



Presents

SKIA

FOR  DELPHI

The word 'SKIA' is written in large, bold, orange, uppercase letters. Below it, the word 'FOR' is in smaller orange uppercase letters, followed by a red Skia logo (a stylized 'S' with a curved line), and then the word 'DELPHI' in orange uppercase letters.

Ian Barker
Delphi MVP
@punctuation



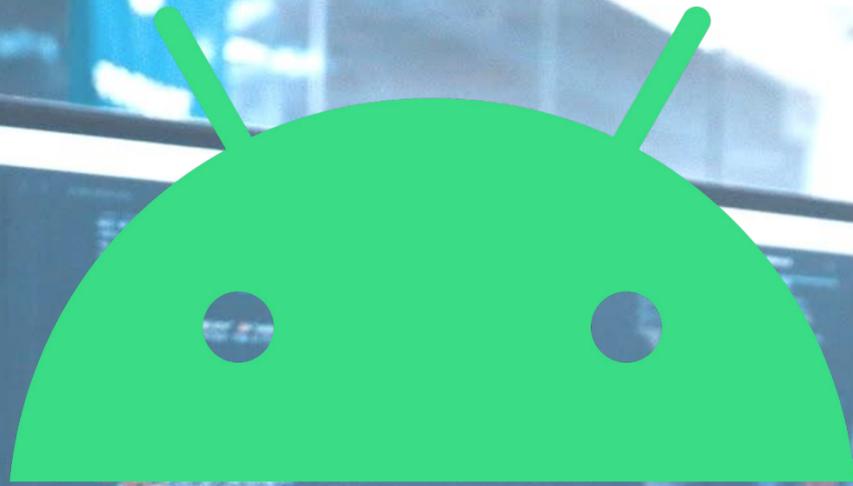
Jim McKeeth
Dev Advocate
@JimMcKeeth

Slides, replay, links and more: blogs.embarcadero.com/?p=140459

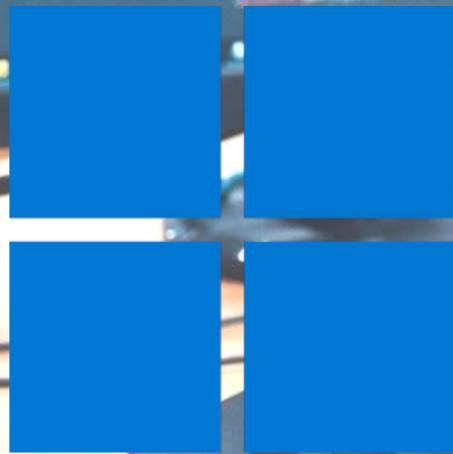
A meme featuring Chris Pratt in a white dress shirt and a striped tie. He has a confused or questioning expression on his face. The background is a blurred office setting.

**I HAVE NO
IDEA WHAT SKIA IS**

**AND AT THIS POINT
I'M TOO AFRAID TO ASK...**



ios mac OS



Imagine you are a software developer who needs to reach all the major platforms today.

Native

Direct access to the hardware.

Separate code for each platform.



The Traditional Choices

Web / Cloud

Mostly shared code.

Detached from hardware.



A new foe has appeared!

CHALLENGER APPROACHING



FireMonkey

Native Compiled

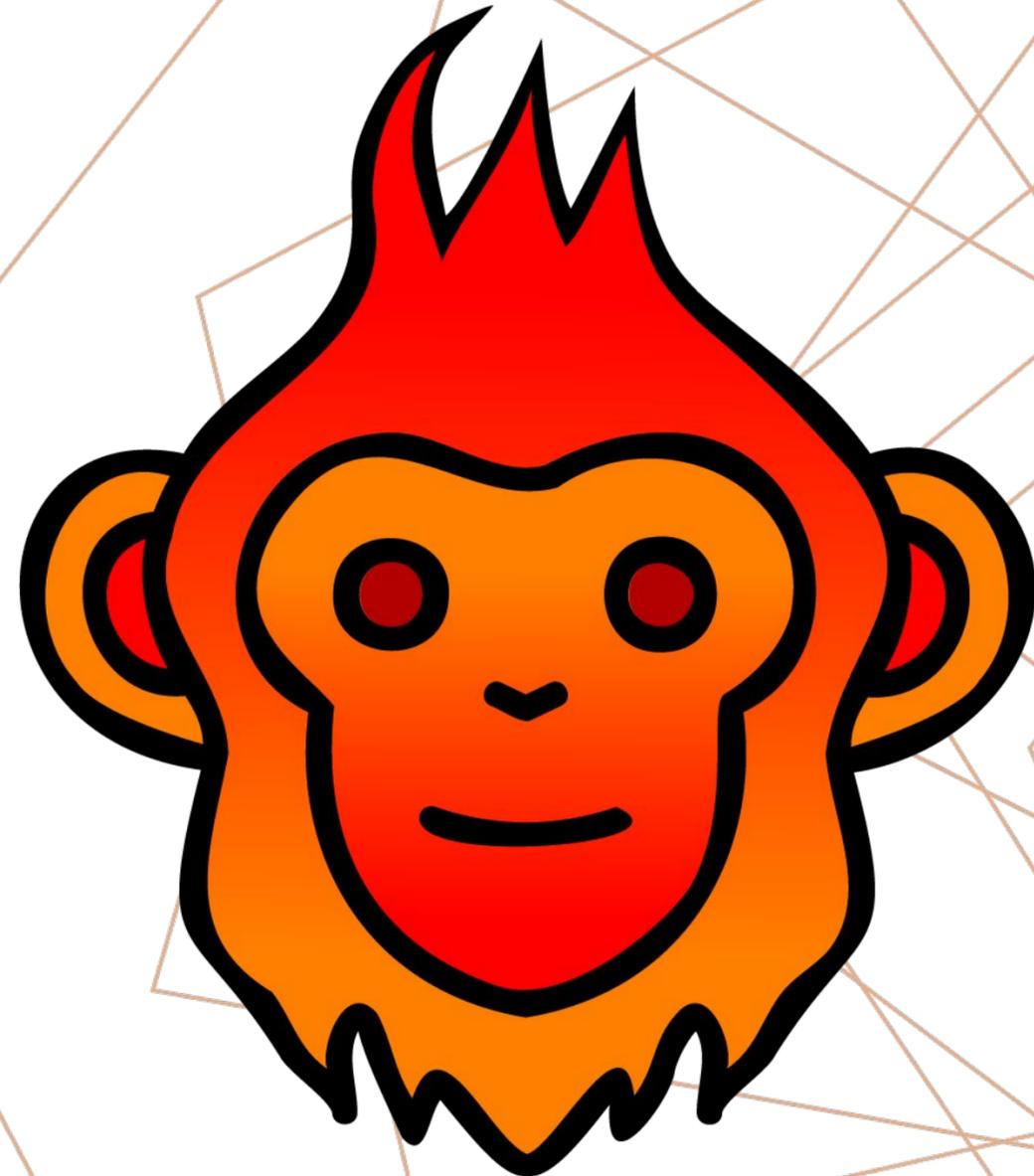
Direct access to the platform hardware.

Multi-Platform

One code base for all platforms.

Component Based Visual Designer

Maximize developer productivity.





Not sure how

Skia

fits in here...

Google Skia

Google Skia is the *open source* graphics engine for Google Chrome, Android, Flutter, Xamarin, Firefox, and many others.

It provides common 2D APIs that work on a variety of platforms, abstracting complexities in implementing low-level libraries it uses behind it, such as Vulkan, DirectX, Metal and others, implementing many optimizations and new features.

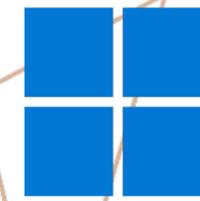
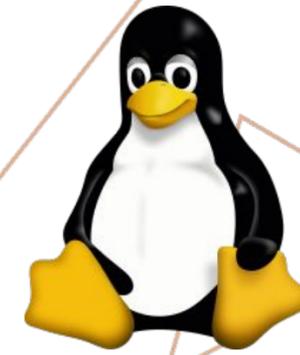


- skia.org
- skia.org/docs
- github.com/google/skia

Skia Platforms

All the most popular platforms in the world, such as:

- Windows
- macOS
- iOS (including simulator)
- Android (including simulator)
- Linux (main distributions)
- FuchsiaOS
- Tizen
- tvOS
- watchOS



Windows



iOS

TIZEN™



Fuchsia

watchOS

Skia Features

2D DRAWINGS

Shapes, paths and texts

SVG

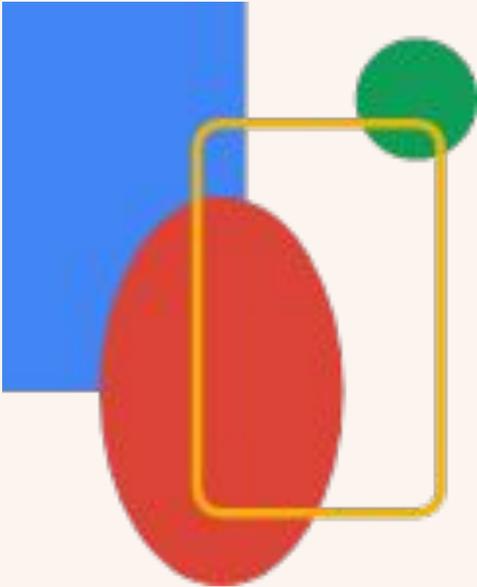
Rendering and creation

IMAGE FORMATS

BMP, GIF, ICO, JPG, PNG, WBMP, WEBP, and raw images

ANIMATED IMAGE FORMATS

Lottie, Telegram Stickers, Animated GIF, and Animated WEBP



Skia Features

ANTIALIASING

High quality drawings with smoothing of jagged edges

PARALLELISM

Possibility to draw in background threads in a really parallel way

PDF

Creation of PDF documents

ADVANCED FONT PROPERTIES

Font weight, families fallbacks, custom font (in a simple way), max number of lines, line spacing, justified text and more



Skia Features

RTL LANGUAGE

Support for texts in Persian, Arabic, Hebrew and other right-to-left languages

UNICODE

Render and string parser (grapheme iterators)

IMAGE/COLOR FILTERS

Apply any type of filter to adjust photo colors, color drawings, produce effects

SHADER LANGUAGE
STANDARDIZATION

Create a single shader code to execute drawings with the GPU on any platform



About Skia4Delphi

- OpenSource
 - Uses a modified fork of Google's Skia
- Cross-Platform & Multi-Framework
- 2D graphics library for Delphi
- Drawing
 - Text
 - Animations
 - Images
- Focus on Quality & Performance

SKIA
FOR  **DELPHI**

www.skia4delphi.org

github.com/skia4delphi/skia4delphi

The Brains Behind Skia4Delphi



- Two brothers from Brazil
- 2021 Spirit of Delphi Winners
- Paulo César Botelho Barbosa
 - github.com/paulocesarbot
- Vinícius Felipe Botelho Barbosa
 - github.com/viniciusfbb
- *With the encouragement and suggestions of Ian and Jim.*

SKIA

FOR  DELPHI

ECONOMY

Open-source project, completely free

EASY TO USE

Easy to install, simple code



Delphi® 11

SKIA
FOR  DELPHI

mbarcadero®

Compatibility

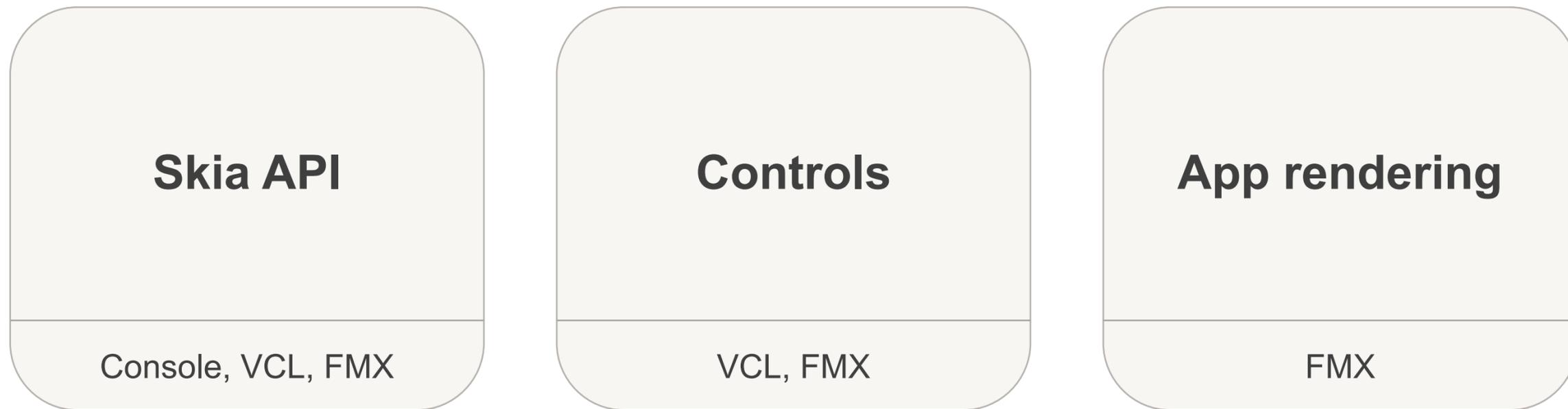
- Delphi 11+: All platforms
- Delphi 10.3+: Windows & Android
- Delphi XE7+: Windows

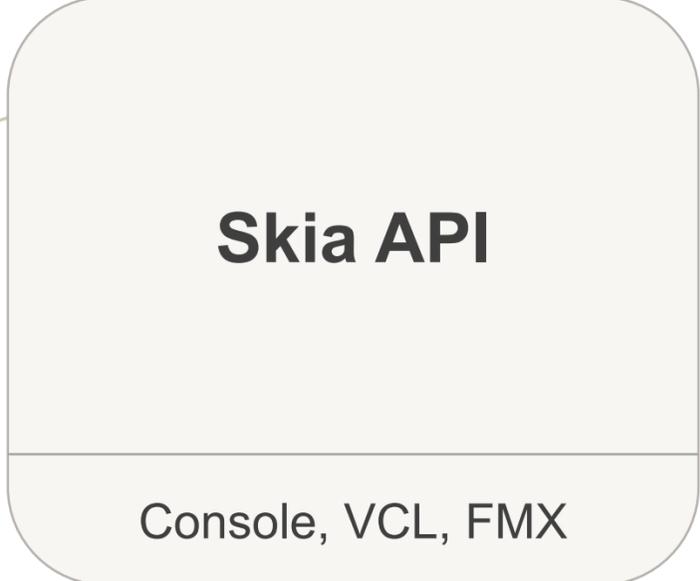
Available via

- [GetIt](#)
- github.com/skia4delphi/skia4delphi

Skia4Delphi Library

The library conceptually exists in 3 parts:





Skia API

Console, VCL, FMX

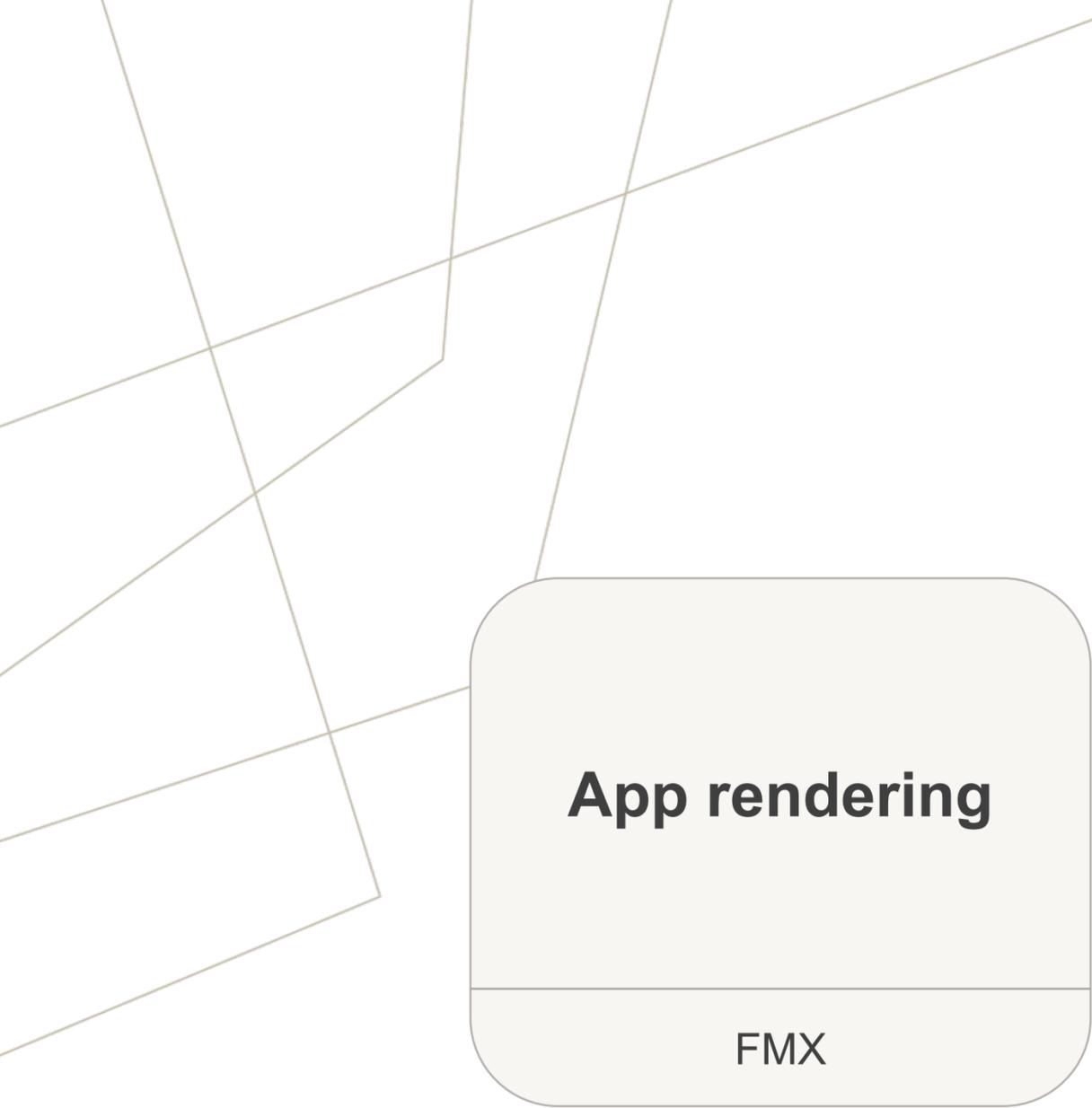
Access to the pure Google Skia library,
through a single unit: **Skia.pas**

Controls

VCL, FMX



- **TSkAnimatedImage:** Play Lottie, Telegram stickers, animated GIF and animated WebP
- **TSkLabel:** Multiple styles in text, font weight, justify alignment, limit max lines, background color on parts of the text, auto size width and height, advanced decorations and more
- **TSkPaintBox:** use OnDraw event to draw with Skia API directly on control
- **TSkSvg:** load icons svgs, change colors and wrap mode



App rendering

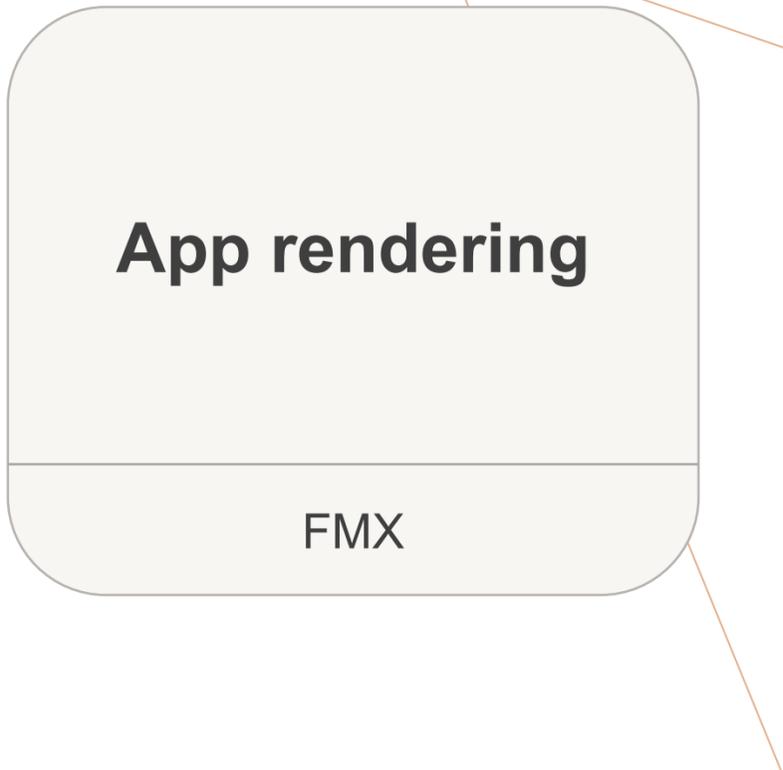
FMX

Optional feature that when enabled, the FMX graphics engine will be replaced by Skia4Delphi's graphics engine, that is, the entire app, all the controls on the screen, will be painted internally by the Skia-based canvas.

That is, by adding just **1 line of code to enable it**, your entire app will automatically:

- Improve the quality of drawings; smoothing of jagged edges
- Gain up to **50% increase in graphics performance**;
- Increase **drawing fidelity**;
- Adds support for **right-to-left languages**;

FMX Canvas



App rendering

FMX

uses

System.StartupCopy,

FMX.Forms,

Skia.FMX,

Unit1 in 'Unit1.pas' {Form1};

{*\$R *.res*}

begin

GlobalUseSkia := True;

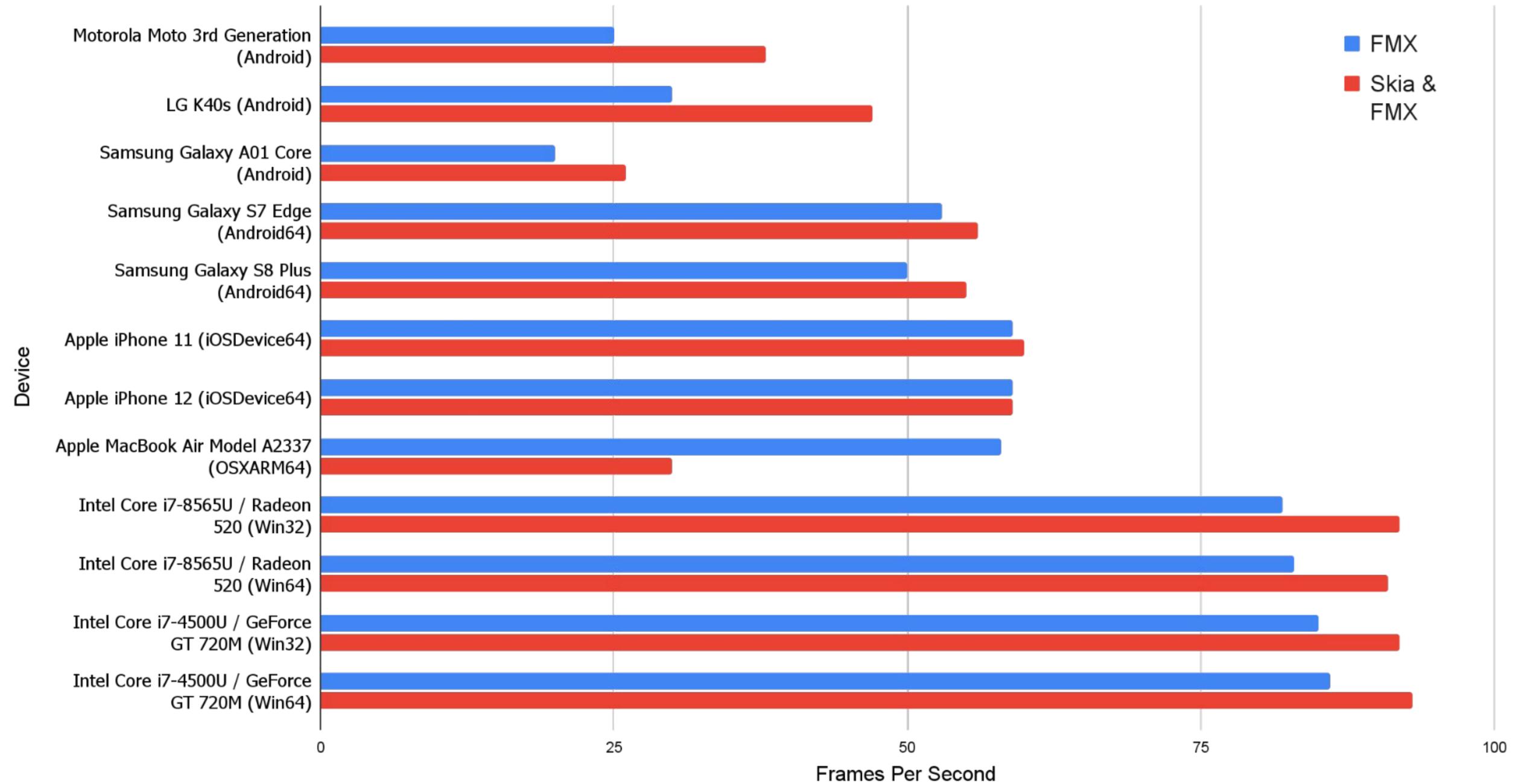
Application.Initialize;

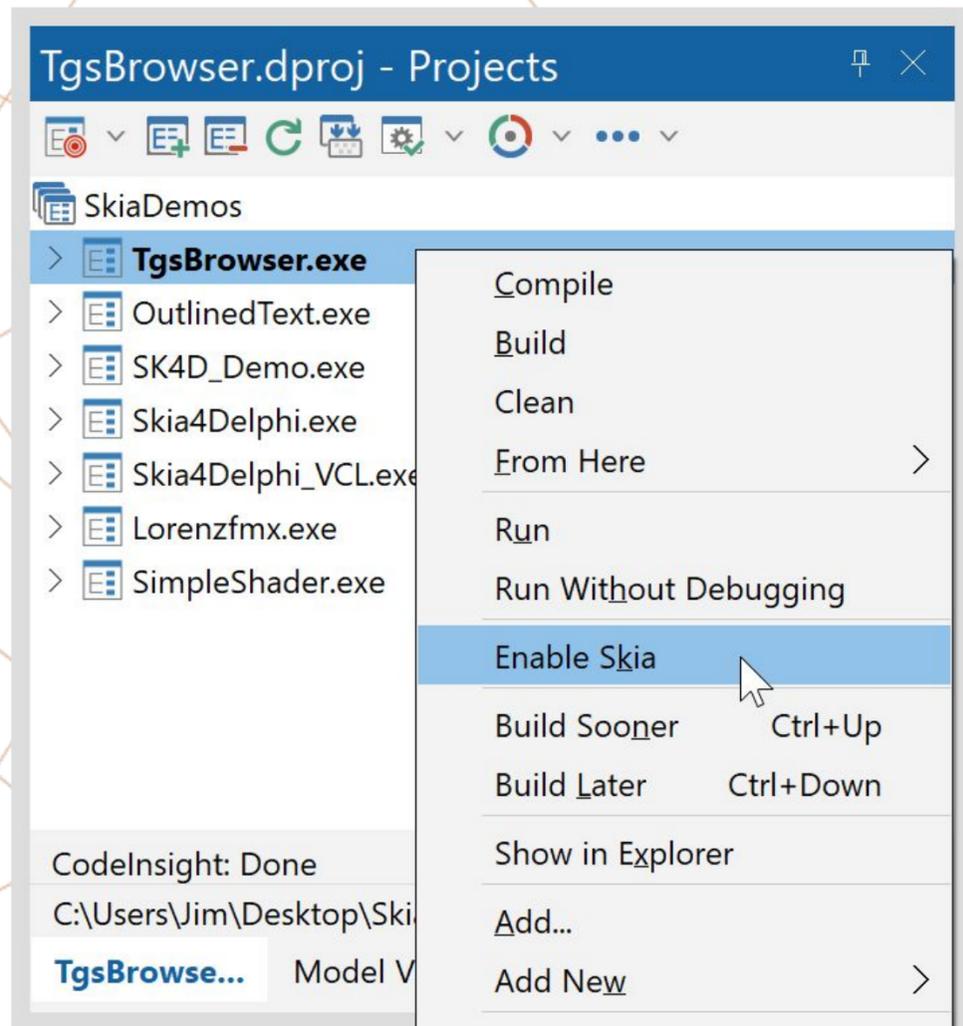
...



Enable Skia Canvas

App Rendering Benchmarks





Architecture

Uses custom version of Skia library

github.com/skia4delphi/skia

You can view and modify the source yourself.

Deployed via Deployment Manager

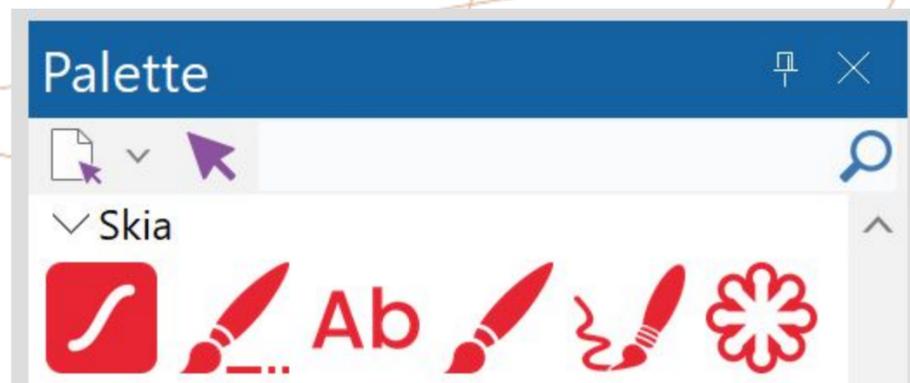
Just right click "Enable Skia" to add to deployment manager.

Native libraries for all platforms

OSXARM64, Win32, Win64, Android, Android64, iOSDevice64, Linux64, and OSX64

Delphi Components and Libraries

The components installed on Tool Palette for VCL and FMX, with the library added to the search path.



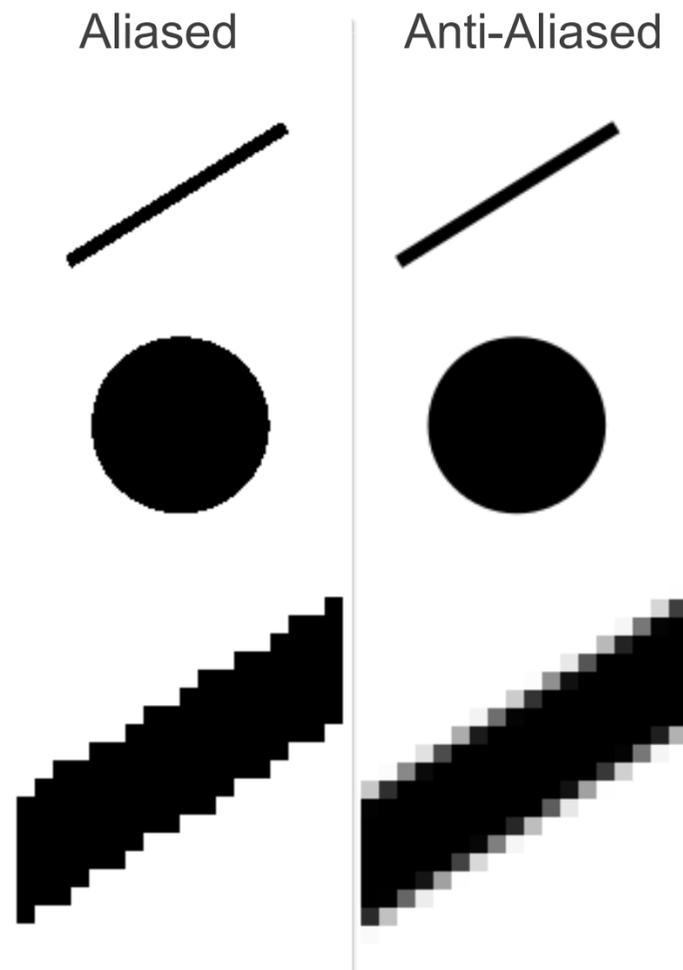


Redistributables

Platform	Library	Size
Win32	sk4d.dll	18 mb
Win64	sk4d.dll	18 mb
Android	libsk4d.so	19 mb
Android64	libsk4d.so	24 mb
iOSDevice64	sk4d.a	60 mb
Ubuntu64	libsk4d.so	22 mb
RedHat64	libsk4d.so	22 mb
OSX64	sk4d.dylib	20 mb
OSXARM64	sk4d.dylib	19 mb

Sizes based on [v3.4.0](#) for 11.1 Alexandria

RENDER QUALITY



Drawing quality is improved, in some scenarios, significantly



SVG Benefits

- Resolution independent and scalable
- Styling (can easily change color)
- Much smaller file
- For icons, always prefer SVG over static images like PNG
- Thousands of free icons and images available on web

Lottie Animation Benefits

- Resolution independent and scalable vector format
- Lightweight, 600% smaller when compared to GIF
- Extraordinary performance with smooth animation
- Thousands of free Lottie (JSON) animations available on web

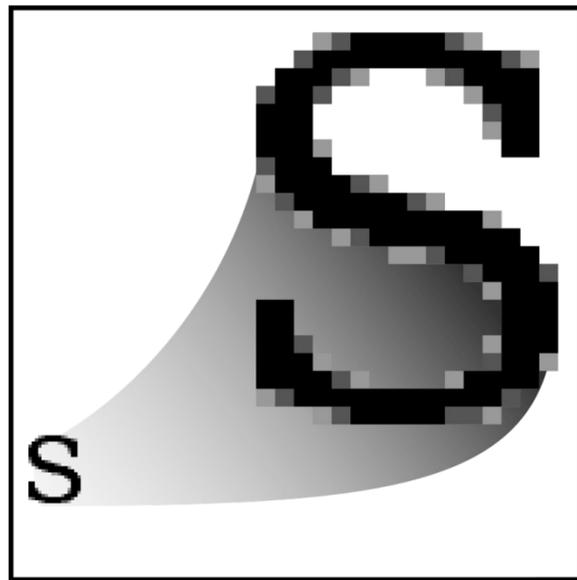
lottiefiles.com

lordicon.com

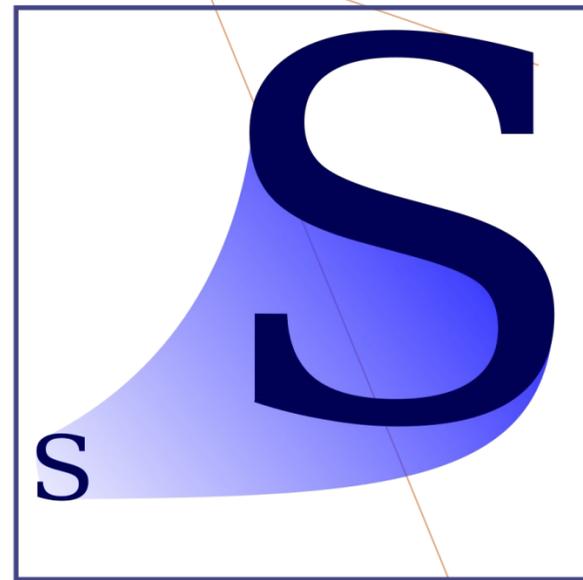
useanimations.com

icons8.com/animated-icons

iconscout.com/free-lotties



Raster
GIF, JPEG, PNG



Vector
SVG

Why Vector Formats?

- Much smaller file sizes
- Infinitely resizable and scalable
- Smoother animations
- Easier editing and customization

Why Vector Graphics?



SVG Source is XML

(Which easily compress via Zip)

```
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xmlns:svg="http://www.w3.org/2000/svg" xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:sodipodi="http://sodipodi.sourceforge.net/DTD/sodipodi-0.dtd"
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```

PNG and JPEG are Binary

(Already compressed)

```

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00000060h: 95 D0 AA A0 82 25 55 AC E0 52 50 8B F6 69 55 54 ; •Ð³ ,%U-aRP<öiUT
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00000080h: BB 10 44 D9 4C 14 14 50 E2 C6 1E 10 44 93 4C C2 ; ».DÜL..PäÆ..D“LÄ
00000090h: 92 CC E4 FE FE B8 33 93 59 EE 72 CE BD E7 AE F3 ; ’İäbp,3“Yirİ¼ç®ó
000000a0h: 7D BF 5E 68 E6 9E 73 CF 39 73 EE 9D 99 7B DF F7 ; }¿^hæžsİ9sî™{ß÷
000000b0h: 7B CE 09 80 20 08 82 20 08 82 30 CD 96 43 91 62 ; {Î.€ ., .,øÍ-C‘b
000000c0h: 00 C5 81 C4 8D 01 14 07 80 E2 E4 4D 01 00 38 1F ; .Ä Ä ...€ääM..8.
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000000e0h: D3 53 DA A0 BE 6F EC EF 80 46 5A C7 1F 0D 01 60 ; ÓSÚ %oiï€FZÇ...`
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00000110h: BD 1E 24 08 82 20 08 82 C8 58 36 7D 95 20 F1 02 ; ½.$., .,ËX6)• ñ.
00000120h: 28 04 50 2A FF 09 00 38 0D 51 99 17 7D 5D 8A 00 ; (.P*ÿ..8.Q™.}Ï.
00000130h: 0A 35 E5 5A 9A 04 4B DE A0 22 00 93 FF 36 2B F8 ; .5âZš.Kp ".“ÿ6+ø
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00000150h: 6F 40 4C 38 76 D4 BF 13 C0 AE 94 7C AB 13 5F F4 ; o@L8vÔ¿.Ä®”|«._ô
00000160h: CC CB 5A 0D 82 20 08 82 20 08 22 09 12 80 04 41 ; ÎËZ., ., .".€..A
00000170h: 10 04 41 F8 96 DA 03 91 42 74 48 BC 62 74 44 E3 ; ..Aø-Ú.‘BtH%btDä
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000001a0h: 5A 99 4A 1B 58 2E 38 55 F3 68 B4 8F B1 8C D5 09 ; Z™J.X.8Uóh`±€Ö.
000001b0h: 19 76 06 92 05 E2 EA 84 BF 37 9F D2 3D AB 41 A7 ; .v.’.ãè,,¿7ÿO=«A$
000001c0h: 0A 82 20 08 82 20 08 4F 42 02 90 20 08 82 20 08 ; ., ., .OB. ., .
000001d0h: CF B1 71 BF 2C F6 A2 17 32 15 00 10 48 88 D0 03 ; Î±q¿,ö¢.2...H^Ð.
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000000c0h: 00 00 02 04 00 00 00 14 72 58 59 5A 00 00 02 18 ; .....rXYZ....
000000d0h: 00 00 00 14 67 58 59 5A 00 00 02 2C 00 00 00 14 ; .....gXYZ...„...
000000e0h: 62 58 59 5A 00 00 02 40 00 00 00 14 64 6D 6E 64 ; bXYZ...@...dmnd
000000f0h: 00 00 02 54 00 00 00 70 64 6D 64 64 00 00 02 C4 ; ...T...pdmd...Ä
00000100h: 00 00 00 88 76 75 65 64 00 00 03 4C 00 00 00 86 ; ...^vued...L...†
00000110h: 76 69 65 77 00 00 03 D4 00 00 00 24 6C 75 6D 69 ; view...Ô...$lumi
00000120h: 00 00 03 F8 00 00 00 14 6D 65 61 73 00 00 04 0C ; ...ø...meas...
00000130h: 00 00 00 24 74 65 63 68 00 00 04 30 00 00 00 0C ; ...$tech...ø...
00000140h: 72 54 52 43 00 00 04 3C 00 00 08 0C 67 54 52 43 ; rTRC...<....gTRC
00000150h: 00 00 04 3C 00 00 08 0C 62 54 52 43 00 00 04 3C ; ...<....bTRC...<
00000160h: 00 00 08 0C 74 65 78 74 00 00 00 00 43 6F 70 79 ; ...text...Copy
00000170h: 72 69 67 68 74 20 28 63 29 20 31 39 39 38 20 48 ; right (c) 1998 H
00000180h: 65 77 6C 65 74 74 2D 50 61 63 6B 61 72 64 20 43 ; ewlett-Packard C
00000190h: 6F 6D 70 61 6E 79 00 00 64 65 73 63 00 00 00 00 ; ompany..desc...
000001a0h: 00 00 00 12 73 52 47 42 20 49 45 43 36 31 39 36 ; ...sRGB IEC6196
000001b0h: 36 2D 32 2E 31 00 00 00 00 00 00 00 00 00 00 00 ; 6-2.1.....
000001c0h: 12 73 52 47 42 20 49 45 43 36 31 39 36 36 2D 32 ; .sRGB IEC61966-2
000001d0h: 2E 31 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ; .1.....
000001e0h: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ; .....
000001f0h: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ; .....
00000200h: 00 00 00 00 58 59 5A 20 00 00 00 00 00 00 F3 51 ; ...XYZ .....6Q
  
```

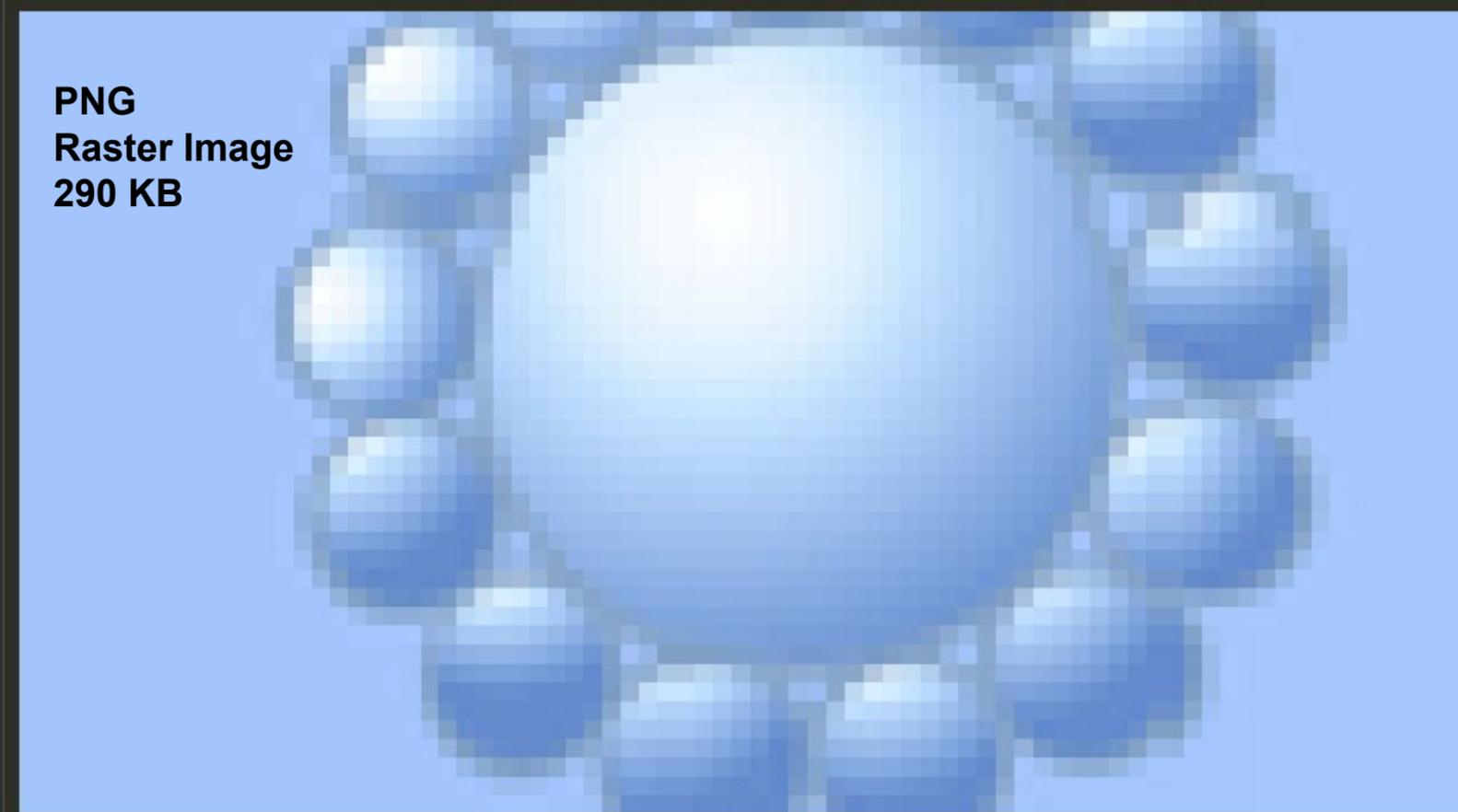
- Both JPEG & PNG are raster/bitmap image formats.
- PNG is lossless, with 100% accurate reproduction of the image.
- JPEG is lossy, losing some image fidelity *each time* it is edited or compressed.

Image File Size Comparisons

Name	Type	Size	Resolution	Comments	Relative	Reaction
Enigma-logo.zip	zipped svg	2,801		vector	-	
Enigma-logo.svg	svg	16,756		vector	6x	
Enigma-logo.30.jpg	jpeg 30%	30,283	1280x562	lossy raster	11x	
Enigma-logo.50.jpg	jpeg 50%	50,076	1280x562	lossy raster	18x	
Enigma-logo.png	png 100%	99,713	1280x562	lossless raster	36x	
Enigma-logo.80.jpg	jpeg 80%	105,712	1280x562	lossy raster	38x	
Enigma-logo.99.jpg	jpeg 99%	309,545	1280x562	lossy raster	111x	



JPEG
Raster Image
30 KB



PNG
Raster Image
290 KB

Offset: (0,0)
Zoom: 1000%

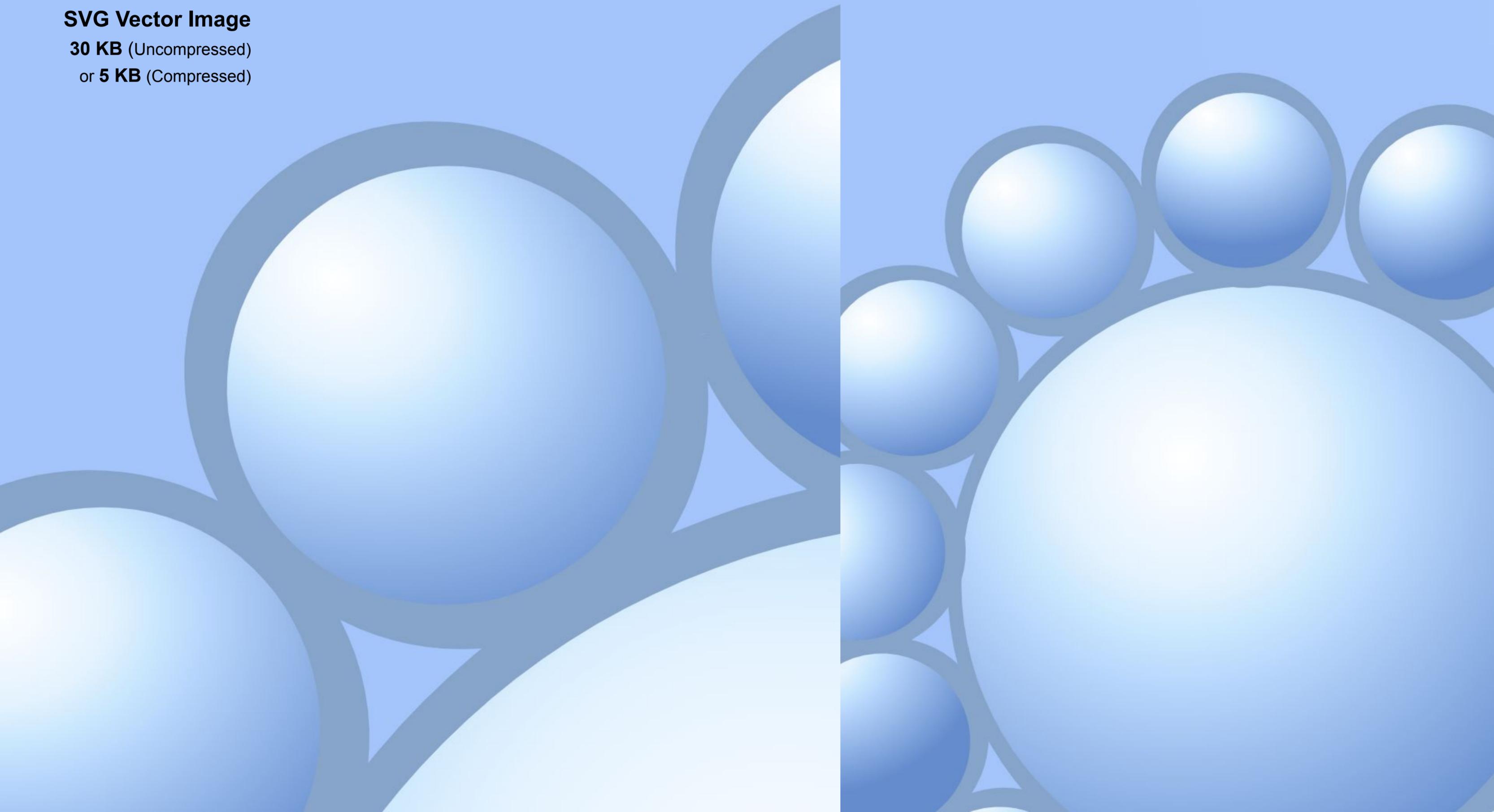


1:1 

SVG Vector Image

30 KB (Uncompressed)

or **5 KB** (Compressed)

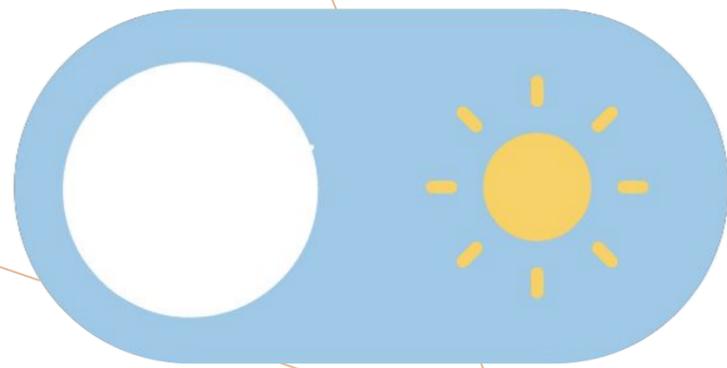




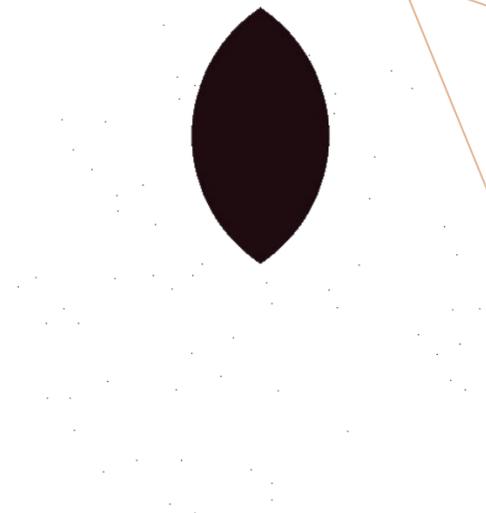
Vector Animations?

Lottie is a JSON based animation format.

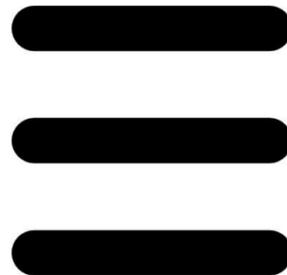
Name	Type	Size	Relative
dev_coding.tgs	tgs (zipped json)	55,834	-
dev_coding.mp4	mpeg4 (lossy)	373,642	7x
dev_coding.json	lottie (json)	583,485	10x
dev_coding.gif	gif (lossless)	5,020,259	90x



[Toggle Switches](#)



[Loading Animations](#)



[Hamburger Icons](#)

User Interface Design

SVG & Lottie make it easy for designer to create smooth and high resolution user interface templates. Then with Skia4Delphi you can make the UI match perfectly.

Make *motion* part of your UI/UX

Other uses:

About screens, splash screens, installers, user onboarding, wizards, etc.

SKIA Contest

FOR  DELPHI

Grand Prize



Apple M1 Mac Mini

Build a project with Skia4Delphi + Delphi 11
Make a beautiful application with VCL or FMX

Post it on GitHub

Include video & screenshots, and then share it on social media.

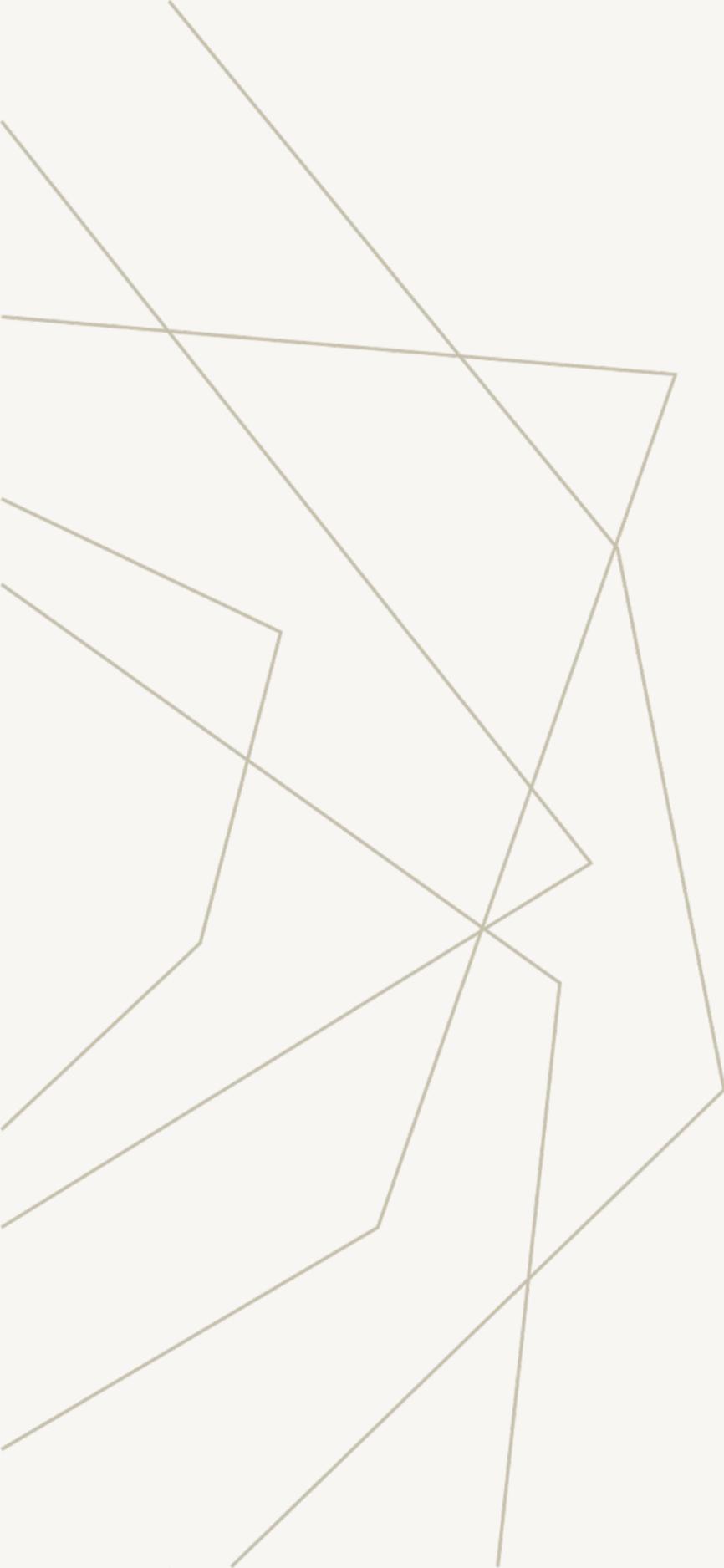
Win Prizes and Acclaim

Grand Prize is an Apple M1 Mac Mini so you can take advantage of the great new support for Apple Silicon in Delphi 11 Alexandria.

Demonstrations

SKIA
FOR  DELPHI

Slides, replay, links and more: blogs.embarcadero.com/?p=140459



FOLLOW THE PROJECT

-  github.com/skia4delphi/skia4delphi
-  t.me/skia4delphi
-  skia4delphi.org
-  blogs.embarcadero.com/?p=140459

SKIA

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More Links

Skia4Delphi github.com/skia4delphi/skia4delphi
Webinar blogs.embarcadero.com/?p=140459

Skia Documentation

- skia.org/docs/
- api.skia.org/

More on Shaders

- shaders.skia.org/
- thebookofshaders.com/
- blog.grijjy.com/2021/01/14/shader-programming/

More Samples

- github.com/jimmckeeth/SkiaSimpleShaderViewer
- github.com/jimmckeeth/TelegramStickerBrowser
- github.com/jimmckeeth/Lorenz_fmx
- github.com/checkdigits/spacecomputer

