Electronics for IoT

Smart Sensors

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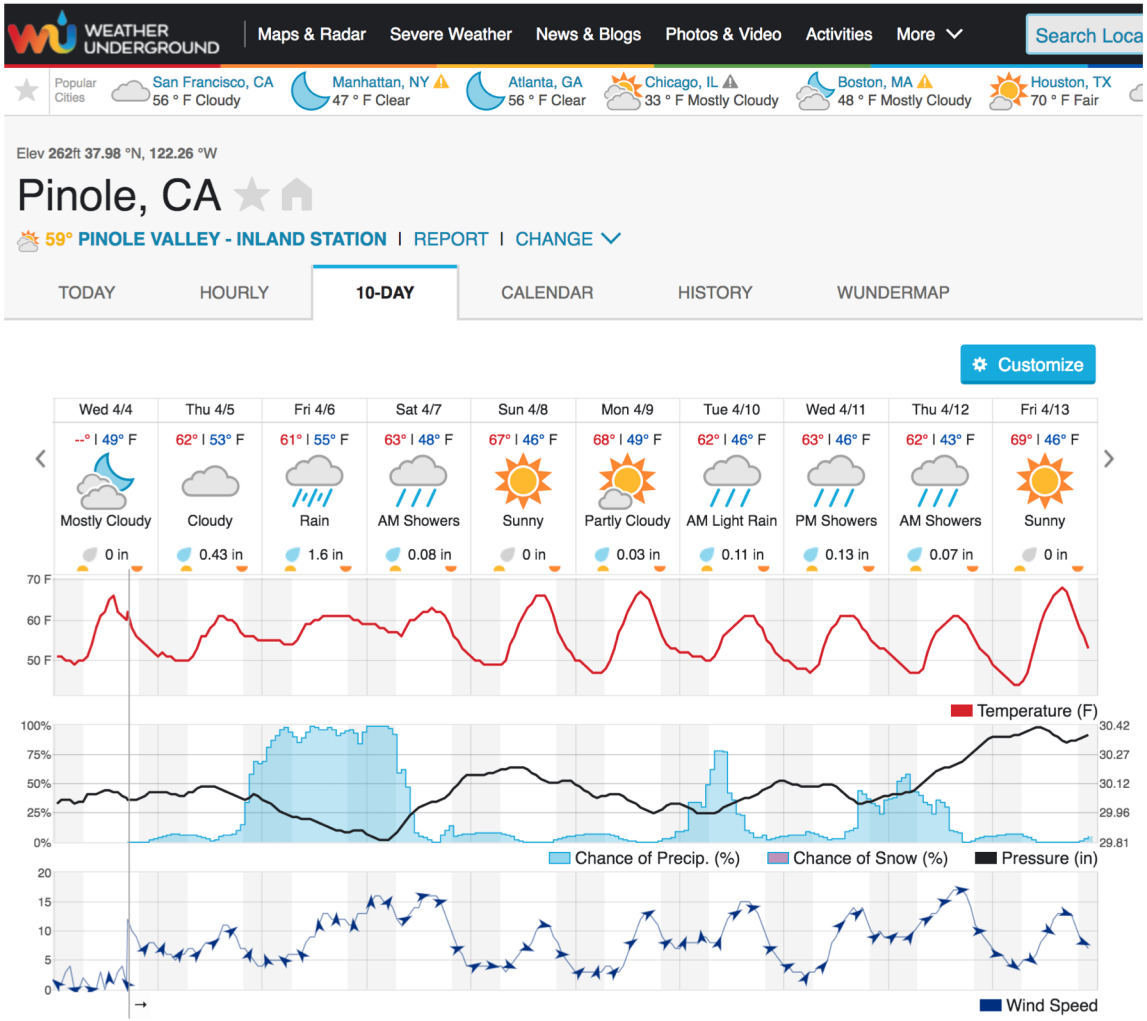
IoT Services

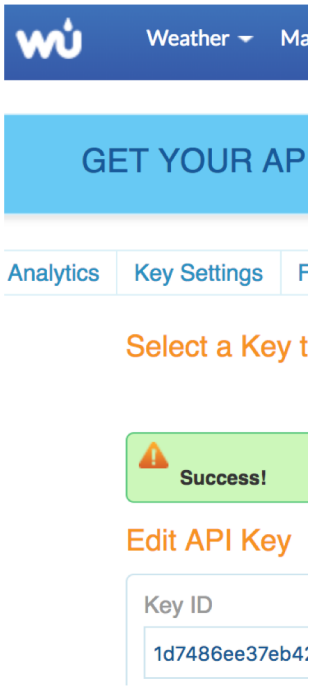
- Current Weather
- Send email
- Send SMS
- …

Weather

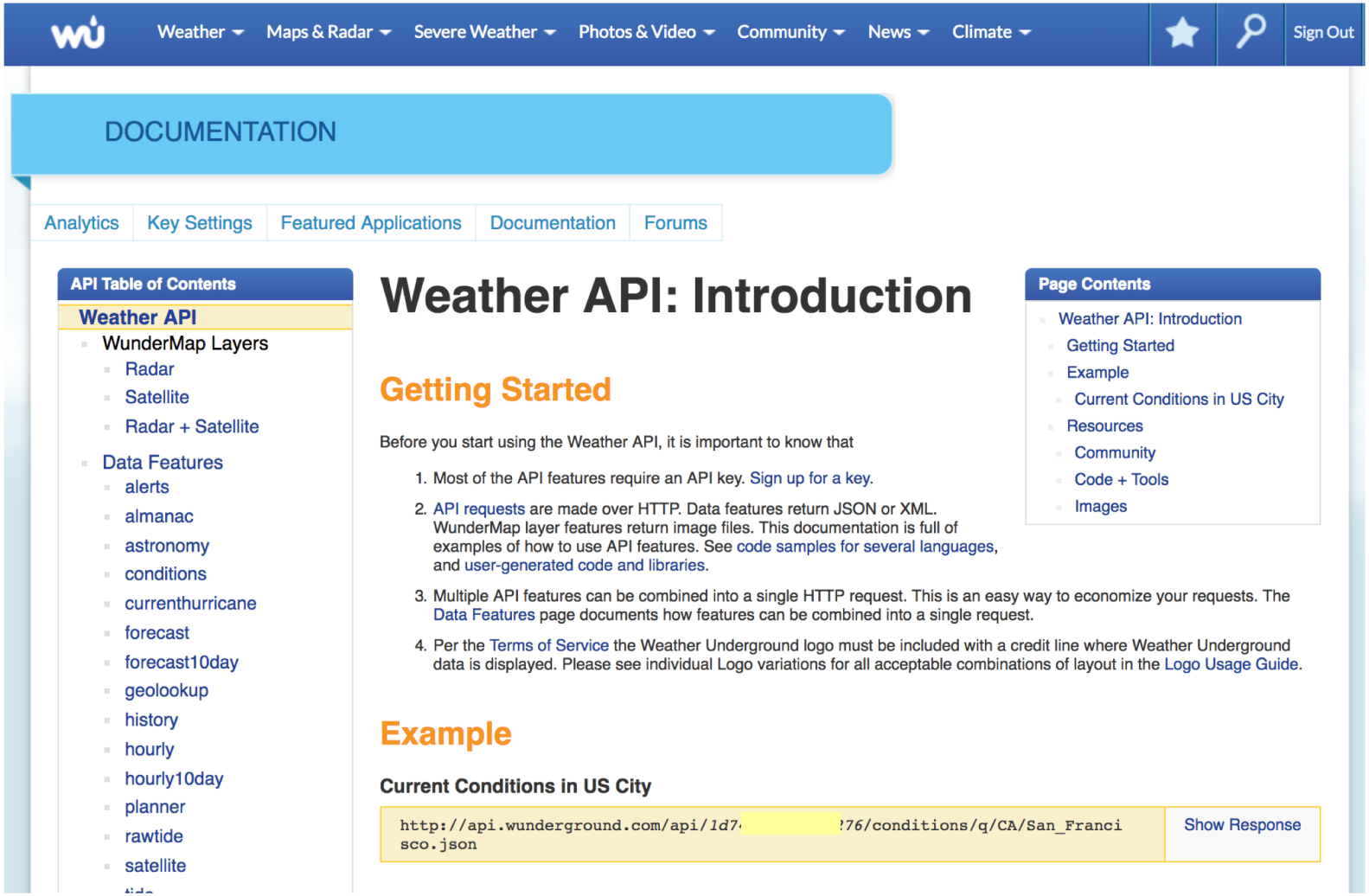

WEATHER UNDERGROUND
Maps & Radar
Severe Weather
News & Blogs
Photos & Video
Activities
More
Search Loca
Popular Cities
San Francisco, CA 56 ° F Cloudy
Manhattan, NY 47 ° F Clear
Atlanta, GA 56 ° F Clear
Chicago, IL 33 ° F Mostly Cloudy
Boston, MA 48 ° F Mostly Cloudy
Houston, TX 70 ° F Fair
Elev 262ft 37.98 °N, 122.26 °W
Pinole, CA
59° PINOLE VALLEY - INLAND STATION | REPORT | CHANGE
TODAY
HOURLY
10-DAY
CALENDAR
HISTORY
WUNDERMAP
Customize
Wed 4/4
Thu 4/5
Fri 4/6
Sat 4/7
Sun 4/8
Mon 4/9
Tue 4/10
Wed 4/11
Thu 4/12
Fri 4/13
--° | 49° F
62° | 53° F
61° | 55° F
63° | 48° F
67° | 46° F
68° | 49° F
62° | 46° F
63° | 46° F
62° | 43° F
69° | 46° F
Mostly Cloudy
Cloudy
Rain
AM Showers
Sunny
Partly Cloudy
AM Light Rain
PM Showers
AM Showers
Sunny
0 in
0.43 in
1.6 in
0.08 in
0 in
0.03 in
0.11 in
0.13 in
0.07 in
0 in
70 F
60 F
50 F
Temperature (F)
100%
75%
50%
25%
0%
30.42
30.27
30.12
29.96
29.81
Chance of Precip. (%)
Chance of Snow (%)
Pressure (in)
20
15
10
5
0
Wind Speed

Wunderground

- Weather service
- Create account at https://www.wunderground.com/weather/api/
- Copy api key



Documentation



Request

```
import urequests as requests

res = requests.get("http://api.wunderground.com/api/1d748saf321a4276/conditions/q/CA/San_Francisco.json")

print(res.json()['current_observation'], end='\n\n')

weather = res.json()['current_observation']
print("Temperature", weather['temp_f'], "F")
print("Temperature", weather['temp_c'], "C")
print("Weather    ", weather['weather'])
```

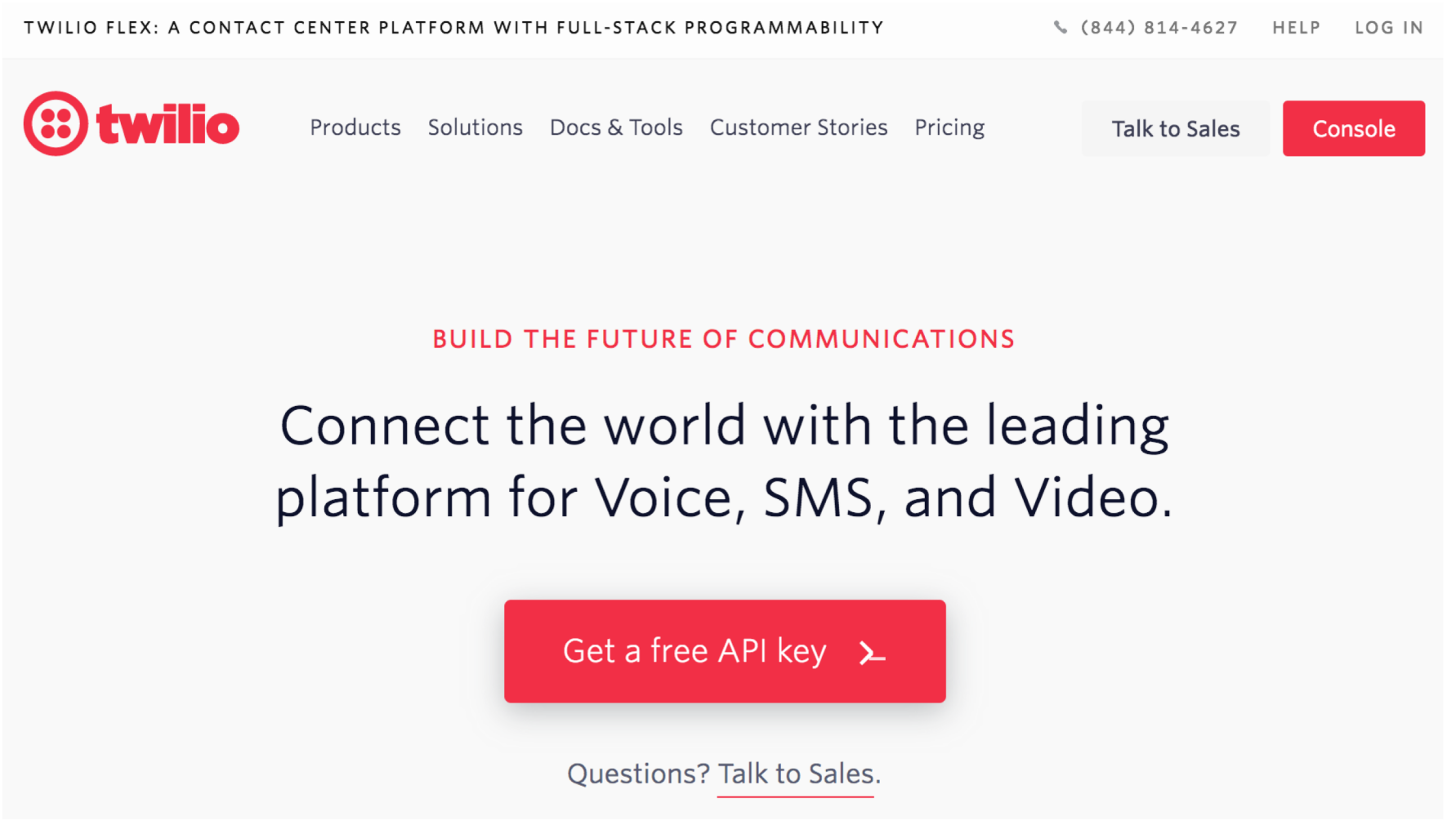
Response

```
L:/Users/boser/Dropbox/Files/Class/49/esp32> run wunderground.py
{'visibility_mi': '10.0', 'feelslike_string': '56.4 F (13.6 C)', 'precip_1hr_metric': ' 0', 'observation_epoch': '1522888
set': '-0700', 'dewpoint_f': 48, 'wind_string': 'From the South at 1.0 MPH Gusting to 6.0 MPH', 'wind_gust_mph': '6.0', '
ncisco.html', 'history_url': 'http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCASANFR131', 'ob_url': 'h
t?query=37.778488,-122.408005', 'observation_time': 'Last Updated on April 4, 5:33 PM PDT', 'pressure_trend': '0', 'wind_
precip_today_string': '0.00 in (0 mm)', 'display_location': {'wmo': '99999', 'elevation': '60.0', 'city': 'San Francisco'
o3166': 'US', 'state': 'CA', 'zip': '94102', 'latitude': '37.77999878', 'country': 'US', 'state_name': 'California', 'ful
me_rfc822': 'Wed, 04 Apr 2018 17:33:56 -0700', 'image': {'title': 'Weather Underground', 'url': 'http://icons.wxug.com/gr
ound.com'}, 'icon_url': 'http://icons.wxug.com/i/c/k/cloudy.gif', 'estimated': {}, 'heat_index_f': 'NA', 'local_tz_short'
, 'visibility_km': '16.1', 'relative_humidity': '72%', 'precip_1hr_string': '0.00 in ( 0 mm)', 'windchill_f': 'NA', 'sola
: '56.4 F (13.6 C)', 'precip_today_metric': '0', 'windchill_c': 'NA', 'local_tz_long': 'America/Los_Angeles', 'station_id
822': 'Wed, 04 Apr 2018 17:33:48 -0700', 'nowcast': '', 'pressure_in': '30.07', 'UV': '1.2', 'dewpoint_string': '48 F (9
 {'country': 'US', 'longitude': '-122.41', 'state': 'California', 'city': 'San Francisco', 'elevation': '23 ft', 'country
titude': '37.78'}, 'temp_f': 56.40000000000001, 'temp_c': 13.6, 'precip_today_in': '0.00', 'feelslike_c': '13.6', 'precip
: '56.4', 'weather': 'Overcast'}

Temperature 56.40000000000001 F
Temperature 13.6 C
Weather     Overcast
L:/Users/boser/Dropbox/Files/Class/49/esp32>
```

Send SMS

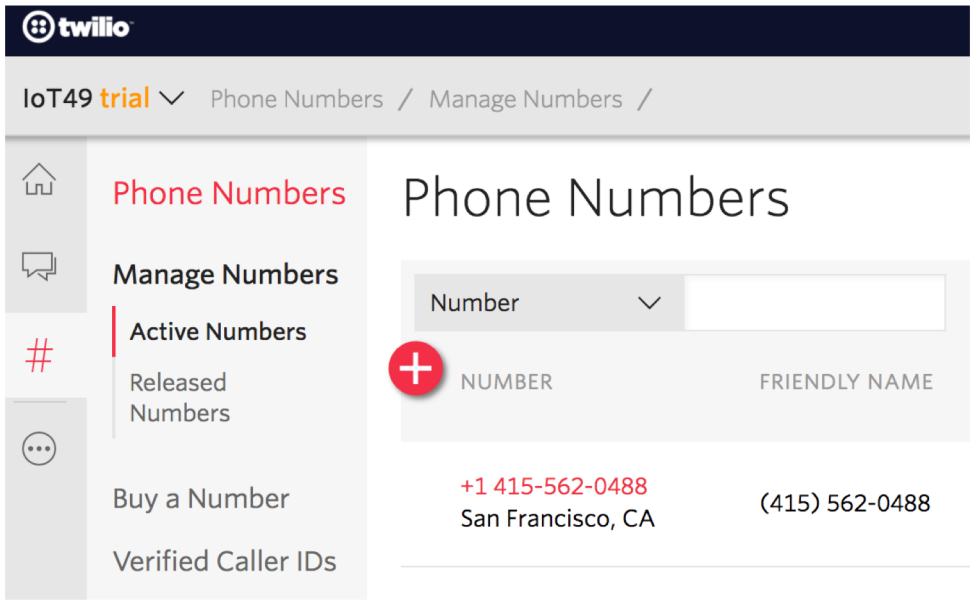
- twilio.com

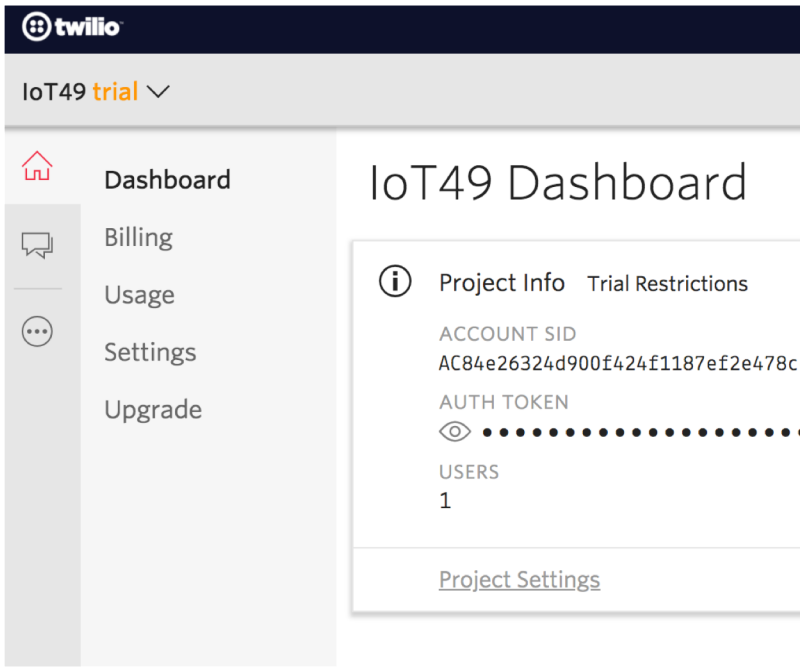
Send SMS from MicroPython



Create Account

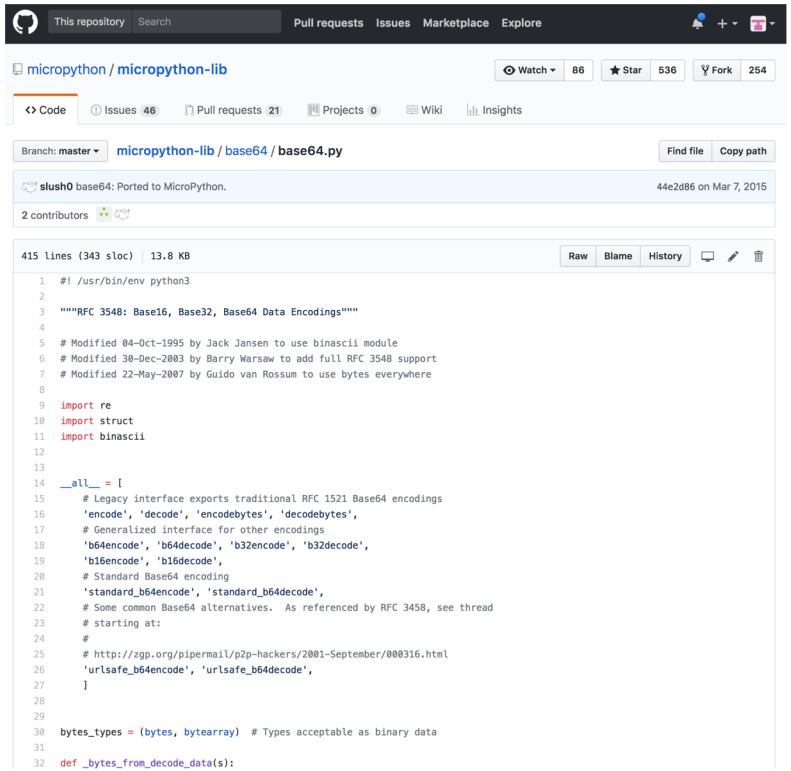
- Setup free trial
- Get phone number, account SID, auth token





Install `base64` library

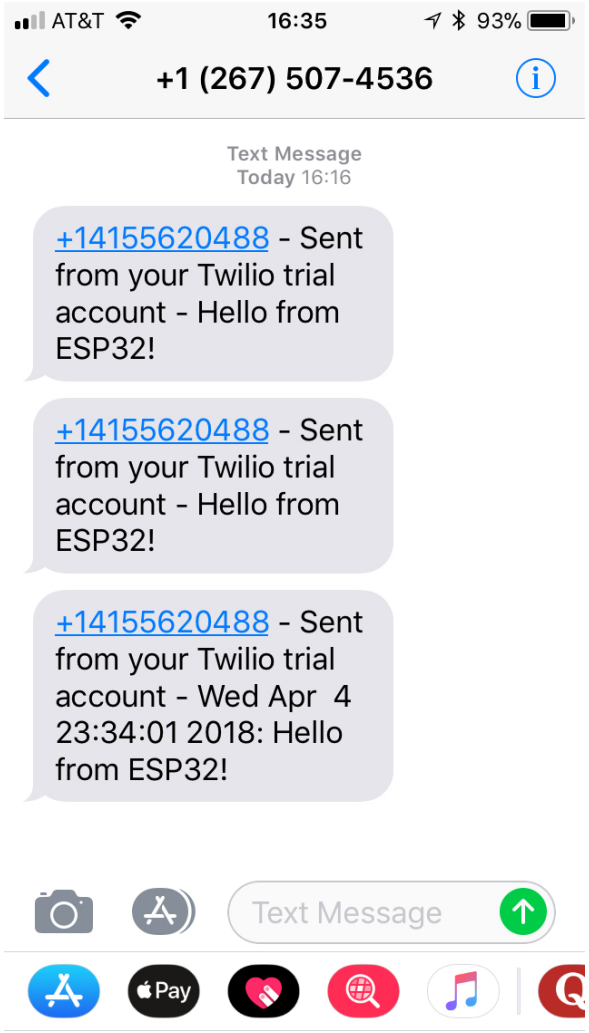
- https://github.com/micropython/micropython-lib/blob/master/base64/base64.py
- Copy to `/flash/lib`
- Add `sys.path.append('/flash/lib')` to `boot.py`



Send SMS

```
import urequests as requests
from base64 import b64encode
import time

"""
Send SMS from Micropython:
0) download and install base64.py
   (https://github.com/micropython/micropython-lib/blob/master/base64/base64.py)
1) create account on twilio.com
2) get 'twilio' phone number (Usage tab) & enter below
3) copy auth_sid and auth_token from API LIVE Credentials (Settings tab) and enter below
4) update msg (below) to what you want to send
"""

# update these (see above)
auth_sid    = "AC84e26324d90476324d90476324d9047"
auth_token  = "ba0ad421bd69da0b5f041a74d"
to_number   = "+1510552350"
from_number = "+1415577028"

# sample message
msg = "{}: Hello from ESP32!".format(time.strftime('%c'))

data = "To={}&From={}&Body={}".format(to_number, from_number, msg)

def auth(user, pwd):
    """Twilio uses basic authentication"""
    return (b64encode(
                b':'.join((auth_sid.encode('latin1'),
                           auth_token.encode('latin1'))))
            ).decode('ascii')

response = requests.post(
    url="https://api.twilio.com/2010-04-01/Accounts/{}/Messages".format(auth_sid),
    data=data,
    headers={
        'Authorization': 'Basic {}'.format(auth(auth_sid, auth_token)),
        'Content-Type': 'application/x-www-form-urlencoded',
    },
)

# print success/error messages
print()
print("response.text =", response.text)
```

Result


AT&T
16:35
93%
+1 (267) 507-4536
Text Message
Today 16:16
+14155620488 - Sent from your Twilio trial account - Hello from ESP32!
+14155620488 - Sent from your Twilio trial account - Hello from ESP32!
+14155620488 - Sent from your Twilio trial account - Wed Apr 4 23:34:01 2018: Hello from ESP32!
Text Message
Pay

Other Services

- E.g. IFTTT.com, Echo, Google home, IBM Watson, …