

JAO CAN DEV 2022

# IoT 101

WHY DON'T WE START BUILDING  
STRONG IoT COMMUNITY  
TOGETHER?



# Table of Contents

## Points for discussion



Intro to IoT

The way things get communicate

Basic programing and Tools

Demo

End



# What is IoT in definition?

**Devices**

**Smart**

**Protocol**

**Internet**

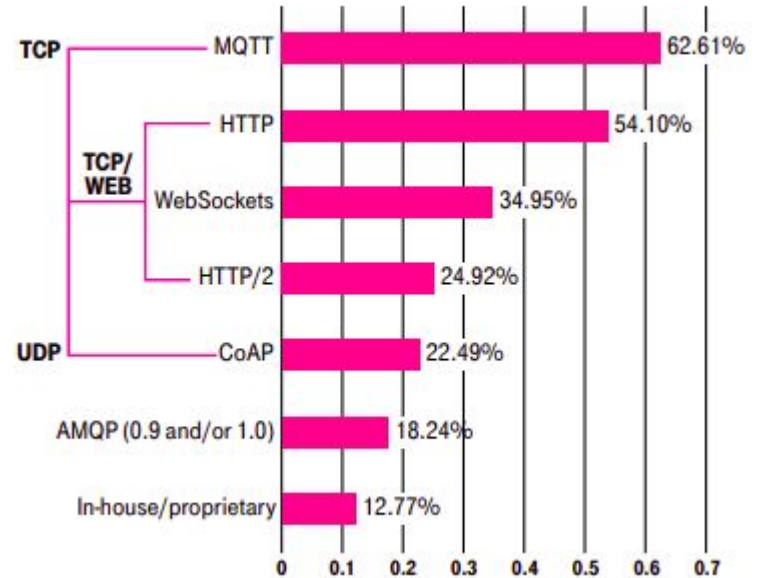
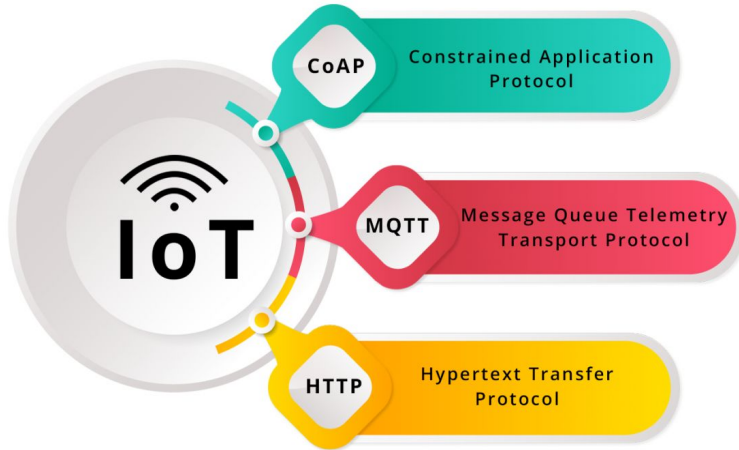
**Sensors**

# What is exactly IoT?

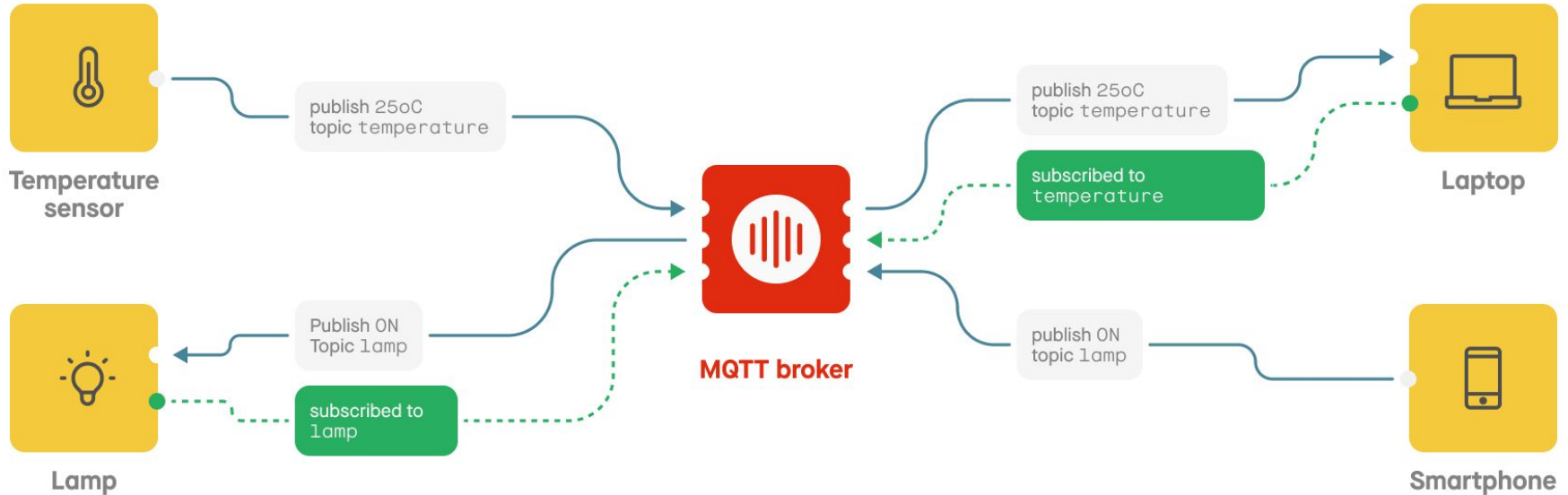
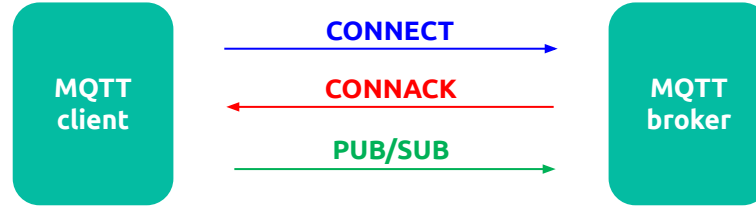
## Connectivity



# IoT Protocols



# MQTT Protocols



# Quality of Service For reliable messaging

## QoS 0

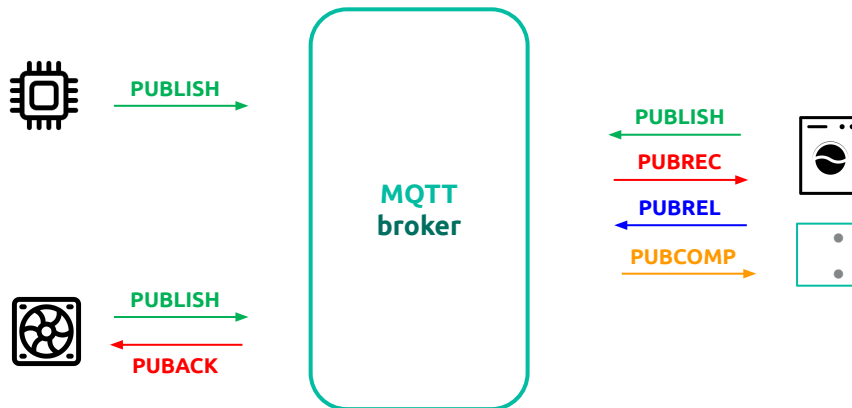
### At most once

- Doesn't survive failures
- Never duplicated

## QoS 1

### At least once

- survives connection loss
- Can be duplicated



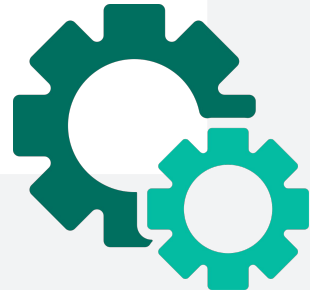
## QoS 2

### Exactly once

- Survives connection loss
- Never duplicated

# Basic Programming

C/C++ for Arduino Framework





# File structure

**There are several frameworks  
you can explore more rather  
than Arduino!!**



```
void setup ()  
{  
  // Run only once when program started  
}  
  
void loop ()  
{  
  // Run repeatedly over and over again  
}
```

## Setup:

Any code that declare in this function will call only once.  
Mostly are use to declare variable(s).  
Declare/setup GPIO.

## Loop:

Loop will start after the Setup is complete  
this are use for command that need to done repeatedly.

# Variable And Datatype

## Vold

no return value variable.

## Char

Return character, size of 2 byte.

-128 to +127

## Int

Return an integer, size of 2 byte.

-32,768 to +32,767

## Float

Return decimal with 6 floating point

3.4E-38 to 3.4E+38

## double

Return decimal with 8 floating point

1.7E-308 to 1.7E+308



# Variable scope

**Global Variable** : Can use everywhere in code

**Local Variable** : Can use specifically in function

```
const int JCD;    //Global Variable
```

```
void setup () {  
    // Do sth  
}
```

```
void loop () {  
    int group;    // group is Local Variable only in loop  
    float indiv; // indiv is Local Variable only in loop  
  
    for (int index = 0; index < 100; index++){  
        // index is Local Variable only in for loop  
    }  
}
```

# Operations

## Arithmetic

|          |   |                |    |       |    |
|----------|---|----------------|----|-------|----|
| plus     | + | divide         | /  | Power | ** |
| minus    | - | modulus        | %  |       |    |
| multiply | * | floor division | // |       |    |

## Comparison

|           |    |         |   |                       |    |
|-----------|----|---------|---|-----------------------|----|
| equal     | == | greater | > | greater than or equal | >= |
| not equal | != | less    | < | less than or equal    | <= |

## Logical

And: & -> True **and** True is True

Or: | -> False **or** False is False

Not: ! -> **not** True is False

## Assignment

|     |    |     |    |    |
|-----|----|-----|----|----|
| =   | += | -=  | *= | /= |
| **= | %= | //= | &= | =  |

# Flow Control



## If statement

```
if (test expression) {  
    // code  
}
```

## If else statement

```
if (test expression) {  
    //expression is true  
}  
else {  
    //expression is false  
}
```

## If nest statement

```
if (test expression 1) {  
    // statement(s)  
}  
else if (test expression 2) {  
    // statement(s)  
}  
else {  
    // statement(s)  
}
```

## Flow control

# Switch case statement

```
switch (expression)
{
    case constant1:
        // statements
        break;

    case constant2:
        // statements
        break;

    .
    .
    .
    default:
        // default statements
}
```

## For loop statement

```
for (initializationStatement; testExpression;  
updateStatement)  
{  
    // statements inside the body of loop  
}
```

## while loop statement

```
while (testExpression)  
{  
    // the body of the loop  
}
```

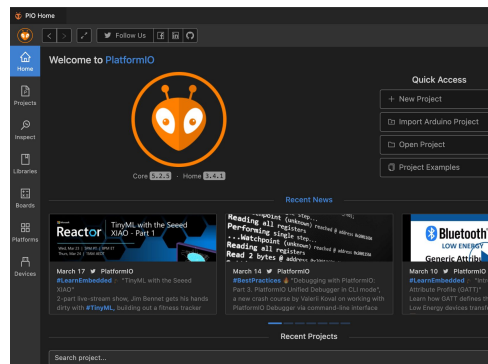
# Development Tools



```
File Edit Sketch Tools Help
sketch_dec07a
void setup() {
  // put your setup code here, to run once:
}

void loop() {
  // put your main code here, to run repeatedly:
}
```

Arduino/Genuino Uno on COM3



```
+ ~ pio --help
Usage: pio [OPTIONS] COMMAND [ARGS]...

Options:
  --version          Show the version and exit.
  -f, --force        DEPRECATE
  -c, --caller TEXT  Caller ID (service)
  --no-ansi          Do not print ANSI control characters
  -h, --help         Show this message and exit.

Commands:
  access      Manage resource access
  account     Manage PlatformIO account
  boards      Embedded board explorer
  check       Static code analysis
  ci          Continuous integration
  debug       Unified debugger
  device      Device manager & serial/socket monitor
  home       GUI to manage PlatformIO
  lib        Library manager
```



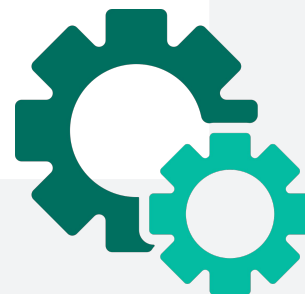
# DEMO

1. **Hello world in IoT**  
<https://www.tinkercad.com/things/cvCcmcv8xo8-button-state-ep4>
2. **Trigger via an MQTT**  
<https://www.tinkercad.com/things/8zQWo1qXwbc-blink-ep1>



# Questions ?

**Thank you for joining the session**





Think it, make it, break it, rethink it, rebuild it

*One stop hub for creative individuals, technical experts and early explorers to generate ideas and turn their visions into practical innovative solutions.*



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