



chrome



CAMPUS SEOUL

# Musicking on the Web

Workshop Day 2 / Lecture 4

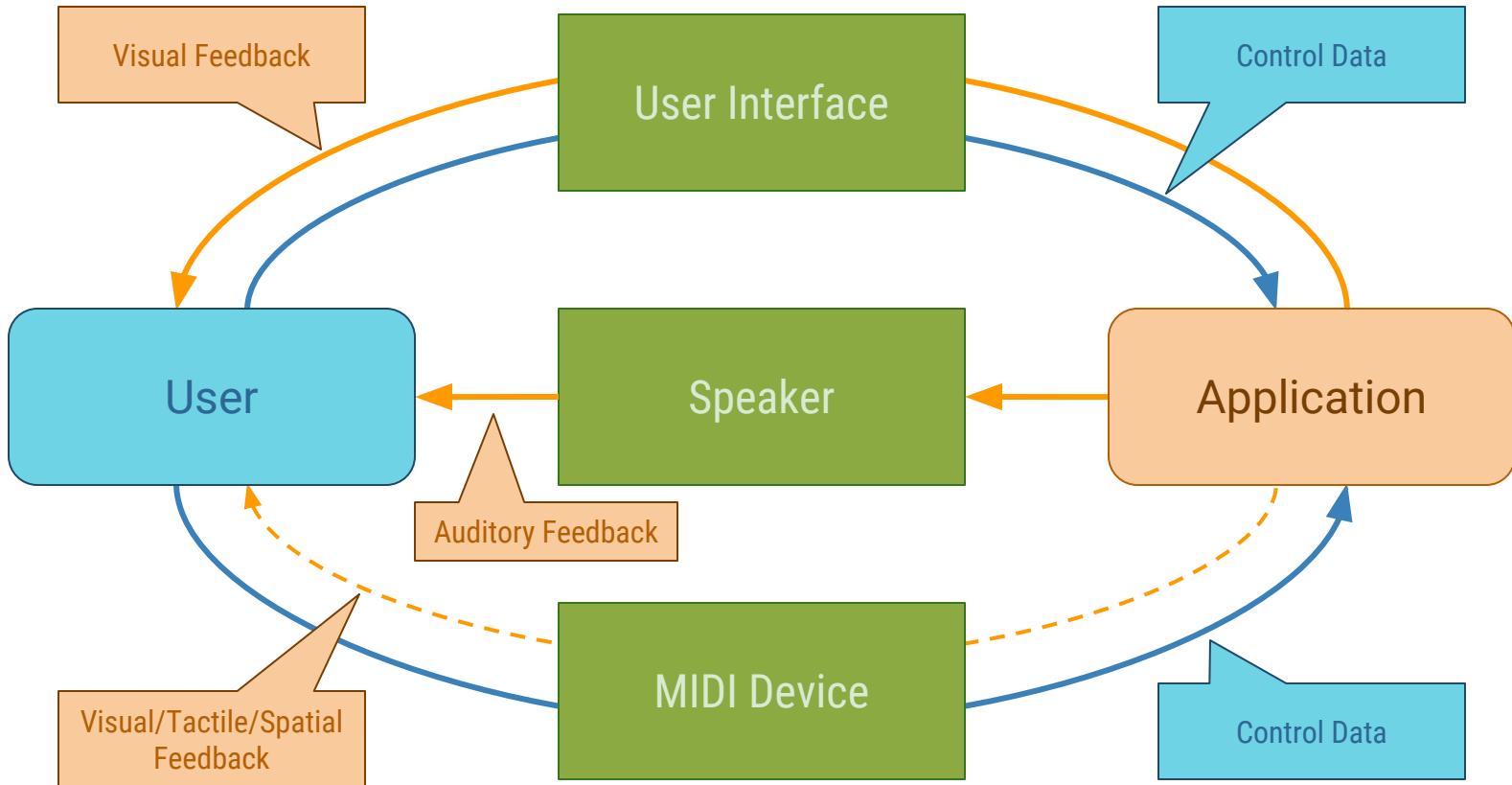


# Hongchan Choi

Software Engineer, Google Chrome  
Web Audio API + Music Apps

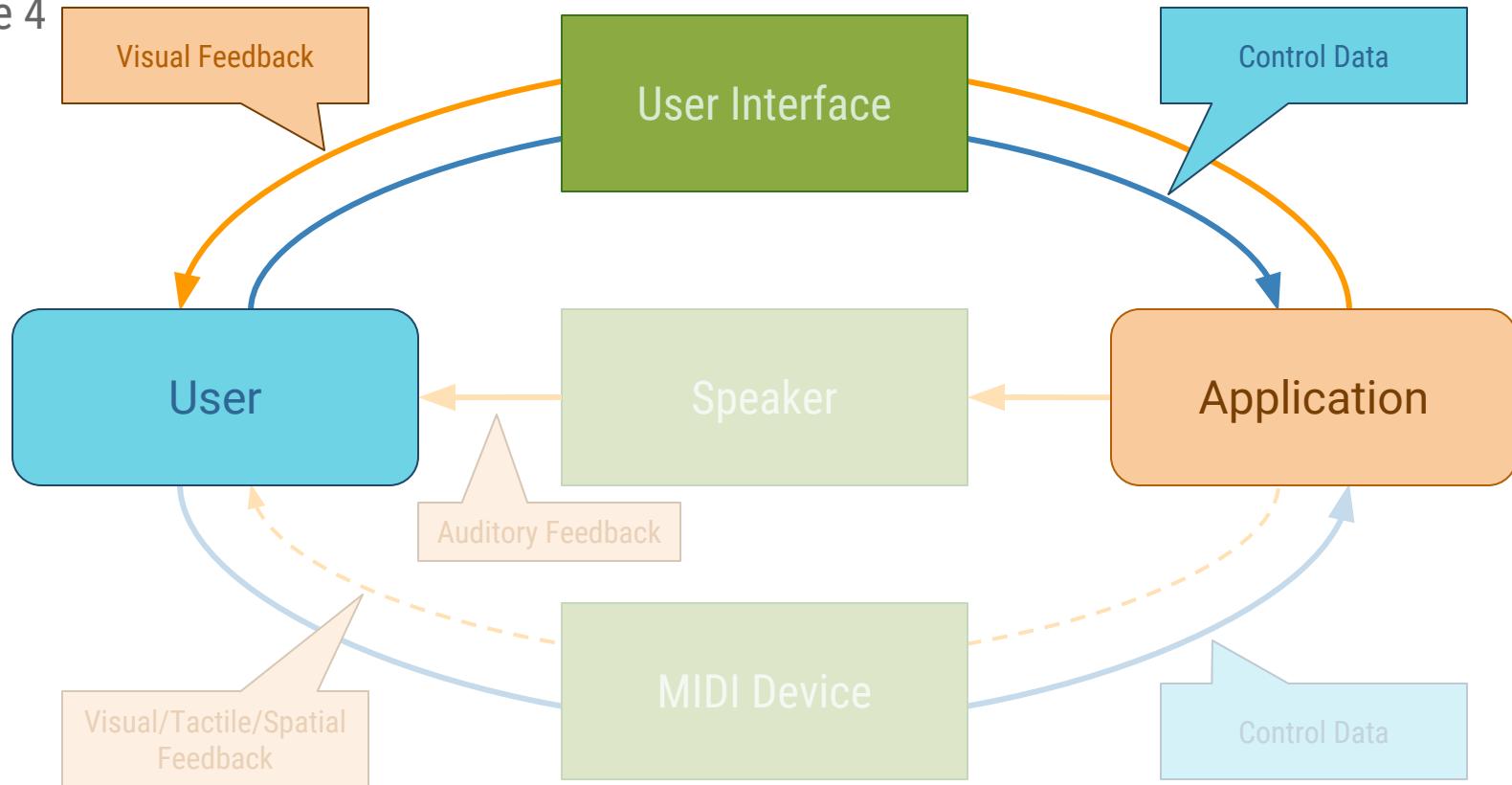


[hoch.io](https://hoch.io)



# Day 2:

## Lecture 4



# User Interface

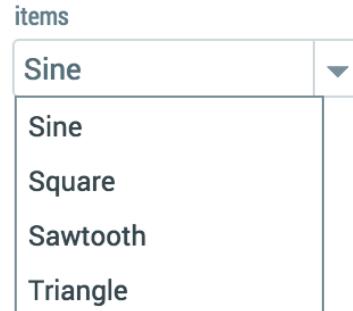
for music apps

# Musical UI: Why is it different?

- ❑ Highly responsive
  - ❑ Jank is not acceptable in most cases.
- ❑ Intuitive yet informative
  - ❑ Some are mathematically involved. (i.e. spectrogram)
- ❑ Multiple parameters
  - ❑ Parameters are the most important factor of the UI/UX design.
- ❑ Large data
  - ❑ Should visualize the large amount of data efficiently. (anti-aliasing, sampling)

# Choose the Right Tool

- ❑ Non-graphic DOM elements
  - ❑ Suitable for text-oriented data model. (i.e. Label and data values)



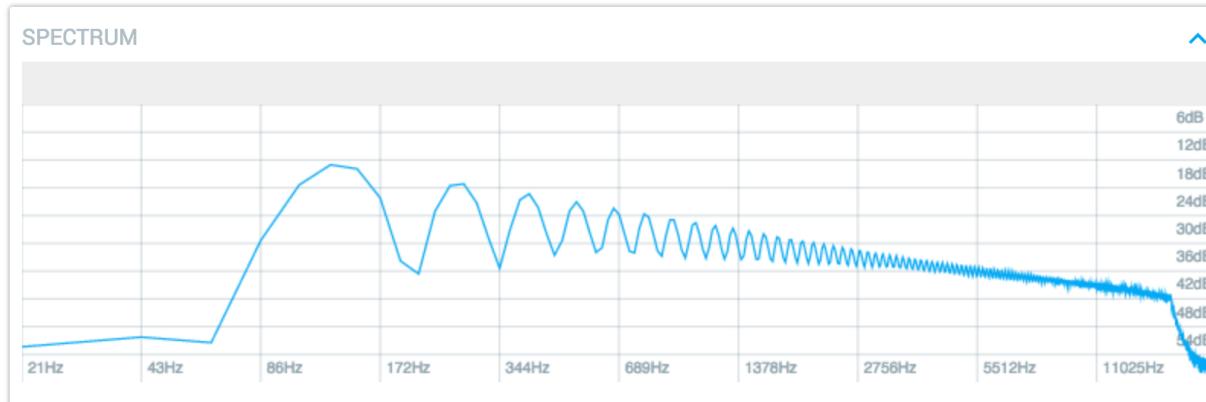
# Choose the Right Tool

- ❑ SVG (Vector-based)
  - ❑ Suitable for low frequency user interaction. (i.e. Slider, knob and 2D pad)

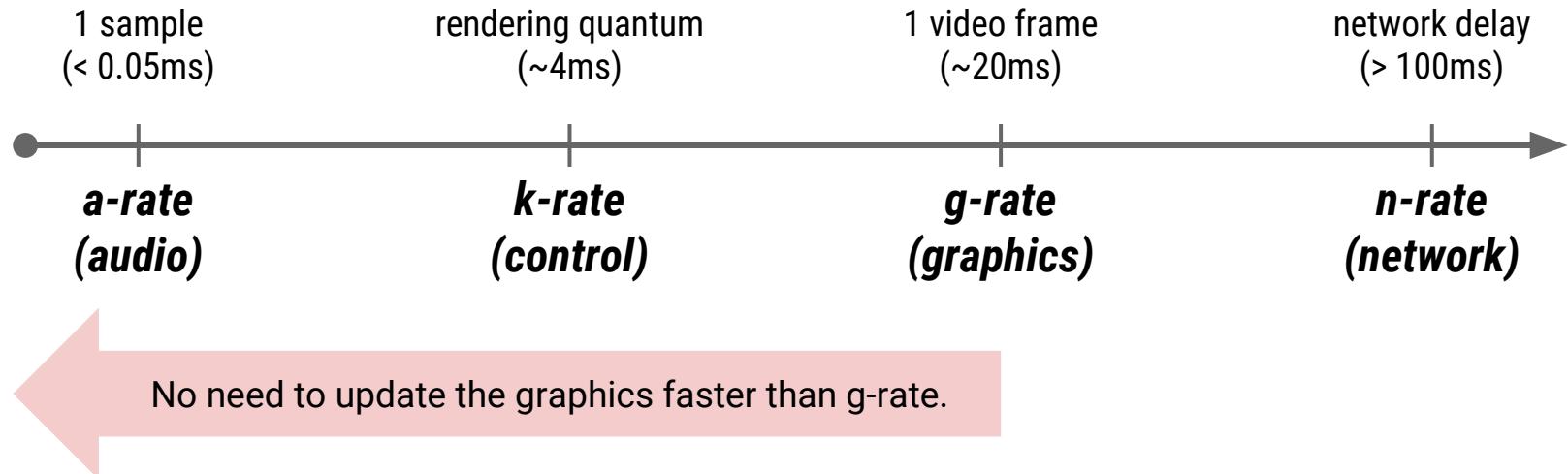


# Choose the Right Tool

- ❑ Canvas (Raster 2D/3D)
  - ❑ Suitable for rapidly changing visualization with a large amount of data points.  
(i.e. Spectrogram, waveform and level meter)



# Degree of Frequency



"sounds like a plan, but..."

## Cell Setting



Elements Network Sources Timeline Profiles Resources Audits Console ✖ 3 ⚠ 1 >\_ 🔍

```
><div id="s-preset" class="c-preset">...</div>
><div id="s-pad" class="c-pad">...</div>
><div class="clearfix">...</div>
▼<div id="s-control">
  ▼<div class="ui-section">
    <div class="ui-section-title">Cell Setting</div>
    ▼<div class="ui-sub-section">
      <div class="ui-sub-section-title"></div>
      ▼<div class="ui-button-view" style="width: 60px;">
        ▼<div class="ui-button-touchable">
          <div class="ui-button-led" style="width: 6px;"></div>
          <div class="ui-button-label">Mute</div>
        </div>
      </div>
    ▼<div class="ui-list-view" style="width: 154px;">
      ▼<div class="ui-list-display">
```

aka  
DIV SOUP..

```
93 // section: cell control
94 var s_cellControl = UI.ControlCenter.createSection("Cell Setting", "s-control");
95
96 // pad control : sample
97 var ss_sample = UI.ControlCenter.createSubSection("Sample", s_cellControl);
98 var btn_mute = UI.ControlCenter.createControl({
99   type: "button", name: "Mute", value: false, mode: "toggle"
100 }, ss_sample);
101 var list_samples = UI.ControlCenter.createControl({
102   type: "indexed-list", name: "Sample", value: "",
103   data: ["Loading..."]
104 }, ss_sample);
105 var sli_tune = UI.ControlCenter.createControl({
106   type: "slider", name: "Tune", value: 0.0, min: -1200.0, max: 1200.0,
107   precision: 0, scale: "linear", unit: "cents"
108 }, ss_sample);
109 var sli_volume = UI.ControlCenter.createControl({
110   type: "slider", name: "Volume", value: 0.0, min: -24.0, max: 24.0,
111   precision: 2, scale: "linear", unit: "dB"
112 }, ss_sample);
113
114 // pad control : envelope
115 var ss_envelope = UI.ControlCenter.createSubSection("Envelope", s_cellControl);
116 var btn_env = UI.ControlCenter.createControl({
117   type: "button", name: "Envelope", value: false, mode: "toggle"
118 }, ss_envelope);
119 var sli_att = UI.ControlCenter.createControl({
120   type: "slider", name: "Attack", value: 0.0, min: 0.0, max: 1.0,
121   precision: 4, scale: "linear", unit: "s"
122 }, ss_envelope);
123 var sli_hld = UI.ControlCenter.createControl({
124   type: "slider", name: "Hold", value: 0.05, min: 0.0, max: 1.0,
125   precision: 4, scale: "linear", unit: "s"
126 }, ss_envelope);
```

lots of  
copy and paste...



THIS IS FINE.

# Polymer

<https://www.polymer-project.org/1.0/>

# Polymer: In a Nutshell



```
<my-knob label="Quantize" value="65"></my-knob>
```

```
...
<div class="c-right">
  <div class="c-knob-label">Quantize</div>
  <input id="eValueDisplay" type="text" class="c-knob-value">
</div>
<svg id="eTouchable" class="c-knob-flat" width="48" height="48" version="1.1" xmlns="http://www.w3.org/2000/svg">
  <circle cx="23.5" cy="23.5" r="23" class="c-knob-flat-outer"></circle>
  <path id="eKnob" class="c-knob-flat-gauge" d="M 10.065 36.935 A 19 19 0 0 1 35.8395 9.05229"></path>
  <circle cx="23.5" cy="23.5" r="16" class="c-knob-flat-inner"></circle>
</svg>
...
```

# Web Components

- ❑ **HTML Imports, Custom Elements, Templates and Shadow DOM**
- ❑ Use polyfill for the cross-browser compatibility. (Install via [Bower](#))

```
<!-- In your main HTML file -->
...
<head>
  <title>HTML Imports</title>
  <script src="bower_components/webcomponentsjs/webcomponents-lite.min.js"></script>
  <link rel="import" href="my-element.html">
</head>
...
```

# Creating Custom Element

- ❑ Start from Polymer's [seed-element](#) example.

```
<!-- my-element.html -->
<link rel="import" href="polymer.html">
<dom-module id="my-element">
  <template> <!-- Add DOM elements here. --> </template>
</dom-module>
<script>
  Polymer({
    is: 'my-element'
    // Add JS code here.
  });
</script>
```

# {Bene,Pro}fits

- ❑ Clean and reusable code.
- ❑ Encapsulation and higher modularity.
- ❑ Scalable Application Design.

works with  
Polymer 0.5

# WAAX

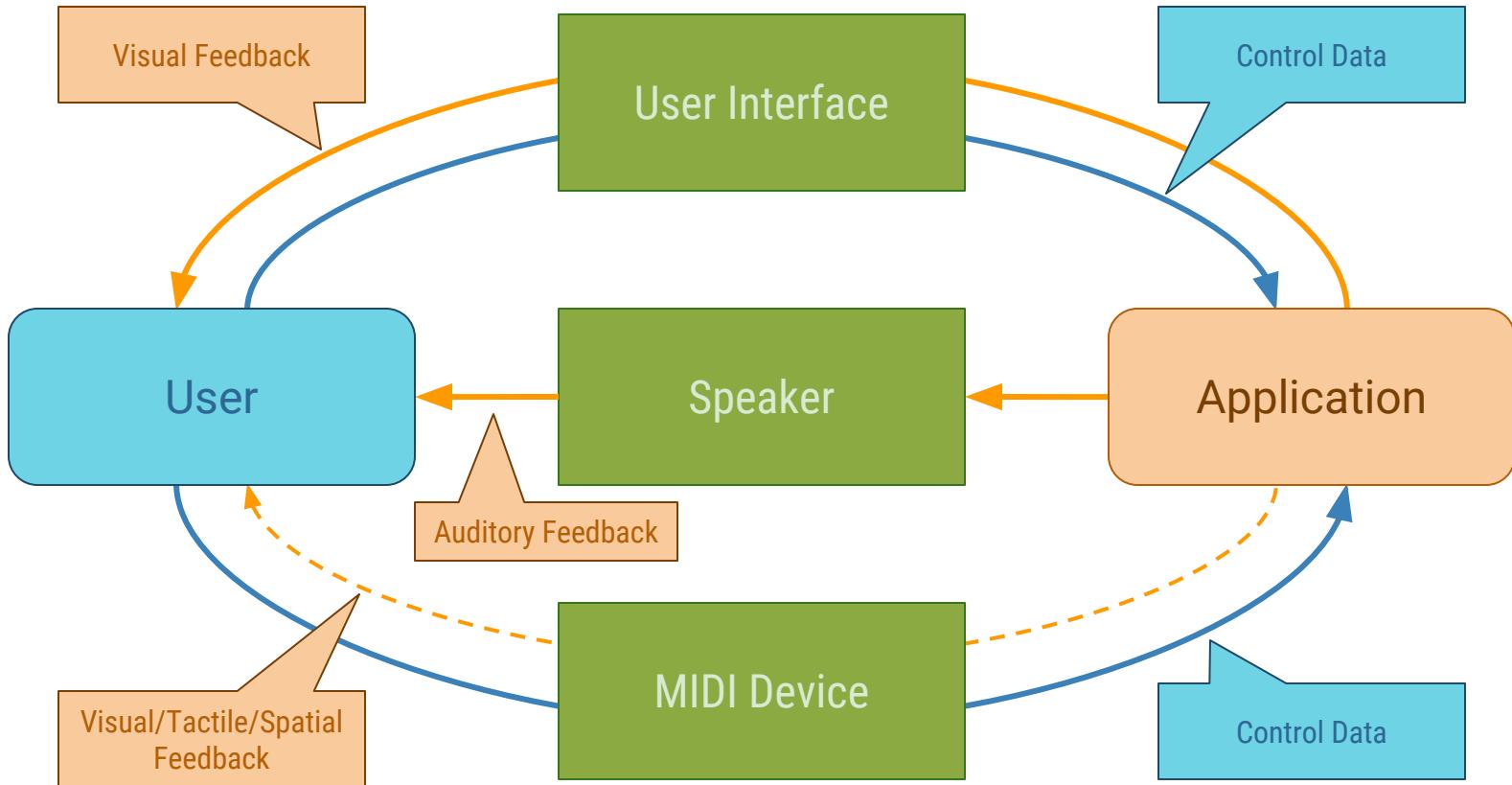
<http://hoch.github.io/WAAX/>

for Polymer 1.0!

# Spiral UI Elements

On GitHub

“The end of the beginning”



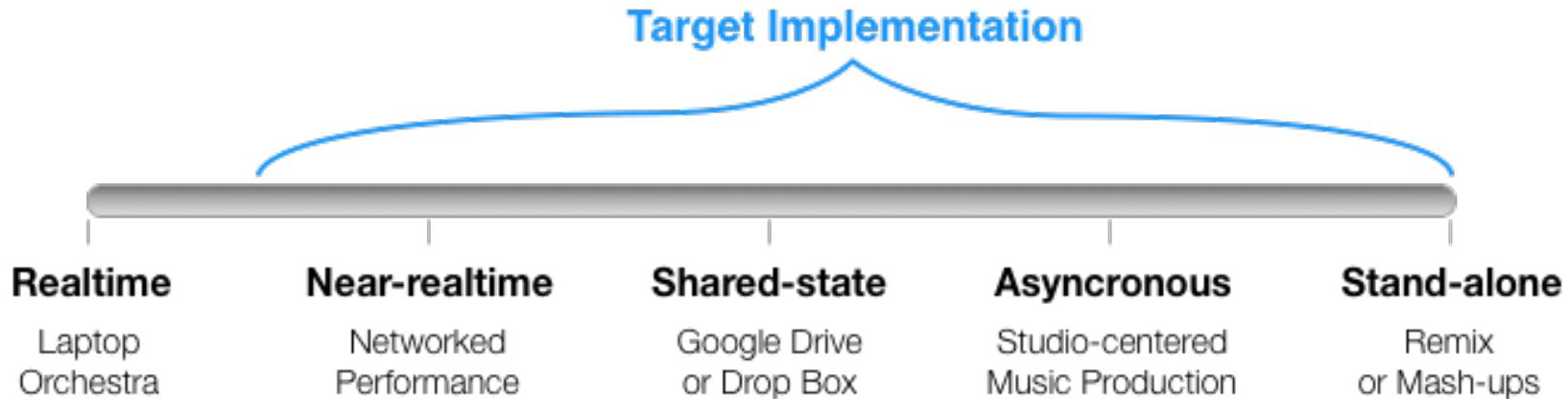


# Where do we go from here?

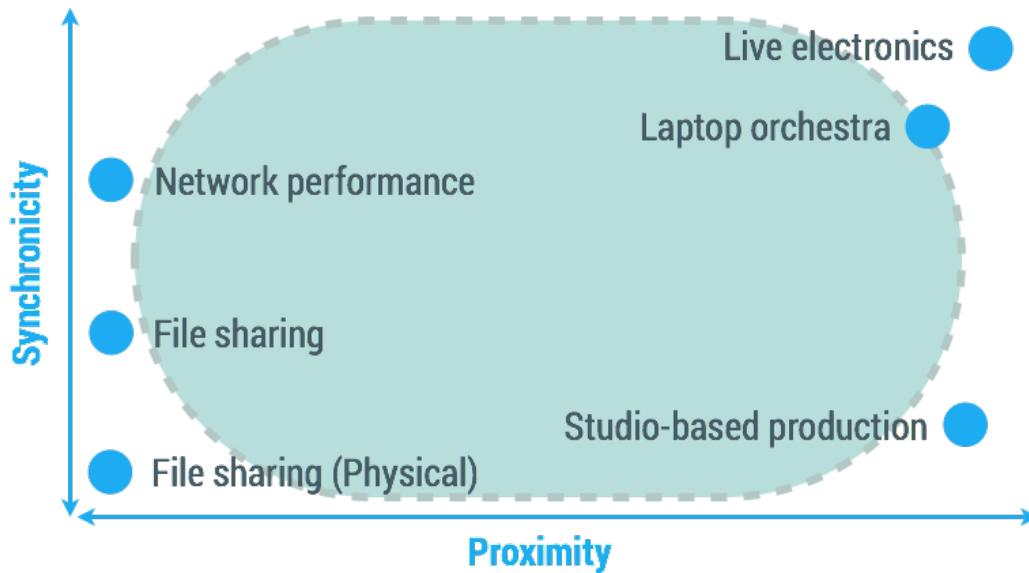
# Moving Forward with Web Music

- ❑ Sample-accurate sequencing and recording
- ❑ Local storage and offline access
- ❑ AudioWorker (or CustomAudioNode)
- ❑ Deprecation: PannerNode, ScriptProcessorNode
- ❑ Near-realtime collaboration

# Degree of Synchronicity



# Synchronicity/Proximity Plot



# Social and Collaborative

- ❑ [Smule](#)
- ❑ [PropellerHeads: Discover](#)
- ❑ [OhmStudio](#)
- ❑ Backup and Sharing
- ❑ SoundCloud

# Web Music: Where it excels

- ❑ No central regulation: no app store!
- ❑ Rapid iteration and experimentation.
- ❑ Universally available: omnipresence and zero friction.
- ❑ Easier to integrate with other counterparts.
  - ❑ Graphics, sensors, geolocation and backend service...
- ❑ Constantly evolving Web APIs.
  - ❑ Backed by Google, Mozilla, Apple and MS.

# But...

- ❑ Observable inconsistency across the browsers.
  - ❑ Please file a bug when you see it.
    - [crbug.com](http://crbug.com) (Chromium), [bugzilla.mozilla.org](http://bugzilla.mozilla.org) (FireFox)
- ❑ Possible inconsistency with the same browser on:
  - ❑ Mobile devices
  - ❑ Different operating systems

*hackathon + demo  
after lunch!*

# That's a wrap!

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