
treq Documentation

Release 22.1.0

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Release v22.1.0 (*What's new?*).

`treq` depends on a recent Twisted and functions on Python 2.7 and Python 3.3+ (including PyPy).

CHAPTER
ONE

WHY?

`requests` by Kenneth Reitz is a wonderful library. I want the same ease of use when writing Twisted applications. `treq` is not of course a perfect clone of `requests`. I have tried to stay true to the do-what-I-mean spirit of the `requests` API and also kept the API familiar to users of `Twisted` and `twisted.web.client.Agent` on which `treq` is based.

QUICK START

Installation

```
$ pip install treq
```

2.1 GET

```
def main(reactor, *args):
    d = treq.get('https://httpbin.org/get')
    d.addCallback(print_response)
    return d
```

Full example: `basic_get.py`

2.2 POST

```
def main(reactor):
    d = treq.post("https://httpbin.org/post",
                 data={"form": "data"})
    d.addCallback(print_response)
    return d
```

Full example: `basic_post.py`

WHY NOT 100% REQUESTS-ALIKE?

Initially when I started off working on `treq` I thought the API should look exactly like `requests` except anything that would involve the network would return a `Deferred`.

Over time while attempting to mimic the `requests` API it became clear that not enough code could be shared between `requests` and `treq` for it to be worth the effort to translate many of the usage patterns from `requests`.

With the current version of `treq` I have tried to keep the API simple, yet remain familiar to users of Twisted and its lower-level HTTP libraries.

FEATURE PARITY WITH REQUESTS

Even though mimicking the [requests](#) API is not a goal, supporting most of its features is. Here is a list of [requests](#) features and their status in `req`.

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5.1 Use Cases

5.1.1 Handling Streaming Responses

In addition to *receiving responses* with `IResponse.deliverBody()`, `treq` provides a helper function `treq.collect()` which takes a response and a single argument function which will be called with all new data available from the response. Much like `IProtocol.dataReceived()`, `treq.collect()` knows nothing about the framing of your data and will simply call your collector function with any data that is currently available.

Here is an example which simply a file object's write method to `treq.collect()` to save the response body to a file.

```
1 def download_file(reactor, url, destination_filename):
2     destination = open(destination_filename, 'wb')
3     d = treq.get(url, unbuffered=True)
4     d.addCallback(treq.collect, destination.write)
5     d.addBoth(lambda _: destination.close())
6     return d
```

Full example: `download_file.py`

5.1.2 URLs, URIs, and Hyperlinks

The `url` argument to `HTTPClient.request()` accepts three URL representations:

- High-level: `hyperlink.DecodedURL`
- Mid-level `str` (unicode on Python 2)
- Low-level: ASCII `bytes` or `hyperlink.URL`

The high-level `DecodedURL` form is useful when programatically generating URLs. Here is an example that builds a URL that contains a `&` character, which is automatically escaped properly.

```
1 def main(reactor):
2     url = (
3         DecodedURL.from_text(u"https://httpbin.org")
4         .child(u"get")      # add path /get
5         .add(u"foo", u"&") # add query ?foo=%26
6     )
7     print(url.to_text())
8     return treq.get(url).addCallback(print_response)
```

Full example: `basic_url.py`

5.1.3 Query Parameters

`treq.HTTPClient.request()` supports a `params` keyword argument which will be URL-encoded and added to the `url` argument in addition to any query parameters that may already exist.

The `params` argument may be either a `dict` or a list of `(key, value)` tuples.

If it is a `dict` then the values in the dict may either be scalar values or a list or tuple thereof. Scalar values means `str`, `bytes`, or anything else — even `None` — which will be coerced to `str`. Strings are UTF-8 encoded.

```
1 @inlineCallbacks
2 def main(reactor):
3     print('List of tuples')
4     resp = yield treq.get('https://httpbin.org/get',
5                           params=[('foo', 'bar'), ('baz', 'bax')])
6     content = yield resp.text()
7     print(content)
8
9     print('Single value dictionary')
10    resp = yield treq.get('https://httpbin.org/get',
11                          params={'foo': 'bar', 'baz': 'bax'})
12    content = yield resp.text()
13    print(content)
14
15    print('Multi value dictionary')
16    resp = yield treq.get('https://httpbin.org/get',
17                          params={'foo': [b'bar', b'baz', b'bax']})
18    content = yield resp.text()
19    print(content)
20
21    print('Mixed value dictionary')
22    resp = yield treq.get('https://httpbin.org/get',
23                          params={'foo': [1, 2, 3], 'baz': b'quux', 'bar': 'foo'})
24    content = yield resp.text()
25    print(content)
26
27    print('Preserved query parameters')
28    resp = yield treq.get('https://httpbin.org/get?foo=bar',
29                          params={'baz': 'bax'})
30    content = yield resp.text()
31    print(content)
```

Full example: `query_params.py`

If you prefer a strictly-typed API, try `hyperlink.DecodedURL`. Use its `add()` and `set()` methods to add query parameters without risk of accidental type coercion.

5.1.4 JSON

`HTTPClient.request()` supports a `json` keyword argument that gives a data structure to serialize as JSON (using `json.dumps()`). This also implies a `Content-Type: application/json` request header. The `json` parameter is mutually-exclusive with `data`.

The `_Response.json()` method decodes a JSON response body. It buffers the whole response and decodes it with `json.loads()`.

```

1 @defer.inlineCallbacks
2 def main(reactor):
3     response = yield treq.post(
4         'https://httpbin.org/post',
5         json={"msg": "Hello!"},
6     )
7     data = yield response.json()
8     pprint(data)

```

Full example: `json_post.py`

5.1.5 Auth

HTTP Basic authentication as specified in [RFC 2617](#) is easily supported by passing an `auth` keyword argument to any of the request functions.

The `auth` argument should be a tuple of the form `('username', 'password')`.

```

1 def main(reactor, *args):
2     d = treq.get(
3         'https://httpbin.org/basic-auth/treq/treq',
4         auth=('treq', 'treq')
5     )
6     d.addCallback(print_response)
7     return d
8
9 react(main, [])

```

Full example: `basic_auth.py`

5.1.6 Redirects

treq handles redirects by default.

The following will print a 200 OK response.

```

1 def main(reactor, *args):
2     d = treq.get('https://httpbin.org/redirect/1')
3     d.addCallback(print_response)
4     return d
5
6 react(main, [])

```

Full example: `redirects.py`

You can easily disable redirects by simply passing `allow_redirects=False` to any of the request methods.

```
1 def main(reactor, *args):
2     d = treq.get('https://httpbin.org/redirect/1', allow_redirects=False)
3     d.addCallback(print_response)
4     return d
5
6 react(main, [])
```

Full example: `disable_redirects.py`

You can even access the complete history of treq response objects by calling the `history()` method on the response.

```
1 def main(reactor, *args):
2     d = treq.get('https://httpbin.org/redirect/1')
3
4     def cb(response):
5         print('Response history:')
6         print(response.history())
7         return print_response(response)
8
9     d.addCallback(cb)
```

Full example: `response_history.py`

5.1.7 Cookies

Cookies can be set by passing a dict or `cookielib.CookieJar` instance via the `cookies` keyword argument. Later cookies set by the server can be retrieved using the `cookies()` method of the response.

The object returned by `cookies()` supports the same key/value access as `requests` cookies.

```
1 def main(reactor, *args):
2     d = treq.get('https://httpbin.org/cookies/set?hello=world')
3
4     def _get_jar(resp):
5         jar = resp.cookies()
6
7         print('The server set our hello cookie to: {}'.format(jar['hello']))
8
9         return treq.get('https://httpbin.org/cookies', cookies=jar)
10
11     d.addCallback(_get_jar)
12     d.addCallback(print_response)
13
14     return d
```

Full example: `using_cookies.py`

5.1.8 Customizing the Twisted Agent

The main `treq` module has helper functions that automatically instantiate an instance of `treq.client.HTTPClient`. You can create an instance of `HTTPClient` directly in order to customize the parameters used to initialize it. Internally, the `HTTPClient` wraps an instance of `twisted.web.client.Agent`. When you create an instance of `HTTPClient`, you must initialize it with an instance of `Agent`. This allows you to customize its behavior.

```

1 def make_custom_agent(reactor):
2     return Agent(reactor, connectTimeout=42)
3
4 def main(reactor, *args):
5     agent = make_custom_agent(reactor)
6     http_client = HTTPClient(agent)
7     d = http_client.get(
8         'https://secure.example.net/area51',
9         auth=('admin', "you'll never guess!"))
10    d.addCallback(print_response)
11    return d
12
13 react(main, [])
14

```

Full example: `custom_agent.py`

5.2 Testing Helpers

The `treq.testing` module provides some tools for testing both HTTP clients which use the `treq` API and implementations of the `Twisted Web resource model`.

5.2.1 Writing tests for HTTP clients

The `StubTreq` class implements the `treq` module interface (`treq.get()`, `treq.post()`, etc.) but runs all I/O via a `MemoryReactor`. It wraps a `twisted.web.resource.IResource` provider which handles each request.

You can wrap a pre-existing `IResource` provider, or write your own. For example, the `twisted.web.resource.ErrorPage` resource can produce an arbitrary HTTP status code. `twisted.web.static.File` can serve files or directories. And you can easily achieve custom responses by writing trivial resources yourself:

```

1 @implementer(IResource)
2 class JsonResource(object):
3     isLeaf = True # NB: means getChildWithDefault will not be called
4
5     def __init__(self, data):
6         self.data = data
7
8     def render(self, request):
9         request.setHeader(b'Content-Type', b'application/json')
10        return json.dumps(self.data).encode('utf-8')

```

However, those resources don't assert anything about the request. The `RequestSequence` and `StringStubbingResource` classes make it easy to construct a resource which encodes the expected request

and response pairs. Do note that most parameters to these functions must be bytes—it's safest to use the `b''` string syntax, which works on both Python 2 and 3.

For example:

```

1 from twisted.internet import defer
2 from twisted.trial.unittest import SynchronousTestCase
3 from twisted.web import http
4
5 from treq.testing import StubTreq, HasHeaders
6 from treq.testing import RequestSequence, StringStubbingResource
7
8
9 @defer.inlineCallbacks
10 def make_a_request(treq):
11     """
12     Make a request using treq.
13     """
14     response = yield treq.get('http://an.example/foo', params={'a': 'b'},
15                             headers={b'Accept': b'application/json'})
16     if response.code == http.OK:
17         result = yield response.json()
18     else:
19         message = yield response.text()
20         raise Exception("Got an error from the server: {}".format(message))
21     defer.returnValue(result)
22
23
24 class MakeARequestTests(SynchronousTestCase):
25     """
26     Test :func:`make_a_request` using :mod:`treq.testing.RequestSequence`.
27     """
28
29     def test_200_ok(self):
30         """On a 200 response, return the response's JSON."""
31         req_seq = RequestSequence([
32             ((b'get', 'http://an.example/foo', {b'a': [b'b]}),
33              HasHeaders({'Accept': ['application/json']}), b'),
34             (http.OK, {b'Content-Type': b'application/json'}, b'{"status": "ok"}')
35         ])
36         treq = StubTreq(StringStubbingResource(req_seq))
37
38         with req_seq.consume(self.fail):
39             result = self.successResultOf(make_a_request(treq))
40
41             self.assertEqual({"status": "ok"}, result)
42
43     def test_418_teapot(self):
44         """On an unexpected response code, raise an exception"""
45         req_seq = RequestSequence([
46             ((b'get', 'http://an.example/foo', {b'a': [b'b]}),
47              HasHeaders({'Accept': ['application/json']}), b'),
48             (418, {b'Content-Type': b'text/plain'}, b'I'm a teapot!"))
49         ])

```

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```

50     treq = StubTreq(StringStubbingResource(req_seq))
51
52     with req_seq.consume(self.fail):
53         failure = self.failureResultOf(make_a_request(treq))
54
55     self.assertEqual(u"Got an error from the server: I'm a teapot!",
56                     failure.getErrorMessage())

```

This may be run with `trial testing_seq.py`. Download: [testing_seq.py](#).

Loosely matching the request

If you don't care about certain parts of the request, you can pass `unittest.mock.ANY`, which compares equal to anything. This sequence matches a single GET request with any parameters or headers:

```

from unittest.mock import ANY

RequestSequence([
    ((b'get', ANY, ANY, b''), (200, {}, b'ok'))
])

```

If you care about headers, use `HasHeaders` to make assertions about the headers present in the request. It compares equal to a superset of the headers specified, which helps make your test robust to changes in `treq` or `Agent`. Right now `treq` adds the `Accept-Encoding: gzip` header, but as support for additional compression methods is added, this may change.

5.2.2 Writing tests for Twisted Web resources

Since `StubTreq` wraps any resource, you can use it to test your server-side code as well. This is superior to calling your resource's methods directly or passing mock objects, since it uses a real `Agent` to generate the request and a real `Site` to process the response. Thus, the request object your code interacts with is a *real* `twisted.web.server.Request` and behaves the same as it would in production.

Note that if your resource returns `NOT_DONE_YET` you must keep a reference to the `RequestTraversalAgent` and call its `flush()` method to spin the memory reactor once the server writes additional data before the client will receive it.

5.3 API Reference

This page lists all of the interfaces exposed by the `treq` package.

5.3.1 Making Requests

The `treq` module provides several convenience functions for making requests. These functions all create a default `treq.client.HTTPClient` instance and pass their arguments to the appropriate `HTTPClient` method.

`treq.request(method, url, **kwargs)`

Make an HTTP request.

Parameters

- **method** (*str*) – HTTP method. Example: 'GET', 'HEAD', 'PUT', 'POST'.
- **url** (`hyperlink.DecodedURL`, *str*, *bytes*, or `hyperlink.EncodedURL`) – http or https URL, which may include query arguments.
- **headers** (`Headers` or `None`) – Optional HTTP Headers to send with this request.
- **params** (*dict w/ str or list/tuple of str values, list of 2-tuples, or None.*) – Optional parameters to be append to the URL query string. Any query string parameters in the *url* will be preserved.
- **data** (*bytes, typing.BinaryIO, IBodyProducer, or None*) – Arbitrary request body data.

If *files* is also passed this must be a `dict`, a `tuple` or `list` of field tuples as accepted by `MultiPartProducer`. The request is assigned a Content-Type of `multipart/form-data`.

If a `dict`, `list`, or `tuple` it is URL-encoded and the request assigned a Content-Type of `application/x-www-form-urlencoded`.

Otherwise, any non-None value is passed to the client's `data_to_body_producer` callable (by default, `IBodyProducer`), which accepts `bytes` and binary files like returned by `open(.., "rb")`.

- **files** – Files to include in the request body, in any of the several formats:

- `[("fieldname", binary_file)]`
- `[("fieldname", "filename", binary_file)]`
- `[("fieldname", "filename", "content-type", binary_file)]`

Or a mapping:

- `{"fieldname": binary_file}`
- `{"fieldname": ("filename", binary_file)}`
- `{"fieldname": ("filename", "content-type", binary_file)}`

Each `binary_file` is a file-like object open in binary mode (like returned by `open("filename", "rb")`). The filename is taken from the file's name attribute if not specified. The Content-Type is guessed based on the filename using `mimetypes.guess_type()` if not specified, falling back to `application/octet-stream`.

While uploading Treq will measure the length of seekable files to populate the Content-Length header of the file part.

If *files* is given the request is assigned a Content-Type of `multipart/form-data`. Additional fields may be given in the *data* argument.

- **json** (*dict, list, tuple, int, str, bool, or None*) – Optional JSON-serializable content for the request body. Mutually exclusive with *data* and *files*.
- **auth** (tuple of ('username', 'password')) – HTTP Basic Authentication information — see `treq.auth.add_auth()`.

- **cookies** (`dict` or `cookielib.CookieJar`) – Cookies to send with this request. The HTTP kind, not the tasty kind.
- **timeout** (`int`) – Request timeout seconds. If a response is not received within this time-frame, a connection is aborted with `CancelledError`.
- **allow_redirects** (`bool`) – Follow HTTP redirects. Default: `True`
- **browser_like_redirects** (`bool`) – Follow redirects like a web browser: When a 301 or 302 redirect is received in response to a POST request convert the method to GET. See [7231](#) and [BrowserLikeRedirectAgent](#)). Default: `False`
- **unbuffered** (`bool`) – Pass `True` to to disable response buffering. By default treq buffers the entire response body in memory.
- **reactor** – Optional Twisted reactor.
- **persistent** (`bool`) – Use persistent HTTP connections. Default: `True`
- **agent** (`twisted.web.iweb.IAgent`) – Provide your own custom agent. Use this to override things like `connectTimeout` or `BrowserLikePolicyForHTTPS`. By default, treq will create its own Agent with reasonable defaults.

Return type Deferred that fires with an `IResponse`

Changed in version treq: 20.9.0

The `url` param now accepts `hyperlink.DecodedURL` and `hyperlink.EncodedURL` objects.

`treq.get(url, headers=None, **kwargs)`

Make a GET request.

See `treq.request()`

`treq.head(url, **kwargs)`

Make a HEAD request.

See `treq.request()`

`treq.post(url, data=None, **kwargs)`

Make a POST request.

See `treq.request()`

`treq.put(url, data=None, **kwargs)`

Make a PUT request.

See `treq.request()`

`treq.patch(url, data=None, **kwargs)`

Make a PATCH request.

See `treq.request()`

`treq.delete(url, **kwargs)`

Make a DELETE request.

See `treq.request()`

5.3.2 Accessing Content

`treq.collect(response, collector)`

Incrementally collect the body of the response.

This function may only be called **once** for a given response.

Parameters

- **response** (*IResponse*) – The HTTP response to collect the body from.
- **collector** (*single argument callable*) – A callable to be called each time data is available from the response body.

Return type Deferred that fires with None when the entire body has been read.

`treq.content(response)`

Read the contents of an HTTP response.

This function may be called multiple times for a response, it uses a `WeakKeyDictionary` to cache the contents of the response.

Parameters **response** (*IResponse*) – The HTTP Response to get the contents of.

Return type Deferred that fires with the content as a str.

`treq.text_content(response, encoding='ISO-8859-1')`

Read the contents of an HTTP response and decode it with an appropriate charset, which may be guessed from the `Content-Type` header.

Parameters

- **response** (*IResponse*) – The HTTP Response to get the contents of.
- **encoding** (*str*) – A charset, such as UTF-8 or ISO-8859-1, used if the response does not specify an encoding.

Return type Deferred that fires with a unicode string.

`treq.json_content(response, **kwargs)`

Read the contents of an HTTP response and attempt to decode it as JSON.

This function relies on `content()` and so may be called more than once for a given response.

Parameters

- **response** (*IResponse*) – The HTTP Response to get the contents of.
- **kwargs** – Any keyword arguments accepted by `json.loads()`

Return type Deferred that fires with the decoded JSON.

5.4 The HTTP Client

`treq.client.HTTPClient` has methods that match the signatures of the convenience request functions in the `treq` module.

```
class treq.client.HTTPClient(agent, cookiejar=None, data_to_body_producer=IBodyProducer)
    request(method, url, *, params=None, headers=None, data=None, files=None, json=<object object>,
            auth=None, cookies=None, allow_redirects=True, browser_like_redirects=False, unbuffered=False,
            reactor=None, timeout=None, _stacklevel=2)
    See treq.request().
```

get(url, **kwargs)
See [treq.get\(\)](#).

head(url, **kwargs)
See [treq.head\(\)](#).

post(url, data=None, **kwargs)
See [treq.post\(\)](#).

put(url, data=None, **kwargs)
See [treq.put\(\)](#).

patch(url, data=None, **kwargs)
See [treq.patch\(\)](#).

delete(url, **kwargs)
See [treq.delete\(\)](#).

5.4.1 Augmented Response Objects

[treq.request\(\)](#), [treq.get\(\)](#), etc. return an object which provides `twisted.web.iweb.IResponse`, plus a few additional convenience methods:

class `treq.response._Response`

collect(collector)

Incrementally collect the body of the response, per [treq.collect\(\)](#).

Parameters **collector** – A single argument callable that will be called with chunks of body data as it is received.

Returns A *Deferred* that fires when the entire body has been received.

content()

Read the entire body all at once, per [treq.content\(\)](#).

Returns A *Deferred* that fires with a *bytes* object when the entire body has been received.

json(**kwargs)

Collect the response body as JSON per [treq.json_content\(\)](#).

Parameters **kwargs** – Any keyword arguments accepted by `json.loads()`

Return type Deferred that fires with the decoded JSON when the entire body has been read.

text(encoding='ISO-8859-1')

Read the entire body all at once as text, per [treq.text_content\(\)](#).

Return type A *Deferred* that fires with a unicode string when the entire body has been received.

history()

Get a list of all responses that (such as intermediate redirects), that ultimately ended in the current response. The responses are ordered chronologically.

Returns A list of *_Response* objects

cookies()

Get a copy of this response's cookies.

Return type `requests.cookies.RequestsCookieJar`

Inherited from `twisted.web.iweb.IResponse`:

Variables

- **version** – See `IResponse.version`
- **code** – See `IResponse.code`
- **phrase** – See `IResponse.phrase`
- **headers** – See `IResponse.headers`
- **length** – See `IResponse.length`
- **request** – See `IResponse.request`
- **previousResponse** – See `IResponse.previousResponse`

deliverBody(*protocol*)

See `IResponse.deliverBody()`

setPreviousResponse(*response*)

See `IResponse.setPreviousResponse()`

5.4.2 Authentication

`treq.auth.add_auth`(*agent*, *auth_config*)

Wrap an agent to perform authentication

Parameters

- **agent** – Agent to wrap.
- **auth_config** – A ('username', 'password') tuple — see `add_basic_auth()`.

Returns `IAgent`

Raises `UnknownAuthConfig` – When the format *auth_config* isn't supported.

`treq.auth.add_basic_auth`(*agent*: `<InterfaceClass twisted.web.iweb.IAgent>`, *username*: `typing.Union[str, bytes]`, *password*: `typing.Union[str, bytes]`) → `<InterfaceClass twisted.web.iweb.IAgent>`

Wrap an agent to add HTTP basic authentication

The returned agent sets the *Authorization* request header according to the basic authentication scheme described in [RFC 7617](#). This header contains the given *username* and *password* in plaintext, and thus should only be used over an encrypted transport (HTTPS).

Note that the colon (:) is used as a delimiter between the *username* and *password*, so if either parameter includes a colon the interpretation of the *Authorization* header is server-defined.

Parameters

- **agent** – Agent to wrap.
- **username** – The username.
- **password** – The password.

Returns `IAgent`

exception `treq.auth.UnknownAuthConfig`(*config*)

The authentication config provided couldn't be interpreted.

5.4.3 Test Helpers

The `treq.testing` module contains tools for in-memory testing of HTTP clients and servers.

StubTreq Objects

class `treq.testing.StubTreq(resource)`

`StubTreq` implements the same interface as the `treq` module or the `HTTPClient` class, with the limitation that it does not support the `files` argument.

flush()

Flush all data between pending client/server pairs.

This is only necessary if a `Resource` under test returns `NOT_DONE_YET` from its `render` method, making a response asynchronous. In that case, after each write from the server, `flush()` must be called so the client can see it.

As the methods on `treq.client.HTTPClient`:

request()

See `treq.request()`.

get()

See `treq.get()`.

head()

See `treq.head()`.

post()

See `treq.post()`.

put()

See `treq.put()`.

patch()

See `treq.patch()`.

delete()

See `treq.delete()`.

RequestTraversalAgent Objects

class `treq.testing.RequestTraversalAgent(rootResource)`

`IAgent` implementation that issues an in-memory request rather than going out to a real network socket.

flush()

Flush all data between pending client/server pairs.

This is only necessary if a `Resource` under test returns `NOT_DONE_YET` from its `render` method, making a response asynchronous. In that case, after each write from the server, `flush()` must be called so the client can see it.

request(method, uri, headers=None, bodyProducer=None)

Implement `IAgent.request`.

RequestSequence Objects

class `treq.testing.RequestSequence(sequence, async_failure_reporter=None)`

For an example usage, see `RequestSequence.consume()`.

Takes a sequence of:

```
[((method, url, params, headers, data), (code, headers, body)),
 ...]
```

Expects the requests to arrive in sequence order. If there are no more responses, or the request's parameters do not match the next item's expected request parameters, calls `sync_failure_reporter` or `async_failure_reporter`.

For the expected request tuples:

- `method` should be `bytes` normalized to lowercase.
- `url` should be a `str` normalized as per the [transformations in that \(usually\) preserve semantics](#). A URL to `http://something-that-looks-like-a-directory` would be normalized to `http://something-that-looks-like-a-directory/` and a URL to `http://something-that-looks-like-a-page/page.html` remains unchanged.
- `params` is a dictionary mapping `bytes` to `list` of `bytes`.
- `headers` is a dictionary mapping `bytes` to `list` of `bytes` – note that `twisted.web.client.Agent` may add its own headers which are not guaranteed to be present (for instance, `user-agent` or `content-length`), so it's better to use some kind of matcher like `HasHeaders`.
- `data` is a `bytes`.

For the response tuples:

- `code` is an integer representing the HTTP status code to return.
- `headers` is a dictionary mapping `bytes` to `bytes` or `str`. Note that the value is *not* a list.
- `body` is a `bytes`.

Variables

- **sequence** (`list`) – A sequence of (request tuple, response tuple) two-tuples, as described above.
- **async_failure_reporter** – An optional callable that takes a `str` message indicating a failure. It's asynchronous because it cannot just raise an exception—if it does, `Resource.render` will just convert that into a 500 response, and there will be no other failure reporting mechanism.

When the `async_failure_reporter` parameter is not passed, async failures will be reported via a `twisted.logger.Logger.Logger` instance, which Trial's test case classes (`twisted.trial.unittest.TestCase` and `SynchronousTestCase`) will translate into a test failure.

Note: Some versions of `twisted.trial.unittest.SynchronousTestCase` report logged errors on the wrong test: see [Twisted #9267](#).

When not subclassing Trial's classes you must pass `async_failure_reporter` and implement equivalent behavior or errors will pass silently. For example:

```

async_failures = []
sequence_stubs = RequestSequence([], async_failures.append)
stub_treq = StubTreq(StringStubbingResource(sequence_stubs))
with sequence_stubs.consume(self.fail): # self = unittest.TestCase
    stub_treq.get('http://fakeurl.com')

self.assertEqual([], async_failures)

```

consume(*sync_failure_reporter*)

Usage:

```

sequence_stubs = RequestSequence([...])
stub_treq = StubTreq(StringStubbingResource(sequence_stubs))
# self = twisted.trial.unittest.SynchronousTestCase
with sequence_stubs.consume(self.fail):
    stub_treq.get('http://fakeurl.com')
    stub_treq.get('http://another-fake-url.com')

```

If there are still remaining expected requests to be made in the sequence, fails the provided test case.

Parameters **sync_failure_reporter** – A callable that takes a single message reporting failures. This can just raise an exception - it does not need to be asynchronous, since the exception would not get raised within a Resource.

Returns a context manager that can be used to ensure all expected requests have been made.

consumed()

Returns *bool* representing whether the entire sequence has been consumed. This is useful in tests to assert that the expected requests have all been made.

StringStubbingResource Objects

class `treq.testing.StringStubbingResource`(*get_response_for*)

A resource that takes a callable with 5 parameters (*method*, *url*, *params*, *headers*, *data*) and returns (*code*, *headers*, *body*).

The resource uses the callable to return a real response as a result of a request.

The parameters for the callable are:

- *method*, the HTTP method as *bytes*.
- *url*, the full URL of the request as text.
- *params*, a dictionary of query parameters mapping query keys lists of values (sorted alphabetically).
- *headers*, a dictionary of headers mapping header keys to a list of header values (sorted alphabetically).
- *data*, the request body as *bytes*.

The callable must return a `tuple` of (*code*, *headers*, *body*) where the *code* is the HTTP status code, the *headers* is a dictionary of bytes (unlike the *headers* parameter, which is a dictionary of lists), and *body* is a string that will be returned as the response body.

If there is a stubbing error, the return value is undefined (if an exception is raised, `Resource` will just eat it and return 500 in its place). The callable, or whomever creates the callable, should have a way to handle error reporting.

render(*request*)

Produce a response according to the stubs provided.

HasHeaders Objects

class `treq.testing.HasHeaders`(*headers*)

Since Twisted adds headers to a request, such as the host and the content length, it's necessary to test whether request headers CONTAIN the expected headers (the ones that are not automatically added by Twisted).

This wraps a set of headers, and can be used in an equality test against a superset if the provided headers. The headers keys are lowercased, and keys and values are compared in their bytes-encoded forms.

Headers should be provided as a mapping from strings or bytes to a list of strings or bytes.

5.4.4 MultiPartProducer Objects

`treq.multipart.MultiPartProducer` is used internally when making requests which involve files.

class `treq.multipart.MultiPartProducer`(*fields*,
boundary=None, cooperator=<module 'twisted.internet.task' from
'/home/docs/checkouts/readthedocs.org/user_builds/treq/envs/release-
22.1.0/lib/python3.8/site-packages/twisted/internet/task.py'>)

`MultiPartProducer` takes parameters for a HTTP request and produces bytes in multipart/form-data format defined in [RFC 2388](#) and [RFC 2046](#).

The encoded request is produced incrementally and the bytes are written to a consumer.

Fields should have form: [(parameter name, value), ...]

Accepted values:

- Unicode strings (in this case parameter will be encoded with utf-8)
- Tuples with (file name, content-type, `IBodyProducer` objects)

Since `MultiPartProducer` can accept objects like `IBodyProducer` which cannot be read from in an event-driven manner it uses a `Cooperator` instance to schedule reads from the underlying producers. Reading is also paused and resumed based on notifications from the `IConsumer` provider being written to.

Variables

- **_fields** – Sorted parameters, where all strings are enforced to be unicode and file objects stacked on bottom (to produce a human readable form-data request)
- **_cooperate** – A method like `Cooperator.cooperate` which is used to schedule all reads.
- **boundary** – The generated boundary used in form-data encoding

pauseProducing()

Temporarily suspend copying bytes from the input file to the consumer by pausing the `CooperativeTask` which drives that activity.

resumeProducing()

Undo the effects of a previous `pauseProducing` and resume copying bytes to the consumer by resuming the `CooperativeTask` which drives the write activity.

startProducing(*consumer*)

Start a cooperative task which will read bytes from the input file and write them to *consumer*. Return a `Deferred` which fires after all bytes have been written.

Parameters *consumer* – Any `IConsumer` provider

stopProducing()

Permanently stop writing bytes from the file to the consumer by stopping the underlying *CooperativeTask*.

5.5 Changelog

5.5.1 22.1.0 (2022-01-29)

Bugfixes

- Cookies specified as a dict were sent to every domain, not just the domain of the request, potentially exposing them on redirect. See [GHSA-fhpf-pp6p-55qc](#). (#339)

5.5.2 21.5.0 (2021-05-24)

Features

- PEP 517/518 `build-system` metadata is now provided in `pyproject.toml`. (#329)

Bugfixes

- `treq.testing.StubTreq` now persists `twisted.web.server.Session` instances between requests. (#327)

Improved Documentation

- The dependency on Sphinx required to build the documentation has been moved from the `dev extra` to the new `docs extra`. (#296)

Deprecations and Removals

- Support for Python 2.7 and 3.5 has been dropped. `treq` no longer depends on `six` or `mock`. (#318)

5.5.3 21.1.0 (2021-01-14)

Features

- Support for Python 3.9: `treq` is now tested with CPython 3.9. (#305)
- The `auth` parameter now accepts arbitrary text and `bytes` for usernames and passwords. Text is encoded as UTF-8, per [RFC 7617](#). Previously only ASCII was allowed. (#268)
- `treq` produces a more helpful exception when passed a tuple of the wrong size in the `files` parameter. (#299)

Bugfixes

- The *params* argument once more accepts non-ASCII bytes, fixing a regression first introduced in treq 20.4.1. (#303)
- treq request APIs no longer mutates a `http_headers.Headers` passed as the *headers* parameter when the *auth* parameter is also passed. (#314)
- The agent returned by `treq.auth.add_auth()` and `treq.auth.add_basic_auth()` is now marked to provide `twisted.web.iweb.IAgent`. (#312)
- treq's package metadata has been updated to require `six >= 1.13`, noting a dependency introduced in treq 20.9.0. (#295)

Improved Documentation

- The documentation of the *params* argument has been updated to more accurately describe its type-coercion behavior. (#281)
- The `treq.auth` module has been documented. (#313)

Deprecations and Removals

- Support for Python 2.7, which has reached end of support, is deprecated. This is the last release with support for Python 2.7. (#309)
- Support for Python 3.5, which has reached end of support, is deprecated. This is the last release with support for Python 3.5. (#306)
- Deprecate tolerance of non-string values when passing headers as a dict. They have historically been silently dropped, but will raise `TypeError` in the next treq release. Also deprecate passing headers other than `dict`, `Headers`, or `None`. Historically falsy values like `[]` or `()` were accepted. (#294)
- treq request functions and methods like `treq.get()` and `HTTPClient.post()` now issue a `DeprecationWarning` when passed unknown keyword arguments, rather than ignoring them. Mixing the *json* argument with *files* or *data* is also deprecated. These warnings will change to a `TypeError` in the next treq release. (#297)
- The minimum supported Twisted version has increased to 18.7.0. Older versions are no longer tested in CI. (#307)

5.5.4 20.9.0 (2020-09-27)

Features

- The *url* parameter of `HTTPClient.request()` (and shortcuts like `get()`) now accept `hyperlink.DecodedURL` and `hyperlink.URL` in addition to `str` and `bytes`. (#212)
- Compatibility with the upcoming Twisted 20.9.0 release (#290).

Improved Documentation

- An example of sending and receiving JSON has been added. (#278)

5.5.5 20.4.1 (2020-04-16)

Bugfixes

- Correct a typo in the treq 20.4.0 package metadata that prevented upload to PyPI (pypa/twine#589)

5.5.6 20.4.0 (2020-04-16)

Features

- Support for Python 3.8 and PyPy3: treq is now tested with these interpreters. (#271)

Bugfixes

- `treq.client.HTTPClient.request()` and its aliases no longer raise `UnicodeEncodeError` when passed a Unicode `url` and non-empty `params`. Now the URL and query parameters are concatenated as documented. (#264)
- In treq 20.3.0 the `params` argument didn't accept parameter names or values that contain the characters `&` or `#`. Now these characters are properly escaped. (#282)

Improved Documentation

- The treq documentation has been revised to emphasize use of `treq.client.HTTPClient` over the module-level convenience functions in the `treq` module. (#276)

5.5.7 20.3.0 (2020-03-15)

Features

- Python 3.7 support. (#228)

Bugfixes

- `treq.testing.RequestTraversalAgent` now passes its memory reactor to the `twisted.web.server.Site` it creates, preventing the Site from polluting the global reactor. (#225)
- `treq.testing` no longer generates deprecation warnings about `twisted.test.proto_helpers.MemoryReactor`. (#253)

Improved Documentation

- The `download_file.py` example has been updated to do a streaming download with `unbuffered=True`. (#233)
- The `agent` parameter to `treq.request()` has been documented. (#235)
- The type of the `headers` element of a response tuple passed to `treq.testing.RequestSequence` is now correctly documented as `str`. (#237)

Deprecations and Removals

- Drop support for Python 3.4. (#240)

Misc

- #247, #248, #249

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