

A nighttime photograph of the Atlanta skyline, featuring the Bank of America Plaza and other illuminated skyscrapers.

welcome

Jonathan Popham

Thanks

Big thanks to

DEVNEXUS™



Who am I?



Organizer
GDG ATL



President
Freeside



User Interface Developer
ADP



Why am I doing this?

Linus's Law :

says that all of our motivations fall into three basic categories. More important, progress is about going through these very same things as “phases” in a process of evolution, a matter of passing from one category to the next. The categories, in order, are “survival,” “social life,” and

“entertainment”.

I do all of this, just for the **fun** of it.



Who are you?

- Stand up
 - Right now, I really mean it
- Tell your name to the people around you
 - If it is a fake name it has to be hilarious
- Tell at least one person something you like to do, just for the fun of it.



<polymer-project>

// web component library

What we're talking about

- ~~a large molecule, or macromolecule, composed of many repeated subunits, known as monomers~~
- Polymer is a library
 - uses the latest web technologies
 - lets you create custom HTML elements
 - polyfill of web components



Web component Libraries

- Polymer (via Chrome via Google)
 - focused on bringing future standards to browsers
- X-Tags from Mozilla
 - similar vision to Polymer, works with key people from Google and webcomponents.org
- Bosonic
 - relative newcomer to the scene
 - focused on bringing old browsers to the present



What we're talking about

- Polymer
- Web Components in general
- Materials Design
- What the landscape looks like for the future
- The Mystical, Magical, Shadow DOM



Status of Polymer

- Out of Beta!
- Works on latest 2 versions of evergreen browsers
 - Chrome
 - Firefox
 - IE
 - Safari
 - Opera



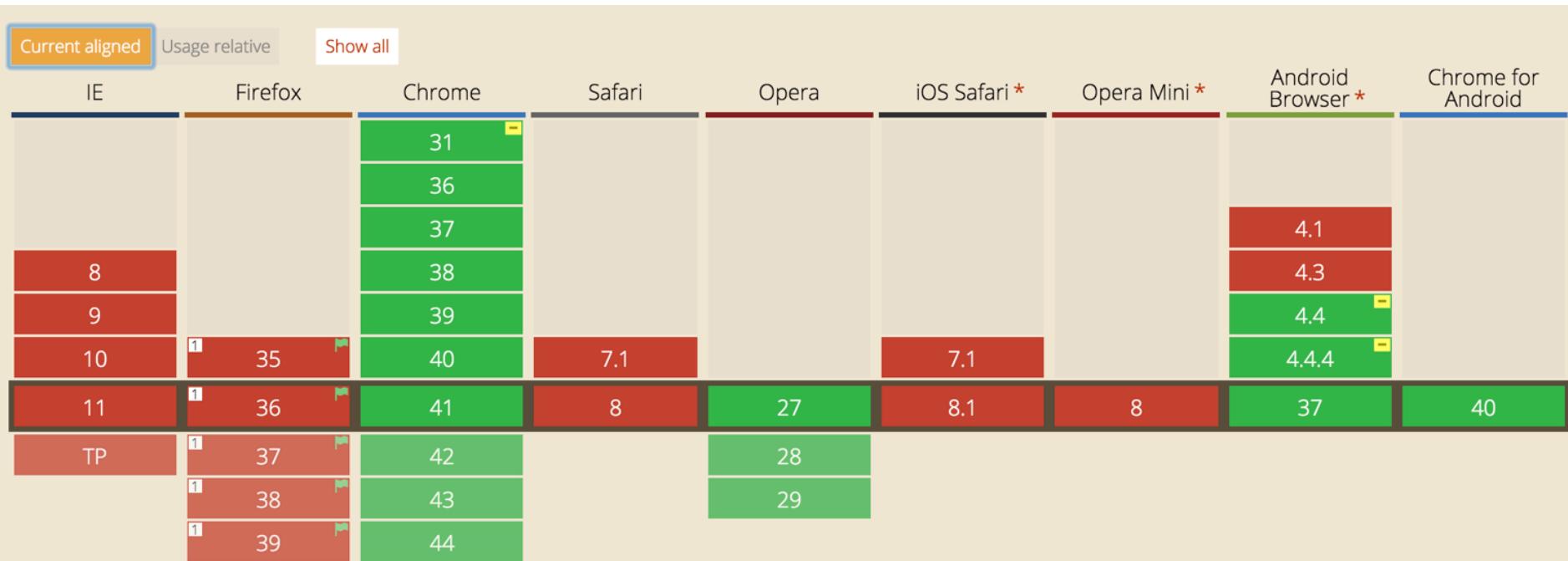
Polymer is a library

“Build anything from a button to a complete application as an encapsulated, reusable element that works across desktop and mobile.”

Polymer is a way of bolting together web components to make robust web applications.



Native (Shadow DOM)



webcomponents.js



webcomponents.js

BROWSER SUPPORT

CHROME

OPERA

FIREFOX

SAFARI

IE



Polymer Layout

Applications

Paper Elements

Core Elements

Polymer.js

Polyfills (`webcomponents.js`)

Native Support



Web components via W3C

1. Templates
2. Custom Elements
3. Shadow DOM
4. Imports



Web components

All can work individually, you don't need Polymer to use web components.

Polymer is a **discussion** whose goal is to form an opinion on what the future of the web is going to look like



Shadow DOM

- File Structure which encapsulates documents, separates event paths
- Effectively a tree of DOM nodes
- Definitely mystical, magical
- Possibly Yggdrasil (non-normative)

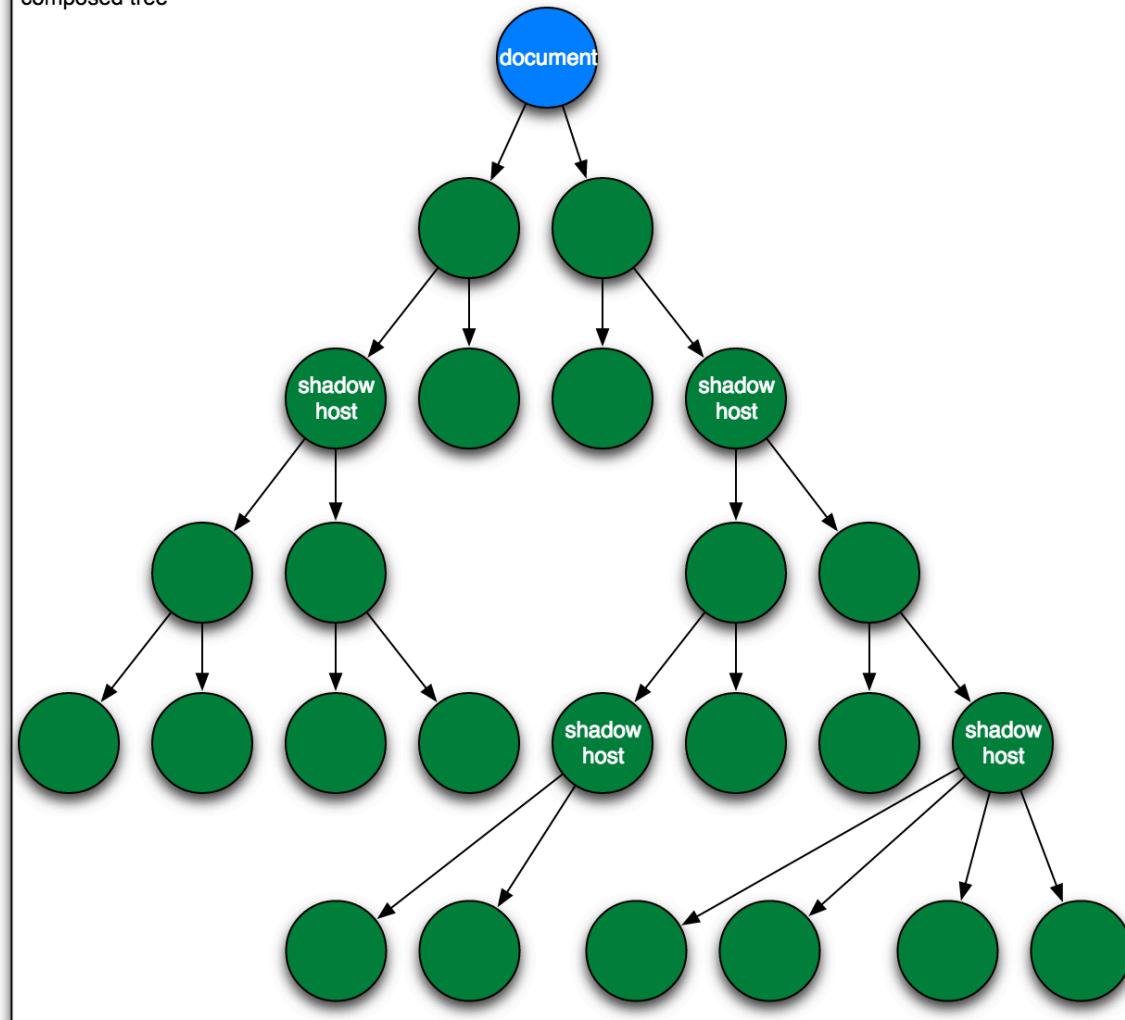


Structure of Shadow DOM

- Document
 - Shadow Host (inert)
 - Shadow Root
 - encapsulated content



composed tree



Create Shadow Host (js)

```
var host = document.querySelector('#host');
var root = host.createShadowRoot();
var content = document.createElement('content');
content.setAttribute('select', 'h1');
root.appendChild(content);
```



Create Shadow Host (html)

```
<div id="host">
    <h1>Mystical Magical Shadow Dom</h1>
</div>
```



That's cool but...

What can you really do with this?



Declarative Event Mapping

```
<polymer-element name="tag-name" constructor="TagName">  
  <template>  
    <!-- shadow DOM here -->  
  </template>  
  <script>  
    Polymer({  
      // properties and methods here  
    });  
  </script>  
</polymer-element>
```



Custom Elements

which let authors define their own elements,
with new tag names and new script interfaces.
also extend existing elements like button

encapsulates state

```
<element extends="button" name="fancy-button">  
</element>
```



HTML Templates

```
<template id="commentTemplate">  
  <div>  
    <img src="">  
    <div class="comment-text"></div>  
  </div>  
</template>
```



HTML Imports

```
<link rel="import" href="bower_components/  
polymer/polymer.html">
```



Data binding

Polymer supports two-way data binding
extends HTML and DOM APIs which
separates the UI and the model.

Updates to the model are reflected in the DOM
and user input to the DOM is immediately
assigned to the model.



Data binding

```
<polymer-element name="name-tag">  
  <template>  
    This is <b>{{owner}}</b>'s name-tag element.  
  </template>  
  <script>  
    Polymer('name-tag', {  
      // initialize the element's model  
      ready: function() {  
        this.owner = 'Rafael';  
      }  
    });  
  </script>  
</polymer-element>
```

```
document.querySelector('name-tag').owner  
= 'June';
```



So what does polymer do?

The team defines the core api like this:

The polymer *core* API is like Polymer's opinion, it's the extra bit that provides the extra sugaring that all Polymer elements use, and is meant to make developing web components much easier.



Sugaring Layer

Polymer connects all of the ingredients of web components

Web components currently use polyfills (webcomponents.js) to extend functionality of current browsers.

Polymer is working to discover what future best practices will be



What's a sugaring layer?

```
▼ <div id="page-outer">
  ▼ <div id="page-container" class="AppContent">
    ▶ <style id="user-style-devnexus">...</style>
    ▶ <div class="ProfileCanopy ProfileCanopy--withNav ProfileCanopy--large">...</div>
    ▼ <div class="AppContainer">
      ▼ <div class="AppContent-main u-cf" role="main" aria-labelledby="content-main-heading">
        ::before
        ▶ <div class="Grid Grid--withGutter">...</div>
        ::after
      </div>
    </div>
    ▶ <div id="trends_dialog" class="trends-dialog modal-container">...</div>
  </div>
</div>
▼ <div class="alert-messages hidden" id="message-drawer" style="top: -40px;">
  ▼ <div class="message ">
    ▼ <div class="message-inside">
      <span class="message-text"></span>
      ▼ <a role="button" class="Icon Icon--close Icon--medium dismiss" href="#">
        <span class="visuallyhidden">Dismiss</span>
      </a>
    </div>
  </div>
</div>
<div class="gallery-overlay"></div>
▼ <div class="Gallery">
  <div class="Gallery-closeTarget"></div>
  ▼ <div class="Gallery-content">
    ▼ <button type="button" class="modal-btn modal-close js-close">
      ▼ <span class="Icon Icon--close Icon--large">
        <span class="visuallyhidden">Close</span>
      </span>
    </button>
  </div>
</div>
```

<google-maps>
</google-maps>



What polymer looks like

```
<head>
  <script src=
    "bower_components/webcomponentsjs/webcomponents.js">
  </script>

  <link rel="import"
        href="bower_components/polymer/polymer.html">
</head>
```

What polymer looks like

```
<polymer-element name="x-foo" noscript>
  <template>
    <h1>Hello from x-foo!</h1>
  </template>
</polymer-element>
```

```
<x-foo></x-foo> // This is your custom element!
```

Stand Up!

- 75 Minutes is a long time
 - This is a break I put in so I could keep your attention
- Sitting still for this long really sucks
- This is an opportunity to receive a Jonathan Point, which are redeemable for fantastic prizes (stickers)



Quiz Questions! (+1J Point)

1. What are the three stages in Linus's Law?





Quiz Questions! (+1J Point)

2. What do you like to do for fun?

(Matter of Opinion)





```
npm verb linkStuff { false,
npm verb linkStuff '/Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules'
npm info linkStuff inquirer@0.7.1
npm verb linkBins inquirer@0.7.1
npm verb linkMans inquirer@0.7.1
npm info linkStuff lodash@3.2.0
npm verb rebuildBundles ['clc-color'],
npm verb rebuildBundles ['figures'],
npm verb rebuildBundles ['lodash'],
npm verb rebuildBundles ['mute-stream'],
npm verb rebuildBundles ['readline'],
npm verb rebuildBundles ['rx'],
npm verb rebuildBundles ['through']
npm info install inquirer@0.7.1
npm info postinstall inquirer@0.7.1
npm verb linkStuff { false,
npm verb readDependencies using package.json deps
npm verb readDependencies using package.json deps
npm verb about to build /Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml/node_modules/argparse/node_modules/todas@0.1.0
npm verb linkStuff { false,
npm verb linkStuff { false,
npm verb linkStuff { false,
npm verb linkStuff '/Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml/node_modules/argparse/node_modules/todas@0.1.0
npm info linkStuff lodash@3.2.0
npm verb linkBins lodash@3.2.0
npm verb linkMans lodash@3.2.0
npm info linkStuff argparse@0.1.0
npm info install lodash@3.2.0
npm info postinstall lodash@3.2.0
npm verb about to build /Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml/node_modules/argparse@0.1.0
npm info build /Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml/node_modules/argparse@0.1.0
npm verb linkStuff { false,
npm verb linkStuff { false,
npm verb linkStuff { false,
npm verb linkStuff '/Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml/node_modules/argparse@0.1.0
npm info linkStuff argparse@0.1.0
npm verb linkBins argparse@0.1.0
npm verb linkMans argparse@0.1.0
npm verb rebuildBundles argparse@0.1.0
npm verb rebuildBundles ['lodash', 'sprintf-js']
npm info install argparse@0.1.0
npm info postinstall argparse@0.1.0
npm verb about to build /Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml@0.1.0
npm info build /Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml@0.1.0
npm verb linkStuff { false,
npm info linkStuff js-yaml@0.2.7
npm verb linkBins [ {'js-yaml': 'bin/js-yaml.js' },
npm verb linkBins [ '/Users/pophamj/Development/Easy-Layouts-with-Flexbox/node_modules/bower/node_modules/update-notifier/node_modules/configstore/node_modules/js-yaml@0.2.7',
npm verb linkBins false ],
npm verb linkMans js-yaml@0.2.7
npm verb rebuildBundles js-yaml@0.2.7
npm verb rebuildBundles ['bin', 'argparse', 'esprima']
npm info install js-yaml@0.2.7
npm info postinstall js-yaml@0.2.7
```

Quiz Questions! (+1J Point)

3. What is the main alternative to declarative event mapping?



Imperative Event Mapping

```
<script>

Polymer('name-tag', {nameColor: 'red'});

var el = document.createElement('div');
el.innerHTML = '\
<polymer-element name="name-tag" attributes="name">\
<template>\
  Hello <span style="color:{{nameColor}}>{{name}}</span>\
</template>\
</polymer-element>';

// The custom elements polyfill can't see the <polymer-element>
// unless you put it in the DOM.
document.body.appendChild(el);

</script>

<name-tag name="John"></name-tag>
```

Quiz Questions! (+1J Point

4. Who Are the five best rappers in the world?





Dylan, Dylan, Dylan, Dylan Dylan

Install polymer

(bower is installed with NPM)

bower also makes a bower.json file which contains version info, and dependencies





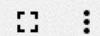
Topics

Favorites

Item



core-submenu



PROPERTIES STYLES

layout reverse align



justify wrap flex



bg color border



opacity padding margin

...

PALETTE TREE

Components



Core



Demo



Paper



Button

Calculator

Checkbox

Floating Action Button

Install designer (lab)

<https://github.com/PolymerLabs/designer.git>

in the root of the project run
and load it up in a local server



Fire it up

\$ npm install -g serve

//

localhost:3000

//localhost:8000



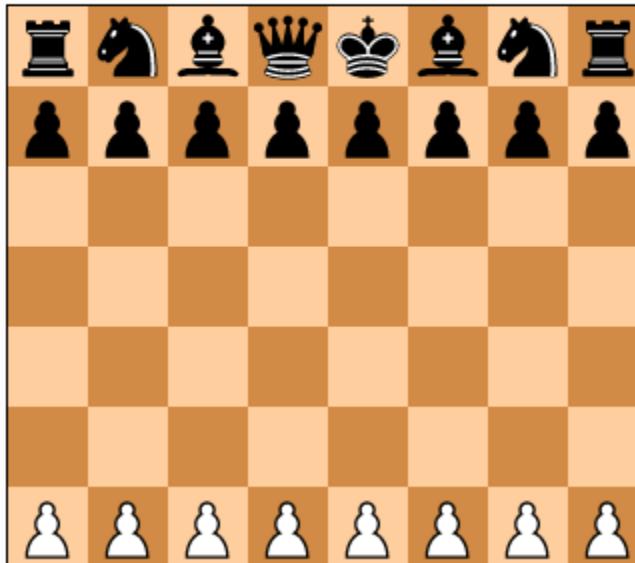
Alternatively (easy mode)

<http://www.polymer-project.org/tools/designer/>



Component.Kitchen

```
<chess-board>
    rnbqkbnr/pppppppp/8/8/8/8/PPPPPPP/RNBQKBNR w KQkq - 0 1
</chess-board>
```



customelements.io



Custom Elements

a web components gallery for modern web apps



Notable Polymer stuff

Core-AJAX

- Capable of performing XHR requests based on changes in url parameters.
- Params are double quoted JSON

Core-XHR

- Web browser scripting language API
- Receives JSON, HTML, etc.



Notable Polymer stuff

- Flexbox!

```
<div horizontal center-justified layout>  
  <div>center-justified</div>  
</div>
```



Other stuff to check out

 polymer



Other Stuff to check out



Materials Design

Create a visual language that synthesizes classic principles of good design with the innovation and possibility of technology and science.

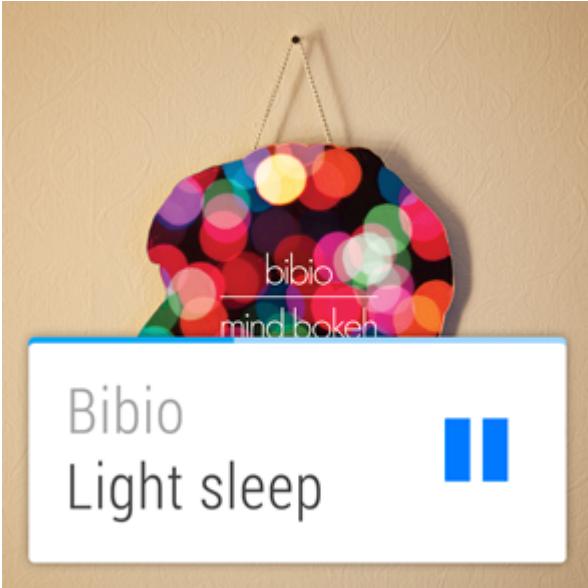
- Everything is a physical object
- Everything is rendered in 3D
- It's awesome



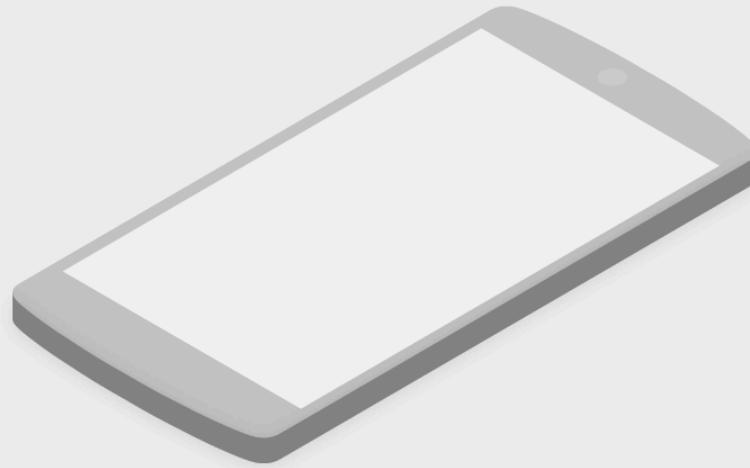
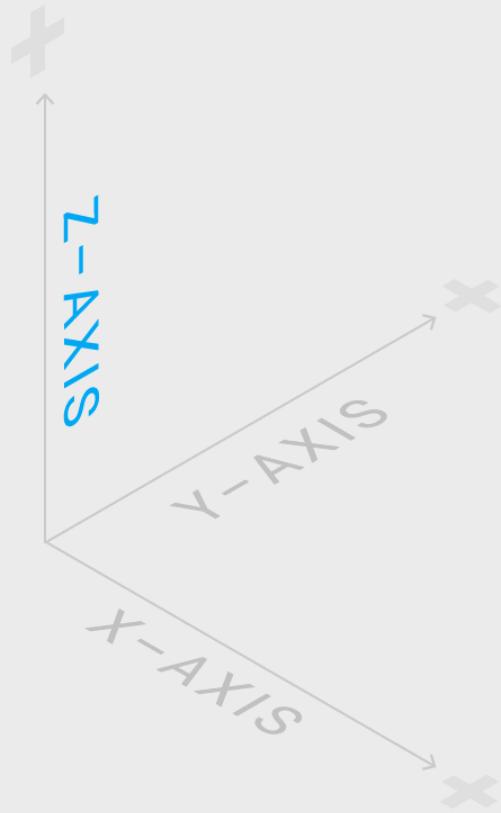
Material Design Status

- The design language of Android-L
- Already built into Polymer





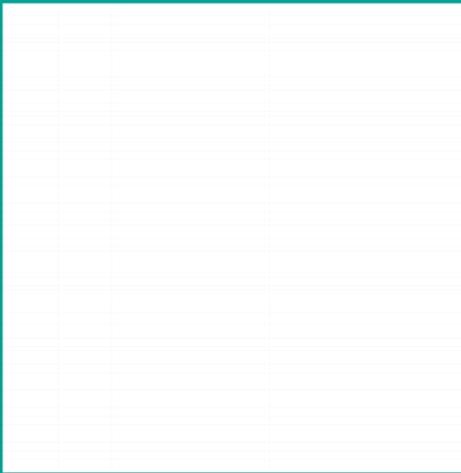
Design principles are based on how the user interacts with the device
(based on several different elements of user input)



Material is the metaphor

A material metaphor is the unifying theory of a rationalized space and a system of motion. Our material is grounded in tactile reality, inspired by our study of paper and ink, yet open to imagination and magic.

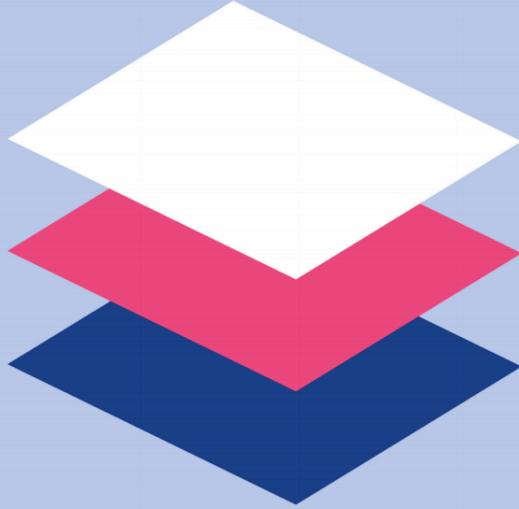
1



Surfaces are intuitive
and natural

Surfaces and edges provide visual cues that are grounded in our experience of reality. The use of familiar tactile attributes speaks to primal parts of our brains and helps us quickly understand affordances.

2



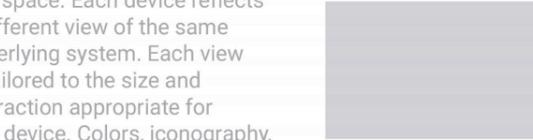
Dimensionality affords interaction

The fundamentals of light, surface, and movement are key to conveying how objects interact. Realistic lighting shows seams, divides space, and indicates moving parts.

3

One adaptive design

A single underlying design system organizes interactions and space. Each device reflects a different view of the same underlying system. Each view is tailored to the size and interaction appropriate for that device. Colors, iconography, hierarchy, and spatial relationships remain constant.



4

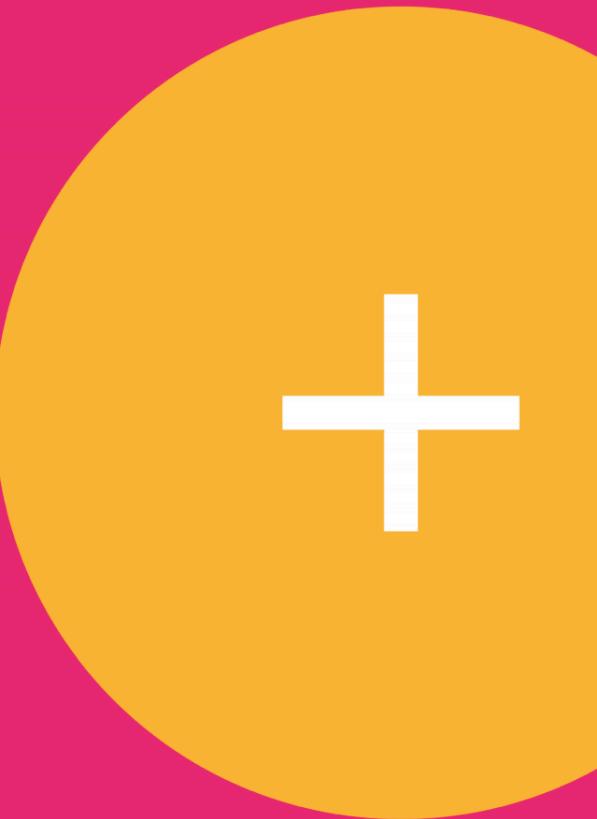


Content is bold, graphic,
and intentional

Bold design creates hierarchy,
meaning, and focus. Deliberate
color choices, edge-to-edge
imagery, large-scale typography,
and intentional white space
create immersion and clarity.



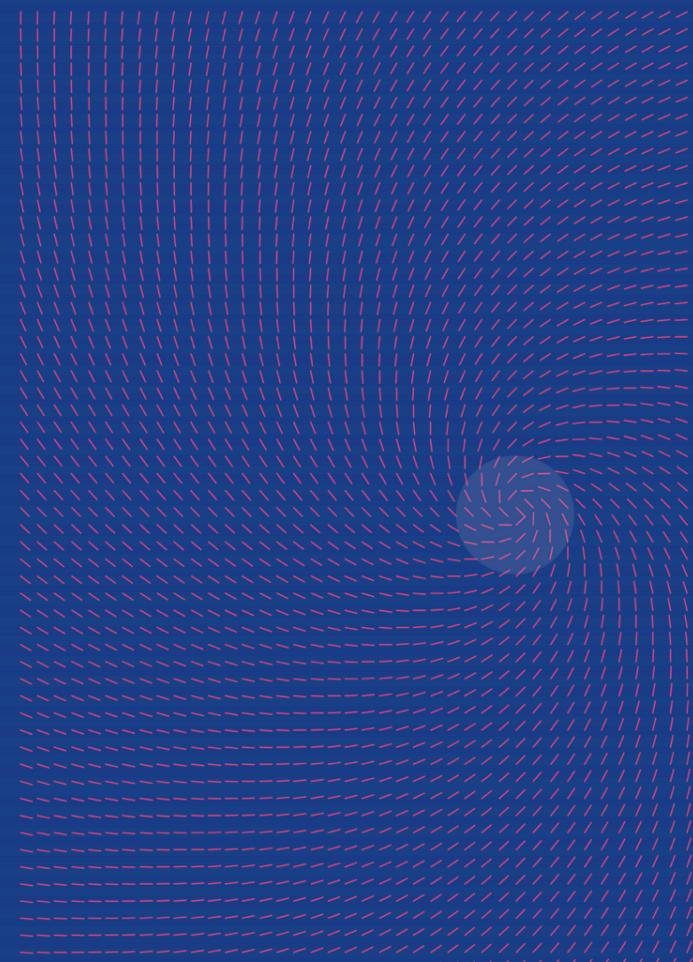
Bc 5



6

Color, surface, and iconography emphasize actions

User action is the essence of experience design. The primary actions are inflection points that transform the whole design. Their emphasis makes core functionality immediately apparent and provides waypoints for the user.



7 User-initiated Change

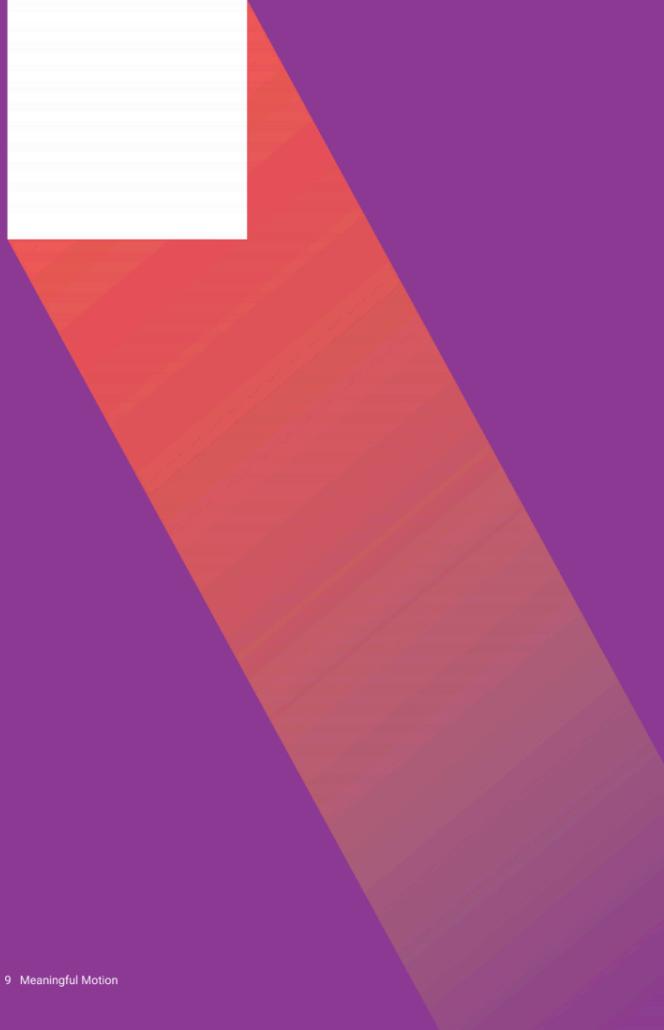
Users initiate change

Changes in the interface derive their energy from user actions. Motion that cascades from touch respects and reinforces the user as the prime mover.



Animation is choreographed
on a shared stage

All action takes place in a single environment. Objects are presented to the user without breaking the continuity of experience even as they transform and reorganize.



Motion provides meaning

Motion is meaningful and appropriate, serving to focus attention and maintain continuity. Feedback is subtle yet clear. Transitions are efficient yet coherent.

9

Topeka!

<https://polymer-topeka.appspot.com/>



Take Home

‘Web Components allow you to create custom HTML elements.

Polymer is just an opinionated way to work with Web Components.’

-Rob Dodson



</polymer-project>

// Google Developer Group Atlanta+Jonathan Popham

GDG Atlanta

- <http://www.meetup.com/gdg-atlanta/>



Questions?

bonus slide

polymer is not xml schema

- - "*jQuery : DOM :: X-Tag/Polymer : Web Components.*"
[// x-tag.org/blog](http://x-tag.org/blog)



bonus slide

Words to Know:

- Shadow Hosts
- Shadow Trees
- Shadow Roots
- Elder/Younger nomenclature
- Insertion Points
- Event Retargeting
- POOL population algorithm



Polymer Layer

