Introduction to

A modern 2D graphics library

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What is Skia?

What is Skia?

A library for drawing 2D Text, Geometries and Images

Focus on accurate, high quality and high performance rendering

What is Skia?

Cross-platform: Linux, Android, ChromeOS, Mac, Windows, ...

and hardware architectures too:
x86, x86_64, ARMv7, AArch64, MIPS, ...

What is Skia?

Open source, licensed under
the New BSD free software license

Figure 1. Skia in the software stack

Originally developed by Skia, Inc,
acquired by Google in 2005,
then released as open source

Sponsored and managed by Google ever since

Similar projects

Cairo, QPainter (Qt), Direct2D,
Cocoa Drawing

Why should I care?

Who uses Skia?

Who uses Skia?

Android   Chromium   Chrome   Firefox   Firefox OS

Combined user-base could be above 1.5 billion

How Skia works?

(Figure 2. High level architecture)

Skia backends

- Raster
- OpenGL (ES)
- PDF
- XPS
- Picture

API overview

SkCanvas: main drawing API (drawRect, drawText, drawLine, drawPath, etc)

SkPaint: encapsulates styling of draw calls (color, path style, blending mode, font, etc)

SkDevice: abstracts the backend (SkBitmapDevice, SkGpuDevice, SkPDFDevice, etc)

SkPicture, SkPicturePlayback:
records and replay draw operations

Main features

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Linear transforms and perspective
(3x3 matrices)

Main features

Shaders, xfermodes, mask filters, path effects

Main features

Antialiasing, transparency, filters

Main features

Deferred drawing (SkDeferredCanvas, SkPicture)

Main features

Subpixel text rendering

Ganesh: the OpenGL(ES) backend

Backend where most of the work is currently focused

Ganesh: the OpenGL(ES) backend

Accelerates 2D Canvas in Chromium/Chrome and Firefox

Expected to accelerate full web content rendering in the future

Some features:

- Accelerate and combine effects with on-demand shaders
- Batching and merging of draw operations
- Geometry shaders
- Accelerated path rendering if available (NV_path_rendering)

Performance

Great tools available:

- Benchmarks in Skia repository under /bench
- [Skia-telemetry](#)
- [skiaperf.com](#)

- Chromium/Chrome's about:tracing can also help

Lack of public benchmarks against similar libraries

The future of Skia

Backend work:

- Enhance PDF for Android and Chrome
- Many GPU backend changes

Platform support:

- C++11 enablement
- GLSL ES 3.0

APIs and New Features:

- Shareable pictures across process boundaries
- sRGB support, in partnership with Chrome

Dev and Test Infrastructure:

- New correctness testing framework
- More frequent recapturing of web archives for buildbot and cluster telemetry testing

Contributing to Skia

Three well defined roles:
developer, **contributor**, **committer**

Report bugs to the issue tracker

Test: try Skia in your platform/hardware. Feed back!

Contribute code: fix bugs, implement features in the roadmap

beginners, look for issues tagged GoodFirstBug

Benchmark: compare Skia perf against other libraries in your platform/hardware; publish results!

For references and more info:

https://sites.google.com/site/skiadocs/

Thank you!

Q & A