

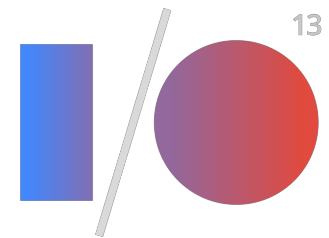




Dart: HTML of the Future, Today!

Happy web dev with Dart

Emily Fortuna and Sigmund Cherem
Google



Web development, today



Web development, with Dart



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Improving DOM APIs

Code feels like native Dart

DOM operations return Dart lists and maps

Your mission: loop through HTML elements.

```
var arr = document.body.childNodes; // Array-like object
for (var index in arr)
  // index = 0, 1, 2, 3, length, item (Here be dragons!)
```

JAVASCRIPT

```
List<Node> list = document.body.children; // Dart list!
for (var node in list) // You can have a pony!
```

DART



Rich libraries in Dart: Futures and Streams

Future: a promise of a value that will be resolved later

DART

```
// Like callbacks, but easier to compose.  
var future1 = somethingAsynchronous()  
    .then(callback)  
    .catchError(trapAsynchronousErrors)  
    .then(doSomethingElse)  
    ...  
  
var future2 = anotherAsynchronousThing();  
var future3 = Future.wait([future1, future2]);
```

Futures in async DOM APIs

```
var xhr = new XMLHttpRequest();
xhr.onload = function() {
  processResponse(this.responseText);
};
xhr.open("GET", "http://...", true);
xhr.send();
```

JAVASCRIPT

```
var future = HttpRequest.getString('http://...');
future.then(processResponse);
```

DART

More sublibraries, fewer prefixes

SVGRect -> Rect, IDBCursor -> Cursor

```
import 'dart:web_gl';
```

DART

```
import 'dart:svg';  
new RectElement();
```

DART

Named arguments

Remember when this was the way to create a MouseEvent?

```
//event.initMouseEvent(type, canBubble, cancelable, view,  
//    detail, screenX, screenY, clientX, clientY, ctrlKey,  
//    altKey, shiftKey, metaKey, button, relatedTarget);
```

JAVASCRIPT

```
event.initMouseEvent('mouseout', true, true, window, 0, 0, 0, 0, 0,  
    false, false, false, true);
```

How do you remember the order of all those parameters?

```
new MouseEvent('mouseout', metaKey: true);
```

DART

Named arguments

also help with discoverability

```
dirEntry.getDirectory('/new/path',  
  {exclusive: true, create: true},  
  function(entry) { console.log('success'); });
```

JAVASCRIPT

```
dirEntry.createDirectory('/new/path', exclusive: true).then(  
  (_) => console.log('success'));
```

DART

```
58     document.querySelector('#stopKTCdemo')  
59     (evt) { video.pause(); vid  
60     });  
61     dirEntry.create  
62   }  
63
```

- createDirectory(String path, {bool exclusiv
- createFile(String path, {bool exclusive}) ->
- createReader() -> DirectoryReader

Discoverable APIs

```
var div = new DivElement();  
div.style.backgroundColor = 'green';  
// this div id="discoverable"
```

DART

mousemoveDemo

DEMO



Where's my jQuery?

Hint: it's already baked in!

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jQuery

Element CSS manipulation

JAVASCRIPT

```
// No jQuery:  
var elements = document.querySelectorAll('slide');  
for(int i = 0; i < elements.length; i++) {  
  elements[i].className = element.className + ' swing';  
}
```

```
// jQuery:  
$('slide').addClass('swing');
```

```
queryAll('slide').classes.add('swing');
```

DART

Toggle absurd slide transitions

DEMO

Effortless browser compatibility

No more vendor prefixes!

```
navigator.getMedia = (navigator.getUserMedia ||  
                      navigator.webkitGetUserMedia ||  
                      navigator.mozGetUserMedia ||  
                      navigator.msGetUserMedia);  
  
navigator.getMedia(...);
```

JAVASCRIPT

```
window.navigator.getUserMedia(...);
```

DART

We worry about the browser compatibility issues for you!

WebRTC demo

DEMO

Effortless browser compatibility

getUserMedia

Stop RTC demo

Chaining

Method cascades

JAVASCRIPT

```
// (poorly written) jQuery  
var element = $('.cascades-demo');  
element.css('textShadow', '0px 2px 3px #656');  
element.css('fontFamily', 'Comic Sans MS');  
element.css('color', '#222');
```

DART

```
document.query('.cascades-demo').style  
  ..textShadow = '0px 2px 3px #656'  
  ..fontFamily = 'Comic Sans MS'  
  ..color = '#222';
```

Take me to the 90s!

DEMO



Embrace future web standards

Adopting web components, shadow DOM, data bindings, and more



Building large web applications is hard!

```
▼<div tabindex="0" style="position: relative; min-height: 100%;" aria-hidden="false">
  ▶<div class="vI8oZc cS">...</div>
  ▼<div class="nH" style="width: 1404px;">
    ▼<div class="nH" style="position: relative;">
      ▶<div class="nH w-asV aiw">...</div>
      ▼<div class="nH">
        ▼<div class="no">
          ▶<div class="nH oy8Mbf nn aeN" style="width: 204px; height: 644px;">...</div>
          ▼<div class="nH nn" style="width: 1200px;">
            ▼<div class="nH">
              ▼<div class="nH">
                ▼<div class=" ar4 z">
                  ▶<div id=":ro" class="aeH">...</div>
                  ▼<div class="A0">
                    ▼<div id=":rp" class="Tm aeJ" style="height: 624px;">
                      ▼<div id=":rr" class="aeF" style="min-height: 194px;">
                        ▼<div class="nH">
                          ▼<div class="Blthke nH oy8Mbf" role="main" style>
                            <div style></div>
                            <div class="afn"></div>
                            <div class="afn"></div>
                            ▼<div class="UI" gh="tl">
                              <div class="aDP"></div>
                            <div class="aDP"></div>
                          </div>
                        </div>
                      </div>
                    </div>
                  </div>
                </div>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
  </div>
</div>
```

A new generation of standards

Features of rich frameworks, now in the browser

- Less boilerplate code
- Encapsulate and reuse components

Dart Web UI: Embracing future standards today

Observable data

JAVASCRIPT

```
var x = {};  
Object.observe(x, function (change) { console.log("x change:" + x);});  
x.f = 1;
```

DART

```
@observable  
class A {  
  int f;  
}  
...  
var x = new A();  
observeChanges(x, (change) => print("x changed: $x"));  
x.f = 1;
```

Declarative data binding

A simple way to attach models and views

Count: 3

DEMO

```
@observable
class Counter {
  var value = 0;
}
...
var counter = new Counter();
new Timer.periodic(new Duration(seconds: 1), (_) => counter.value++);
```

DART

```
<template>
  Count: {{ counter.value }}
</template>
```

HTML

Two-way data binding

Bindings can update models from the view

```
<b>Text</b>: {{ sample.value }}<br>  
<input type="text" bind-value="sample.value">
```

HTML

Text:

DEMO

```
@observable  
class Sample2 {  
  String value = '';  
}
```

DART

Template repeat

Use bindings to expand lists of repeated elements

Find slide by title:

DEMO

- Happy web dev with Dart
- Web development, today
- Web development, with Dart
- Improving DOM APIs
- Code feels like native Dart
- Rich libraries in Dart: Futures and Streams
- Futures in async DOM APIs
- More sublibraries, fewer prefixes
- Named arguments
- ...

Template repeat

Behind the scenes

```
<b>Search a slide title</b>:  
<input type="text" bind-value="query">  
<ul>  
  <template repeat="title in matchingTitles">  
    <li on-click="selectSlide(title)">{{title}}</li>  
  </template>  
</ul>
```

HTML

```
var query = '';  
Iterable<String> get matchingTitles => ...;
```

DART

Custom elements

Encapsulated markup as a tag, and use it multiple times

custom element demo

DEMO

```
<element name="my-element" extends="div">  
  <template>  
    ...  
</div is="my-element"></div>  
<my-element></my-element>
```

DART

Load other custom elements

```
<head>  
  <link rel="import" href="other_custom_elements.html">
```

HTML

import custom elements demo

DEMO

Be part of a community

share your libraries and components with others via pub

pubspec.yaml [app.html](#) [more...](#)

```
name: slidedeck
dependencies:
  widget: any
  web_ui: ">=0.4.8"
  browser: any
  js: any
dev_dependencies:
  unittest: any
```

YAML

Kevin Moore / <https://github.com/kevmoo/widget.dart>



Additional resources

- Web UI:
 - github.com/dart-lang/web-ui
- Specs and related projects:
 - wiki.ecmascript.org/doku.php?id=harmony:observe
 - github.com/toolkitchen/mdv
 - dvcs.w3.org/hg/webcomponents/raw-file/tip/spec/shadow/index.html
 - dvcs.w3.org/hg/webcomponents/raw-file/tip/spec/custom/index.html

Try it out!

- Ready for you to try, today!
- More to come!
- Join us at the code lab, tomorrow (Friday) at 9am

dartlang.org



Google
Developers