

# 1. Raspberry Pi official system

---

## 32-bit system

---

The Raspberry Pi is a low-cost microcomputer targeted at education and the maker community. Its 32-bit operating system is designed to make full use of the Raspberry Pi's hardware resources. Typically based on ARM architecture, such operating systems offer lightweight performance and rich functionality. Raspbian is the officially recommended 32-bit operating system. It is based on Debian Linux and provides rich software packages and good support for Raspberry Pi hardware. In addition, you can also choose other 32-bit operating systems, such as Ubuntu MATE, Arch Linux, etc., to meet different needs.

These operating systems can be easily installed and booted from the Raspberry Pi's micro SD card. They support various development tools and programming languages such as Python, Scratch, etc., making them ideal for educational and learning purposes. In addition, the 32-bit operating system of Raspberry Pi can also be used as an experimental platform for the development of Internet of Things projects, home media center equipment, network servers, etc. Due to its low power consumption and small design, Raspberry Pi is also widely used for prototyping embedded systems and IoT devices.

## 64-bit system

---

The Raspberry Pi's 64-bit operating system is designed to better exploit the performance of its hardware. This type of operating system is usually based on the ARM architecture, which provides a larger memory addressing space and higher performance, allowing the Raspberry Pi to handle more complex tasks and applications. Currently, Raspberry Pi 3 and later models support 64-bit operating systems.

Officially recommended 64-bit operating systems include the Debian-based Raspberry Pi OS 64-bit version, as well as other Linux distributions such as Ubuntu Server, Fedora, etc. These operating systems typically support rich software packages and provide good support for Raspberry Pi hardware. They are also suitable for various development tools and programming languages, such as Python, C++, etc., to meet the needs of education, learning and practical applications.

The 64-bit operating system of Raspberry Pi can be used as a platform for developing high-performance Internet of Things devices, home media centers, network servers and other projects. Due to its larger memory addressing space and higher performance, 64-bit operating systems can also better support data-intensive applications, such as large-scale data processing, machine learning, etc.

## Lightweight operating system

---

A lightweight operating system is an operating system specifically designed to run on resource-constrained devices and is typically small and efficient. The lightweight operating system on the Raspberry Pi is primarily used for embedded development, IoT projects, and other applications with low resource requirements.

Raspberry Pi OS Lite is the officially recommended lightweight operating system for Raspberry Pi. It is a streamlined version based on Debian and does not include a desktop environment and a large number of pre-installed software. This allows it to have smaller storage space requirements and faster boot times, and is suitable for different models of Raspberry Pi.

Lightweight operating systems usually provide basic system functions and services. Users can install and configure required software packages according to actual needs, such as web servers, databases, etc. They usually also provide a wealth of development tools and programming language environments, such as Python, C++, etc., to meet the needs of embedded development.

The Raspberry Pi lightweight operating system is suitable for projects that do not require complex graphical interfaces and a large amount of pre-installed software, such as sensor data collection, remote control, Internet of Things devices, etc. They excel in resource utilization and performance, making the Raspberry Pi better suited for a variety of embedded and IoT applications.

## Desktop system

---

The Raspberry Pi desktop operating system is an operating system designed by the Raspberry Pi Foundation for the Raspberry Pi single-board computer. It is based on the Linux operating system and has been optimized and customized to adapt to the Raspberry Pi hardware platform, providing a graphical desktop environment and rich applications.

The Raspberry Pi desktop operating system has a simple and easy-to-use user interface, and users can operate it through the mouse and keyboard. It has built-in some commonly used office software, Internet browsers and media players to facilitate users for office work, Internet access and entertainment.

In addition, the Raspberry Pi desktop operating system also supports the installation and running of various Linux applications. Users can easily obtain the required software through the software package manager and perform customized configurations.

The Raspberry Pi desktop operating system also has rich hardware support and community resources. Users can obtain technical support and exchange experience through official forums and community Q&A platforms.

## Bookworm Operating System

---

The Raspberry Pi Bookworm operating system is a lightweight Linux distribution based on Debian, specially designed for Raspberry Pi computers. It aims to provide a simple and efficient operating system environment to meet the reading, writing and learning needs of Raspberry Pi users.

The Bookworm operating system uses a lightweight desktop environment, allowing the Raspberry Pi to run smoothly even with limited resources. The operating system is pre-installed with a series of reading-related software, such as LibreOffice Writer for document writing, Evince for PDF file reading, Caliber for e-book management, etc. These software aid users in reading and writing tasks, and promote learning and knowledge management.

In addition to reading and writing tools, Bookworm operating system also provides some basic applications, such as web browsers, email clients, etc., to meet daily office and study needs. In addition, due to the versatility and programmability of Raspberry Pi, the Bookworm operating system also supports programming languages such as Python, providing users with the possibility of learning programming and development.

# BullseyeOS

---

The Raspberry Pi Bullseye operating system is the latest version of the Raspberry Pi based on Debian 11. This operating system has been comprehensively upgraded and improved, providing users with a more stable and efficient experience.

The Bullseye operating system uses the latest Linux kernel and software packages, bringing more powerful performance and functionality to the Raspberry Pi. It provides a modern desktop environment, pre-installed with new applications, such as Chromium browser, LibreOffice office suite, VLC media player, etc., to meet the needs of users for daily use.

In addition, the Bullseye operating system has also been optimized for the hardware characteristics of the Raspberry Pi, providing better hardware support and performance tuning. At the same time, it also supports Raspberry Pi's official hardware acceleration functions, such as OpenGL, video decoding, etc., allowing users to enjoy a smoother experience.

In addition, Bullseye operating system has also made improvements in security and stability, enhanced system protection and stability, and provided a more reliable system environment.

The above are the more common systems for Raspberry Pi. For Raspberry Pi beginners, we recommend the desktop system.