
mooq Documentation

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Latest Version: v 0.1.1

mooq is an asyncio compatible library for interacting with a [RabbitMQ](#) AMQP broker.

CHAPTER 1

Features

- Uses asyncio. No more callback hell.
- Simplified and pythonic API to RabbitMQ
- Built on top of the proven [pika](#) library
- Comes with an in memory broker for unit testing projects that depend on RabbitMQ

CHAPTER 2

Get It Now

```
$ pip install mooq
```


CHAPTER 3

Just mooq it

Creating a connection:

```
conn = await mooq.connect(  
    host="localhost",  
    port=5672,  
    broker="rabbit")
```

Creating a channel of the connection:

```
chan = await conn.create_channel()
```

Registering a producer:

```
await chan.register_producer(  
    exchange_name="log",  
    exchange_type="direct")
```

Registering a consumer and associated callback:

```
async def yell_it(resp):  
    print(resp['msg'].upper())  
  
await chan.register_consumer(  
    exchange_name="log",  
    exchange_type="direct",  
    routing_keys=["greetings", "goodbyes"],  
    callback = yell_it)
```

Publishing a message:

```
await chan.publish(exchange_name="log",  
    msg="Hello World!",  
    routing_key="greetings")
```

Process messages asynchronously, running associated callbacks:

```
loop = asyncio.get_event_loop()
loop.create_task(conn.process_events())
```

Installation

Get it now

```
$ pip install mooq
```

Installing RabbitMQ

Follow the installation guides [here](#) for installing RabbitMQ on your particular operating system.

For linux users, since RabbitMQ is quite popular, check your distribution's package repository as there may already be a package available for download and easy install.

Tutorial

mooq is really useful for creating asyncio based microservices that talk to eachother. So let's create an app that does just that.

- *Introducing "in2com"*
- *hello.py*
- *loud.py*
- *Running*
- *Next Steps*

Introducing “in2com”

With a real intercom, a person presses a button and says something. On the other end, connected by a long wire, is a speaker that receives the audio and amplifies it.

Our very own *in2com* app consists of two microservices:

- *hello.py* for publishing greetings at random intervals
- *loud.py* for receiving the greetings and logging them in uppercase

Before starting, make sure you have installed rabbitMQ and mooq on your machine. See [Installation](#)

hello.py

We are going to schedule three coroutines for our hello.py microservice:

- *publish_randomly()*: for sending “hello world!” to a RabbitMQ broker at random intervals of between 1 and 10 seconds.
- *tick_every_second()*: for regularly printing a “tick” to the console, similar to an intercom having a blinking green LED to let us know it is on
- *main()*: the entry point for running the microservice. It sets up the connection to the RabbitMQ broker and schedules the *tick_every_second()* and *publish_randomly()* coroutines.

The *main()* coroutine looks like this:

```
1 import mooq
2 import asyncio
3 import random
4
5 async def main():
6     conn = await mooq.connect(
7         host="localhost",
8         port=5672,
9         broker="rabbit")
10
11     chan = await conn.create_channel()
12
13     await chan.register_producer(
14         exchange_name="in2com_log",
15         exchange_type="direct")
16
17     loop.create_task(tick_every_second())
18     loop.create_task(publish_randomly(chan))
```

Before we can publish messages to the broker, we first need to connect to it using the `mooq.connect()` function. *mooq* will raise an exception if it cannot connect to the broker.

Once we have a connection, we can create a channel using the `create_channel()` method of the `conn` object.

Channels enable many different producers and consumers to multiplex one connection to RabbitMQ. This is helpful because establishing a connection is generally an expensive operation. When using *mooq*, you should only have one producer or consumer per channel.

Once we have a channel, we can register a producer with the broker using the `register_producer()` method of the `chan` object. This tells the broker to register a direct exchange called “in2com_log” if isn’t already registered. Publishing to a “direct” exchange ensures a message goes to the queues whose routing key exactly matches the routing key of the message. Exchanges in *mooq* can be either “direct”, “topic” or “fanout”.

The last two lines of `main()` schedule the other coroutines to run.

The `publish_randomly()` coroutine looks like this:

```

1 async def publish_randomly(chan):
2     while True:
3         await chan.publish(
4             exchange_name="in2com_log",
5             msg="Hello World!",
6             routing_key="greetings")
7
8     print("published!")
9     await asyncio.sleep(random.randint(1,10))

```

In *moq* messages are published at the channel level and messages are consumed at the connection level. We've found this fits in best with `asyncio` apps. Invoking `chan.publish()` sends a "Hello World!" message with a routing key of "greetings" to the "in2com_log" exchange. Messages must be json serialisable.

If we tried to publish to an exchange that isn't registered with the broker, an exception would've been raised.

The `tick_every_second()` coroutine is self explanatory:

```

1 async def tick_every_second():
2     cnt = 0
3     while True:
4         print("tick hello {}".format(cnt))
5         cnt = cnt + 1
6         await asyncio.sleep(1)

```

Finally, to run the microservice from the command line, we add statements to get the event loop, schedule the main coroutine and then run the event loop:

```

loop = asyncio.get_event_loop()
loop.create_task(main())
loop.run_forever()

```

Final *hello.py* source:

```

import moq
import asyncio
import random

async def main():
    conn = await moq.connect(
        host="localhost",
        port=5672,
        broker="rabbit")

    chan = await conn.create_channel()

    await chan.register_producer(
        exchange_name="in2com_log",
        exchange_type="direct")

    loop.create_task(tick_every_second())
    loop.create_task(publish_randomly(chan))

async def tick_every_second():
    cnt = 0

```

```
while True:
    print("tick hello {}".format(cnt))
    cnt = cnt + 1
    await asyncio.sleep(1)

async def publish_randomly(chan):
    while True:
        await chan.publish(
            exchange_name="in2com_log",
            msg="Hello World!",
            routing_key="greetings")

        print("published!")
        await asyncio.sleep(random.randint(1,10))

loop = asyncio.get_event_loop()
loop.create_task(main())
loop.run_forever()
```

loud.py

We are going to schedule three coroutines for our loud.py microservice:

- *main()*: the entry point for running the microservice. It sets up the connection to the RabbitMQ broker and schedules coroutines.
- *process_events()*: for scheduling coroutines to run on receiving messages
- *tick_every_second()*: for regularly printing a “tick” to the console, similar to an intercom having a blinking green LED to let us know it is on

The *main()* coroutine looks like this:

```
1 import moq
2 import asyncio
3
4 #the callback to run
5 async def yell_it(resp):
6     print(resp['msg'].upper())
7
8 async def main(loop):
9     conn = await moq.connect(
10         host="localhost",
11         port=5672,
12         broker="rabbit")
13
14     chan = await conn.create_channel()
15
16     await chan.register_consumer(
17         exchange_name="in2com_log",
18         exchange_type="direct",
19         routing_keys=["greetings", "goodbyes"],
20         callback = yell_it)
21
22     loop.create_task(tick_every_second())
23     loop.create_task(conn.process_events())
```


As per *hello.py*, we connect to the broker and create a channel to use. Next we register a consumer on the channel. As per `register_producer()`, `register_consumer()` tells the broker to register a direct exchange called “in2com_log” if isn’t already registered.

The *routing_keys* argument is a list of routing keys that we want to match against. If a message is published to the “in2com_log” exchange with either the “greetings” or “goodbyes” routing keys, then the broker will send the message to our channel. If a message were to be published with any other routing key, the channel not receive the message.

We instruct *moq* to run the *callback* `yell_it()` when a message is received. In *moq*, callbacks are always coroutines with one argument - a response dictionary. This enables apps to be purely based in the *asyncio* world. The response dictionary for each callback contains the message sent as well as metadata such as the routing key it was sent with.

As per *hello.py*, we schedule the *tick_every_second()* coroutine to run.

Lastly, we schedule a task to run `conn.process_events()` that listens for all messages being sent to all channels of the connection and runs the required callbacks. It bears repeating that in *moq*, messages are published at the channel level and messages are consumed at the connection level.

`conn.process_events()` should always run as a separate task and not awaited for, as it is designed to run until explicitly stopped.

Finally, as per *hello.py*, to run the microservice from the command line, we add statements to get the event loop, schedule the main coroutine and then run the event loop:

```
loop = asyncio.get_event_loop()
loop.create_task(main(loop))
loop.run_forever()
```

Final *loud.py* source:

```
import moq
import asyncio

#the callback to run
async def yell_it(resp):
    print(resp['msg'].upper())

async def main(loop):
    conn = await moq.connect(
        host="localhost",
        port=5672,
        broker="rabbit")

    chan = await conn.create_channel()

    await chan.register_consumer(
        exchange_name="in2com_log",
        exchange_type="direct",
        routing_keys=["greetings", "goodbyes"],
        callback = yell_it)

    loop.create_task(tick_every_second())
    loop.create_task(conn.process_events())

async def tick_every_second():
    cnt = 0
    while True:
        print("tick loud {}".format(cnt))
```

```
        cnt = cnt + 1
        await asyncio.sleep(1)

loop = asyncio.get_event_loop()
loop.create_task(main(loop))
loop.run_forever()
```

Running

Open up two tabs in your favourite terminal program.

Terminal 1:

```
$ python hello.py
```

```
tick hello 0
published!
tick hello 1
tick hello 2
published!
tick hello 3
tick hello 4
tick hello 5
published!
tick hello 6
```

Terminal 2:

```
$ python loud.py
```

```
tick loud 0
HELLO WORLD!
tick loud 1
tick loud 2
HELLO WORLD!
tick loud 3
tick loud 4
tick loud 5
HELLO WORLD!
tick loud 6
```

Next Steps

- Check out some more [Examples](#)
- Familiarise yourself with the [API](#)
- Let us know any [issues](#) you have

Examples

- *Direct*

Direct

hello.py:

- Prints a ‘tick’ message every second and publishes messages to a RabbitMQ at the same time.

```
import mooq
import asyncio
import random

async def main():
    conn = await mooq.connect(
        host="localhost",
        port=5672,
        broker="rabbit")

    chan = await conn.create_channel()

    await chan.register_producer(
        exchange_name="in2com_log",
        exchange_type="direct")

    loop.create_task(tick_every_second())
    loop.create_task(publish_randomly(chan))

async def tick_every_second():
    cnt = 0
    while True:
        print("tick hello {}".format(cnt))
        cnt = cnt + 1
        await asyncio.sleep(1)

async def publish_randomly(chan):
    while True:
        await chan.publish(
            exchange_name="in2com_log",
            msg="Hello World!",
            routing_key="greetings")

        print("published!")
        await asyncio.sleep(random.randint(1,10))

loop = asyncio.get_event_loop()
loop.create_task(main())
loop.run_forever()
```

loud.py:

- Prints a ‘tick’ message every second and processes messages from RabbitMQ at the same time.

```
import moq
import asyncio

#the callback to run
async def yell_it(resp):
    print(resp['msg'].upper())

async def main(loop):
    conn = await moq.connect(
        host="localhost",
        port=5672,
        broker="rabbit")

    chan = await conn.create_channel()

    await chan.register_consumer(
        exchange_name="in2com_log",
        exchange_type="direct",
        routing_keys=["greetings", "goodbyes"],
        callback = yell_it)

    loop.create_task(tick_every_second())
    loop.create_task(conn.process_events())

async def tick_every_second():
    cnt = 0
    while True:
        print("tick loud {}".format(cnt))
        cnt = cnt + 1
        await asyncio.sleep(1)

loop = asyncio.get_event_loop()
loop.create_task(main(loop))
loop.run_forever()
```

Terminal 1:

```
$ python hello.py
```

```
tick hello 0
published!
tick hello 1
tick hello 2
published!
tick hello 3
tick hello 4
tick hello 5
published!
tick hello 6
```

Terminal 2:

```
$ python loud.py
```

```
tick loud 0
HELLO WORLD!
tick loud 1
tick loud 2
HELLO WORLD!
tick loud 3
tick loud 4
tick loud 5
HELLO WORLD!
tick loud 6
```

API

- *Connect to a Broker*
- *RabbitMQ Transport*
- *In Memory Transport*
- *Custom Exceptions*

Connect to a Broker

RabbitMQ Transport

In Memory Transport

Custom Exceptions

Changelog

0.1.0 (2017-07-18)

- Initial release.

0.1.1 (2017-07-19)

- Fixed bug that prevented the *queue_name* argument of `Channel.register.consumer()` from not being truly optional.

License

```
MIT License

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```

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Authors

Leads

- Jeremy Arr @jeremyarr

Contributors

Kudos

- The [python tutorial](#) on the RabbitMQ website is top notch was a great way to get started with AMQP.
- [pika](#), a well thought out and full featured RabbitMQ python library
- Blog posts [here](#) and [here](#) on some simple ways to unit test asyncio code

Some other awesome projects doing similar things:

- [aio-pika](#)
- [kombu](#)
- [aiokafka](#)

CHAPTER 5

Indices and tables

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- `modindex`
- `search`

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