

Task: High-Speed File Download to SPIFFS on ESP32

Objective:

Develop a firmware application for the ESP32 Dev Kit that downloads a file via HTTPS from a public URL and writes it to SPIFFS (SPI Flash File System) at a speed of at least 400KBps.

Task Requirements:

1. Hardware Required:

- ESP32 Dev Kit
- Stable internet connection

2. Software Requirements:

- ESP-IDF (or Arduino framework)
- SPIFFS for file storage
- HTTPS client (using mbedTLS or ESP HTTP Client)

3. Download Source:

- The file should be fetched from any public HTTPS URL.
- The URL should be configurable in the firmware (e.g., via hardcoded string or serial input).

Expected Deliverables:

1. Firmware Code:

- The ESP32 should make an HTTPS request to download a file from a public URL.
- The file should be stored in SPIFFS with a download + write speed of at least 400KBps.
- Proper error handling for network failures, timeouts, and storage limits.

2. Performance Testing & Validation:

- Measure the actual download and write speed.
- Provide logs showing the achieved speed.

3. Documentation:

- Explanation of the implementation (e.g., buffer sizes, optimizations).
- Steps to compile, flash, and test the firmware.

Evaluation Criteria:

Code Quality: Well-structured, modular, and optimized code.

Performance: Achieving 400KBps or higher throughput.

Error Handling: Ability to handle failures (e.g., connection drops, storage limits).

Documentation: Clear and detailed explanations of design choices.