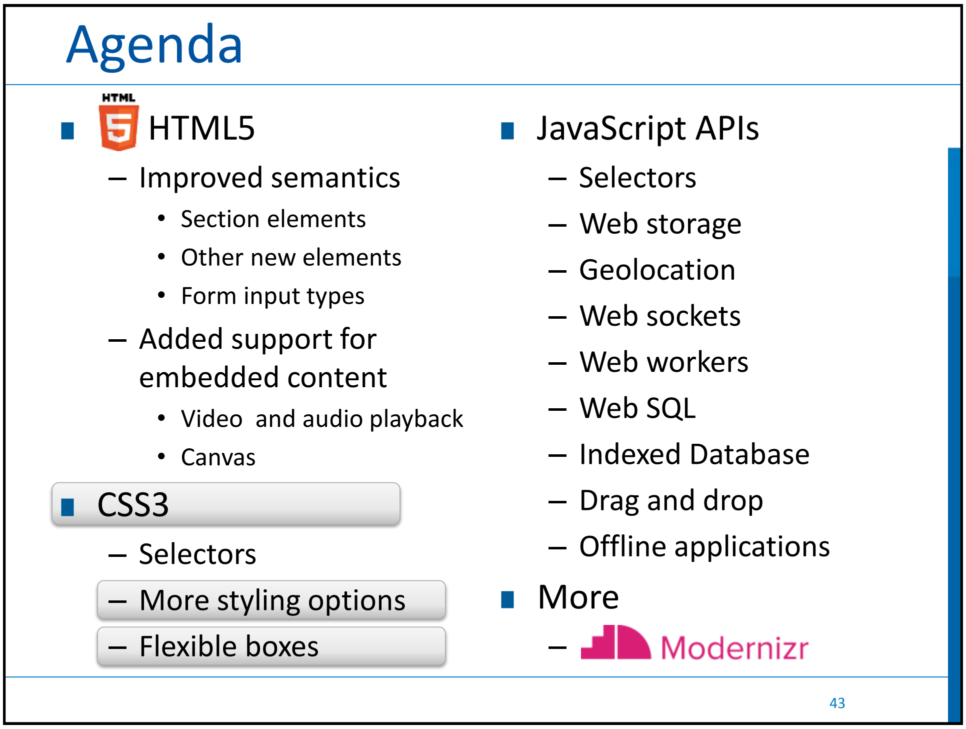

Agenda

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  - Web sockets
  - Web workers
  - Web SQL
  - Indexed Database
  - Drag and drop
  - Offline applications
- More
  - Modernizr

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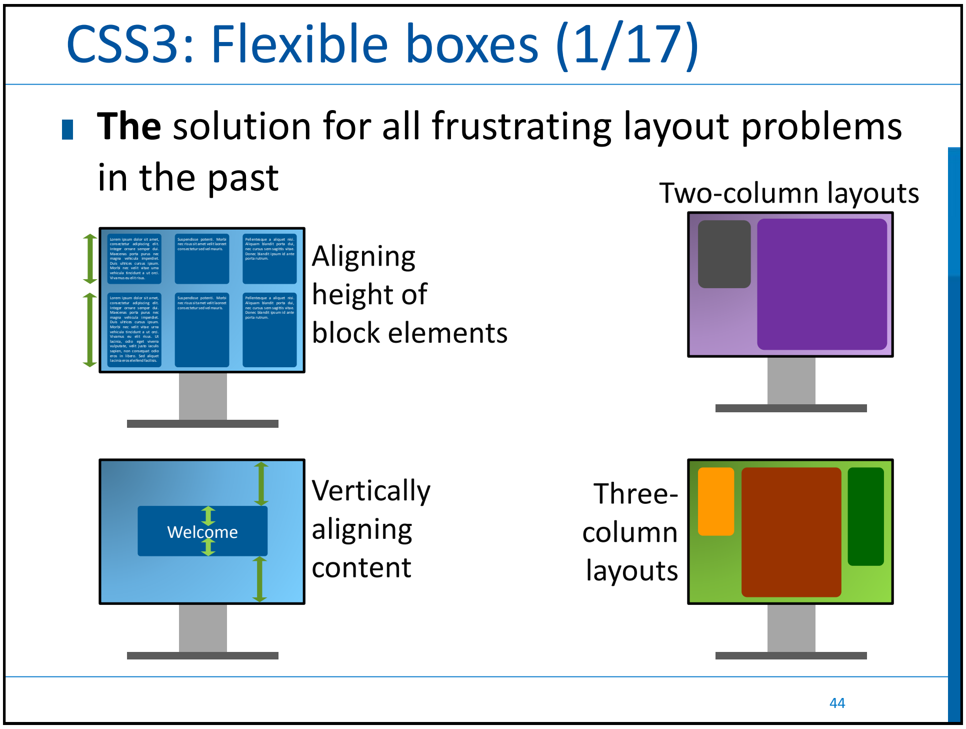


CSS3: Flexible boxes (1/17)

- **The** solution for all frustrating layout problems in the past

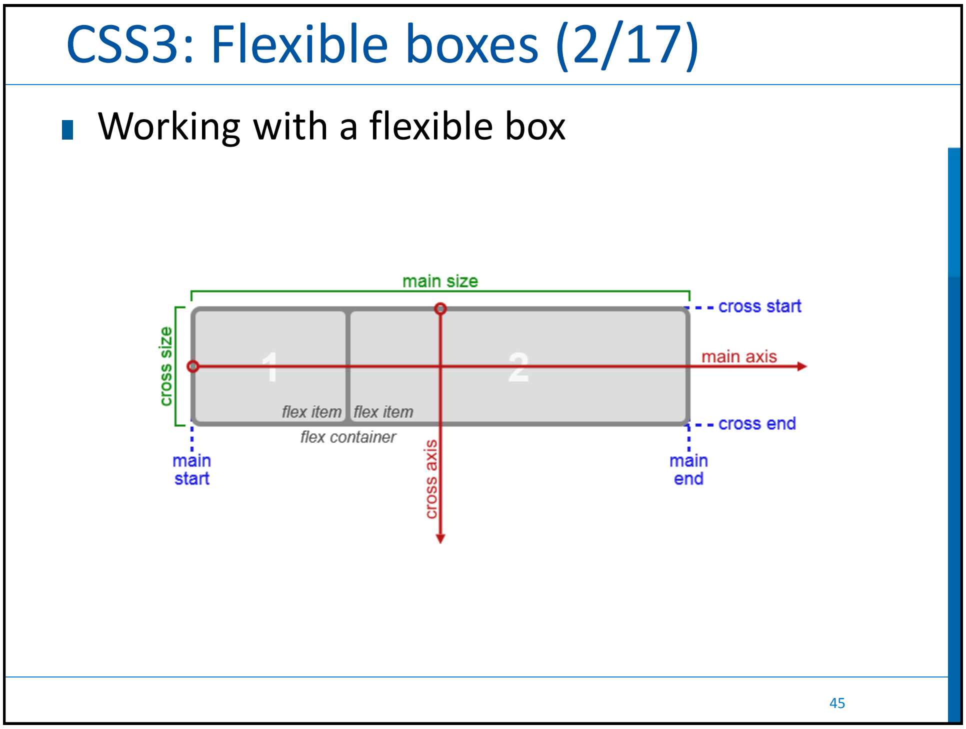
Aligning height of block elements

Two-column layouts

Vertically aligning content

Three-column layouts

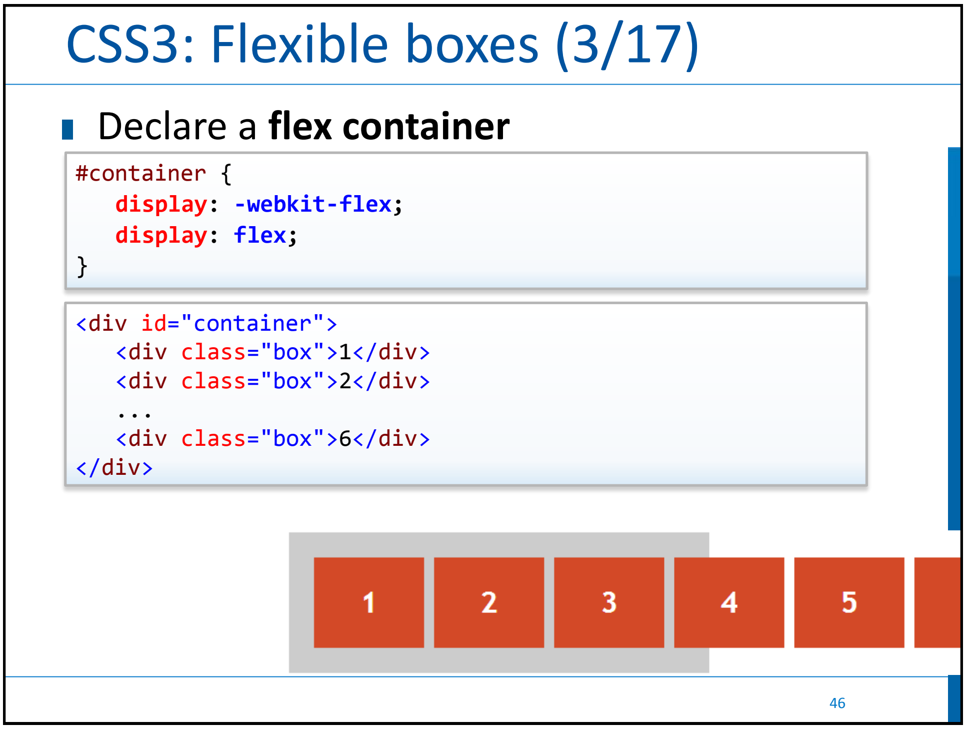
44



CSS3: Flexible boxes (2/17)

- Working with a flexible box

45



CSS3: Flexible boxes (3/17)

- Declare a **flex container**

```
#container {
   display: -webkit-flex;
   display: flex;
}
```

```
<div id="container">
   <div class="box">1</div>
   <div class="box">2</div>
   ...
   <div class="box">6</div>
</div>
```

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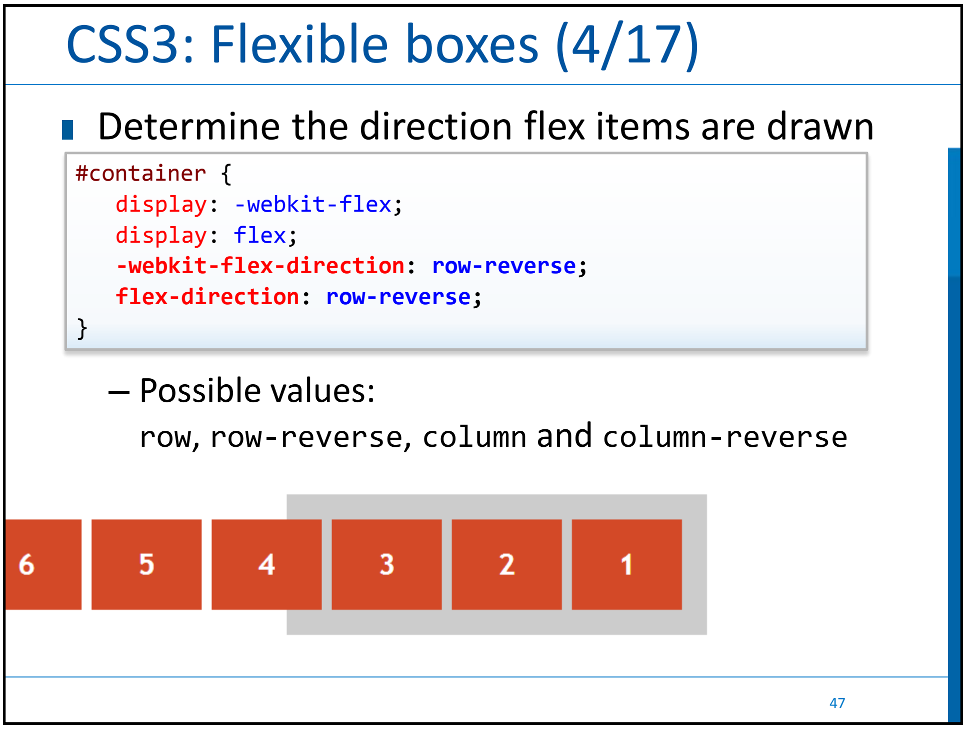

CSS3: Flexible boxes (4/17)

- Determine the direction flex items are drawn

```
#container {
   display: -webkit-flex;
   display: flex;
   -webkit-flex-direction: row-reverse;
   flex-direction: row-reverse;
}
```

– Possible values:
`row`, `row-reverse`, `column` and `column-reverse`

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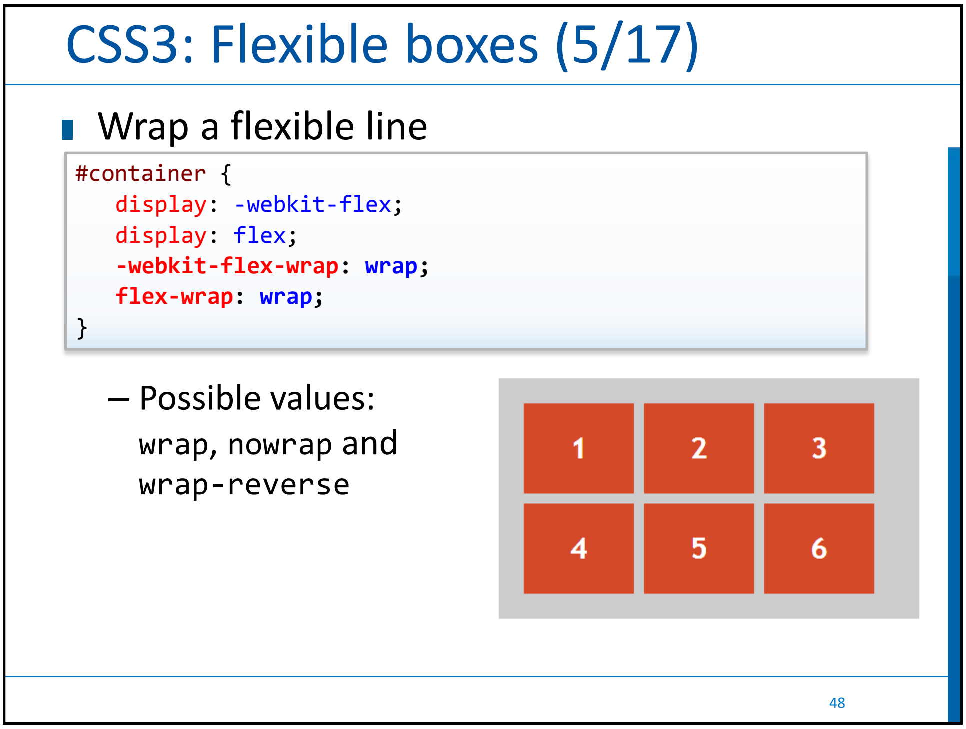

CSS3: Flexible boxes (5/17)

- Wrap a flexible line

```
#container {
   display: -webkit-flex;
   display: flex;
   -webkit-flex-wrap: wrap;
   flex-wrap: wrap;
}
```

– Possible values:
`wrap`, `nowrap` and `wrap-reverse`

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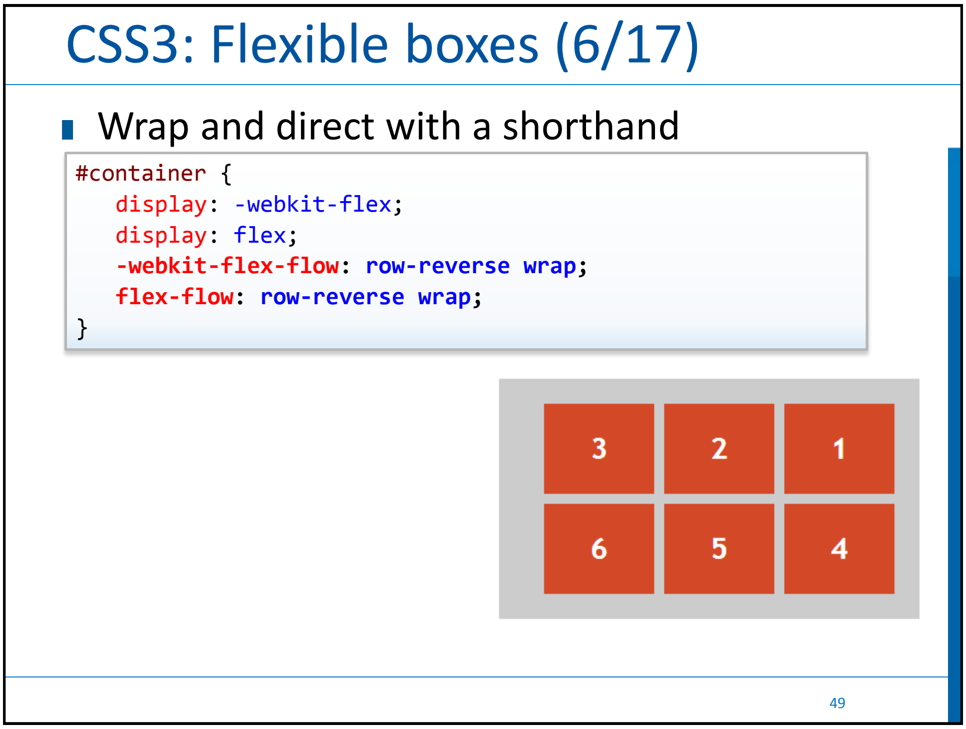
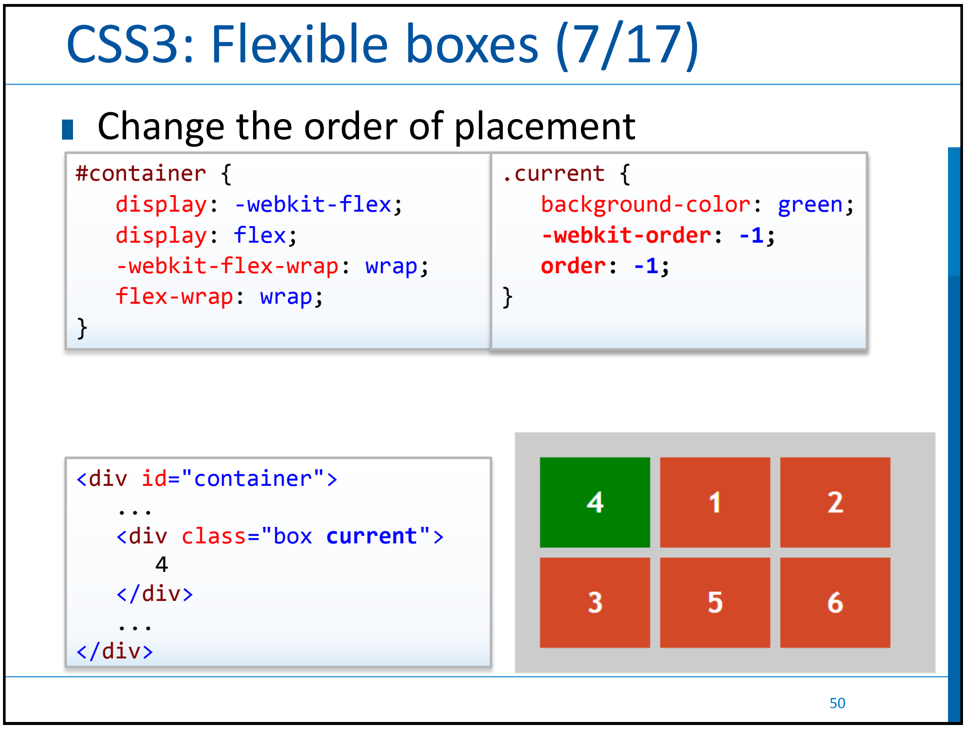


CSS3: Flexible boxes (6/17)

- Wrap and direct with a shorthand

```
#container {
   display: -webkit-flex;
   display: flex;
   -webkit-flex-flow: row-reverse wrap;
   flex-flow: row-reverse wrap;
}
```



CSS3: Flexible boxes (7/17)

- Change the order of placement

```
#container {
   display: -webkit-flex;
   display: flex;
   -webkit-flex-wrap: wrap;
   flex-wrap: wrap;
}
```

```
.current {
   background-color: green;
   -webkit-order: -1;
   order: -1;
}
```

```
<div id="container">
   ...
   <div class="box current">
      4
   </div>
   ...
</div>
```

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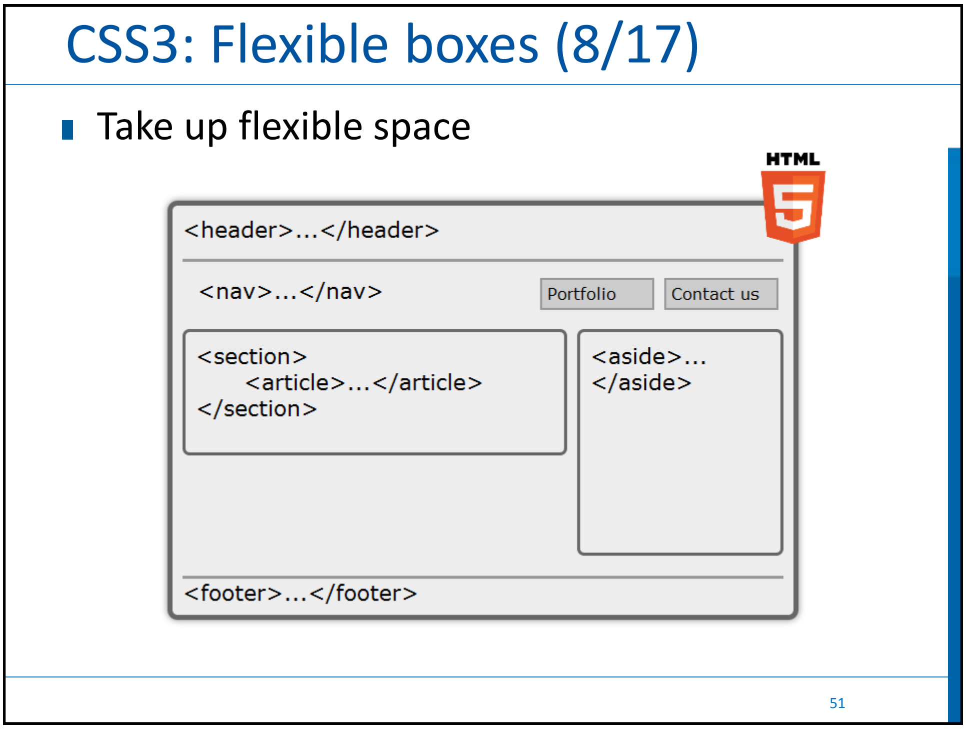

CSS3: Flexible boxes (8/17)

- Take up flexible space

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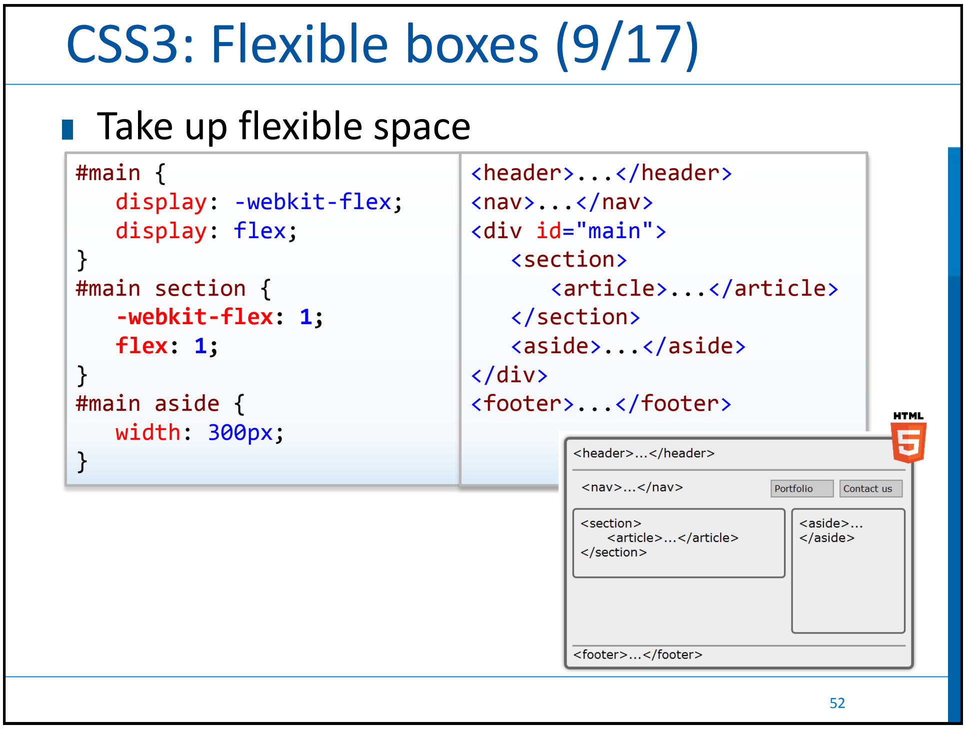

CSS3: Flexible boxes (9/17)

- Take up flexible space

```
#main {
   display: -webkit-flex;
   display: flex;
}
#main section {
   -webkit-flex: 1;
   flex: 1;
}
#main aside {
   width: 300px;
}
```

```
<header>...</header>
<nav>...</nav>
<div id="main">
   <section>
      <article>...</article>
   </section>
   <aside>...</aside>
</div>
<footer>...</footer>
```

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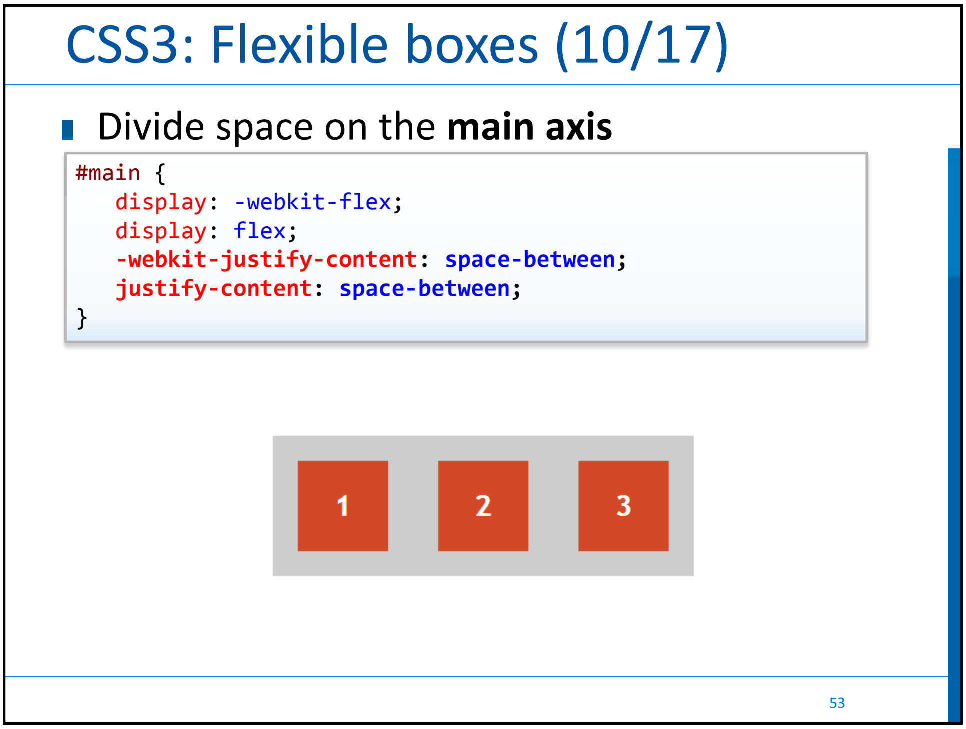
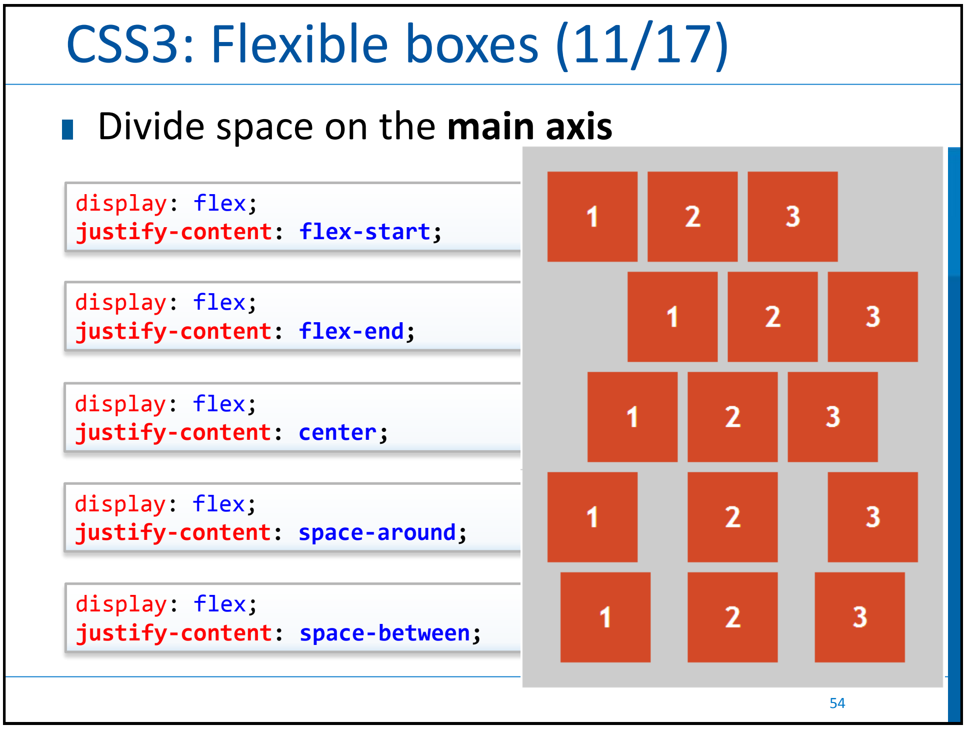


CSS3: Flexible boxes (10/17)

- Divide space on the **main axis**

```
#main {
   display: -webkit-flex;
   display: flex;
   -webkit-justify-content: space-between;
   justify-content: space-between;
}
```

53



CSS3: Flexible boxes (11/17)

- Divide space on the **main axis**

```
display: flex;
justify-content: flex-start;
```

```
display: flex;
justify-content: flex-end;
```

```
display: flex;
justify-content: center;
```

```
display: flex;
justify-content: space-around;
```

```
display: flex;
justify-content: space-between;
```

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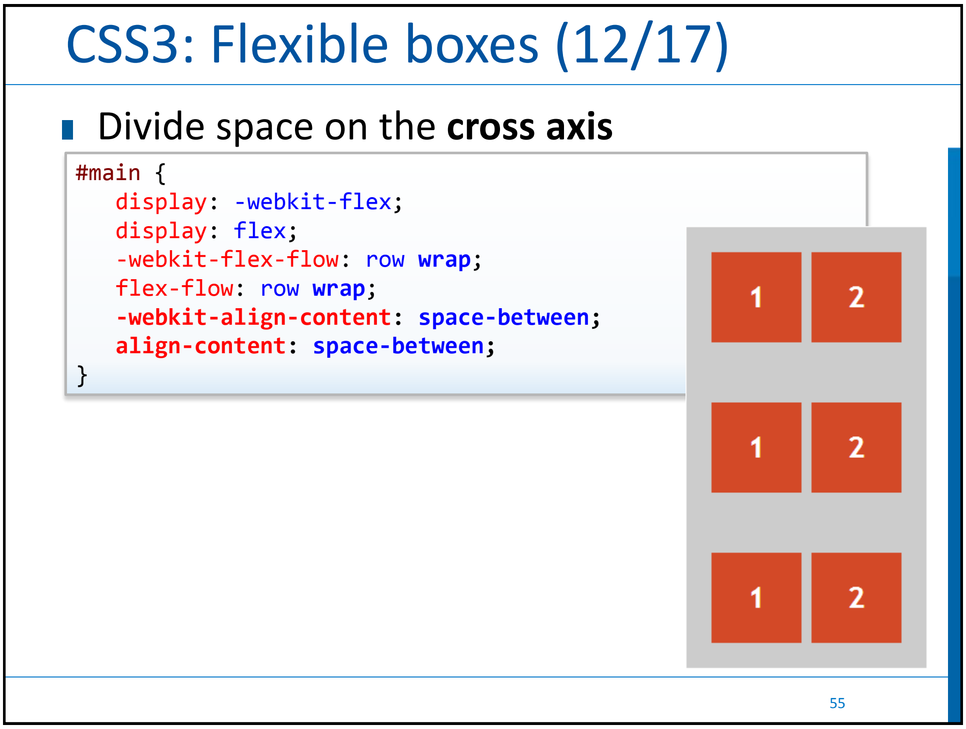
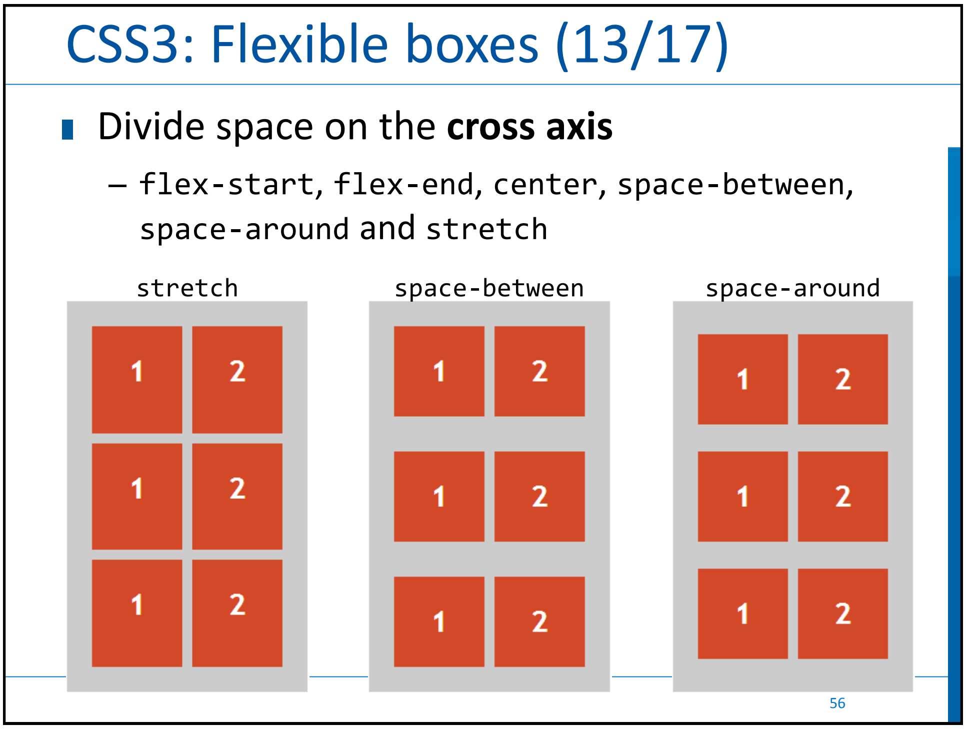


CSS3: Flexible boxes (12/17)

- Divide space on the **cross axis**

```
#main {
   display: -webkit-flex;
   display: flex;
   -webkit-flex-flow: row wrap;
   flex-flow: row wrap;
   -webkit-align-content: space-between;
   align-content: space-between;
}
```

55



CSS3: Flexible boxes (13/17)

- Divide space on the **cross axis**
  - flex-start, flex-end, center, space-between, space-around and stretch

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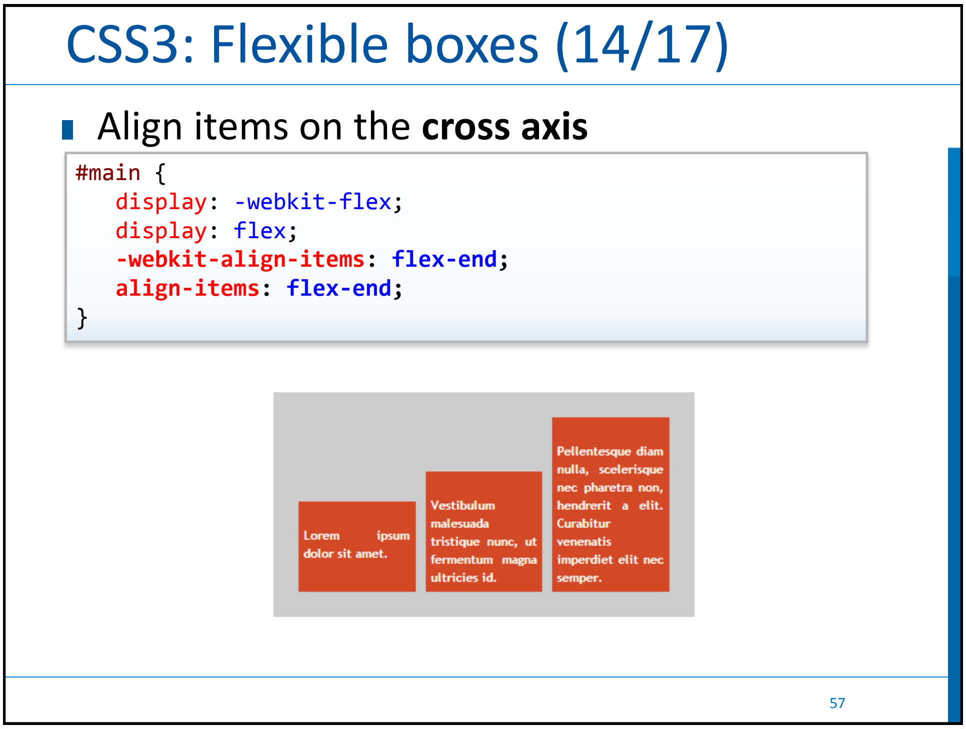


CSS3: Flexible boxes (14/17)

- Align items on the **cross axis**

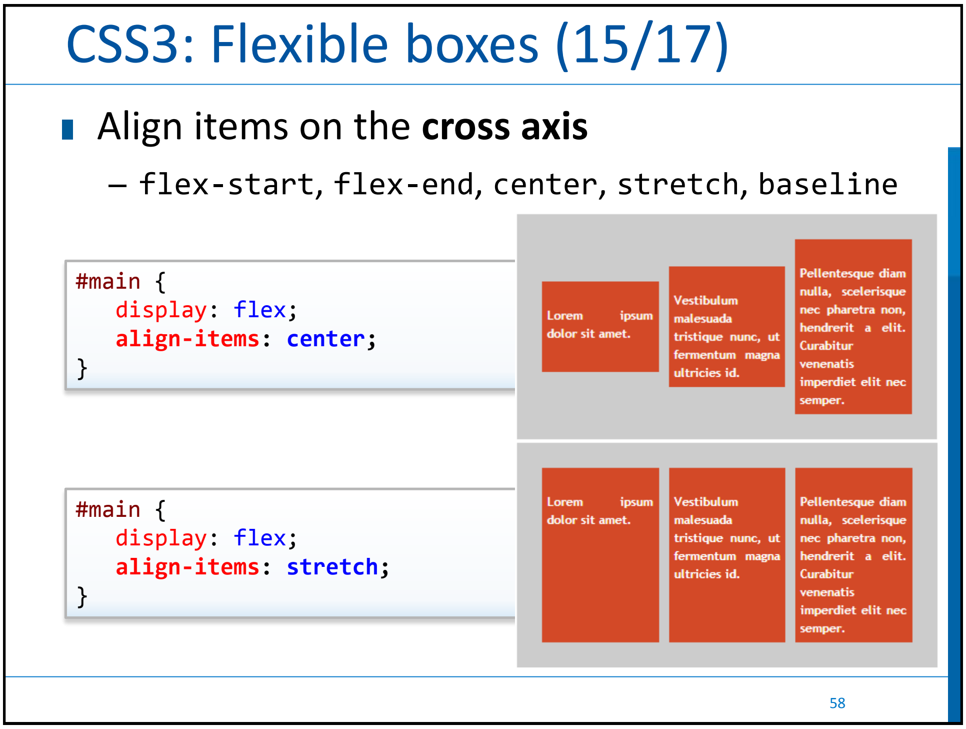
```
#main {
   display: -webkit-flex;
   display: flex;
   -webkit-align-items: flex-end;
   align-items: flex-end;
}
```

Lorem ipsum dolor sit amet.

Vestibulum malesuada tristique nunc, ut fermentum magna ultricies id.

Pellentesque diam nulla, scelerisque nec pharetra non, hendrerit a elit. Curabitur venenatis imperdiet elit nec semper.

57



CSS3: Flexible boxes (15/17)

- Align items on the **cross axis**
  - – flex-start, flex-end, center, stretch, baseline

```
#main {
   display: flex;
   align-items: center;
}
```

Lorem ipsum dolor sit amet.

Vestibulum malesuada tristique nunc, ut fermentum magna ultricies id.

Pellentesque diam nulla, scelerisque nec pharetra non, hendrerit a elit. Curabitur venenatis imperdiet elit nec semper.

```
#main {
   display: flex;
   align-items: stretch;
}
```

Lorem ipsum dolor sit amet.

Vestibulum malesuada tristique nunc, ut fermentum magna ultricies id.

Pellentesque diam nulla, scelerisque nec pharetra non, hendrerit a elit. Curabitur venenatis imperdiet elit nec semper.

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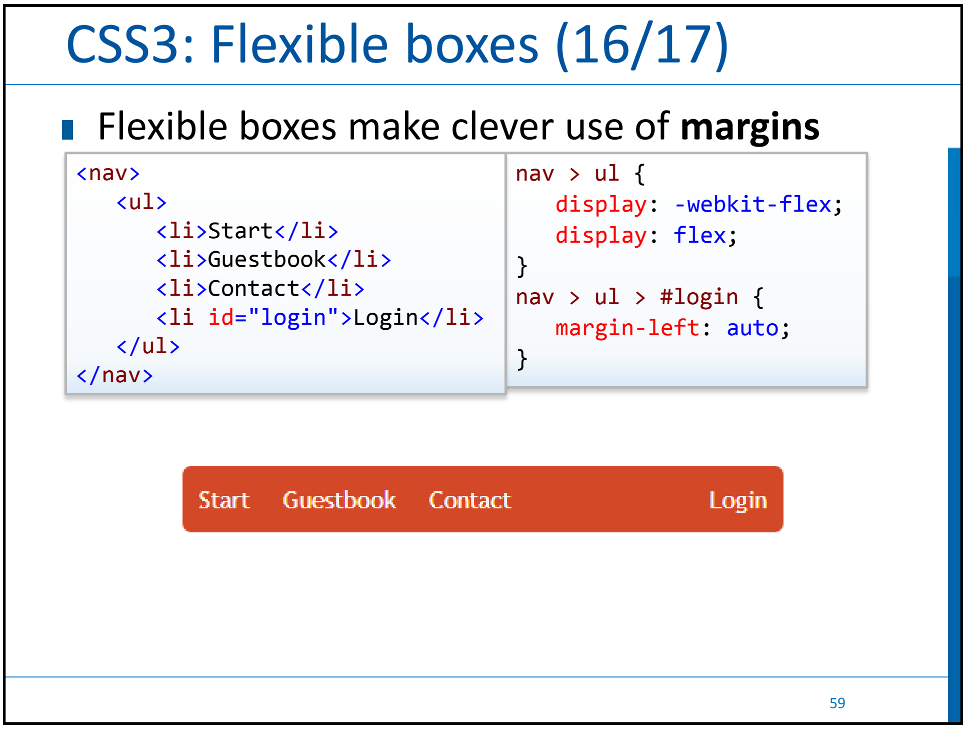

CSS3: Flexible boxes (16/17)

- Flexible boxes make clever use of **margins**

```
<nav>
   <ul>
      <li>Start</li>
      <li>Guestbook</li>
      <li>Contact</li>
      <li id="login">Login</li>
   </ul>
</nav>
```

```
nav > ul {
   display: -webkit-flex;
   display: flex;
}
nav > ul > #login {
   margin-left: auto;
}
```

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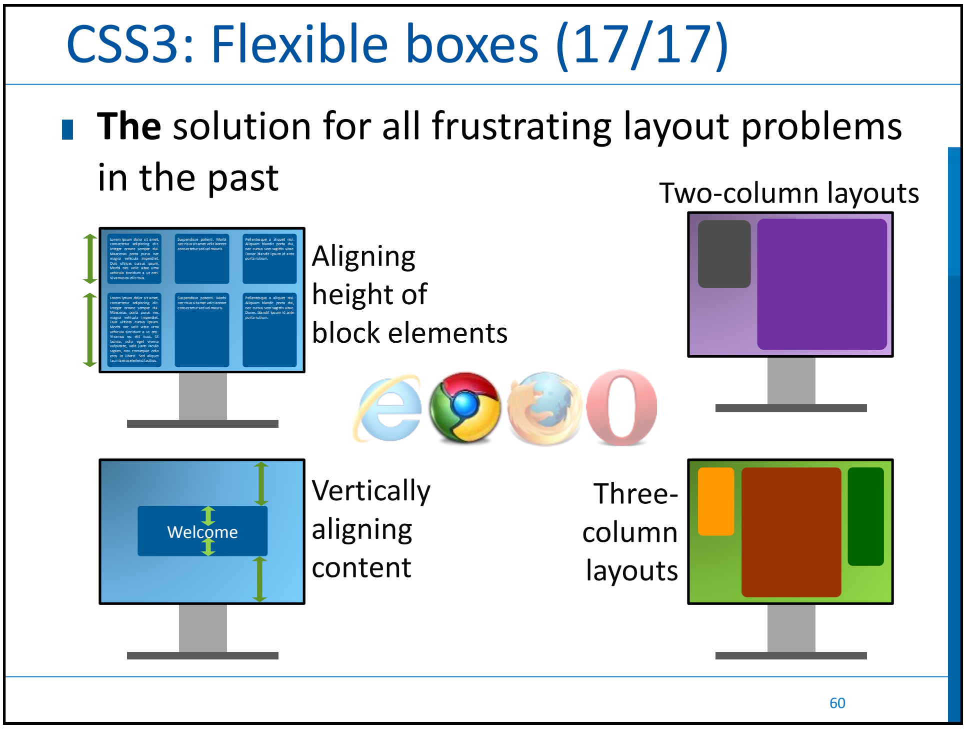

CSS3: Flexible boxes (17/17)

- **The** solution for all frustrating layout problems in the past

Two-column layouts
Aligning height of block elements
Welcome
Vertically aligning content
Three-column layouts

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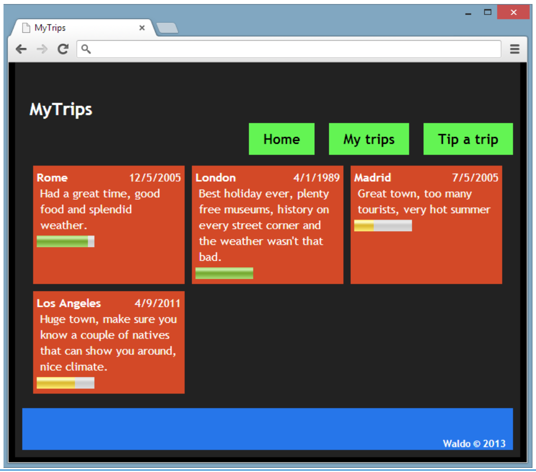
Lab: Semantic elements

- Exercise 1: Semantic elements
- Exercise 2: Using flexible boxes



MyTrips

MyTrips

Home | My trips | Tip a trip

Rome 12/5/2005
Had a great time, good food and splendid weather.

London 4/1/1989
Best holiday ever, plenty free museums, history on every street corner and the weather wasn't that bad.

Madrid 7/5/2005
Great town, too many tourists, very hot summer

Los Angeles 4/9/2011
Huge town, make sure you know a couple of natives that can show you around, nice climate.

Waldo © 2013

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Agenda

- HTML5
  - Improved semantics
    - Section elements
    - Other new elements
    - Form input types
  - Added support for embedded content
    - Video and audio playback
    - Canvas
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  - Selectors
  - More styling options
  - Flexible boxes
- JavaScript APIs
  - Selectors
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  - Offline applications
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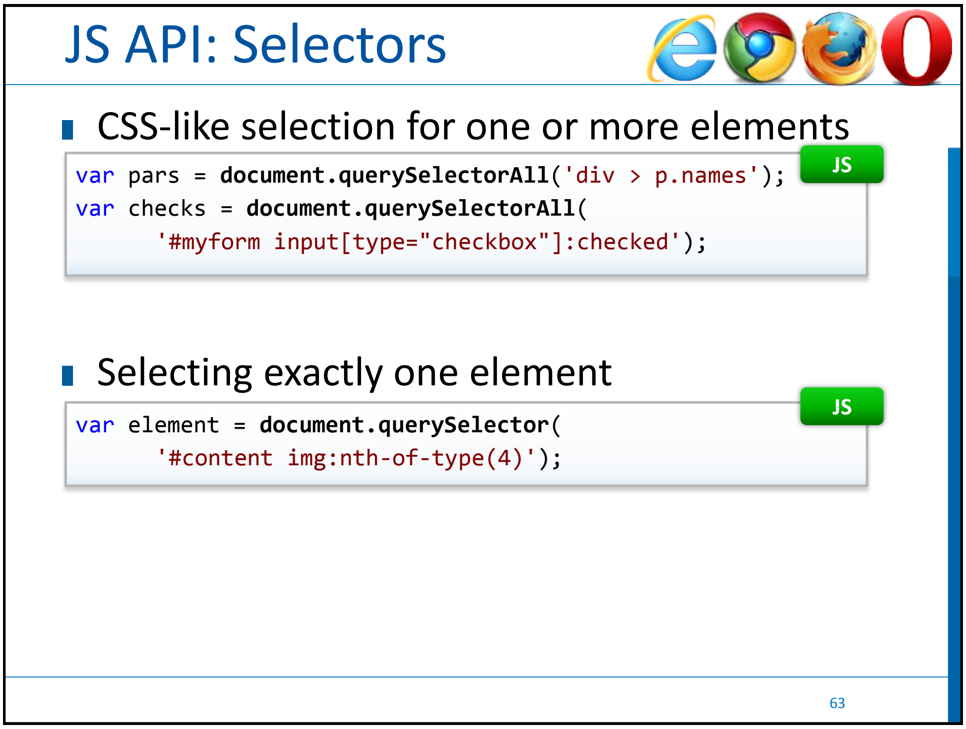

JS API: Selectors

- CSS-like selection for one or more elements

JS

```
var pars = document.querySelectorAll('div > p.names');
var checks = document.querySelectorAll(
      '#myform input[type="checkbox"]:checked');
```

- Selecting exactly one element

JS

```
var element = document.querySelector(
      '#content img:nth-of-type(4)');
```

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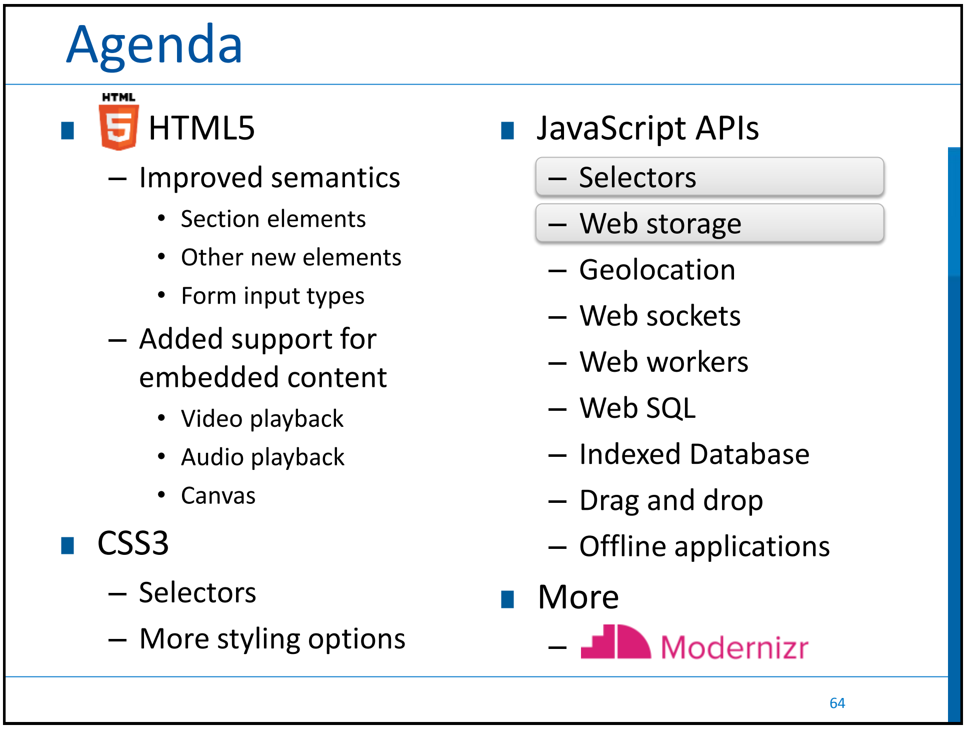

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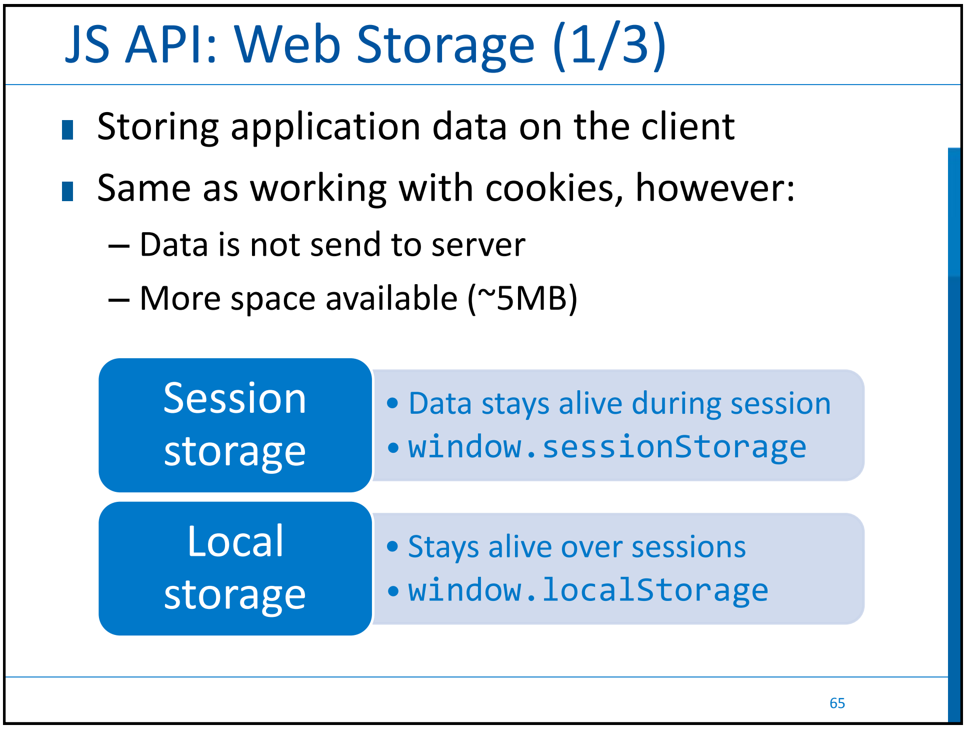

JS API: Web Storage (1/3)

- Storing application data on the client
- Same as working with cookies, however:
  - Data is not send to server
  - More space available (~5MB)

Session storage
- Data stays alive during session
- `window.sessionStorage`

Local storage
- Stays alive over sessions
- `window.localStorage`

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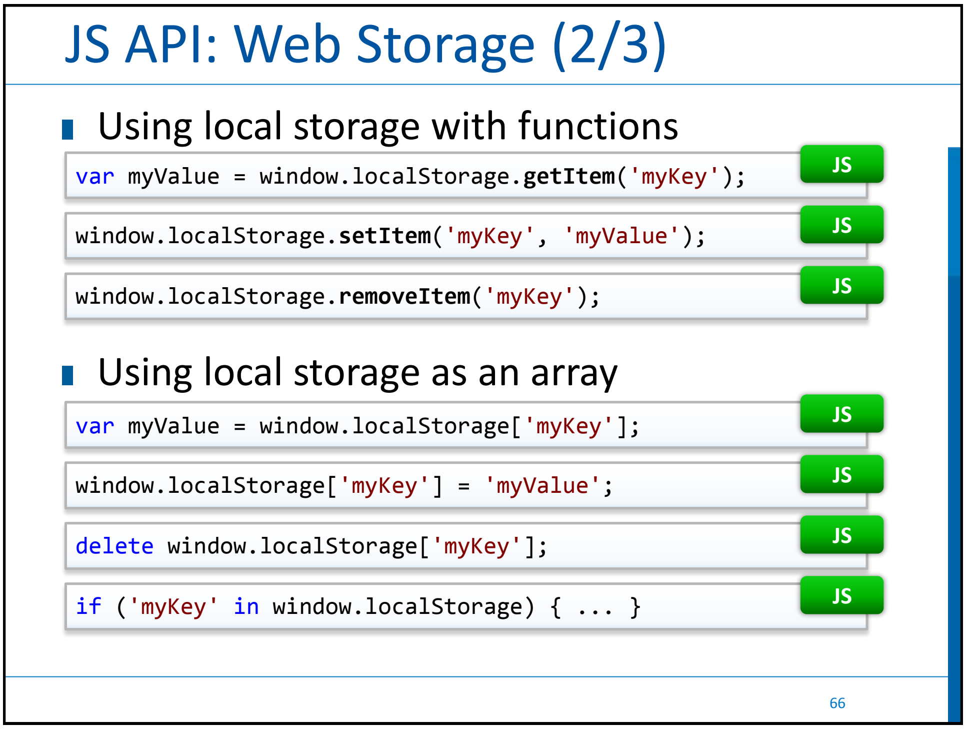

JS API: Web Storage (2/3)

- Using local storage with functions

```
var myValue = window.localStorage.getItem('myKey');
```
JS

```
window.localStorage.setItem('myKey', 'myValue');
```
JS

```
window.localStorage.removeItem('myKey');
```
JS

- Using local storage as an array

```
var myValue = window.localStorage['myKey'];
```
JS

```
window.localStorage['myKey'] = 'myValue';
```
JS

```
delete window.localStorage['myKey'];
```
JS

```
if ('myKey' in window.localStorage) { ... }
```
JS

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JS API: Web Storage (3/3)

- Web Storage only stores strings
  - The built-in JSON object converts to/from strings

- Store objects using JSON.stringify()

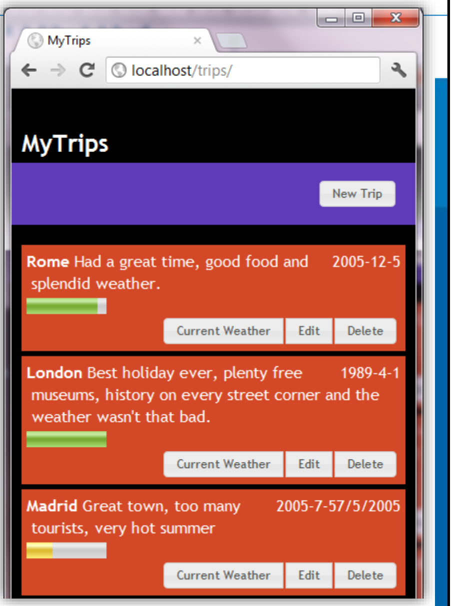
JS
```
var myObject = { x: 14, y: 28, q: 'Hi' };
window.localStorage['myObj'] = JSON.stringify(myObject);
```

- Retrieve objects using JSON.parse()

JS
```
if (window.localStorage['myObj']) {
   var myObject = JSON.parse(window.localStorage['myObj']);
   alert(myObject.y);
}
```

Lab: Storing data

- Exercise 2:
  Store the added trips in local storage for later viewing



MyTrips

Rome Had a great time, good food and splendid weather. 2005-12-5

London Best holiday ever, plenty free museums, history on every street corner and the weather wasn't that bad. 1989-4-1

Madrid Great town, too many tourists, very hot summer 2005-7-57/5/2005

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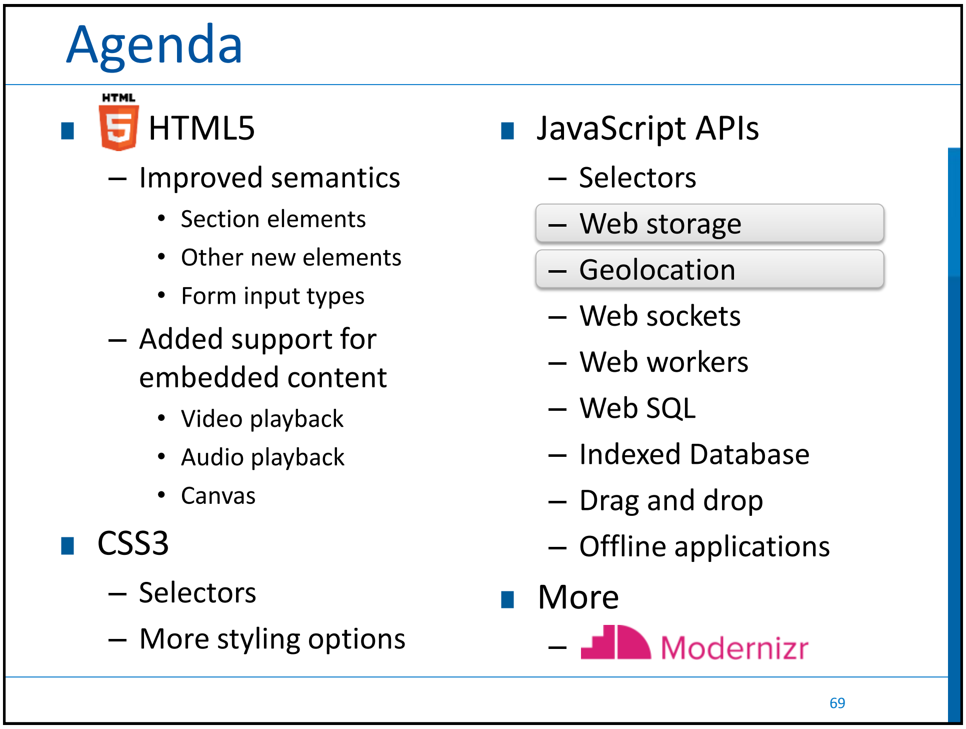

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  - Web SQL
  - Indexed Database
  - Drag and drop
  - Offline applications
- More
  - Modernizr

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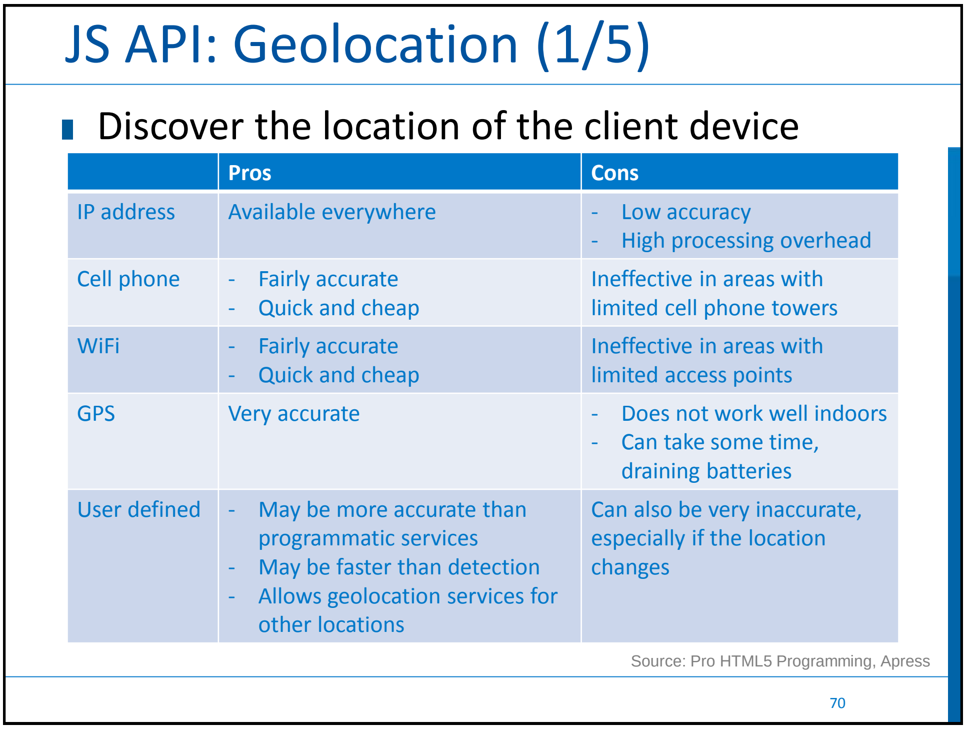

JS API: Geolocation (1/5)

- Discover the location of the client device

	Pros	Cons
IP address	Available everywhere	- Low accuracy - High processing overhead
Cell phone	- Fairly accurate - Quick and cheap	Ineffective in areas with limited cell phone towers
WiFi	- Fairly accurate - Quick and cheap	Ineffective in areas with limited access points
GPS	Very accurate	- Does not work well indoors - Can take some time, draining batteries
User defined	- May be more accurate than programmatic services - May be faster than detection - Allows geolocation services for other locations	Can also be very inaccurate, especially if the location changes

Source: Pro HTML5 Programming, Apress

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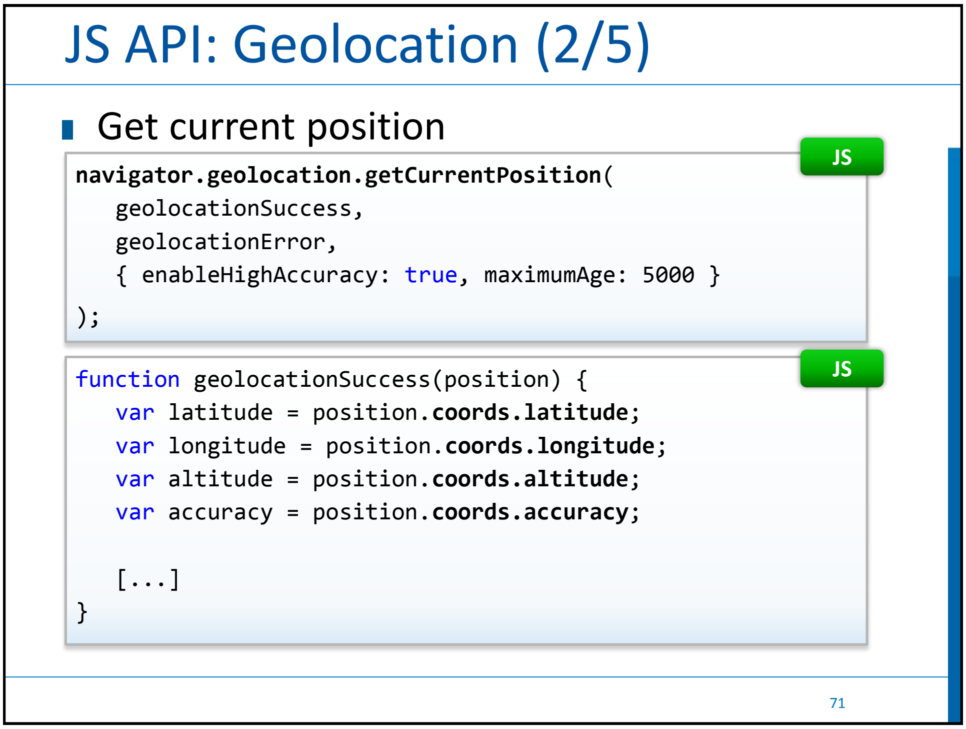

JS API: Geolocation (2/5)

- Get current position

JS

```
navigator.geolocation.getCurrentPosition(
   geolocationSuccess,
   geolocationError,
   { enableHighAccuracy: true, maximumAge: 5000 }
);
```

JS

```
function geolocationSuccess(position) {
   var latitude = position.coords.latitude;
   var longitude = position.coords.longitude;
   var altitude = position.coords.altitude;
   var accuracy = position.coords.accuracy;

   [...]
}
```

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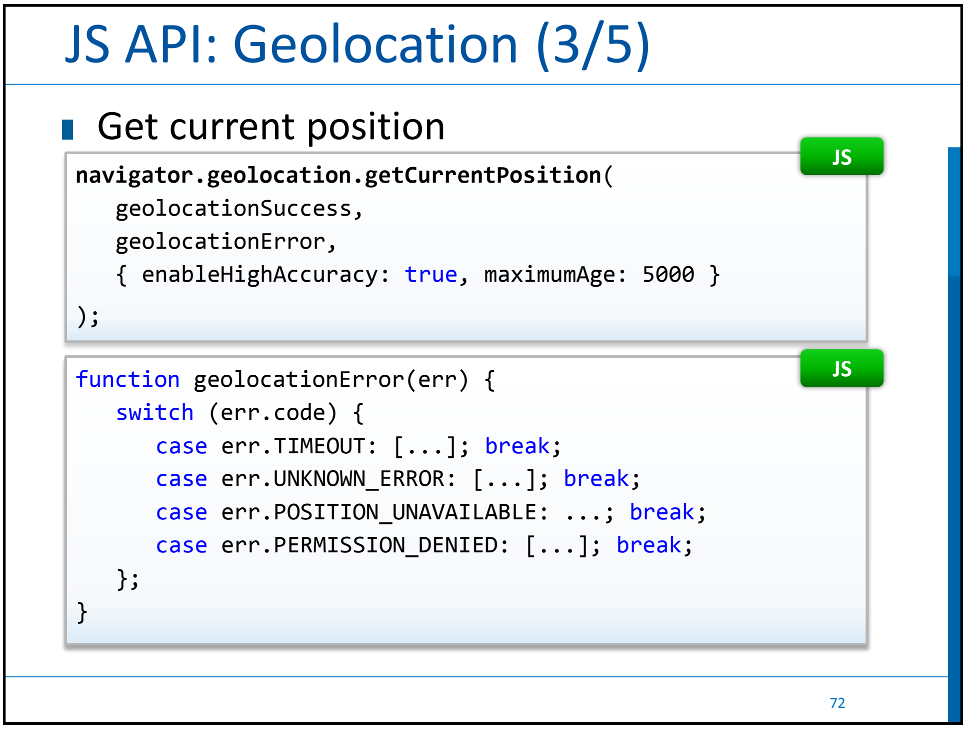

JS API: Geolocation (3/5)

- Get current position

JS

```
navigator.geolocation.getCurrentPosition(
   geolocationSuccess,
   geolocationError,
   { enableHighAccuracy: true, maximumAge: 5000 }
);
```

JS

```
function geolocationError(err) {
   switch (err.code) {
      case err.TIMEOUT: [...]; break;
      case err.UNKNOWN_ERROR: [...]; break;
      case err.POSITION_UNAVAILABLE: ...; break;
      case err.PERMISSION_DENIED: [...]; break;
   };
}
```

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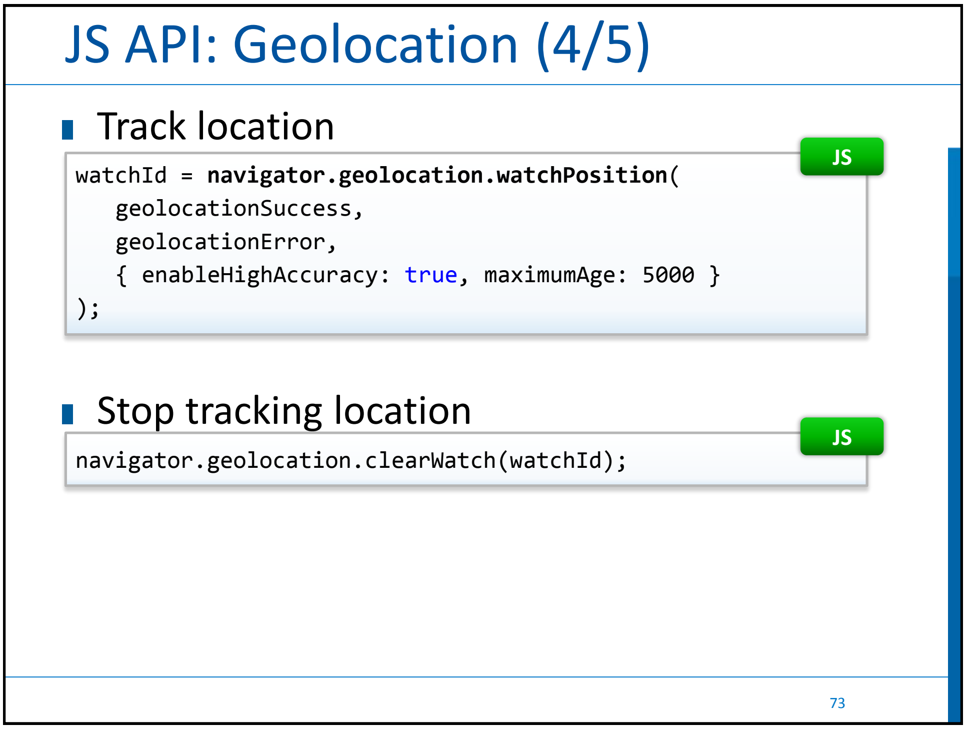

JS API: Geolocation (4/5)

- Track location

JS

```
watchId = navigator.geolocation.watchPosition(
   geolocationSuccess,
   geolocationError,
   { enableHighAccuracy: true, maximumAge: 5000 }
);
```

- Stop tracking location

JS

```
navigator.geolocation.clearWatch(watchId);
```

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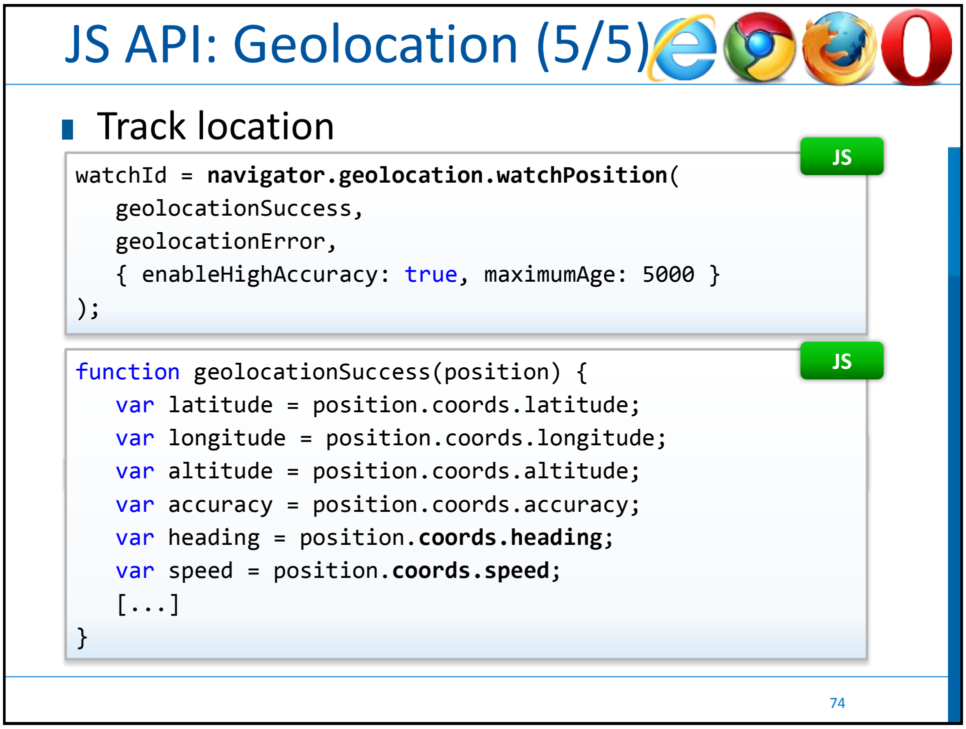

JS API: Geolocation (5/5)

- Track location

JS

```
watchId = navigator.geolocation.watchPosition(
   geolocationSuccess,
   geolocationError,
   { enableHighAccuracy: true, maximumAge: 5000 }
);
```

JS

```
function geolocationSuccess(position) {
   var latitude = position.coords.latitude;
   var longitude = position.coords.longitude;
   var altitude = position.coords.altitude;
   var accuracy = position.coords.accuracy;
   var heading = position.coords.heading;
   var speed = position.coords.speed;
   [...]
}
```

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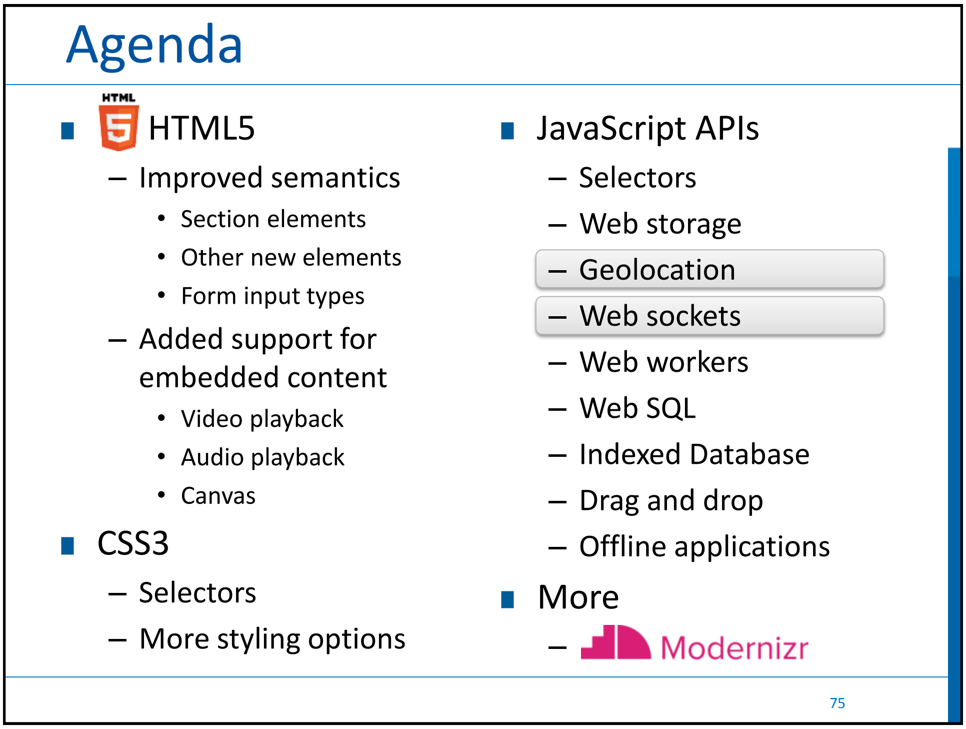

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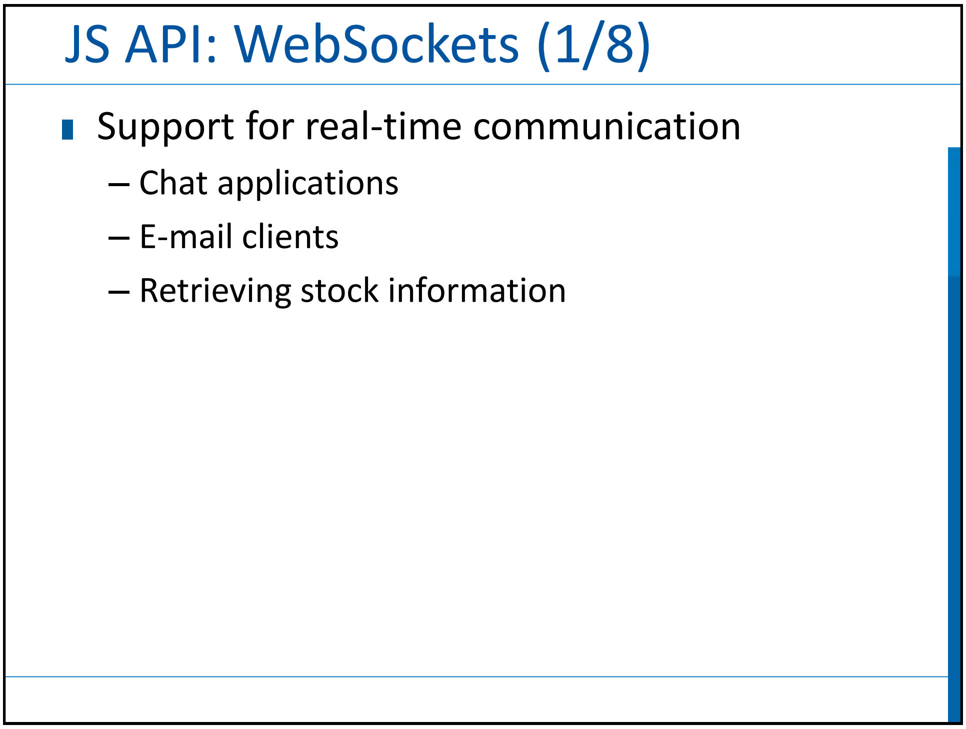

JS API: WebSockets (1/8)

- Support for real-time communication
  - Chat applications
  - E-mail clients
  - Retrieving stock information

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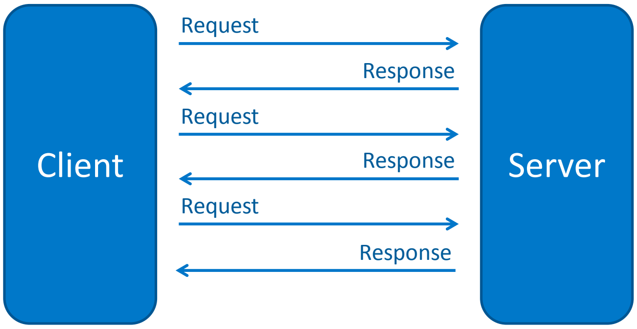
JS API: WebSockets (2/8)

- Real-time communication before websockets: Polling



JS API: WebSockets (3/8)

A basic HTTP request

```
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Encoding: gzip, deflate
Accept-Language: nl,en-us;q=0.7,en;q=0.3
Connection: keep-alive
Cookie: __utma=104736729.2049376885.1331671738.1331762681.1331768165.4;
__utmz=104736729.1331768165.4.3.utmcsr=google|utmccn=(organic)|utmcmd=organ
ic|utmctr=html5%20drag%20and%20drop%20uses;
__utma=195626862.541212434.1331740109.1331771486.1331801021.4;
__utmc=195626862;
__utmz=195626862.1331740109.1.1.utmcsr=google|utmccn=(organic)|utmcmd=organ
ic|utmctr=html5%20selectors%20api; __utmc=104736729
DNT: 1
Host: www.html5rocks.com
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:10.0.2) Gecko/20100101
Firefox/10.0.2
```

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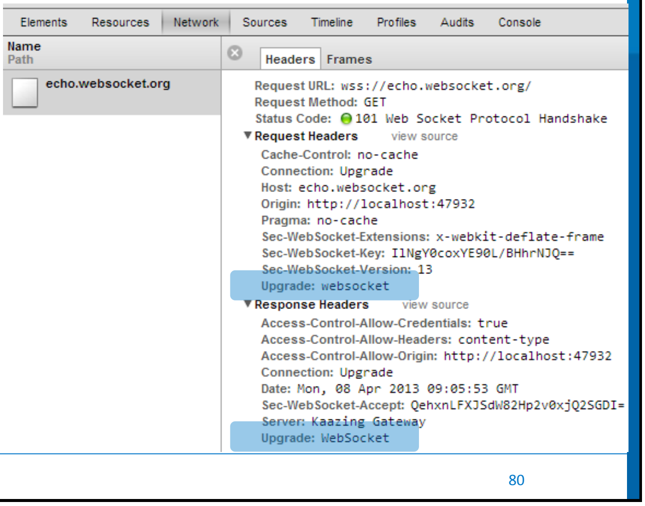
JS API: WebSockets (4/8)

A basic HTTP response

```
Age: 14115
Cache-Control: public, max-age=2592000
Content-Encoding: gzip
Content-Length: 28319
Content-Type: text/html
Date: Wed, 14 Mar 2012 11:53:27 GMT
Etag: "2OOdDQ"
Expires: Fri, 13 Apr 2012 11:53:27 GMT
Server: Google Frontend
```

JS API: WebSockets (5/8)

- WebSockets use **a new TCP-based protocol**
  - When approaching the web server, a handshake is performed



```
Request URL: wss://echo.websocket.org/
Request Method: GET
Status Code: 101 Web Socket Protocol Handshake
▼Request Headers
  Cache-Control: no-cache
  Connection: Upgrade
  Host: echo.websocket.org
  Origin: http://localhost:47932
  Pragma: no-cache
  Sec-WebSocket-Extensions: x-webkit-deflate-frame
  Sec-WebSocket-Key: I1NgY0coxYE90L/BHhrNJQ==
  Sec-WebSocket-Version: 13
  Upgrade: websocket
▼Response Headers
  Access-Control-Allow-Credentials: true
  Access-Control-Allow-Headers: content-type
  Access-Control-Allow-Origin: http://localhost:47932
  Connection: Upgrade
  Date: Mon, 08 Apr 2013 09:05:53 GMT
  Sec-WebSocket-Accept: QehxnLFXJSdW82Hp2v0xjQ2SGDI=
  Server: Kaazing Gateway
  Upgrade: WebSocket
```

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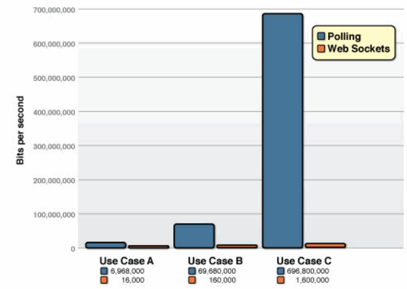
JS API: WebSockets (6/8)

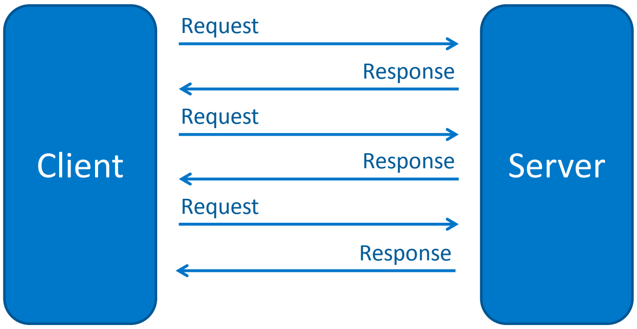
- WebSockets use **a new TCP-based protocol**
  - When approaching the web server, a handshake is performed
  - Connections may remain open as long as needed
  - Eliminates excess HTTP request bodies



Source: http://websocket.org/quantum.html

JS API: WebSockets (7/8)

- Communication with websockets



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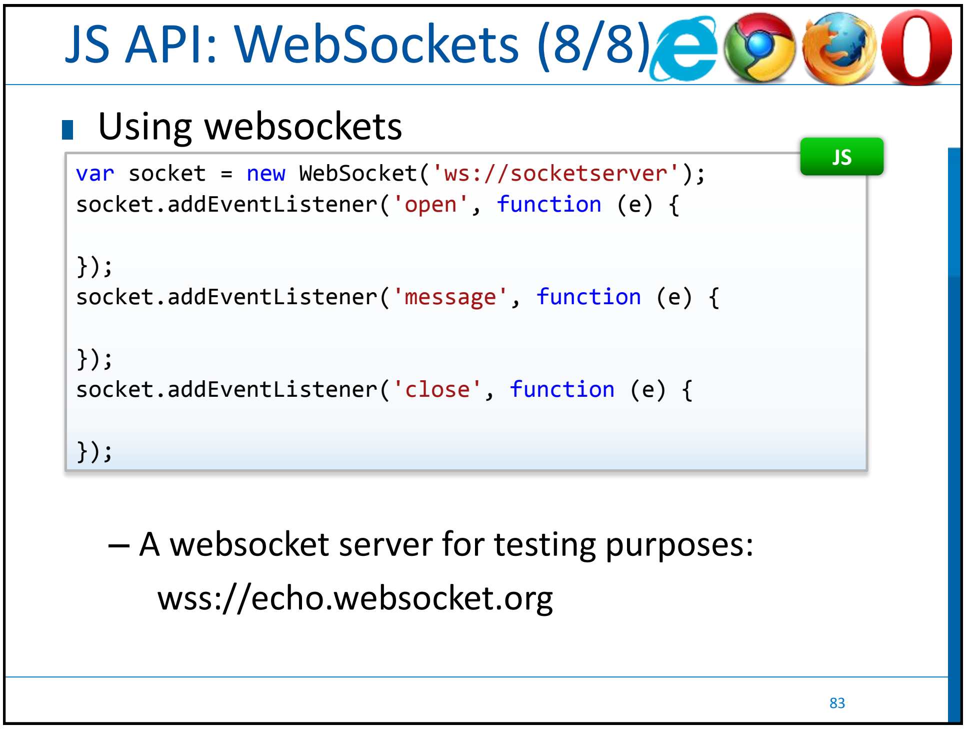

JS API: WebSockets (8/8)

- Using websockets

JS

```
var socket = new WebSocket('ws://socketserver');
socket.addEventListener('open', function (e) {

});
socket.addEventListener('message', function (e) {

});
socket.addEventListener('close', function (e) {

});
```

– A websocket server for testing purposes:

wss://echo.websocket.org

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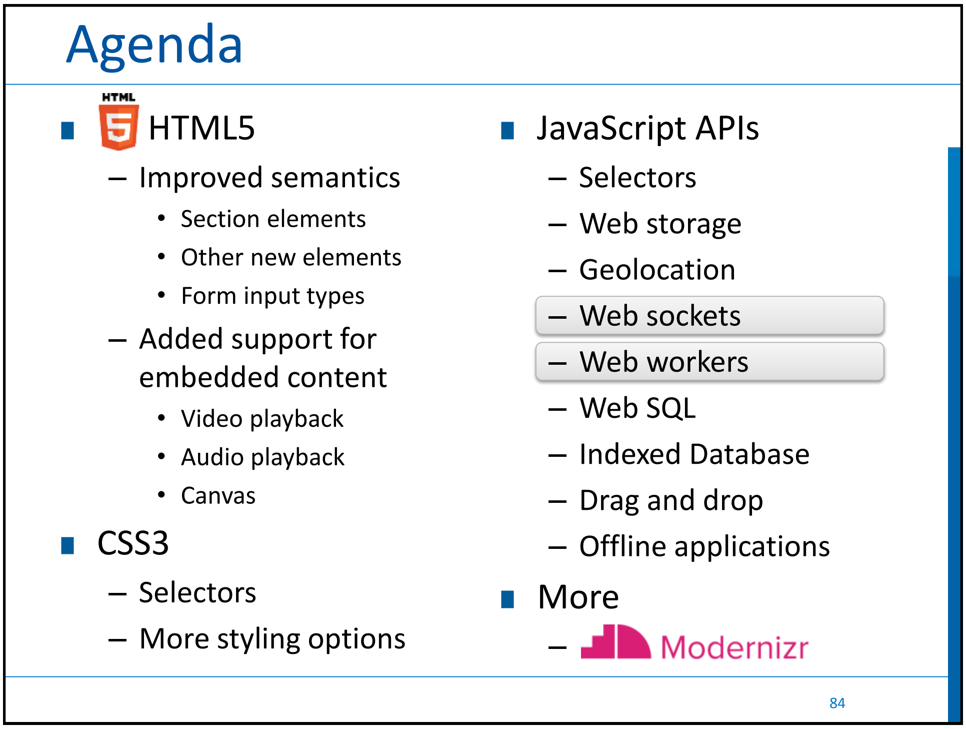

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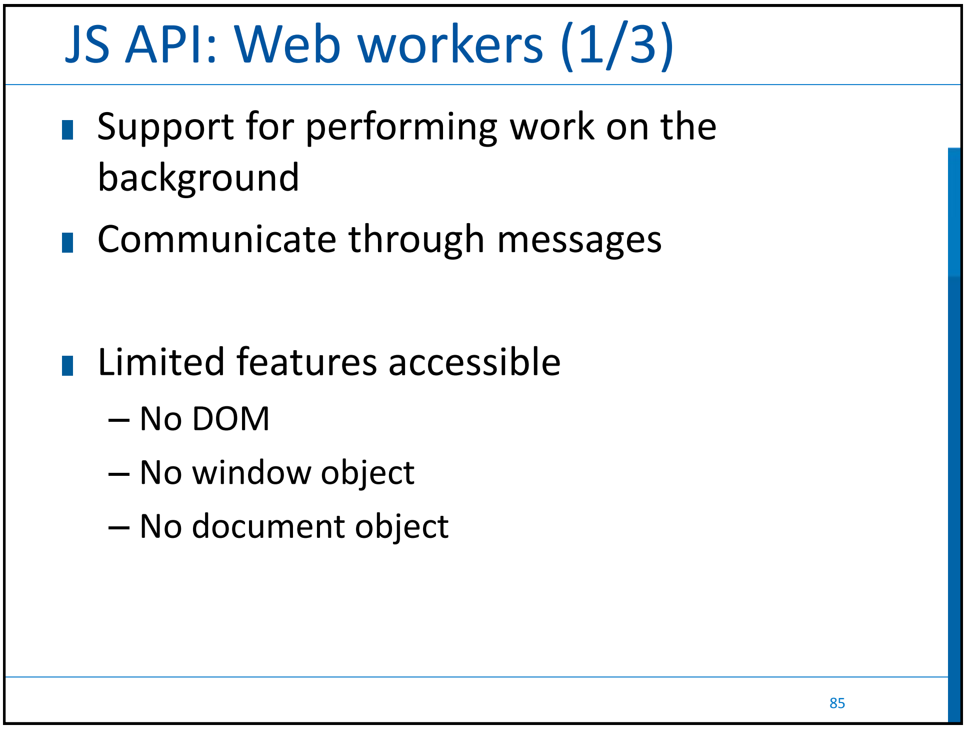

JS API: Web workers (1/3)

- Support for performing work on the background
- Communicate through messages
- Limited features accessible
  - No DOM
  - No window object
  - No document object

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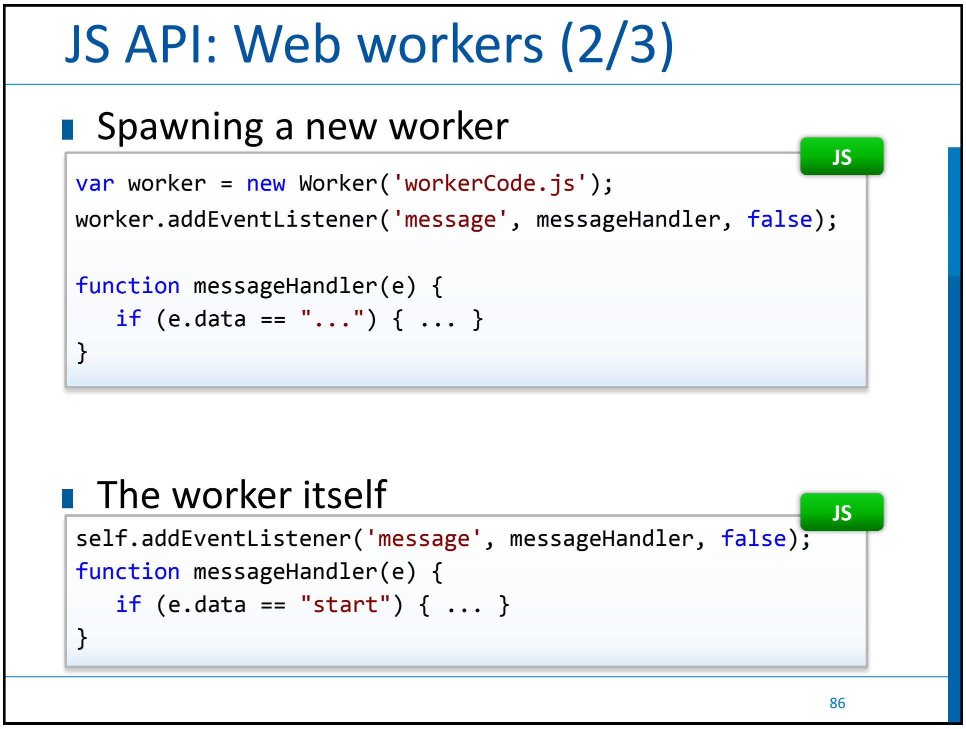

JS API: Web workers (2/3)

- Spawning a new worker

JS

```
var worker = new Worker('workerCode.js');
worker.addEventListener('message', messageHandler, false);

function messageHandler(e) {
   if (e.data == "...") { ... }
}
```

- The worker itself

JS

```
self.addEventListener('message', messageHandler, false);
function messageHandler(e) {
   if (e.data == "start") { ... }
}
```

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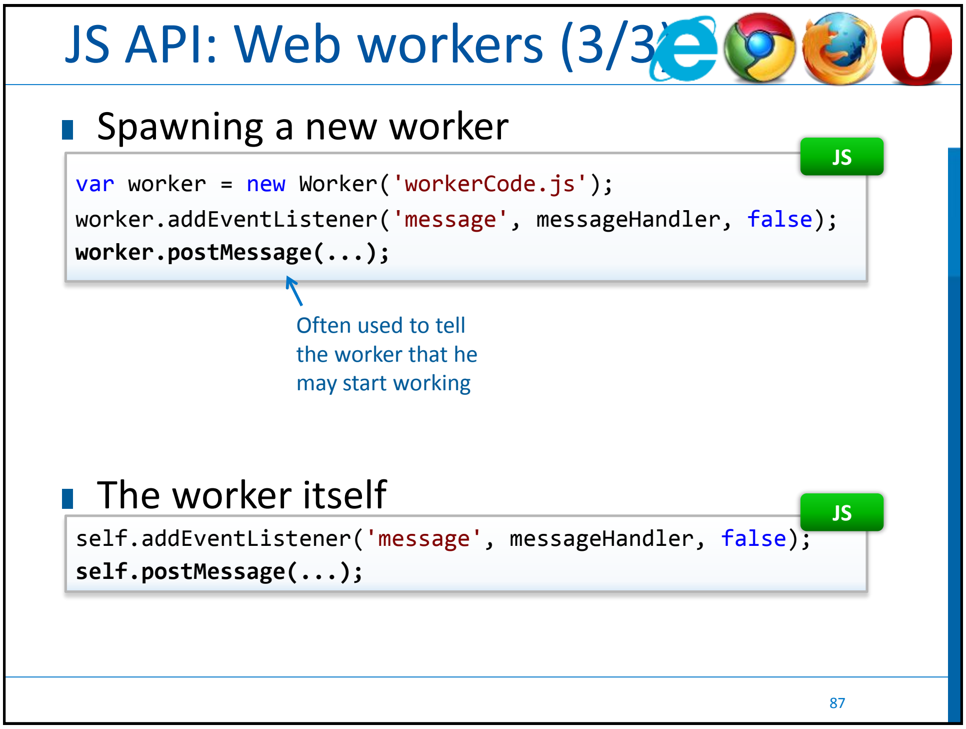

JS API: Web workers (3/3)

- Spawning a new worker

JS
```
var worker = new Worker('workerCode.js');
worker.addEventListener('message', messageHandler, false);
worker.postMessage(...);
```

Often used to tell the worker that he may start working

- The worker itself

JS
```
self.addEventListener('message', messageHandler, false);
self.postMessage(...);
```

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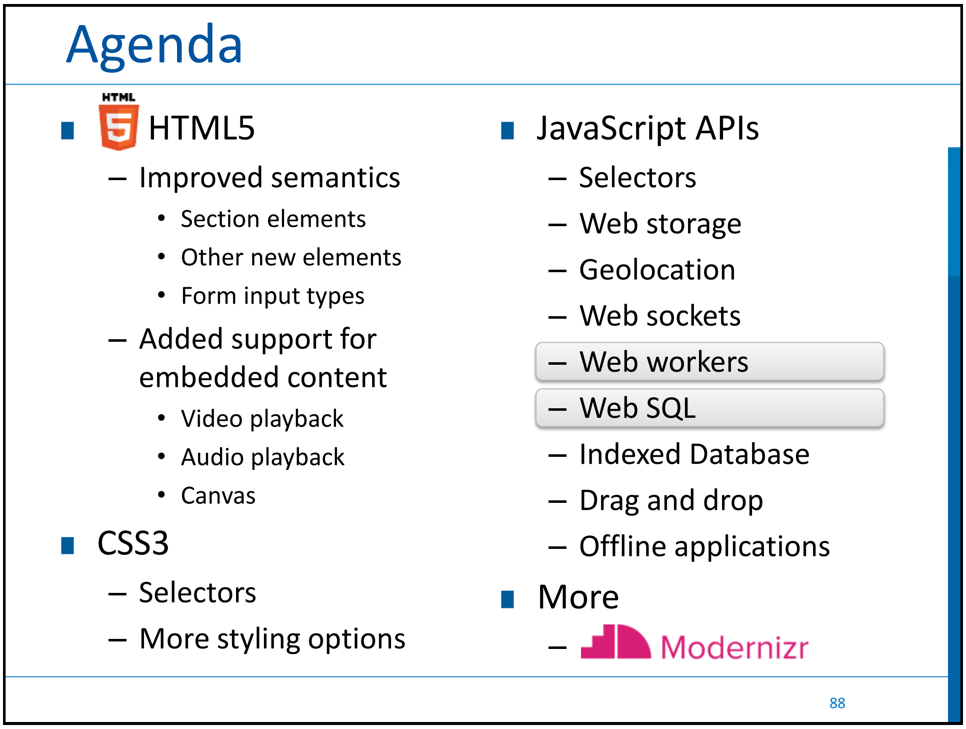

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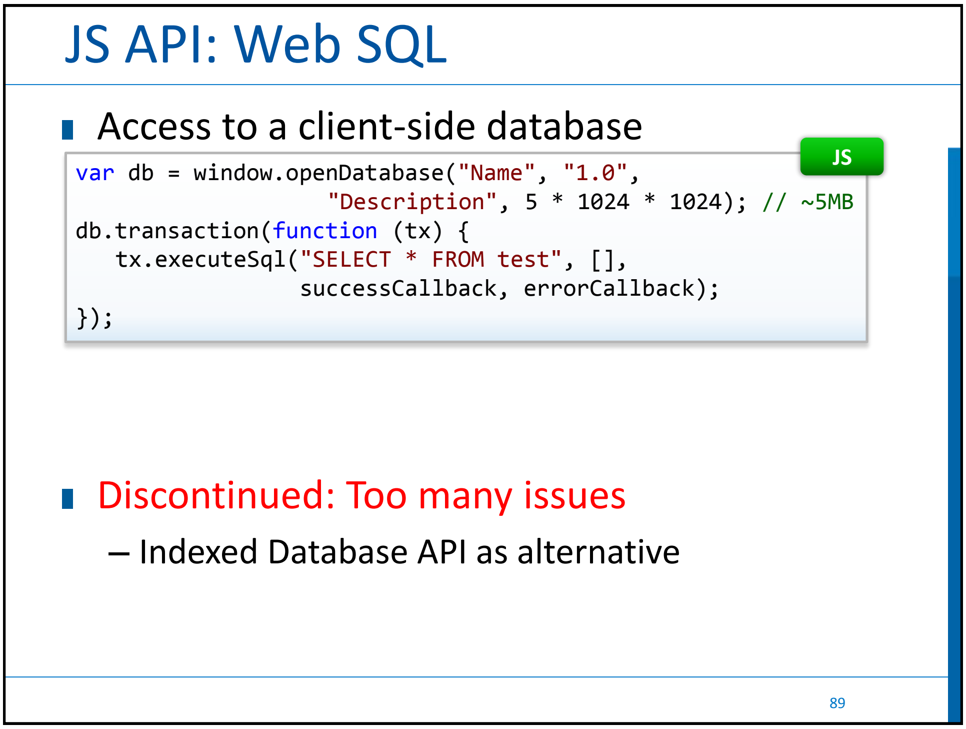

JS API: Web SQL

- Access to a client-side database

JS

```
var db = window.openDatabase("Name", "1.0",
                             "Description", 5 * 1024 * 1024); // ~5MB
db.transaction(function (tx) {
   tx.executeSql("SELECT * FROM test", [],
                 successCallback, errorCallback);
});
```

- Discontinued: Too many issues
  - Indexed Database API as alternative

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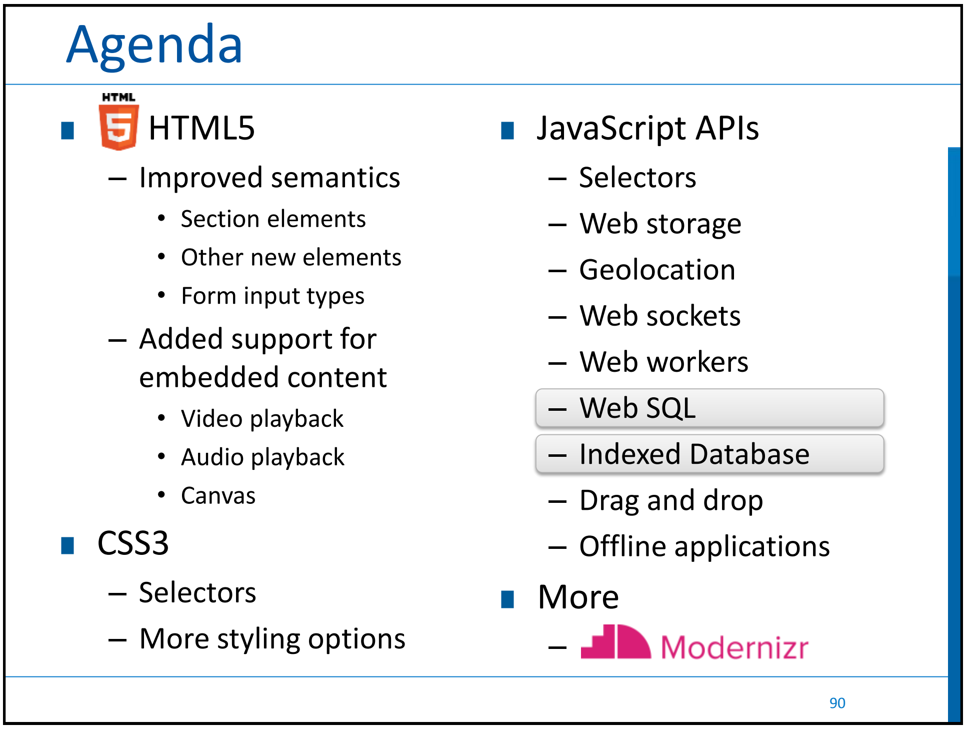

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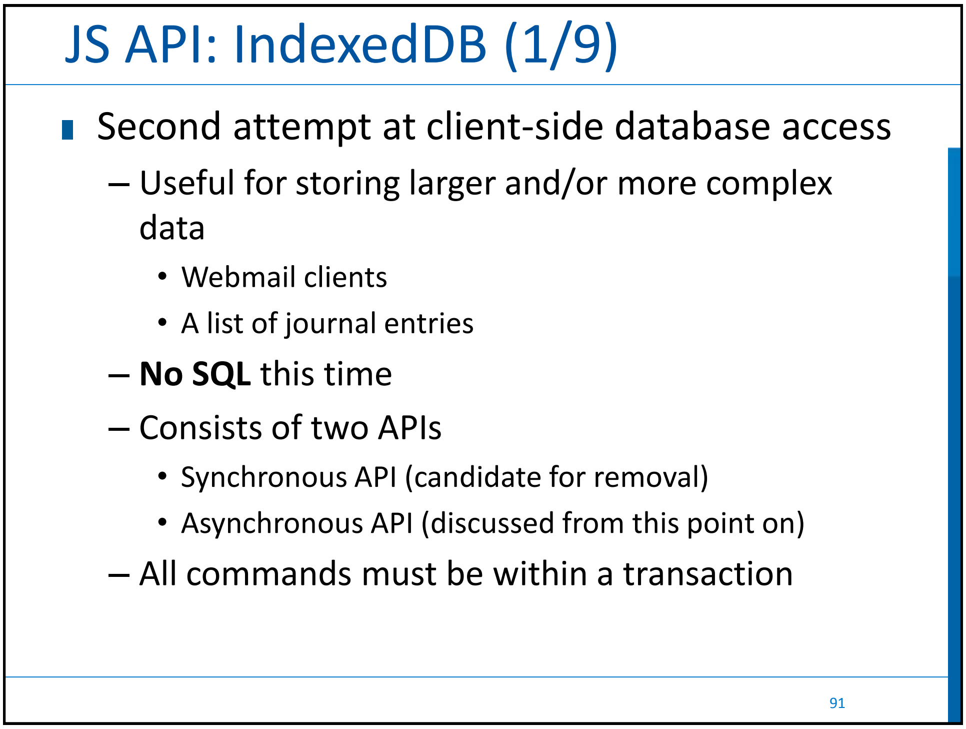
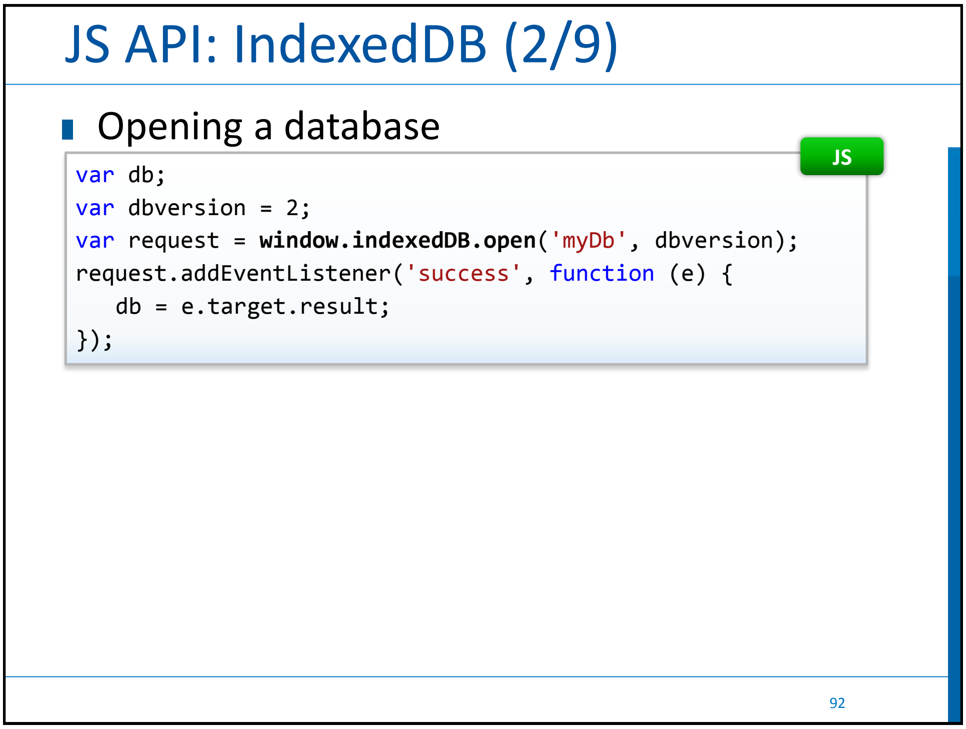


JS API: IndexedDB (1/9)

- Second attempt at client-side database access
  - Useful for storing larger and/or more complex data
    - Webmail clients
    - A list of journal entries
  - **No SQL** this time
  - Consists of two APIs
    - Synchronous API (candidate for removal)
    - Asynchronous API (discussed from this point on)
  - All commands must be within a transaction



JS API: IndexedDB (2/9)

- Opening a database

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('success', function (e) {
   db = e.target.result;
});
```

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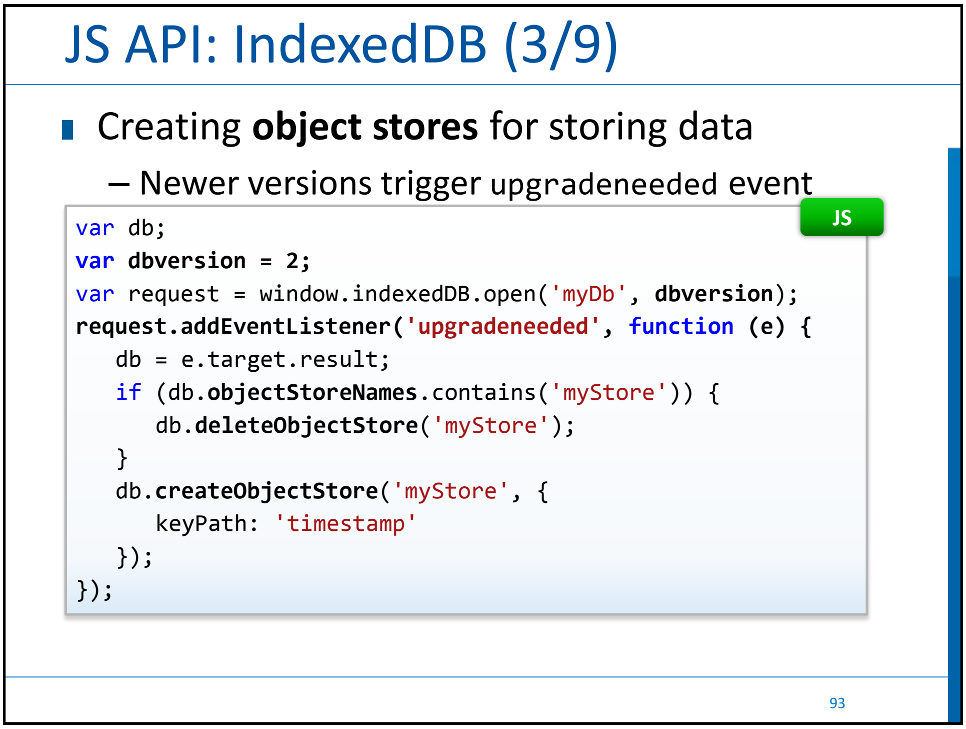

JS API: IndexedDB (3/9)

- Creating **object stores** for storing data
  - Newer versions trigger upgradeneeded event

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('upgradeneeded', function (e) {
   db = e.target.result;
   if (db.objectStoreNames.contains('myStore')) {
      db.deleteObjectStore('myStore');
   }
   db.createObjectStore('myStore', {
      keyPath: 'timestamp'
   });
});
```

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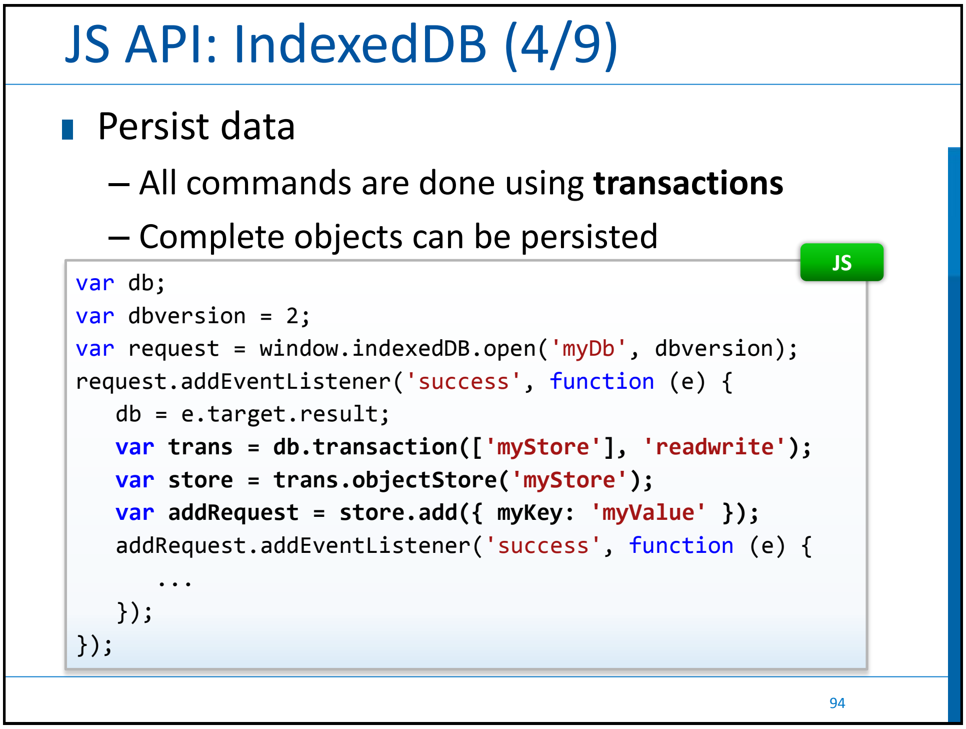

JS API: IndexedDB (4/9)

- Persist data
  - All commands are done using **transactions**
  - Complete objects can be persisted

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('success', function (e) {
   db = e.target.result;
   var trans = db.transaction(['myStore'], 'readwrite');
   var store = trans.objectStore('myStore');
   var addRequest = store.add({ myKey: 'myValue' });
   addRequest.addEventListener('success', function (e) {
      ...
   });
});
```

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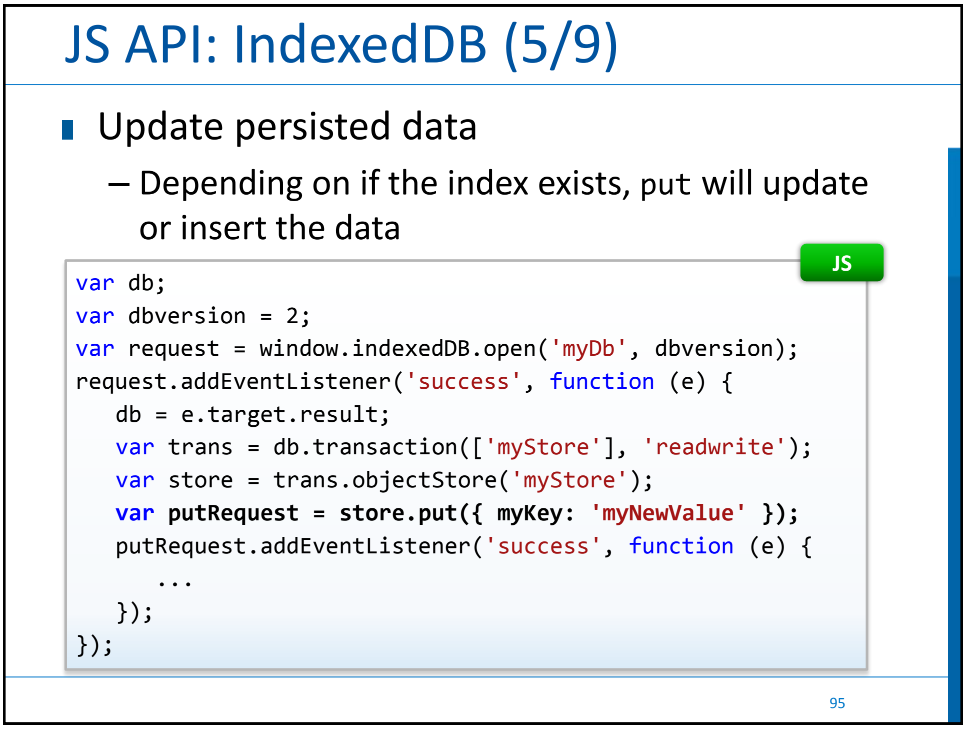
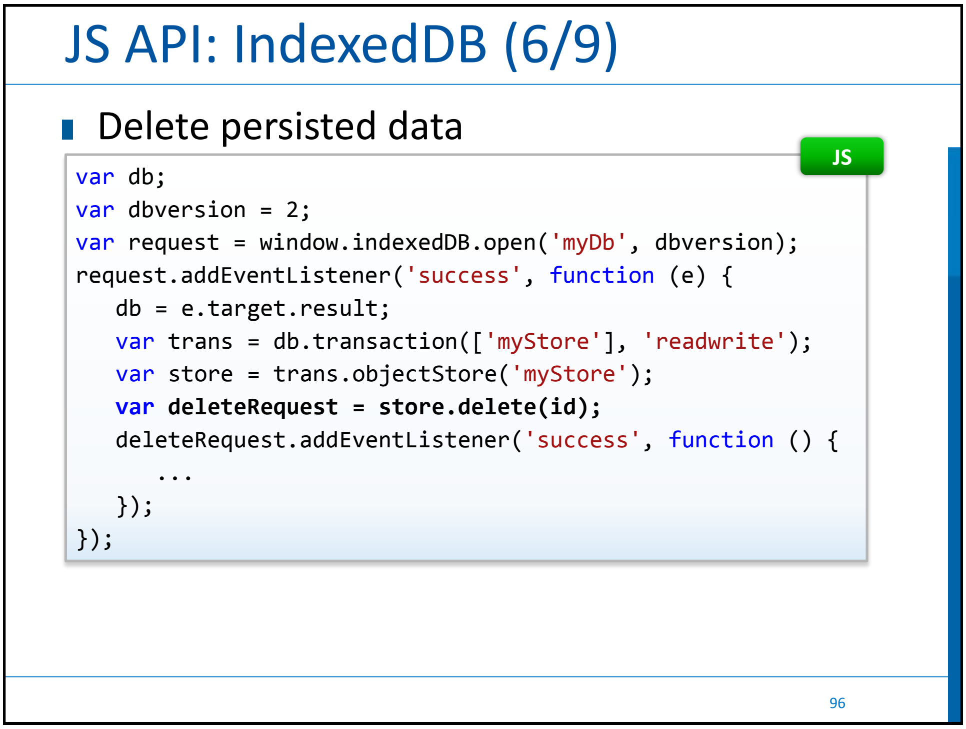


JS API: IndexedDB (5/9)

- Update persisted data
  - – Depending on if the index exists, put will update or insert the data

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('success', function (e) {
   db = e.target.result;
   var trans = db.transaction(['myStore'], 'readwrite');
   var store = trans.objectStore('myStore');
   var putRequest = store.put({ myKey: 'myNewValue' });
   putRequest.addEventListener('success', function (e) {
      ...
   });
});
```



JS API: IndexedDB (6/9)

- Delete persisted data

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('success', function (e) {
   db = e.target.result;
   var trans = db.transaction(['myStore'], 'readwrite');
   var store = trans.objectStore('myStore');
   var deleteRequest = store.delete(id);
   deleteRequest.addEventListener('success', function () {
      ...
   });
});
```

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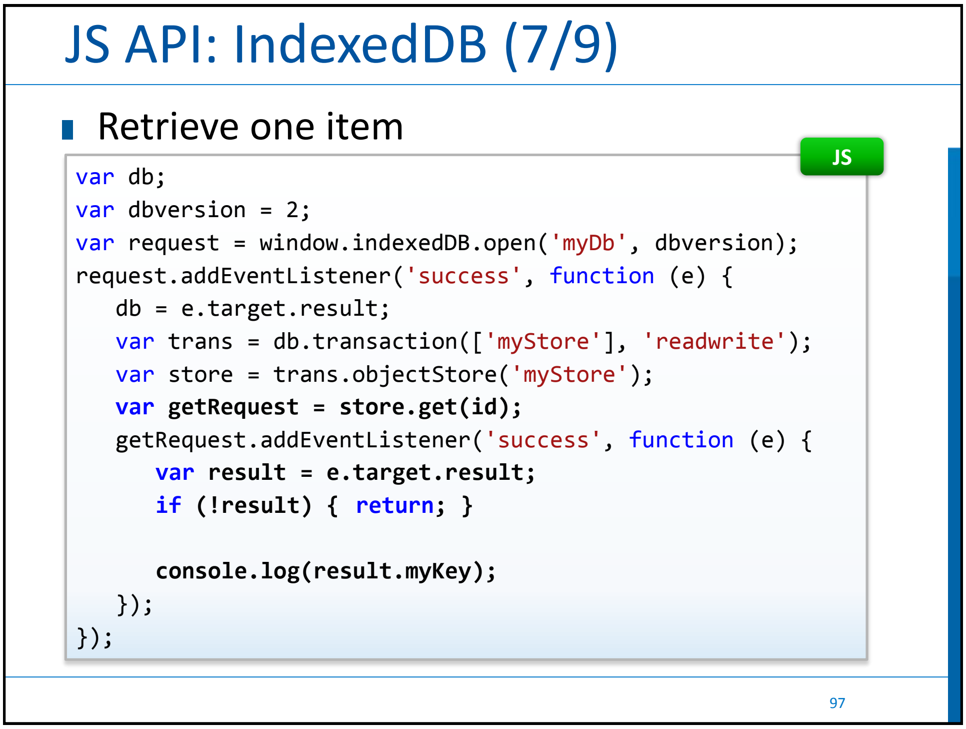

JS API: IndexedDB (7/9)

- Retrieve one item

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('success', function (e) {
   db = e.target.result;
   var trans = db.transaction(['myStore'], 'readwrite');
   var store = trans.objectStore('myStore');
   var getRequest = store.get(id);
   getRequest.addEventListener('success', function (e) {
      var result = e.target.result;
      if (!result) { return; }

      console.log(result.myKey);
   });
});
```

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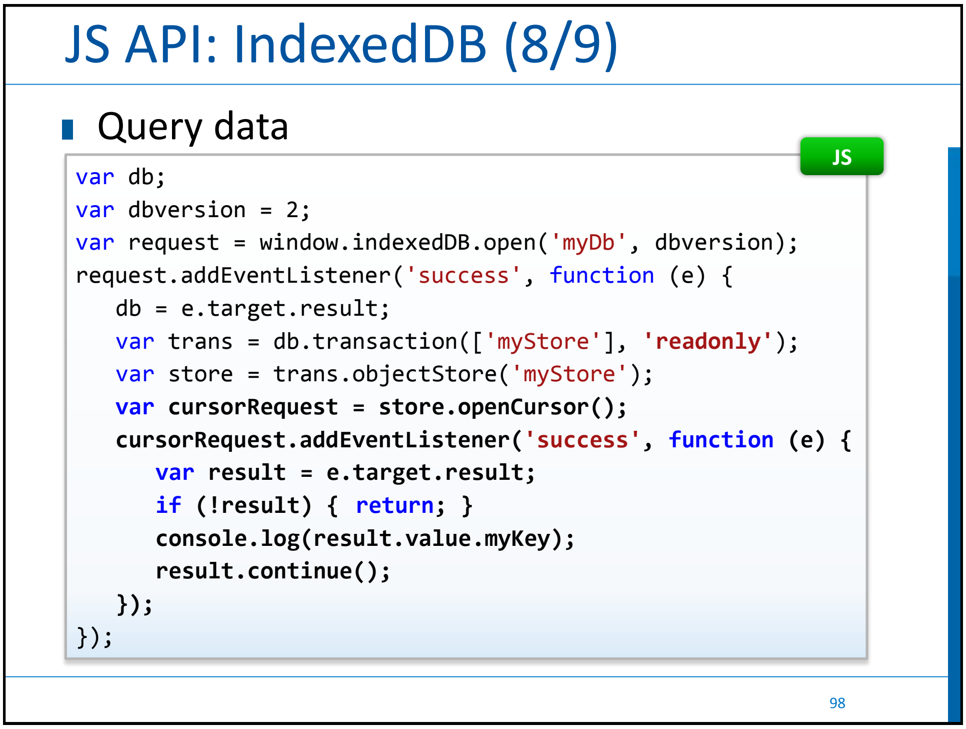

JS API: IndexedDB (8/9)

- Query data

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('success', function (e) {
   db = e.target.result;
   var trans = db.transaction(['myStore'], 'readonly');
   var store = trans.objectStore('myStore');
   var cursorRequest = store.openCursor();
   cursorRequest.addEventListener('success', function (e) {
      var result = e.target.result;
      if (!result) { return; }
      console.log(result.value.myKey);
      result.continue();
   });
});
```

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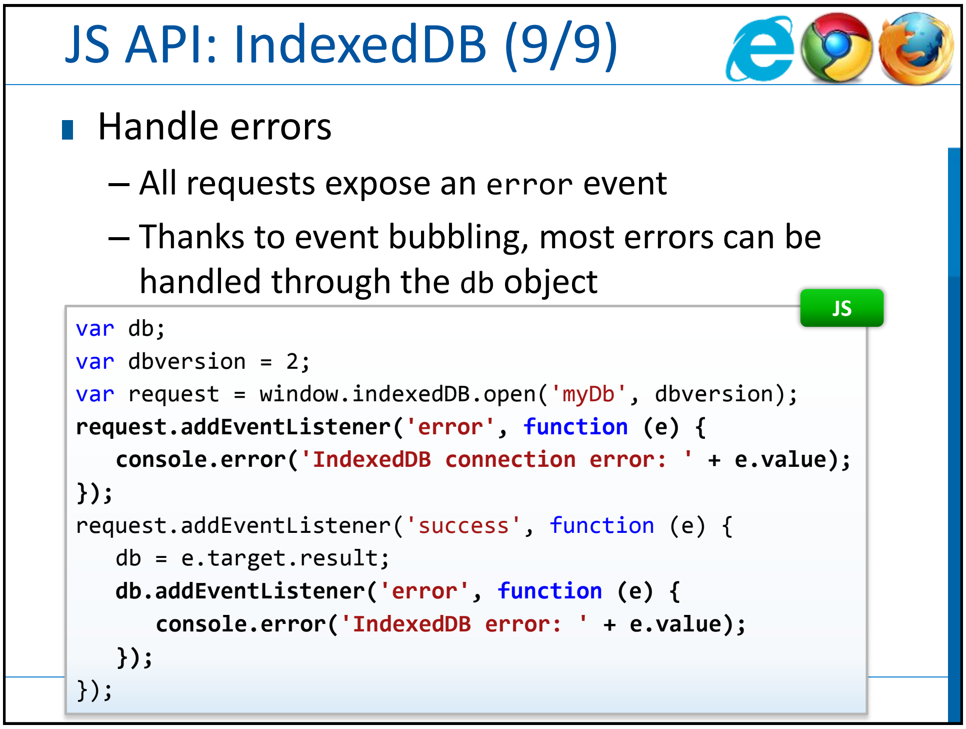
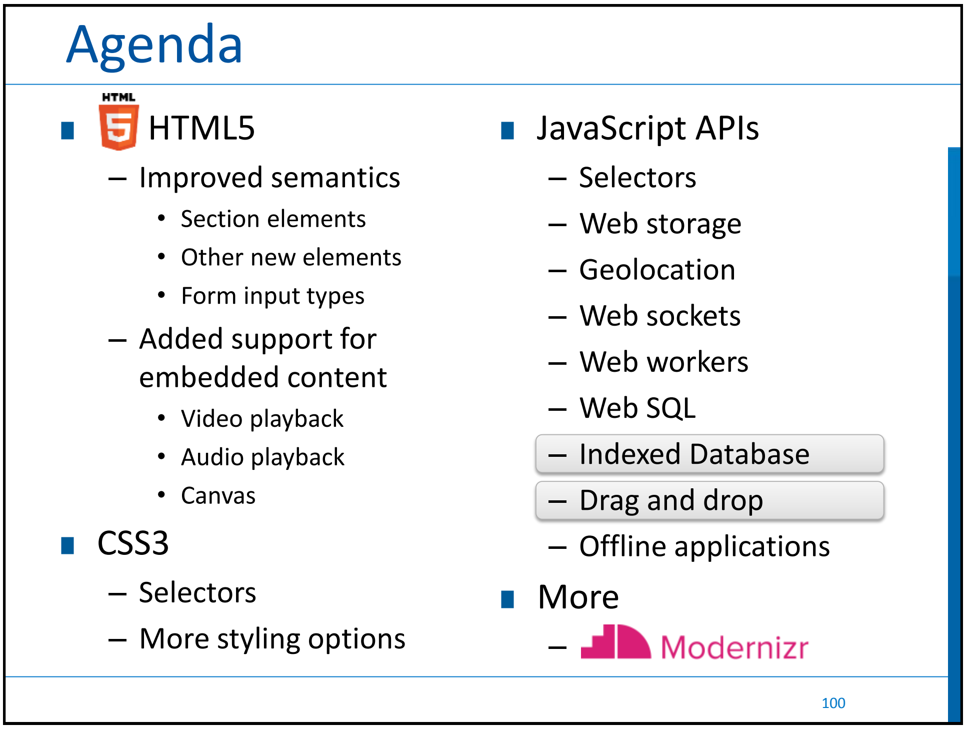


JS API: IndexedDB (9/9)

- Handle errors
  - All requests expose an error event
  - Thanks to event bubbling, most errors can be handled through the db object

JS

```
var db;
var dbversion = 2;
var request = window.indexedDB.open('myDb', dbversion);
request.addEventListener('error', function (e) {
   console.error('IndexedDB connection error: ' + e.value);
});
request.addEventListener('success', function (e) {
   db = e.target.result;
   db.addEventListener('error', function (e) {
      console.error('IndexedDB error: ' + e.value);
   });
});
```



Agenda

- HTML5
  - Improved semantics
    - Section elements
    - Other new elements
    - Form input types
  - Added support for embedded content
    - Video playback
    - Audio playback
    - Canvas
- CSS3
  - Selectors
  - More styling options
- JavaScript APIs
  - Selectors
  - Web storage
  - Geolocation
  - Web sockets
  - Web workers
  - Web SQL
  - Indexed Database
  - Drag and drop
  - Offline applications
- More
  - Modernizr

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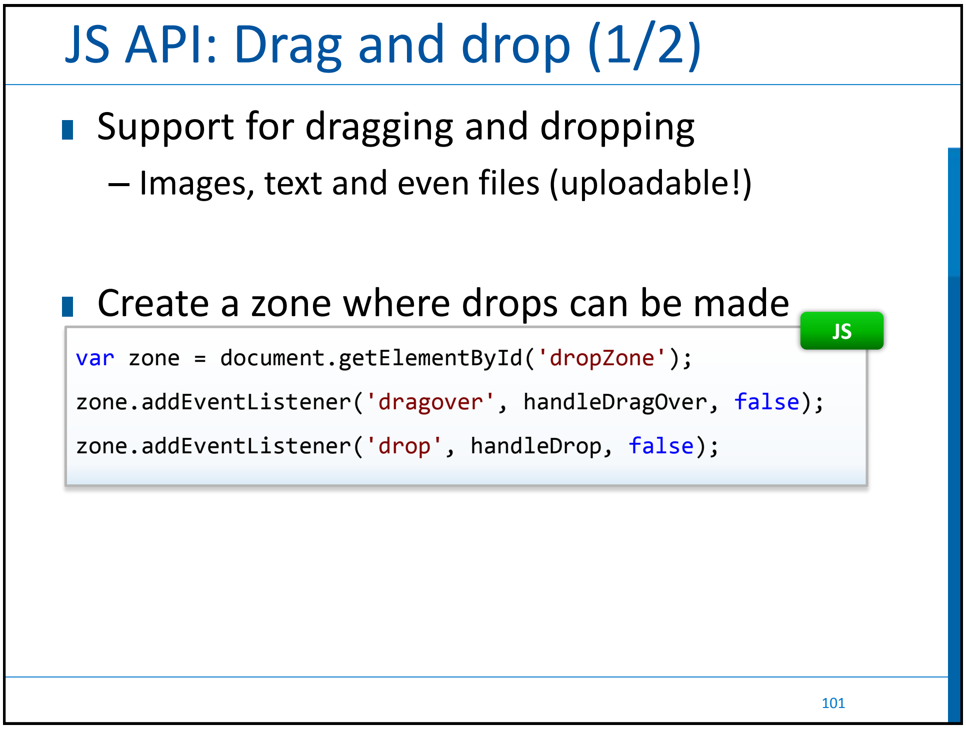

JS API: Drag and drop (1/2)

- Support for dragging and dropping
  - Images, text and even files (uploadable!)
- Create a zone where drops can be made

JS

```
var zone = document.getElementById('dropZone');
zone.addEventListener('dragover', handleDragOver, false);
zone.addEventListener('drop', handleDrop, false);
```

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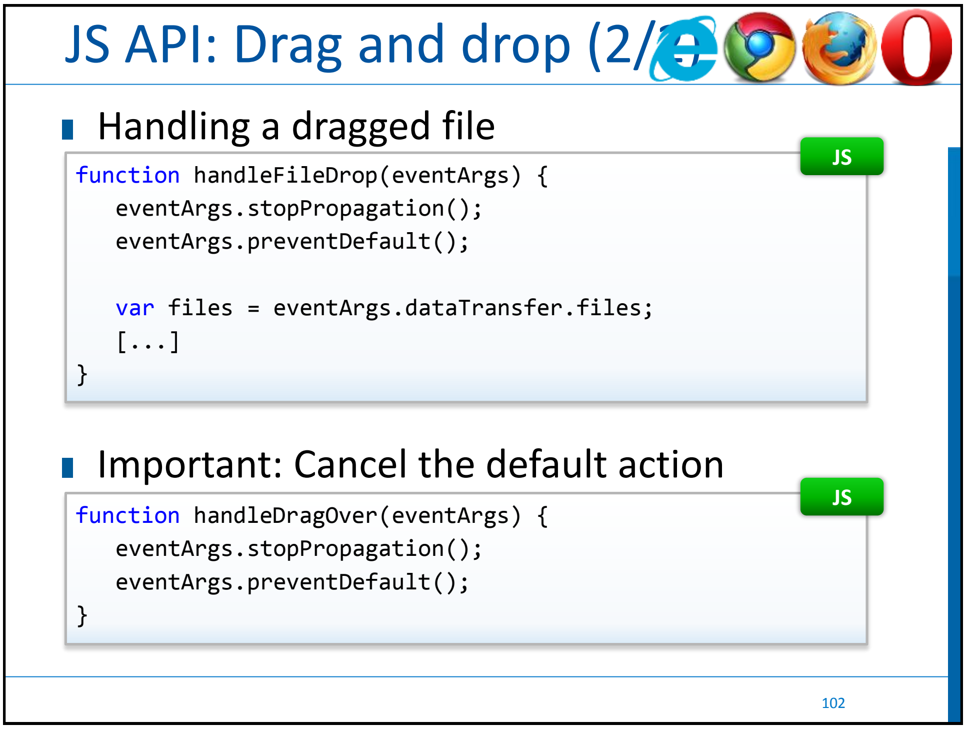

JS API: Drag and drop (2/2)

- Handling a dragged file

JS

```
function handleFileDrop(eventArgs) {
   eventArgs.stopPropagation();
   eventArgs.preventDefault();

   var files = eventArgs.dataTransfer.files;
   [...]
}
```

- Important: Cancel the default action

JS

```
function handleDragOver(eventArgs) {
   eventArgs.stopPropagation();
   eventArgs.preventDefault();
}
```

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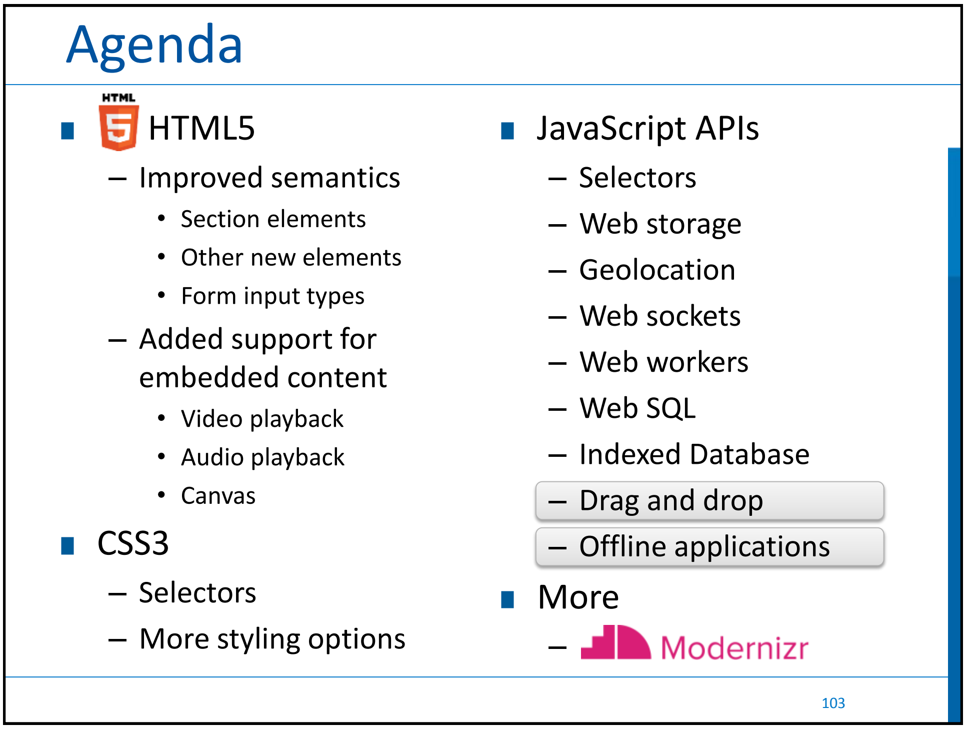

Agenda

- HTML5
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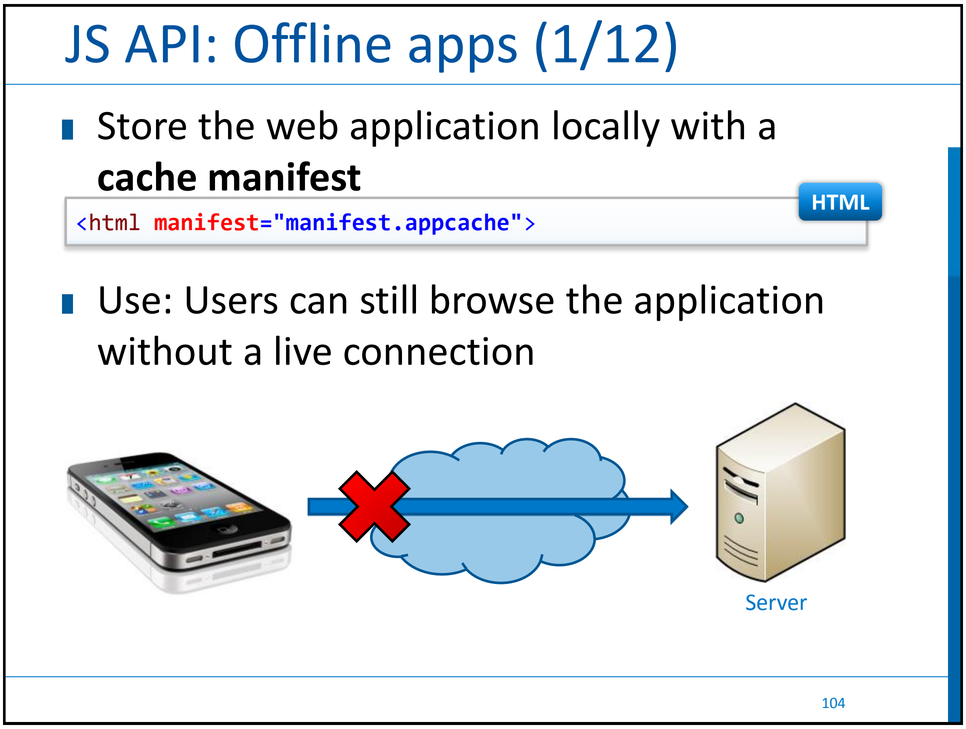

JS API: Offline apps (1/12)

- Store the web application locally with a **cache manifest**

HTML
```
<html manifest="manifest.appcache">
```

- Use: Users can still browse the application without a live connection

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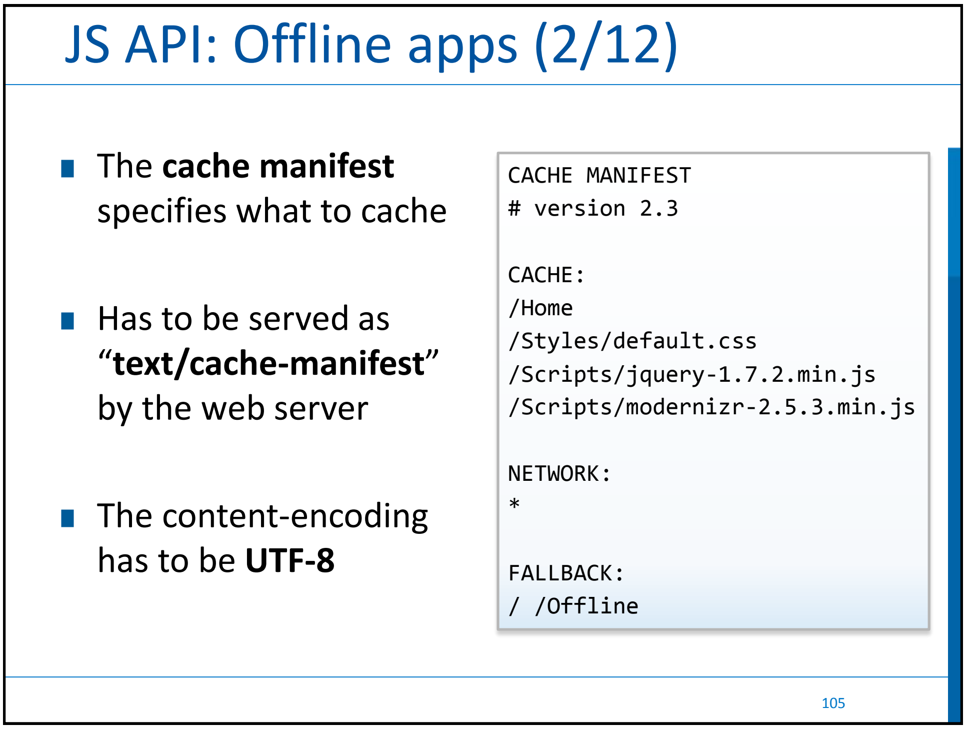


JS API: Offline apps (2/12)

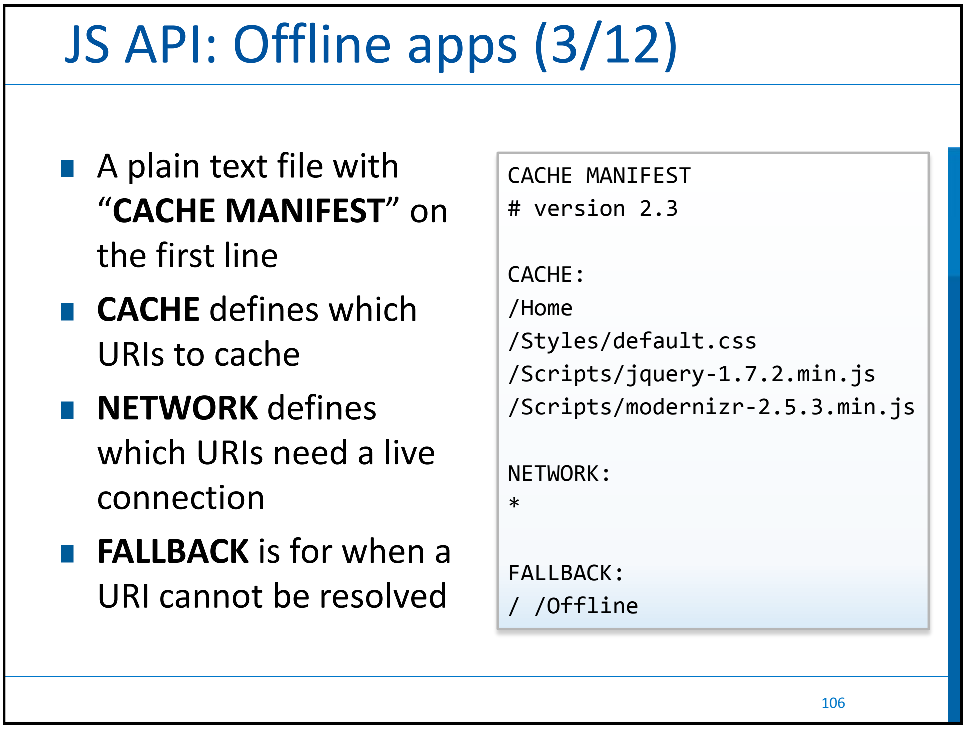
- The **cache manifest** specifies what to cache
- Has to be served as "**text/cache-manifest**" by the web server
- The content-encoding has to be **UTF-8**

```
CACHE MANIFEST
# version 2.3

CACHE:
/Home
/Styles/default.css
/Scripts/jquery-1.7.2.min.js
/Scripts/modernizr-2.5.3.min.js

NETWORK:
*

FALLBACK:
/ /Offline
```



JS API: Offline apps (3/12)

- A plain text file with "**CACHE MANIFEST**" on the first line
- **CACHE** defines which URIs to cache
- **NETWORK** defines which URIs need a live connection
- **FALLBACK** is for when a URI cannot be resolved

```
CACHE MANIFEST
# version 2.3

CACHE:
/Home
/Styles/default.css
/Scripts/jquery-1.7.2.min.js
/Scripts/modernizr-2.5.3.min.js

NETWORK:
*

FALLBACK:
/ /Offline
```

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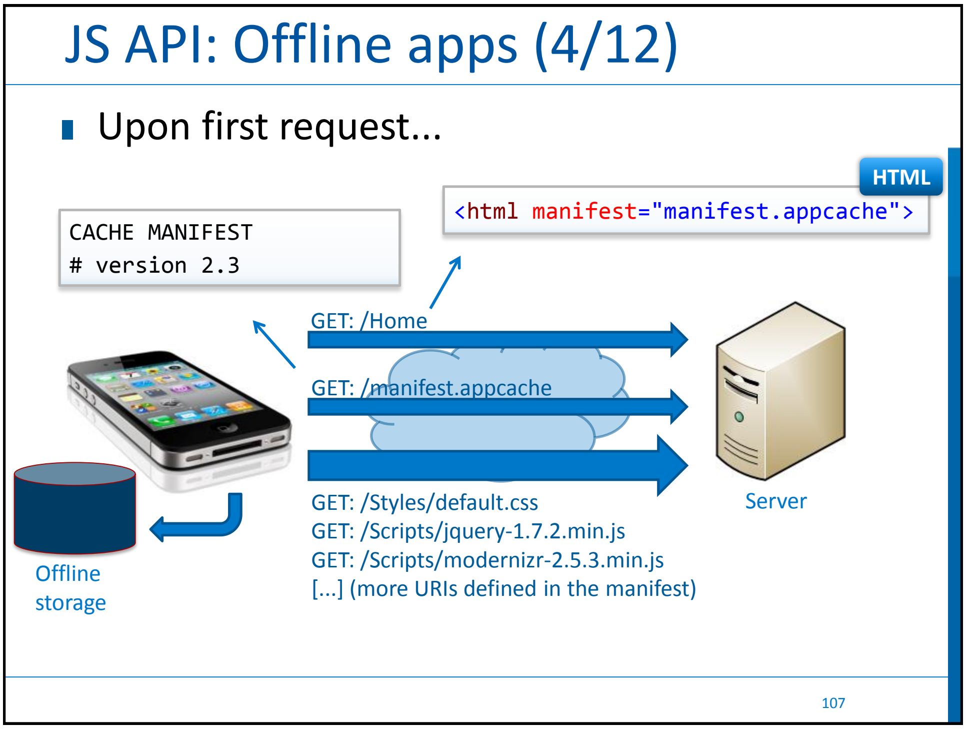

JS API: Offline apps (4/12)

- Upon first request...

```
CACHE MANIFEST
# version 2.3
```

HTML

```
<html manifest="manifest.appcache">
```

GET: /Home

GET: /manifest.appcache

GET: /Styles/default.css
GET: /Scripts/jquery-1.7.2.min.js
GET: /Scripts/modernizr-2.5.3.min.js
[...] (more URIs defined in the manifest)

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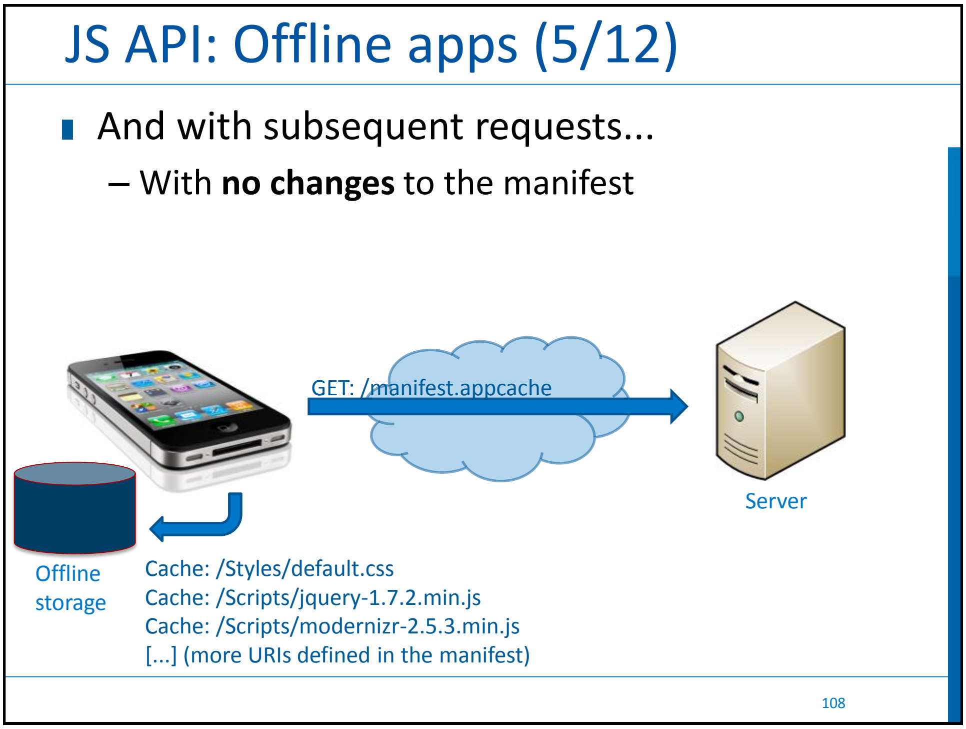

JS API: Offline apps (5/12)

- And with subsequent requests...
  - – With **no changes** to the manifest

GET: /manifest.appcache

Cache: /Styles/default.css
Cache: /Scripts/jquery-1.7.2.min.js
Cache: /Scripts/modernizr-2.5.3.min.js
[...] (more URIs defined in the manifest)

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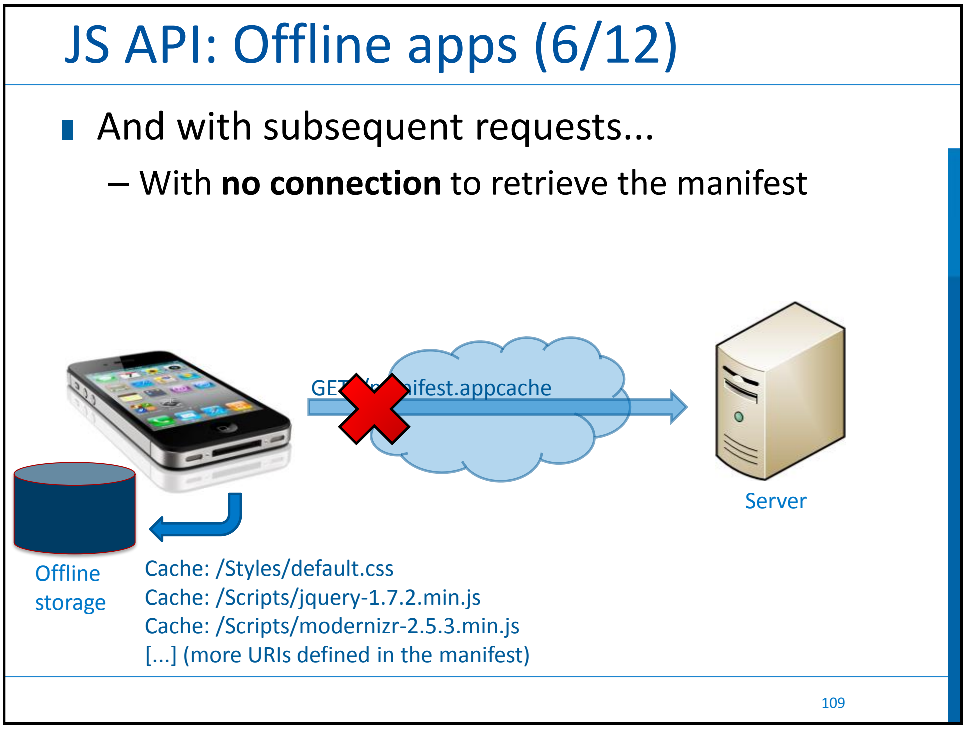


JS API: Offline apps (6/12)

- And with subsequent requests...
  - With **no connection** to retrieve the manifest

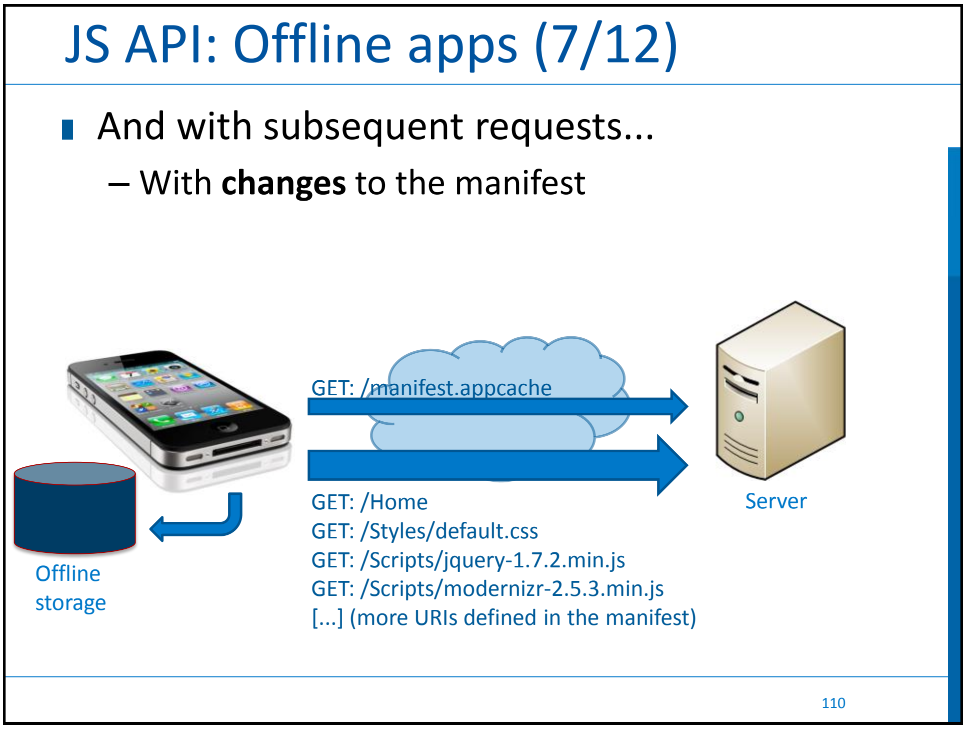
GET: /manifest.appcache

Server

Offline storage

Cache: /Styles/default.css
Cache: /Scripts/jquery-1.7.2.min.js
Cache: /Scripts/modernizr-2.5.3.min.js
[...] (more URIs defined in the manifest)

109



JS API: Offline apps (7/12)

- And with subsequent requests...
  - With **changes** to the manifest

GET: /manifest.appcache

Server

Offline storage

GET: /Home
GET: /Styles/default.css
GET: /Scripts/jquery-1.7.2.min.js
GET: /Scripts/modernizr-2.5.3.min.js
[...] (more URIs defined in the manifest)

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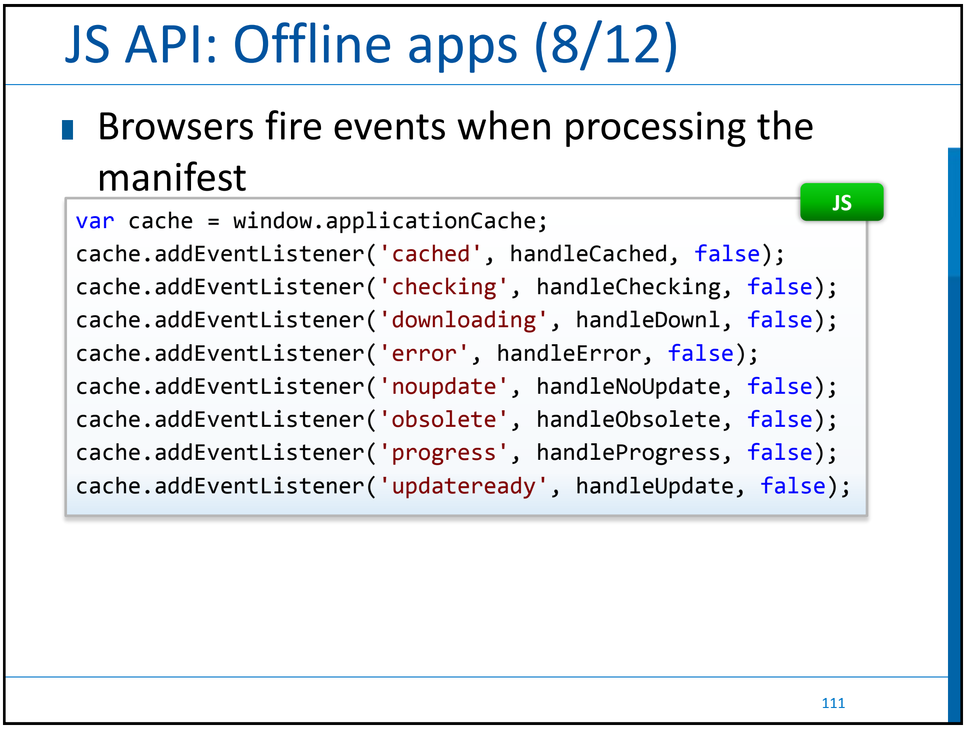

JS API: Offline apps (8/12)

- Browsers fire events when processing the manifest

JS

```
var cache = window.applicationCache;
cache.addEventListener('cached', handleCached, false);
cache.addEventListener('checking', handleChecking, false);
cache.addEventListener('downloading', handleDownl, false);
cache.addEventListener('error', handleError, false);
cache.addEventListener('noupdate', handleNoUpdate, false);
cache.addEventListener('obsolete', handleObsolete, false);
cache.addEventListener('progress', handleProgress, false);
cache.addEventListener('updateready', handleUpdate, false);
```

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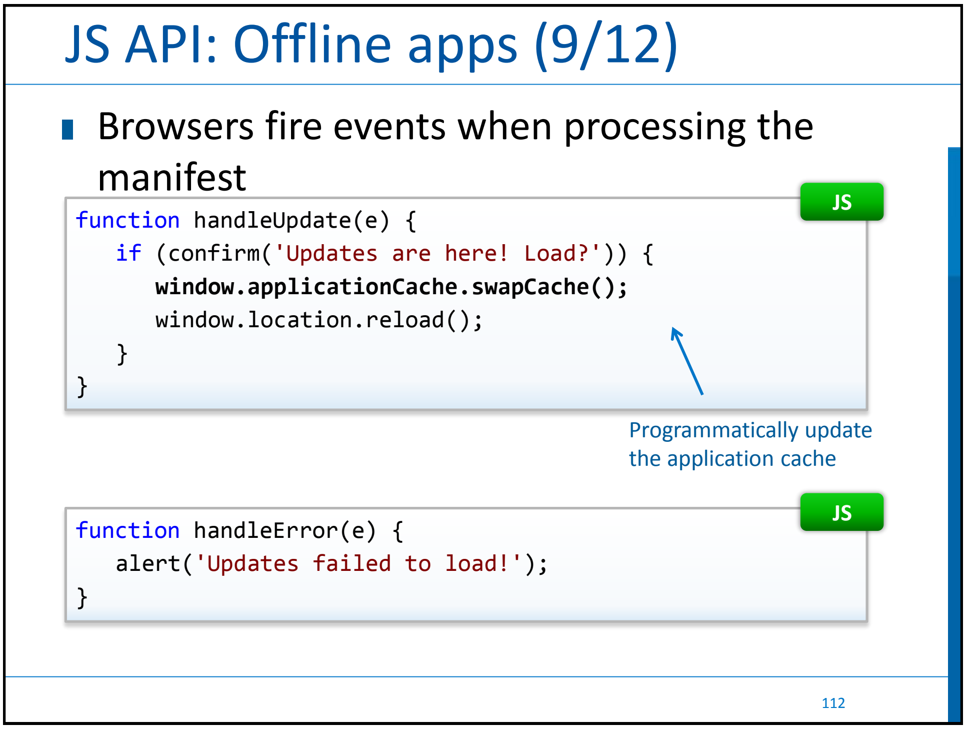

JS API: Offline apps (9/12)

- Browsers fire events when processing the manifest

JS

```
function handleUpdate(e) {
   if (confirm('Updates are here! Load?')) {
      window.applicationCache.swapCache();
      window.location.reload();
   }
}
```

Programmatically update the application cache

JS

```
function handleError(e) {
   alert('Updates failed to load!');
}
```

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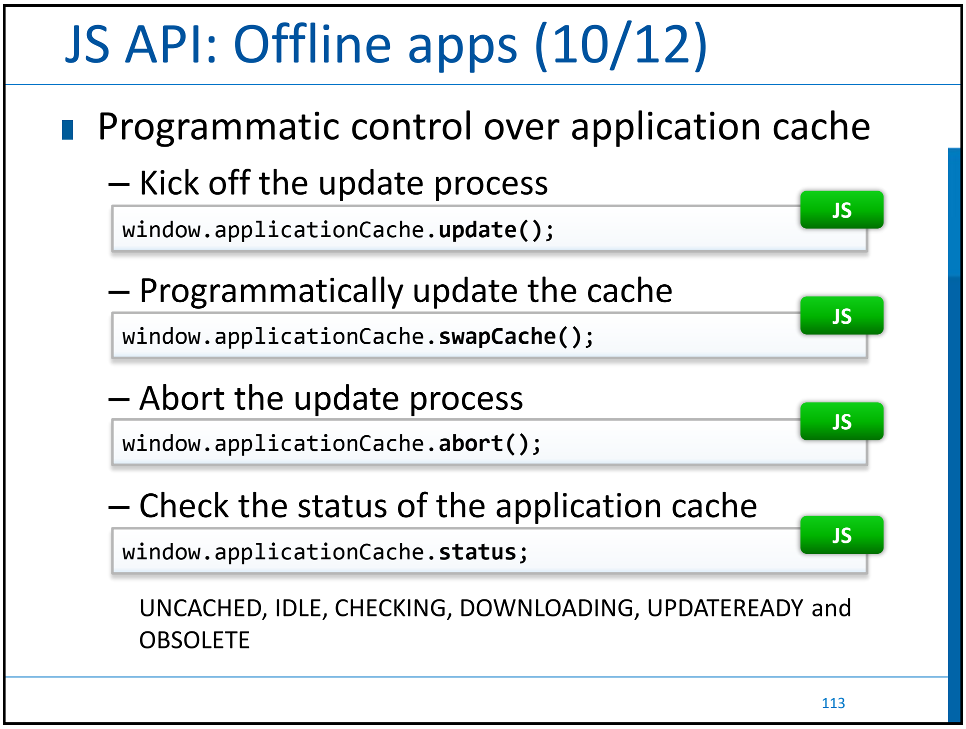

JS API: Offline apps (10/12)

- Programmatic control over application cache
  - Kick off the update process

```
window.applicationCache.update();
```

JS

  - Programmatically update the cache

```
window.applicationCache.swapCache();
```

JS

  - Abort the update process

```
window.applicationCache.abort();
```

JS

  - Check the status of the application cache

```
window.applicationCache.status;
```

JS

UNCACHED, IDLE, CHECKING, DOWNLOADING, UPDATEREADY and OBSOLETE

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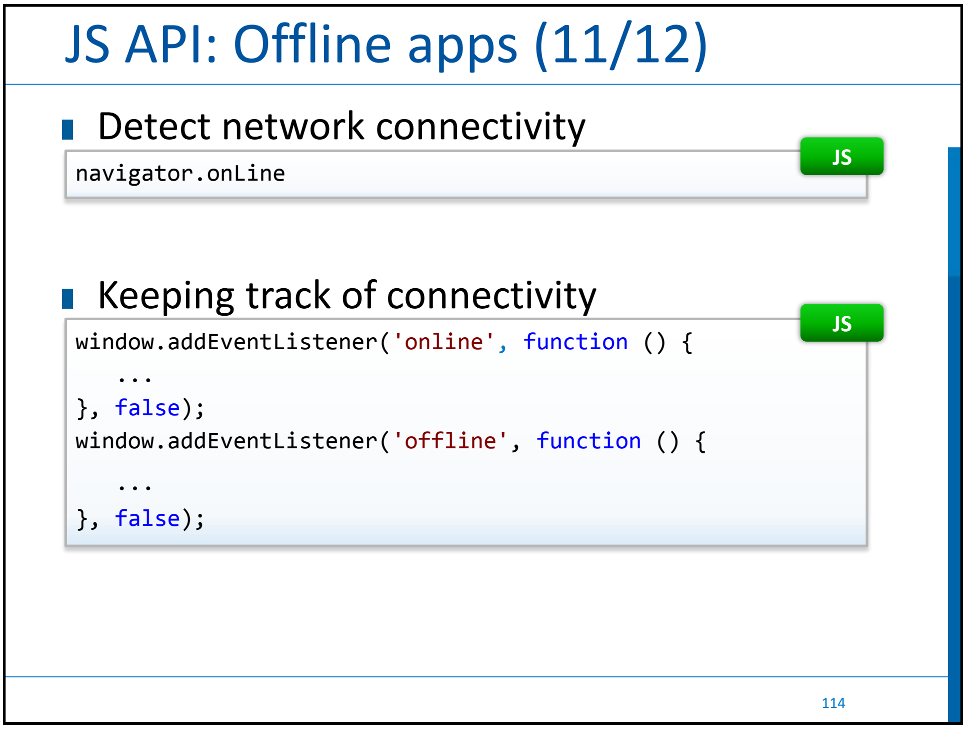

JS API: Offline apps (11/12)

- Detect network connectivity

```
navigator.onLine
```

JS

- Keeping track of connectivity

```
window.addEventListener('online', function () {
   ...
}, false);
window.addEventListener('offline', function () {
   ...
}, false);
```

JS

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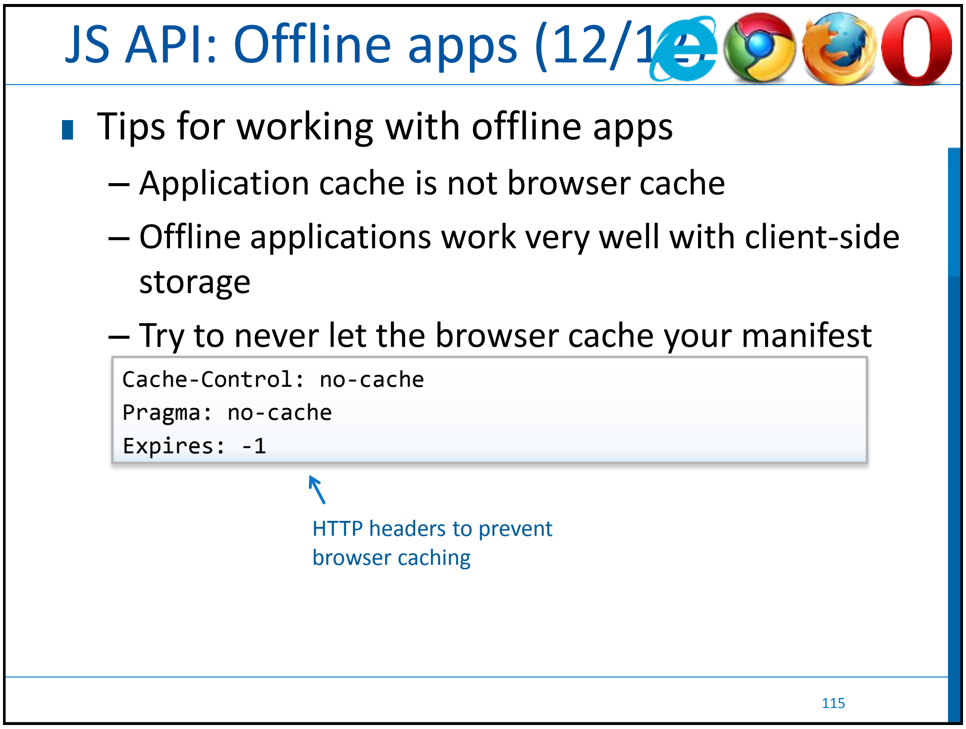

JS API: Offline apps (12/1

- Tips for working with offline apps
  - Application cache is not browser cache
  - Offline applications work very well with client-side storage
  - Try to never let the browser cache your manifest

```
Cache-Control: no-cache
Pragma: no-cache
Expires: -1
```

HTTP headers to prevent browser caching

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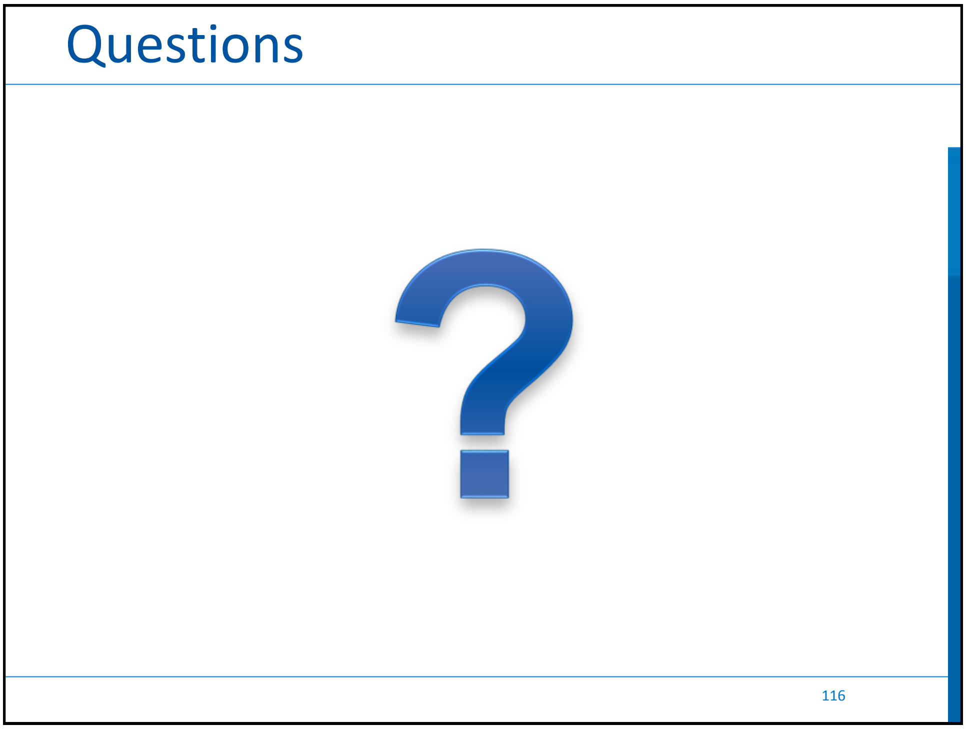

Questions

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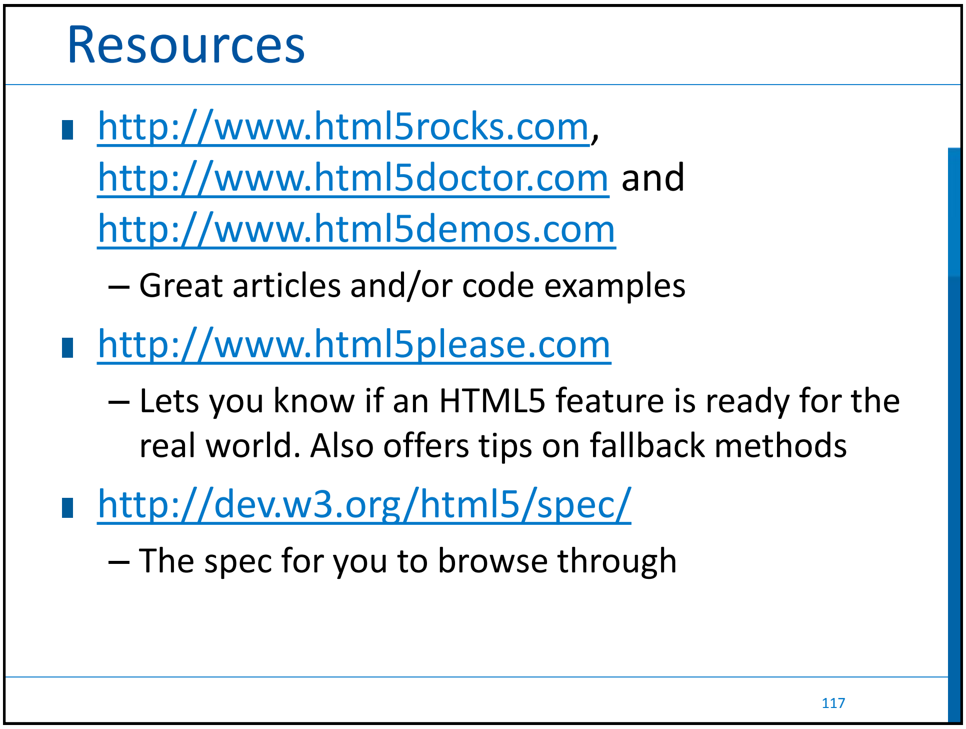

Resources

- http://www.html5rocks.com, http://www.html5doctor.com and http://www.html5demos.com
  - Great articles and/or code examples
- http://www.html5please.com
  - Lets you know if an HTML5 feature is ready for the real world. Also offers tips on fallback methods
- http://dev.w3.org/html5/spec/
  - The spec for you to browse through

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