

Lab 7A: ThingSpeak

Create new channel `cpu_loop` with field1 `cpu_pc` and field2 `mem_avail_mb`

ThingSpeak™

Channels ▾

Apps ▾

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Commercial Use

How to Buy

ZY

My Channels

New Channel

Search by tag

Q

Name	Created	Updated
<div><div>cpu_loop</div><div>PrivatePublicSettingsSharingAPI KeysData Import / Export</div></div>	2020-11-11	2020-11-11 03:47

Help

Collect data in a ThingSpeak channel from a device, from another channel, or from the web.

Click **New Channel** to create a new ThingSpeak channel.

Click on the column headers of the table to sort by the entries in that column or click on a tag to show channels with that tag.

Learn to [create channels](#), explore and transform data.

Learn more about [ThingSpeak Channels](#).

Examples

- [Arduino](#)
- [Arduino MKR1000](#)
- [ESP8266](#)
- [Raspberry Pi](#)
- [Netduino Plus](#)

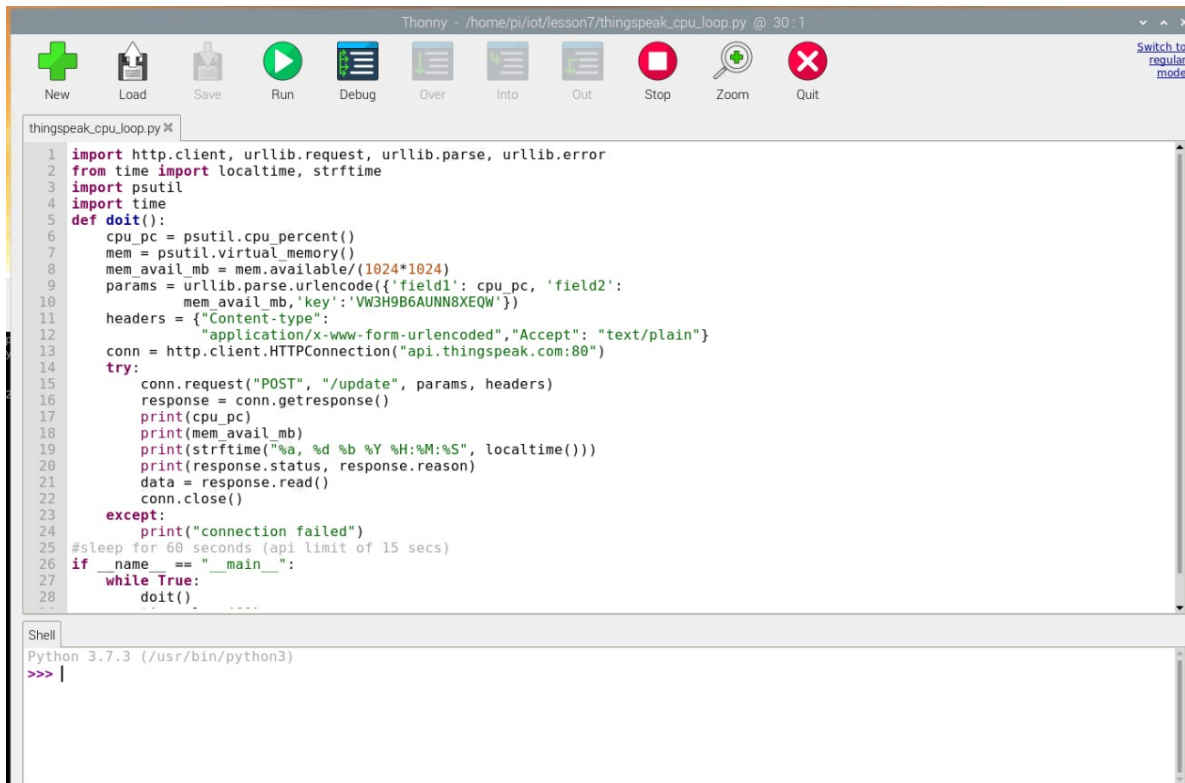
Upgrade

Need to send more data faster?

Need to use ThingSpeak for a commercial project?

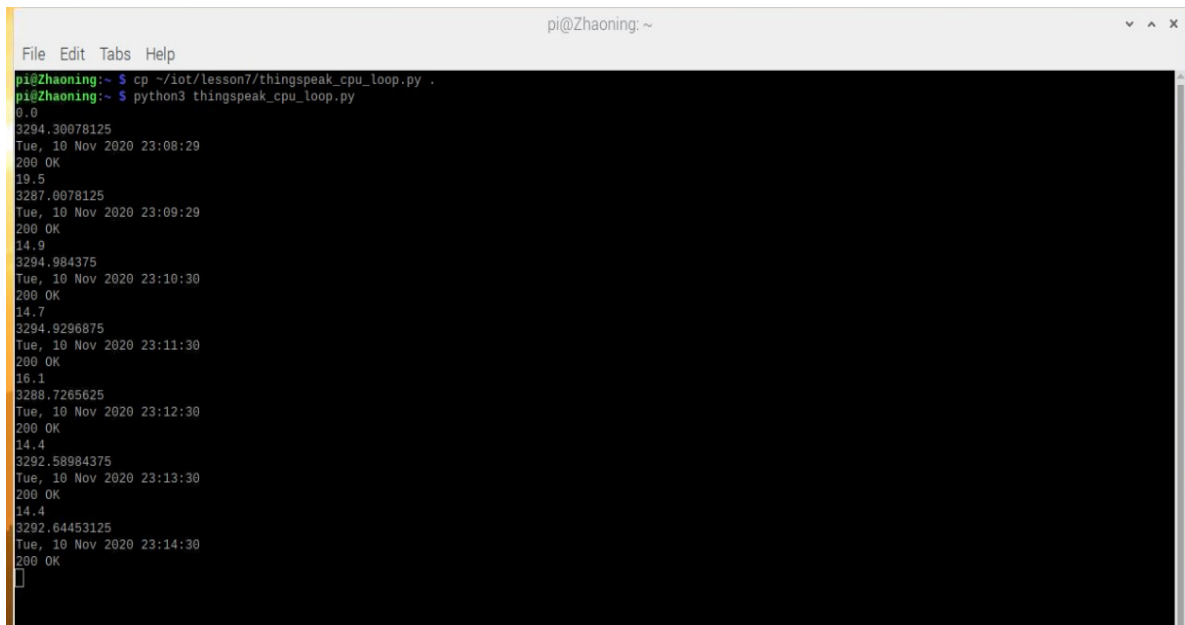
Upgrade

Copy the Write API Key from [channels](#)



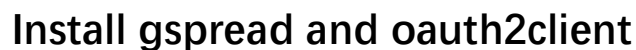
```
Thonny - /home/pi/iot/lesson7/thingspeak_cpu_loop.py @ 30:1
New Load Save Run Debug Over Into Out Stop Zoom Quit
thingspeak_cpu_loop.py
1 import http.client, urllib.request, urllib.parse, urllib.error
2 from time import localtime, strftime
3 import psutil
4 import time
5 def do_it():
6     cpu_pc = psutil.cpu_percent()
7     mem = psutil.virtual_memory()
8     mem_avail_mb = mem.available/(1024*1024)
9     params = urllib.parse.urlencode({'field1': cpu_pc, 'field2':
10         mem_avail_mb, 'key': 'VM3H9B6AUNN8XEQW'})
11     headers = {"Content-type":
12         "application/x-www-form-urlencoded", "Accept": "text/plain"}
13     conn = http.client.HTTPConnection("api.thingspeak.com:80")
14     try:
15         conn.request("POST", "/update", params, headers)
16         response = conn.getresponse()
17         print(cpu_pc)
18         print(mem_avail_mb)
19         print(strftime("%a, %d %b %Y %H:%M:%S", localtime()))
20         print(response.status, response.reason)
21         data = response.read()
22         conn.close()
23     except:
24         print("connection failed")
25     #sleep for 60 seconds (api limit of 15 secs)
26 if __name__ == "__main__":
27     while True:
28         do_it()
29         time.sleep(60)
Shell
Python 3.7.3 (/usr/bin/python3)
>>> |
```

Run thingspeak_cpu_loop.py



```
pi@Zhaoning: ~
File Edit Tabs Help
pi@Zhaoning:~$ cp ~/iot/lesson7/thingspeak_cpu_loop.py .
pi@Zhaoning:~$ python3 thingspeak_cpu_loop.py
0.0
3294.30078125
Tue, 10 Nov 2020 23:08:29
200 OK
19.5
3287.0078125
Tue, 10 Nov 2020 23:09:29
200 OK
14.9
3294.984375
Tue, 10 Nov 2020 23:10:30
200 OK
14.7
3294.0296875
Tue, 10 Nov 2020 23:11:30
200 OK
16.1
3288.7265625
Tue, 10 Nov 2020 23:12:30
200 OK
14.4
3292.58984375
Tue, 10 Nov 2020 23:13:30
200 OK
14.4
3292.64453125
Tue, 10 Nov 2020 23:14:30
200 OK
|
```

Go to [Google Sheets](#)



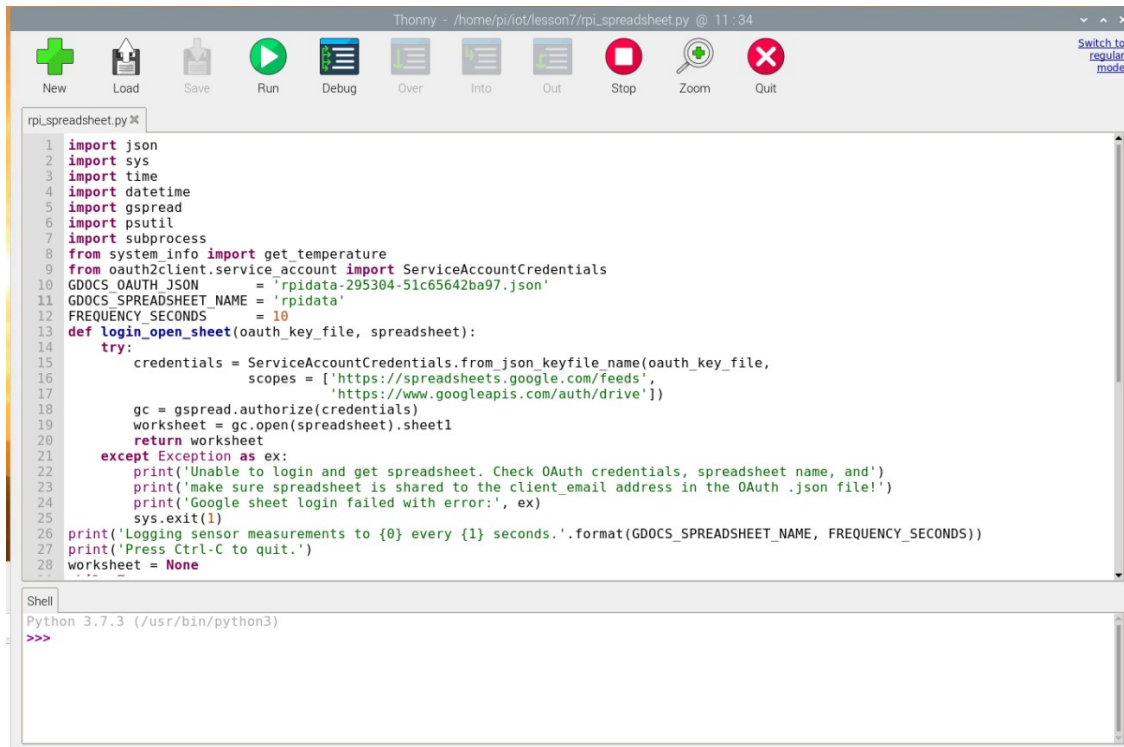
```

File Edit Tabs Help

pi@Zhaoqing:~$ sudo pip3 install -U gspread oauth2client
Looking in indexes: https://pypi.org/simple, https://www.piwheels.org/simple
Collecting gspread
  Downloading https://files.pythonhosted.org/packages/9c/ba/bc8de4f5077bd34bc873bdd67a89cb29c4f18abba8a836d2c6a0a142365/gspread-3.6.0-py3-none-any.whl
Collecting oauth2client
  Downloading https://files.pythonhosted.org/packages/95/a9/4f25a1423f0786b64875b91784607c2277eff25d48f915e39ff0cf5065a/oauth2client-4.1.3-py2.py3-none-any.whl (98kB)
100% |#####| 102kB 1.3MB/s
Collecting google-auth-oauthlib==0.4.1 (from gspread)
  Downloading https://files.pythonhosted.org/packages/81/67/e2c34bb0628984c7ce11cce6ba964cb29c418873847fc285f826e032e5e/google_auth_oauthlib-0.4.2-py2.py3-none-any.whl
Requirement already satisfied, skipping upgrade: requests>=2.2.1 in /usr/local/lib/python3.7/dist-packages (from gspread) (2.24.0)
Collecting google-auth==1.12.0 (from gspread)
  Downloading https://files.pythonhosted.org/packages/1d/60/81e68e70ee91ef05b0b0bcdac2436d7b61f820c65aaca6961de622dfdf7/google_auth-1.23.0-py2.py3-none-any.whl (114kB)
100% |#####| 122kB 1.7MB/s
Requirement already satisfied, skipping upgrade: six>=1.6.1 in /usr/local/lib/python3.7/dist-packages (from google-auth==1.12.0) (1.11.0)
Collecting httplib2>=0.9.1 (from google-auth)
  Downloading https://files.pythonhosted.org/packages/b3/ad/d9d9331850ea5bd4f5cb8c650c0bfa119a4abd6b0ad7c45b6506bc979f0c/httplib2-0.18.1-py3-none-any.whl (95kB)
100% |#####| 102kB 1.9MB/s
Collecting rsa==3.1.4 (from google-auth)
  Downloading https://files.pythonhosted.org/packages/1c/df/c3587a667d6b308fad90b99e8bc8774788d033efcc70f4eca8e7fad144b/rsa-4.6-py3-none-any.whl (47kB)
100% |#####| 51kB 1.2MB/s
Requirement already satisfied, skipping upgrade: pyasn1-modules==0.5.5 in /usr/local/lib/python3.7/dist-packages (from google-auth==1.12.0) (0.2.8)
Requirement already satisfied, skipping upgrade: pyasn1==0.1.7 in /usr/local/lib/python3.7/dist-packages (from google-auth==1.12.0) (0.4.8)
Requirement already satisfied, skipping upgrade: requests-oauthlib==0.7.0 in /usr/local/lib/python3.7/dist-packages (from google-auth-oauthlib==0.4.1->gspread) (1.0.0)
Requirement already satisfied, skipping upgrade: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packages (from requests>=2.2.1->gspread) (2018.8.24)
Requirement already satisfied, skipping upgrade: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /usr/local/lib/python3.7/dist-packages (from requests>=2.2.1->gspread) (1.24.1)
Requirement already satisfied, skipping upgrade: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-packages (from requests>=2.2.1->gspread) (3.0.4)
Requirement already satisfied, skipping upgrade: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests>=2.2.1->gspread) (2.6)
Requirement already satisfied, skipping upgrade: setuptools==40.3.0 in /usr/local/lib/python3.7/dist-packages (from google-auth==1.12.0->gspread) (50.3.2)
Collecting cachetools<5.0,>=2.0.0 (from google-auth==1.12.0->gspread)
  Downloading https://files.pythonhosted.org/packages/cd/5c/f3aa88b6d5482f3051b433c7616688a9b96fbd49a622210e2c9781938a5c/cachetools-4.1.1-py3-none-any.whl
Installing collected packages: cachetools, rsa, google-auth, google-auth-oauthlib, gspread, httplib2, oauth2client
Successfully installed cachetools-4.1.1 google-auth-1.23.0 google-auth-oauthlib-0.4.2 gspread-3.6.0 httplib2-0.18.1 oauth2client-4.1.3 rsa-4.6
pi@Zhaoqing:~$ cd demo
bash: cd: demo: No such file or directory
pi@Zhaoqing:~$ cp ~/iot/lesson3/system_info.py .
pi@Zhaoqing:~$ cp ~/iot/lesson7/rpi_spreadsheet.py .
pi@Zhaoqing:~$ mv ~/Downloads/rpdata*.json ~/demo
pi@Zhaoqing:~$ 

```

Edit rpi_spreadsheet.py



```
Thonny - /home/pi/iot/lesson7/rpi_spreadsheet.py @ 11:34

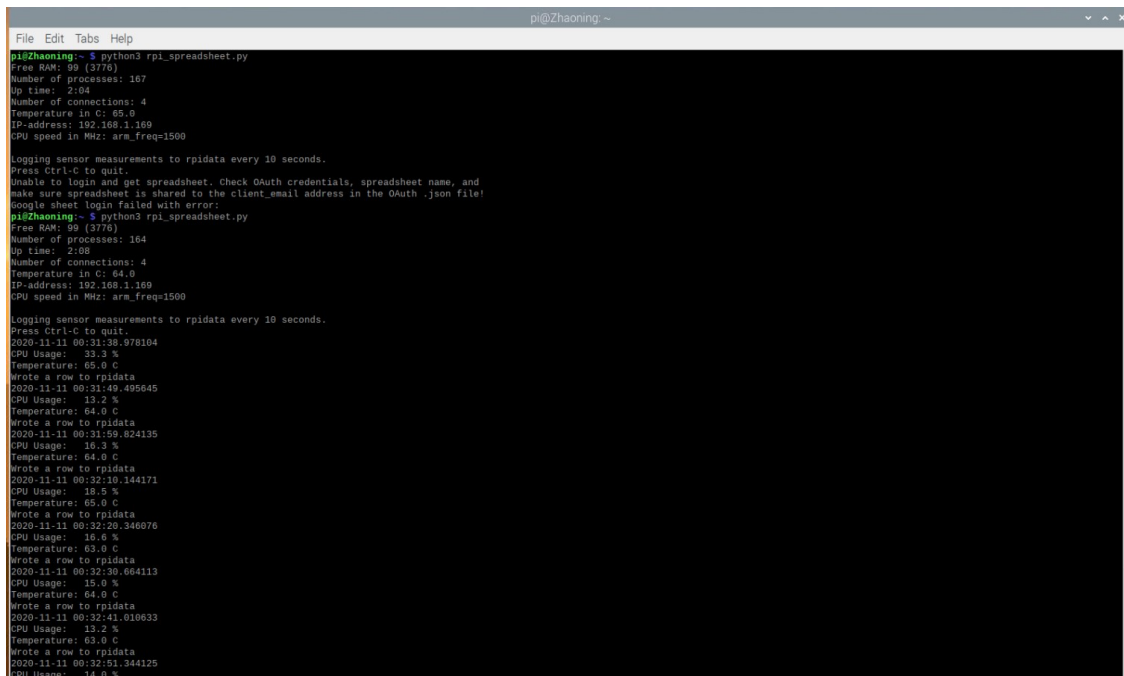
New Load Save Run Debug Over Into Out Stop Zoom Quit

Switch to regular mode

rpi_spreadsheet.py X
1 import json
2 import sys
3 import time
4 import datetime
5 import gspread
6 import psutil
7 import subprocess
8 from system_info import get_temperature
9 from oauth2client.service_account import ServiceAccountCredentials
10 GDOCS_OAUTH_JSON = 'rpidata-295304-51c65642ba97.json'
11 GDOCS_SPREADSHEET_NAME = 'rpidata'
12 FREQUENCY_SECONDS = 10
13 def login_open_sheet(oauth_key_file, spreadsheet):
14     try:
15         credentials = ServiceAccountCredentials.from_json_keyfile_name(oauth_key_file,
16             scopes = ['https://spreadsheets.google.com/feeds',
17                 'https://www.googleapis.com/auth/drive'])
18         gc = gspread.authorize(credentials)
19         worksheet = gc.open(spreadsheet).sheet1
20         return worksheet
21     except Exception as ex:
22         print('Unable to login and get spreadsheet. Check OAuth credentials, spreadsheet name, and')
23         print('make sure spreadsheet is shared to the client_email address in the OAuth .json file!')
24         print('Google sheet login failed with error:', ex)
25         sys.exit(1)
26 print('Logging sensor measurements to {} every {} seconds.'.format(GDOCS_SPREADSHEET_NAME, FREQUENCY_SECONDS))
27 print('Press Ctrl-C to quit.')
28 worksheet = None
29 .....
```

```
Shell
Python 3.7.3 (/usr/bin/python3)
>>>
```

Run rpi_spreadsheet.py



```
pi@Zhaoning: ~
File Edit Tabs Help
pi@Zhaoning:~$ python3 rpi_spreadsheet.py
Free RAM: 99 (3776)
Number of processes: 167
Up time: 2:04
Number of connections: 4
Temperature in C: 65.0
IP address: 192.168.1.169
CPU speed in MHz: arm_freq=1500
Logging sensor measurements to rpidata every 10 seconds.
Press Ctrl-C to quit.
Unable to login and get spreadsheet. Check OAuth credentials, spreadsheet name, and
make sure spreadsheet is shared to the client_email address in the OAuth .json file!
Google sheet login failed with error:
pi@Zhaoning:~$ python3 rpi_spreadsheet.py
Free RAM: 99 (3776)
Number of processes: 164
Up time: 2:08
Number of connections: 4
Temperature in C: 64.0
IP address: 192.168.1.169
CPU speed in MHz: arm_freq=1500
Logging sensor measurements to rpidata every 10 seconds.
Press Ctrl-C to quit.
2020-11-11 00:31:38.978104
CPU Usage: 33.3 %
Temperature: 65.0 C
Wrote a row to rpidata
2020-11-11 00:31:49.495645
CPU Usage: 13.2 %
Temperature: 64.0 C
Wrote a row to rpidata
2020-11-11 00:31:59.824135
CPU Usage: 16.3 %
Temperature: 64.0 C
Wrote a row to rpidata
2020-11-11 00:32:10.144171
CPU Usage: 19.5 %
Temperature: 65.0 C
Wrote a row to rpidata
2020-11-11 00:32:20.346076
CPU Usage: 16.6 %
Temperature: 63.0 C
Wrote a row to rpidata
2020-11-11 00:32:30.064113
CPU Usage: 15.0 %
Temperature: 64.0 C
Wrote a row to rpidata
2020-11-11 00:32:41.010633
CPU Usage: 13.2 %
Temperature: 63.0 C
Wrote a row to rpidata
2020-11-11 00:32:51.344125
CPU Usage: 14.0 %
```