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# **Smarmets Python API Client Documentation**

***Release 9.4.3***

**Smarmets Limited**

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Release v9.4. (*Installation*)

The Smarmets Python API Client (smk\_python\_sdk) is a Python implementation of a [Smarmets](#) streaming [API client](#).

Our intention for providing a Python reference implementation is to allow developers to quickly build applications in Python that make use of the Smarmets exchange.



This section provides a quick overview of the general design philosophy behind the Python API client as well as step-by-step instructions for getting started using the client.

## 1.1 Introduction

### 1.1.1 Philosophy

The main driving force behind the development of the Smarkets streaming API is efficiency. Many other applications in our industry rely on “polling” a service in order to provide a real-time view of changing data. While the streaming API can be used in a “synchronous” manner by making a request and waiting for a response, it is often far more efficient to design an application asynchronously. Asynchronous messaging allows for more flexible patterns and techniques like pipelining.

The streaming API also uses framed [protocol buffers](#) to define the wire format, so parsing messages is relatively fast and simple. We will endeavour to maintain backwards compatibility as we release newer revisions of the API. Protocol buffers definitions provide a [decent facility for doing so](#).

### 1.1.2 MIT License

In selecting a software license, we aimed to choose one which allows third-party application developers flexibility in using the code we provide.

The Smarkets Python API Client is released under the [MIT License](#).

### 1.1.3 Smarkets Python API Client License

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## 1.2 Installation

This covers the basic installation of the Smarkets API Client which is obviously necessary to get started.

### 1.2.1 Requirements

These packages are necessary at runtime.

- *protobuf* Python package, version 2.5.0 or higher (*smk-python-sdk* package installation process will automatically install it)

These are required to build from source and run unit tests, etc.

- *cURL*
- *mock*
- *piqi*

### 1.2.2 Pip

Install the client with *pip*:

```
$ pip install smk-python-sdk
```

### 1.2.3 Updating the SDK

Minor updates (0.5.0 to 0.5.1) are backwards compatible. Major updates (for example 0.5.1 to 0.6.0) are not necessarily backwards compatible, please consult SDK [Change log](#).

### 1.2.4 Github

Smarkets makes its open source development activities available on [GitHub](#), and the Python API Client is [available there](#).

Clone the public master branch:



```
$ git clone https://github.com/smarkets/smk_python_sdk.git
```

Or, download a `.tar.gz`:

```
$ curl -O https://github.com/smarkets/smk_python_sdk/tarball/master
```

Or, a `.zip`:

```
$ curl -O https://github.com/smarkets/smk_python_sdk/zipball/master
```

## 1.2.5 Installing from source

Once you have downloaded a copy of the source, you can install it into site-packages:

```
$ python setup.py build install
```

The build target will download the necessary files to generate the protobuf modules. Make sure you have satisfied the *requirements* listed above.

## 1.3 Quickstart

This quickstart guide assumes you have already installed the client. If you haven't, read *Installation* first.

### 1.3.1 Setting up logging

When developing, it's often useful to turn on debug logging console output:

```
import logging
logging.basicConfig(level=logging.DEBUG)
```

### 1.3.2 Starting a session

In order to do anything meaningful with the API, you must first start a new session. We import the base module and create our `SessionSettings` object:

```
>>> from smarkets.streaming_api.api import (
...     BUY, SELL, OrderCreate, Session, SessionSettings, StreamingAPIClient)
>>> username = 'username'
>>> password = 'password'
>>> settings = SessionSettings(username, password)
>>> settings.host = 'api.smarkets.com'
>>> settings.port = 3701
```

Then, we create the `Session` object which we will use to keep track of sequence numbers:

```
>>> session = Session(settings)
```

Finally, the `Client` class is the higher-level wrapper which allows us to send and handle messages:

```
>>> client = StreamingAPIClient(session)
```

Now, let's login!

```
>>> client.login()
```

We can also test our connectivity:

```
>>> client.ping()
>>> client.flush()
>>> client.read() # this will read a 'pong' response
```

And logout:

```
>>> client.logout()
```

### 1.3.3 Placing a bet

The `Order` class provides the mechanism to send a message to create a new order:

```
>>> order = OrderCreate()
>>> order.quantity = 400000 # 40.0000 GBP payout
>>> order.price = 2500 # 25.00%
>>> order.side = BUY
>>> order.market_id = some_market
>>> order.contract_id = some_contract
```

The above order is a **buy** (or **back**) at 25.00% (or 4.0 in decimal format) for a £40.00 return. The buyer's liability if the execution is at 25.00% will be £10.00.

Now, we send the create message:

```
>>> client.order(order)
>>> client.flush()
```

### 1.3.4 Registering callback functions

We can register some relatively simple callback functions for various messages. This example uses the `text_format` module from the `protocol buffers` package to simply print the message to `stdout`:

```
>>> from google.protobuf import text_format
>>> def login_response_callback(message):
>>>     print "Received a eto.login_response: %s" % (
>>>         text_format.MessageToString(message))
>>> def global_callback(message_name, message):
>>>     print "[global] Received a %s: %s" % (
>>>         message_name, text_format.MessageToString(message.protobuf))
```

First, we register the callback for the `eto.login_response` message:

```
>>> client.add_handler('eto.login_response', login_response_callback)
```

We can also register a **global** handler which will be called for every message received:

```
>>> client.add_global_handler(global_callback)
```

## 1.4 Change log

### 1.4.1 9.4.3

- Change protobuf generated file names to support newer versions of protobuf library.
- Drop Python 3.3 support

### 1.4.2 9.4.2

- Explicitly depend on pytz

### 1.4.3 9.4.1

- Minor compatibility bump

### 1.4.4 9.4.0

- Update smk\_api\_common to v6.3.0: Add additional return information on order messages
- Validate login operation
- Minor fixes in log messages

### 1.4.5 9.3.0

- Update smk\_api\_common to v6.2.0: Introduce order void and balance changed messages.

### 1.4.6 9.2.0

- Update smk\_api\_common to v6.1.0: Introduce labels so users can tag special orders.

### 1.4.7 9.1.3

- Update smk\_api\_common to v6.0.6: [https://github.com/smarkets/smk\\_api\\_common/issues/2](https://github.com/smarkets/smk_api_common/issues/2) Version 9.1.2 is broken: do not use.

### 1.4.8 9.1.2

- order-cancelled, order-executed, order-quantity-reduced, order-execute-voided and order-reduced messages now include the following additional order state information: total executed quantity, average executed price, available quantity, origin price

### 1.4.9 9.1.1

- Fix: Don't set a uint64 value as the old account sequence which makes it overflow

#### **1.4.10 9.1.0**

- Add settings and settings-accepted messages
- Add executed avg price/quantity on order-cancelled
- Add a uint64 account sequence
- Add account sequences in order quantity reduce rejected

#### **1.4.11 9.0.0**

- The long deprecated uuid fields have been removed from the seto protocol. Use ints instead.

#### **1.4.12 8.0.1**

- The streaming API now allows to cancel all orders by market

#### **1.4.13 8.0.0**

- The streaming API now dispatches frames instead of payload. This lets you access raw bytes
- Fix examples in README
- Simplify requirements
- Require protobuf when installing
- Use Smarmets' piqi binary fork

#### **1.4.14 7.1.0**

- Account sequences in reduce quantity messages
- Keep in play orders
- Trading suspended reasons

#### **1.4.15 7.0.1**

- ParseFromString expects string not bytearray

#### **1.4.16 7.0.0**

- Use bytearray for buffers instead of byte strings (changes smarmets.streaming\_api.framing API)
- BUGFIX: frames\_decode\_all may hang
- BUGFIX: frame\_decode\_all could miss frames

#### **1.4.17 6.4.0**

- Remove call to quantize in Odds.decimal

### 1.4.18 6.3.0

- Add functions to query available prices, ie ticks
- Fix flake8 and pin versions

### 1.4.19 6.2.0

- Upgrade smk\_api\_common to 5.2.0

### 1.4.20 6.1.0

- Bump smk\_api\_common to 5.1.0: reduction messages, cancel all feature
- Fix the broken flake8 build because of flake8-import-order

### 1.4.21 6.0.0

- Update smk\_api\_common and eto\_common versions

### 1.4.22 5.0.0

- Removed obsolete smarkets.compatibility and smarkets.rest\_api modules

### 1.4.23 4.1.2

- Update smk\_api\_common version

### 1.4.24 4.1.0

- 4.0.0 uploaded to PyPI is broken (it misses some files causing the package to initiate a full pipi -> protobuf -> Python build process on installation), 4.1.0 fixes it
- Made most of the package's dependencies optional
- Improved Python 3 compatibility (all tests pass now), the package isn't advertised as Python 3 compatible because there are some parts of it not tested on Python 3 yet.

### 1.4.25 4.0.0

Backwards compatible:

- Fixed installation on Python 3 (not the whole package is Python 3-compatible yet but installation works)

Backwards incompatible:

- Removed smarkets.datetime.iso8601\_to\_datetime (parse\_datetime is recommended instead, do note they have different interfaces)

### **1.4.26 0.6.0**

- Merge smkcommon project
- Refactor documentation

### **1.4.27 0.5.3**

- Create separate logger for “flushing x payloads” message

### **1.4.28 0.5.2**

- Update SETO definitions

### **1.4.29 0.5.1**

- Stop requiring curl/piqi/protoc if installing distribution

### **1.4.30 0.5.0**

- Handle order reference property
- Remove per-message streaming API callbacks
- Remove unused API

### **1.4.31 0.4.x/0.3.x**

Change list available only in git log.

### **1.4.32 0.2.0**

- Update to latest eto and seto definitions
- Add additional integration tests
- Add unit tests
- Add first pass at documentation

### **1.4.33 0.1.0**

- Initial Release

Specific modules, classes and methods are listed in this section.

## 2.1 smarkets package

### 2.1.1 Subpackages

**smarkets.streaming\_api package**

**smarkets.streaming\_api.client module**

**smarkets.streaming\_api.exceptions module**

Core Smarkets API exceptions

**exception** `smarkets.streaming_api.exceptions.ConnectionError`  
Bases: `smarkets.errors.Error`

TCP connection-related error

**exception** `smarkets.streaming_api.exceptions.DecodeError`  
Bases: `smarkets.errors.Error`

Header decoding error

**exception** `smarkets.streaming_api.exceptions.DownloadError`  
Bases: `smarkets.errors.Error`

Raised when a URL could not be fetched

**exception** `smarkets.streaming_api.exceptions.InvalidCallbackError`  
Bases: `smarkets.errors.Error`

Invalid callback was specified

**exception** `smarkets.streaming_api.exceptions.InvalidUrlError`

Bases: `smarkets.errors.Error`

Raised when a URL is invalid

**exception** `smarkets.streaming_api.exceptions.LoginError` (*reason*)

Bases: `smarkets.errors.Error`

Raised when a login is not successful

**exception** `smarkets.streaming_api.exceptions.LoginTimeout`

Bases: `smarkets.errors.Error`

Raised when no message is received after sending login request

**exception** `smarkets.streaming_api.exceptions.ParseError`

Bases: `smarkets.errors.Error`

Error parsing a message or frame

**exception** `smarkets.streaming_api.exceptions.SocketDisconnected`

Bases: `smarkets.errors.Error`

Socket was disconnected while reading

## **smarkets.streaming\_api.session module**

Smarkets TCP-based session management

**class** `smarkets.streaming_api.session.Session` (*settings*, *inseq=1*, *outseq=1*, *ac-*  
*count\_sequence=None*)

Bases: `object`

Manages TCP communication via Smarkets streaming API

**connect** ()

Connects to the API and logs in if not already connected

**connected**

Returns True if the socket is currently connected

**disconnect** ()

Disconnects from the API

**flush** ()

Flush payloads to the socket

**logout** ()

Disconnects from the API

**next\_frame** ()

Get the next payload and increment inseq.

**Warning:** Payload returned by *next\_frame* has to be consumed before next call to *next\_frame* happens.

**Returns** A payload or None if no payloads in buffer.

**Return type** `smarkets.streaming_api.session.Frame` or None

**raw\_socket**

Get raw socket used for communication with remote endpoint. :rtype: `socket.socket`



**send()**

Serialise, sequence, add header, and send payload

```
class smarkets.streaming_api.session.SessionSettings (username=None,      pass-  
word=None,      token=None,  
host='stream.smarkets.com',  
port=3801,      ssl=True,  
socket_timeout=30,  
ssl_kwargs=None,  
tcp_nodelay=True)
```

Bases: object

Encapsulate settings necessary to create a new session

```
class smarkets.streaming_api.session.SessionSocket (settings)
```

Bases: object

Wraps a socket with basic framing/deframing

**connect()**

Create a TCP socket connection.

Returns True if the socket needed connecting, False if not

**connected**

Returns True if the socket is currently connected

**disconnect()**

Close the TCP socket.

**recv()**

Read stuff from underlying socket.

**Return type** byte string

**send(byte\_array)**

**Returns** Number of sent bytes

**Return type** int

## 2.1.2 Submodules

### 2.1.3 smarkets.configuration module

```
class smarkets.configuration.ConfigurationReader (directories,      parser_class=<class  
ConfigParser.SafeConfigParser>)
```

Bases: object

Reads a configuration from a series of “inheriting” .ini files. You may specify what config file your file inherits from like this:

```
[inherit]  
from=other.conf
```

Moreover files of the same name may be present in multiple directories ConfigurationReader is set to look for config files - in this case it will read configuration from all of them but in reverse order. For example, let’s have:

- B.conf inherits from “A.conf”
- files present:

- /etc/conf/B.conf
- /home/conf/A.conf
- /home/conf/B.conf

- reader configured like this:

```
reader = ConfigurationReader(['/etc/conf', '/home/conf'])
```

Order in which files will be read:

- /home/conf/A.conf
- /home/conf/B.conf
- /etc/conf/B.conf

**read** (*filename*)

Reads the configuration into new instance of `parser_class`. :rtype: `ConfigParser`

**read\_into** (*filename, config*)

Reads the configuration into config object. :type config: `ConfigParser`

## 2.1.4 smarkets.errors module

**exception** `smarkets.errors.Error`

Bases: `exceptions.Exception`

Base class for every Smarkets error

`smarkets.errors.swallow` (*exceptions, default=None*)

Swallow exception(s) when executing something. Works as function decorator and as a context manager:

```
>>> @swallow(NameError, default=2)
... def fun():
...     a = b # noqa
...     return 1
...
>>> fun()
2
>>> with swallow(KeyError):
...     raise KeyError('key')
...
...

```

**Parameters** `default` – value to return in case of an exception

## 2.1.5 smarkets.functools module

`smarkets.functools.overrides` (*ancestor\_class*)

Mark method as overriding `ancestor_class`' method.

---

**Note:** Overriding method can not have its own docstring.

---

---

**Note:** Method being overridden must be (re)defined in `ancestor_class` itself (see `BadChild3` example below); `overrides()` will not follow the inheritance tree.

---

Usage:

```
>>> class Parent(object):
...     def method(self):
...         'parent docstring'
...
>>>
>>> class BadChild1(Parent):
...     @overrides(Parent)
...     def methd(self):
...         pass
...
Traceback (most recent call last):
OverrideError: No method 'methd' in class <class 'smarkets.functools.Parent'> to_
↳ override
>>>
>>> class BadChild2(Parent):
...     @overrides(Parent)
...     def method(self):
...         'child method docstring'
...
Traceback (most recent call last):
OverrideError: No docstrings allowed in overriding method
>>>
>>> class IntermediateChild(Parent):
...     pass
...
>>> class BadChild3(IntermediateChild):
...     @overrides(IntermediateChild)
...     def method(self):
...         pass
...
Traceback (most recent call last):
OverrideError: No method 'method' in class <class 'smarkets.functools.
↳ IntermediateChild'> to override
>>>
>>> class GoodChild(Parent):
...     @overrides(Parent)
...     def method(self):
...         return 1
...
>>> child = GoodChild()
>>> str(child.method.__doc__)
'parent docstring'
>>> child.method()
1
```

### Raises

**OverrideError** Method does not exist in parent class or overriding method has docstring.

**exception** `smarkets.functools.OverrideError`

Bases: `exceptions.Exception`

Method override fails

`smarkets.functools.lru_cache(maxsize=100, typed=False)`

Least-recently-used cache decorator.

If *maxsize* is set to None, the LRU features are disabled and the cache can grow without bound.

If *typed* is True, arguments of different types will be cached separately. For example, `f(3.0)` and `f(3)` will be treated as distinct calls with distinct results.

Arguments to the cached function must be hashable.

View the cache statistics named tuple (hits, misses, maxsize, currsize) with `f.cache_info()`. Clear the cache and statistics with `f.cache_clear()`. Access the underlying function with `f.__wrapped__`.

See: [http://en.wikipedia.org/wiki/Cache\\_algorithms#Least\\_Recently\\_Used](http://en.wikipedia.org/wiki/Cache_algorithms#Least_Recently_Used)

## 2.1.6 smarkets.itertools module

`smarkets.itertools.listitems(d)`

Return *d* item list

`smarkets.itertools.listkeys(d)`

Return *d* key list

`smarkets.itertools.listvalues(d)`

Return *d* value list

`smarkets.itertools.merge_dicts(*dicts)`

Return *dicts* merged together.

If keys clash the subsequent dictionaries have priority over preceding ones.

```
>>> merge_dicts() == {}
True
>>> merge_dicts({'a': 2}) == {'a': 2}
True
>>> merge_dicts({'a': 2, 'b': 3}, {'a': 1, 'c': 4}) == {'a': 1, 'b': 3, 'c': 4}
True
```

`smarkets.itertools.listmap()`

`map(function, sequence[, sequence, ...]) -> list`

Return a list of the results of applying the function to the items of the argument sequence(s). If more than one sequence is given, the function is called with an argument list consisting of the corresponding item of each sequence, substituting None for missing values when not all sequences have the same length. If the function is None, return a list of the items of the sequence (or a list of tuples if more than one sequence).

`smarkets.itertools.inverse_mapping(d)`

Return a dictionary with input mapping keys as values and values as keys.

**Raises**

**ValueError** Input mapping values aren't unique.

`smarkets.itertools.is_sorted(sequence, **kwargs)`

**Parameters** *kwargs* – `sorted()` kwargs

`smarkets.itertools.copy_keys_if_present` (*source, destination, keys*)

Copy keys from source mapping to destination mapping while skipping nonexistent keys.

`smarkets.itertools.listmap` ()

`map(function, sequence[, sequence, ...])` -> list

Return a list of the results of applying the function to the items of the argument sequence(s). If more than one sequence is given, the function is called with an argument list consisting of the corresponding item of each sequence, substituting None for missing values when not all sequences have the same length. If the function is None, return a list of the items of the sequence (or a list of tuples if more than one sequence).

## 2.1.7 smarkets.signal module

**class** `smarkets.signal.Signal`

Bases: `object`

All instance methods of this class are thread safe.

**add** (*handler*)

Add signal handler. You can also do:

```
signal = Signal()
signal += handler
```

**fire** (*\*\*kwargs*)

Execute all handlers associated with this Signal.

You can also call signal object to get the same result:

```
signal = Signal()
signal() # calls the signal handler
```

**handle** (*handler*)

Add signal handler. You can also do:

```
signal = Signal()
signal += handler
```

**remove** (*handler*)

Remove signal handler. You can also do:

```
signal = Signal()
# add a handler "handler"
signal -= handler
```

## 2.1.8 smarkets.uuid module

**class** `smarkets.uuid.Uuid`

Bases: `smarkets.uuid.UuidBase`

Represents a UUID

**static base\_n** (*number, chars*)

Recursive helper for calculating a number in base len(chars)

**chars** = '0123456789abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ'

```
classmethod from_hex (hex_str)
    Convert a hex uuid into a Uuid :type hex_str: byte string or unicode string

classmethod from_int (number, ttype)
    Convert an integer and tag type to a Uuid

classmethod from_slug (slug, base=36, chars=None)
    Convert a slug into a Uuid

high
    Higher 64 bits of number

low
    Lower 64 bits of number

mask64 = 18446744073709551615L

static pad_uuid (uuid, pad=32, padchar='0')
    Pads a UUID with <pad> <padchar>s

shorthex
    Short hex representation of Uuid

tags = {'Account': UuidTagBase(name='Account', int_tag=44225, prefix='a'), 'Comment':
tags_by_hex_str = {'0444': UuidTagBase(name='Entity', int_tag=1092, prefix='n'), '0f0
tags_by_int_tag = {1092: UuidTagBase(name='Entity', int_tag=1092, prefix='n'), 3840:
tags_by_prefix = {'a': UuidTagBase(name='Account', int_tag=44225, prefix='a'), 'b':
to_hex (pad=32)
    Convert to tagged hex representation

to_slug (prefix=True, base=36, chars=None, pad=0)
    Convert to slug representation

classmethod unsplit64 (high, low)
    Converts a high/low 64-bit integer pair into a 128-bit large integer

class smarkets.uuid.UuidBase (number, tag)
    Bases: tuple

    number
        Alias for field number 0

    tag
        Alias for field number 1

class smarkets.uuid.UuidTag
    Bases: smarkets.uuid.UuidTagBase
    Represents tag information

    hex_str
        Hex tag value

    classmethod split_int_tag (number)
        Splits a number into the ID and tag

    tag_mult = 65536

    tag_number (number)
        Adds this tag to a number
```

```
class smarkets.uuid.UuidTagBase (name, int_tag, prefix)
    Bases: tuple

    int_tag
        Alias for field number 1

    name
        Alias for field number 0

    prefix
        Alias for field number 2

smarkets.uuid.int_to_slug (number, ttype)
    Convert a large integer to a slug

smarkets.uuid.int_to_uuid (number, ttype)
    Convert an untagged integer into a tagged uuid


smarkets.uuid.slug_to_int (slug, return_tag=None, split=False)
    Convert a slug to an integer, optionally splitting into high and low 64 bit parts

smarkets.uuid.slug_to_uuid (slug)
    Convert a slug to a Smarkets UUID

smarkets.uuid.uuid_to_int (uuid, return_tag=None, split=False)
    Convert a tagged uuid into an integer, optionally returning type

smarkets.uuid.uuid_to_short (uuid)
    Converts a full UUID to the shortened version

smarkets.uuid.uuid_to_slug (number, prefix=True)
    Convert a Smarkets UUID (128-bit hex) to a slug
```

## 2.1.9 Module contents





## CHAPTER 3

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### Support

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Stuck? Found a bug? If you are looking for help, please contact Smarkets directly [via email on support@smarkets.com](mailto:support@smarkets.com).



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