PWAs 逼近原生应用的利器：Project Fugu（河豚）

撖书良

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收获国内外一线大厂实践
与技术大咖同行成长

✓ 演讲视频 ✓ 干货整理 ✓ 大咖采访 ✓ 行业趋势

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自我介绍

撤书良， 英特尔中国 Web 团队高级软件工程师，曾经的 CrossWalk Project 开发者，活跃于 Chromium 社区（Owner, Committer）4+ 年，在 Mojo, Device Service, Service Worker 等项目中多有贡献，目前致力于 Service Worker 以及 Project Fugu 相关的技术标准制定及其 Chromium 实现。Let's make Web Amazing!

目录

PWAs 回顾

QCon 演讲：2019 年再看 PWAs——历史、发展和现状，以及在 Chromium 中的实现

PWAs = Progressive Web Applications
渐进式Web应用程序

- 可逐渐使用更多的功能
- 可安装成主屏图标
- 可脱离网络离线工作
- 可以使用推送通知
- 可发现，可链接，可支付，安全可信

我是Mac

我是PC

反正现在你干什么都在浏览器里，我们基本没区别

问题从哪里来？

🐡 We love Web!
　　跨平台、易于开发、易于分享、自动更新 ……

🐡 开发者愿意选择 web 技术，却没有选择浏览器，而选择了衍生方案
　　例：小程序、Cordova、NW.js、Electron

🐡 Web APIs vs Native APIs
　　例：VS Code, AutoCAD

Project Fugu的缘起

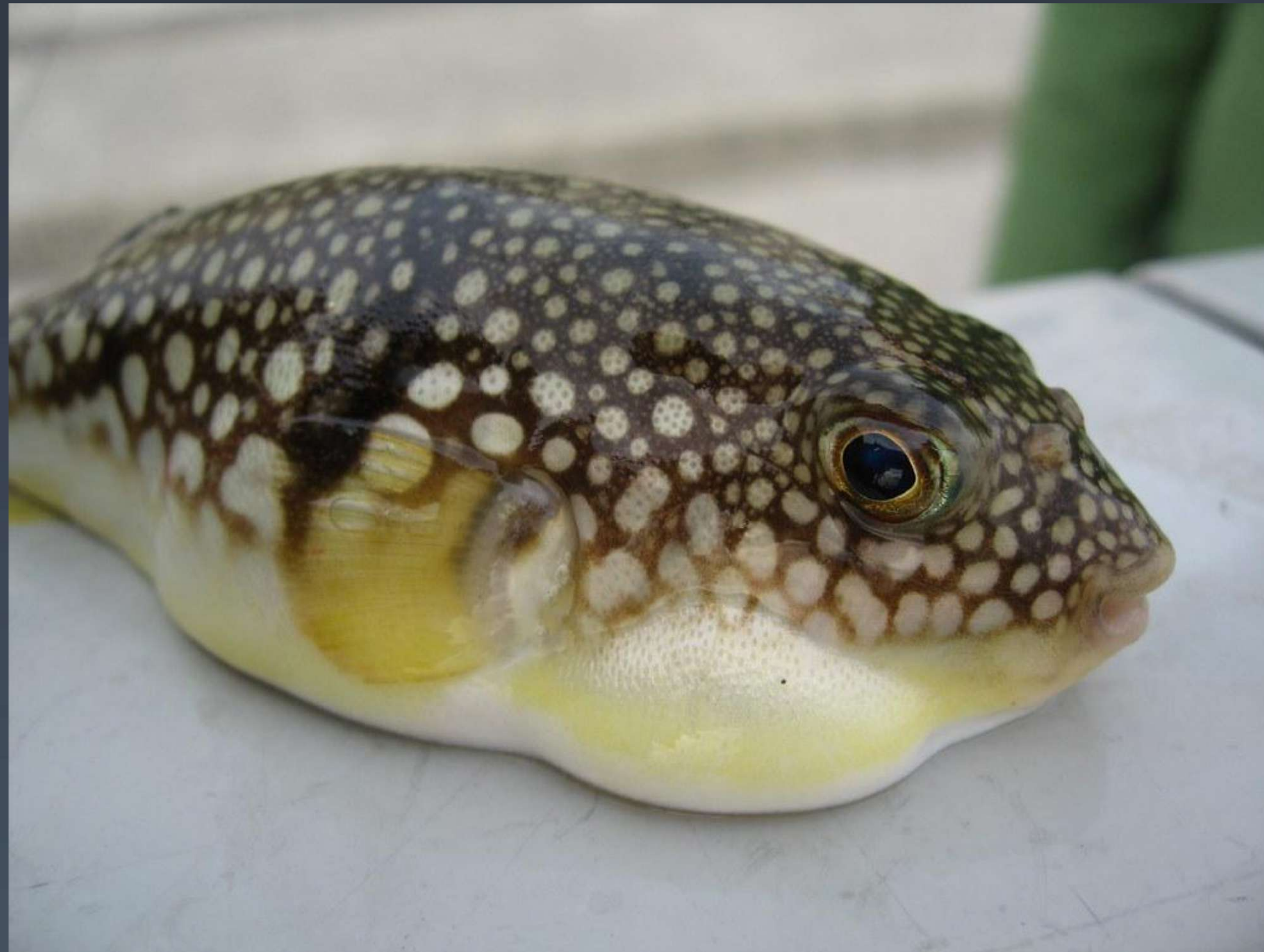**PWAs**

Fugu

WASM

WebGPU

目标：Native 能干啥，Web就能干啥

Enables web apps to **do anything native apps can**, by exposing the capabilities of native platforms to the web platform, while maintaining **user security**, **privacy**, **trust**, and other **core tenets of the web**.

Fugu -- 河豚（フグ），致命的美味

美味
满足用户需求，体验更好。

致命
如果犯错则会有隐私安全问题。

关键是"厨师"如何操作！

Project Fugu是什么？

🐡 定义API，增加功能

🐡 W3C标准化方式推进

🐡 Web安全模型的新考量

Arthur Stolyar
@nekrtemplar

I have no idea what Chrome's Project Fugu is, but it has some cool PWA APIs listed there and they are Priority 1 (meaning -- top priority).

俺不知道 Fugu 是啥玩意，但它有老多的可酷的 API 了，还是顶级优先的

To name a few:
- Notification badges
- Contacts Picker
- WakeLock API
- ... and others
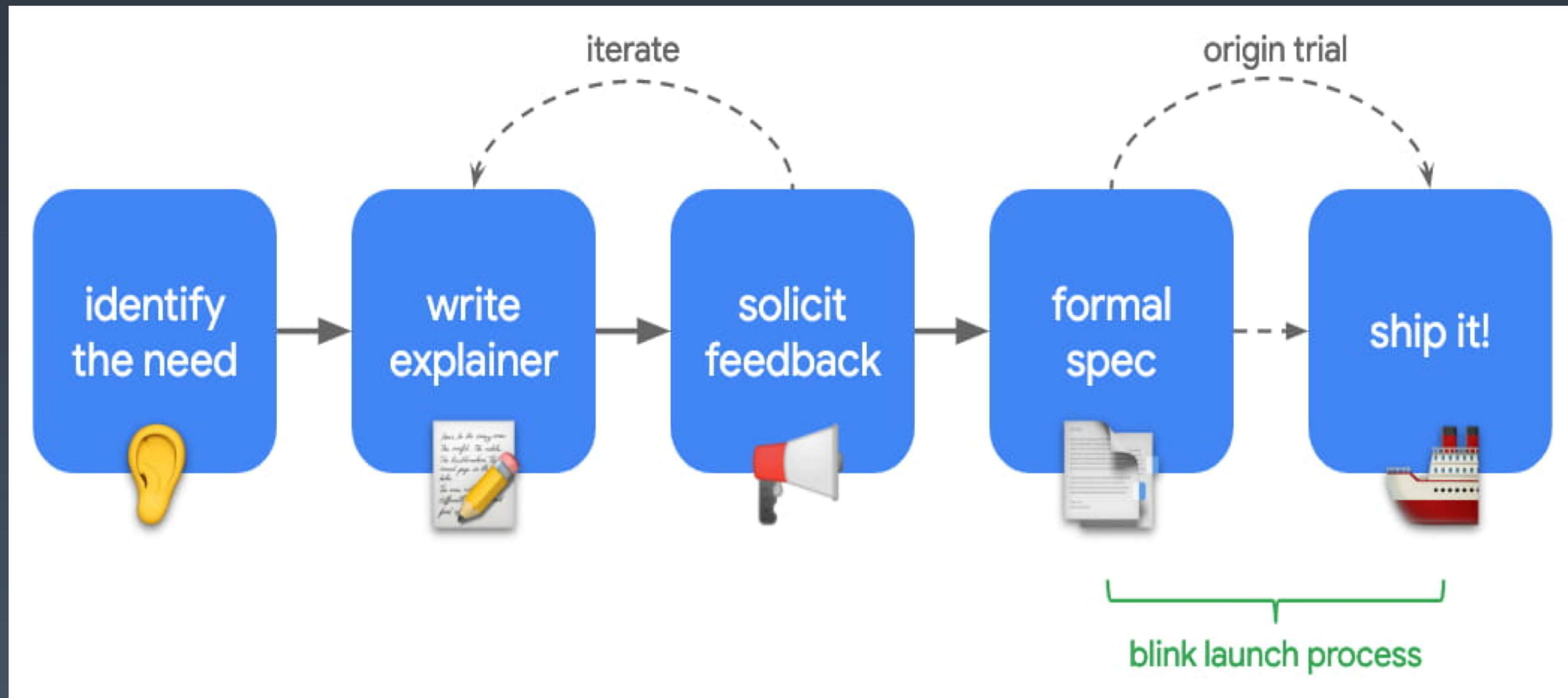
随便说俩
● 图标右上角显示数字
● 联系人
● 保持不熄屏

Yay! 🎉🎉😎👍   神！🎉🎉😎👍

👉 bugs.chromium.org/p/chromium/iss...

Project Fugu的工作方式

G + (intel) ◼ Microsoft + **You**

Fugu APIs的推进流程

iterate — origin trial

identify the need → write explainer → solicit feedback → formal spec ⤏ ship it!

blink launch process

Fugu APIs进展现状

API Tracker

Last updated: October 8, 2019 1:51:46 PM PDT			76	77 (stable)	78 (beta)	79 (canary)	80	81	82	83
Legend: italic = not started; strikeout = finished			🏳=Behind Flag	bar=Origin Trial	🐡=Ship					
Pri 1										
~~Web Share Target API~~	668389	📱								
App icon notification badge for PWAs	719176	💻	████	████	████	████ 🐡				
ChromeOS: Allow webpages to consume alt+click	248762	💻		🐡						
WakeLock API - Screen Lock	257511	💻📱		🏳	████	████ 🐡				
SMS Receiver API	670299	📱		🏳	████	████ 🐡				
Native File System API	853326	💻📱		🏳	████	████ 🐡				
Contact Picker API	860467	📱			████	████ 🐡				
Web Serial API	884928	💻		🏳	████	████			🐡	
getInstalledRelatedApps origin trial	895854	📱		████	████ 🐡					
Implement Periodic Background Sync	925297	💻📱		████	████	████ 🐡				
Ability for websites to be registered file handlers	829689	💻			🏳	████	████	████	████ 🐡	
WebHID API	890096	💻📱			🏳	████	████	████	████ 🐡	
Notification Triggers (a.k.a. Scheduled Notification AP	891339	💻📱			████ 🏳	████ 🐡				

...

（截图已省略表格下方共计 86 行内容）

Origin Trial是什么？

相对比较成熟的Web Platform APIs的试验场，面向Web开发者有限范围试用，收集反馈用来完善API标准以及实现。
https://github.com/GoogleChrome/OriginTrials/blob/gh-pages/explainer.md

🐡 这里，注册一个token，专用于你的origin

🐡 把token放在页面\<meta\>里
```
<meta http-equiv="origin-trial" content="**your token**">
```
或者HTTP header里
```
Origin-Trial: **your token**
```
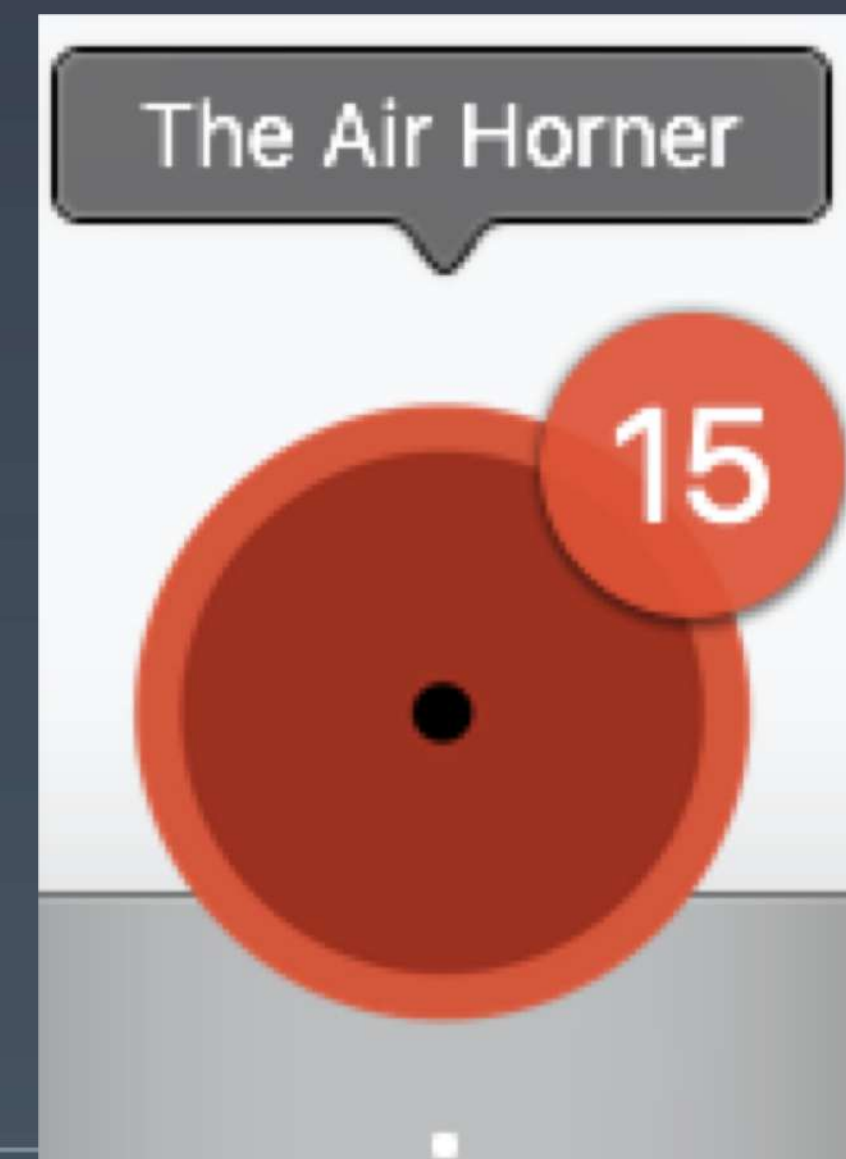
Badging API

Explainer

🐡 在 PWAs 应用的图标上，显示通知角标（数字）。

🐡 Origin Trial ongoing

```
window.ExperimentalBadge.set(15);

window.ExperimentalBadge.clear();
```
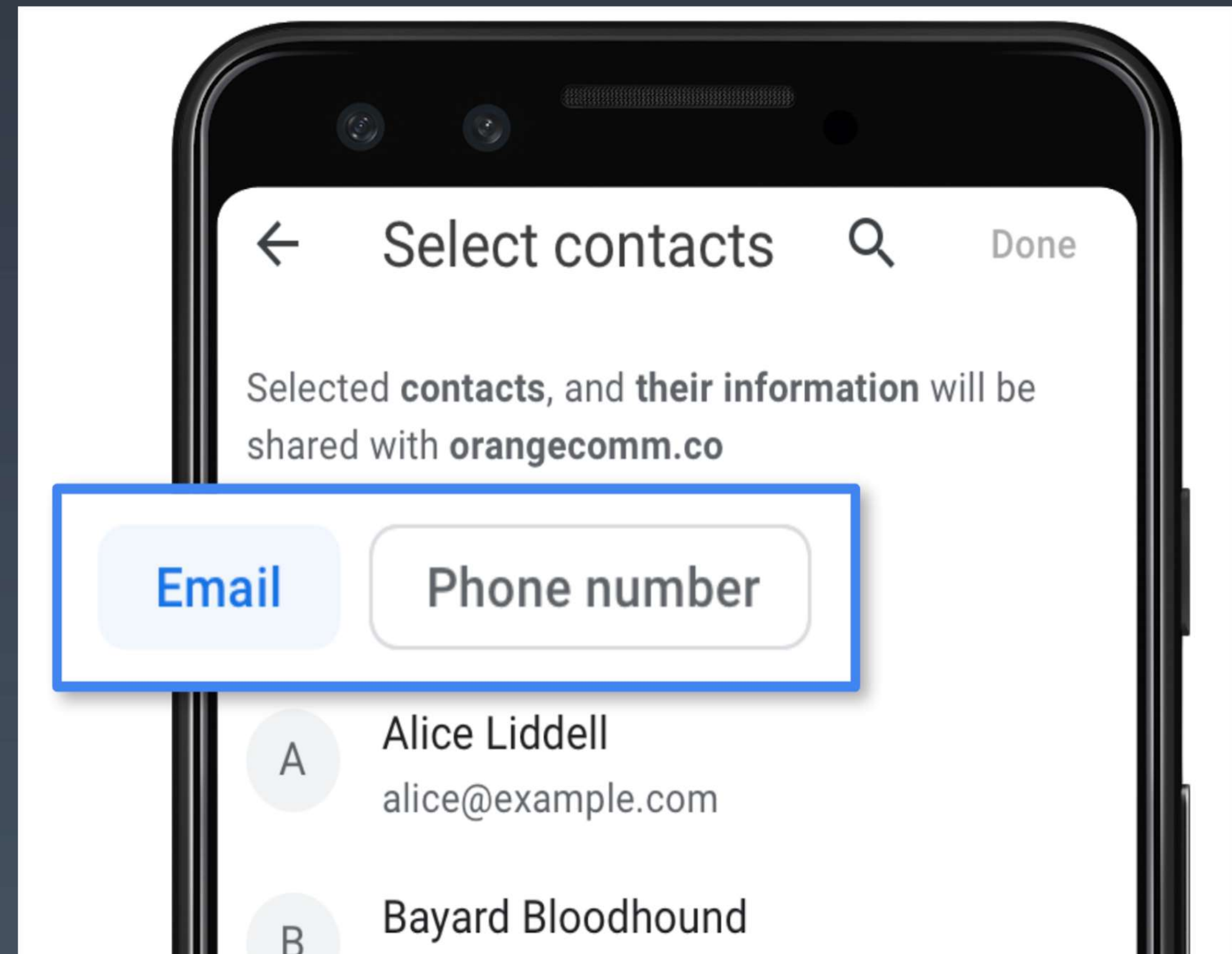
更多 Fugu APIs 的介绍

Contact Picker API

🐡 访问用户通讯录。（目前只支持Android）

🐡 Origin Trial ongoing

```javascript
const contacts = await navigator.contacts.select(
    ['name', 'email'],
    {multiple: true});

if (!contacts.length) {
  // No contacts were selected, or picker couldn't be
opened.
  return;
}
```

Wake Lock API

[Explainer](#)

🐡 防止系统锁屏或者睡眠（比如放PPT）
   Android, Windows, Linux, and macOS

🐡 即将开始Origin Trial

```javascript
const controller = new AbortController();
const signal = controller.signal;
window.WakeLock.request('screen', {signal})
.catch((e) => {
  if (e.name === 'AbortError') {
    wakeLockCheckbox.checked = false;
    console.log('Wake Lock was aborted');
  } else {
    console.error(`${e.name}, ${e.message}`);
  }
});
wakeLockCheckbox.checked = true;
console.log('Wake Lock is active');
return controller;

controller.abort();
```

Shape Detection API

[Explainer](#)

🐡 FaceDetector: Android, macOS, Windows

```
const faces = await new FaceDetector().detect(img);
```

🐡 BarcodeDetector: Android, macOS

```
const barcodes = await new BarcodeDetector().detect(img);
```

🐡 TextDetector: Android, macOS, Windows

```
const texts = await new TextDetector().detect(img);
```

Origin Trial已经结束，正在根据反馈做各种修正。

Web NFC API

[Explainer](#)

🐡 读写NFC tags（目前只支持Android）

```javascript
const reader = new NFCReader();

reader.addEventListener("reading", event => {
  for (let record of event.message.records) {
    const json = record.toJSON();
    const article = /[aeio]/.test(json.title) ? "an" : "a";
    console.log(`${json.name} is ${article} ${json.title}`);
  }
});

reader.scan({
  url: document.baseURI,
  recordType: "json"
});
```

[A good WebNFC demo](#)

Native File System API

Explainer

🐡 访问本地文件系统（For Text Editors, IDEs, etc.）
　VS Code, GSuite, AutoCAD...

🐡 Chrome **M78**（稳定版发布于十月）已经开始 Origin Trial

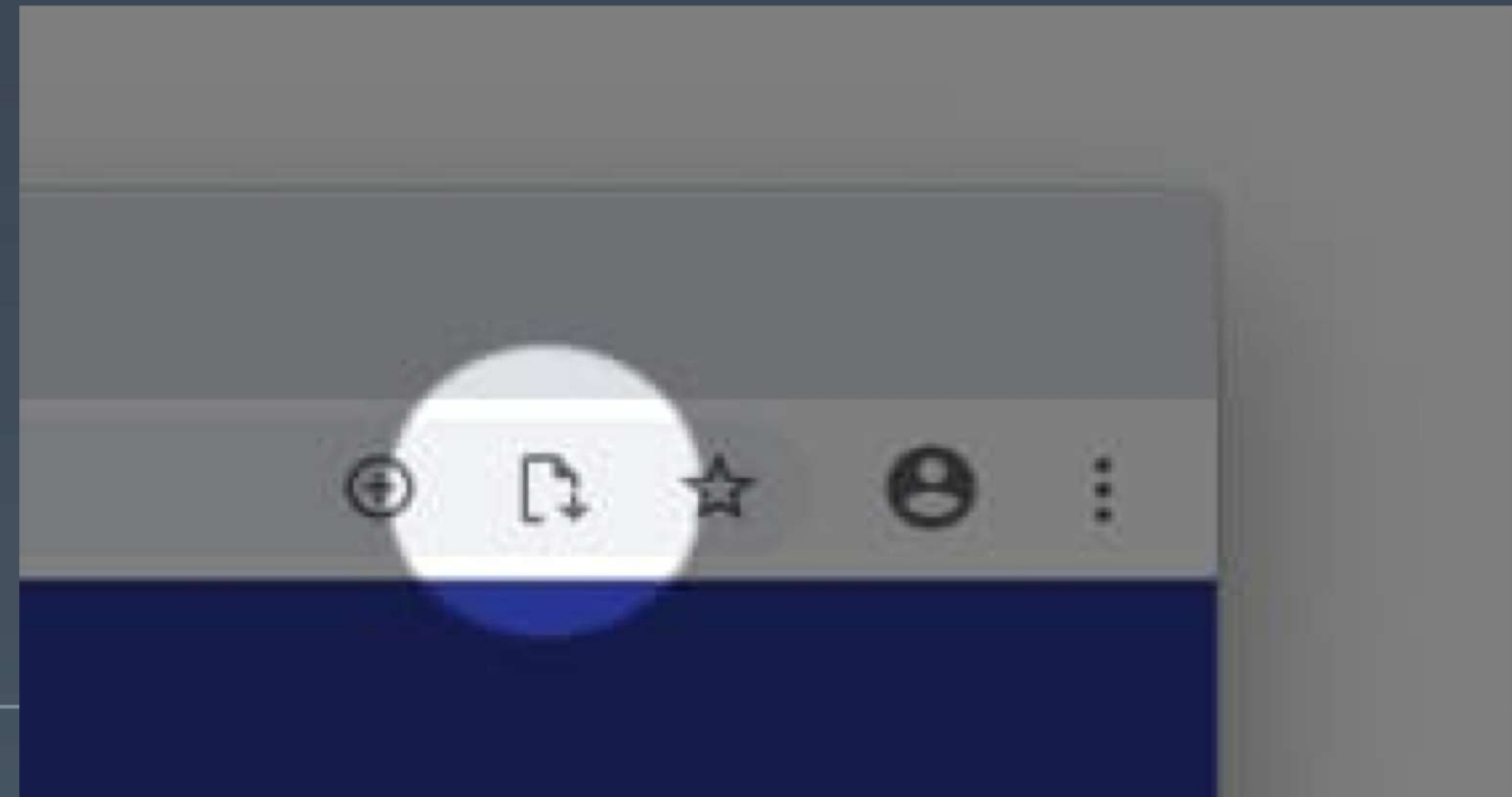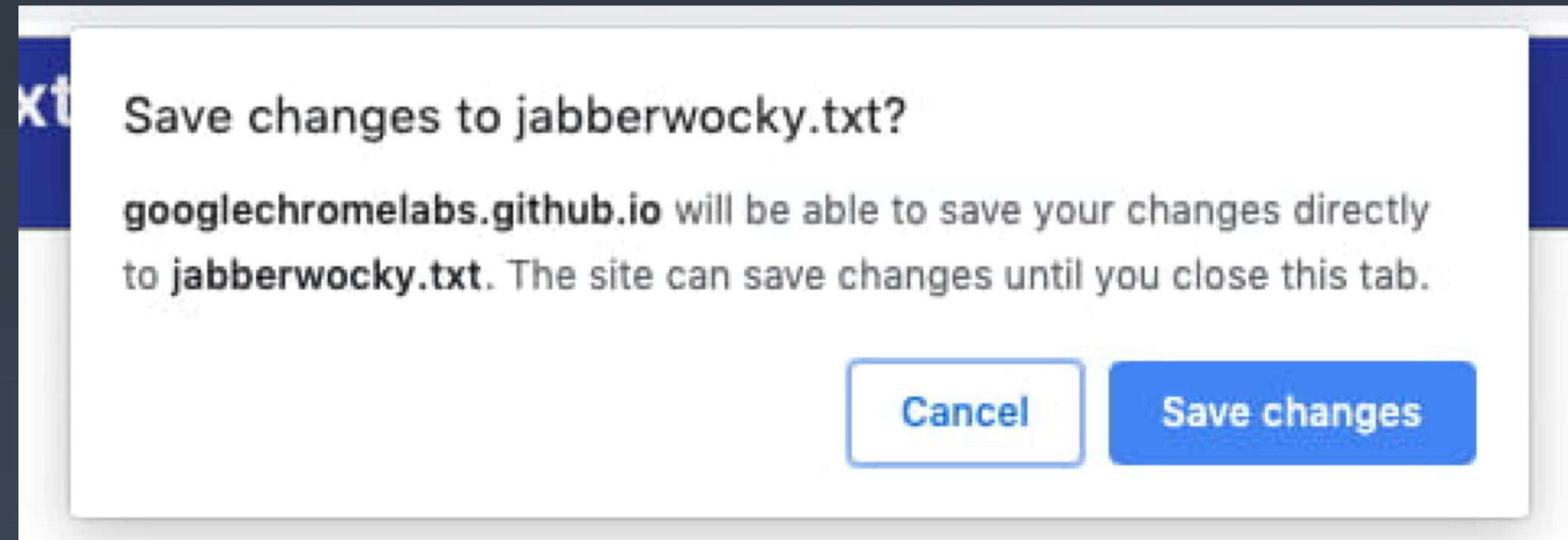🐡 chrome://flags 开关：#native-file-system-api

用例1：读文件、目录

```javascript
let fileHandle;
btnOpenFile.addEventListener('click', async (e) => {
  fileHandle = await window.chooseFileSystemEntries();
  const file = await fileHandle.getFile();
  const contents = await file.text();
  textArea.value = contents;
});


butDir.addEventListener('click', async (e) => {
  const opts = {type: 'openDirectory'};
  const handle = await window.chooseFileSystemEntries(opts);
  const entries = await handle.getEntries();
  for await (const entry of entries) {
    const kind = entry.isFile ? 'File' : 'Directory';
    console.log(kind, entry.name);
  }
});
```
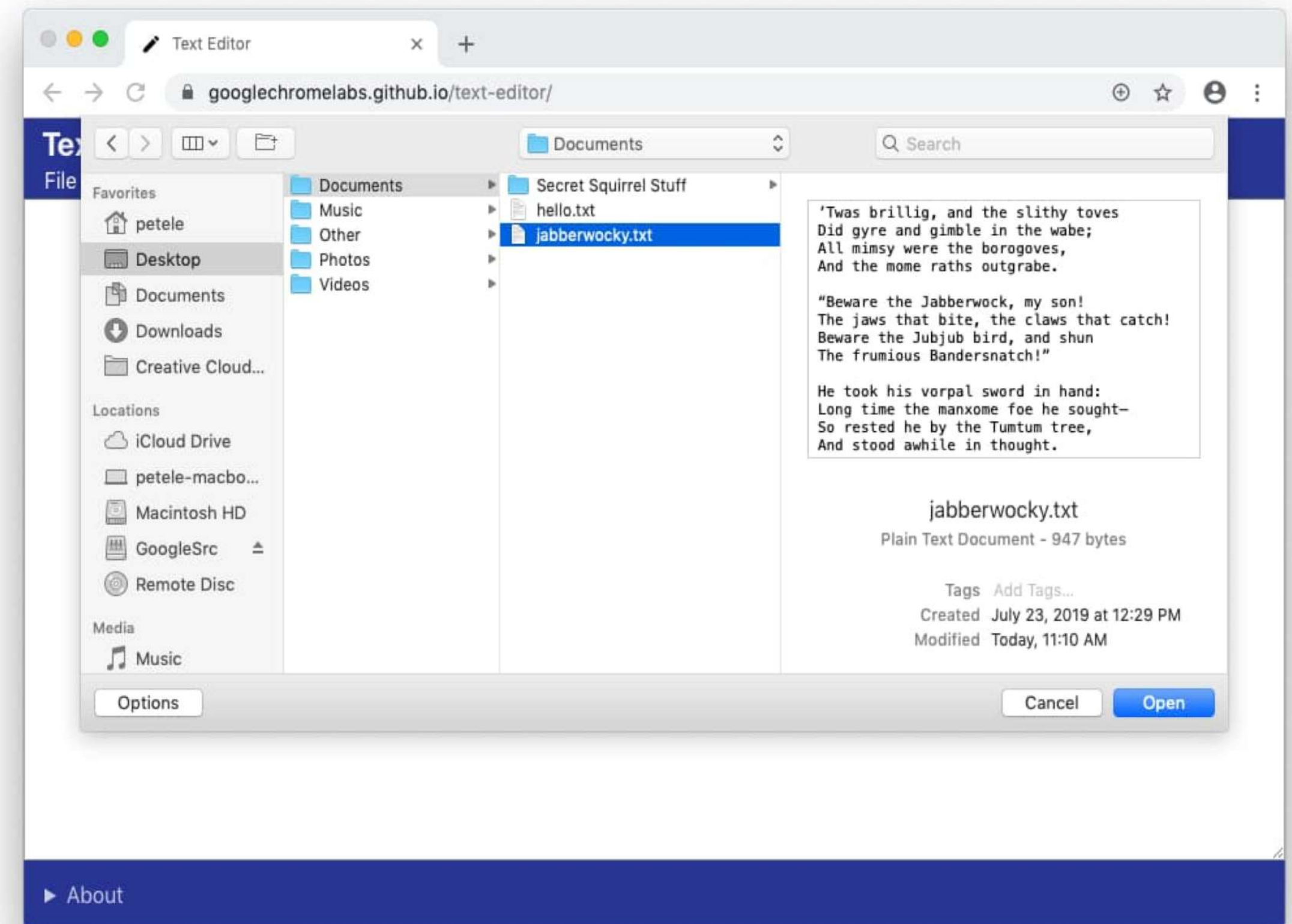
用例2： 写文件

```
async function writeFile(fileHandle, contents) {
  // Create a writer (request permission if
necessary).
  const writer = await fileHandle.createWriter();
  // Make sure we start with an empty file
  await writer.truncate(0);
  // Write the full length of the contents
  await writer.write(0, contents);
  // Close the file and write the contents to disk
  await writer.close();
}
```

Save changes to jabberwocky.txt?

googlechromelabs.github.io will be able to save your changes directly
to jabberwocky.txt. The site can save changes until you close this tab.

Cancel   Save changes

File Handles 授权管理

🐡 Per-origin 授权

🐡 File Handles 可以在frames, workers之间传递。 (IndexedDB, postMessage)

🐡 Installed PWAs 可以长久保持权限

Web安全模型新考量

🐡 打造Web平台通用的APIs

🐡 安全环境的基线：https，顶层frame，用户操作

🐡 授权管理
    用户充分控制
    Non-installed PWAs vs. Installed PWAs

PWAs+Fugu 和小程序们

API 比较表 (By **Intel China Web Team**)

PDF File

Features/Standards	W3C Spec	Spec Status	Standard APIs (Proposed By Chinese Web IG)	Fugu Feature	PWA (PWA.next)	Quick App (China Mobile Phone Manufacturers Alliance)	WeChat Mini Program (Tencent)	Alipay Mini Program (Alipay)	Baidu Smart Mini Program (Baidu)
Sensor (Proximity)	Proximity Sensor	WD		Yes	Yes	Sensor (sensor.subscribeProximity(OBJECT))	No	No	No
Sensor (Orientation Event)	DeviceOrientation Event	WD	DeviceOrientation Event		Yes	Sensor (sensor.subscribeCompass(OBJECT))	wx.onCompassChange(CALLBACK)	my.onCompassChange/offCompassChange	swan.onCompassChange
Sensor (OrientationSensor)	Orientation Sensor	WD	Orientation Sensor		Yes	Sensor (sensor.subscribeCompass(OBJECT))	wx.onCompassChange(CALLBACK)	my.onCompassChange/offCompassChange	swan.onCompassChange
Sensor (Magnetometer)	Magnetometer	WD	Magnetometer		Yes	Sensor (sensor.subscribeCompass(OBJECT))	wx.onCompassChange(CALLBACK)	my.onCompassChange/offCompassChange	swan.onCompassChange
Sensor (Gyroscope)	Gyroscope	WD	Gyroscope		Yes	Sensor (sensor.subscribeCompass(OBJECT))	wx.onCompassChange(CALLBACK)	my.onGyroscopeChange/offGyroscopeChange	swan.onCompassChange
Sensor (Accelerometer)	Accelerometer	WD	Accelerometer		Yes	Sensor (sensor.subscribeAccelerometer(OBJECT))	wx.onAccelerometerChange(CALLBACK)	my.onAccelerometerChange/offAccelerometerChang	swan.onAccelerometerChange
Sensor(Geolocation)	Geolocation Sensor	WD	Geolocation Sensor	Yes	Yes	Geoloaction (@system.geolocation)	Geolocation (private implementation)	Location (private implementation)	swan.getLocation
Sensor	Generic Sensor API	WD	Generic Sensor		Yes	Sensor (@system.sensor)	Sensor (private implementation)	Yes (private implementation)	Not general
Geolocation	Geolocation API	Rec	Geolocation API/	Yes	Yes	Geoloaction (@system.geolocation)	Geolocation (private implementation)	Location (private implementation)	swan.getLocation
WebHID	WebHID API	ED		Yes	Yes	No	No	No	No
Web Serial	Serial API	CGR		Yes	Yes	No	No	No	No
Battery Status	Battery Status API	CR	Battery Status API		Yes	Battery (@system.battery)	Battery (wx.getBatteryInfo*)	my.getSystemInfo	swan.getBatteryInfo
NFC	Web NFC API	CGR	Web NFC API	Yes	Yes		NFC (private implementation)		No
Bluetooth	Web Bluetooth	CGR	Web Bluetooth	Yes	Yes	Bluetooth (private implementation)	Bluetooth (private implementation)	Bluetooth (private implementation)	No
Device Info	No				No	Device Info (@system.device)	System Info (wx.getSystemInfo*)	my.getSystemInfo	swan.getSystemInfo
Network Information	Network Information API	CGR	Network Information API		Yes	Network Info (@system.network)	Network (private implementation)	Network Status (private implementation)	swan.getNetworkType
Screen Brightness	No				No	Screen Brightness (@system.brightness)	Screen (private implementation)	Screen Brightness (private implementation)	swan.setScreenBrightness
System Volume	No				No	System Volume (@system.volume)	No	No	No
App Management	No				No	App Management (@system.package)	No and managed by WeChat	No and managed by Alipay	No and managed by Baidu App
Contact	Contact Picker API	Proposal		Yes	Yes	Contact (@system.contact)	Contact (wx.addPhoneContact)	Contact (private implementation)	swan.addPhoneContact
SMS	No				No	SMS (@system.sms)	No	No	No
Wi-Fi	No				No	Wi-Fi (@system.wifi)	Wi-Fi (private implementation)	No	No
HiBoard	No				No	Yes	No	No	No
Phone Call	Web Telephony API(No update	ED			No	Yes	Phone Call (wx.makePhoneCall)	my.makePhoneCall(OBJECT)	swan.makePhoneCall
Modifying System Settings	No			Yes	No	Yes(Partial)	Yes(Partial)	No	Yes(Partial)

一个Fugu API在Chromium中是如何实现的

WebNFC impl

Javascript	C++ in Blink (Renderer进程)	Java (Browser进程)

NFCReader.scan(options)

WebIDL
V8 bindings

NFCReader

Mojo Message
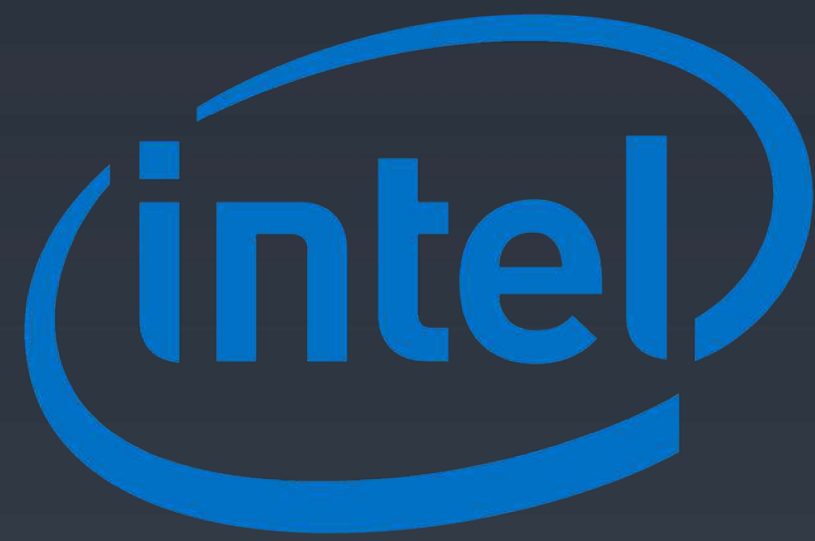
android.nfc.tech.Ndef.
getNdefMessage()

NFCReader.onReading()

语言边界

进程边界

Intel China Web Team 在做什么

PWAs

Fugu
  Shape Detection, Web NFC, Web Serial etc.

Web Machine Learning
  Up to 40x inference speedup in browser

Web Graphics

Web Performance

WebRTC

V8, WASM

Key Takeaway

1、Proj Fugu 为 Web 应用补全 API
2、Proj Fugu 以全新模式加速推进开发过程
3、趋势：桌面 PWAs 应用 + 新的 Web 安全模型

加入 Fugu 讨论： fugu-dev@chromium.org
提出新的 Fugu API: bit.ly/new-fugu-request

资源链接

- 官方 Blog 第一次宣布
- 2019 Google IO Proj Fugu 视频重播
- 2019 Proj Fugu 日本会议纪要
- 2019 W3C TPAC Fugu讨论纪要（内有幻灯片）
- Proj Fugu 多公司常规会议纪要（持续更新）
- Proj Fugu API 状态图
- Proj Fugu 代码实验室

- Fugu 相关讨论: @chromium 内使用标签 #fugu
- 提出新的Fugu API: bit.ly/new-fugu-request

THANKS! | QCon 10th