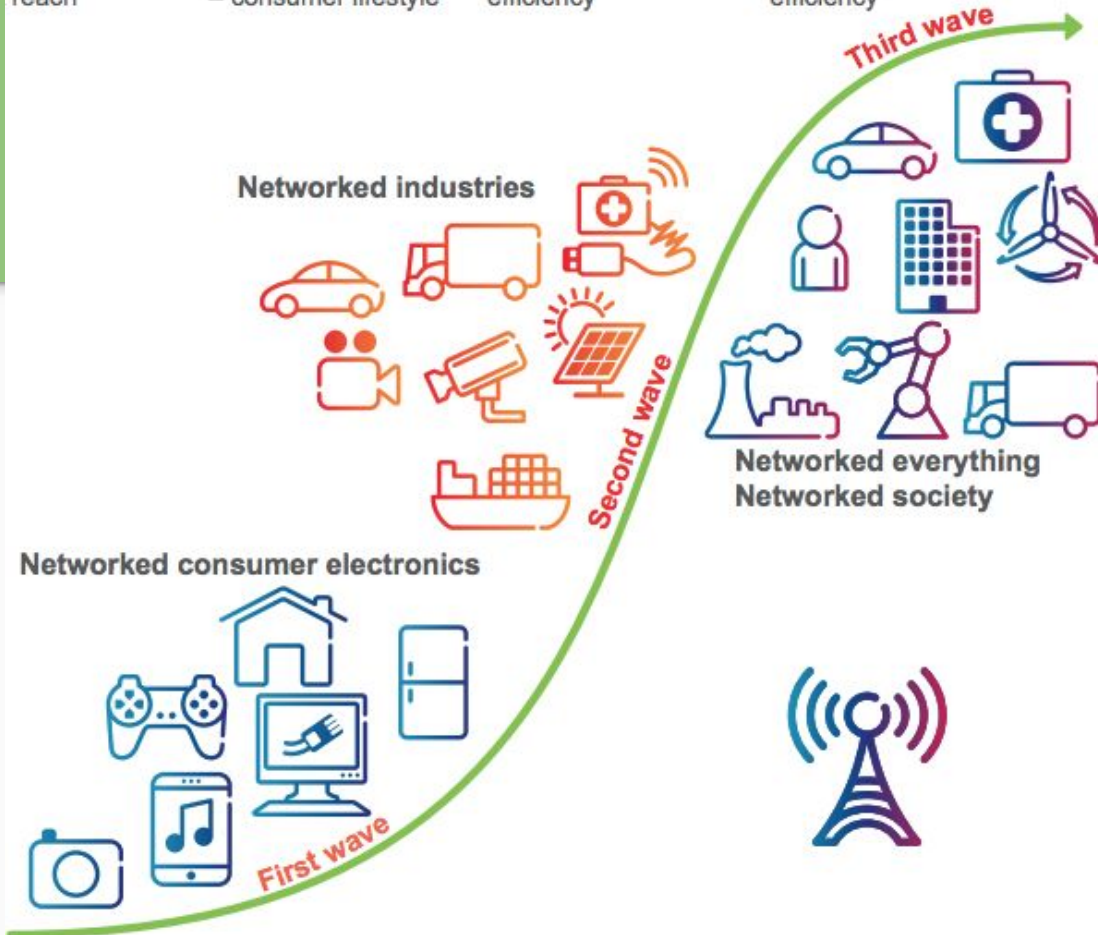


Improved reach

Improved value – consumer lifestyle

Improved process efficiency

Improved human efficiency



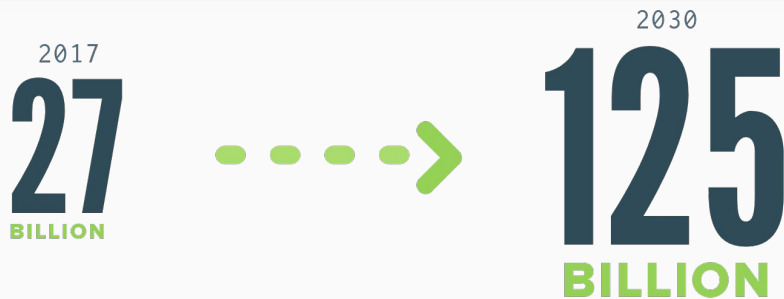
ERICSSON WHITE PAPER
284 23-3149 Uen | February 2011

ericsson.com

MORE THAN
50 BILLION
CONNECTED
DEVICES

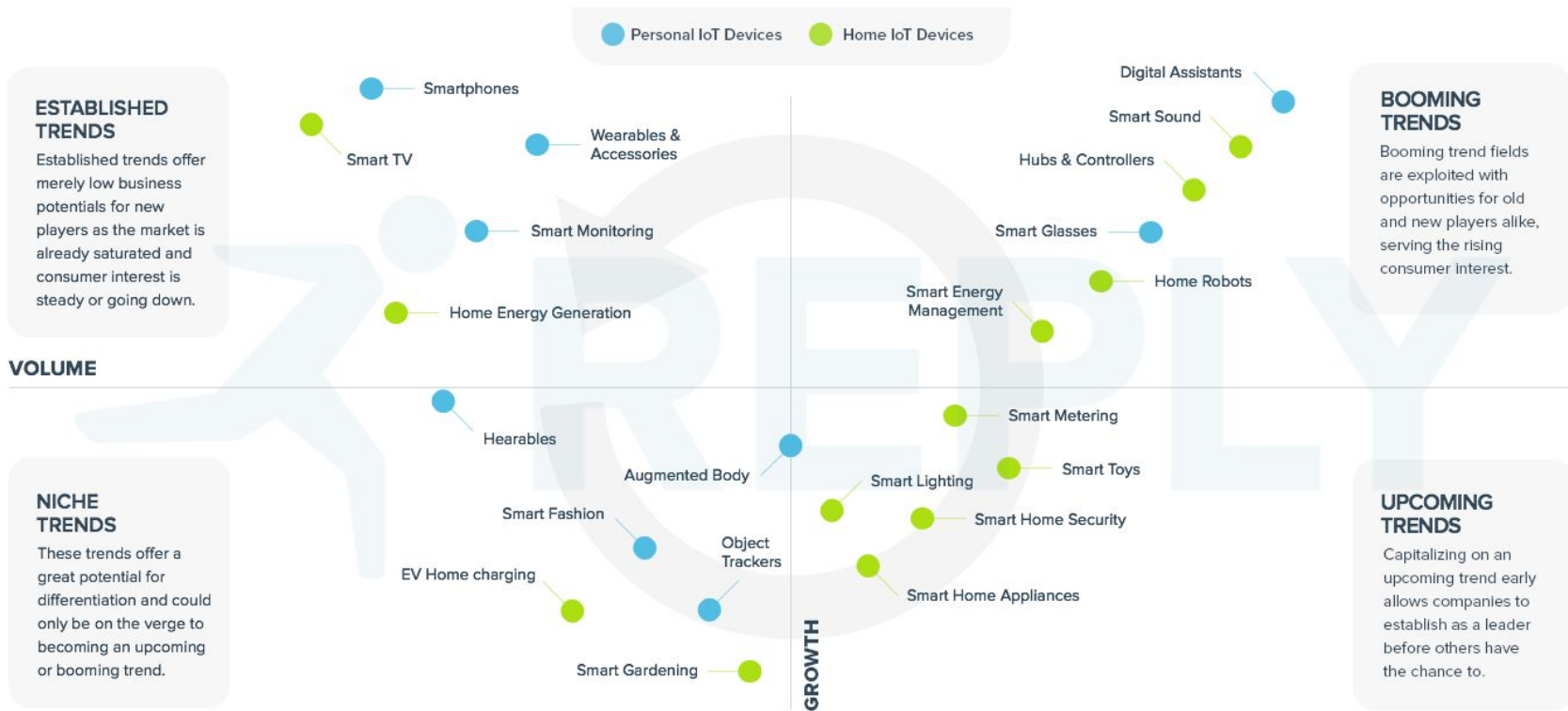
Figure 2. The three waves of connected device development.

Números de IoT



15
DEVICES
PER PERSON





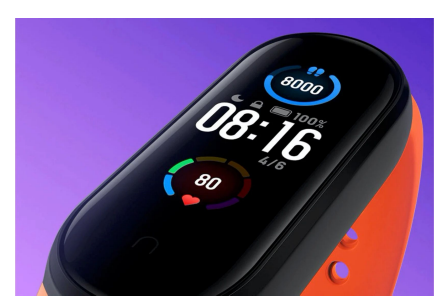
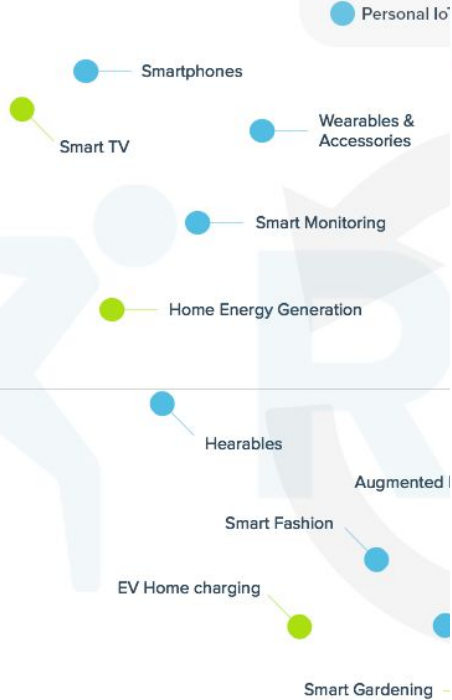
Tendências em IoT

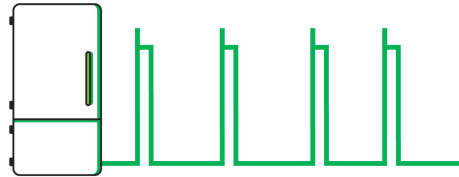
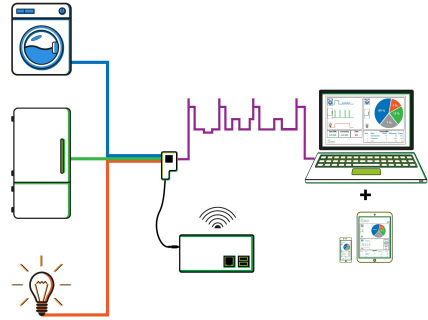
ESTABLISHED TRENDS

Established trends offer merely low business potentials for new players as the market is already saturated and consumer interest is steady or going down.

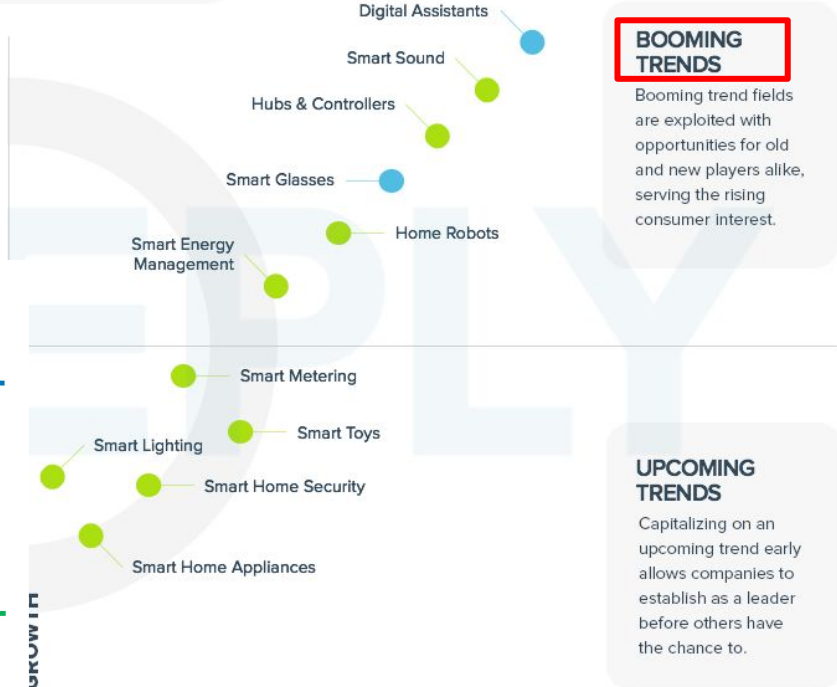
NICHE TRENDS

These trends offer a great potential for differentiation and could only be on the verge of becoming an upcoming or booming trend.





● Personal IoT Devices ● Home IoT Devices



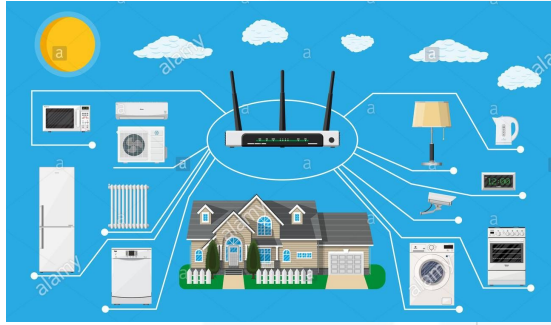
BOOMING TRENDS

Booming trend fields are exploited with opportunities for old and new players alike, serving the rising consumer interest.

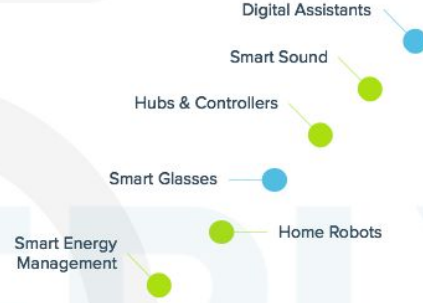
UPCOMING TRENDS

Capitalizing on an upcoming trend early allows companies to establish as a leader before others have the chance to.

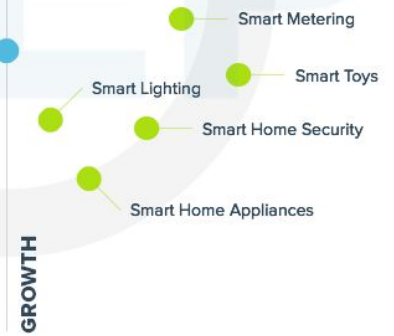
Volume and growth are standardized and normalized. (values from 0-100)



● Personal IoT Devices ● Home IoT Devices



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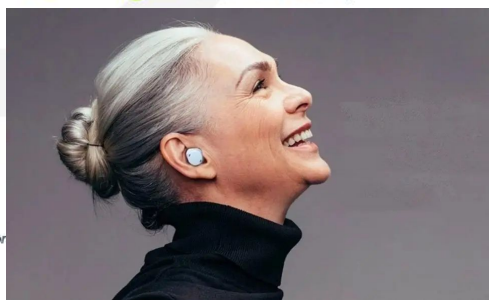
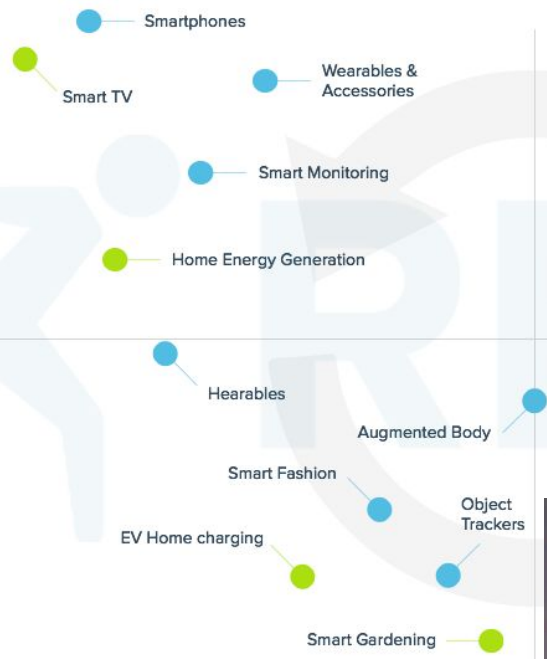
Personal IoT Devices

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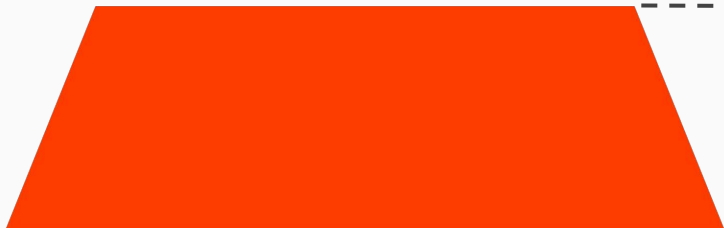
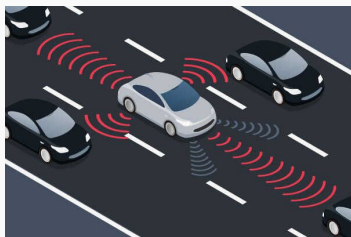
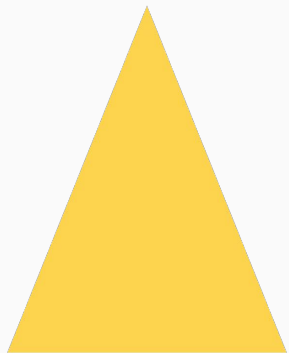
VOLUME

NICHE TRENDS
 These trends offer a great potential for differentiation and could only be on the verge to becoming an upcoming or booming trend.



Timeframe: February 2016 - February 2018 For comprehensibility, values for

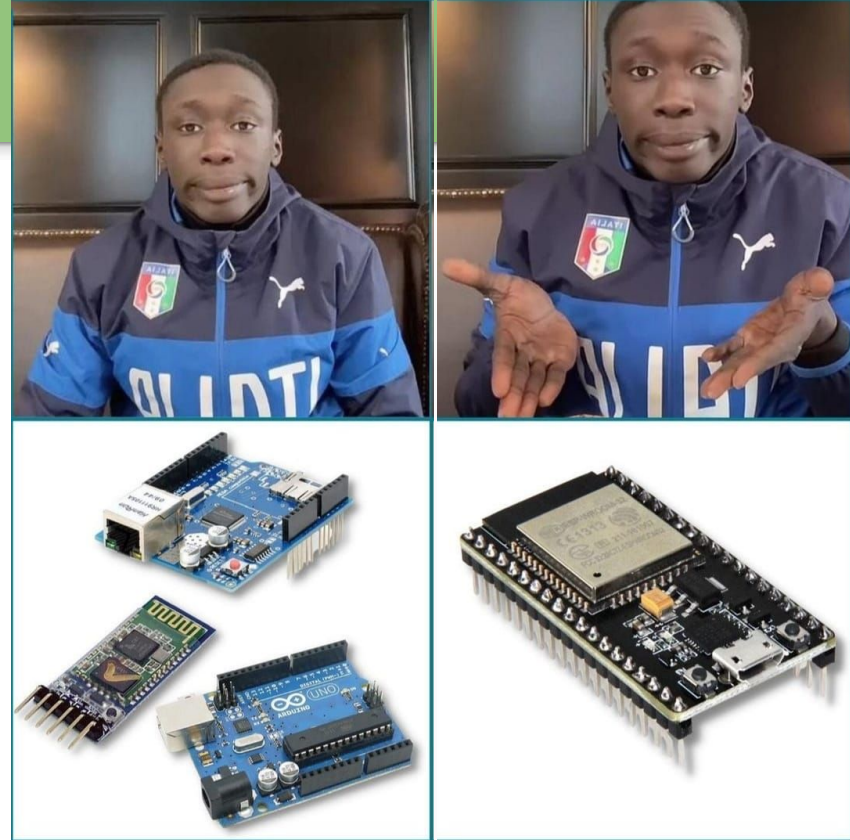
Pirâmide de Expansão IoT

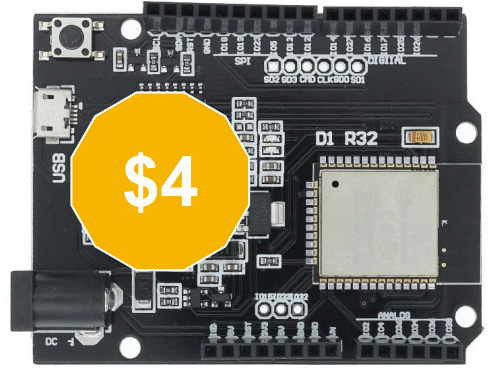
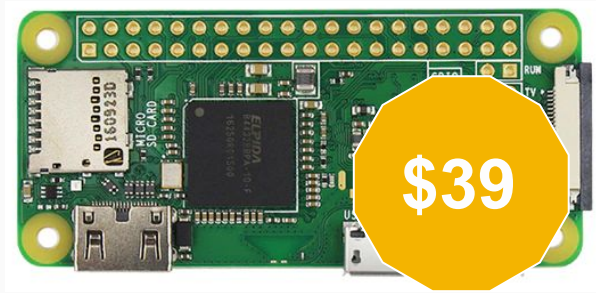
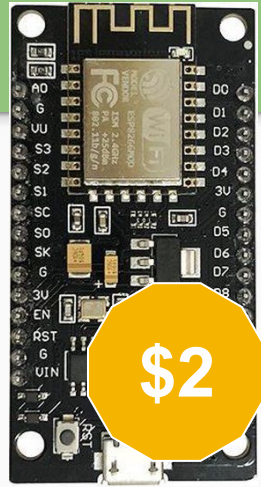
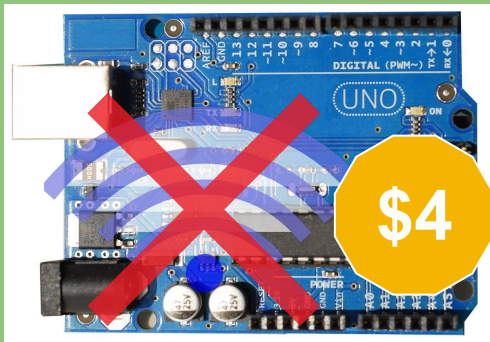


IoT?

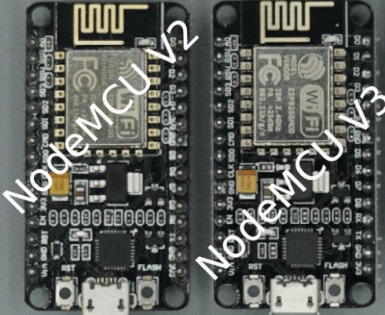
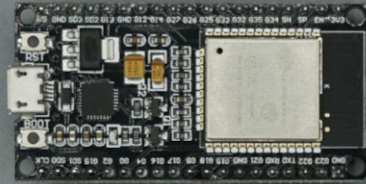
O que é necessário?

O que é necessário?

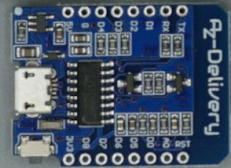




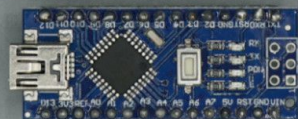
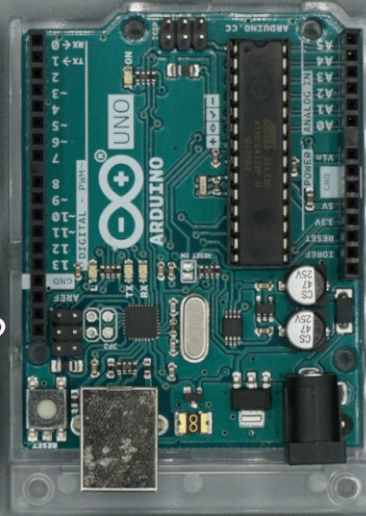
NodeMCU ESP32



WeMos D1 Mini

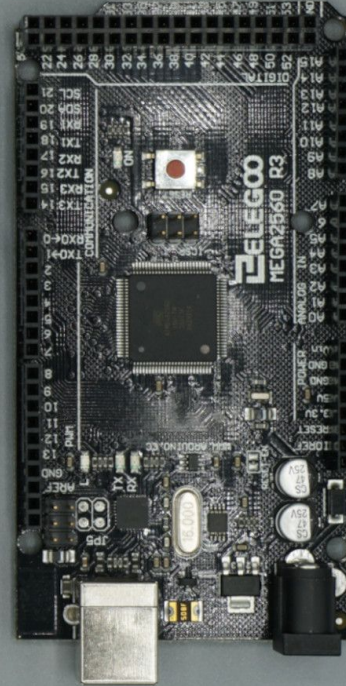


Arduino Uno



Arduino Nano

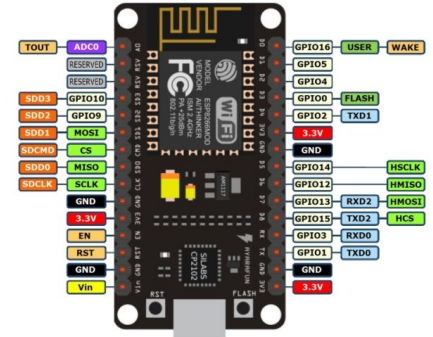
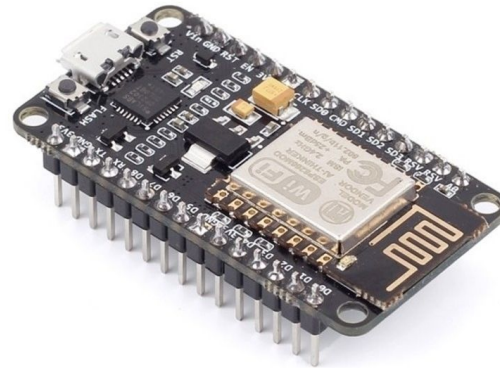
Arduino Mega



NodeMCU ESP8266 ESP-12E

O Módulo ESP8266 NodeMCU ESP-12E é uma placa de desenvolvimento completa, que além do chip ESP8266 conta com um conversor TTL-Serial e um regulador de tensão 3.3V.

Possui 11 pinos de GPIO (I2C, SPI, PWM), conector micro-usb para programação/alimentação e botões para reset e flash do módulo.



Módulo ESP32 WiFi + Bluetooth

O ESP32 é tudo que o ESP8266 é, mas muito mais. Tem WiFi integrado, tem mais sinais de GPIO (36 contra 17 do ESP8266), e de quebra vem com Bluetooth 4.2 (BLE)!

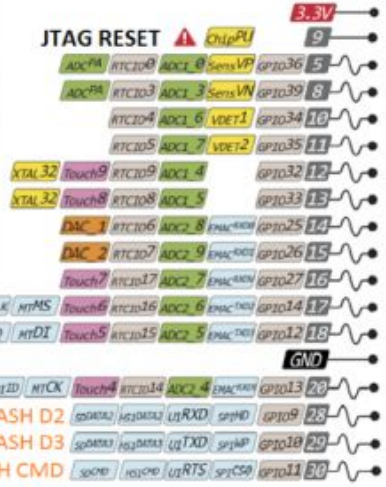




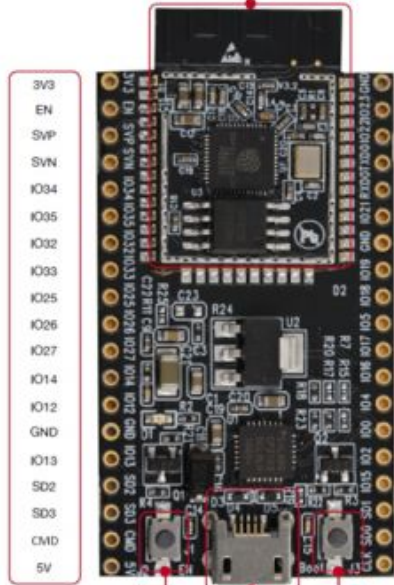
ESP32-WROOM-32 PINOUT (aka ESP32-DevKitC)

JTAG

- Power
- GND
- Serial Pin
- Analog Pin
- Control
- Physical Pin
- Port Pin
- Touch Pin
- DAC Pin
- ~ PWM Pin



ESP-WROOM-32



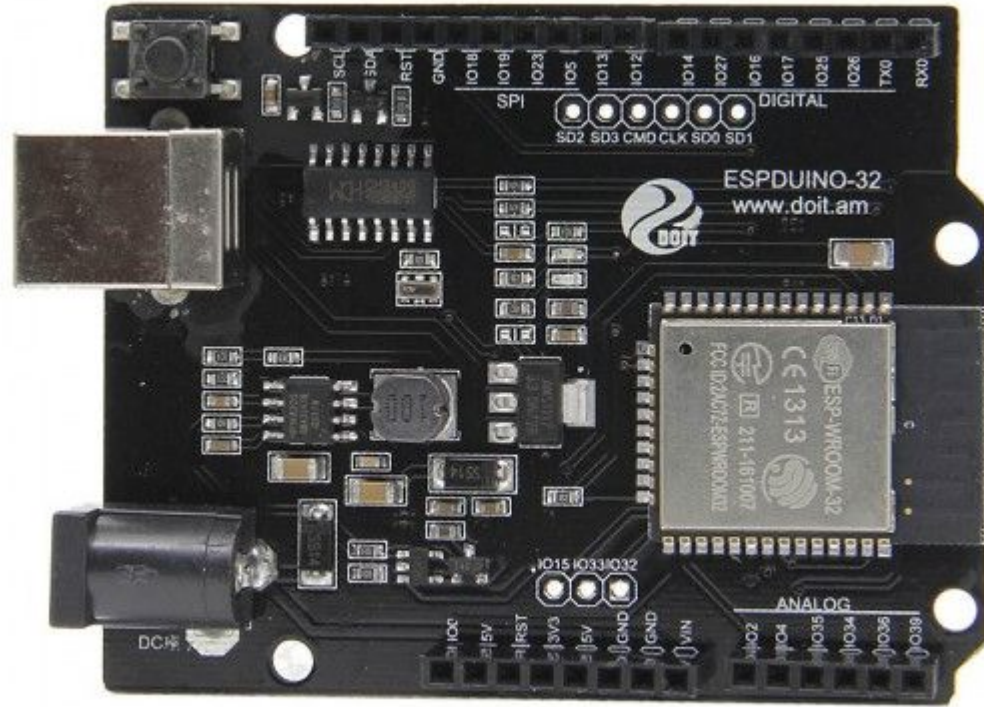
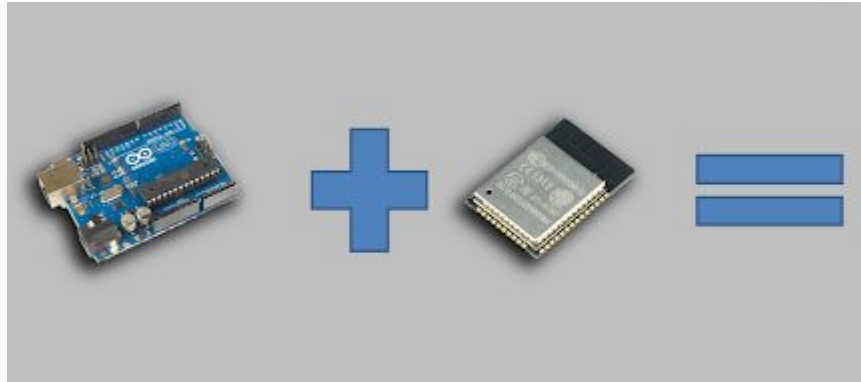
EN USB Boot

JTAG 20-pin		
Red	3V3	Vtref 1 ●● 2
Gray	RST	nTRST 3 ●● 4
Orange	IO12	TDI 5 ●● 6
Yellow	IO14	TMS 7 ●● 8
Blue	IO13	TCK 9 ●● 10
(to GND)	RTCK	11 ●● 12
Purple	IO15	TDO 13 ●● 14
	RESET	15 ●● 16
	DBGREQ	17 ●● 18
	SW-Supply	19 ●● 20
		GND GND
		GND Black
		GND
		GND Green
		GND White
		GND
		GND
		GND
		GND
		GND

Pins 14, 16, 18, 20:
 On some models like the high-end model J-Link PRO, these pins may not be connected to GND but are reserved for future use/extension. In case of doubt, leave open on target hardware.

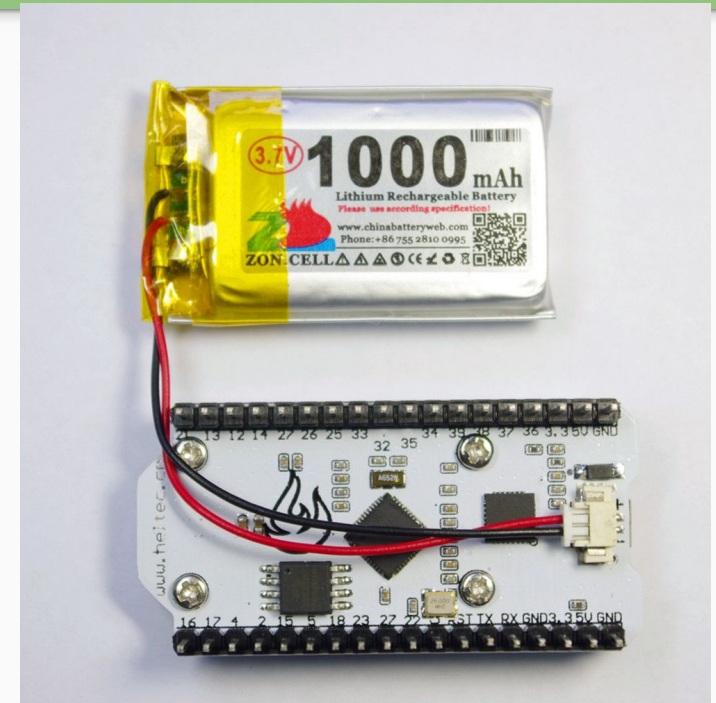


ESPDUINO-32 & Wemos ESP32 D1 R32

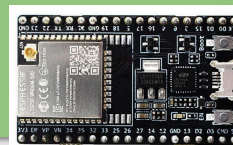
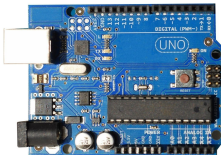


Wifi Lora 32

Desenvolvida pela empresa **Heltec Automation**, contém o **ESP32**, tecnologia **LoRa** com chip **SX1276**, **Display OLED** de 0,96 Polegadas e ainda está equipada com circuito de carga e descarga de bateria de lítio.



Arduino Uno vs ESP32



Descrição	Arduino UNO	ESP32
WiFi:	Não Possui	2,4 GHz, 802.11 b/g/n/e/i (802.11n até 150 Mbps)
Bluetooth:	Não Possui	Bluetooth Low Energy v4.2 (BLE)
Pinos de I/O:	23 pinos com 6 PWM	34 pinos com 16 PWM
Processador:	AVR® 8-bit RISC	Xtensa® Dual-Core 32-bit LX6
Frequência de Operação:	0 ~ 16 MHz	80 MHz ~ 240 MHz
Memória FLASH:	32 KB	4 MB
Memória RAM/SRAM:	2 KB	520 KB
Memória ROM/EEPROM	4 KB	448 KB
Conversores ADC (Analogico para Digital):	6 ADC com 10-bit de resolução (1024 bits)	18 ADC com 12-bit de resolução (4096 bits)
Conversores DAC (Digital para Analogico):	Nenhum	2 DAC com 8-bit de resolução (256 bits)
Alimentação	5V	2,2V ~ 3,3V DC
Entrada Regulada (VIN)	7 ~ 12V	5 ~ 9V
Corrente de Consumo:	Média de 15 mA	Média de 80mA
Interfaces de Módulos	I2C, SPI, UART e LED PWM	I2C, SPI, SDIO, LED PWM, Motor PWM, I2S
Watchdog	1 Watchdog	4 Watchdogs
Temporizadores	3 Timers, um de 16-bit e dois de 8 bit	4 Timers de 64-bit
Temperatura de Operação:	-40°C ~ +85°C	-40°C ~ +85°C

ESP32 FUNCTION BLOCK DIAGRAM

