
cheroot

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Feb 12, 2019

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Cheroot is the high-performance, pure-Python HTTP server used by CherryPy.

CHAPTER 1

Status

The test suite currently relies on pytest. It's being run via Travis CI.

CHAPTER 2

Contribute Cheroot

Want to add something to upstream? Feel free to submit a PR or file an issue if unsure. Please follow [CherryPy's common contribution guidelines](#). Note that PR is more likely to be accepted if it includes tests and detailed description helping maintainers to understand it better :tada:

Oh, and be pythonic, please :snake:

Don't know how? Check out [How to Contribute to Open Source](#) article by GitHub :rocket:

3.1 Read and contribute to Cheroot

Make sure you read the [README](#). Also **ensure you set up pre-commit utility correctly** and TravisCI tests pass.

3.2 Submitting Pull Requests

If you're changing the structure of the repository please create an issue first. Don't forget to write appropriate test cases, add them into CI process if applicable and make the TravisCI build pass.

Sync (preferably rebase) your feature branch with upstream regularly to make us able to merge your PR seamlessly.

3.3 Submitting bug reports

Make sure you are on latest changes and that you re-ran this command `tox` after updating your local repository. If you can, please provide more information about your environment such as browser, operating system, python version, and any other related software versions. It is also helpful to post a markdown snippet demonstrating minimum reproducible example of an issue.

3.4 Also

See [Contributing](#) in the CherryPy docs.

3.4.1 First-time setup

- You need to install [Python 3](#) which is required for building docs.

For example, Python 3.7.

Then, create and activate a virtual environment. And install [tox](#).

- [Install git](#)
- [Configure git](#):

1. Please, identify yourself:

```
$ git config --global user.name "firstname lastname"
$ git config --global user.email yourname@example.com
```

- Use the address bound to your GitHub account so that the commits would be linked to your profile.

2. Choose an editor for Git:

```
$ git config --global core.editor vim
```

- Create and log in to a [GitHub](#) account
- [Fork](#) Cheroot to your GitHub account by clicking the Fork button
- [Clone](#) your fork locally:

```
$ git clone https://github.com/{username}/cheroot
$ cd cheroot
```

- Also, you can [clone](#) fork using [ssh](#):

```
$ git clone git@github.com:{username}/cheroot.git
$ cd cheroot
```

- To create a new [branch](#) and switch to it:

```
$ git checkout -b patch/some_fix
```

3.4.2 Write your code

- Please, use [PEP 8](#)

Once you finished coding, you are recommended to do the following steps:

- Run tests with [tox](#)

Run one test with Python3.6:

```
$ tox -e py36 -- cheroot/test/test_name.py
```

‘tox’ — Run all tests using the Python version where *python* command currently points to which is specified in tox settings:

```
envlist = python
minversion = 3.5.3
```

Run linters and all tests against several Python interpreters:

```
$ tox -e pre-commit,py27,py37 # etc.
```

- Run the [pre-commit linting suite](#):

```
$ tox -e pre-commit
```

- [git add](#) your files
- Write [good commit messages](#) when checking in your changes to Git
- [Push and create a pull request](#)

3.4.3 Building the docs

To build the docs from a checked out source, run:

```
$ tox -e build-docs
```

Open the documentation:

GNU/Linux

```
$ xdg-open build/html/index.html
```

macOS

```
$ open build/html/index.html
```

Windows

Please, open `build/html/index.html` in your browser.

Also, one can serve docs using a built-in static files server. This is preferable because of possible CSRF issues.:

```
$ python3 -m http.server --directory build/html/ 8000
```

After that, you can open <http://localhost:8000/> in your browser.

Read more about [Sphinx](#).

3.5 History

3.5.1 v6.5.4

01 Jan 2019

- [#113](#): Fix `cheroot.ssl.pyopenssl` under Python 3.
- [#154](#) via [PR #159](#): Remove custom license field from dist metadata.
- [#95](#): Fully integrate `trustme` into all TLS tests. Also remove all hardcoded TLS certificates.
- [#42](#): Remove traces of `unittest` and `ddt` usage.
- Fix invalid input processing in `cheroot._compat.extract_bytes()`.
- Fix returning error explanation over plain HTTP for PyOpenSSL.
- Add a fallback for `os.lchmod()` where it's missing.

- Avoid traceback for invalid client cert with builtin `ssl` adapter.
- Avoid deprecation warning with `OpenSSL.SSL.Connection`.
- Fix socket wrapper in PyOpenSSL adapter.
- Improve tests coverage:
 - Client TLS certificate tests
 - `cheroot._compat.extract_bytes()`
 - Peercreds lookup

3.5.2 v6.5.3

20 Dec 2018

- PR #149: Make `SCRIPT_NAME` optional per PEP 333.

3.5.3 v6.5.2

03 Sep 2018 - #6 via PR #109: Fix import of

`cheroot.ssl.pyopenssl` by refactoring and separating `cheroot.makefile`'s stream wrappers.

- #95 via PR #109: Add initial tests for SSL layer with use of `trustme`

3.5.4 v6.5.1

02 Sep 2018 - #93 via PR #110: Improve UNIX socket fs access mode

in `cheroot.server.HTTPServer.prepare()` on a file socket when starting to listen to it.

3.5.5 v6.5.0

29 Aug 2018

- CherryPy #1001 via PR #52 and PR #108: Add support for validating client certificates.

3.5.6 v6.4.0

01 Aug 2018

- #68 via PR #98: Factor out parts of `cheroot.server.HTTPServer.start()` into `prepare()` and `serve()`

3.5.7 v6.3.3

10 Jul 2018

- Fix bug with returning empty result in `cheroot.ssl.builtin.BuiltinSSLAdapter.wrap()`

3.5.8 v6.3.2

16 Jun 2018

- #100 via PR #101: Respond with HTTP 400 to malicious `Content-Length` in request headers.

3.5.9 v6.3.1

21 May 2018

- CherryPy #1618: Ignore OpenSSL's 1.0+ Error 0 under Python 2 while wrapping a socket.

3.5.10 v6.3.0

17 May 2018

- PR #87: Add `cheroot` command and `runpy` launcher to launch a WSGI app from the command-line.

3.5.11 v6.2.4

19 Apr 2018

- Fix missing `resolve_peer_creds` argument in `cheroot.wsgi.Server` being bypassed into `cheroot.server.HTTPServer`.
- PR #85: Revert conditional dependencies. System packagers should honor the dependencies as declared by cheroot, which are defined intentionally.

3.5.12 v6.2.3

14 Apr 2018

- PR #85: Skip installing dependencies from backports namespace under Python 3.

3.5.13 v6.2.2

14 Apr 2018

- #84 (CherryPy #1704): Fix regression, causing `ModuleNotFoundError` under cygwin.

3.5.14 v6.2.1

10 Apr 2018

- PR #83: Fix regression, caused by inverted check for Windows OS.
- Add more URLs to distribution metadata

3.5.15 v6.2.0

10 Apr 2018

- [PR #37](#): Implement PEERCRED lookup over UNIX-socket HTTP connection.
 - Discover connected process' PID/UID/GID
 - Respect server switches: `peercreds_enabled` and `peercreds_resolve_enabled`
 - `get_peer_creds` and `resolve_peer_creds` methods on connection
 - `peer_pid`, `peer_uid`, `peer_gid`, `peer_user` and `peer_group` properties on connection
 - `X_REMOTE_PID`, `X_REMOTE_UID`, `X_REMOTE_GID`, `X_REMOTE_USER` (`REMOTE_USER`) and `X_REMOTE_GROUP` WSGI environment variables when enabled and supported
 - Per-connection caching to reduce lookup cost

3.5.16 v6.1.2

08 Apr 2018

- [#81](#): Fix regression introduced by [PR #80](#).
 - Restore `storing bound socket` in Windows broken by use of `socket.AF_UNIX`

3.5.17 v6.1.1

07 Apr 2018

- [PR #80](#): Fix regression introduced by [68a5769](#).
 - Get back support for `socket.AF_UNIX` in stored bound address in `cheroot.server.HTTPServer.bind_addr`

3.5.18 v6.1.0

05 Apr 2018

- [PR #67](#): Refactor testsuite to completely rely on pytest.
 - Integrate `pytest-testmon` and `pytest-watch`
 - Stabilise testing
- [CherryPy #1664](#) via [PR #66](#): Implement input termination flag support as suggested by [@mitsuhiko](#) in his `wsgi.input_terminated` Proposal.
- [#73](#): Fix SSL error bypassing.
- [#77](#) via [PR #78](#): Fix WSGI documentation example to support Python 3.
- [PR #76](#): Send correct conditional HTTP error in helper function.
- [CherryPy #1404](#) via [PR #75](#): Fix headers being unsent before request closed. Now we double check that they've been sent.
- Minor docs improvements.
- Minor refactoring.

3.5.19 v6.0.0

04 Dec 2017

- Drop support for Python 2.6, 3.1, 3.2, and 3.3.
- Also drop built-in SSL support for Python 2.7 earlier than 2.7.9.

3.5.20 v5.11.0

04 Dec 2017

- [CherryPy #1621](#): To support webtest applications that feed absolute URIs to `getPage` but expect the scheme/host/port to be ignored (as cheroot 5.8 and earlier did), provide a `strip_netloc` helper and recipe for calling it in a subclass.

3.5.21 v5.10.0

23 Nov 2017

- Minor refactorings of `cheroot/server.py` to reduce redundancy of behavior.
- Delinting with fewer exceptions.
- Restored license to BSD.

3.5.22 v5.9.2

23 Nov 2017

- [#61](#): Re-release without spurious files in the distribution.

3.5.23 v5.9.1

17 Nov 2017

- [#58](#): Reverted encoding behavior in `wsgi` module to correct regression in CherryPy tests.

3.5.24 v5.9.0

16 Nov 2017

- [CherryPy #1088](#) and [PR #53](#): Avoid using `SO_REUSEADDR` on Windows where it has different semantics.
- `cheroot.tests.webtest` adopts the one method that was unique in CherryPy, now superseding the implementation there.
- Substantial cleanup around compatibility functions (`_compat` module).
- License unintentionally changed to MIT. BSD still declared and intended.

3.5.25 v5.8.3

11 Aug 2017

- Improve HTTP request line validation:
 - Improve HTTP version parsing
- Fix HTTP CONNECT method processing:
 - Respond with 405 Method Not Allowed if `proxy_mode` is False
 - Validate that request-target is in authority-form
- Improve tests in `test.test_core`
- [PR #44](#): Fix EPROTOTYPE @ Mac OS

3.5.26 v5.8.2

07 Aug 2017

- Fix [PR #39](#) regression. Add HTTP request line check: absolute URI path must start with a forward slash (“/”).

3.5.27 v5.8.1

05 Aug 2017

- CI improvements:
 - Add basic working Circle CI v2 config
- Fix URI encoding bug introduced in [PR #39](#)
 - Improve `cheroot.test.helper.Controller` to properly match unicode

3.5.28 v5.8.0

01 Aug 2017

- CI improvements:
 - Switch to native PyPy support in Travis CI
 - Take into account [PEP 257](#) compliant modules
 - Build wheel in Appveyor and store it as an artifact
- Improve urllib support in `cheroot._compat`
- [#38](#) via [PR #39](#): Improve URI parsing:
 - Make it compliant with [RFC 7230](#), [RFC 7231](#) and [RFC 2616](#)
 - Fix setting of `environ['QUERY_STRING']` in WSGI
 - Introduce `proxy_mode` and `strict_mode` argument in `server.HTTPRequest`
 - Fix decoding of unicode URIs in WSGI 1.0 gateway

3.5.29 v5.7.0

24 Jun 2017

- CI improvements:
 - Don't run tests during deploy stage
 - Use VM based build job env only for pyenv envs
 - Opt-in for beta trusty image @ Travis CI
 - Be verbose when running tests (show test names)
 - Show xfail/skip details during test run
- #34: Fix `_handle_no_ssl` error handler calls
- #21: Fix `test_conn` tests:
 - Improve `setup_server` def in HTTP connection tests
 - Fix HTTP streaming tests
 - Fix HTTP/1.1 pipelining test under Python 3
 - Fix `test_readall_or_close` test
 - Fix `test_No_Message_Body`
 - Clarify `test_598` fail reason
- #36: Add GitHub templates for PR, issue && contributing
- #27: Default HTTP Server header to Cheroot version str
- Cleanup `_compat` functions from server module

3.5.30 v5.6.0

20 Jun 2017

- Fix all **PEP 257** related errors in all non-test modules.
`cheroot/test/*` folder is only one left allowed to fail with this linter.
- [CherryPy #1602](#) and [PR #30](#): Optimize chunked body reader loop by returning empty data if the size is 0.
- [CherryPy #1486](#): Reset buffer if the body size is unknown
- [CherryPy #1131](#): Add missing size hint to `SizeCheckWrapper`

3.5.31 v5.5.2

18 Jun 2017

- [PR #32](#): Ignore “unknown error” and “https proxy request” SSL errors.
Ref: [sabnzbd/sabnzbd#820](#)
Ref: [sabnzbd/sabnzbd#860](#)

3.5.32 v5.5.1

18 Jun 2017

- Make Appveyor list separate tests in corresponding tab.
- **PR #29**: Configure Travis CI build stages.
Prioritize tests by stages.
Move deploy stage to be run very last after all other stages finish.
- **PR #31**: Ignore “Protocol wrong type for socket” (EPROTOTYPE) @ OSX for non-blocking sockets.
This was originally fixed for regular sockets in [CherryPy #1392](#).
Ref: <https://forums.sabnzbd.org/viewtopic.php?f=2&t=22728&p=112251>

3.5.33 v5.5.0

02 May 2017

- **#17** via **PR #25**: Instead of a `read_headers` function, cheroot now supplies a `HeaderReader` class to perform the same function.
Any `HTTPRequest` object may override the `header_reader` attribute to customize the handling of incoming headers.
The server module also presents a provisional implementation of a `DropUnderscoreHeaderReader` that will exclude any headers containing an underscore. It remains an exercise for the implementer to demonstrate how this functionality might be employed in a server such as [CherryPy](#).
- **PR #26**: Configured TravisCI to run tests under OS X.

3.5.34 v5.4.0

19 Mar 2017

- **PR #22**: Add “ciphers” parameter to `SSLAdapter`.

3.5.35 v5.3.0

12 Mar 2017

- **PR #8**: Updated style to better conform to **PEP 8**.
Refreshed project with [jaraco skeleton](#).
Docs now built and [deployed at RTD](#).

3.5.36 v5.2.0

02 Mar 2017

- **#5**: Set `Server.version` to Cheroot version instead of [CherryPy](#) version.
- **PR #4**: Prevent tracebacks and drop bad HTTPS connections in the `BuiltinSSLAdapter`, similar to `pyOpenSSLAdapter`.

- #3: Test suite now runs and many tests pass. Some are still failing.

3.5.37 v5.1.0

22 Jan 2017

- Removed the WSGI prefix from classes in `cheroot.wsgi`. Kept aliases for compatibility.
- #1: Corrected docstrings in `cheroot.server` and `cheroot.wsgi`.
- PR #2: Fixed `ImportError` when `pkg_resources` cannot find the cheroot distribution.

3.5.38 v5.0.1

14 Jan 2017

- Fix error in `parse_request_uri` created in 68a5769.

3.5.39 v5.0.0

14 Jan 2017

- Initial release based on `cherry.py.cherry.py.wsgiserver 8.8.0`.

3.6 cheroot._compat module

Compatibility code for using Cheroot with various versions of Python.

`cheroot._compat.assert_native` (*n*)

Check whether the input is of native `str` type.

Raises: `TypeError`: in case of failed check

`cheroot._compat.bton` (*b*, *encoding*='ISO-8859-1')

Return the byte string as native string in the given encoding.

`cheroot._compat.extract_bytes` (*mv*)

Retrieve bytes out of memoryview/buffer or bytes.

class `cheroot._compat.memoryview`

Bases: `object`

Create a new memoryview object which references the given object.

c_contiguous

A bool indicating whether the memory is C contiguous.

cast ()

Cast a memoryview to a new format or shape.

contiguous

A bool indicating whether the memory is contiguous.

f_contiguous

A bool indicating whether the memory is Fortran contiguous.

format

A string containing the format (in struct module style) for each element in the view.

hex()

Return the data in the buffer as a string of hexadecimal numbers.

itemsize

The size in bytes of each element of the memoryview.

nbytes

The amount of space in bytes that the array would use in a contiguous representation.

ndim

An integer indicating how many dimensions of a multi-dimensional array the memory represents.

obj

The underlying object of the memoryview.

readonly

A bool indicating whether the memory is read only.

release()

Release the underlying buffer exposed by the memoryview object.

shape

A tuple of ndim integers giving the shape of the memory as an N-dimensional array.

strides

A tuple of ndim integers giving the size in bytes to access each element for each dimension of the array.

suboffsets

A tuple of integers used internally for PIL-style arrays.

tobytes()

Return the data in the buffer as a byte string.

tolist()

Return the data in the buffer as a list of elements.

`cheroot._compat.ntob(n, encoding='ISO-8859-1')`

Return the native string as bytes in the given encoding.

`cheroot._compat.ntou(n, encoding='ISO-8859-1')`

Return the native string as unicode with the given encoding.

3.6.1 Indices and tables

- [genindex](#)
- [modindex](#)
- [search](#)

3.7 cheroot.errors module

Collection of exceptions raised and/or processed by Cheroot.

exception `cheroot.errors.FatalSSLAlert`

Bases: `Exception`

Exception raised when the SSL implementation signals a fatal alert.

exception `cheroot.errors.MaxSizeExceeded`

Bases: `Exception`

Exception raised when a client sends more data then acceptable within limit.

Depends on `request.body.maxbytes` config option if used within CherryPy

exception `cheroot.errors.NoSSLERror`

Bases: `Exception`

Exception raised when a client speaks HTTP to an HTTPS socket.

`cheroot.errors.plat_specific_errors` (**errnames*)

Return error numbers for all errors in *errnames* on this platform.

The 'errno' module contains different global constants depending on the specific platform (OS). This function will return the list of numeric values for a given list of potential names.

3.7.1 Indices and tables

- `genindex`
- `modindex`
- `search`

3.8 cheroot.makefile module

Socket file object.

class `cheroot.makefile.BufferedWriter` (*raw, buffer_size=8192*)

Bases: `_pyio.BufferedWriter`

Faux file object attached to a socket object.

write (*b*)

Write bytes to buffer.

`cheroot.makefile.MakeFile` (*sock, mode='r', bufsize=8192*)

File object attached to a socket object.

class `cheroot.makefile.MakeFile_PY2` (**args, **kwargs*)

Bases: `object`

Faux file object attached to a socket object.

flush ()

Write all data from buffer to socket and reset write buffer.

read (*size=-1*)

Read data from the socket to buffer.

readline (*size=-1*)

Read line from the socket to buffer.

recv (*size*)

Receive message of a size from the socket.

send (*data*)

Send some part of message to the socket.

```
write (data)
    Sendall for non-blocking sockets.
```

```
class cheroot.makefile.StreamReader(sock, mode='r', bufsize=8192)
    Bases: _pyio.BufferedReader

    Socket stream reader.
```

```
class cheroot.makefile.StreamWriter(sock, mode='w', bufsize=8192)
    Bases: cheroot.makefile.BufferedReader

    Socket stream writer.
```

3.8.1 Indices and tables

- genindex
- modindex
- search

3.9 cheroot.server module

A high-speed, production ready, thread pooled, generic HTTP server.

For those of you wanting to understand internals of this module, here's the basic call flow. The server's listening thread runs a very tight loop, sticking incoming connections onto a Queue:

```
server = HTTPServer(...)
server.start()
-> while True:
    tick()
    # This blocks until a request comes in:
    child = socket.accept()
    conn = HTTPConnection(child, ...)
    server.requests.put(conn)
```

Worker threads are kept in a pool and poll the Queue, popping off and then handling each connection in turn. Each connection can consist of an arbitrary number of requests and their responses, so we run a nested loop:

```
while True:
    conn = server.requests.get()
    conn.communicate()
    -> while True:
        req = HTTPRequest(...)
        req.parse_request()
        -> # Read the Request-Line, e.g. "GET /page HTTP/1.1"
            req.rfile.readline()
            read_headers(req.rfile, req.inheaders)
        req.respond()
        -> response = app(...)
            try:
                for chunk in response:
                    if chunk:
                        req.write(chunk)
            finally:
                if hasattr(response, "close"):
```

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```

        response.close()
    if req.close_connection:
        return

```

For running a server you can invoke `start()` (it will run the server forever) or use invoking `prepare()` and `serve()` like this:

```

server = HTTPServer(...)
server.prepare()
try:
    threading.Thread(target=server.serve).start()

    # waiting/detecting some appropriate stop condition here
    ...

finally:
    server.stop()

```

And now for a trivial doctest to exercise the test suite

```

>>> 'HTTPServer' in globals()
True

```

class `cheroot.server.HTTPRequest` (*server, conn, proxy_mode=False, strict_mode=True*)

Bases: `object`

An HTTP Request (and response).

A single HTTP connection may consist of multiple request/response pairs.

chunked_write = False

If True, output will be encoded with the “chunked” transfer-coding.

This value is set automatically inside `send_headers`.

close_connection = False

Signals the calling Connection that the request should close. This does not imply an error! The client and/or server may each request that the connection be closed.

conn = None

The HTTPConnection object on which this request connected.

ensure_headers_sent ()

Ensure headers are sent to the client if not already sent.

header_reader = <cheroot.server.HeaderReader object>

A HeaderReader instance or compatible reader.

inheaders = {}

A dict of request headers.

outheaders = []

A list of header tuples to write in the response.

parse_request ()

Parse the next HTTP request start-line and message-headers.

read_request_headers ()

Read `self.rfile` into `self.inheaders`. Return success.

read_request_line ()

Read and parse first line of the HTTP request.

Returns: bool: True if the request line is valid or False if it's malformed.

ready = False

When True, the request has been parsed and is ready to begin generating the response. When False, signals the calling Connection that the response should not be generated and the connection should close.

respond ()

Call the gateway and write its iterable output.

send_headers ()

Assert, process, and send the HTTP response message-headers.

You must set self.status, and self.outheaders before calling this.

server = None

The HTTPServer object which is receiving this request.

simple_response (status, msg="")

Write a simple response back to the client.

write (chunk)

Write unbuffered data to the client.

class cheroot.server.HTTPConnection (server, sock, makefile=<function MakeFile>)

Bases: object

An HTTP connection (active socket).

RequestHandlerClass

alias of *HTTPRequest*

close ()

Close the socket underlying this connection.

communicate ()

Read each request and respond appropriately.

get_peer_creds ()

Return the PID/UID/GID tuple of the peer socket for UNIX sockets.

This function uses SO_PEERCRED to query the UNIX PID, UID, GID of the peer, which is only available if the bind address is a UNIX domain socket.

Raises: NotImplementedError: in case of unsupported socket type RuntimeError: in case of SO_PEERCRED lookup unsupported or disabled

linger = False

peer_gid

Return the group id of the connected peer process.

peer_group

Return the group of the connected peer process.

peer_pid

Return the id of the connected peer process.

peer_uid

Return the user id of the connected peer process.

peer_user

Return the username of the connected peer process.

peercreds_enabled = False

peercreds_resolve_enabled = False

rbufsize = 8192

remote_addr = None

remote_port = None

resolve_peer_creds ()

Return the username and group tuple of the peercreds if available.

Raises: NotImplementedError: in case of unsupported OS RuntimeError: in case of UID/GID lookup unsupported or disabled

ssl_env = None

wbufsize = 8192

class cheroot.server.HTTPServer(*bind_addr, gateway, minthreads=10, maxthreads=-1, server_name=None, peercreds_enabled=False, peercreds_resolve_enabled=False*)

Bases: `object`

An HTTP server.

ConnectionClass

The class to use for handling HTTP connections.

alias of `HTTPConnection`

bind (*family, type, proto=0*)

Create (or recreate) the actual socket object.

bind_addr

Return the interface on which to listen for connections.

For TCP sockets, a (host, port) tuple. Host values may be any IPv4 or IPv6 address, or any valid hostname. The string 'localhost' is a synonym for '127.0.0.1' (or '::1', if your hosts file prefers IPv6). The string '0.0.0.0' is a special IPv4 entry meaning "any active interface" (INADDR_ANY), and '::' is the similar IN6ADDR_ANY for IPv6. The empty string or None are not allowed.

For UNIX sockets, supply the filename as a string.

Systemd socket activation is automatic and doesn't require tempering with this variable.

static bind_socket (*socket_, bind_addr*)

Bind the socket to given interface.

bind_unix_socket (*bind_addr*)

Create (or recreate) a UNIX socket object.

clear_stats ()

Reset server stat counters..

error_log (*msg="", level=20, traceback=False*)

Write error message to log.

Args: msg (str): error message level (int): logging level traceback (bool): add traceback to output or not

gateway = None

A Gateway instance.

interrupt

Flag interrupt of the server.

max_request_body_size = 0

The maximum size, in bytes, for request bodies, or 0 for no limit.

max_request_header_size = 0

The maximum size, in bytes, for request headers, or 0 for no limit.

maxthreads = None

The maximum number of worker threads to create.

(default -1 = no limit)

minthreads = None

The minimum number of worker threads to create (default 10).

nodelay = True

If True (the default since 3.1), sets the TCP_NODELAY socket option.

peercreds_enabled = False

If True, peer cred lookup can be performed via UNIX domain socket.

peercreds_resolve_enabled = False

If True, username/group will be looked up in the OS from peercreds.

prepare ()

Prepare server to serving requests.

It binds a socket's port, setups the socket to `listen()` and does other preparing things.

static prepare_socket (bind_addr, family, type, proto, nodelay, ssl_adapter)

Create and prepare the socket object.

protocol = 'HTTP/1.1'

The version string to write in the Status-Line of all HTTP responses.

For example, "HTTP/1.1" is the default. This also limits the supported features used in the response.

ready = False

Internal flag which indicating the socket is accepting connections.

request_queue_size = 5

The 'backlog' arg to `socket.listen()`; max queued connections.

(default 5).

static resolve_real_bind_addr (socket_)

Retrieve actual bind addr from bound socket.

runtime ()

Return server uptime.

safe_start ()

Run the server forever, and stop it cleanly on exit.

serve ()

Serve requests, after invoking `prepare()`.

server_name = None

The name of the server; defaults to `self.version`.

shutdown_timeout = 5

The total time to wait for worker threads to cleanly exit.

Specified in seconds.

software = None

The value to set for the SERVER_SOFTWARE entry in the WSGI environ.

If None, this defaults to '%s Server' % self.version.

ssl_adapter = None

An instance of ssl.Adapter (or a subclass).

You must have the corresponding SSL driver library installed.

start ()

Run the server forever.

It is shortcut for invoking *prepare ()* then *serve ()*.

stop ()

Gracefully shutdown a server that is serving forever.

tick ()

Accept a new connection and put it on the Queue.

timeout = 10

The timeout in seconds for accepted connections (default 10).

version = 'Cheroot/6.5.5.dev14+g97af36e'

A version string for the HTTPServer.

class cheroot.server.SizeCheckWrapper (rfile, maxlen)

Bases: `object`

Wraps a file-like object, raising `MaxSizeExceeded` if too large.

close ()

Release resources allocated for rfile.

next ()

Generate next file chunk.

read (size=None)

Read a chunk from rfile buffer and return it.

Args: size (int): amount of data to read

Returns: bytes: Chunk from rfile, limited by size if specified.

readline (size=None)

Read a single line from rfile buffer and return it.

Args: size (int): minimum amount of data to read

Returns: bytes: One line from rfile.

readlines (sizehint=0)

Read all lines from rfile buffer and return them.

Args: sizehint (int): hint of minimum amount of data to read

Returns: list[bytes]: Lines of bytes read from rfile.

class cheroot.server.KnownLengthRFile (rfile, content_length)

Bases: `object`

Wraps a file-like object, returning an empty string when exhausted.

close ()

Release resources allocated for rfile.

next ()

Generate next file chunk.

read (*size=None*)

Read a chunk from rfile buffer and return it.

Args: size (int): amount of data to read

Returns: bytes: Chunk from rfile, limited by size if specified.

readline (*size=None*)

Read a single line from rfile buffer and return it.

Args: size (int): minimum amount of data to read

Returns: bytes: One line from rfile.

readlines (*sizehint=0*)

Read all lines from rfile buffer and return them.

Args: sizehint (int): hint of minimum amount of data to read

Returns: list[bytes]: Lines of bytes read from rfile.

class cheroot.server.**ChunkedRFile** (*rfile, maxlen, bufsize=8192*)

Bases: `object`

Wraps a file-like object, returning an empty string when exhausted.

This class is intended to provide a conforming wsgi.input value for request entities that have been encoded with the 'chunked' transfer encoding.

close ()

Release resources allocated for rfile.

read (*size=None*)

Read a chunk from rfile buffer and return it.

Args: size (int): amount of data to read

Returns: bytes: Chunk from rfile, limited by size if specified.

read_trailer_lines ()

Read HTTP headers and yield them.

Returns: Generator: yields CRLF separated lines.

readline (*size=None*)

Read a single line from rfile buffer and return it.

Args: size (int): minimum amount of data to read

Returns: bytes: One line from rfile.

readlines (*sizehint=0*)

Read all lines from rfile buffer and return them.

Args: sizehint (int): hint of minimum amount of data to read

Returns: list[bytes]: Lines of bytes read from rfile.

class cheroot.server.**Gateway** (*req*)

Bases: `object`

Base class to interface HTTPServer with other systems, such as WSGI.

respond()

Process the current request. Must be overridden in a subclass.

`cheroot.server.get_ssl_adapter_class(name='builtin')`

Return an SSL adapter class for the given name.

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3.10 cheroot.ssl module

Implementation of the SSL adapter base interface.

class `cheroot.ssl.Adapter` (*certificate, private_key, certificate_chain=None, ciphers=None*)

Bases: `object`

Base class for SSL driver library adapters.

Required methods:

- `wrap(sock) -> (wrapped socket, ssl environ dict)`
- `makefile(sock, mode='r', bufsize=DEFAULT_BUFFER_SIZE) -> socket file object`

bind (*sock*)

Wrap and return the given socket.

get_environ ()

Return WSGI environ entries to be merged into each request.

makefile (*sock, mode='r', bufsize=-1*)

Return socket file object.

wrap (*sock*)

Wrap and return the given socket, plus WSGI environ entries.

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3.11 cheroot.ssl.builtin module

A library for integrating Python's builtin `ssl` library with Cheroot.

The `ssl` module must be importable for SSL functionality.

To use this module, set `HTTPServer.ssl_adapter` to an instance of `BuiltinSSLAdapter`.

```
class cheroot.ssl.builtin.BuiltinSSLAdapter(certificate, private_key, certifi-  
                                           cate_chain=None, ciphers=None)
```

Bases: *cheroot.ssl.Adapter*

A wrapper for integrating Python's builtin ssl module with Cheroot.

```
CERT_KEY_TO_ENV = {'issuer': 'SSL_CLIENT_I_DN', 'subject': 'SSL_CLIENT_S_DN'}
```

```
CERT_KEY_TO_LDAP_CODE = {'commonName': 'CN', 'countryName': 'C', 'emailAddress': 'E'}
```

```
bind(sock)
```

Wrap and return the given socket.

```
certificate = None
```

The filename of the server SSL certificate.

```
certificate_chain = None
```

The filename of the certificate chain file.

```
ciphers = None
```

The ciphers list of SSL.

```
context = None
```

The ssl.SSLContext that will be used to wrap sockets.

```
env_dn_dict(env_prefix, cert_value)
```

Return a dict of WSGI environment variables for a client cert DN.

E.g. SSL_CLIENT_S_DN_CN, SSL_CLIENT_S_DN_C, etc. See SSL_CLIENT_S_DN_x509 at https://httpd.apache.org/docs/2.4/mod/mod_ssl.html#envvars.

```
get_environ(sock)
```

Create WSGI environ entries to be merged into each request.

```
makefile(sock, mode='r', bufsize=8192)
```

Return socket file object.

```
private_key = None
```

The filename of the server's private key file.

```
wrap(sock)
```

Wrap and return the given socket, plus WSGI environ entries.

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3.12 cheroot.ssl.pyopenssl module

A library for integrating pyOpenSSL with Cheroot.

The OpenSSL module must be importable for SSL functionality. You can obtain it from [here](#).

To use this module, set HTTPServer.ssl_adapter to an instance of ssl.Adapter. There are two ways to use SSL:

3.12.1 Method One

- `ssl_adapter.context`: an instance of `SSL.Context`.

If this is not `None`, it is assumed to be an `SSL.Context` instance, and will be passed to `SSL.Connection` on `bind()`. The developer is responsible for forming a valid `Context` object. This approach is to be preferred for more flexibility, e.g. if the cert and key are streams instead of files, or need decryption, or `SSL.SSLv3_METHOD` is desired instead of the default `SSL.SSLv23_METHOD`, etc. Consult the `pyOpenSSL` documentation for complete options.

3.12.2 Method Two (shortcut)

- `ssl_adapter.certificate`: the filename of the server SSL certificate.
- `ssl_adapter.private_key`: the filename of the server's private key file.

Both are `None` by default. If `ssl_adapter.context` is `None`, but `.private_key` and `.certificate` are both given and valid, they will be read, and the context will be automatically created from them.

class `cheroot.ssl.pyopenssl.SSLConnection` (*args)

Bases: `object`

A thread-safe wrapper for an `SSL.Connection`.

*args: the arguments to create the wrapped `SSL.Connection`(*args).

accept (*args)

bind (*args)

close (*args)

connect (*args)

connect_ex (*args)

family

fileno (*args)

get_app_data (*args)

get_cipher_list (*args)

get_context (*args)

get_peer_certificate (*args)

getpeername (*args)

getsockname (*args)

getsockopt (*args)

gettimeout (*args)

listen (*args)

makefile (*args)

pending (*args)

read (*args)

recv (*args)

renegotiate (*args)

```
send (*args)
sendall (*args)
set_accept_state (*args)
set_app_data (*args)
set_connect_state (*args)
setblocking (*args)
setsockopt (*args)
settimeout (*args)
shutdown (*args)
sock_shutdown (*args)
state_string (*args)
want_read (*args)
want_write (*args)
write (*args)
```

```
class cheroot.ssl.pyopenssl.SSLConnectionProxyMeta
    Bases: object
```

Metaclass for generating a bunch of proxy methods.

```
class cheroot.ssl.pyopenssl.SSLFileobjectMixin
    Bases: object
```

Base mixin for an SSL socket stream.

```
readline (size)
    Receive message of a size from the socket.
```

```
recv (size)
    Receive message of a size from the socket.
```

```
send (*args, **kwargs)
    Send some part of message to the socket.
```

```
sendall (*args, **kwargs)
    Send whole message to the socket.
```

```
ssl_retry = 0.01
```

```
ssl_timeout = 3
```

```
class cheroot.ssl.pyopenssl.SSLFileobjectStreamReader (sock, mode='r', buf-
                                                    size=8192)
    Bases: cheroot.ssl.pyopenssl.SSLFileobjectMixin, cheroot.makefile.
           StreamReader
```

SSL file object attached to a socket object.

```
class cheroot.ssl.pyopenssl.SSLFileobjectStreamWriter (sock, mode='w', buf-
                                                    size=8192)
    Bases: cheroot.ssl.pyopenssl.SSLFileobjectMixin, cheroot.makefile.
           StreamWriter
```

SSL file object attached to a socket object.

class cheroot.ssl.pyopenssl.pyOpenSSLAdapter (*certificate*, *private_key*, *certificate_chain=None*, *ciphers=None*)

Bases: *cheroot.ssl.Adapter*

A wrapper for integrating pyOpenSSL with Cheroot.

bind (*sock*)

Wrap and return the given socket.

certificate = None

The filename of the server SSL certificate.

certificate_chain = None

Optional. The filename of CA's intermediate certificate bundle.

This is needed for cheaper "chained root" SSL certificates, and should be left as None if not required.

ciphers = None

The ciphers list of SSL.

context = None

An instance of SSL.Context.

get_context ()

Return an SSL.Context from self attributes.

get_environ ()

Return WSGI environ entries to be merged into each request.

makefile (*sock*, *mode='r'*, *bufsize=-1*)

Return socket file object.

private_key = None

The filename of the server's private key file.

wrap (*sock*)

Wrap and return the given socket, plus WSGI environ entries.

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3.13 cheroot.testing module

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3.14 cheroot.wsgi module

This class holds Cheroot WSGI server implementation.

Simplest example on how to use this server:

```
from cheroot import wsgi

def my_crazy_app(environ, start_response):
    status = '200 OK'
    response_headers = [('Content-type', 'text/plain')]
    start_response(status, response_headers)
    return [b'Hello world!']

addr = '0.0.0.0', 8070
server = wsgi.Server(addr, my_crazy_app)
server.start()
```

The Cheroot WSGI server can serve as many WSGI applications as you want in one instance by using a PathInfoDispatcher:

```
path_map = {
    '/': my_crazy_app,
    '/blog': my_blog_app,
}
d = wsgi.PathInfoDispatcher(path_map)
server = wsgi.Server(addr, d)
```

class cheroot.wsgi.Gateway(*req*)

Bases: *cheroot.server.Gateway*

A base class to interface HTTPServer with WSGI.

classmethod gateway_map()

Create a mapping of gateways and their versions.

Returns:

dict[tuple[int,int],class]: map of gateway version and corresponding class

get_environ()

Return a new environ dict targeting the given wsgi.version.

respond()

Process the current request.

From **PEP 333**:

The start_response callable must not actually transmit the response headers. Instead, it must store them for the server or gateway to transmit only after the first iteration of the application return value that yields a NON-EMPTY string, or upon the application's first invocation of the write() callable.

start_response(*status, headers, exc_info=None*)

WSGI callable to begin the HTTP response.

write(*chunk*)

WSGI callable to write unbuffered data to the client.

This method is also used internally by start_response (to write data from the iterable returned by the WSGI application).

```

class cherroot.wsgi.Gateway_10(req)
    Bases: cherroot.wsgi.Gateway

    A Gateway class to interface HTTPServer with WSGI 1.0.x.

    get_environ()
        Return a new environ dict targeting the given wsgi.version.

    version = (1, 0)

class cherroot.wsgi.Gateway_u0(req)
    Bases: cherroot.wsgi.Gateway_10

    A Gateway class to interface HTTPServer with WSGI u.0.

    WSGI u.0 is an experimental protocol, which uses unicode for keys and values in both Python 2 and Python 3.

    get_environ()
        Return a new environ dict targeting the given wsgi.version.

    version = ('u', 0)

class cherroot.wsgi.PathInfoDispatcher(apps)
    Bases: object

    A WSGI dispatcher for dispatch based on the PATH_INFO.

class cherroot.wsgi.Server(bind_addr, wsgi_app, numthreads=10, server_name=None, max=-1, request_queue_size=5, timeout=10, shutdown_timeout=5, accepted_queue_size=-1, accepted_queue_timeout=10, peercreds_enabled=False, peercreds_resolve_enabled=False)
    Bases: cherroot.server.HTTPServer

    A subclass of HTTPServer which calls a WSGI application.

    numthreads
        Set minimum number of threads.

    wsgi_version = (1, 0)
        The version of WSGI to produce.

cherroot.wsgi.WSGIGateway
    alias of cherroot.wsgi.Gateway

cherroot.wsgi.WSGIGateway_10
    alias of cherroot.wsgi.Gateway_10

cherroot.wsgi.WSGIGateway_u0
    alias of cherroot.wsgi.Gateway_u0

cherroot.wsgi.WSGIPathInfoDispatcher
    alias of cherroot.wsgi.PathInfoDispatcher

cherroot.wsgi.WSGIServer
    alias of cherroot.wsgi.Server

```

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Cheroot is the high-performance, pure-Python HTTP server used by [CherryPy](#).

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