pyModbusTCP Documentation

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CHAPTER 1

Quick start guide

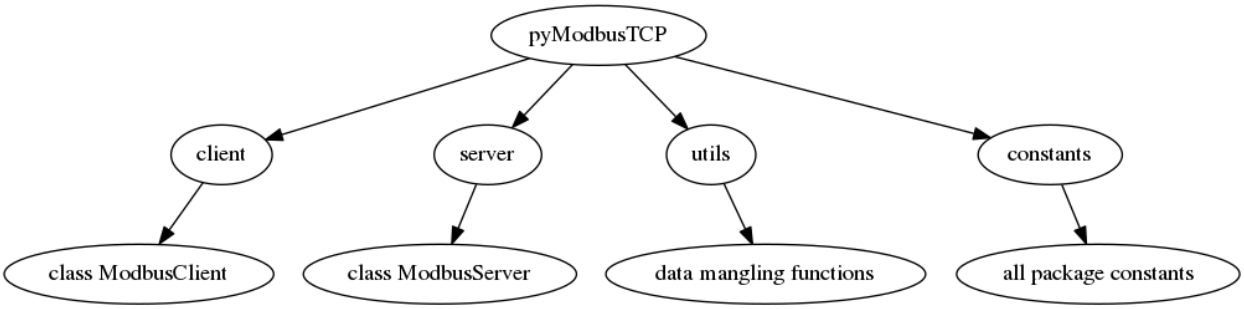
1.1 Overview of the package

pyModbusTCP give access to modbus/TCP server through the ModbusClient object. This class is define in the client module.

Since version 0.1.0, a server is available as ModbusServer class. This server is currently in test (API can change at any time).

To deal with frequent need of modbus data mangling (for example convert 32 bits IEEE float to 2x16 bits words) a special module named utils provide some helpful functions.

Package map:



1.2 Package setup

from PyPi:

```
# for Python 2
sudo pip2 install pyModbusTCP
# or for Python 3
```

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```
sudo pip3 install pyModbusTCP
# upgrade from an older release
sudo pip3 install pyModbusTCP --upgrade
```

from Github:

```
git clone https://github.com/sourceperl/pyModbusTCP.git
cd pyModbusTCP
# here change "python" by your python target(s) version(s) (like python3.2)
sudo python setup.py install
```

1.3 ModbusClient: init

init module from constructor (raise ValueError if host/port error):

```
from pyModbusTCP.client import ModbusClient
try:
    c = ModbusClient(host="localhost", port=502)
except ValueError:
    print("Error with host or port params")
```

you can also init module from functions host/port return None if error:

```
from pyModbusTCP.client import ModbusClient
c = ModbusClient()
if not c.host("localhost"):
    print("host error")
if not c.port(502):
    print("port error")
```

1.4 ModbusClient: manage TCP link

Now, it's possible to use auto mode to let module deal with TCP open/close.

For keep TCP open, add auto_open=True in init:

```
c = ModbusClient(host="localhost", auto_open=True)
```

For open/close socket before/after read or write, do this:

```
c = ModbusClient(host="localhost", auto_open=True, auto_close=True)
```

You can also open manually the TCP link. After this, you call a modbus request function (see list in next section):

```
if c.open():
    regs_list_1 = c.read_holding_registers(0, 10)
    regs_list_2 = c.read_holding_registers(55, 10)
    c.close()
```

With a forever polling loop, TCP always open (auto-reconnect code):

```
while True:
    if c.is_open():
        regs_list_1 = c.read_holding_registers(0, 10)
        regs_list_2 = c.read_holding_registers(55, 10)
    else:
        c.open()
    time.sleep(1)
```

1.5 ModbusClient: available modbus requests functions

See http://en.wikipedia.org/wiki/Modbus for full table.

Domain	Function name	Function code	ModbusClient function
Bit	Read Discrete Inputs	2	*read_discrete_inputs()*
	Read Coils	1	*read_coils()*
	Write Single Coil	5	*write_single_coil()*
	Write Multiple Coils	15	*write_multiple_coils()*
Register	Read Input Registers	4	*read_input_registers()*
	Read Holding Registers	3	*read_holding_registers()*
	Write Single Register	6	*write_single_register()*
	Write Multiple Registers	16	*write_multiple_registers()*
	Read/Write Multiple Registers	23	n/a
	Mask Write Register	22	n/a
File	Read FIFO Queue	24	n/a
	Read File Record	20	n/a
	Write File Record	21	n/a
	Read Exception Status	7	n/a
Diagnostic	Diagnostic	8	n/a
	Get Com Event Counter	11	n/a
	Get Com Event Log	12	n/a
	Report Slave ID	17	n/a
	Read Device Identification	43	n/a

1.6 ModbusClient: debug mode

If need, you can enable a debug mode for ModbusClient like this:

```
from pyModbusTCP.client import ModbusClient
c = ModbusClient(host="localhost", port=502, debug=True)
```

or:

```
c.debug(True)
```

when debug is enable all debug message is print on console and you can see modbus frame:

```
c.read_holding_registers(0, 4)
```

print:

```
Tx
[E7 53 00 00 00 06 01] 03 00 00 00 04
Rx
[E7 53 00 00 00 0B 01] 03 08 00 00 00 6F 00 00 00 00
[0, 111, 0, 0]
```

1.7 utils module: Modbus data mangling

Sample data mangling, usefull for interface PLC device.

- 16 bits to 32 bits integers:

```
from pyModbusTCP import utils
list_16_bits = [0x0123, 0x4567, 0x89ab, 0xcdef]

# big endian sample (default)
list_32_bits = utils.word_list_to_long(list_16_bits)
# display "['0x1234567', '0x89abcdef']"
print([hex(i) for i in list_32_bits])

# little endian sample
list_32_bits = utils.word_list_to_long(list_16_bits, big_endian=False)
# display "['0x45670123', '0xcdef89ab']"
print([hex(i) for i in list_32_bits])
```

- two's complement (see http://en.wikipedia.org/wiki/Two%27s_complement):

```
from pyModbusTCP import utils
list_16_bits = [0x0000, 0xFFFF, 0x00FF, 0x8001]

# display "[0, -1, 255, -32767]"
print(utils.get_list_2comp(list_16_bits, 16))

# display "-1"
print(utils.get_2comp(list_16_bits[1], 16))
```

- an integer of val_size bits (default is 16) to an array of boolean:

```
from pyModbusTCP import utils
# display "[True, False, True, False, False, False, False, False]"
print(utils.get_bits_from_int(0x05, val_size=8))
```

- IEEE single/double precision floating-point:

```
from pyModbusTCP import utils

# 32 bits IEEE single precision
# encode : python float 0.3 -> int 0x3e99999a
# display "0x3e99999a"
print(hex(utils.encode_ieee(0.3)))
# decode: python int 0x3e99999a -> float 0.3
# display "0.300000011921" (it's not 0.3, precision leak with float...)
print(utils.decode_ieee(0x3e99999a))

# 64 bits IEEE double precision
```

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```
# encode: python float 6.62606957e-34 -> int 0x390b860bb596a559
# display "0x390b860bb596a559"
print(hex(utils.encode_ieee(6.62606957e-34, double=True)))
# decode: python int 0x390b860bb596a559 -> float 6.62606957e-34
# display "6.62606957e-34"
print(utils.decode_ieee(0x390b860bb596a559, double=True))
```

CHAPTER 2

pyModbusTCP modules documentation

Contents:

2.1 Module pyModbusTCP.client

This module provide the ModbusClient class used to deal with modbus server.

2.1.1 class pyModbusTCP.client.ModbusClient

class pyModbusTCP.client.**ModbusClient**(*host=None*, *port=None*, *unit_id=None*, *timeout=None*, *debug=None*, *auto_open=None*, *auto_close=None*)

Modbus TCP client

__init__(*host=None*, *port=None*, *unit_id=None*, *timeout=None*, *debug=None*, *auto_open=None*, *auto_close=None*)

Constructor

Modbus server params (host, port) can be set here or with host(), port() functions. Same for debug option.

Use functions avoid to launch ValueError except if params is incorrect.

Parameters

- **host** (*str*) – hostname or IPv4/IPv6 address server address (optional)
- **port** (*int*) – TCP port number (optional)
- **unit_id** (*int*) – unit ID (optional)
- **timeout** (*float*) – socket timeout in seconds (optional)
- **debug** (*bool*) – debug state (optional)
- **auto_open** (*bool*) – auto TCP connect (optional)
- **auto_close** (*bool*) – auto TCP close (optional)

Returns Object ModbusClient

Return type *ModbusClient*

Raises **ValueError** – if a set parameter value is incorrect

auto_close(*state=None*)
Get or set automatic TCP close mode (after each request)

Parameters **state** (*bool or None*) – auto_close state or None for get value

Returns auto_close state or None if set fail

Return type bool or None

auto_open(*state=None*)
Get or set automatic TCP connect mode

Parameters **state** (*bool or None*) – auto_open state or None for get value

Returns auto_open state or None if set fail

Return type bool or None

close()
Close TCP connection

Returns close status (True for close/None if already close)

Return type bool or None

debug(*state=None*)
Get or set debug mode

Parameters **state** (*bool or None*) – debug state or None for get value

Returns debug state or None if set fail

Return type bool or None

host(*hostname=None*)
Get or set host (IPv4/IPv6 or hostname like 'plc.domain.net')

Parameters **hostname** (*str or None*) – hostname or IPv4/IPv6 address or None for get value

Returns hostname or None if set fail

Return type str or None

is_open()
Get status of TCP connection

Returns status (True for open)

Return type bool

last_error()
Get last error code

Returns last error code

Return type int

last_error_txt()
Get last error as human readable text

Returns last error as string

Return type str

last_except()
Get last exception code

Returns last exception code

Return type int

last_except_txt(*verbose=False*)
Get last exception code as human readable text

Parameters **verbose** (*bool*) – set to True for detailed information about exception

Returns last exception as string

Return type str

mode(*mode=None*)
Get or set modbus mode (TCP or RTU)

Parameters **mode** (*int*) – mode (MODBUS_TCP/MODBUS_RTU) to set or None for get value

Returns mode or None if set fail

Return type int or None

open()
Connect to modbus server (open TCP connection)

Returns connect status (True if open)

Return type bool

port(*port=None*)
Get or set TCP port

Parameters **port** (*int or None*) – TCP port number or None for get value

Returns TCP port or None if set fail

Return type int or None

read_coils(*bit_addr*, *bit_nb=1*)
Modbus function READ_COILS (0x01)

Parameters

- **bit_addr** (*int*) – bit address (0 to 65535)
- **bit_nb** (*int*) – number of bits to read (1 to 2000)

Returns bits list or None if error

Return type list of bool or None

read_discrete_inputs(*bit_addr*, *bit_nb=1*)
Modbus function READ_DISCRETE_INPUTS (0x02)

Parameters

- **bit_addr** (*int*) – bit address (0 to 65535)
- **bit_nb** (*int*) – number of bits to read (1 to 2000)

Returns bits list or None if error

Return type list of bool or None

read_holding_registers(*reg_addr*, *reg_nb=1*)
Modbus function READ_HOLDING_REGISTERS (0x03)

Parameters

- **reg_addr** (*int*) – register address (0 to 65535)
- **reg_nb** (*int*) – number of registers to read (1 to 125)

Returns registers list or None if fail

Return type list of int or None

read_input_registers(*reg_addr*, *reg_nb=1*)
Modbus function READ_INPUT_REGISTERS (0x04)

Parameters

- **reg_addr** (*int*) – register address (0 to 65535)
- **reg_nb** (*int*) – number of registers to read (1 to 125)

Returns registers list or None if fail

Return type list of int or None

timeout(*timeout=None*)
Get or set timeout field

Parameters **timeout** (*float or None*) – socket timeout in seconds or None for get value

Returns timeout or None if set fail

Return type float or None

unit_id(*unit_id=None*)
Get or set unit ID field

Parameters **unit_id** (*int or None*) – unit ID (0 to 255) or None for get value

Returns unit ID or None if set fail

Return type int or None

version()
Get package version

Returns current version of the package (like "0.0.1")

Return type str

write_multiple_coils(*bits_addr*, *bits_value*)
Modbus function WRITE_MULTIPLE_COILS (0x0F)

Parameters

- **bits_addr** (*int*) – bits address (0 to 65535)
- **bits_value** (*list*) – bits values to write

Returns True if write ok or None if fail

Return type bool or None

write_multiple_registers(*regs_addr*, *regs_value*)
Modbus function WRITE_MULTIPLE_REGISTERS (0x10)

Parameters

- **regs_addr** (*int*) – registers address (0 to 65535)
- **regs_value** (*list*) – registers values to write

Returns True if write ok or None if fail

Return type bool or None

write_single_coil(*bit_addr*, *bit_value*)
Modbus function WRITE_SINGLE_COIL (0x05)

Parameters

- **bit_addr** (*int*) – bit address (0 to 65535)
- **bit_value** (*bool*) – bit value to write

Returns True if write ok or None if fail

Return type bool or None

write_single_register(*reg_addr*, *reg_value*)
Modbus function WRITE_SINGLE_REGISTER (0x06)

Parameters

- **reg_addr** (*int*) – register address (0 to 65535)
- **reg_value** (*int*) – register value to write

Returns True if write ok or None if fail

Return type bool or None

2.2 Module pyModbusTCP.server

This module provide the ModbusServer and DataBank class.

2.2.1 class pyModbusTCP.server.ModbusServer

class pyModbusTCP.server.**ModbusServer**(*host='localhost'*, *port=502*, *no_block=False*, *ipv6=False*)
Modbus TCP server

is_run
Return True if server running.

start()
Start the server.

Do nothing if server is already running. This function will block if no_block is not set to True.

stop()
Stop the server.

Do nothing if server is already not running.

2.2.2 class pyModbusTCP.server.DataBank

class pyModbusTCP.server.**DataBank**
Data class for thread safe access to bits and words space

classmethod get_bits(*address*, *number=1*)
Read data on server bits space

Parameters

- **address** (*int*) – start address
- **number** (*int*) – number of bits (optional)

Returns list of bool or None if error

Return type list or None

classmethod get_words(*address*, *number=1*)
Read data on server words space

Parameters

- **address** (*int*) – start address
- **number** (*int*) – number of words (optional)

Returns list of int or None if error

Return type list or None

classmethod set_bits(*address*, *bit_list*)
Write data to server bits space

Parameters

- **address** (*int*) – start address
- **bit_list** (*list*) – a list of bool to write

Returns True if success or None if error

Return type bool or None

Raises **ValueError** – if bit_list members cannot be convert to bool

classmethod set_words(*address*, *word_list*)
Write data to server words space

Parameters

- **address** (*int*) – start address
- **word_list** (*list*) – a list of word to write

Returns True if success or None if error

Return type bool or None

Raises **ValueError** – if word_list members cannot be convert to int

2.3 Module pyModbusTCP.utils

This module provide a set of functions for modbus data mangling.

2.3.1 Bit functions

pyModbusTCP.utils.**get_bits_from_int**(*val_int*, *val_size=16*)
Get the list of bits of val_int integer (default size is 16 bits)

Return bits list, least significant bit first. Use list.reverse() if need.

Parameters

- **val_int** (*int*) – integer value
- **val_size** (*int*) – bit size of integer (word = 16, long = 32) (optional)

Returns list of boolean "bits" (least significant first)

Return type list

pyModbusTCP.utils.**set_bit**(*value*, *offset*)
Set a bit at offset position

Parameters

- **value** (*int*) – value of integer where set the bit
- **offset** (*int*) – bit offset (0 is lsb)

Returns value of integer with bit set

Return type int

pyModbusTCP.utils.**reset_bit**(*value*, *offset*)
Reset a bit at offset position

Parameters

- **value** (*int*) – value of integer where reset the bit
- **offset** (*int*) – bit offset (0 is lsb)

Returns value of integer with bit reset

Return type int

pyModbusTCP.utils.**toggle_bit**(*value*, *offset*)
Return an integer with the bit at offset position inverted

Parameters

- **value** (*int*) – value of integer where invert the bit
- **offset** (*int*) – bit offset (0 is lsb)

Returns value of integer with bit inverted

Return type int

pyModbusTCP.utils.**test_bit**(*value*, *offset*)
Test a bit at offset position

Parameters

- **value** (*int*) – value of integer to test
- **offset** (*int*) – bit offset (0 is lsb)

Returns value of bit at offset position

Return type bool

2.3.2 Word functions

pyModbusTCP.utils.**word_list_to_long**(*val_list*, *big_endian=True*, *long_long=False*)
Word list (16 bits) to long (32 bits) or long long (64 bits) list

By default word_list_to_long() use big endian order. For use little endian, set big_endian param to False. Output format could be long long with long_long option set to True.

Parameters

- **val_list** (*list*) – list of 16 bits int value
- **big_endian** (*bool*) – True for big endian/False for little (optional)
- **long_long** (*bool*) – True for long long 64 bits, default is long 32 bits (optional)

Returns list of 32 bits int value

Return type list

pyModbusTCP.utils.**long_list_to_word**(*val_list*, *big_endian=True*, *long_long=False*)
Long (32 bits) or long long (64 bits) list to word (16 bits) list

By default long_list_to_word() use big endian order. For use little endian, set big_endian param to False. Input format could be long long with long_long param to True.

Parameters

- **val_list** (*list*) – list of 32 bits int value
- **big_endian** (*bool*) – True for big endian/False for little (optional)
- **long_long** (*bool*) – True for long long 64 bits, default is long 32 bits (optional)

Returns list of 16 bits int value

Return type list

2.3.3 Two's complement functions

pyModbusTCP.utils.**get_2comp**(*val_int*, *val_size=16*)
Get the 2's complement of Python int val_int

Parameters

- **val_int** (*int*) – int value to apply 2's complement
- **val_size** (*int*) – bit size of int value (word = 16, long = 32) (optional)

Returns 2's complement result

Return type int

Raises **ValueError** – if mismatch between val_int and val_size

pyModbusTCP.utils.**get_list_2comp**(*val_list*, *val_size=16*)
Get the 2's complement of Python list val_list

Parameters

- **val_list** (*list*) – list of int value to apply 2's complement
- **val_size** (*int*) – bit size of int value (word = 16, long = 32) (optional)

Returns 2's complement result

Return type list

2.3.4 IEEE floating-point functions

pyModbusTCP.utils.**decode_ieee**(*val_int*, *double=False*)

Decode Python int (32 bits integer) as an IEEE single or double precision format

Support NaN.

Parameters

- **val_int** (*int*) – a 32 or 64 bits integer as an int Python value
- **double** (*bool*) – set to decode as a 64 bits double precision, default is 32 bits single (optional)

Returns float result

Return type float

pyModbusTCP.utils.**encode_ieee**(*val_float*, *double=False*)

Encode Python float to int (32 bits integer) as an IEEE single or double precision format

Support NaN.

Parameters

- **val_float** (*float*) – float value to convert
- **double** (*bool*) – set to encode as a 64 bits double precision, default is 32 bits single (optional)

Returns IEEE 32 bits (single precision) as Python int

Return type int

2.3.5 Misc functions

pyModbusTCP.utils.**crc16**(*frame*)

Compute CRC16

Parameters **frame** (*str (Python2) or class bytes (Python3)*) – frame

Returns CRC16

Return type int

CHAPTER 3

pyModbusTCP examples

Here some examples to see pyModbusTCP in some usages cases

3.1 An example for add float support

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

# how-to add float support to ModbusClient

from pyModbusTCP.client import ModbusClient
from pyModbusTCP import utils


class FloatModbusClient(ModbusClient):
    def read_float(self, address, number=1):
        reg_l = self.read_holding_registers(address, number * 2)
        if reg_l:
            return [utils.decode_ieee(f) for f in utils.word_list_to_long(reg_l)]
        else:
            return None

    def write_float(self, address, floats_list):
        b32_l = [utils.encode_ieee(f) for f in floats_list]
        b16_l = utils.long_list_to_word(b32_l)
        return self.write_multiple_registers(address, b16_l)


c = FloatModbusClient(host='localhost', port=502, auto_open=True)

# write 10.0 at @0
c.write_float(0, [10.0])
```

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```
# read @0 to 9
float_l = c.read_float(0, 10)
print(float_l)

c.close()
```

3.2 Simple read registers example

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

# read_register
# read 10 registers and print result on stdout

# you can use the tiny modbus server "mbserverd" to test this code
# mbserverd is here: https://github.com/sourceperl/mbserverd

# the command line modbus client mbtget can also be useful
# mbtget is here: https://github.com/sourceperl/mbtget

from pyModbusTCP.client import ModbusClient
import time

SERVER_HOST = "localhost"
SERVER_PORT = 502

c = ModbusClient()

# uncomment this line to see debug message
#c.debug(True)

# define modbus server host, port
c.host(SERVER_HOST)
c.port(SERVER_PORT)

while True:
    # open or reconnect TCP to server
    if not c.is_open():
        if not c.open():
            print("unable to connect to "+SERVER_HOST+":"+str(SERVER_PORT))

    # if open() is ok, read register (modbus function 0x03)
    if c.is_open():
        # read 10 registers at address 0, store result in regs list
        regs = c.read_holding_registers(0, 10)
        # if success display registers
        if regs:
            print("reg ad #0 to 9: "+str(regs))

    # sleep 2s before next polling
    time.sleep(2)
```

3.3 Simple read bits example

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

# read_bit
# read 10 bits and print result on stdout

from pyModbusTCP.client import ModbusClient
import time

SERVER_HOST = "localhost"
SERVER_PORT = 502
SERVER_U_ID = 1

c = ModbusClient()

# uncomment this line to see debug message
# c.debug(True)

# define modbus server host, port and unit_id
c.host(SERVER_HOST)
c.port(SERVER_PORT)
c.unit_id(SERVER_U_ID)

while True:
    # open or reconnect TCP to server
    if not c.is_open():
        if not c.open():
            print("unable to connect to "+SERVER_HOST+":"+str(SERVER_PORT))

    # if open() is ok, read coils (modbus function 0x01)
    if c.is_open():
        # read 10 bits at address 0, store result in regs list
        bits = c.read_coils(0, 10)
        # if success display registers
        if bits:
            print("bit ad #0 to 9: "+str(bits))

    # sleep 2s before next polling
    time.sleep(2)
```

3.4 Simple write bits example

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

# write_bit
# write 4 bits to True, wait 2s, write False, restart...

from pyModbusTCP.client import ModbusClient
import time

SERVER_HOST = "localhost"
```

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```
SERVER_PORT = 502

c = ModbusClient()

# uncomment this line to see debug message
#c.debug(True)

# define modbus server host, port
c.host(SERVER_HOST)
c.port(SERVER_PORT)

toggle = True

while True:
    # open or reconnect TCP to server
    if not c.is_open():
        if not c.open():
            print("unable to connect to "+SERVER_HOST+":"+str(SERVER_PORT))

    # if open() is ok, write coils (modbus function 0x01)
    if c.is_open():
        # write 4 bits in modbus address 0 to 3
        print("")
        print("write bits")
        print("----------")
        print("")
        for addr in range(4):
            is_ok = c.write_single_coil(addr, toggle)
            if is_ok:
                print("bit #" + str(addr) + ": write to " + str(toggle))
            else:
                print("bit #" + str(addr) + ": unable to write " + str(toggle))
            time.sleep(0.5)

        time.sleep(1)

        print("")
        print("read bits")
        print("---------")
        print("")
        bits = c.read_coils(0, 4)
        if bits:
            print("bits #0 to 3: "+str(bits))
        else:
            print("unable to read")

    toggle = not toggle
    # sleep 2s before next polling
    time.sleep(2)
```

3.5 An example with a modbus polling thread

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-
```

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```
# modbus_thread
# start a thread for polling a set of registers, display result on console
# exit with ctrl+c

import time
from threading import Thread, Lock
from pyModbusTCP.client import ModbusClient

SERVER_HOST = "localhost"
SERVER_PORT = 502

# set global
regs = []

# init a thread lock
regs_lock = Lock()


# modbus polling thread
def polling_thread():
    global regs
    c = ModbusClient(host=SERVER_HOST, port=SERVER_PORT)
    # polling loop
    while True:
        # keep TCP open
        if not c.is_open():
            c.open()
        # do modbus reading on socket
        reg_list = c.read_holding_registers(0, 10)
        # if read is ok, store result in regs (with thread lock synchronization)
        if reg_list:
            with regs_lock:
                regs = list(reg_list)
        # 1s before next polling
        time.sleep(1)


# start polling thread
tp = Thread(target=polling_thread)
# set daemon: polling thread will exit if main thread exit
tp.daemon = True
tp.start()

# display loop (in main thread)
while True:
    # print regs list (with thread lock synchronization)
    with regs_lock:
        print(regs)
    # 1s before next print
    time.sleep(1)
```

3.6 Simple blocking server example

```
#!/usr/bin/env python3
# -*- coding: utf-8 -*-

# Modbus/TCP server

import argparse
from pyModbusTCP.server import ModbusServer

if __name__ == '__main__':
    # parse args
    parser = argparse.ArgumentParser()
    parser.add_argument('-H', '--host', type=str, default='localhost', help='Host')
    parser.add_argument('-p', '--port', type=int, default=502, help='TCP port')
    args = parser.parse_args()
    # start modbus server
    server = ModbusServer(host=args.host, port=args.port)
    server.start()
```

3.7 Server example with alive word and downtime period

```
#!/usr/bin/env python3
# -*- coding: utf-8 -*-

# Modbus/TCP server with start/stop schedule

import argparse
import time
from pyModbusTCP.server import ModbusServer, DataBank
# need https://github.com/dbader/schedule
import schedule


# word @0 = second since 00:00 divide by 10 to avoid 16 bits overflow
def alive_word_job():
    DataBank.set_words(0, [int(time.time()) % (24*3600) // 10])


if __name__ == "__main__":
    # parse args
    parser = argparse.ArgumentParser()
    parser.add_argument("-H", "--host", type=str, default="localhost", help="Host")
    parser.add_argument("-p", "--port", type=int, default=502, help="TCP port")
    args = parser.parse_args()
    # init modbus server and start it
    server = ModbusServer(host=args.host, port=args.port, no_block=True)
    server.start()
    # init scheduler
    # schedule a daily downtime (from 18:00 to 06:00)
    schedule.every().day.at("18:00").do(server.stop)
    schedule.every().day.at("06:00").do(server.start)
    # update life word at @0
    schedule.every(10).seconds.do(alive_word_job)
```

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```
    # main loop
    while True:
        schedule.run_pending()
        time.sleep(1)
```

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