

# Frame Timing and Pacing in XR

Lots of pretty charts



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COLLABORA

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## COLLABORA Talk to me about

- XR, VR & AR
- Volt Programming Language
- Voxel/SVO rendering
- FOSS & Society
- Joining Collabora!





## • What is a frame? Tools Graphs Wrapping up



## What is a frame?

### Anatomy of a frame

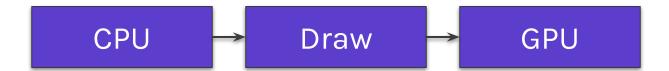
### • CPU

- Logic
- Drawing
- GPU





### On a line

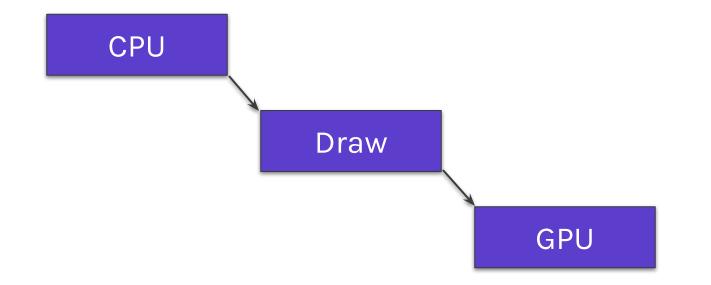






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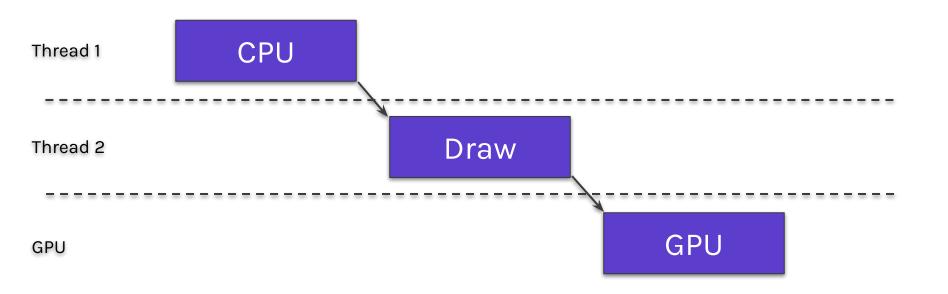
### Waterfall







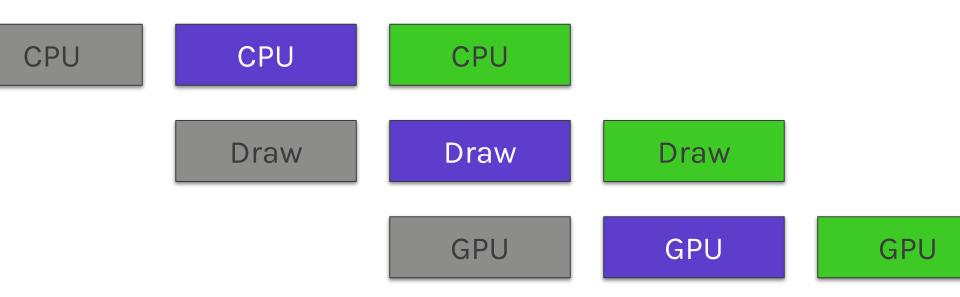








**Pipeline** 

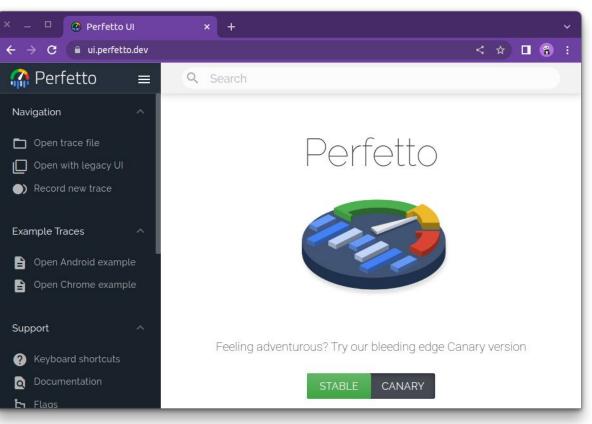








Tools



### Perfetto

- Google Project
- Server/Client(s)
- System tracing
- Fancy UI





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## Home growned scripts

- Dump data from Monado
- Process in Python
- Visualise using Bokeh







Graphs

### Perfetto demos

- System tracing
- Monado trace
  - Graphics composition
  - Compute composition





### **Monado Metrics**

- Pretty graphs
- Compare to perfetto trace







## Backup pictures And for offline viewing



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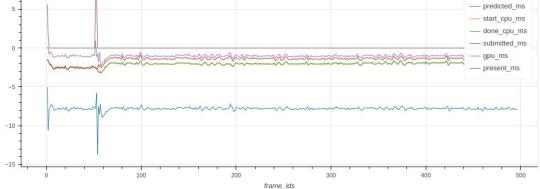
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# Wrapping Up

## Some thoughts

- Perfetto limitations
  - Overlapping calls
- I'm not a python programmer

• Oh god what am I doing?!







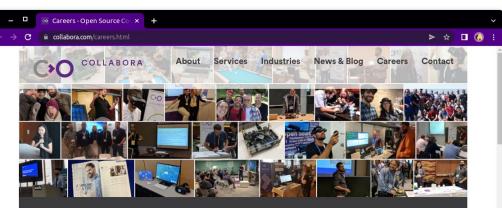
## **Questions?**





#### We are hiring!

COLLABORA



#### Open Source all day, every day

For over 13 years, we've helped clients navigate the ever-evolving world of Open Source, enabling them to develop the best solutions – whether writing a line of code or shaping a longer-term strategic software development plan.

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#### More on Careers @ Collabora



Empathy first: Driving growth through people leadership



Engaging in an "Open First" remote internship at Collabora



Why remote working can be good for people, business and environment





### Links

- https://monado.freedesktop.org/
- https://perfetto.dev
- <u>https://ui.perfetto.dev</u>
- https://gitlab.freedesktop.org/monado/utilities/metrics
- https://www.collabora.com/careers.html







## Thank you!



