

# 7.1 Introduction: The IoT Communication Stack

For an IoT device to be useful, it needs to communicate. This communication happens in layers, much like a conversation. You need to have connectivity, then you need a common language to request things (web communication), and sometimes a specialized shorthand (messaging).

- **Connectivity (Wi-Fi):** Wi-Fi allows your ESP32 to connect to a local network, giving it a path to the internet or other local devices. This module will cover how to configure the ESP32 as both a client that connects to a router and as an access point that creates its own network.
- **Web Communication (HTTP/HTTPS):** HTTP allows your device to request data from and send data to web servers and APIs (Application Programming Interfaces). This is essential for tasks like fetching weather data, logging information to a cloud database, or being controlled by a web dashboard. HTTPS is the secure version, encrypting the conversation to protect your data.
- **Messaging (MQTT/MQTTs):** While HTTP is powerful, it can be inefficient for the constant, small data packets typical of IoT sensors. MQTT is a lightweight, efficient protocol designed specifically for this purpose. It uses a publish/subscribe model, which is perfect for real-time telemetry and control. MQTTs is its secure counterpart.

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