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asyncio (PEP 3156) Redis client library.

The library is intended to provide simple and clear interface to Redis based on asyncio.
### Chapter 1

#### Features

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<th>Status</th>
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<tbody>
<tr>
<td>hiredis parser</td>
<td>Yes</td>
</tr>
<tr>
<td>Pure-python parser</td>
<td>Yes</td>
</tr>
<tr>
<td>Low-level &amp; High-level APIs</td>
<td>Yes</td>
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<tr>
<td>Connections Pool</td>
<td>Yes</td>
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<td>Yes</td>
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<td>Yes</td>
</tr>
<tr>
<td>Sentinel support</td>
<td>Yes(^1)</td>
</tr>
<tr>
<td>Redis Cluster support</td>
<td>WIP</td>
</tr>
<tr>
<td>Trollius (python 2.7)</td>
<td>No</td>
</tr>
<tr>
<td>Tested CPython versions</td>
<td>3.5, 3.6(^2)</td>
</tr>
<tr>
<td>Tested PyPy3 versions</td>
<td>5.9.0</td>
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<td>2.6, 2.8, 3.0, 3.2, 4.0</td>
</tr>
<tr>
<td>Support for dev Redis server</td>
<td>through low-level API</td>
</tr>
</tbody>
</table>

\(^1\) Sentinel support is available in master branch. This feature is not yet stable and may have some issues.

\(^2\) For Python 3.3, 3.4 support use aioredis v0.3.
The easiest way to install aioredis is by using the package on PyPi:

```
pip install aioredis
```
CHAPTER 3

Requirements

- Python 3.5.3+
- hiredis
Benchmarks

Benchmarks can be found here: https://github.com/popravich/python-redis-benchmark
Contribute

- Issue Tracker: https://github.com/aio-libs/aioredis/issues
- Source Code: https://github.com/aio-libs/aioredis
- Contributor’s guide: Contributing

Feel free to file an issue or make pull request if you find any bugs or have some suggestions for library improvement.
CHAPTER 6

License

The aioredis is offered under MIT license.
CHAPTER 7

Contents

7.1 Getting started

7.1.1 Commands Pipelining

Commands pipelining is built-in.

Every command is sent to transport at-once (ofcourse if no TypeError/ValueError was raised)

When you making a call with await/yield from you will be waiting result, and then gather results.

Simple example show both cases (get source code):

```python
# No pipelining;
async def wait_each_command():
    val = await redis.get('foo')  # wait until 'val' is available
    cnt = await redis.incr('bar')  # wait until 'cnt' is available
    return val, cnt

# Sending multiple commands and then gathering results
async def pipelined():
    fut1 = redis.get('foo')  # issue command and return future
    fut2 = redis.incr('bar')  # issue command and return future
    # block until results are available
    val, cnt = await asyncio.gather(fut1, fut2)
    return val, cnt
```

Note: For convenience aioredis provides pipeline() method allowing to execute bulk of commands as one (get source code):

```python
# Explicit pipeline
async def explicit_pipeline():
    pipe = redis.pipeline()
```

(continues on next page)
7.1.2 Multi/Exec transactions

`aioredis` provides several ways for executing transactions:

- when using raw connection you can issue Multi/Exec commands manually;
- when using `aioredis.Redis` instance you can use `multi_exec()` transaction pipeline.

`multi_exec()` method creates and returns new `MultiExec` object which is used for buffering commands and then executing them inside MULTI/EXEC block.

Here is a simple example (get source code):

```python
async def transaction():
    tr = redis.multi_exec()
    future1 = tr.set('foo', '123')
    future2 = tr.set('bar', '321')
    result = await tr.execute()
    assert result == await asyncio.gather(future1, future2)
    return result
```

As you can notice `await` is only used at line 5 with `tr.execute` and not with `tr.set(...)` calls.

**Warning:** It is very important not to `await` buffered command (ie `tr.set('foo', '123')`) as it will block forever.

The following code will block forever:

```python
tr = redis.multi_exec()
await tr.incr('foo')  # that's all. we've stuck!
```

7.1.3 Pub/Sub mode

`aioredis` provides support for Redis Publish/Subscribe messaging.

To switch connection to subscribe mode you must execute `subscribe` command by yield’ing from `subscribe()` it returns a list of `Channel` objects representing subscribed channels.

As soon as connection is switched to subscribed mode the channel will receive and store messages (the `Channel` object is basically a wrapper around `asyncio.Queue`). To read messages from channel you need to use `get()` or `get_json()` coroutines.

**Note:** In Pub/Sub mode redis connection can only receive messages or issue (P)SUBSCRIBE / (P)UNSUBSCRIBE commands.
Pub/Sub example (get source code):

```
sub = await aioredis.create_redis('redis://localhost')

ch1, ch2 = await sub.subscribe('channel:1', 'channel:2')
assert isinstance(ch1, aioredis.Channel)
assert isinstance(ch2, aioredis.Channel)

async def async_reader(channel):
    while await channel.wait_message():
        msg = await channel.get(encoding='utf-8')
        # ... process message ...
        print("message in {}: ".format(channel.name, msg))

tsk1 = asyncio.ensure_future(async_reader(ch1))

# Or alternatively:

async def async_reader2(channel):
    while True:
        msg = await channel.get(encoding='utf-8')
        if msg is None:
            break
        # ... process message ...
        print("message in {}: ".format(channel.name, msg))

tsk2 = asyncio.ensure_future(async_reader2(ch2))
```

Pub/Sub example (get source code):

```
async def reader(channel):
    while (await channel.wait_message()):
        msg = await channel.get(encoding='utf-8')
        # ... process message ...
        print("message in {}: ".format(channel.name, msg))

        if msg == STOPWORD:
            return

with await pool as conn:
    await conn.execute_pubsub('subscribe', 'channel:1')
    channel = conn.pubsub_channels['channel:1']
    await reader(channel)  # wait for reader to complete
    await conn.execute_pubsub('unsubscribe', 'channel:1')

# Explicit connection usage
conn = await pool.acquire()
try:
    await conn.execute_pubsub('subscribe', 'channel:1')
    channel = conn.pubsub_channels['channel:1']
    await reader(channel)  # wait for reader to complete
finally:
    pool.release(conn)
```
7.1.4 Python 3.5 async with / async for support

`aioredis` is compatible with PEP 492.

Pool can be used with async with (get source code):

```python
pool = await aioredis.create_pool('redis://localhost')
async with pool.get() as conn:
    value = await conn.execute('get', 'my-key')
    print('raw value:', value)
```

It also can be used with await:

```python
pool = await aioredis.create_pool('redis://localhost')
# This is exactly the same as:
# with (yield from pool) as conn:
with (await pool) as conn:
    value = await conn.execute('get', 'my-key')
    print('raw value:', value)
```

New scan-family commands added with support of async for (get source code):

```python
redis = await aioredis.create_redis('redis://localhost')

async for key in redis.iscan(match='something*'):
    print('Matched:', key)

async for name, val in redis.ihscan(key, match='something*'):
    print('Matched:', name, '->', val)

async for val in redis.isscan(key, match='something*'):
    print('Matched:', val)

async for val, score in redis.izscan(key, match='something*'):
    print('Matched:', val, ':', score)
```

7.1.5 SSL/TLS support

Though Redis server does not support data encryption it is still possible to setup Redis server behind SSL proxy. For such cases `aioredis` library support secure connections through asyncio SSL support. See BaseEventLoop.create_connection for details.

7.2 Migrating from v0.3 to v1.0

API changes and backward incompatible changes:

- `aioredis.create_pool`
- `aioredis.create_reconnecting_redis`
- `aioredis.Redis`
• Blocking operations and connection sharing
• Sorted set commands return values
• Hash hscan command now returns list of tuples

7.2.1 aioredis.create_pool

create_pool() now returns ConnectionsPool instead of RedisPool.
This means that pool now operates with RedisConnection objects and not Redis.

<table>
<thead>
<tr>
<th>v0.3</th>
<th>v1.0</th>
</tr>
</thead>
</table>
| pool = await aioredis.create_pool({'
  'localhost', 6379'})

    with await pool as redis:
    # calling methods of Redis class
    await redis.lpush('list-key', 'item1', 'item2')

| | |
| | |
| pool = await aioredis.create_pool({'
  'localhost', 6379'})

    with await pool as conn:
    # calling conn.lpush will raise
    # AttributeError exception
    await conn.execute('lpush', 'list-key', 'item1', 'item2')

7.2.2 aioredis.create_reconnecting_redis

create_reconnecting_redis() has been dropped.
create_redis_pool() can be used instead of former function.

<table>
<thead>
<tr>
<th>v0.3</th>
<th>v1.0</th>
</tr>
</thead>
</table>
| redis = await aioredis.create_
  reconnecting_redis(
  {'localhost', 6379})

    await redis.lpush('list-key', 'item1', 'item2')

| | |
| | |
| redis = await aioredis.create_redis_pool(
  {'localhost', 6379})

    await redis.lpush('list-key', 'item1', 'item2')

7.2. Migrating from v0.3 to v1.0
create_redis_pool returns Redis initialized with ConnectionsPool which is responsible for reconnecting to server.

Also create_reconnecting_redis was patching the RedisConnection and breaking closed property (it was always True).

### 7.2.3 aioredis.Redis

Redis class now operates with objects implementing aioredis.abc.AbcConnection interface. RedisConnection and ConnectionsPool are both implementing AbcConnection so it is become possible to use same API when working with either single connection or connections pool.

<table>
<thead>
<tr>
<th>v0.3</th>
<th>v1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>redis = await aioredis.create_redis((</td>
<td>redis = await aioredis.create_redis((</td>
</tr>
<tr>
<td>→'localhost', 6379))</td>
<td>→'localhost', 6379))</td>
</tr>
<tr>
<td>await redis.lpush('list-key', 'item1',</td>
<td>await redis.lpush('list-key', 'item1',</td>
</tr>
<tr>
<td>→'item2')</td>
<td>→'item2')</td>
</tr>
<tr>
<td>pool = await aioredis.create_pool((</td>
<td>pool = await aioredis.create_pool((</td>
</tr>
<tr>
<td>→'localhost', 6379))</td>
<td>→'localhost', 6379))</td>
</tr>
<tr>
<td>redis = await pool.acquire() # get_</td>
<td>redis = await pool.acquire() # get_</td>
</tr>
<tr>
<td>→Redis object</td>
<td>→Redis object</td>
</tr>
<tr>
<td>await redis.lpush('list-key', 'item1',</td>
<td>await redis.lpush('list-key', 'item1',</td>
</tr>
<tr>
<td>→'item2')</td>
<td>→'item2')</td>
</tr>
</tbody>
</table>

### 7.2.4 Blocking operations and connection sharing

Current implementation of ConnectionsPool by default execute every command on random connection. The Pros of this is that it allowed implementing AbcConnection interface and hide pool inside Redis class, and also keep pipelining feature (like RedisConnection.execute). The Cons of this is that different tasks may use same connection and block it with some long-running command.

We can call it Shared Mode — commands are sent to random connections in pool without need to lock [connection]:

```python
redis = await aioredis.create_redis_pool(
    ('localhost', 6379),
    minsize=1,
    maxsize=1)

async def task():
    # Shared mode
    await redis.set('key', 'val')
```

(continues on next page)
asyncio.ensure_future(task())
asyncio.ensure_future(task())
# Both tasks will send commands through same connection
# without acquiring (locking) it first.

Blocking operations (like **blpop**, **brpop** or long-running LUA scripts) in **shared mode** mode will block connection and thus may lead to whole program malfunction.

This **blocking** issue can be easily solved by using exclusive connection for such operations:

```python
redis = await aioredis.create_redis_pool(  
    ('localhost', 6379),  
    minsize=1,  
    maxsize=1)

async def task():
    # Exclusive mode
    with await redis as r:
        await r.set('key', 'val')
asyncio.ensure_future(task())
asyncio.ensure_future(task())
# Both tasks will first acquire connection.
```

We can call this **Exclusive Mode** — context manager is used to acquire (lock) exclusive connection from pool and send all commands through it.

**Note:** This technique is similar to v0.3 pool usage:

```python
# in aioredis v0.3
pool = await aioredis.create_pool(('localhost', 6379))
with await pool as redis:
    # Redis is bound to exclusive connection
    redis.set('key', 'val')
```

### 7.2.5 Sorted set commands return values

Sorted set commands (like **zrange**, **zrevrange** and others) that accept **withscores** argument now return list of tuples instead of plain list.
redis = await aioredis.create_redis((
    'localhost', 6379))
await redis.zadd('zset-key', 1, 'one', 2,
    'two')
res = await redis.zrange('zset-key',
    withscores=True)
assert res == [b'one', 1, b'two', 2]

# not an easiest way to make a dict
it = iter(res)
assert dict(zip(it, it)) == {b'one': 1, b'
    two': 2}

redis = await aioredis.create_redis((
    'localhost', 6379))
await redis.zadd('zset-key', 1, 'one', 2,
    'two')
res = await redis.zrange('zset-key',
    withscores=True)
assert res == [(b'one', 1), (b'two', 2)]

# now its easier to make a dict of it
assert dict(res) == {b'one': 1, b'
    two': 2}

7.2.6 Hash hscan command now returns list of tuples

hscan updated to return a list of tuples instead of plain mixed key/value list.
### 7.3 aioredis — API Reference

#### 7.3.1 Connection

Redis Connection is the core function of the library. Connection instances can be used as is or through pool or high-level API.

Connection usage is as simple as:

```python
import asyncio
import aioredis

async def connect_uri():
    conn = await aioredis.create_connection('redis://localhost/0')
    val = await conn.execute('GET', 'my-key')

async def connect_tcp():
    conn = await aioredis.create_connection(('localhost', 6379))
    val = await conn.execute('GET', 'my-key')

async def connect_unixsocket():
    conn = await aioredis.create_connection('/path/to/redis/socket')
    # or uri 'unix:///path/to/redis/socket?db=1'
    val = await conn.execute('GET', 'my-key')
```

(continues on next page)
coroutine aioredis.create_connection(address, *, db=0, password=None, ssl=None, encoding=None, parser=None, loop=None, timeout=None)

Creates Redis connection.

Changed in version v0.3.1: timeout argument added.

Changed in version v1.0: parser argument added.

Parameters

- **address** *(tuple or str)* – An address where to connect. Can be one of the following:
  - a Redis URI — "redis://host:6379/0?encoding=utf-8";
  - a (host, port) tuple — ('localhost', 6379);
  - or a unix domain socket path string — "/path/to/redis.sock".
- **db** *(int)* – Redis database index to switch to when connected.
- **password** *(str or None)* – Password to use if redis server instance requires authorization.
- **ssl** *(ssl.SSLContext or True or None)* – SSL context that is passed through to asyncio.BaseEventLoop.create_connection().
- **encoding** *(str or None)* – Codec to use for response decoding.
- **parser** *(callable or None)* – Protocol parser class. Can be used to set custom protocol reader; expected same interface as hiredis.Reader.
- **loop** *(EventLoop)* – An optional event loop instance (uses asyncio.get_event_loop() if not specified).
- **timeout** *(float greater than 0 or None)* – Max time to open a connection, otherwise raise asyncio.TimeoutError exception. None by default

Returns RedisConnection instance.

class aioredis.RedisConnection
Bases: abc.AbcConnection

Redis connection interface.

**address**
Redis server address; either IP-port tuple or unix socket str (read-only). IP is either IPv4 or IPv6 depending on resolved host part in initial address.

New in version v0.2.8.

**db**
Current database index (read-only).

**encoding**
Current codec for response decoding (read-only).

**closed**
Set to True if connection is closed (read-only).

**in_transaction**
Set to True when MULTI command was issued (read-only).
pubsub_channels
Read-only dict with subscribed channels. Keys are bytes, values are Channel instances.

pubsub_patterns
Read-only dict with subscribed patterns. Keys are bytes, values are Channel instances.

in_pubsub
Indicates that connection is in PUB/SUB mode. Provides the number of subscribed channels. Read-only.

execute(command, *args, encoding=_NOTSET)
Execute Redis command.

The method is not a coroutine itself but instead it writes to underlying transport and returns an asyncio.Future waiting for result.

Parameters
- command (str, bytes, bytearray) – Command to execute
- encoding (str or None) – Keyword-only argument for overriding response decoding. By default will use connection-wide encoding. May be set to None to skip response decoding.

Raises
- TypeError – When any of arguments is None or can not be encoded as bytes.
- aioredis.ReplyError – For redis error replies.
- aioredis.ProtocolError – When response can not be decoded and/or connection is broken.

Returns
Returns bytes or int reply (or str if encoding was set)

execute_pubsub(command, *channels_or_patterns)
Method to execute Pub/Sub commands. The method is not a coroutine itself but returns an asyncio.gather() coroutine. Method also accept aioredis.Channel instances as command arguments:

```python
chl = Channel('A', is_pattern=False, loop=loop)
await conn.execute_pubsub('subscribe', chl)
[[b'subscribe', b'A', 1]]
```

Changed in version v0.3: The method accept Channel instances.

Parameters
- command (str, bytes, bytearray) – One of the following Pub/Sub commands: subscribe, unsubscribe, psubscribe, punsubscribe.
- *channels_or_patterns – Channels or patterns to subscribe connection to or unsubscribe from. At least one channel/pattern is required.

Returns
Returns a list of subscribe/unsubscribe messages, ex:

```python
await conn.execute_pubsub('subscribe', 'A', 'B')
[[b'subscribe', b'A', 1], [b'subscribe', b'B', 2]]
```

close()
Closes connection.

Mark connection as closed and schedule cleanup procedure.

All pending commands will be canceled with ConnectionForcedCloseError.
wait_closed()
   Coroutine waiting for connection to get closed.

select (db)
   Changes current db index to new one.
   Parameters db (int) – New redis database index.
   Raises
   • TypeError – When db parameter is not int.
   • ValueError – When db parameter is less then 0.
   Return True  Always returns True or raises exception.

auth (password)
   Send AUTH command.
   Parameters password (str) – Plain-text password
   Return bool  True if redis replied with ‘OK’.

7.3.2 Connections Pool
The library provides connections pool. The basic usage is as follows:

```python
import aioredis

async def sample_pool():
    pool = await aioredis.create_pool('redis://localhost')
    val = await pool.execute('get', 'my-key')
```

aioredis.create_pool (address, *, db=0, password=None, ssl=None, encoding=None, minsize=1,
maxsize=10, parser=None, loop=None, create_connection_timeout=None,
pool_cls=None, connection_cls=None)
   A coroutine that instantiates a pool of RedisConnection.
   Changed in version v0.2.7: minsize default value changed from 10 to 1.
   Changed in version v0.2.8: Disallow arbitrary ConnectionsPool maxsize.
   Deprecated since version v0.2.9: commands_factory argument is deprecated and will be removed in v1.0.
   Changed in version v0.3.2: create_connection_timeout argument added.
   New in version v1.0: parser, pool_cls and connection_cls arguments added.
   Parameters
   • address (tuple or str) – An address where to connect. Can be one of the following:
      – a Redis URI — "redis://host:6379/0?encoding=utf-8";
      – a (host, port) tuple — ('localhost', 6379);
      – or a unix domain socket path string — "/path/to/redis.sock".
   • db (int) – Redis database index to switch to when connected.
   • password (str or None) – Password to use if redis server instance requires authorization.
• **ssl** *(ssl.SSLContext or True or None)* — SSL context that is passed through to `asyncio.BaseEventLoop.create_connection()`.

• **encoding**(str or None) — Codec to use for response decoding.

• **minsize**(int) — Minimum number of free connection to create in pool. 1 by default.

• **maxsize**(int) — Maximum number of connection to keep in pool. 10 by default. Must be greater then 0. None is disallowed.

• **parser**(callable or None) — Protocol parser class. Can be used to set custom protocol reader; expected same interface as `hiredis.Reader`.

• **loop**(EventLoop) — An optional event loop instance (uses `asyncio.get_event_loop()` if not specified).

• **create_connection_timeout**(float greater than 0 or None) — Max time to open a connection, otherwise raise an `asyncio.TimeoutError`. None by default.

• **pool_cls**(aioredis.abc.AbcPool) — Can be used to instantiate custom pool class. This argument must be a subclass of `AbcPool`.

• **connection_cls**(aioredis.abc.AbcConnection) — Can be used to make pool instantiate custom connection classes. This argument must be a subclass of `AbcConnection`.

**Returns** `ConnectionsPool` instance.

**class** aioredis.ConnectionsPool  
**Bases:** abc.AbcPool  
Redis connections pool.

**minsize**  
A minimum size of the pool *(read-only)*.

**maxsize**  
A maximum size of the pool *(read-only)*.

**size**  
Current pool size — number of free and used connections *(read-only)*.

**freesize**  
Current number of free connections *(read-only)*.

**db**  
Currently selected db index *(read-only)*.

**encoding**  
Current codec for response decoding *(read-only)*.

**closed**  
True if pool is closed.  
New in version v0.2.8.

**execute**(command, *args, **kwargs)  
Execute Redis command in a free connection and return `asyncio.Future` waiting for result.

This method tries to pick a free connection from pool and send command through it at once (keeping pipelining feature provided by `aioredis.RedisConnection.execute()`). If no connection is found — returns coroutine waiting for free connection to execute command.

New in version v1.0.
execute_pubsub(command, *channels)
Execute Redis (p)subscribe/(p)unsubscribe command.

ConnectionsPool picks separate free connection for pub/sub and uses it until pool is closed or connection is disconnected (unsubscribing from all channels/pattern will leave connection locked for pub/sub use).

There is no auto-reconnect for Pub/Sub connection as this will hide from user messages loss.

Has similar to execute() behavior, ie: tries to pick free connection from pool and switch it to pub/sub mode; or fallback to coroutine waiting for free connection and repeating operation.

New in version v1.0.

get_connection(command, args=())
Gets free connection from pool returning tuple of (connection, address).

If no free connection is found – None is returned in place of connection.

Return type tuple(RedisConnection or None, str)

New in version v1.0.

coroutine clear()
Closes and removes all free connections in the pool.

coroutine select(db)
Changes db index for all free connections in the pool.

Parameters db (int) – New database index.

coroutine acquire(command=None, args=())
Acquires a connection from free pool. Creates new connection if needed.

Parameters
• command – reserved for future.
• args – reserved for future.

 Raises aioredis.PoolClosedError – if pool is already closed

release(conn)
Returns used connection back into pool.

When returned connection has db index that differs from one in pool the connection will be dropped. When queue of free connections is full the connection will be dropped.

Note: This method is not a coroutine.

Parameters conn (aioredis.RedisConnection) – A RedisConnection instance.

close()
Close all free and in-progress connections and mark pool as closed.

New in version v0.2.8.

coroutine wait_closed()
Wait until pool gets closed (when all connections are closed).

New in version v0.2.8.
### 7.3.3 Pub/Sub Channel object

*Channel* object is a wrapper around queue for storing received pub/sub messages.

```python
class aioredis.Channel(name, is_pattern, loop=None)
    Bases: abc.AbcChannel

Object representing Pub/Sub messages queue. It's basically a wrapper around asyncio.Queue.

name
    Holds encoded channel/pattern name.

is_pattern
    Set to True for pattern channels.

is_active
    Set to True if there are messages in queue and connection is still subscribed to this channel.

coroutine get(*, encoding=None, decoder=None)
    Coroutine that waits for and returns a message.
    Return value is message received or None signifying that channel has been unsubscribed and no more messages will be received.

    Parameters
    • encoding (str) – If not None used to decode resulting bytes message.
    • decoder (callable) – If specified used to decode message, ex. json.loads()

    Raises aioredis.ChannelClosedError – If channel is unsubscribed and has no more messages.

get_json(*, encoding="utf-8")
    Shortcut to get(encoding="utf-8", decoder=json.loads)

coroutine wait_message()
    Waits for message to become available in channel or channel is closed (unsubscribed).

    Main idea is to use it in loops:
    >>> ch = redis.channels['channel:1']
    >>> while await ch.wait_message():
    ...     msg = await ch.get()

Return type bool

coroutine async-for iter(*, encoding=None, decoder=None)
    Same as get() method but it is a native coroutine.

    Usage example:
    >>> async for msg in ch.iter():
    ...     print(msg)

New in version 0.2.5: Available for Python 3.5 only
7.3.4 Exceptions

exception aioredis.RedisError
   Bases Exception
   Base exception class for aioredis exceptions.

exception aioredis.ProtocolError
   Bases RedisError
   Raised when protocol error occurs. When this type of exception is raised connection must be considered broken and must be closed.

exception aioredis.ReplyError
   Bases RedisError
   Raised for Redis error replies.

exception aioredis.MaxClientsError
   Bases ReplyError
   Raised when maximum number of clients has been reached (Redis server configured value).

exception aioredis.AuthError
   Bases ReplyError
   Raised when authentication errors occur.

exception aioredis.ConnectionClosedError
   Bases RedisError
   Raised if connection to server was lost/closed.

exception aioredis.Connection ForcedCloseError
   Bases ConnectionClosedError
   Raised if connection was closed with RedisConnection.close() method.

exception aioredis.PipelineError
   Bases RedisError
   Raised from pipeline() if any pipelined command raised error.

exception aioredis.MultiExecError
   Bases PipelineError
   Same as PipelineError but raised when executing multi_exec block.

exception aioredis.WatchVariableError
   Bases MultiExecError
   Raised if watched variable changed (EXEC returns None). Subclass of MultiExecError.

exception aioredis.ChannelClosedError
   Bases RedisError
   Raised from aioredis.Channel.get() when Pub/Sub channel is unsubscribed and messages queue is empty.
exception aioredis.PoolClosedError
    Bases RedisError
    Raised from aioredis.ConnectionsPool.acquire() when pool is already closed.

exception aioredis.ReadOnlyError
    Bases RedisError
    Raised from slave when read-only mode is enabled.

exception aioredis.MasterNotFoundError
    Bases RedisError
    Raised by Sentinel client if it can not find requested master.

exception aioredis.SlaveNotFoundError
    Bases RedisError
    Raised by Sentinel client if it can not find requested slave.

exception aioredis.MasterReplyError
    Bases RedisError
    Raised if establishing connection to master failed with RedisError, for instance because of required or wrong authentication.

exception aioredis.SlaveReplyError
    Bases RedisError
    Raised if establishing connection to slave failed with RedisError, for instance because of required or wrong authentication.

Exceptions Hierarchy

<table>
<thead>
<tr>
<th>Exception</th>
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<tbody>
<tr>
<td>RedisError</td>
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<td>MasterReplyError</td>
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<td>SlaveReplyError</td>
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</tbody>
</table>
7.3.5 Commands Interface

The library provides high-level API implementing simple interface to Redis commands. The usage is as simple as:

```python
import aioredis

# Create Redis client bound to single non-reconnecting connection.
async def single_connection():
    redis = await aioredis.create_redis('redis://localhost')
    val = await redis.get('my-key')

# Create Redis client bound to connections pool.
async def pool_of_connections():
    redis = await aioredis.create_redis_pool('redis://localhost')
    val = await redis.get('my-key')

    # we can also use pub/sub as underlying pool
    # has several free connections:
    ch1, ch2 = await redis.subscribe('chan:1', 'chan:2')
    # publish using free connection
    await redis.publish('chan:1', 'Hello')
    await ch1.get()
```

For commands reference — see commands mixins reference.

```python
coroutine aioredis.create_redis(address, *, db=0, password=None, ssl=None, encoding=None, commands_factory=Redis, parser=None, timeout=None, connection_cls=None, loop=None)
```

This coroutine creates high-level Redis interface instance bound to single Redis connection (without auto-reconnect).

New in version v1.0: parser, timeout and connection_cls arguments added.

See also RedisConnection for parameters description.

Parameters

- **address** (tuple or str) – An address where to connect. Can be a (host, port) tuple, unix domain socket path string or a Redis URI string.
- **db** (int) – Redis database index to switch to when connected.
- **password** (str or bytes or None) – Password to use if Redis server instance requires authorization.
- **ssl** (ssl.SSLContext or True or None) – SSL context that is passed through to asyncio.BaseEventLoop.create_connection().
- **encoding** (str or None) – Codec to use for response decoding.
- **commands_factory** (callable) – A factory accepting single parameter – object implementing AbcConnection and returning an instance providing high-level interface to Redis. Redis by default.
- **parser** (callable or None) – Protocol parser class. Can be used to set custom protocol reader; expected same interface as hiredis.Reader.
• **timeout** (*float greater than 0 or None*) – Max time to open a connection, otherwise raise `asyncio.TimeoutError` exception. `None` by default

• **connection_cls** (*aioredis.abc.AbcConnection*) – Can be used to instantiate custom connection class. This argument must be a subclass of `AbcConnection`.

• **loop** (*EventLoop*) – An optional event loop instance (uses `asyncio.get_event_loop()` if not specified).

Returns Redis client (result of `commands_factory` call), `Redis` by default.

**coroutine** `aioredis.create_redis_pool` *(address, *, db=0, password=None, ssl=None, encoding=None, commands_factory=Redis, minsize=1, maxsize=10, parser=None, timeout=None, pool_cls=None, connection_cls=None, loop=None)*

This coroutine create high-level Redis client instance bound to connections pool (this allows auto-reconnect and simple pub/sub use).

See also `ConnectionsPool` for parameters description.

Changed in version v1.0: parser, timeout, pool_cls and connection_cls arguments added.

**Parameters**

• **address** *(tuple or str)* – An address where to connect. Can be a (host, port) tuple, unix domain socket path string or a Redis URI string.

• **db** *(int)* – Redis database index to switch to when connected.

• **password** *(str or bytes or None)* – Password to use if Redis server instance requires authorization.

• **ssl** *(ssl.SSLContext or True or None)* – SSL context that is passed through to `asyncio.BaseEventLoop.create_connection()`.

• **encoding** *(str or None)* – Codec to use for response decoding.

• **commands_factory** *(callable)* – A factory accepting single parameter – object implementing `AbcConnection` interface and returning an instance providing high-level interface to Redis. `Redis` by default.

• **minsize** *(int)* – Minimum number of connections to initialize and keep in pool. Default is 1.

• **maxsize** *(int)* – Maximum number of connections that can be created in pool. Default is 10.

• **parser** *(callable or None)* – Protocol parser class. Can be used to set custom protocol reader; expected same interface as `hiredis.Reader`.

• **timeout** *(float greater than 0 or None)* – Max time to open a connection, otherwise raise `asyncio.TimeoutError` exception. `None` by default

• **pool_cls** *(aioredis.abc.AbcPool)* – Can be used to instantiate custom pool class. This argument must be a subclass of `AbcPool`.

• **connection_cls** *(aioredis.abc.AbcConnection)* – Can be used to make pool instantiate custom connection classes. This argument must be a subclass of `AbcConnection`.

• **loop** *(EventLoop)* – An optional event loop instance (uses `asyncio.get_event_loop()` if not specified).

Returns Redis client (result of `commands_factory` call), `Redis` by default.
7.4 aioredis.Redis — Commands Mixins Reference

This section contains reference for mixins implementing Redis commands. Descriptions are taken from docstrings so may not contain proper markup.

```python
class aioredis.Redis(pool_or_conn)
    High-level Redis interface.
    Gathers in one place Redis commands implemented in mixins.
    For commands details see: http://redis.io/commands/#connection

    Parameters pool_or_conn (AbcConnection) – Can be either RedisConnection or ConnectionsPool.

    address
        Redis connection address (if applicable).

    auth (password)
        Authenticate to server.
        This method wraps call to aioredis.RedisConnection.auth()

    close()
        Close client connections.

    closed
        True if connection is closed.

    connection

    db
        Currently selected db index.

    echo (message, *, encoding=<object object>)
        Echo the given string.

    encoding
        Current set codec or None.

    in_transaction
        Set to True when MULTI command was issued.

    ping (message=<object object>, *, encoding=<object object>)
        Ping the server.
        Accept optional echo message.

    quit()
        Close the connection.

    select (db)
        Change the selected database for the current connection.
        This method wraps call to aioredis.RedisConnection.select()

    coroutine wait_closed()
        Coroutine waiting until underlying connections are closed.
```
7.4.1 Generic commands

class aioredis.commands.GenericCommandsMixin
Generic commands mixin.

For commands details see: http://redis.io/commands/#generic

    delete (key, *keys)
    Delete a key.

    dump (key)
    Dump a key.

    exists (key, *keys)
    Check if key(s) exists.
    Changed in version v0.2.9: Accept multiple keys; return type changed from bool to int.

    expire (key, timeout)
    Set a timeout on key.
    if timeout is float it will be multiplied by 1000 coerced to int and passed to pexpire method.
    Otherwise raises TypeError if timeout argument is not int.

    expireat (key, timestamp)
    Set expire timestamp on a key.
    if timeout is float it will be multiplied by 1000 coerced to int and passed to pexpireat method.
    Otherwise raises TypeError if timestamp argument is not int.

    iscan (match=None, count=None)
    Incrementally iterate the keys space using async for.
    Usage example:

```
>>> async for key in redis.iscan(match='something*'):
    ...     print('Matched:', key)
```

    keys (pattern, *, encoding=<object object>)
    Returns all keys matching pattern.

    migrate (host, port, key, dest_db, timeout, *, copy=False, replace=False)
    Atomically transfer a key from a Redis instance to another one.

    migrate_keys (host, port, keys, dest_db, timeout, *, copy=False, replace=False)
    Atomically transfer keys from one Redis instance to another one.
    Keys argument must be list/tuple of keys to migrate.

    move (key, db)
    Move key from currently selected database to specified destination.

    Raises
    • TypeError – if db is not int
    • ValueError – if db is less then 0

    object_encoding (key)
    Returns the kind of internal representation used in order to store the value associated with a key (OBJECT ENCODING).
object_idletime (key)
Returns the number of seconds since the object is not requested by read or write operations (OBJECT IDLETIME).

object_refcount (key)
Returns the number of references of the value associated with the specified key (OBJECT REFCOUNT).

persist (key)
Remove the existing timeout on key.

pexpire (key, timeout)
Set a milliseconds timeout on key.

    Raises TypeError – if timeout is not int

pexpireat (key, timestamp)
Set expire timestamp on key, timestamp in milliseconds.

    Raises TypeError – if timeout is not int

pttl (key)
Returns time-to-live for a key, in milliseconds.

Special return values (starting with Redis 2.8):

    • command returns -2 if the key does not exist.
    • command returns -1 if the key exists but has no associated expire.

randomkey (encoding=<object object>)
Return a random key from the currently selected database.

rename (key, newkey)
Renames key to newkey.

    Raises ValueError – if key == newkey

renamenx (key, newkey)
Renames key to newkey only if newkey does not exist.

    Raises ValueError – if key == newkey

restore (key, ttl, value)
Creates a key associated with a value that is obtained via DUMP.

scan (cursor=0, match=None, count=None)
Incrementally iterate the keys space.

Usage example:

```python
>>> match = 'something*'  
>>> cur = b'0'  
>>> while cur:
...     cur, keys = await redis.scan(cur, match=match)  
...     for key in keys:
...         print('Matched:', key)
```

sort (key, *get_patterns, by=None, offset=None, count=None, asc=None, alpha=False, store=None)
Sort the elements in a list, set or sorted set.

touch (key, *keys)
Alters the last access time of a key(s).

Returns the number of keys that were touched.
**ttl** *(key)*

Returns time-to-live for a key, in seconds.

Special return values (starting with Redis 2.8):

* `command` returns `-2` if the key does not exist.
* `command` returns `-1` if the key exists but has no associated expire.

**type** *(key)*

Returns the string representation of the value’s type stored at key.

**unlink** *(key, *keys)*

Delete a key asynchronously in another thread.

**wait** *(numslaves, timeout)*

Wait for the synchronous replication of all the write commands sent in the context of the current connection.

### 7.4.2 Geo commands

New in version v0.3.0.

```python
class aioredis.commands.GeoCommandsMixin
    Geo commands mixin.

    For commands details see: http://redis.io/commands#geo
```

**geoadd** *(key, longitude, latitude, member, *args, **kwargs)*

Add one or more geospatial items in the geospatial index represented using a sorted set.

**Return type** int

**geodist** *(key, member1, member2, unit='m')*

Returns the distance between two members of a geospatial index.

**Return type** list[float or None]

**geohash** *(key, member, *members, **kwargs)*

Returns members of a geospatial index as standard geohash strings.

**Return type** list[str or bytes or None]

**geopos** *(key, member, *members, **kwargs)*

Returns longitude and latitude of members of a geospatial index.

**Return type** list[GeoPoint or None]

**georadius** *(key, longitude, latitude, radius, unit='m', *, with_dist=False, with_hash=False, with_coord=False, count=None, sort=None, encoding=<object object>)*

Query a sorted set representing a geospatial index to fetch members matching a given maximum distance from a point.

Return value follows Redis convention:

- if none of WITH* flags are set – list of strings returned:
  ```python
  >>> await redis.georadius('Sicily', 15, 37, 200, 'km')
  [b"Palermo", b"Catania"]
  ```

- if any flag (or all) is set – list of named tuples returned:
```python
>>> await redis.georadius('Sicily', 15, 37, 200, 'km',
...                      with_dist=True)
[GeoMember(name=b"Palermo", dist=190.4424, hash=None, coord=None),
 GeoMember(name=b"Catania", dist=56.4413, hash=None, coord=None)]
```

Raises
- **TypeError** – radius is not float or int
- **TypeError** – count is not int
- **ValueError** – if unit not equal m, km, mi or ft
- **ValueError** – if sort not equal ASC or DESC

Return type  list[str] or list[GeoMember]

`georadiusbymember(key, member, radius, unit='m', *, with_dist=False, with_hash=False, with_coord=False, count=None, sort=None, encoding=<object object>)`

Query a sorted set representing a geospatial index to fetch members matching a given maximum distance from a member.

Return value follows Redis convention:
- if none of WITH* flags are set – list of strings returned:

  ```python
  >>> await redis.georadiusbymember('Sicily', 'Palermo', 200, 'km')
  [b"Palermo", b"Catania"]
  ```

- if any flag (or all) is set – list of named tuples returned:

  ```python
  >>> await redis.georadiusbymember('Sicily', 'Palermo', 200, 'km',
  ...                                 with_dist=True)
  [GeoMember(name=b"Palermo", dist=190.4424, hash=None, coord=None),
   GeoMember(name=b"Catania", dist=56.4413, hash=None, coord=None)]
  ```

Raises
- **TypeError** – radius is not float or int
- **TypeError** – count is not int
- **ValueError** – if unit not equal m, km, mi or ft
- **ValueError** – if sort not equal ASC or DESC

Return type  list[str] or list[GeoMember]

Geo commands result wrappers

```python
class aioredis.commands.GeoPoint(longitude, latitude)
Bases: tuple
```

Named tuple representing result returned by GEOPOS and GEORADIUS commands.

Parameters
- `longitude (float)` – longitude value.
- `latitude (float)` – latitude value.
class aioredis.commands.GeoMember(member, dist, hash, coord)
Bases: tuple

Named tuple representing result returned by GEORADIUS and GEORADIUSBYMEMBER commands.

Parameters

- **member**(str or bytes) – Value of geo sorted set item;
- **dist**(None or float) – Distance in units passed to call. None if with_dist was not set in georadius() call.
- **hash**(None or int) – Geo-hash represented as number. None if with_hash was not in georadius() call.
- **coord**(None or GeoPoint) – Coordinate of geospatial index member. None if with_coord was not set in georadius() call.

7.4.3 Strings commands

class aioredis.commands.StringCommandsMixin
String commands mixin.

For commands details see: http://redis.io/commands/#string

**append**(key, value)
Append a value to key.

**bitcount**(key, start=None, end=None)
Count set bits in a string.

    Raises **TypeError** – if only start or end specified.

**bitop_and**(dest, key, *keys)
Perform bitwise AND operations between strings.

**bitop_not**(dest, key)
Perform bitwise NOT operations between strings.

**bitop_or**(dest, key, *keys)
Perform bitwise OR operations between strings.

**bitop_xor**(dest, key, *keys)
Perform bitwise XOR operations between strings.

**bitpos**(key, bit, start=None, end=None)
Find first bit set or clear in a string.

    Raises **ValueError** – if bit is not 0 or 1

**decr**(key)
Decrement the integer value of a key by one.

**decrby**(key, decrement)
Decrement the integer value of a key by the given number.

    Raises **TypeError** – if decrement is not int

**get**(key, *, encoding=<object object>)
Get the value of a key.

**getbit**(key, offset)
Returns the bit value at offset in the string value stored at key.
Raises

- **TypeError** – if offset is not int
- **ValueError** – if offset is less than 0

**getrange** *(key, start, end, *, encoding=<object object>)*
Get a substring of the string stored at a key.

**Raises** **TypeError** – if start or end is not int

**getset** *(key, value, *, encoding=<object object>)*
Set the string value of a key and return its old value.

**incr** *(key)*
Increment the integer value of a key by one.

**incrby** *(key, increment)*
Increment the integer value of a key by the given amount.

**Raises** **TypeError** – if increment is not int

**incrbyfloat** *(key, increment)*
Increment the float value of a key by the given amount.

**Raises** **TypeError** – if increment is not int

**mget** *(key, *keys, encoding=<object object>)*
Get the values of all the given keys.

**mset** *(key, value, *pairs)*
Set multiple keys to multiple values.

**Raises** **TypeError** – if len of pairs is not even number

**msetnx** *(key, value, *pairs)*
Set multiple keys to multiple values, only if none of the keys exist.

**Raises** **TypeError** – if len of pairs is not even number

**psetex** *(key, milliseconds, value)*
Set the value and expiration in milliseconds of a key.

**Raises** **TypeError** – if milliseconds is not int

**set** *(key, value, *, expire=0, pexpire=0, exist=None)*
Set the string value of a key.

**Raises** **TypeError** – if expire or pexpire is not int

**setbit** *(key, offset, value)*
Sets or clears the bit at offset in the string value stored at key.

**Raises**

- **TypeError** – if offset is not int
- **ValueError** – if offset is less than 0 or value is not 0 or 1

**setex** *(key, seconds, value)*
Set the value and expiration of a key.

If seconds is float it will be multiplied by 1000 coerced to int and passed to **psetex** method.

**Raises** **TypeError** – if seconds is neither int nor float
**setnx** *(key, value)*
Set the value of a key, only if the key does not exist.

**setrange** *(key, offset, value)*
Overwrite part of a string at key starting at the specified offset.

*Raises*
- **TypeError** – if offset is not int
- **ValueError** – if offset less than 0

**strlen** *(key)*
Get the length of the value stored in a key.

### 7.4.4 Hash commands

class **aioredis.commands.HashCommandsMixin**
Hash commands mixin.

For commands details see: [http://redis.io/commands#hash](http://redis.io/commands#hash)

**hdel** *(key, field, *fields)*
Delete one or more hash fields.

**hexists** *(key, field)*
Determine if hash field exists.

**hget** *(key, field, *, encoding=<object object>)*
Get the value of a hash field.

**hgetall** *(key, *, encoding=<object object>)*
Get all the fields and values in a hash.

**hincrby** *(key, field, increment=1)*
Increment the integer value of a hash field by the given number.

**hincrbyfloat** *(key, field, increment=1.0)*
Increment the float value of a hash field by the given number.

**hkeys** *(key, *, encoding=<object object>)*
Get all the fields in a hash.

**hlen** *(key)*
Get the number of fields in a hash.

**hmget** *(key, field, *fields, encoding=<object object>)*
Get the values of all the given fields.

**hmset** *(key, field, value, *pairs)*
Set multiple hash fields to multiple values.

**hmset_dict** *(key, *args, **kwargs)*
Set multiple hash fields to multiple values.

dict can be passed as first positional argument:

```python
>>> await redis.hmset_dict('key', {'field1': 'value1', 'field2': 'value2'})
```

or keyword arguments can be used:
>>> await redis.hmset_dict(
...     'key', field1='value1', field2='value2')

or dict argument can be mixed with kwargs:

>>> await redis.hmset_dict(
...     'key', {'field1': 'value1'}, field2='value2')

**Note:** `dict` and `kwargs` not get mixed into single dictionary, if both specified and both have same key(s) – `kwargs` will win:

```python
>>> await redis.hmset_dict('key', {'foo': 'bar'}, foo='baz')
>>> await redis.hget('key', 'foo', encoding='utf-8')
'baz'
```

**hscan** *(key, cursor=0, match=None, count=None)*

Incrementally iterate hash fields and associated values.

**hset** *(key, field, value)*

Set the string value of a hash field.

**hsetnx** *(key, field, value)*

Set the value of a hash field, only if the field does not exist.

**hstrlen** *(key, field)*

Get the length of the value of a hash field.

**hvals** *(key, *, encoding=<object object>)*

Get all the values in a hash.

**ihscan** *(key, *, match=None, count=None)*

Incrementally iterate sorted set items using async for.

Usage example:

```python
>>> async for name, val in redis.ihscan(key, match='something*'): ...
...     print('Matched:', name, '->', val)
```

### 7.4.5 List commands

**class aioredis.commands.ListCommandsMixin**

List commands mixin.

For commands details see: [http://redis.io/commands#list](http://redis.io/commands#list)

**blpop** *(key, *keys, timeout=0, encoding=<object object>)*

Remove and get the first element in a list, or block until one is available.

**Raises**

- `TypeError` – if timeout is not int
- `ValueError` – if timeout is less then 0

**brpop** *(key, *keys, timeout=0, encoding=<object object>)*

Remove and get the last element in a list, or block until one is available.

**Raises**
• **TypeError** – if timeout is not int
  • **ValueError** – if timeout is less than 0

`brpoplpush(sourcekey, destkey, timeout=0, encoding=<object object>)`
Remove and get the last element in a list, or block until one is available.

**Raises**

• **TypeError** – if timeout is not int
  • **ValueError** – if timeout is less than 0

`lindex(key, index, *, encoding=<object object>)`
Get an element from a list by its index.

**Raises** **TypeError** – if index is not int

`linsert(key, pivot, value, before=False)`
Inserts value in the list stored at key either before or after the reference value pivot.

`llen(key)`
Returns the length of the list stored at key.

`lpop(key, *, encoding=<object object>)`
Removes and returns the first element of the list stored at key.

`lpush(key, value, *values)`
Insert all the specified values at the head of the list stored at key.

`lpushx(key, value)`
Inserts value at the head of the list stored at key, only if key already exists and holds a list.

`lrange(key, start, stop, *, encoding=<object object>)`
Returns the specified elements of the list stored at key.

**Raises** **TypeError** – if start or stop is not int

`lrem(key, count, value)`
Removes the first count occurrences of elements equal to value from the list stored at key.

**Raises** **TypeError** – if count is not int

`lset(key, index, value)`
Sets the list element at index to value.

**Raises** **TypeError** – if index is not int

`ltrim(key, start, stop)`
Trim an existing list so that it will contain only the specified range of elements specified.

**Raises** **TypeError** – if start or stop is not int

`rpop(key, *, encoding=<object object>)`
Removes and returns the last element of the list stored at key.

`rpoplpush(sourcekey, destkey, *, encoding=<object object>)`
Atomically returns and removes the last element (tail) of the list stored at source, and pushes the element at the first element (head) of the list stored at destination.

`rpush(key, value, *values)`
Insert all the specified values at the tail of the list stored at key.

`rpushx(key, value)`
Inserts value at the tail of the list stored at key, only if key already exists and holds a list.
7.4.6 Set commands

class aioredis.commands.SetCommandsMixin
Set commands mixin.

For commands details see: http://redis.io/commands#set

isscan(key, *, match=None, count=None)
Incrementally iterate set elements using async for.
Usage example:

```python
>>> async for val in redis.isscan(key, match='something*'):
...     print('Matched:', val)
```

sadd(key, member, *members)
Add one or more members to a set.
scard(key)
Get the number of members in a set.

sdiff(key, *keys)
Subtract multiple sets.

sdiffstore(destkey, key, *keys)
Subtract multiple sets and store the resulting set in a key.

sinter(key, *keys)
Intersect multiple sets.

sinterstore(destkey, key, *keys)
Intersect multiple sets and store the resulting set in a key.
sismember(key, member)
Determine if a given value is a member of a set.

smembers(key, *, encoding=<object object>)
Get all the members in a set.

smove(sourcekey, destkey, member)
Move a member from one set to another.

spop(key, *, encoding=<object object>)
Remove and return a random member from a set.

srandmember(key, count=None, *, encoding=<object object>)
Get one or multiple random members from a set.

srem(key, member, *members)
Remove one or more members from a set.

sscan(key, cursor=0, match=None, count=None)
Incrementally iterate Set elements.

sunion(key, *keys)
Add multiple sets.

sunionstore(destkey, key, *keys)
Add multiple sets and store the resulting set in a key.
7.4.7 Sorted Set commands

class aioredis.commands.SortedSetCommandsMixin
Sorted Sets commands mixin.

For commands details see: http://redis.io/commands/#sorted_set

izscan (key, *, match=None, count=None)
Incrementally iterate sorted set items using async for.

Usage example:

```python
>>> async for val, score in redis.izscan(key, match='something*'):
...   print('Matched:', val, ':', score)
```

zadd (key, score, member, *pairs, exist=None)
Add one or more members to a sorted set or update its score.

Raises

• **TypeError** – score not int or float
• **TypeError** – length of pairs is not even number

zcard (key)
Get the number of members in a sorted set.

zcount (key, min=-inf, max=inf, *, exclude=None)
Count the members in a sorted set with scores within the given values.

Raises

• **TypeError** – min or max is not float or int
• **ValueError** – if min grater then max

zincrby (key, increment, member)
Increment the score of a member in a sorted set.

Raises **TypeError** – increment is not float or int

zinterstore (destkey, key, *keys, with_weights=False, aggregate=None)
Intersect multiple sorted sets and store result in a new key.

Parameters with_weights (bool) – when set to true each key must be a tuple in form of
(key, weight)

zlexcount (key, min=b'\'-', max=b'+', include_min=True, include_max=True)
Count the number of members in a sorted set between a given lexicographical range.

Raises

• **TypeError** – if min is not bytes
• **TypeError** – if max is not bytes

zrange (key, start=0, stop=-1, withscores=False, encoding=<object object>)
Return a range of members in a sorted set, by index.

Raises

• **TypeError** – if start is not int
• **TypeError** – if stop is not int
zrangebylex(key, min=b'-', max=b'+', include_min=True, include_max=True, offset=None, count=None, encoding=<object object>)

Return a range of members in a sorted set, by lexicographical range.

Raises

- TypeError – if min is not bytes
- TypeError – if max is not bytes
- TypeError – if both offset and count are not specified
- TypeError – if offset is not bytes
- TypeError – if count is not bytes

zrangebyscore(key, min=-inf, max=inf, withscores=False, offset=None, count=None, *, exclude=None, encoding=<object object>)

Return a range of members in a sorted set, by score.

Raises

- TypeError – if min or max is not float or int
- TypeError – if both offset and count are not specified
- TypeError – if offset is not int
- TypeError – if count is not int

zrank(key, member)

Determine the index of a member in a sorted set.

zrem(key, member, *members)

Remove one or more members from a sorted set.

zremrangebylex(key, min=b'-', max=b'+', include_min=True, include_max=True, offset=None, count=None, encoding=<object object>)

Remove all members in a sorted set between the given lexicographical range.

Raises

- TypeError – if min is not bytes
- TypeError – if max is not bytes

zremrangebyrank(key, start, stop)

Remove all members in a sorted set within the given indexes.

Raises

- TypeError – if start is not int
- TypeError – if stop is not int

zremrangebyscore(key, min=-inf, max=inf, *, exclude=None)

Remove all members in a sorted set within the given scores.

Raises TypeError – if min or max is not int or float

zrevrange(key, start, stop, withscores=False, encoding=<object object>)

Return a range of members in a sorted set, by index, with scores ordered from high to low.

Raises TypeError – if start or stop is not int

zrevrangebylex(key, min=b'-', max=b'+', include_min=True, include_max=True, offset=None, count=None, encoding=<object object>)

Return a range of members in a sorted set, by lexicographical range from high to low.
Raises

- **TypeError** – if min is not bytes
- **TypeError** – if max is not bytes
- **TypeError** – if both offset and count are not specified
- **TypeError** – if offset is not bytes
- **TypeError** – if count is not bytes

```python
zreverangebyscore(key, max=inf, min=-inf, *, exclude=None, withscores=False, offset=None, count=None, encoding=<object object>)
```

Return a range of members in a sorted set, by score, with scores ordered from high to low.

Raises

- **TypeError** – if min or max is not float or int
- **TypeError** – if both offset and count are not specified
- **TypeError** – if offset is not int
- **TypeError** – if count is not int

```python
zrevrank(key, member)
```

Determine the index of a member in a sorted set, with scores ordered from high to low.

```python
zscan(key, cursor=0, match=None, count=None)
```

Incrementally iterate sorted sets elements and associated scores.

```python
zscore(key, member)
```

Get the score associated with the given member in a sorted set.

```python
zunionstore(destkey, key, *keys, with_weights=False, aggregate=None)
```

Add multiple sorted sets and store result in a new key.

### 7.4.8 Server commands

```python
class aioredis.commands.ServerCommandsMixin
    Server commands mixin.
```

For commands details see: http://redis.io/commands/#server

```python
bgrewriteaof()
```

Asynchronously rewrite the append-only file.

```python
bgsave()
```

Asynchronously save the dataset to disk.

```python
client_getname(encoding=<object object>)
```

Get the current connection name.

```python
client_kill()
```

Kill the connection of a client.

**Warning:** Not Implemented

```python
client_list()
```

Get the list of client connections.
Returns list of ClientInfo named tuples.

`client_pause(timeout)`
Stop processing commands from clients for `timeout` milliseconds.

**Raises**
- `TypeError` – if `timeout` is not int
- `ValueError` – if `timeout` is less than 0

`client_setname(name)`
Set the current connection name.

`command()`
Get array of Redis commands.

`command_count()`
Get total number of Redis commands.

`command_getkeys(command, *args, encoding='utf-8')`
Extract keys given a full Redis command.

`command_info(command, *commands)`
Get array of specific Redis command details.

`config_get(parameter='*')`
Get the value of a configuration parameter(s).

If called without argument will return all parameters.

**Raises** `TypeError` – if `parameter` is not string

`config_resetstat()`
Reset the stats returned by INFO.

`config_rewrite()`
Rewrite the configuration file with the in memory configuration.

`config_set(parameter, value)`
Set a configuration parameter to the given value.

`dbsize()`
Return the number of keys in the selected database.

`debug_object(key)`
Get debugging information about a key.

`debug_segfault(key)`
Make the server crash.

`debug_sleep(timeout)`
Suspend connection for `timeout` seconds.

`flushall(async_op=False)`
Remove all keys from all databases.

**Parameters** `async_op` – lets the entire dataset to be freed asynchronously. Defaults to False

`flushdb(async_op=False)`
Remove all keys from the current database.

**Parameters** `async_op` – lets a single database to be freed asynchronously. Defaults to False
**info (section='default')**
Get information and statistics about the server.

If called without argument will return default set of sections. For available sections, see [http://redis.io/commands/INFO](http://redis.io/commands/INFO)

* Raises **ValueError** – if section is invalid

**lastsave ()**
Get the UNIX time stamp of the last successful save to disk.

**monitor ()**
Listen for all requests received by the server in real time.

**role ()**
Return the role of the server instance.

Returns named tuples describing role of the instance. For fields information see [http://redis.io/commands/role#output-format](http://redis.io/commands/role#output-format)

**save ()**
Synchronously save the dataset to disk.

**shutdown (save=None)**
Synchronously save the dataset to disk and then shut down the server.

**slaveof (host=<object object>, port=None)**
Make the server a slave of another instance, or promote it as master.

Calling `slaveof(None)` will send `SLAVEOF NO ONE`.

Changed in version v0.2.6: `slaveof()` form deprecated in favour of explicit `slaveof(None)`.

**slowlog_get (length=None)**
Returns the Redis slow queries log.

**slowlog_len ()**
Returns length of Redis slow queries log.

**slowlog_reset ()**
Resets Redis slow queries log.

**sync ()**
Redis-server internal command used for replication.

**time ()**
Return current server time.

### 7.4.9 HyperLogLog commands

**class aioredis.commands.HyperLogLogCommandsMixin**
HyperLogLog commands mixin.
For commands details see: [http://redis.io/commands#hyperloglog](http://redis.io/commands#hyperloglog)

**pfadd (key, value, *values)**
Adds the specified elements to the specified HyperLogLog.
pfcount(key, *keys)
Return the approximated cardinality of the set(s) observed by the HyperLogLog at key(s).

pfmerge(destkey, sourcekey, *sourcekeys)
Merge N different HyperLogLogs into a single one.

7.4.10 Transaction commands

class aioredis.commands.TransactionsCommandsMixin
Transaction commands mixin.
For commands details see: http://redis.io/commands/#transactions

Transactions HOWTO:
```python
>>> tr = redis.multi_exec()
>>> result_future1 = tr.incr('foo')
>>> result_future2 = tr.incr('bar')
>>> try:
...     result = await tr.execute()
... except MultiExecError:
...     pass  # check what happened
>>> result1 = await result_future1
>>> result2 = await result_future2
>>> assert result == [result1, result2]
```

multi_exec()
Returns MULTI/EXEC pipeline wrapper.
Usage:
```python
>>> tr = redis.multi_exec()
>>> fut1 = tr.incr('foo')  # NO `await` as it will block forever!
>>> fut2 = tr.incr('bar')
>>> result = await tr.execute()
>>> result
[1, 1]
>>> await asyncio.gather(fut1, fut2)
[1, 1]
```

pipeline()
Returns Pipeline object to execute bulk of commands.
It is provided for convenience. Commands can be pipelined without it.
Example:
```python
>>> pipe = redis.pipeline()
>>> fut1 = pipe.incr('foo')  # NO `await` as it will block forever!
>>> fut2 = pipe.incr('bar')
>>> result = await pipe.execute()
>>> result
[1, 1]
>>> await asyncio.gather(fut1, fut2)
[1, 1]
>>> #
>>> # The same can be done without pipeline:
>>> #
```
unwatch()
   Forget about all watched keys.

watch(key, *keys)
   Watch the given keys to determine execution of the MULTI/EXEC block.

class aioredis.commands.Pipeline(connection, commands_factory=lambda conn: conn, *, loop=None)
Commands pipeline.
Buffers commands for execution in bulk.
This class implements __getattr__ method allowing to call methods on instance created with commands_factory.

Parameters
   • connection (aioredis.RedisConnection) – Redis connection
   • commands_factory (callable) – Commands factory to get methods from.
   • loop (EventLoop) – An optional event loop instance (uses asyncio.get_event_loop() if not specified).

coroutine execute(*, return_exceptions=False)
Executes all buffered commands and returns result.
Any exception that is raised by any command is caught and raised later when processing results.
If return_exceptions is set to True then all collected errors are returned in resulting list otherwise single aioredis.PipelineError exception is raised (containing all collected errors).

Parameters return_exceptions (bool) – Raise or return exceptions.

    Raises aioredis.MultiExecError – Raised instead of aioredis.PipelineError
    • aioredis.WatchVariableError – If watched variable is changed
7.4.11 Scripting commands

class aioredis.commands.ScriptingCommandsMixin
Set commands mixin.

For commands details see: http://redis.io/commands#scripting

eval(script, keys=[], args=[])
Execute a Lua script server side.

evalsha(digest, keys=[], args=[])
Execute a Lua script server side by its SHA1 digest.

script_exists(digest, *digests)
Check existence of scripts in the script cache.

script_flush()
Remove all the scripts from the script cache.

script_kill()
Kill the script currently in execution.

script_load(script)
Load the specified Lua script into the script cache.

7.4.12 Server commands

class aioredis.commands.ServerCommandsMixin
Server commands mixin.

For commands details see: http://redis.io/commands/#server

bgrewriteaof()
Asynchronously rewrite the append-only file.

bgsave()
Asynchronously save the dataset to disk.

client_getname(encoding=<object object>)
Get the current connection name.

client_kill()
Kill the connection of a client.

Warning: Not Implemented

client_list()
Get the list of client connections.

Returns list of ClientInfo named tuples.

client_pause(timeout)
Stop processing commands from clients for timeout milliseconds.

Raises
- TypeError – if timeout is not int
- ValueError – if timeout is less then 0
client_setname(name)
    Set the current connection name.

command()
    Get array of Redis commands.

command_count()
    Get total number of Redis commands.

command_getkeys(command, *args, encoding='utf-8')
    Extract keys given a full Redis command.

command_info(command, *commands)
    Get array of specific Redis command details.

config_get(parameter='*')
    Get the value of a configuration parameter(s).
    If called without argument will return all parameters.
    
    Raises TypeError – if parameter is not string

config_resetstat()
    Reset the stats returned by INFO.

config_rewrite()
    Rewrite the configuration file with the in memory configuration.

config_set(parameter, value)
    Set a configuration parameter to the given value.

dbsize()
    Return the number of keys in the selected database.

debug_object(key)
    Get debugging information about a key.

debug_segfault(key)
    Make the server crash.

debug_sleep(timeout)
    Suspend connection for timeout seconds.

flushall(async_op=False)
    Remove all keys from all databases.
    
    Parameters async_op – lets the entire dataset to be freed asynchronously. Defaults to False

flushdb(async_op=False)
    Remove all keys from the current database.
    
    Parameters async_op – lets a single database to be freed asynchronously. Defaults to False

info(section='default')
    Get information and statistics about the server.
    
    If called without argument will return default set of sections. For available sections, see http://redis.io/commands/INFO
    
    Raises ValueError – if section is invalid

lastsave()
    Get the UNIX time stamp of the last successful save to disk.
monitor()
    Listen for all requests received by the server in real time.

    Warning: Will not be implemented for now.

role()
    Return the role of the server instance.
    Returns named tuples describing role of the instance. For fields information see http://redis.io/commands/role#output-format

save()
    Synchronously save the dataset to disk.

shutdown (save=None)
    Synchronously save the dataset to disk and then shut down the server.

slaveof (host=<object object>, port=None)
    Make the server a slave of another instance, or promote it as master.
    Calling slaveof(None) will send SLAVEOF NO ONE.
    Changed in version v0.2.6: slaveof() form deprecated in favour of explicit slaveof(None).

slowlog_get (length=None)
    Returns the Redis slow queries log.

slowlog_len()
    Returns length of Redis slow queries log.

slowlog_reset()
    Resets Redis slow queries log.

time()
    Return current server time.

7.4.13 Pub/Sub commands

Also see aioredis.Channel.

class aioredis.commands.PubSubCommandsMixin
    Pub/Sub commands mixin.
    For commands details see: http://redis.io/commands/#pubsub

    channels
        Returns read-only channels dict.
        See pubsub_channels

    in_pubs
        Indicates that connection is in PUB/SUB mode.
        Provides the number of subscribed channels.

    patterns
        Returns read-only patterns dict.
See `pubsub_patterns`

`psubscribe` *(pattern, *patterns)*  
Switch connection to Pub/Sub mode and subscribe to specified patterns.

Arguments can be instances of `Channel`.

Returns `asyncio.gather()` coroutine which when done will return a list of subscribed `Channel` objects with `is_pattern` property set to `True`.

`publish` *(channel, message)*  
Post a message to channel.

`publish_json` *(channel, obj)*  
Post a JSON-encoded message to channel.

`pubsub_channels` *(pattern=\texttt{None})*  
Lists the currently active channels.

`pubsub_numpat` ()  
Returns the number of subscriptions to patterns.

`pubsub_nums\text{ub}` *(\texttt{*channels})*  
Returns the number of subscribers for the specified channels.

`punsubscribe` *(pattern, *patterns)*  
Unsubscribe from specific patterns.

Arguments can be instances of `Channel`.

`subscribe` *(channel, *channels)*  
Switch connection to Pub/Sub mode and subscribe to specified channels.

Arguments can be instances of `Channel`.

Returns `asyncio.gather()` coroutine which when done will return a list of `Channel` objects.

`unsubscribe` *(channel, *channels)*  
Unsubscribe from specific channels.

Arguments can be instances of `Channel`.

### 7.4.14 Cluster commands

**Warning:** Current release (1.1.0) of the library **does not support** Redis Cluster in a full manner. It provides only several API methods which may be changed in future.

### 7.5 `aioredis.abc` — Interfaces Reference

This module defines several abstract classes that must be used when implementing custom connection managers or other features.

```python
class aioredis.abc.AbcConnection
    Bases: abc.ABC

    Abstract connection interface.

    address
        Connection address.
```
close()
Perform connection(s) close and resources cleanup.

closed
Flag indicating if connection is closing or already closed.

db
Current selected DB index.

encoding
Current set connection codec.

execute(command, *args, **kwargs)
Execute redis command.

execute_pubsub(command, *args, **kwargs)
Execute Redis (p)subscribe/(p)unsubscribe commands.

in_pubsub
Returns number of subscribed channels.
Can be tested as bool indicating Pub/Sub mode state.

pubsub_channels
Read-only channels dict.

pubsub_patterns
Read-only patterns dict.

coroutine wait_closed()
Coroutine waiting until all resources are closed/released/cleaned up.

class aioredis.abc.AbcPool
Bases: aioredis.abc.AbcConnection
Abstract connections pool interface.
Inherited from AbcConnection so both have common interface for executing Redis commands.
coroutine acquire()
Acquires connection from pool.

address
Connection address or None.

get_connection()
Gets free connection from pool in a sync way.
If no connection available — returns None.

release(conn)
Releases connection to pool.

Parameters
conn (AbcConnection) — Owned connection to be released.

class aioredis.abc.AbcChannel
Bases: abc.ABC
Abstract Pub/Sub Channel interface.

close(exc=None)
Marks Channel as closed, no more messages will be sent to it.
Called by RedisConnection when channel is unsubscribed or connection is closed.
coroutine get()
Wait and return new message.

Will raise ChannelClosedError if channel is not active.

is_active
Flag indicating that channel has unreceived messages and not marked as closed.

is_pattern
Boolean flag indicating if channel is pattern channel.

name
Encoded channel name or pattern.

put_nowait(data)
Send data to channel.

Called by RedisConnection when new message received. For pattern subscriptions data will be a tuple of channel name and message itself.

7.6 aioredis.pubsub — Pub/Sub Tools Reference

Module provides a Pub/Sub listener interface implementing multi-producers, single-consumer queue pattern.

```python
class aioredis.pubsub.Receiver(loop=None, on_close=None)
    Multi-producers, single-consumer Pub/Sub queue.

    Can be used in cases where a single consumer task must read messages from several different channels (where pattern subscriptions may not work well or channels can be added/removed dynamically).

    Example use case:

    >>> from aioredis.pubsub import Receiver
    >>> from aioredis.abc import AbcChannel
    >>> mpsc = Receiver(loop=loop)
    >>> async def reader(mpsc):
    ...     async for channel, msg in mpsc.iter():
    ...         assert isinstance(channel, AbcChannel)
    ...         print("Got {!r} in channel {!r}".format(msg, channel))
    >>> asyncio.ensure_future(reader(mpsc))
    >>> await redis.subscribe(mpsc.channel('channel:1'),
    ...     mpsc.channel('channel:3'))
    ...     mpsc.channel('channel:5'))
    >>> await redis.psubscribe(mpsc.pattern('hello'))
    >>> # publishing 'Hello world' into 'hello-channel'
    >>> # will print this message:
    >>> Got b'Hello world' in channel b'hello-channel'
    >>> # when all is done:
    >>> await redis.unsubscribe('channel:1', 'channel:3', 'channel:5')
    >>> await redis.punsubscribe('hello')
    >>> mpsc.stop()
    >>> # any message received after stop() will be ignored.
```

Warning: Currently subscriptions implementation has few issues that will be solved eventually, but until then developer must be aware of the following:
- Single Receiver instance can not be shared between two (or more) connections (or client instances) because any of them can close _Sender.
- Several Receiver instances can not subscribe to the same channel or pattern. This is a flaw in subscription mode implementation: subsequent subscriptions to some channel always return first-created Channel object.

**channel** *(name)*
Create a channel.

Returns _Sender object implementing AbcChannel.

**channels**
Read-only channels dict.

**check_stop** *(channel, exc=None)*
TBD

**coroutine get** *(encoding=None, decoder=None)*
Wait for and return pub/sub message from one of channels.

Return value is either:
- tuple of two elements: channel & message;
- tuple of three elements: pattern channel, (target channel & message);
- or None in case Receiver is not active or has just been stopped.

**Raises** aioredis.ChannelClosedError – If listener is stopped and all messages have been received.

**is_active**
Returns True if listener has any active subscription.

**iter** *(encoding=None, decoder=None)*
Returns async iterator.

Usage example:

```python
>>> async for ch, msg in mpsc.iter():
...   print(ch, msg)
```

**pattern** *(pattern)*
Create a pattern channel.

Returns _Sender object implementing AbcChannel.

**patterns**
Read-only patterns dict.

**stop** ()
Stop receiving messages.

All new messages after this call will be ignored, so you must call unsubscribe before stopping this listener.

**coroutine wait_message** ()
Blocks until new message appear.

**class** aioredis.pubsub._Sender *(receiver, name, is_pattern)*
Write-Only Channel.
Does not allow direct `.get()` calls.

Bases: `aioredis.abc.AbcChannel`

Not to be used directly, returned by `Receiver.channel()` or `Receiver.pattern()` calls.

7.7 `aioredis.sentinel` — Sentinel Client Reference

This section contains reference for Redis Sentinel client.

Sample usage:

```python
import aioredis

sentinel = await aioredis.create_sentinel(
    [('sentinel.host1', 26379), ('sentinel.host2', 26379)])

redis = sentinel.master_for('mymaster')
assert await redis.set('key', 'value')
assert await redis.get('key', encoding='utf-8') == 'value'

# redis client will reconnect/reconfigure automatically
# by sentinel client instance
```

7.7.1 RedisSentinel

coroutine `aioredis.sentinel.create_sentinel`(sentinels, *, db=None, password=None, encoding=None, minsize=1, maxsize=10, ssl=None, parser=None, loop=None)

Creates Redis Sentinel client.

Parameters

- **sentinels** *(list[tuple]*) — A list of Sentinel node addresses.
- **db** *(int)* — Redis database index to select for every master/slave connections.
- **password** *(str or bytes or None)* — Password to use if Redis server instance requires authorization.
- **encoding** *(str or None)* — Codec to use for response decoding.
- **minsize** *(int)* — Minimum number of connections (to master or slave) to initialize and keep in pool. Default is 1.
- **maxsize** *(int)* — Maximum number of connections (to master or slave) that can be created in pool. Default is 10.
- **ssl** *(ssl.SSLContext or True or None)* — SSL context that is passed through to `asyncio.BaseEventLoop.create_connection()`.
- **parser** *(callable or None)* — Protocol parser class. Can be used to set custom protocol reader; expected same interface as `hiredis.Reader`.
- **loop** *(EventLoop)* — An optional event loop instance (uses `asyncio.get_event_loop()` if not specified).

Return type `RedisSentinel`
class aioredis.sentinel.RedisSentinel
Redis Sentinel client.

The class provides interface to Redis Sentinel commands as well as few methods to acquire managed Redis clients, see below.

closed
True if client is closed.

master_for(name)
Get Redis client to named master. The client is instantiated with special connections pool which is controlled by SentinelPool. This method is not a coroutine.

Parameters:
- name (str) – Service name.

Return type: aioredis.Redis

slave_for(name)
Get Redis client to named slave. The client is instantiated with special connections pool which is controlled by SentinelPool. This method is not a coroutine.

Parameters:
- name (str) – Service name.

Return type: aioredis.Redis

execute(command, *args, **kwargs)
Execute Sentinel command. Every command is prefixed with SENTINEL automatically.

Return type: asyncio.Future

coroutine ping()
Send PING to Sentinel instance. Currently the ping command will be sent to first sentinel in pool, this may change in future.

master(name)
Returns a dictionary containing the specified master’s state. Please refer to Redis documentation for more info on returned data.

Return type: asyncio.Future

master_address(name)
Returns a (host, port) pair for the given service name.

Return type: asyncio.Future

masters()
Returns a list of dictionaries containing all masters’ states.

Return type: asyncio.Future

slaves(name)
Returns a list of slaves for the given service name.

Return type: asyncio.Future

sentinels(name)
Returns a list of Sentinels for the given service name.

Return type: asyncio.Future

monitor(name, ip, port, quorum)
Add a new master to be monitored by this Sentinel.

Parameters:
- name (str) – Service name.
• **ip**(str) – New node’s IP address.
• **port**(int) – Node’s TCP port.
• **quorum**(int) – Sentinel quorum.

**remove**(name)
Remove a master from Sentinel’s monitoring.

**Parameters**
- **name**(str) – Service name

**set**(name, option, value)
Set Sentinel monitoring parameter for a given master. Please refer to Redis documentation for more info on options.

**Parameters**
- **name**(str) – Master’s name.
- **option**(str) – Monitoring option name.
- **value**(str) – Monitoring option value.

**failover**(name)
Force a failover of a named master.

**Parameters**
- **name**(str) – Master’s name.

**check_quorum**(name)
Check if the current Sentinel configuration is able to reach the quorum needed to failover a master, and the majority needed to authorize the failover.

**Parameters**
- **name**(str) – Master’s name.

**close**()
Close all opened connections.

**coroutine wait_closed**()
Wait until all connections are closed.

### 7.7.2 SentinelPool

**Warning:** This API has not yet stabilized and may change in future releases.

**coroutine aioredis.sentinel.create_sentinel_pool**(sentinels, *, db=None, password=None, encoding=None, minsize=1, maxsize=10, ssl=None, parser=None, loop=None)

Creates Sentinel connections pool.

**class aioredis.sentinel.SentinelPool**
Sentinel connections pool.

This pool manages both sentinel connections and Redis master/slave connections.

**closed**
True if pool and all connections are closed.

**master_for**(name)
Returns a managed connections pool for requested service name.
Parameters name (str) – Service name.

Return type ManagedPool

slave_for (name)
Returns a managed connections pool for requested service name.

Parameters name (str) – Service name.

Return type ManagedPool

execute (command, *args, **kwargs)
Execute Sentinel command.

coroutine discover (timeout=0.2)
Discover Sentinels and all monitored services within given timeout.

This will reset internal state of this pool.

coroutine discover_master (service, timeout)
Perform named master discovery.

Parameters

• service (str) – Service name.
• timeout (float) – Operation timeout

Return type aioredis.RedisConnection

coroutine discover_slave (service, timeout)
Perform slave discovery.

Parameters

• service (str) – Service name.
• timeout (float) – Operation timeout

Return type aioredis.RedisConnection

close ()
Close all controlled connections (both to sentinel and redis).

coroutine wait_closed ()
Wait until pool gets closed.

7.8 Examples of aioredis usage

Below is a list of examples from aioredis/examples (see for more).

Every example is a correct python program that can be executed.

7.8.1 Low-level connection usage example

g: get source code

import asyncio
import aioredis
async def main():
    conn = await aioredis.create_connection(
        'redis://localhost', encoding='utf-8')

    ok = await conn.execute('set', 'my-key', 'some value')
    assert ok == 'OK', ok

    str_value = await conn.execute('get', 'my-key')
    raw_value = await conn.execute('get', 'my-key', encoding=None)
    assert str_value == 'some value'
    assert raw_value == b'some value'

    print('str value:', str_value)
    print('raw value:', raw_value)

    # optionally close connection
    conn.close()
    await conn.wait_closed()

if __name__ == '__main__':
    asyncio.get_event_loop().run_until_complete(main())

7.8.2 Connections pool example

get source code

```python
import asyncio
import aioredis

async def main():
    pool = await aioredis.create_pool(
        'redis://localhost',
        minsize=5, maxsize=10)
    with await pool as conn:  # low-level redis connection
        await conn.execute('set', 'my-key', 'value')
        val = await conn.execute('get', 'my-key')
        print('raw value:', val)
    pool.close()
    await pool.wait_closed()  # closing all open connections

if __name__ == '__main__':
    asyncio.get_event_loop().run_until_complete(main())
```

7.8.3 Commands example

get source code

```python
import asyncio
import aioredis

# (continues on next page)
```
async def main():
    # Redis client bound to single connection (no auto reconnection).
    redis = await aioredis.create_redis('redis://localhost')
    await redis.set('my-key', 'value')
    val = await redis.get('my-key')
    print(val)

    # gracefully closing underlying connection
    redis.close()
    await redis.wait_closed()

async def redis_pool():
    # Redis client bound to pool of connections (auto-reconnecting).
    redis = await aioredis.create_redis_pool('redis://localhost')
    await redis.set('my-key', 'value')
    val = await redis.get('my-key')
    print(val)

    # gracefully closing underlying connection
    redis.close()
    await redis.wait_closed()

if __name__ == '__main__':
    asyncio.get_event_loop().run_until_complete(main())
    asyncio.get_event_loop().run_until_complete(redis_pool())

7.8.4 Transaction example

get source code

```python
import asyncio
import aioredis

async def main():
    redis = await aioredis.create_redis('redis://localhost')
    await redis.delete('foo', 'bar')
    tr = redis.multi_exec()  
    fut1 = tr.incr('foo')  
    fut2 = tr.incr('bar')  
    res = await tr.execute()  
    res2 = await asyncio.gather(fut1, fut2)  
    print(res)
    assert res == res2

    redis.close()
    await redis.wait_closed()
```

(continues on next page)
7.8.5 Pub/Sub example

get source code

```python
import asyncio
import aioredis

async def reader(ch):
    while (await ch.wait_message()):
        msg = await ch.get_json()
        print("Got Message:", msg)

async def main():
    pub = await aioredis.create_redis('redis://localhost')
    sub = await aioredis.create_redis('redis://localhost')
    res = await sub.subscribe('chan:1')
    ch1 = res[0]

    tsk = asyncio.ensure_future(reader(ch1))
    res = await pub.publish_json('chan:1', ['Hello', 'world'])
    assert res == 1

    await sub.unsubscribe('chan:1')
    await tsk
    sub.close()
    pub.close()

if __name__ == '__main__':
    asyncio.get_event_loop().run_until_complete(main())
```

7.8.6 Scan command example

get source code

```python
import asyncio
import aioredis

async def main():
    """Scan command example."""
    redis = await aioredis.create_redis('redis://localhost')

    await redis.mset('key:1', 'value1', 'key:2', 'value2')
```

7.8. Examples of aioredis usage
cur = b'0'  # set initial cursor to 0
while cur:
    cur, keys = await redis.scan(cur, match='key:*')
    print("Iteration results:", keys)

redis.close()
await redis.wait_closed()

if __name__ == '__main__':
    import os
    if 'redis_version:2.6' not in os.environ.get('REDIS_VERSION', ''):
        asyncio.get_event_loop().run_until_complete(main())

7.8.7 Sentinel client

git source code

```python
import asyncio
import aioredis

async def main():
    sentinel_client = await aioredis.create_sentinel(
        [('localhost', 26379)])

    master_redis = sentinel_client.master_for('mymaster')
    info = await master.Redis.role()
    print("Master role:", info)
    assert info.role == 'master'

    sentinel_client.close()
    await sentinel_client.wait_closed()

if __name__ == '__main__':
    asyncio.get_event_loop().run_until_complete(main())
```

7.9 Contributing

To start contributing you must read all the following.

First you must fork/clone repo from github:

```bash
$ git clone git@github.com:aio-libs/aioredis.git
```

Next, you should install all python dependencies, it is as easy as running single command:

```bash
$ make devel
```

this command will install:

- `sphinx` for building documentation;
• pytest for running tests;
• flake8 for code linting;
• and few other packages.

7.9.1 Code style

Code must be pep8 compliant.

You can check it with following command:

```
$ make flake
```

7.9.2 Running tests

You can run tests in any of the following ways:

```
# will run tests in a verbose mode
$ make test
# or
$ py.test

# will run tests with coverage report
$ make cov
# or
$ py.test --cov
```

SSL tests

Running SSL tests requires following additional programs to be installed:

- openssl – to generate test key and certificate;
- socat – to make SSL proxy;

To install these on Ubuntu and generate test key & certificate run:

```
$ sudo apt-get install socat openssl
$ make certificate
```

Different Redis server versions

To run tests against different redises use `--redis-server` command line option:

```
$ py.test --redis-server=/path/to/custom/redis-server
```

UVLoop

To run tests with `uvloop`:

```
$ pip install uvloop
$ py.test --uvloop
```

7.9. Contributing

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Note: Until Python 3.5.2 EventLoop has no `create_future` method so aioredis won’t benefit from uvloop’s futures.

### 7.9.3 Writing tests

`aioredis` uses `pytest` tool.

Tests are located under `/tests` directory.

Pure Python 3.5 tests (ie the ones using `async/await` syntax) must be prefixed with `py35_`, for instance see:

```bash
tests/py35_generic_commands_tests.py
tests/py35_pool_test.py
```

#### Fixtures

There is a number of fixtures that can be used to write tests:

**loop**

Current event loop used for test. This is a function-scope fixture. Using this fixture will always create new event loop and set global one to None.

```python
def test_with_loop(loop):
    @asyncio.coroutine
    def do_something():
        pass
    loop.run_until_complete(do_something())
```

**unused_port()**

Finds and returns free TCP port.

```python
def test_bind(unused_port):
    port = unused_port()
    assert 1024 < port <= 65535
```

**coroutine create_connection(*args, **kw)**

Wrapper around `aioredis.create_connection()`. Only difference is that it registers connection to be closed after test case, so you should not be worried about unclosed connections.

**coroutine create_redis(*args, **kw)**

Wrapper around `aioredis.create_redis()`.

**coroutine create_pool(*args, **kw)**

Wrapper around `aioredis.create_pool()`.

**redis**

Redis client instance.

**pool**

RedisPool instance.

**server**

Redis server instance info. Namedtuple with following properties:

```python
    name  server instance name.
```
**port**  Bind port.

**unixsocket**  Bind unixsocket path.

**version**  Redis server version tuple.

### serverB

Second predefined Redis server instance info.

### start_server (**name**)  

Start Redis server instance. Redis instances are cached by name.

- **Returns**  server info tuple, see server.
- **Return type**  tuple

### ssl_proxy (**unsecure_port**)  

Start SSL proxy.

- **Parameters**  **unsecure_port** (**int**) – Redis server instance port
- **Returns**  secure_port and ssl_context pair
- **Return type**  tuple

### Helpers

**aioredis** also updates pytest’s namespace with several helpers.

#### pytest.

**redis_version (**version, reason**)**  

Marks test with minimum redis version to run.

- **Example:**

  ```python
  @pytest.redis_version(3, 2, 0, reason='HISTRLEN new in redis 3.2.0')
  def test_hstrlen(redis):
      pass
  ```

**logs (**logger, level=None**)**  

Adopted version of unittest.TestCase.assertEqual(), see it for details.

- **Example:**

  ```python
  def test_logs(create_connection, server):
      with pytest.logs('aioredis', 'DEBUG') as cm:
          conn yield from create_connection(server.tcp_address)
      assert cm.output[0].startswith('DEBUG:aioredis:Creating tcp connection')
  ```

**assert_almost_equal (**first, second, places=None, msg=None, delta=None**)**  

Adopted version of unittest.TestCase.assertAlmostEqual().

**raises_regex (**exc_type, message**)**  

Adopted version of unittest.TestCase.assertRaisesRegex().

### 7.10 Releases

#### 7.10.1  1.1.0 (2018-02-16)

**NEW:**

7.10. Releases
• Implement new commands: wait, touch, swapdb, unlink (see #376);
• Add async_op argument to flushall and flushdb commands (see #364, and #370);

FIX:
• **Important!** Fix Sentinel sentinel client with pool minsize greater than 1 (see #380);
• Fix SentinelPool.discover_timeout usage (see #379);
• Fix Receiver hang on disconnect (see #354, and #366);
• Fix an issue with subscribe/psubscribe with empty pool (see #351, and #355);
• Fix an issue when StreamReader’s feed_data is called before set_parser (see #347);

MISC:
• Update dependencies versions;
• Multiple test fixes;

7.10.2 1.0.0 (2017-11-17)

NEW:
• **Important!** Drop Python 3.3, 3.4 support; (see #321, #323 and #326);
• **Important!** Connections pool has been refactored; now create_redis function will yield Redis instance instead of RedisPool (see #129);
• **Important!** Change sorted set commands reply format: return list of tuples instead of plain list for commands accepting withscores argument (see #334);
• **Important!** Change hscan command reply format: return list of tuples instead of mixed key-value list (see #335);
• Implement Redis URI support as supported address argument value (see #322);
• Dropped create_reconnecting_redis, create_redis_pool should be used instead;
• Implement custom StreamReader (see #273);
• Implement Sentinel support (see #181);
• Implement pure-python parser (see #212);
• Add migrate_keys command (see #187);
• Add zrevrangebylex command (see #201);
• Add command, command_count, command_getkeys and command_info commands (see #229);
• Add ping support in pubsub connection (see #264);
• Add exist parameter to zadd command (see #288);
• Add MaxClientsError and implement ReplyError specialization (see #325);
• Add encoding parameter to sorted set commands (see #289);

FIX:
• Fix CancelledError in conn._reader_task (see #301);
• Fix pending commands cancellation with CancelledError, use explicit exception instead of calling cancel() method (see #316);
• Correct error message on Sentinel discovery of master/slave with password (see #327);
• Fix bytearray support as command argument (see #329);
• Fix critical bug in patched asyncio.Lock (see #256);
• Fix Multi/Exec transaction canceled error (see #225);
• Add missing arguments to create_redis and create_redis_pool;
• Fix deprecation warning (see #191);
• Make correct __aiter__() (see #192);
• Backward compatibility fix for with (yield from pool) as conn: (see #205);
• Fixed pubsub receiver stop() (see #211);

MISC:
• Multiple test fixes;
• Add PyPy3 to build matrix;
• Update dependencies versions;
• Add missing Python 3.6 classifier;

7.10.3 0.3.5 (2017-11-08)
FIX:
• Fix for indistinguishable futures cancellation with asyncio.CancelledError (see #316), cherry-picked from master;

7.10.4 0.3.4 (2017-10-25)
FIX:
• Fix time command result decoding when using connection-wide encoding setting (see #266);

7.10.5 0.3.3 (2017-06-30)
FIX:
• Critical bug fixed in patched asyncio.Lock (see #256);

7.10.6 0.3.2 (2017-06-21)
NEW:
• Added zrevrangebylex command (see #201), cherry-picked from master;
• Add connection timeout (see #221), cherry-picked from master;
FIX:
• Fixed pool close warning (see #239 and #236), cherry-picked from master;
• Fixed asyncio Lock deadlock issue (see #231 and #241);
7.10.7 0.3.1 (2017-05-09)

**FIX:**

- Fix pubsub Receiver missing iter() method (see #203);

7.10.8 0.3.0 (2017-01-11)

**NEW:**

- Pub/Sub connection commands accept `Channel` instances (see #168);
- Implement new Pub/Sub MPSC (multi-producers, single-consumer) Queue – `aioredis.pubsub.Receiver` (see #176);
- Add `aioredis.abc` module providing abstract base classes defining interface for basic lib components; (see #176);
- Implement Geo commands support (see #177 and #179);

**FIX:**

- Minor tests fixes;

**MISC:**

- Update examples and docs to use `async/await` syntax also keeping `yield from` examples for history (see #173);
- Reflow Travis CI configuration; add Python 3.6 section (see #170);
- Add AppVeyor integration to run tests on Windows (see #180);
- Update multiple development requirements;

7.10.9 0.2.9 (2016-10-24)

**NEW:**

- Allow multiple keys in `EXISTS` command (see #156 and #157);

**FIX:**

- Close RedisPool when connection to Redis failed (see #136);
- Add simple `INFO` command argument validation (see #140);
- Remove invalid uses of `next()`

**MISC:**

- Update `devel.rst` docs; update Pub/Sub Channel docs (cross-refs);
- Update `MANIFEST.in` to include docs, examples and tests in source bundle;

7.10.10 0.2.8 (2016-07-22)

**NEW:**

- Add `hmset_dict` command (see #130);
- Add `RedisConnection.address` property;
• RedisPool minsize/maxsize must not be None;

• Implement close()/wait_closed()/closed interface for pool (see #128);

**FIX:**

• Add test for hstrlen;

• Test fixes

**MISC:**

• Enable Redis 3.2.0 on Travis;
• Add spell checking when building docs (see #132);
• Documentation updated;

### 7.10.11 0.2.7 (2016-05-27)

• create_pool() minsize default value changed to 1;
• Fixed cancellation of wait_closed (see #118);
• Fixed time() conversion to float (see #126);
• Fixed hmset() method to return bool instead of b'OK' (see #126);
• Fixed multi/exec + watch issue (changed watch variable was causing tr.execute() to fail) (see #121);
• Replace asyncio.Future uses with utility method (get ready to Python 3.5.2 loop.
create_future());
• Tests switched from unittest to pytest (see #126);
• Documentation updates;

### 7.10.12 0.2.6 (2016-03-30)

• Fixed Multi/Exec transactions cancellation issue (see #110 and #114);
• Fixed Pub/Sub subscribe concurrency issue (see #113 and #115);
• Add SSL/TLS support (see #116);
• aioredis.ConnectionClosedError raised in execute_pubsub as well (see #108);
• Redis.slaveof() method signature changed: now to disable replication one should call redis.
slaveof(None) instead of redis.slaveof();
• More tests added;

### 7.10.13 0.2.5 (2016-03-02)

• Close all Pub/Sub channels on connection close (see #88);
• Add iter() method to aioredis.Channel allowing to use it with async for (see #89);
• Inline code samples in docs made runnable and downloadable (see #92);
• Python 3.5 examples converted to use async/await syntax (see #93);
• Fix Multi/Exec to honor encoding parameter (see #94 and #97);
• Add debug message in `create_connection` (see #90);
• Replace `asyncio.async` calls with wrapper that respects asyncio version (see #101);
• Use `NODELAY` option for TCP sockets (see #105);
• New `aioredis.ConnectionClosedError` exception added. Raised if connection to Redis server is lost (see #108 and #109);
• Fix RedisPool to close and drop connection in subscribe mode on release;
• Fix `aioredis.util.decode` to recursively decode list responses;
• More examples added and docs updated;
• Add google groups link to README;
• Bump year in LICENSE and docs;

7.10.14 0.2.4 (2015-10-13)

• Python 3.5 async support:
  – New scan commands API (`iscan`, `izscan`, `ihscan`);
  – Pool made awaitable (allowing `with await pool: ... and async with pool.get()` as `conn: constructs`);
• Fixed dropping closed connections from free pool (see #83);
• Docs updated;

7.10.15 0.2.3 (2015-08-14)

• Redis cluster support work in progress;
• Fixed pool issue causing pool growth over max size & `acquire` call hangs (see #71);
• `info` server command result parsing implemented;
• Fixed behavior of util functions (see #70);
• `hstrlen` command added;
• Few fixes in examples;
• Few fixes in documentation;

7.10.16 0.2.2 (2015-07-07)

• Decoding data with `encoding` parameter now takes into account list (array) replies (see #68);
• `encoding` parameter added to following commands:
  – generic commands: `keys, randomkey`;
  – hash commands: `hgetall, hkeys, hmget, hvals`;
  – list commands: `blpop, brpop, brpoplpush, lindex, lpop, lrange, rpop, rpoplpush`;
  – set commands: `smembers, spop, srandmember`;
  – string commands: `getrange, getset, mget`;
- Backward incompatibility:
  `ltrim` command now returns bool value instead of ‘OK’;
- Tests updated;

7.10.17 0.2.1 (2015-07-06)
- Logging added (aioredis.log module);
- Fixed issue with `wait_message` in pub/sub (see #66);

7.10.18 0.2.0 (2015-06-04)
- Pub/Sub support added;
- Fix in `zrevrangebyscore` command (see #62);
- Fixes/tests/docs;

7.10.19 0.1.5 (2014-12-09)
- AutoConnector added;
- `wait_closed` method added for clean connections shutdown;
- `zscore` command fixed;
- Test fixes;

7.10.20 0.1.4 (2014-09-22)
- Dropped following Redis methods – `Redis.multi()`, `Redis.exec()`, `Redis.discard()`;
- `Redis.multi_exec` hack’ish property removed;
- `Redis.multi_exec()` method added;
- High-level commands implemented:
  - generic commands (tests);
  - transactions commands (api stabilization).
- Backward incompatibilities:
  - Following sorted set commands’ API changed:
    `zcount`, `zrangebyscore`, `zremrangebyscore`, `zrevrangebyscore`;
  - set string command’ API changed;

7.10.21 0.1.3 (2014-08-08)
- `RedisConnection.execute` refactored to support commands pipelining (see #33);
- Several fixes;
- WIP on transactions and commands interface;
• High-level commands implemented and tested:
  – hash commands;
  – hyperloglog commands;
  – set commands;
  – scripting commands;
  – string commands;
  – list commands;

7.10.22 0.1.2 (2014-07-31)

• `create_connection`, `create_pool`, `create_redis` functions updated: db and password arguments made keyword-only (see #26);
• Fixed transaction handling (see #32);
• Response decoding (see #16);

7.10.23 0.1.1 (2014-07-07)

• Transactions support (in connection, high-level commands have some issues);
• Docs & tests updated.

7.10.24 0.1.0 (2014-06-24)

• Initial release;
• RedisConnection implemented;
• RedisPool implemented;
• Docs for RedisConnection & RedisPool;
• WIP on high-level API.

7.11 Glossary

asyncio  Reference implementation of PEP 3156
  See https://pypi.python.org/pypi/asyncio

error replies  Redis server replies that start with - (minus) char. Usually starts with -ERR.

hiredis  Python extension that wraps protocol parsing code in hiredis.
  See https://pypi.python.org/pypi/hiredis

pytest  A mature full-featured Python testing tool. See http://pytest.org/latest/

uvloop  Is an ultra fast implementation of asyncio event loop on top of libuv. See https://github.com/MagicStack/uvloop
CHAPTER 8

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