embarcadero®

Presents

SKIA

FOR DELPHI

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@punctuation

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


I HAVE NO
IDEA WHAT SKIA IS
AND AT THIS POINT
I'M TOO AFRAID TO ASK...

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

The Traditional Choices

Native

Direct access to the hardware.

Separate code for each platform.

Web / Cloud

Mostly shared code.

Detached from hardware.

JS

A new foe has appeared!

CHALLENGER APPROACHING

FireMonkey

Native Compiled

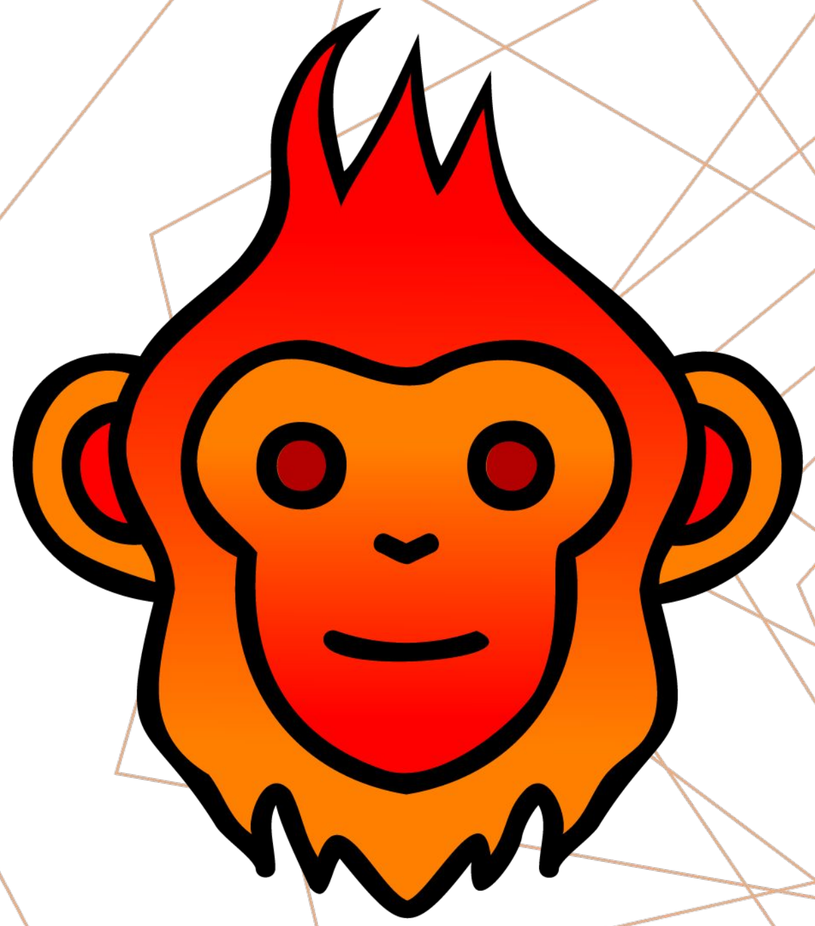
Direct access to the platform hardware.

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)
- FuschiaOS
- Tizen
- tvOS
- watchOS

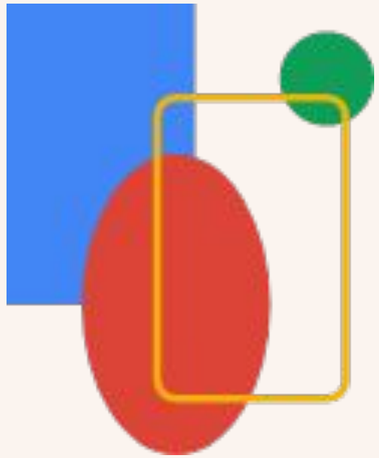
Skia Features

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

Compatibility

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

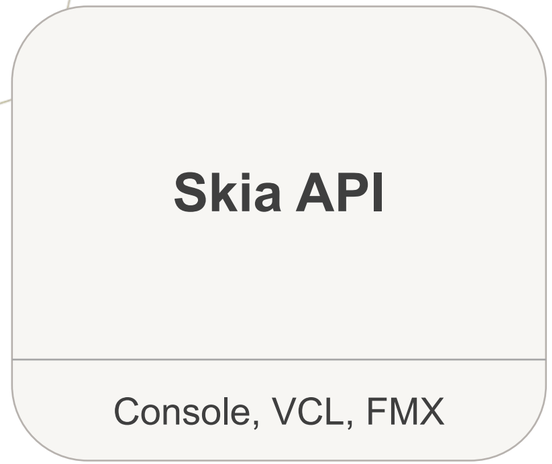
Available via

- **GetIt**
- github.com/skia4delphi/skia4delphi

Skia4Delphi Library

The library conceptually exists in 3 parts:

Skia API	Controls	App rendering
Console, VCL, FMX	VCL, FMX	FMX

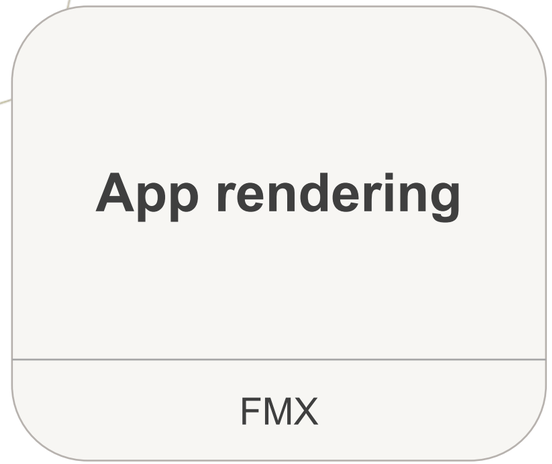


Access to the pure Google Skia library, through a single unit: **`Skia.pas`**

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

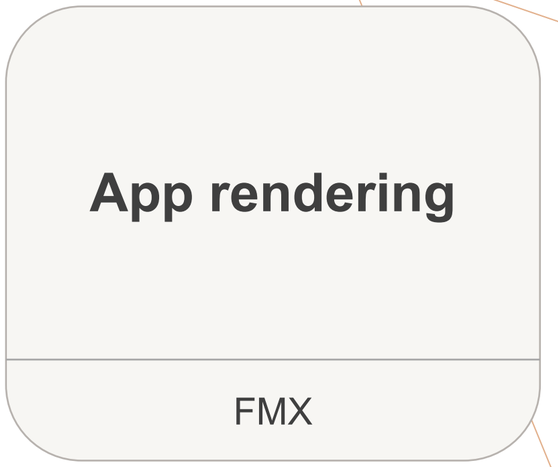


Optional feature that when enabled, the FMX graphics engine will be replaced by Skia4Delphi's graphics engine, that is, the entire app, all the controls on the screen, will be painted internally by the Skia-based canvas.

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



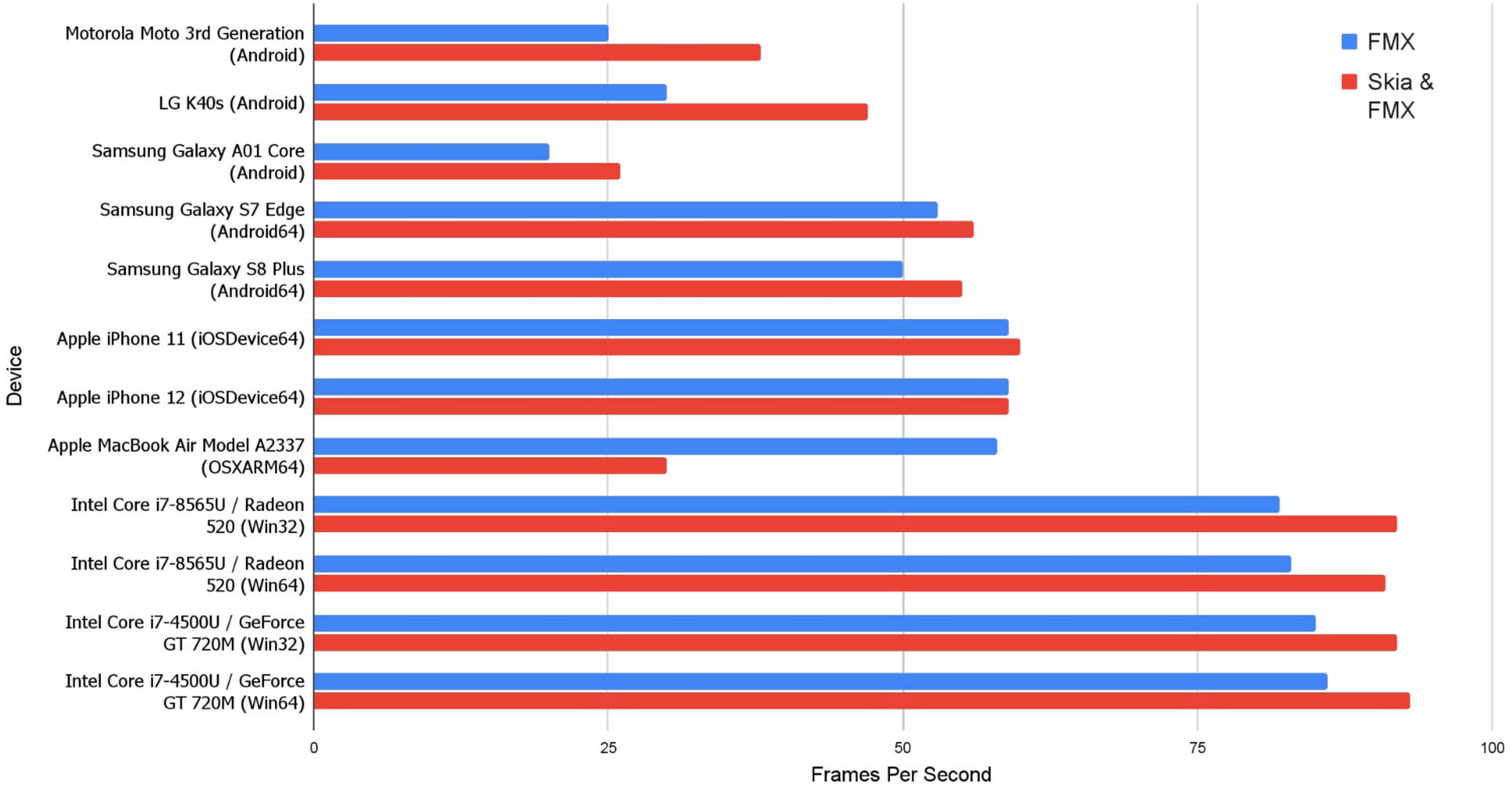

```
uses
  System.StartUpCopy,
  FMX.Forms,
  Skia.FMX,
  Unit1 in 'Unit1.pas' {Form1};

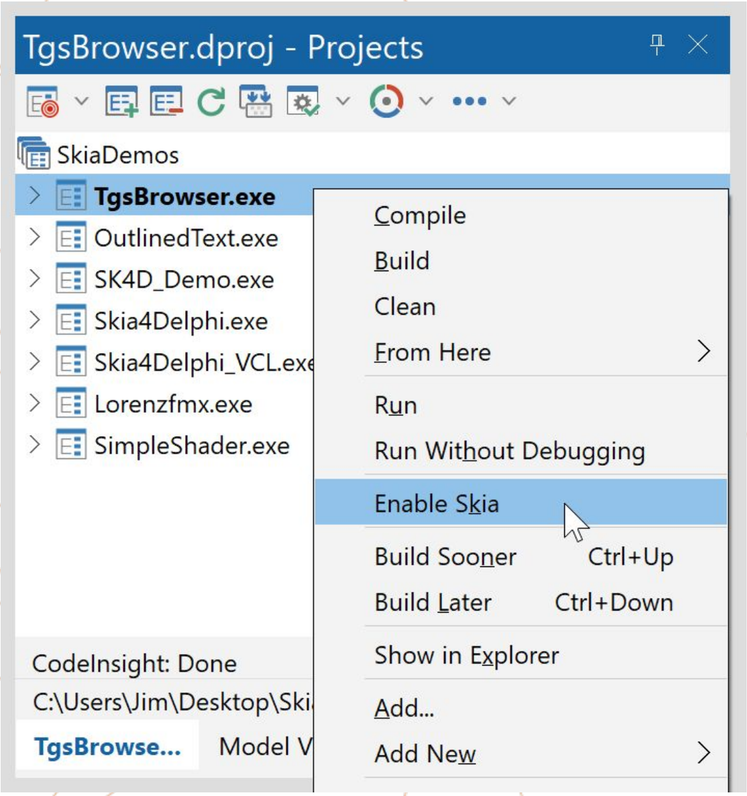
{$R *.res}

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

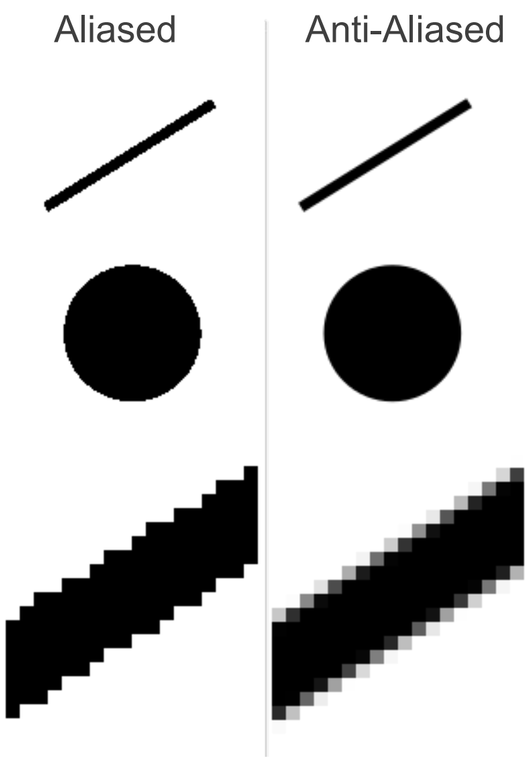
The components installed on Tool Palette for VCL and FMX, with the library added to the search path.

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

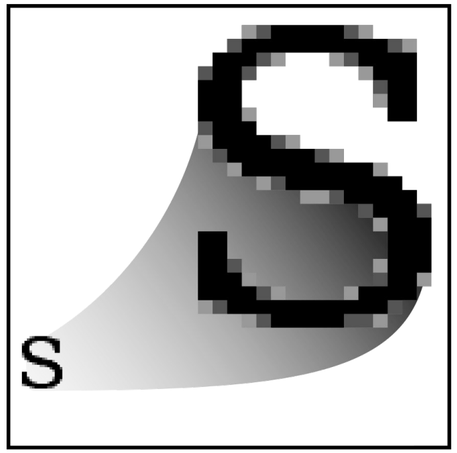
  lottiefiles.com

  lordicon.com

  useanimations.com

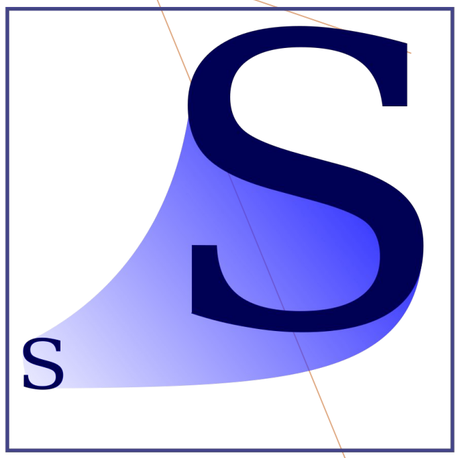
  icons8.com/animated-icons

  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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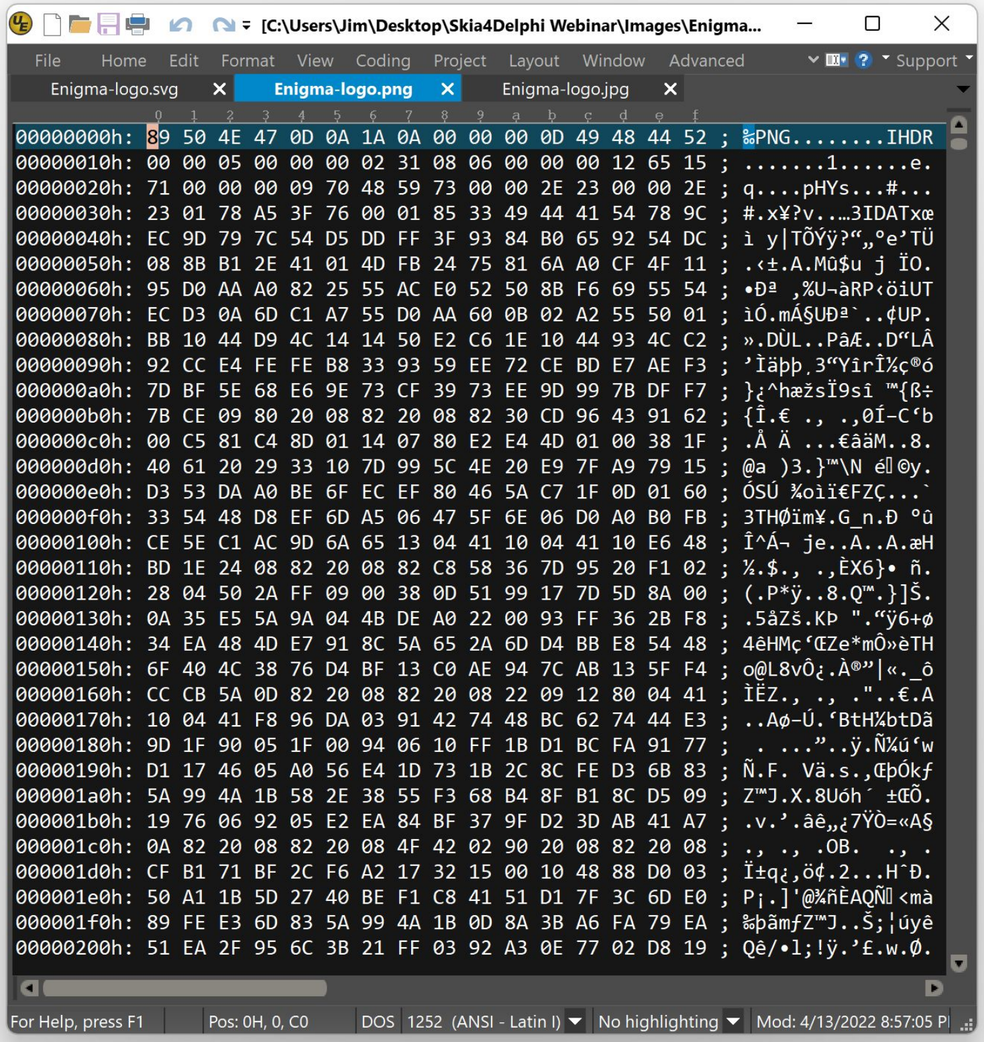
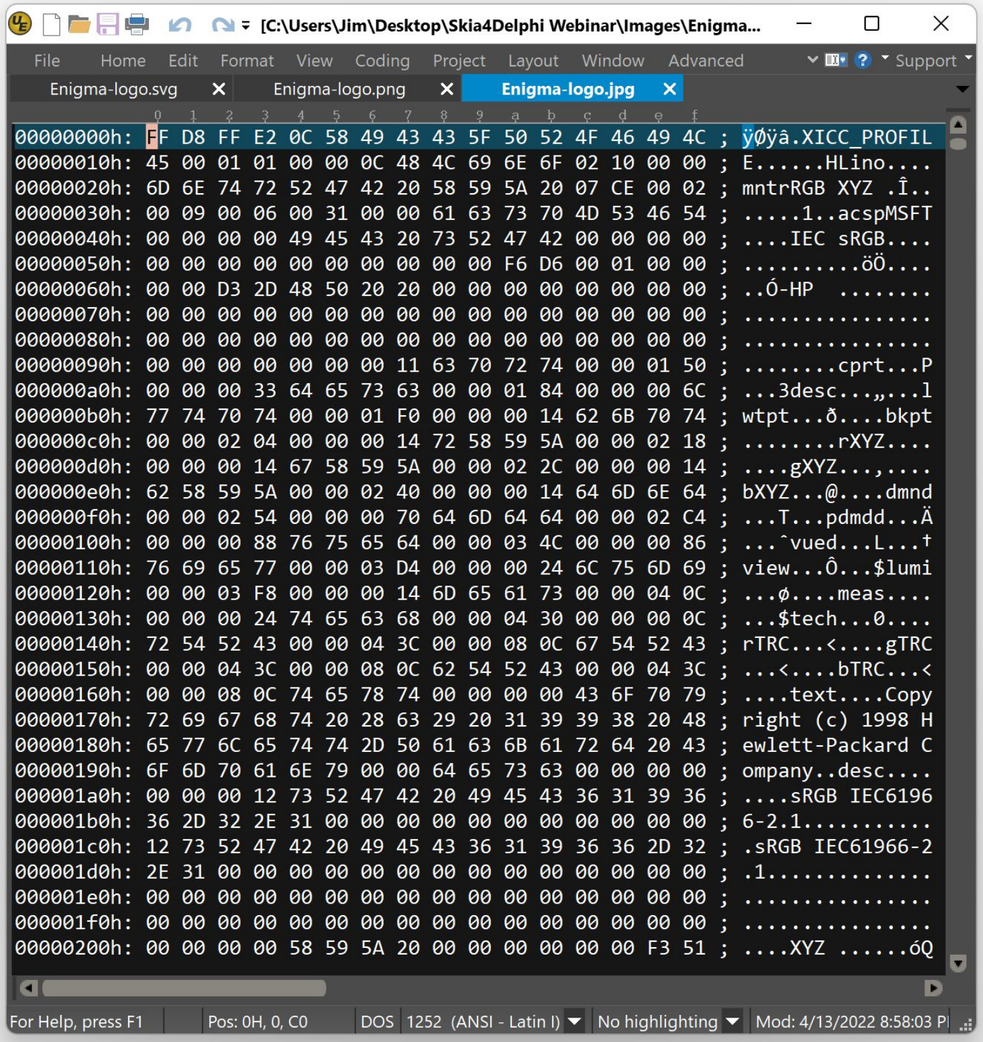
PNG and JPEG are Binary

(Already compressed)





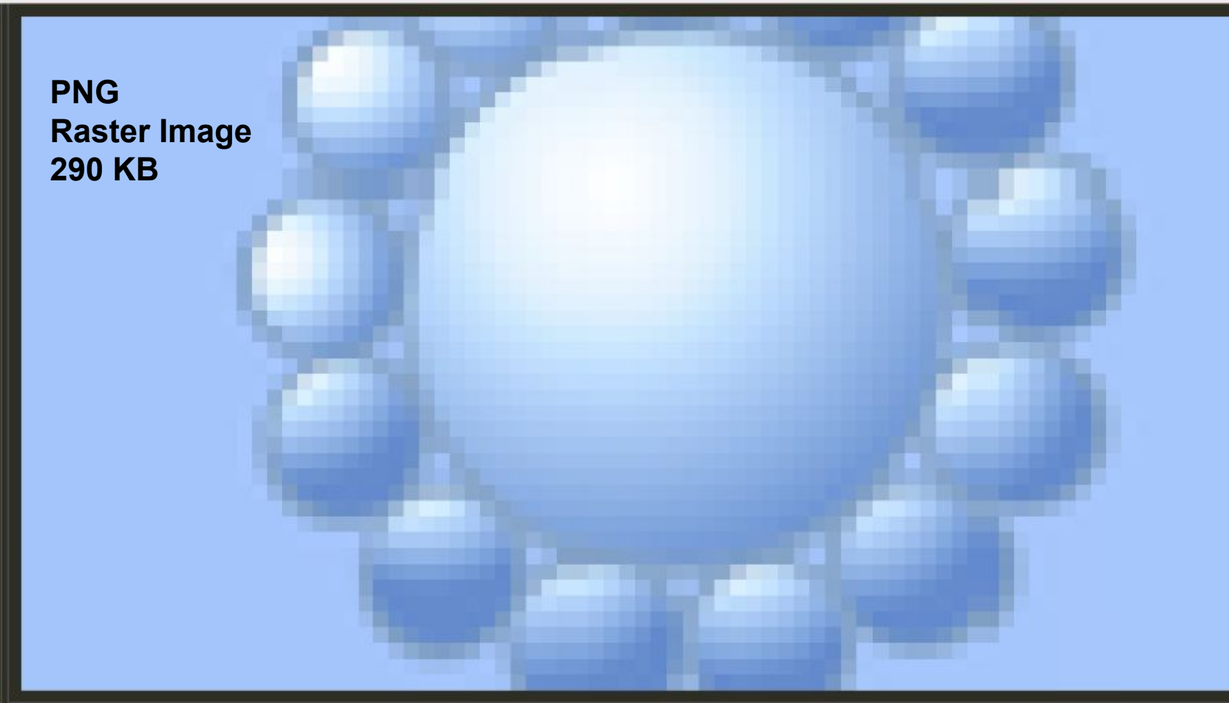
- Both JPEG & PNG are raster/bitmap image formats.
- PNG is lossless, with 100% accurate reproduction of the image.
- JPEG is lossy, losing some image fidelity *each time* it is edited or compressed.

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	🤯

Today, 11:54:57 PM 30,283 bytes Picture Files 1280 x 562

Today, 11:53:02 PM 290,900 bytes Picture Files 1280 x 562



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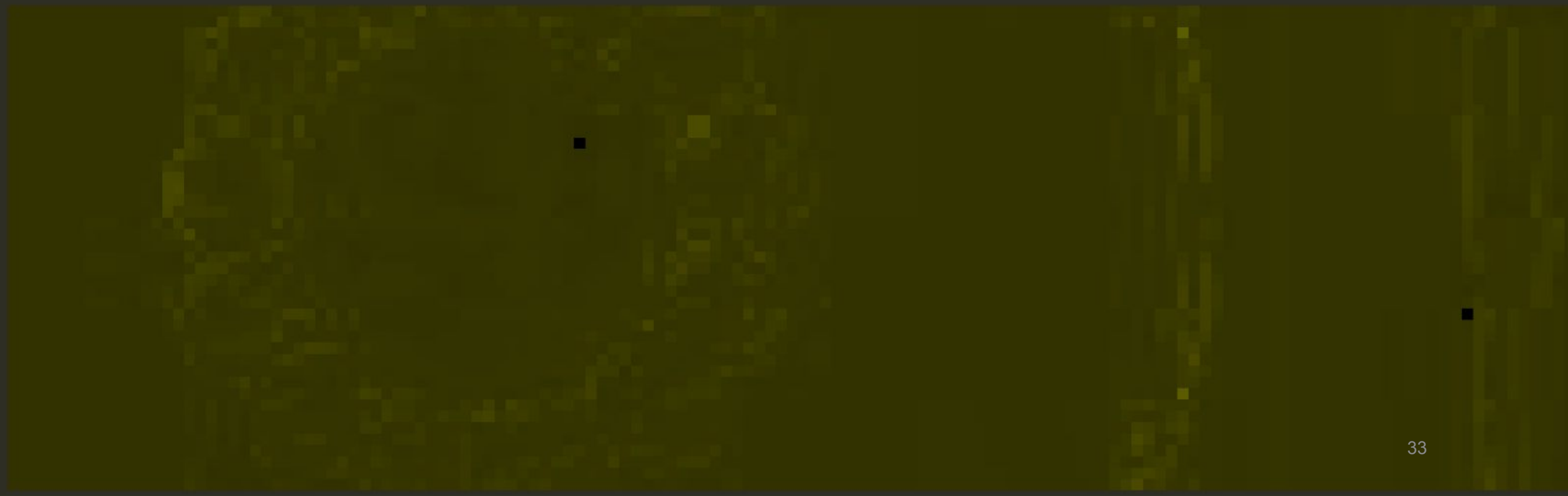
Zoom: 1000%

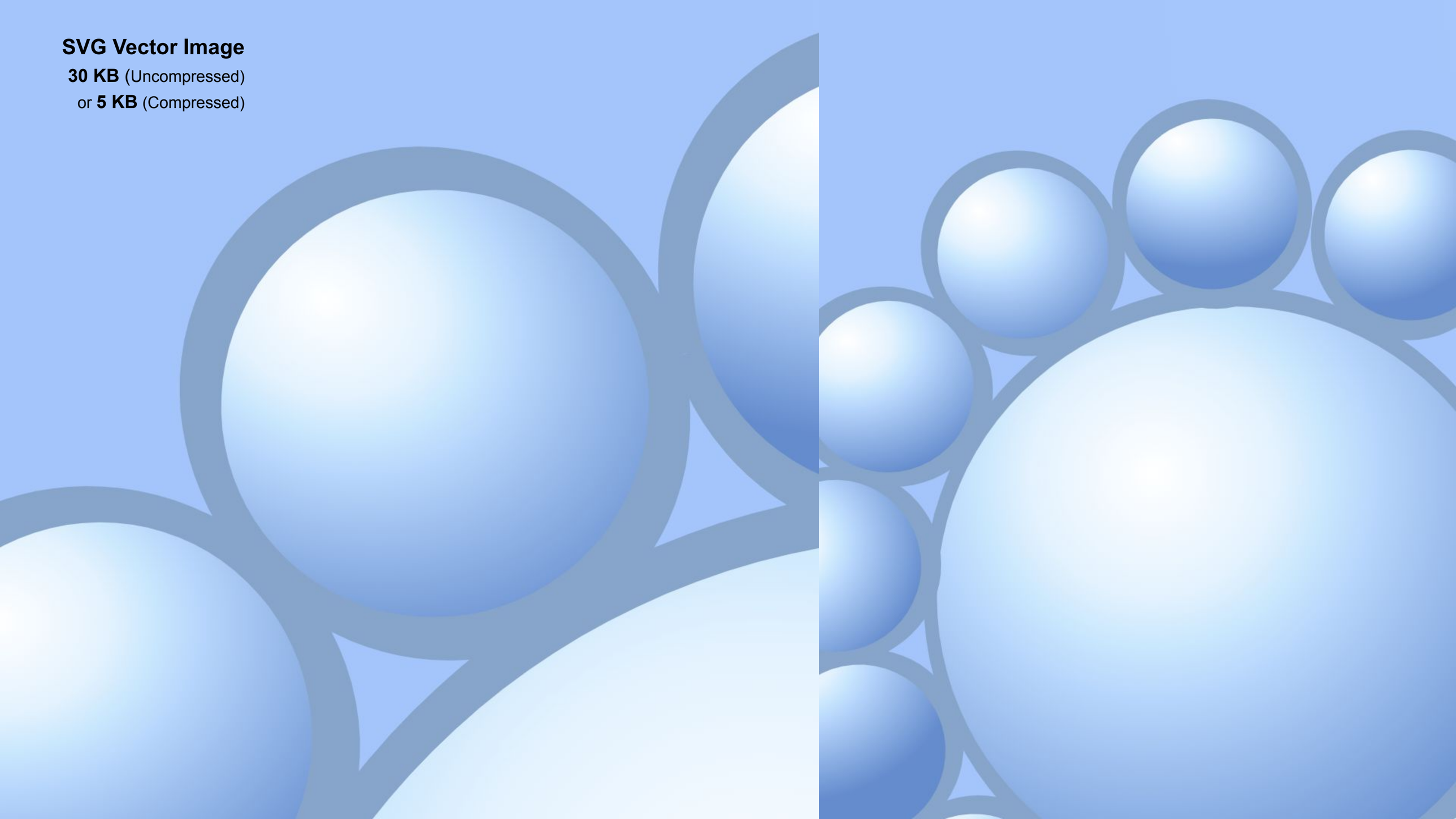
1:1

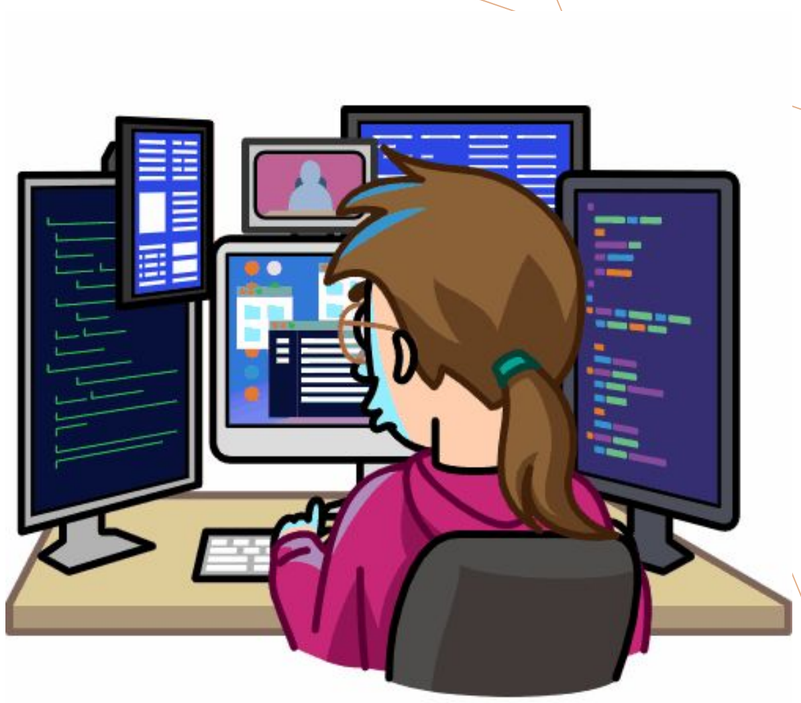


SVG Vector Image

30 KB (Uncompressed)

or **5 KB** (Compressed)

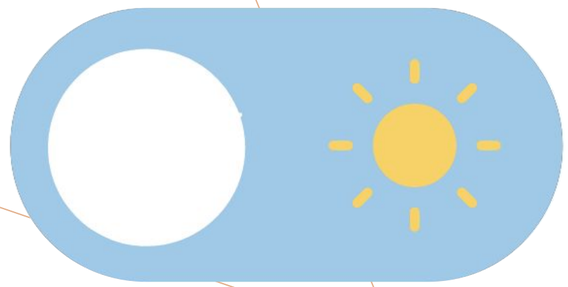




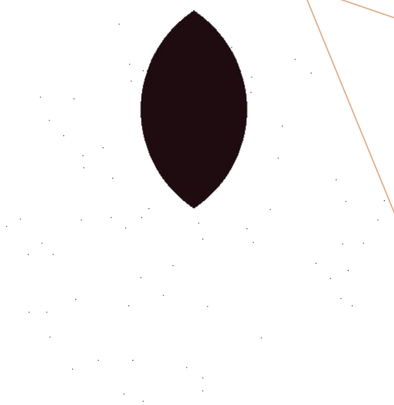
Vector Animations?

Lottie is a JSON based animation format.

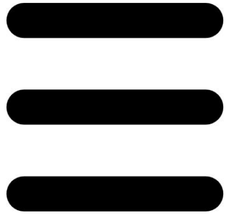
Name	Type	Size	Relative
dev_coding.tgs	tgs (zipped json)	55,834	-
dev_coding.mp4	mpeg4 (lossy)	373,642	7x
dev_coding.json	lottie (json)	583,485	10x
dev_coding.gif	gif (lossless)	5,020,259	90x



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 FOR DELPHI Contest

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.

More details to come: blogs.embarcadero.com/?p=140459

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 FOR DELPHI

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


SKIA
FOR DELPHI