UNIVERSITÀ DEGLI STUDI
DI GENOVA

DIPARTIMENTO DI INGEGNERIA NAVALE, ELETTRICA, ELETTRONICA E DELLE TELECOMUNICAZIONI

CORSO DI STUDIO IN INGEGNERIA ELETTRONICA E TECNOLOGIE DELL'INFORMAZIONE

Tesi di Laurea Triennale

Progetto e implementazione di un sistema embedded di controllo remoto

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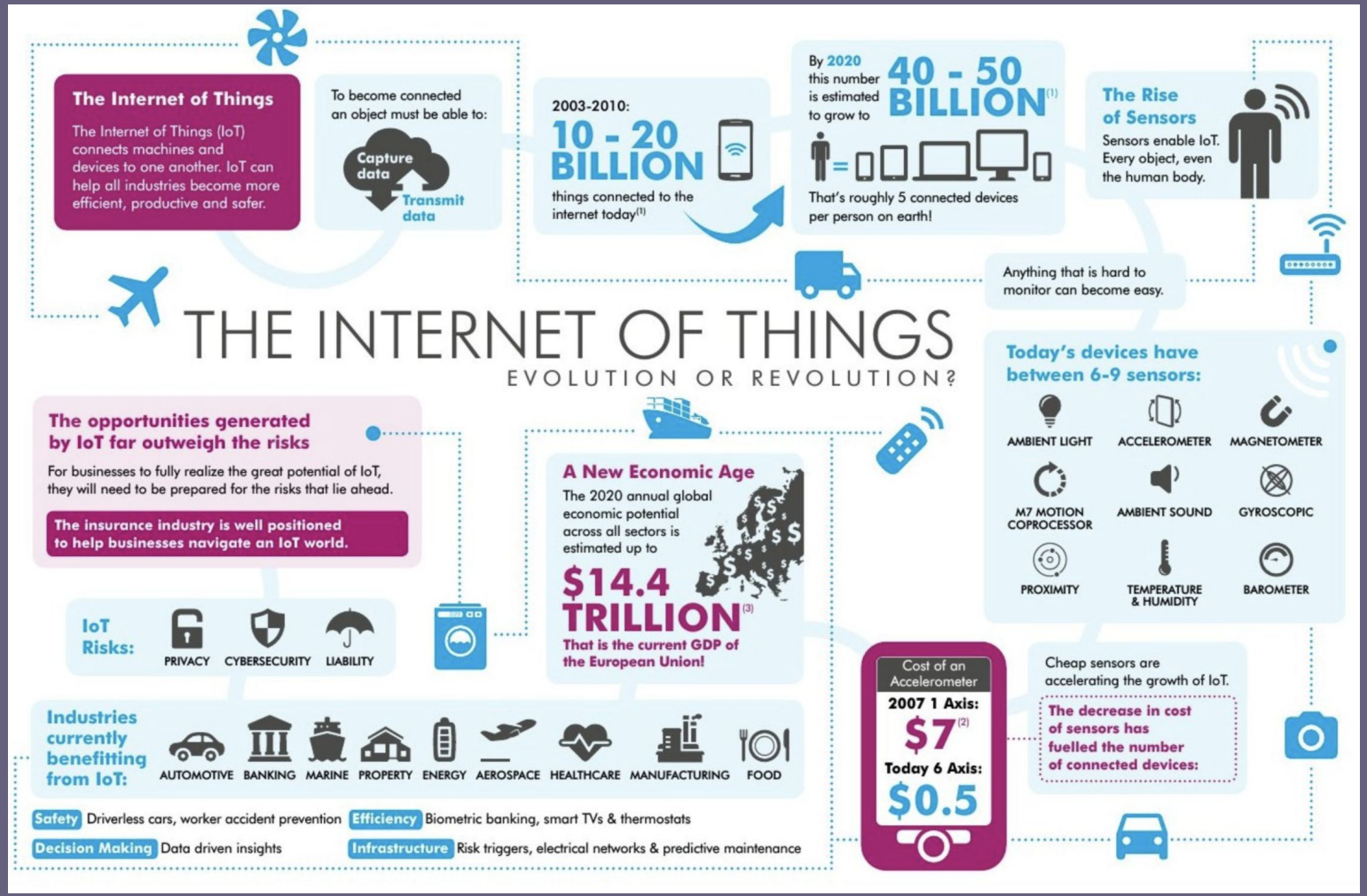
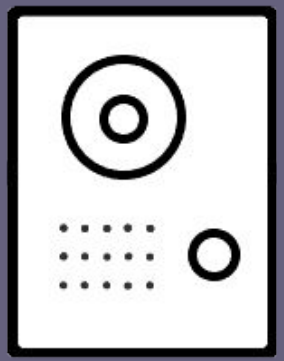
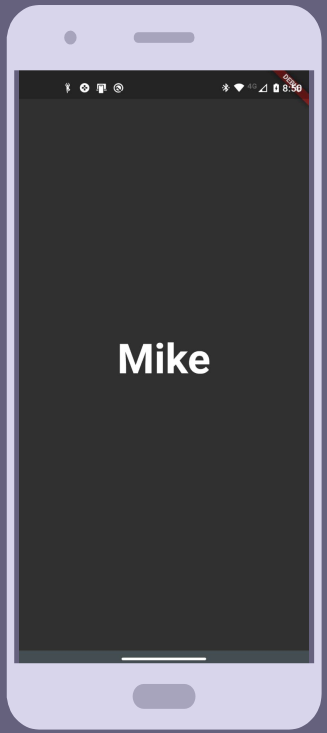
Relatore: Prof. Riccardo Berta

Luglio 2020

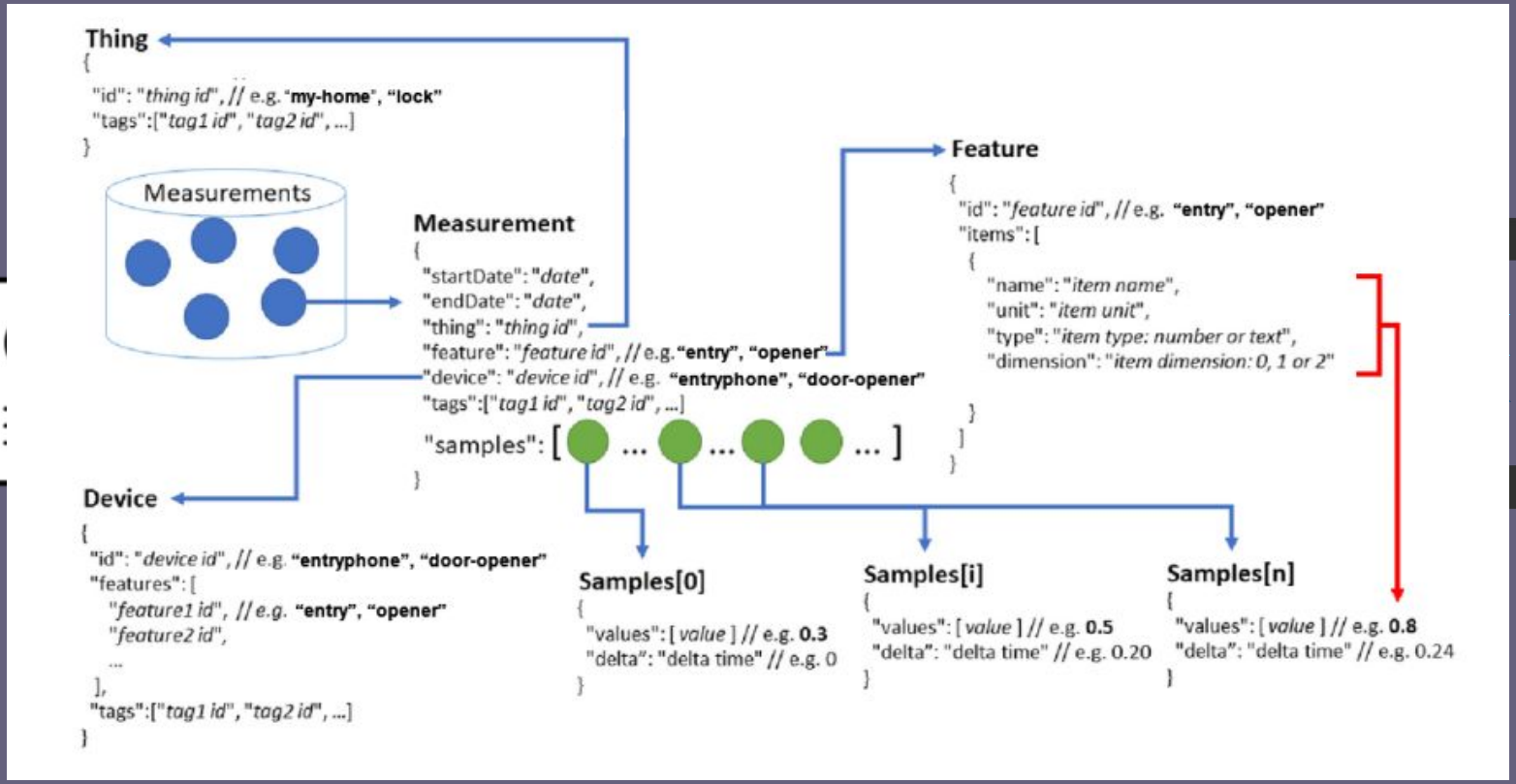

The Internet of Things
The Internet of Things (IoT) connects machines and devices to one another. IoT can help all industries become more efficient, productive and safer.
To become connected an object must be able to:
Capture data
Transmit data
2003-2010:
10 - 20 BILLION
things connected to the internet today(1)
By 2020 this number is estimated to grow to
40 - 50 BILLION(1)
That's roughly 5 connected devices per person on earth!
The Rise of Sensors
Sensors enable IoT. Every object, even the human body.
Anything that is hard to monitor can become easy.
THE INTERNET OF THINGS
EVOLUTION OR REVOLUTION?
Today's devices have between 6-9 sensors:
AMBIENT LIGHT
ACCELEROMETER
MAGNETOMETER
M7 MOTION COPROCESSOR
AMBIENT SOUND
GYROSCOPIC
PROXIMITY
TEMPERATURE & HUMIDITY
BAROMETER
The opportunities generated by IoT far outweigh the risks
For businesses to fully realize the great potential of IoT, they will need to be prepared for the risks that lie ahead.
The insurance industry is well positioned to help businesses navigate an IoT world.
A New Economic Age
The 2020 annual global economic potential across all sectors is estimated up to
$14.4 TRILLION(3)
That is the current GDP of the European Union!
IoT Risks:
PRIVACY
CYBERSECURITY
LIABILITY
Cost of an Accelerometer
2007 1 Axis:
$7(2)
Today 6 Axis:
$0.5
Cheap sensors are accelerating the growth of IoT.
The decrease in cost of sensors has fuelled the number of connected devices:
Industries currently benefitting from IoT:
AUTOMOTIVE
BANKING
MARINE
PROPERTY
ENERGY
AEROSPACE
HEALTHCARE
MANUFACTURING
FOOD
Safety Driverless cars, worker accident prevention
Efficiency Biometric banking, smart TVs & thermostats
Decision Making Data driven insights
Infrastructure Risk triggers, electrical networks & predictive maintenance

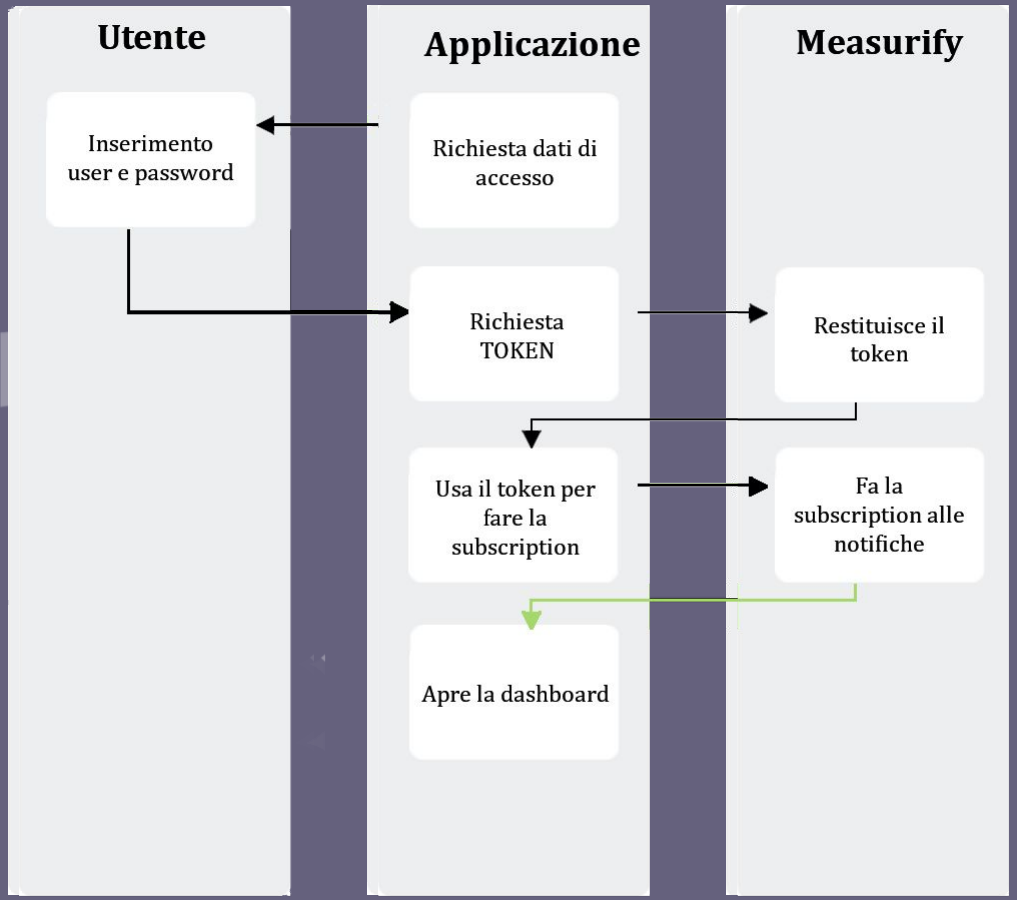
Obiettivo



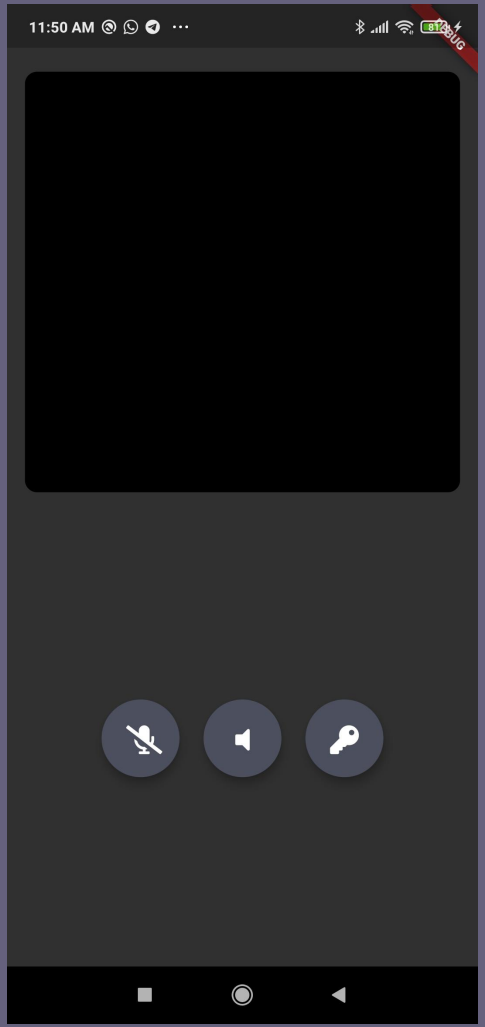


Architettura





GET http://students.atmosphere.tools/v1/subscriptions



Applicazione

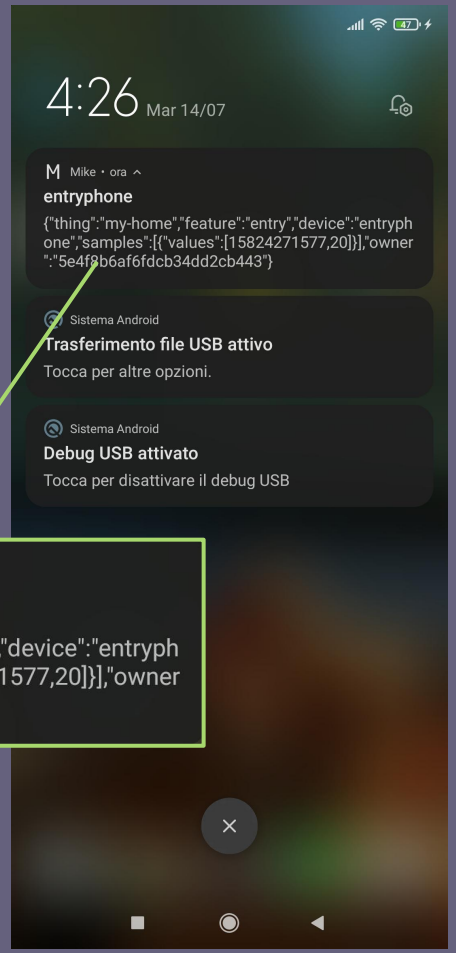
Arrivo della notifica push

Measurify

Aggiunge una nuova Measurement

Raspberry

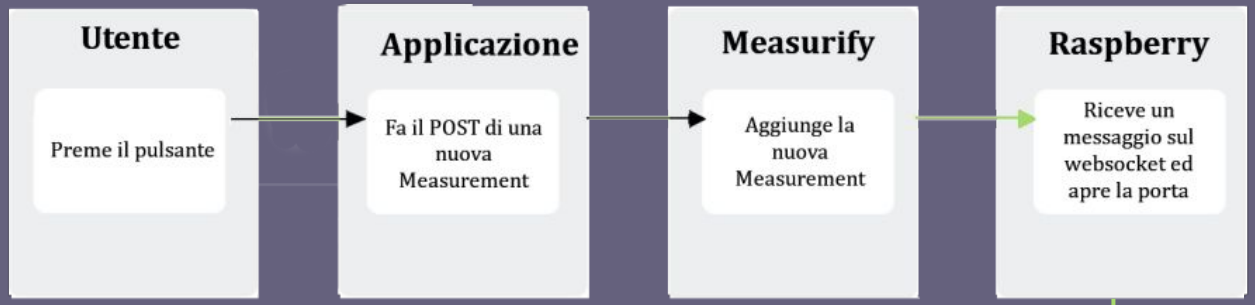
Pressione del pulsante per citofonare



POST http://students.atmosphere.tools/v1/measurements

```
{
   "thing": "my-home",
   "feature": "entry",
   "device": "entryphone",
   "samples": [ { "values": [1582271577, 20] } ]
}
```

M Mike • ora
entryphone
{"thing":"my-home","feature":"entry","device":"entryphone","samples":[{"values":[15824271577,20]}],"owner":"5e4f8b6af6fdcb34dd2cb443"}



POST http://students.atmosphere.tools/v1/measurements

```
{
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   "samples": [ { "values": [] } ]
}
```
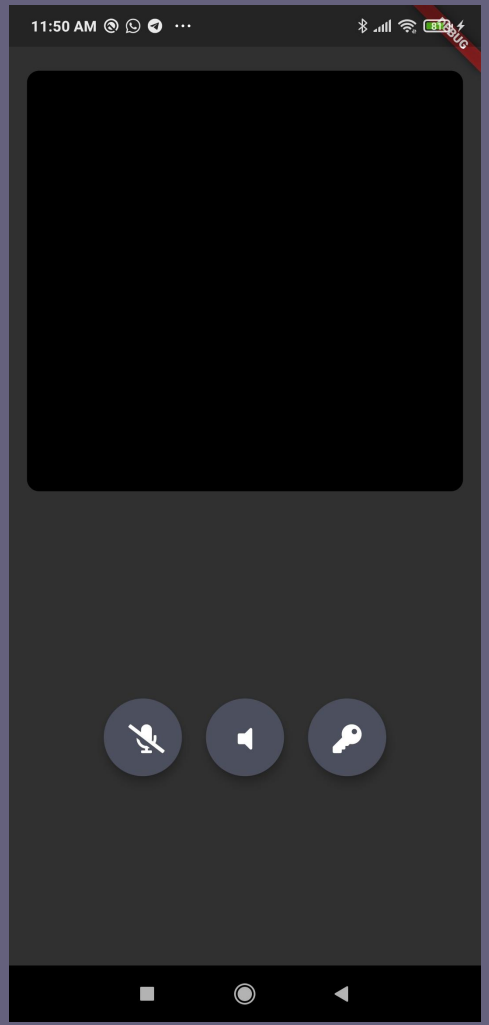
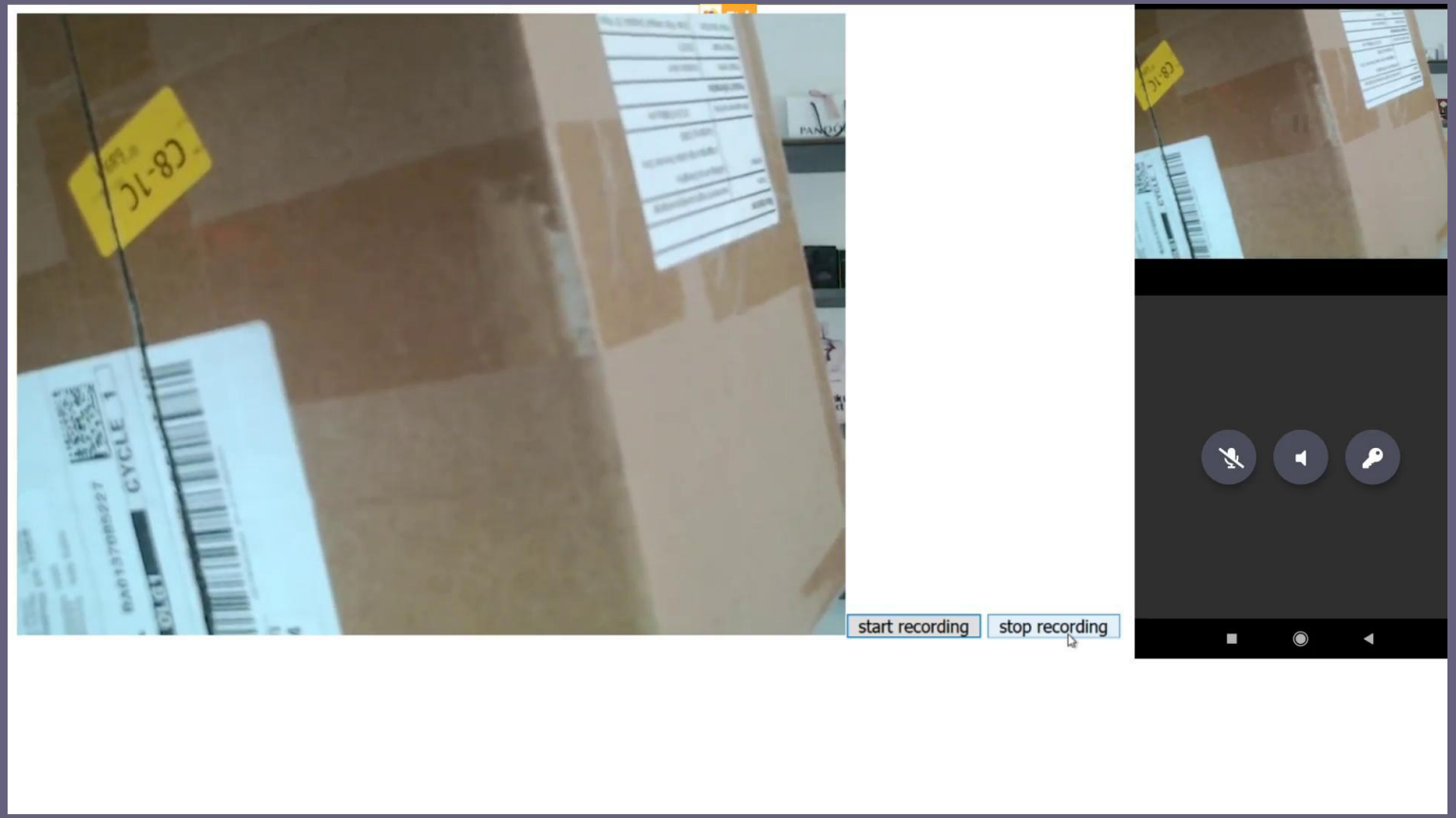
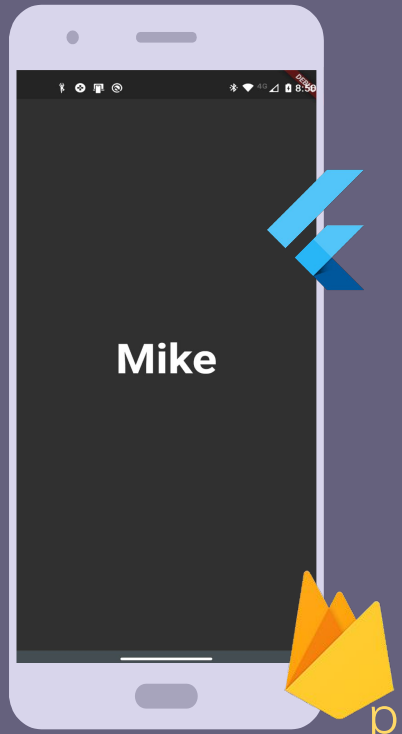

Websocket




start recording
stop recording

Conclusioni



fast development

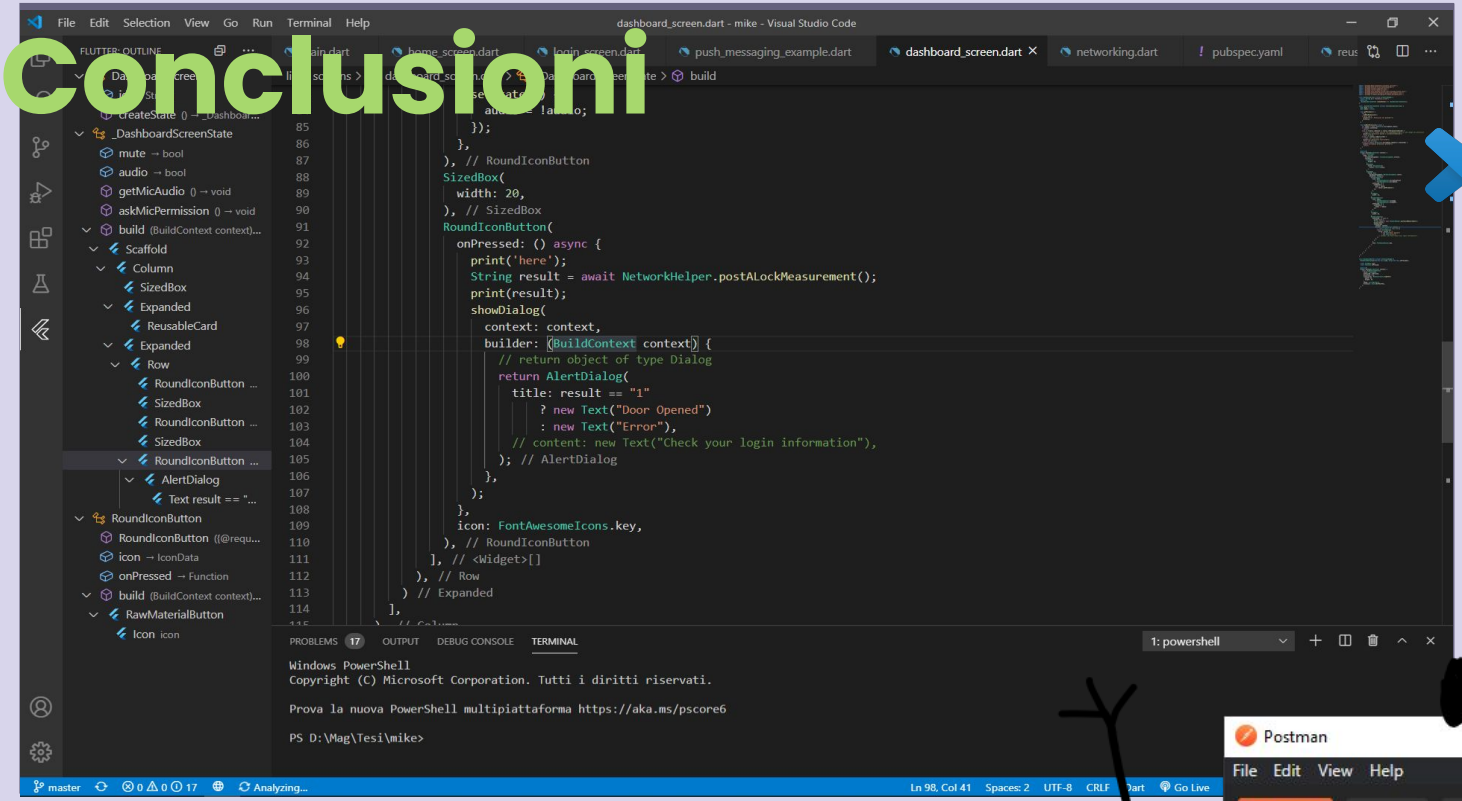
beautiful UI

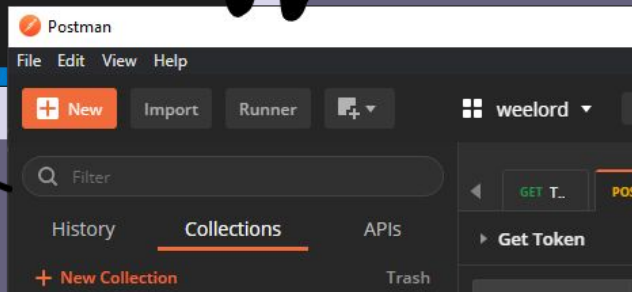
native performance

dart packages

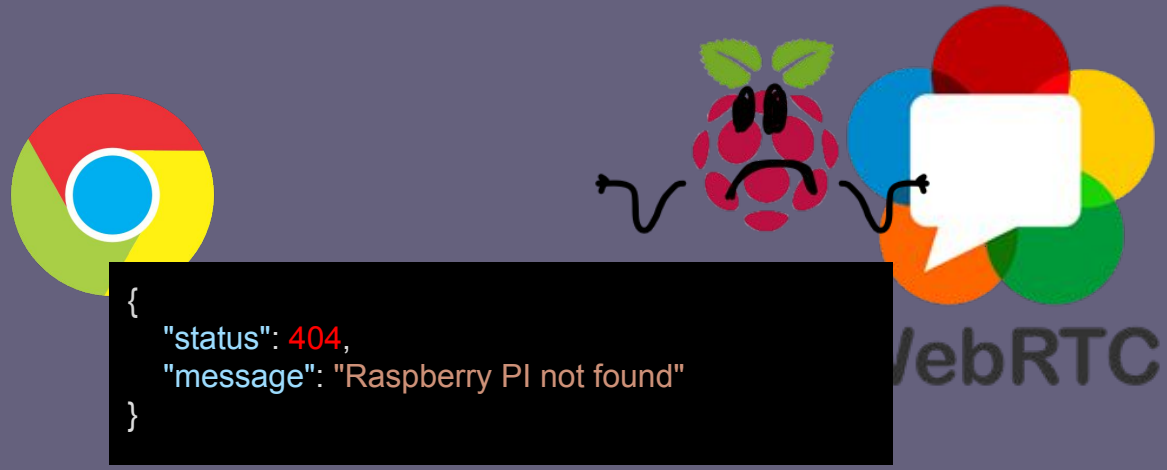
push notifications

Conclusioni





Conclusioni



Conclusioni

Thanks!