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JPEG on the Mac:

A New Chapter in History and 20 Years Xcode Development

Last year, in October 2022, the Independent JPEG Group (IJG) published an article about the history of the two major Integrated Development Environments (IDEs) for the creation of applications with a graphical user interface (GUI): Microsoft Visual Studio/Microsoft Visual C++ (MSVC) and Embarcadero RAD Studio (Rapid Application Development)/C++Builder/Delphi.
Both IDEs are available on the dominant Microsoft Windows platform for Personal Computers (PCs), as a result of sustained prosperity after formation of the company Microsoft in April 1975, 48 years ago.

One year later, in April 1976, another company, Apple, was founded, which today provides the second largest platform for Desktop Computing after Microsoft Windows. Other than Microsoft, Apple not only provides the Operating System software (macOS) to run a computing device, but also exclusively builds the hardware device itself, indivisible from their OS. An advantage of this approach is the potentially better integration and adjustment of software and hardware with less possible trouble for the user, but the disadvantage is that the choice of devices for the user is much more limited than on the Windows PC platform, where a large quantity of Independent Hardware Vendors (IHVs) exists to meet specific demands.

Apple builds first real computer after 47 years of company history

The Independent JPEG Group has the goal to develop reference software with the requirement to use reference devices to do this. The Apple range of devices was carefully observed over the years with the desire to also cover the Apple platform, but unfortunately no appropriate device could be found.
The situation changed only in this year 2023, when Apple introduced the fanless MacBook Air model with a 15 inch display – the first Apple computer to meet the demands for a reference device, after 47 years of formation of the company. Previously, Apple offered only toy devices (with a tiny screen) or noise generating devices (with a fan), but not reference computers.
On the Windows platform, appropriate reference devices could be used for 17 years now, thanks to the existence of several Independent Hardware Vendors with suitable offers.
The Independent JPEG Group is glad to announce that Apple platform support can now be started.

The Apple Mac platform with macOS has one major Integrated Development Environment, Xcode provided by Apple, on a level comparable with the two major environments on the Windows platform. So Xcode is the third major IDE considering Desktop Computing overall. It is also important for mobile application development, because mobile devices on their own are unsuitable for application development and require a desktop host with appropriate tools (SDKs – Software Development Kits) for mobile application development.

In this year 2023 Xcode celebrates its 20th anniversary under this name, although the codebase can be traced back to 1999 as Project Builder X (PBX – a name which still appears today as project file

extension .pbxproj in Xcode), which was later integrated with Interface Builder and rebranded as Xcode.
This year 2023 is also the 40th anniversary of Turbo Pascal by Borland, which was described in the previous article as the predecessor of Delphi (Object Pascal). Embarcadero, the company continuing working on the successors of Turbo Pascal, just shipped version 36 of that compiler. The command line compiler in Delphi 12 Athens gives the message "Embarcadero Delphi for Win32 compiler version 36.0". The compiler version number, 36, dates back to the first Turbo Pascal.

In January 1984 Steve Jobs, the charismatic founder and leader of Apple, presented the original Macintosh, the first micro computer with a graphical user interface which was produced in larger quantities. The first version of Windows was introduced by Microsoft only in November 1985, and it took Microsoft 10 more years to gain noticeable popularity with it.
Due to differences in the management, Jobs subsequently left Apple and founded the company NeXT to build the NeXT series of computer workstations and the NeXTSTEP operating system.
With the success of Microsoft Windows 95 in 1995, Apple was struggling to keep up and to modernize the antiquated operating system base of the Macintosh. Several attempts to develop a Mac OS successor, such as Project Copland, had failed, and finally it was considered to adopt an alternative system such as BeOS, a system developed by former Apple executive Jean-Louis Gassée, or NeXTSTEP by Steve Jobs' company NeXT. The decision was made for the last, which also brought back founder Steve Jobs to Apple.

Microsoft also needed a modern successor for its antiquated MS-DOS operating system base in the 1990s. Microsoft leader Bill Gates hired Dave Cutler, who developed the VAX/VMS operating systems at Digital Equipment Corporation (DEC), to build the Microsoft Windows NT ("New Technology") operating system, which is at the core of Microsoft Windows systems to date.
Cutler is known for his disdain for Unix. He thinks Unix is a junk operating system designed by a committee of hypocrites lacking authority and integrity.
Actually, Windows NT is indeed the most commonly used operating system on the desktop.
Unix is on the second place, thanks to Steve Jobs' NeXTSTEP, a Unix derivative, which is present in macOS to date as Darwin.

The strength of NeXTSTEP was the object-oriented application programming environment.
It was a NeXT computer workstation with NeXTSTEP operating system and powerful programming tools which enabled Tim Berners-Lee to create the foundation for the World Wide Web.

Standard C++ language is unsuitable for graphical user interface programming to date

The previous article about the IDE topic describes C/C++ as the dominant computer programming languages to date.
Surprisingly, even the extended C++ language in its current standard is unsuitable for proper graphical user interface programming because it lacks essential elements. That's why every major IDE provider has to find a custom solution for this problem.

The solution provided by NeXTSTEP and inherited by macOS/Xcode particularly for its Cocoa Framework is the Objective-C programming language, another superset of C beside C++, which was derived from another programming language Smalltalk. When Apple switched to another compiler infrastructure LLVM/Clang later, they introduced a modern alternative to Objective-C, the Swift programming language, in 2014, because Objective-C's syntax looked rather strange and it was not very popular among developers.

Qt is a cross-platform Framework which relies on a third-party C++ compiler. To solve the C++ deficit, it requires pre-build processing and moc (meta object compiler). But a language should be powerful enough on its own.

When Delphi (Object Pascal) was first released in 1995, many programmers complained: “Why isn’t it based on the C++ language?”. Some of them replied: “Simply because this is not possible, due to many missing features of the C++ language”. When Borland released C++Builder two years later in 1997, it was based on a heavily extended version of the ANSI C++ language including almost all the major features of the Object Pascal language found in Delphi, which was necessary so that the same frameworks could be used by both languages.
Today Embarcadero, the company continuing working on C++Builder, base their C++ toolchains on the same LLVM/Clang tools as Apple Xcode and add their custom extensions on top of it.

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Leipzig, December 2023