





Putting the App Back Into Web App

Web Programming with Dart

Dan Grove and Vijay Menon
Google

2007:

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★ Recover My Email 3.1 - Aug 19, 2007 8:45 AM
Undelete Deleted Mail in Outlook and Outlook Express

Recently, my bell rang. It was a smiling delivery person with a packet for my absent neighbor. "Sure," I said reassuringly, "you can leave it with me. I am, however, not..."

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★ Butterfly on Orange Lily - Aug 20, 2007 9:21 AM
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When a milkmaid making butter could not the resist the creamy temptation and nibbled a bit, there were, fortunately, always butter- or, more precisely, cream-flies to blame. This is how...

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I had: a few soft tortilla wraps, this wonderful rich Camembert cheese, and hunger. Boy do the three go well together! Give it a try maybe. I'll see how Brie works...

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Why Is Swarm a Modern App?

Beautiful

Fast

- Instant startup
- < 100ms response to all user actions

Always Available

- Supports offline

Uses the cloud

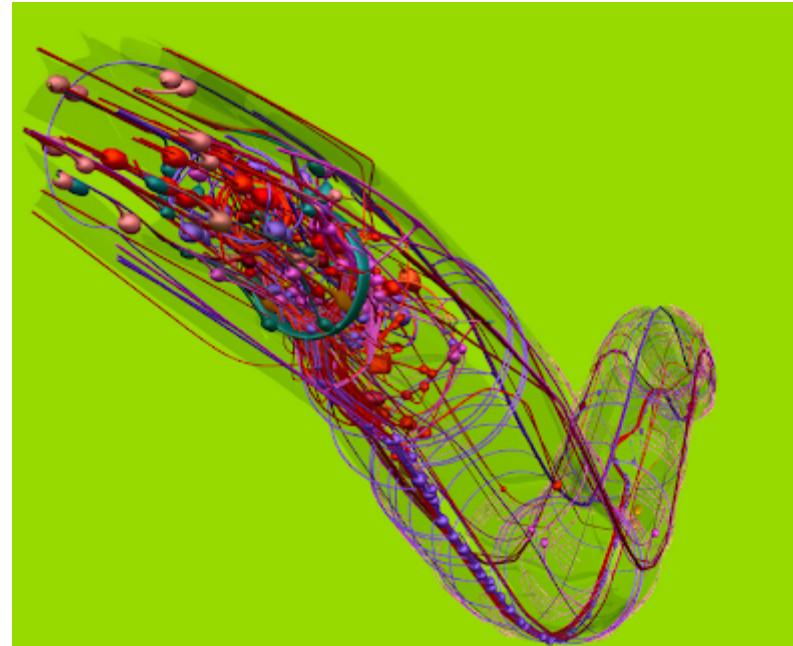
- Install not required



HTML5 and Beyond

Web capabilities have improved radically

- Animation
- **Canvas / WebGL**
- Audio / Video
- FileSystem
- IndexedDB
- Touch
- Drag and Drop
- Geolocation
- WebSockets
- Web Workers



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HTML5 and Beyond

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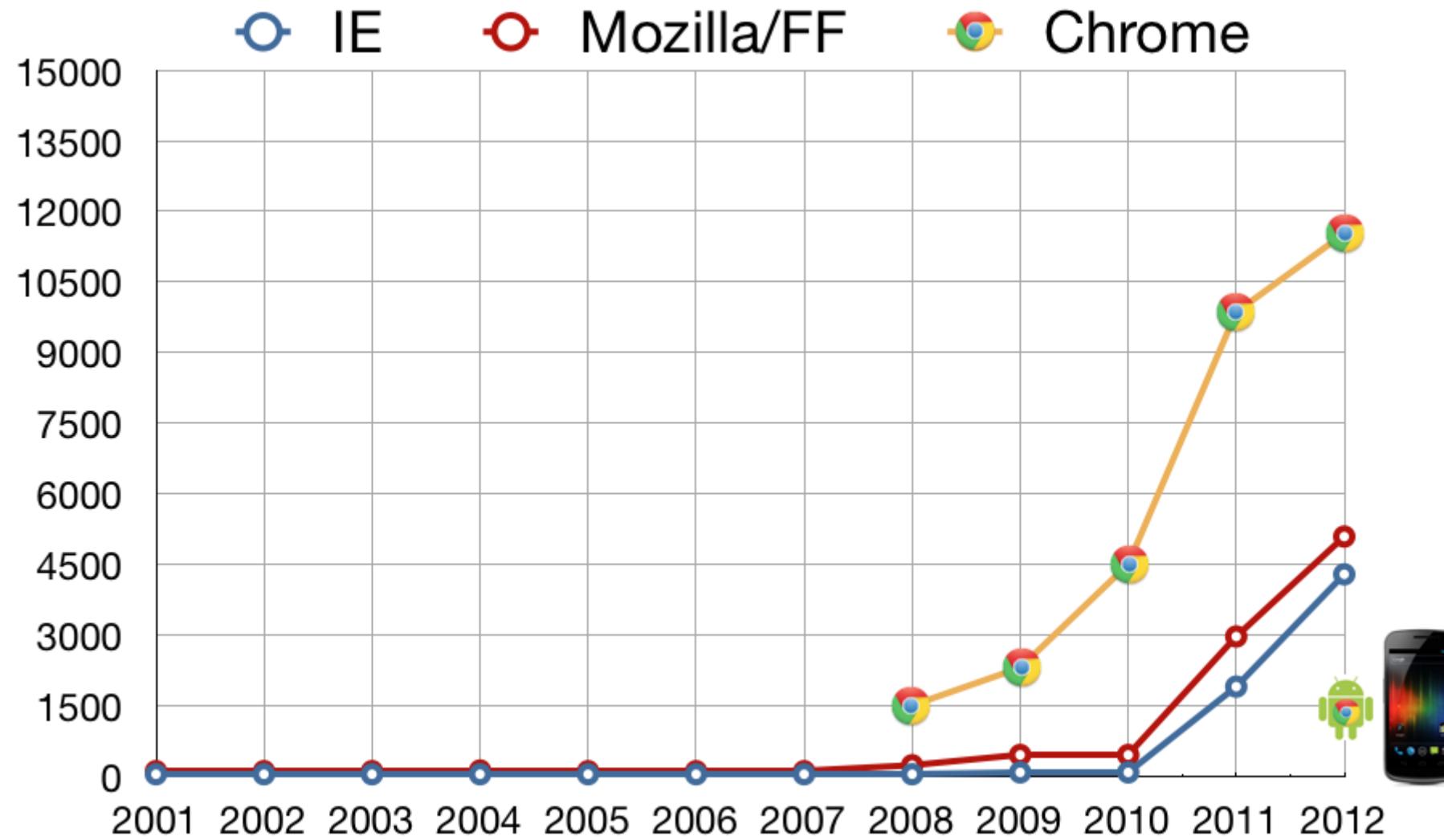
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- Audio / Video
- FileSystem
- IndexedDB
- Touch
- Drag and Drop
- Geolocation
- **WebSockets**
- Web Workers

```
var ws = new WebSocket("ws://foo.bar/");
ws.on.open.add( (e) => ws.send(e, "Hi!") );
ws.on.message.add( (e) => process(e.data) );
ws.on.close.add( (e) => handleClose(e) );
```



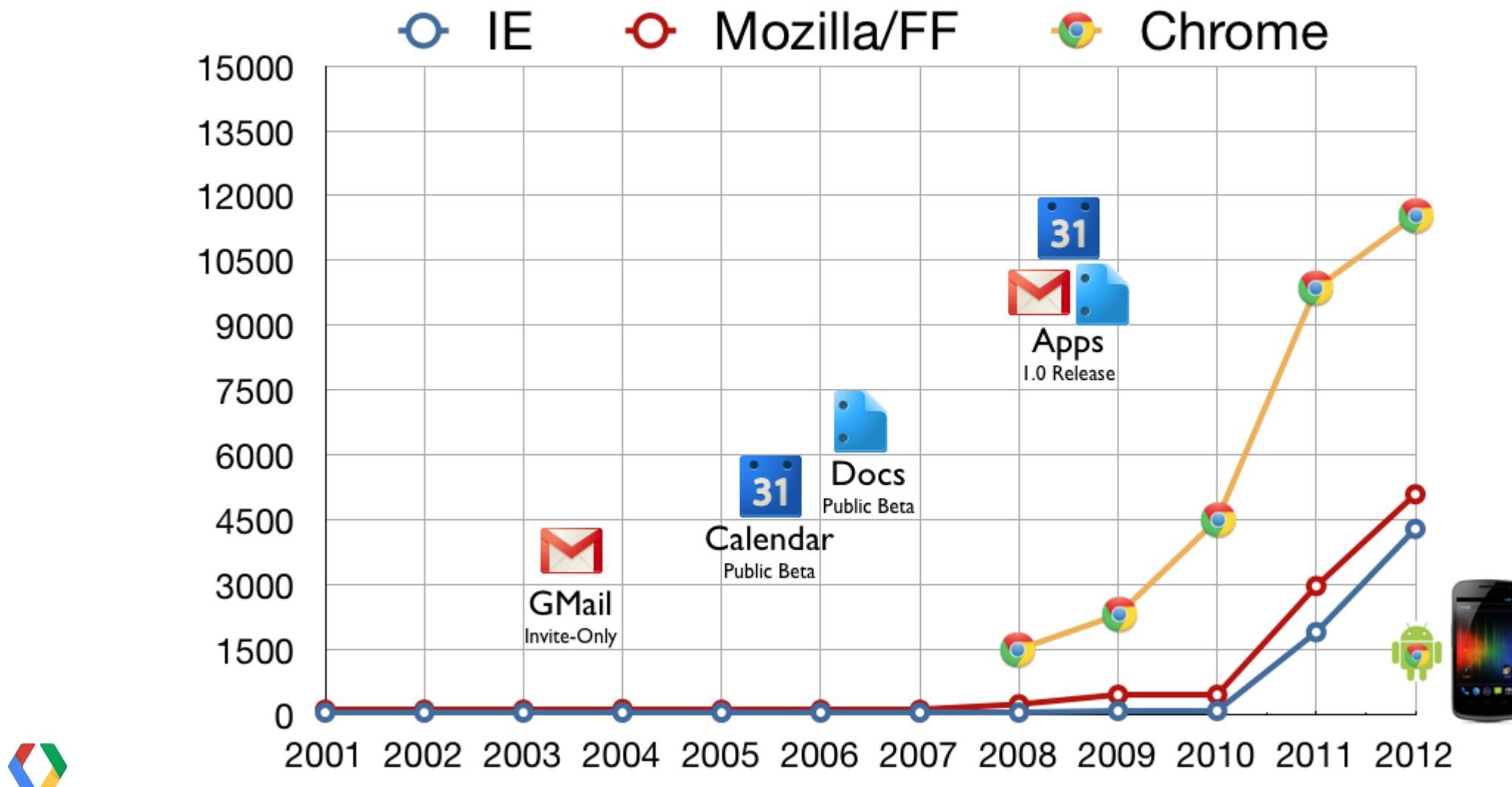
JavaScript Performance Timeline

V8 benchmark v3 - higher numbers are better



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V8 benchmark v3 - higher numbers are better



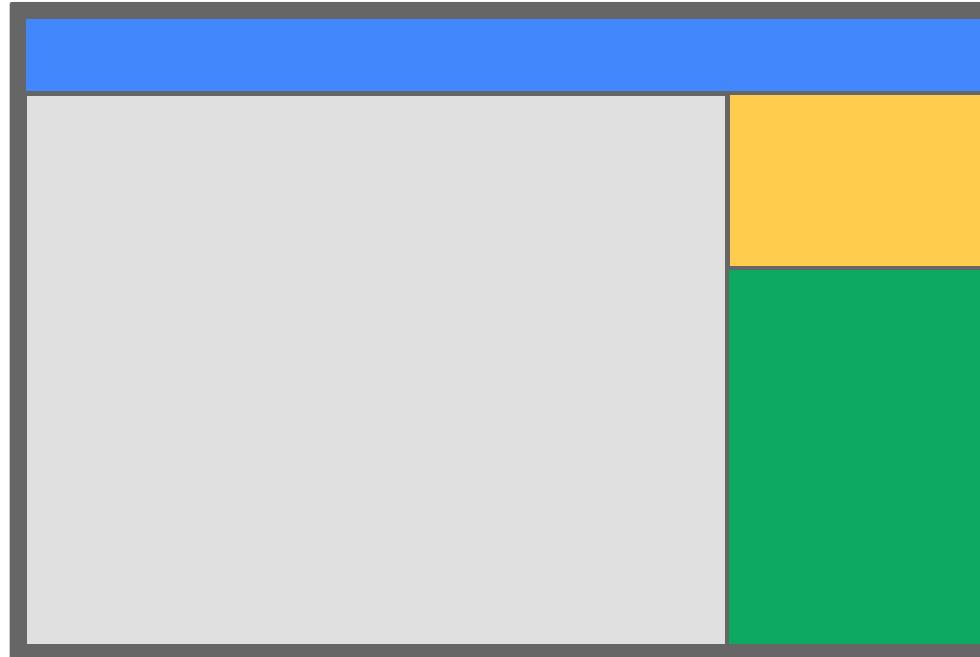


The browser has changed. a lot.

So, Why Are We Talking About Dart?

Better, bigger apps **require** programming at scale

- Composability
- Code reuse
- Structure
- Static checking
- Toolability



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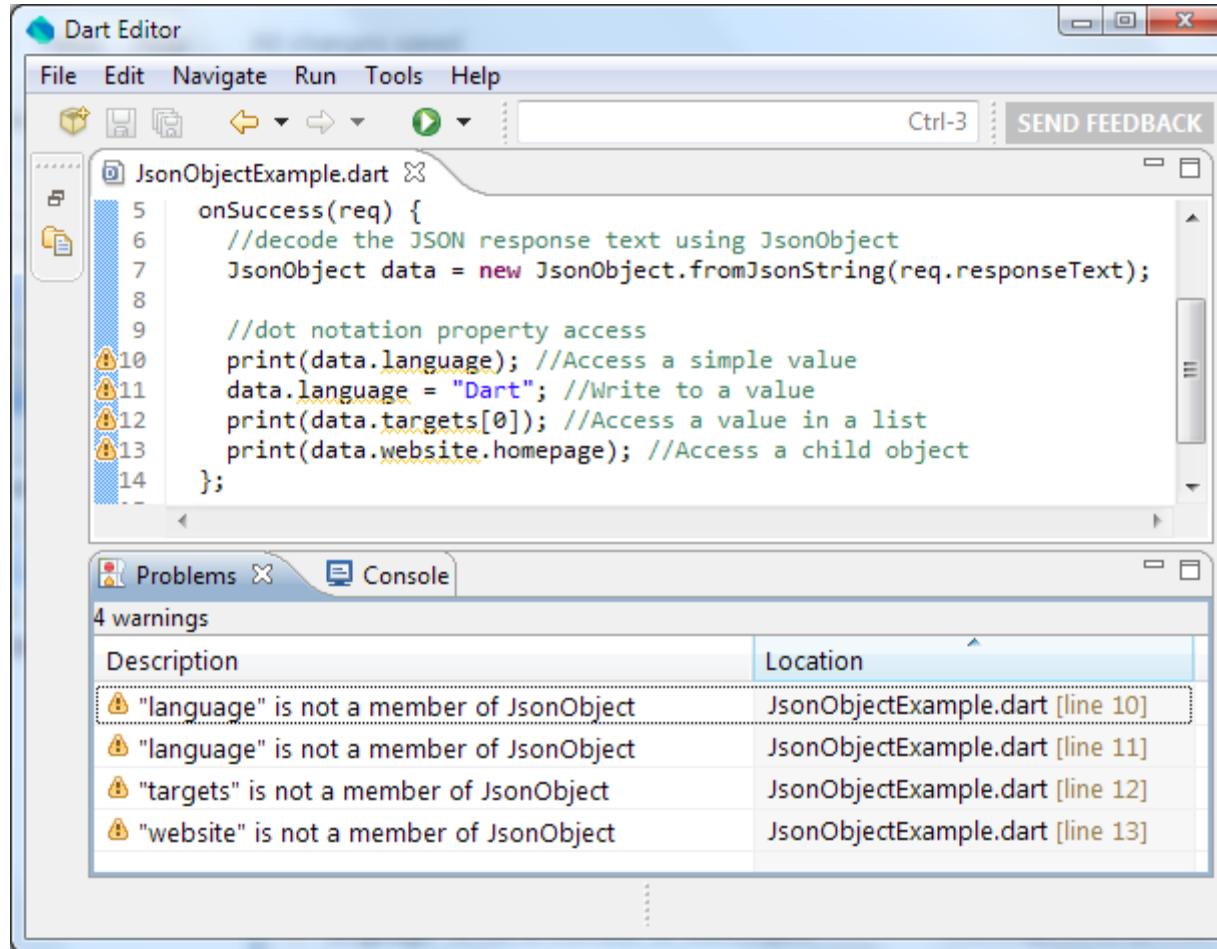
```
class CompositeView extends View {  
  List<View> childViews;  
  
  View addChild(View view) {  
    childViews.add(view);  
    return view;  
  }  
}
```



So, Why Are We Talking About Dart?

Better, bigger apps **require** programming at scale

- Composability
- Code reuse
- Structure
- **Static checking**
- Toolability



The screenshot shows the Dart Editor interface. The main window displays a Dart file named `JsonObjectExample.dart` with the following code:

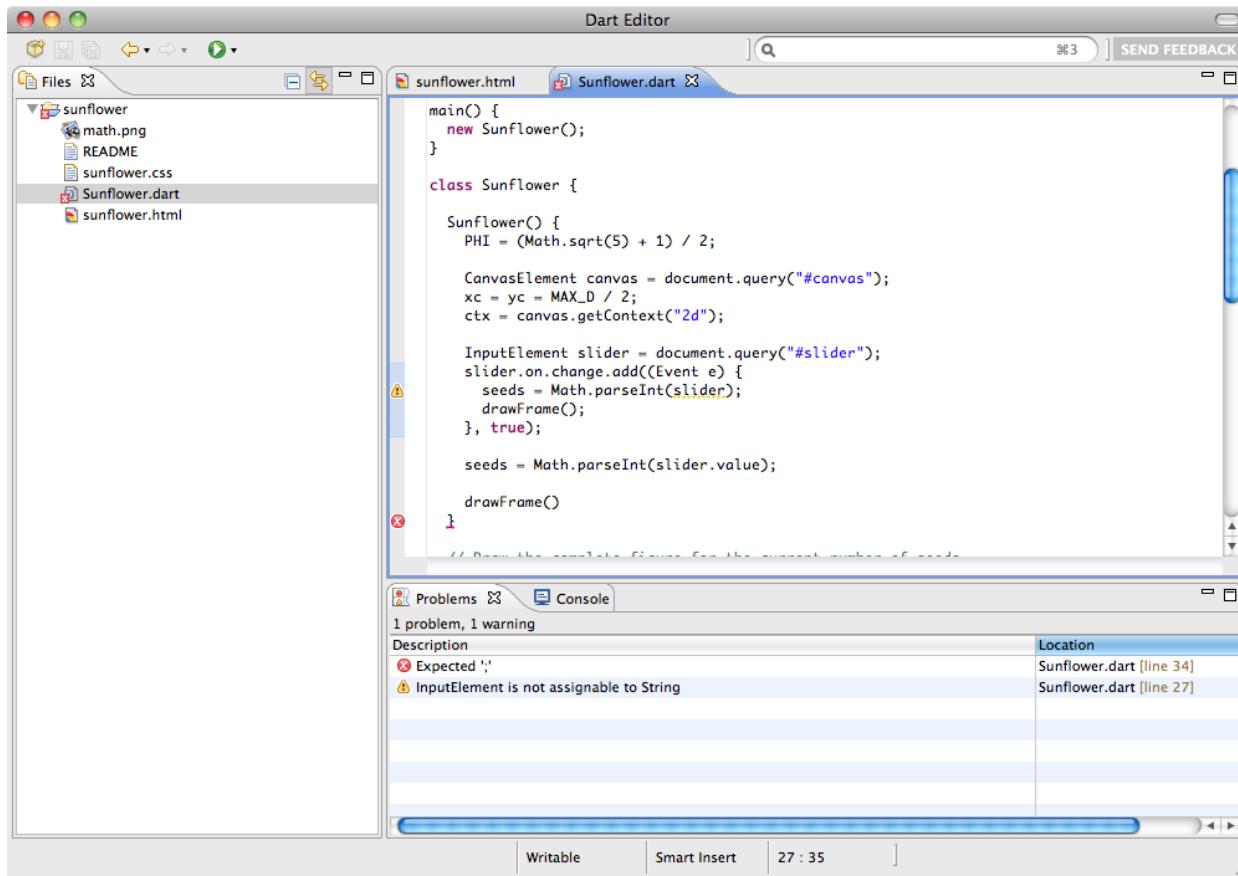
```
5  onSuccess(req) {  
6      //decode the JSON response text using JsonObject  
7      JsonObject data = new JsonObject.fromJsonString(req.responseText);  
8  
9      //dot notation property access  
10     print(data.language); //Access a simple value  
11     data.language = "Dart"; //Write to a value  
12     print(data.targets[0]); //Access a value in a list  
13     print(data.website.homepage); //Access a child object  
14 };
```

Below the code editor, the `Problems` tab is open, showing four warnings:

Description	Location
⚠ "language" is not a member of JsonObject	JsonObjectExample.dart [line 10]
⚠ "language" is not a member of JsonObject	JsonObjectExample.dart [line 11]
⚠ "targets" is not a member of JsonObject	JsonObjectExample.dart [line 12]
⚠ "website" is not a member of JsonObject	JsonObjectExample.dart [line 13]



Dart Tools



"Dartium"

**Dart2JS
Compiler**

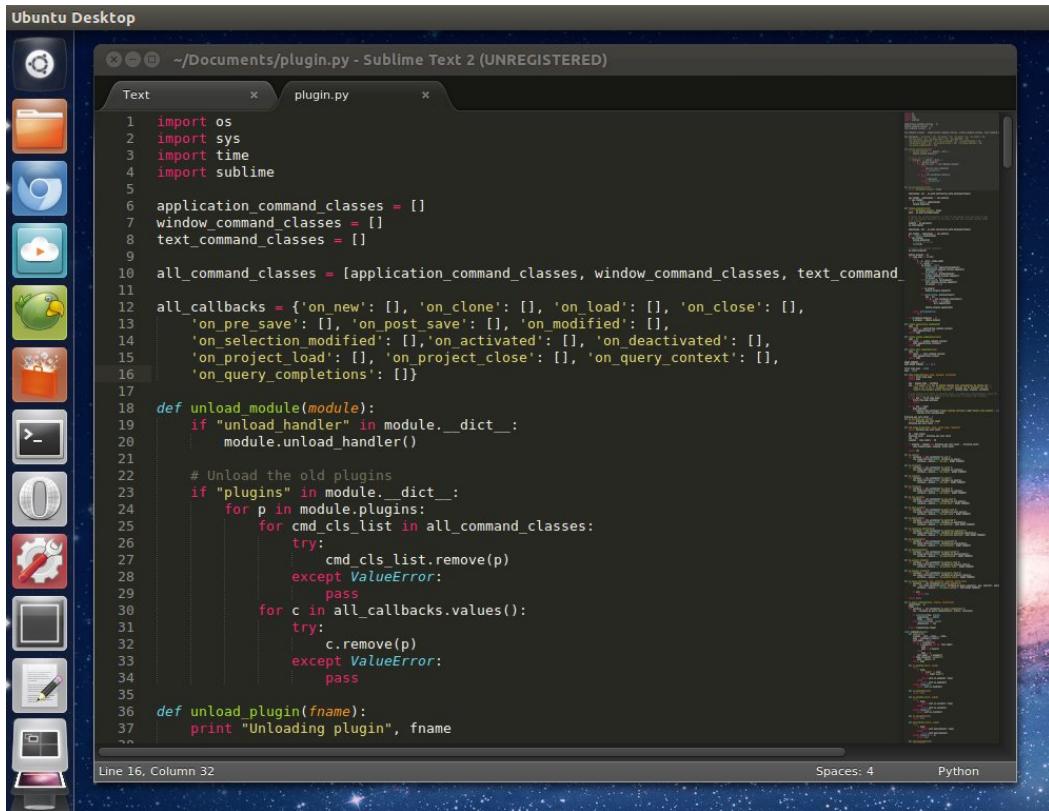


Tip

IE9+



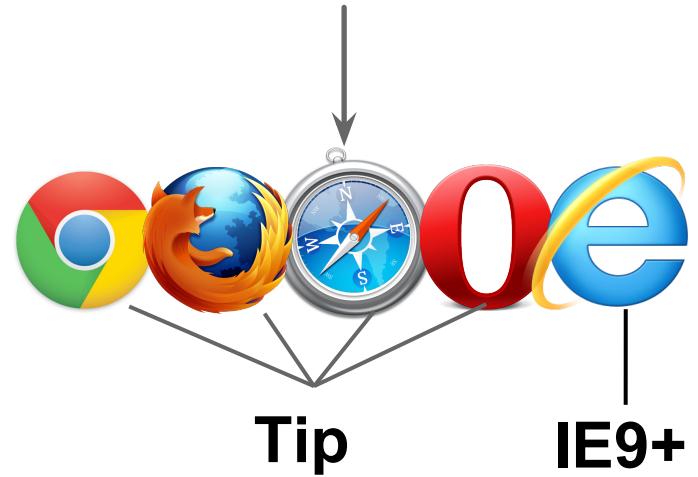
Dart Tools - You Have Choices



A screenshot of the Ubuntu desktop environment showing Sublime Text 2. The window title is "Ubuntu Desktop" and the file path is "~/Documents/plugin.py - Sublime Text 2 (UNREGISTERED)". The code in the editor is Python, defining a plugin for Sublime Text 2. It includes imports for os, sys, time, and sublime, and defines application_command_classes, window_command_classes, and text_command_classes. It also defines callbacks for various events like 'on_new', 'on_clone', 'on_load', 'on_close', etc. The code ends with a function to unload a module and another to unload a plugin. The status bar at the bottom shows "Line 16, Column 32", "Spaces: 4", and "Python".



```
> dart2js hello.dart  
--out=hello.dart.js
```



Back to Swarm

Swarm	Top	Design	Eco	Geek	Google			
Design Milk  Fresh From The Dairy: Patterned iPhone Cases Jaime 2011-10-06	Rock, Paper, Shotgun  Gullible Human Drones: Warp Jim Rossignol 2011-10-26	The Big Picture  Oktoberfest 2011 anonymous 2011-10-05	WebUrbanist  Holy Water! 24 Aquariums and Fish Tanks Marc					
I decided it would be fun to do something different this week and choose prints for The Design Milk Dairy art collection based on how they would look best as iPhone cases...	A trailer for EA's Warp is below. Warp, as EA's emotionless robo-voice explains, is: "a puzzle-based stealth action game where gamers play as Zero, a loveable yet lethal,..."	The taps were flowing and the oom-pah bands were oom-pahing again in Germany. It's Oktoberfest time, and the world's largest festival celebrating beer reportedly attracts...	[By Marc in Environment & Furniture & Interiors & Gadgets] True aquarium aficionados beautifully design their tanks.					
 Shadow Construction by Marte Haverkamp Jaime 2011-10-06	Sky High, Or Below The Rift Specs John Walker 2011-10-25	 Scenes from Kashmir anonymous 2011-10-03	 18 Examples of Long-Exposure Photography Steph					
Marte Haverkamp graduated last year from School of the Arts Utrecht, Netherlands and her graduation project, Shadow Construction. She explains, "I have been fa...	Will Skyrim run on your PC? Well yes, actually, there's a fairly good chance it will. Bethesda have revealed the specs necessary to make it run at all, or make it ...	Kashmir is a scenic land of tranquil beauty. A longstanding dispute over control of the region ensures that life for Kashmiris is anything but tranquil. Both India and Pakis...	[By Steph in Architecture & Graffiti & Drawing.] Streaks of stars, smoothly swirling waterfalls, and a variety of other gradients.					
 Fibulae Installation by Marc Fornes and Focus Lighting Jaime 2011-10-06	Cryptic Comet Reveals The ... Chronicles Jim Rossignol 2011-10-25	 Global protests anonymous 2011-09-30	 Stored Potential: Omaha's Grain Silos Steve					
Fibulae is an 1800-square-foot pop-up shop/installation by Marc Fornes &...	Brain-witching turn-based strategy-creator Vic Davis (aka Cryptic Comet) has	There are many forms of protest, many ways to express an objection to particular events.	[By Steve in Architecture & Design] 1 of 2 < >					



Swarm Goals

Great Dart news reader
Speed - 60FPS
Customized to form factor

- Touch

Build new UIs easily
Offline-capable

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Layout

CSS Grid inspired Browser primitive?

- CSS Grid not everywhere yet
- Flexbox:
 - No animation
 - Not identical cross browser

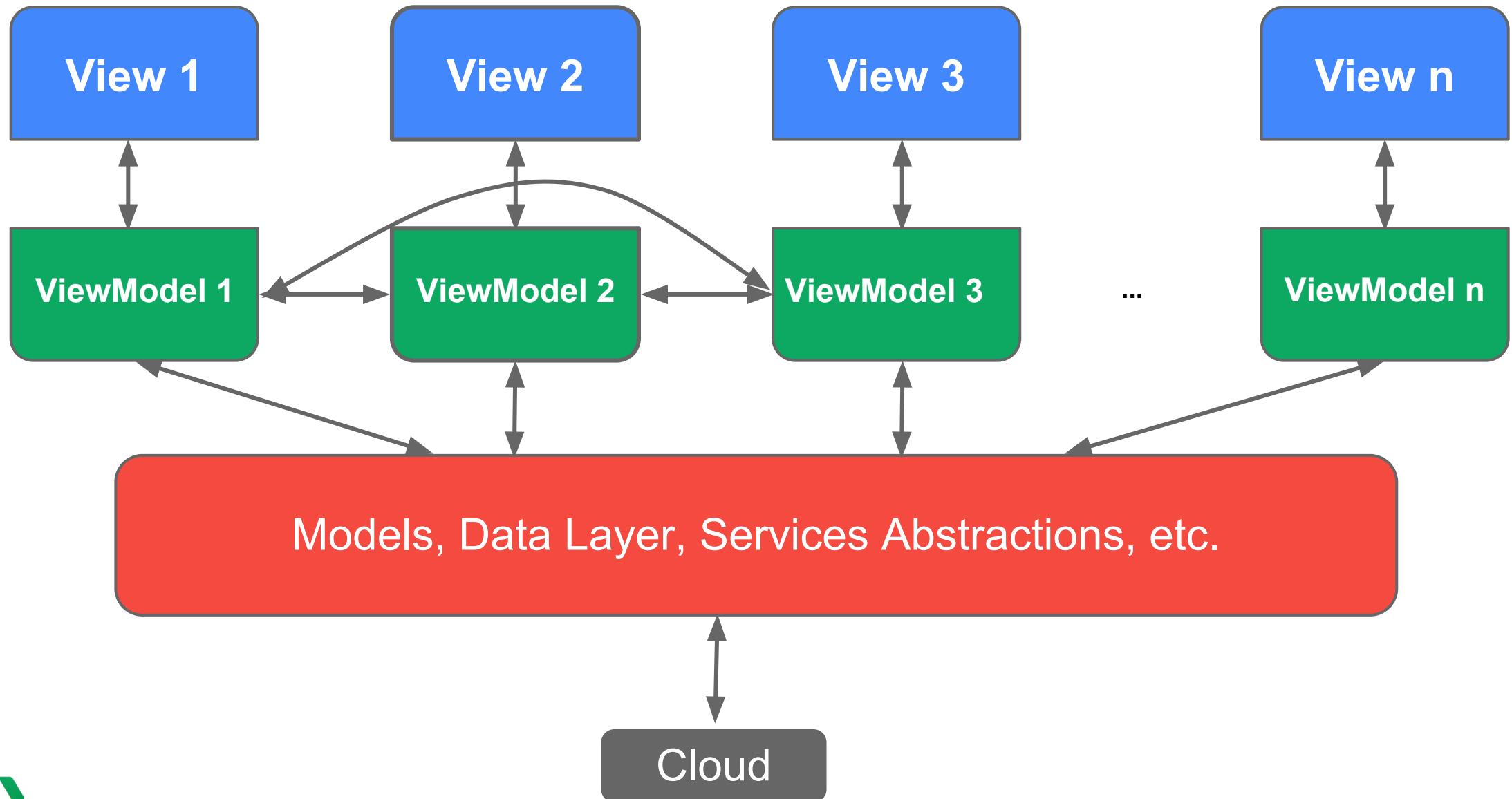
Absolute positioned DOM

- Layout in code
- Same everywhere
- Browser VM speed
- Animation-capable

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Model-View-ViewModel Approach



Model

True application state

Benefits:

- Protection from network
 - Caching, local acceleration
 - Offline
- Tab consistency
- Strong data/view separation

Swarm Model

- Sections
- Feeds
- Articles per feed

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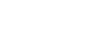
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Model for the View

- Transforms Model for View
 - View<->App interactions
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Swarm ViewModel

- Current Section
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Cryptic Comet Reveals The ... Chronicles
Jim Rossignol 2011-10-25

Brain-witching turn-based strategy-creator Via Davis (aka Cryptic Comet) has...



View

Composable UI units Handle all UI interaction Dart + HTML/CSS

- Derivable
- Custom Views

Events - UI, ViewModel

Swarm	Top	Design	Eco	Geek	Google
Design Milk					
	Fresh From The Dairy: Patterned iPhone Cases				
Jaime	2011-10-06				
I decided it would be fun to do something different this week and choose prints for The Design Milk Dairy art collection based on how they would look best as iPhone cases...					
	Shadow Construction by Marte Haverkamp				
Jaime	2011-10-06				
Marte Haverkamp graduated last year from School of the Arts Utrecht, Netherlands and her graduation project, Shadow Construction. She explains, "I have been fa...					
	Fibulae Installation by Marc Fornes and Focus Lighting				
Jaime	2011-10-06				
Fibulae is an 1800-square-foot pop-up show/installation by Marc Fornes .					
	Rock, Paper, Shotgun				
	Gullible Human Drones: Warp				
	Jim Rossignol	2011-10-26			
A trailer for EA's Warp is below. Warp, as EA's emotionless robo-voice explains, is: "a puzzle-based stealth action game where gamers play as Zero, a loveable yet lethal,...					
	Sky High, Or Below The Ri... Specs				
	John Walker	2011-10-25			
Will Skyrim run on your PC? Well yes, actually, there's a fairly good chance it will. Bethesda have revealed the specs necessary to make it run at all, or make it ...					
	Cryptic Comet Reveals The ... Chronicles				
	Jim Rossignol	2011-10-25			
Brain-witching turn-based strategy-creator <i>Vic Davis</i> (aka Cryptic Comet) has					



Swarm in the Editor



Status

Early version of Dart platform available

Read and download: <http://dartlang.org>

- Language Spec and API Documentation
- Editor, Dartium and SDK
- Mailing lists: misc@dartlang.org

Open source: <http://dart.googlecode.com>

- Source for Dartium, Dart2JS, Editor, Libraries, Swarm,



Learn More at Google IO

- **Today, June 27th**
 - 4:00pm: Migrating Code from GWT to Dart (this room)
 - Now - 6:45pm: Dart Office Hours (Chrome Demo Floor)
- **Tomorrow, June 28th**
 - 4:00pm: Bullseye - Your First Dart App



Remember

Web capabilities vastly better than 5 years ago

Dart enables programming at scale

Dart will enable modern web apps



<Thank You!>



Web Programming with Dart

dgrove@google.com, vsm@google.com

#dartlang

<http://dartlang.org>



Google
Developers