METTIAMO LA TELEMETRIA ALLA SLITTA DI BABBO NATALE

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NET CODE

DotNetAbruzzo

DotNet Toscana

Mettiamo la telemetria alla slitta di Babbo Natale

DEMO

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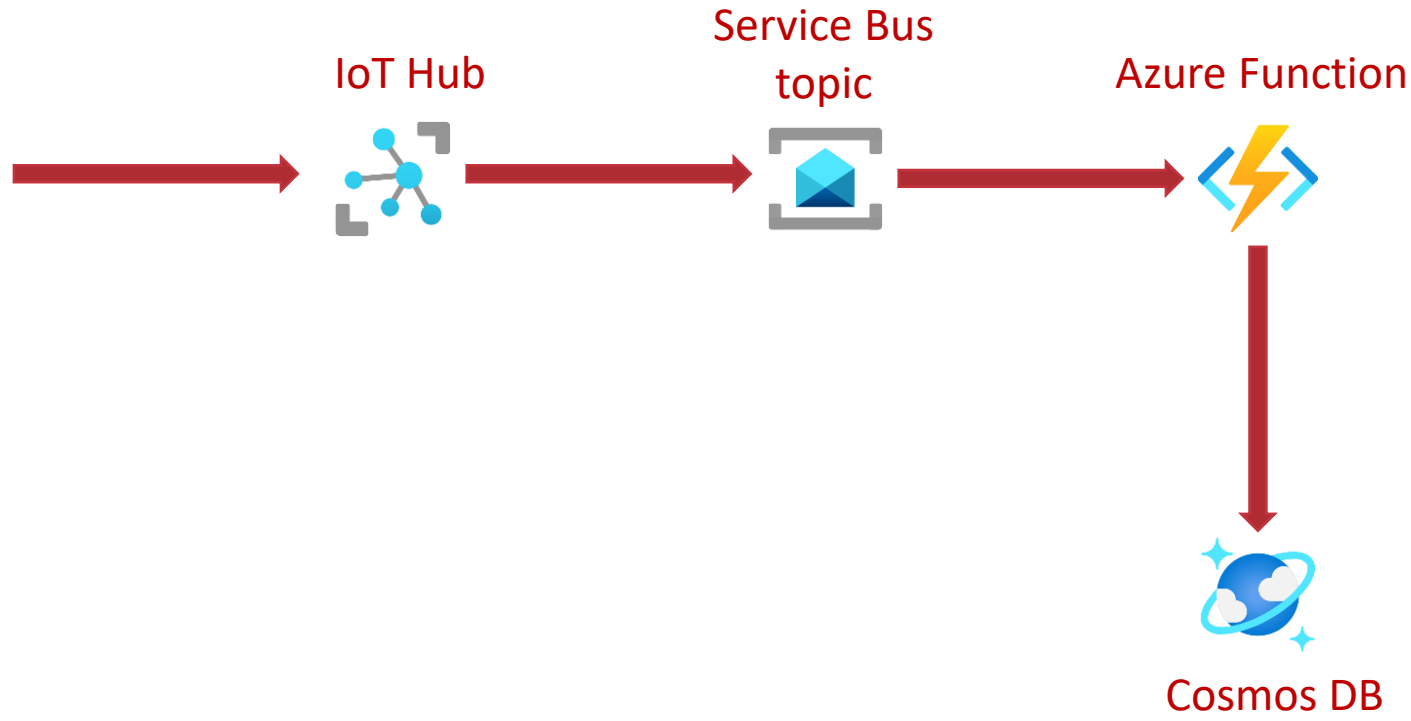
ARCHITECTURE - DEVICE TO CLOUD



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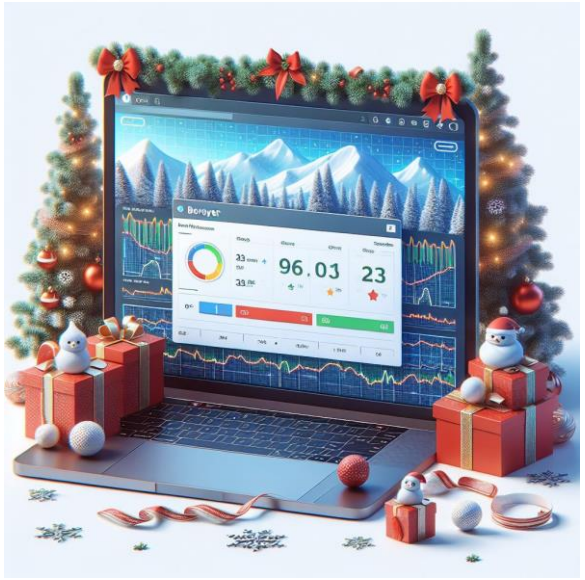
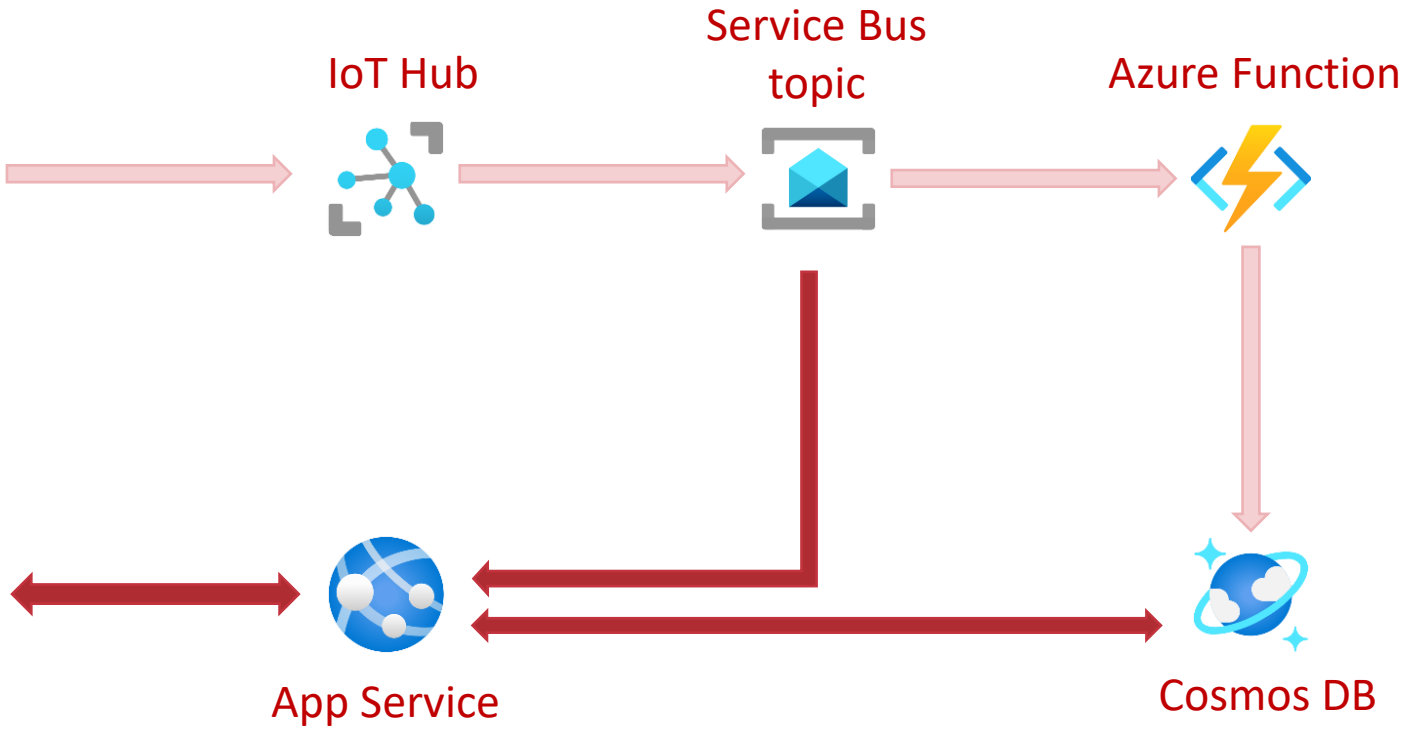
ARCHITECTURE - WEB





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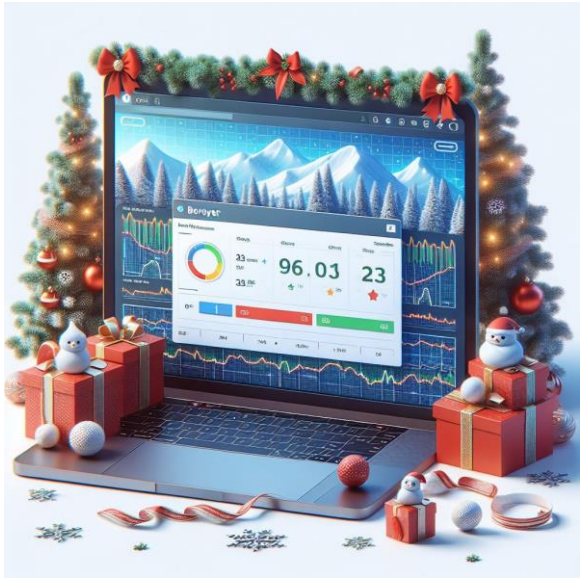
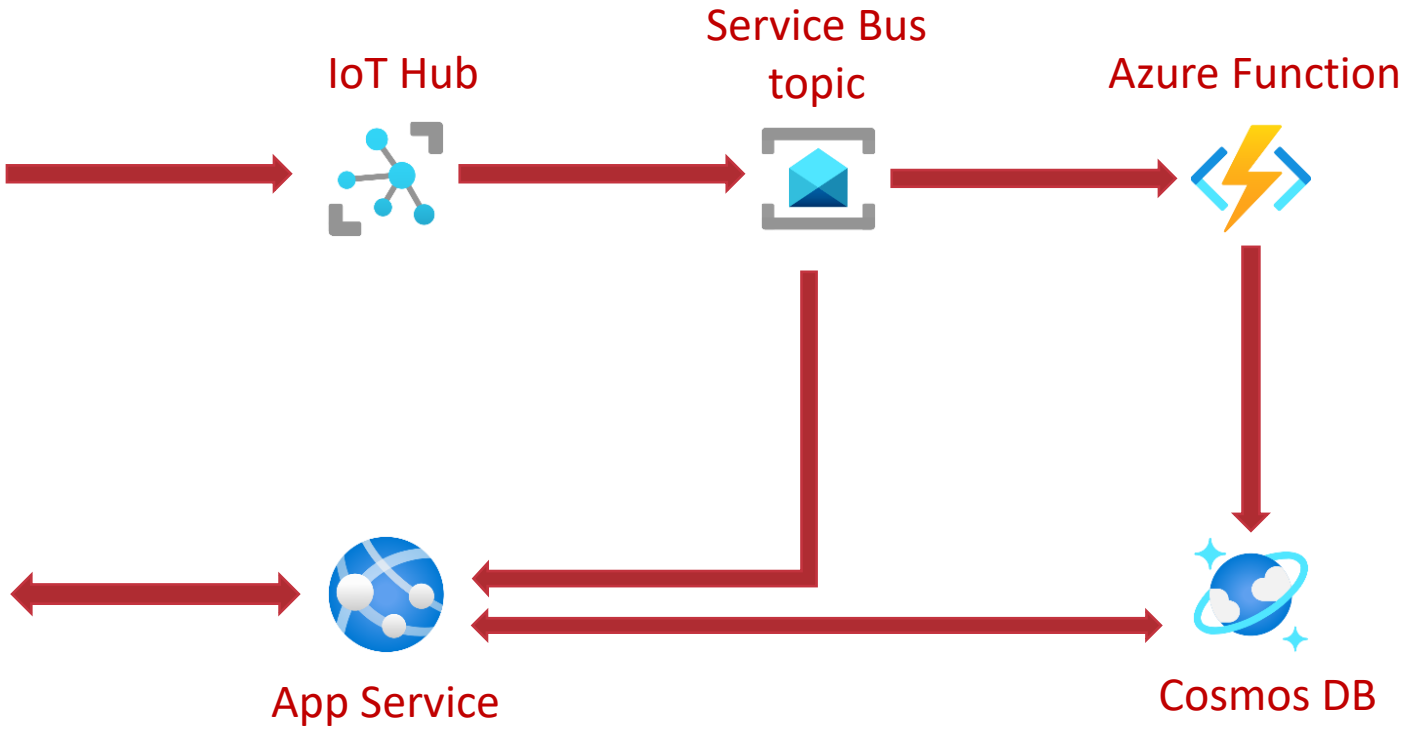
ARCHITECTURE





BLAZOR

- [new] Blazor Web App
  - Rendermode="InteractiveServer"
- "*realtime*" service added as Singleton
  - eventHandler to notified all components
- JS-interop for maps update

.NET NANOFRAMEWORK

- .NET nanoFramework is a free and open-source platform that enables the writing of managed code applications for constrained embedded devices.

- It is suitable for many types of projects including IoT sensors, wearables, academic proof of concept, robotics, hobbyist/makers creations or even complex industrial equipment.

- It includes a reduced version of the .NET Common Language Runtime (CLR) and features a subset of the .NET base class libraries along with the most common APIs included in .NET IoT allowing code reuse from .NET IoT applications, thousands of code examples and open source projects.

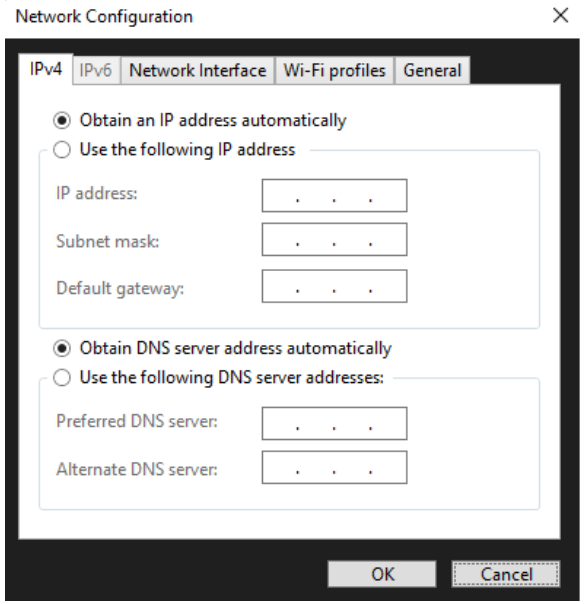
.NET NANOFRAMEWORK

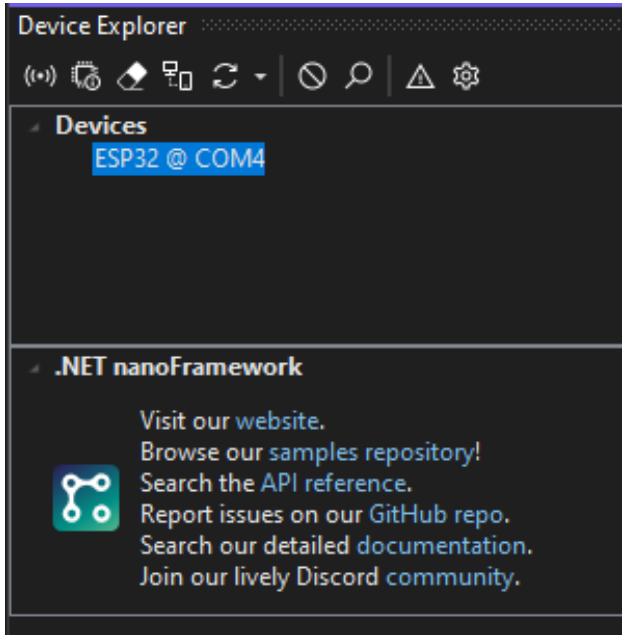
- Can run on resource-constrained devices with as low as 128kB of flash and 64kB of RAM.
- Runs directly on bare metal. Currently ARM Cortex-M and ESP32 devices are supported.
- Supports common embedded peripherals and interconnects like GPIO, UART, SPI, I2C, USB, networking.
- Provides multi threading support natively.
- Support for energy-efficient operation such as devices running on batteries.
- Support for Interop code allowing developers to easily write libraries that have both managed (C#) and native code (C/C++).
- No manual memory management because of its simpler mark-and-sweep garbage collector.
- Execution constrains to catch device lockups and crashes.

.NET nanoFramework Home

.NET NANOFRAMEWORK – VS 2022 INTEGRATION

```
Show output from: .NET nanoFramework Extension
System Information
HAL build info: nanoCLR running @ ESP32 built with ESP-IDF v4.4
  Target:   ESP32
  Platform: ESP32

Firmware build Info:
  Date:        Feb 26 2022
  Type:        MinSizeRel build, chip rev. >= 0, without support for PSRAM
  CLR Version: 1.7.4.76
  Compiler:    GNU ARM GCC v8.4.0

OEM Product codes (vendor, model, SKU): 0, 0, 0

Serial Numbers (module, system):
  00000000000000000000000000000000
  0000000000000000

Target capabilities:
  Has nanoBooter: NO
  IFU capable: NO
  Has proprietary bootloader: YES

AppDomains:

Assemblies:
  Proxima.Nano.Demo, 1.0.0.0
  nanoFramework.Json, 2.1.2.0
  nanoFramework.Hardware.Esp32, 1.3.5.0
```





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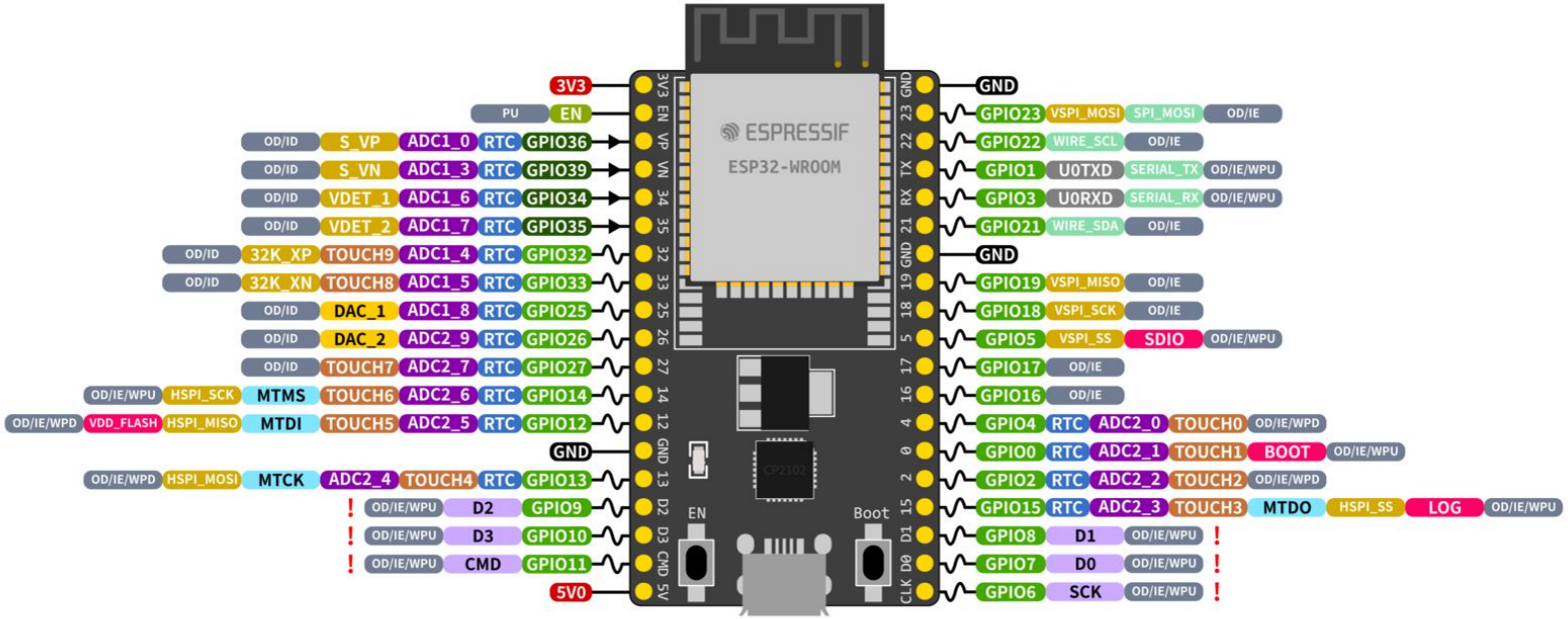
ESP32 - DEVKIT

ESP32-DevKitC

ESPRESSIF



ESP32 Specs

32-bit Xtensa® dual-core @240MHz
Wi-Fi IEEE 802.11 b/g/n 2.4GHz
BLuetooth 4.2 BR/EDR and BLE
520 KB SRAM (16 KB for cache)
448 KB ROM
34 GPIOs, 4x SPI, 3x UART, 2x I2C,
2x I2S, RMT, LED PWM, 1 host SD/eMMC/SDIO,
1 slave SDIO/SPI, TWAI®, 12-bit ADC, Ethernet

- PWM Capable Pin
- GPIOX — GPIO Input Only
- GPIOX — GPIO Input and Output
- DAC_X — Digital-to-Analog Converter
- DEBUG — JTAG for Debugging
- FLASH — External Flash Memory (SPI)
- ADCX_CH — Analog-to-Digital Converter
- TOUCHX — Touch Sensor Input Channel
- OTHER — Other Related Functions
- SERIAL — Serial for Debug/Programming
- ARDUINO — Arduino Related Functions
- STRAP — Strapping Pin Functions

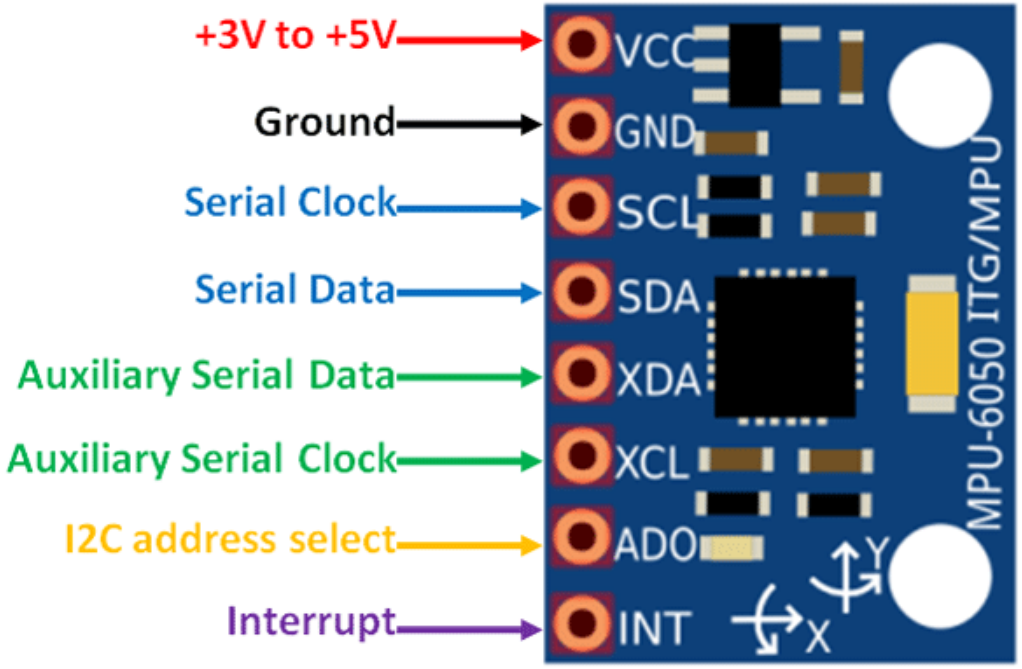
- RTC — RTC Power Domain (VDD3P3_RTC)
- GND — Ground
- PWD — Power Rails (3V3 and 5V)
- ! — Pin Shared with the Flash Memory *Can't be used as regular GPIO*

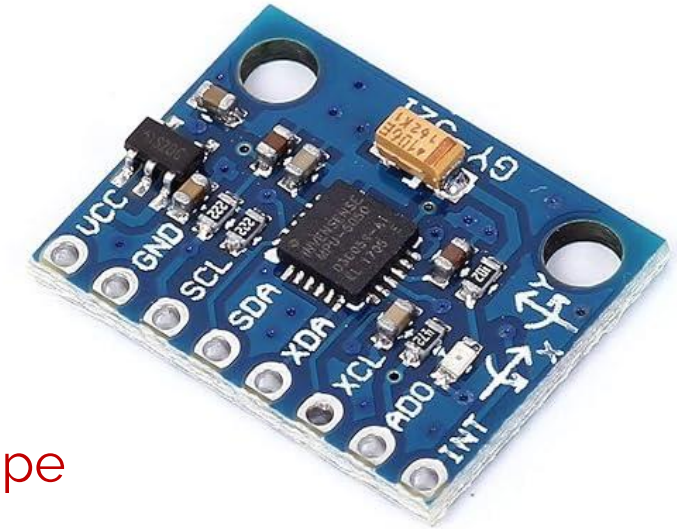
GPIO STATE

- **WPU**: *Weak Pull-up (Internal)*
- **WPD**: *Weak Pull-down (Internal)*
- **PU**: *Pull-up (External)*
- **IE**: *Input Enable (After Reset)*
- **ID**: *Input Disabled (After Reset)*
- **OE**: *Output Enable (After Reset)*
- **OD**: *Output Disabled (After Reset)*

AZDelivery ESP-32 NodeMCU Dev Kit C V4 WiFi

MPU6050 - ACCELEROMETER AND GYROSCOPE MODULE





Micro Electro-Mechanical Systems (MEMS) which consists of a 3-axis Accelerometer and 3-axis Gyroscope inside it.

MPU-6000 and MPU-6050 Product Specification Revision 3.4

DEMO

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SIZING / SCALING

Today, there are more than

2.2 billion

children on Earth.

IOT-HUB TIER

Standard tier Free

- Price per IoT Hub unit: Free
- Total number of messages/day per IoT Hub unit: 8.000

Basic tier B3

- Price per IoT Hub unit: €455,332
- Total number of messages/day per IoT Hub unit: 300.000.000

PRICING

- IoT Hub B3 x 8
  - 300.000.000 x 8 = 2.400.000.000
  - €455,33 x 8 = **€3.642,66**
  - 1 day cost: €117,50
- Service Bus Standard
  - 730 Hours x 0,012 = **€8,94**
  - 6 billions Operations = **€1.802,76**
- Azure Function (consumption)
  - **€795,37**
- Cosmos DB
  - 730 Hours x 1000 RU/s = **€53,18**
- App Service linux S1
  - **€63,15**

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linkedin: **proxsoft**
}

FEEDBACK

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