

Interfacing IoT with Augmented Reality: Security and use cases

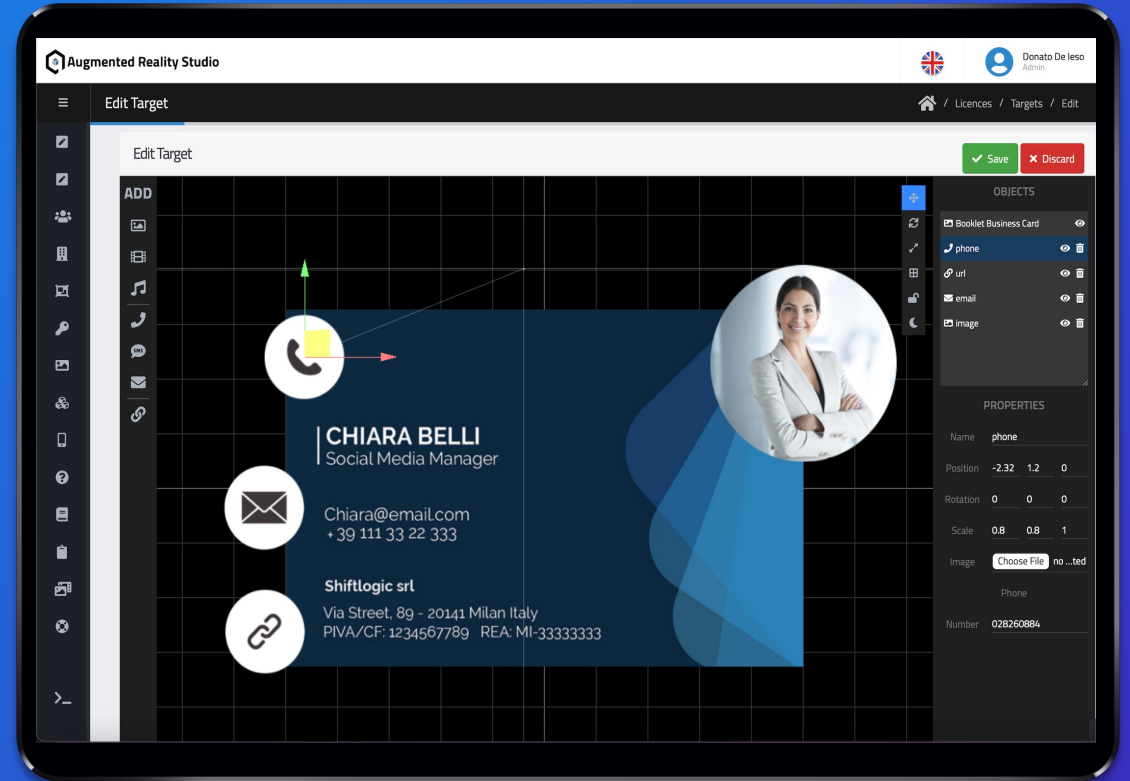
Milan, 15 November 2021
dott. Donato DE IESO
Ceo and Co-founder dilium srl

>_dilium
Technologies for Ideas

Have you ever heard about
Augmented Reality?



AR Studio | The photoshop of Augmented Reality



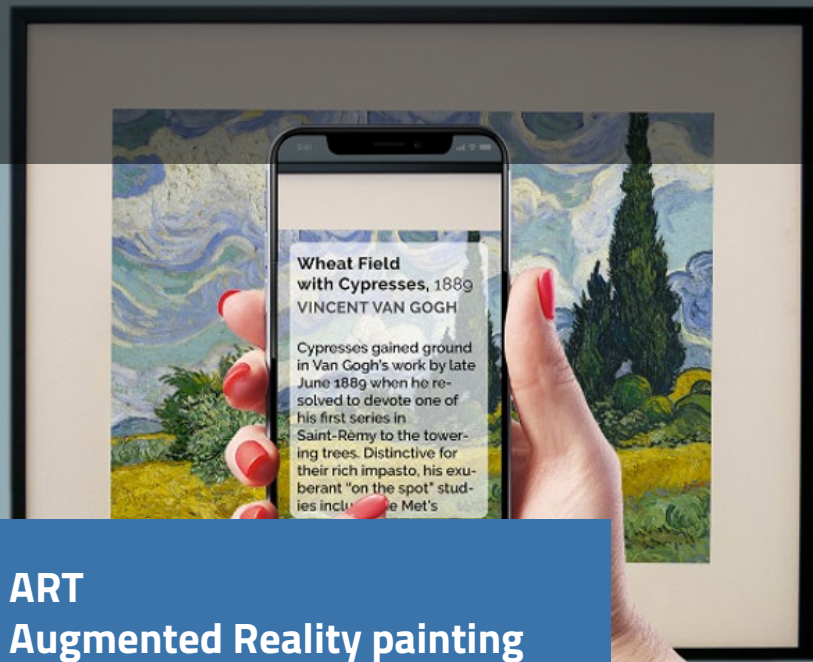
GET IT ON
App Store

GET IT ON
Google Play

Case history



DESIGN
Augmented Reality T-Shirt



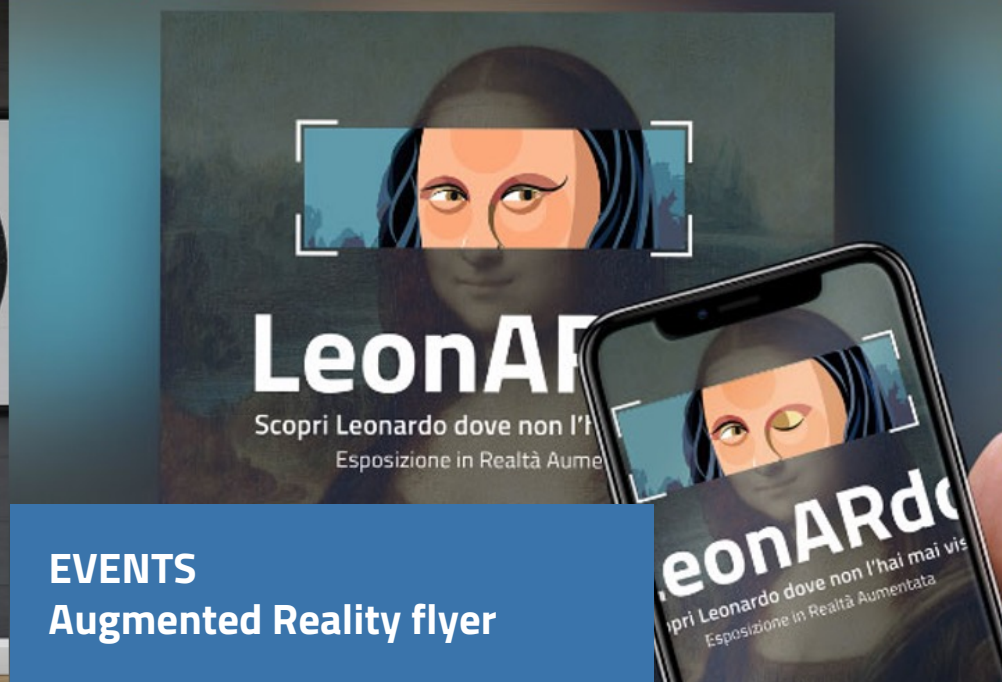
ART
Augmented Reality painting



EDUCATION
Augmented Reality book



RETAIL
Augmented Reality shopping



EVENTS
Augmented Reality flyer



ADVERTISING
Augmented Reality banner

How it works

Anchors, Keypoints & Feature Detection



■ 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.

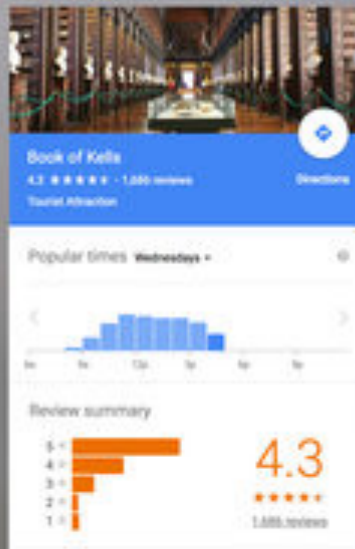
Design

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 ...

■ 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.



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**



AFTER
COOLER TEMP
49.8C

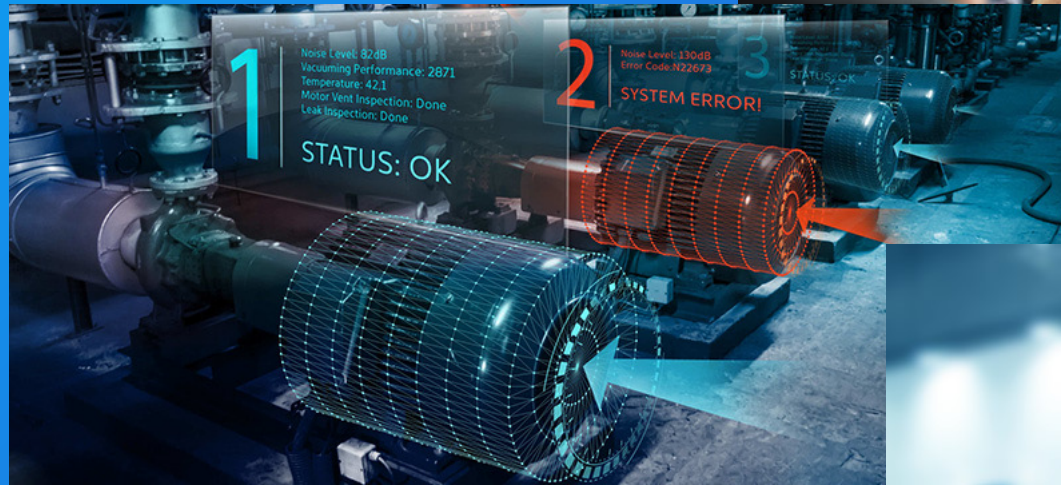
ENGINE
POWER
1701H

HOUR
METER
11118.9 H

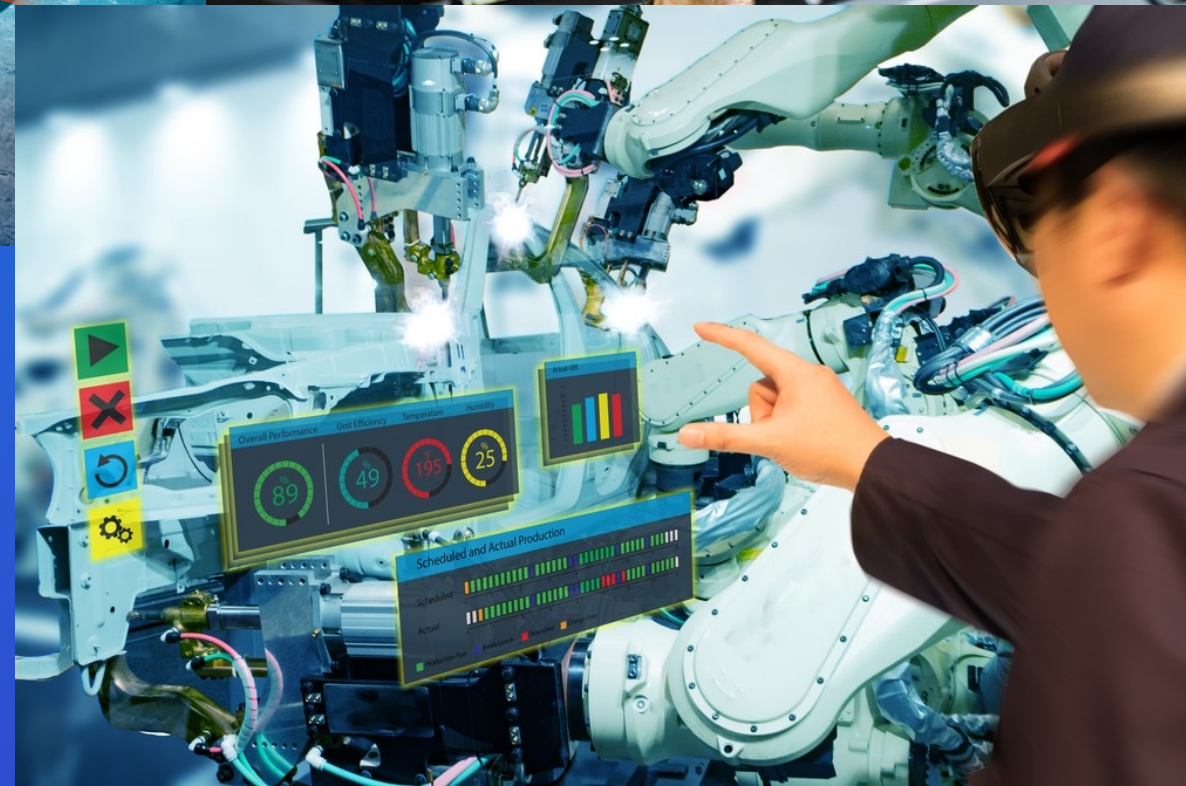
ENGINE
OIL TEMP
95.6C



Example Industry



All this
example in AR
interact with
IoT but how?



Dominant Type

Over 80% of
all public 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

Overview GET openweathermap X + ... No Environment

test / openweathermap Save ...

GET http://api.openweathermap.org/data/2.5/weather?q=Milan, Italy&units=metric&lang=en&APPID=[redacted] Send

Params Authorization Headers (6) Body Pre-request Script Tests Settings Cookies

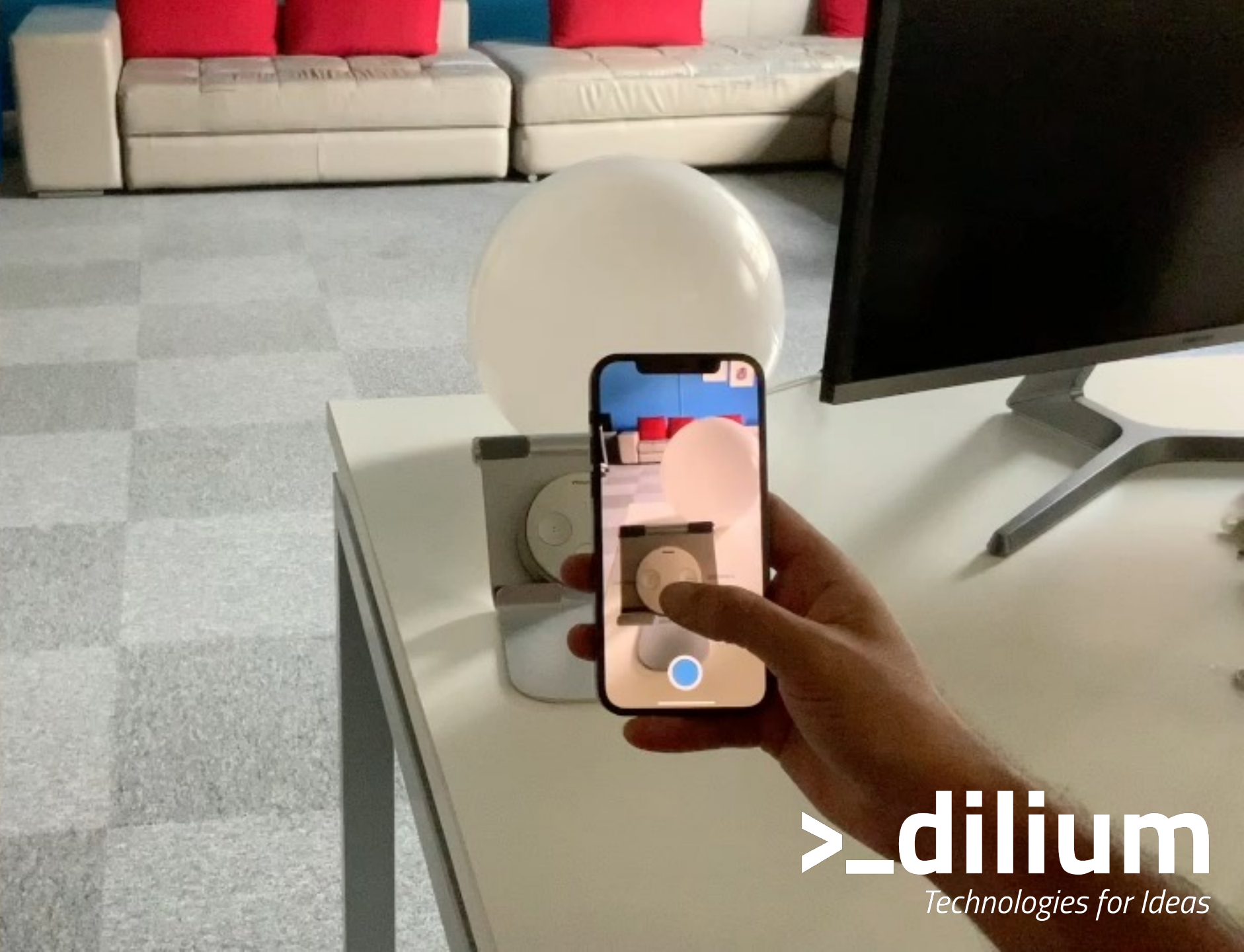
Query Params

KEY	VALUE	DESCRIPTION	...	Bulk Edit
<input checked="" type="checkbox"/> q	Milan, Italy	place		
<input checked="" type="checkbox"/> units	metric			
<input checked="" type="checkbox"/> lang	en			
<input checked="" type="checkbox"/> APPID	[redacted]	key app		
Key	Value	Description		

Body Cookies Headers (9) Test Results Status: 200 OK Time: 71 ms Size: 942 B Save Response

Pretty Raw Preview Visualize JSON

```
1  {
2    "coord": {
3      "lon": 9.1895,
4      "lat": 45.4643
5    },
6    "weather": [
7      {
8        "id": 701,
9        "main": "Mist",
10       "description": "mist",
11       "icon": "50n"
12      },
13      {
14        "id": 500,
15        "main": "Rain",
```



Example Philips Hue*

Works on LAN
Need a token
after push
physical button

The image displays two screenshots of the Postman API client. The top screenshot shows a GET request to a URL (redacted) with a status of 200 OK, a response time of 34 ms, and a size of 17.94 KB. The response body is shown in JSON format:

```
1 {
2   "1": {
3     "state": {
4       "on": true,
5       "bri": 254,
6       "hue": 8597,
7       "sat": 121,
8       "effect": "none",
9       "xy": [
10        0.4452,
11        0.4068
12      ],
13       "ct": 343,
14       "alert": "select",
15       "colormode": "xy",
16       "mode": "homeautomation",
17       "reachable": true
18     },
19     "swupdate": {
20       "state": "noupdates",
21       "lastinstall": "2021-08-30T04:28:23"
22     },
23     "type": "Extended color light",
24   }
25 }
```

The bottom screenshot shows a PUT request to a URL (redacted) with a status of 200 OK, a response time of 54 ms, and a size of 72 bytes. The request body is {"on": true}. The response body is shown in JSON format:

```
1 {
2   "success": {
3     "/lights/1/state/on": true
4   }
5 }
6
7
```

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

Example Philips Hue

Augmented Reality Studio

Donato De Ieso Admin

Edit Target

Licences / Targets / Edit

Save Discard

ADD

PHILIPS

LIVING ROOM

ENTRANCE

OPEN SPACE

OBJECTS

- Custom
- image
- image
- image
- url
- url

PROPERTIES

Name	url		
Position	0.93	0.42	0
Rotation	0	0	0
Scale	1	1	1
Image	Choose File	no ...ted	
Url	Url		
Link	Link		

Advance options

Example Philips Hue

Augmented Reality Studio

Donato De Ieso Admin

Edit Target

Licences / Targets / Edit

Save Discard

Advance options Uri

Url
[Redacted] /acti

Method
GET

Header name	Header value
Content-Type	application/json

+
Body
{ "on": true }

Save Cancel

OBJECTS

- Custom
- image
- image
- image
- url
- url

PROPERTIES

Name	url
Position	0.93 0.42 0
Rotation	0 0 0
Scale	1 1 1
Image	Choose File no ...ted
Url	
Link	h [Redacted]

Advance options

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/>

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!

donato@dilium.com

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