

# Unity In Action: Multiplatform Game Development In C

Video game development

*deadlines. An average development budget for a multiplatform game is US\$18-28M, with high-profile games often exceeding \$40M. In the early era of home*

Video game development (sometimes shortened to gamedev) is the process of creating a video game. It is a multidisciplinary practice, involving programming, design, art, audio, user interface, and writing. Each of those may be made up of more specialized skills; art includes 3D modeling of objects, character modeling, animation, visual effects, and so on. Development is supported by project management, production, and quality assurance. Teams can be many hundreds of people, a small group, or even a single person.

Development of commercial video games is normally funded by a publisher and can take two to five years to reach completion. Game creation by small, self-funded teams is called independent development. The technology in a game may be written from scratch or use proprietary software specific to one company. As development has become more complex, it has become common for companies and independent developers alike to use off-the-shelf "engines" such as Unity, Unreal Engine or Godot.

Commercial game development began in the 1970s with the advent of arcade video games, first-generation video game consoles like the Atari 2600, and home computers like the Apple II. Into the 1980s, a lone programmer could develop a full and complete game such as Pitfall!. By the second and third generation of video game consoles in the late 1980s, the growing popularity of 3D graphics on personal computers, and higher expectations for visuals and quality, it became difficult for a single person to produce a mainstream video game. The average cost of producing a high-end (often called AAA) game slowly rose from US\$1–4 million in 2000, to over \$200 million and up by 2023. At the same time, independent game development has flourished. The best-selling video game of all time, Minecraft, was initially written by one person, then supported by a small team, before the company was acquired by Microsoft and greatly expanded.

Mainstream commercial video games are generally developed in phases. A concept is developed which then moves to pre-production where prototypes are written and the plan for the entire game is created. This is followed by full-scale development or production, then sometimes a post-production period where the game is polished. It has become common for many developers, especially smaller developers, to publicly release games in an "early access" form, where iterative development takes place in tandem with feedback from actual players.

Assassin's Creed IV: Black Flag

*Rogue and Assassin's Creed Unity in November 2014. Assassin's Creed IV: Black Flag is an action-adventure, stealth game set in an open world environment*

Assassin's Creed IV: Black Flag is a 2013 action-adventure game developed by Ubisoft Montreal and published by Ubisoft. It is the sixth major installment in the Assassin's Creed series. Its historical timeframe precedes that of Assassin's Creed III (2012), but its modern-day sequences succeed III's own. Black Flag was originally released for PlayStation 3, Xbox 360, and Wii U in October 2013 and a month later for PlayStation 4, Windows, and Xbox One. It was later ported to the Nintendo Switch as part of The Rebel Collection alongside Assassin's Creed Rogue in December 2019. The game was released for Google Stadia in September 2021.

The plot is set in a fictional history of real-world events and follows the millennia-old struggle between the Assassins, who fight to preserve peace and free will, and the Templars, who desire peace through control. The framing story is set in the 21st century and depicts the player as an employee of Abstergo Industries (a company used as a front by the modern-day Templars), who is manipulated into uncovering secrets related to the Assassin-Templar conflict and the precursor race known as the First Civilization. The main story is set in the West Indies during the Golden Age of Piracy from 1715 to 1722, and follows notorious Welsh pirate Edward Kenway, grandfather of Assassin's Creed III protagonist Ratonhnhaké:ton / Connor and father of antagonist Haytham Kenway, as he searches for fortune and a mythical location called the Observatory, which is sought by both the Assassins and the Templars. A major plot element concerns the attempted establishment of an independent Pirate republic in the Caribbean.

Unlike previous games, gameplay elements focus more on the ship-based exploration of the seamless open world map, while also retaining the series' third-person land-based exploration, melee combat, and stealth system. Multiplayer also returns, albeit with only land-based modes and settings. The game's setting spans the West Indies with the three main cities of Havana, Nassau, and Kingston, along with numerous islands, sunken ships, and forts. Players have the option to harpoon large sea animals and hunt land animals. For the first time in the series, naval exploration is a major part of an Assassin's Creed game, where Edward captains the Jackdaw, a brig he captures from a Spanish fleet in an early game mission. A number of downloadable content (DLC) packs were released to support Black Flag, including Assassin's Creed Freedom Cry, a story expansion that was later made available as a standalone game in 2014. Set over a decade after Black Flag's main campaign, Freedom Cry follows Adéwalé, Edward's former quartermaster who became an Assassin.

Assassin's Creed IV: Black Flag received critical acclaim and became one of the best-selling games of 2013, with over 11 million copies sold as of 2014. Critics praised the open world gameplay, improved naval combat, side-quests, graphics, narrative, characters, and pirate theme. However, the modern-day story and combat received a slightly more mixed response, while criticism fell on aspects of the historical story missions which were considered repetitive. The game received several awards and nominations, including winning the Spike VGX 2013 award for Best Action Adventure Game. It was followed by Assassin's Creed Rogue and Assassin's Creed Unity in November 2014.

## Glossary of video game terms

*video game consoles, targeting 64-bit computer architecture. AAA A high-budget game with a large development team. AAA games are usually multiplatform or*

Since the origin of video games in the early 1970s, the video game industry, the players, and surrounding culture have spawned a wide range of technical and slang terms.

## Fez (video game)

*persona and his prominence in the 2012 documentary Indie Game: The Movie, which detailed Fez's final stages of development and Polytron's related legal*

Fez is a 2012 indie puzzle-platform game developed by Polytron Corporation and published by Trapdoor. The player-character Gomez receives a fez that reveals his two-dimensional (2D) world to be one of four sides of a three-dimensional (3D) world. The player rotates between these four 2D views to realign platforms and solve puzzles. The objective is to collect cubes and cube fragments to restore order to the universe.

The game was called an "underdog darling of the indie game scene" during its high-profile and protracted five-year development cycle. Fez designer and Polytron founder Phil Fish gained celebrity status for his outspoken public persona and his prominence in the 2012 documentary Indie Game: The Movie, which detailed Fez's final stages of development and Polytron's related legal issues. Fez met critical acclaim upon its April 2012 release for Xbox Live Arcade. The game was ported to other platforms following the expiration of a yearlong exclusivity agreement.

Reviewers commended the game's emphasis on discovery and freedom, but criticized its technical issues, in-game navigation, and endgame backtracking. They likened the game's rotation mechanic to the 2D–3D shifts of *Echochrome*, *Nebulus*, *Super Paper Mario*, and *Crush*. *Fez* won awards including the Seumas McNally Grand Prize and Eurogamer's 2012 Game of the Year. It had sold one million copies by the end of 2013, and it influenced games such as *Monument Valley*, *Crossy Road*, and *Secrets of Rætikon*. A planned sequel was canceled when Fish abruptly left game development.

## Video games and Linux

*Linux: Humble Bundle is going truly multiplatform*; Polygon. Retrieved March 19, 2023. Zinoune, M. *Options for Linux Gamers*; Unixmen. Retrieved March 19,

Linux-based operating systems can be used for playing video games. Because fewer games natively support the Linux kernel than Windows, various software has been made to run Windows games, software, and programs, such as Wine, Cedega, DXVK, and Proton, and managers such as Lutris and PlayOnLinux. The Linux gaming community has a presence on the internet with users who attempt to run games that are not officially supported on Linux.

## Jetpack Compose

*Compose Multiplatform – Beautiful UIs Everywhere*; JetBrains. Retrieved June 14, 2025. *What's new in Compose Multiplatform 1.8.1 | Kotlin Multiplatform*; Kotlin

Jetpack Compose is an open-source Kotlin-based declarative UI framework for Android developed by Google. The first preview was announced in May 2019, and the framework was made ready for production in July 2021.

In Compose, a user interface is defined using functions that have been annotated with the `@Composable` annotation, which are known as composable functions and define the screen's state. Jetpack Compose uses a Kotlin compiler plugin to transform composable functions into UI elements. For example, the `Text` composable function displays a text label on the screen.

## John Wick

*Stahelski's production studio 87Eleven will create a "comprehensive multiplatform content strategy...to guide the short- and long-term creative direction*

John Wick is an American media franchise created by Derek Kolstad. It centers on a neo-noir action thriller film series featuring the titular character portrayed by Keanu Reeves. Wick is a legendary hitman who is reluctantly drawn back into the criminal underworld after retiring. The franchise began with the release of *John Wick* (2014), which was followed by three sequels: *Chapter 2* (2017), *Chapter 3 – Parabellum* (2019), and *Chapter 4* (2023). Various spin-offs expanded the franchise: the prequel comic book series *John Wick: The Book of Rules* (2017–2019), the prequel television miniseries *The Continental* (2023), and the spinoff film *Ballerina* (2025), all incorporating elements of alternate history.

The films have received critical acclaim, and have been considered one of the greatest action film series of all time. Some critics and publications consider the first film, as well as *Chapter 4*, as two of the greatest action films ever made. The films have earned a collective gross of more than \$1 billion worldwide.

Chad Stahelski, Basil Iwanyk, and Erica Lee serve in oversight roles for the John Wick franchise. 87Eleven Productions, Thunder Road Films, and Lionsgate produce the franchise.

## Dragon Quest Builders

*has said that Sony Interactive Entertainment's multiplatform PhyreEngine was chosen for ease of development across multiple PlayStation consoles. Protagonists*

Dragon Quest Builders is a 2016 sandbox action role-playing game developed and published by Square Enix for the PlayStation 3, PlayStation 4, PlayStation Vita, Android iOS, and Microsoft Windows and published by Nintendo for Nintendo Switch.

The game is set in Alefgard, the world of the original Dragon Quest video game, with players controlling the builder who is tasked with rebuilding the world after it was destroyed. The game features a blocky aesthetic style, with gathering and building elements similar to games such as Minecraft. A sequel, Dragon Quest Builders 2, was released in 2018.

### Mass Effect 3

*Mass Effect 3 is a 2012 action role-playing game developed by BioWare and published by Electronic Arts. The third major entry in the Mass Effect series*

Mass Effect 3 is a 2012 action role-playing game developed by BioWare and published by Electronic Arts. The third major entry in the Mass Effect series and the final installment of the original trilogy, it was released in March 2012 for Windows, Xbox 360, and PlayStation 3. A Wii U version of the game, entitled Mass Effect 3: Special Edition, was later released in November 2012. The game is set within the Milky Way galaxy in 2186, where galactic civilization is invaded by a very advanced machine race of synthetic-organic starships known as Reapers.

Similar to Mass Effect 2, the player can import a completed saved game into Mass Effect 3 that influences the plot by taking previous decisions into account. In general, Mass Effect 3 revolves around increasing military strength by completing missions and gathering resources. As BioWare designed the game to be accessible to both old and new players, many of the series' traditional gameplay elements remain, such as cover-based third-person shooting, but new aspects are introduced as well, such as a multiplayer component. The game's score was written by a variety of composers, who aimed for a balance between the orchestral sound of Mass Effect 2 and the synthesizer-driven sound of the first Mass Effect. Mass Effect 3 also supports a variety of downloadable content packs, ranging from minor in-game items to more significant plot-related missions. Notable packs include From Ashes, Leviathan, Omega, and Citadel.

Mass Effect 3 received critical acclaim for its art direction, characters, emotional depth, improved combat, soundtrack, and voice acting. However, its ending was poorly received by fans, who felt that it did not meet expectations. In response to the controversy, BioWare released the Extended Cut pack, which expands upon the original ending. The game received several year-end awards, including Best RPG at the Spike Video Game Awards and the D.I.C.E. Award for Role-Playing Game of the Year. A standalone sequel, Mass Effect: Andromeda, was released in March 2017. In May 2021, Mass Effect 3 was remastered as part of the Mass Effect Legendary Edition.

### Nintendo Switch

2016). "Capcom looking into PS4, Xbox One and Nintendo Switch multiplatform games". *VideoGamer.com*. Archived from the original on November 8, 2016. Retrieved

The Nintendo Switch is a video game console developed by Nintendo and released worldwide in most regions on March 3, 2017. Released in the middle of the eighth generation of home consoles, the Switch succeeded the Wii U and competed with Sony's PlayStation 4 and Microsoft's Xbox One; it also competes with the ninth generation consoles, the PlayStation 5 and Xbox Series X/S.

The Switch is a tablet that can either be docked for home console use or used as a portable device, making it a hybrid console. Its wireless Joy-Con controllers function as two halves of a standard controller and

alternatively as individual controllers, featuring buttons, directional analog sticks for user input, motion sensing, and tactile feedback. A pair can attach to the sides of the console for handheld-style play, attach to a grip accessory to provide the form of a separated gamepad, or be used unattached. The Switch's system software supports online gaming through internet connectivity, as well as local wireless ad hoc connectivity with other consoles. Switch games and software are available on both physical flash-based ROM cartridges and digital distribution via Nintendo eShop; the system has no region lockout. Two hardware revisions were released: the handheld-only Switch Lite, released on September 20, 2019; and a higher-end version featuring an OLED screen, released on October 8, 2021.

The Switch was unveiled on October 20, 2016; the concept came about as Nintendo's reaction to financial losses attributed to poor sales of the Wii U and market competition from mobile games. Nintendo's then-president Satoru Iwata pushed the company towards mobile gaming and novel hardware. The Switch's design was aimed at a wide demographic of players through multiple modes of use. Nintendo preemptively sought the support of many third-party developers and publishers, as well as independent studios, to help build the Switch's game library alongside its first-party games, while standard electronic components, such as a chipset based on Nvidia's Tegra line, were chosen to make development for the console easier for programmers and more compatible with existing game engines.

Critical reception of the Switch was positive. The system received praise for its intuitive design and software library, with criticism directed toward hardware and controller issues. The Switch became a major commercial success, and has shipped over 150 million units worldwide as of December 2024, becoming the third-best selling console of all time behind the PlayStation 2 and Nintendo DS. It is also Nintendo's most successful home console to date, surpassing the Wii's 101.6 million units.

A direct successor, the Nintendo Switch 2, which is backward compatible with most Switch games, was released on June 5, 2025.

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