

Building real-time elements with Polymer and Firebase

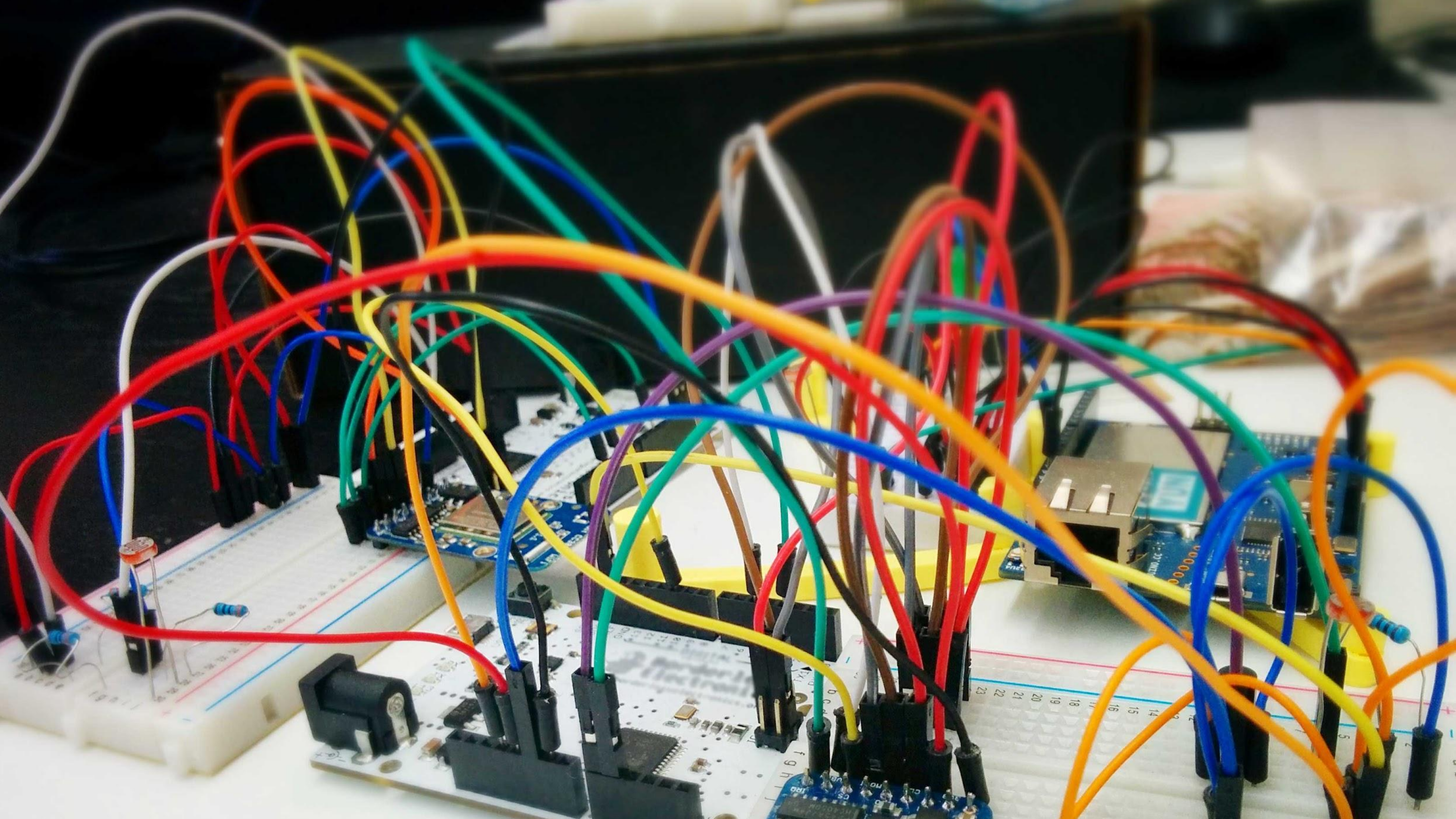


+Justin Ribeiro
@justinribeiro





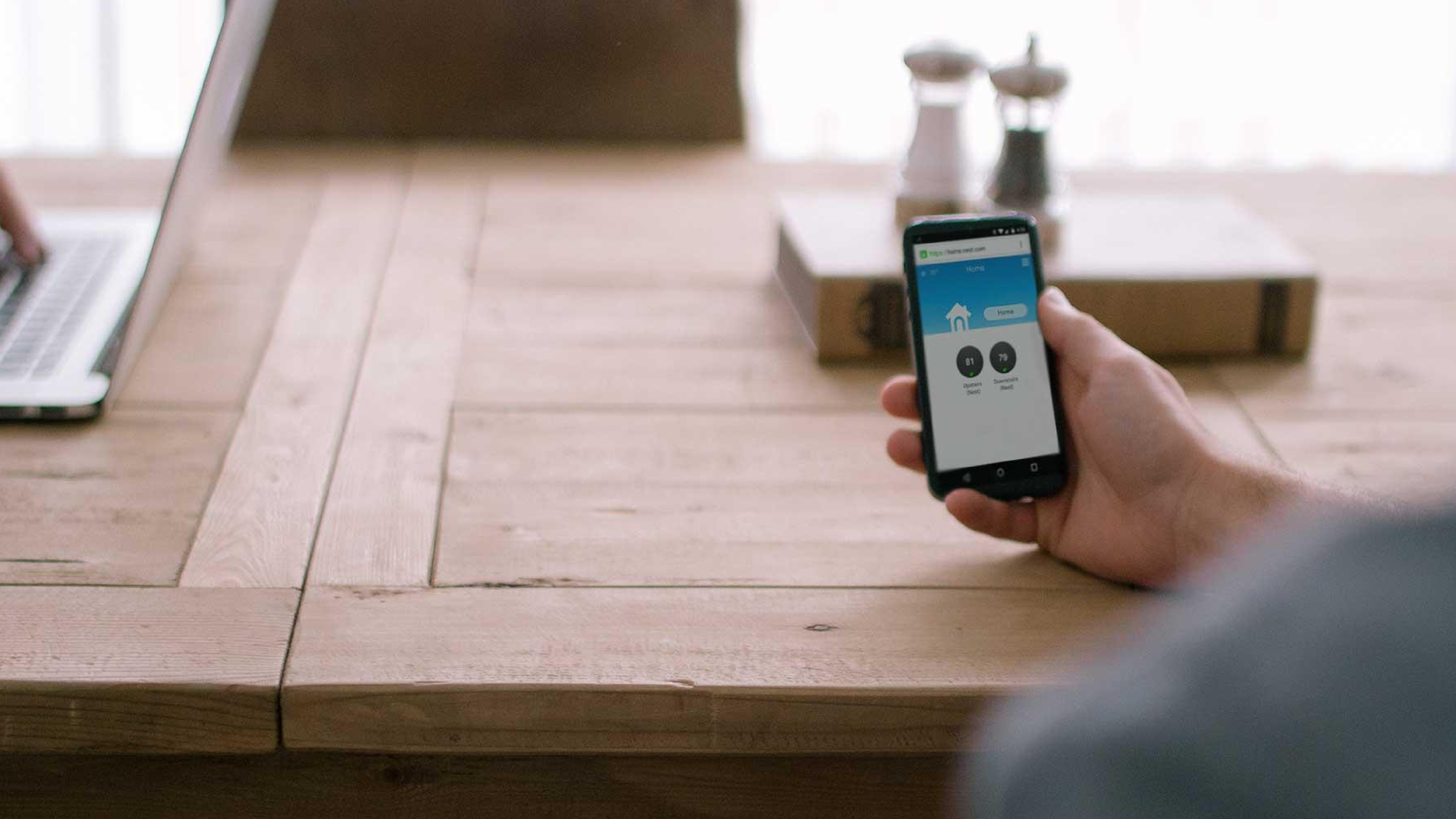
CC0 - Caleb George





Our users don't see this world.

On the bench / Justin Ribeiro



FIREBASE + POLYMER

*CCO - Jonathan Velasquez.
Modified by Justin Ribeiro.*

Firestore for our data

Our data becomes our backend

Scalability without having to deal with servers. Libraries that are quick and easy to wire. Fast real-time data without the configuration.

Polymer for our UI

Composable, reusable, built on standards

Data binding, property observation and a host of other features allow us to build real-time elements with ease.

python-gateway python snmp-bridge.py
{u'name': u'-Jnhn9L9pXw4A_uxyB8v'}
{u'name': u'-Jnhn9eBxFwqiftwsArb'}
{u'name': u'-Jnhn9y-bu9c0gjQd7Ca'}
{u'name': u'-JnhnAGrI6aaE3dfx16F'}
{u'name': u'-JnhnA_i4-8mtQkXmCv'}
{u'name': u'-JnhnAtNv6f24NQs168r'}
{u'name': u'-JnhnBCKHcuCpUy_qpvV'}
{u'name': u'-JnhnBW7Y_TeA1Gn0GUt'}
{u'name': u'-JnhnBopN9NRrH2N0_YY'}
{u'name': u'-JnhnC7kclP3EtHkNhdV'}
{u'name': u'-JnhnCRZHM9H3S3qtwuV'}
{u'name': u'-JnhnCzw36s2zqjEK9xg'}
{u'name': u'-JnhnDIvaxI1ilzz7rTn'}
{u'name': u'-JnhnDbzJOIQy6R4pVHM'}
{u'name': u'-JnhnEAHcx2kb1DHmGBL'}
{u'name': u'-JnhnETtRmcI_alnLBjf'}
{u'name': u'-JnhnEmifsd15JY08ooz'}
{u'name': u'-JnhnF5x-huLt0BtB9Qz'}
{u'name': u'-JnhnFQIewTmXcsLicAS'}
{u'name': u'-JnhnFivpBr5UDZMAV1_'}
{u'name': u'-JnhnG1SU0xnU1yESfBs'}
{u'name': u'-JnhnGLKvq-x548vudaF'}
{u'name': u'-JnhnGe4j4VEay8tRfcb'}
{u'name': u'-JnhnGxkayJCucfw5Fsg'}
{u'name': u'-JnhnHGao01V-wIzHFub'}
{u'name': u'-JnhnH_K_rlwF93P5wUl'}
{u'name': u'-JnhnHtCeE8PtpOd4tgg'}
{u'name': u'-JnhnIBvYR37SFv1BuPj'}
{u'name': u'-JnhnIVQl9c28Cvf-_aB'}
{u'name': u'-JnhnIoKsIHSWFtNrVDY'}
{u'name': u'-JnhnJ7JQAIQUjB2mUk0'}
{u'name': u'-JnhnJR1_37IkbPMix9e'}
{u'name': u'-JnhnJjkr_4gJQD2Xz3B'}
{u'name': u'-JnhnK2mAN_-rYV6e8K'}
{u'name': u'-JnhnKMeiCBxFhxHn5W8'}
{u'name': u'-JnhnKfTxihWOKJvKbrn'}
{u'name': u'-JnhnKz_Fs7shxR598KT'}

localhost:50002/demo.html x

localhost:50002/demo.html

Out In

381.66
KB/s

11.9
MB/s

<!DOCTYPE html>
<html lang="en">
 <head>...</head>
 <body>
 <bandwidth-gauge id="out" name="Out" scale="3">...</bandwidth-gauge>
 <bandwidth-gauge id="in" name="In" scale="20">...</bandwidth-gauge>
 <script src="https://cdn.firebase.com/js/client/2.2.4/firebase.js"></script>
 <script>...</script>
 </body>
</html>

Forge: Firebase Graphical D x

https://wan-traffic-logger.firebaseio.com

Dashboard VIEWING WAN-TRAFFIC-LOGGER Account Settings

Data

Security & Rules

Simulator

Analytics

Expand Data Collapse Data

Import Data Export Data

WAN-TRAFFIC-LOGGER

wan-traffic-logger

em4

~Jnhn9L9pXw4A_uxyB8v

calc

calc_bits_iflnOctets

Legend

Changed

Added

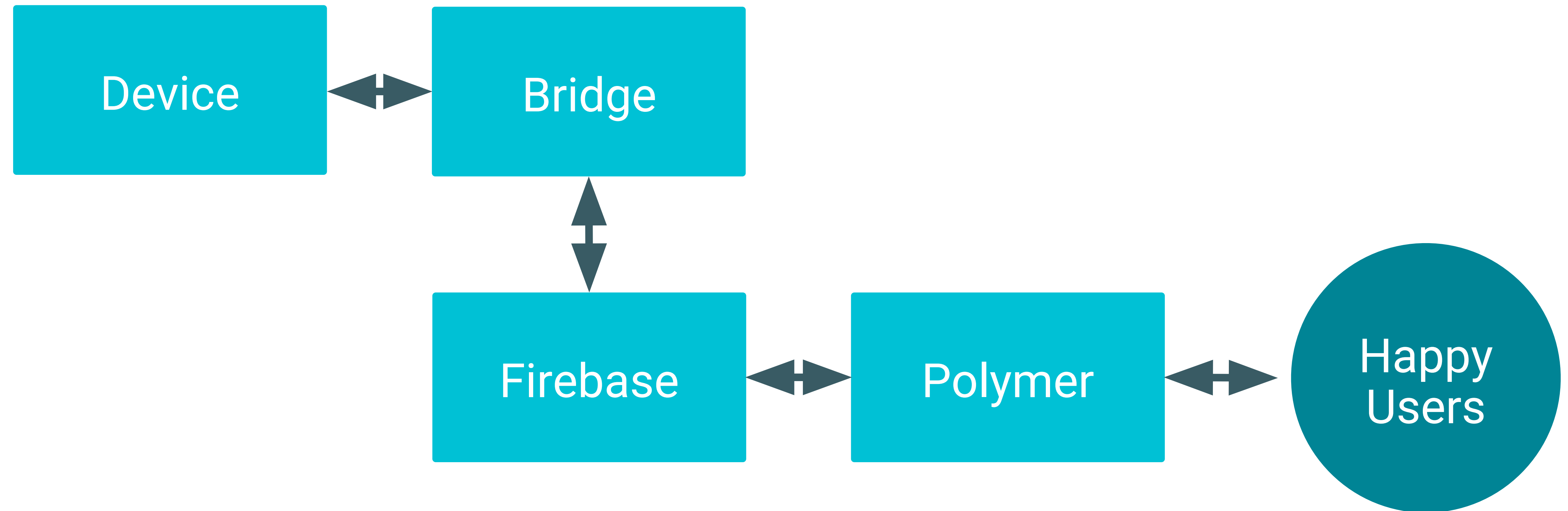
Deleted

Moved

What we are building today

Justin Ribeiro

From device to user: looking at the flow





Bridging apis and transports to Firebase

CC0 - Matthew Wiebe



wan-snmp-to-firebase.py

```
firebaseConnection = firebase.FirebaseApplication(_FIREBASE_ENDPOINT, None)
load("IF-MIB")
m = M(_WAN_HOST, _WAN_COMMUNITY, _WAN_SNMP_VERSION)

# ... collect data from SNMP
result = {
    'raw': {
        'ifOutOctets': m.ifOutOctets[_WAN_ADAPTER],
        'ifInOctets': m.ifInOctets[_WAN_ADAPTER],
        'timestamp': holder_timestamp
    }
}

firebaseResult = firebaseConnection.post('/em4', result)
```



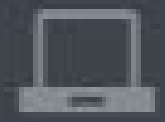
[Source: github.com/justinribeiro/wan-snmp-to-firebase-bridge](https://github.com/justinribeiro/wan-snmp-to-firebase-bridge)



Data



Security & Rules



Simulator



Analytics



Login & Auth

+ Expand Data

- Collapse Data

Import Data

Export Data

WAN-TRAFFIC-LOGGER

EM5

em5



~Jpy3diGy7nh--lxm2t3

Legend

- Changed
- Added
- Deleted
- Moved

Bridges can help guide data to where it needs to be.



Developer Tools - https://mail.google.com/mail/u/0/?pli=1

Q

Elements

Network

Sources

Timeline

Profiles

Resources

Audits

Console

PageSpeed

<div class="J-M agd aY0" style="display: none;"></div>

<div class="J-M agd aY0 jQjAxd aX1" style="-webkit-user-select: none; left: 520px; top: 98px; display: none;" role="menu" aria-haspopup="true">

<div class="SK AX" style="-webkit-user-select: none;">...</div>

</div>

<div class="J-M aX0 aY0 jQjAxd" role="menu" aria-haspopup="true" style="-webkit-user-select: none; left: 378px; top: 98px; display: none;">

<div class="SK AX" style="-webkit-user-select: none; min-width: 64px;">...</div>

</div>

<div class="T-ays T-ays-avH" role="tooltip" style="left: 192px; top: 99px;">

<div class="T-ays-W095bf">Back to Inbox</div>

<div class="T-ays-hFsbo T-ays-atG" style="left: 47px;">...</div>

</div>

<div style="display: none;">

<iframe frameborder="0" hspace="0" marginheight="0" marginwidth="0" scrolling="no" style tabindex="0" vspace="0" width="100%" allowtransparency="true" id="I4_1431028730991" name="I4_1431028730991" src="https://plus.google.com/u/0/_/streamwidgets/notificationdetail?orig...nderstart&id=I4_1431028730991&parent=https%3A%2F%2Fmail.google.com&pfname=">

...</iframe>

</div>

<div class="Kj-JD-Jh" style="display: none; opacity: 0.5;"></div>

<div class="Kj-JD" tabindex="0" role="alertdialog" aria-labelledby=":1ia" style="display: none; left: 692px; top: 490px;">

<div class="Kj-JD-K7 Kj-JD-K7-GIHV4">...</div>

<div class="Kj-JD-Jz"></div>

<div class="Kj-JD-Jl">...</div>

</div>

<div style="display:none" class="aC7">...</div>

<div style="display:none" class="aC7 aWP">...</div>

<div class="aLF-aPX aLF-aPX-a3n aLF-aPX-aLK-aPD-JE" aria-label="Showing viewer." role="dialog" tabindex="0" style="opacity: 0; display: none;" aria-hidden="true">...</div>

<iframe id="apiproxy305150d4c54ff66c384aab4ea37eeda5b961db560.06512346840463579" name="apiproxy305150d4c54ff66c384aab4ea37eeda5b961db560.06512346840463579" src="https://content.googleapis.com/static/proxy.html?jsh=m%3B%2F_%2Fscs%2F...HBUY7VliRmZQAcQnGg#parent=https%3A%2F%2Fmail.google.com&rpctoken=303616994" tabindex="-1" style="width: 1px; height: 1px; position: absolute; top: -100px;">...</iframe>

<div aria-live="polite" aria-atomic="true" style="position: absolute; top: -1000px; height: 1px; overflow: hidden;">Displaying screen divs individual.zip.</div>

<iframe src="?ui=2&ik=339d215e71&view=att&th=14d302a687f122e5&attid=0.1&disp=safe&realattid=f_i9enm0280&zw" style="display: none;">...</iframe>

<div style="display:none" class="aC7">

<div class="aC8">...</div>

</div>

<div style="display:none" class="aC7 aWP">

<div class="aC8">...</div>

</div>

<div style="display:none" class="aC7">

<div class="aC8">...</div>

</div>

<div style="display:none" class="aC7 aWP">

<script type="text/javascript" src="//www-gm-opensocial.googleusercontent.com/gadgets/js/rpc.js?container=gm&nocache=0&debug=0&c=1&v=d30b8b5668c233bafcf12346b6771e3e&sv=10" gapi_processed="true"></script>

<div style="display:none" class="aC7">

<div class="aC8">...</div>

</div>

<div style="display:none" class="aC7 aWP">...</div>

<div style="display:none" class="aC7">...</div>

<div style="display:none" class="aC7 aWP">

<div class="aC8">...</div>

</div>

<div style="display:none" class="aC7">...</div>

<div style="display:none" class="aC7 aWP">...</div>

Styles

Computed

Event Listeners

>>

element.style {

display: none;

}

.aC7 {

border-spacing: 6px;

font-size: 40px;

position: absolute;

text-align: center;

}

div {

display: block;

}

Inherited from body.aAU

body, td, input, textarea, select {

margin: 0;

font-family: arial,sans-serif;

}

body, td, input, textarea, select {

font-family: arial,sans-serif;

}

position

margin

border

padding

auto x auto



POLYMER

my-dashboard.html

```
<html lang="en">
  <head>
    <title>My Dashboard</title>
    <script
      src="bower_components/webcomponentsjs/webcomponents-lite.js"></script>
    <link rel="import" href="bandwidth-gauge.html">
  </head>
  <body>
    <bandwidth-gauge id="out" name="Out" scale="3"></bandwidth-gauge>
    <bandwidth-gauge id="in" name="In" scale="20"></bandwidth-gauge>
  </body>
</html>
```


bandwidth-gauge.html

```
<link rel="import" href="../polymer/polymer.html">
<dom-module id="bandwidth-gauge">
  <template>
    <style>
      /* our scoped CSS via Shadow DOM styling rules */
    </style>
    <div id="name">{{name}}</div>
    <div id="chart"></div>
    <div id="reading">
      <span>{{bandwidth.speed}}</span>
      <span>{{bandwidth.unit}}</span>
    </div>
  </template>
</dom-module>
```

Source: github.com/justinribeiro/bandwidth-gauge

bandwidth-gauge.html

```
<script>
```

```
Polymer({  
  is: 'bandwidth-gauge',  
  properties: {  
    name: {  
      type: String,  
      value: "Gage"  
    },  
    bandwidth: {  
      type: Object  
    },  
    scale: {  
      type: Number  
    }  
  } ...
```

Source: github.com/justinribeiro/bandwidth-gauge

bandwidth-gauge.html

```
<script>
  Polymer({
    ...
    observers: [
      'updateChart(bandwidth)'
    ],
    updateChart: function() {
      // Create our rotating gauge
      // Fired by our observation of bandwidth property
    }
  });
</script>
```


my-dashboard.html

```
<bandwidth-gauge id="out" name="Out" scale="3"></bandwidth-gauge>
<bandwidth-gauge id="in" name="In" scale="20"></bandwidth-gauge>
<script>
  document.addEventListener('WebComponentsReady', function() {
    document.getElementById("out").bandwidth = {
      'speed': 100.01,
      'unit': 'KB/s'
    };
    document.getElementById("in").bandwidth = {
      'speed': 10.01,
      'unit': 'MB/s'
    };
  });
</script>
```

Source: github.com/justinribeiro/bandwidth-gauge


```
<bandwidth-gauge id="out" name="Out" scale="3"></bandwidth-gauge>
<bandwidth-gauge id="in" name="In" scale="20"></bandwidth-gauge>
<script>
  document.addEventListener('WebComponentsReady', function() {
    var firebaseRef = new Firebase("https://my_endpoint.firebaseio.com/");
    var em4Child = firebaseRef.child("em4");
    em4Child.limitToLast(1).on('child_added', function(snapshot) {
      var rawData = snapshot.val();
      document.getElementById("out").bandwidth =
        rawData.calc.calc_bytes_ifOutOctets;
      document.getElementById("in").bandwidth =
        rawData.calc.calc_bytes_ifInOctets;
    });
  });
</script>
```



```
<template is="dom-bind">
```

```
  <firebase-collection
```

```
    limit-to-last="1"
```

```
    location="https://wan-traffic-logger.firebaseio.com/em4"
```

```
    data="{{em4}}"></firebase-collection>
```

```
<template is="dom-repeat" items="[[em4]]" as="device">
```

```
  <bandwidth-gauge name="Out" scale="3"
```

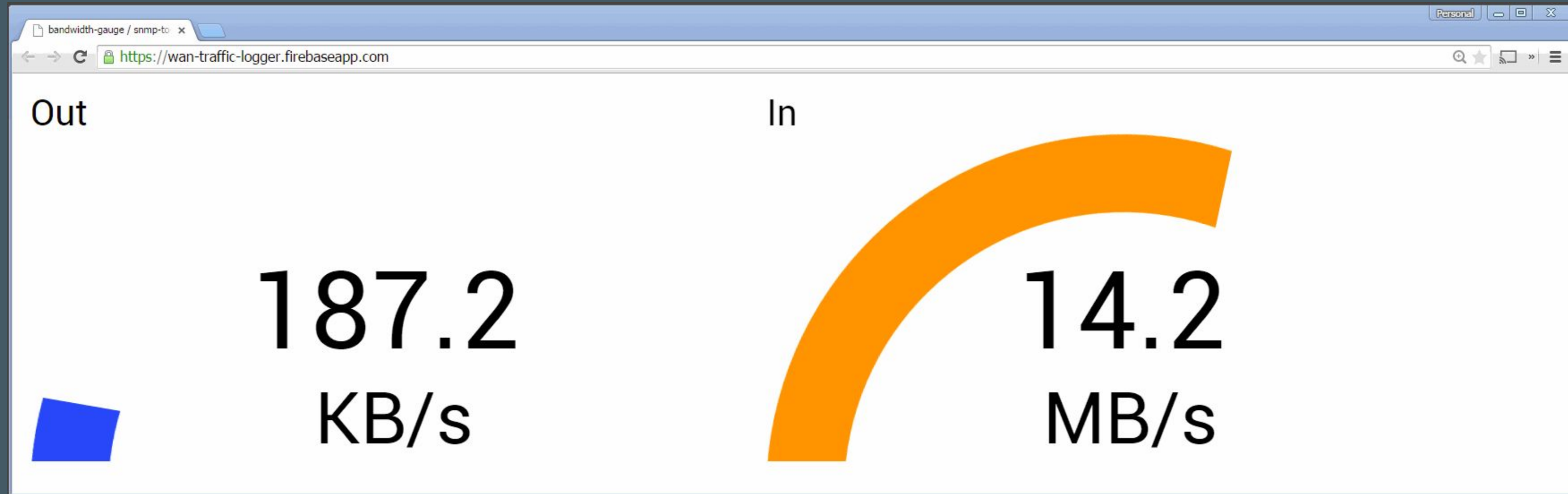
```
    bandwidth="[[device.calc.calc_bytes_ifOutOctets]]"></bandwidth-gauge>
```

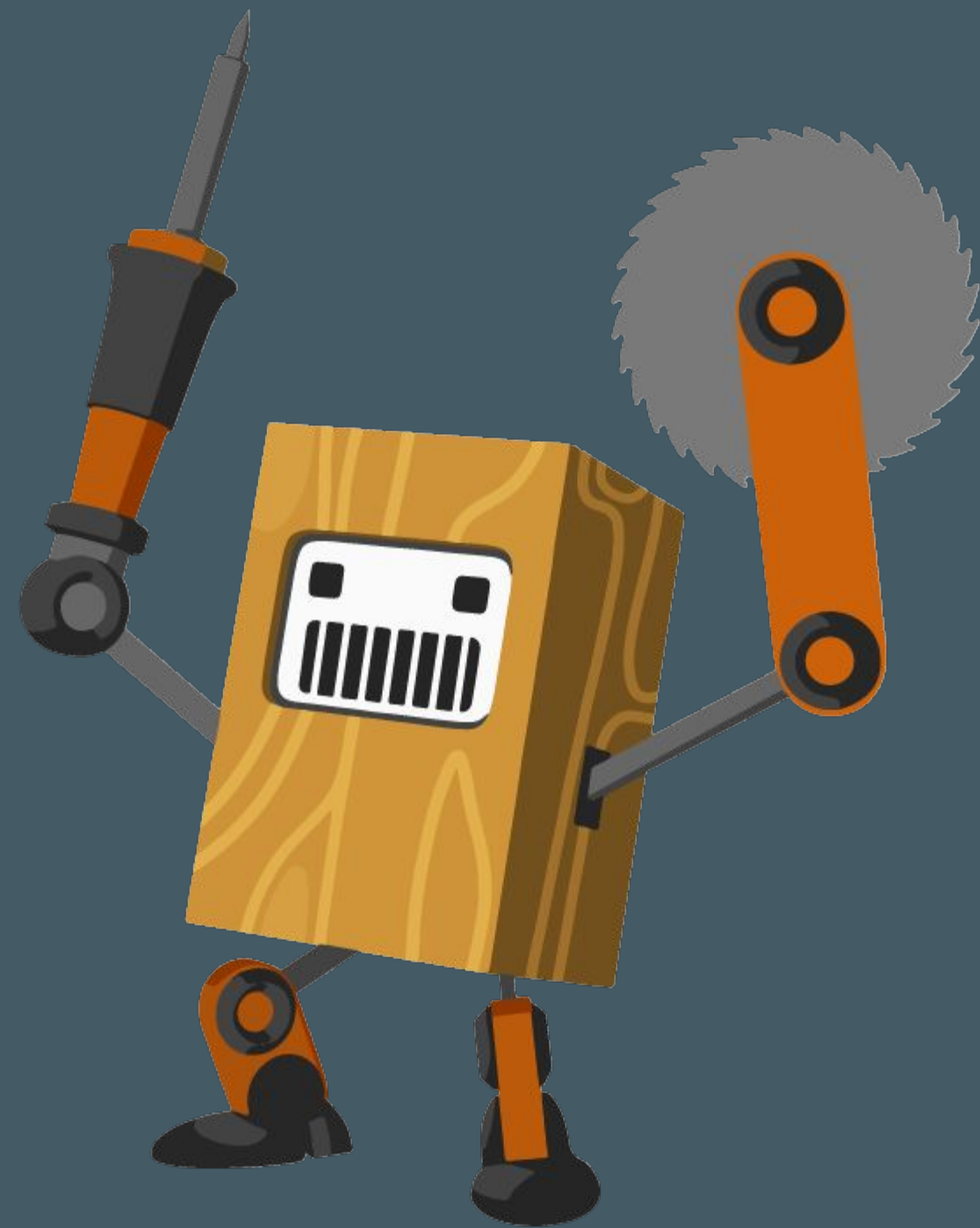
```
  <bandwidth-gauge name="In" scale="20"
```

```
    bandwidth="[[device.calc.calc_bytes_ifInOctets]]"></bandwidth-gauge>
```

```
</template>
```

```
</template>
```

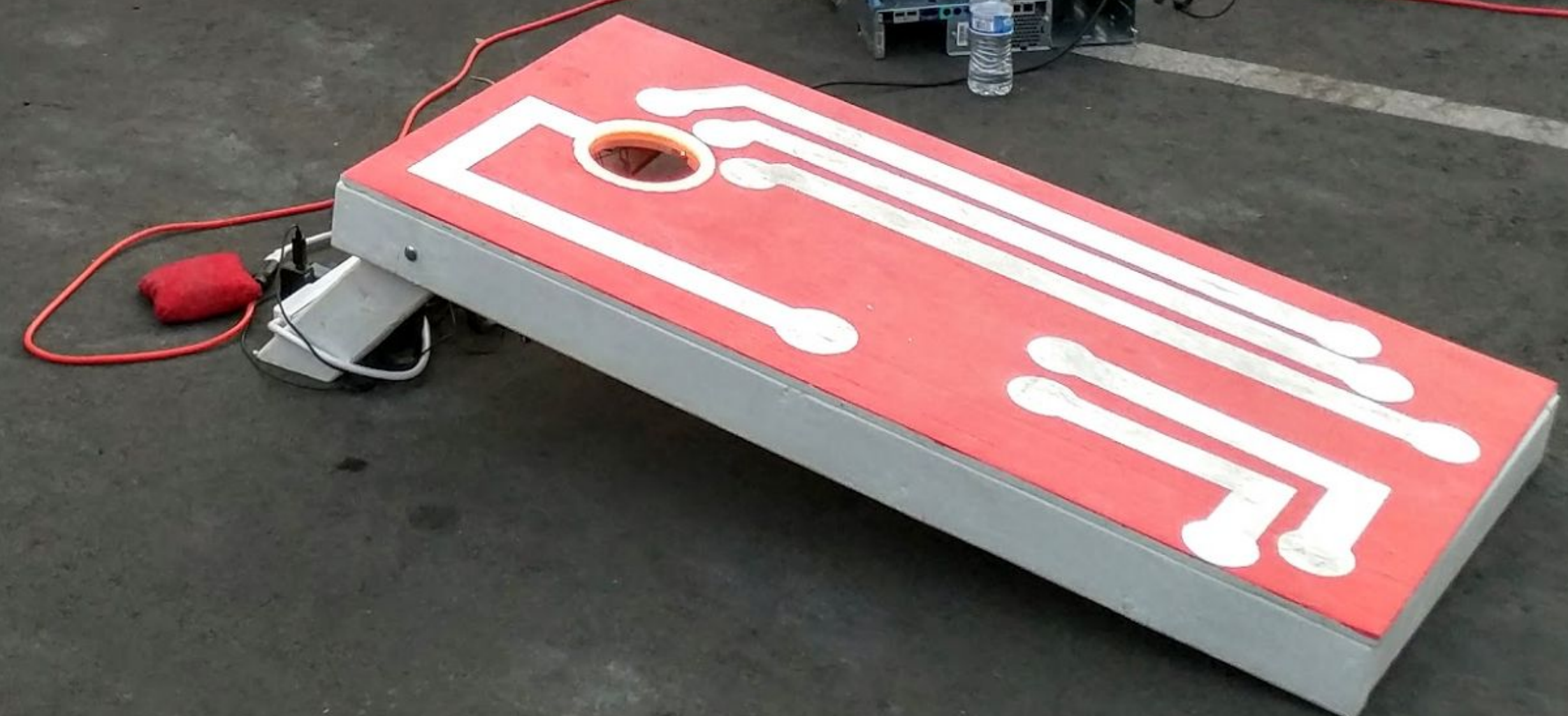


Plywood Connected

<https://plywoodconnected.github.io/#!/cornhole>



NO PARKING
PRIVATE
PROPERTY
UNAUTHORIZED
VEHICLES WILL BE
TOWED AT OWNERS RISK
315 F ST.




```
<dom-module id="cornhole-game">
  <template>
    <firebase-collection
      location="{{target}}"
      data="{{games}}"
      on-firebase-child-added="_childAdded"
      on-firebase-child-changed="_childChanged">
    </firebase-collection>

    <div class="flex layout horizontal center center-justified">
      <template is="dom-repeat" items="[[games]]" as="game">
        <cornhole-team id="red" team="RED Team" score="[[game.teams.red.score]]"
          color="red"></cornhole-team>
        <cornhole-team id="blue" team="BLU Team" score="[[game.teams.blue.score]]"
          color="blue"></cornhole-team>
      </template>
    </div>
  </template>
</dom-module>
```

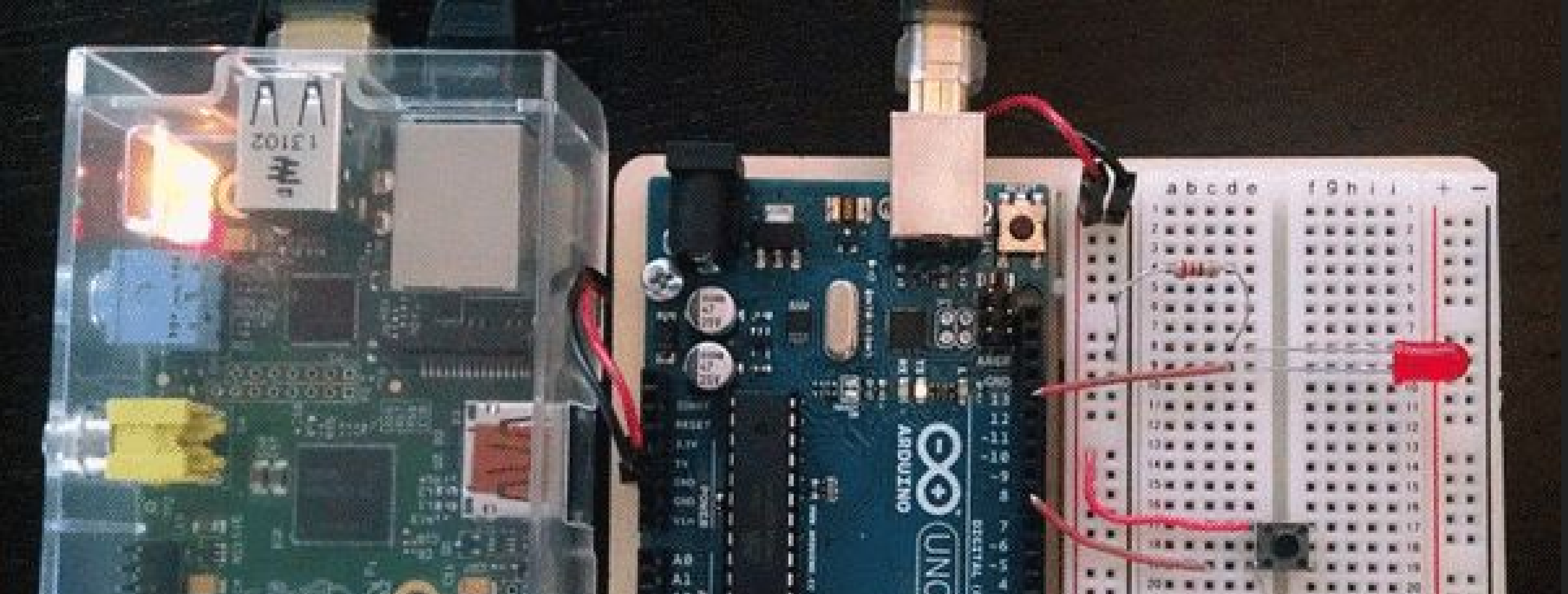
Source: github.com/PlywoodConnected/cornhole-next-polymer


```
<script>
  (function() {
    Polymer({
      is: 'cornhole-game',
      ...
      _childChanged: function(event) {
        var score = event.detail.childSnapshot.val();
        if (!this.locked) {
          if (JustinChoppedTheLogicForTheSlide) {
            this.$$('#red').gooaaal();
          } else if (this.score.teams.blue.score !== score.teams.blue.score
&&
          ...
            this.score = score;
          }
        });
      })();
    })();
  })();

```

Source: github.com/PlywoodConnected/cornhole-next-polymer

</script>

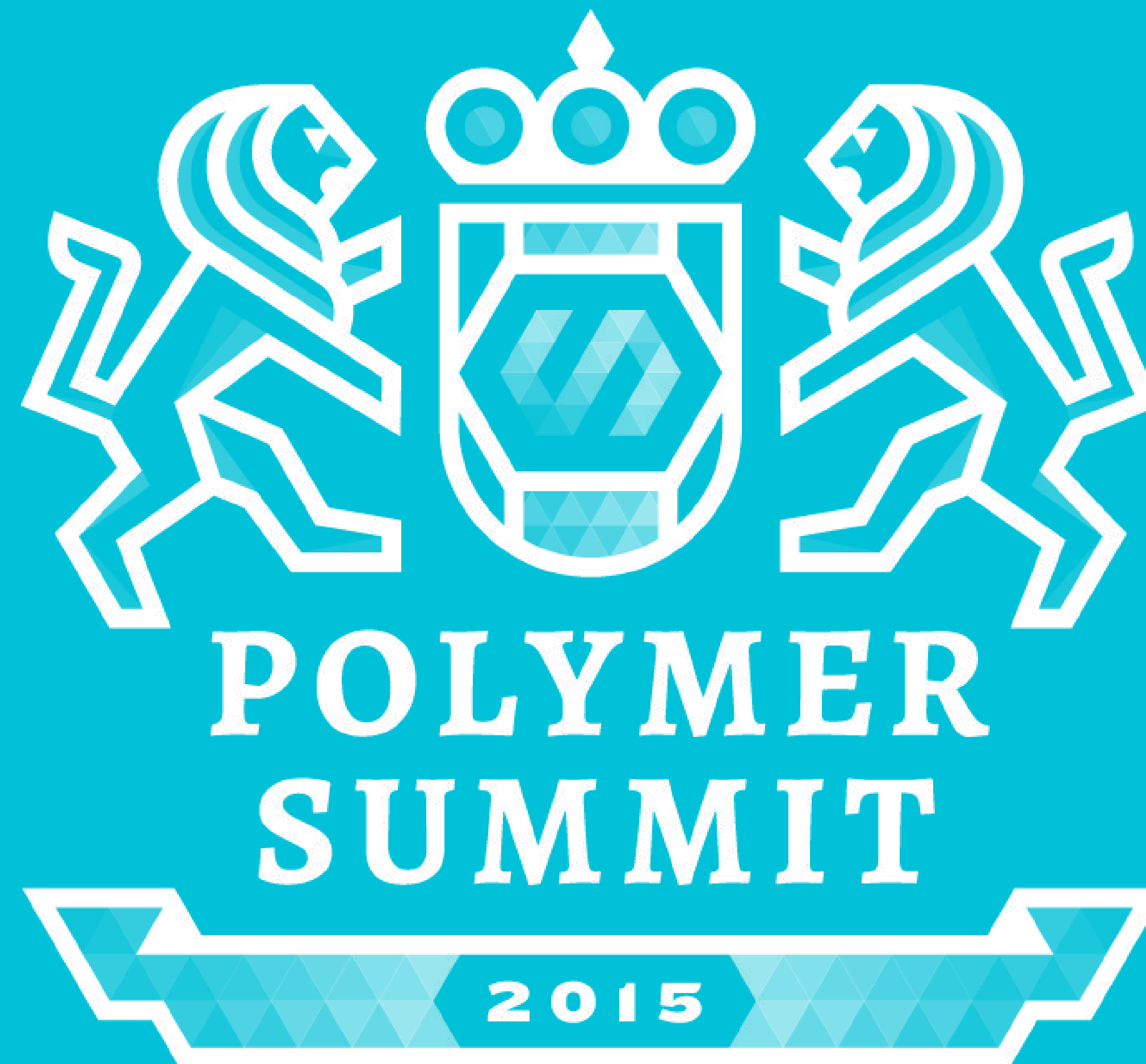


Firestore button all the things

<https://www.firebase.com/blog/2014-09-22-realtime-iot-dev-with-firebase.html>

Jenny Tong





<http://www.code-labs.io/polymer-summit>



<https://itshackademic.com/>

What's Next?

Polymer

polymer-project.org

Firebase

firebase.com

firebase-element documentation

elements.polymer-project.org/elements/firebase-element

bandwidth-gauge element sample code

github.com/justinribeiro/bandwidth-gauge

youtube.com/GoogleDevelopers

Thank You!



+Justin Ribeiro
@justinribeiro

#devfest #polymer #firebase #iot



developers.google.com/experts