Raspberry Pi 4 and Raspberry Pi 5 Analysis

Introduction

The Raspberry Pi series is one of the most popular Single-board computers due to its high capability in various tasks. With the new release of Raspberry Pi 5, coming on October 23 on its official website, we can compare its specifications to its older model, Raspberry Pi 4. These small yet powerful devices are known for their affordability, versatility, and a wide range of applications. The improvements stated under this report have provide users with more capable and efficient devices, and this transition from the Pi 4 to the Pi 5 can prove to be even better.

Analysis

The hardware differences between the Raspberry Pi 4 and Raspberry Pi 5 are significant. The Raspberry Pi 5 features a BCM2712 SoC (System on Chip) with a quad-core Cortex-A76 CPU at 2.4 GHz, while the Pi 4's Cortex-A72 CPU is at 1.8 GHz, which is almost 2 times faster. Additionally, the Pi 5's VideoCore VII GPU, running at 800 MHz which can increase graphics performance and also support OpenGL ES 3.1 and Vulkan 1.2. The Raspberry Pi 5 also uses dual 4Kp60 HDMI display output, compared to Raspberry Pi 4 single 4Kp60 / dual 4Kp30 displays. This enhancement in video output makes multimedia focus possible. Furthermore, the addition of two 4-lane MIPI camera/display transceivers can work with higher bit rates cameras and high-resolution LCDs. A significant change in the Raspberry Pi 5 is the inclusion of a Real-Time Clock (RTC) which no longer relies on network time like Raspberry Pi 4. Moreover, the built-in power button makes the user shutdown and restart without disconnecting the power supply.

Another big improvement is its energy management. The Raspberry Pi 5 draws 5 Amp while Raspberry Pi 4 uses 3 Amp, which can concern for power supply, but the 16nm CPU in the Pi 5 enhances its energy efficiency, resulting in 2.75 Gf/W, a substantial improvement over the Pi 4's 1.64 Gf/W. This means that, despite the increased power consumption, the Pi 5 makes more efficient use of the energy it draws.

For the price, Raspberry Pi 5 will be available for purchase with different RAM options, costing about 2100 Baht for 4GB and almost 3000 for 8GB. Considering the performance improvements and new features, this increase in cost can be justified for people who prefer faster performance.

Conclusion

The transition from Raspberry Pi 4 to Raspberry Pi 5 is a notable advancement in single-board computing. It introduces improvements in architecture, connectivity, software compatibility, energy efficiency, and a reasonable cost adjustment. This demonstrates the Raspberry Pi Foundation's commitment to accessibility and versatility. The Raspberry Pi 5 is the potential of single-board computing, enabling users to explore technology and creativity in fresh and exciting ways.

Spec Comparison

	Raspberry Pi 4B	Raspberry Pi 5
CPU	Broadcom BCM2711, quad-core Cortex-A72 (ARM v8) 64-bit, running at 1.8GHz	Broadcom BCM2712, quad-core 64-bit Arm Cortex-A76 CPU running at 2.4GHz
GPU	500MHz VideoCore VI GPU	800MHz VideoCore VII GPU, supports OpenGL ES 3.1, Vulkan 1.2
Multimedia	H.264(AVC)	H.265(HEVC)
memory	1GB, 2GB, 4GB, or 8GB LPDDR4-3200 SDRAM (depending on model)	1GB, 2GB, 4GB, or 8GB LPDDR4X-4267 SDRAM (depending on model)

WIFI	Dual-band 802.11ac Wi-Fi	Dual-band 802.11ac Wi-Fi
Bluetooth	Bluetooth 5.0, BLE	Bluetooth 5.0 / Bluetooth Low Energy (BLE)
USB	1 Type-C port, 2 USB 3.0 ports, 2 USB 2.0 ports, 1 Ethernet port, 1 Micro-SD card slot	1 Type-C port, 2 USB 3.0 ports, 2 USB 2.0 ports, 1 Ethernet port, 1 Micro-SD card slot
Storage	MicroSD card slot	MicroSD card slot + PCIE lane for NVME M.2 SSD
Networking	Dua-Band 802.11acBluetooth 5 / BLEGigabit EthernetPoE via POE + Hat (Incompatible with old version)	Dua-Band 802.11acBluetooth 5 / BLEGigabit EthernetPoE via POE + Hat (Incompatible with old version)
Power consumption	Up to 7.5W	Up to 15W (requires new power supply)
Thermal performance	Lower temperature and passive cooling option	Higher temperature and fan requirement
Camera/display ports	One DSI port for displays and one CSI port for cameras	Two 4-lane MIPI ports for both cameras and displays (new cables needed)
Audio output	HDMI, USB, or analog audio jack	HDMI or USB only
Connector	2 micro HDMI ports (supports up to 4Kp60), 1	2 micro HDMI interfaces (supports up to

	2-lane MIPI DSI display port, 1 2-lane MIPI CSI camera port, 4-pole stereo audio and composite video ports	4Kp60)compatible with HDR, 2 4-channel MIPI camera/display transceivers, 1 PCIe 2.0 interface, 1 battery connector (for real-time clock), 1 UART port
Input power	5V DC power via USB-C (3A minimum), 5V DC power via GPIO (3A minimum), Powered by PoE (requires separate PoE+HAT)	Provides 5V/5A DC power through USB-C, supports power supply through GPIO, provides 5V DC power through PoE (requires separate PoE+HAT)
GPIO	Raspberry Pi standard 40-pin connector	Raspberry Pi standard 40-pin connector

References

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