

Module 1i.

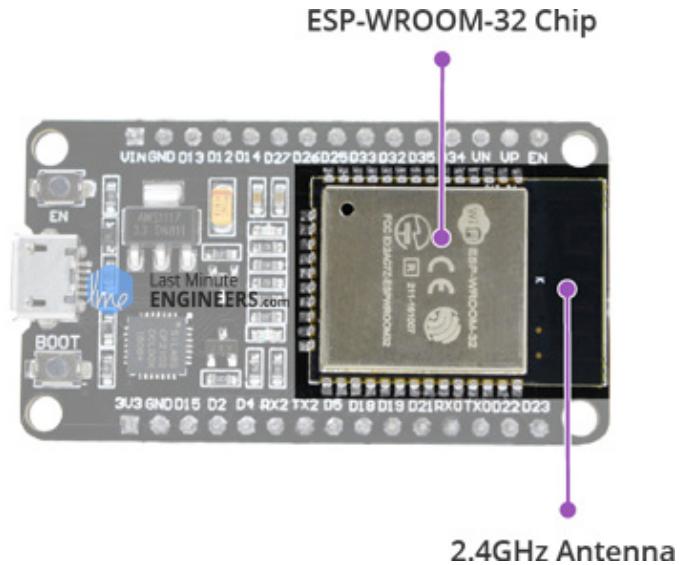
Introduction to ESP32 Development Board & Its Features

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019 622 0575

1i. Introduction to ESP32 Development Board & Its Features

ESP-WROOM-32 Module

- Power Requirement
- Peripherals & I/O
- On-board Switches & LED Indicators
- Serial Communication
- ESP32 Development Board Pinout
- Why ESP32?
- ESP32 Applications
- Programming Environments
- ESP32 vs ESP8266



ESP-WROOM-32 Chip

- Xtensa® Dual-Core 32-bit LX6
- Up to 240MHz Clock Freq.
- 520kB internal SRAM
- 4MB external flash
- 802.11b/g/n Wi-Fi transceiver
- Bluetooth 4.2/BLE

Source: <https://lastminuteengineers.com/esp32-arduino-ide-tutorial/>

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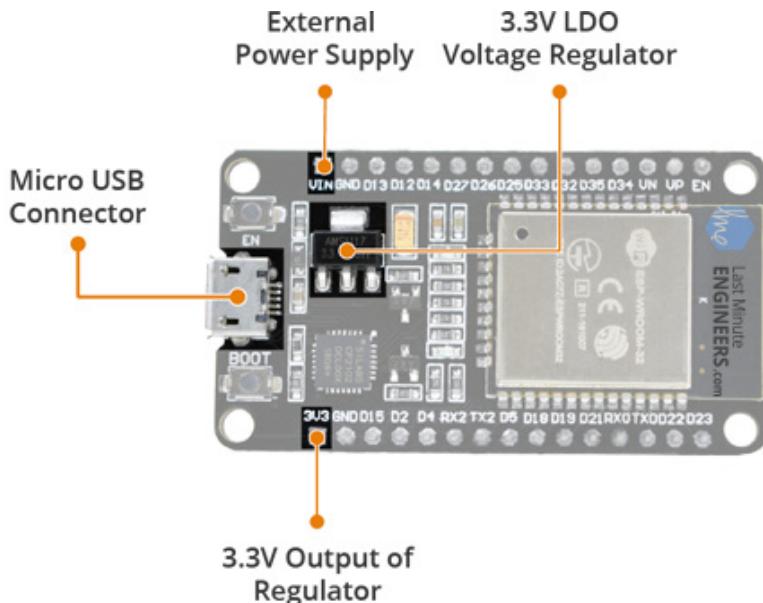
ESP32 Development Board Pinout

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Power Requirement

- Operating Voltage: 2.2V to 3.6V
- On-board 3.3V 600mA regulator
- 5 μ A during Sleep Mode
- 250mA during RF transmissions

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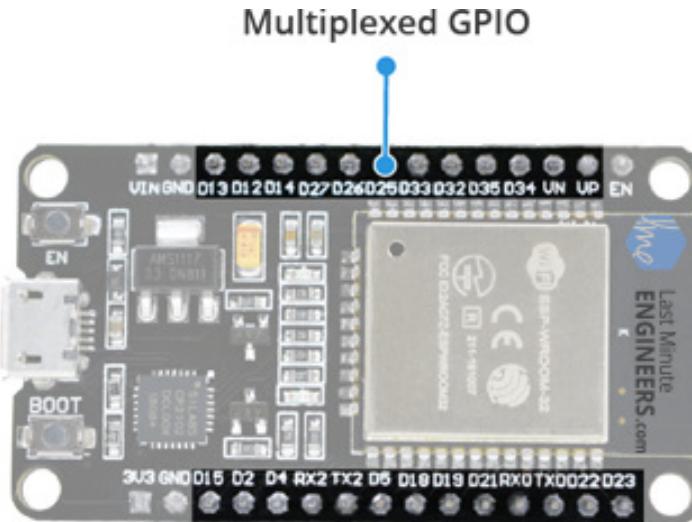
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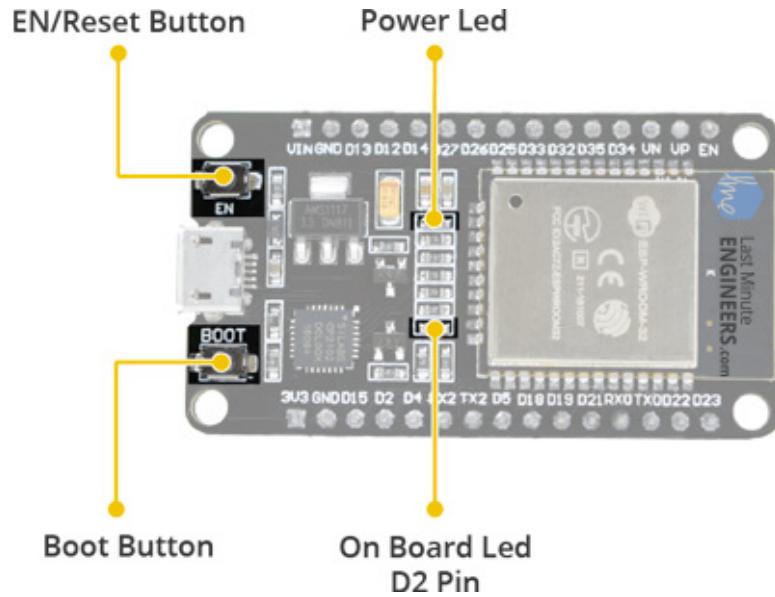
Multiplexed I/Os

- 15 ADC channels
- 2 UART interfaces
- 25 PWM outputs
- 2 DAC channels
- SPI, I2C & I2S interface
- 9 Touch Pads

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Switches & Indicators

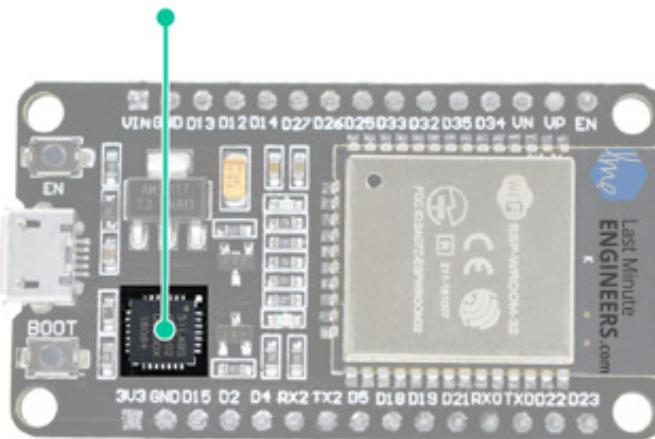
- EN – Reset the ESP32 chip
- Boot – Download new programs
- Red LED – Power Indicator
- Blue LED – User Programmable

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**USB To TTL Converter
CP2102**



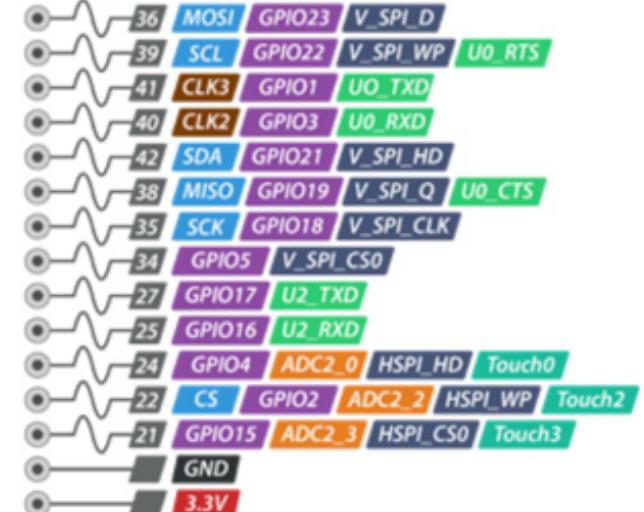
Serial Communication

- CP2102 USB-to-UART converter
- 5 Mbps communication speed
- IrDA support

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Legend:

Color	Function
Red	Power
Black	GND
Brown	Control
Cyan	Touch
Blue	Arduino
Purple	GPIO
Orange	ADC
Yellow	DAC
Dark Blue	SPI
Green	UART
Teal	EN
Wavy Line	PWM

ESP32 Dev. Board Pinout

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Source: <https://lastminuteengineers.com/esp32-arduino-ide-tutorial/>

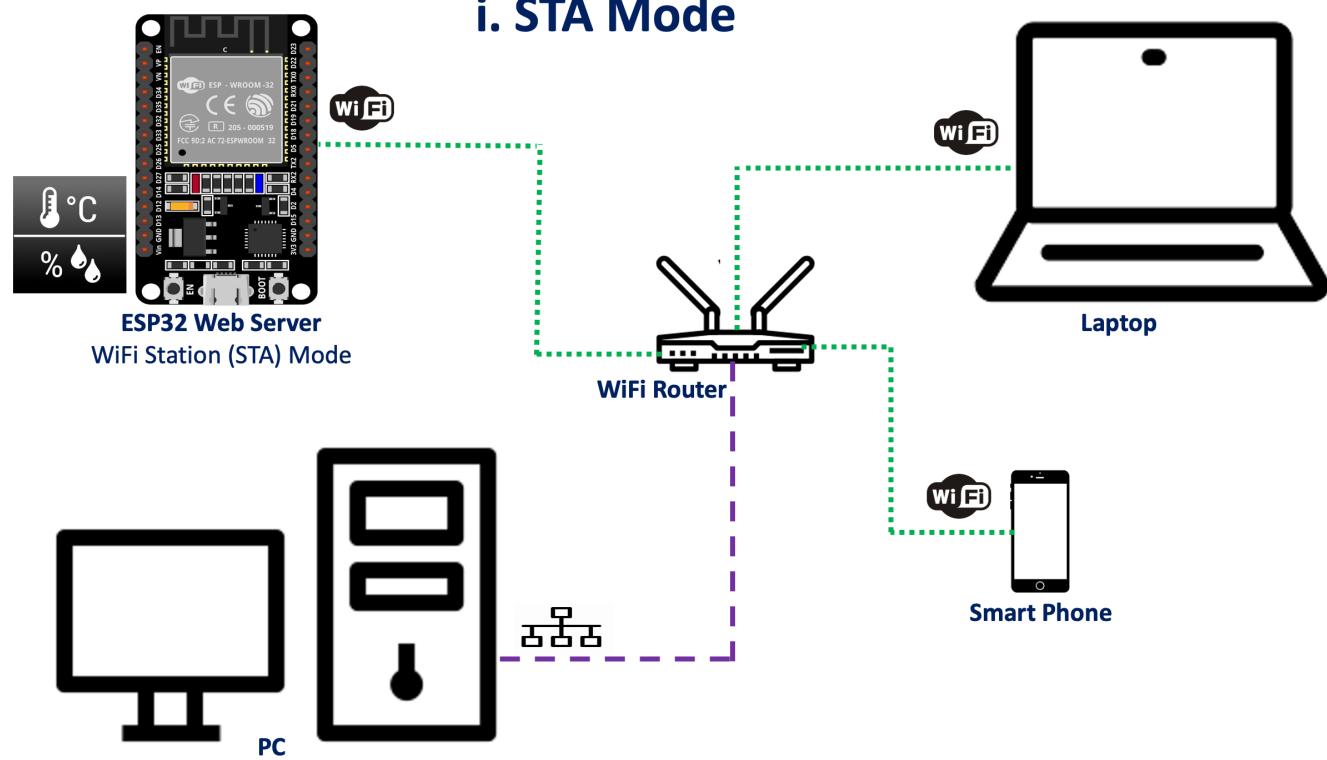
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→ Web Server Station Mode
→ Soft Access Point Mode
→ Combination STA & Soft AP Mode

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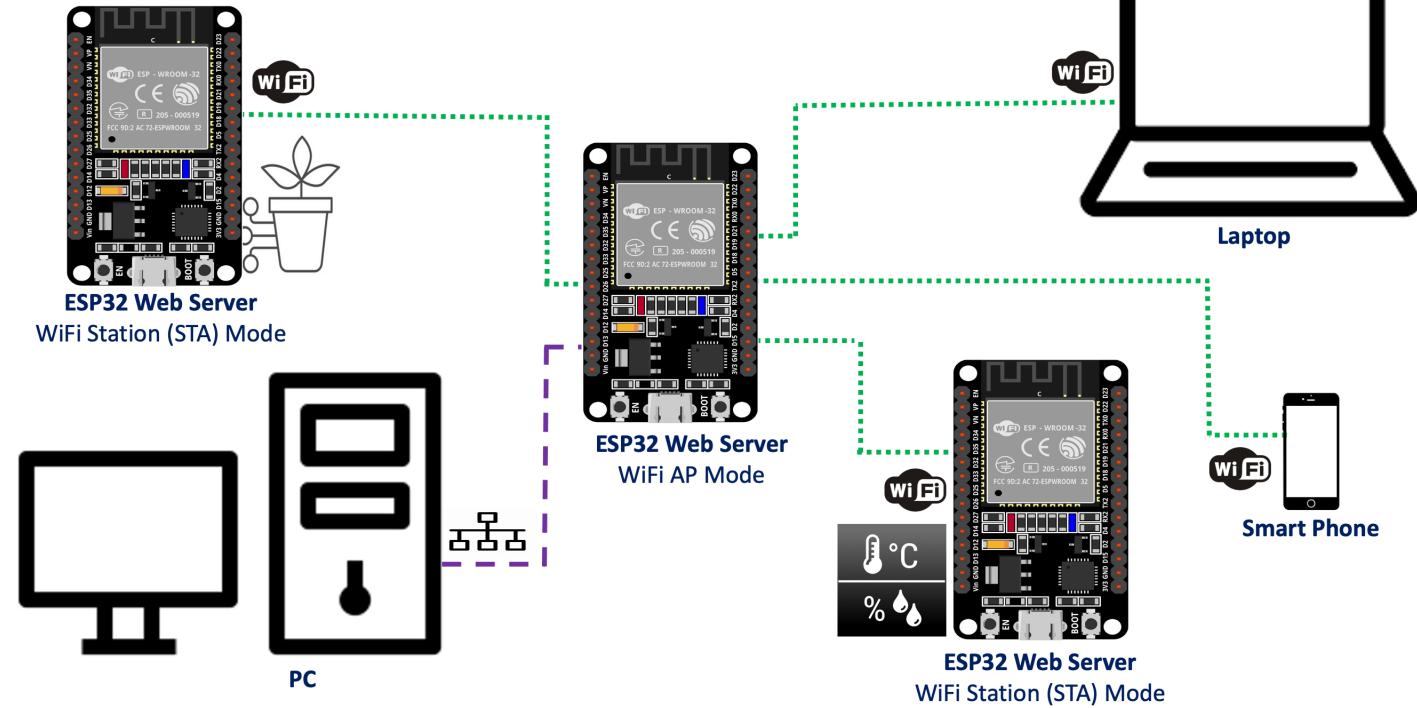


We will concentrate on this mode only.

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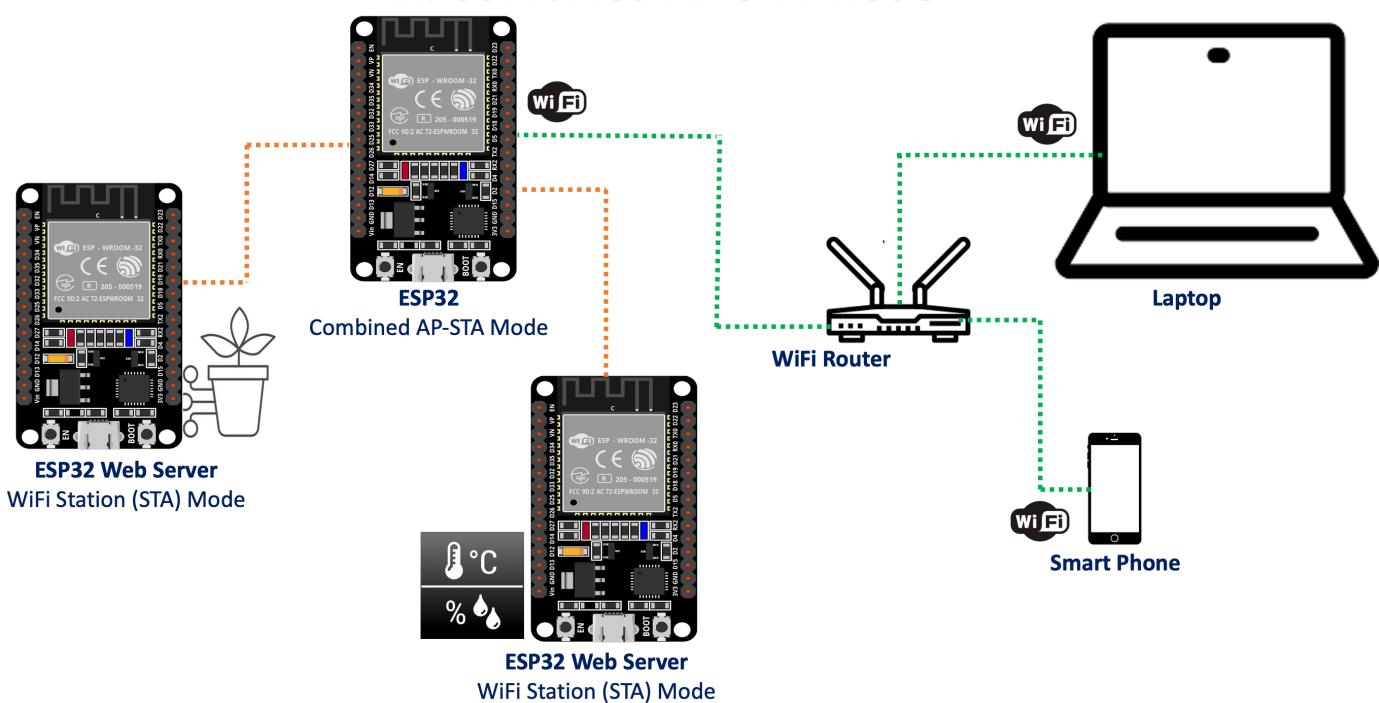
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ii. Soft Access Point Mode



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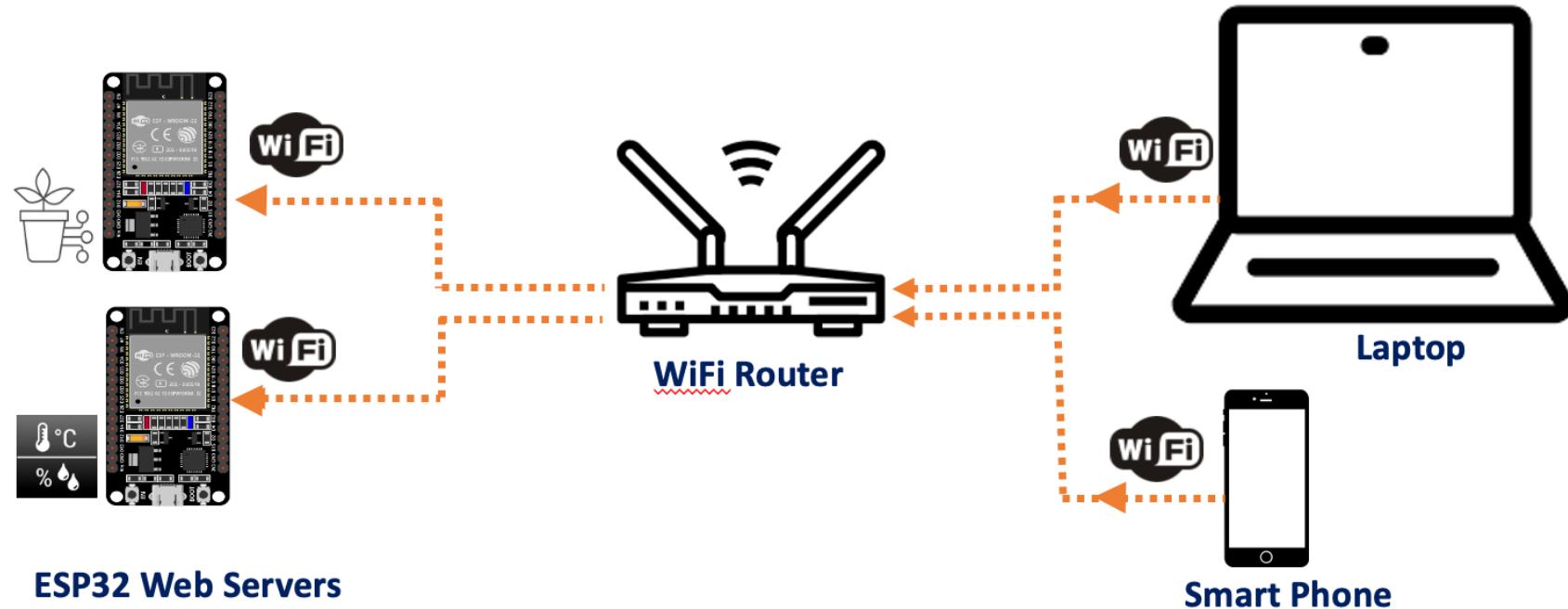
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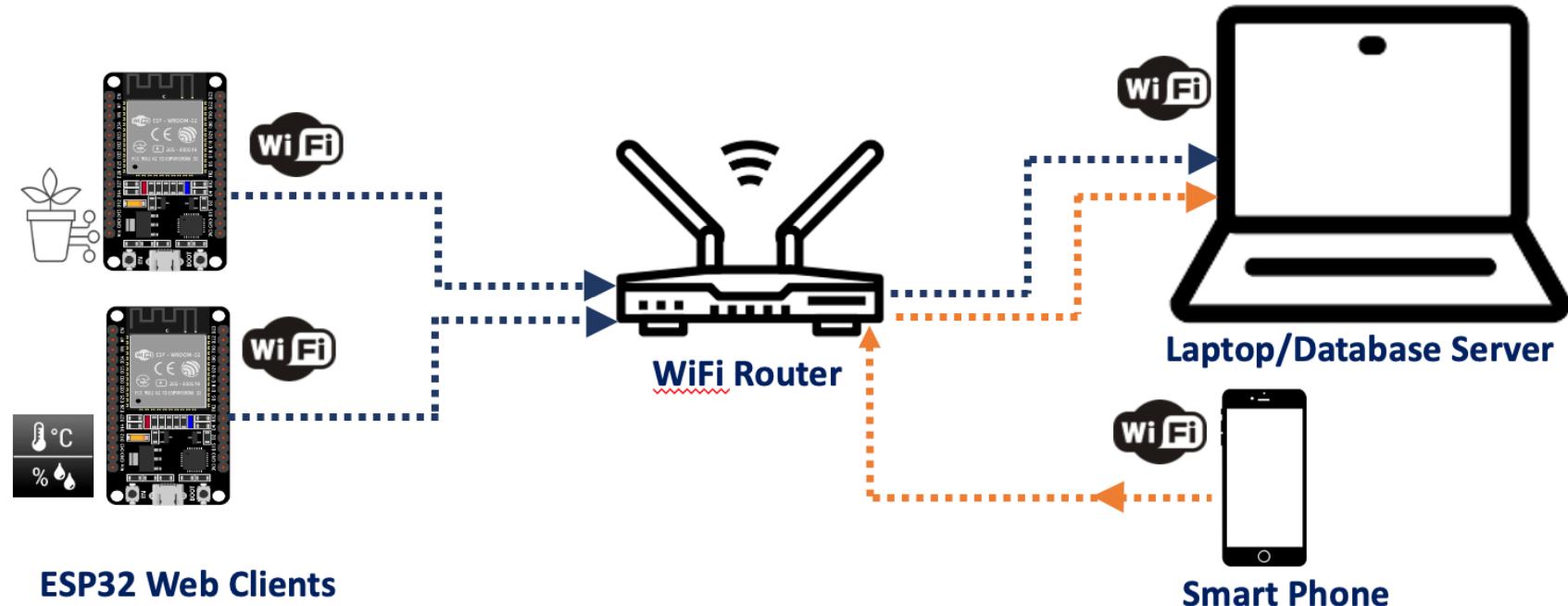
i. ESP32 as Web Servers



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ii. ESP32 as Clients



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Programming Environments

The ESP32 can be programmed in different programming environments. You can use:

- Arduino IDE
- Espressif IDF (IoT Development Framework)
- [Micropython](#)
- JavaScript
- LUA
- ...

<https://randomnerdtutorials.com/getting-started-with-esp32/>

We are using [Arduino IDE](#) for programming the ESP32

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	ESP8266	ESP32
MCU	Xtensa Single-core 32-bit L106	Xtensa Dual-Core 32-bit LX6 with 600 DMIPS
802.11 b/g/n Wi-Fi	HT20	HT40
Bluetooth	X	Bluetooth 4.2 and BLE
Typical Frequency	80 MHz	160 MHz
SRAM	X	✓
Flash	X	✓
GPIO	17	36
Hardware /Software PWM	None / 8 channels	None / 16 channels
SPI/I2C/I2S/UART	2/1/2/2	4/2/2/2
ADC	10-bit	12-bit
CAN	X	✓
Ethernet MAC Interface	X	✓
Touch Sensor	X	✓
Temperature Sensor	X	✓
Hall effect sensor	X	✓
Working Temperature	-40°C to 125°C	-40°C to 125°C

<https://www.kuongshun-ks.com/info/esp32-vs-esp8266-pros-and-cons-29182509.html>

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Questions?