

# Introducing

# **C++ Builder** **12.1 Athens**



# Visual Assist work in 12.1

- Expanding rename refactoring to rename across code and visual designers
  - Renaming a component will include renaming it in the designer
  - Renaming now also renames event handlers
- Solved an issue where VA was left with a cache if a file was closed unsaved
- Code completion on object properties is working correctly
- Improved `#include` preprocessor directive autocomplete with `<` and `"`
- Minor UI improvements on menus

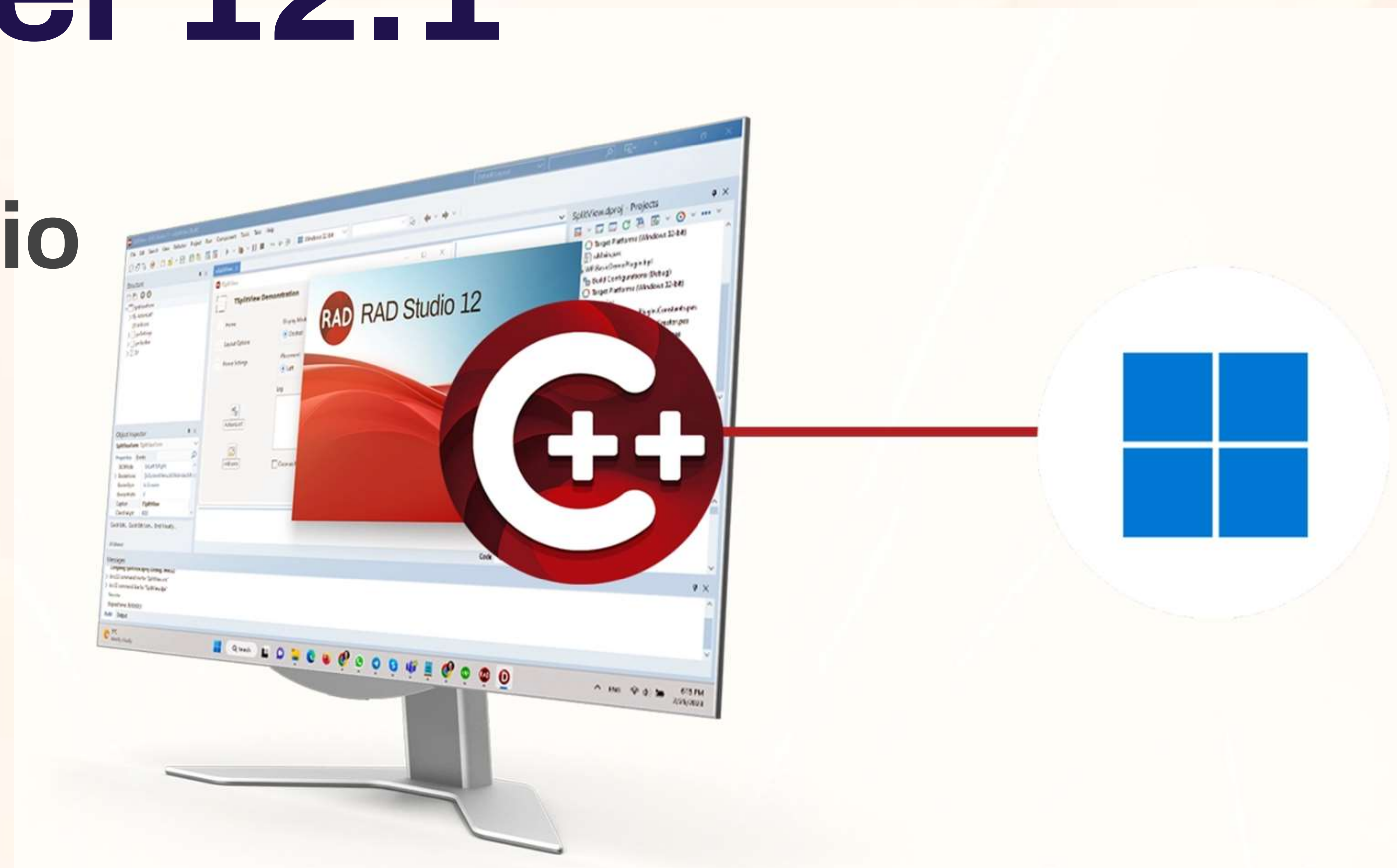
***A great feature for C++Builder 12. More to come in 12.x releases!***



# Clang Upgrade in C++Builder 12.1

A new foundation for C++Builder and RAD Studio

- New version of Clang
- Revision of the entire toolchain
- Focus on *platform conventions*
- Focus on *doing it right*
- Focus on *quality*
  - STL, linker etc: a must-use



***The value of C++Builder with a high quality toolchain for modern C++***



# Clang Upgrade in C++Builder 12.1

**Feb 2024: Behind the Build for 12.1:**  
[youtube.com/watch?v=Ps5pW5uhmMw](https://www.youtube.com/watch?v=Ps5pW5uhmMw)

Nov 2023: released 12.0 with Clang Preview

Sep 2023: Behind the Build for 12.0  
[youtube.com/watch?v=B0Be\\_NFmEEE](https://www.youtube.com/watch?v=B0Be_NFmEEE)

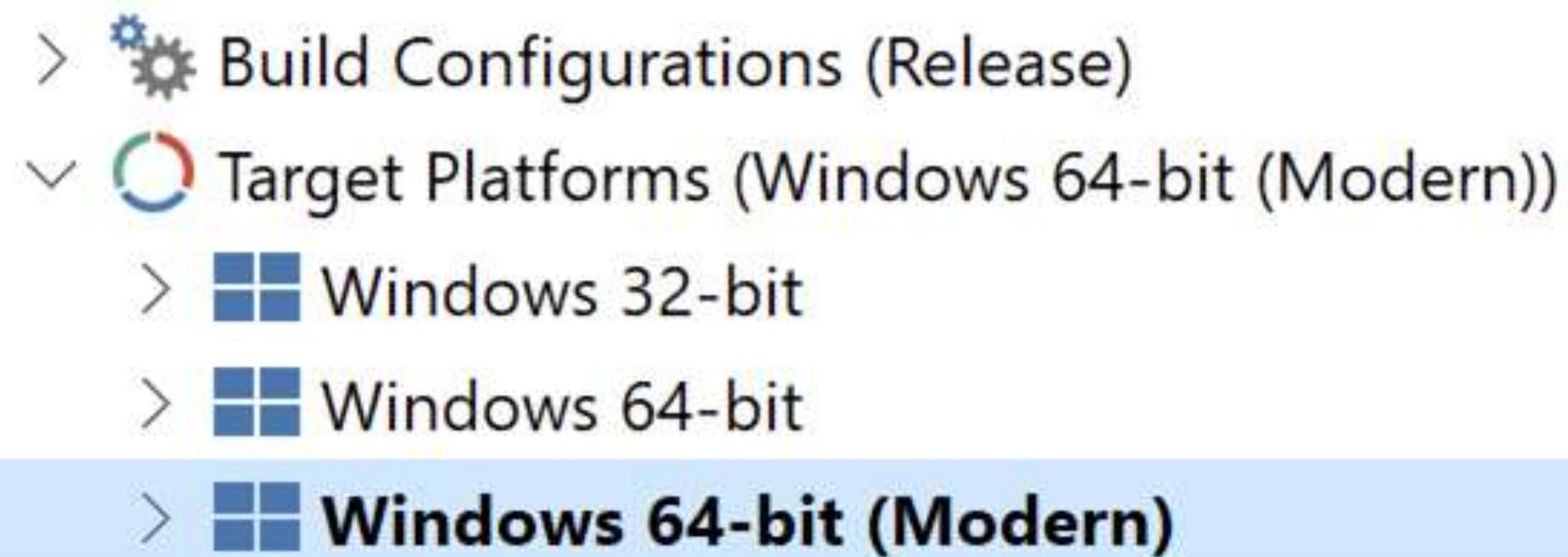
March 2023: Blog, 'What's coming for C++Builder'  
<https://blogs.embarcadero.com/whats-coming-for-cbuilder-an-amazing-preview/>





# Clang Upgrade in C++Builder 12.1

- Shipping the first official version
  - Targets Win64
    - Existing Win64 compiler remains available in-IDE to help migration
  - Build your VCL and FMX apps
  - New toolchain: compiler, linker, STL, C++ RTL
  - Excellent compatibility with C++ standards and 3rd party libraries
  - Very exciting: performance, standards, quality



***The value of C++Builder with a high quality toolchain for modern C++***



# Technical Info of the new Clang Toolchain

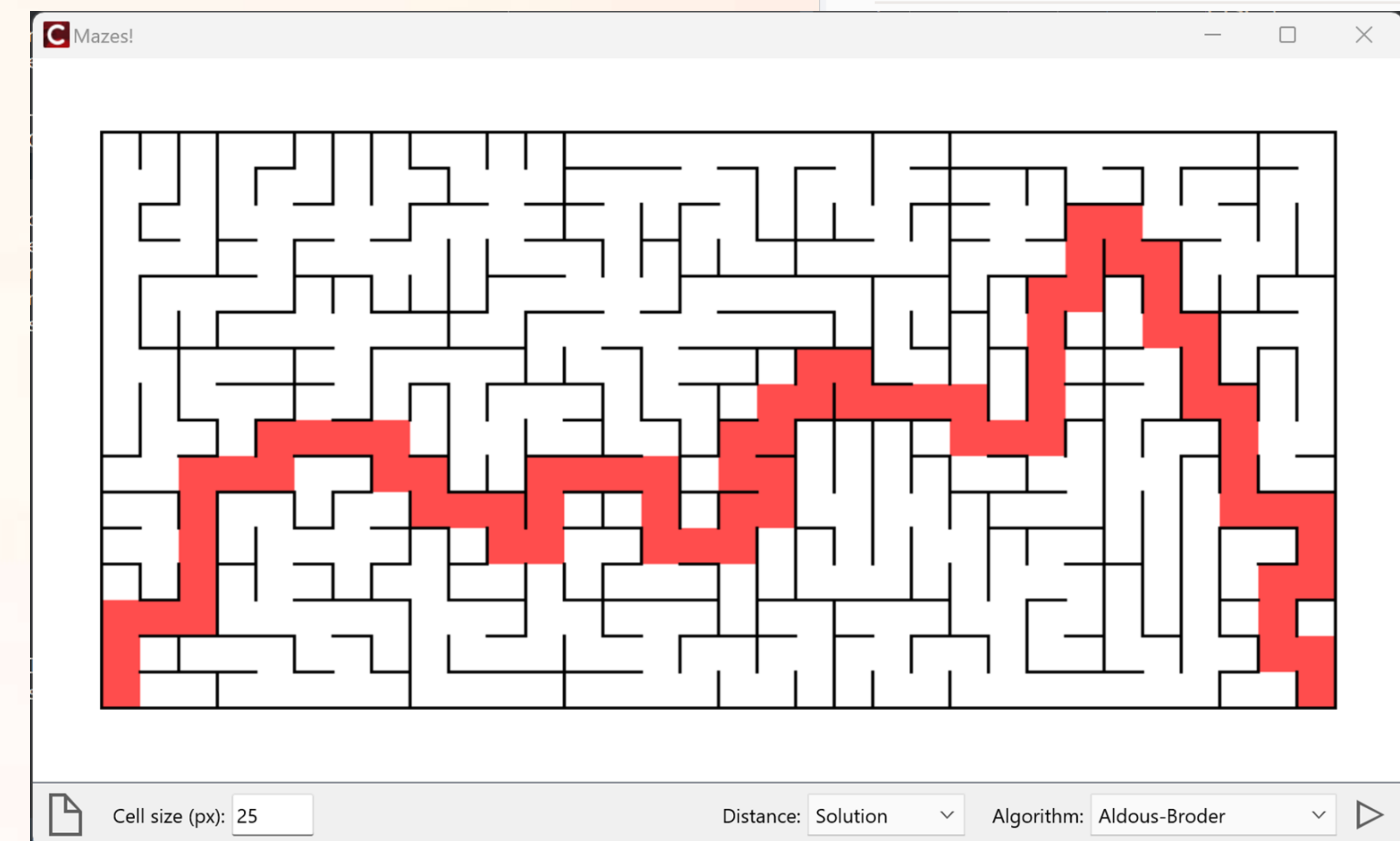
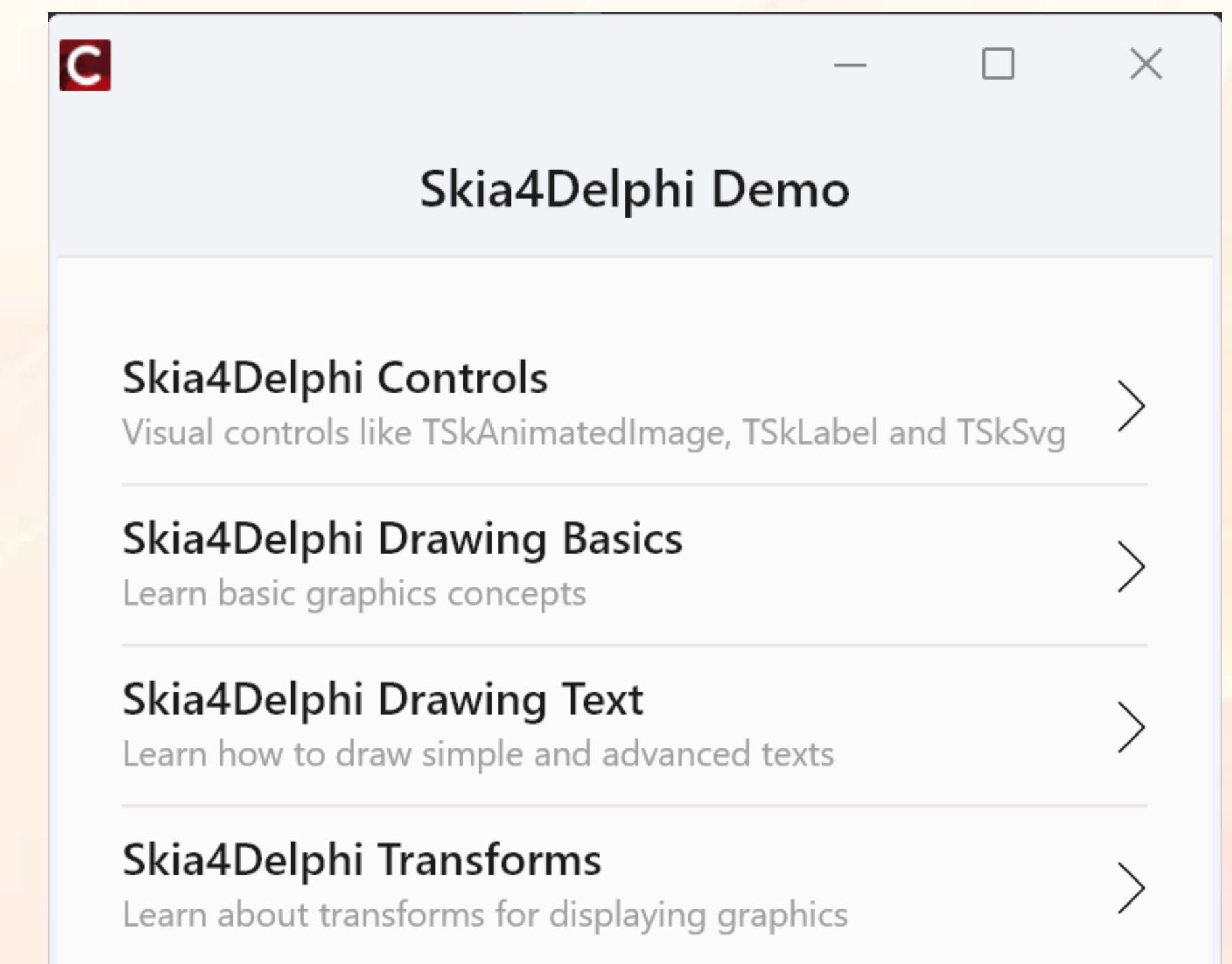
- General goal: follow Windows platform standards
  - Leads to COFF, UCRT, PDB, etc
- Uses the Itanium C++ ABI
- COFF object file format, PDB debug format
  - Not link-compatible with a VC++ COFF object file, different C++ ABI  
(goal: *source compatible*, handle any C++ code)
- C RTL: Uses the Windows component: Universal C Runtime (UCRT)
- C++ RTL, with enormous amount of exception handling work - 700+ new tests + more
- STL: LLVM's libc++
- Linker: LLVM's lld (used for Chrome)
- 64-bit binaries (even in IDE) – enormous memory space



# Clang Toolchain: VCL and FMX apps

- VCL applications
- FMX applications
- DLLs, LIBs, console apps, etc
  - Can be 'pure C++' for these if you wish
- In 12.0, Delphi packages (components) are statically linked – but much faster linker to make up for it
  - Ie the Delphi default! Never had a fast enough linker to do it before
  - These smaller features, like dynamic package linking and CMake support, coming soon

Skia in VCL used from C++



FMX 'Mazes' app



# Clang Upgrade: Why It Matters to You!

## Quality

- Linker problems? (Eg memory issues) -> *Use this toolchain*
- STL problems? (Using 3rd party C++ code or modern C++ code?) -> *Use this toolchain*
  - *Much better STL! Things that didn't work before, do work now -> Use this toolchain*
- Compiler stability (ICEs) etc -> *Use this toolchain*

## Compatibility

- Want to use other tools? (Eg other debuggers) -> *Use this toolchain*
- Use C++ code from anywhere -> *Use this toolchain*

## Modernisation

- Clang 15, much more recent.

## Performance

- Linker about 4x faster -> *Use this toolchain*

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[youtube.com/watch?](https://youtube.com/watch?v=Ps5pW5uhmMw)

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**Our foundation for C++'s future – here for you now.**





**Live**

**Q & A**



# New Embarcadero Quality Portal

- Announcing the new portal:  
<https://embt.atlassian.net/servicedesk/customer/portals>
- Powered by Jira Service Manager
- Integrated with the Embarcadero R&D Jira instance
- Hosted by Atlassian Cloud
- Self service accounts
- New Feature requests, Bug reports and Documentation Bug reports

