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Turtle
Sec



Patricia Aas

@pati_gallardo

I know it's crazy, but I want to make a browser.

3:54 PM · Feb 23, 2020 · 0 · 0 · 0

...actually before 2005

But I have no money
At least not for this...

What does it take?

- Development needs people = **money**
- Maintenance needs people = **money**
- Hosting = **money**

What is the “browser business model”?

Google Search

About 1\$ per user/year... maybe

I don't have a deal now at least
Google is only interested once you have users
There is no bootstrapping process

Open Source

More a stunt
than a plan

Heh...

1 dev

0 budget

Upside is...
...it's 2020?



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Trying to build an
Open Source browser
in 2020

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C++ Russia 2020

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Patricia Aas - Trainer & Consultant

C++ Programmer, Application Security

Currently : *TurtleSec* 







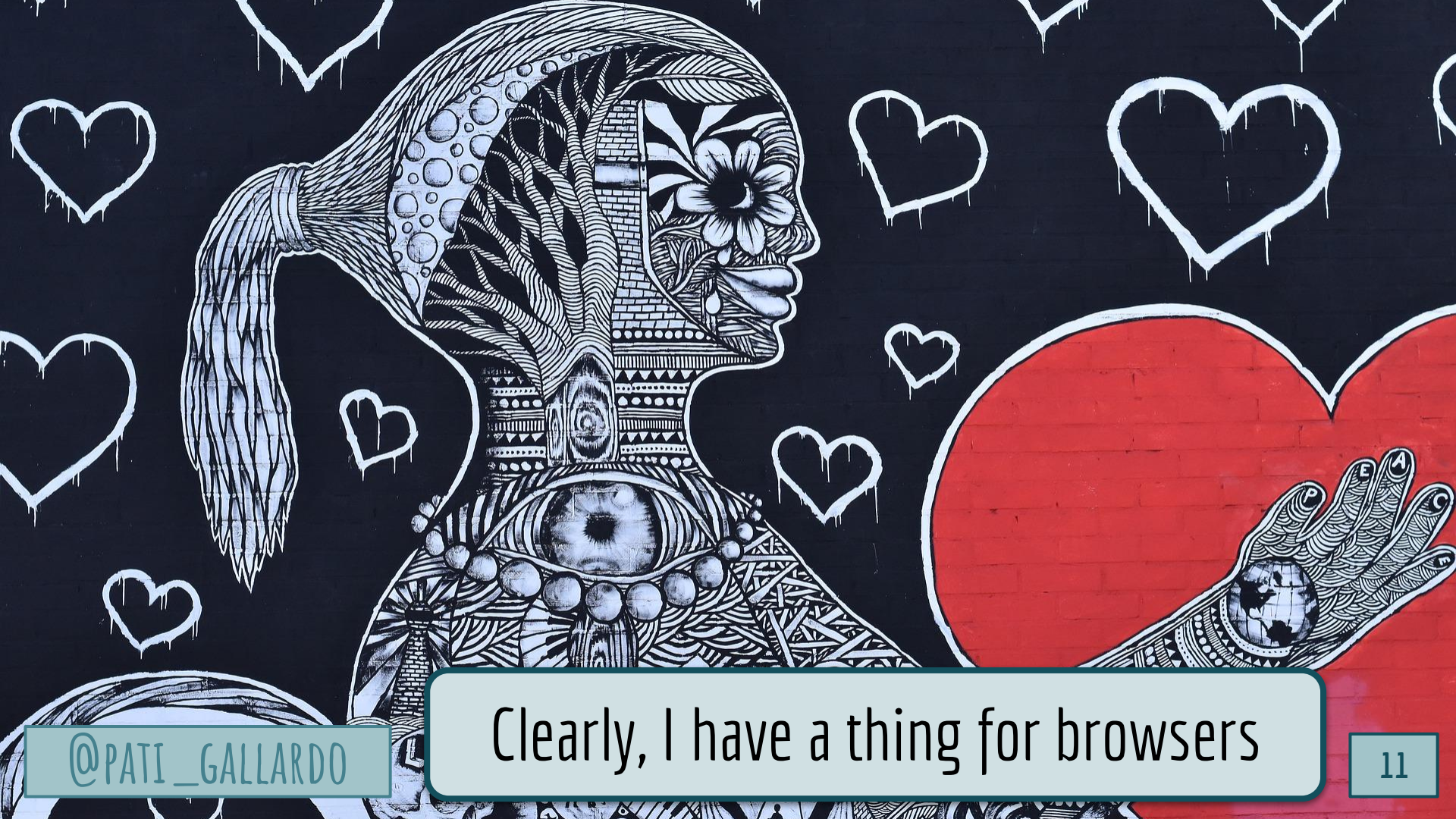
Previously : Vivaldi, Cisco Systems, Knowit, Opera Software

Master in Computer Science

Pronouns: she/her







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Clearly, I have a thing for browsers

Why?

Technically challenging

I use it myself

Lots of other users

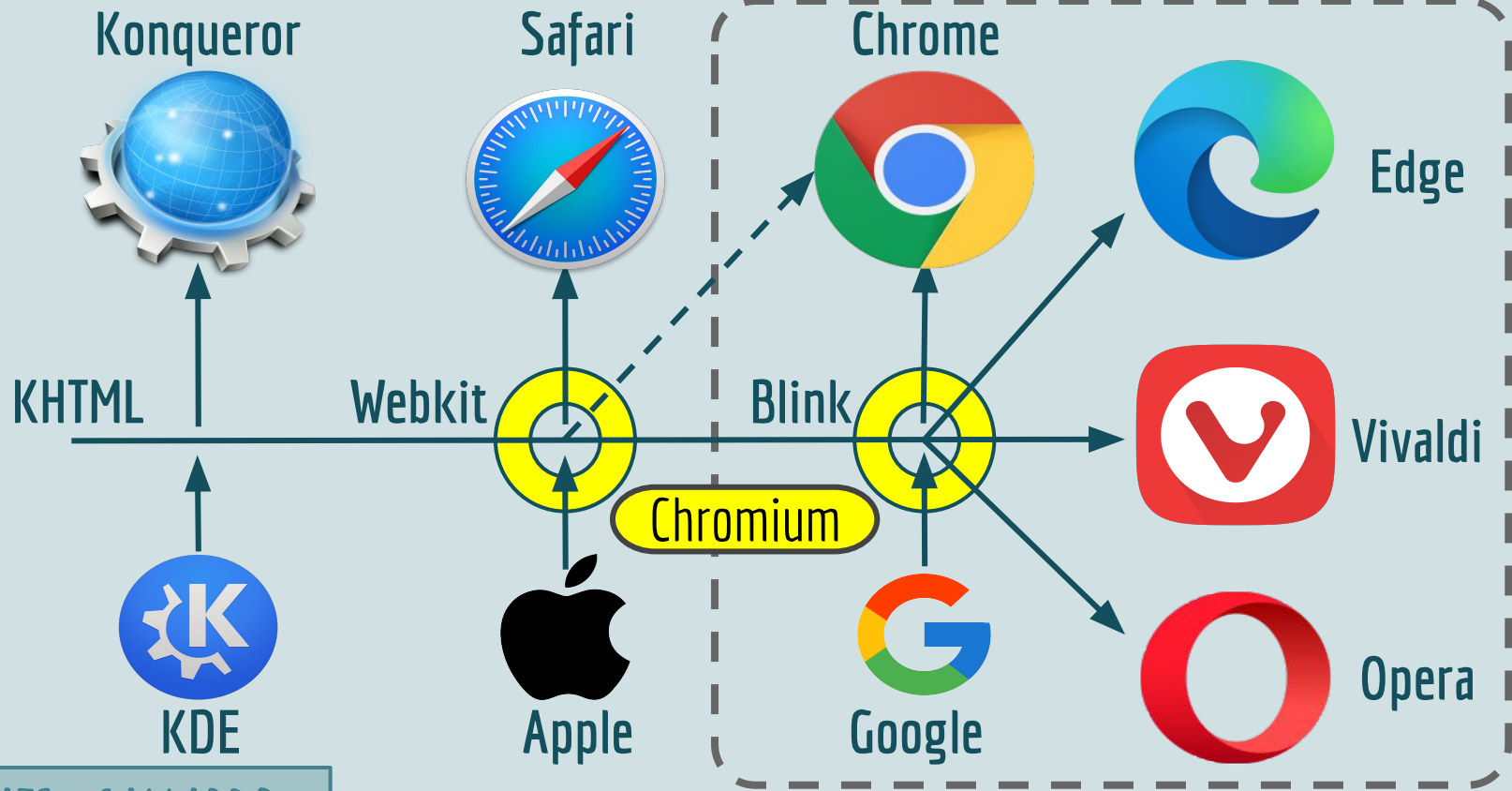
I believe in the web



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Outside of Firefox
this is the general
landscape of browsers
in 2020...

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Then I made a toy browser



A bit by accident

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ISOLATING GPU ACCESS

in its own process

PATRICIA AAS, *TurtleSec*

NDC TechTown **2018**

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2018 Slide

Demo of Composition

...I might have made a browser...

...I might have decided to have a demo last night...

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But I got busy

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I was doing on-prem international trainings
March 2020: everything got canceled



So...

I guess I suddenly have some time?

TurtleBrowser

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Questions?

So, if the last 10% of functionality
is 90% of the time...

..then the first 90%
is 10% of the time, right?

Skimming the surface

Bring-up time is Queen

No time for Depth First



GUI framework

Porting layer

Initial platforms

Linux

MacOS

Windows

Porting layer

Mobile too, eventually



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BOOTLEG

Qt (C++)

Qml



C++ for business logic
Qml for GUI

What does Qml look like?

Imagine if JSON, JavaScript and CSS had a baby...



```
import QtQml 2.15
import QtQuick.Controls 2.15
import QtQuick.Layouts 1.15
import QtWebEngine 1.10
```

Importing Qml modules

```
import "url.js" as URL
```

Importing JS files

```
ColumnLayout {
```

```
    AddressBar {
```

```
        url: webView.url
```

```
        onReload: webView.reload()
```

```
        onBack: webView.goBack()
```

```
        onForward: webView.goForward()
```

```
        onGoToAddress: webView.text = address
```

```
    }
```

Custom Qml Component
Defined in a file in this
directory

```
    WebView {
```

```
        id: webView
```

```
        property string typedText: ""
```

```
        onTextChanged: {
```

```
            webView.url = URL.construct(typedText)
```

```
        }
```

```
    }
```

QtWebEngine
Component
Imported on line 4

Advantage of Qml

Easy to change the GUI

Desktop WebView

A man with a beard, wearing a red hoodie and dark pants, is sitting on a bed or couch. He is looking out of a window on the right side of the frame. The background is a textured, grey wall. The overall scene is dimly lit, with the man's red hoodie being the most prominent color.

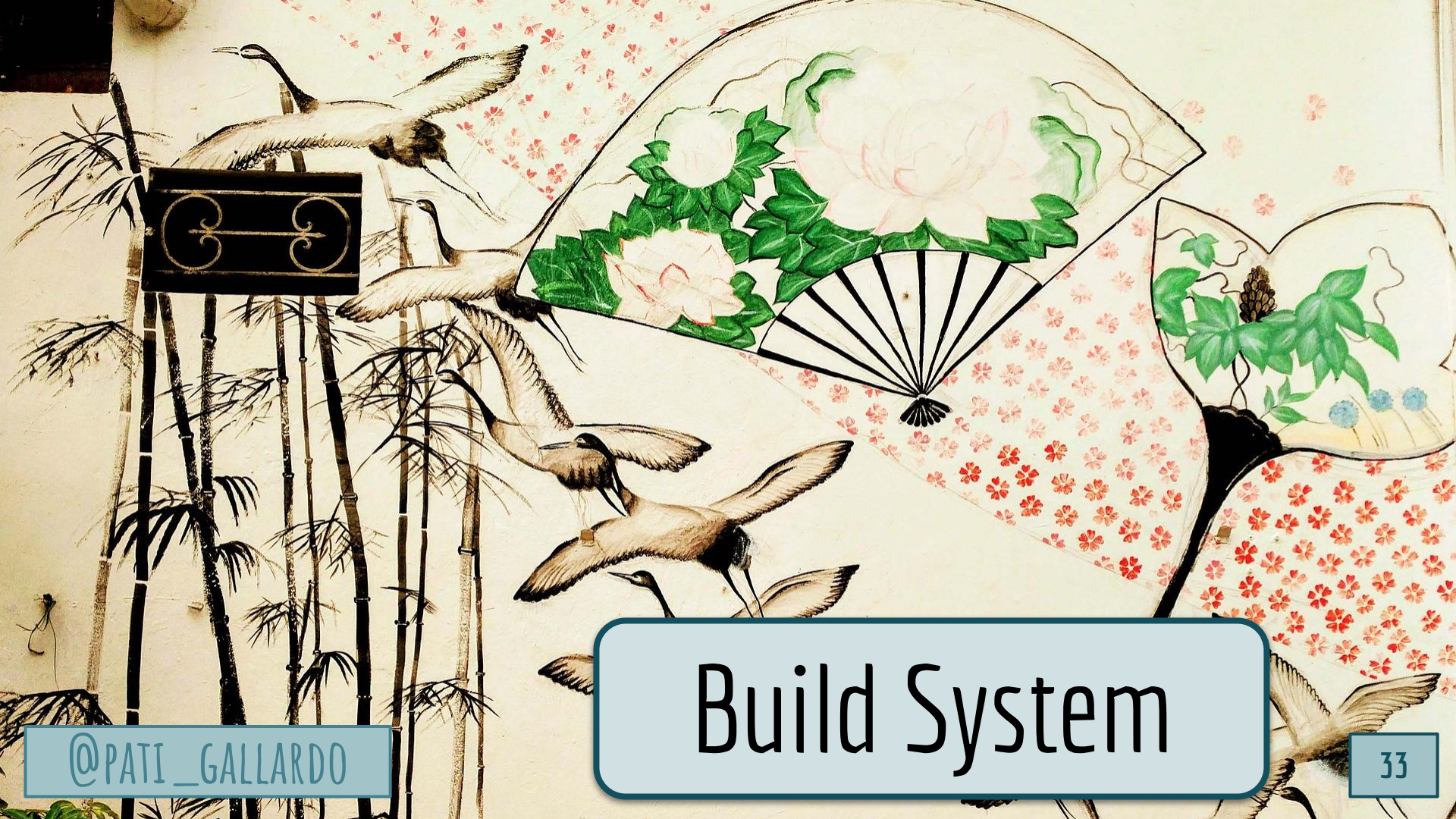
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This bit will get complicated



Chromium Blink *QtWebEngine*

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Build System



CMake

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Dependency Management

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Conan

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conan-qt

Eric Lemanissier

Config Qt modules



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CI/CD

GitHub Actions

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conan-cache

GitHub Action Hack
Stuff .conan into git
Push it to GitHub
GitHub LFS

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Docker Actions
are Linux only!

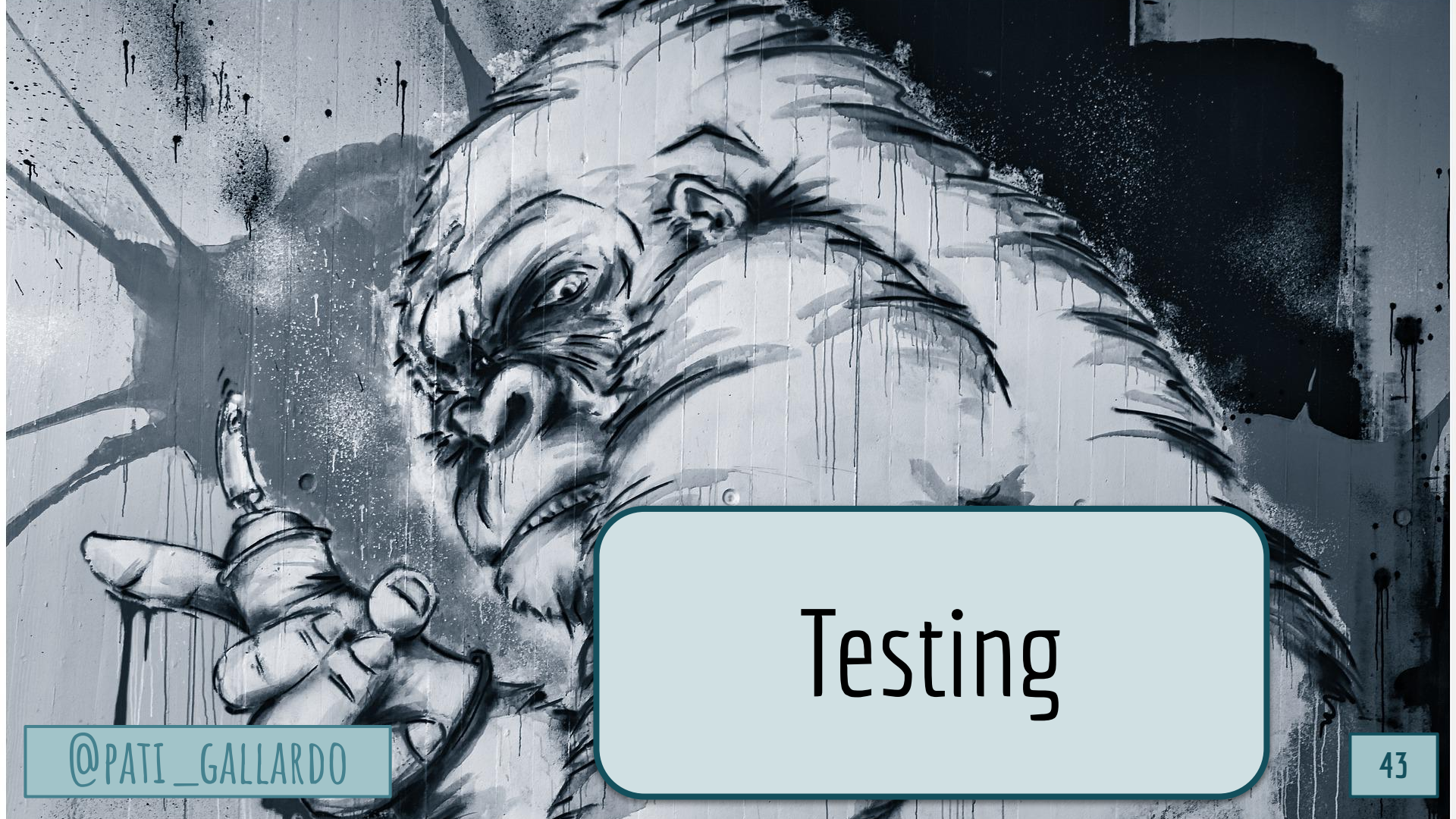
Docker ~~X~~ Action
JavaScript Action



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Hack

Call shell script from JavaScript



Testing

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Qml

C++

GUI Driver?

...I am your father

?



Licensing

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Pretty Safe

Chromium

Qt

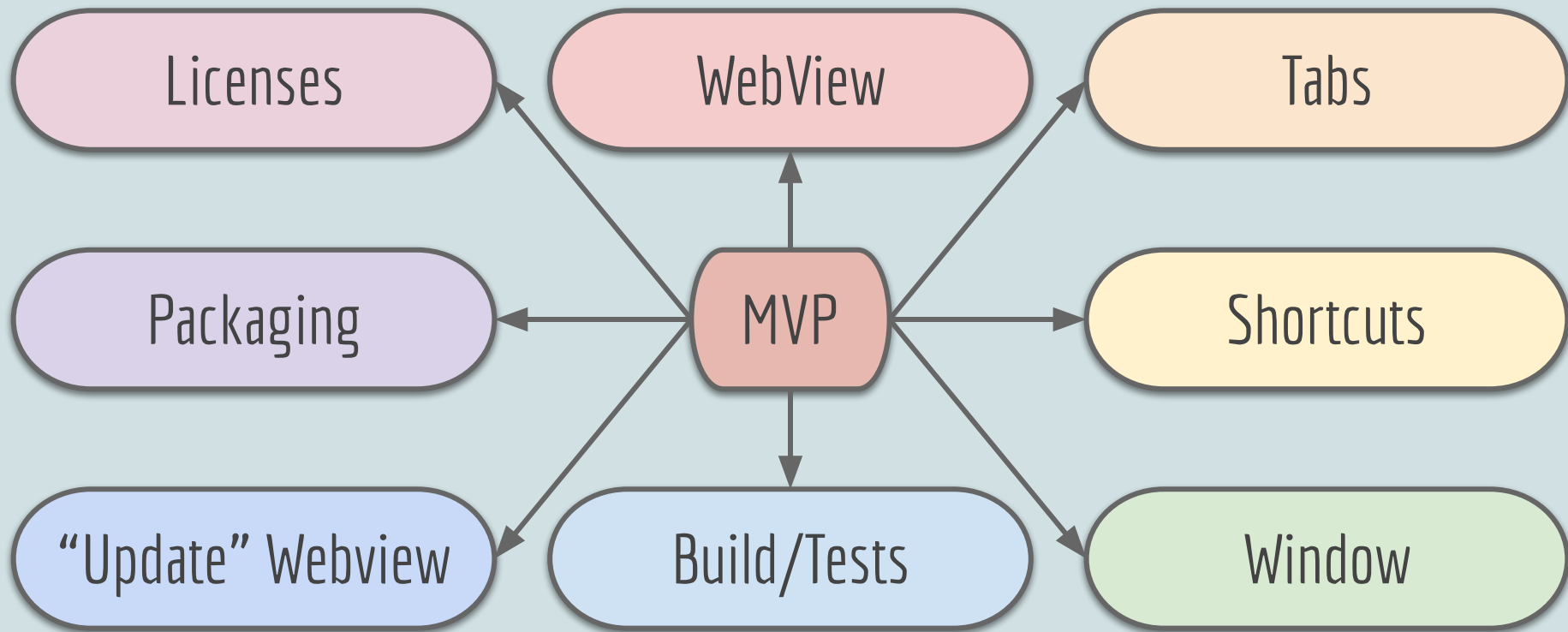
Remember, we
have no money

Maneuverable

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- Collect Conan licenses
- Make qrc
- Make GUI to display
- MONITOR

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Packaging

CPack

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Web Site

GitHub Pages Jekyll Theme

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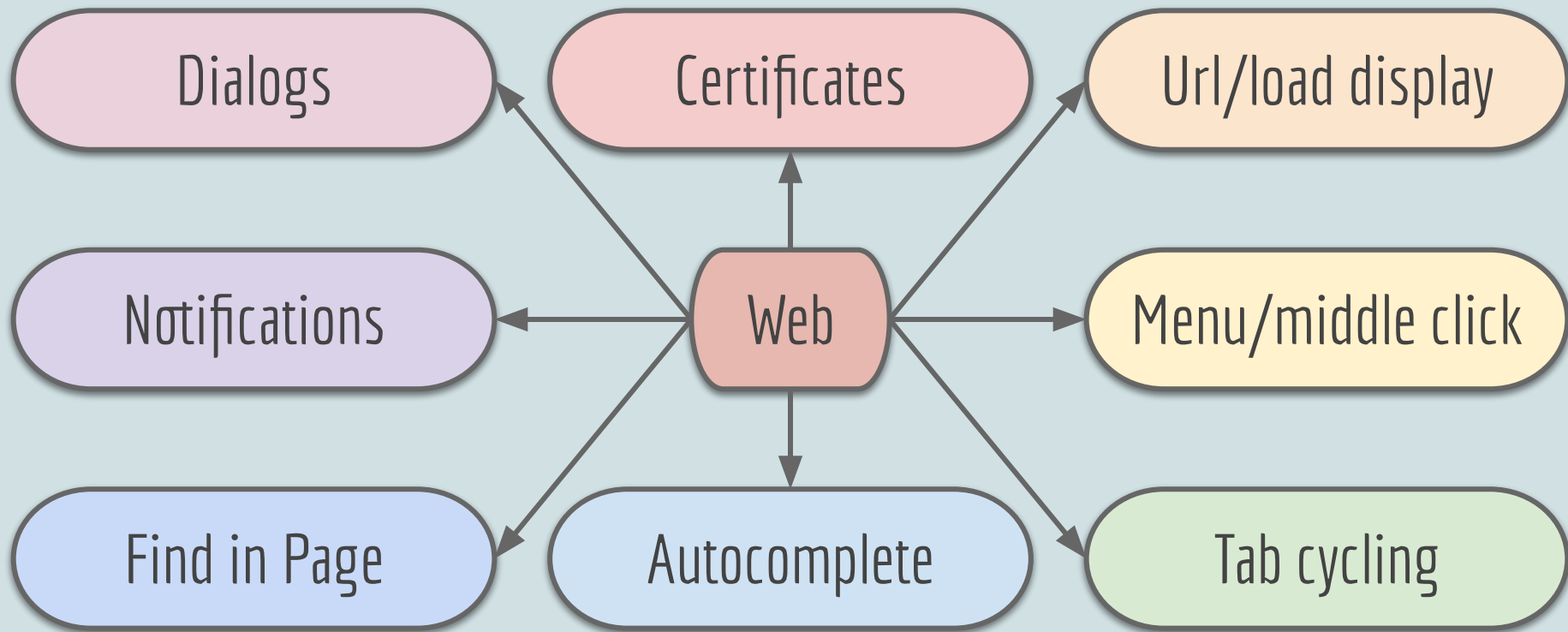
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Releases

GitHub Releases?



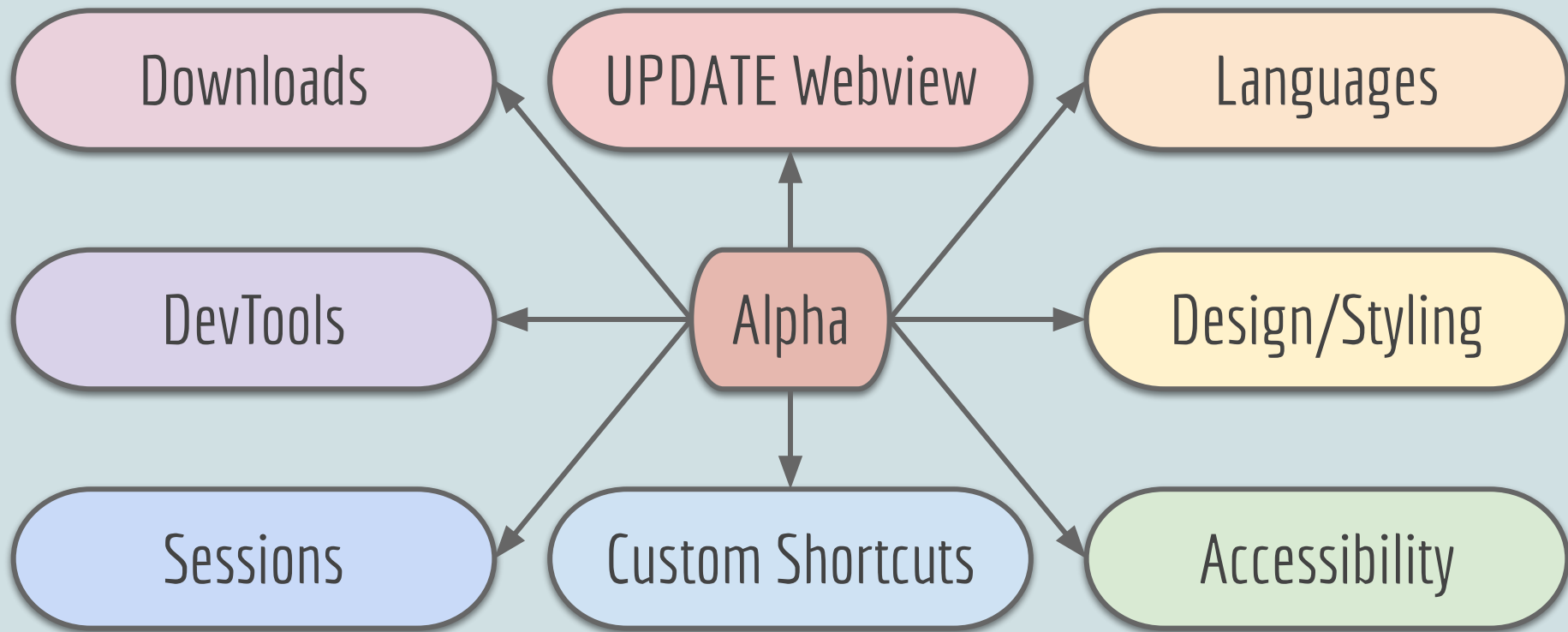
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Alpha Release





GUI Styling

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@S
SOULART

Qt Imagine Style



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Questions?



The Hard Parts

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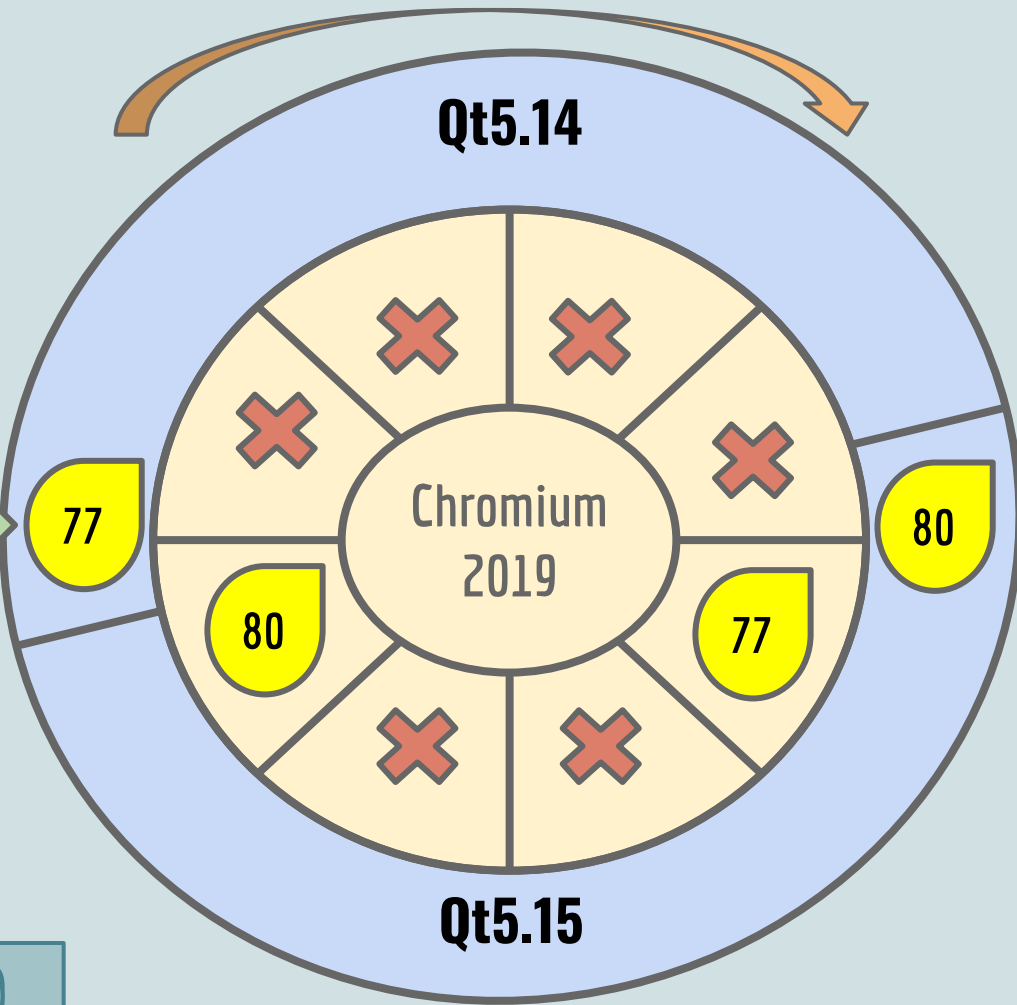
Updating Chromium



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How Qt has designed it

Start of 2020



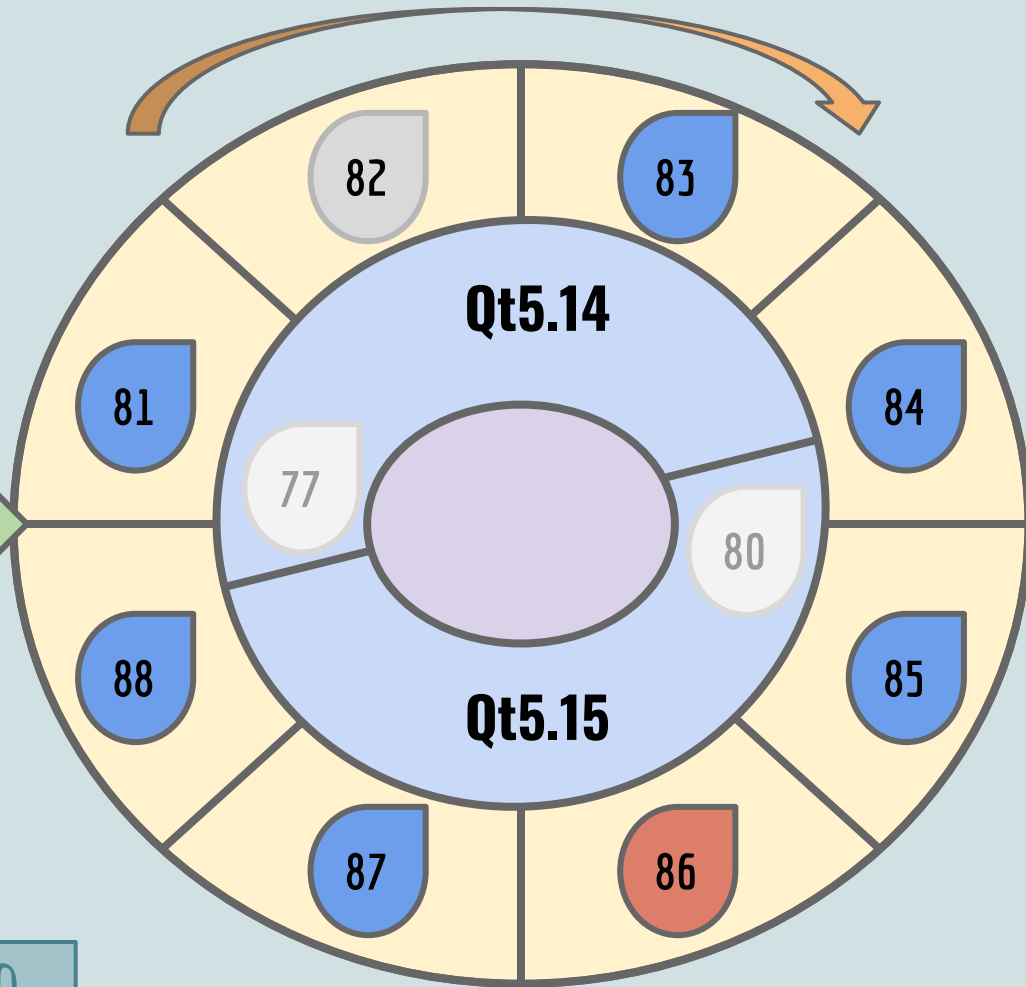
By the time a new Qt version is released the Chromium version is almost a year old.

Chromium browser
releases have to follow
Chromium releases.
NOT Qt releases

We're not
going to *play*
browser

How it has
to be

Start of 2020



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Vivaldi



Chrome



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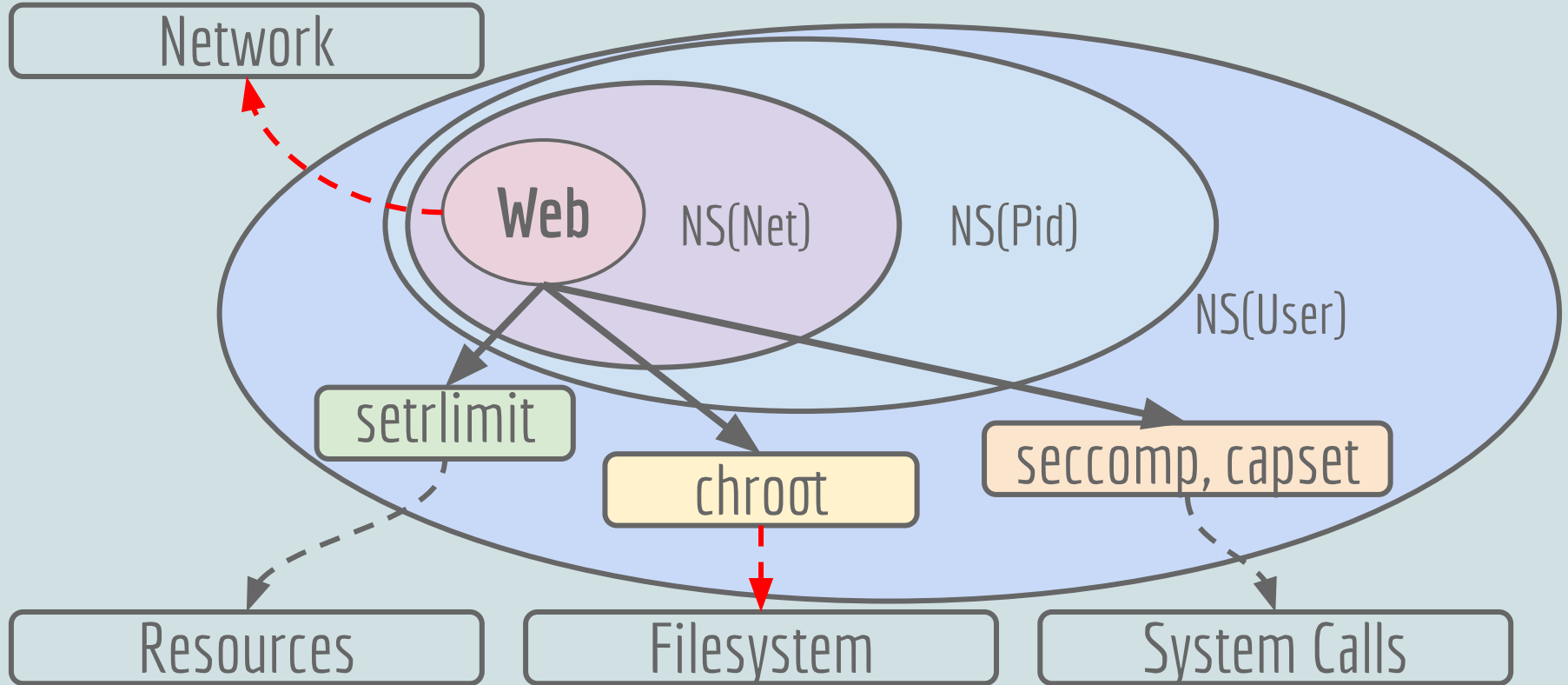
Sandboxing

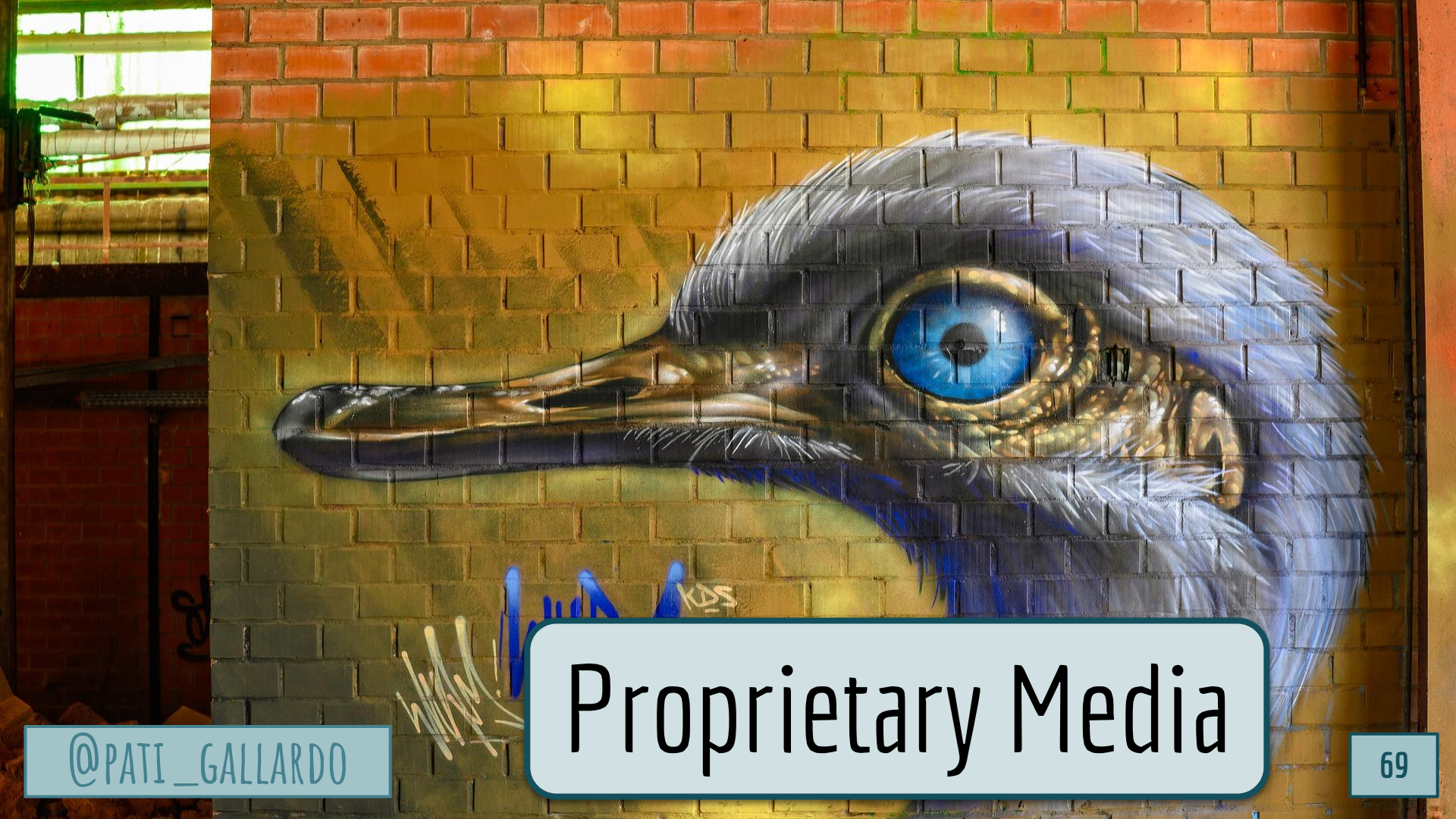
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- Platform specific
- Qt has disabled
- Process architecture different

Linux

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Proprietary Media



- Codec Patents
- Free ffmpeg
- QtMultimedia?



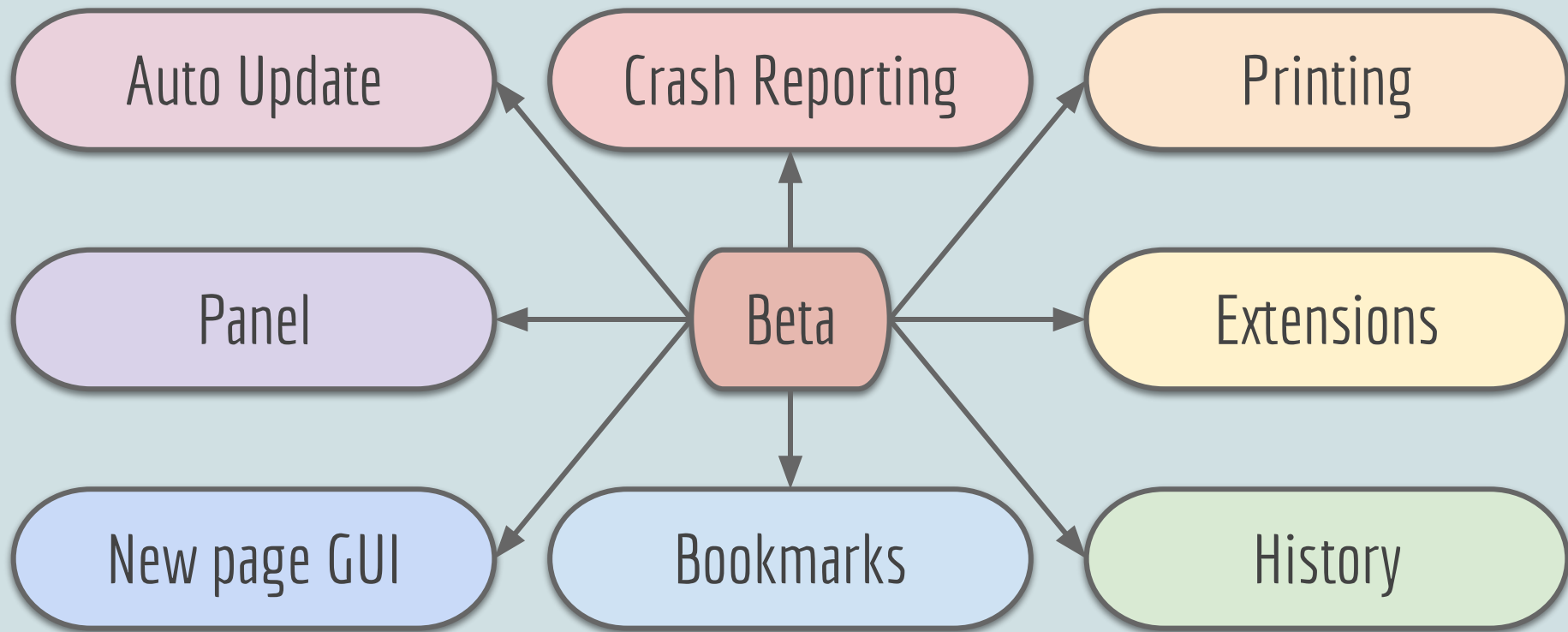
Beta Release

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**We've updated
our privacy
policy.**

@LUSHSUX

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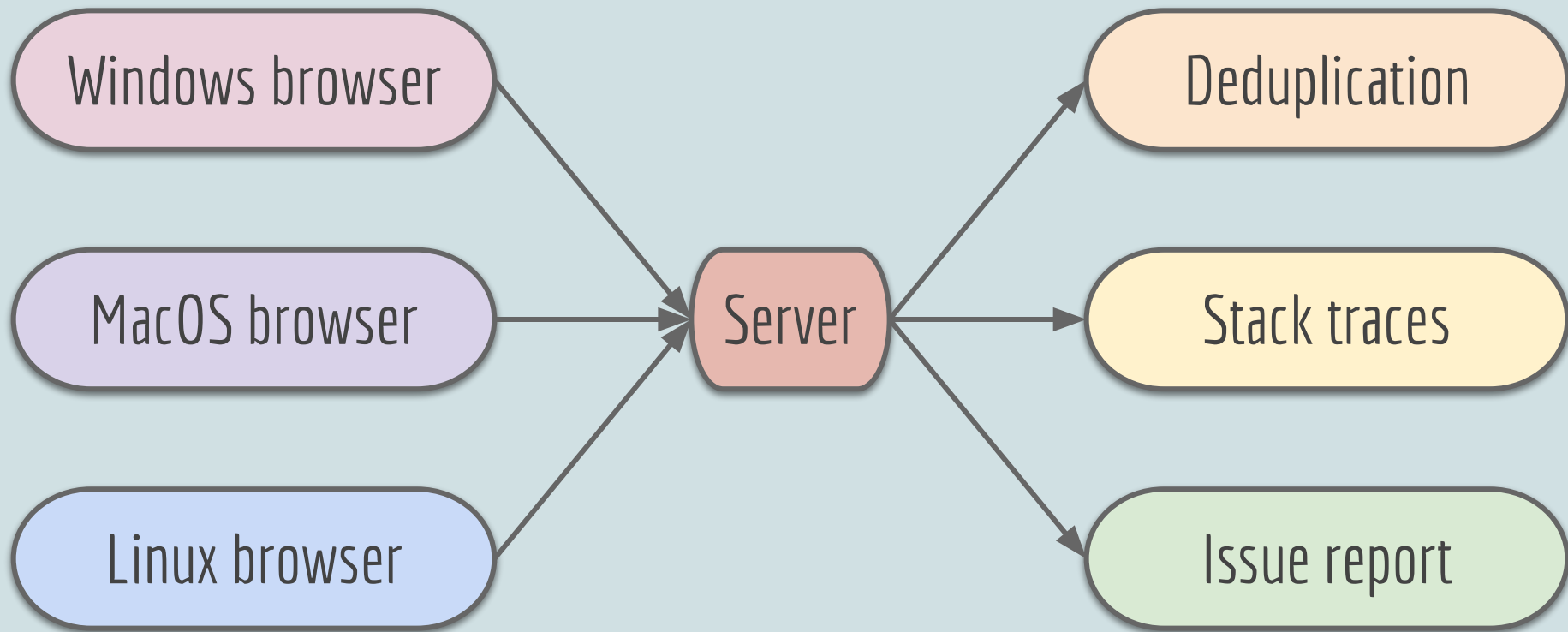
Crash Reporting

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Sentry

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FOOL!

Mobile Alpha

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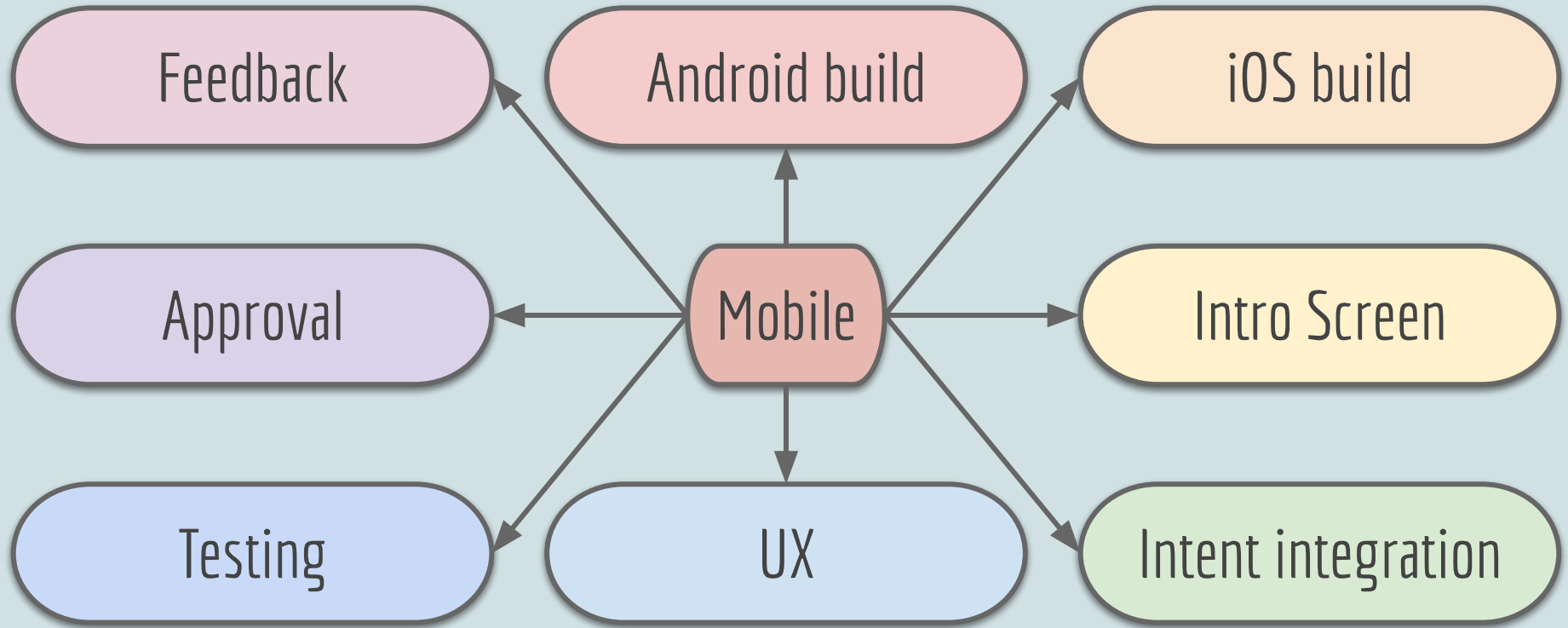
Embedding Platform WebViews

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QtWebView



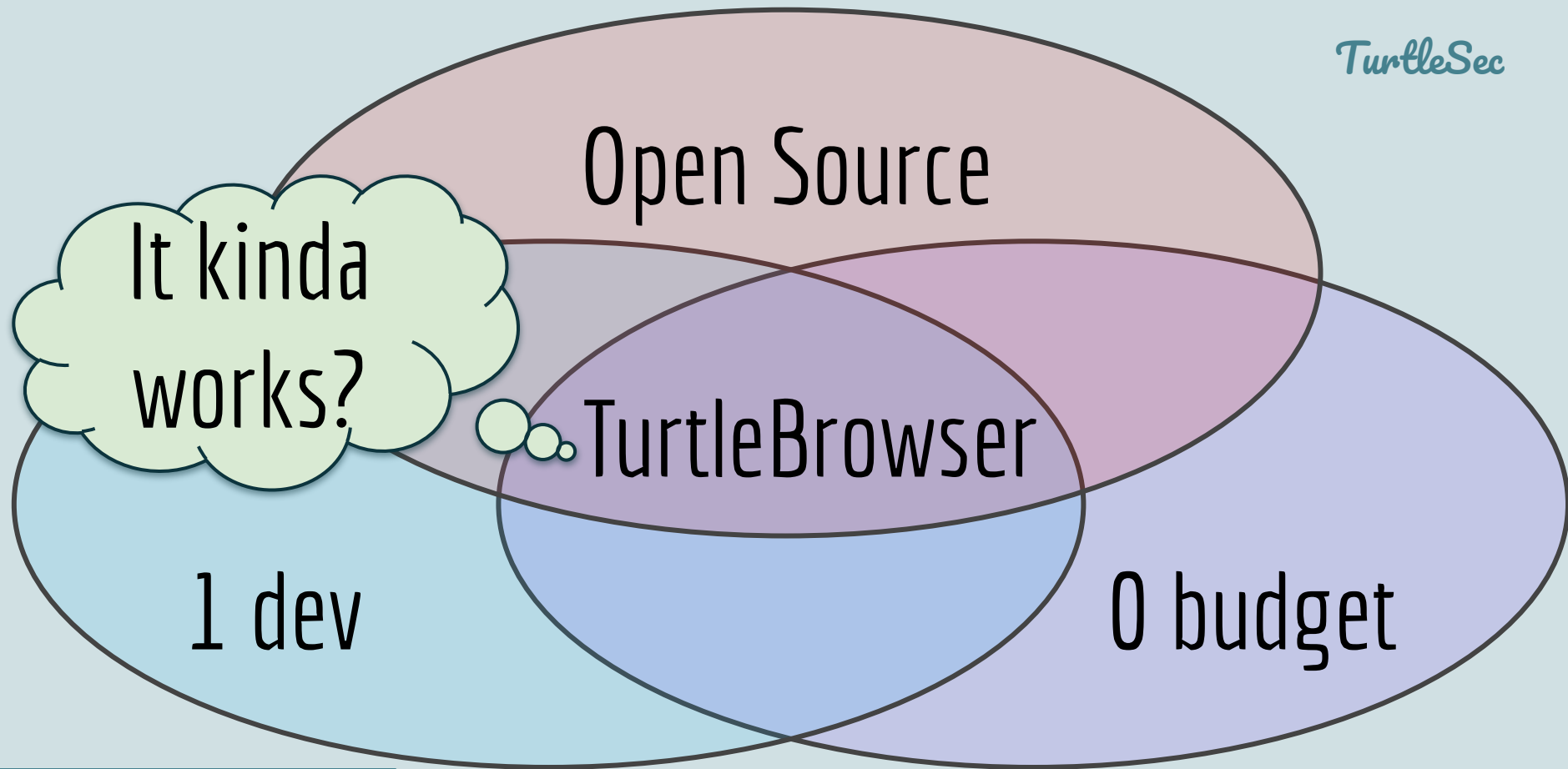
November 2020



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Making a browser is not a one person job
Just to keep up with Chromium is a full/part-time job
But you can get pretty far with just one person
And little or no money

We need a way to pay for Open Source Software
GitHub Sponsor?





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Questions?

Photos from pixabay.com

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