Shipping COLRv1 in Chrome

BlinkOn 15

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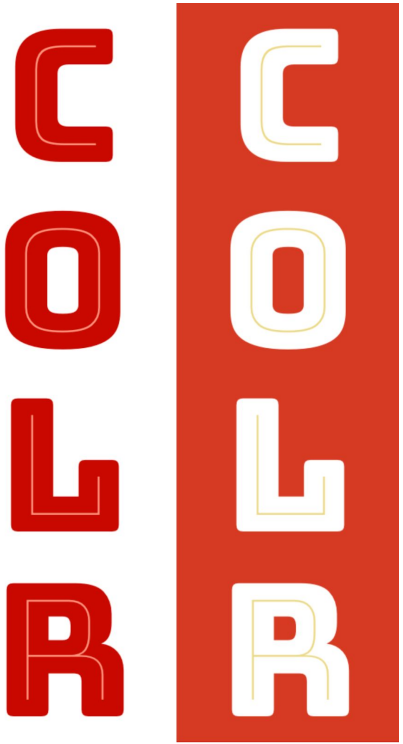
In this talk

- Color Fonts?
- How does the COLRv1 format work?
- Enabling new use cases on the web
- COLRv1 in Chrome
- Shipping COLRv1
- Outlook

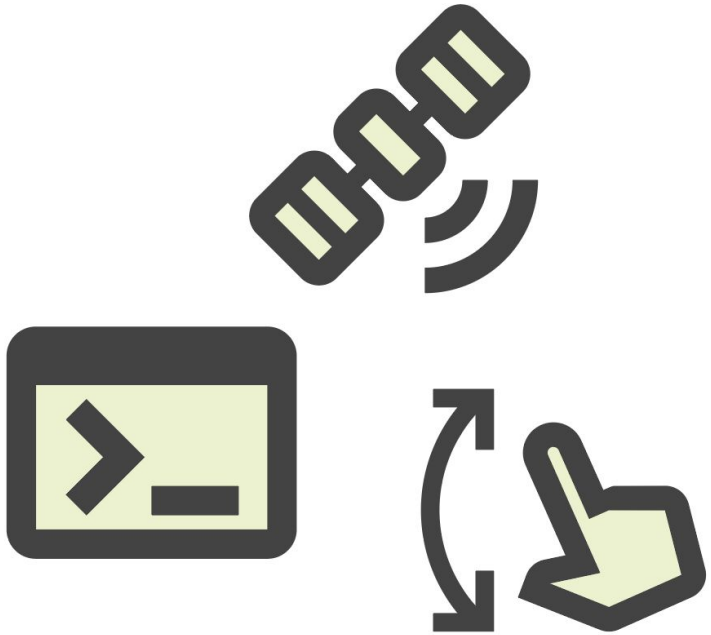
Color Fonts?

Lobster
Lobster

National Park Emoji from Noto Emoji by Jennifer Daniel
https://github.com/googlefonts/noto-emoji/



Bungee by DJR https://djr.com/bungee



Material Two Tone Icons https://fonts.google.com/icons

Reem-Kufi Arabic font by Khaled Hosny
https://github.com/aliftype/reem-kufi

COLRv1 Format

COLRv1 glyphs are a
directed acyclic graph
of paint operations.

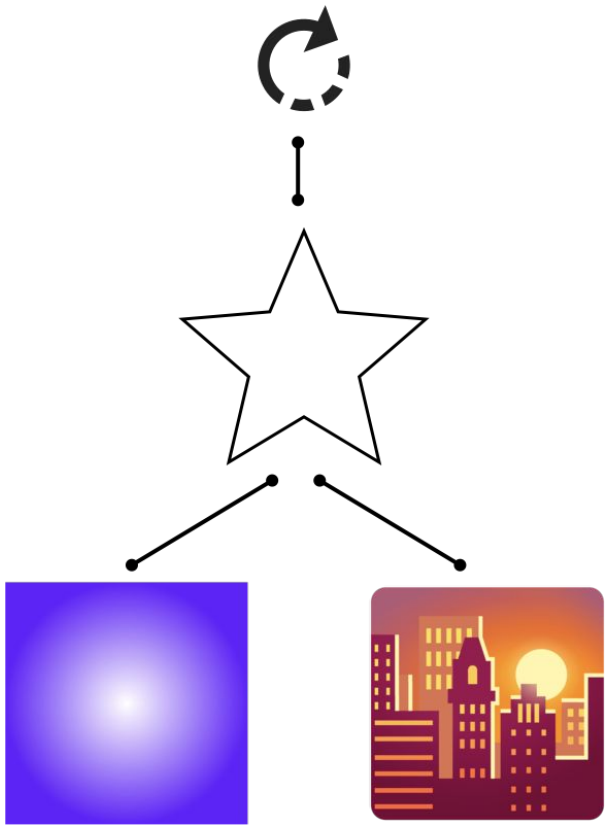
Rendering a COLRv1 glyph means:

Traverse the graph and execute the 2D graphics operation in each node.

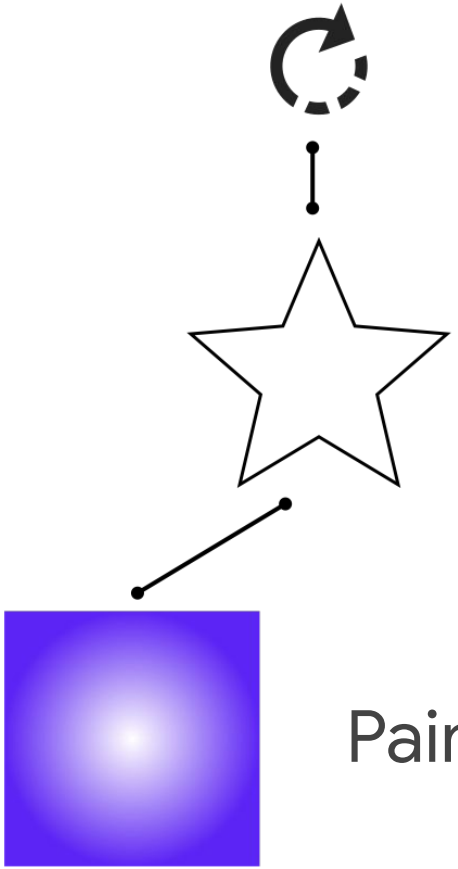
PaintRotate

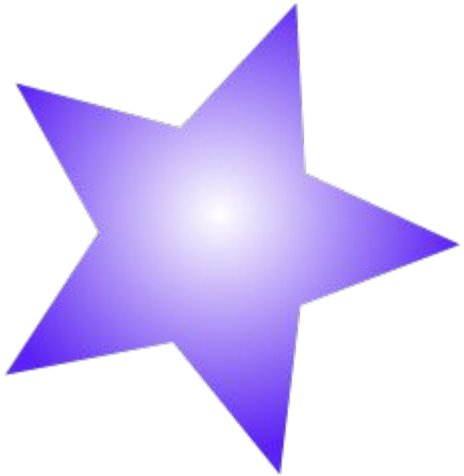
PaintGlyph

PaintRadialGradient

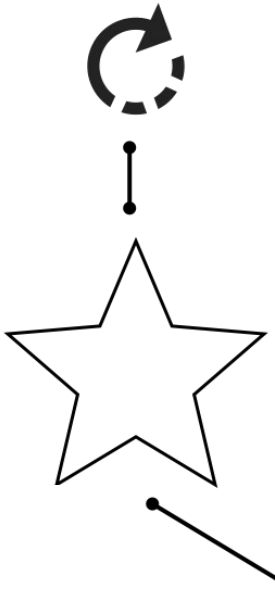


PaintColrGlyph





PaintRadialGradient



PaintColrGlyph

COLRv1 Paint Tables

PaintGlyph
PaintColrLayers
PaintColrGlyph

PaintComposite

PaintSolid
PaintLinearGradient
PaintRadialGradient
PaintSweepGradient

PaintTransform
PaintTranslate
PaintScale
PaintScaleAroundCenter
PaintScaleUniform
PaintScaleUniformAroundCenter
PaintRotate
PaintRotateAroundCenter
PaintSkew
PaintSkewAroundCenter

PaintVarSolid
PaintVarLinearGradient
PaintVarRadialGradient
PaintVarSweepGradient

PaintVarTransform
PaintVarTranslate
PaintVarScale
PaintVarScaleAroundCenter
PaintVarScaleUniform
PaintVarScaleUniformAroundCenter
PaintVarRotate
PaintVarRotateAroundCenter
PaintVarSkew
PaintVarSkewAroundCenter

https://github.com/googlefonts/colr-gradients-spec/#c-structures

Transform & Compose: Layer reuse

Reuse, offset, scaled

SVG & COLRv1

SVG as inputs to picosvg, nanoemoji tools pipeline

SVG

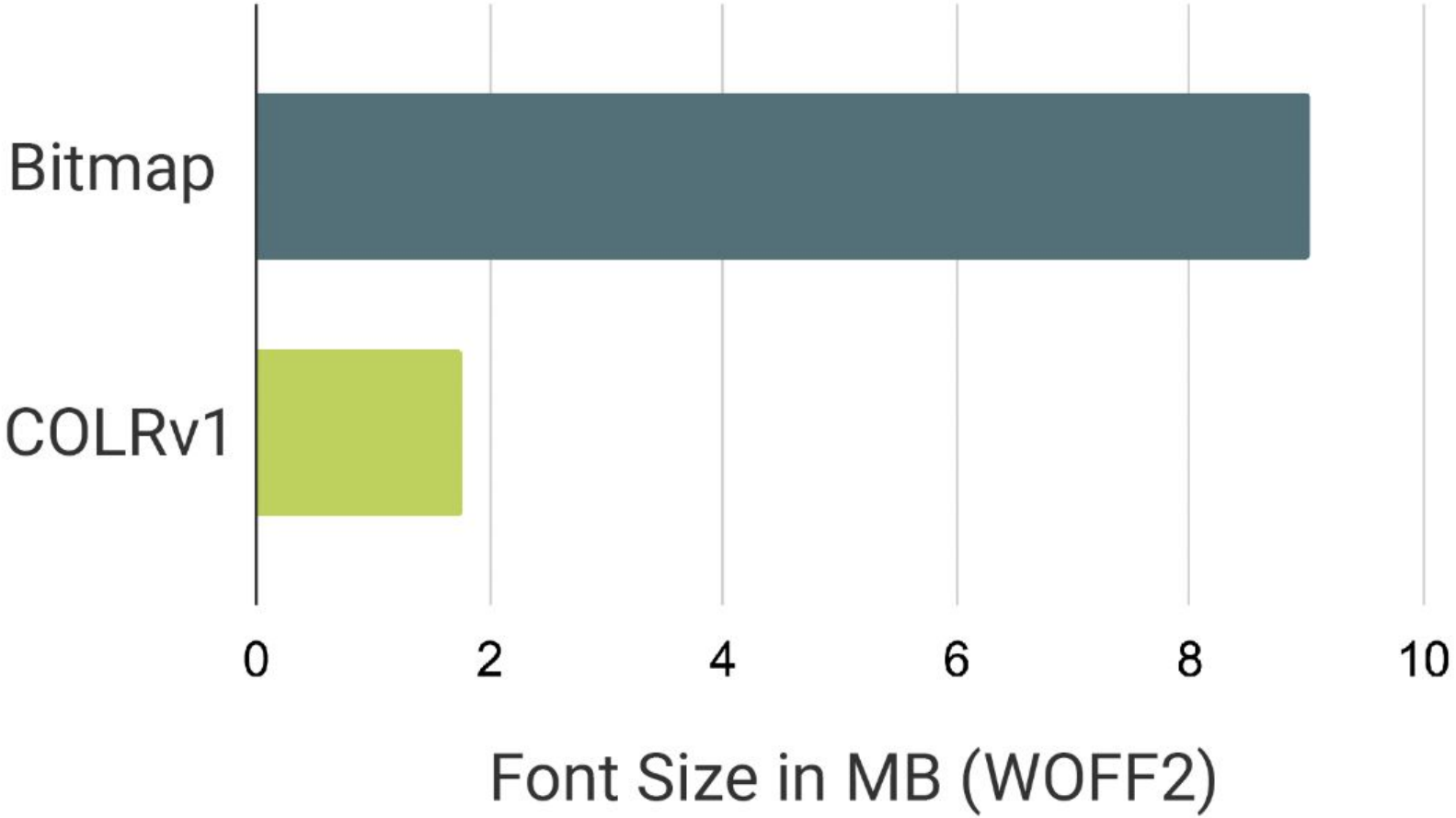
picosvg

Flattened SVG

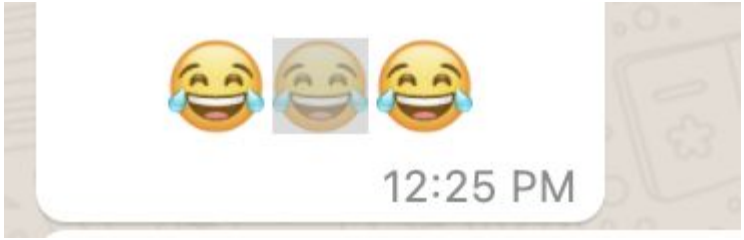
nanoemoji
fonttools

COLRv1 Font Glyph

New Web Use Cases


Bitmap
COLRv1
0
2
4
6
8
10
Font Size in MB (WOFF2)

Overcome image replacement

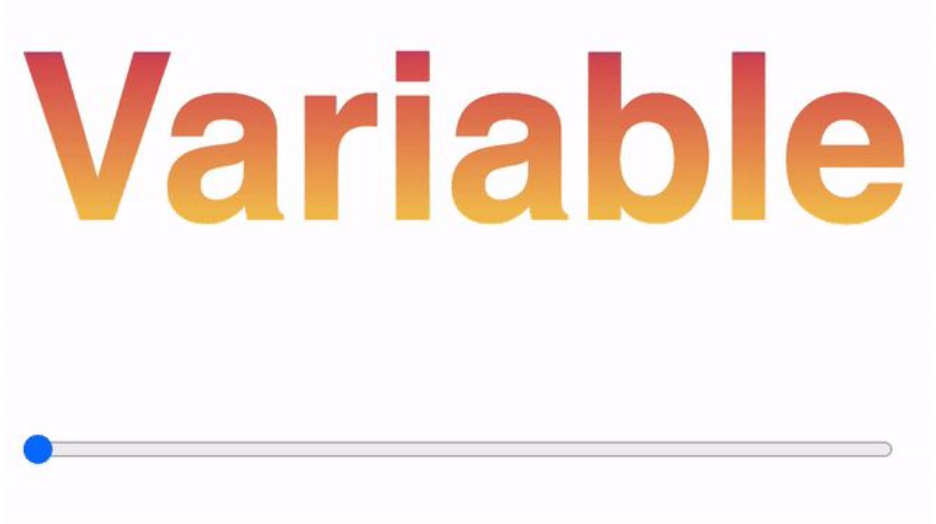



```
▼<span class="_3R6rC"> == $0
    <img crossorigin="anonymous" src="/img/8d34dcc… w 1888-64.png" alt="😂"
    draggable="false" class="_2UdhN _3Ci02 i0jNr selectable-text copyable-text"
    data-plain-text="😂" style="visibility: visible;">
  </span>
```

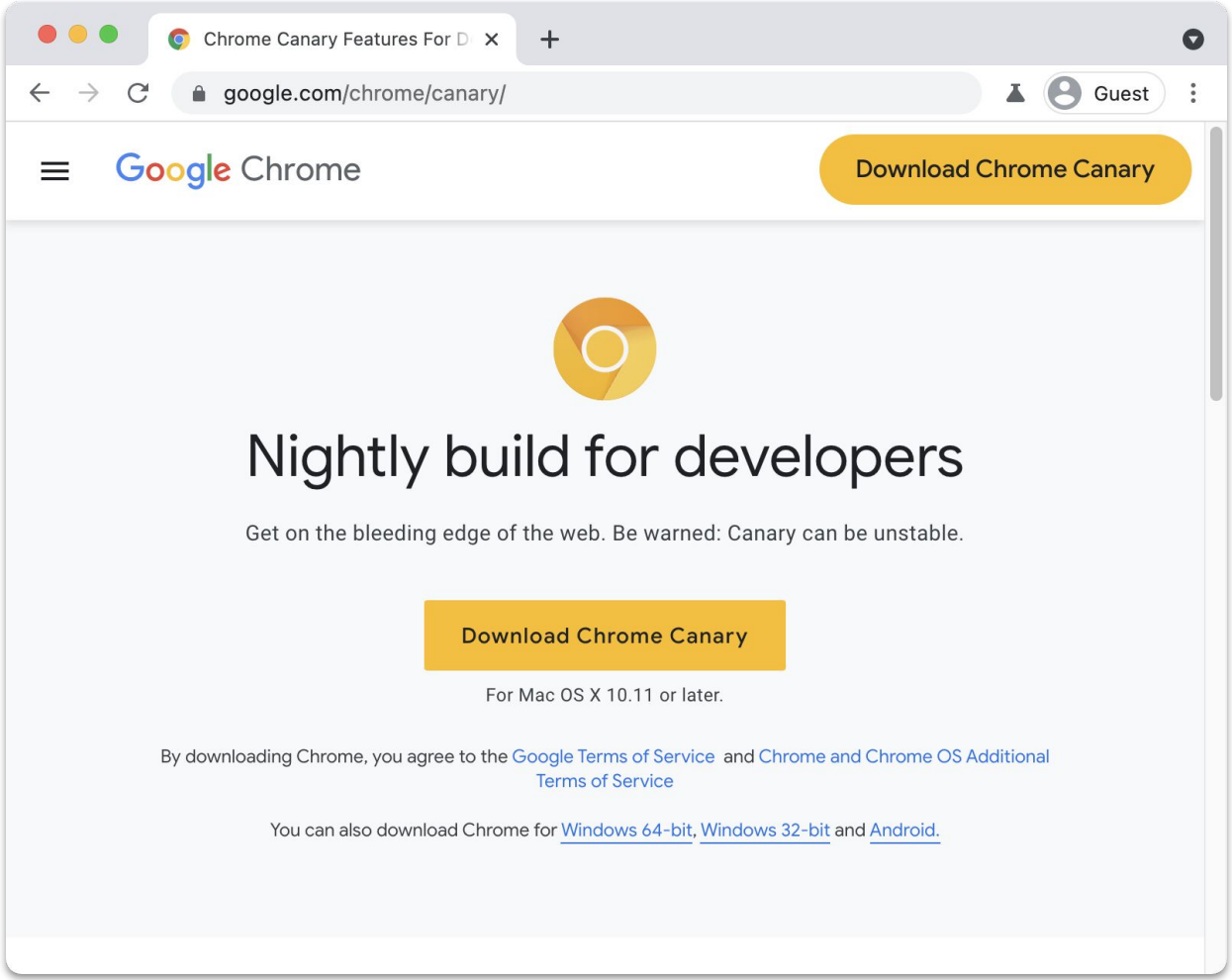
Variable Color Fonts

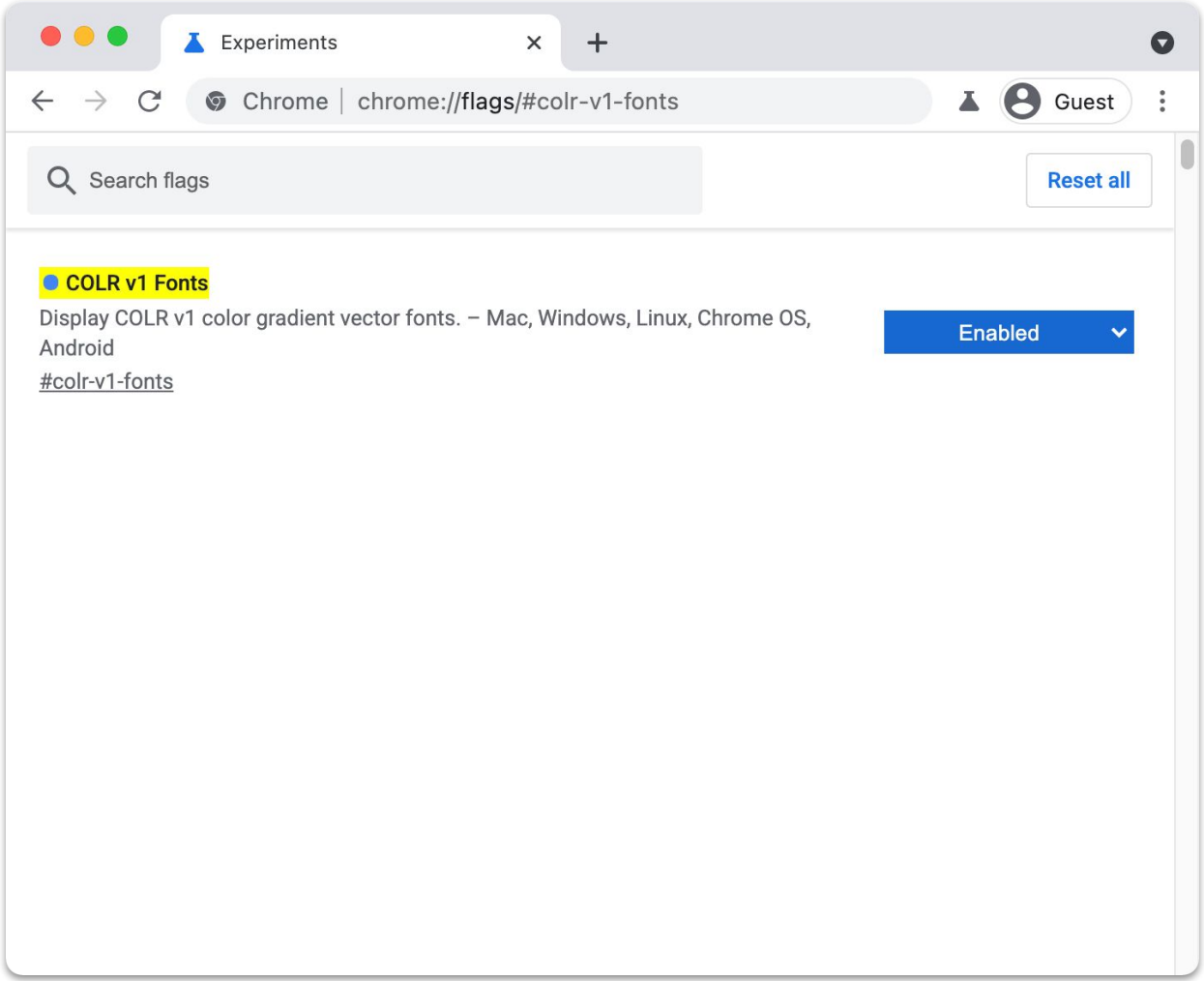
Elements become variable:

- Shapes (glyph outlines)
- Gradient placement, color stop offsets
- Color value alphas
- Transforms (e.g., rotation angles)

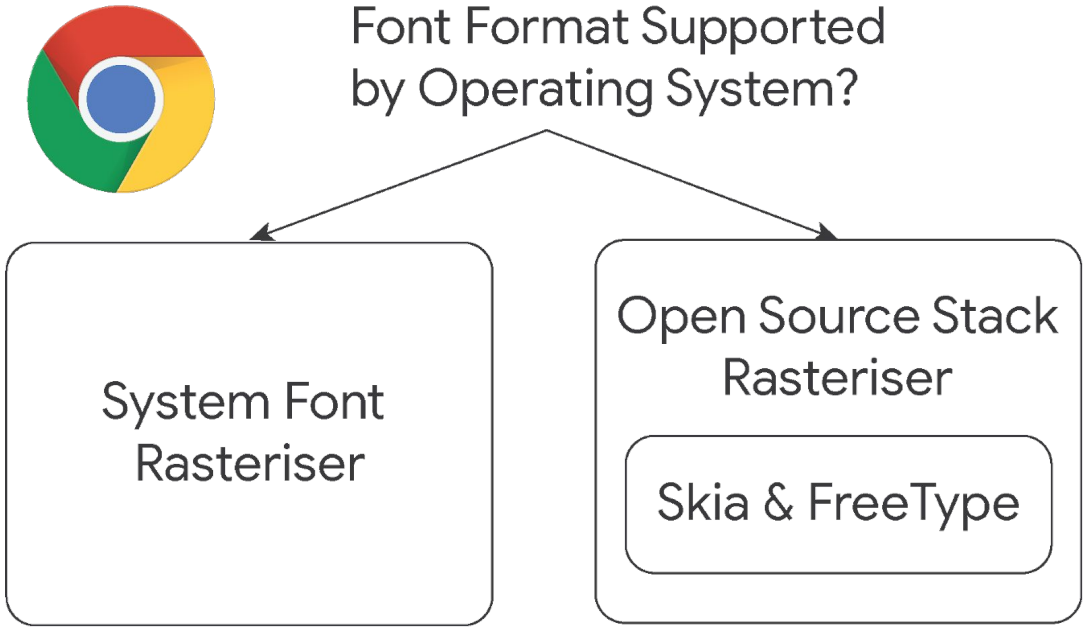


COLRv1 in Chrome & OSS


Chrome Canary Features For D
google.com/chrome/canary/
Guest
Google Chrome
Download Chrome Canary
Nightly build for developers
Get on the bleeding edge of the web. Be warned: Canary can be unstable.
Download Chrome Canary
For Mac OS X 10.11 or later.
By downloading Chrome, you agree to the Google Terms of Service and Chrome and Chrome OS Additional Terms of Service
You can also download Chrome for Windows 64-bit, Windows 32-bit and Android.


Experiments
Chrome | chrome://flags/#colr-v1-fonts
Guest
Search flags
Reset all
COLR v1 Fonts
Display COLR v1 color gradient vector fonts. – Mac, Windows, Linux, Chrome OS, Android
#colr-v1-fonts
Enabled

Hybrid Font Stack



Open-Source Foundations for COLRv1 in Chrome

Loads and displays COLRv1 web fonts

Traverses COLRv1 glyph graph, executes graphics operations

Understands COLRv1 & CPAL tables

COLRv1 in OSS

- Black Foundry Python based renderer
  - https://github.com/BlackFoundryCom/black-renderer
- Issues for COLRv1 support filed for Swash
  - “Add support for COLRv1” https://github.com/dfrg/swash/issues/21
  - “Implement a reference rasterizer for COLRv1 outlines” https://github.com/dfrg/swash/issues/22

Shipping

Intent-to-ship
3 × LGTM

https://groups.google.com/a/chromium.org/g/blink-dev/c/kDfj3rcA6sc/m/77Ary8NVBwAJ

Noteworthy Positions - Microsoft

“COLR v1 also has the significant advantage of being much better integrated into other aspects of the OpenType format, notably variations.

For all these reasons, I believe the enhanced COLR table has the best prospects among the various OpenType colour formats [...].”

Peter Constable (MS) on blink-dev

Noteworthy Positions - Mozilla's Jonathan Kew

"I suspect that in the longer term, COLRv1 may (should?) eclipse OT-SVG as the preferred format for "rich" color fonts. [...]

In summary, then, I think we should consider this as "worth prototyping"."

Jonathan Kew (Mozilla) on Mozilla's standards positions tracker

Outlook

Feature Detection

CSS

```
@supports(font-technology(color-colrv1)) {
    @font-face {
        font-family: “my_colrv1_font”;
        src: url(my_colrv1_font.otf);
        unicode-range: …;
    }
}
```

Feature Detection

JavaScript

```
function isCOLRv1Supported() {
    return CSS.supports(
        “font-technology(color-colrv1)”);
}
```

CSS font-palette support

§ 9.1. Controlling Color Font Palettes: The ‘font-palette’ property

Name:	***‘font-palette’***
Value:	normal | light | dark | <palette-identifier>

https://crbug.com/1170794

COLRv2?

Capabilities?

- Bitmap embedding support
- Filter effects
  - blur, lighting, shadows...
- Bitmap patterns
- Mesh gradients

CPAL palette enhancements?

- Variation of color values
- Other representations than RGB — HSL, Lab, LCH...
- Wide color gamut

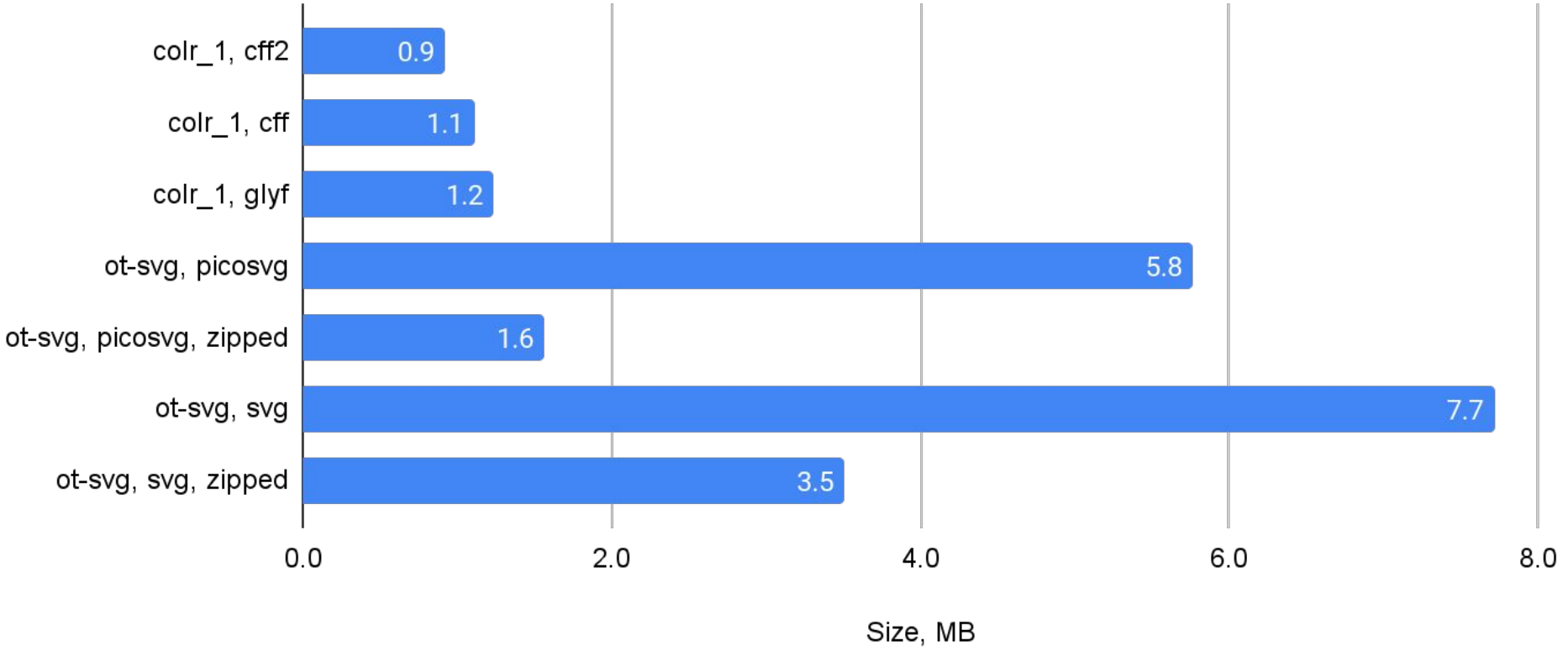
Recap

- COLRv1 is a highly space efficient color font format
- COLRv1 enables new use-cases on the web
- Implemented in Chrome's hybrid font stack

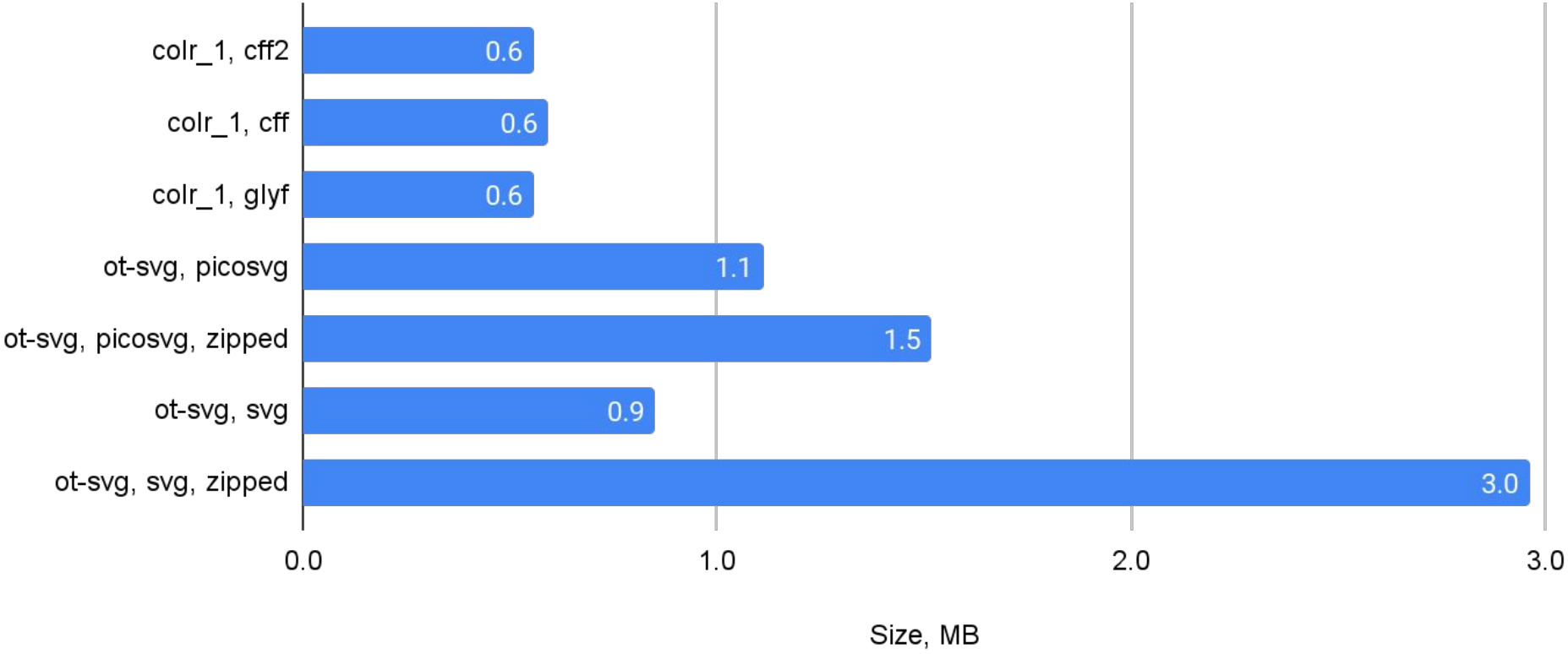
  based on FreeType and Skia
- I2S LGTM'ed, flipping the flag real soon now

Thank you!

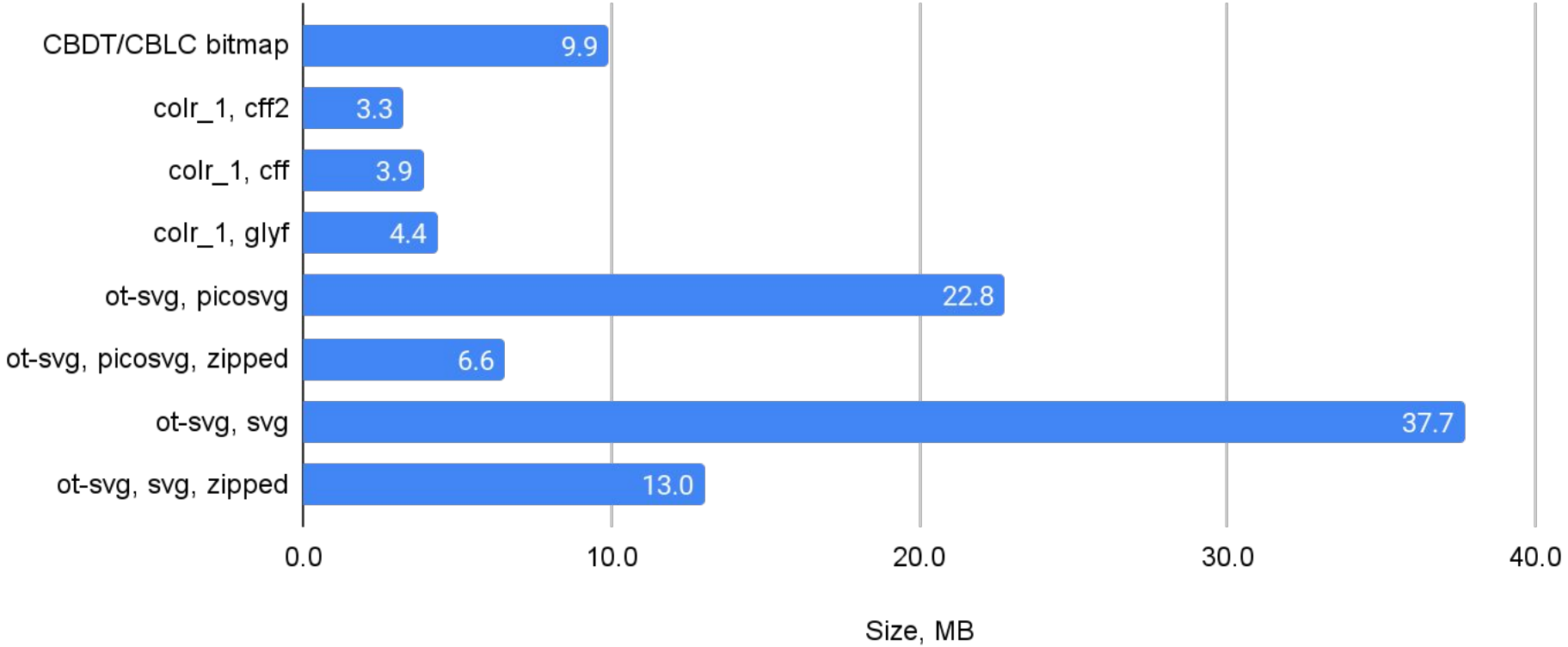
Twemoji, at rest



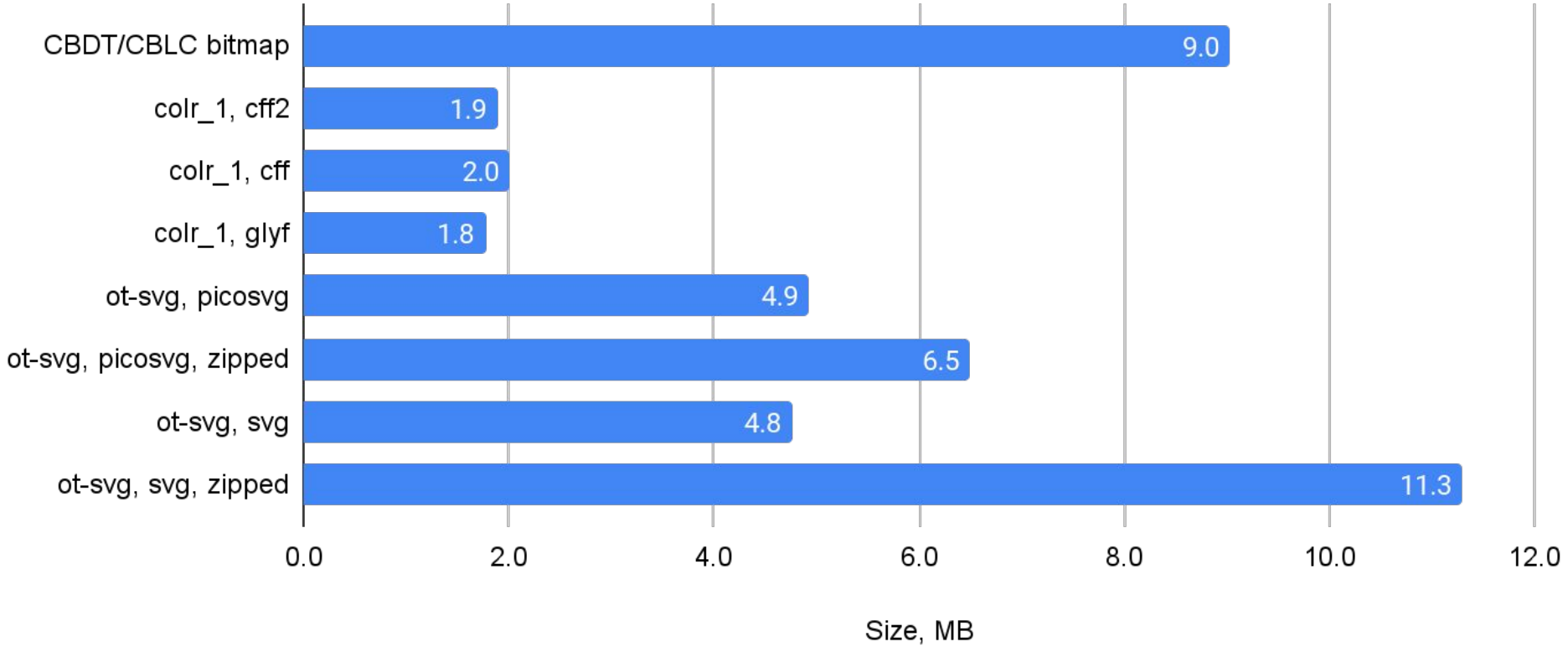
Twemoji, in flight



Noto Emoji, at rest



Noto Emoji, in flight



COLRv1

- Binary Format, fast to parse
- Highly space-efficient
- Integrates with variations and incremental transfer
- Lower implementation complexity, likely safer
- No XML dependency

OT-SVG

- XML documents embedded in OpenType file
- Large files
- XML parser dependency and overhead
- No support for variations
- Interoperability issues

IMPORTANT INFORMATION

Technical, Best Practices & Etiquette

**Pro Tip: Please check your Network Connectivity Settings & browser compatibility prior to your talk*

- Please review Best Practices for Speakers
- Preferable to use a hard line connection over wireless & headset
- Find a quiet location with a background that's not too distracting
- Have a light source in front of you to help bring the focus on you
- Put your devices in "Do Not Disturb" mode to silence notifications on your computer & other nearby devices
- Mute your mic when you are not speaking
- Look directly into the camera as much as possible to establish eye contact with your viewers
- sign up for a Hopin Demo or watch a short orientation video for attendees

Breakout Session Instructions

To present your slides live or pre-recorded talk

1. When it's time for you to start your session, click on your session you have been assigned in your calendar invite
    - Choose how you would like to capture captions for your presentation:
        - Syncwords Integration
        - Accessibility: Tips on Using Captions and Translations
        - Creating Captions with Google Slides
        - Creating Captions with Google Meet and Zoom
        - Webcaptioner
    - Click share audio and video
    - Once you are on screen, you are live to anyone viewing the session
2. As the moderator, you will be able to bring people onto the screen from the moderation panel in your bottom left corner.
3. Click the "Return" button to go back to the "Main Event page" when your session is complete

Live Captions on Google Chrome

Follow these steps to enable Google Chrome's live captioning tool if you want to see captions anytime audio is detected through your browser:

1. Copy and paste this link into Chrome: **chrome://settings/accessibility**
2. Toggle the *"Live Caption"* control on. When **Live Caption** is on, the toggle turns blue
3. Quit and relaunch Chrome.
    a. The next time Google Chrome detects audio (whether you're watching a video, chatting on Google Meet or attending an event on Hopin), the **Live Caption** window will automatically appear.

Hopin Resources

**Pro Tip: Don't have many apps or tabs open while using hopin for best performance*

Tech Troubleshooting and Speaker Resources

- Speaker Instructions
- Organizers, Moderators, and Speakers
- Speakers vs. Moderators
- Attendee Troubleshooting Steps
- Troubleshooting Steps
- Hopin Knowledge Base
- Troubleshooting Tips