



# DelphiDay

italian conference

## Afterwarp Framework v3.5+

A new version of the powerful Afterwarp Framework v3.5  
for 3D industrial real-time applications



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# DelphiDay

italian conference

19-20 Giugno 2025  
Piacenza



**wintech**  
italia



# OPEN-SOURCE PROJECTS

<https://github.com/yunkot>

## Afterwarp Framework

<https://afterwarp.io>

## MicroPXL

<https://github.com/yunkot/MicroPXL>

## Other Projects and Resources

<https://asphyre.net>



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# Framework: 26 years of evolution

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- **Afterwarp Framework**: 2015 – current
  - Celebrating 10 years under the name of Afterwarp Framework!
- **Asphyre Framework**: 2005 – 2015
  - Also known as Pascal eXtended Library (PXL)
- **PowerDraw library**: 2001 – 2005
- **PowerGrafix**: 1999 - 2000



# Afterwarp Framework: at the glance

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- ❖ Hybrid forward+/deferred rendering pipeline
  - Up to 65536 shadow-casting light sources in real-time
  - Realistic real-time shadows with soft-penumbra
  - High-dynamic range (HDR) and physically-based (PBR)
- ❖ Accurate order-independent transparency in one pass
- ❖ 4K/5K+ and Variable-Refresh Rate (VRR) monitor support
- ❖ Suitable for high-DPI posters and Lenticular printing
- ❖ Up to 256 bits per pixel (32 bits per channel)



# What's new in version 3.5+

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1. **Bone-joint connections and object movement waypoints**
  - Animation of robotic arms, cranes, shuttles, trains, etc.
2. **“Auto-draw” feature with automatic instancing on GPU**
  - Render hundreds of thousands of 3D objects simultaneously
3. **Advanced material and texturing system with an improved native OBJ file format loading and saving system**
  - New ModelForge tool for working with 3D mesh files
4. **Software Rendering backend with Progressive Rendering**



# What's new in Afterwarp v3.5+ (cont'd)

1. SSE2, AVX2 and AVX512 highly optimized builds
  - AVX512 uses internally double-precision math for higher accuracy
  - Optimized builds for each of 32-bit and 64-bit architectures!
2. Hybrid ARM64X binary (ARM64EC and ARM64)
  - 64-bit Delphi application running on **Windows on ARM** under a translation layer, BUT... **using native ARM64 Aftewarp binary!**
    - Excellent real-time performance, efficiency and memory usage!



Let's run some samples!





# Afterwarp Framework: requirements

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## 1. Delphi XE2 or later

- Still using Delphi 7? Support is available on request
- FreePascal/Lazarus is supported

## 2. Windows Vista or later

- **Windows 10/11** required for VRR monitor support
- Older versions down to Windows NT 4.0 are supported on request

## 3. Linux / FreeBSD

- Raspberry PI and other SBCs are supported



# Afterwarp Framework: internals

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- **Core framework is written in C++ using C++23 dialect**
  - Uses proprietary template and runtime framework
    - Gradually becoming open-source
  - Does not use Standard C++ library (also known as STL)
  - Highly optimized for reliability and performance
- **High-level framework is written in Delphi**
  - Compiles under FreePascal/Lazarus



# **Afterwarp Framework: licensing**

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## **→ Individual developers and small companies: FREE!**

As long as income from the project using Afterwarp is under \$200 000 USD annual

## **→ Medium and large enterprises**

→ Professional License

→ \$10 000 USD: one-time payment, perpetual license

→ Enterprise License



# **Afterwarp Framework v3.8 and beyond**

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- **Full support for Delphi** (and FPC/Lazarus)
- **Full support for C/C++** (Visual Studio, etc.)
- **Full support for C# and .NET**

**and now...**





# Meet Afterwarp.JS !

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## → Full JavaScript API !

- Rendering backend is compiled into WebAssembly module
- High-performance and visual quality under WebGL
- Experimental builds ready for testing!

→ Try it: <https://afterwarp.io/testjs>





QUESTIONS?