What is ARM64? Decoding today's powerful microprocessor architecture.

What is ARM64? ARM64 is ARM's 64-bit microprocessor architecture, which optimizes performance and saves power for smartphones and laptops.

Many people wonder what ARM64 is when learning about microprocessor architecture. With its superior features, this architecture is widely used in many current technology products. Let's explore the operating principles, strengths, weaknesses, and practical role of ARM64!

What is ARM64?

ARM64 (AArch64 - Advanced RISC Machine 64-bit) is the name of a 64-bit microprocessor architecture platform. This architecture was developed by ARM Holdings based on RISC (Reduced Instruction Set Computing), which uses simple instructions to optimize performance and energy consumption.

Compared to the 32-bit ARM platform, ARM64 allows devices to process 64-bit data and access more than 4GB of RAM, thereby improving overall performance. This architecture is essential in thin and light devices capable of handling demanding tasks while maintaining power efficiency.

For example, you can use an iPhone 14, equipped with an ARM64 architecture chip, to play graphically intensive games. This is one of the reasons why games run more smoothly and with less lag compared to older phones using 32-bit ARM chips.

The MacBook is a prime example of the ARM64 architecture, offering stable performance, long battery life, and minimal overheating even under heavy workloads. We offer a variety of new MacBook models to ensure

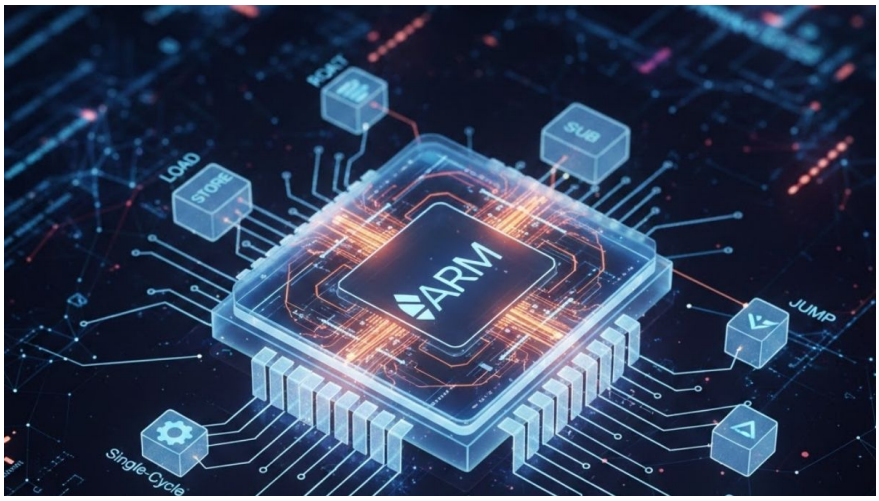
uninterrupted work; check them out now!

How does the ARM64 architecture work?

To understand what ARM64 is, you need to grasp how this architecture works. Additionally, you need to differentiate between 32-bit and 64-bit architectures to understand why ARM64 is becoming increasingly popular.

ARM's RISC principle

ARM64 is developed based on the RISC instruction set, so you need to understand its operating principles. Specifically, ARM based on the RISC principle is built on a simple instruction set, performing few tasks at very high processing speeds to improve performance.



Furthermore, ARM, developed based on RISC, also has a large register set to increase the number of instruction threads that the CPU can execute in parallel. Most ARM instructions have a fixed length, thereby shortening processing time and increasing energy efficiency.

The difference between 32-bit and 64-bit

The ARM64 architecture is gradually replacing the older ARM32 architecture due to its many unique features. To understand this better, please see the differences below:

The difference	32-bit	64-bit
Register width	32-bit	64-bit
Maximum RAM support	4GB	Theoretically, it can reach the EB rank.

Data processing speed	Slower	Faster
Suitable app	32-bit software	Both 32-bit and 64-bit software
Currently popular	Less common	More common

What is the difference between ARM64 and x64 (Intel/AMD)?

ARM64 and x64 are two different microprocessor architectures, yet many people still confuse them. The differences between ARM64 and x64 are shown below:

The difference	**ARM64**	**x64 (AMD64)**
Type of architecture	RISC - Simple Instruction Set	CISC - Complex Instruction Set
Energy consumption	Save more	More energy is needed.
Performance	Primarily focused on multi-core	Powerful in both single-player and multi-player modes.
Featured applications	Smartphones, tablets, and thin and light laptops	Desktop computers, gaming laptops, workstations
Production costs	Lower	Higher

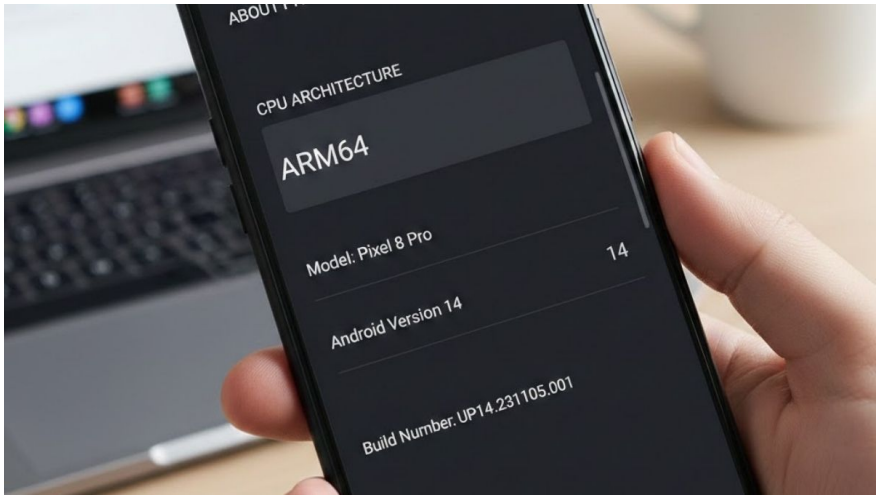
Current practical applications of ARM64

Once you understand the differences between ARM64 and AMD64, you'll know why this architecture is so widely used in practice. Below are some applications of the ARM64 architecture in modern technology products.

ARM64 on Android

ARM64 is the common architecture for modern Android phones and tablets (usually from 2015 onwards).

Chip lines that utilize the ARM64 architecture include Qualcomm Snapdragon, MediaTek Dimensity, Samsung Exynos, Huawei Kirin, and others. The ARM64 architecture, combined with AI features, is becoming a new development trend for Android devices.



ARM64 on iPhone and iPad

The ARM64 architecture first appeared in the iPhone 5S and iPad Air (first generation) using the A7 chip, launched in 2013. Since then, most subsequent generations of iPhones and iPads have used the ARM64 architecture. This architecture allows phones and tablets to process data with high efficiency and save battery power, making it suitable for modern trends.

ARM64 on Windows

The ARM64 architecture is best supported on Windows 11, while support is more limited on Windows 10. This architecture is mainly found on thin and light Windows computers, focusing on multitasking for office workers.

ARM64 on macOS

Apple uses the ARM64 architecture in many MacBook models that utilize Apple Silicon chips from the M1, M2, M3, and M4 series. This architecture results in impressive performance, improved battery life, and excellent compatibility with most iOS/iPadOS software.

How to check if a device is ARM64

To check if your device is ARM64, you need to use third-party software or check directly in your device's settings. The instructions below will guide you through the detailed check for Android, Windows, and macOS devices.

Check on Android

On Android phones, the processor architecture isn't displayed directly in Settings, so you need to download a third-party app. CPU-Z is a popular software used to check this, with the following steps:

1. **Step 1 : Go to the Google Play Store and search for the CPU-Z** app .

1. **Step 2** : Click **Install** to download this app to your Android device.
2. **Step 3** : Open the CPU-Z application and go to the **System** section .
3. **Step 4** : Check the Kernel Architecture section. If you see **aarch64,** it means it's an ARM64 architecture.

Check on Windows

On Windows, you can check the processor architecture directly in Settings by following these steps:

1. **Step 1** : Press **Start** and then select **Settings** to open your computer's settings.

1. **Step 2** : Go to **System** in Settings.

1. **Step 3** : Click on the **"About"** section to view the introductory information.

1. **Step 4** : Check the **System type section.** If you see the text '64-bit operating system, ARM64-based processor', it's an ARM64 architecture.

Test on Mac

For MacBooks, you can also check the processor architecture directly on the machine without downloading any other applications, as follows:

1. **Step 1** : Click on the apple icon **.**

1. **Step 2** : Click **on About My Mac.**
2. **Step 3** : Check the **Chip** section . If it says Apple M1, Apple M2, or Apple M3, it's an ARM64 architecture.

Advantages and disadvantages of ARM64

In fact, the ARM64 architecture is increasingly being used in many technological devices due to the following outstanding advantages:

1. **Reduced power consumption** : Helps increase battery life for tech devices.
2. **Low heat dissipation** : This helps the device operate more stably when running heavy tasks and reduces its reliance on the cooling system.
3. **Higher memory support** : ARM64 can access up to more EB of RAM to increase stability when handling heavy tasks.
4. **Good multitasking performance** : Helps the device handle multiple tasks efficiently.

Additionally, the ARM64 architecture also has some weaknesses, as follows:

1. **Single-core performance** : May not be as high as x64 when handling heavy tasks with older chip generations.
2. **Application compatibility** : Some x86 software cannot be installed directly due to a lack of compatibility optimization; complex emulation is required.

The information above answers the question of what ARM64 is, as well as its advantages, disadvantages, operating principles, and prominent applications. If you need more information about current new technologies, please check out the content here!

Frequently Asked Questions

Is ARM64 compatible with 32-bit applications?

The ARM64 architecture is designed for backward compatibility, allowing the installation of 32-bit applications. Therefore, phones, tablets, and laptops can run older software.

Should you choose an ARM64 device?

You should choose an ARM64 device if you prioritize battery life, smooth multitasking performance, and minimal overheating. If you're doing intensive work that requires strong single-core performance, then an ARM64 might not be the best choice.