# Interfacing IoT with Augmented Reality: Security and use cases

Milan, 15 November 2021

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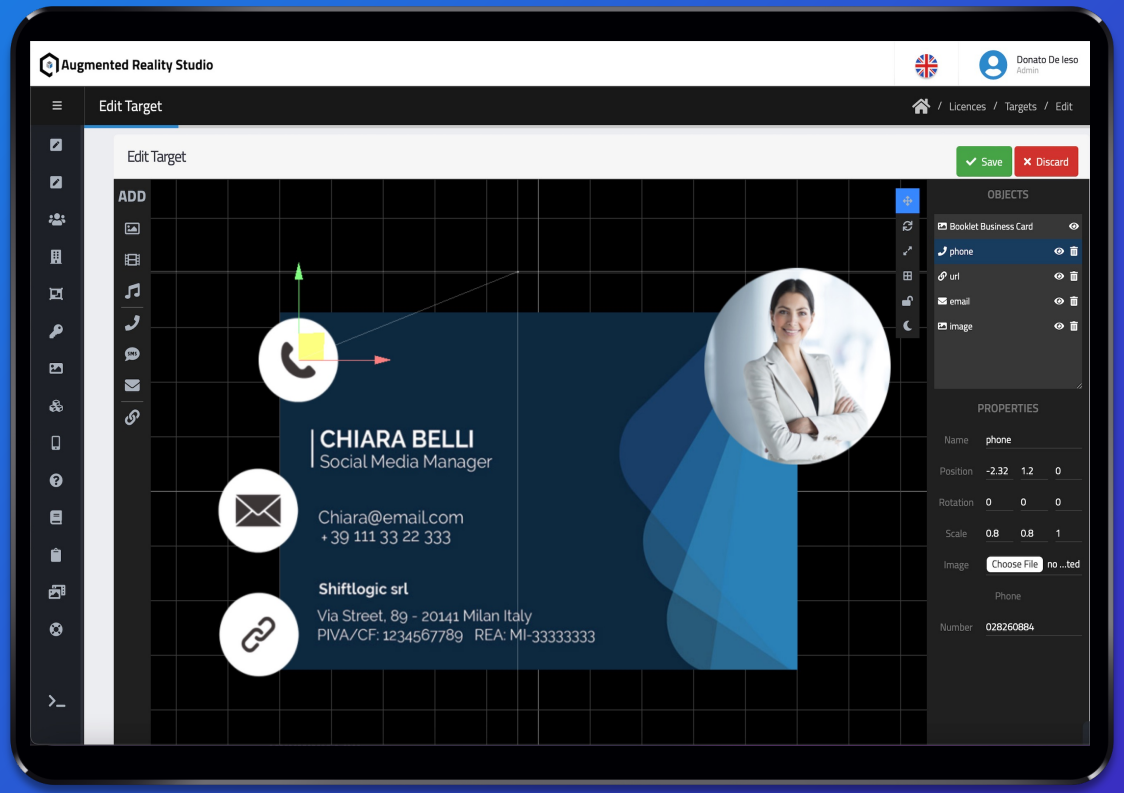
*Technologies for Ideas*

# Have you ever heard about Augmented Reality?

BROOKLYN
BOROUGH

# AR Studio | The photoshop of Augmented Reality

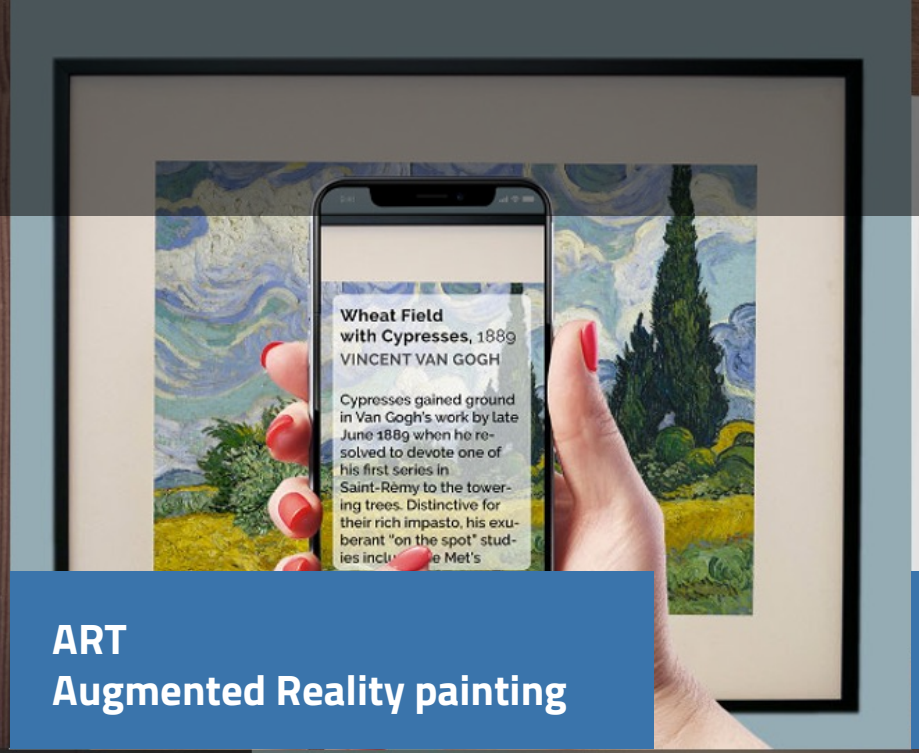



GET IT ON App Store

GET IT ON Google Play

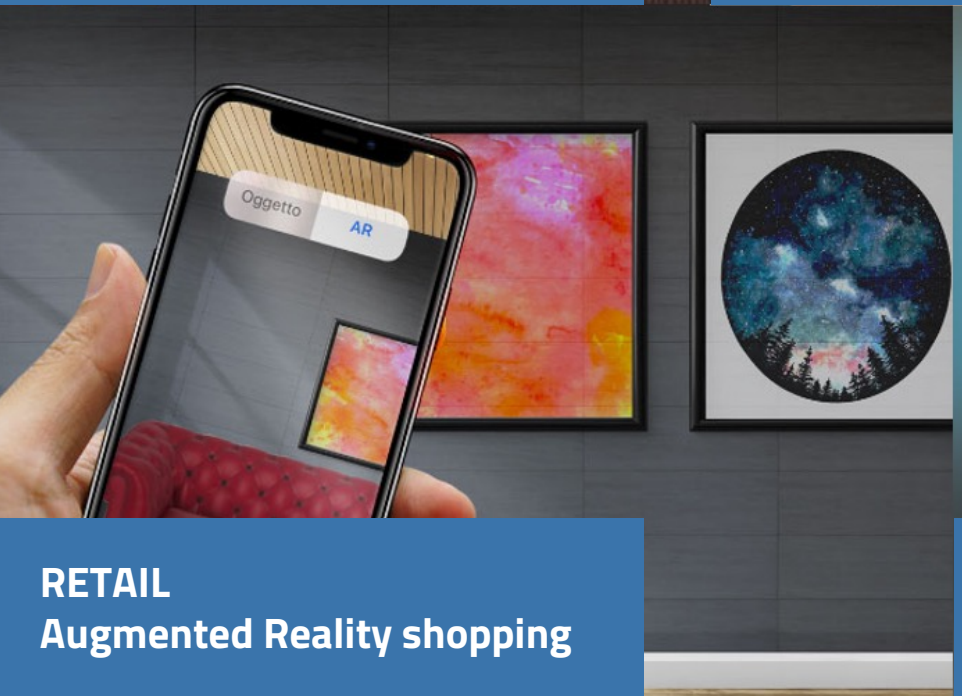
# Case history

**DESIGN**
**Augmented Reality T-Shirt**

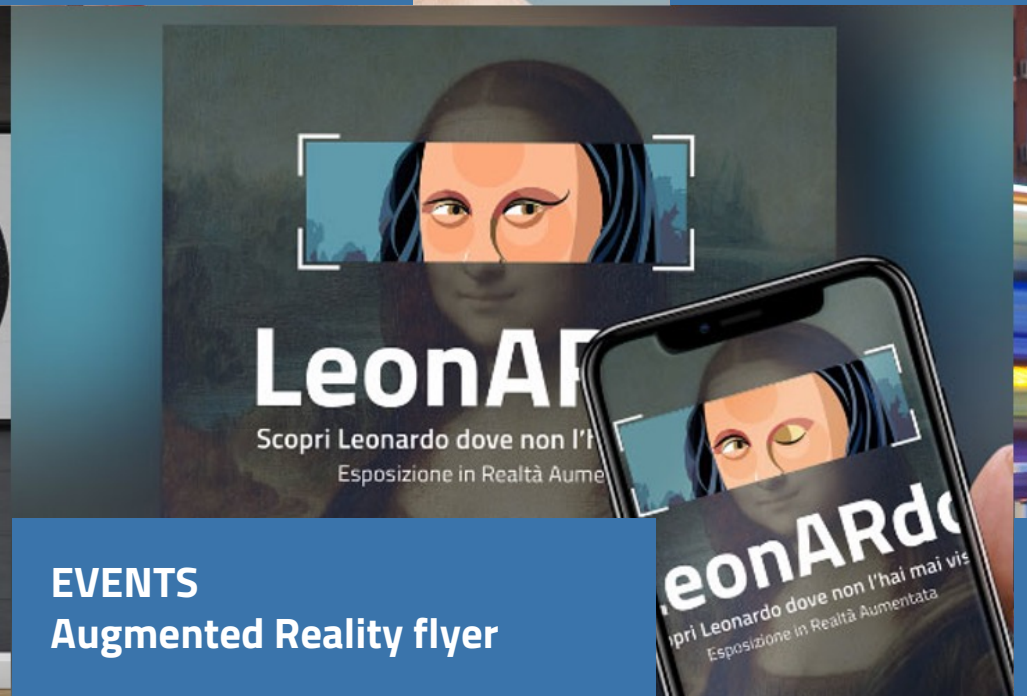



**ART**
**Augmented Reality painting**

**EDUCATION**
**Augmented Reality book**




**RETAIL**
**Augmented Reality shopping**

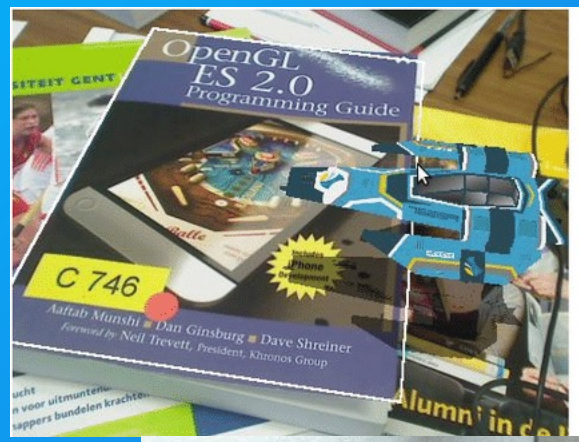


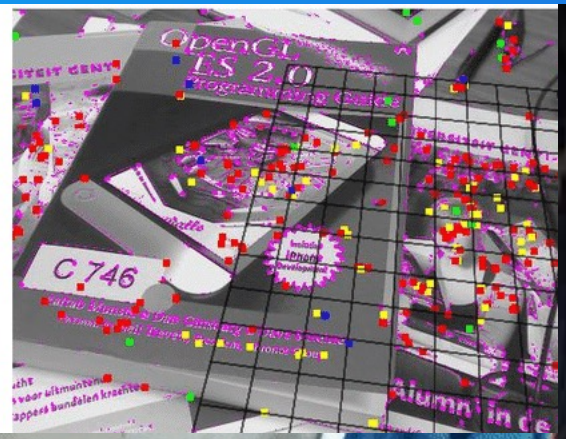

**EVENTS**
**Augmented Reality flyer**

**ADVERTISING**
**Augmented Reality banner**

# How it works

## Anchors, Keypoints & Feature Detection



*https://www.andreasjakl.com/basics-of-ar-anchors-keypoints-feature-detection/*

# AR + IoT

**IoT** is a combination of physical objects with virtual representations and services.
**Augmented reality** provides an **ideal interface to IoT** applications by superimposing virtual information about smart objects and services on a user's view of the real world.

# AR + IoT

This allows a user to interact with the physical object as well as receiving additional context-aware information about the object e.g., size, speed and temperature, as well as information about nearby objects.

# Campanile (Trinity College, Dublin)

The Campanile of Trinity College, Dublin is a bell tower and one of its most iconic landmarks. Donated by then Archbishop of Armagh, Lord John Beresford it was designed by Sir Charles Lanyon, sculpted by Thomas Kirk and finished in 1853.

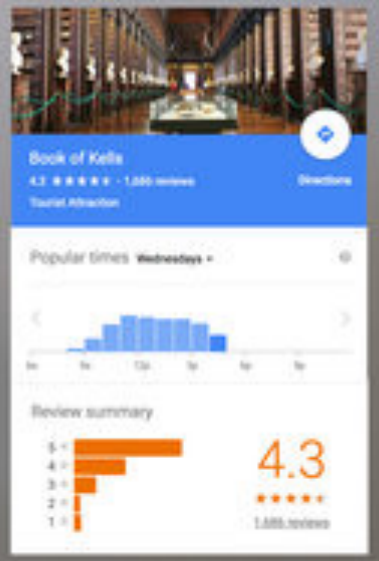
## Design

The entire structure stands at 30.5 metres (100 ft) tall and is mainly granite in composition with its carvings being of portland stone. Lanyon had originally intended the campanile to be linked to the buildings on either side (Old Library and Graduates Memorial Building) by an "arcaded screen", however this was never realised.

## Superstition

The college tradition and superstition holds that any student who passes beneath the campanile when the bells toll will fail their exams, causing some to never pass under it until they finish their time at Trinity College. There is another student legend that the bell will ring automatically when a virgin stands underneath it. This was the subject of a cartoon in Trinity News c. 1966 by Nick Robinson which showed a forlorn student couple standing under the Campanile while the bell remained silent. The boy says to the girl "Maybe if you jump up and down a little".

## Suggested Location




## George Salmon

Rev Prof George Salmon DD FBA FRS FRSE LLD (25 September 1819 – 22 January 1904) was ...

## William E. H. Lecky

William Edward Hartpole Lecky, OM, FBA (26 March 1838 – 22 October 1903) was an Irish ...

*Augmented Reality in IoT - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Tourist-interacting-with-services-in-AR_fig2_327884565 [accessed 13 Nov, 2021]*

# AR + IoT

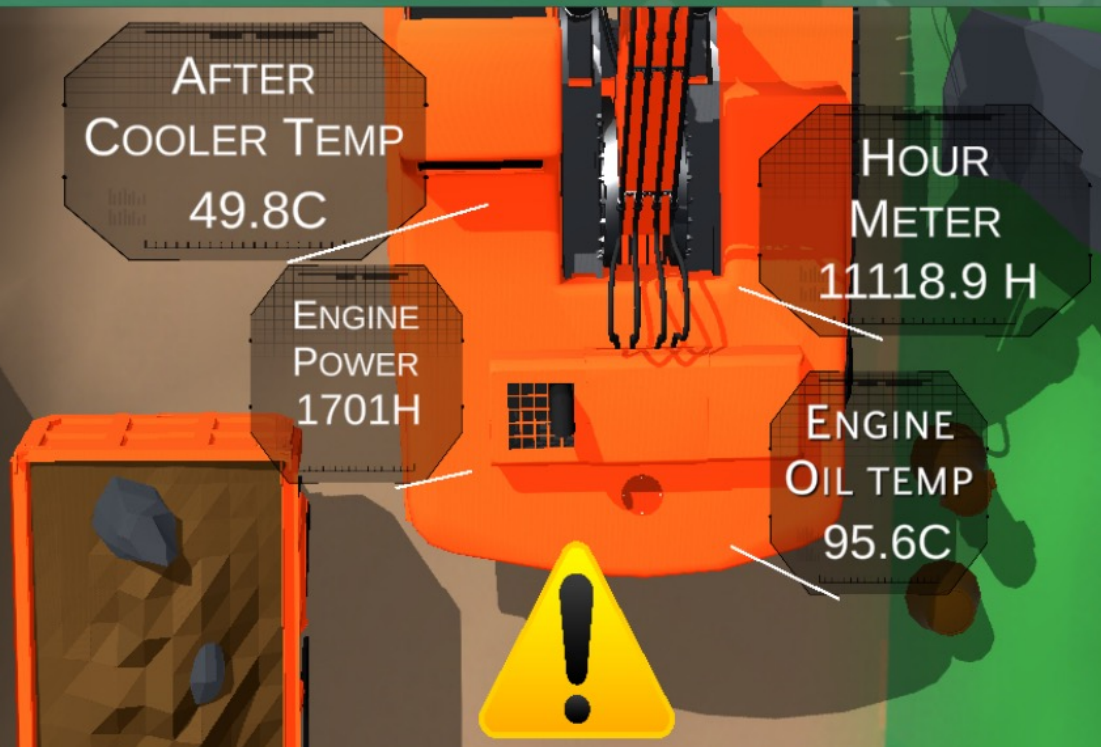
Users do not have to directly interact with the physical objects or sensors as augmented reality can be an effective method of providing additional information about IoT services in the environment, such as the attributes of a service or the ratings that other users have provided during previous invocations.

Back
Viewer Mode
You have arrived
TT-2222
50%
FV-2222
20%
PT-2244
100%
FV-2222
0.0m

## WE NEED YOUR HELP.

THE IoT DATA HAS EXPOSED POTENTIAL ISSUES AND THE EXCAVATOR MIGHT BE IN NEED OF SERVICE SOON.

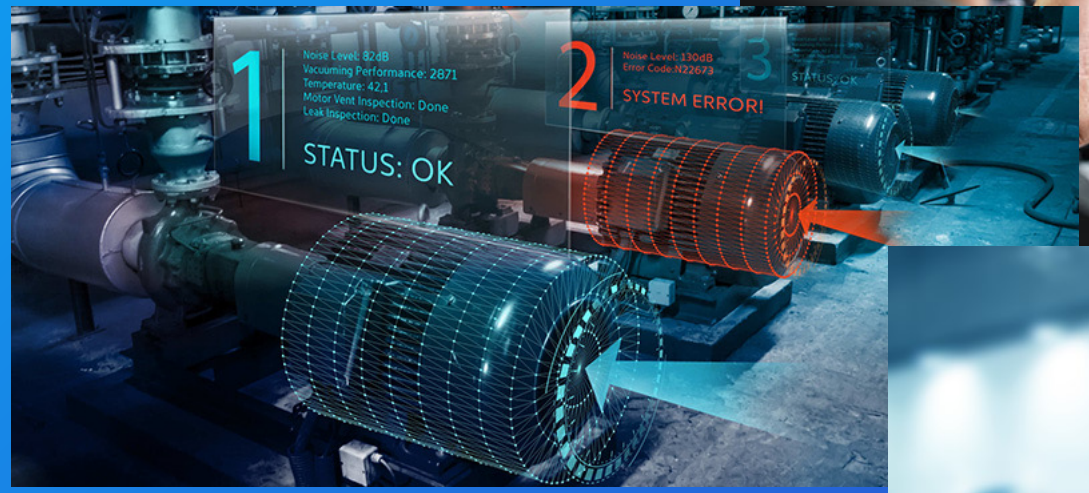
I'M READY

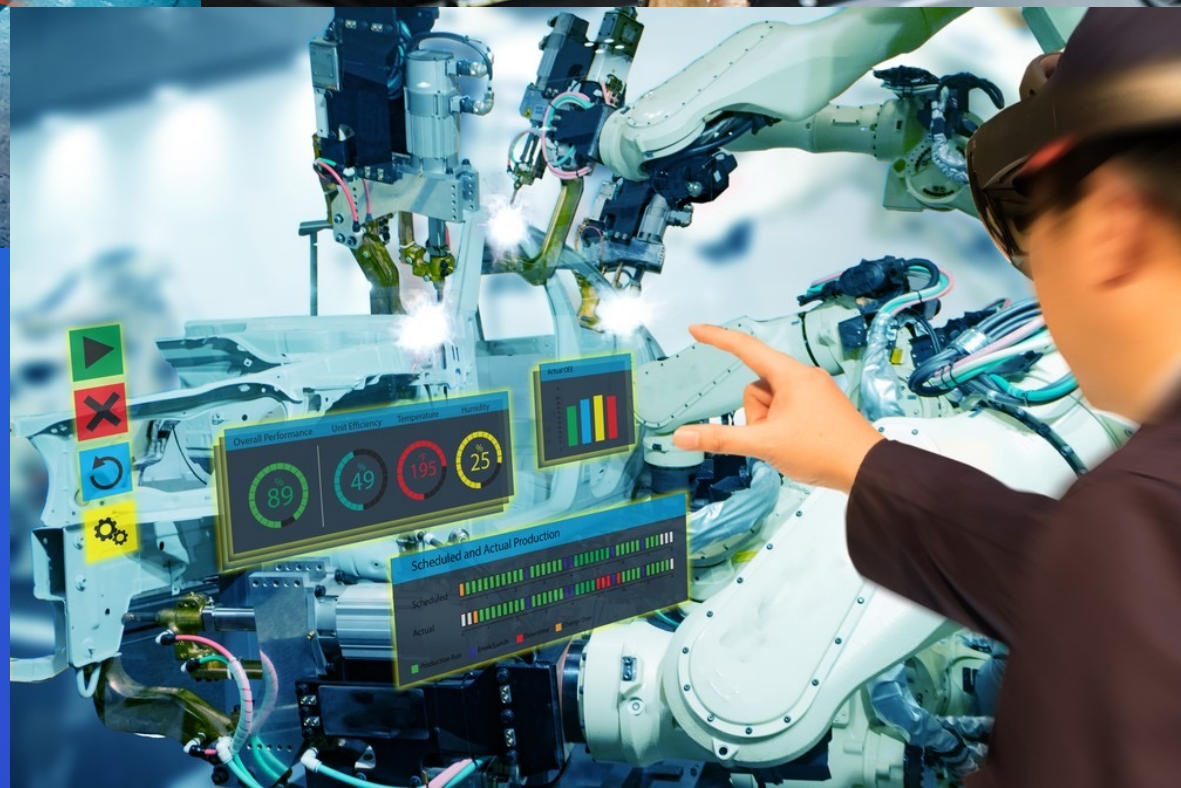



SERVICE NEEDED IN:
**30 HOURS**

SYSTEM: **ON**
PRESSURE: **LOW**
TEMP: **ELEVATED**

# Example Industry




**All this example in AR interact with IoT but how?**

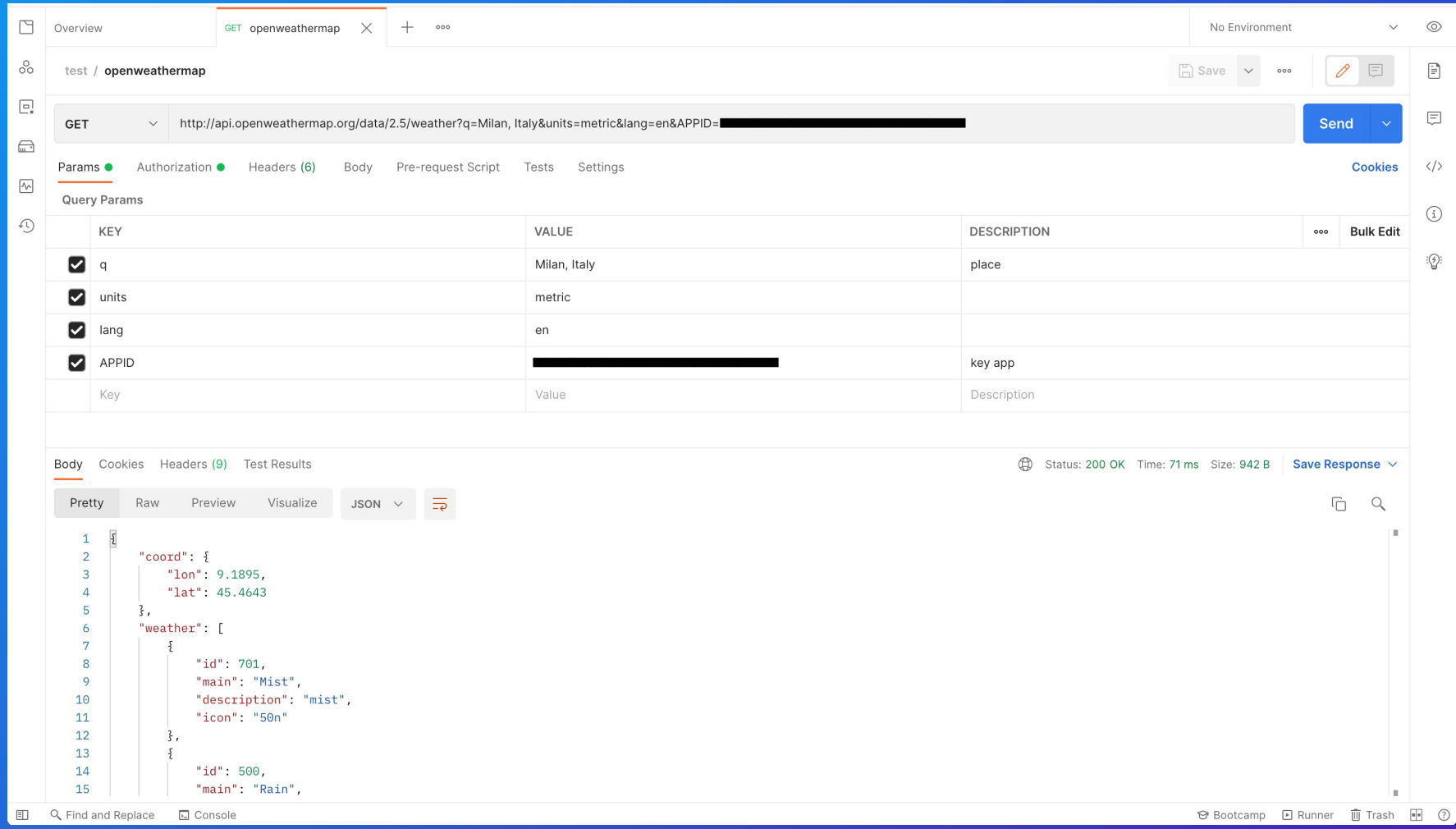
# Dominant Type

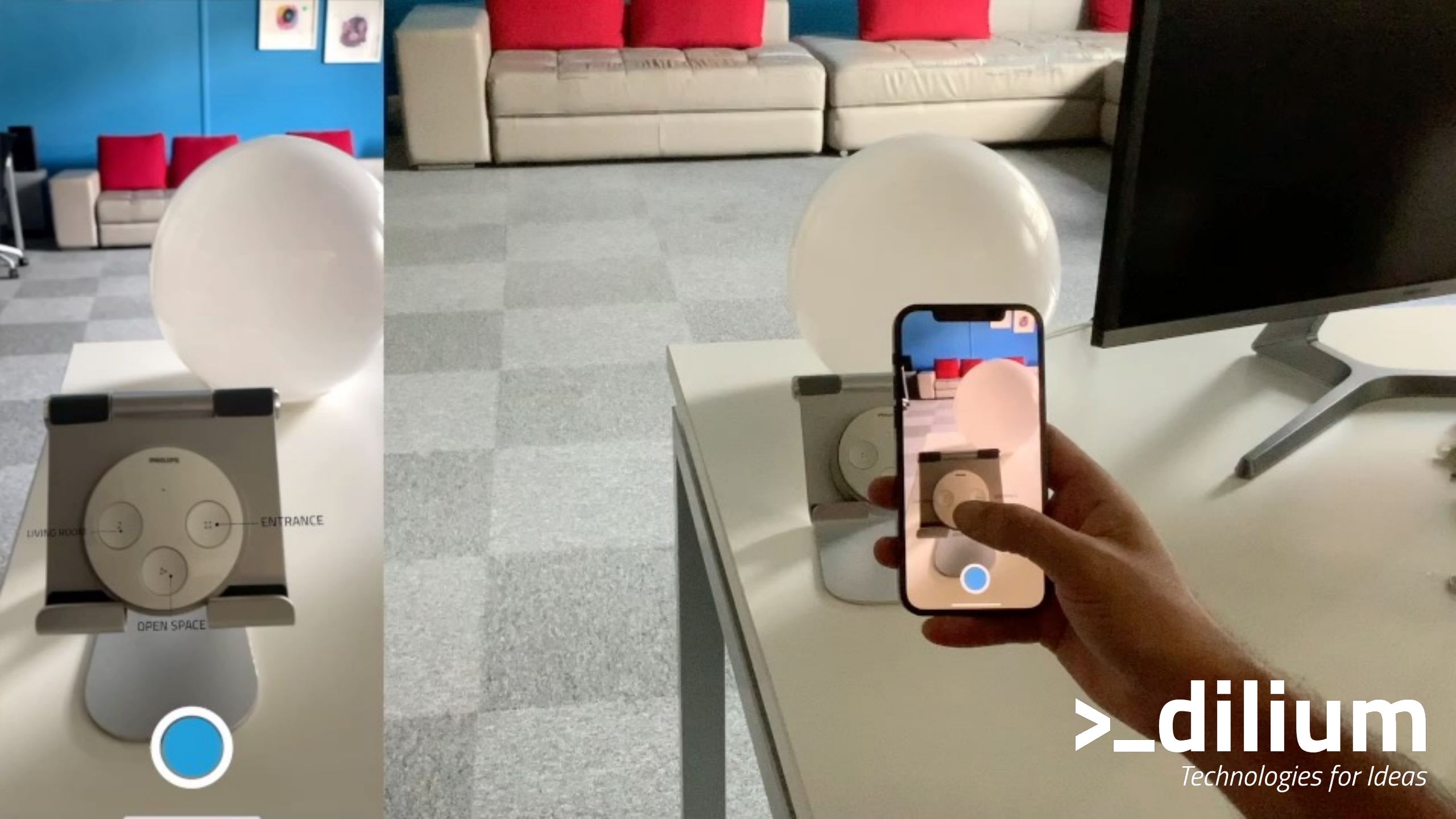
**Over 80% of all puclic web APIs***

*https://www.programmableweb.com/news/json-clearly-king-api-data-formats-2020/research/2020/04/03

# Example OpenWeatherMap

No https
Only an AppId



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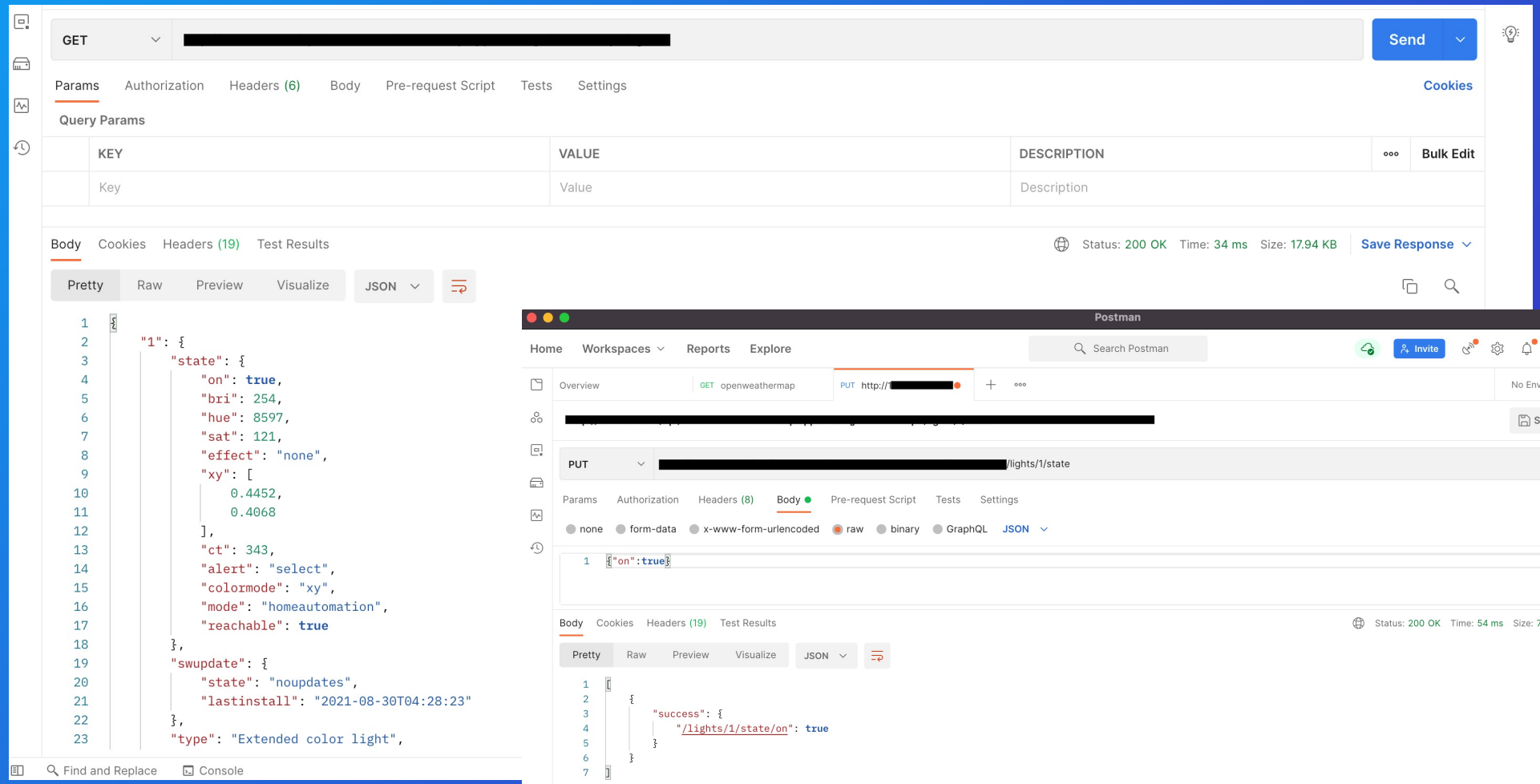
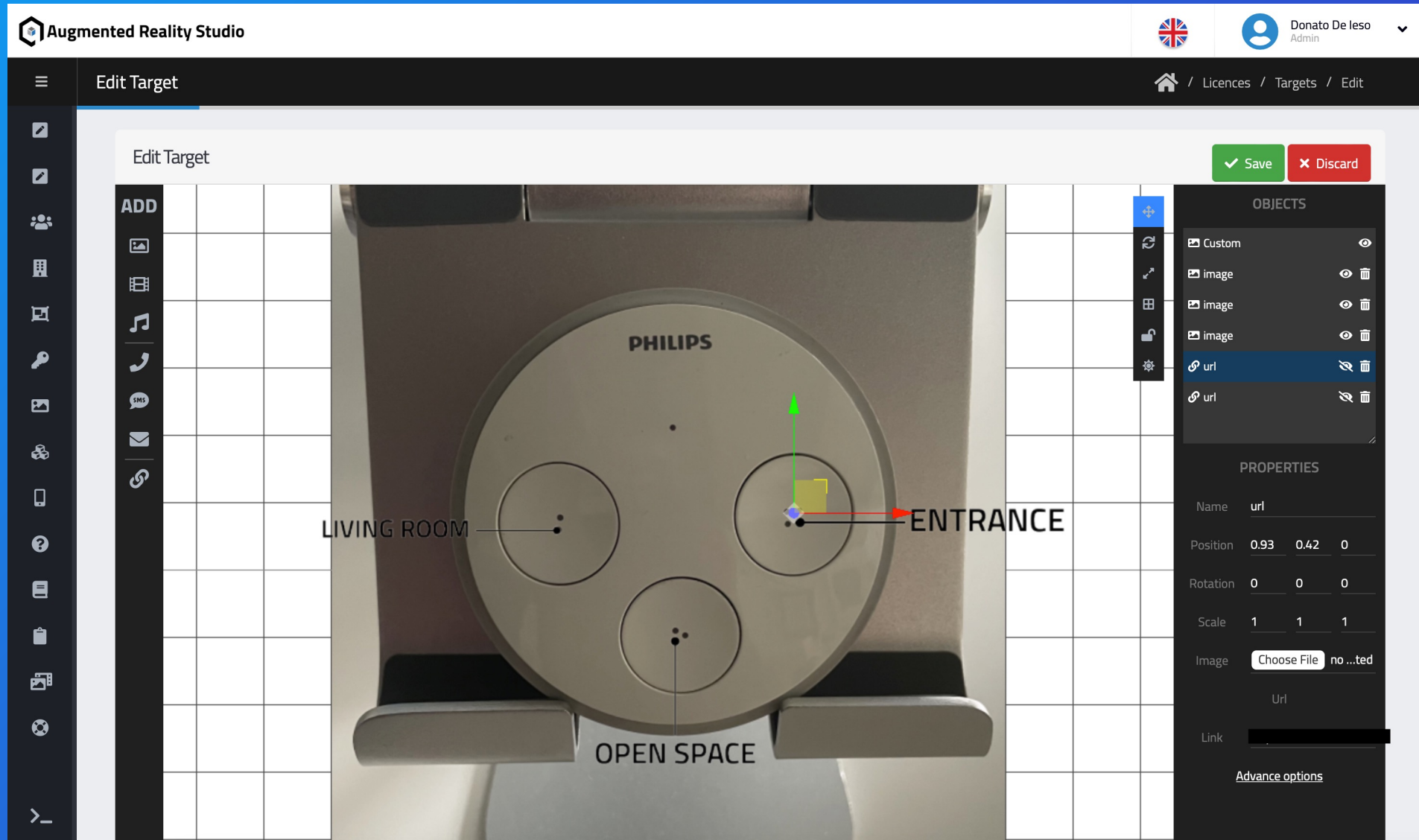
# Example Philips Hue*

**Works on LAN**
**Need a token after push physical button**

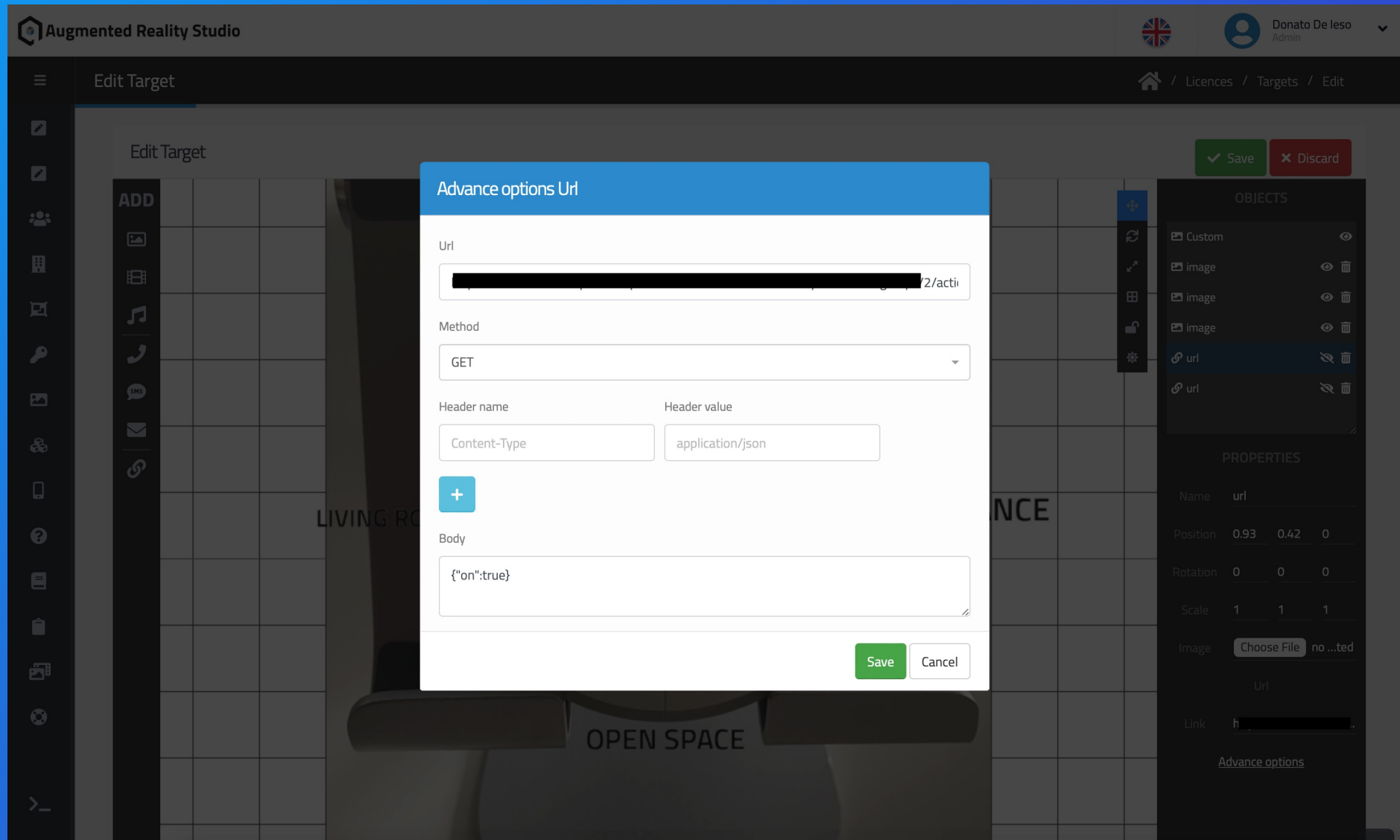



*https://developers.meethue.com/develop/get-started-2/*

# Example Philips Hue



# Example Philips Hue



# Conclusion

Industry experts agree that web services and APIs will increasingly come under attack in the coming years.

Recent events, such as the Facebook data leak caused by an API vulnerability*, underline the importance of API security.

In 2019, OWASP even added a new Top 10 list: the API Security Top Ten**.

** https://www.infosecurity-magazine.com/news/data-leak-exposes-267-million/*
*** https://owasp.org/www-project-api-security/*

Project Works

# How we can do to ensure REST API Security?

Connection Security | API Access Control | API Client Restrictions |
Sensitive Data in API Communication | Content Type Validation | Response Security Headers | Input Validation

# Thanks!

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